LOW-VOLTAGE POWER DISTRIBUTION PRODUCTS

Low-voltage Circuit Breakers

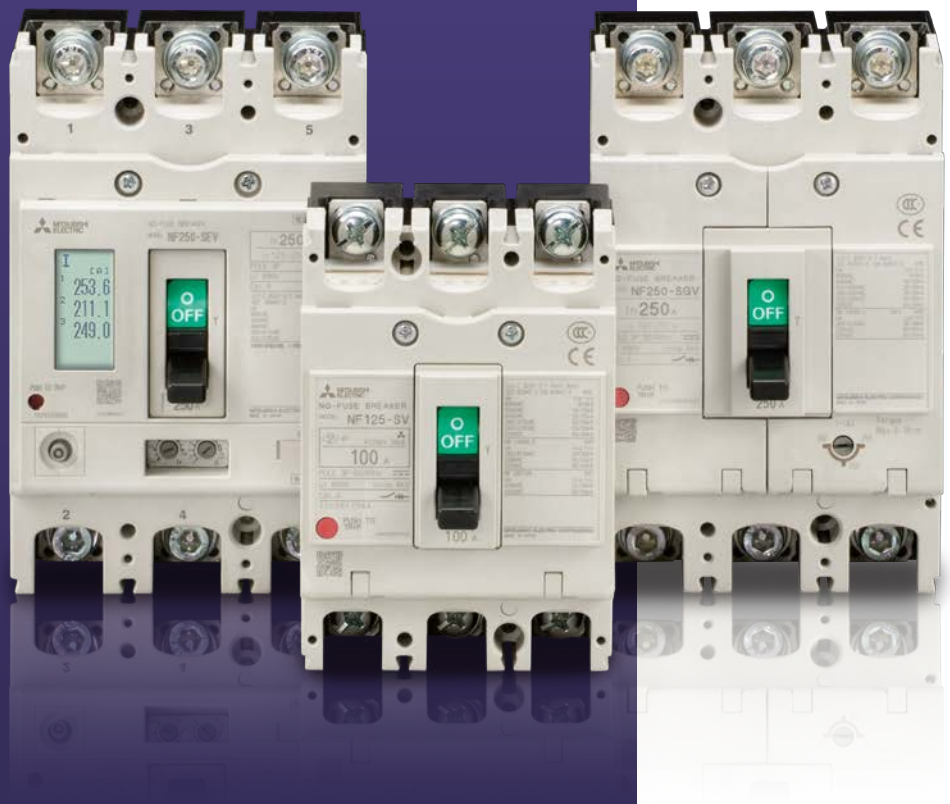
Magnetic Contactor and Starters

Our Power Distribution Products are compact, easy-to-use, and built with safety in mind, including the full lineup of Low-voltage Circuit Breakers.

World Super WS-V Series

Low-voltage Circuit Breakers

Mitsubishi is proud to support the future creation of electrical equipment through its Low-voltage Circuit Breakers.



For more than 50 years, Mitsubishi's Low-voltage circuit breaker continued to deliver market needs.
Our complete lineup, including the WS-V series built with a new breaking technology, is designed to respond to the individual market needs of the Receiving and Distribution and machineries.

Product details P.664

MS-T/N Series
Magnetic Contactor and Starters

A wide variety of lineup to meet any and all demands

The MS-T/N series magnetic contactors and starters are eco-friendly, ready for global use, compact, easy-to-use, and built with safety in mind. Compatible with many international standards and highly-reliable to meet various situations from switchboards to machineries.

Product details P.850

Low-voltage Circuit Breakers

For more than 50 years, Mitsubishi's Low Voltage Circuit breakers and earth leakage circuit breakers continued to deliver market needs.

Our complete lineup, including the WS-V series built with a new breaking technology, is designed to respond to the individual market needs of the receiving and distribution and machineries.

Molded Case Circuit Breakers

Circuit breaker for protection against overload and short circuit

Detailed Specifications P.672 | Installation and Connection P.716 | Characteristics and Dimensions P.760

Earth Leakage Circuit Breakers

Circuit breaker for protection against overload, short circuit, and electrification

Detailed Specifications P.682 | Installation and Connection P.716 | Characteristics and Dimensions P.800

Motor Protection Breakers

Circuit breaker for protection of motor and against short circuit

Detailed Specifications P.688

UL 489 Listed Circuit Breakers

Circuit breaker compliant with UL 489 America

Detailed Specifications P.689 | Installation and Connection P.716 | Characteristics and Dimensions P.818

Measuring Display Unit Breakers

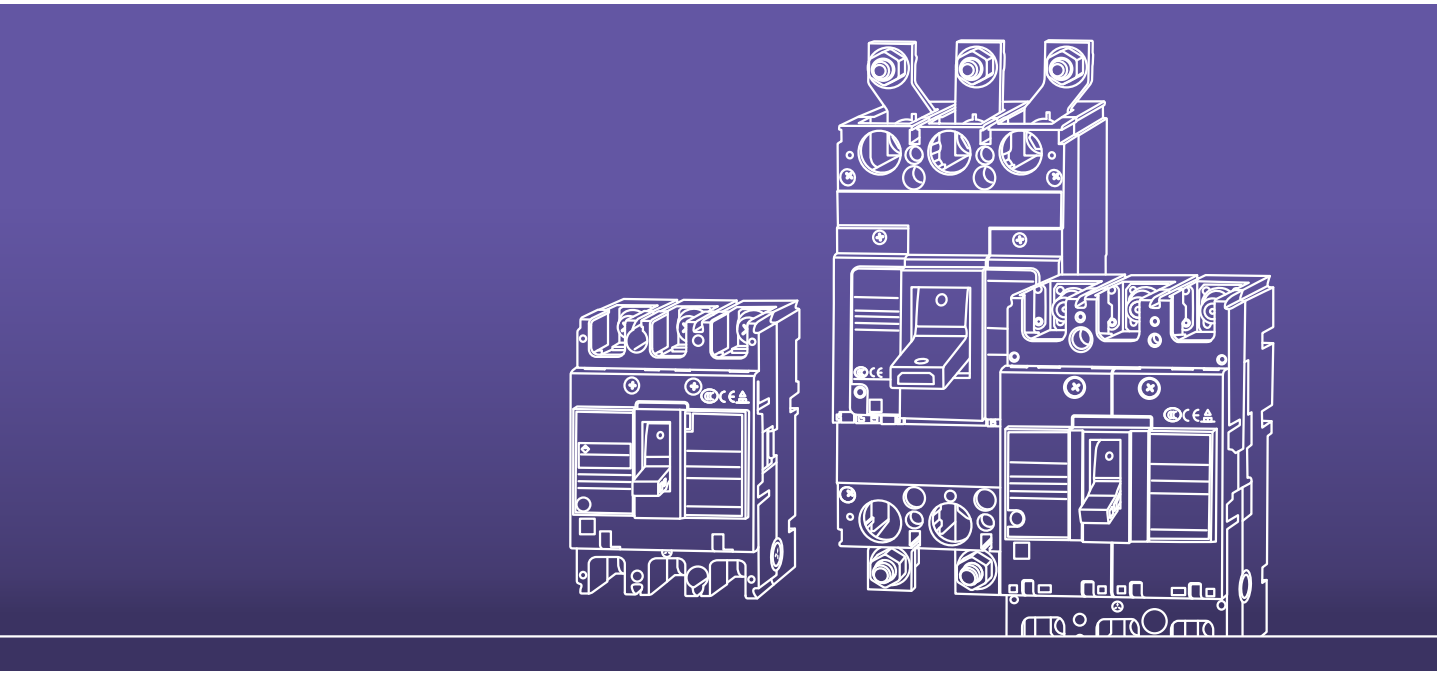
Circuit breaker with measuring and display function

Detailed Specifications P.693 | Installation and Connection P.716 | Characteristics and Dimensions P.832

Miniature Circuit Breakers

Circuit breaker for protection against overload and short circuit of branch circuit

Detailed Specifications P.702 | Characteristics and Dimensions P.838



Residual Current Circuit Breaker

Circuit breaker for protection against earth leakage and electrification of branch circuit

Detailed Specifications P.704 | Characteristics and Dimensions P.841

Isolating Switch

Mechanical switch for equipment

Detailed Specifications P.703 | Characteristics and Dimensions P.843

Circuit Protectors

Circuit breaker for protection against overload of equipment

Detailed Specifications P.706 | Installation and Connection P.709 | Characteristics and Dimensions P.844

Low Voltage Air Circuit Breakers

Main circuit breaker to meet demands more advanced and multi-functional facilities

Detailed Specifications P.710 | Installation and Connection P.710

Related Components

Our lineup also includes an earth leakage relay

Detailed Specifications P.712

Product Line-up

Classification \ Frame (A)		20 30 32	40 50 60 63	70 100 125	160	225 250	
Molded Case Circuit Breakers	NF-C Economy class	NF30-CS	NF63-CV	NF125-CV		NF250-CV	
	NF-S Standard class	NF32-SV	NF63-SV	NF125-SV NF125-SGV NF125-SEV	NF160-SGV	NF250-SV NF250-SGV NF250-SEV	
	NF-H/L High-performance class		NF63-HV	NF125-HV NF125-LGV NF125-HEV NF125-HGV	NF160-LGV NF160-HGV	NF250-HV NF250-LGV NF250-HEV NF250-HGV	
	NF-R/U Ultra current-limiting class			NF125-RGV NF125-UV		NF250-RGV NF250-UV	
Earth Leakage Circuit Breakers	NV-C Economy class		NV63-CV	NV125-CV		NV250-CV	
	NV-S Standard class	NV32-SV	NV63-SV	NV125-SV NV125-SEV		NV250-SV NV250-SEV	
	NV-H/R High-performance class		NV63-HV	NV125-HV NV125-HEV		NV250-HV NV250-HEV	
Motor Protection Breakers	NF-MB	NF32-SV (*1)	NF63-CV (*1) NF63-SV (*1)	NF125-SV (*1)		NF250-SV (*1)	
UL 489 Listed Circuit Breakers	UL 489 Listed MCCB		NF50-SVFU	NF100-CVFU NF125-SVU NF125-HVU		NF225-CWU NF250-SVU NF250-HVU	
	UL 489 Listed ELCB		NV50-SVFU	NV100-CVFU NV125-SVU NV125-HVU		NV250-SVU NV250-HVU	
Measuring Display Unit Breakers	MDU Breakers					NF250-SEV with MDU NF250-HEV with MDU	
Miniature Circuit Breakers		BH-DN	BH-D6 BH-D10	BH BH-P			
Residual Current Circuit Breaker			BV-D				
Residual Current Circuit Breaker with Overload Protection			BV-DN				
Isolating Switch			KB-D				
Circuit Protectors		CP30-BA CP-S					
Air Circuit Breakers	AE-SW						
Related Components	Earth Leakage Relays	NV-ZBA, NV-ZSA, NV-ZHA, NV-ZLA					

Note: *1 When placing an order, specify “MB.”
WS-V Series (New models)

	400	600 630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
	NF400-CW	NF630-CW	NF800-CEW									
	NF400-SW NF400-SEW	NF630-SW NF630-SEW	NF800-SDW NF800-SEW	NF1000-SEW	NF1250-SDW NF1250-SEW	NF1600-SDW NF1600-SEW						
	NF400-HEW	NF630-HEW	NF800-HEW									
	NF400-REW NF400-UEW	NF630-REW	NF800-REW NF800-UEW									
	NV400-CW	NV630-CW										
	NV400-SW NV400-SEW	NV630-SW NV630-SEW	NV800-SEW									
	NV400-HEW NV400-REW	NV630-HEW	NV800-HEW									
	NF400-SWU NF400-HWU	NF630-SWU NF630-HWU										
	NF400-SEP with MDU NF400-HEP with MDU	NF630-SEP with MDU NF630-HEP with MDU	NF800-SEP with MDU NF800-HEP with MDU									
		AE630-SW		AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SW AE2000-SWA	AE2500-SW	AE3200-SW	AE4000-SWA AE4000-SW	AE5000-SW	AE6300-SW

The next No.1 breaker brand Mitsubishi WS-V Series

The all-new "World Super V Series (WS-V Series)" is the result of revolutionary evolution, equipped with a new cutoff technology to enhance interrupting performance, and compatible with the latest standards of various countries to deliver optimal performance according to individual needs.

High-Performance

Takes high-performance to the next level

Adoption of the Expanded ISTAC

Standardization

Enhanced usability based on user-friendly product design

Widened the scope of internal auxiliary sharing parts

Environment

Eco-friendly products

Adapt to RoHS directive and the use of restricted substance is within the line limits stipulated by the said directive

Global

Full lineup to meet the fast-growing internationalization

Compatible with JIS, IEC (EN), GB, UL/CSA and other national standards worldwide

High-Performance Takes High-Performance to The Next Level

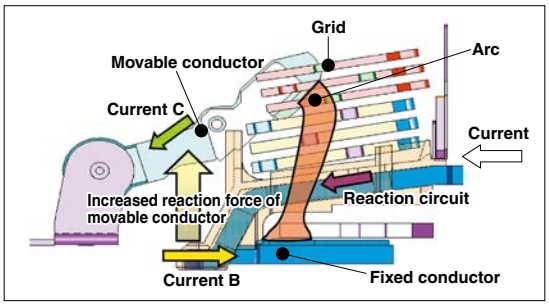
Technologies based on long year experience are brought together to realize more improved performance

The new circuit breaking technology “Expanded ISTAC” has improved the current-limiting performance and upgraded the overall breaking capacity. Expansion of the conductor under the stator shortens the contact parting time of the mover as compared to the conventional ISTAC structure.
The current-limiting performance has been improved remarkably. (The maximum peak current value has been reduced by approx. 10%.)

Example of breaking capacity improvement

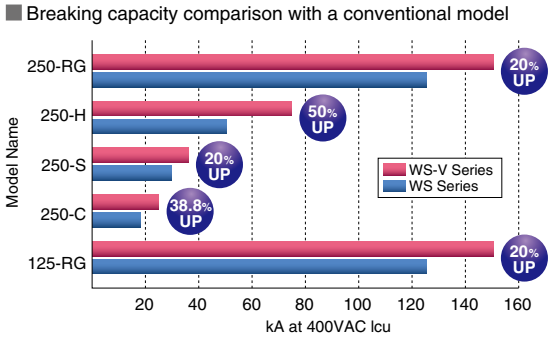
Previous Model NF250-SW	→	New Model NF250-SV
50kA /25kA (at 230VAC)		85kA /85kA (at 230VAC)

New circuit breaking technology (Expanded ISTAC)



Breaking capacity of 5 models is 20% to 50% higher than the W & WS Series

Improvement of breaking capacity on 250AF-C/S/H models (Fixed) & 125.250AF-R models (Thermal/Adjustable).



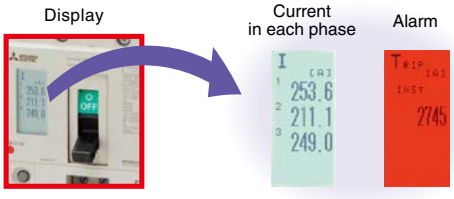
The new electronic circuit breakers (with display) and MDU breakers can display various measurement items

This will enable energy management through “visualization”, which leads to energy saving.

Electronic Circuit Breaker (with display)

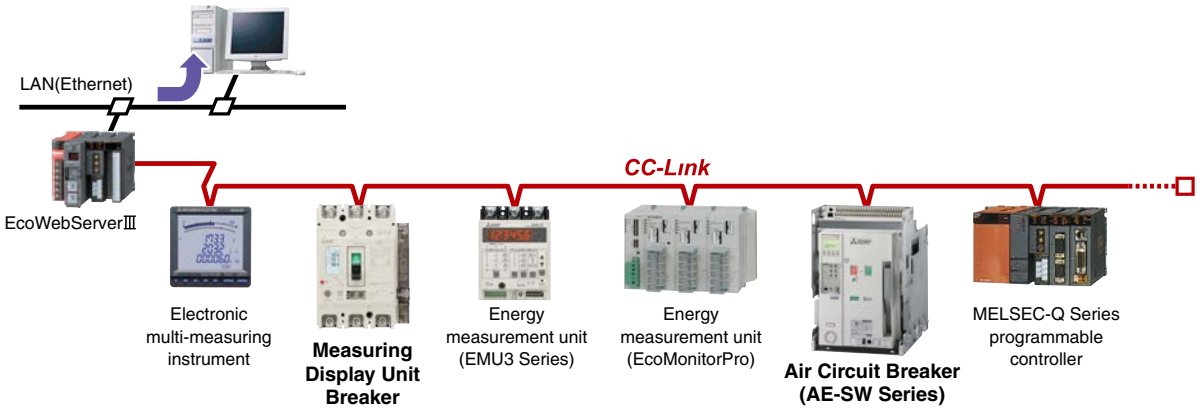
Measuring Display Unit Breaker

- The display is on the circuit breaker body and shows circuit information.
- Detailed setting can be done on the display.
- The display turns red during alarms.



Intelligent Communications through CC-Link

Measuring data can be transmitted to Personal Computer through CC-Link.



Standardization Enhanced Usability Based on User-Friendly Product Design

Compact design for easy to use

The thermal adjustable circuit breakers and electronic circuit breakers are smaller.

NF250-SGW

(Conventional model : 105 × 165 × **86mm**)

NF250-SGV

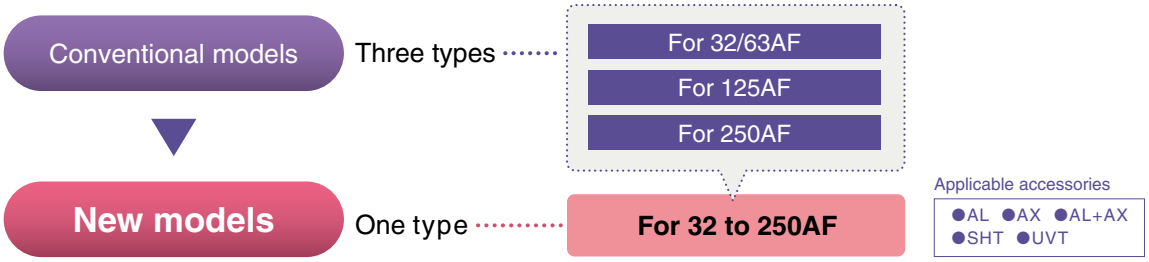
(New model : 105 × 165 × **68mm**)

Volume ratio 79%
(Compared with our conventional models)

250AF circuit breakers' fixed types (NF250-CV, NF250-SV, NF250-HV, NV250-CV, NV250-SV, NV250-HV), thermal adjustable types (NF250-SGV, NF250-HGV, NF250-RGV), and electronic types (NF250-SEV, NF250-HEV, NV250-SEV, NV250-HEV) are the same size, leading to the reduction and standardization of panel design.

Types of internal accessories are reduced from 3 types to 1 type

Standardization of internal accessories contributes to the reduction of stock and delivery time.



32AF and 63AF circuit breakers can now be used in both AC and DC circuits without specifying when ordering. This will lead to prevention of ordering mistakes.

The earth leakage circuit breakers can now be equipped with a voltage shunt trip device (SHT).

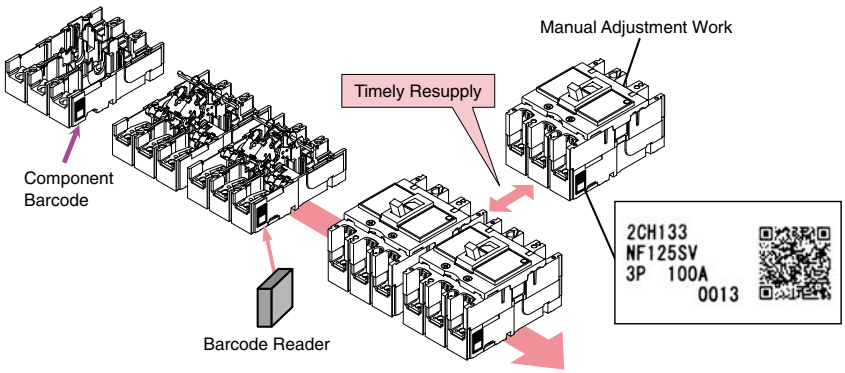
Innovative manufacturing using a robot-cell production line

This manufacturing innovation takes the pursuit of increased productivity, shortened manufacturing lead-time and improved quality to the upper limits.

Robot-cell Production Line

Individual unit production management system

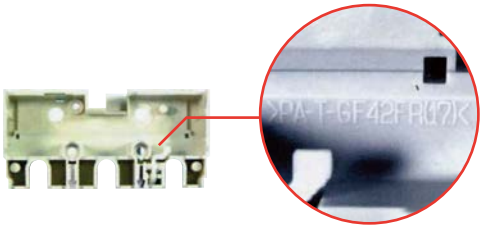
A multi-model, single-unit flow production system is utilized the ultimate multi-cycle production method. The production line is controlled using barcodes to manage the model information for each unit. Small-lot, flexible production that's one step ahead!



Environment Eco-Friendly Products

Use of Various Recyclable Materials

The circuit breakers are made of thermo-plastic materials that are easy to recycle.
(Some models are partially made of thermoset materials.)
The major plastic parts bear material identifications so that they can be recycled.



Eco-friendly products

Our products are compliament with the RoHS directive and the use of restricted substances is within the line limits stipulated by the said directive.

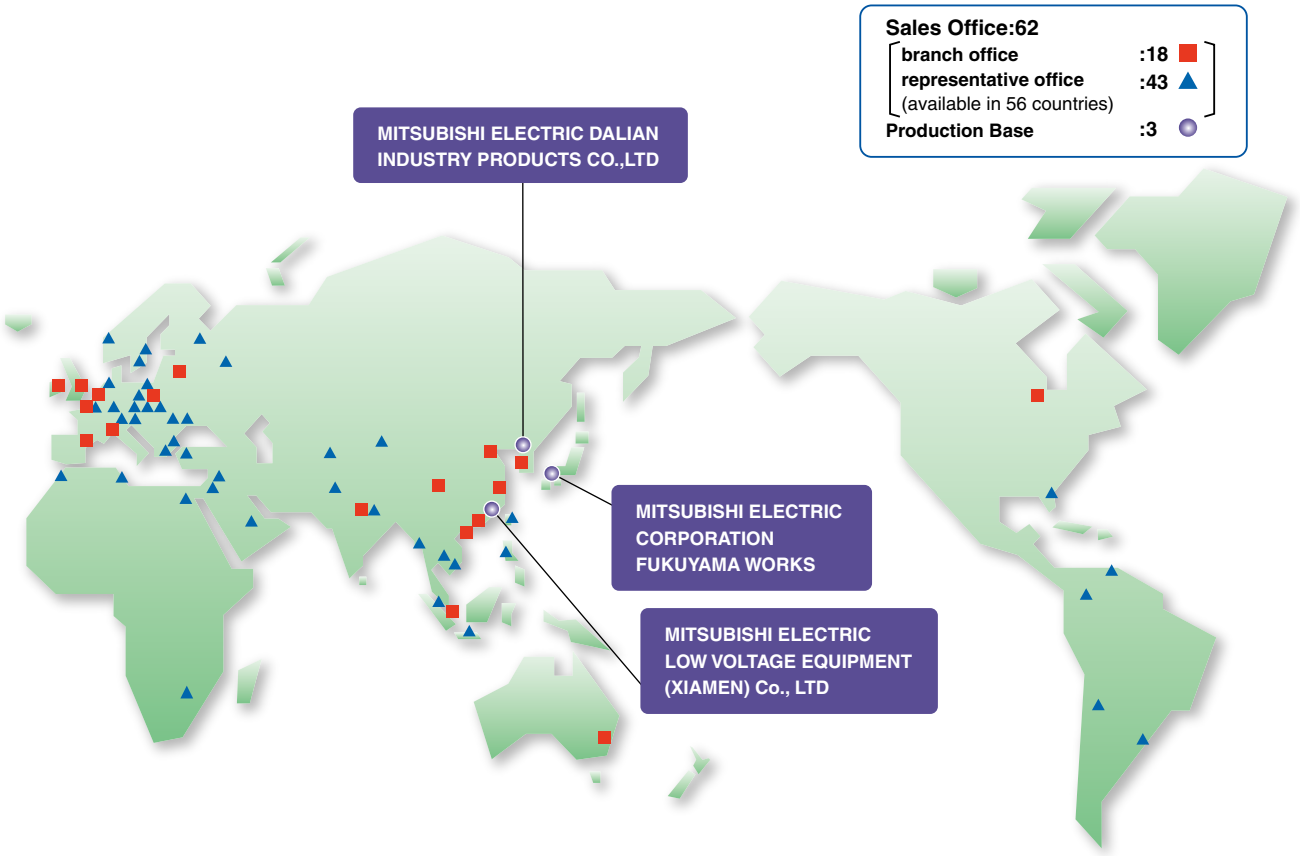
Energy Saving at Mitsubishi Electric Corporation Fukuyama Works

Mitsubishi Electric Corporation Fukuyama Works uses energy saving support devices such as MDU breakers and EcoServer to save energy through “visualization” of energy. Along with “visualization”, Fukuyama Works also installed high-efficiency equipments to further promote energy saving.
Through energy saving activity, Fukuyama Works has successfully reduced its electrical power consumption rate by 27% in 2007 (compared with 1990).

Global Full Lineup to Meet The Fast-Growing Internationalization

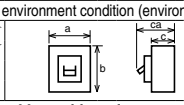
Global Networks of Sales Offices and Production Bases

Our sales networks are designed to comfort customers internationally through the worldwide distributors. Constantly contactable distributors enable us to accommodate customer’s needs for smooth supply.

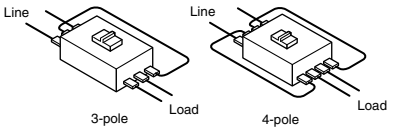


Detailed Specifications

●NF-C (Economy class)

Frame (A)				30	50	60	63	100	125
Model				NF30-CS	NF63-CV			NF125-CV	
Image									
Rated current In (A) Rated ambient temperture 40°C (45°C for marine use)				3 5 10 15 20 30	3 4 (5) 6 10 (15) 16 20 25 (30) 32 40 50	(60)	63	50 (60) 63 (75) 80 100	125
Number of poles				2 3	2 3	2 3	2 3	2 3	2 3
Rated insulation voltage Ui (V)				500	600	600	600	600	600
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	–	–	–	–	–	–
			500V	–	2.5/2.5	2.5/2.5	2.5/2.5	7.5/4	7.5/4
			440V	–	2.5/2.5	2.5/2.5	2.5/2.5	10/5	10/5
			415V	1.5/1.5	2.5/2.5	2.5/2.5	2.5/2.5	10/5	10/5
			400V	1.5/1.5	5/5	5/5	5/5	10/5	10/5
			380V	1.5/1.5	5/5	5/5	5/5	10/5	10/5
			230V	2.5/2 (240V)	7.5/7.5	7.5/7.5	7.5/7.5	30/15	30/15
			200V	2.5/2 (240V)	7.5/7.5	7.5/7.5	7.5/7.5	30/15	30/15
		DC	250V	–	2.5/2.5 (*7)	2.5/2.5 (*7)	2.5/2.5 (*7)	7.5/4 (*4)	7.5/4 (*4)
Rated impulse withstand voltage Uimp (kV)				4	8	8	8	8	8
Current (*1)				AC	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible
Suitability for isolation				–	Compatible	Compatible	Compatible	Compatible	Compatible
Reverse connection				–	Possible	Possible	Possible	Possible	Possible
Number of operating cycles	Without current			10,000	10,000	10,000	10,000	10,000	10,000
	With current (440VAC)			6,000 (AC415V)	6,000	6,000	6,000	6,000	6,000
Utilization category				A	A	A	A	A	A
Pollution degree				2	3	3	3	3	3
EMC environment condition (environment A or B)				N/A	N/A	N/A	N/A	N/A	N/A
Overall dimensions (mm)			a	45 67.5	50 75	50 75	50 75	60 90	60 90
			b	96	130	130	130	130	130
			c	52	68	68	68	68	68
			ca	67	90	90	90	90	90
Mass of front-face type (kg)				0.25 0.35	0.45 0.65	0.5 0.7	0.5 0.7	0.6 0.9	0.6 0.9
Installation and connections	Front connection	(F)	Page	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal
	Solderless (BOX) terminal	(SL)	716	–	–	–	–	●	●
	Rear	(B)		●Round stud (assembled in)	●Round stud	●Round stud	●Round stud	●Bar stud	●Bar stud
	Plug-in	(PM)		–	●	●	●	●	●
Cassette-type accessories	Alarm switch	(AL)	725	● (*5)	● (*6)	● (*6)	● (*6)	● (*6)	●(*6)
	Auxiliary switch	(AX)		●(*5)	● (*6)	● (*6)	● (*6)	● (*6)	●(*6)
	Shunt trip	(SHT)		–	● (*6)	● (*6)	● (*6)	● (*6)	●(*6)
	Undervoltage trip	(UVT)		–	● (*6)	● (*6)	● (*6)	● (*6)	●(*6)
	With lead-wire terminal block	(SLT)	737	●	●	●	●	●	●
	Pre-alarm	(PAL)	739	–	–	–	–	–	–
External accessories	Enclosure	Closed	(S)	753	●	●	●	●	●	●
		Dustproof	(I)		–	●	●	●	●	●
		Waterproof	(W)		–	– ●	– ●	– ●	– ●	– ●
	Electrical operation device	(NFM)		756	–	–	–	– ●	– ●
	Mechanical interlock (MI) (*10)	Panel mounting		752	–	●	●	●	●
		Breaker mounting			–	●	●	●	●
	Handle lock device	LC		750	●	●	●	●	●
		HL			●	●	●	●	●
		HL-S			–	●	●	●	●
	External operating handle	(F)		740	–	●	●	●	●
		(V)			–	●	●	●	●
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)			744	●	●	●	●	●
	Rear stud	(B-ST)		718	–	●	●	●	●
	Plug-in	(PM)			–	●	●	●	●
	IEC 35mm rail mounting adapters			759	●	●	●	–	–
CE marking				TÜV approval	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
Marine use approval (NK, LR, ABS, GL)				☆ (NK, LR, ABS)	☆	☆	☆	☆	☆
Automatic tripping device				Hydraulic magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Trip button				– (*2)	Equipped	Equipped	Equipped	Equipped	Equipped
Page of Characteristics and dimensions				760	762			764	

Notes: *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
*2 It is attached with the alarm switch.
*3 In case of a current rating of 100A, it does not specify NK rating.
*4 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 400 and 500VDC, respectively.
*5 The standard lead drawing is performd laterally. Load drawing is also available.
*6 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
*7 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.
*8 Place an order of other models in conjunction with the circuit breaker.
*9 Solid state relay output is option. Please specify if other output is necessary. (Standard type is thus SLT equipped).
*10 Not isolation compatible, excluding 400 to 800A frame.

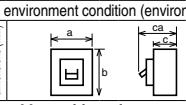


●NF-C (Economy class)

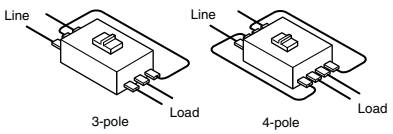
	225	250	400	600	630	800
	NF250-CV		NF400-CW	NF630-CW		NF800-CEW
						
	(100) 125 150 175 200 225 (*3)	250	250 300 350 400	500 600	630	Adjustable 400 450 500 600 700 800
	2 | 3	2 | 3	2 | 3	2 | 3	2 | 3	3
	600	600	690	690	690	690
	–	–	–	–	–	–
	10/8	10/8	15/8	18/9	18/9	18/9
	15/12	15/12	25/13	36/18	36/18	36/18
	25/19	25/19	36/18	36/18	36/18	36/18
	25/19	25/19	36/18	36/18	36/18	36/18
	25/19	25/19	40/20	40/20	40/20	40/20
	36/27	36/27	50/25	50/25	50/25	50/25
	36/27	36/27	50/25	50/25	50/25	50/25
	15/12 (*4)	15/12 (*4)	20/10 (*4)	20/10 (*4)	20/10 (*4)	–
	8	8	8	8	8	8
	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC
	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
	Possible	Possible	Possible	Possible	Possible	Possible
	8,000	8,000	6,000	6,000	6,000	4,000
	4,000	4,000	1,000	1,000	1,000	500
	A	A	A	A	A	B
	3	3	3	3	3	3
	N/A	N/A	N/A	N/A	N/A	A
	105	105	140	140	140	210
	165	165	257	257	257	275
	68	68	103	103	103	103
	92	92	134	134	134	155
	1.3 | 1.5	1.3 | 1.5	4.4 | 5.0	5.2 | 6.0	5.2 | 6.0	10.9
	●Screw terminal	●Screw terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal
	●	●	–	–	–	–
	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
	●	●	●	●	●	●
	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)
	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)
	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)
	●(*6)	●(*6)	●	●	●	●
	●	●	●	●	●	●
	–	–	–	–	–	●(*9)
	●	●	–	–	–	–
	●	●	●	●	●	●
	– | ●	– | ●	●	●	●	●
	●	●	●(*8)	●(*8)	●(*8)	●(*8)
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	–	–	–	–
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	● | ●	● | ●	● | ●	●
	●	●	●	● | ●	● | ●	●
	–	–	–	–	–	–
	TÜV approval	TÜV approval	Self-declaration	Self-declaration	Self-declaration	Self-declaration
	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
	☆	☆	☆	☆	☆	☆
	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)
	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
	768		776	782		786

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

●NF-S (Standard class)

Frame (A)				30		32		50			60			63		
Model				NF32-SV				NF63-SV								
Image																
Rated current In (A) Rated ambient temperture 40°C (45°C for marine use)				3 4 (5) 6 10 15 16 20 25 (30)		32		3 4 (5) 6 10 (15) 16 20 25 (30) 32 40 50			(60)			63		
Number of poles				2	3	2	3	2	3	4	2	3	4	2	3	4
Rated insulation voltage Ui (V)				600		600		600			600			600		
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	–		–		–			–			–		
			500V	2.5/2.5		2.5/2.5		7.5/7.5			7.5/7.5			7.5/7.5		
			440V	2.5/2.5		2.5/2.5		7.5/7.5			7.5/7.5			7.5/7.5		
			415V	2.5/2.5		2.5/2.5		7.5/7.5			7.5/7.5			7.5/7.5		
			400V	5/5		5/5		7.5/7.5			7.5/7.5			7.5/7.5		
			380V	5/5		5/5		7.5/7.5			7.5/7.5			7.5/7.5		
			230V	7.5/7.5		7.5/7.5		15/15			15/15			15/15		
			200V	7.5/7.5		7.5/7.5		15/15			15/15			15/15		
		DC	250V	2.5/2.5 (*5)		2.5/2.5 (*5)		7.5/7.5 (*5)			7.5/7.5 (*5)			7.5/7.5 (*5)		
Rated impulse withstand voltage Uimp (kV)				8		8		8			8			8		
Current (*1)				AC/DC compatible		AC/DC compatible		AC/DC compatible			AC/DC compatible			AC/DC compatible		
Suitability for isolation				Compatible		Compatible		Compatible			Compatible			Compatible		
Reverse connection				Possible		Possible		Possible			Possible			Possible		
Number of operating cycles	Without current			10,000		10,000		10,000			15,000			15,000		
	With current (440VAC)			6,000		6,000		6,000			8,000			8,000		
Utilization category				A		A		A			A			A		
Pollution degree				3		3		3			3			3		
EMC environment condition (environment A or B)				N/A		N/A		N/A			N/A			N/A		
Overall dimensions (mm)			a	50	75	50	75	50	75	100	50	75	100	50	75	100
			b	130		130		130			130			130		
			c	68		68		68			68			68		
			ca	90		90		90			90			90		
Mass of front-face type (kg)				0.45	0.65	0.45	0.65	0.5	0.7	0.9	0.55	0.75	1.0	0.55	0.75	1.0
Installation and connections	Front connection	(F)	Page	●Screw terminal		●Screw terminal		●Screw terminal			●Screw terminal			●Screw terminal		
	Solderless (BOX) terminal	(SL)		–		–		–			–			–		
	Rear	(B)	716	●Bar stud		●Round stud		●Round stud			●Round stud			●Round stud		
	Plug-in	(PM)		●		●		●			●			●		
Cassette-type accessories	Alarm switch	(AL)	725	● (*4)		● (*4)		● (*4)		●	● (*4)		●	● (*4)		●
	Auxiliary switch	(AX)		● (*4)		● (*4)		● (*4)		●	● (*4)		●	● (*4)		●
	Shunt trip	(SHT)		● (*4)		● (*4)		● (*4)		●	● (*4)		●	● (*4)		●
	Undervoltage trip	(UVT)		● (*4)		● (*4)		● (*4)		●	● (*4)		●	● (*4)		●
	With lead-wire terminal block	(SLT)	737	●		●		●		●	●		●	●		●
	Pre-alarm	(PAL)	739	–		–		–			–			–		
External accessories	Enclosure	Closed (S)	753	●		●		●		–	●		–	●		–
		Dustproof (I)		●		●		●		–	●		–	●		–
		Waterproof (W)		–	●	–	●	–	●	–	–	●	–	–	●	–
	Electrical operation device	(NFM)	756	–		–		–			–			–		
	Mechanical interlock (MI) (*7)	Panel mounting	752	●		●		●		●	●		●	●		●
		Breaker mounting		●		●		●		–	●		–	●		–
	Handle lock device	LC	750	●		●		●			●			●		
		HL		●		●		●			●			●		
		HL-S		●		●		●			●			●		
	External operating handle	(F)	740	●		●		●			●			●		
		(V)		●		●		●			●			●		
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●		●		●		●	●		●	●		●
	Rear stud	(B-ST)	718	●		●		●			●			●		
	Plug-in	(PM)		●		●		●		●	●		●	●		●
	IEC 35mm rail mounting adapters		759	●		●		●		–	●		–	●		–
CE marking				Self-declaration		Self-declaration		Self-declaration			Self-declaration			Self-declaration		
CCC recognition				Recognition in process		Recognition in process		Recognition in process			Recognition in process			Recognition in process		
Marine use approval (NK, LR, ABS, GL)				☆		☆		☆		–	☆		–	☆		–
Automatic tripping device				Thermal-magnetic		Thermal-magnetic		Thermal-magnetic			Thermal-magnetic			Thermal-magnetic		
Trip button				Equipped		Equipped		Equipped			Equipped			Equipped		
Page of Characteristics and dimensions				762				762								

Notes: *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
*2 In case of a current rating of 100A, it does not specify NK rating.
*3 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 400 and 500VDC, respectively. (In case of NF250-SV, three and four poles can be used for up to 500 and 600VDC)
*4 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
*5 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.
*6 Place an order of other models in conjunction with the circuit breaker.
*7 Not isolation compatible. excluding 400 to 800A frame.



●NF-S (Standard class)

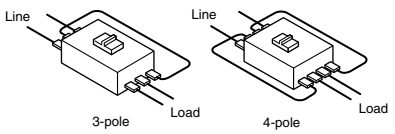
100	125	125	125	160	225	250
NF125-SV		NF125-SGV	NF125-SEV	NF160-SGV	NF250-SV	
						
(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100	125	16-20 20-25 25-32 32-40 35-50 45-63 56-80 70-100 90-125	16-32 32-63 63-125	125-160	(100) 125 150 160 175 200 225 (*2)	250
2 3 4	2 3 4	2 3 4	3 4	2 3 4	2 3 4	2 3 4
690	690	690	690	690	690	690
8/8	8/8	8/8	8/8	8/8	8/8	8/8
18/18	18/18	30/30	30/30	30/30	30/30	30/30
25/25	25/25	36/36	36/36	36/36	36/36	36/36
30/30	30/30	36/36	36/36	36/36	36/36	36/36
30/30	30/30	36/36	36/36	36/36	36/36	36/36
30/30	30/30	36/36	36/36	36/36	36/36	36/36
50/50	50/50	85/85	85/85	85/85	85/85	85/85
50/50	50/50	85/85	85/85	85/85	85/85	85/85
40/40 (*3)	40/40 (*3)	20/20 (300V) (*3)	–	20/20 (300V) (*3)	20/20 (300V) (*3)	20/20 (300V) (*3)
8	8	8	8	8	8	8
AC/DC compatible	AC/DC compatible	AC/DC compatible	AC	AC/DC compatible	AC/DC compatible (*1)	AC/DC compatible (*1)
Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Possible	Possible	Possible	Possible	Possible	Possible	Possible
25,000	25,000	50,000	25,000	40,000	25,000	25,000
10,000	10,000	30,000	10,000	15,000	10,000	10,000
A	A	A	A	A	A	A
3	3	3	3	3	3	3
N/A	N/A	N/A	A	N/A	N/A	N/A
60 90 120	60 90 120	105 140	105 140	105 140	105 140	105 140
130	130	165	165	165	165	165
68	68	68	68	68	68	68
90	90	92	92	92	92	92
0.7 1.0 1.3	0.7 1.0 1.3	1.4 1.6 2.0	1.7 2.2	1.4 1.6 2.0	1.4 1.6 2.0	1.4 1.6 2.0
●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal
●	●	●	● ●	●	● ●	● ●
●Bar stud	●Bar stud	●Bar stud	●Bar stud ●Bar stud	●Bar stud	●Bar stud	●Bar stud
● ●	● ●	●	● ●	●	● ●	● ●
● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●
● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●
● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●
● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●	● (*4) ●
● ●	● ●	●	● ●	●	● ●	● ●
–	–	–	●	–	–	–
● –	● –	● –	● –	● –	● –	● –
● –	● –	● –	● –	● –	● –	● –
– ● –	– ● –	● –	● –	● –	● –	● –
– ●	– ●	●	●	●	●	●
● ●	● ●	●	● ●	●	● ●	● ●
● –	● –	●	● –	●	● –	● –
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
– ● ●	– ●	●	●	●	●	●
● ●	● ●	●	● ●	●	● ●	● ●
● ●	● ●	●	● ●	●	● ●	● ●
● ●	● ●	●	● ●	●	● ●	● ●
–	–	–	–	–	–	–
Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	TÜV approval Self-declaration	TÜV approval Self-declaration
Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
☆ –	☆ –	☆ (LR, ABS, GL) –	☆ (LR, ABS, GL) –	☆ (LR, ABS, GL) –	☆ –	☆ –
Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
764		772	774	772	768	

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify “P-LT” when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

●NF-S (Standard class)

Frame (A)				250			250		400			400		600			630		
Model				NF250-SGV			NF250-SEV		NF400-SW			NF400-SEW		NF630-SW					
Image																			
Rated current In (A) Rated ambient temperture 40°C (45°C for marine use)				125-160 140-200 175-250			80-160 125-250		250 300 350 400			Adjustable 200 225 250 300 350 400		500 600			630		
Number of poles				2	3	4	3	4	2	3	4	3	4	2	3	4	2	3	4
Rated insulation voltage Ui (V)				690			690		690			690		690			690		
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	8/8			8/8		10/10			10/10		10/10			10/10		
			500V	30/30			30/30		30/30			30/30		30/30			30/30		
			440V	36/36			36/36		42/42			42/42		42/42			42/42		
			415V	36/36			36/36		45/45			50/50		50/50			50/50		
			400V	36/36			36/36		45/45			50/50		50/50			50/50		
			380V	36/36			36/36		50/50			50/50		50/50			50/50		
			230V	85/85			85/85		85/85			85/85		85/85			85/85		
			200V	85/85			85/85		85/85			85/85		85/85			85/85		
		DC	250V	20/20 (300V) (*2)			–		40/40 (*2)			–		40/40 (*2)			40/40 (*2)		
Rated impulse withstand voltage Uimp (kV)				8			8		8			8		8			8		
Current				AC/DC compatible			AC		AC/DC compatible			AC		AC/DC compatible			AC/DC compatible		
Suitability for isolation				Compatible			Compatible		Compatible			Compatible		Compatible			Compatible		
Reverse connection				Possible			Possible		Possible			Possible		Possible			Possible		
Number of operating cycles	Without current			25,000			25,000		6,000			6,000		6,000			6,000		
	With current (440VAC)			10,000			10,000		1,000			1,000		1,000			1,000		
Utilization category				A			A		A			B		A			A		
Rated short time with stand current Icw (kA) at 0.25s				–			–		–			5		–			–		
Pollution degree				3			3		3			3		3			3		
EMC environment condition (environment A or B)				N/A			A		N/A			A		N/A			N/A		
Overall dimensions (mm)			a	105		140	105	140	140		185	140	185	140		185	140		185
			b	165			165		257			257		257			257		
			c	68			68		103			103		103			103		
			ca	92			92		155			155		155			155		
Mass of front-face type (kg)				1.4	1.6	2.0	1.7	2.2	4.6	5.2	6.8	6.0	7.6	5.4	6.2	8.0	5.4	6.2	8.0
Installation and connections	Front connection	(F)	Page	●			●Screw terminal	●Screw terminal	●Busbar terminal			●Busbar terminal		●Busbar terminal			●Busbar terminal		
	Solderless (BOX) terminal	(SL)		●			●	●	–	–	–	–	–	–	–	–	–	–	–
	Rear	(B)	716	●Bar stud			●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
	Plug-in	(PM)		●			●	●	●		●	●	●	●		●	●		●
Cassette-type accessories	Alarm switch	(AL)	725	● (*3)		●	● (*3)	●	● (*3)		●	● (*3)	●	● (*3)		●	● (*3)		●
	Auxiliary switch	(AX)		● (*3)		●	● (*3)	●	● (*3)		●	● (*3)	●	● (*3)		●	● (*3)		●
	Shunt trip	(SHT)		● (*3)		●	● (*3)	●	● (*3)		●	● (*3)	●	● (*3)		●	● (*3)		●
	Undervoltage trip	(UVT)		● (*3)		●	● (*3)	●	●		●	●	●	●		●	●		●
	With lead-wire terminal block	(SLT)	737	●			●	●	●		●	●	●	●		●	●		●
	Pre-alarm	(PAL)	739	–			●		–			● (*5)		–			–		
External accessories	Enclosure	Closed (S)	753	●		–	●	–	–		–	–		–		–	–		–
		Dustproof (I)		●		–	●	–	●		–	●	–	●		–	●		–
		Waterproof (W)		●		–	●	–	●		–	●	–	●		–	●		–
	Electrical operation device	(NFM)	756	●			●		● (*6)			● (*6)		● (*6)			● (*6)		
	Mechanical interlock (MI) (*7)	Panel mounting	752	●			●	●	●		●	●	●	●		●	●		●
		Breaker mounting		●			●	–	●		–	●	–	●		–	●		–
	Handle lock device	LC	750	●			●		–			–		–			–		
		HL		●			●		●			●		●			●		
		HL-S		●			●		●			●		●			●		
	External operating handle	(F)	740	●			●		●			●		●			●		
		(V)		●			●		●			●		●			●		
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●			●	●	●		●	●	●	●		●	●		●
	Rear stud	(B-ST)	718	●			●	●	●		●	●		●	●	●	●	●	●
	Plug-in	(PM)		●			●	●	●	●	●	●	●	●	●	●	●	●	●
	IEC 35mm rail mounting adapters		759	–			–		–			–		–			–		
CE marking				Self-declaration			Self-declaration		Self-declaration			Self-declaration		Self-declaration			Self-declaration		
CCC recognition				Recognition in process			Recognition in process		Recognition in process			Recognition in process		Recognition in process			Recognition in process		
Marine use approval (NK, LR, ABS, GL)				☆ (LR, ABS, GL)		–	☆ (LR, ABS, GL)	–	☆		–	☆	–	☆		–	☆		–
Automatic tripping device				Thermal-magnetic			Electronic (effective value detection)		Thermal-magnetic			Electronic (effective value detection)		Thermal-magnetic			Thermal-magnetic		
Trip button				Equipped			Equipped		Equipped			Equipped		Equipped			Equipped		
Page of Characteristics and dimensions				772			774		776			778		782					

Notes:
*1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
*2 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 400 and 500VDC, respectively.
*3 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
*4 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.
*5 Solid state relay output is option. Please specify if other output is necessary. (Standard type is thus SLT equipped) AS for flush plate type, an outline differs from a standard.
*6 Place an order of other models in conjunction with the circuit breaker.
*7 Not isolation compatible. excluding 400 to 800A frame.

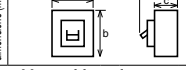


●NF-S (Standard class)

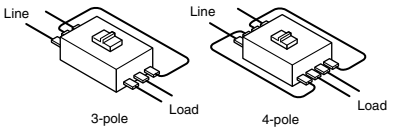
630	800	800	1000	1250	1200	1600	1600
NF630-SEW	NF800-SEW	NF800-SDW	NF1000-SEW	NF1250-SEW	NF1250-SDW	NF1600-SEW	NF1600-SDW
							
Adjustable 300 350 400 500 600 630	Adjustable 400 450 500 600 700 800	(700) 800	Adjustable 500 600 700 800 900 1000	Adjustable 600 700 800 1000 1200 1250	1000 1250	Adjustable 800 1000 1200 1400 1500 1600	1600
3 4	3 4	2	3 4	3 4	2	3 4	2
690	690	690	690	690	690	690	690
10/10	10/10	–	25/13	25/13	–	25/13	–
30/30	30/30	–	65/33	65/33	–	65/33	–
42/42	42/42	–	85/43	85/43	–	85/43	–
50/50	50/50	–	85/43	85/43	–	85/43	–
50/50	50/50	–	85/43	85/43	–	85/43	–
50/50	50/50	–	85/43	85/43	–	85/43	–
85/85	85/85	–	125/63	125/63	–	125/63	–
85/85	85/85	–	125/63	125/63	–	125/63	–
–	–	40/40	–	–	40/20	–	40/20
8	8	8	8	8	8	8	8
AC	AC	DC	AC	AC	DC	AC	DC
Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
6,000	4,000	4,000	3,000	3,000	3,000	3,000	3,000
1,000	500	500	500	500	500	500	500
B	B	A	B	B	A	B	B
7.6	9.6	–	20 at 0.1	20 at 0.1	–	20 at 0.1	–
3	3	3	3	3	3	3	3
A	A	N/A	A	A	N/A	A	A
140 185	210 280	210	210 280	210 280	210	210 280	210
257	275	275	406	406	406	406	406
103	103	103	140	140	140	140	140
155	155	155	190	190	190	190	190
6.5 8.3	10.9 14.2	9.0	23.5 30.7	23.5 30.7	22.0	34.5 41.2	32.0
●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal ●Busbar terminal	●Busbar terminal ●Busbar terminal	●Busbar terminal	●Busbar terminal ●Busbar terminal	●Busbar terminal
– –	– –	–	– –	– –	–	–	–
●Bar stud ●Bar stud	●Bar stud ●Bar stud	●Bar stud	●Bar stud ●Bar stud	●Bar stud ●Bar stud	●Bar stud	●Bar stud ●Bar stud	●Bar stud
● ●	● ●	●	● –	● –	●	–	–
● (*3) ●	● (*3) ●	●	● ●	● ●	●	● ●	●
● (*3) ●	● (*3) ●	●	● ●	● ●	●	● ●	●
● (*3) ●	● (*3) ●	●	● ●	● ●	●	● ●	●
● ●	● ●	●	● ●	● ●	●	● ●	●
● ●	● ●	●	● ●	● ●	●	● ●	●
● (*5)	● (*5)	–	● (*5)	● (*5)	–	● (*5)	–
–	–	–	–	–	–	–	–
● –	● –	●	– –	– –	–	–	–
● –	● –	●	– –	– –	–	–	–
● (*6)	● (*6)	●(*6)	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)
● ●	● ●	●	●	●	●	●	●
● ●	● ●	●	–	–	–	–	–
–	–	–	–	–	–	–	–
●	●	●	●	●	●	●	●
●	●	●	–	–	–	–	–
●	●	●	● ●	● ●	●	● ●	●
●	●	●	–	–	–	–	–
● ●	● ●	●	●	●	●	–	–
● ●	● ●	●	–	–	–	–	–
● ●	●	●	●	●	●	–	–
–	–	–	–	–	–	–	–
Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	–	Recognition in process	–
☆ –	☆ –	–	☆ –	☆ –	–	–	–
Electronic (effective value detection)	Electronic (effective value detection)	Thermal-magnetic	Electronic (effective value detection)	Electronic (effective value detection)	Thermal-magnetic	Electronic (effective value detection)	magnetic
Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
784	786	788	792	792	794	796	798

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

●NF-L / NF-H / NF-R (High-performance class)

Frame (A)				50			60			63			100			125			125			125			125		
Model				NF63-HV									NF125-HV						NF125-LGV			NF125-HGV			NF125-RGV		
Image																											
Rated current In (A) Rated ambient temperture 40°C (45°C for marine use)				10 15 16 20 25 30 32 40 50			60			(63)			15 16 20 30 32 40 50 60 63 75 80 100			125			16-20 20-25 25-32 32-40 35-50 45-63 56-80 70-100 90-125			16-20 20-25 25-32 32-40 35-50 45-63 56-80 70-100 90-125			16-20 20-25 25-32 32-40 40-50 50-63 63-80 80-100 100-125		
Number of poles				2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	
Rated insulation voltage Ui (V)				690			690			690			690			690			690			690			690		
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	2.5/2.5			2.5/2.5			2.5/2.5			10/8			10/8			8/8			10/8			–		
			500V	7.5/7.5			7.5/7.5			7.5/7.5			30/23			30/23			36/36			50/38			–		
			440V	10/8			10/8			10/8			50/38			50/38			50/50			65/65			125/125		
			415V	10/8			10/8			10/8			50/38			50/38			50/50			70/70			150/150		
			400V	10/8			10/8			10/8			50/38			50/38			50/50			75/75			150/150		
			380V	10/8			10/8			10/8			50/38			50/38			50/50			75/75			150/150		
			230V	25/19			25/19			25/19			100/75			100/75			90/90			100/100			150/150		
			200V	25/19			25/19			25/19			100/75			100/75			90/90			100/100			150/150		
		DC	250V	7.5/7.5 (*5)			7.5/7.5 (*5)			7.5/7.5 (*5)			–			–			20/20 (300V) (*2)			40/40 (300V) (*2)			–		
Rated impulse withstand voltage Uimp (kV)				8			8			8			8			8			8			8			8		
Current				AC/DC compatible (*1)			AC/DC compatible (*1)			AC/DC compatible (*1)			AC			AC			AC/DC compatible			AC/DC compatible			AC		
Suitability for isolation				Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible		
Reverse connection				Possible			Possible			Possible			Possible			Possible			Possible			Possible			Possible		
Number of operating cycles	Without current			15,000			15,000			15,000			25,000			25,000			50,000			50,000			50,000		
	With current (440VAC)			8,000			8,000			8,000			10,000			10,000			30,000			30,000			30,000		
Utilization category				A			A			A			A			A			A			A			A		
Pollution degree				3			3			3			3			3			3			3			3		
EMC environment condition (environment A or B)				N/A			N/A			N/A			N/A			N/A			N/A			N/A			N/A		
Overall dimensions (mm)			a	50	75	100	50	75	100	50	75	100	90		120	90		120	105		140	105		140	105		
			b	130			130			130			130			130			165			165			165		
			c	68			68			68			68			68			68			68			68		
			ca	90			90			90			90			90			92			92			92		
Mass of front-face type (kg)				0.5	0.7	0.9	0.55	0.75	1.0	0.55	0.75	1.0	0.8	1.0	1.3	0.8	1.0	1.3	1.4	1.6	2.0	1.4	1.6	2.0	1.5	1.8	
Installation and connections	Front connection	(F)	Page	●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●			●			●Screw terminal		
	Solderless (BOX) terminal	(SL)		●			●			●			●			●			●			●			●		
	Rear	(B)	716	●Round stud			●Round stud			●Round stud			●Bar stud			●Bar stud			●Bar stud			●Bar stud			●Bar stud		
	Plug-in	(PM)		●			●			●			●		●	●		●	●			●			●		
Cassette-type accessories	Alarm switch	(AL)	725	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●
	Auxiliary switch	(AX)		● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●
	Shunt trip	(SHT)		● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●
	Undervoltage trip	(UVT)		● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●	● (*3)		●
	With lead-wire terminal block	(SLT)	737	●		●	●		●	●		●	●		●	●		●	●			●			●		
	Pre-alarm	(PAL)	739	–			–			–			–			–			–			–			–		
External accessories	Enclosure	Closed (S)	753	●		–	●		–	●		–	●		–	●		–	●		–	●		–	–		
		Dustproof (I)		●		–	●		–	●		–	●		–	●		–	●		–	●		–	–		
		Waterproof (W)		–	●	–	–	●	–	–	●	–	●		–	●		–	●		–	●		–	–		
	Electrical operation device	(NFM)	756	–			–			–			●			●			●			●			●		
	Mechanical interlock (MI) (*4)	Panel mounting	752	●		●	●		●	●		●	●		●	●		●	●			●			●		
		Breaker mounting		●		–	●		–	●		–	●		–	●		–	●			●			●		
	Handle lock device	LC	750	●			●			●			●			●			●			●			●		
		HL		●			●			●			●			●			●			●			●		
		HL-S		●			●			●			●			●			●			●			●		
	External operating handle	(F)	740	●			●			●			●			●			●			●			●		
		(V)		●			●			●			●			●			●			●			●		
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●		●	●		●	●		●	●		●	●		●	●			●			●		
	Rear stud	(B-ST)	718	●			●			●			●	●	●	●	●	●	●			●			●		
	Plug-in	(PM)		●		●	●		●	●		●	●	●	●	●	●	●	●			●			●		
	IEC 35mm rail mounting adapters		759	●		–	●		–	●		–	–			–			–			–			–		
CE marking				Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration		
CCC recognition				Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process		
Marine use approval (NK, LR, ABS, GL)				☆		–	☆		–	☆		–	☆		–	☆		–	☆ (LR, ABS, GL)		–	☆ (LR, ABS, GL)		–	☆ (LR, ABS, GL)		
Automatic tripping device				Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic		
Trip button				Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped		
Page of Characteristics and dimensions				762									764						772			772			772		

Notes: *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
*2 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 500 and 600VDC, respectively.
*3 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
*4 Not isolation compatible, excluding 400 to 800A frame.
*5 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.

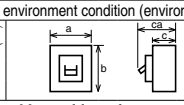


●NF-L / NF-H / NF-R (High-performance class)

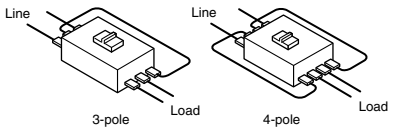
125	160	160	225	250	250	250	250
NF125-HEV	NF160-LGV	NF160-HGV	NF250-HV		NF250-LGV	NF250-HGV	NF250-RGV
							
16-32 32-63 63-125	125-160	125-160	125 150 160 175 200 225	250	125-160 140-200 175-250	125-160 140-200 175-250	125-160 160-200 200-250
3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3
690	690	690	690	690	690	690	690
10/8	8/8	10/8	10/8	10/8	8/8	10/8	–
50/38	36/36	50/38	50/38	50/38	36/36	50/38	–
65/65	50/50	65/65	65/65	65/65	50/50	65/65	125/125
70/70	50/50	70/70	70/70	70/70	50/50	70/70	150/150
75/75	50/50	75/75	75/75	75/75	50/50	75/75	150/150
75/75	50/50	75/75	75/75	75/75	50/50	75/75	150/150
100/100	90/90	100/100	100/100	100/100	90/90	100/100	150/150
100/100	90/90	100/100	100/100	100/100	90/90	100/100	150/150
–	20/20 (300V) (*2)	40/40 (300V) (*2)	40/40 (300V) (*2)	40/40 (300V) (*2)	20/20 (300V) (*2)	40/40 (300V) (*2)	–
8	8	8	8	8	8	8	8
AC	AC/DC compatible	AC/DC compatible	AC/DC compatible (*1)	AC/DC compatible (*1)	AC/DC compatible	AC/DC compatible	AC
Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
25,000	40,000	40,000	25,000	25,000	25,000	25,000	25,000
10,000	15,000	15,000	10,000	10,000	10,000	10,000	10,000
A	A	A	A	A	A	A	A
3	3	3	3	3	3	3	3
A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
105 140	105 140	105 140	105 140	105 140	105 140	105 140	105
165	165	165	165	165	165	165	165
68	68	68	68	68	68	68	68
92	92	92	92	92	92	92	92
1.7 2.2	1.4 1.6 2.0	1.4 1.6 2.0	1.4 1.6 2.0	1.4 1.6 2.0	1.4 1.6 2.0	1.4 1.6 2.0	1.5 1.8
●Screw terminal ●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Busbar terminal
● ●	●	●	● ●	● ●	●	●	●
●Bar stud ●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
● ●	●	●	● ●	● ●	●	●	●
● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3)
● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3)
● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3)
● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3) ●	● (*3)
● ●	●	●	● ●	● ●	●	●	●
●	–	–	–	–	–	–	–
–	● –	–	–	–	● –	–	–
● –	● –	● –	● –	● –	● –	● –	–
● –	● –	● –	● –	● –	● –	● –	–
●	●	●	●	●	●	●	●
● ●	●	●	● ●	● ●	●	●	●
● –	●	●	● –	● –	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
● ●	●	●	● ●	● ●	●	●	●
● ●	●	●	● ●	● ●	●	●	–
● ●	●	●	● ●	● ●	●	●	●
–	–	–	–	–	–	–	–
Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
☆ (LR, ABS, GL) –	☆ (LR, ABS, GL)	☆ (LR, ABS, GL)	☆ –	☆ –	☆ (LR, ABS, GL)	☆ (LR, ABS, GL)	☆ (LR, ABS, GL)
Electronic (effective value detection)	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
774	772	772	768		772	772	772

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

●NF-H / NF-R (High-performance class)

Frame (A)				250		400			630		800		
Model				NF250-HEV		NF400-HEW		NF400-REW	NF630-HEW	NF630-REW	NF800-HEW		NF800-REW
Image													
Rated current In (A) Rated ambient temperture 40°C (45°C for marine use)				80-160 125-250		Adjustable 200 225 250 300 350 400		Adjustable 200 225 250 300 350 400	Adjustable 300 350 400 500 600 630	Adjustable 300 350 400 500 600 630	Adjustable 400 450 500 600 700 800		Adjustable 400 450 500 600 700 800
Number of poles				3	4	3	4	3	3	4	3	4	3
Rated insulation voltage Ui (V)				690		690		690	690	690	690		690
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	10/8		35/18		–	35/18	–	15/15		–
			500V	50/38		50/50		70/35	50/50	70/35	50/50		70/35
			440V	65/65		65/65		125/63	65/65	125/63	65/65		125/63
			415V	70/70		70/70		125/63	70/70	125/63	70/70		125/63
			400V	75/75		70/70		125/63	70/70	125/63	70/70		125/63
			380V	75/75		70/70		125/63	70/70	125/63	70/70		125/63
			230V	100/100		100/100		150/75	100/100	150/75	100/100		150/75
			200V	100/100		100/100		150/75	100/100	150/75	100/100		150/75
		DC	250V	–		–		–	–	–	–		–
Rated impulse withstand voltage Uimp (kV)				8		8		8	8	8	8		8
Current				AC		AC		AC	AC	AC	AC		AC
Suitability for isolation				Compatible		Compatible		Compatible	Compatible	Compatible	Compatible		Compatible
Reverse connection				Possible		Possible		Possible	Possible	Possible	Possible		Possible
Number of operating cycles	Without current			25,000		6,000		6,000	6,000	6,000	4,000		4,000
	With current (440VAC)			10,000		1,000		1,000	1,000	1,000	500		500
Utilization category				A		B		B	B	B	B		B
Rated short time with stand current Icu (kA) at 0.25s				–		5		5	7.6	7.6	9.6		9.6
Pollution degree				3		3		3	3	3	3		3
EMC environment condition (environment A or B)				A		A		A	A	A	A		A
Overall dimensions (mm)			a	105	140	140	185	140	140	185	140	210	280	210
			b	165		257		257	257		257	275		275
			c	68		103		103	103		103	103		103
			ca	92		155		155	155		155	155		155
Mass of front-face type (kg)				1.7	2.2	6.0	7.6	6.0	6.5	8.3	6.0	10.9	14.2	10.9
Installation and connections	Front connection	(F)	Page	●Screw terminal		●Busbar terminal		●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal
	Solderless (BOX) terminal	(SL)	716	●	●	–	–	–	–	–	–	–	–	–
	Rear	(B)		●Bar stud	●Bar stud	●Bar stud		●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
	Plug-in	(PM)		●	●	●	●	●	●	●	●	●	●	●
Cassette-type accessories	Alarm switch	(AL)	725	● (*1)	●	● (*1)	●	● (*1)	● (*1)	●	● (*1)	● (*1)	●	● (*1)
	Auxiliary switch	(AX)		● (*1)	●	● (*1)	●	● (*1)	● (*1)	●	● (*1)	● (*1)	●	● (*1)
	Shunt trip	(SHT)		● (*1)	●	● (*1)	●	● (*1)	● (*1)	●	● (*1)	● (*1)	●	● (*1)
	Undervoltage trip	(UVT)		● (*1)	●	●	●	●	●	●	●	●	●	●
	With lead-wire terminal block	(SLT)	737	●	●	●	●	●	●	●	●	●	●	●
	Pre-alarm	(PAL)	739	●		● (*2)		● (*2)	● (*2)		● (*2)	● (*2)		● (*2)
External accessories	Enclosure	Closed (S)	753	–		–		–	–		–	–		–
		Dustproof (I)		●	–	–		–	–		–	–		–
		Waterproof (W)		●	–	–		–	–		–	–		–
	Electrical operation device	(NFM)	756	●		● (*3)		● (*3)	● (*3)		● (*3)	● (*3)		● (*3)
	Mechanical interlock (MI) (*4)	Panel mounting	752	●	●	●	●	●	●	●	●	●	●	●
		Breaker mounting		●	–	●	–	●	●	–	●	●	–	●
	Handle lock device	LC	750	●		–		–	–		–	–		–
		HL		●		●		●	●		●	●		●
		HL-S		●		●		●	●		●	●		●
	External operating handle	(F)	740	●		●		●	●		●	●		●
		(V)		●		●		●	●		●	●		●
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●	●	●	●	●	●	●	●	●		●
	Rear stud	(B-ST)	718	●	●	●		●	●	●	●	●	●	●
	Plug-in	(PM)		●	●	●		●	●	●	●	●		●
	IEC 35mm rail mounting adapters		759	–		–		–	–		–	–		–
CE marking				Self-declaration		Self-declaration		Self-declaration	Self-declaration	Self-declaration	Self-declaration		Self-declaration	Self-declaration
CCC recognition				Recognition in process		Recognition in process		Recognition in process	Recognition in process	Recognition in process	Recognition in process		Recognition in process	Recognition in process
Marine use approval (NK, LR, ABS, GL)				☆ (LR, ABS, GL)	–	☆	–	☆	☆	–	☆	☆	–	☆
Automatic tripping device				Electronic (effective value detection)		Electronic (effective value detection)		Electronic (effective value detection)	Electronic (effective value detection)		Electronic (effective value detection)			Electronic (effective value detection)
Trip button				Equipped		Equipped		Equipped	Equipped		Equipped			Equipped
Page of Characteristics and dimensions				774		778		778	784		784	786		786

Notes: *1 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
*2 Solid state relay output is option. Please specify if other output is necessary. (Standard type is thus SLT equipped).
*3 Place an order of other models in conjunction with the circuit breaker.
*4 Not isolation compatible, excluding 400 to 800A frame.



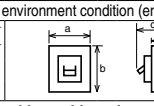
●NF-U (Ultra current-limiting class)

	125			250			400		800	
	NF125-UV			NF250-UV			NF400-UEW		NF800-UEW	
										
	15 20 30 40 50 60 75 100 125			125 150 175 200 225 250			Adjustable 200 225 250 300 350 400		Adjustable 400 450 500 600 700 800	
	2	3	4	2	3	4	3	4	3	4
	690			690			690		690	
	10/10			15/15			–		35/35	
	200/200			200/200			170/170		170/170	
	200/200			200/200			200/200		200/200	
	200/200			200/200			200/200		200/200	
	200/200			200/200			200/200		200/200	
	200/200			200/200			200/200		200/200	
	200/200			200/200			200/200		200/200	
	200/200			200/200			200/200		200/200	
	–			–			–		–	
	8			8			8		8	
	AC			AC			AC		AC	
	Compatible			Compatible			Compatible		Compatible	
	Possible			Possible			Possible		Possible	
	25,000			25,000			6,000		4,000	
	10,000			10,000			1,000		500	
	A			A			B		B	
	–			–			5		9.6	
	3			3			3		3	
	N/A			N/A			A		A	
	90	120		105	140		140	280	210	280
	191			240			297	322	322	
	68			68			200		200	
	90			92			252		252	
	1.35	1.5	1.9	2.5	2.7	3.7	16.2	25.4	27.6	33.7
	●Screw terminal			●Screw terminal			●Busbar terminal		●Busbar terminal	
	●Bar stud			●Bar stud			–		–	
	●Bar stud			●Bar stud			●Bar stud		●Bar stud	
	●	–		●	–		●	–	–	
	● (*1)	●		● (*1)	●		● (*1)		● (*1)	
	● (*1)	●		● (*1)	●		● (*1)		● (*1)	
	● (*1)	●		● (*1)	●		● (*1)		● (*1)	
	● (*1)	●		● (*1)	●		●		●	
	●			●			●		●	
	–			–			● (*2)		● (*2)	
	–			–			–		–	
	–			–			–		–	
	–			–			–		–	
	●			●			● (*3)		● (*3)	
	●			●			●		●	
	–			–			–		–	
	●			●			–		–	
	●			●			●		●	
	●			●			●		●	
	●			●			●		●	
	●			●			●	–	–	
	●			●			●		●	
	–			–			–		–	
	●	–		●	–		–		–	
	–			–			–		–	
	Self-declaration			Self-declaration			Self-declaration		Self-declaration	
	–			–			–		–	
	☆	–		☆	–		☆	–	–	
	Thermal-magnetic			Thermal-magnetic			Electronic (effective value detection)		Electronic (effective value detection)	
	Equipped			Equipped			Equipped		Equipped	
	766			770			780		790	

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

Detailed Specifications

●NV-C (Economy class) Harmonic Surge Ready

Frame (A)			50		60		63		100	125
Model			NV63-CV						NV125-CV	
Image										
Rated current In (A) Rated ambient temperture 40°C			(5) (10) (15) 16 20 25 (30) 32 40 50		(60)		63		(60) 63 (75) 80 100	125
Number of poles			2	3	2	3	2	3	3	3
Phase line (*1)			1φ2W	3φ3W, 1φ3W, 1φ2W	1φ2W	3φ3W, 1φ3W, 1φ2W	1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W
Rated operational voltage Ue (V) (*2)		AC	100-240	100-440	100-240	100-440	100-240	100-440	100-440	100-440
High-speed type	Rated current sensitivity	(mA)	30	30,100/200/500 selectable	30	30,100/200/500 selectable	30	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable
	Max. operating time (s)	at IΔn	0.1		0.1		0.1		0.1	0.1
		at 5IΔn	0.04		0.04		0.04		0.04	0.04
Time-delay type	Rated current sensitivity	(mA)	–		–		–		(100/200/500 selectable)	(100/200/500 selectable)
	Max. operating time (s)	(*3)	–		–		–		(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)
	Internal non-operating (s)	(or more)	–		–		–		(0.1/0.5/1.0)	(0.1/0.5/1.0)
Earth leakage indication system			Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)	Mechanical type (button)
Rated short-circuit breaking capacities (kA) IEC 60947-2 EN 60947-2 (Icu/Ics)		AC 440V	–	2.5/2.5	–	2.5/2.5	–	2.5/2.5	10/5	10/5
		AC 415V	–	2.5/2.5	–	2.5/2.5	–	2.5/2.5	10/5	10/5
		AC 400V	–	5/5	–	5/5	–	5/5	10/5	10/5
		230V	7.5/7.5		7.5/7.5		7.5/7.5		30/15	30/15
		200V	7.5/7.5		7.5/7.5		7.5/7.5		30/15	30/15
		100V	7.5/7.5		7.5/7.5		7.5/7.5		30/15	30/15
Rated impulse withstand voltage Uimp (kV)			6		6		6		6	6
Current			AC		AC		AC		AC	AC
Suitability for isolation			Compatible		Compatible		Compatible		Compatible	Compatible
Reverse connection (below 230VAC)			Possible		Possible		Possible		Possible	Possible
Number of operating cycles	Without current		10,000		10,000		10,000		10,000	10,000
	With current		6,000		6,000		6,000		6,000	6,000
Utilization category			A		A		A		A	A
Pollution degree			2		2		2		2	2
EMC environment condition (environment A or B)			A		A		A		A	A
Overall dimensions (mm)		a	75		75		75		90	90
		b	130		130		130		130	130
		c	68		68		68		68	68
		ca	90		90		90		90	90
Mass of front-face type (kg)			0.7	0.75	0.7	0.75	0.7	0.75	1.0	1.0
Installation and connections	Front connection	(F)	Page	●Screw terminal		●Screw terminal		●Screw terminal	●Screw terminal	●Screw terminal
	Solderless (BOX) terminal	(SL)	716	–		–		–	–	–
	Rear	(B)		●Round stud		●Round stud		●Round stud	●Bar stud	●Bar stud
	Plug-in	(PM)		–		–		–	–	–
Cassette-type accessories	Alarm switch	(AL)	725	● (*4)		● (*4)		● (*4)	● (*4)	● (*4)
	Auxiliary switch	(AX)		● (*4)		● (*4)		● (*4)	● (*4)	● (*4)
	Shunt trip	(SHT)		● (*4)		● (*4)		● (*4)	● (*4)	● (*4)
	Undervoltage trip	(UVT)		● (*4)		● (*4)		● (*4)	● (*4)	● (*4)
	Earth leakage alarm switch	(EAL)		–		–		–	–	–
	With lead-wire terminal block	(SLT)	737	●		●		●	●	●
	Test button module	(TBM)	738	● (*5)		● (*5)		● (*5)	● (*5)	● (*5)
External accessories	Enclosure	Closed (S)	753	–		–		–	–	–
		Dustproof (I)		–		–		–	–	–
		Waterproof (W)		–		–		–	–	–
	Electrical operation device	(NFM)	756	–		–		–	●	●
	Mechanical interlock (MI) (*7)	Panel mounting	752	●		●		●	●	●
		Breaker mounting		●		●		●	●	●
	Handle lock device	LC	750	●		●		●	●	●
		HL		●		●		●	●	●
		HL-S		●		●		●	●	●
	External operating handle	(F)	740	●		●		●	●	●
		(V)		●		●		●	●	●
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●		●		●	●	●
	Rear stud	(B-ST)	718	●		●		●	●	●
	Plug-in	(PM)		–		–		–	–	–
	IEC 35mm rail mounting adapters		759	●		●		●	–	–
CE marking			Self-declaration		Self-declaration		Self-declaration		Self-declaration	Self-declaration
CCC recognition			–	Recognition in process	–	Recognition in process	–	Recognition in process	Recognition in process	Recognition in process
Marine use approval (NK, LR, ABS, GL)			–		–		–		–	–
Automatic tripping device			Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic	Thermal-magnetic
Trip button			Equipped		Equipped		Equipped		Equipped	Equipped
Page of Characteristics and dimensions			800						802	

Notes: *1 If using a 3-pole earth leakage circuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole. When wiring to single-phase 3-wire, connect the neutral line to the central pole.
*2 In case of time delay type, rated voltage is 200-440VAC.
*3 When the operating time are 0.45, 1.0 and 2.0 seconds, the Earth Leakage circuit breaker operates between 0.15 and 0.45 seconds, between 0.6 and 1.0 seconds and between 1.2 and 2.0 seconds respectively.
*4 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
*5 Standard type is SLT equipped.
*6 Place an order of other models in conjunction with the circuit breaker.
*7 Not isolation compatible, excluding 400 to 630A frame.
*8 AC100V does not acquire the CCC certification.

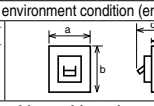
●NV-C (Economy class) Harmonic Surge Ready

	225	250	400	600	630
	NV250-CV		NV400-CW	NV630-CW	
					
	125 150 175 200 225	250	250 300 350 400	500 600	(630)
	3	3	3	3	3
	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W
	100-440	100-440	100-440	200-440	200-440
	30,100/200/500 selectable	30,100/200/500 selectable	(30),100/200/500 selectable	–	–
	0.1	0.1	0.1	–	–
	0.04	0.04	0.04	–	–
	(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)
	(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)
	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)
	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
	15/12	15/12	25/13	36/18	36/18
	25/19	25/19	36/18	36/18	36/18
	25/19	25/19	36/18	36/18	36/18
	36/27	36/27	50/25	50/25	50/25
	36/27	36/27	50/25	50/25	50/25
	36/27	36/27	50/25	–	–
	6	6	8	8	8
	AC	AC	AC	AC	AC
	Compatible	Compatible	Compatible	Compatible	Compatible
	Possible	Possible	Possible	Possible	Possible
	8,000	8,000	6,000	6,000	6,000
	4,000	4,000	1,000	1,000	1,000
	A	A	A	A	A
	2	2	3	3	3
	A	A	A	A	A
	105	105	140	140	140
	165	165	257	257	257
	68	68	103	103	103
	92	92	134	155	155
	1.7	1.7	6.1	6.9	6.9
	●Screw terminal	●Screw terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal
	–	–	–	–	–
	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
	–	–	–	–	–
	● (*4)	● (*4)	● (*4)	● (*4)	● (*4)
	● (*4)	● (*4)	● (*4)	● (*4)	● (*4)
	● (*4)	● (*4)	● (*4)	● (*4)	● (*4)
	● (*4)	● (*4)	●	●	●
	–	–	–	–	–
	●	●	●	●	●
	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)
	–	–	–	–	–
	–	–	–	–	–
	–	–	–	–	–
	●	●	● (*6)	● (*6)	● (*6)
	●	●	●	●	●
	●	●	●	●	●
	●	●	–	–	●
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●
	–	–	–	–	–
	–	–	–	–	–
	TÜV approval	TÜV approval	Self-declaration	Self-declaration	Self-declaration
	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
	–	–	–	–	–
	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
	Equipped	Equipped	Equipped	Equipped	Equipped
	804		808	812	

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
4.

Rated operational voltage	Applicable circuit voltage	Available voltage range
100-240V	100/110/200/220/230/240V	85-264V
100-440V	100/110/200/220/240/254/265/380/400/415/440V	85-484V
200-440V	200/220/240/254/265/380/400/415/440V	170-484V

●NV-S (Standard class) Harmonic Surge Ready

Frame (A)				30	32	50	60	63	100		125		125	
Model				NV32-SV		NV63-SV			NV125-SV				NV125-SEV	
Image														
Rated current In (A) Rated ambient temperture 40°C				(5) 6 10 (15) 16 20 25 (30)	(32)	(5) (10) (15) 16 20 25 (30) 32 40 50	(60)	63	(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100 (*3)		125		63-125	
Number of poles				3	3	3	3	3	3	4	3	4	3	4
Phase line (*1)				3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ2W	3ϕ4W
Rated operational voltage Ue (V) (*2)			AC	100-440	100-440	100-440	100-440	100-440	100-440	200-440	100-440	200-440	100-440	
High-speed type	Rated current sensitivity (mA)			30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable		30,100/200/500 selectable		(30),100/200/500 selectable	
	Max. operating time (s)	at IΔn		0.1	0.1	0.1	0.1	0.1	0.1		0.1		0.1	
		at 5IΔn		0.04	0.04	0.04	0.04	0.04	0.04		0.04		0.04	
Time-delay type	Rated current sensitivity (mA)			–	–	–	–	–	(100/200/500selectable)		(100/200/500selectable)		(100/200/500selectable)	
	Max. operating time (s) (*4)			–	–	–	–	–	(0.45/1.0/2.0selectable)		(0.45/1.0/2.0selectable)		(0.45/1.0/2.0selectable)	
	Internal non-operating (s) (or more)			–	–	–	–	–	(0.1/0.5/1.0)		(0.1/0.5/1.0)		(0.1/0.5/1.0)	
Earth leakage indication system				Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)		Mechanical type (button)		Mechanical type (button)	
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	5/5	5/5	7.5/7.5	7.5/7.5	7.5/7.5	25/25		25/25		36/36	
			415V	5/5	5/5	7.5/7.5	7.5/7.5	7.5/7.5	30/30		30/30		36/36	
			400V	5/5	5/5	7.5/7.5	7.5/7.5	7.5/7.5	30/30		30/30		36/36	
			230V	10/10	10/10	15/15	15/15	15/15	50/50		50/50		85/85	
			200V	10/10	10/10	15/15	15/15	15/15	50/50		50/50		85/85	
			100V	10/10	10/10	15/15	15/15	15/15	50/50	–	50/50	–	85/85	
Rated impulse withstand voltage Uimp (kV)				6	6	6	6	6	6		6		6	
Current				AC	AC	AC	AC	AC	AC		AC		AC	
Suitability for isolation				Compatible	Compatible	Compatible	Compatible	Compatible	Compatible		Compatible		Compatible	
Reverse connection (below 230VAC)				Possible	Possible	Possible	Possible	Possible	Possible		Possible		Possible	
Number of operating cycles	Without current			10,000	10,000	15,000	15,000	15,000	25,000		25,000		25,000	
	With current			6,000	6,000	8,000	8,000	8,000	10,000		10,000		10,000	
Utilization category				A	A	A	A	A	A		A		A	
Rated short time withstand current Icu (kA) at 0.25s				–	–	–	–	–	–		–		–	
Pollution degree				2	2	2	2	2	2		2		2	
EMC environment condition (environment A or B)				A	A	A	A	A	A		A		A	
Overall dimensions (mm)			a	75	75	75	75	75	90	120	90	120	105	140
			b	130	130	130	130	130	130		130		165	
			c	68	68	68	68	68	68		68		68	
			ca	90	90	90	90	90	90		90		92	
Mass of front-face type (kg)				0.75	0.75	0.75	0.8	0.8	1.1	1.4	1.1	1.4	1.9	2.5
Installation and connections	Front connection (F)		Page	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal		●Screw terminal		●	
	Solderless (BOX) terminal (SL)			–	–	–	–	–	–		–		–	
	Rear (B)		716	●Round stud	●Round stud	●Round stud	●Round stud	●Round stud	●Bar stud		●Bar stud		●Bar stud	
	Plug-in (PM)			–	–	–	–	–	–		–		–	
Cassette-type accessories	Alarm switch (AL)			● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●
	Auxiliary switch (AX)			● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●
	Shunt trip (SHT)		725	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●
	Undervoltage trip (UVT)			● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●
	Earth leakage alarm switch (EAL)			–	–	–	–	–	–		–		–	
	With lead-wire terminal block (SLT)		737	●	●	●	●	●	●	●	●	●	●	
	Test button module (TBM)		738	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)		● (*6)		● (*6)	
External accessories	Enclosure	Closed (S)	753	–	–	–	–	–	–		–		●	–
		Dustproof (I)		–	–	–	–	–	–		–		●	–
		Waterproof (W)		–	–	–	–	–	–		–		●	–
	Electrical operation device (NFM)		756	–	–	–	–	–	●		●		●	
	Mechanical interlock (MI) (*8)	Panel mounting	752	●	●	●	●	●	●	●	●	●	●	
		Breaker mounting		●	●	●	●	●	●	–	●	–	●	–
	Handle lock device	LC	750	●	●	●	●	●	●		●		●	
		HL		●	●	●	●	●	●		●		●	
		HL-S		●	●	●	●	●	●		●		●	
	External operating handle	(F)	740	●	●	●	●	●	●		●		●	
		(V)		●	●	●	●	●	●		●		●	
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●	●	●	●	●	●		●		●	
	Rear stud (B-ST)		718	●	●	●	●	●	●		●		●	
	Plug-in (PM)			–	–	–	–	–	–		–		–	
	IEC 35mm rail mounting adapters		759	●	●	●	●	●	–		–		–	
CE marking				Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration		Self-declaration		Self-declaration	
CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process		Recognition in process		Recognized	
Marine use approval (NK, LR, ABS, GL)				–	–	–	–	–	–		–		–	
Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic		Thermal-magnetic		Electronic (effective value detection)	
Trip button				Equipped	Equipped	Equipped	Equipped	Equipped	Equipped		Equipped		Equipped	
Page of Characteristics and dimensions				800		800			802				806	

Notes: *1 If using a 3-pole earth leakage cirsuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole. When wiring to single-phase 3-wire, connect the neutral line to the central pole.
*2 In case of time delay type, rated voltage is 200-440VAC.
*3 In case of time delay type, rated current is produced with 20 amp. or more.
*4 When the operating time are 0.45, 1.0 and 2.0 seconds, the Earth Leakage circuit breaker operates between 0.15 and 0.45 seconds, between 0.6 and 1.0 seconds and between 1.2 and 2.0 seconds respectively.
*5 Cassette type accessories are field mountable type. It can respend to adhesion attachment of a breaker as standard below 250A frame. (excluding UVT.)
*6 Standard type is SLT equipped.
*7 Place an order of other models in conjunction with the circuit breaker.
*8 Not isolation compatible, excluding 400 to 800A frame.
*9 AC100V does not acquire the CCC certification.

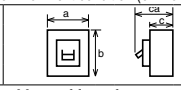
●NV-S (Standard class) Harmonic Surge Ready

225	250	250	400	400	600	630	630	800
NV250-SV		NV250-SEV	NV400-SW	NV400-SEW	NV630-SW		NV630-SEW	NV800-SEW
								
125 150 175 200 225	250	125-250	250 300 350 400	Adjustable 200 225 250 300 350 400	500 600	(630)	Adjustable 300 350 400 500 600 630	Adjustable 400 450 500 600 700 800
3	3	3	3	3 / 4	3	3	3 / 4	3
3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W / 3φ4W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W / 3φ4W	3φ3W, 1φ3W, 1φ2W
100-440	100-440	100-440	100-440	100-440	200-440	200-440	100-440	200-440
(30),100/200/500 selectable	(30),100/200/500 selectable	(30),100/200/500 selectable	(30),100/200/500 selectable	(30),100/200/500 selectable	–	–	–	–
0.1	0.1	0.1	0.1	0.1	–	–	–	–
0.04	0.04	0.04	0.04	0.04	–	–	–	–
(100/200/500selectable)	(100/200/500selectable)	(100/200/500selectable)	(100/200/500selectable)	(100/200/500selectable)	100/200/500selectable	100/200/500selectable	(100/200/500selectable)	100/200/500selectable
(0.45/1.0/2.0selectable)	(0.45/1.0/2.0selectable)	(0.45/1.0/2.0selectable)	(0.45/1.0/2.0selectable)	(0.45/1.0/2.0selectable)	0.45/1.0/2.0selectable	0.45/1.0/2.0selectable	(0.45/1.0/2.0selectable)	0.45/1.0/2.0selectable
(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	0.1/0.5/1.0	0.1/0.5/1.0	(0.1/0.5/1.0)	0.1/0.5/1.0
Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
36/36	36/36	36/36	42/42	42/42	42/42	42/42	42/42	42/42
36/36	36/36	36/36	45/45	50/50	50/50	50/50	50/50	50/50
36/36	36/36	36/36	45/45	50/50	50/50	50/50	50/50	50/50
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
85/85	85/85	85/85	85/85	85/85	–	–	85/85	–
6	6	6	8	8	8	8	8	8
AC	AC	AC	AC	AC	AC	AC	AC	AC
Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
25,000	25,000	25,000	6,000	6,000	6,000	6,000	6,000	4,000
10,000	10,000	10,000	1,000	1,000	1,000	1,000	1,000	500
A	A	A	A	B	A	A	B	A
–	–	–	–	5	–	–	7.6	9.6
2	2	2	3	3	3	3	3	3
A	A	A	A	A	A	A	A	A
105	105	105	140	140 / 185	140	140	140 / 185	210
165	165	165	257	257	257	257	257	275
68	68	68	103	103	103	103	103	103
92	92	92	155	155	155	155	155	155
1.9	1.9	1.9	6.4	6.2 / 8.2	6.9	6.9	7.1 / 8.9	15.3
●Screw terminal	●Screw terminal	●	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal
–	–	–	–	–	–	–	–	–
●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
–	–	–	–	–	–	–	–	–
● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)
● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)
● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)	● (*5)
● (*5)	● (*5)	● (*5)	●	●	●	●	●	●
–	–	–	–	–	–	–	–	–
●	●	●	●	●	●	●	●	●
● (*6)	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)	● (*6)
–	–	●	–	–	–	–	–	–
–	–	●	–	● / –	–	–	● / –	–
–	–	●	–	● / –	–	–	● / –	–
●	●	●	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	–	–	–	–	–	–
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
–	–	–	–	●	–	–	●	–
–	–	–	–	–	–	–	–	–
TÜV approval	TÜV approval	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
Recognition in process	Recognition in process	Recognized	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
–	–	–	–	–	–	–	–	–
Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)	Thermal-magnetic	Electronic (effective value detection)	Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)	Electronic (effective value detection)
Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
804		806	808	810	812		814	816

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
4.

Rated operational voltage	Applicable circuit voltage	Available voltage range
100-440V	100/110/200/220/240/254/265/380/400/415/440V	85-484V
200-440V	200/220/240/254/265/380/400/415/440V	160-484V

●NV-H / NV-R (High-performance class) Harmonic Surge Ready

Frame (A)				50	60	63	100		125		125		225	250	250
Model				NV63-HV			NV125-HV				NV125-HEV		NV250-HV		NV250-HEV
Image															
Rated current In (A) Rated ambient temperture 40°C				(15) 16 20 (30) 32 40 50	(60)	63	(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100 (*3)		125		63-125		125 150 175 200 225	250	125-250
Number of poles				3	3	3	3	4	3	4	3	4	3	3	3
Phase line (*1)				3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ3W, 1ϕ2W
Rated operational voltage Ue (V) (*2)			AC	100-440	100-440	100-440	100-440	200-440	100-440	200-440	100-440		100-440	100-440	100-440
High-speed type	Rated current sensitivity (mA)			30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable		30,100/200/500 selectable		(30),100/200/500 selectable		30,100/200/500 selectable	30,100/200/500 selectable	(30),100/200/500 selectable
	Max. operating time (s)	at IΔn		0.1	0.1	0.1	0.1		0.1		0.1		0.1	0.1	0.1
		at 5IΔn		0.04	0.04	0.04	0.04		0.04		0.04		0.04	0.04	0.04
Time-delay type	Rated current sensitivity (mA)			–	–	–	(100/200/500selectable)		(100/200/500selectable)		(100/200/500selectable)		(100/200/500selectable)	(100/200/500selectable)	(100/200/500selectable)
	Max. operating time (s) (*4)			–	–	–	(0.45/1.0/2.0selectable)		(0.45/1.0/2.0selectable)		(0.45/1.0/2.0selectable)		(0.45/1.0/2.0selectable)	(0.45/1.0/2.0selectable)	(0.45/1.0/2.0selectable)
	Internal non-operating (s) (or more)			–	–	–	(0.1/0.5/1.0)		(0.1/0.5/1.0)		(0.1/0.5/1.0)		(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)
Earth leakage indication system				Mechanical type (button)			Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	10/8	10/8	10/8	50/38		50/38		65/65		65/65	65/65	65/65
			415V	10/8	10/8	10/8	50/38		50/38		70/70		70/70	70/70	70/70
			400V	10/8	10/8	10/8	50/38		50/38		75/75		75/75	75/75	75/75
			230V	25/19	25/19	25/19	100/75		100/75		100/100		100/100	100/100	100/100
			200V	25/19	25/19	25/19	100/75		100/75		100/100		100/100	100/100	100/100
			100V	25/19	25/19	25/19	100/75	–	100/75	–	100/100		100/100	100/100	100/100
Rated impulse withstand voltage Uimp (kV)				6	6	6	6		6		6		6	6	6
Current				AC	AC	AC	AC		AC		AC		AC	AC	AC
Suitability for isolation				Compatible	Compatible	Compatible	Compatible		Compatible		Compatible		Compatible	Compatible	Compatible
Reverse connection (below 230VAC)				–	–	–	–		–		–		–	–	–
Number of operating cycles	Without current			15,000	15,000	15,000	25,000		25,000		25,000		25,000	25,000	25,000
	With current			8,000	8,000	8,000	10,000		10,000		10,000		10,000	10,000	10,000
Utilization category				A	A	A	A		A		A		A	A	A
Rated short time withstand current Icu (kA) at 0.25s				–	–	–	–		–		–		–	–	–
Pollution degree				2	2	2	2		2		2		2	2	2
EMC environment condition (environment A or B)				A	A	A	A		A		A		A	A	A
Overall dimensions (mm)			a	75	75	75	90	120	90	120	105	140	105	105	105
			b	130	130	130	130		130		165		165	165	165
			c	68	68	68	68		68		68		68	68	68
			ca	90	90	90	90		90		92		92	92	92
Mass of front-face type (kg)				0.75	0.8	0.8	1.1	1.4	1.1	1.4	1.9	2.5	1.8	1.8	1.9
Installation and connections	Front connection (F)		Page	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal		●Screw terminal		●		●Screw terminal	●Screw terminal	●
	Solderless (BOX) terminal (SL)			–	–	–	–		–		–		–	–	–
	Rear (B)		716	●Round stud	●Round stud	●Round stud	●Bar stud		●Bar stud		●Bar stud		●Bar stud	●Bar stud	●Bar stud
	Plug-in (PM)			–	–	–	–		–		–		–	–	–
Cassette-type accessories	Alarm switch (AL)			● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●	● (*5)	● (*5)	● (*5)
	Auxiliary switch (AX)			● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●	● (*5)	● (*5)	● (*5)
	Shunt trip (SHT)		725	● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●	● (*5)	● (*5)	● (*5)
	Undervoltage trip (UVT)			● (*5)	● (*5)	● (*5)	● (*5)	●	● (*5)	●	● (*5)	●	● (*5)	● (*5)	● (*5)
	Earth leakage alarm switch (EAL)			–	–	–	–		–		–		–	–	–
	With lead-wire terminal block (SLT)		737	●	●	●	●	●	●	●	●		●	●	●
	Test button module (TBM)		738	● (*6)	● (*6)	● (*6)	● (*6)		● (*6)		● (*6)		● (*6)	● (*6)	● (*6)
External accessories	Enclosure	Closed (S)	753	–	–	–	–		–		●	–	–	–	●
		Dustproof (I)		–	–	–	–		–		●	–	–	–	●
		Waterproof (W)		–	–	–	–		–		●	–	–	–	●
	Electrical operation device (NFM)		756	–	–	–	●		●		●		●	●	●
	Mechanical interlock (MI) (*7)	Panel mounting	752	●	●	●	●	●	●	●	●		●	●	●
		Breaker mounting		●	●	●	●	–	●	–	●	–	●	●	●
	Handle lock device	LC	750	●	●	●	●		●		●		●	●	●
		HL		●	●	●	●		●		●		●	●	●
		HL-S		●	●	●	●		●		●		●	●	●
	External operating handle	(F)	740	●	●	●	●		●		●		●	●	●
		(V)		●	●	●	●		●		●		●	●	●
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●	●	●	●		●		●		●	●	●
	Rear stud (B-ST)		718	●	●	●	●		●		●		●	●	●
	Plug-in (PM)			–	–	–	–		–		–		–	–	–
	IEC 35mm rail mounting adapters		759	●	●	●	–		–		–		–	–	–
CE marking				Self-declaration	Self-declaration	Self-declaration	Self-declaration		Self-declaration		Self-declaration		Self-declaration	Self-declaration	Self-declaration
CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognition in process		Recognition in process		Recognized		Recognition in process	Recognition in process	Recognized
Marine use approval (NK, LR, ABS, GL)				–	–	–	–		–		–		–	–	–
Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic		Thermal-magnetic		Electronic (effective value detection)		Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)
Trip button				Equipped	Equipped	Equipped	Equipped		Equipped		Equipped		Equipped	Equipped	Equipped
Page of Characteristics and dimensions				800			802				806		804		806

Notes: *1 If using a 3-pole earth leakage cirsuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole. When wiring to single-phase 3-wire, connect the neutral line to the central pole.
*2 In case of time delay type, rated voltage is 200-440VAC.
*3 In case of time delay type, rated current is produced with 20 amp. or more.
*4 When the operating time are 0.45, 1.0 and 2.0 seconds, the Earth Leakage circuit breaker operates between 0.15 and 0.45 seconds, between 0.6 and 1.0 seconds and between 1.2 and 2.0 seconds respectively.
*5 Cassette type accessories are field mountable type. It can respend to adhesion attachment of a breaker as standard. (excluding UVT.)
*6 Standard type is SLT equipped.
*7 Not isolation compatible.
*8 AC100V does not acquire the CCC certification.

●NV-H / NV-R (High-performance class) Harmonic Surge Ready

	400	400	630	800
	NV400-HEW	NV400-REW	NV630-HEW	NV800-HEW
				
	Adjustable 200 225 250 300 350 400	Adjustable 200 225 250 300 350 400	Adjustable 300 350 400 500 600 630	Adjustable 400 450 500 600 700 800
	3 / 4	3	3	3
	3φ3W, 1φ3W, 1φ2W / 3φ4W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W
	100-440	100-440	100-440	100-440
	(30), 100/200/500 selectable	(30), 100/200/500 selectable	–	–
	0.1	0.1	–	–
	0.04	0.04	–	–
	(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)
	(0.45/1.0/2.0)	(0.45/1.0/2.0)	(0.45/1.0/2.0)	(0.45/1.0/2.0 selectable)
	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)
	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
	65/65	125/63	65/65	65/65
	70/70	125/63	70/70	70/70
	70/70	125/63	70/70	70/70
	100/100	150/75	100/100	100/100
	100/100	150/75	100/100	100/100
	100/100	150/75	100/100	100/100
	8	8	8	8
	AC	AC	AC	AC
	Compatible	Compatible	Compatible	Compatible
	–	–	–	–
	6,000	6,000	6,000	4,000
	1,000	1,000	1,000	500
	B	B	B	B
	5	5	7.6	9.6
	3	3	3	3
	A	A	A	A
	140 / 185	140	140	210
	257	257	257	275
	103	103	103	103
	155	155	155	155
	6.6 / 8.2	6.6	7.1	15.3
	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal
	–	–	–	–
	●Bar stud	●Bar stud	●Bar stud	●Bar stud
	–	–	–	–
	● (*5)	● (*5)	● (*5)	● (*5)
	● (*5)	● (*5)	● (*5)	● (*5)
	● (*5)	● (*5)	● (*5)	● (*5)
	●	●	●	●
	–	–	–	–
	●	●	●	●
	● (*6)	● (*6)	● (*6)	● (*6)
	–	–	–	–
	● / –	●	●	●
	● / –	●	●	●
	● (*7)	● (*7)	● (*7)	● (*7)
	●	●	●	●
	●	●	●	●
	–	–	–	–
	●	●	●	●
	●	●	●	●
	●	●	●	●
	●	●	●	●
	●	●	●	●
	●	●	●	●
	–	–	–	–
	–	–	–	–
	Self-declaration	Self-declaration	Self-declaration	Self-declaration
	Recognition in process	Recognition in process	Recognition in process	Recognition in process
	–	–	–	–
	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)
	Equipped	Equipped	Equipped	Equipped
	810	810	814	816

Remarks:
1. Products with rated current parenthesized are produced when an order is placed.
2. The setting is set to 500mA and delivered when not specifying the rated current sensitivity and the time of time-delay type of operation to 2.0 seconds.
3. Specify "FP-LT" when using a flush plate product with a lead-wire terminal block.
4. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
5. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
6.

Rated operational voltage	Applicable circuit voltage	Available voltage range
100-440V	100/110/200/220/240/254/265/380/400/415/440V	85-484V
200-440V	200/220/240/254/265/380/400/415/440V	175-484V

Detailed Specifications

●NF-MB

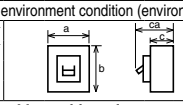
Please specify MB

Frame (A)				30	32	50		100	225
Model				NF32-SV		NF63-CV	NF63-SV	NF125-SV	NF250-SV
Rated current In (A) Rated motor capacity (kW) Rated ambient temperture 40°C (45°C for marine use)				A / 200/220V kW / 400/440V kW 25 / 5.5 / 11 16 / 3.7 / 7.5 12 / – / 5.5 10 / 2.2 / – 8 / – / 3.7 7.1 / 1.5 / – 5 / – / 2.2 4 / 0.75 / 1.5	A / 200/220V kW / 400/440V kW 32 / 7.5 / 15	A / 200/220V kW / 400/440V kW 45 / 11 / 22 40 / – / 18.5 32 / 7.5 / 15 25 / 5.5 / 11 16 / 3.7 / 7.5 12 / – / 5.5 10 / 2.2 / – 8 / – / 3.7	A / 200/220V kW / 400/440V kW 7.1 / 1.5 / – 5 / – / 2.2 4 / 0.75 / 1.5	A / 200/220V kW / 400/440V kW 100 / – / 55 90 / 22 / 45 71 / 18.5 / 37 63 / 15 / 30 45 / 11 / 22 (40) / – / 18.5 32 / 7.5 / 15 (25) / 5.5 / 11 (16) / 3.7 / 7.5 (12.5) / – / 5.5	A / 200/220V kW / 400/440V kW 225 / 55 / 110 200 / – / – 175 / 45 / 90 150 / 37 / 75 125 / 30 / –
Number of poles				3	3	3	3	3	3
Rated insulation voltage Ui (V)				500	500	500	500	500	500
Rated short-circuit breaking capacities (kA)	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	2.5/2.5	2.5/2.5	2.5/2.5	7.5/7.5	25/25	36/36
			415V	2.5/2.5	2.5/2.5	2.5/2.5	7.5/7.5	30/30	36/36
			400V	5/5	5/5	5/5	7.5/7.5	30/30	36/36
			380V	5/5	5/5	5/5	7.5/7.5	30/30	36/36
			230V	7.5/7.5	7.5/7.5	7.5/7.5	15/15	50/50	85/85
Rated impulse withstand voltage Uimp (kV)				8	8	8	8	8	8
Current				AC	AC	AC	AC	AC	AC
Suitability for isolation				Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Reverse connection				Possible	Possible	Possible	Possible	Possible	Possible
Number of operating cycles	Without current			10,000	10,000	10,000	15,000	25,000	25,000
	With current (440VAC)			6,000	6,000	6,000	8,000	10,000	10,000
Utilization category				A	A	A	A	A	A
Pollution degree				3	3	3	3	3	3
EMC environment condition (environment A or B)				N/A	N/A	N/A	N/A	N/A	N/A
Overall dimensions (mm)			a	75	75	75	75	90	105
			b	130	130	130	130	130	165
			c	68	68	68	68	68	68
			ca	90	90	90	90	90	92
Mass of front-face type (kg)				0.65	0.65	0.65	0.7	1.0	1.6
Installation and connections	Front connection	(F)	Page	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal
	Solderless (BOX) terminal	(SL)		–	–	–	–	●	●
	Rear	(B)	716	●Round stud	●Round stud	●Round stud	●Round stud	●Bar stud	●Bar stud
	Plug-in	(PM)		●	●	●	●	●	●
Cassette-type accessories	Alarm switch	(AL)	725	● (*1)	● (*1)	● (*1)	● (*1)	● (*1)	● (*1)
	Auxiliary switch	(AX)		● (*1)	● (*1)	● (*1)	● (*1)	● (*1)	● (*1)
	Shunt trip	(SHT)		● (*1)	● (*1)	● (*1)	● (*1)	● (*1)	● (*1)
	Undervoltage trip	(UVT)		● (*1)	● (*1)	● (*1)	● (*1)	● (*1)	● (*1)
	With lead-wire terminal block	(SLT)	737	●	●	●	●	●	●
External accessories	Enclosure	Closed (S)	753	●	●	●	●	●	●
		Dustproof (I)		●	●	●	●	●	●
		Waterproof (W)		●	●	●	●	●	●
	Electrical operation device	(NFM)	756	–	–	–	–	● (*3)	● (*3)
	Mechanical interlock (MI) (*2)	Panel mounting	752	●	●	●	●	●	●
		Breaker mounting		●	●	●	●	●	●
	Handle lock device	LC	750	●	●	●	●	●	●
		HL		●	●	●	●	●	●
		HL-S		●	●	●	●	●	●
	External operating handle	(F)	740	●	●	●	●	●	●
		(V)		●	●	●	●	●	●
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		744	●	●	●	●	●	●
	Rear stud	(B-ST)	718	●	●	●	●	●	●
	Plug-in	(PM)		●	●	●	●	●	●
	IEC 35mm rail mounting adapters		759	●	●	●	●	–	–
CE marking				Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	TÜV approval
CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
Marine use approval (NK, LR, ABS, GL)				☆	☆	☆	☆	☆	☆
Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Trip button				Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
Page of Characteristics and dimensions				762		762		764	768

Notes: *1 The cassette type design makes it easy for customer to install. Available for installation on side (excluding UVT).
*2 Not isolation compatible.
*3 Place an order of other models in conjunction with the circuit breaker.

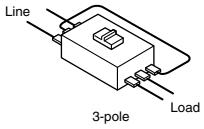
Remarks: 1. The motor circuit breakers do not have an applicable rated motor capacity. Select a motor circuit breaker based on the total load current of the motor.
2. Products with rating parenthesized are produced when an order is placed.
3. Specify “P-LT” when using a plug-in product with a lead wire terminal block.
4. The circuit breaker has the rated short circuit breaking capacity specified in the shaded cells.

●UL 489 Listed Molded Case Circuit Breakers

Frame (A)				50	100	125			
Model				NF50-SVFU	NF100-CVFU	NF125-SVU		NF125-HVU	
Image									
Rated current In (A) (*4) Rated ambient temperture 40°C (IEC 30°C)				(3) 5 10 15 20 30 40 50	60 (70) 75 (80) (90) 100	15 20 30 40 50 60 (70) 75 (80) (90) 100	125	15 20 30 40 50 60 (70) 75 (80) (90) 100	125
Number of poles				2 | 3	2 | 3	2 | 3	2 | 3	3	3
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage	AC (V)	240	240	480	480	600Y/347	600Y/347
			DC (V)	–	–	–	–	–	–
		AC	600Y/347V	–	–	–	–	18	18
			480V	–	–	30	30	50	50
			480Y/277V	–	–	–	–	–	–
			240V	14	14	50	50	100	100
			120V	–	–	–	–	–	–
		DC	60V	–	–	–	–	–	–
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		440	600	690	690	690	690
		AC	690V	–	–	8/4	8/4	10/5	10/5
			500V	–	7.5/4	18/9	18/9	25/13	25/13
			440V	7.5/4	10/5	30/15	30/15	50/25	50/25
			415V	10/5	10/5	30/15	30/15	50/25	50/25
			400V	10/5	10/5	30/15	30/15	50/25	50/25
			380V	10/5	10/5	30/15	30/15	50/25	50/25
			230V	15/8	15/8	50/25	50/25	100/50	100/50
		DC	250V	–	–	–	–	–	–
			60V	–	–	–	–	–	–
Rated impulse withstand voltage Uimp (kV)				6	8	8	8	8	8
Current (*1)				AC	AC	AC	AC	AC	AC
Suitability for isolation				Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Reverse connection				–	Possible	Possible	Possible	Possible	Possible
Utilization category				A	A	A	A	A	A
Pollution degree				3	3	3	3	3	3
EMC environment condition (environment A or B)				N/A	N/A	N/A	N/A	N/A	N/A
Overall dimensions (mm)			a	36 | 54	50 | 75	90	90	90	90
			b	120	150	160	160	160	160
			c	68	68	68	68	68	68
			ca	90	90	90	90	90	90
Mass of front-face type (kg)				0.3 | 0.45	0.55 | 0.8	1.0 | 1.1	1.0 | 1.1	1.1	1.1
Installation and connections	Front (F)	Screw terminal	(AMP-N)	Page	●	●	●	●	●	●
		Solderless terminal	(SL)	716	–	●	●	●	●	●
		Bar	(BAR)		–	● (*5)	●	●	●	●
		Power supply solderless load bar	(SL/BAR)		–	● (*5, 6)	● (*6)	● (*6)	● (*6)	● (*6)
Cassette-type accessories (*2)	Alarm switch		(AL)	725	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)
	Auxiliary switch		(AX)		● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)
	Shunt trip		(SHT)		● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)
	Undervoltage trip		(UVT)		●	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)
	With lead-wire terminal block		(SLT)	737	●	●	●	●	●	●
External accessories (*2)	Mechanical interlock		(MI)	752	–	–	–	–	–	–
	Handle lock device		(HL)	750	●	●	●	●	●	●
			(HL-S)		●	●	●	●	●	●
	External operating handle		(F)	740	●	●	●	●	●	●
			(V)		●	●	●	●	●	●
	Terminal cover	Large terminal cover	(TC-L)	744	●	●	●	●	●	●
		Small terminal cover	(TC-S)	745	– (*3)	– (*3)	– (*3)	– (*3)	– (*3)	– (*3)
	IEC 35mm rail mounting adapters			759	Standard accessory	Standard accessory	–	–	–	–
CE marking					TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval
CCC recognition					Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
Automatic tripping device					Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Trip button					Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
Page of Characteristics and dimensions					818	820	822		822	

Notes: *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
*2 These accessories differ from the general and CE/CCC products in specifications. Please consult us for details.
*3 The standard structure conforms to IP20 (finger protection).
*4 The rated ambient temperature for NF50-SVFU, NF100-CVFU, NF125-SVU and NF125-HVU is specified at 40°C also by IEC.
*5 The circuit breakers with busbar terminals have insulation barriers.
*6 Circuit breakers for power supply solderless load screw terminal (SL/AMP-N) are available. In this case, a busbar terminal is not provided on the load side.
*7 These cassette type circuit breakers can be installed by the customer. They can be installed with their side faces in close contact (except NF50-SVFU and UVT).

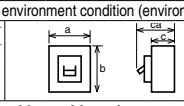
Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
3. The 3-pole circuit breakers can be used on single-phase circuits.



US UL Standard 489
UL File No.E167691 Body
UL File No.E108284 Accessories

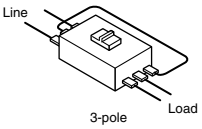
Canada CSA Standard
C22.2 No.5

●UL 489 Listed Molded Case Circuit Breakers

Frame (A)				225	250			
Model				NF225-CWU	NF250-SVU		NF250-HVU	
Image								
Rated current In (A) (*5) Rated ambient temperture 40°C (IEC 30°C)				125 150 175 200 225	125 150 175 200 225	250	125 150 175 200 225	250
Number of poles				3	3	3	3	3
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage	AC (V)	240	480	480	600Y/347	600Y/347
			DC (V)	–	–	–	–	–
		AC	600Y/347V	–	–	–	18	18
			480V	–	35	35	50	50
			480Y/277V	–	–	–	–	–
			240V	35	65	65	100	100
			120V	–	–	–	–	–
		DC	60V	–	–	–	–	–
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		600	690	690	690	690
		AC	690V	–	8/4	8/4	10/5	10/5
			500V	10/5	25/13	25/13	36/18	36/18
			440V	15/8	36/18	36/18	50/25	50/25
			415V	18/9	36/18	36/18	50/25	50/25
			400V	18/9	36/18	36/18	50/25	50/25
			380V	18/9	36/18	36/18	50/25	50/25
			230V	35/18	65/33	65/33	100/50	100/50
		DC	250V (*3)	10/5	–	–	–	–
			60V	–	–	–	–	–
Rated impulse withstand voltage Uimp (kV)				6	8	8	8	8
Current (*1)				AC/DC compatible	AC	AC	AC	AC
Suitability for isolation				Compatible	Compatible	Compatible	Compatible	Compatible
Reverse connection				Possible	Possible	Possible	Possible	Possible
Utilization category				A	A	A	A	A
Pollution degree				3	3	3	3	3
EMC environment condition (environment A or B)				N/A	N/A	N/A	N/A	N/A
Overall dimensions (mm)			a	105	105	105	105	105
			b	165	185	185	185	185
			c	68	68	68	68	68
			ca	92	92	92	92	92
Mass of front-face type (kg)				1.5	1.6	1.6	1.6	1.6
Installation and connections	Front (F)	Screw terminal	(AMP-N)	●	●	●	●	●
		Solderless terminal	(SL)	–	●	●	●	●
		Bar	(BAR)	●	●	●	●	●
		Power supply solderless load bar	(SL/BAR)	–	●(*8)	●(*8)	●(*8)	●(*8)
Cassette-type accessories (*2)	Alarm switch		(AL)	●	●(*7)	●(*7)	●(*7)	●(*7)
	Auxiliary switch		(AX)	●	●(*7)	●(*7)	●(*7)	●(*7)
	Shunt trip		(SHT)	●	●(*7)	●(*7)	●(*7)	●(*7)
	Undervoltage trip		(UVT)	●	●(*7)	●(*7)	●(*7)	●(*7)
	With lead-wire terminal block		(SLT)	●	●	●	●	●
External accessories (*2)	Mechanical interlock		(MI)	●(*6)	–	–	–	–
	Handle lock device		(HL)	●	●	●	●	●
			(HL-S)	●	●	●	●	●
	External operating handle		(F)	●	●	●	●	●
			(V)	●	●	●	●	●
	Terminal cover	Large terminal cover	(TC-L)	●	●	●	●	●
		Small terminal cover	(TC-S)	– (*4)	– (*4)	– (*4)	– (*4)	– (*4)
	IEC 35mm rail mounting adapters			–	–	–	–	–
CE marking				TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval
CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Trip button				Equipped	Equipped	Equipped	Equipped	Equipped
Page of Characteristics and dimensions				824	826		826	

Notes: *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
*2 These accessories differ from the general products in specifications. Please consult us for details.
*3 When using a 3-pole circuit breaker, use two poles. When wired as shown right, NF225-CWU can be used at up to 400 V DC.
*4 Since NF225-CWU comes with a protective cover, it has an IP20 (finger protection) structure as standard. Other models have IP20 (finger protection) structures as standard.
*5 The rated ambient temperature for NF250-SVU and NF250-HVU is specified at 40°C also by IEC.
*6 Not isolation compatible.
*7 These cassette type circuit breakers can be installed by the customer. They can be installed with their side faces in close contact (except UVT).
*8 Circuit breakers for power supply solderless load screw terminal (SL/AMP-N) are available. In this case, a busbar terminal is not provided on the load side.

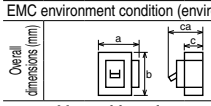
Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
3. The 3-pole circuit breakers can be used on single-phase circuits.



US UL Standard 489	
UL File No.E167691	Body
UL File No.E108284	Accessories

Canada CSA Standard
C22.2 No.5

●UL 489 Listed Molded Case Circuit Breakers

Frame (A)				400		630	
Model				NF400-SWU	NF400-HWU	NF630-SWU	NF630-HWU
Image							
Rated current In (A) Rated ambient temperture 40°C				250 300 350 400	250 300 350 400	500 600 630	500 600 630
Number of poles				3	3	3	3
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage	AC (V)	600Y/347	600Y/347	600Y/347	600Y/347
			DC (V)	–	–	–	–
		AC	600Y/347V	20	25	20	25
			480V	35	65	35	65
			480Y/277V	–	–	–	–
			240V	65	100	85	100
			120V	–	–	–	–
		DC	60V	–	–	–	–
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		690	690	690	690
		AC	690V	10/10(5/5)(*4)	15/10	10/10	15/10
			500V	30/30(25/25)(*4)	42/42	30/30	42/42
			440V	42/42(36/36)(*4)	65/65	42/42	65/65
			415V	45/45(36/36)(*4)	70/70	45/45	70/70
			400V	45/45(36/36)(*4)	70/70	45/45	70/70
			380V	50/50(42/42)(*4)	70/70	50/50	70/70
			230V	85/85(65/65)(*4)	100/100	85/85	100/100
		DC	250V	–	–	–	–
			60V	–	–	–	–
Rated impulse withstand voltage Uimp (kV)				8	8	8	8
Current				AC	AC	AC	AC
Suitability for isolation				Compatible	Compatible	Compatible	Compatible
Reverse connection				Possible	Possible	Possible	Possible
Utilization category				A	A	A	A
Pollution degree				3	3	3	3
EMC environment condition (environment A or B)				N/A	N/A	N/A	N/A
Overall dimensions (mm)			a	140	140	210	210
			b	257	257	275	275
			c	103	103	103	103
			ca	155	155	155	155
Mass of front-face type (kg)				5.7	5.7	9.6	9.6
Installation and connections	Front (F)	Screw terminal	(AMP-N)	–	–	–	–
		Solderless terminal	(SL)	●	–	●(*7)	–
		Bar	(BAR)	●(*5)	●(*5)	●(*5)	●(*5)
		Power supply solderless load bar	(SL/BAR)	●(*5)	–	●(*5)	–
Cassette-type accessories	Alarm switch		(AL)	●(*3)	●(*3)	●(*3)	●(*3)
	Auxiliary switch		(AX)	●(*3)	●(*3)	●(*3)	●(*3)
	Shunt trip		(SHT)	●(*3)	●(*3)	●(*3)	●(*3)
	Undervoltage trip		(UVT)	●	●	●	●
	With lead-wire terminal block		(SLT)	●	●	●	●
External accessories	Mechanical interlock		(MI)	●(*1)(*2)	●(*1)(*2)	●(*1)(*2)	●(*1)(*2)
	Handle lock device		(HL)	●(*6)	●(*6)	●(*6)	●(*6)
			(HL-S)	–	–	–	–
	External operating handle		(F)	●	●	●	●
			(V)	●	●	●	●
	Terminal cover	Large terminal cover	(TC-L)	●	●	●	●
		Small terminal cover	(TC-S)	–	–	–	–
	IEC 35mm rail mounting adapters			–	–	–	–
CE marking				TÜV approval	TÜV approval	TÜV approval	TÜV approval
CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognition in process
Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Trip button				Equipped	Equipped	Equipped	Equipped
Page of Characteristics and dimensions				828	828	830	830

Installation and connections				Page
		Screw terminal	(AMP-N)	
	Front (F)	Solderless terminal	(SL)	716
		Bar	(BAR)	
		Power supply solderless load bar	(SL/BAR)	

Cassette-type accessories			
Alarm switch	(AL)	725	
Auxiliary switch	(AX)		
Shunt trip	(SHT)		
Undervoltage trip	(UVT)		
With lead-wire terminal block	(SLT)	737	

External accessories				
Mechanical interlock		(MI)	752	
Handle lock device		(HL)	750	
		(HL-S)		
External operating handle		(F)	740	
		(V)		
Terminal cover	Large terminal cover	(TC-L)	744	
	Small terminal cover	(TC-S)	745	
IEC 35mm rail mounting adapters			759	

Notes: *1 Not isolation compatible.
*2 Not acquire the TÜV certification.
*3 Cassette type accessories are field mountable type. It can respend to adhesion attachment of a breaker as standard below 250A frame. (excluding UVT.)
*4 The values in parentheses apply to the circuit breakers with solderless terminals.
*5 The circuit breakers with busbar terminals have insulation barriers.
*6 Please consult us. (Models which are not UL or TUV certified but can be locked in the ON and OFF positions are available.)
*7 Not available for 630A.

Remarks: 1. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
2. The 3-pole circuit breakers can be used on single-phase circuits.

US UL Standard 489	
UL File No.E167691	Body
UL File No.E108284	Accessories

Canada CSA Standard
C22.2 No.5

●UL 489 Listed Earth Leakage Circuit Breakers (Harmonic Surge Ready)

Frame (A)				50		100	125				250			
Model				NV50-SVFU		NV100-CVFU	NV125-SVU		NV125-HVU		NV250-SVU		NV250-HVU	
Image														
Rated current In (A) Rated ambient temperture 40°C				(5) (10) 15 20 30 40 50		60 (70) 75 (80) (90) 100	15 20 30 (40) 50 60 75 100	125	15 20 30 (40) 50 60 75 100	125	125 150 175 200 225	250	125 150 175 200 225	250
Number of poles				2	3	3	3	3	3	3	3	3	3	3
Phase line (*1)				1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W
Rated operational voltage AC V	UL 489			120-240		120-240	120-480	120-480	120-480	120-480	120-480	120-480	120-480	120-480
	IEC 60947-2 EN 60947-2			100-240	100-440	100-440	100-440	100-440	100-440	100-440	100-440	100-440	100-440	100-440
High-speed type	Rated current sensitivity I△n mA			30 50	30 50 100	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable	30, 50, 100/200/500 selectable
	Pickup current, UL 1053			75% of I△n		75% of I△n	75% of I△n	75% of I△n	75% of I△n	75% of I△n	75% of I△n	75% of I△n	75% of I△n	75% of I△n
	Max. operating time (s) at 5I△n (*4)			0.04		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Earth leakage indication system				Display window		Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	AC	480V	–		–	30	30	50	50	35	35	50	50
			240V	14		14	50	50	100	100	65	65	100	100
			120V	14		14	50	50	100	100	65	65	100	100
	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	–	7.5/4	10/5	30/15	30/15	50/25	50/25	36/18	36/18	50/25	50/25
			400V	–	10/5	10/5	30/15	30/15	50/25	50/25	36/18	36/18	50/25	50/25
			230V	15/8	15/8	15/8	50/25	50/25	100/50	100/50	65/33	65/33	100/50	100/50
			100V	15/8	15/8	15/8	50/25	50/25	100/50	100/50	65/33	65/33	100/50	100/50
Rated impulse withstand voltage Uimp (kV)				4	6	6	6	6	6	6	6	6	6	6
Suitability for isolation				Compatible		Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Reverse connection (below 240VAC)				–		Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
Utilization category				A		A	A	A	A	A	A	A	A	A
Pollution degree				2		2	2	2	2	2	2	2	2	2
EMC environment condition (environment A or B)				A		A	A	A	A	A	A	A	A	A
Overall dimensions (mm)			a	36	54	75	90	90	90	90	105	105	105	105
			b	120		150	160	160	160	160	185	185	185	185
			c	68		68	68	68	68	68	68	68	68	68
			ca	90		90	90	90	90	90	92	92	92	92
Mass of front-face type (kg)				0.4	0.5	0.9	1.2	1.2	1.2	1.2	1.8	1.8	1.8	1.8
Installation and connections	Front (F)	Screw terminal	(AMP-N)	Page		●	●	●	●	●	●	●	●	●
		Solderless terminal	(SL)			–	●	●	●	●	●	●	●	●
		Bar	(BAR)	716		–	●(*5)	●	●	●	●	●	●	●
		Power supply solderless load bar	(SL/BAR)			–	●(*5, *6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)
Cassette-type accessories (*2)	Alarm switch		(AL)	725	–	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)
	Auxiliary switch		(AX)		–	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)
	Shunt trip		(SHT)		–	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)
	Undervoltage trip		(UVT)		–	●	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)	●(*8)
	With lead-wire terminal block		(SLT)	737	–	●	●	●	●	●	●	●	●	●
	Test button module		(TBM)	738	●(*9)		–	●(*9)	●(*9)	●(*9)	●(*9)	●(*9)	●(*9)	●(*9)
External accessories (*2)	Mechanical interlock		(MI)	752	–		–	–	–	–	–	–	–	–
	Handle lock device		(HL)	750	●		●	●	●	●	●	●	●	●
			(HL-S)		●		●	●	●	●	●	●	●	●
	External operating handle		(F)	740	●		●	●	●	●	●	●	●	●
			(V)		●		●	●	●	●	●	●	●	●
	Terminal cover	Large terminal cover	(TC-L)	744	●		●	●	●	●	●	●	●	●
		Small terminal cover	(TC-S)	745	●(*3)		– (*3)	– (*3)	– (*3)	– (*3)	– (*3)	– (*3)	– (*3)	– (*3)
	IEC 35mm rail mounting adapters			759	Standard accessory		Standard accessory	–	–	–	–	–	–	–
CE marking				TÜV approval		TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval	TÜV approval
CCC recognition				Recognition in process		Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
Automatic tripping device				Thermal-magnetic		Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Trip button				Equipped		Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped
Page of Characteristics and dimensions				818		820	822		822		826		826	

Notes:
*1 If using a 3-pole earth leakage circuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole.
*2 These are different from general models in specifications. Consult us for the details.
*3 The standard structure conforms to IP20 (finger protection).
*4 The maximum operating time is 0.1 according to UL 1053.
*5 The circuit breakers with busbar terminals have insulation barriers.
*6 Circuit breakers for power supply solderless load screw terminal (SL/AMP-N) are available. In this case, a bar terminal is not provided on the load side.
*7 Circuit breakers for 100 V AC do not have obtained CCC certificate.
*8 These cassette type accessories can be installed by the customer. They can be installed with their side faces in close contact with circuit breakers (except NV50-SVFU and UVT).
*9 Standard type is SLT equipped.

Remarks:
1. Products with rated current parenthesized are produced when an order is placed.
2.

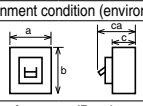
Rated operational voltage	Applicable circuit voltage	Available voltage range
120-240V (UL)	120/240V	66-264V
120-240-480V (UL)	120/240/480V	66-528V
240V (UL)	240V	132-264V
100-230V (IEC)	100/110/200/220/230V	85-253V
100-240V (IEC)	100/110/200/220/230/240V	85-264V
100-230-400-440V (IEC) 100-440V (IEC)	100/110/200/220/ 230/240/254/265/ 380/400/415/440V	85-484V
230-400-440V (IEC)	230/240/254/265/ 380/400/415/440V	195-484V

US UL Standard 489	
UL File No.E167691	Body
UL File No.E108284	Accessories

Canada CSA Standard
C22.2 No.144
C22.2 No.5

Detailed Specifications

●MDU Breakers

Frame (A)				250				400				630				800			
Model				NF250-SEV with MDU		NF250-HEV with MDU		NF400-SEP with MDU		NF400-HEP with MDU		NF630-SEP with MDU		NF630-HEP with MDU		NF800-SEP with MDU		NF800-HEP with MDU	
Image																			
Rated current In (A) Rated ambient temperture 40°C				Adjustable 125-250A (12.5A Step)				Adjustable 200 225 250 300 350 400				Adjustable 300 350 400 500 600 630				Adjustable 400 450 500 500 600 700 800			
Number of poles				3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Phase line				3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W	3ϕ3W, 1ϕ3W, 1ϕ2W	3ϕ4W
Rated insulation voltage Ui (V)				690				690				690				690			
Rated short-circuit breaking capacities (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	8/8		10/8		10/10		10/10		10/10		15/15		10/10		15/15	
			500V	18/18		30/23		30/30		50/50		30/30		50/50		30/30		50/50	
			440V	36/36		50/50		42/42		65/65		42/42		65/65		42/42		65/65	
			415V	36/36		70/70		45/45		70/70		45/45		70/70		45/45		70/70	
			400V	36/36		75/75		45/45		70/70		45/45		70/70		45/45		70/70	
			380V	36/36		75/75		45/45		70/70		45/45		70/70		45/45		70/70	
			230V	85/85		100/100		85/85		100/100		85/85		100/100		85/85		100/100	
			200V	85/85		100/100		85/85		100/100		85/85		100/100		85/85		100/100	
			100V	–		–		–		–		–		–		–		–	
Rated impulse withstand voltage Uimp (kV)				8				8				8				8			
Current				AC				AC				AC				AC			
Suitability for isolation				Compatible				Compatible				Compatible				Compatible			
Reverse connection (below 240VAC)				–				–				–				–			
Number of operating cycles		Without current		25,000				6,000				6,000				4,000			
		With current		10,000				1,000				1,000				500			
Utilization category				A				B				B				B			
Pollution degree				3				3				3				3			
EMC environment condition (environment A or B)				A				A				A				A			
Overall dimensions (mm)			a	105	140	105	140	140	185	140	185	210	280	210	280	210	280	210	280
			b	165				257				275				275			
			c	68				103				103				103			
			ca	92				155				155				155			
Mass of front-face type (Breaker mounting) (kg)				1.8	2.3	1.8	2.3	6.2	8	6.2	8	10.7	13.8	10.7	13.8	11.1	14.4	11.1	14.4
MDU installation				Breaker mounting, Panel mounting (*1)				Breaker mounting, Panel mounting (*2)											
Installation and connections	Front		(F)	Page	●	●	●	●	●										
	Rear (*3)		(B)	716	●	●	●	●	●										
	Plug-in		(PM)		–				–								–		
Cassette-type accessories	Alarm switch		(AL)		●(*4)	●	●(*4)	●	●(*4)										
	Auxiliary switch		(AX)		●(*4)	●	●(*4)	●	●(*4)										
	Shunt trip		(SHT)	725	●(*4)	●	●(*4)	●	●(*4)										
	Undervoltage trip		(UVT)		●(*4)	●	●(*4)	●	●										
	MDU transform AL, AX, AL + AX		(MG)		●(*4)	●	●(*4)	●	●(*4)										
	With lead-wire terminal block		(SLT)	737	●	●	●	●	●										
	Alarm contact output (*5)	Pre-alarm	(PAL)	739	● PAL 1a				● PAL 1a				● PAL 1a				● PAL 1a		
		Trip-indicator	(TI)		–				● PAL 1a, OAL 1a				● PAL 1a, OAL 1a				● PAL 1a, OAL 1a		
External accessories (*2)	Electrical operation device (*6) (NFM)			756	Available only for the MDU panel mounting type				Available only for the MDU panel mounting type. Disavailable alarm contact output.										
	Mechanical interlock (MI) (*7)	Panel mounting		752	●				●				●				●		
		Breaker mounting			●(*9)	–	●(*9)	–	Available only for the MDU panel mounting type										
	Handle lock device	LC		750	●				–				–				–		
		HL			●				●				●				●		
		HL-S			Available only for the MDU panel mounting type														
	External operating handle	(F)		740	Available only for the MDU panel mounting type														
		(V)			Available only for the MDU panel mounting type														
	Terminal cover	TC-L		744	●(*8)	●	●(*8)	●	Available only for the MDU panel mounting type										
		TC-S			●(*8)	●	●(*8)	●	–										
		TTC			●(*8)	●(*8)	●(*8)	●(*8)	●(*8)										
		BTC			●(*8)	●	●(*8)	●	Available only for the MDU panel mounting type and line side										
	Rear stud (B-ST)			718	●	●(*8)	●	●	–				–				–		
Automatic tripping device				Electronic (effective value detection)				Electronic (effective value detection)				Electronic (effective value detection)				Electronic (effective value detection)			
MDU measurement specifications				See. 36															
Trip button				Equipped				Equipped				Equipped				Equipped			
Page of Characteristics and dimensions				832				834				836				836			

Notes:
*1 In the case of panel mounting, the panel holder plate, the screws and the MDU connection cable (2m) are packed as standard. The MDU connection cable of 0.5m, 3m, 5m and 10m can be specified when ordering. And dimension of the front panel drilling of the breaker is different between breaker mounting and panel mounting.
*2 In the case of panel mounting, the panel holder plate, the nuts and the MDU connection cable (2m) are packed as standard. The MDU connection cable of 0.5m, 3m, 5m and 10m can be specified when ordering.
*3 For 250AF breakers, the studs are packed as standard. For 400/630/800AF breakers, please specify the installation angle of the studs because it is installed to the breaker before shipping.
*4 It can be installed to the breaker by each customer.
*5 In the case of the breaker with alarm contact output, the module (terminal) is attached to the right side of the breaker and the control power (AC/DC 100-240V 50-60Hz 5VA) is needed. The Output function for alarm output of PAL can set “Self-holding” or “Auto-reset”. Default setup is “Auto-reset”.
*6 For 250AF of electrical operation device, AL is used for the trip indication as standard. The breaker with alarm output contact is not available.
*7 Not isolation compatible.
*8 In the case of breaker mounting, the terminal cover is special type for MDU breaker.
*9 Available only for the MDU panel mounting type.

Measuring Display Unit Breakers (Circuit Breakers with Measuring Display Unit)

●Three major features of Measuring Display Unit Breakers

1. Saving of space and labor for installation
2. Improved and diversified functions
3. Provision of total cost advantages

Measuring Display Unit Breakers with built-in VT and CT and Measuring Display Unit realize measurement, display and transmission of electric circuit information in small space with less installation and wiring work and provide total cost advantages.
The Measuring Display Unit Breakers full of functions in small bodies are suitable for monitoring and protection of electric circuits and maintenance of equipment. A wide variety of models applicable to various networks supports the customers' energy saving activities through detailed energy control as energy saving supporting devices.

●Simply realizing measurement and monitoring of electric circuits for supporting various types of energy saving control

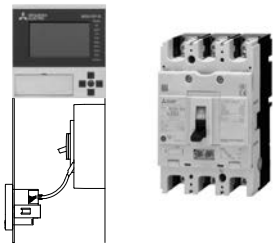
The circuit breakers measure and display the load current, line voltage, electric power, electric energy, harmonic current, leak current and power factor to realize detailed energy control. They support customers' energy saving control.

WS-V Series Measuring Display Unit Breakers

Applicable models
NF250-SEV with MDU, NF250-HEV with MDU

●The measuring display unit can be installed on the body or panel.

【Examples of installation of measuring display unit】

Breaker mounting	Panel mounting
	

Note: The size of holes in the face board of the circuit breaker body varies depending on whether the measuring display unit is installed on the body or the panel.

■Model list

Model type	Type name
CC-Link communication	MDU-DP-C
Electric energy pulse output	MDU-DP-P
No transmission	MDU-DP-N

■Measuring Display Unit cable list

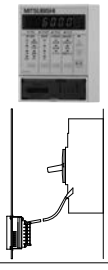
Type name	Cable length
MDU-DP-CB-2M	2m
MDU-DP-CB-3M	3m
MDU-DP-CB-5M	5m
MDU-DP-CB-10M	10m

W & WS Series Measuring Display Unit Breakers

Applicable models
NF400-SEP with MDU, NF400-HEP with MDU, NF630-SEP with MDU, NF630-HEP with MDU, NF800-SEP with MDU, NF800-HEP with MDU

●The measuring display unit can be installed on the body or panel.

【Examples of installation of measuring display unit】

Breaker mounting	Panel mounting
	

■Model list

Model type	Type name	Remarks
CC-Link communication	MDU-AC ○○○	• The model names do not include ○○○.
Electric energy pulse output	MDU-AP ○○○	• When installing the Measuring Display Unit on the body, specify the A frame type in ○○○. For example, when the circuit breaker NF400-SEP with MDU and the Measuring Display Unit with CC-Link communication are combined, the model name is MDU-AC400. If 630A frame or 800A frame is used, specify 630 or 800 in ○○○.
No transmission	MDU-AN ○○○	• When installing the Measuring Display Unit on the panel, specify the cable length (0.5 m, 2 m, 3 m, 5 m or 10 m) in ○○○. For example, when the Measuring Display Unit with CC-Link communication is installed on the panel with a 3-m cable, the model name is MDU-AC-PANEL 3M.

●Specifications for Measuring Display Unit (1)

The measurement and display items vary depending on the model or frame A.
(For the measurement accuracy, please refer to page 697.)

Applicable models
NF250-SEV with MDU, NF250-HEV with MDU

Table 1

Measurement and memory items (accuracy) (*1) (*2) / Model			Display	Storage (*3)	With CC-Link communication: Communication	Remarks
Load current (±1.0%)	Present value	Each phase	●	–	●	
		General (average value) (*5)	●	–	●	
		Phase with max. value	–	–	●	
	Present value of demand (*4)	Each phase	●	–	●	
		Phase with max. value	●	–	●	
	Max. demand value among all phases		●	●	●	
	Time of occurrence of max. demand value among all phases		●	●	●	
Line voltage (±1.0%)	Present value	Between each lines	●	–	●	
		General (average value) (*5)	●	–	●	
	Max. value among all lines		●	●	●	
	Time of occurrence of max. value among all lines		●	●	●	
Harmonic current (±2.5%)	Present value	Fundamental wave of each phase	●	–	●	
		Each order of each phase	●	–	●	
		General of each phase (*6)	●	–	●	
	Max. value of fundamental wave among all phases		●	●	●	
	Time of occurrence of max. value of fundamental wave among all phases		●	●	–	
	Max. value in each order of each phase		●	●	●	
	Time of occurrence of max. value in each order of each phase		●	●	●	
	Demand value (*4)	General of each phase (*6)	●	–	●	
		General max. value among all phases	●	●	●	
		Time of occurrence of general max. value among all phases	●	●	●	
	General distortion factor of each phase		●	–	–	
	Content in each order of each phase		●	–	–	
Electric power (±1.5%)	Present value		●	–	●	
	Demand value (*4)	Present value	●	–	●	
		Max. value	●	●	●	
		Time of occurrence of max. value	●	●	●	
Reactive power (±2.5%)	Present value		●	–	●	
	Demand value (*4)	Present value	●	–	●	
		Max. value	●	●	●	
		Time of occurrence of max. value	●	●	●	
Electric energy (±2.0%) (*7)	Integrated value		●	●	●	Value accumulated from previous reset to present
	Amount for last 1 hour		●	–	●	
	Max. value of amount for 1 hour		●	●	●	
	Time of occurrence of max. value of amount for 1 hour		●	●	●	
Reactive energy (±3.0%) (*7)	Integrated value		●	●	●	Value accumulated from previous reset to present
	Amount for last 1 hour		●	–	●	
	Max. value of amount for 1 hour		●	●	●	
	Time of occurrence of max. value of amount for 1 hour		●	●	●	
Cause of fault (*8)	Fault current (accuracy: ±15%)		●	●	●	Information on fault after previous reset or last fault, and cause of fault (continuously monitored)
	Cause of fault		●	●	●	
Power factor (±5.0%)	Present value		●	–	●	
	Max. value		●	●	●	
	Time of occurrence of max. value		●	●	–	
Frequency (±2.5%)	Present value		●	–	●	
Alarm of circuit breaker (*9)	PAL, OVER, IDM_AL, ILA_AL, IUB_AL		●	–	●	The PAL functions are enabled when the MDU breaker with PAL module (option) is used.
	Neutral line open phase alarm		●	–	–	The neutral line open phase alarm is given only on the display.
State of circuit breaker	Tripping state of circuit breaker (AL)		–	–	●	On installation of alarm switch for transmission with Measuring Display Unit (option)
	ON/OFF state of circuit breaker (AX)		–	–	●	On installation of auxiliary switch for transmission with Measuring Display Unit (option)
	Number of times of tripping of circuit breaker		–	●	●	On installation of alarm switch for transmission with Measuring Display Unit (option)
	Number of times of opening and closing of circuit breaker		–	●	●	On installation of auxiliary switch for transmission with Measuring Display Unit (option)
Default settings	Time setting		●	●	●	Initial setting and resetting after power failure are necessary (no power failure compensation)
	Demand time limit setting (*4)		●	●	●	By default, the demand time limit is 2 min. It can be set in the range from 0 to 15 min in 1-min steps.
	IDM_AL (current demand alarm)		●	●	●	By default, the function is off. The parameters can be set in the following ranges. Function: ON/OFF Pickup current: 50 to 100% (1% step) Demand time limit: 1 to 10 min (1-min step), 15, 20, 25 and 30 min
	ILA_AL (current open phase alarm)		●	●	●	By default, the function is off. The parameters can be set in the following ranges. Function: ON/OFF Pickup current: 10%, fixed (no setting) Operating time: 30 sec (no setting)
	IUB_AL (unbalanced current alarm)		●	●	●	By default, the function is off. The parameters can be set in the following ranges. Function: ON/OFF Pickup current: 30%, fixed (no setting) Operating time: 30 sec (no setting)
	Neutral line open phase alarm		●	●	●	30 When the single-phase 3-wire type is set, the function is turned on. Rated operating overvoltage: 135 V AC (no setting) Operating time: 1 sec (no setting)
	Phase switching setting		●	●	●	Default: No phase switching
	Alarm retention (self-retention or automatic reset) setting		●	●	●	Default: Automatic reset
	Phase and wire type		●	●	●	Default: 3-phase 3-wire
	Electric energy arbitrary setting		●	●	●	
	Reactive energy arbitrary setting		●	●	●	
	Display direction		●	●	●	Default: Vertical One of vertical, horizontal 1 and horizontal 2 can be selected.

Notes:
*1 The term “each phase” used for load current and harmonic current refers to phase 1, 2, 3 or N. However, the phase N is provided only on 4-pole circuit breakers. The term “between each phase” used for line voltage refers to between phases 1 and 2, 2 and 3, 3 and 1, 1 and N, 2 and N or 3 and N. However, voltage between phases 1 and N, 2 and N and 3 and N is applicable only on 4-pole circuit breakers. These circuit breakers measure the values every 0.25 sec. Therefore, even when a low order circuit breaker operates, operating current may not be measured.
*2 Each maximum value is the largest value among values obtained from the start of operation (after the previous reset) to the present.
*3 The integrated value of electric energy and the integrated value of reactive energy are stored upon occurrence of power failure and every 30 minutes, the fault current and the cause are stored upon occurrence of fault, the set values are stored when they are set, and other values are stored every 30 minutes in the nonvolatile E^2PROM.
*4 The demand time limit cannot be set individually. It is common to the items.
*5 The average values of load current and line voltage are calculated as shown below when the phase and wire type is specified.

Phase and wire type	Average present value of current	Average present value of voltage
Single-phase 2-wire	Average present value of current = phase 3 current	Average present value of voltage = voltage between phases 2
Single-phase 3-wire	Average present value of current = (phase 1 current + phase 3 current)/2	Average present value of voltage = (voltage between phases 1 and 2 + voltage between phases 2 and 3)/2
3-phase 3-wire 3-phase 4-wire	Average present value of current = (phase 1 current + phase 2 current + phase 3 current)/3	Average present value of voltage = (voltage between phases 1 and 2 + voltage between phases 2 and 3 + voltage between phases 3 and 1 phases)/3

*6 Sum of values of harmonic components in third to 19th orders except fundamental wave component
*7 The reverse power is not measured.
*8 If the upper limit of the fault current measurement range (rated current 125 to 250 A (adjustable): 4000 A, rated current 50, 60, 75, 100, 125 A (fixed): 2000 A)) is exceeded when overload or short circuit fault occurs, the cause of the fault may not be displayed, and the fault current may not be measured. For fault current, display of cause of fault and measurement of fault current are enabled when the AL for transmission with the Measuring Display Unit (option) is installed.
*9 When the alarm retention mode has been set to Automatic reset, the alarm display on the Measuring Display Unit will be reset automatically. When the alarm retention mode is Self-retention, the alarm display will be self-retained. In the self-retention mode, the display can be reset through the alarm reset operation (collective reset). OVER will be automatically reset regardless of the mode setting.

●Specifications for Measuring Display Unit (1)

The measurement and display items vary depending on the model or frame A.
(For the measurement accuracy, please refer to page 698.)

Applicable models
NF400-SEP with MDU, NF400-HEP with MDU, NF630-SEP with MDU, NF630-HEP with MDU, NF800-SEP with MDU, NF800-HEP with MDU

Table 2

Measurement and memory items (accuracy) (*3) / Model		MDU Display	Storage (*1)	Electric energy with pulse output: Pulse output (*1)	With CC-Link communication: Communication	Remarks
Load current (±2.5%)	Present value of each phase	●	–	–	●	Time limit: 0 to 15 min, changeable (Same as the present value when 0 min is specified)
	Demand value of each phase	●	–	–	●	
	Average present value (*11)	●	–	–	●	
	Max. demand value (general value) (*4)	●	●	–	●	Max. demand value after previous reset
	Time of occurrence of max. value (year, month, day, hour, minute)	–	●	–	●	
Line voltage (±2.5%)	Present value between each phases	●	–	–	●	
	Average present value (*11)	●	–	–	●	
	Max. value (general value) (*4)	●	●	–	●	Max. value after previous reset (not demand value)
	Time of occurrence of max. value (year, month, day, hour, minute)	–	●	–	●	
Harmonic current (±2.5%)	Current value in 3rd, 5th, 7th ... 19th orders of each phase	●	–	–	●	
	Max. value in 3rd, 5th, 7th ... 19th orders (general value) (*4)	●	●	–	●	Max. value after previous reset (not demand value)
	Time of occurrence of max. value (year, month, day, hour, minute)	–	●	–	●	
	Current value of general harmonics of each phase (*10)	●	–	–	●	Time limit: 0 to 15 min, changeable (Same as the present value when 0 min is specified)
	Demand value of general harmonics of each phase (*10)	●	–	–	●	
	Max. demand value (general value) (*4)	●	●	–	●	Max. demand value after previous reset
	Time of occurrence of max. value (year, month, day, hour, minute)	–	●	–	●	
Electric power (±2.5%)	Current value (also reverse power is measured)	●	–	–	●	Time limit: 0 to 15 min, changeable (Same as the present value when 0 min is specified)
	Demand value (also reverse power is measured)	●	–	–	●	
	Max. demand value	●	●	–	●	Max. demand value after previous reset
	Time of occurrence of max. value (year, month, day, hour, minute)	–	●	–	●	
Electric energy (±2.5%)	Electric energy (integrated value) (*5)	●	●	●	●	Value accumulated from previous reset to present
	Electric energy per time (*5)	●	–	–	●	Amount for 1 hour from hour to hour on built-in clock
	Max. value of electric energy per time (*5)	●	●	–	●	Max. demand value after previous reset
	Time of occurrence of max. value (year, month, day, hour, minute)	–	●	–	●	
Cause of fault	Fault current (accuracy: ±15%) (*11)	●	●	–	●	Information on fault after previous reset or last fault, and cause of fault (continuously monitored)
		●	●	–	●	
Power factor (±5%)	Present value	●	–	–	●	
Alarm of circuit breaker	PAL, OVER (*6) (*11)	● LED on	–	–	●	
State of circuit breaker	Tripping state of circuit breaker (AL)	–	–	–	●	When alarm switch for transmission with Measuring Display Unit (option) is installed
	ON/OFF state of circuit breaker (AX)	–	–	–	●	When auxiliary switch for transmission with Measuring Display Unit (option) is installed
Default settings	Time setting	–	–	–	●	Initial setting and resetting after power failure are necessary (no power failure compensation).
	Demand time limit setting (*7)	●	●	–	●	Default: 2 min Setting in 1-min steps in range from 0 to 15 min
	PAL pickup current setting * Setting on circuit breaker body The Measuring Display Unit does not have the setting function.	●	●	–	●	Default: 100% Setting in 5% steps in range from 70 to 100% Default setting on breaker body is 70% unless otherwise specified.
	Pulse unit setting	●	●	–	–	Default: 1 kWh/pulse Setting to 1 kWh, 10 kWh, 100 kWh, 1000 kWh or 10000 kWh
	Phase switching setting	●	●	–	●	Default: No phase switching
	Alarm retention (self-retention or automatic reset) setting	●	●	–	●	Default: Automatic reset

Notes: *1 The electric energy (integrated value) is stored upon occurrence of power failure and every 2 hours, the fault current and the cause are stored upon occurrence of fault, the demand time limit, EPAL sensitivity current, PAL pickup current, pulse unit, alarm retention and phase switching settings are stored when they are set, and other values are stored every 2 hours in the nonvolatile E^2PROM.
Each maximum value is the largest value among values obtained from the start of operation (after the previous reset) to the present.

*2 Every time the electric energy is integrated in the pulse unit (the unit can be set to 1 kWh, 10 kWh, 100 kWh, 1000 kWh or 10000 kWh), a pulse is output. Counting can be performed with a PLC.

*3 The term "each phase" used for load current and harmonic current refers to phase 1, 2, 3 or N. However, the phase N is provided only on 4-pole circuit breakers.
The term "between each phase" used for line voltage refers to between phases 1 and 2, 2 and 3, 3 and 1, 1 and N, 2 and N or 3 and N. However, voltage between phases 1 and N, 2 and N and 3 and N is applicable only on 4-pole circuit breakers.
The electric energy data is 6-digit data of up to 999999 kWh. The voltage and harmonic current are 3-digit data, and others are 4-digit.
These circuit breakers measure the values every 0.25 sec. Therefore, even when a low order circuit breaker operates, operating current may not be measured.

*4 Each general value indicates the value only of the phase with the maximum value.

*5 The electric energy is not measured in the case of reverse power flow.

*6 When the alarm retention mode has been set to Automatic reset, the PAL alarm LED display on the Measuring Display Unit front panel will be reset automatically. When the alarm retention mode is Self-retention, the alarm display will be self-retained. In the self-retention mode, the display can be reset through alarm reset operation (collective reset). OVER will be automatically reset regardless of the mode setting.

*7 The demand time limit cannot be set individually. It is common to the items.

*8 Sum of values of harmonic components in third to 19th orders except fundamental wave component.

*9 The average present value of load current is the average value of current among phases 1, 2 and 3 (the current of the phase N is not included even in the case of a 4-pole circuit breaker). When the circuit breaker is used on a single-phase 3-wire circuit, the calculated value is displayed. However, ignore it. The average present value of line voltage is the average value of voltages between phases 1 and 2, 2 and 3 and 3 and 1 (the voltages between phases 1 and N, 2 and N and 3 and N are not included in the case of a 4-pole circuit breaker).

*10 Setting at the pre-alarm current Ip (which can be set in the range from 70 to 100% of the rated current In in 5% steps) on the circuit breaker body. The Measuring Display Unit does not have the setting function.

*11 The operating time of PAL is shown below.

PAL	Same as pre-alarm operating time Tp on circuit breaker body

●Specifications for Measuring Display Unit (2)

Applicable models
NF250-SEV with MDU, NF250-HEV with MDU

Table 3

Item		Specification
Data updating cycle		250 ms (harmonic current: 2 s)
Tolerances		Current and voltage: ±1.0% (to rating input) Electric power: ±1.5% (to rating input) Reactive power: ±2.5% (to rating input) Harmonic current: ±2.5% (to rating input) Power factor: ±5% Frequency: ±2.5% Electric energy: ±2.0% (voltage 100 V to 440 V, range from 5 to 100% of current rating, power factor 1) Reactive energy: ±3.0% (voltage 100 V to 440 V, range from 10 to 100% of current rating, power factor 0) Fault current: ±15% (*1)
Demand time limit setting range		0 to 15 min (1-min steps)
Rated input	Voltage circuit (1ϕ2W, 3ϕ3W)	440 V (only 4-pole breakers applicable to 3ϕ4W)
	Voltage circuit (1ϕ3W)	
	Voltage circuit (3ϕ4W)	
	Current circuit	Load current/harmonic current: 250 A
	Frequency	50 Hz/60 Hz (automatic discrimination of frequency)
Power failure compensation	(1) Wh (integrated value) (2) Max. value (3) Setting data	Stored in EEPROM (nonvolatile memory) * Wh and varh are stored upon occurrence of power failure and every 30 min. Max. value is stored every 30 min. Setting data are stored when they are set.
	Clock	No power failure compensation
Clock accuracy		Approx. 1 min/month
External dimensions (unit: mm)		See Characteristics and Dimensions.
Control power supply		Compatible with 100 to 240 V AC/DC, 50/60 Hz (allowable voltage range: 85% to 110%), 12 VA (*2)
Other functions		Function for switching phases to be measured to 1-3 and 3-1 PAL alarm, self-retention/automatic reset setting function (*3) Function for counting number of times of opening and closing of circuit breaker body (*4)

Notes: *1 The measurement of fault current of load is enabled when the AL switch for transmission with Measuring Display Unit (option) is installed in the Measuring Display Unit Breaker body.
*2 When the MDU unit control power is turned on, a rush current transitionally flows (maximum rush current: 2A, energizing time: 1ms (240V AC)
*3 The PAL functions are enabled when the MDU breaker with PAL module (option) is used.
*4 The function is enabled when the AX switch for transmission with Measuring Display Unit (option) is installed in the Measuring Display Unit Breaker body.

●Network Specifications for Measuring Display Unit

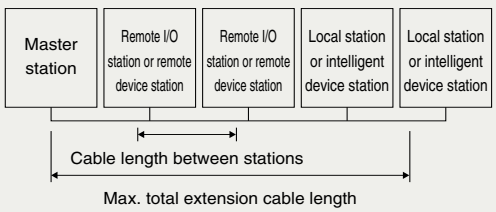
[Electric energy pulse output]

Table 4

Item	Specification
Output elements	Solid state relay (SSR), no voltage a contact (Ca and Cb terminals: no polarity)
Contact capacity	Compatible with 24V DC and 100 to 200 V AC, 20 mA
Output pulse unit	1, 10, 100, 1000 and 10000 kWh/pulse (settable)
Output pulse width	0.35 to 0.45 s
Max. wiring length	100m

[CC-Link communication]

Table 5

Item	Specification
Communication speed	10M/5M/2.5M/625k/156kbps
Communication method	Broadcast polling method
Synchronization method	Frame synchronization method
Encoding method	NRZI
Transmission format	Conforming to HDLC
Number of occupied stations	Remote device occupying 1 station
Number of connected units	Meet the following conditions. When a system consists only of Measuring Display Units, up to 42 units can be connected. Condition 1 for number of connected units $\{(1\times a)+(2\times b)+(3\times c)+(4\times d)\} \leqq 64$ a: Number of units occupying 1 station b: Number of units occupying 2 stations c: Number of units occupying 3 stations d: Number of units occupying 4 stations Condition 2 for number of connected units $\{(16\times A)+(54\times B)+(88\times C)\} \leqq 2304$ A: Number of units at 1 remote I/O station $\leqq 64$ B: Number of units at remote device station $\leqq 42$ C: Number of units at local station $\leqq 26$
Station number	Setting in range from 1 to 64 (Set the station number without fail.)
CC-Link version	CC-Link Ver.1.10
Max. total extension cable length and cable length between stations	 Cables applicable to CC-Link Ver. 1.10 (with use of 110-ohm terminal resistance)
Connecting cable	Cables applicable to CC-Link Ver. 1.10 (shielded 3-core twisted pair cables) * Cables applicable to Ver. 1.10 supplied by different manufacturers can be used simultaneously.

Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
Cable length between stations	0.2 m or more				
Max. total extension cable length	1200m	900m	400m	160m	100m

Note: For more information, visit the website of CC-Link Partner Association ("http://www.cc-Link.org/").

●Specifications for Measuring Display Unit (2)

Applicable models
NF400-SEP with MDU, NF400-HEP with MDU, NF630-SEP with MDU, NF630-HEP with MDU, NF800-SEP with MDU, NF800-HEP with MDU

Table 6

Item		Specification
Data updating cycle		250 ms (harmonic current: 2 s)
Tolerances		Current, voltage and Electric power: ±2.5% (to rating input) Power factor: ±5% Electric energy: ±2.5% (voltage 100 V to 440 V, range from 5 to 100% of current rating, power factor 1) Fault current: ±15%
Demand time limit setting range		0 to 15 min (1-min steps)
Rated input	Voltage circuit (1ϕ2W, 3ϕ3W)	440 V (only 4-pole breakers applicable to 3ϕ4W)
	Voltage circuit (1ϕ3W)	
	Voltage circuit (3ϕ4W)	
	Current circuit	Load current/harmonic current: 100 A/225 A/400 A/600 A/800 A (Automatic discrimination. Determined based on A frame of circuit breaker. 100 A when rated current of 225 A frame is 100 A or less) Leakage current: 500 mA
	Frequency	50 Hz/60 Hz (automatic discrimination of frequency)
Power failure compensation	(1) Wh (integrated value) (2) Max. value (3) Setting data	Stored in EEPROM (nonvolatile memory) * Wh is stored upon occurrence of power failure and every 2 hours The max. value is stored every 2 hours. The setting data is stored when it is set.
	Clock	No power failure compensation
Clock accuracy		Approx. 1 min/month
External dimensions (unit: mm)		W×D×H: 90×75×30
Control power supply		Compatible with 100 to 240 V AC/DC, 50/60 Hz (allowable voltage range: 85% to 110%), 12 VA
Other functions		Function for switching phases to be measured to 1-3 and 3-1 ECA/PAL alarm, self-retention/automatic reset setting function

Note: *1 When the MDU unit control power is turned on, a rush current transitionally flows (maximum rush current: 2A, energizing time: 1ms (240V AC)

●Network Specifications for Measuring Display Unit

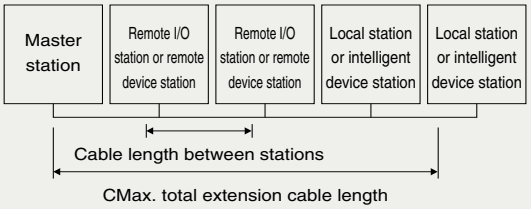
[Electric energy pulse output]

Table 7

Item	Specification
Output elements	Solid state relay (SSR), no voltage a contact (Ca and Cb terminals: no polarity)
Contact capacity	Compatible with 24V DC and 100 to 200 V AC, 20 mA
Output pulse unit	1, 10, 100, 1000 and 10000 kWh/pulse (settable)
Output pulse width	0.35 to 0.45 s
Max. wiring length	100m

[CC-Link communication]

Table 8

Item	Specification
Communication speed	10M/5M/2.5M/625k/156kbps
Communication method	Broadcast polling method
Synchronization method	Frame synchronization method
Encoding method	NRZI
Transmission format	Conforming to HDLC
Number of occupied stations	Remote device occupying 1 station
Number of connected units	Meet the following conditions. When a system consists only of Measuring Display Units, up to 42 units can be connected. Condition 1 for number of connected units $\{(1\times a) + (2\times b) + (3\times c) + (4\times d)\} \leqq 64$ a: Number of units occupying 1 station b: Number of units occupying 2 stations c: Number of units occupying 3 stations d: Number of units occupying 4 stations Condition 2 for number of connected units $\{(16\times A) + (54\times B) + (88\times C)\} \leqq 2304$ A: Number of units at 1 remote I/O station $\leqq$ 64 B: Number of units at remote device station $\leqq$ 42 C: Number of units at local station $\leqq$ 26
Station number	Setting in range from 1 to 64 (Set the station number without fail.)
CC-Link version	CC-Link Ver. 1.10
Max. total extension cable length and cable length between stations	 Cables applicable to CC-Link Ver. 1.10 (with use of 110-ohm terminal resistance) When the Measuring Display Unit is installed on the panel, the terminal block on the panel mounting plate and the terminal block on the Measuring Display Unit are connected with a CC-Link cable having a one-way length of 15 cm and an entire length of 30 cm. When connecting the unit in consideration of the following three points. (1) The one-way length of the CC-Link cable, 15 cm, is included in the distance between stations. (2) The entire length of the CC-Link cable, 30 cm, is included in the maximum transmission distance (total extension distance).
Connecting cable	Cables applicable to CC-Link Ver. 1.10 (shielded 3-core twisted pair cables) * Cables applicable to Ver. 1.10 supplied by different manufacturers can be used simultaneously.

Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
Cable length between stations	0.2 m or more				
Max. total extension cable length	1200m	900m	400m	160m	100m

Note: For more information, visit the website of CC-Link Partner Association (HYPERLINK "http://www.cc-Link.org/").

●Cautions when Using Measuring Display Unit Breakers (common instructions)

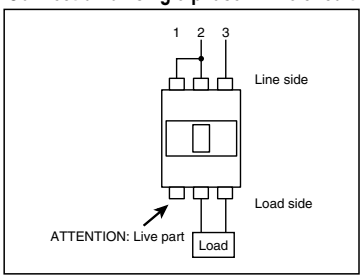
Measuring accuracy

(1) The accuracy of measurement of current or voltage is indicated as the percentage of error to the rated current or voltage for measurement by the Measuring Display Unit.
The measurement rated current is the maximum rated current of each ampere frame. For W & WS Series Measuring Display Unit Breakers, the accuracy is the max. rated current × ±2.5%. For WS-V Series Measuring Display Unit Breakers, the accuracy is the max. rated current × ±1%.
(For example, when the rated current of NF630-SEP with Measuring Display Unit is 350 A, the measurement rated current is 630 A, and the current accuracy is 630 A × ±2.5% = ±15 A.)
* The measurement rated voltage is 440 V. (Common to all A frames)
When the current is less than 1.0% of the measurement rated current in the case of WS-V Series Measuring Display Unit Breakers or less than 2.0% of the measurement rated current in the case of W & WS Series Measuring Display Unit Breakers or when the voltage is less than 5.0% of the measurement rated voltage in the case of WS-V Series Measuring Display Unit Breakers or less than 2.0% of the measurement rated current in the case of W & WS Series Measuring Display Unit Breakers, the current or voltage is cut off, and zero is displayed.
(2) When the current is cut off, the current is displayed as 0 A. However, if the current is 0.4% or more of the measurement rated current, the electric energy is measured.
(3) The accuracy of power factor is the percentage to electrical angle of 90°. A power factor of 50% or less is displayed as a reference value.
(4) The accuracy of electric energy is ±2.0% of the true value in the case of WS-V Series Measuring Display Unit Breakers and ±2.5% of the true value in the case of W & WS Series Measuring Display Unit Breakers in the range of measurement rated voltage (100 V to 440 V) × current (measurement rated current of 5 to 100%).

How to use Measuring Display Unit Breaker on single-phase 2-wire circuity

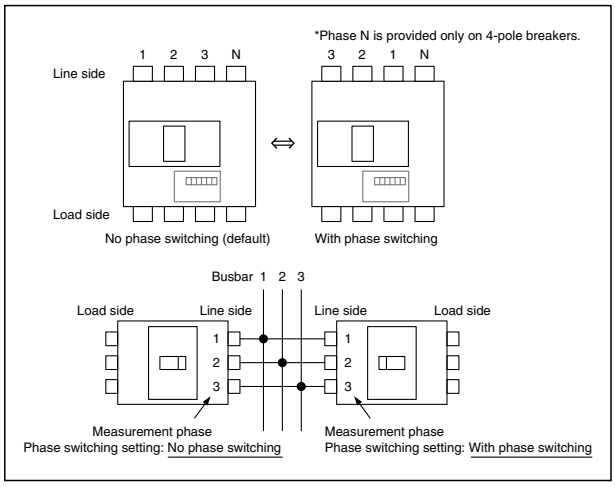
(1) Connect the breaker as shown in the right figure.
The phase 1 on the load side is charged. Insulate it.
As measurement data, use the current of the phases 2 and 3 and the voltage between the phases 2 and 3.
Although the current of the phase 1 and the voltage between the phases 1 and 2 and the phases 3 and 1 are measured, ignore the measurements. The Measuring Display Unit is designed for 3-phase 3-wire and single-phase and 3-wire circuits.
On W & WS Series Measuring Display Unit Breakers, the average values of load current and line voltage are calculated from the values of the phases 1, 2 and 3 (between the phases). Ignore these measurement values.
Also when the breaker is used on a single-phase 3-wire circuit, ignore these values.
When using any WS-V Series Measuring Display Unit Breaker, set the phase and wire type.

Connection on single-phase 2-wire circuit



Phase sequence of Measuring Display Unit Breaker

The phase sequence of Measuring Display Unit Breaker can be set by using the phase switching function as shown below.
When the breaker is installed vertically with the power supply side upward (see the right figure), the phase sequence is set as stated below.
No phase switching: 1, 2, 3 and N from the left (default)
With phase switching: 3, 2, 1, and N from the left
Set the phase sequence in accordance with the installation and wiring methods.
Notes (1) The phase N is provided only on 4-pole circuit breakers.
(2) Note that the position of the phase N is unchanged regardless of the phase switching setting.



Reverse connection of Measuring Display Unit Breaker

The Measuring Display Unit Breakers cannot be connected with the power supply and load sides set reversely.

Installation of Measuring Display Unit Breaker in close contact

The Measuring Display Unit Breakers must not be installed in close contact.
(1) In the case of 400, 630 or 800A frame, install the breaker body securing a wiring space of 30 mm or more on the right side of the breaker to connect the connecting cables and fitting the connecting cable connectors.
(2) In the case of WS-V Series Measuring display Unit Breaker, install the breaker body securing a wiring space of 40 mm or more on the right side of the breaker to connect the connecting cables.

●Cautions when using Measuring Display Unit Breaker (For Measuring Display Unit)

Transmission method

(1) One of No transmission, With pulse output and With CC-Link communication should be specified.
(2) W & WS Series Measuring Display Unit Breaker with CC-Link communication cannot be manufactured for installing the Measuring Display Unit on the breaker body.
(3) When With transmission is selected, data which can be transmitted depends on the function of the Measuring Display Unit Breaker body. The transmission options cannot be installed or changed later. Specify the options when issuing the initial order.
(4) For the maximum number of connected units and transmission distance for each transmission type, see the following tables.
<WS-V Measuring Display Unit Breakers>
Tables 4 and 5
<W & WS Measuring Display Unit Breakers>
Tables 7 and 8

Installation of Measuring Display Unit

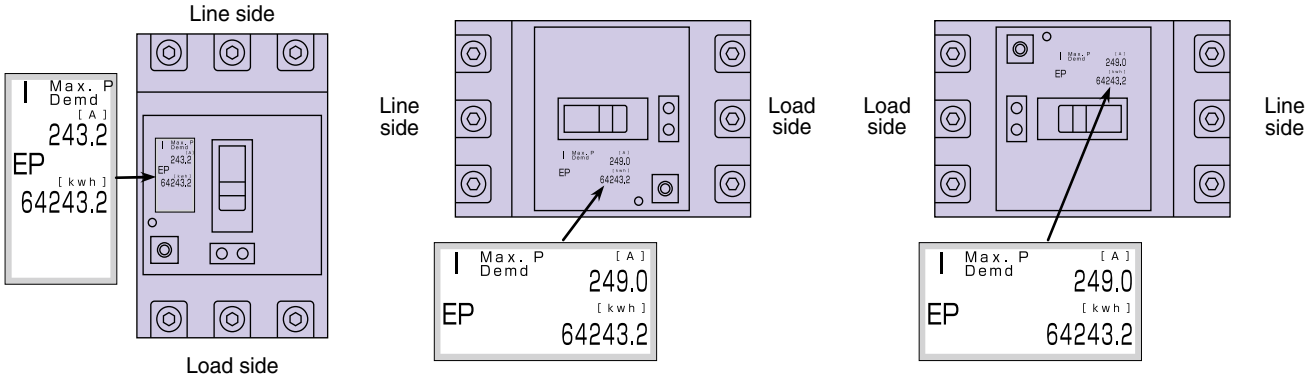
(1) When the installation of Measuring Display Unit on panel has been specified, the breaker will come with the panel mounting parts, mounting screws and 2-m connecting cable (standard).
(The 0.5-, 3-, 5- or 10-m connecting cable can be specified.)
(2) If the installation position of the Measuring Display Unit is changed from the panel to the body or vice versa, the Measuring Display Unit and the breaker body must be returned to the manufacturer for modification.

Measuring Display Unit Breaker with CC-Link communication (W & WS Series Measuring Display Unit Breakers)

(1) If you intend to use the circuit breaker with its pane out on the face board, specify the installation on panel.

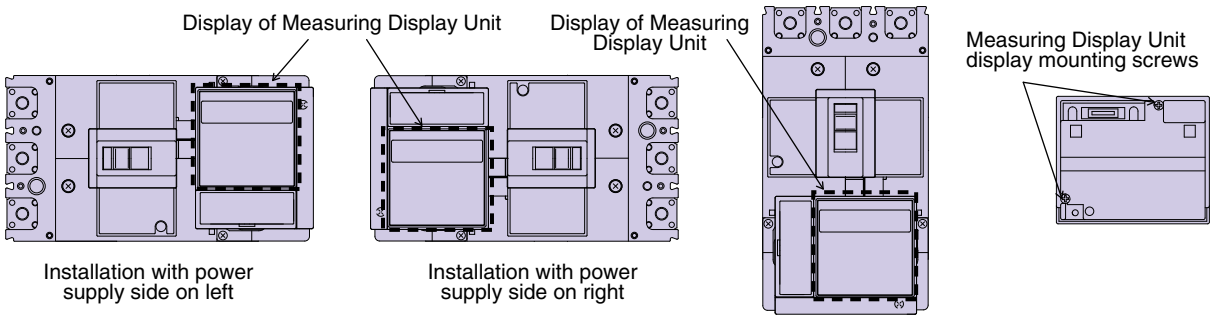
●Change of display direction for breaker mounting

<WS-V Series Measuring Display Unit Breaker>
(1) When installing the Measuring Display Unit on the breaker body installed in the horizontal direction, the direction of the display can be changed according to the installation direction.
(2) The display direction is set on the display unit.



Default display direction
Installation with line side on left
Installation with line side on right

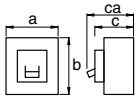
<W & WS Series Measuring Display Unit Breaker>
(1) When installing the Measuring Display Unit on the breaker body installed in the horizontal direction, the direction of the display of Measuring Display Unit can be changed for ease in reading according to the installation direction.
(2) Remove the screws on the rear panel of the Measuring Display Unit, and change the direction according to the installation direction.



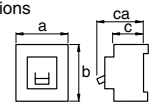
Installation with power supply side on left
Installation with power supply side on right
Default direction of Measuring Display Unit display

MEMO

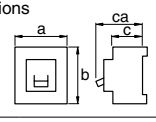
Detailed Specifications

Model			BH			BH-P		
Frame (A)			70	100	100	70	100	100
Image								
Number of poles			1	2	3	1	2	3
Rated current (A) at ambient temperature 40°C			70	70, 100	70, 100	70	70, 100	70, 100
Rated voltage (V)		AC	230/400			230/400		
		DC	125			125		
Rated short circuit capacity (kA)	IEC 60898-1	AC230/400V	3	–		3	–	
	IEC 60898-1	AC400V	–	3		–	3	
	–	DC125V	1			1		
Instantaneous tripping			Type C (5 In <, ≦10 In)					
Dimensions (mm) 		a	25	50	75	25	50	75
		b	95			74		
		c	57.5			60.5		
		ca	77.5			79		
Mass (kg)			0.16	0.32	0.48	0.13	0.26	0.38
Connection (*1)			Clamp terminal			Plug-in (line) Clamp (load)		
								
Automatic tripping device			Thermal, magnetic					
Optional accessories	Terminal cover		●			–		
	Mounting plate		●			–		
	Terminal base		–			●		
	Lock cover		●			●		
Approved by			–	LR, GL, NK	–	–	LR, BV, AB, GL, NK	–

Note: *1 If reguired solderless terminal can be supplied.
(BH : Line and Load side, BH-P : Load side only)

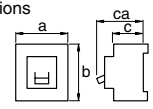
Model				BH-D6					BH-D10				BH-DN
Image													
Number of poles [P]				1	2	3	4(3+N)*1	2(1+N)*1	1	2	3	4(3+N)*1	2 (1+N)*1
Instantaneous tripping				Type B, C, D*2				Type B, C*2	Type B, C, D*2				Type C*2
Rated insulation voltage U_i [V]				440					440				230
Rated current I_n [A] at ambient temperature 30°C				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40	0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				6, 10, 16, 20
Rated short-circuit capacity [kA]	IEC 60898-1 (Icn)	AC	230V	6	–			6	10	–			4.5
			230/400V	6	–			–	10	–			–
			400V	–	6			–	–	10			–
Number of operating cycles		Without current		8,000					10,000				20,000
		With current		8,000					10,000				20,000
Dimensions [mm] 			a	18	36	54	72	36	18	36	54	72	18
			b	87					87				88
			c	44					44				44
			ca	70					70				70
Type of overcurrent release				Thermal-magnetic					Thermal-magnetic				Thermal-magnetic
Mounting				IEC35mm rail					IEC35mm rail				IEC35mm rail
Applicable wire size				1 to 25mm^2					1 to 25mm^2				1 to 10mm^2
Weight [kg]				0.15	0.3	0.45	0.55	0.25	0.15	0.3	0.45	0.55	0.12
Mass optional accessories	Alarm switch (AL)			●					●				–
	Auxiliary switch (AX)			●					●				–
	Shunt trip (SHT)			●					●				–
Terminal connection				Solderless					Solderless				Solderless
Based on standard				IEC 60898-1					IEC 60898-1				IEC 60898-1
CE marking				EN 60898-1 : Self-declaration					EN 60898-1 : Self-declaration				EN 60898-1 : Self-declaration
CCC				GB 10963.1					GB 10963.1				GB 10963.1

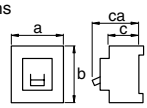
Notes: *1 N pole is a switched neutral pole (without overcurrent release device).
*2 Type B (3 In <, ≦ 5 In), Type C (5 In <, ≦ 10 In), Type D (10 In <, ≦ 20 In)

Model				BH-D10 (For DC)	
Image					
Number of poles [P]				1	2
Instantaneous tripping				Type B, C*3	
Rated insulation voltage U_i [V]				250	
Rated current I_n [A] at ambient temperature 30°C				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63	
Rated short-circuit capacity [kA]	IEC 60898-2 (Icn)	DC	125V	10	–
			250V	–	10
Number of operating cycles		Without current		8,000	
		With current		4,000	
Dimensions [mm] 			a	18	36
			b	87	
			c	44	
			ca	70	
Type of overcurrent release				Thermal-magnetic	
Mounting				IEC35mm rail	
Applicable wire size				1 to 25mm^2	
Weight [kg]				0.15	0.3
Mass optional accessories	Alarm switch (AL)			●	
	Auxiliary switch (AX)			●	
	Shunt trip (SHT)			●	
Terminal connection				Solderless	
Based on standard				IEC 60898-2	
CE marking				EN 60898-2 : Self-declaration	
CCC				GB 10963.2	

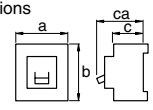
Notes: *3 Type B: (5 In <, ≦ 7 In), Type C: (7 In <, ≦ 15 In)

Detailed Specifications

		RCCB	
Model		BV-D	
Image			
Number of poles [P]		2(1+N)*1	4(3+N)*1 *3
Rated current [A] at ambient temperature 30°C		25, 40, 63	
Rated voltage [VAC]		230	230/400
Rated current sensitivity I△n [mA]		30, 300	
Max. operating time at 5I△n [s]		0.04	
Pulsating current sensitivity		Type AC	
Rated conditional short-circuit current [kA]		6	
Dimensions [mm] 	a	36	72
	b	85	
	c	44	
	ca	70	
Mass [kg]		0.2	0.35
Rated making and breaking capacity Im [A]		500(In 25,40A), 630(In63A)	
Rated conditional short-circuit current Inc [kA]		6	
Rated residual making and breaking capacity I△m [A]		500(In 25,40A), 630(In63A)	
Rated conditional residual short-circuit current I△c [kA]		6	
Number of operating cycles	Without current	8,000	
	With current	8,000	
Type of overcurrent release		–	
Mounting		IEC35mm rail	
Applicable wire size		1 to 25mm²	
Weight [kg]		0.2	0.35
Terminal connection		Solderless	
Based on standard		IEC 61008-2-2	
CE marking		EN 61008-2-2 : Self-declaration	
CCC		GB 16916.22	

		RCBO
Model		BV-DN
Image		
Number of poles [P]		2(1+N)*1
Rated current [A] at ambient temperature 30°C		6, 10, 16, 20, 25, 32, 40
Rated voltage [VAC]		230
Rated current sensitivity I△n [mA]		30, 100, 300
Max. operating time at 5I△n [s]		0.04
Pulsating current sensitivity		Type AC
Breaking capacity [kA] sym. (IEC 61009)		4.5
Tripping characteristics		Type C*2
Dimensions [mm] 	a	36
	b	88
	c	44
	ca	70
Mass [kg]		0.19
Automatic tripping device		Thermal, magnetic
Number of operating cycles	Without current	20,000
	With current	20,000 (In 6,10,16,20A) 15,000 (In 25A) 10,000 (In 32,40A)
Type of overcurrent release		Thermal-magnetic
Mounting		IEC35mm rail
Applicable wire size		1 to 16mm²
Weight [kg]		0.19
Terminal connection		Solderless
Based on standard		IEC 61009-2-2
CE marking		EN 61009-2-2 : Self-declaration
CCC		GB 16917.22

Notes: *1 N pole is a switched neutral pole (without overcurrent release device).
*2 Type C: (5 In <, ≦ 10 In)
*3 For use to three phase 4-wire type. When using, it be sure to connect the neutral wire to the neutral phase. Not available for use to three phase 3-wire type.

		Isolating switch			
Model		KB-D			
Image					
Number of poles [P]		1	2	3	4(3+N)
Utilization category		AC22A class			
Rated current [A] at ambient temperature 30°C		32, 63, 80			
Rated voltage [VAC]		230	400		
Short time withstand current [A]		20 × In, 1s			
Short-circuit making capacity [A]		20 × In			
Dimensions [mm] 	a	18	36	54	72
	b	87			
	c	44			
	ca	70			
Mass [kg]		0.09	0.18	0.27	0.36
Number of operating cycles	Without current	20,000			
	With current	3,000			
Mounting		IEC35mm rail			
Applicable wire size		1 to 25mm²			
Weight [kg]		0.1	0.2	0.3	0.4
Terminal connection		Solderless			
Based on standard		IEC 60947-3			
CE marking		EN 60947-3 : Self-declaration			
CCC		GB 14048.3			

Detailed Specifications

Accessories for Miniature Circuit Breakers

■Functions of Accessories

Internal accessory	Function
AL Alarm switch	Electrically indicates the trip status of the circuit breaker.
AX Auxiliary switch	Electrically indicates the On/Off status of the circuit breaker.
SHT Shunt trip	Electrically trips the circuit breaker from a remote location. Permissible working voltages are 70 to 110% of the AC rated voltage or 70 to 125% of the DC rated voltage.

■Equipping of Accessories

Accessory \ Model	BH-D6	BH-D10	BH, BH-P, BH-DN, BV-DN, KB-D, BV-D
AL	○	○	–
AX	○	○	
SHT	○	○	

○: Accessory equipped
–: Accessory not equipped

■Specifications

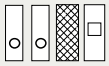
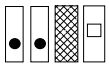
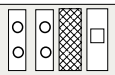
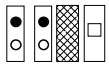
Type		AL	AX	AL+AX	AX+AX
		AL-05DLS	AX-05DLS	ALAX-05DLS	AX2-05DLS
Contact	Configuration	1C	1C	2C	2C
	Contact capacity	400VAC, 2A	230VAC, 5A	120VDC, 0.4A	48VDC, 1.5A	24VDC, 4A
Function	Line	–	–	AX	AX
	Load	AL	AX	AL	AX
Connection		Clamp terminal			
Compliance standard		IEC 60947-5-1			

Type	SHT	
	SHTA400-05DLS	SHTD048-05DLS
Cut-off switch	Equipped	
Voltage	110-400VAC	24-48VDC
Input power requirement	110VAC 60VA 230VAC 250VA 400VAC 750VA	24VDC 75VA 48VDC 300VA
Operating time [ms]	<20	
Connection	Solderless terminal	
Compliance standard	IEC 60947-2	

* Secure a sufficient input power supply so that the voltage will not drop below the permissible lower working voltage (70% of the lowest rated voltage).
* The operating time denotes the time from when the rated voltage is applied to SHT until the time the main contact of the breaker starts to open.

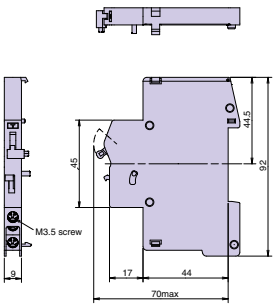
Detailed Specifications

■Combinations of Accessories

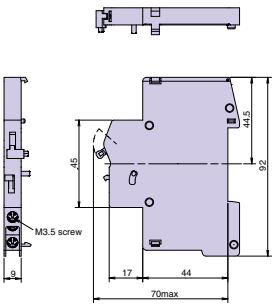
Accessory connection combinations	AL	
	AX	
	2AX	
	ALAX	
	SHT	
	AX+SHT	
	AL+SHT	
	2AX+SHT	
	ALAX+SHT	

■Outline Drawing

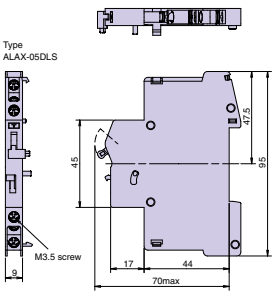
AL-05DLS



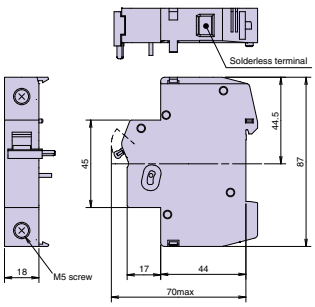
AX-05DLS



ALAX-05DLS
AX2-05DLS

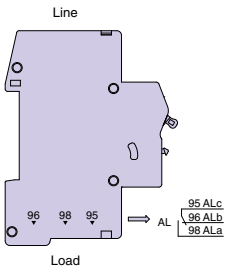


SHTA400-05DLS
SHTD048-05DLS

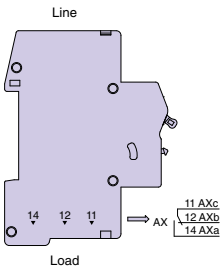


■Connection of Line and Load Side

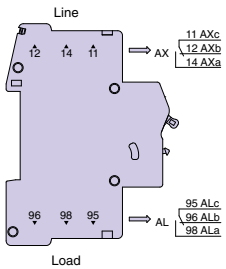
AL-05DLS



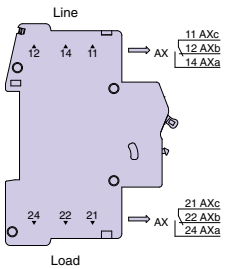
AX-05DLS



ALAX-05DLS

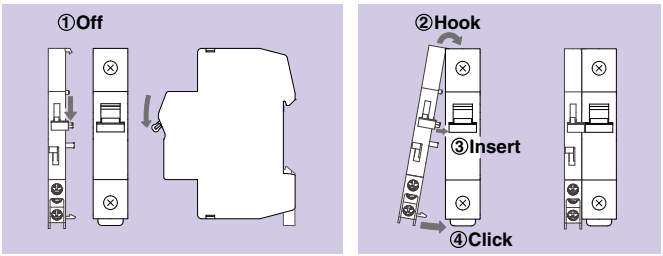


AX2-05DLS

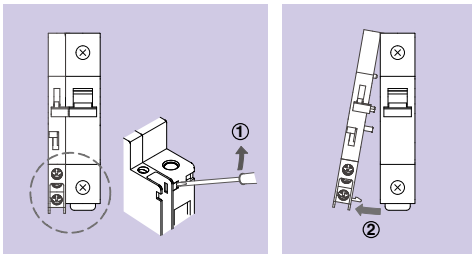


■Installation of Accessories (AX, AL, SHT)

(1) Installation



(2) Removal



Detailed Specifications

■Circuit Protectors

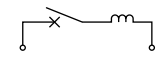
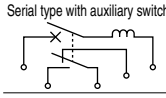
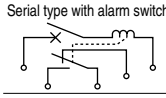
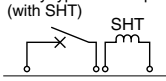
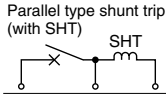
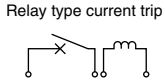
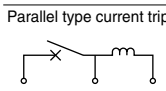
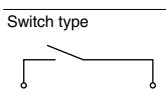
Frame (A)				30					
Model				CP30-BA			CP-S		
Image									
Number of poles				1	2	3	1	2	3
Rated insulation voltage Ui (V)				250			250		
Rated impulse withstand voltage Uimp (kV)				2.5			2.5		
Rated current (A)				0.1 0.25 0.3 0.5 1 2 3 5 7 10 15 20 30			0.05 0.1 0.25 0.3 0.5 0.75 1 2 2.5 3 5 7 7.5 10 15 20 25 30		
Rated short-circuit capacity (kA)	UL 1077 CSA C22.2 No.235 (*11)	Rated voltage (V)	AC (V)	250			250	–	
			DC (V)	65	125	–	65	–	
		AC		2.5kA at 250V			1.5kA at 250V	–	
		DC		2.5kA at 65V	2.5kA at 125V	–	1kA at 65V	–	
	IEC 60934 EN 60934 (Icn)	Rated insulation voltage Ui (V)		250			250		
		AC		250			1.5kA at 230V 2.5kA at 120V		
		DC		2.5kA at 60V	2.5kA at 120V	–	1kA at 60V	1kA at 120V (1kA at 60V) (*7)	1kA at 60V
	EN 60947-2 IEC 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		250			–		
		AC		2.5/2.5kA at 230V			–		
		DC		2.5/2.5kA at 60V	2.5/2.5kA at 120V	–	–		
AC-DC common use				●		– (*1)	– (*8)		
Reverse connection				●			–		
Rated short time current (for switch only type)				–			AC250V 50/60Hz 1500A 0.02s AC125V 50/60Hz 2500A 0.02s DC65V 1000A 0.02s DC125V 1000A 0.02s		
Rated ambient temperature (°C)				40 (T40)			25 (T25)		
Operating characteristics				Instantaneous type (I); Medium type (M), (MD); Slow type (S), (SD); Fast type (F) (*2)			Instantaneous type (I); Medium type (M), (MD); Slow type (S), (SD); Fast type (F) (FD)		
Mode of tripping				Instantaneous type (I): magnetic only [MO]			Instantaneous type (I): magnetic only [MO]		
				Medium type (M), (MD) Slow type (S), (SD) Fast type (F) : hydraulic-magnetic [HM]			Medium type (M), (MD) Slow type (S), (SD) Fast type (F), (FD) : hydraulic-magnetic [HM]		
Method of operation				S-type (IEC 60934)					
Trip-free behaviour				Trip-free (IEC 60934)					
Mass (kg)				0.08	0.16	0.23	0.06	0.12	0.18
Accessories	Retractable small terminal cover (TC-S)			●Standard IP20 (front, terminal covers closed) [Certified of TUV]			–		
	Inertial delay (ID)			● (Medium, Slow type: AC only)			● (Medium, Slow, Fast type: AC only)		
	Alarm switch (AL)			● (1c)			● (1c) (*7)		
	Auxiliary switch (AX)			● (1c)			● (1c)		
	Shunt trip (SHT)			● (for relay type) (*3)			● (for parallel and relay type: AC only)		
	Large terminal cover (TC-L)			● (*6)			–		
	Flushpanel mounting brackets (FP)			●			–		
	Back facing wiring termnal (BT)			● (*4), (*6)			–		
	Lock cover (LC)			–			●	–	
	Accessory terminal cover (TC)			● (*6)			–		
Connection	Main body			20A or less : Screw terminal M4 30A : Screw termnal M5			Male tub terminal 6.3mm (#250) [Screw terminal M4 (series type only)]		
	Alarm switch / Auxiliary switch			Screw terminal M3.5			Male tub terminal 2.8mm (#110)		
Main body mounting method				Srface, IEC rail mounting Flush panel mounting (option)			Panel mounting		
International standard				UL(cURus), CCC (*5)			UL(UR) (*9), (*10)	–	
CE Marking				EN 60934 : TUV approval EN 60947-2 : Self-declaration (*5)			EN 60934 : TUV approval (*10)	Operating characteris is Medium type (M) only. The rated current, 0.3A, 2A, 3A and 7A are not applied.	

Notes: *1 The 3-pole products are for AC use only.
*2 Contact us for operating characteristics other than those mentioned above.
*3 In poles equipped with a shunt tripping mechanism, the overcurrent tripping element is not operative (switched shunt tripping).
*4 For back-face wiring terminals, specify if it will be used with 30A, or 20A or less.
*5 UL(cURus), CCC, and CE Marking are displayed on standard products.
*6 It is recognition of UL(cURus), CCC, and TUV.
*7 In case of DC use, only DC65V is available.
*8 Specify if for DC use when ordering.
*9 Specify when ordering. (In case of CP-S UL, type name is CP-SU.)
*10 Connection is male tub terminal only.
*11 CP30-BA only.

Remarks: 1. Products for non-standard conditions are special order. (Low temperature, 1st and 2nd-degree moisture fungal treatment, corrosion-resistant)
2. Although a buzzing sound may occur when an instantaneous type becomes 80% or more of the rated current for AC use, performance is not effected. Please take this point into consideration when selecting units for use in quiet environments.
3. Please use in environments free of high temperatures, humidity, dust, corrosive gas, vibration, and impact. Also, do not use it in a circuit with inrush current or harmonics. Problems may result.

Detailed Specifications

■Internal circuits and examples of application

Internal circuit	Available model	Operating characteristics							
		Instantaneous type	High speed type		Medium speed type	Low speed type			shunt trip
		I	F	FD	M	MD	S	SD	
Serial type 	CP30-BA	●	●	–	●	●	●	●	–
	CP-S	●	●	●	●	●	●	●	–
Serial type with auxiliary switch 	CP30-BA	●	●	–	●	●	●	●	–
	CP-S	●	●	●	●	●	●	●	–
Serial type with alarm switch 	CP30-BA	●	●	–	●	●	●	●	–
	CP-S	●	●	●	●	●	●	●	–
Relay type shunt trip (with SHT) SHT 	CP30-BA	–	–	–	–	–	–	–	●
	CP-S	–	–	–	–	–	–	–	●
Parallel type shunt trip (with SHT) SHT 	CP-S	–	–	–	–	–	–	–	●
Relay type current trip 	CP-S	●	●	●	●	●	●	●	–
Parallel type current trip 	CP-S	●	●	●	●	●	●	●	–
Switch type 	CP-S	–	–	–	–	–	–	–	–

■Internal accessories

Auxiliary switch (AX)

Operates in conjunction with the main circuit operating mechanism to electrically retrieve the ON/OFF status of protector.

Alarm switch (AL)

Operates in conjunction with the main circuit operating mechanism to electrically retrieve the tripping status of protector.

Remarks (1) When the handle of CP30-BA is constrained in the ON status, it does not issue the alarm signal even if it is tripped.
(2) The alarm switch will be reset when the body is reset or turned on.

Shunt trip (SHT)

A parallel relay type protector, which can break the circuit instantaneously when receiving an external signal

Inertial delay device

The inertial delay device is designed to avoid unnecessary operation caused by inrush current of transformer or lamp load. The device can withstand unrepeated one pulse of crest value 20 times higher than the rated current (pulse time = 8 ms). It can be added to circuits having high, medium and low speed operating characteristics. (It cannot be added to instantaneous or DC types.)

●Ratings of alarm switches (AL) and auxiliary switches (AX)

(1) For CP30-BA

Classification			AC			DC		
			Voltage (V)	Current (A)		Voltage (V)	Current (A)	
				Resistive load	Inductive load		Resistive load	Inductive load
Ratings of items other than those shaded in Table 1	For general load	Max.	(250)	(1)	(0.5)	50	1	0.5
			125	3	1	30	2	1
		Min.	0.1A/15VAC			0.1A/15VDC		
	For minute load	Max.	125	0.5	–	30	0.5	–
		Min.	1mA/24VDC, 2mA/12VDC, 5mA/6VDC					
Ratings of items shaded in Table 1	For general load	Max.	(250)	(1)	(0.5)	(50)	(1)	(0.5)
			125	3	(1)	30	(2), 0.5	(1)
		Min.	0.1A/15VAC			0.1A/15VDC		
	For minute load	Max.	125	(0.5), 0.1	–	30	(0.5), 0.1	–
		Min.	1mA/24VDC, 2mA/12VDC, 5mA/6VDC					

Remark: 1. The switches having the ratings in parentheses are manufactured at the customer's request. (Specify the voltage). Such switches do not conform to UL (cURus), CCC or CE Marking requirements.

(2) For CP-S

AC			DC		
Voltage (V)	Current (A)		Voltage (V)	Current (A)	
	Resistive load	Inductive load		Resistive load	Inductive load
250	3	2	250	0.2	0.2
125	5	3	125	0.4	0.4
–	–	–	30	4	3
–	–	–	14	5	4

Remark: 1. When using these switches to a circuit with a minute load (125 V AC, 0.1 A or 30 V DC, 0.1 A or less), designate the application as minute load.

●Ratings of shunt trip (SHT) coils

(1) For CP30-BA

Ratings

Rated operating voltage (V)		Time rating
100-200	Compatible with 100 to 200 V AC and 100 V DC	10 sec or less
24-48	Compatible with 24 to 48 V DC	

Coil resistance, resistance and impedance (at25°C)

Voltage (V)	Impedance for AC (Ω)	DC resistance for DC (Ω)
24-48	–	160
100-200	2400	2100

Remarks: 1. The allowable range is 70 to 110% of the rated voltage for AC and 75 to 120% of the rated voltage for DC.
2. The time rating is 10 seconds or less. Configure the circuit on which voltage will not be applied for more than 10 seconds.

(2) For CP-S

Ratings

Rated operating voltage (V)		Time rating
100	Compatible with 100 to 120 V AC (50/60Hz)	10 sec or less
200	Compatible with 200 to 240 V AC (50/60Hz)	
24, 48, 100	DC24, DC48, DC100	

Coil resistance, resistance and impedance (at25°C)

Voltage (V)	Impedance for AC (Ω)	DC resistance for DC (Ω)
24	–	110
48	–	110
100	1100	400
200	1100	–

Remarks: 1. The allowable range is 70 to 110% of the rated voltage for AC and 75 to 120% of the rated voltage for DC.
2. The time rating is 10 seconds or less. Configure the circuit on which voltage will not be applied for more than 10 seconds.

●Operation of auxiliary switch and alarm switch

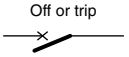
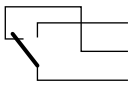
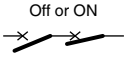
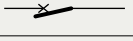
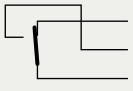
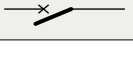
Protector status		Switch status CP30-BA, CP-S
AX	Off or trip 	 AXa (open) / ALa (closed) AXb (open) / ALb (closed) AXc / ALc
AL	Off or ON 	
AX	ON 	 AXa (closed) / ALa (open) AXb (closed) / ALb (open) AXc / ALc
AL	Trip 	

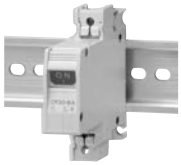
Table 1 List of numbers of internal accessories which can be fitted

●AL ○AX ◐AL or AX ■SHT

Type name	AX			AX More than one				AL			AL+AX			SHT			AL+SHT or AX+SHT			AL+AX+SHT
	1P	2P	3P	1P	2P	3P	3P	1P	2P	3P	1P	2P	3P	1P	2P	3P	1P	2P	3P	3P
CP30-BA	○	○ ○	○ ○	–	○ ○	○ ○	○ ○ ○	●	● ●	● ●	–	○ ●	○ ●	■	■ ■	■ ■		■ ◐	■ ◐	■ ○ ●
CP-S	○	○ ○	○ ○	–	○ ○	○ ○	○ ○ ○	●	● ●	● ●	–	● ○	● ○	■	■ ■	■ ■	–	◐ ■	◐ ■	● ○ ■

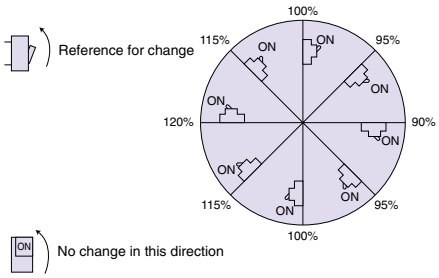
Remark: 1. All accessories should be fitted on the internal accessory terminal block.

Installation and connection

Installation method	With screws	On IEC rails	With embedded fittings	On panel
Appearance			 Circuit protectors with AL, AX and/or SHT cannot be installed by this method.	
CP30-BA	●	●	●	–
CP-S	–	–	–	●

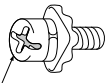
Installation posture

The operating characteristics of electromagnetic (instantaneous) type circuit protectors are not affected by the installation posture. However, when installing a fluid electromagnetic (high, medium or low speed) type circuit protector, pay attention to the installation angle because the operating current value is changed under the influence of the gravity applied to the iron core in the oil dash pot.
Generally, it is recommended to use the circuit protectors in the vertical direction.



Electric wires which can be connected and applicable screw terminals

CP30-BA

Classification	Shape of terminal		Electric wire size used (mm^2)	Applicable screw terminals	Tightening torque (N • m)
Body	Threaded terminal (standard specification)  Cross recessed or slotted	20 A or less M4	0.25-1.65	R1.25-4 R1.25-5	M4 1-1.4
			1.04-2.63	R2-4 R2-5	
		30A M5	2.63-6.64	R5.5-4 R5.5-5	M5 1.8-2.2
			6.64-10.52	*8-5NS (made by JST)	
Alarm and auxiliary switch terminals	Wire retaining screw (square washer)  Cross recessed or slotted	M3.5	0.25-1.65	R1.25-3.5	0.7-0.9
			1.04-2.63	R2-3.5	

*Use the screw terminal 8-5NS made by JST.

Detailed Specifications

●Low Voltage Air Circuit Breakers (AE-SW Series)

Frame (A)			630	1000	1250	1600	2000	2000	2500	3200	4000
Model			AE630-SW	AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA	AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA
Image			 AE1600-SW (Drawout type)					●See the catalog of Low Voltage Air Circuit Breakers, Y-0622, for the details.			
Rated current (CT rating) In (A)			630 (*1)	1000	1250	1600	2000	2000 (*1)	2500	3200	4000
Rated current setting Ir (A) (adjustable) (Rated ambient temperature 40°C) (For marine use 45°C)			315-346.5-378-409.5-441-472.5-504-535.5-567-598.5-630 (*1)	500-550-600-650-700-750-800-850-900-950-1000	625-687.5-750-812.5-875-937.5-1000-1062.5-1125-1187.5-1250	800-880-960-1040-1120-1200-1280-1360-1440-1520-1600	1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000	1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000 (*1)	1250-1375-1500-1625-1750-1875-2000-2125-2250-2375-2500	1600-1760-1920-2080-2240-2400-2560-2720-2880-3040-3200	2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000
Number of poles			3, 4 (*2)								
Rated insulation voltage V			1000								
Current carrying capacity of neutral pole A			630	1000	1250	1600	2000	2000	2500	3200	4000
Rated breaking capacity (kA symmetrical RMS)	IEC 60947-2, EN 60947-2 BS JIS C 8201-2-1 Ann.1 Ann.2 NK, LR, GL, BV, ABS, DNV, CCS	AC690V	65					75			
		AC600V	65					75			
		AC240-500V	65					85			
Ics = % Icu			100%								
Rated short-time withstand current (kA symmetrical RMS)		1 second	65					75			
Suitability for isolation			Compatible								
Reverse connection			Possible								
Number of operating cycles		Without current	25000					20000			
		With current (690 V AC)	5000				1500	1500		1000	500
Utilization category			B								
Pollution degree			3								
EMC environment condition (environment A or B)			A								
Outline dimension (mm) Height (H) x width (W) x depth (D)	Fixed type	3-pole product	410×340×290					410×475×290			
		4-pole product	410×425×290					410×605×290			
	Drawout type	3-pole product	430×300×368					430×435×368			430×439×368
		4-pole product	430×385×368					430×565×368			430×569×368
Weight (kg) (Without Accessory)	Fixed type	3-pole product	40	41		42	47	60	61	63	81
		4-pole product	50	51		52	57	72	73	75	99
	Drawout type	3-pole product	63	64		65	70	92	93	95	108
		4-pole product	77	78		79	84	113	114	116	136
	Cradle only	3-pole product	26				31	35		36	49
		4-pole product	30				35	43		44	61
CE Marking			Self-declaration								
CCC recognition (☆ Certified)			☆								
Marine approval			☆Certified (NK, LR, GL, BV, ABS, DNV, CCS)								
Automatic tripping device			Electronic (effective value detection)								

●When the MCR is provided, the breaking capacity may be changed. See the catalog of Low Voltage Air Circuit Breakers, Y-0622.
●See the catalog of Low-voltage Air Circuit Breakers, Y-0622, for the details of the accessories.

Notes: *1 AE630-SW and AE2000-SW having low rating types are available. See the catalog of Low Voltage Air Circuit Breakers, Y-0622, for the details.
*2 The 4-pole products do not have obtained the marine approval.
*3 4 (HN) means the neutral poles current capacity is 50% of the rated current, for 4poles.
4 (FN) means the neutral poles current capacity is 100% of the rated current, for 4poles.
*4 ( ) shows the value for 4P FN type.
*5 Marine approval value is 138kA.

■Features

● **Higher reliability by High operating durability (Mechanical)**

● **Increase of rated short-time withstand current**

Combination of the Electronic trip relay (ETR) with MCR (*1) enables increase of the choice coordination range.

● **Applicability to increase and decrease of load and improvement of protection coordination**

The electronic tripping system enables detailed setting of tripping characteristics. The system uses RMS detection resistant to distorted waves.

● **More improved Electronic trip relay (ETR) and transmission functions**

To flexibly meet various requirements, functions suitable for purposes can be selected effectively. In addition, improved measuring functions are provided, so that the circuit breakers are applicable to CC-Link, PROFIBUS-DP and MODBUS transmission and helpful in establishing various electrical circuit measurement monitoring systems and energy-saving systems in combination with measuring display unit breakers.

Note: *1 MCR is an abbreviation for marking current release. It has INST characteristic only when the circuit breaker in the OFF state turns ON (closes). The circuit breaker will lose the INST characteristic after closing, and it will have LTD and STD characteristics.

● **Various connections**

Various connections for panel structures are available. (See the following figure.)

Connections

Connections / Model	Horizontal (standard)	Vertical (*1) (VT)	Front (FT)	Vertical terminal adapter (VTA)	Front terminal adapter (FTA)
Fixed type (FIX)	 (Standard)	 FIX-VT	—	 (FIX-VTA)	 (FIX-FTA)
Drawout type (DR)	 (Standard)	 (DR-VT)	 (DR-FT)	 (DR-VTA)	 (DR-FTA)

Note: *1 For AE2000-SWA, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW models, vertical terminal only is available.

●Low Voltage Air Circuit Breakers (AE-SW Series)

Frame (A)			4000	5000	6300
Model			AE4000-SW	AE5000-SW	AE6300-SW
Image (Reference)			 AE6300-SW (Drawout type)		●See the catalog of Low Voltage Air Circuit Breakers, Y-0622, for the details.
Rated current (CT rating) In (A)			4000	5000	6300
Rated current setting Ir (A) (adjustable) (Rated ambient temperature 40°C) (For marine use 45°C)			2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000	2500-2750-3000-3250-3500-3750-4000-4250-4500-4750-5000	3150-3465-3780-4095-4410-4725-5040-5355-5670-5985-6300
Number of poles			3, 4 (HN, FN) (*3)		
Rated insulation voltage V			1000		
Current carrying capacity of neutral pole A			2000 (4000) (*4)	2500 (5000) (*4)	3150 (6300) (*4)
Rated breaking capacity (kA symmetrical RMS)	IEC 60947-2, EN 60947-2 BS JIS C 8201-2-1 Ann.1 Ann.2 NK, LR, GL, BV, ABS	AC690V	85		
		AC600V	85		
		AC240-500V	130 (*5)		
	Ics = % Icu		100%		
Rated short-time withstand current (kA symmetrical RMS)		1 second	100		
Suitability for isolation			Compatible		
Reverse connection			Possible		
Number of operating cycles		Without current	10000 (3P) /5000 (4P)		
		With current (690 V AC)	1000		
Utilization category			B		
Pollution degree			3		
EMC environment condition (environment A or B)			A		
Outline dimension (mm) Height (H) x width (W) x depth (D)	Fixed type	3-pole product	414×873×290		
		4-pole product	414×1003×290		
	Drawout type	3-pole product	480×875×368		
		4-pole product	480×1005×368		
Weight (kg) (without Accessory)	Fixed type	3-pole product	160	160	160
		4-pole product	180	180	180
	Drawout type	3-pole product	233	233	240
		4-pole product	256	256	263
	Cradle only	3-pole product	118	118	125
		4-pole product	133	133	140
CE Marking			Self-declaration		
CCC recognition (☆ Certified)			☆		
Marine approval			☆Certified (NK, LR, GL, BV, ABS)		
Automatic tripping device			Electronic (effective value detection)		

■Electronic trip relay (ETR) Type code

□□□-□

● Main setting module

WS1, WB1, WM1, WF1	AE630-1600-SW, AE2000-3200-SW, AE4000-SW
WS2, WB2, WM2, WF2	AE2000-SWA, AE4000-SWA, AE5000-SW
WS3,WB3,WM3, WF3	AE6300-SW

WS : General use
WM : Generator protection use
WB : INST/MCR only
WF : Protective coordination use

● Optional setting module

G1: Ground fault protection
N5: Neutral pole 50% protection
E1: Earth leakage protection
AP: 2nd Additional Pre-alarm
NA: Without optional setting

● ETR Auxiliary Equipment

☐ Temperature alarm(TAL)
☐ MCR switch(MCR-SW)

● Power supply

P1: AC･DC100-240V
P2: DC24-60V
P3: AC100-240V / DC100-125V with output contact
P4: DC24-60V with output contact
P5: DC100-240V with output contact (SSR)

Additional function

☐ Extension module(EX1)
☐ Display(DP1)
☐ Display onto panel board(DP2)
☐ VT unit(VT)

Network

☐ BIF-CC
☐ BIF-PR
☐ BIF-MD

Wire system (when EX1 is specified)

EX1 — ☐ 3φ3W / ☐ 3φ4W / ☐ Normal connection / ☐ Reverse connection

Normal connection: Upper terminal is connected to power supply.
Reverse connection: Lower terminal is connected to power supply.

For the details of the characteristics, alarm contact output and expanded functions of the ETR, see the catalog of Low Voltage Air Circuit Breakers, Y-0622.

*The display is optional.

■Earth Leakage Relays

Model			Interchangeable leakage relays (*1)					
			Electrical self-hold type		Mechanical self-hold type		Harmonic surge ready Electrical self-hold type	Harmonic surge ready Mechanical self-hold type
	Hole diameter mm		NV-ZBA		NV-ZSA		NV-ZHA	NV-ZLA
Model name of ZCT combined (*5)	15		ZT15B	–	ZT15B	–	ZT15B	ZT15B
	30		ZT30B	–	ZT30B	–	ZT30B	ZT30B
	40		ZT40B	–	ZT40B	–	ZT40B	ZT40B
	60		–	ZT60B	–	ZT60B	ZT60B	ZT60B
	80		–	ZT80B	–	ZT80B	ZT80B	ZT80B
	100		–	ZT100B	–	ZT100B	ZT100B	ZT100B
Image								
								
Phase line type			3φ4W, 3φ3W, 1φ3W, 1φ2W					
Control voltage AC V		JIS	120 • 240 selectable		120 • 240 selectable 240 • 415 selectable		–	–
		UL/JIS (*2) UL/CE (*3)	–		–		120 • 240 selectable 240 • 440 selectable	120 • 240 selectable 240 • 440 selectable 480
JIS	High speed type	Rated sensitivity current mA	30 100 • 200 • 500 selectable	100 • 200 • 500 selectable	30 100 • 200 • 500 selectable	100 • 200 • 500 selectable	–	–
		Max. operating time (s)	0.1		0.1			
	Delay type	Rated sensitivity current mA	100 • 200 • 500 selectable		100 • 200 • 500 selectable (200 • 500 • 1000 selectable)			
		Operating time (s) (*4)	0.3 • 0.8 • 1.6 selectable		0.3 • 0.8 • 1.6 selectable			
		Inertial non-operating time (s) or longer than (s)	0.1 • 0.5 • 1.1		0.1 • 0.5 • 1.1			
UL/JIS	High speed type	Rated sensitivity current mA	–		–		30 50	30 50
		Max. operating time (s)					0.1	0.1
	High speed • Delay type	Rated sensitivity current mA					100 • 200 • 500 selectable	100 • 200 • 500 selectable
		Max. operating time (s) (*4)					0.1 • 0.45 • 1.0 selectable	0.1 • 0.45 • 1.0 selectable
		Inertial non-operating time (s) or longer than (s)					– • 0.1 • 0.5	– • 0.1 • 0.5
UL/CE	High speed type	Rated sensitivity current mA	–		–		30 • 50 • 100 selectable	30 • 50 • 100 selectable
		Max. operating time (s) at 5IΔn					0.04	0.04
	Delay type	Rated sensitivity current mA					100 • 300 • 500 selectable 300 • 500 • 1000 selectable	100 • 300 • 500 selectable 300 • 500 • 1000 selectable
		Max. operating time (s) at 2IΔn (*4)					0.45 • 1.0 selectable	0.45 • 1.0 selectable
		Inertial non-operating time (s) at 2IΔn					0.1 • 0.5	0.1 • 0.5
Earth leakage indication			Electric type (LED)		Mechanical type (button)		Electric type (LED)	Mechanical type (button)
Resetting method			Push button or control power switch off		Push button (conbined with earth leakage indicator)		Push button or control power switch off	Push button (conbined with earth leakage indicator)
Built-in contact	Configuration		1c		1a1c		1a1c	1a1c
	Continuous current capacity A		5		5		5	5
	Contact capacity A		cosφ=1 / cosφ=0.4 L/R=0.007 120VAC 5 2 240VAC 5 2 24VDC 5 2		cosφ=1 / cosφ=0.4 L/R=0.007 120VAC 5 3 240VAC 3 2 415VAC 2 1 30VDC 4 3 100VDC 0.4 0.4 200VDC 0.2 0.2		cosφ=1 / cosφ=0.4 L/R=0.007 120VAC 5 2 240VAC 5 2 24VDC 5 2 Use auxiliary relay for AC415V contact.	cosφ=1 / cosφ=0.4 L/R=0.007 120VAC 5 3 240VAC 3 2 480VAC 1 1 30VDC 3 3
Connection		Front	●Clamp terminal		●Clamp terminal		●Clamp terminal	●Clamp terminal
		Rear	–		●Clamp terminal		●Clamp terminal	●Clamp terminal
Standard attachment (Front connection)			Mounting screw					
Mass kg		Relay	0.3		0.4		0.4	0.4
External accessories	Terminal cover		● (TC-ZBA)		● (TC-ZSA)		● (TC-ZSA) (*6)	● (TC-ZSA) (*6)
	Mounting hook for IEC 35mm rail (DIN rail) Fixture		● (DIN-ZBA)		–		–	–
Max. consumption VA			3					
Conforming standard	US UL standard (UR certified)		–		–		UL1053 Recognized component (File No.E196562)	UL1053 Recognized component (File No.E196562)
	Canada CSA standard		–		–		LR103083(Certified No.)	LR103083(Certified No.)
	European CE marking		–		–		Declaration for conformity IEC 60947-2 AnnexB EN 60947-2 AnnexB	Declaration for conformity IEC 60947-2 AnnexB EN 60947-2 AnnexB

Notes: *1 Interchangeable leakage relays can be easily combined with other relays and our ZCT. However, products with 30mA sensitivity (excluding NV-ZHA/ZLA) can only be used in combination with ZT15B, ZT30B and ZT40B.
*2 Indicates the UL-standard control voltage. UL, CSA and JIS standards are indicated together. For JIS voltage indications, 100-200V changeover is 120-240V changeover, 200-415V changeover is 240-440V changeover, and 460V and 480V are described together. When ordering, specify "UL/JIS".
*3 Indicates the UL-standard control voltage. UL, CSA and CE standards are indicated together. For CE voltage indications, 120-230V changeover is 120-240V changeover, 230-440V changeoever is 240-440V selectable, which are described together. When ordering, specify "UL/CE".
*4 When operating times are 0.3 and 0.45sec, 0.8 and 1.0sec and 1.6sec, the relay operates between 0.15 and 0.45sec, 0.6 and 1.0sec and 1.2 and 2.0sec, respectively.
*5 Can be combined with an interchangeable ZCT equipped with a primary conductor. Refer to the next page for details.
*6 Not UL-certified.

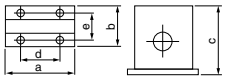
Remarks: 1. Relays with rates shown in parentheses are special-order.
2. The relay complies with CE marking conformity declaration only when used with CE marking type MCCB with a voltage tripping device to interrupt current during ground fault.
3. NV-ZBA/ZSA

Control voltage	Available voltage range	Example of applicable circuit voltage
120V	80-126V	100 • 110V • 120V
240V	160-252V	200 • 220 • 240V
415V	320-484V	400 • 415 • 440V

4.NV-ZHA/ZLA

Control voltage	Available voltage range	Example of applicable circuit voltage
120V	80-132V	100 • 110 • 120V
240V	160-264V	200 • 220 • 230 • 240V
440V	304-484V	380 • 400 • 415 • 440V
480V	368-528V	460 • 480V

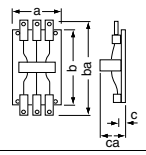
Interchangeable ZCT

Type		ZT15B	ZT30B	ZT40B	ZT60B	ZT80B	ZT100B
Aperture diameter (mm)		15	30	40	60	80	100
Mass (kg)		0.2	0.4	0.6	2.0	2.6	3.3
Rated short time current		50 (peak value)					
Dimensions (mm)	a	48	68	85	140	160	185
	b	52	52	52	90	90	90
	c	70	90	100	150	169	190
	d	25	50	50	100	100	100
	e	40	40	40	70	70	70

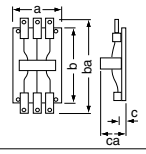
ZCT aperture diameter and wire size

	ZCT aperture diameter (mm)	15	30	40	60	80	100
		Max. 600V rated wire size in mm^2 (current in amperes)					
1ϕ2w	Polyvinyl-chloride insulated wire	14 (88)	60 (217)	150 (395)	325 (650)	600 (992)	800 (1185)
	Cross-linked polyethylene insulated cable	2 (33)	38 (190)	60 (260)	250 (655)	400 (870)	600 (1140)
1ϕ3w 3ϕ3w	Polyvinyl-chloride insulated wire	8 (61)	38 (162)	100 (298)	250 (556)	500 (842)	725 (1095)
	Cross-linked polyethylene insulated cable	2 (33)	22 (135)	60 (260)	200 (560)	325 (760)	600 (1140)
3ϕ4w	Polyvinyl-chloride insulated wire	8 (61)	38 (162)	100 (298)	150 (395)	325 (650)	600 (992)
	Cross-linked polyethylene insulated cable	–	14 (105)	38 (190)	100 (365)	250 (655)	400 (870)

Interchangeable ZCTs with primary conductors

Type		ZTA600A	ZTA1200A	ZTA2000A
Number of poles		3		
Rated voltage (VAC)		600		
Rated short time current (kA)		100 (peak value)		
	a	227	227	360
	b	256	298	250
	ba	366	444	594
	c	42	78	79
	ca	125	176	214

ELRs with a ZCT with primary conductors

Frame (A)		600	1200	2000	3200
Type	ZBA	Interchangeable ELR and interchangeable ZCTs with primary conductors			NV-ZBA3200
	ZSA				NV-ZSA3200
	ZHA				NV-ZHA3200
	ZLA				NV-ZLA3200
Number of poles		3			
Rated voltage (VAC)		600			
Rated short time current (kA)		100 (peak value)			
	a	227	227	360	490
	b	256	298	250	320
	ba	366	444	594	868
	c	42	78	79	111
	ca	125	176	214	290
Mass (kg)		6.5	11	27	54

			Control voltage (VAC)	Rated current sensitivity (mA)	Max. operating time (s)	Inertial non-operating time (s)
Specification of ELRs	High-speed type	ZBA	120 • 240 (*1)	100 • 200 • 500 (*1)	0.1	—
		ZSA	120 • 240 (*1) 240 • 415 (*1)	100 • 200 • 500 (*1)		
	Time-delay type	ZBA	120 • 240 (*1)	100 • 200 • 500 (*1)	0.3 • 0.8 • 1.6 (*1)	0.1 • 0.5 • 1.1
		ZSA	120 • 240 (*1) 240 • 415 (*1)	100 • 200 • 500 (*1) (200 • 500 • 1000 (*1))	0.3 • 0.8 • 1.6 (*1)	0.1 • 0.5 • 1.1
	(High-speed • Time-delay type)	ZHA	120 • 240 (*1) 240 • 440 (*1)	100 • 200 • 500 (*1)	0.1 • 0.45 • 1.0 (*1)	– • 0.1 • 0.5
				100 • 300 • 500 (*1) 300 • 500 • 1000 (*1)	0.45 • 1.0 (*1) (at 2IΔn)	0.1 • 0.5 (at 2IΔn)
		ZLA	120 • 240 (*1) 240 • 440 (*1) 480	100 • 200 • 500 (*1)	0.1 • 0.45 • 1.0 (*1)	– • 0.1 • 0.5
				100 • 300 • 500 (*1) 300 • 500 • 1000 (*1)	0.45 • 1.0 (*1) (at 2IΔn)	0.1 • 0.5 (at 2IΔn)

Note: *1 Selectable.

Mag Only (Instantaneous Tripping Circuit Breakers)

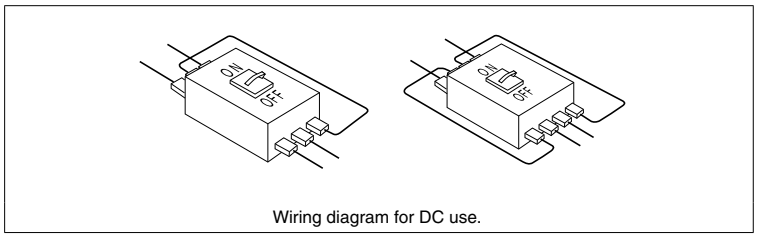
Fixed	NF63-CV/SV/HV	AC, DC	Rated current x 10 (AC) (DC)	
	NF125-CV/SV/HV	AC, DC		
	NF250-CV/SV/HV	AC, DC		
	NF400-CW/SW NF630-CW/SW	AC, DC		
Adjustable	NF800-SEW	AC	High: Rated current x 10 Low: Rated current x 2	
	NF800-SDW	DC	High: 8000A	Low: 3200A
	NF1000-SEW NF1250-SEW	AC	High: Rated current x 10 Low: Rated current x 2	
	NF1600-SEW	AC	High: Rated current x 10 Low: Rated current x 2	
	NF1250-SDW NF1600-SDW	DC	High: 8000A Low: 3200A	

Remarks: 1. The size, weight, accessories, etc., are all identical to the same-designation C, S and H series breakers.
2. For more details, contact your dealer.

DC MCCBs and DSN Switches

Breaking is more difficult with direct currents because the current value never reaches zero. While ordinary DC breakers are suitable for low voltages, special-voltage DC breakers are recommended for voltages in excess of 250VDC. Breakers for 550V are all 4-pole models.
The size, shape, drilling plan, accessories, etc., are all identical to the S Series breakers with the same designations.

Wiring diagram for DC usage.



Wiring diagram for DC use.

Remark: 1. The tripping characteristics will change if the wiring differs from the one shown here.

Model	NF63-SV		NF125-SV		NF250-SV		NF400-SW		NF630-SW		NF800-SDW		NF1250-SDW		NF1600-SDW	
Number of poles	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Rated voltage (VDC)	400	550	440	550	500	600	500	600	500	600	500	600	500	600	500	600
Rated breaking capacity (kA) IEC 60947-2 (Icu/Ics)	2/2		10/10		20/20		40/40		40/40		40/40		40/20		40/20	

Remark: 1. Time constant: 10ms or below.

●DC side

These breakers are designed as thyristor-Leonard system DC side breakers. They protect the thyristor from short circuiting when there is a power or communication failure (Mag Only breakers can also be used for this purpose). Use these breakers in combination with fast fuses for even greater protection.

Model	NF125-SV		NF250-SV		NF400-SW		NF630-SW		NF800-SDW		NF1250-SDW		NF1600-SDW	
Number of poles	2	3	2	3	2	3	2	3	2	3	2	3	2	3
Rated voltage (VDC)	250	440	300	500	250	480	250	480	250	480	250	480	250	480
Rated breaking capacity (kA) IEC 60947-2 (Icu/Ics)	40/40	10/10	20/20		20/20		20/20		20/20		20/20		20/20	
Instantaneous trip current (min.)	3 times rated current		3 times rated current		900A		1000A		1400A		2500A		3200A	

●DSN switches

These are standard MCCBs without the automatic tripping element. The tripping capacity is about six times the rated current.
The appearance, size, drilling plan and available accessories are all identical to similar standard S and C Series MCCBs.

Model	DSN63-CV	DSN125-CV	DSN250-CV	DSN400-CW	DSN630-CW	DSN800-CW
Rated current (A)	63	125	250	400	630	800
Number of poles	2 3	2 3	2 3	2 3	3	3
Rated voltage (AC/DC)	500/250	500/250	500/250	600/250	600/250	600/250
Max. switching current (AC/DC)	378/155	750/310	1500/625	2400/1000	3780/1575	4800/2000

Model	DSN32-SV	DSN63-SV	DSN125-SV	DSN125-SGV	DSN160-SGV	DSN250-SV	DSN250-SGV	DSN400-SW	DSN630-SW	DSN800-SW	DSN1000-SW	DSN1250-SW	DSN1600-SW
Rated current (A)	32	63	125	125	160	250	250	400	630	800	1000	1250	1600
Number of poles	2 3	2 3	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	3 4	3 4	3 4	3 4	3 4
Rated voltage (AC/DC)	500/250	500/250	690/250	690/300	690/300	690/250	690/300	690/250	690/250	690/250	690/250	690/250	690/250
Max. switching current (AC/DC)	192/80	378/155	750/310	750/315	960/400	1500/625	1500/625	2400/1000	3780/1575	4800/2000	6000/2500	7500/3125	9600/4000

400Hz MCCBs

Standard MCCBs cannot be used in 400Hz circuits. When standard MCCBs are used in high-frequency circuits (eq. 400Hz), the instantaneous characteristics are shifted higher. The 400Hz MCCB is recommended for use in 400Hz circuits.

●Specifications

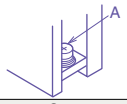
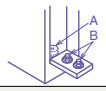
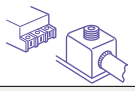
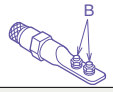
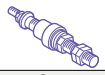
The appearance, size, rated interrupting capacity, drilling plan, accessories, etc., are all identical to the standard S and H Series breakers of the same designation.

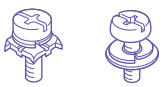
Model		NF125-SV	NF125-HV	NF250-SV	NF250-HV	NF400-SW	NF400-SEW	NF630-SW (*1)	NF630-SEW	NF800-SEW	NF1250-SEW	NF1600-SEW
Rated current (A)		16, 20, 32, 40, 50, 63, 80, 100	16, 20, 32, 40, 50, 63, 80, 100	125, 150 175, 200	125, 150 175, 200	225, 250 300, 350	200-350 adjustable	400, 500	300-500 adjustable	400-600 adjustable	600-800 adjustable	800-1200 adjustable
Number of poles		2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	3 4	3 4	3 4	3 4	3 4	3 4
Rated insulation voltage (V)		690										
Rated breaking capacity (kA) IEC 60947-2 (Icu/Ics)	690V	8/8	10/8	8/8	10/8	10/10	10/10	10/10	10/10	10/10	25/13	25/13
	500V	18/18	30/23	30/30	50/38	30/30	30/30	30/30	30/30	30/30	65/33	65/33
	440V	25/25	50/38	36/36	65/65	42/42	42/42	42/42	42/42	42/42	85/43	85/43
	400V	30/30	50/38	36/36	75/75	45/45	50/50	50/50	50/50	50/50	85/43	85/43
	230V	50/50	100/75	85/85	100/100	85/85	85/85	85/85	85/85	85/85	125/63	125/63

Note: *1 Instantaneous trip current : Rated current x 14 (Fix)

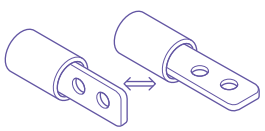
Connection Types

Table 1 Connection

Connection type (Code address)			Front connection (F)			Rear (B)		
			Screw terminal (AMP-N)	Busbar terminal (BAR)	Solderless (BOX) terminal (SL)	Bar stud (B-ST)	Round stud (B-ST)	
Image			Please refer to page 720. 	 	 	 	 	
MCCB	C•S•H•MB	NF30-CS	●	–	–	–	●	
		NF32-SV • NF63-CV • NF63-SV • NF63-HV	●	●	–	–	●	
		NF125-CV • NF125-SV • NF125-HV • NF125-SEV • NF125-SGV • NF125-LGV • NF125-HEV • NF125-HGV	●	●	●	●	–	
		NF160-SGV • NF160-LGV • NF160-HGV • NF250-CV • NF250-SV • NF250-HV • NF250-SEV • NF250-HEV • NF250-SGV • NF250-LGV • NF250-HGV	●	●	●	●	–	
		NF400-SW • NF400-SEW • NF400-HEW • NF400-REW • NF400-CW	–	●	–	●	–	
		NF630-SW • NF630-SEW • NF630-HEW • NF630-REW • NF630-CW	–	●	–	●	–	
		NF800-SEW • NF800-HEW • NF800-REW • NF800-SDW • NF800-CEW						
		NF1000-SEW • NF1250-SEW • NF1600-SEW				●		
	R•U	NF125-UV	●	●	●	●	–	
		NF125-RGV • NF250-RGV • NF250-UV	●	●	●	●	–	
		NF400-UEW	–	●	–	●	–	
		NF800-UEW						
	UL	NF50-SVFU	●	●	–	–	–	
		NF100-CVFU	●	●	●	–	–	
		NF125-SVU NF125-HVU	●	●	●	–	–	
		NF250-SVU NF250-HVU	●	●	●	–	–	
		NF225-CWU	●	●	–	–	–	
		NF-SKW • NF-SLW	–	●	●	–	–	
BH		BH-K • BH-C1 • BH-C2 • BV-C1 • BV-C2	●	–	–	–	–	
		BH-P	●(Only load side)	–	–	–	–	
ELCB	C•S•H	NV32-SV • NV63-CV • NV63-SV • NV63-HV	●	●	–	–	●	
		NV125-CV • NV125-SV • NV125-HV • NV125-SEV • NV125-HEV	●	●	–	●	–	
		NV250-CV/SV/HV • NV250-SEV/HEV	●	●	–	●	–	
		NV400-SW • NV400-SEW • NV400-HEW • NV400-REW • NV400-CW	–	●	–	●	–	
		NV630-SW • NV630-SEW • NV630-HEW • NV630-CW			–	●		
		NV800-SEW • NV800-HEW						

Remarks									
Kind of terminal screw (A) (Circuit breakers having frame size of 1000A and more are not provided with terminal screws (A).)									
Shape	Pan-head screw with clamp 			Pan-head screw 		Bolt (Hex-socket) 			Bolt 
Screw size	M5			M8		M8	2×M8		M10
Type	NF32-SV 63-CV 63-SV 63-HV 50-SVFU(*1)	BH-P	NV32-SV 63-CV 63-SV 63-HV	NF 63-CV(60, 63A) 63-SV(60, 63A) 63-HV(60, 63A) 125-CV 125-SV 125-HV 125-SEV 125-HEV 100-CVFU 125-SVU 125-HVU 125-UV	NV 63-CV(60, 63A) 63-SV(60, 63A) 63-HV(60, 63A) 125-CV 125-SV 125-HV 125-SEV 125-HEV	NF 125-SEV 125-HEV 125-RGV 125-SGV 125-LGV 125-HGV 160-SGV 160-LGV 160-HGV 250-CV 250-SV 250-HV 250-SEV 250-HEV 250-SGV 250-LGV 250-HGV 250-RGV 250-UV 225-CWU 250-SVU 250-HVU NV 125-SEV 125-HEV 250-CV 250-SV 250-HV 250-SEV 250-HEV	NF 400-UEW (4P) 800-CEW 800-SEW 800-HEW 800-REW 800-UEW 800-SDW	NV 800-SEW 800-HEW	NF 400-CW 400-SW 400-SEW 400-HEW 400-REW 400-UEW(3P) 630-CW 630-SW 630-SEW 630-HEW 630-REW NV 400-CW 400-SW 400-SEW 400-HEW 400-REW 630-CW 630-SW 630-SEW 630-HEW
	In case of clamp connection (*3)  ①When the wire size is 5.5 mm² or more, divide the wires, and connect them. ②When connecting wires differing in size, for example, ϕ1.6 wires and 5.5-mm² wires, connect the two kinds of wires together to a crimp terminal because the thinner wires easily come off. ③Do not tighten directly solid wires and cords consisting of thin copper wires used as strands, for example ϕ1.6 and 1.25-mm² wires, together.								

●With insulating base (tube) for installation of metallic board
●The bar stud installation position can be turned 90° on all models (except NF800-UEW). The current-carrying capacity of a vertically installed bus bar is larger than that of a horizontally installed bus bar even if the bus bars have the same dimensions.



Note *1 It is impossible to directly connect the wires of 40- and 50-A, NF/NV 50-SVFU.

	Plug-in (PM)		Plug-in type for distribution board
	Bar stud (PM)	Screw terminal (PM)	For distribution board for electric lamps (BPA)
			
	–	–	–
	–	●	–
	–	●	–
	●	–	–
	●	–	–
	● (Except for NF1600-SEW)	–	–
	–	●(Except for 4P)	–
	●(Except for 4P)	–	–
	● (Except for NF800-UEW)	–	–
	–	–	–
	–	–	–
	–	–	–
	–	–	–
	–	–	–
	–	–	–
	–	–	●
	–	●	–
	–	●	–
	●	–	–
	●	–	–
	The circuit breaker can be connected only by pushing it onto the preliminarily wired terminal block. Install it tightening the supplied screws through the mounting holes.		Mounting base for distribution board for electric lamps.

Table 2 List of terminal screws (B)

Model			Connection type: Front	Rear	Plug-in
MCCB	C • S • H	NF400-CW • NF400-SW • NF400-SEW • NF400-HEW • NF400-REW • NF630-CW • NF630-SW • NF630-SEW NF630-HEW • NF630-REW • NF800-CEW • NF800-SEW • NF800-HEW • NF800-REW • NF800-SDW • NF-SKW • NF-SLW	M12 bolt		
		NF1000-SEW • NF1250-SEW	M12 bolt		
		NF1600-SEW	M10 bolt		—
	U	NF400-UEW	M12 bolt		
		NF800-UEW	M12 bolt		—
ELCB	C•S•H	NV400-SW • NV400-SEW • NV400-HEW • NV400-REW • NV400-CW • NV630-SW • NV630-SEW • NV630-HEW • NV630-CW • NV-SKW	M12 bolt		
		NV800-SEW • NV800-HEW	M12 bolt		

Connecting Parts

For the connection shown in the table on the previous page, the following parts are available as connecting parts.

Table 3 Studs on rear surface (B-ST)

Type name	Number of poles	Applicable models		Set of order	Stud shape and major included parts	Remarks
		MCCB	ELCB			
ST-05SV2	2	NF32-SV, NF63-CV, NF63-SV NF63-HV	NV32-SV, NV63-CV NV63-SV, NV63-HV	sets	★Round studs ●Round studs (with insulating tube) (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs) ●Bolts and nuts	One set includes the parts for one unit. Please place an order for the number of circuit breakers.
ST-05SV3	3					
ST-05SV4	4	NF63-SV, NF63-HV	—			
ST-1SV2	2	NF125-CV, NF125-SV NF125-HV(3, 4P)	—	sets	★Bar studs ●Bar studs (with insulating tube) (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs) ●Bolts and nuts	
ST-1SV3	3		NV125-CV, NV125-SV NV125-HV			
ST-1SV4	4					
ST-1HV2	2	NF125-HV(2P)	—			
ST-2SV2	2	NF125-SEV, NF125-HEV, NF125-RGV NF125-SGV, NF125-LGV, NF125-HGV NF160-SGV, NF160-LGV, NF160-HGV NF250-SGV, NF250-LGV, NF250-HGV NF250-CV, NF250-SV NF250-LGV/HGV, NF250-HV NF250-SEV, NF250-RGV NF250-HEV, NF125-SGV/HGV NF125-LGV, NF160-SGV NF160-LGV/HGV	—	sets	★Bar studs ●Bar studs (with insulating tube) (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs) ●Bolts and nuts	
ST-2SV3	3		NV125-SEV, NV125HEV NV250-CV, NV250-SV NV250-HV, NV250-SEV NV250-HEV			
ST-2SV4	4					
ST-4SW2	2	NF400-CW, NF400-SW NF400-SEW, NF400-HEW NF400-REW	—		★Bar studs ●Insulating bases (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs) ●Bar studs (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs) ●Mounting screws, bolts and nuts	
ST-4SW3	3		NV400-CW, NV400-SW NV400-SEW NV400-HEW NV400-REW			
ST-4SW4	4			sets		
ST-6SW2	2	NF630-CW, NF630-SW NF630-SEW, NF630-HEW NF630-REW	—			
ST-6SW3	3		NV630-CW, NV630-SW NV630-SEW, NV630-HEW			
ST-6SW4	4					
ST-8SW2	2	NF800-SDW, NF800-CEW NF800-SEW, NF800-HEW NF800-REW	—	sets	★Bar studs ●Insulating base (2 pcs) ●Bar studs (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs) ●Mounting screws, bolts and nuts	
ST-8SW3	3		NV800-SEW, NV800-HEW			
ST-8SW4	4					

Table 4 Plug-in type terminal blocks (PM)

Type name	Number of poles	Applicable models	Set of order	Major included parts
PMDN-05SV2L	2	NF32-SV NF63-CV/SV/HV (3A-50A)	sets	Plug-in type terminal block (1 pc) Crip terminals (2-pole: 4pcs, 3-pole: 6 pcs, 4-pole: 8 pcs)
PMDN-05SV3L	3	NF32-SV NF63-CV/SV/HV (3A-50A) NV32-SV NV63-CV/SV/HV (5A-50A)		
PMDN-05SV4L	4			
PMDN-05SV2H	2	NF63-CV/SV/HV (60A, 63A)		
PMDN-05SV3H	3	NF63-CV/SV/HV (60A, 63A) NV63-CV/SV/HV (60A, 63A)		
PMDN-05SV4H	4			
PMDN-1SV2	2	NF125-CV/SV	sets	Plug-in type terminal block (1 pc) Crip terminals (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs)
PMDN-1HV2	2	NF125-HV		
PMDN-1SV3	3	NF125-CV/SV/HV NV125-CV/SV/HV		
PMDN-1SV4	4			
PMDN-1UV2	2	NF125-UV	sets	Plug-in type terminal block (2 pc) Crip terminals (2-pole: 4pcs, 3-pole: 6 pcs)
PMDN-1UV3	3			
—	4			
PMDN-2SV2	2	NF125-SEV/HEV/SGV/LGV/HGV NF160-SGV/LGV/HGV NF250-CV/SV/HV/SEV/HEV/SGV/LGV/HGV NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV	sets	Plug-in type terminal block (1 pc) Plug-in type barriers (2-pole: 2 pcs, 3-pole: 4 pcs, 4-pole: 6 pcs) Tulip terminals (2-pole: 4 pcs, 3-pole: 6 pcs, 4-pole: 8 pcs)
PMDN-2SV3	3			
PMDN-2SV4	4			
PMDN-2SV2	2	NF125-RGV, NF250-RGV		
PMDN-2SV3	3			
PMDN-2UV2	2	NF250-UV	sets	Plug-in type terminal block (2 pc) Plug-in type barriers (2-pole: 2 pcs, 3-pole: 4 pcs) Tulip terminals (2-pole: 4pcs, 3-pole: 6 pcs)
PMDN-2UV3	3			
—	4			
PMDN-4SW2	2	NF400-CW/SW	sets	Plug-in type terminal block (2 pcs) Plug-in type barriers (4 pcs) Tulip terminals (3-pole: 6 pcs)
PMDN-4SW3	3	NF400-CW/SW/SEW NV400-CW/SW/SEW		
	3	NF400-HEW/REW NV400-HEW/REW		
PMDN-4SW4	4	NF400-SW/SEW NV400-SEW		
	4	NF400-HEW		
PMDN-8SW2	2	NF800-SDW	sets	Plug-in type terminal block (2 pcs) Tulip terminals (3-pole: 6 pcs)
PMDN-8SW3	3	NF800-CEW/SEW NV800-SEW		
	3	NF800-HEW/REW NV800-HEW		
PMDN-8SW4	4	NF800-SEW		
	4	NF800-HEW		

Note In addition to the circuit breakers shown above, 4-pole and 2-pole circuit breakers are available. We are ready to manufacture such circuit breakers to order. Please consult us.

Standard Tightening Torque

Rear
<Round stud>

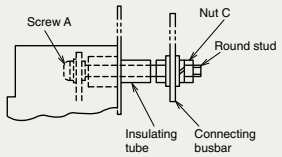


Fig. 1

<Bar stud>

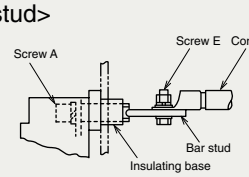


Fig. 2

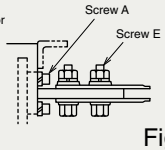


Fig. 3

Plug-in
<Screw terminal>

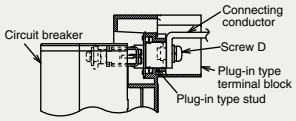


Fig. 4

<Bar stud>

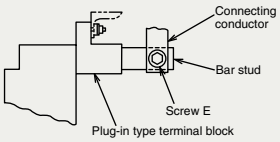


Fig. 5

Table 5 Standard tightening torque (*1)

Tightening torque N·m

Model / Connection type		Rear								Plug-in			
		Round stud				Bar stud				Screw terminal		Bar stud	
		Fig.1				Fig. 2, Fig.3				Fig.4		Fig.5	
		Screw A		Nut C		Screw A		Screw E		Screw D		Screw E	
MCCB	ELCB	Size	Tightening torque	Size	Tightening torque	Size	Tightening torque	Size	Tightening torque	Size	Tightening torque	Size	Tightening torque
NF30-CS	–	M4×0.7	1	M6	2	–	–	–	–	–	–	–	–
NF32-SV, NF63-CV NF63-SV, NF63-HV	NV32-SV, NV63-CV NV63-SV, NV63-HV	M4×0.7	1	M6	2	–	–	–	–	M6	3	–	–
NF125-CV, NF125-SV NF125-HV, NF125-UV	NV125-CV, NV125-SV NV125-HV	–	–	–	–	M6	4	M8	12	M8	6	–	–
NF125-SEV, NF125-HEV, NF125-RGV NF250-CV, NF250-SV, NF250-HV, NF250-SEV NF250-HEV, NF250-RGV, NF250-UV NF250-LGV/HGV, NF250-RGV, NF125-SGV/HGV NF125-LGV, NF160-SGV, NF160-LGV/HGV NF125-SGV, NF125-LGV, NF125-HGV NF160-SGV, NF160-LGV, NF160-HGV NF250-SGV, NF250-LGV, NF250-HGV	NV125-SEV, NV125-HEV NV250-CV, NV250-SV NV250-HV, NV250-SEV NV250-HEV	–	–	–	–	M6	10	M8	12	–	–	M8	12
NF400-CW, NF400-SW, NF400-SEW NF400-HEW, NF400-REW NF400-UEW (3P)	NV400-CW, NV400-SW NV400-SEW, NV400-HEW NV400-REW	–	–	–	–	M8	20	M12	45	–	–	M12	45
NF400-UEW (4P)	–	–	–	–	–	M10	30	M12	45	–	–	M12	45
NF630-CW, NF630-SW NF630-SEW NF630-HEW, NF630-REW	NV630-CW, NV630-SW NV630-SEW NV630-HEW	–	–	–	–	M8	20	M12	45	–	–	M12	45
NF800-CEW, NF800-SDW NF800-SEW, NF800-HEW, NF800-REW NF800-UEW (*2)	NV800-SEW NV800-HEW	–	–	–	–	M10	30	2-M12	45	–	–	2-M12	45
NF1000-SEW NF1250-SEW	–	–	–	–	–	4-M8	12	2-M12	45	–	–	2-M12	45
NF1600-SEW	–	–	–	–	–	4-M8	12	4-M10	25	–	–	–	–

Notes *1 The appropriate range of tightening torque is ±20% of each value (standard tightening torque) shown in the above table. Please refer to the supplied assembly manual and instruction manual for more information.
*2 The plug-in type is not available.

Crimp Terminal Type

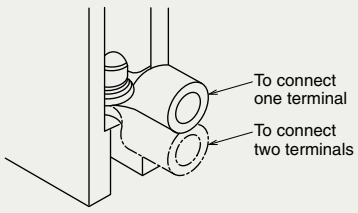
As the terminals in [ ], commercially available crimp terminals can be used. Please purchase the terminals at an electric material store.
For others, the crimp terminals for MCCB must be used. Place an order with us.
For the connection types shown in Fig. a and Fig. b, only crimp terminals will be delivered.

Table 6 List of applicable crimp terminals

Frame (A)	MCCB	ELCB	Nominal sectional area mm²	2	5.5	8	14	22
			Allowable current (600 V, IV wire at 30°C, not in conduit) (*4)	27A	49A	61A	88A	115A
			Size of mm²	1.04 to 2.63	2.63 to 6.64	6.64 to 10.52	10.52 to 16.78	16.78 to 26.66
30 50 100	BH-P	–		R-2-5	R-5.5-5	R-8-5	R-14-5	BH-22 (L330T459-23)
	BH-P100	–				R-8-8	R-14-8	R-22-8
30 32 50 60 63	NF30-CS, NF32-SV, NF63-CV*, NF63-SV* NF63-HV* *50A or below	NV32-SV, NV63-CV*, NV63-SV* NV63-HV* *50A or below		R-2-5 *(R-2-6)	R-5.5-5 *(R-5.5-6)	R-8-5	R-14-5	JST22-S5 BH-22 (L330T459-23)
	NF63-CV, NF63-SV, NF63-HV 60, 63A	NV63-CV, NV63-SV, NV63-HV 60, 63A		R-2-8	R-5.5-8	R-8-8	R-14-8	R-22-8
125	–	–		R-2-5 (R-2-6)	R-5.5-5 (R-5.5-6)	R-8-5	R-14-5	JST22-S5 (L330T459-23)
	NF125-CV, NF125-SV, NF125-HV, NF125-UV 60A or more	NV125-CV, NV125-SV, NV125-HV 60A or more		R-2-8	R-5.5-8	R-8-8	R-14-8	R-22-8
125 225 250	NF125-SEV, NF125-HEV, NF125-RGV NF250-CV, NF250-SV, NF250-HV, NF250-UV NF250-SEV, NF250-HEV, NF250-RGV NF125-SGV, NF160-SGV, NF250-SGV NF125-LGV, NF160-LGV, NF250-LGV NF125-HGV, NF160-HGV, NF250-HGV	NV125-SEV, NV125-HEV NV250-CV, NV250-SV, NV250-HV NV250-SEV, NV250-HEV					R-14-8	R-22-8
400 600 630	NF400-CW, NF400-SW, NF400-SEW NF400-HEW, NF400-REW, NF400-UEW NF630-CW, NF630-SW, NF630-SEW NF630-HEW, NF630-REW	NV400-CW, NV400-SW NV400-SEW, NV400-HEW NV400-REW, NV630-CW NV630-SW, NV630-SEW NV630-HEW						
800 1000 1200 1250	NF800-CEW, NF800-SEW, NF800-HEW NF800-REW, NF800-UEW, NF800-SDW NF1000-SEW, NF1250-SEW	NV800-SEW, NV800-HEW						

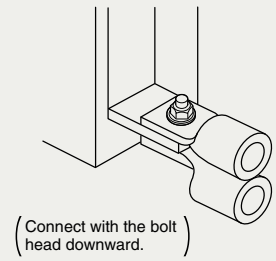
● Reference drawings of connection types

Method of connecting directly to terminal(s) of body

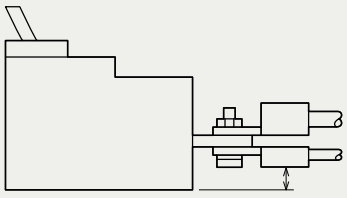


(Fig. a)

Method of connecting to front bar terminal

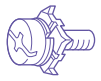
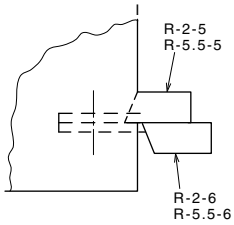
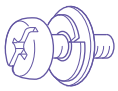
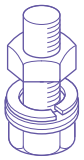


(Fig. b)



Carefully check the insulating distance between the connecting bus bar, crimp terminal and tightening bolt and the ground and the phase-to-phase insulating distance.

<Explanation of abbreviations>
R ..... Product specified by JIS
CB ..... Product specified by JEM 1399
AMP ..... Product made by Nippon AMP
JST ..... Product made by J.S.T. Mfg. Co., Ltd.
NTK ..... Product made by Nippon Tanshi Co., Ltd.
NTM ..... Product made by Nichifu Co., Ltd.
DST ..... Product made by Daido Solderless Terminal Mfg. Co., Ltd.

38	60	100	150	200	325	Crimp terminal tightening screw			Remarks	Reference drawing of connection type
162A	217A	298A	395A	469A	650A	Screw size	Tightening torque N • m	Shape		
26.66 to 42.42	42.42 to 60.57	96.3 to 117.2	117.2 to 152.05	192.6 to 242.27	242.27 to 325					
						M5	2 to 3	 M5 • M6	When connecting two crimp terminals, set the terminals as shown below if the *-marked terminals are used. 	(Fig. a)
AMP #322870 JST 38-S8 NTK R38-8S	1AF-60 (L330T459-12) CB60-S8					M8	5 to 7			
						M5	2 to 3	 M8		
AMP #322870 JST 38-S8 NTK R38-8S	1AF-60 (L330T459-12) CB60-S8					M8	5 to 7			
						M5	2 to 3	 M5		
AMP #322870 JST 38-S8 NTK R38-8S	1AF-60 (L330T459-12) CB60-S8					M8	5 to 7	 M8		
R-38-8	R-60-8	2AF (LN300T920-20) CB100-S8	2CR-150(*1) (LN300T920-21) (*1)CB150-S8			M8	8 to 13		When using 2AF, use a crimp tool having a nominal size of 100.	
R-38-12	R-60-12	R-100-12	R-150-12	R-200-12	JST325-12	M12	40 to 50		Fit to a front type bar terminal. Up to two pieces can be fitted to one terminal.	(Fig. b)
R-38-12	R-60-12	R-100-12	R-150-12 RD150-12 SD150-12	R-200-12 RD200-12 SD200-12	JST325-12 RD325-12 SD325-12					

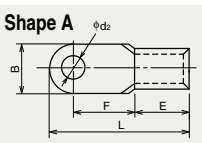
Notes *1 When using 2CR-150 or CB150-S8, insulate it from TC-S with insulating tube or tape. When using CB150-SB for a 2- or 3-pole circuit breaker, TCL-2SV3L is applicable.
*2 On the power supply side, pan-head screws M5 are used.
*3 When tightening a terminal screw without connecting a wire, crimp terminal or bar, tighten the screw to 20 to 30% of the torque shown in the above table (to prevent damage to the threads).
*4 The table shows not the allowable current values of circuit breakers, but those of wires applicable to crimp terminals.
Remark: 1. For the crimp terminals for UL listed circuit breakers, refer to the page of the characteristics and external dimensions of UL 489 Listed Circuit Breakers.

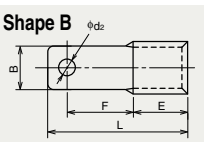
● Dimensions of crimp terminals <extracted from catalog of JST>

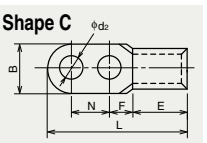
Part number	Shape	Applicable screw size	External dimensions						Applicable wire mm²
			ϕd2	B	L	F	E	Thickness	
R2-5	A	M5	5.3	9.5	16.8	7.3	4.8	0.8	1.04 to 2.63
R2-6		M6	6.4	12.0	21.8	11.0			
R2-8		M8	8.4						
R5.5-5	A	M5	5.3	9.5	19.8	8.3	6.8	1.0	2.63 to 6.64
R5.5-6		M6	6.4	12.0	25.8	13.0			
R5.5-8		M8	8.4	15.0	28.0	13.7			
R8-5	A	M5	5.3	12.0	23.8	9.3	8.5	1.2	6.64 to 10.52
8-5NS		M5	5.3	9.0	22.3				
R8-6		M6	6.4	12.0	23.8				
R8-8		M8	8.4	15.0	29.8	13.8			
8-5SC-9		M5	5.3	9	23.8	9.3	8.5	1.2	6.64 to 10.52
R14-5	A	M5	5.3	12.0	29.8	13.3	10.5	1.5	10.52 to 16.78
14-5NS		M5	5.3	9.0	28.3				
R14-6		M6	6.4	12.0	29.8				
R14-8		M8	8.4	16.0	32.8	14.5			
L330T459-23	A	M5	5.3	12.0	30.0	12.0	12.0	1.8	16.78 to 26.66
22-5NS		M5	5.3	9.5	28.7				
22-S6		M6	6.4	12.0	30.0				
R22-8		M8	8.4	16.5	33.7	13.5			
R22-12		M12	13.0	22.0	42.5	19.5			
38-S8	A	M8	8.4	15.5	38.0	16.0	14.0	1.8	26.66 to 42.42
R38-8		M8	8.4	22.0	42.7	17.7			
R38-12		M12	13.0						
L330T459-12	A	M8	8.4	22.0	46.7	20.7	18.0	2.0	42.42 to 60.57
R60-8		M8	8.4		49.7	20.7			
R60-12		M12	13.0						
LN300T920-20	B	M8	8.4	22.5	51.0	20.0	21.0	2.6	96.3 to 117.2
R100-12	A	M12	13.0	28.5	55.6	20.4			

Part number	Shape	Applicable screw size	External dimensions						Applicable wire mm²
			ϕd2	B	L	F	E	Thickness	
LN300T920-21	B	M8	8.4	22.5	70.0	33.0	27.0	3.2	117.2 to 152.05
L330T402-8		M8	8.4	25.3	61.5	23.0			
R150-12	A	M12	13.0	36.0	66.0	21.0			
R200-12	A	M12	13.0	44.0	78.0	24.5	31.5	4.0	192.6 to 242.27
325-12	A	M12	13.0	50.5	88.0	33.5	35.5	4.5	242.27 to 325
CB60-S8	B	M8	8.4	16.0	46.7	20.7	18.0	2.0	42.42 to 60.57
CB100-S8			8.4	22.0	52.5	20.5	21.0	2.6	96.3 to 117.2
CB150-S8			8.4	22.0	61.0	23.0	27.0	3.2	117.2 to 152.05

Part number	Shape	Applicable screw size	External dimensions							Applicable wire mm²
			ϕd2	B	L	F	E	N	Thickness	
RD60-12	C	M12	14.0	22.0	89.0	20.0	18.0	40	2.0	42.42 to 60.57
RD100-12			14.0	28.5	95.5	20.3	21.0		2.6	96.3 to 117.2
RD150-12			14.0	36.0	106.0	21.0	27.0		3.2	117.2 to 152.05
RD200-12			14.0	44.0	116.5	23.0	31.5		4.0	192.6 to 242.27
RD325-12			14.0	50.5	123.8	23.0	35.5		4.5	242.27 to 325
SD150-12	C	M12	14.0	36.0	107.0	29.0	28.0	32	3.2	117.2 to 152
SD200-12				44.0	108.0	36.0	32.0		4.0	192.6 to 242.2
SD325-12				50.5	125.0	38.0	37.0		4.5	242.2 to 325

Shape A 

Shape B 

Shape C 

Busbar

The size of the conductor can be connected is shown on the outline drawing of each model. The following special busbars are available. Use them as needed. When using any busbar, isolate it from the bare busbar on the circuit breaker power supply side with an insulating barrier.

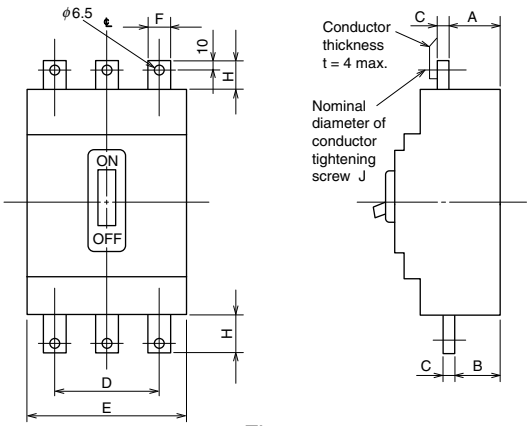


Fig. 1

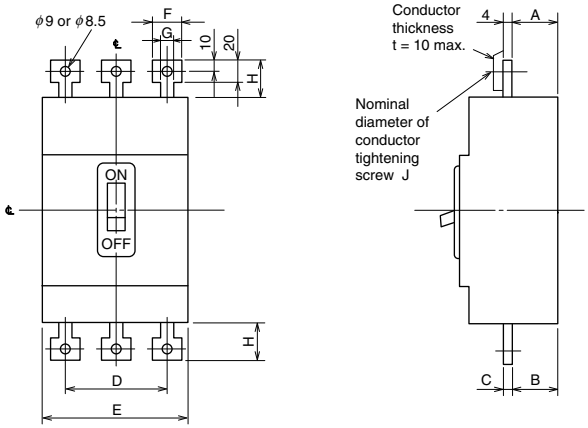


Fig. 2

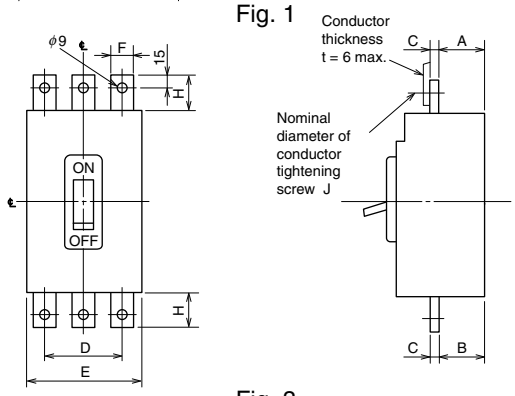
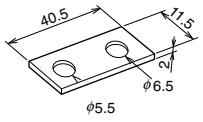
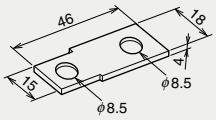
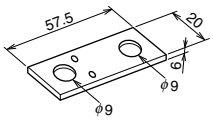


Fig. 3

Table 7 Table of variable dimensions

Type name	Applicable models		Outline and dimentions	Busbar									
	MCCB	ELCB		Fig.	A	B	C	D	E	F	G	H	J
FB-05SV	NF32-SV NF63-CV (50A or below) NF63-SV (50A or below) NF63-HV (50A or below)	NV32-SV NV63-CV (50A or below) NV63-SV (50A or below) NV63-HV (50A or below)		1	24	24	2	50	75	11.5	–	25	M5×0.8
FB-1SV	NF125-CV, NF125-SV NF125-HV, NF125-UV	NV125-CV NV125-SV NV125-HV		2	24	24	4	60	90	18	15	29	M8
FB-2SV	NF125-SEV NF125-HEV, NF125-RGV NF250-CV, NF250-SV, NF250-HV NF250-UV, NF250-SEV NF250-HEV, NF250-RGV NF125-SGV/LGV/HGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV	NV125-SEV NV125-HEV NV250-CV, NV250-SV NV250-HV, NV250-SEV NV250-HEV		3	24	24	6	70	105	20	–	37	M8

Insulation Distance on Power Source Side

●Basic concept

Insulation distance (distance indicated in standards)

Be sure to at least secure the insulation distances (spatial distance and creeping distance) specified by the codes and standards of the relevant equipment and facilities where the circuit breakers are installed.
It is recommended that insulation barriers and insulation tape be used to enhance the electrical insulation between bare-live parts and between bare-live parts and ground to avoid accidents otherwise caused by a loose metal piece, conductive dust, abnormal surge voltage in the circuit or a similar event so as to improve the reliability of panels.

Arc Space (insulation space)

At the exhaust outlet side of breaker, arc space is necessary. When the actual load circuit is opened, especially when a large current such as overload or short-circuit is interrupted, ionized gas is emitted from the exhaust outlet. This gas can cause a short circuit between bare, live parts such as busbars, and also can cause grounding faults between conductive installation metal panels.
Therefore, it is important to secure enough arc space at the exhaust outlet side of the breaker and to strengthen insulation of parts exposed to the gas. In addition, securing enough space at the front of the exhaust outlet is necessary, because when the gas emission is blocked, failures such as deterioration of breaking performance can be caused.

●Insulation required part

With regard to insulation of bear, live parts of the line side of the breaker, please make sure to insulate at least C part C indicated in the diagram above with insulation tape, a tube or a terminal cover.

①A : Distance from the circuit breaker to the ceiling plate
②B1 : Distance from the circuit breaker to the uncovered conducting part of the upper circuit breaker terminal (front connection)
③B2 : Distance from the lower circuit breaker to the end face of the upper circuit breaker (rear connection)
④D1 : Distance from the side of the breaker to the side plate
⑤C : Insulated length of the power source terminal of the circuit breaker (front connection)
Please secure insulation using insulating tape, insulating tubing, insulation barrier, or a terminal cover, between bare charge parts within this size range. Please refer to a table a necessary size must.
◇When using insulation tape and insulation tubing together with insulation barriers and terminal covers, make them overlap with the other by at least 10 mm.
◇For the models with insulation barriers supplied as standard, please make sure to use the barriers.
a : clearance specified in standard
⑥D2 : Side-to-side spacing of breakers
While the circuit breakers can basically be installed together without a clearance in between, be sure to observe the following instructions.
◇It is desirable to install an insulation barrier between the adjacent circuit breakers or insulate the bare-live parts considering the effect of cutoff gas.
◇Be sure to secure the insulation distance (dimension a) as the minimum, indispensable requirement.
◇With a leakage circuit breaker and a leakage alarm circuit breaker installed in close contact with the other, a current of 2,500A or higher flowing through one of the circuit breakers could cause the other to operate falsely.
Be sure to secure a distance of at least 50 mm in between.
◇A circuit breaker of 400-ampere frame or larger with an SHT or a UVT could operate falsely if a current of 50 kA or higher flows through the adjacent circuit breaker. Be sure to secure a distance of at least 50 mm in between.

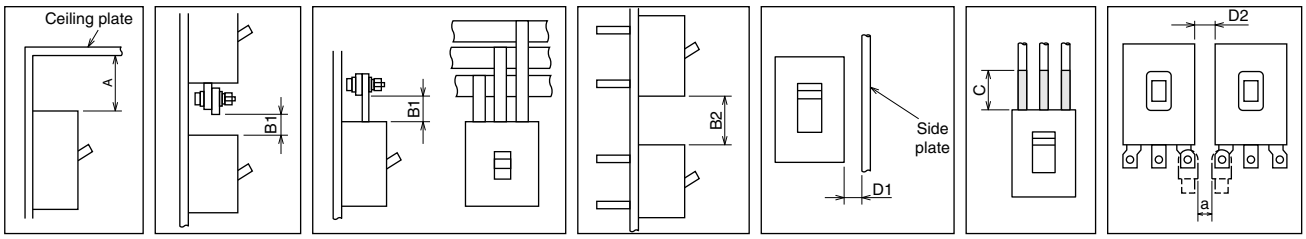


Table 8 Insulation distance (mm) (440VAC or below) *Figures in parentheses are for 230VAC or below.

Class • Series	Model		Ceiling plate			Vertical spacing		C	Horizontal spacing
	MCCB	ELCB	A			B1, B2			D1
			Uncovered metal Plate		Insulated plate, coated plate	Without terminal cover	With terminal cover		
			Without terminal cover	With terminal cover					
C • S • H • R • MB	NF30-CS	–	10	10	10	20	20	(*1)	20
	NF32-SV, NF63-CV	NV63-CV	5	5	5	20	20	(*1)	20
	NF63-SV, NF63-HV	NV32-SV, NV63-SV, NV63-HV	10	10	10	30	30	30	25
	NF125-CV	NV125-CV	50(30)	40(30)	10	50	50	(*1)	25
	NF125-SV	NV125-SV	50(10)	30(10)	10	50	50	50	25
	NF125-HV	NV125-HV	50	40	40	80	80	80	40
	NF250-CV	NV250-CV	40	40	40	50	50	50	50
	NF125-SEV, NF250-SV, NF250-SEV NF125-SGV, NF160-SGV, NF250-SGV	NV125-SEV, NV250-SV, NV250-SEV	70(40)	40	40	70(50)	50	70(50)	50
	NF125-HEV, NF250-HV, NF250-HEV NF125-LGV, NF160-LGV, NF250-LGV NF125-HGV, NF160-HGV, NF250-HGV	NV125-HEV, NV250-HV, NV250-HEV	80	60	60	80	80	80	60
	NF400-CW	NV400-CW	60	60	60	60	60	60	40
	NF400-SW, NF400-SEW	NV400-SW, NV400-SEW	70	70	70	70	70	70	70
	NF400-HEW, NF400-REW	NV400-HEW, NV400-REW	200	200	200	200	200	200	150
	NF630-SW, NF630-SEW, NF630-CW	NV630-CW, NV630-SW, NV630-SEW	70	70	70	70	70	70	70
	NF630-HEW, NF630-REW	NV630-HEW	200	200	200	200	200	200	150
	NF800-SEW, NF800-CEW	NV800-SEW	80	80	80	80	80	80	80
	NF800-HEW, NF800-REW	NV800-HEW	200	200	200	200	200	200	150
	NF1000-SEW, NF1250-SEW NF1600-SEW	–	100	100	100	100	100	100	100
R • U	NF125-RGV, NF250-RGV	–	30 (*6)	30 (*6)	30 (*6)	50 (*9)	50 (*9)	50	5
	NF125-UV, NF250-UV	–	(*1)	(*1)	(*1)	(*1)	(*1)	(*1)	25
	NF400-UEW	–	70	70	70	70	70	70	70
	NF800-UEW	–	80	80	80	80	80	80	80
BH	BH-K, BH-K100	–	(*1)		(*1)	(*1)		(*1)	20
UL	NF225-CWU	–	(40)	–	(40)	(50)	–	(50)	(50)
	NF50-SVFU	–	10 (*6)	10 (*6)	10 (*6)	20 (*7)	20 (*7)	30	10
	NF100-CVFU	–	50(25)	40(25)	10	50	50	50	25(15)
	NF125-SVU(*4)	–	40(10)	30(10)	10	50	50	50	25(20)
	NF125-HVU(*5)	–	40	40	40	80	80	80	25(20)
	NF250-SVU(*4)	–	40	40	40	70(50)	50	70(50)	50(20)
	NF250-HVU(*5)	–	40	40	40	80	80	80	50(20)
	NF400-SWU, NF400-HWU(*5)	–	70	70	70	70	70	70	70
	NF630-SWU, NF630-HWU(*5)	–	70	70	70	70	70	70	70

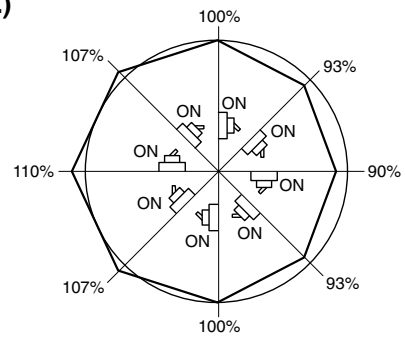
Remark: 1. The table shows the dimensions in the case of the use of a large terminal cover (TC-L).
Notes *1 It is not necessary to provide an insulation distance (an arc space) on the power supply side. However, if a grounding metal piece or the like comes in close contact with the terminal, be sure to completely insulate the terminals or the bare-live parts of the cable conductors.
*2 At more than 440 V AC, the distance shall be 10 mm.
*3 For 480Y/277V AC.
*4 For 480V AC.
*5 For 600Y/347V AC.
*6 An exhaust port is provided also on the circuit breaker load side. Secure the dimension A both on the power supply side and on the load side.
*7 When any of the circuit breakers NF125-RGB to NF250-RGV is used on the upstream side, an exhaust port is provided also on the circuit breaker load side. Secure the larger distance of the dimension B1 of NF125-RGV, NF250-RGV or NF50-SVFU and the dimension B1 of the downstream circuit breaker.

Effect of Installation Orientation

Installation orientation does not affect the operating characteristics of circuit breakers of electronic or thermo-magnetic operation types. However, the installation orientation affects the operating current of fully magnetic type circuit breakers as the iron core in the oil dash pot is under gravitational force.
It is generally suggested they be installed vertically.

●Hydraulic-magnetic (The same applies to other models of hydraulic-magnetic type.)

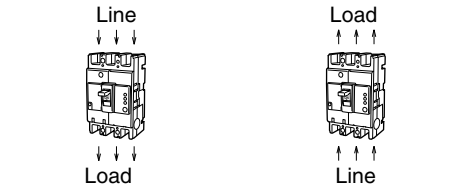
MCCB	
Class	Model
C	NF30-CS



Rate of change of rated current by mounting angle

Connection of Line and Load

The standard wiring of line and load on the circuit breaker is as shown in (a) normal connection on the right.
Avoid the wiring shown in (b) reverse connection. This may lead to a decrease in breaking performance.
However, the reverse connection is allowed for the following models (excluding MDU breakers).



(a) Normal connection (b) Reserve connection

Connection methods

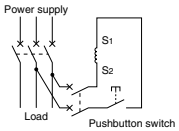
NF-C, NF-S, NF-H, NF-R and NF-U class BH-P, CP30-BA, NV-C, S, H and R class of 400 to 800AF, NF100-CVFU, NF125-SVU, NF125-HVU, NF250-SVU, NF250-HVU	Reverse connection is allowed for the standard models.

Internal Accessories

The accessories to be installed in circuit breakers include the followings. For the numbers of the accessories which can be installed. The standard internal accessories have lead wires (450 mm long) drawn out. (However, some of Models UVT and TBM have vertical lead wire terminal blocks as standard.)
When circuit breakers are installed side by side, keep a space of 8 mm or more for lead wires between the circuit breakers. (Models with lead wires drawn out toward load and models with lead wire grooves in the side faces can be installed in close contact.)

SHT (Shunt trip)

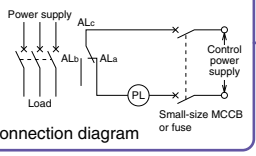
Device to electrically trip a circuit breaker from a distance. The allowable operating voltage range is 70 to 110% of the rated voltage. (JIS C 8201-2-1 Ann.1, Ann.2)



Connection diagram

AL (Alarm switch)

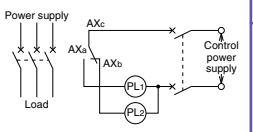
Switch to electrically display the tripping status of circuit breaker



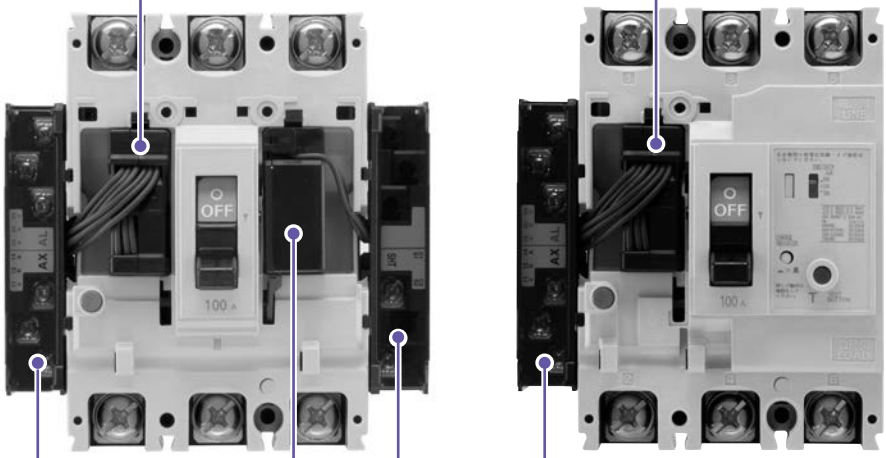
Connection diagram

AX (Auxiliary switch)

Switch to electrically display the ON-OFF status of circuit breaker

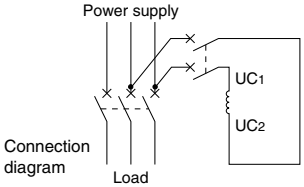


Connection diagram



UVT (Undervoltage trip)

Device to automatically trip a circuit breaker when the voltage drops. The operating voltage is 70 to 35% of the UVT rated voltage. (JIS C 8201-2-1 Ann.1)
When the voltage recovers at least to 85% or more, the circuit breaker can be turned on after the device is manually reset.



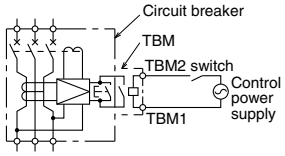
Connection diagram

SLT (Lead wire terminal block)

Terminals for connecting with internal accessories. The terminal block will be manufactured to order. For the detailed dimensions. (The dimensions of SLT slightly vary depending on the number of installed accessories and the model.)
However, circuit breakers with a frame size of 400A and above having an electrical operation device are normally provided with SLT.

TBM (Test button module)

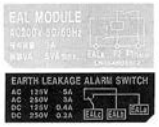
Unit to perform test under voltage from a distance. TBMs can be connected in parallel. (The standard TBMs are provided with SLT. In the case of the flush plate type, the external dimensions are partially different from those of the standard type.)



TBM circuit diagram

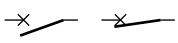
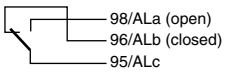
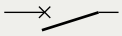
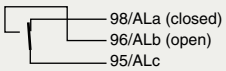
Kinds of Internal Accessories

Table 1

Accessory name		Nameplate (sample)	Accessory name		Nameplate (sample)
AL	Alarm switch		EAL	Earth leakage trip alarm switch	
AX	Auxiliary switch				
SHT	Shunt tripping device		TBM	Test button module	
UVT	Undervoltage tripping device				

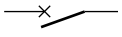
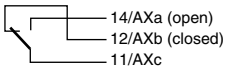
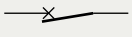
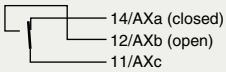
Operations and Ratings of Switches

Table 2 Operations of AL switch

Status of circuit breaker	Contact status of AL switch
 Off or On	 98/ALa (open) 96/ALb (closed) 95/ALc
 Trip	 98/ALa (closed) 96/ALb (open) 95/ALc

* The terminal numbers 98/ALa, 96/ALb and 95/ALc may vary depending on the number of installed switches and the installation poles.

Table 3 Operations of AX switch

Status of circuit breaker	Contact status of AX switch
 Off or Trip	 14/AXa (open) 12/AXb (closed) 11/AXc
 On	 14/AXa (closed) 12/AXb (open) 11/AXc

* The terminal numbers 14/AXa, 12/AXb and 11/AXc may vary depending on the number of installed switches and the installation poles.

Table 4 Ratings of AL and AX switches

Applied switch	AC			DC		
	Voltage V	Current A		Voltage V	Current A	
		Resistive load	Inductive load		Resistive load	Inductive load
A	(250)	(1)	(0.5)	(50)	(1)	(0.5)
	125	3	(1)	30	(2)	(1)
S	460	—	—	250	0.2	0.2
	250	3	2	125	0.4	0.4
	125	5	3	30	4	3
V	460	5	2	250	0.3	0.3
	250	10	10	125	0.6	0.6
	125	10	10	30	10	6

Remark: 1. The ratings in parentheses do not conform to UL.

Maximum Number of Internal Accessories

MCCB and Motor Protection Breakers

●AL ○AX ▨SHT or UVT ■PAL →Outgoing direction of lead wires

Handle of circuit breaker
Left pole → ← Right pole

▭ are cassette type accessories. (Some of UVT are not provided with cassettes.)

Table 5 Table of maximum number of internal accessories

Model								
	C	NF30-CS	NF63-CV NF125-CV	NF63-CV NF125-CV NF250-CV		NF400-CW NF630-CW	NF800-CEW	
	S		NF32-SV NF63-SV NF125-SV	NF32-SV NF63-SV NF125-SV NF125-SGV NF160-SGV NF250-SV NF250-SGV	NF125-SEV NF250-SEV	NF400-SW NF400-SEW NF630-SW NF630-SEW	NF800-SEW NF800-SDW	NF1000-SEW NF1250-SEW NF1600-SEW
	L • H • R		NF63-HV	NF63-HV NF125-HV NF125-LGV NF125-HGV NF125-RGV NF160-LGV NF160-HGV NF250-HV NF250-LGV NF250-HGV NF250-RGV	NF125-HEV NF250-HEV	NF400-HEW NF400-REW NF630-HEW NF630-REW	NF800-HEW NF800-REW	
	U			NF125-UV NF250-UV		NF400-UEW(3P)	NF400-UEW(4P) NF800-UEW	
Number of poles		2 or 3 poles	2 poles	2, 3 or 4 poles	3, 4 poles	2, 3 or 4 poles	2, 3 or 4 poles	2, 3 or 4 poles
AL and AX (standard) switches		S						V
Accessory								
AL		(*3)		❶ ❷	❶ ❷		(*7)	
AX		(*3)	① ②	① ② ③	① ② ③	① ③ ② ④	(*7) ① ⑤ ③ ② ⑥ ④	③ ① ② ⑤ ④ ⑥
SHT or UVT			(*1)	(*1)(*5)	(*1)(*5)	(*1) (*6)	(*1) (*6)	(*1)
AL + AX		(*3) 3-pole product only		(*2) ❶ ❷ ① ②	(*2) ❶ ❷ ① ②	(*7)	(*7)	
AL + SHT or UVT				(*1)	(*1)	(*1) (*6) (*7) (*8)	(*1) (*6) (*7) (*8)	(*1)
AX + SHT or UVT				(*1) ① ②	(*1) ① ②	(*1) (*6) (*7) (*8) ③ ① ②	(*1) (*6) (*7) (*8) ①③ ②④ ⑤ ③ ① ④ ②	(*1)
AL + AX + SHT or UVT				(*1)	(*1)	(*1) (*6) (*7) (*8)	(*1) (*6) (*7) (*8)	(*1)
PAL (contact output)					(*4)	(*9) Option for NF400-SEW, HEW, REW and UEW and NF630-SEW, HEW and REW	(*9) Option for NF800-CEW, SEW, HEW and REW and NF800-UEW	(*9) Option for NF1000-SEW and NF1250-SEW and NF1600-SEW

Notes
*1 When UVT is provided, the UVT voltage module will come in the vertical lead wire terminal block type. (SHT does not have a voltage module.)
*2 The second AX can be installed in place of the AL on the left pole side. When placing an order, specify the incorporation of the switches in the body.
*3 Although the lead wires are normally drawn out laterally, those with lead wires drawn out toward load are available. (Only for front connection type)
*4 PAL (contact output) can be installed together with AL and AX on the left pole side. (It cannot be installed together with SHT or UVT.) The standard type is provided with SLT. PAL control voltage (compatible with 100 to 200 V AC) is necessary.
*5 SHT and UVT can be installed on the left side.
*6 SHT and UVT are normally installed on the right pole side. If you intend to install them on the left pole side, specify so. (The reset preventing UVT must be installed on the left pole side.)
*7 In the case where three or more accessories are installed on the left pole side and AL, AX or AL and AX are installed on the pole on which SLT, SHT or UVT is installed, the SLT will be manufactured to order.
*8 When AL, AX or AL and AX are installed on the pole on which UVT is installed, the UVT voltage module must be installed separately.
*9 SLT is provided as standard. A control power supply (100 to 200 V AC) is required. (In this case, other internal accessories cannot be installed on the right pole side.)

Remarks: 1. For electrically operated automatic reset type circuit breakers having a frame size of 400A or above, the numbers of AL switches which can be installed are smaller by 1 than the values shown above.
2. The encircled numbers indicate the order of installation.

ELCB

Table 6 Table of maximum number of internal accessories

●AL ○AX SHT or UVT

Handle of circuit breaker
Left pole → ← Right pole

TBM →Outgoing direction of lead wires

are cassette type accessories.

Model				
	C	NV63-CV NV125-CV NV250-CV	NV400-CW NV630-CW	
	S	NV32-SV NV63-SV NV125-SV NV125-SEV NV250-SV NV250-SEV	NV400-SW NV400-SEW NV630-SW NV630-SEW	NV800-SEW
	H • R	NV63-HV NV125-HV NV125-HEV NV250-HV NV250-HEV	NV400-HEW NV400-REW NV630-HEW	NV800-HEW
	U			
Number of poles / Switch		2, 3, or 4 poles	3 poles	
Accessory		S		
AL				(*6)
AX		① ②		(*6)
AL + AX		(*2)	(*6)	(*6)
SHT or UVT		(*3)	(*5)	(*5)
AL + SHT or UVT			(*4) (*5) (*6)	(*4) (*5) (*6)
AX + SHT or UVT			(*4) (*5) (*6)	(*4) (*5) (*6)
AL + AX + SHT or UVT			(*4) (*5) (*6)	(*4) (*5) (*6)
TBM		(*1)	(*1)	(*1)

Notes *1 The standard type is provided with SLT. Only in the case of 24 V DC, specify the control voltage.
*2 The second AX can be installed in place of the AL on the left pole side. When placing an order, specify the incorporation of the switches in the body.
*3 When UVT is provided, the UVT voltage module will come in the vertical lead wire terminal block type. (SHT does not have a voltage module.)
*4 When AL, AX or AL and AX are installed on the pole on which UVT is installed, the UVF voltage module must be separately installed.
*5 When the accessory is provided with UVT, the UVT voltage module has a vertical lead wire terminal block. The UVT is not provided with a cassette.
*6 SLT to be used when three or more accessories are installed on the left pole is manufactured to order.

Remarks: 1. The encircled numbers indicate the order of installation.
2. TBM can be installed regardless of the number of installed AL, AX, SHT and UVT.

UL 489 Listed Circuit Breakers

Table 7 Table of maximum number of internal accessories

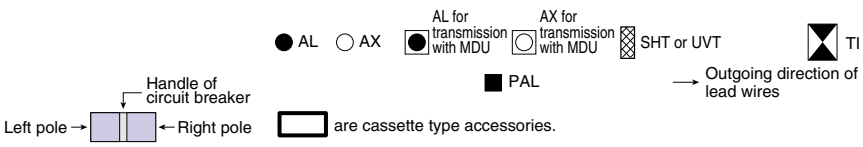
Handle of circuit breaker ● AL ○ AX ▨ SHT or UVT ➡ TBM →Outgoing direction of lead wires
Left pole → ← Right pole
▭ are cassette type accessories.

Model / Number of poles / AL and AX (standard) switches / Accessory									
MCCB	NF50-SVFU NF100-CVFU	NF50-SVFU NF100-CVFU	NF125-SVU NF125-HVU NF250-SVU NF250-HVU	NF225-CWU	NF400-SWU NF400-HWU	NF630-SWU NF630-HWU			
ELCB							NV50-SVFU	NV50-SVFU NV100-CVFU	NV125-SVU NV125-HVU NV250-SVU NV250-HVU
Number of poles	2 poles	3 poles	2 or 3 poles	3 poles	3 poles	3 poles	2 poles	3 poles	3 poles
AL and AX (standard) switches	S								
AL						(*4)			
AX						(*4)			
SHT or UVT	(*1) (*6)	(*1) (*3) (*6)	(*1) (*3)	(*1)	(*1) (*3)	(*1) (*3)		(*1) (*6)	(*1)
AL + AX		(*2)	(*2)		(*6)	(*6)		(*2)	(*2)
AL + SHT or UVT		(*1) (*6)	(*1)	(*1)	(*1) (*3) (*4) (*5)	(*1) (*3) (*4) (*5)			
AX + SHT or UVT		(*1) (*6)	(*1)	(*1)	(*1) (*3) (*4) (*5)	(*1) (*3) (*4) (*5)			
AL + AX + SHT or UVT		(*1) (*6)	(*1)	(*1)	(*1)(*3) (*4)(*5)	(*1)(*3) (*4)(*5)			
TBM							(*7)	(*7)	(*7)

Notes *1 When UVT is provided, the UVT voltage module will come in the vertical lead wire terminal block type. (SHT does not have a voltage module.)
*2 SHT cannot be installed.
*3 SHT and UVT are normally installed on the right pole side. If you intend to install them on the left pole side, specify so.
*4 In the case where three or more accessories are installed on the left pole side and AL, AX or AL and AX are installed on the pole on which SLT, SHT or UVT is installed, the SLT will be manufactured to order.
*5 When AL, AX or AL and AX are installed on the pole on which UVT is installed, the UVT voltage module must be installed separately.
*6 UVT of NF50-SVFU and NV50-SVFU are not provided with cassettes.
*7 The standard type is provided with SLT. Only in the case of 24 V DC, specify the control voltage.
Remarks: 1. The encircled numbers indicate the order of installation.
2. AL and AX for minute load can be manufactured to order. (These switches have been certified only by UL and CSA. They have not been certified by TUV.)

MDU Breakers

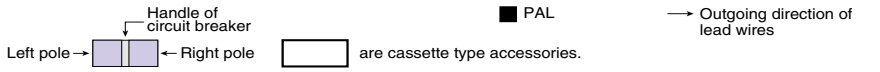
Table 8-1 Table of maximum number of internal accessories



Model	NF400-SEP with MDU NF400-HEP with MDU	NF600-SEP with MDU NF600-HEP with MDU NF800-SEP with MDU NF800-HEP with MDU
Number of poles	3 or 4 poles	
switch	S	
Accessory		
AL		(*1)
AX		(*1)
SHT	(*2)	(*2)
UVT	(*3) (*4)	(*3) (*4)
AL + AX	(*1)	(*1)
AL + SHT	(*1) (*2)	(*1) (*2)
AX + SHT	(*1) (*2)	(*1) (*2)
AL + AX + SHT	(*1) (*2)	(*1) (*2)
AL + UVT	(*1) (*3) (*4) (*5)	(*1) (*3) (*4) (*5)
AX + UVT	(*1) (*3) (*4) (*5)	(*1) (*3) (*4) (*5)
AL + AX + UVT	(*1) (*3) (*4) (*5)	(*1) (*3) (*4) (*5)
PAL	(*6)	(*6)
EPAL	———	———
TI	(*6) With contact outputs for PAL and OAL	(*6) With contact outputs for PAL and OAL

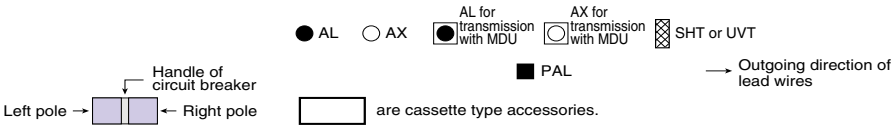
Notes *1 In the case where three or more accessories are installed on the left pole side and AL, AX or AL and AX are installed on the pole on which SLT, SHT or UVT is installed, the SLT will be manufactured to order.
*2 SHT and UVT are normally installed on the right pole side. If you intend to install them on the left pole side, specify so. (The reset preventing UVT must be installed on the left pole side.)
*3 The UVT voltage module is installed externally. UTV is not provided with a cassette.
*4 UVT is normally installed on the right pole. If you intend to install it on the left pole, specify so.
*5 When AL, AX or AL and AX are installed on the pole on which UVT is installed, the UVT voltage module must be installed separately.
*6 The standard model has a terminal block. A 5-VA control power supply (compatible with 100 to 240 V AC/DC) is required. (In this case, another internal accessory cannot be installed on the right pole.)
Remark: 1. The encircled numbers indicate the order of installation.

Table 8-2 Table of maximum number of internal accessories



Model / Number of poles / switch / Accessory	NF400-SEP with MDU NF400-HEP with MDU	NF600-SEP with MDU NF600-HEP with MDU NF800-SEP with MDU NF800-HEP with MDU
	3 or 4 poles	
	S	
AL for transmission with MDU (*1)		
AX for transmission with MDU (*1)		
AL + AX for transmission with MDU (*1)		
AL + AX + AL for transmission with MDU (*1)		
AL+AX + AX for transmission with MDU (*1)		
AL + AX + AL + AX for transmission with MDU (*1)		

Note *1 To transmit signals from AL, AX or AL and AX, AL and/or AX for transmission with the MDU are installed on the left pole side. In this case, the lead wires of AL and/or AX for transmission with the MDU installed on the left pole side cannot be drawn out to the outside or fitted to the terminal block.



Model / Number of poles / switch / Accessory	NF250-SEV with MDU NF250-HEV with MDU
	3 or 4 poles
	S
AL	
AX	
AL + AX	 (*1)
SHT or UVT	 (*2)
AL + SHT	 (*2)
AX + SHT	 (*2)
AL + AX + SHT	 (*2)
AL + UVT	 (*2)
AX + UVT	 (*2)
AL + AX + UVT	 (*2)
AL for transmission with MDU (*3)	
AL for transmission with MDU AX (*3)	
AL for transmission with MDU AL + AX (*3)	
AL for transmission with MDU AL + AX + AL (*3)	
AL for transmission with MDU AL + AX + AX (*3)	
AL for transmission with MDU AL + AX + AL + AX (*3)	

Notes *1 The second AX can be installed in place of the AL on the left pole side. When placing an order, specify the incorporation of the switches in the body.
*2 When UVT is provided, the UVT voltage module will come in the vertical lead wire terminal block type. (SHT does not have a voltage module.)
*3 To transmit signals from AL, AX or AL and AX, AL and/or AX for transmission with the MDU are installed on the left pole side. In this case, the lead wires of AL and/or AX for transmission with the MDU installed on the left pole side cannot be drawn out to the outside or fitted to the terminal block. In the case of 225A frame circuit breakers, AL for transmission with the MDU must be installed for fault current measurement.
Remark: 1. The encircled numbers indicate the order of installation.

Cassette Type Accessories

The internal accessories for major models having a frame size from 30 to 800 A come in cassettes, and they can be installed to and removed from circuit breakers by the user.
Some cassette type accessories have lead wires drawn out, and others have vertical lead wire terminal blocks (SLT). (These parts are supplied by 10 pieces for frame size from 30 to 250 A or by 1 piece for frame size from 400 to 800 A.)

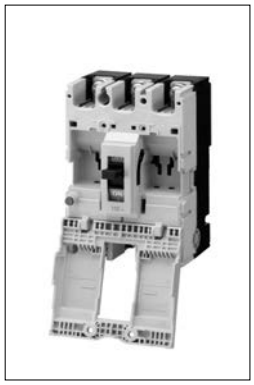
Applicable models and kinds of cassette type accessories

	Model	Alarm switch (AL)	Auxiliary switch (AX)	Shunt tripping device (SHT)	Undervoltage tripping device (UVT)
MCCB	NF63-CV~NF250-CV, NF32-SV~NF250-SV NF63-HV~NF250-HV NF125-SGV~NF250-SGV, NF125-LGV~NF250-LGV NF125-HGV~NF250-HGV NF125-SEV, NF250-SEV, NF125-HEV, NF250-HEV NF125-RGV, NF250-RGV, NF125-UV, NF250-UV NF100-CVFU, NF125-SVU/HVU, NF250-SVU/HVU	○	○	○	○
	NF50-SVFU, NF400-CW, NF630-CW, NF800-CEW NF400-SW, NF630-SW, NF400-SEW~NF800-SEW NF800-SDW, NF400-HEW~NF800-HEW NF400-REW~NF800-REW, NF400-UEW, NF800-UEW NF400-SWU/HWU, NF630-SWU/HWU	○	○	○	–
ELCB	NV63-CV~NV250-CV, NV32-SV~NV250-SV NV63-HV~HV250-HV NV125-SEV, NV250-SEV, NV125-HEV, NV250-HEV NV100-CVFU, NV125-SVU/HVU, NV250-SVU/HVU	○	○	○	○
	NV50-SVFU, NV400-CW, NV630-CW NV400-SW, NV630-SW, NV400-SEW~NV800-SEW NV400-HEW~NV800-HEW, NV400-REW	○	○	○	–

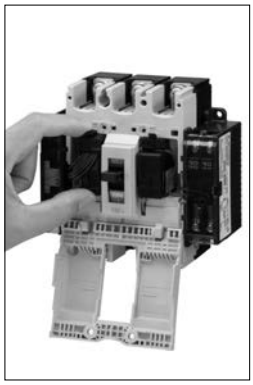
Procedure for installing cassette type accessories

1. Press the trip button (PTT) to trip the circuit breaker. (*1)

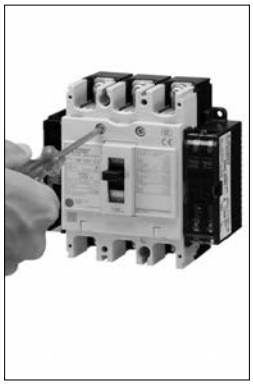
2. Loosen the cover screws.



3. Open the cover.



4. Install the cassette type accessory. (*2)



5. Close the cover, and tighten the screws.

Notes *1 When installing any cassette type accessory, set the circuit breaker to the tripped state.
*2 If the inner lid or another accessory has been installed, remove it before installing the accessory.
When any circuit breaker supplied with the inner lid is used without an accessory, fit the inner lid without fail.
Failure to do so may affect the short-circuiting performance.
Models with inner lid: NF125-SV, NF125-HV, NF125-UV
NV125-SV, NV125-HV
NF250-SV, NF250-HV
NV250-SV, NV250-HV
NF125-SVU, NF125-HVU, NV125-SVU, NV125-HVU
NF250-SVU, NF250-HVU, NV250-SVU, NV250-HVU
NF250-SEV, NF250-HEV, NF250-UV
NV250-HEV
NF125-SEV, NF125-HEV
NV125-SEV, NV125-HEV
NF400-REW, NF400-UEW
NF630-REW, NV400-REW
NF800-HEW, NF800-REW, NF800-UEW
NV800-HEW
NF630-SWU, NF630-HWU

Cautions when installing

Before installing or removing any cassette type accessory, set the circuit breaker and accessories to the no-voltage state.
Never install a cassette type accessory while the handle is in the ON or OFF position. Doing so may damage the accessory.
When installing an accessory with lead wires drawn out, apply the supplied nameplate to the circuit breaker side face.
When installing an accessory with lead wires drawn out for a frame size of 400 to 800 A, secure the lead wires along the circuit breaker side face with the supplied lead wire retainers.

Type name

Table 9-1

Model MCCB	Model ELCB	Installation pole	AL	AX	AL+AX	SHT	UVTN or UVTS
NF50-SVFU		For right pole	AL-03SVU AL-03SVURS	AX-03SVU AX-03SVURS	ALAX-03SVU ALAX-03SVURS	SHTA240-03SVUR SHTA440-03SVUR SHTD100-03SVUR SHTA240-03SVURS SHTA440-03SVURS SHTD100-03SVURS	–
		For left pole					
	NV50-SVFU	For left pole	AL-03SVU AL-03SVULS	AX-03SVU AX-03SVULS	ALAX-03SVU ALAX-03SVULS	SHTA240-03SVUL SHTA440-03SVUL SHTD100-03SVUL SHTA240-03SVULS SHTA440-03SVULS SHTD100-03SVULS	–
NF32-SV, NF63-CV, NF63-SV, NF63-HV NF125-CV, NF125-SV, NF125-HV NF125-SGV, NF125-LGV, NF125-HGV NF160-SGV, NF160-LGV, NF160-HGV NF125-SEV, NF125-HEV NF125-RGV, NF125-UV NF250-CV, NF250-SV, NF250-HV NF250-SGV, NF250-LGV, NF250-HGV NF250-SEV, NF250-HEV NF250-RGV, NF250-UV		For right pole	AL-05SV AL-05SVRS	AX-05SV AX-05SVRS	ALAX-05SV ALAX-05SVRS	SHTA240-05SVR SHTA550-05SVR SHTD125-05SVR SHTA240-05SVRS SHTA550-05SVRS SHTD125-05SVRS	UVTNAD130-05SVR UVTSAD130-05SVR UVTNA250-05SVR UVTSA250-05SVR UVTNA480-05SVR UVTSA480-05SVR UVTNAD130-05SVRS UVTSAD130-05SVRS UVTNA250-05SVRS UVTSA250-05SVRS UVTNA480-05SVRS UVTSA480-05SVRS
		For left pole					
	NV32-SV, NV63-CV NV63-SV, NV63-HV NV125-CV, NV125-SV NV125-HV NV125-SEV, NV125-HEV NV250-CV, NV250-SV NV250-HV NV250-SEV, NV250-HEV	For left pole	AL-05SV AL-05SVLS	AX-05SV AX-05SVLS	ALAX-05SV ALAX-05SVLS	SHTA240-05SVL SHTA550-05SVL SHTD125-05SVL SHTA240-05SVLS SHTA550-05SVLS SHTD125-05SVLS	UVTNAD130-05SVL UVTSAD130-05SVL UVTNA250-05SVL UVTSA250-05SVL UVTNA480-05SVL UVTSA480-05SVL UVTNAD130-05SVLS UVTSAD130-05SVLS UVTNA250-05SVLS UVTSA250-05SVLS UVTNA480-05SVLS UVTSA480-05SVLS
NF100-CVFU NF125-SVU/HVU NF250-SVU/HVU		For right pole	AL-05SVU AL-05SVURS	AX-05SVU AX-05SVURS	ALAX-05SVU ALAX-05SVURS	SHTA240-05SVUR SHTA550-05SVUR SHTD125-05SVUR SHTA240-05SVURS SHTA550-05SVURS SHTD125-05SVURS	UVTNAD130-05SVUR UVTSAD130-05SVUR UVTNA250-05SVUR UVTSA250-05SVUR UVTNA480-05SVUR UVTSA480-05SVUR UVTNAD130-05SVURS UVTSAD130-05SVURS UVTNA250-05SVURS UVTSA250-05SVURS UVTNA480-05SVURS UVTSA480-05SVURS
		For left pole					
	NV100-CVFU NV125-SVU/HVU NV250-SVU/HVU	For left pole	AL-05SVU AL-05SVULS	AX-05SVU AX-05SVULS	ALAX-05SVU ALAX-05SVULS	SHTA240-05SVUL SHTA550-05SVUL SHTD125-05SVUL SHTA240-05SVULS SHTA550-05SVULS SHTD125-05SVULS	UVTNAD130-05SVUL UVTSAD130-05SVUL UVTNA250-05SVUL UVTSA250-05SVUL UVTNA480-05SVUL UVTSA480-05SVUL UVTNAD130-05SVULS UVTSAD130-05SVULS UVTNA250-05SVULS UVTSA250-05SVULS UVTNA480-05SVULS UVTSA480-05SVULS
NF400-CW, NF400-SW, NF400-SEW NF400-HEW, NF400-REW, NF400-UEW NF630-CW, NF630-SW, NF630-SEW NF630-HEW, NF630-REW NF800-CEW, NF800-SDW, NF800-SEW NF800-HEW, NF800-REW, NF800-UEW		For right pole (2, or 3 poles)	–	AX-4SW AX-4SWRS AX2-4SWRS	–	SHT-4SW SHT-4SWRS	–
		For right pole (4 poles)	–	–	–	SHT-4SWRFS SHT-8SWRFS	–
		For left pole (2, 3 or 4 poles)					
	NV400-CW, NV400-SW NV400-SEW, NV400-HEW NV400-REW NV630-CW, NV630-SW NV630-SEW, NV630-HEW NV800-SEW, NV800-HEW	For left pole (2, 3 or 4 poles)	AL-4SWL AL-4SWLS AL2-4SWLS	AX-4SW AX-4SWLS AX2-4SWLS	ALAX-4SWL ALAX-4SWLS	SHT-4SW SHT-4SWLS	–
NF400-SWU, NF400-HWU NF630-SWU, NF630-HWU		For right pole	–	AX-4SWU AX-4SWURS AX2-4SWURS	–	SHT-4SWU SHT-4SWURS	–
		For left pole	AL-4SWUL	AX-4SWUL	ALAX-4SWUL	SHT-4SWU	

Remarks:
1. For the possibility of installation of accessories and the installation pole, refer to the tables of maximum numbers on pages 727 to 731.
2. AL and AX for minute load can be manufactured to order.
3. Corrosion-proof cassette type AL and AX are not available. When the circuit breaker body is exposed to class 1 tropicalization, class 2 tropicalization, reinforced corrosion resistance treatment or class 2 heat resistance treatment, place an order for the circuit breaker including the accessories.
4. Cassette type accessories with SLT for right pole cannot be installed to 4-pole circuit breakers. Accessories with SLT for right pole to be used in 4-pole circuit breakers are manufactured to order.
5. Cassette type accessories with SLT cannot be installed to flush plate type circuit breakers.
6. Cassette type accessories (AL, AX and SHT) cannot be installed to circuit breakers with MG.
7. It is impossible to install a combination of a cassette type accessory with lead wires drawn out and that with SLT or a combination of cassette type accessories with SLT on the same pole.
8. It is impossible to install the cassette type AL or AX to the pole to which UVT has been installed.
9. AX and SHT with lead wires drawn out for frame size from 400 to 800 A can be installed to any of the right and left poles.
10. When installing more than one AL or AX with lead wires drawn out for frame size from 400 to 800 A to one side, install the necessary number of the accessories for one piece. The lead wires from the circuit breaker vary in length depending on the installation position.
11. Install the cassette accessories for frame size from 400 to 800 A starting from the outside of the installation positions. For the installation positions, see the installation positions shown in the following table.
12. When three pieces of more of AL and AX are installed on a circuit breaker with a frame size 400 to 800 A, the AL and AX with SLT are manufactured to order.

Installation positions of cassette type accessories for 400 to 800 A frames

Installation positions

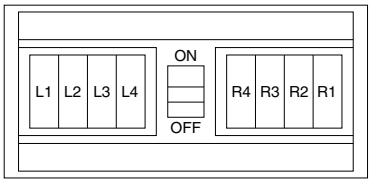


Table 9-2 Installation positions of cassette type accessories

Frame (A)	400 • 600 • 630					800							
Accessory \ Installation positions	L1	L2	L3	R2	R1	L1	L2	L3	L4	R4	R3	R2	R1
AL	○	○	–	–	–	○	○	○	–	–	–	–	–
AX	○	○	–	○	○	○	○	○	○	–	–	○ (*1)	○
AL + AX	○	○	–	–	–	○	○	–	–	–	–	–	–
SHT	–	○		○		–	–	○		○ (*1)		–	–

* Accessories only for Earth Leakage Circuit Breakers (NV-C, S and H), Earth Leakage Alarm Breakers (NF-Z) and single-phase 3-wire circuits (NF-N and NV-N) cannot be installed to R1, R2, R3 or R4.

Note *1 It is impossible to simultaneously install AX on R2 and SHT on R3 or R4.

Interpretation of type name

(1) Alarm switch • Auxiliary switch

AL 2 — 4 SV (or SW) L S B

Kind of accessory	
AL	Alarm switch
AX	Auxiliary switch

Number of accessories to be installed: When installing more than one AL or AX with SLT, specify the number.

Ampere frame	
05	For 30 to 250A frames
4	For 400 to 800A frames

Installation position	
R	Right pole, 2 or 3 poles
RF	Right pole, 4 poles
L	Left pole
Blank	Right and left

With SLT (vertical lead wire terminal block) (with lead wires drawn out unless otherwise specified)

Kind of switch	
Blank	Standard
B	Minute load

(2) Shunt tripping device
Undervoltage tripping device

SHT A1 — 1 SV (or SW) R S

Kind of accessory	
SHT	Shunt tripping device
UVTN (*1)	Undervoltage tripping device
UVTS (*2)	

Voltage (SHT)	
A240	AC100-240V
A440	AC380-440V
A480	AC380-480V
A550	AC380-550V
D100	DC100V
D125	DC100-125V
Blank	AC100-450/DC100-200V

Ampere frame	
05	For 30 to 250A frames
4	For 400•600•630A frames For 800A frames (3P)
8	For 800A frames (4P)

Installation position	
R	Right pole, 2 or 3 poles
RF	Right pole, 4 poles
L	Left pole
Blank	Right and left

With SLT (vertical lead wire terminal block) (with lead wires drawn out unless otherwise specified)

Voltage (UVTN or UVTS)	
AD130	Switching between 100 to 130 V AC and 100 to 130 V DC
A250	AC200-250V
A480	AC380-480V

Notes *1 The circuit breaker cannot be reset if voltage is not applied to UVTN. (Non-reset type UVT)
*2 The circuit breaker can be reset even if voltage is not applied to UVTS. (Reset type UVT)

Shunt Trip (SHT)

Coil ratings (standard)

Table 10-1

Model	Provision of coil burnout preventing switch	Voltage (V)	Input (VA) (*1) AC	Input (VA) (*1) DC	Operating time (*2) (ms)
NF50-SVFU NV50-SVFU	Provided	AC100-240 380-440 DC100	120	60	15 or less
NF32-SV, NF63-CV/SV/HV, NF125-SGV/LGV/HGV NF160-SGV/LGV/HGV, NF125-CV/SV/HV/SEV/HEV/RGV/UV NF250-CV/SV/HV/SEV/HEV/RGV/UV NF250-SGV/LGV/HGV NV32-SV, NV63-CV/SV/HV NV125-CV/SV/HV/SEV/HEV, NV250-CV/SV/HV/SEV/HEV NF100-CVFU, NF125-SVU/HVU, NF250-SVU/HVU NV100-CVFU, NV125-SVU/HVU, NV250-SVU/HVU		AC100-240 380-550 DC100-125		50	
NF225-CWU		AC100-240 380-480 DC100-125		60	
NF400-CW/SW/SEW/HEW/REW/UEW NF630-CW/SW/SEW/HEW/REW NF800-CEW/SDW/SEW/HEW/REW/UEW NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW NV800-SEW/HEW, NF400-SWU/HWU, NF630-SWU/HWU		Compatible with 100 to 450 V AC and 100 to 200 V DC	100V 20 200V 50 380V 120 450V 170	100V 10 200V 35	5-15
NF1000-SEW, NF1250-SEW/SDW NF1600-SEW/SDW		AC100-120 200-240 380-450 DC100	200 300	70 100	7-15 15-25

Notes *1 Ensure that the voltage of the operating power supply for SHT is not dropped below the allowable operating voltage (70% of the rated minimum voltage value) by the input power.
*2 The operating time is the time from when the rated voltage is applied to the shunt tripping device until the main contact of the circuit breaker starts opening.
Remark: 1. The accessory is usable at 50 Hz and 60 Hz.

Coil ratings (list of available special voltage coils)

Table 10-2

Model	VAC										VDC											Compatible with AC/DC
	24	25-27	24-48	48	50-55	60	440-480	380-550	440-550	500-550	12	24	24-36	36	36-48	48	60	110	125	220	200-250	220-250	24-48
NF32-SV, NF63-CV/SV/HV NF125-CV/SV/HV/SEV/HEV/RGV/UV NF125-SGV/LGV/HGV, F160-SGV/LGV/HGV NF250-CV/SV/HV/SEV/HEV/RGV/UV NF250-SGV/LGV/HGV NV32-SV, NV63-CV/SV/HV NV125-CV/SV/HV/SEV/HEV NV250-CV/SV/HV/SEV/HEV NF100-CVFU, NF125-SVU/HVU, NF250-SVU/HVU NV100-CVFU, NV125-SVU/HVU, NV250-SVU/HVU	–	–	○	–	–	–	–	–	–	–	○	–	○	–	○	–	–	–	–	–	○	–	–
NF225-CWU	–	–	○	–	–	○	–	–	–	–	○	–	○	–	○	–	○	–	–	–	○	–	–
NF400-CW/SW/SEW/HEW/REW/UEW NF630-CW/SW/SEW/HEW/REW NF800-CEW/SDW/SEW/HEW/REW/UEW NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW NV800-SEW/HEW, NF400-SWU/HWU, NF630-SWU/HWU	–	–	–	–	–	–	–	○	–	–	○	–	–	–	–	–	–	–	–	–	–	–	○
NF1000-SEW, NF1250-SEW/SDW NF1600-SEW/SDW	○	–	–	○	–	–	○	–	–	○	○	○	–	○	–	○	–	○	○	–	–	–	–

Undervoltage Trip (UVT)

(1) Specifications for UVT and coil ratings

Table 11

Model	Specification		Coil ratings			
	Reset type	Non-reset type	Voltage (V)		Input (VA)	Operating time (*2) (ms)
			Standard voltage	Special voltage (*1)		
NF50-SVFU NV50-SVFU	–	○	AC/DC100-130V AC200-250V AC380-480V	AC/DC24V AC/DC48V	5	30 or less
NF32-SV, NF63-CV/SV/HV/HRV NF125-CV/SV/HV/RGV/SEV/HEV/UV NF125-SGV/LGV/HGV, NF160-SGV/LGV/HGV NF250-CV/SV/HV/RGV/SEV/HEV/UV NF250-SGV/LGV/HGV NV32-SV, NV63-CV/SV/HV NV125-CV/SV/HV/SEV/HEV NV250-CV/SV/HV/SEV/HEV NF100-CVFU, NF125-SVU/HVU, NF250-SVU/HVU NV100-CVFU, NV125-SVU/HVU, NV250-SVU/HVU	○	○		AC/DC24V AC/DC48V AC500-600V		
NF400-CW/SW/SEW/HEW/REW/UEW NF630-CW/SW/SEW/HEW/REW NF800-CEW/SDW/SEW/HEW/REW/UEW NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW NV800-SEW/HEW	○ (*4)	○ (*5)	Switching between 100 to 110 and 120 to 130 AC (*3) Switching between 200 to 220 and 230 to 250 AC Switching between 380 to 415 and 440 to 480 AC Switching between 100 and 110 DC	Switching between 24/48 AC (*3) Switching between 500 to 550/600 AC Switching between 24/48DC Switching between 110/125DC	5	5-30
NF1000-SEW, NF1250-SEW NF1600-SEW	○	○				5-35
NF400-SWU/HWU, NF630-SWU/HWU	○ (*4)	–				5-30
NF225-CWU	–	○		Switching between 24/48 AC (*3) Switching between 24/48DC Switching between 110/125DC		30 or less

Notes *1 Some special voltage models vary in voltage range.
*2 The operating time is the time from when the undervoltage tripping device is set to the no-voltage state until the main contact starts opening.
*3 The accessory is usable at 50 Hz and 60 Hz.
*4 If UVT is turned on without excitation, the circuit breaker instantaneously opens and immediately trips.
*5 Only for installation on the left pole

(2) Reset type and non-reset type UVT

■ Reset type (Refer to Table 12.)

The reset type UVT has a structure which does not trip a circuit breaker even if the UVT coil is not excited when the circuit breaker handle is in the OFF or reset position. Therefore, it keeps the circuit breaker in the reset state even if the coil is not excited when the breaker is reset electrically.
When the coil in the unexcited state is turned on, the circuit breaker is normally tripped. However, the major contacts of some models of circuit breakers may instantaneously close, or, on circuit breakers with AX, the AX switches may instantaneously change over. For electrical interlock, use a non-reset type UVT.

■ Non-reset type (Refer to Table 12.)

When the UVT coil is not excited, the circuit breaker cannot be set to the off state even if the circuit breaker is tried to be reset from the tripped state. When the coil exciting voltage restores to the reference voltage or more, the circuit breaker can be reset to the off state.

(3) Time delay UVT

- This type of UVT has a time delay in operation.
- It can prevent operation upon occurrence of instantaneous power failure.

Table 12

UVT module type name	Time delay	Voltage (V)	
		Standard voltage	Special voltage
U-05W	Switching among 0.1, 0.3 and 0.5 s	AC24/48 AC100–120/200–240/380–450 AC220–250/380–450/460–550 (Compatible with 50 Hz and 60 Hz) DC100–110	AC380–450/460–550/600–690 (Compatible with 50 Hz and 60 Hz) DC24/48
U-30W	Switching among 0.5, 1 and 3 s	AC100–120/200–240/380–450 AC220–250/380–450/460–550 (Compatible with 50 Hz and 60 Hz)	–

(4) Structure of UVT

The UVT mechanical unit is installed in a circuit breaker, and the UVT voltage module is installed on the outside of the circuit breaker. When the voltage drops, the UVT voltage module detects the voltage drop, and the UVT mechanical unit trips the circuit breaker.
The UVT voltage module has a vertical lead wire terminal block and is normally installed on the body. The external module will be manufactured to order.

●Outline drawing

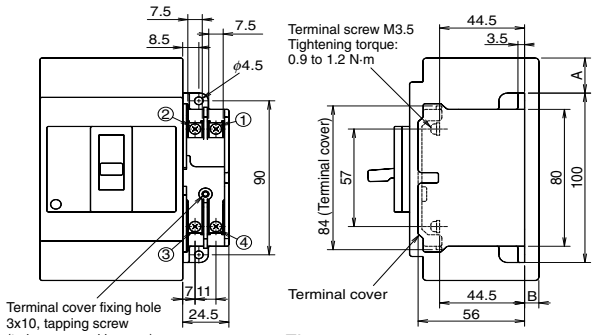


Fig. 1

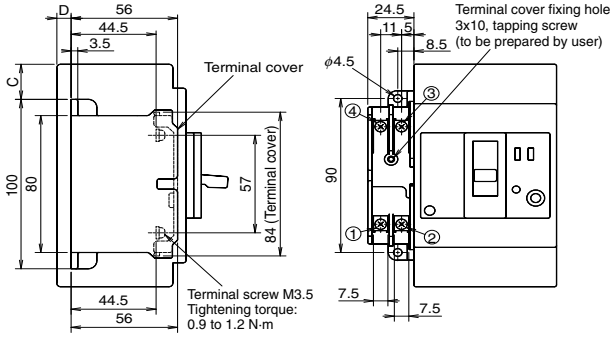


Fig. 2

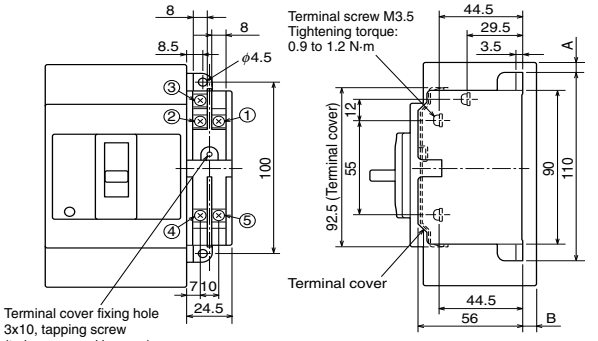


Fig. 3

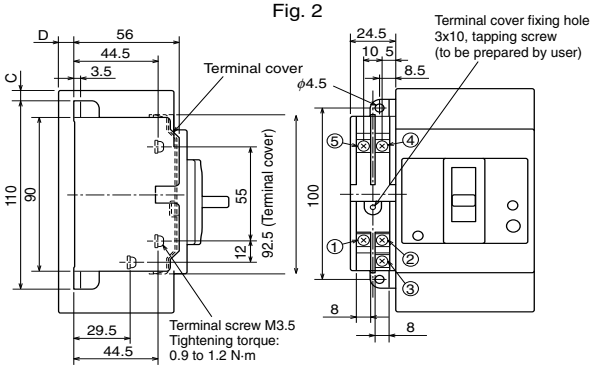
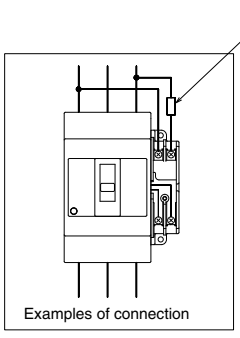


Fig. 4

●Examples of connection

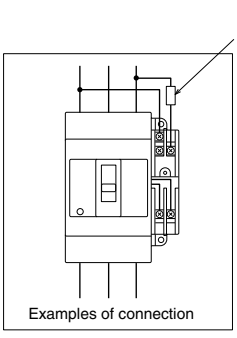


Terminal symbols

①	D1/P1	Control power supply terminal (COM)
②	D2/P2	Control power supply terminal (rated voltage)
③	J1/UC1	UVT coil connecting terminal
④	J2/UC2	UVT coil connecting terminal

Remarks: 1. When the UVT voltage module is installed on the body (standard), the UVT is supplied with J1/UC1 and J2/UC2 terminals connected with the UVT coil.
2. When the UVT is installed on the left pole side, the UVT module terminal positions are reversed (on the power supply and load sides). Carefully connect the terminals.

Fig. 5



Terminal symbols

①	D1/P1	Control power supply terminal (COM)
②	D2/P2	Control power supply terminal (rated voltage Lo)
③	D3/P3	Control power supply terminal (rated voltage Hi)
④	J1/UC1	UVT coil connecting terminal
⑤	J2/UC2	UVT coil connecting terminal

Remarks: 1. When the UVT is used at the rated voltage Lo, connect the control voltage to D1/P1 and D2/P2 terminals.
When the UVT is used at the rated voltage Hi, connect the control voltage to D1/P1 and D3/P3 terminals.
(Ex.) 100 to 110/120 to 130 V AC
(Rated voltage Lo/rated voltage Hi)
2. When the UVT voltage module is installed on the body (standard), the UVT is supplied with J1/UC1 and J2/UC2 terminals connected with the UVT coil.
3. When the UVT is installed on the left pole side, the UVT module terminal positions are reversed (on the power supply and load sides). Carefully connect the terminals.

Fig. 6

Table 13 Installation on right pole side

Model	Reference drawing	Variable dimensions A	Variable dimensions B
NF50-SVFU	Fig. 1 Fig. 5	11	7.5
NF32-SV, NF63-CV/SV/HV		20.5	7.5
NF100-CVFU		20.5	7.5
NF125-CV/SV/HV		20.5	7.5
NF125-SVU/HVU		41.5	7.5
NF125-UV		81.5	7.5
NF125-SEV/HEV/RGV, NF250-CV/SV/HV/RGV/SEV/HEV NF125-SGV/LGV/HGV, NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV		38	7.5
NF250-SVU/HVU		48	7.5
NF250-UV		113	7.5
NF225-CWU	Fig. 3 Fig. 6	25.5	7.5
NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW, NF400-SWU/HWU		67.5	41.5
NF400-UEW(3P)		107.5	138.5
NF800-CEW/SDW/SEW/HEW/REW, NF630-SWU/HWU		76.5	41.5
NF400-UEW(4P), NF800-UEW		123.5	138.5
NF1000-SEW, NF1250-SEW, NF-1600-SEW		161	63

Table 14 Installation on left pole side

Model	Reference drawing	Variable dimensions C	Variable dimensions D
NV125-CV/SV/HV	Fig. 2	20.5	7.5
NV125-SEV/HEV, NV250-CV/SV/HV/SEV/HEV	Fig. 5	38	7.5
NF400-CW/SW/SEW/HEW/REW	Fig. 4 Fig. 6	67.5	41.5
NF630-CW/SW/SEW/HEW/REW			
NV400-CW/SW/SEW/HEW/REW			
NV630-CW/SW/SEW/HEW			
NF400-ZCW/ZSW/ZEW			
NF400-SWU/HWU			
NF400-UEW(3P)		107.5	138.5
NF800-CEW/SDW/SEW/HEW/REW		76.5	41.5
NV800-SEW/HEW, NF630-SWU/HWU			
NF400-UEW(4P), NF800-UEW		123.5	138.5

Lead Wire Drawing

Lead wire lateral drawing … Available to all models

Note *1 Except for BH, BH-P, BH-S, BH-PS, BH-D6, BH-D10, BH-DN, BV-D, BV-DN and KB-D.

Remark: 1. Although the following models are applicable to lead wires drawn laterally, they are normally applicable to installation in close contact with the circuit breaker side faces. (The circuit breaker side faces have grooves.)

NF32-SV, NF63-CV/SV/HV~NF250-CV/SV/HV/UV
NF125-SEV/HEV, NF250-SEV/HEV, NF125-RGV
NF250-RGV, NF125-SGV/LGV/HGV~NF250-SGV/LGV/HGV
NV32-SV, NV63-CV/SV/HV~NV250-CV/SV/HV
NV125-SEV/HEV, NV250-SEV/HEV
NF50-SVFU, NF100-CVFU, NF125-SVU/HVU, NF250-SVU/HVU, NF225-CWU
NV100-CVFU, NV125-SVU/HVU
NV250-SVU/HVU

(When a 4-pole model among the above models has accessories installed on the right pole side, the lead wires are 400 mm long.)

Lead wires drawing to load

Table 15

Model applicable to lead wire drawing to load	(only front connection type)
NF30-CS	

Specifications for lead wires

Table 16

Applicable model	Kind of lead wire	Lead wire thickness	Lead wire length	Example of ring mark
NF30-CS	Heat-resistant wire	0.4mm²	450mm	98/ALa (Red), 96/ALb (Blue) 95/ALc (Gray), 14/AXa (Brown) 12/AXb (Black), 11/AXc (White) C1/S1 (Red), C2/S2 (Red) J1/UC1 (White), J2/UC2 (White) A terminal symbol is indicated on each lead wire with a ring mark.
1000A frame or above		0.75mm²		
30 to 800A frames except above models		0.5mm²		

Lead Wire Terminal Block

(1) Vertical lead wire terminal block (SLT)

The lead wire terminal blocks for plug-in terminal blocks are available (P-LT).
The drilling size of these terminal blocks differs from the standard size. Consult us for details.
For a flush plate type circuit breaker, a terminal block will be installed on the circuit breaker rear face. (Specify as FP-LT.)

Note *1 When the circuit breaker body is equipped with internal accessories and electrical operation device of motor-driven type (2) or spring charge type (2), the circuit breaker is normally provided with a lead wire terminal block.

MCCB

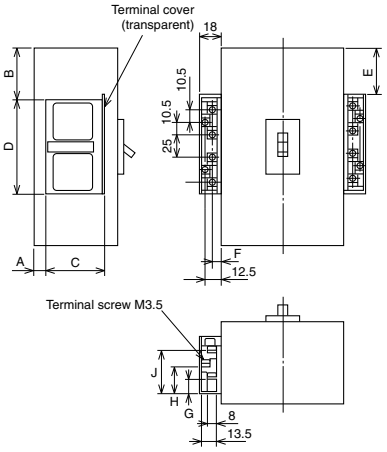


Table 17-1 Table of variable dimensions

Model	A	B	C	D	E	F	G	H	J
NF30-CS (*1)	4	4.5	44.5	86.5	4.5	7	10	22	34
NF32-SV, NF63-CV/SV/HV	7	26.5	54	86.5	26.5	7	14	26	38
NF125-CV/SV/HV	7	26.5	54	86.5	26.5	7	14	26	38
NF125-UV	7	87.5	54	86.5	87.5	7	14	26	38
NF250-UV	7	119	54	86.5	119	7	14	26	38
NF125-SEV/HEV/RGV, NF250-CV/SV/HV/SEV/HEV/RGV NF125-SGV/LGV/HGV, NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV	7	44	54	86.5	44	7	14	26	38
NF50-SVFU	7	27.5	54	86.5	27.5	7	14	26	38
NF100-CVFU	7	28.5	54	86.5	28.5	7	14	26	38
NF125-SVU/HVU	7	47.5	54	86.5	47.5	7	14	26	38
NF225-CWU	7	37	54	86.5	37	7	14	26	38
NF400-CW/SW/SEW/HEW/REW, NF400-SWU/HWU NF630-CW/SW/SEW/HEW/REW	41	79.5	54	86.5	79.5	7	14	26	38
NF800-CEW/SDW/SEW/HEW/REW, NF630-SWU/HWU		88.5	54	86.5	88.5	7	14	26	38
NF1000-SEW, NF1250-SEW, NF1600-SEW	62.5	173	54	86.5	173	7	14	26	38
NF400-UEW(3P) (*1)	138	119.5	54	86.5	119.5	7	14	26	38
NF400-UEW(4P), NF800-UEW (*1)		135.5	54	86.5	135.5	7	14	26	38

Note *1 The terminal positions are different from those shown in the left figure. Consult us for details.
Remark: 1. Terminal screw tightening torque: M3.5 … 0.9 to 1.2 N·m

ELCB

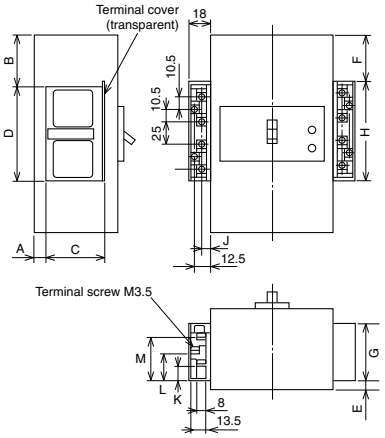


Table 17-2 Table of variable dimensions

Model	A	B	C	D	E	F	G	H	J	K	L	M
NV50-SVFU	16.5	17	54	86.5	16.5	17	54	86.5	6	10.5	22.5	34.5
NV32-SV, NV63-CV/SV/HV	7	26.5	54	86.5	7	26.5	54	86.5	7	14	26	38
NV100-CVFU	7	36.5	54	86.5	7	36.5	54	86.5	7	14	26	38
NV125-CV/SV/HV	7	26.5	54	86.5	7	26.5	54	86.5	7	14	26	38
NV125-SVU/HVU	7	47.5	54	86.5	7	47.5	54	86.5	7	14	26	38
NV125-SEV/HEV, NV250-CV/SV/HV/SEV/HEV	7	44	54	86.5	7	44	54	86.5	7	14	26	38
NV250-SVU/HVU	7	54	54	86.5	7	54	54	86.5	7	14	26	38
NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	41	79.5	54	86.5	26.5	79.5	52	92	7	14	26	38
NV800-SEW/HEW (*1)	41	88.5	54	86.5	26.5	88.5	52	92	7	14	26	38

Note *1 The terminal positions are different from those shown in the left figure. Consult us for details.
Remarks: 1. Terminal screw tightening torque: M3.5 … 0.9 to 1.2 N·m
2. The lead wire terminal block for TBL is provided on the right pole side. However, the lead wire terminal blocks for TBL of NV30-FA and NV50-FA are provided on the left pole side.

14-terminal SLT

SLT for installing three or more internal accessories on the left pole side

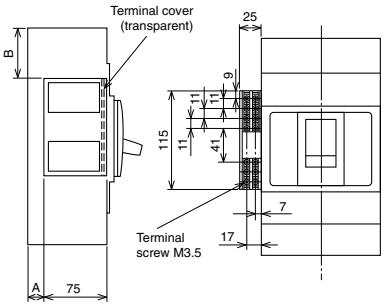


Table 17-3

Model		A	B
MCCB	ELCB		
NF400-CW/SW/SEW NF400-HEW/REW NF630-CW/SW/SEW NF630-HEW/REW	NV400-CW/SW/SEW NV400-HEW/REW NV630-CW/SW/SEW/HEW	20	60
NF400-UEW(3P)	–	117	100
NF800-CEW/SDW/SEW NF800-HEW/REW	NV800-SEW/HEW	20	69
NF400-UEW(4P), NF800-UEW	–	117	116
NF1000-SEW, NF1250-SEW NF1600-SEW	–	35	154

Remark: 1. The terminal positions are different from those shown in the left figure. Consult us for details.

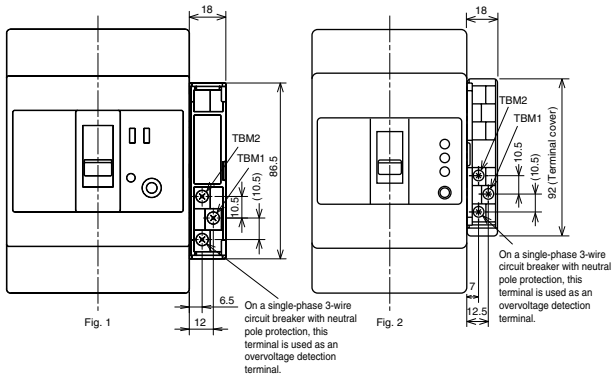
Test Button Module (TBM)

- The test button is kept pressed while control input voltage is applied to the button. (When ELCB of time delay type is used, apply voltage for 2 seconds or more.)
- The test button module is supplied with voltage through a circuit isolated from the main circuit. It can share the control sequence with SHT of a molded case circuit breaker.
- Unlike TBL, the test button modules can be connected in parallel.
- The module is normally provided with a vertical lead wire terminal block (SLT).

Table 18

Model	NV32-SV NV63-CV/SV/HV NV125-CV/SV/HV NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV NV50-SVFU NV100-CVFU NV125-SVU/HVU NV250-SVU/HVU	NV400-CW/SW NV630-CW/SW NV400-SEW~NV800-SEW NV400-HEW~NV800-HEW NV400-REW
Control input Rated voltage (V)	Compatible with 100 to 240 AC and 100 to 240 DC (DC24) (*1)	
Control input (VA)	1.5 VA or less	1 VA or less
Reference drawing	Fig. 1	Fig. 2

Note *1 Unless otherwise specified, the module will be manufactured for 100 to 240 V AC and 100 to 240 V DC.
In the case of 24 V DC, specify the voltage.
Remark: 1. The length of the lead wires to be connected to TBM1 and 2 shall be 100 m or more.



For a flush plate type with 250A frame or below, the external dimensions of the flush plate type differ from the standard dimensions.

Pre-Alarm Module (PAL)

The pre-alarm is a function to output an alarm when the load current exceeds the preset current value. It is helpful in securing continuous power supply and preventive maintenance.
It can be fitted to electronic circuit breakers with a frame size from 125 to 1600 A.

■ 125 and 250A frames

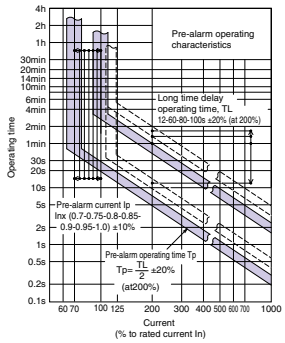
● Pre-alarm module (PAL module)

The standard modules have SLT. Other internal accessories cannot be installed on the right pole side.
A control power supply (compatible with 100 to 240 V AC and DC) is necessary. The control power supply voltage range is 85 to 246 V AC/DC, and the required volt-ampere is 5 VA.

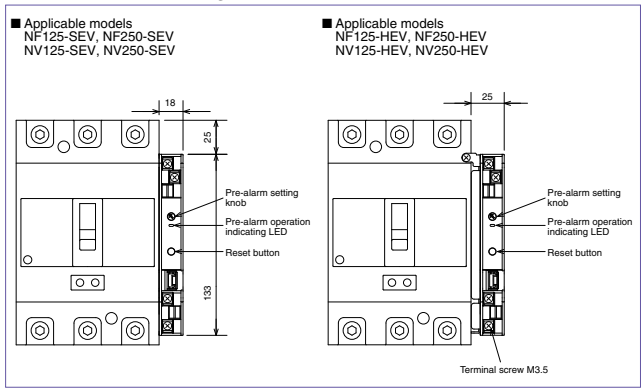
Table 19-1

Model	Switching capacity Contact output (1a)	Resetting method
NF125-SEV NF125-HEV NF250-SEV NF250-HEV NV125-SEV NV125-HEV NV250-SEV NV250-HEV	AC125V 2A DC 30V 2A AC250V 2A DC100V 0.3A	Press the reset button, or turn off the control power supply.

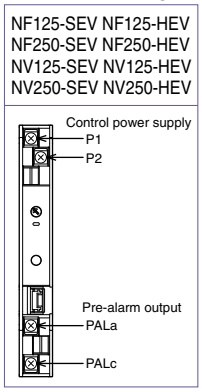
Pre-alarm characteristics



Dimensional drawing of pre-alarm module



Terminal arrangement



● Pre-alarm LED indication

When the load current exceeds the preset current value, the LED lamp on the pre-alarm module front panel starts blinking. When the pre-alarm output is given, the lamp stops blinking and turns on.

● Pre-alarm current setting (IP setting)

The pre-alarm current can be set to the rated current In × 0.7, 0.75, 0.8, 0.85, 0.9, 0.95 or 1.0 with the knob on the pre-alarm module front panel.

■ 400 A frame or above

● Solid state relay (SSR) output (PAL lead)

The lead wires are drawn out. On the right pole side, only internal accessories with lead wires drawn out can be installed. A control power supply is unnecessary.

Table 19-2

Model	Switching capacity Solid state relay (SSR) – Non-contact output	Resetting method
NF400-SEW NF400-HEW NF400-REW NF400-UEW NF630-SEW NF630-HEW NF630-REW NF800-CEW NF800-SEW NF800-HEW NF800-REW NF800-UEW NF1000-SEW NF1250-SEW NF1600-SEW NV400-SEW NV400-HEW NV400-REW NV630-SEW NV630-HEW NV800-SEW NV800-HEW	AC/DC24 to 240V 20mA	When the load current becomes lower than the preset current value, the alarm is reset.

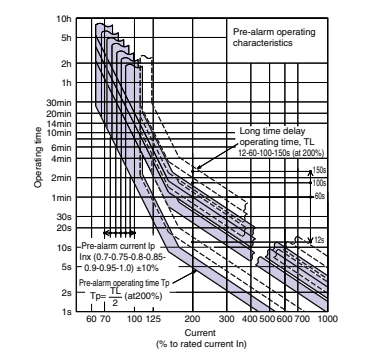
● Pre-alarm module (PAL module)

The standard modules have SLT. Other internal accessories cannot be installed on the right pole side.
A control power supply (compatible with 100 to 200 V AC) is necessary except for NF-ZEW. The control power supply voltage range is 80 to 242 V AC, and the required volt-ampere is 10 VA.

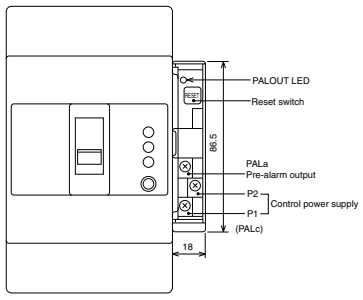
Table 19-3

Model	Switching capacity Contact output (1a)	Resetting method
NF400-SEW NF400-HEW NF400-REW NF400-UEW NF630-SEW NF630-HEW NF630-REW NF800-CEW NF800-SEW NF800-HEW NF800-REW NF800-UEW NF1000-SEW NF1250-SEW NF1600-SEW NV400-SEW NV400-HEW NV400-REW NV630-SEW NV630-HEW NV800-SEW NV800-HEW	100 V AC or 200 V AC, 2 A	Press the reset button, or turn off the control power supply.

Pre-alarm characteristics



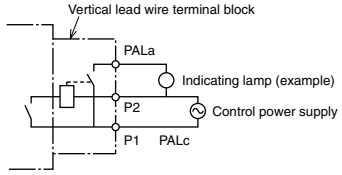
Detailed drawing of pre-alarm module



Pre-alarm module output rating

AC		
Voltage V	Current (A)	
	Resistive load	Inductive load
200	3	2
100	3	2

A control power supply (compatible with 100 to 200 V AC) is necessary. For the wiring method, see the following figure. (The control power supply voltage range is 80 to 242 V AC.) The required volt-ampere is 10 VA.



● Pre-alarm LED display (standard device)

When the load current exceeds the preset current value, the LED lamp on the circuit breaker front panel starts blinking. When the pre-alarm output is given, the lamp stops blinking and turns on.

● Pre-alarm current setting (IP setting)

The pre-alarm current can be set to the rated current In × 0.7, 0.75, 0.8, 0.85, 0.9, 0.95 or 1.0 with the knob on the circuit breaker front panel.

F-Type Operating Handle

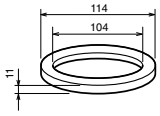
Operating handle of breaker mount type to be installed to circuit breaker body

Appearance (Color: Munsell N1.5)

- The handle provides an isolating function in combination with the circuit breaker body (except F10SW and above).
- It has a safety device which prevents the circuit breaker turning on while the door is open.
- It can be locked in the OFF position. (Up to 3 commercially available padlocks (35 mm and 40 mm) can be fitted. A type which can be locked in the ON or OFF position can be manufactured. Specify the type if required.) On circuit breakers with a frame size of 1000A or above, the handle can be locked in the ON or OFF position. (If it is necessary to lock the handle only in the OFF position, specify so.)
- It is in protection class IP54 (IEC 60529). (For circuit breakers with a frame size of 1000A or above, the protection class (IEC 60529) is IP3X (IP5X when dust-proof packing is provided).

Dust-proof packing (optional)

Type name	Operating handle type name	Delivery category
PFL	F10SW~F120UR	●



Outline drawings

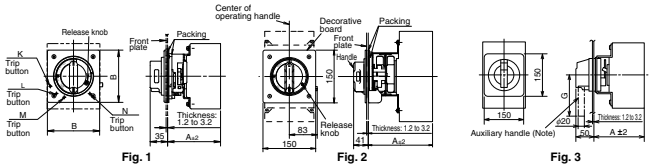
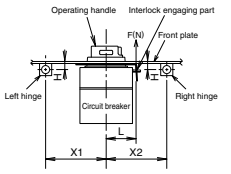


Fig. 1 Fig. 2 Fig. 3

Note Auxiliary handles are provided with F10SW, F10SW4P and F120UR as standard.
Auxiliary handles (F-HT) are provided for F-4S ~ F-6SUL as option.

Center of hinge and breaker



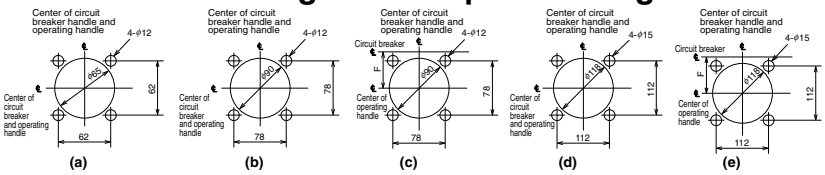
- The left drawing shows the relationship between the hinges and circuit breaker viewed from the load side of the circuit breaker.

Center of hinge and circuit breaker

	Hinge on left side		Hinge on right side	
	H	X_1	H	X_2
For 30 to 250 A frames	0 or more	(5H+85) or more	Less than 10	170 or more
			10 or more	(5H+120) or more
For 400 to 800 A frames	0 or more	(5H+85) or more	0 or more	(4H+120) or more
For 1000 to 1600 A frames	0 or more	(8H+150) or more	0 or more	(4H+120) or more

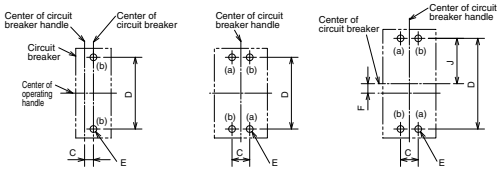
Remarks: 1. The handle is opened and closed in the projection area of the handle and does not run over the projection area of the circuit breaker (except when the auxiliary handle is provided.)
2. When the operating handle is fitted to NV, the test button cannot be pressed easily. If necessary, use a circuit breaker with TBL or TBM. When using an Earth Leakage Alarm Breaker, use the externally resetting type (ECA-SLT RST) or automatically resetting type (ARS).

Dimensional drawings of front plate drilling



(a) (b) (c) (d) (e)

Dimensional drawings of circuit breaker mounting holes



(f) (g) (h)

Door lock withstand load

	F(N)	L(mm)
F-05~F-2	500	50
F-4~F-8		68

Table 20 Summary of dimensions

Type name	Door opening position: OFF position	Door opening position: Reset position	Applicable model: MCCB	MCCB: Number of poles	Applicable model: ELCB	ELCB: Number of poles	Reference drawing: Dimensional drawing	Reference drawing: Drilling plan	A (*1)	B	C	D	E	F	G	J	Trip button position (*4)	Mounting screw
F-05SV2 F-05SVE2	–	○	NF32-SV NF63-CV, NF63-SV, NF63-HV	2P	–	–	Fig. 1	f	105	104	13	111	M4 screw or ϕ5	–	–	–	N	(a) Circuit breaker mounting screw (2 pcs.) (b) Circuit breaker handle mounting screw (2 pcs.) F-05SV2 F-05SVE2 F-1SV2 F-1SVE2 F-05SRUL2 F-03SVUL2 F-05SVUL2 Only the screws (b) are used for the following models.
F-05SV F-05SVE (*2)	–	○	NF32-SV NF63-CV, NF63-SV, NF63-HV	3P • 4P	NV32-SV NV63-CV, NV63-SV, NV63-HV	2P • 3P		g			25						L	
F-1SV2, F-1SVE2	–	○	NF125-CV, NF125-SV	2P	–	–		f	105		15			–		–	N	
F-1SV F-1SVE	–	○	NF125-CV, NF125-SV NF125-HV	3P • 4P 2P • 3P • 4P	NF125-CV, NV125-SV, NV125-HV	3P • 4P		g			30						L	
F-1UV, F-1UVE	–	○	NF125-UV	2P • 3P • 4P	–	–		c				172		31		86	L	
F-2SV F-2SVE	–	○	NF125-SEV, NF125-HEV, NF125-RV NF125-SGV, NF125-LGV, NF125-HGV NF160-SGV, NF160-LGV, NF160-HGV NF250-SGV, NF250-LGV, NF250-HGV NF250-CV, NF250-SV, NF250-HV NF250-SEV, NF250-HEV, NF250-RV	2P • 3P • 4P	NV125-SEV, NV125-HEV NV250-CV, NV250-SV, NV250-HV NV250-SEV, NV250-HEV	3P • 4P		b	107		35	126					K	
F-2UV, V-2UVE	–	○	NF250-UV	2P • 3P • 4P	–	–		c				201		38		100.5	K	
F-1SVUL	–	○	NF125-SVU, NF125-HVU	3P	NV125-SVU, NV125-HVU	3P		h	105		30	123		6		61.5	L	
F-2SVUL	–	○	NF250-SVU, NF250-HVU	3P	NV250-SVU, NV250-HVU	3P		b	107		35	126					K	
F-03SVUL2	–	○	NF50-SVFU	2P	NV50-SVFU	2P		a	105	80	9	82.5		–		–	M	
F-03SVUL	–	○		3P		3P		g			18							
F-05SVUL2	–	○	NF100-CVFU	2P	–	–		b		104	13	111					N	
F-05SVUL	–	○		3P	NV100-CVFU	3P		g			25						L	
F-2SUL	–	○	NF225-CWU	3P	–	–		b	107	104	35	126					–	
F-4S F-4SE	–	○	NF400-CW, SW, SEW, HEW, REW NF630-CW, SW, SEW, HEW, REW	2P, 3P, 4P	NV400-CW, SW, SEW, HEW, REW NV630-CW, SW, SEW, HEW	3P, 4P	Fig. 2	d	183	–	44	194	M6 screw or ϕ7	–	–	–	–	(a)(b) Circuit breaker mounting screw (4 pcs.)
F-4U F-4UE	–	○	NF400-UEW	3P	–	–		e	280			234		20				
F-8S F-8SE	–	○	NF800-CEW, SDW, SEW NF800-HEW, REW	2P, 3P, 4P	NV800-SEW, HEW	3P		d	183		70	243		–				
F-8U F-8UE	–	○	NF800-UEW NF400-UEW(4P)	3P, 4P	–	–		e	280			290		23.5				
F-4SUL	–	○	NF400-SWU/HWU	3P	–	3P		d	183		44	194		–				
F-6SUL	–	○	NF630-SWU/HWU	3P	–	–					70	243						
F10SW (*3)	–	○	NF1000-SEW NF1250-SEW/SDW NF1600-SEW/SDW	2P, 3P	–	–	Fig. 3	d	221	–	70	375	M8 screw or ϕ10	–	200			
F10SW4P (*3)				4P				g										

Notes *1 The dimensions for the front connection type are shown. On some models of the rear connection type and plug-in type, the reference surface for mounting the circuit breaker may change.
*2 For the 4-pole plug-in type, a special handle is required. Consult us for details.
*3 If a handle which can be locked only in the OFF position is required, specify so.
*4 The circuit breaker can be tripped by operating the trip button while the door is open.
*5 Do not remove the sponge packing used to secure the protection class IP51. Fit the supplied packing without fail.
*6 The handle cannot be used when the circuit breaker is installed on IEC 35-mm rails.

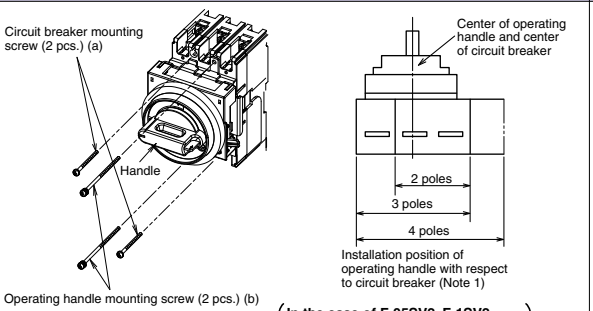
Remarks: 1. The handles with E in their model names are designed for emergency stop devices. Their delivery category is ●.
2. The standard handles are Reset Open Type which can open the doors only when they are reset to open. OFF Open type handles which can open the doors when they are in the OFF position can be manufactured to order.
3. A handle which can be operated and can indicate the ON and OFF positions in the same manner as the standard models even if the circuit breaker is installed horizontally can be manufactured to order.
4. F10SW and higher models do not conform to the isolation function.
5. Handles which are opened and closed in the OFF position can be opened also in the reset position.

●Installation procedure For details, please refer to Operating Handle Installation Manual supplied with the product.

① Installation to a breaker Install the operating handle to the circuit breaker in accordance with the following procedure.

Installation procedure

250A frame and below

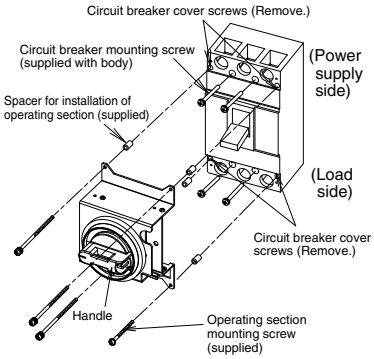


(Installation procedure)
① Install the circuit breaker on the panel with the two circuit breaker mounting screws through the holes (a).
② Install the operating handle with the supplied two operating handle mounting screws through the holes (b).

(In the case of F-05SV2, F-1SV2, F-05SRUL2, F-05SUL2 and F-1SUL2

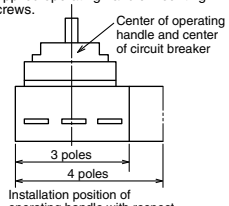
Tighten the circuit breaker and operating handle together with the supplied two operating handle mounting screws.

400 to 1600A frames



(In the case of F-4S to F-6SUL)
The operating handle mounting screws are tapping screws without washers or spring washers.

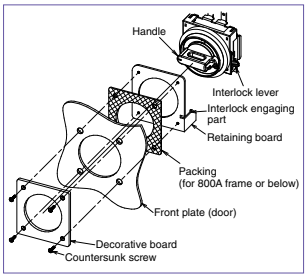
(Installation procedure)
① Remove the circuit breaker cover screws in the same positions as the operating handle mounting holes.
② Install the circuit breaker with the four circuit breaker mounting screws.
③ Fit the spacer(s) for installation of operating handle between the circuit breaker and operating handle. (The number of the spacers varies depending on the model.)
④ Install the operating handle with the supplied operating handle mounting screws.



Note *1 In the case of F-05SRUL2, the center of the operating handle is the same as the center of the circuit breaker.

② Installation of decorative board and retaining board

Drill holes in the door according to the drilling size shown on the previous page, and tighten the decorative board and retaining board with the supplied countersunk screws. In the case of 800A frame or below, fit the supplied packing to the position shown right.



●Door locking mechanism

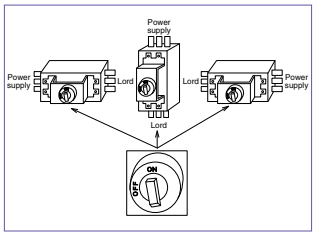
The panel door can be opened only when the operating handle is operated to open (reset). (On F-4S to F10SW, the door lock is held in the released state even if the handle is returned to OFF.) The door can be opened when the handle is in the ON position if the release knob is operated with a tool.

●Operation locking mechanism

Circuit breakers with a frame size of 800A or below can be locked by setting the handle in the OFF position. (Operating handles which can lock circuit breakers in the ON or OFF position can be manufactured.) Operate the locking part, and lock the handle with padlocks. Up to three padlocks can be fitted.
Lockout hasps (scissors locks) can be used.
If the circuit breaker trips even when the operating handle is locked in the ON position, also the operating handle indicates that it has tripped.
[F-2SUL or below: Only when one 35-mm padlock (weighing 70 g or less) is used
F-4S or above: Only when one 40-mm padlock (weighing 100 g or less) is used]
To 800A frame or below, padlocks with dimension C of 3 mm to 8 mm can be applied.
For 1000A or above, padlocks with dimension of 3 mm to 6 mm can be applied. (When using padlocks of 3 mm or less, please consult us.)

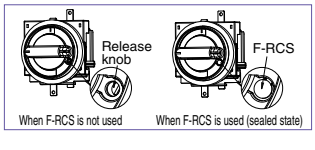
●Circuit breaker installation direction (except UL 489 listed circuit breakers)

We can supply circuit breakers on which the handles and their ON and OFF positions are in the same directions as on vertically installed circuit breakers even when they are installed horizontally. The door drilling size is identical. If you intend to install an operating handle on a horizontally installed circuit breaker, specify "Y" (horizontal installation with power supply on the left) or "Z" (horizontal installation with power supply on the right) at the end of the model name. (Ex.: F-4S Y)



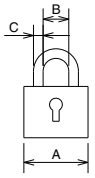
●Sealing of release knob

The use of an optional part, Release Protection "F-RCS", can prevent the panel door being opened by operating the release knob. (800A frame or below)



●Operation Lock Devices

(1) Padlock



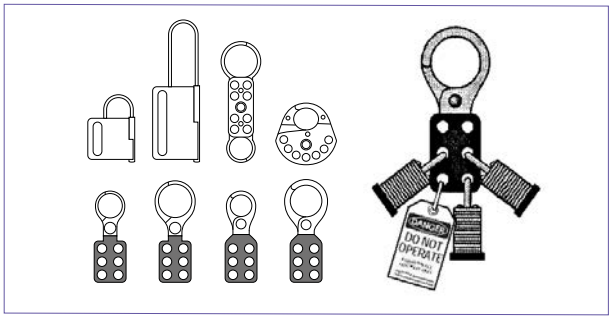
Padlock Dimensions

Use commercially available padlocks. (mm)

Applicable model	A (Nominal size)	B	C
All models	35	19	5
	40	22 or 23	5.5

Dimension C: Maximum 8mm.

(2) Lockout Devices (Scissors Lock)



●How to order

For 800A frame or below, specify the following specification symbols together with the model name.
· Operation lock: LF ····· Lock in OFF position
· Operation lock: LN ····· Lock in ON or OFF position
· Door opening: DR ····· Reset to open
· Operation lock: DF ····· Open in OFF position
· Installation direction: Blank ··· Power supply upward
· Installation direction: Y ····· Power supply on left
· Operation lock: Z ····· Power supply on right
For a standard product with a frame size of 1000A or above, specify the model name. When it is required to enable the operation lock only in the OFF position, specify the model name and "only lock in OFF position."
If you intend to seal the release knob, place an order for the release protection. (Lot: 10 pcs.)

●Interpretation of model name

(1) For 800A frame or below

F	–	1	SV	UL	E	2
1)		2)	3)	4)	5)	6)

1) F: Operating handle type name
2) 1: Circuit breaker group (0.5, 1, 2, 4, 6 or 8)
3) SV: Classification of circuit breaker (S, SV, H, U, UV, SR or SG)
4) UL: Blank···General product UL···UL 489 listed product
5) E: Blank···Standard E···For emergency stop
6) 2: Blank···3P or 4P 2···2P

(2) For 1000A frame or above

F	10	SW	4P
1)	2)	3)	4)

1) F: Operating handle type name
2) 4: Circuit breaker A frame (10 or 120)
3) SW: Series name
4) 4P: Number of poles (4P) * Not indicated for 3P

V-Type Operating Handle

Operating handle of door mount type consisting of operating section to be mounted on circuit breaker body and operating handle on panel door

Appearance (Color: Munsell N1.5)

- The handle provides an isolation function in combination with the circuit breaker body.
- Conforming to the safety regulations of EN Standard (EN 60204-1)
- Protection class (IEC 60529) IP65 as standard
- The handle can be locked only in the OFF position with up to three commercially available padlocks (35 mm or 40 mm).
- The panel door can be opened in the OFF position. In the ON and trip positions, the panel door is locked and cannot be opened. However, the door can be opened even in the ON and trip positions by operating the release part with a tool.

Outline drawings

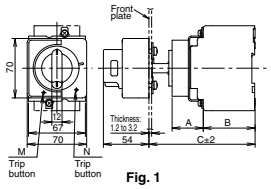


Fig. 1

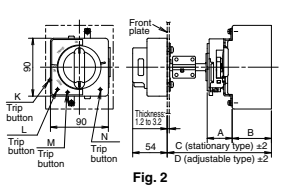


Fig. 2

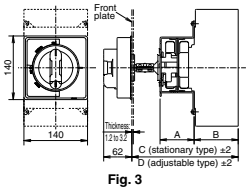
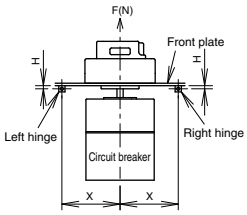


Fig. 3

Note Auxiliary handles (F-HT) are provided for V-4S ~ V-6SUL as option.

Center of hinge and breaker

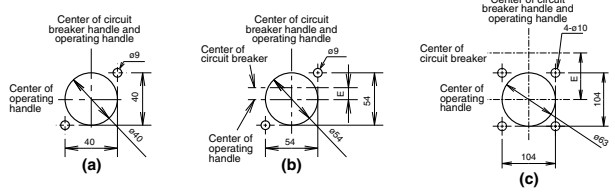


Relationship between hinges and circuit breaker viewed from load side of circuit breaker

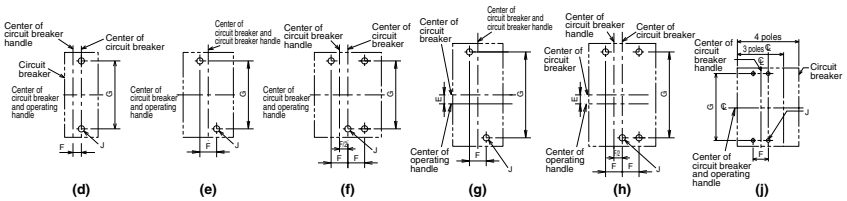
	H	X
For 30 to 250 A frames	0 or more	5H+100 or more
For 400 to 800 A frames		8H+150 or more

* The above figure shows the relationship viewed from the load side.

Dimensional drawings for front plate drilling



Dimensional drawings of circuit breaker mounting holes



Door lock withstand load

	F(N)
30 to 800A frames	200

Table 21 Summary of dimension

Type name		Applicable model				Reference drawing			Dimensions (mm)									Trip button position (*5)
Stationary type	Adjustable type	MCCB	Number of poles	ELCB	Number of poles	Dimensional drawing	Drilling plan		A	B	Stationary type C	Adjustable type(*2) D (min)	Adjustable type(*2) D (max)	E	F	G	J	
V-05SV2 V-05SVE2	(*1) Adjusting unit V-AD3S is mounted on stationary type.	NF32-SV NF63-CV, NF63-SV, NF63-HV	2P	–	–	Fig. 2	b	d	39	61	125	–	–	–	12.5	111	M4 screw or ϕ5	N
V-05SV V-05SVE		NF32-SV NF63-CV, NF63-SV, NF63-HV	3P	NV32-SV NV63-CV, NV63-SV, NV63-HV	2P, 3P			e				162	300	–	25			L
			4P	–	–													
V-1SV2, V-1SVE2		NF125-CV, NF125-SV	2P	–	–			d				–	–	–	15			N
V-1SV V-1SVE		NF125-CV, NF125-SV	3P	NV125-CV, NV125-SV NV125-HV	3P			e						–				
			4P		4P			f										
		NF125-HV	2P, 3P	–	–			e							30			L
			4P					f										
V-1UV V-1UVE		NF125-UV	2P, 3P	–	–			g	39					30.5		172		
			4P					h										
V-2SV V-2SVE		NF125-SEV, NF125-HEV, NF125-SGV NF125-LGV, NF125-HGV, NF125-RGV NF160-SGV, NF160-LGV, NF160-HGV NF250-CV, NF250-SV, NF250-HV NF250-SGV, NF250-LGV, NF250-HGV NF250-SEV, NF250-HEV, NF250-RGV	2P, 3P	NV125-SEV, NV125-HEV NV250-CV, NV250-SV, NV250-HV NV250-SEV, NV250-HEV	3P			e	41			162	300	–	35	126		K
			4P		4P			f										
V-2UV V-2UVE		NF250-UV	2P, 3P	–	–			g						37.5		201		
			4P					h										
V-03SVUL2	–	NF50-SVFU	2P	NV50-SVFU	2P	Fig. 1	a	d	39	61	125	–	–	–	9	82.5	M4 screw or ϕ5	M
V-03SVUL			3P		3P			e							18			N
V-05SVUL2	(*1) Adjusting unit V-AD3S is mounted on stationary type.	NF100-CVFU	2P	–	–	Fig. 2	b	d	39	61	125	–	–	–	12.5	111		N
V-05SVUL			3P	NV100-CVFU	3P			e				162	300	–	25			L
V-1SVUL		NF125-SVU, NF125-HVU	3P	NV125-SVU, NV125-HVU	3P	Fig. 2	b	g	39	61	125	162	300	6	30	123		L
V-2SVUL		NF250-SVU, NF250-HVU	3P	NV250-SVU, NV250-HVU	3P										35	126		K
V-2SUL		NF225-CWU	3P	–	3P			e	41	61	125	162	300	–	35	126		–
V-4S V-4SE	(*1) Adjusting unit V-AD3L is mounted on stationary type.	NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	2P, 3P, 4P	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	3P, 4P	Fig. 3	c	j	76	97	191	233	300	–	44	194	M6 screw or ϕ7	–
V-4U V-4UE		NF400-UEW	3P	–	–			h		194	288	330	397	20		234		
V-8S V-8SE		NF800-CEW/SDW/SEW/HEW/REW	2P, 3P, 4P	NV800-SEW/HEW	3P			j		97	191	233	300	–	70	243		
V-4SUL		NF400-SWU/HWU	3P	–	3P										44	194		
V-6SUL		NF630-SWU/HWU	3P	–	–										70	243		

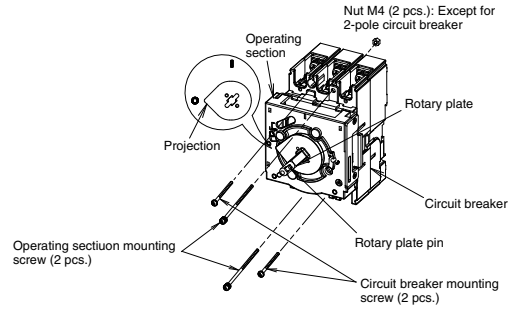
Notes
*1 For the adjustable type, purchase the optional adjusting unit V-AD3S or V-AD3L.
*2 The dimensions of the adjustable type models provided with the adjusting unit V-AD3S or V-AD3L are shown.
*3 When using the operating handle for a plug-in type model with a frame size of 250A or below, specify so.
*4 The dimensions on the front connection type are shown. For the rear connection and plug-in types, separately consult us.
*5 The circuit breaker can be tripped by operating the trip button while the door is open. (The trip button position varies depending on the model.)
*6 The handle cannot be used when the circuit breaker is installed on IEC 35-mm rails.

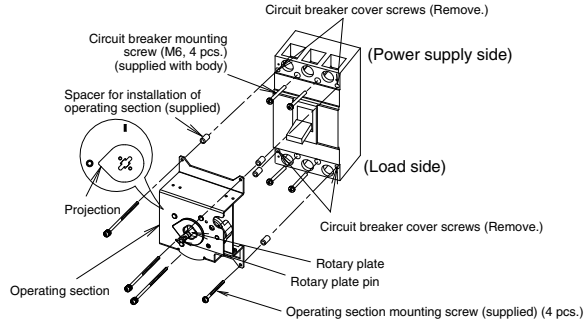
Remarks:
1. The products whose model names contain E are designed for emergency stop. The delivery category is ●. That of V-05SVE is ●.
2. When the operating handle is fitted to NV, the test button cannot be pressed easily. If necessary, use a circuit breaker with TBL or TBM. When using an Earth Leakage Alarm Breaker, use the externally resetting type (ECA-SLT) or automatically resetting type (ARS).

●Installation procedure For details, please refer to Operating Handle Installation Manual supplied with the product.

① Installation to a breaker Install the operating handle to the circuit breaker in accordance with the following procedure.

	250A frame and below	400 to 800A frames
Installation procedure	**(Installation procedure)** ① Operating handle for 3- or 4-pole circuit breaker Set the rotary plate of the operating section to the OFF (symbol O) position, and fit the plate to the circuit breaker with the supplied operating section mounting screws and nuts. Install the circuit breaker to the panel with the circuit breaker mounting screws (2 pcs.). ② Operating handle for 2-pole circuit breaker Install the operating section together with the circuit breaker to the panel with the supplied operating section mounting screws (2 pcs.)	**(Installation procedure)** ① Remove the circuit breaker cover screws (4 pcs.) in the same positions as the operating handle mounting holes. ② Install the circuit breaker with the circuit breaker mounting screws (4 pcs.). ③ Fit the supplied operating section mounting spacers (4 pcs.) between the circuit breaker and operating handle. ④ Set the rotary plate to the OFF (symbol O) position, and install the operating section to the circuit breaker with the supplied operating section mounting screws.



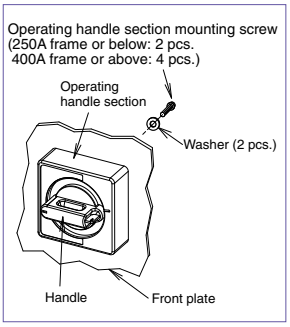


② Installation of operating handle section

Drill a hole in the door according to the dimensional drawing for front plate drilling given on the previous page, and install the operating handle section in accordance with the following procedure.

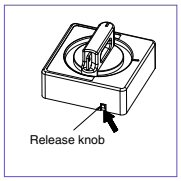
- Tighten the operating handle section from the back of the front plate. Temporarily tighten the screws to center the section in the hole.
- Set the handle of the operating handle section to the OFF state, tighten the front plate, and make sure that the handle can be smoothly turned to the ON and OFF positions.

Turn the handle to the right and left in the OFF state, and make sure that OFF is displayed. If OFF is not displayed, move the operating handle section up and down and to the right and left for adjustment. (Take care that the operating handle section is in parallel with the circuit breaker.) Then, open the front plate, and finally tighten the screws.



●Door locking mechanism

The operating handle is provided with an interlock mechanism to prevent the door opening in the ON and TRIP positions. In the OFF position, the door can be opened. However, the door can be opened in the ON or TRIP position by pressing the release knob in the arrow direction with a tool (3 mm wide and 1.8 mm thick).



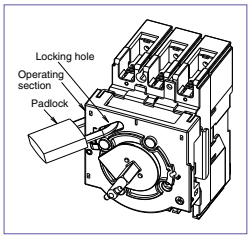
●Operation locking mechanism

① Operating handle section

Operation lock can be set only in the OFF Position. Up to three commercially available padlocks (A = 35 or 40 mm) can be fitted. Lockout hasps (scissors locks) can be used. When the operating handle section is locked with padlocks, also the door is locked.

② Operating section

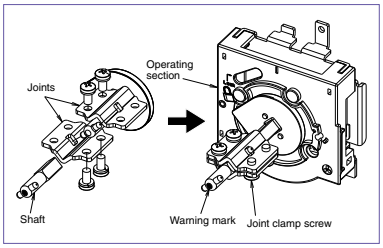
The operating section can be locked so that the circuit breaker will not be turned on carelessly when the inside of the panel is inspected with the panel door open. Fit a padlock through the hole in the operating section of the operating handle.



●Adjusting unit

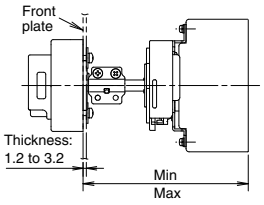
The height from the circuit breaker mounting surface to the panel door can be adjusted by fitting the optional adjusting unit V-AD3S or V-AD3L. Cut the shaft of the adjusting unit according to the height.

Note The adjusting unit is not applicable to 2-pole external type circuit breakers. If it is used on a 2-pole external type circuit breaker, the positions may not be correctly displayed.

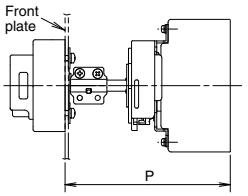


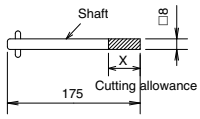
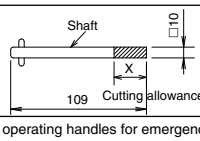
Make adjustments with the adjusting unit as stated below.

①External dimension drawing



②Calculation of shaft cutting allowance



Type name	Dimensions (mm) Min	Dimensions (mm) Max	Cutting allowance	Calculation
V-05SV V-05SVUL V-1SV V-1SVUL V-1SUL V-2SV V-2SVUL V-2SUL	162	300		(Cutting allowance)(P max)(panel size) X = 300 mm - P
V-2SGUL	180	318		
V-4S V-8S	233	300		
V-4SUL V-6SUL				

Note The unit is applicable to operating handles for emergency stop (E).

●Padlocks

The user must prepare padlocks.
The dimensions of the padlocks are the same as those shown on page 752.

●How to order

Specify the model name of the operating handle.
For adjustable type, place an order for the adjustment unit. (One lot includes 1 pc.)
250A frame or below: V-AD3S
400 to 800A frames: V-AD3L

●Interpretation of model name

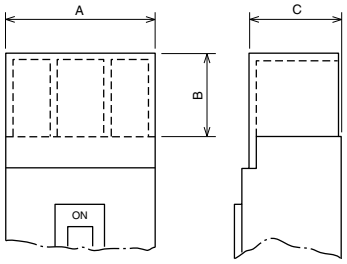
(1) For 800A frame or below

V	–	1	S	UL	E	2
1)		2)	3)	4)	5)	6)

1) V: Operating handle type name
2) 1: Circuit breaker group (0.5, 1, 2, 4, 6 or 8)
3) S: Classification of circuit breaker (S, SV, H, U, UV)
4) UL: Blank···General product UL···UL 489 listed product
5) E: Blank···Standard E···For emergency stop
6) 2: Blank···3P or 4P 2···2P

Terminal Covers

The terminal covers are used to avoid exposure of live parts. Many kinds of terminal covers, including large terminal covers (TC-L), small terminal covers (TC-S), transparent terminal covers (TTC), rear terminal covers (BTC) and plug-in terminal covers (PTC), for various models and applications are available, and they are helpful. (The terminal covers cannot be fitted to electrically operated circuit breakers of spring charged type (2) and motor-drive type (2). The standard terminal covers can be used for the spring charged type (1). For the motor-drive type, special terminal covers can be manufactured. Consult us for details.)



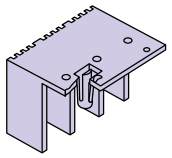
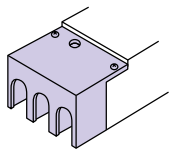
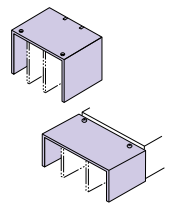
TC-L TC-S TTC

●Quick terminal covers

These covers are very convenient because they can be fitted only by inserting them into the mounting holes in the circuit breaker body. To remove the terminal cover, shift the projections of the terminal cover with the tip of a slotted screwdriver or finger, and draw it out.

●Table of variable dimensions

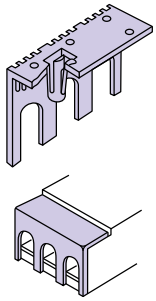
Table 22 Large terminal covers (TC-L)

Type name	Color	Number of poles of circuit breaker	Applicable model MCCB	Applicable model ELCB	Dimensions (mm) A	B	C	Contents Number of covers	Cover mounting screw	Sealing plate	Appearance	Remarks
TCL-03CS2W	White	2	NF30-CS	– (*1)	43.5	25	30.5	2	–	2		
TCL-03CS3W	White	3		–	67	25	30.5	2	–	2		
TCL-05SV2 (*2)(*8)	White	2	NF32-SV NF63-CV/SV/HV	–	50	25	65.5	2	–	2		
TCL-05SV2L (*2)(*9)	White	2	NF32-SV NF63-CV/SV/HV	–	50	40	65.5	2	–	2		
TCL-05SV3 (*3)(*8)	White	3	NF32-SV NF63-CV/SV/HV	NV32-SV, NV63-HV	75	25	65.5	2	–	2		
	White	2, 3	–	NV63-CV/SV								
TCL-05SV3L (*3)(*9)	White	3	NF32-SV, NF63-CV/SV/HV	NV32-SV, NV63-HV	75	40	65.5	2	–	2		
	White	2, 3	–	NV63-CV/SV								
TCL-05SV4 (*3)	White	4	NF63-SV/HV	–	100	25	65.5	2	–	2		
TCL-1SV2 (*2)	White	2	NF125-CV/SV	–	60	40	65.5	2	–	2		
TCL-1SV3 (*3)	White	3	NF125-CV/SV	NV125-CV/SV/HV	90	40	65.5	2	–	2		
	White	2, 3	NF125-HV/UV	–								
TCL-1SV4 (*3)	White	4	NF125-SV/HV/UV	NV125-SV/HV	120	40	65.5	2	–	2		
TCL-2SV3 (*3)(*10)	White	2, 3	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV NV250-SEV/HEV NV125-SEV/HEV	105	40	65.5	2	–	2		
	White	3	(*6)									
TCL-2SV3L (*3)(*11)	White	2, 3	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV NV250-SEV/HEV NV125-SEV/HEV	105	50	65.5	2	–	2		
TCL-2SV4 (*3)(*5)	White	4	NF250-SV/HV/UV NF250-SEV/HEV NF125-SEV/HEV NF225-SWM (*6)	NV250-SV/HV NV250-SEV/HEV NV125-SEV/HEV	140	40	65.5	2	–	2		
TCL-4SW3 (*3)	White	2, 3	NF400-CW/SW/SEW NF630-CW/SW/SEW	NV400-CW/SW/SEW NV630-CW/SW/SEW	171	110	99.5	2	–	2	Quick type The cover can be sealed with the sealing plate.	
	White	3	NF400-SEP with MDU (*7)	–								
			NF400-UEW (*4)	–	171	110	132.5/196.5	2	–			
TCL-4SW4 (*3)	White	4	NF400-SW/SEW/HEW NF630-SW/SEW NF400-SEP with MDU (*7)	NV400-SEW/HEW NV630-SEW	240	110	105	2	6	–		Use in combination with insulating barrier.
TCL-8SW3 (*3)	White	2, 3	NF800-CEW/SDW/SEW/HEW/REW	NV800-SEW/HEW	224	155	103.5	2	4	–		
	White	3	NF600-SEP with MDU/HEP with MDU (*7) NF800-SEP with MDU/HEP with MDU (*7)	–								
TCL-8UW3	Transparent	3	NF800-UEW (*4)	–	220	155	146/194.5	2	4	–		
TCL-8SW4 (*3)	White	4	NF800-SEW/HEW NF600-SEP with MDU/HEP with MDU (*7) NF800-SEP with MDU/HEP with MDU (*7)	–	294	155	103.5	2	6	–		
TCL-8UW4	Transparent	4	NF400-UEW, NF800-UEW (*4)	–	290	155	146/194.5	2	6	–		
TCL-10SW3	Transparent	3	NF1000-SEW NF1250-SEW/SDW	–	220	150	139	2	4	–		
TCL-10SW4	Transparent	4	NF1000-SEW NF1250-SEW/SDW	–	290	150	139	2	4	–	Screw type	
TCL-03SVU2 (*3)	White	2	NF50-SVFU	NV50-SVFU	36	30	65.5	2	–	–	Quick type (Remove the existing cover from the body, and fit the terminal cover.)	
TCL-03SVU3 (*3)	White	3	NF50-SVFU	NV50-SVFU	54	30	65.5	2	–	–		
TCL-05SVU2 (*2)(*8)	White	2	NF100-CVFU	–	50	25	65.5	2	2	–	Screw type	
TCL-05SU2L (*2)(*9)	White	2	NF100-CVFU	–	50	40	65.5	2	2	–		
TCL-05SVU3 (*3)(*8)	White	3	NF100-CVFU	NV100-CVFU	75	25	65.5	2	2	–		
TCL-05SVU3L (*3)(*9)	White	3	NF100-CVFU	NV100-CVFU	75	40	65.5	2	2	–		
TCL-1SVU3 (*3)	White	2, 3	NF125-SVU	–	90	40	65.5	2	2	–	Screw type (Remove the existing cover from the body, and fit the terminal cover.)	
		3	NF125-HVU	NV125-SVU/HVU								
TCL-2SVU3 (*3)(*10)	White	3	NF250-SVU/HVU	NV250-SVU/HVU	105	40	65.5	2	2	–	Screw type (Remove the existing cover from the body, and fit the terminal cover.)	
TCL-2SVU3L (*3)(*11)	White	3	NF250-SVU/HVU	NV250-SVU/HVU	105	50	65.5	2	2	–	Screw type (Remove the existing cover from the body, and fit the terminal cover.)	
TCL-2SWU3 (*10)	White	3	NF225-CWU	–	105	40	65.5	2	–	–	Quick type (Remove the existing cover from the body, and fit the terminal cover.)	
TCL-2SWU3L (*3)(*11)	White	3	NF225-CWU	–	105	50	65.5	2	–	–	Quick type (Remove the existing cover from the body, and fit the terminal cover.)	
TCL-4SWU	White	3	NF400-SWU/HWU	–	171	110	99.5	2	–	2	Quick type	
TCL-6SWU	Transparent	3	NF630-SWU/HWU	–	224	155	103.5	2	4	–	Screw type	Use in combination with insulating barrier.

Notes *1 For 2-pole NV, use TC-L for 3-pole circuit breaker.
*2 For a circuit breaker with F or V type operating handle, specify the model name with F at the end.
(F or V type operating handle dedicated models, screws are used for fixing.)
*3 The standard models can be used in combination with F and V Type Operating Handles.
*4 The dimension C is the size on the power supply side and load side.
*5 When a crimp terminal applicable to wires with a size of 117.2 to 152.05 mm^2 (Model 2CR-150 or CB150-S8) is used, TC-L cannot be fitted. Insulate the terminal from TC-S with insulating tube or taping.
*6 In the case of installation on the body, specify the model name with-MDU at the end.
*7 It cannot be installed in the case of installation on the body.
*8 Applicable to circuit breakers with rating of 75A or less (max. wire size 25 mm^2)
*9 Applicable to circuit breakers with rating of 125A or less (max. wire size 60 mm^2)
*10 Applicable to circuit breakers with rating of 200A or less (max. wire size 100 mm^2)
*11 Applicable to circuit breakers with rating of 250A or less (max. wire size 150 mm^2) (Applicable to UL wire 300MCM)

Remarks: 1. The wire sizes shown in the above notes *10 to *13 are those of the 600-V vinyl insulated wires.
2. Insulate the exposed live parts of crimp terminals with insulating tape or the like.
3. When protection from the power supply and load sides is necessary, separately consult us.

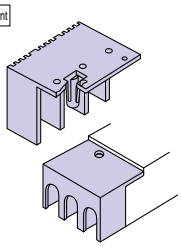
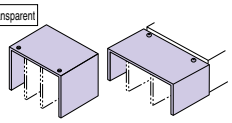
Table 23 Small terminal covers (TC-S)

Type name	Color	Number of poles of circuit breaker	Applicable model		Dimensions (mm)			Contents			Appearance	Remarks
			MCCB	ELCB	A	B	C	Number of covers	Cover mounting screw	Sealing plate		
TCS-03CS2W	White	2	NF30-CS	–	43.5	5	30.5	2	–	2	 Quick type The cover can be sealed with the sealing plate.	
TCS-03CS3W	White	3		–	67	5	30.5	2	–	2		
TCS-05SV2 (*1)	White	2	NF32-SV, NF63-CV/SV/HV	–	50	5	65.5	2	–	2		
TCS-05SV3 (*2)	White	3	NF32-SV, NF63-CV/SV/HV	NV32-SV, NV63-HV	75	5	65.5	2	–	2		
	White	2, 3	–	NV63-CV/SV								
TCS-1SV2(*2)	White	2	NF125-CV/SV	–	60	6.5	65.5	2	–	2		
TCS-1SV3(*3)	White	3	NF125-CV/SV	NV125-CV/SV/HV	90	6.5	65.5	2	–	2		
	White	2, 3	NF125-HV/UV	–								
TCS-2SV3 (*2)	White	2, 3	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV NV250-SEV/HEV NV125-SEV/HEV	105	6.5	65.5	2	–	2		

Notes *1 For a circuit breaker with F type operating handle, specify the model name with F at the end.
(F type operating handle dedicated models, screws are used for fixing.)
*2 The standard models can be used in combination with F and V Type Operating Handles.

Remarks: 1. Small terminal covers for 4-pole circuit breakers are available.
2. Insulate the exposed live parts of crimp terminals with insulating tape or the like.

Table 24 Transparent terminal covers (TTC)

Type name	Number of poles of circuit breaker	Applicable model		Dimensions (mm)			Contents			Appearance	Remarks
		MCCB	ELCB	A	B	C	Number of covers	Cover mounting screw	Sealing plate		
TTC-03CS2	2	NF30-CS	–	43.5	25	30.5	2	–	2	Transparent  Quick type The cover can be sealed with the sealing plate.	
TTC-03CS3	3		–	67	25	30.5	2	–	2		
TTC-05SV2 (*1)	2	NF32-SV NF63-CV/SV/HV	–	50	25	65.5	2	–	2		
TTC-05SV3 (*2)	3	NF32-SV NF63-CV/SV/HV	NV32-SV, NV63-HV	75	25	65.5	2	–	2		
	2, 3	–	NV63-CV/SV								
TTC-1SV2 (*1)	2	NF125-CV/SV	–	60	40	65.5	2	–	2		
TTC-1SV3 (*2)	3	NF125-CV/SV	NV125-CV/SV/HV	90	40	65.5	2	–	2		
	2, 3	NF125-HV/UV	–								
TTC-2SV3 (*2)(*3)(*5)	2, 3	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV NV250-SEV/HEV NV125-SEV/HEV	105	40	65.5	2	–	2		
	3	–	–								
TTC-4SW3	2, 3	NF400-CW/SW/SEW NF400-HEW/REW NF630-CW/SW/SEW NF630-HEW/REW	NV400-CW/SW/SEW NV400-HEW/REW NV630-CW/SW/SEW NV630-HEW	171	110	104.5	2	4	–		
	3	NF400-SEP with MDU/HEP with MDU(*4)	–								
TTC-4SW4	4	NF400-SW/SEW/HEW NF630-SW/SEW/HEW NF400-SEP with MDU/HEP with MDU(*4)	NV400-SEW/HEW NV630-SEW	240	110	104.5	2	6	–	Transparent  Screw type	Use in combination with insulating barrier.
TTC-8SW3	2, 3	NF800-CEW/SDW/SEW NF800-HEW/REW	NV800-SEW/HEW	224	155	103.5	2	4	–		
	3	NF600-SEP with MDU/HEP with MDU (*4) NF800-SEP with MDU/HEP with MDU (*4)	–								
TTC-8SW4	4	NF800-SEW/HEW NF600-SEP with MDU/HEP with MDU (*4) NF800-SEP with MDU/HEP with MDU (*4)	–	294	155	103.5	2	6	–		

Notes *1 For a circuit breaker with F type operating handle, specify the model name with F at the end.
(F type operating handle dedicated models, screws are used for fixing.)
*2 The standard models can be used in combination with F and V Type Operating Handles.
*3 When a crimp terminal applicable to wires with a size of 117.2 to 152.05 mm² (Model 2CR-150 or CB150-S8) is used, TTC cannot be fitted.
Use TCL-2SV3L. Or insulate the terminal from TC-S with insulating tube or taping.
*4 In the case of installation on the body, specify the model name with • MDU at the end.
*5 Applicable to circuit breakers with rating of 200A or less (max. wire size 100 mm²)

<BTC>

Fig. 1

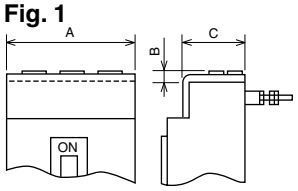
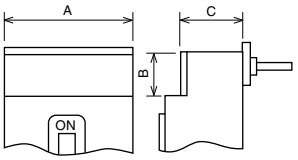


Fig. 2



<PTC>

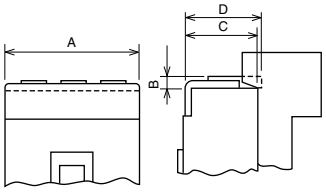
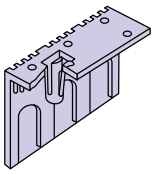
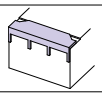
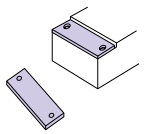


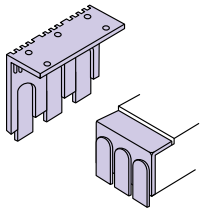
Table 25 Rear terminal cover (BTC)

Type name	Color	Number of poles of circuit breaker	Applicable model MCCB	Applicable model ELCB	Dimensions (mm) A	B	C	Contents Number of covers	Cover mounting screw	Sealing plate	Appearance	Remarks
BTC-03CS2W	White	2	NF30-CS	–	43.5	6.5	30.5	2	–	2		Cover for connection block in the case of simple rear connection
BTC-03CS3W	White	3		–	67	6.5	30.5	2	–	2		
BTC-05SV2	White	2	NF32-SV NF63-CV/SV/HV	– (*1)	50	5	65.5	2	–	2		Cover for stud connection block on back in the case of rear connection type
BTC-05SV3	White	3	NF32-SV NF63-CV/SV/HV	NV32-SV, NV63-HV	75	5	65.5	2	–	2		
	White	2, 3	–	NV63-CV/SV								
BTC-1SV2	White	2	NF125-CV/SV	–	60	6.5	65.5	2	–	2		
BTC-1SV3	White	3	NF125-CV/SV	NV125-CV/SV/HV	90	6.5	65.5	2	–	2		
	White	2, 3	NF125-HV/UV	–								
BTC-2SV3	White	2, 3	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV NV250-SEV/HEV NV125-SEV/HEV	105	6.5	65.5	2	–	2		
BTC-4SW3	White	2, 3	NF400-CW/SW/SEW NF630-CW/SW/SEW	NV400-CW/SW/SEW NV630-CW/SW/SEW	140	42 (*2)	99.5	2	–	2	Quick type The cover can be sealed with the sealing plate. 	
	White	3	NF400-SEP with MDU (*5)	(*5)								
			NF400-UEW (*4)	–	140	42 (*2)	132.5/196.5	2	–			
BTC-4SW4 (*3)	Transparent	4	NF400-SW/SEW/HEW NF630-SW/SEW/HEW NF400-SEP with MDU/HEP with MDU (*5)	NV400-SEW/HEW NV630-SEW	185	42 (*2)	97.5	2	6	–	 Screw type	
BTC-8SW3 (*3)	Transparent	2, 3	NF800-CEW/SDW/SEW/HEW/REW	NV800-SEW/HEW	210	32 (*2)	97.5	2	8	–		
	Transparent	3	NF600-SEP with MDU/HEP with MDU (*5) NF800-SEP with MDU/HEP with MDU (*5)	–								
			NF800-UEW (*4)	–	210	32 (*2)	146/194.5	2	4	–		
BTC-8SW4 (*3)	Transparent	4	NF800-SEW/HEW NF600-SEP with MDU/HEP with MDU (*5) NF800-SEP with MDU/HEP with MDU (*5)	(*5)	280	32 (*2)	97.5	2	10	–		
			NF400-UEW, NF800-UEW (*4)	–	280	32 (*2)	146/194.5	2	6	–		

Notes *1 For 2-pole ELCB, use BTC for 3-pole circuit breaker.
*2 Dimension B in Fig. 2
*3 The covers can be used for plug-in type circuit breakers. Other models are designed only for rear connection type.
*4 The dimension C is the size on the power supply side and load side.
*5 In the case of installation on the body, it can be fitted only on the power supply side.

Remarks: 1. PTC-4SW3 can be used as the back terminal covers for NF400-HEW/REW, NF630-HEW/REW, NV400-HEW/REW and NV630-HEW.
2. For terminal covers for 4-pole circuit breakers not listed above, consult us.

Table 26 Plug-in terminal covers (PTC)

Type name	Color	Number of poles of circuit breaker	Applicable model MCCB	Applicable model ELCB	Dimensions (mm) A	B	C	D	Contents Number of covers	Cover mounting screw	Sealing plate	Appearance	Remarks
PTC-05SV2	White	2	NF32-SV NF63-CV/SV/HV	–	50	6.5	65.5	72	2	2	–	 Screw type	Cover for stud connection block in the case of plug-in type
PTC-05SV3	White	3	NF32-SV NF63-CV/SV/HV	NV32-SV, NV63-HV	75	6.5	65.5	72	2	2	–		
	White	2, 3	–	NV63-CV/SV									
PTC-1SV2	White	2	NF125-CV/SV	–	60	6.5	65.5	–	2	4	–		
PTC-1SV3	White	3	NF125-CV/SV	NV125-CV/SV/HV	90	6.5	65.5	–	2	4	–		
	White	2, 3	NF125-HV/UV	–									
PTC-2SV3	White	2, 3	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV NV250-SEV/HEV NV125-SEV/HEV	105	6.5	65.5	78.5	2	4	–		
PTC-4SW3 (*2)	Transparent	2, 3	NF400-CW/SW/SEW NF630-CW/SW/SEW	NV400-CW/SW/SEW NV630-CW/SW/SEW	140	42	97.5	–	2	4	–	Same as screw type of BTC	
			NF400-HEW/REW (*1) NF630-HEW/REW (*1)	NV400-HEW/REW (*1) NV630-HEW (*1)									

Notes *1 The covers can be used as back terminal covers.
*2 See Fig. 2 of BTC.

Table 27 List of terminal covers applicable to F and V Type Operating Handles

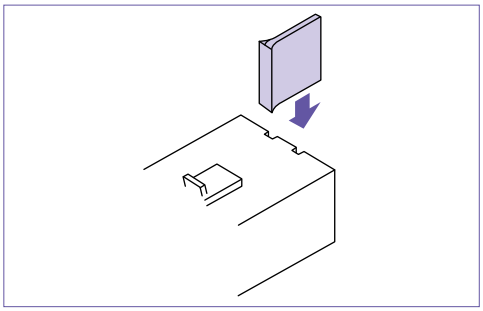
Type name			Applicable operating handles	Number of poles of circuit breaker	Applicable model	
Large terminal covers (TC-L)	Small terminal covers (TC-S)	Transparent terminal covers (TTC)			MCCB	ELCB
TCL-05SV2F (*2)(*3) TCL-05SV2LF (*2)(*4)	TCS-05SV2F (*2)	TTC-05SV2F (*2)	F-05SV2, V-05SV2	2	NF32-SV, NF63-CV/SV/HV	– (*1)
TCL-05SV3 (*3)	TCS-05SV3	TTC-05SV3	F-05SV, V-05SV	3	NF32-SV, NF63-CV/SV/HV	NV32-SV, NV63-HV
TCL-05SV3L (*4)				2, 3	–	NV63-CV/SV
TCL-05SV4	–	–		4	NF32-SV, NF63-CV/SV/HV	–
TCL-1SV2F (*2)	TCS-1SV2F (*2)	TTC-1SV2F (*2)	F-1SV2, V-1SV2	2	NF125-CV/SV	–
TCL-1SV3	TCS-1SV3	TTC-1SV3	F-1SV, V-1SV	3	NF125-CV/SV	NV125-CV/SV/HV
				2, 3	NF125-HV/UV	–
TCL-1SV4	–	–		4	NF125-CV/SV/HV/UV	NV125-CV/SV/HV
TCL-2SV3 (*5) TCL-2SV3L (*6)	TCS-2SV3	TTC-2SV3	F-2SV, V-2SV	2, 3	NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV, NV250-SEV/HEV NV125-SEV/HEV
TCL-2SV4	–	–		4	NF250-CV/SV/HV/UV, NF250-SEV/HEV NF125-SEV/HEV	NV250-CV/SV/HV, NV250-SEV/HEV NV125-SEV/HEV
TCL-4SW3 TCL-4SP3W	–	TTC-4SW3	F-4S V-4S	2, 3	NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW
TCL-4SW4	–	TTC-4SW4		4	NF400-SW/SEW/HEW NF630-SW/SEW/HEW	NV400-SEW/HEW NV630-SEW
TCL-8SW3	–	TTC-8SW3	F-8S V-8S	2, 3	NF800-CEW/SDW/SEW/HEW/REW	NV800-SEW/HEW
TCL-8SW4	–	TTC-8SW4		4	NF800-SEW/HEW	–

Notes *1 For 2-pole NV, use a terminal cover for 3-pole circuit breaker.
*2 Only for F and V Type Operating Handles (screw type)
*3 Applicable to circuit breakers with rating of 75A or less (max. wire size 25 mm²)
*4 Applicable to circuit breakers with rating of 125A or less (max. wire size 60 mm²)
*5 Applicable to circuit breakers with rating of 200A or less (max. wire size 100 mm²)
*6 Applicable to circuit breakers with rating of 250A or less (max. wire size 150 mm²)

Remark: 1. The terminal covers for UL 489 Listed Circuit Breakers can be normally combined with F Type Operating Handles.

Insulating Barriers

The insulating barrier enhances the insulation between the phases of circuit breaker terminals. It also prevents accidents due to conductive foreign matter and dust, and secondary accidents when isolating a fault current.



●The insulating barrier is available for the models listed in the table below.

Table 28

("●" denotes optional)

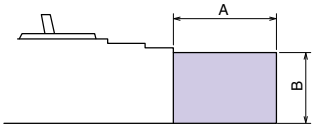
Applicable model		Connecting method			
MCCB	ELCB	Front	Rear	Flush plate	Plug-in
NF32-SV, NF63-CV NF125-CV, NF100-CVFU	NV32-SV, NV63-CV NV125-CV, NV100-CVFU	●	–	–	–
NF63-SV/HV NF125-SV/HV	NV63-SV/HV NV125-SV/HV	Standard attachment	–	–	–
NF125-SEV/HEV, NF125-ZEV NF250-CV/SV/HV/SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NF250-SEV/HEV/ZEV with MDU	NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV NV250-SEV/HEV with MDU	Standard attachment	–	–	Standard attachment
NF125-SVU NF125-HVU NF250-SVU NF250-HVU NF225-CWU	NV125-SVU NV125-HVU NV250-SVU NV250-HVU NV100-SWU	Standard attachment	–	–	–
NF400-CW/SW/SEW/HEW/REW/UEW NF630-CW/SW/SEW/HEW/REW	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	Standard attachment	●	●	Standard attachment
NF400-UEW(4P) NF800-CEW/SEW/HEW/REW/SDW	NV800-SEW/HEW	Standard attachment	●	●	●
NF800-UEW	–	Standard attachment	●	●	–
NF400-SWU/HWU NF630-SWU/HWU	–	Standard attachment	–	–	–
NF1000-SEW, NF1250-SEW/SDW	–	Standard attachment	–	–	Standard attachment
NF1600-SEW/SDW	–	Standard attachment	–	–	–

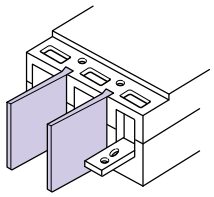
Always mount the insulating barrier when it comes with the circuit breaker.

●Insulating Barrier-Front (BA-F)

Table 29 Summary of dimensions

Type name	Applicable model		Dimensions (mm)		Quantity per breaker			Reference diagram
	MCCB	ELCB	A	B	2P	3P	4P	
BAF-05SV	NF32-SV NF63-CV NF125-CV	NV32-SV NV63-CV NV125-CV	50	59.5	1 (*2)	2	3	
	NF63-SV/HV NF125-SV/HV/UV	NV63-SV/HV NV125-SV/HV						
BAF-2SV	NF125-SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV/UV/SEV/HEV NF250-SGV/LGV/HGV/RGV NF250-SEV/HEV/ZEV with MDU	NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV NV250-SEV/HEV with MDU	100	59.5	2	4	6	
BAF-05SVU	NF100-CVFU	NV100-CVFU	50	59.5	2	4	–	
	NF125-SVU NF125-HVU	NV125-SVU NV125-HVU						
BAF-2SVU	NF250-SVU NF250-HVU	NV250-SVU NV250-HVU	100	59.5	–	4	–	
BAF-2SWU	NF225-CWU	–	100	59.5	–	4	–	
BAF-4SW	NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	110	98.5	2	4	6	
BAF-4UW (*1)	NF400-UEW(3P)	–	110	132/ 98.5	–	4	–	
BAF-8SW	NF800-CEW/SEW/SDW/HEW/REW	NV800-SEW/HEW	110	98.5	1	2	3	
BAF-10SW	NF400-UEW(4P) NF800-UEW, NF1000-SEW NF1250-SEW/SDW	–	110	132	1	2	3	
BAF-4SWU	NF400-SWU/HWU	–	110	98.5	–	4	–	
	NF630-SWU/HWU(less than 600A)	–	110	98.5	–	2	–	
BAF-6SWU	NF630-SWU/HWU(630A)	–	150	98.5	–	4	–	
BAF-16SW	NF1600-SEW/SDW	–	185	132	1	2	3	



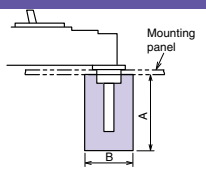


Notes *1 The barriers BAF-4UW for the power supply and load sides vary in the dimension B.
*2 Not supplied with ELCB.

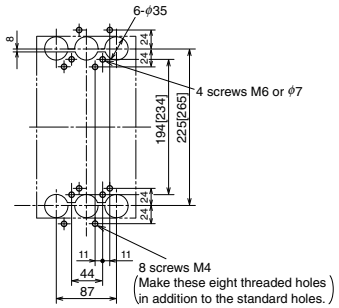
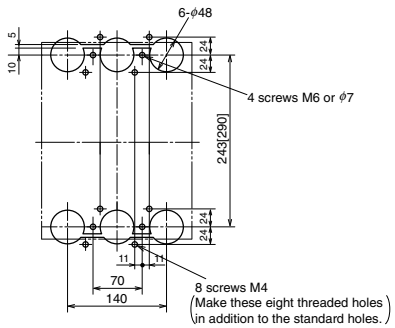
●Insulating Barrier-Rear (BA-B)

Table 30 Summary of dimensions

Type name	Applicable model		Dimensions (mm)		Quantity per breaker			Reference diagram
	MCCB	ELCB	A	B	2P	3P	4P	
BAB-4SW	NF400-CW/SW/SEW/HEW/REW NF400-UEW(3P) NF630-CW/SW/SEW/HEW/REW	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	140	74.5	–	4	6	
BAB-8SW	NF800-CEW/SEW/SDW/HEW/REW NF400-UEW(4P) NF800-UEW	NV800-SEW/HEW	140	74.5	–	4	6	



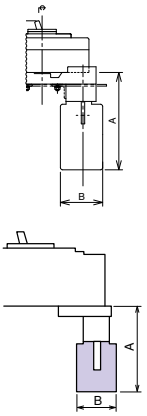
Drilling size for use of BA-B (in the case of 3-pole circuit breaker)

NF400-CW, NF400-SW, NF400-SEW, NF400-HEW, NF400-REW, NF400-UEW NV400-CW, NV400-SW, NV400-SEW, NV400-HEW, NV400-REW NF630-CW, NF630-SW, NF630-SEW, NF630-HEW, NF630-REW NV630-CW, NV630-SW, NV630-SEW, NV630-HEW	**NF800-CEW, NF800-SEW, NF800-HEW, NF800-REW, NF800-UEW NV800-SEW, NV800-HEW**
Power supply side Note The dimensions in brackets are those for NF400-UEW.  Load side	Note The dimensions in brackets are those for NF800-UEW. 

The drilling size drawings show the dimensions viewed from the rear side.

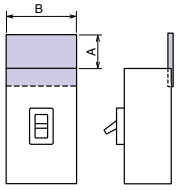
●Insulating Barrier-Plug-in (BA-P)

Table 31 Summary of dimensions

Type name	Applicable model		Dimensions (mm)		Quantity per breaker			Reference diagram
	MCCB	ELCB	A	B	2P	3P	4P	
BAP-2SV	NF125-SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV NF250-SGV/LGV/HGV/RGV NF250-SEV/HEV	NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV	172	74.5	4	4	6	
BAP-4SW	NF400-CW/SW NF400-SEW/HEW/REW/UEW NF630-CW/SW NF630-SEW/HEW/REW	NV400-CW/SW NV400-SEW/HEW/REW NV630-CW/SW NV630-SEW/HEW	178	74.5	–			
BAP-8SW	NF800-CEW/SEW NF800-HEW/REW	NV800-SEW/HEW	172	74.5				
	NF1000-SEW NF1250-SEW	–	215	74.5				

●Earth fault preventing barriers (BA-G)

Table 32 Summary of dimensions

Type name	Applicable model		Dimensions (mm)		Quantity per breaker	Reference diagram
	MCCB	ELCB	A	B	3P	
BAG-05SV3	NF32-SV NF63-CV/SV/HV	NV32-SV NV63-CV/SV/HV	30	75	1	 Earth fault preventing barrier (3 poles)
BAG-1SV3	NF125-CV/SV/HV	NV125-CV/SV/HV	40	90		
BAG-2SV3	NF125-SEV/HEV NF250-CV/SV/HV/SEV/HEV NF250-SEV/HEV/ZEV with MDU	NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV NV250-SEV/HEV with MDU	63	105		
BAG-4SW3	NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	63	164		
BAG-4UW3	NF400-UEW	–	63	164		
BAG-8SW3	NF800-CEW/SEW/SDW/HEW/REW	NV800-SEW/HEW	110	210		
BAG-8UW3	NF800-UEW	–	110	210		
BAG-10SW3	NF1000-SEW NF1250-SEW/SDW	–	98	210		
BAG-16SW3	NF1600-SEW/SDW	–	150	300		

Also the earth fault preventing barriers for 2- and 4-pole circuit breakers are available.

Handle Lock Devices, Lock Covers, Auxiliary Handles, Card Holders

(1) Handle Lock Devices (HL and HL-S)

These devices are used to lock the circuit breakers in the ON or OFF position. If overcurrent flows while the circuit breaker is locked, it will trip. Model HL (red resin moldings) to be fitted to handles and Model HL-S to be secured on circuit breaker covers are available. (Use a commercially available padlock having the nominal size shown in the right table. If a padlock in another size is used, the device may not lock correctly.)

Padlock size (mm)

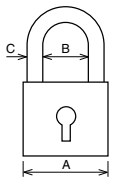
Application	A (Nominal size)	B	C
a	25	11	4
b	35	19	5
c	40	22 or 23	5.5

Table 33 HL

Type name	Applicable model MCCB	Applicable model ELCB	Reference diagram	Padlock
HL-05FH	NF30-CS	–	Fig. 4	a
HLN-05SV	NF32-SV, NF63-CV/SV/HV NF125-CV/SV/HV/UV, NF125-SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF250-SGV/LGV/HGV/RGV	NV32-SV, NV63-CV/SV/HV NV125-CV/SV/HV, NV125-SEV/HEV NV250-CV/SV/HV, NV250-SEV/HEV	Fig. 1	
HLF-05SV	NF32-SV, NF63-CV/SV/HV NF125-CV/SV/HV/UV, NF125-SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV/UV, NF250-SEV/HEV NF250-SGV/LGV/HGV/RGV	NV32-SV, NV63-CV/SV/HV NV125-CV/SV/HV, NV125-SEV/HEV NV250-CV/SV/HV, NV250-SEV/HEV		
HLF-05SVU	NF125-SVU/HVU NF250-SVU/HVU	NV125-SVU/HVU NV250-SVU/HVU		
		–		
HLF-2SWU	NF225-CWU	–		
HL-4CW (*1)	NF400-CW	NV400-CW	Fig. 2	c
HL-4SW (*1)	NF400-SW/SEW/HEW/REW/UEW NF630-CW/SW/SEW/HEW/REW NF800-CEW/SDW/SEW/HEW/REW/UEW	NV400-SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW NV800-SEW/HEW		
HL-4SWU	NF400-SWU/HWU, NF630-SWU/HWU	–		
HL (*2)	NF1000-SEW, NF1250-SEW/SDW, NF1600-SEW/SDW	–	Fig. 3	

Notes *1 When a padlock is not used, the device can be used as a lock cover (LC).
*2 Place an order for a circuit breaker body combined with the device.

Remarks: 1. One lot of HL-4CW and HL-4SW contains one piece, and one lot of others contains 10 pieces.
2. HLF types are used for OFF lock, and HLN types for ON lock.



Padlock

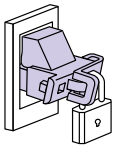


Fig. 1

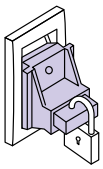


Fig. 2

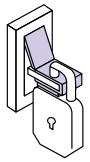


Fig. 3

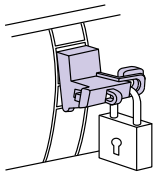


Fig. 4

Table 34 HL-S

Type name	Applicable model MCCB	Number of poles	Applicable model ELCB	Number of poles	A	B	C	D	E	F	Reference diagram	Padlock
HLS-05SV2 (*1)	NF32-SV, NF63-CV, NF63-SV NF63-HV	2P	–	–	32	75	50	–	63	32	Fig. 5	b
	NF125-CV, NF125-SV	2P	–	–			57					
HLS-05SV (*1)	NF32-SV, NF63-CV, NF63-SV NF63-HV	3P	NV32-SV, NV63-HV	3P			75					
	NF63-SV,NF63-HV	4P	–	–				23				
	NF125-CV, NF125-SV	3P	NV125-CV, NV125-SV, NV125-HV	3P			86	–				
	NF125-HV	2P, 3P	–	–								
	NF125-SV, NF125-HV	4P	NV125-SV, NV125-HV	4P				28				
	NF125-UV	2P, 3P	–	–	62.5			–		1.5		
		4P	–	–				28				
HLS-2SV (*1)	NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV, NF250-SV, NF250-HV NF250-SGV/LGV/HGV/RGV	2P	NV125-SEV, NV125-HEV NV250-CV, NV250-SV, NV250-HV NV250-SEV, NV250-HEV	3P	32	84	100	–		32		
	NF125-SEV, NF125-HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV, NF250-SV, NF250-HV NF250-SEV, NF250-HEV NF250-SGV/LGV/HGV/RGV	3P										
	NF125-SEV, NF125-HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SV, NF250-HV, NF250-SEV, NF250-HEV NF250-SGV/LGV/HGV/RGV	4P	NV125-SEV, NV125-HEV NV250-SV, NV250-SEV, NV250-HEV	4P				33				
	NF250-UV	2P, 3P	–	–	69.5			–		-5.5		
		4P	–	–				33				
HLS-03SVU (*1)	NF50-SVFU	2P, 3P	NV50-SVFU	2P, 3P	–	–	–	–			Fig. 9	
HLS-05SVU2 (*1)	NF100-CVFU	2P	–	–	32	75	50	–		32	Fig. 5	
HLS-05SVU (*1)	NF100-CVFU	3P	NV100-CVFU	3P			75					
	NF125-SVU/HVU	2P, 3P	NV125-SVU/HVU	3P			86					
HLS-05SVU (*2)	NF125-SVU/HVU	2P, 3P	NV125-SVU/HVU	3P	32	75	86	–		32	Fig. 5	
HLS-2SVU (*1)	NF250-SVU/HVU	3P	NV250-SVU/HVU	3P		84	100					
HLS-2SWU (*1)	NF225-CWU	3P	–	3P		84	100	–		32	Fig. 6	
HLS-4SW (*3)	NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	2P, 3P, 4P	NV400-CW/SW/SEW/ HEW/REW NV630-CW/SW/SEW/ HEW	3P, 4P	–	–	–	–	–	–	Fig. 7	
HLS-4UW (*3)	NF400-UEW	3P	–	–	–	–	–	–	–	–		
HLS-8SW (*3)	NF800-CEW/SDW/SEW/HEW/REW	2P, 3P, 4P	NV800-SEW/HEW	3P, 4P	–	–	–	–	–	–		
HLS-8UW (*3)	NF400-UEW	4P	–	–	–	–	–	–	–	–	Fig. 8	
	NF800-UEW	3P, 4P										

Notes *1 For locking in OFF position
*2 A, B, C and D in Figs. 5 and 6 are drilling sizes in front plate.
*3 Terminal covers cannot be fitted.

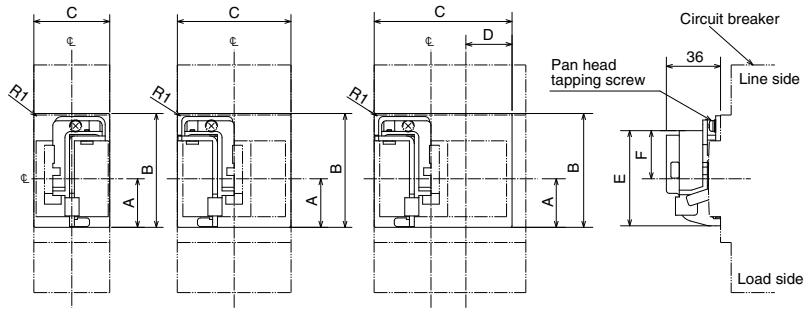


Fig. 5

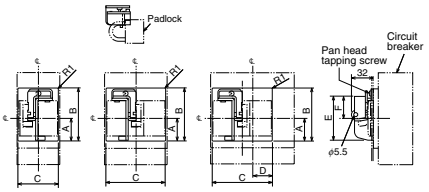


Fig. 6

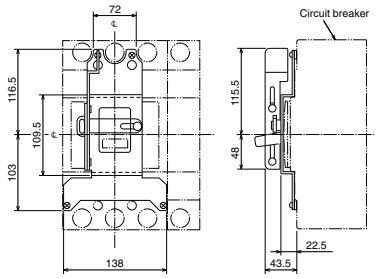


Fig. 7

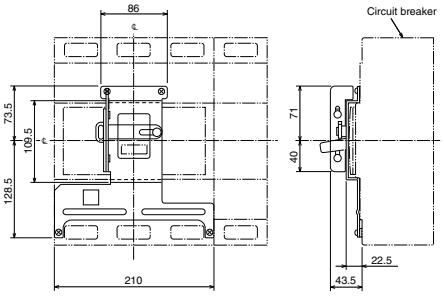


Fig. 8

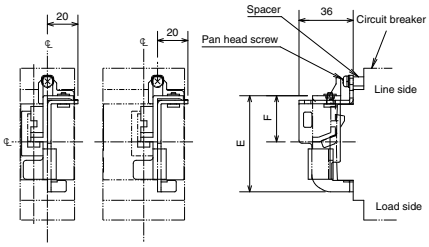
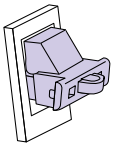


Fig. 9

(2) Lock Covers (LC)

Lock Cover is a plug-in lock for indicating easily without using padlocks that it is prohibited to operate the circuit breaker. A “Caution” tag can be hung on it. The covers are red resin moldings.



LC-05SW to LC-2SW

LCBH1

LCBH2, 3

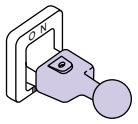
Table 35 LC

Type name	Applicable model	
	MCCB	ELCB
LC03CS	NF30-CS	–
LC-05SV	NF32-SV NF63-CV/SV/HV NF125-CV/SV/HV/UV NF125-SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV/UV NF250-SEV/HEV NF250-SGV/LGV/HGV/RGV	NV32-SV NV63-CV/SV/HV NV125-CV/SV/HV NV125-SEV/HEV NV250-CV/SV/HV NV250-SEV/HEV
LCBH1R (red) LCBH1Y (yellow)	BH-P(1P)	–
LCBH2R (red) LCBH2Y (yellow)	BH-P(2P)	–
LCBH3R (red) LCBH3Y (yellow)	BH-P(3P)	–

Remark: 1. One lot of LCBH, LCBL and LCNVL contains 50 pieces, and one lot of other models contains 10 pieces.

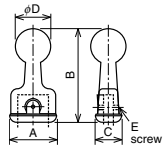
(3) Auxiliary Handles (HT)

These handles facilitate opening and closing circuit breakers.



Auxiliary Handles

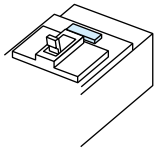
Table 36 HT

Type name	Applicable model	Dimensions					Outline dimension drawing
		A	B	C	D	E	
HT-4CW (*1)	NF400-CW, NV400-CW	59	77.5	32	38	M4	
HT-4SW (*1) (*2)	NF400-SW/SEW/HEW/REW/UEW NF630-CW/SW/SEW/HEW/REW NF800-CEW/SDW/SEW/HEW NF800-REW/UEW NV400-SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW NV800-SEW/HEW		81				
HT-10SW	NF1000-SEW NF1250-SEW/SDW NF1600-SEW/SDW	62	118	34	45	M4	

Notes *1 HT can be supplied separately. The user can fit it to the circuit breaker. (One lot contains 1 piece.)
*2 1-pole circuit breakers with 800A frame and 4-pole NF400-UEW come with auxiliary handles as standard accessories.

(4) Card Holders (CH)

Cards showing the circuit breaker name and circuit number can be inserted to the card holder.
Fit the card holder to the circuit breaker body or the flush plate in the flush frame. (Although a card holder is supplied with each circuit breaker body, the card holder is available as an optional part.)



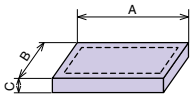


Table 37 Card holder size (mm)

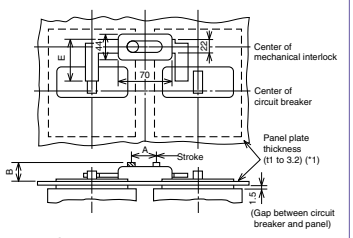
Applicable model	Type name	A	B	C	Card size
NF250-SV or below NV250-SV or below	CH-P No.5	44	12	5	39×9
NF400-SW or above NV400-SW or above	CH-P No.3	38	22	5	33×20

Mechanical Interlocks (MI)

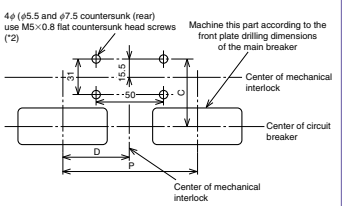
This mechanical interlock device is used to enable one of two circuit breakers to turn on. Install the device on the panel.
Mechanical interlocks to be installed directly to circuit breaker bodies can be manufactured.
Consult us for details.

●Front, rear and plug-in types

Front, rear and plug-in types (Panel mounting)
These interlocks can be locked with padlocks.



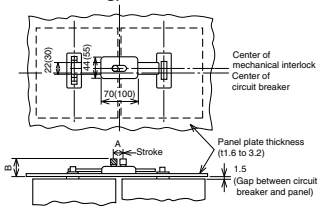
Outside Dimension Diagram



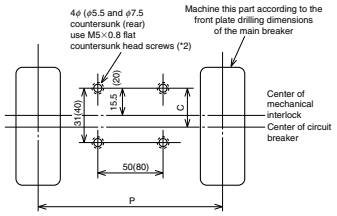
Drilling Dimension Diagram

Fig. 1

Front, rear and plug-in types (Panel mounting)



Outside Dimension Diagram



Drilling Dimension Diagram

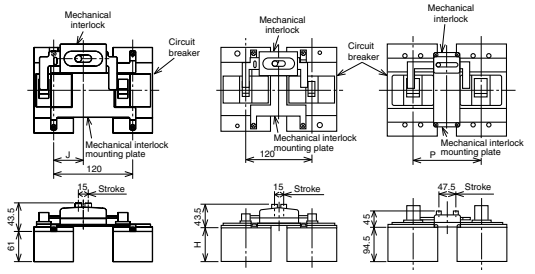
Fig. 2

Breaker mountiong (front) Terminal covers cannot be fitted.

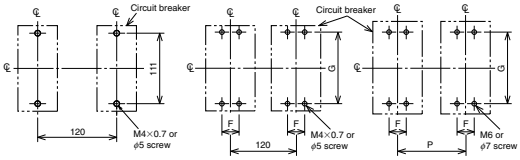
Type name	J
MI-05SVFB2	47.5
MI-1SVFB2	45

Type name	F	G	H
MI-05SVFB3	25	111	61
MI-05SWHFB3	25	111	75
MI-1SVFB3	30	111	61
MI-2SVFB3	35	126	61

Type name	F	G	P
MI-4SWFB3	44	194	190
MI-8SWFB3	70	243	260



Outside Dimension Diagram



Drilling Dimension Diagram (breaker mount)

Fig. 3

Notes *1 For 400A frame or above, use a panel 1.6 to 3.2 thick.
*2 When the panel is 2.3 or more thick, countersink the panel (rear side) in φ9.5 for the four φ5.5 holes.

Table 38 Table of variable dimensions

Applicable model		Pitch (P) (*1)						Dimensions (mm)						Reference diagram	Breaker mount (*3)	Reference diagram (3P)
MCCB	ELCB (*6)	Standard			Semi-standard		Standard		t	A	B	C	D	E		Type name	
		Type name	2P	3P	3P		Type name	4P								2P•3P	
NF32-SV, NF63-CV/SV/HV	–	MI-05SV3	120	–	–	–	–	–	(*2) –	15	33	63	47.5	58	(Fig. 1)	MI-05SVFB2	(Fig. 3)
NF32-SV, NF63-CV/SV/HV	NV32-SV, NV63-CV/SV/HV		–	120	–	130	MI-05SV4	120 (*4)		15	33	63	–	58		MI-05SVFB3	
NF125-CV/SV	–	MI-05SV3	120	–	–	–	–	–		15	33	63	45	58		MI-1SVFB2	
NF125-CV/SV/HV	NV125-CV/SV/HV		–	120	130	150	MI-1SV4	130 (*4)		15	33	63	–	58		MI-1SVFB3	
NF125-UV	–									15	33	32.5		58		–	–
NF125-SEV/HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV, NF250-SEV/HEV NF250-SGV/LGV/HGV/RGV	NV125-SEV/HEV NV250-CV/SV/HV NV250-SEV/HEV	MI-05SV3	120 (*4)		150	180	MI-2SV4	150 (*4)		15	33	63	–	58		MI-2SVFB3	(Fig. 3)
NF250-UV	–											25.5				–	–
NF225-CWU	–	MI-05SWU3	–	120 (*4)	–	–	–	–		15	33	63	–	58		–	–
NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	NV400-CW/SW/SEW/HEW/REW NV630-CW/SW/SEW/HEW	MI-4SW3	190		–	210	MI-4SW4	250		47.5	33	83.5	–	74		MI-4SWFB3	(Fig. 3)
NF400-UEW (3P)	–		–	190			–	–	(*2) –			83.5				–	
NF800-CEW/SDW/SEW/HEW/REW	NV800-SEW/HEW	MI-8SW3	220		–	240	MI-8SW4	290		47.5	33	83.5	–	74		MI-8SWFB3	
NF400-UEW (4P) NF800-UEW	–		–	220								60				–	
NF1000-SEW, NF1250-SEW/SDW	–	MI-10SW3	220		–	–	MI-10SW4	290	2.3 (*5)	47.5	47	37.5	–	–	(Fig. 2)	–	–
NF1600-SEW/SDW	–	MI-16SW3	315		–	–	MI-16SW4	426		65	54.5	39	–	–		–	

Notes *1 Specify the circuit breaker mounting pitch (P).
*2 No need to specify the panel thickness (t). (Usable panel thickness range: t = 1~3.2mm. Above 400AF, use panel thickness t = 1.6~3.2mm)
*3 Terminal covers cannot be fitted. (However, TCL-4SW3 can be fitted.)
*4 When UVT is provided, separately install the module.
*5 If the thickness is not 2.3, specify the panel thickness (t).
*6 For NV with TBL, use a circuit breaker with MG.

Remarks: 1. When a mechanical interlock is installed on the panel, screw type terminal covers cannot be installed.
2. These devices do not provide an isolation function. However, 400, 600, 630 and 800A frame circuit breakers can be made conforming to it. (See Note 3.)
3. On a 2-pole circuit breaker obtained by removing the neutral pole conductor from a 3-pole circuit breaker, the mechanical interlock can be installed in the same manner as on a 3-pole circuit breaker.

Boxes for Circuit Breakers and Boxed Circuit Breakers

(1) Kinds and specifications

Table 39

			Closed type (S)		Dust-proof type (I)	Water-proof type (W)
	Appearance		 (*1)	 (*1)		
MCCB (*2)	NF30-CS	2, 3P	NFS-03CS	–	–	–
	NF32-SV, NF63-CV/SV/HV	2P	NFS-05SV2 (*5)	–	NFI-05SV	–
		3P	NFS-05SV			NFW-05SV
	NF125-CV/SV	2P	NFS-1SV2 (*5)	–	NFI-1SV	–
		3P	NFS-1SV			NFW-1SV
	NF125-HV	2, 3P				NFW-1HV
	NF125-SGV/LGV NF160-SGV/LGV NF250-SGV/LGV NF250-CV/SV, NF125/250-SEV	2, 3P	NFS-2SV	–	NFI-2SV	NFW-2SV
	NF125/160/250-HGV NF250-HV, NF125/250-HEV		–			
	NF400-CW		–	–	NFI-4CW	NFW-4CW
	NF400-SW/SEW		–	–	NFI-4SW	NFW-4SW
	NF630-CW/SW/SEW		–	–	NFI-6SW	NFW-6SW
	NF800-CEW/SDW/SEW		–	–	NFI-8SW	NFW-8SW
ELCB (*2)	NV32-SV, NV63-CV/SV/HV	2P	NFS-05SV	–	NFI-05SV	–
		3P	NFS-05SV			NFW-05SV
	NV125-CV/SV	3P	NFS-1SV	–	NFI-1SV	NFW-1SV
	NV125-HV		NFS-1SV			NFW-1HV
	NV250-CV/SV, NV125/250-SEV		NFS-2SV	–	NFI-2SV	NFW-2SV
	NV250-HV, NV125/250-HEV		–			
	NV400-CW		–	–	NFI-4CW	NFW-4CW
	NV400-SW/SEW		–	–	NFI-4SW	NFW-4SW
	NV630-CW/SW/SEW		–	–	NFI-6SW	NFW-6SW
	NV800-SEW		–	–	NFI-8SW	NFW-8SW
Operating method			Direct operation of circuit breaker handle		Operation through operating handle mechanism	
Standard paint color			Box: Munsell 5Y7/1 Operating handle: Munsell N1.5			
Protection class (IEC 60529)			IP3X		IP4X (*3)	IP65 (*4)

Notes *1 The window frame varies depending on the model.
*2 For 1-pole circuit breakers, boxes are not manufactured.
*3 The protection class of NFI-1SV and NFI-2SV is IP3X.
*4 The protection class of NFW-4CW, NFW-4SW, NFW-6SW and NFW-8SW is IP54.
*5 The circuit breaker body is a 2-pole external type.
Remarks: 1. Only internal accessories with lead wires drawn out can be fitted. (However, LT and SLT can be fitted on the right pole side.)
2. The dust-proof type (I) models do not provide an isolation function.

●Selection of rated current

When selecting the rated current of circuit breaker, it is necessary to consider the temperature in the box. When the rated current is carried, the temperature in the box increases by 10 to 20K. Correct the rated current with the temperature correction curve.
Determine the maximum working current to be 80% or less of the rated current.

●Locking

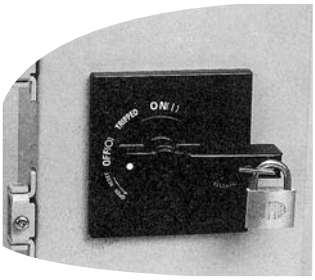
Type I and W boxed circuit breakers can be provided with locks in the following parts. Locking can prevent unnecessary operation.
①Cover and case
②ON or OFF position of operating handle
(Padlocks must be prepared by the user. The dimensions of the padlocks are shown on page 739.)

●Interlock (only for Dust-proof type)

The cover cannot be opened while the circuit breaker is in the ON state. However, if the interlock release screw is turned, the cover is released from the locked state and can be opened even in the ON state.

●Handle operation and display

The ON, OFF or trip state of the body is displayed on each position on the decorative board.



Example of Type I operating handle block

(2) External dimensions

■MCCB

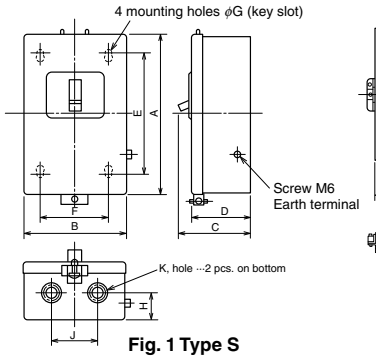


Fig. 1 Type S

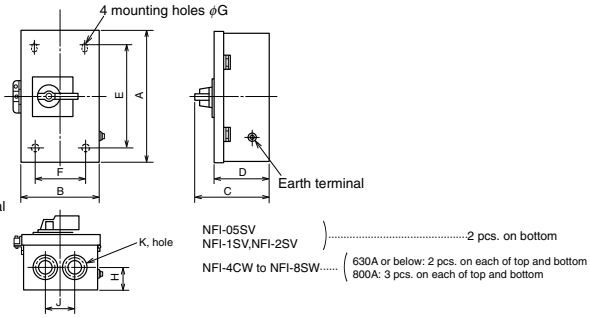


Fig. 3 Type I

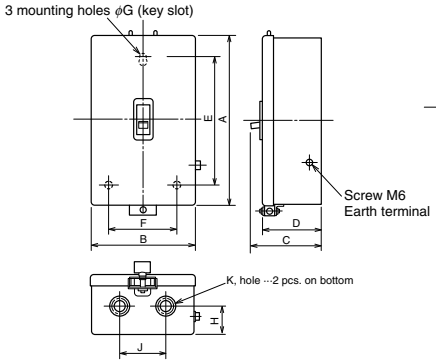


Fig. 2 Type S

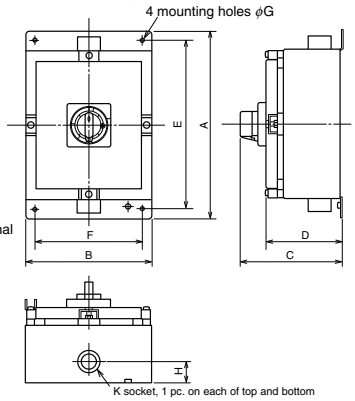


Fig. 4 Type W

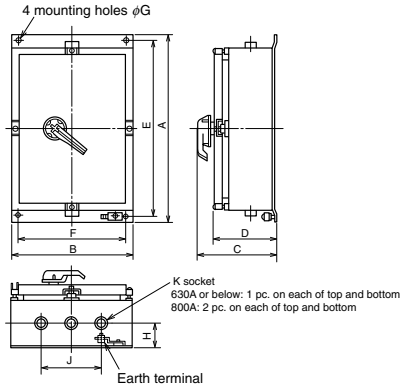


Fig. 5 Type W

Table 40 Table of variable dimensions (Boxes for 4-pole circuit breakers are not manufactured.) Note) The sockets are applicable to thick steel duct (JIS C 8305) and conduit tube thread.

Box type	Type name	Applicable Model	Variable dimensions										
			Fig.	A	B	C	D	E	F	G	H	J	K
S	NFS-03CS	NF30-CS	2	188	158	69	58	150	78	6	25	100	20, 28
	NFS-05SV2	NF32-SV, NF63-CV/SV/HV	1	260	178	98	78	202	100	7	34	100	28, 35, 44
	NFS-05SV												
	NFS-1SV2	NF125-CV/SV	1	310	178	98	78	252	100	7	34	100	28, 35, 44
	NFS-1SV	NF125-CV/SV/HV											
	NFS-2SV	NF250-CV/SV, NF125/250-SEV NF125-SGV/LGV NF160-SGV/LGV NF250-SGV/LGV	1	440	247	137	116	373	170	9	52	120	50, 62, 78
I	NFI-05SV	NF32-SV, NF63-CV/SV/HV	3	350	186	155.5	117	286	120	7	42	100	28, 35, 44
	NFI-1SV	NF125-CV/SV/HV	3	352	188	155.5	118	286	120	7	42	100	28, 35, 44
	NFI-2SV	NF250-CV/SV/HV, NF125/250-SEV/HEV NF125-SGV/LGV/HGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV	3	442	248	162	124	373	170	9	54	120	50, 62, 78
	NFI-4CW	NF400-CW	3	730	320	244	191	650	240	11	87	120	50, 62, 78
	NFI-4SW	NF400-SW/SEW	3	730	320	244	191	650	240	11	65	120	50, 62, 78
	NFI-6SW	NF630-CW/SW/SEW	3	940	433	260	207	856	350	15	90	150	92
	NFI-8SW	NF800-CEW/SDW/SEW	3	1353	543	304	251	1270	460	15	90	320	104
W	NFW-05SV	NF32-SV, NF63-CV/SV/HV	4	390	265	214	160	350	225	9.5	45	–	28
	NFW-1SV	NF125-CV/SV	4	390	265	214	160	350	225	9.5	50	–	36
	NFW-1HV	NF125-HV	4	480	265	239	186	440	225	9.5	60	–	36
	NFW-2SV	NF250-CV/SV/HV, NF125/250-SEV/HEV NF125-SGV/LGV/HGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV	4	550	355	264	210	510	315	11	75	–	54
	NFW-4CW	NF400-CW	5	800	355	257	220	760	315	11	85	–	70
	NFW-4SW	NF400-SW/SEW	5	800	355	257	220	760	315	11	85	–	70
	NFW-6SW	NF630-CW/SW/SEW	5	800	355	257	220	760	315	11	85	–	82
	NFW-8SW	NF800-CEW/SDW/SEW	5	1435	550	339	265	1395	515	15	100	180	104

■ELCB

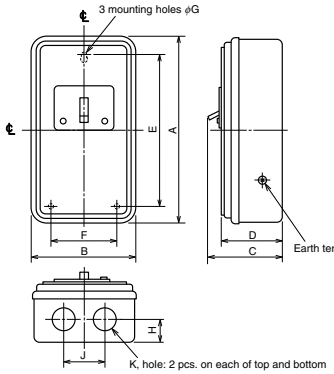


Fig. 1 Type S

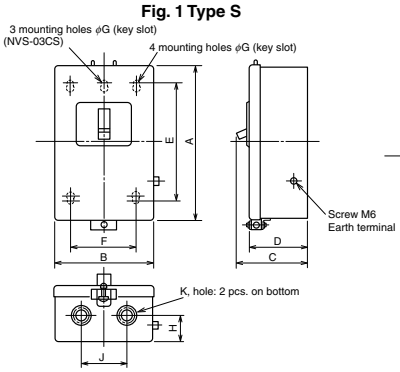


Fig. 2 Type S

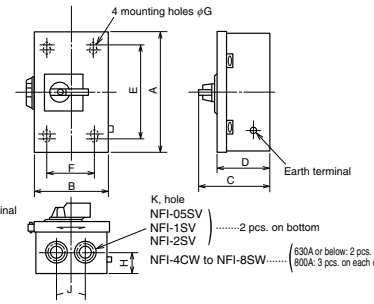


Fig. 3 Type I

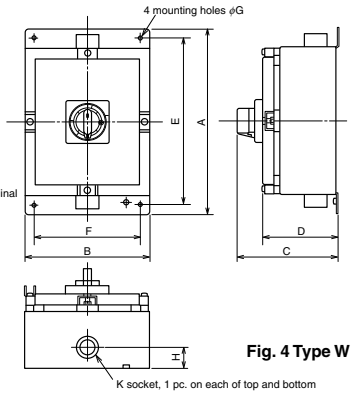


Fig. 4 Type W

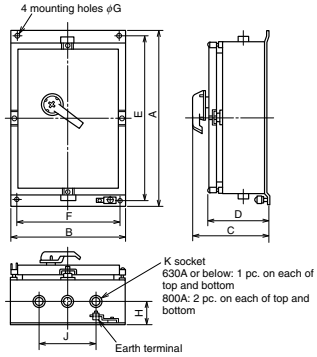


Fig. 5 Type W

Table 41 Table of variable dimensions (Boxes for 4-pole circuit breakers are not manufactured.) Note) The sockets are applicable to thick steel duct (JIS C 8305) and conduit tube thread.

Box type	Type name	Applicable Model	Variable dimensions										
			Fig.	A	B	C	D	E	F	G	H	J	K
S	NFS-05SV2	NV32-SV, NV63-CV/SV/HV	2	260	178	98	78	202	100	7	34	100	28, 35, 44
	NFS-05SV												
	NFS-1SV2	NV125-CV/SV	2	310	178	98	78	252	100	7	34	100	28, 35, 44
	NFS-1SV	NV125-CV/SV/HV											
	NFS-2SV	NV250-CV/SV, NV125/250-SEV	2	440	247	137	116	373	170	9	52	120	50, 62, 78
I	NFI-05SV	NV32-SV, NV63-CV/SV/HV	3	350	186	155.5	117	286	120	7	42	100	28, 35, 44
	NFI-1SV	NV125-CV/SV/HV	3	352	188	155.5	118	286	120	7	42	100	28, 35, 44
	NFI-2SV	NV250-CV/SV/HV, NV125/250-SEV/HEV	3	442	248	162	124	373	170	9	54	120	50, 62, 78
	NFI-4CW	NV400-CW	3	730	320	244	191	650	240	11	87	120	50, 62, 78
	NFI-4SW	NV400-SW/SEW	3	730	320	244	191	650	240	11	65	120	50, 62, 78
	NFI-6SW	NV630-CW/SW/SEW	2	940	433	260	207	856	350	15	90	150	92
	NFI-8SW	NV800-SEW	3	1353	543	304	251	1270	460	15	90	320	104
W	NFW-05SV	NV32-SV, NV63-CV/SV/HV	4	390	265	214	160	350	225	9.5	45	–	28
	NFW-1SV	NV125-CV/SV	4	390	265	214	160	350	225	9.5	50	–	36
	NFW-1HV	NV125-HV	4	480	265	239	186	440	225	9.5	60	–	36
	NFW-2SV	NV250-CV/SV/HV, NV125/250-SEV/HEV	4	550	355	264	210	510	315	11	75	–	54
	NFW-4CW	NV400-CW	5	800	355	257	220	760	315	11	85	–	70
	NFW-4SW	NV400-SW/SEW	5	800	355	257	220	760	315	11	85	–	70
	NFW-6SW	NV630-CW/SW/SEW	5	800	355	257	220	760	315	11	85	–	82
	NFW-8SW	NV800-SEW	5	1435	550	339	265	1395	515	15	100	180	104

Electrical Operated Circuit Breakers and Electrical Operation Devices

Spring charge type (1)

Spring charge type (2)
Standard paint color: Munsell 5Y7/1

Motor-drive type (2)
Standard paint color: Munsell 5Y7/1

(1) Specifications

●Electrically operated circuit breakers

Table 42

Specify the electrical operation device together with the circuit breaker body.

Electrically operating method				Spring charge type (1)	Spring charge type (2)		Motor-drive type (2)	
MCCB	Class S, H and R			NF125-SV, NF125-HV NF125-SEV, NF125-HEV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SV, NF250-HV NF250-SEV, NF250-HEV NF250-SGV/LGV/HGV/RGV NF125-RV, NF250-RV	NF400-SW, NF400-SEW NF400-HEW, NF400-REW NF630-SW, NF630-SEW NF630-HEW, NF630-REW NF800-SDW, NF800-SEW NF800-HEW, NF800-REW	NF1000-SEW NF1250-SEW NF1250-SDW NF1600-SEW NF1600-SDW	NF400-SW, NF400-SEW NF400-HEW, NF400-REW NF630-SW, NF630-SEW NF630-HEW, NF630-REW NF800-SDW, NF800-SEW NF800-HEW, NF800-REW	NF1000-SEW NF1250-SEW NF1250-SDW NF1600-SEW NF1600-SDW
	Class C			NF125-CV NF250-CV	NF400-CW NF630-CW NF800-CEW	–	NF400-CW NF630-CW NF800-CEW	–
	Class U			NF125-UV NF250-UV	NF400-UEW NF800-UEW	–	NF400-UEW NF800-UEW	–
	Motor breakers			NF125-SV, NF250-SV	–	–	–	–
ELCB	Class S, H and R			NV125-SV, NV125-HV NV125-SEV, NV125-HEV NV250-SV, NV250-HV NV250-SEV, NV250-HEV	NV400-SW, NV400-SEW NV400-HEW, NV400-REW NV630-SW, NV630-SEW NV630-HEW, NF800-SEW NV800-HEW	–	NV400-SW, NV400-SEW NV400-HEW, NV400-REW NV630-SW, NV630-SEW NV630-HEW, NF800-SEW NV800-HEW (*3)	–
	Class C			NV125-CV NV250-CV	NV400-CW NV630-CW	–	NV400-CW(*3) NV630-CW	–
	Motor breakers			NV125-SV, NV250-SV	–	–	–	–
Rated operating voltage (V) (Allowable operating voltage range: 85 to 110%)				Compatible with 100 to 240 V AC and 100 to 250 V DC 24 V DC, 48 to 60 V DC (*1)	DC100-110, AC100-110 AC200-220(DC125, AC240)		DC100-110, AC100-110, AC200-220 (DC125, AC240)	
Operating current (Ams) Values in ( ): Starting current	DC	100/110V	ON	0.5 (1.5)	8	10	3.0(8.0)	5.0(13.5)
			OFF		1.0 (3.0)	1.0 (4.0)		
	AC	100/110V	ON	0.6 (3.0)	10	10	4.0(8.0)	5.0(10.0)
			OFF		1.0 (3.0)	1.0 (3.0)		
		200/220V	ON	0.5 (2.5)	8	8	2.0(4.5)	3.5(7.0)
			OFF		0.5 (1.5)	0.5 (1.5)		
Operating time	s	ON		0.05~0.1(*2)	0.05	0.07	0.3 or less (self-holding type)	
		OFF		0.6 or less (self-holding type)	3 or less (self-holding type)			
		Charge		1.2 or less (self-holding type)			–	–
Required transformer capacity VA				150	700		400	700
Endurance voltage				1500V	1500V			

Notes *1 When the rated operating voltage is 24 V DC or 48 to 60 V DC, specify the voltage. If the voltage is not specified, the circuit breaker will be manufactured for 100 to 240 V AC and 100 to 250 V DC.
*2 For 24-V DC circuit breakers, the operating time at a voltage of 100% or more is shown.
*3 Models for special voltage (125 V DC or 240 V AC) are not provided with the test button.

Remarks: 1. Flush plate type circuit breakers can be manufactured to order.
2. The models with voltage in parentheses are special voltage products.
3. For the spring charge type (1), use an ON-OFF operating switch for minute load.
4. For the spring charge type (1) The circuit breaker of 3 pole can be used TC-S, TC-L, TTC, BTC and PTC.
In case of 125A frame 4 pole can be used only TC-L.
In case of 250A frame 4 pole can be used TC-S, TC-L, TTC, BTC and PTC.
5. When the body of the spring charge type (1) breaker is an earth leakage alarm breaker, the reset button cannot be pressed. Provide such a circuit breaker with an external reset or automatic reset system (except for the electronic type).
6. When the body of the motor-drive type (2) or spring charge type (2) has internal accessories, they are normally provided with lead wire terminal blocks.
7. The types other than the spring charge type (1) do not provide an isolation function.
8. When placing an order for a CE marked product of the spring charge type (1) or spring charge type (2), specify the model name with CE.
9. The switching durability of electrically operated circuit breakers conforms to JIS.

●Electrical operation devices

The following models of Electrical Operation Devices are supplied also as separate devices. The user can install them to the circuit breaker body.
(Front connection, rear connection and plug-in types)
(When requiring a motor breaker or a CE marked product, place an order for it together with the circuit breaker body.)

Table 43

Electrically operating method	Spring charge type (1)				
Applicable models / Rated operating voltage	NF125-CV/SV/HV	NV125-CV/SV/HV	NF125-SEV/HEV/SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-CV/SV/HV/UV/SEV/HEV/SGV/LGV/HGV/RGV NF250-UV	NV250-CV/SV/HV	NV125-SEV/HEV NV250-SEV/HEV
Compactible to 100-240VAC/100-250VDC	MDSAD240-NF1SVE	MDSAD240-NV1SVE	MDSAD240-NF2SVE	MDSAD240-NV2SVE	MDSAD240-NVE2SVE
24VDC	MDSD024-NF1SVE	MDSD024-NV1SVE	MDSD024-NF2SVE	MDSD024-NV2SVE	MDSD024-NVE2SVE
48-60VDC	MDSD060-NF1SVE	MDSD060-NV1SVE	MDSD060-NF2SVE	MDSD060-NV2SVE	MDSD060-NVE2SVE

●Cautions

- All electrical operations are based on intermittent rating. Avoid operating any device continuously 10 times or more (ON and OFF operations are counted as one time).
- Operate any device at 85 to 110% of the rated operating voltage.
- The dielectric strength of electrical operation circuits is 1500 V. When performing dielectric strength test of any of these devices and other devices, if the test voltage exceeds the rated value (1500 V), disconnect the operation power supply terminal.
- When collectively operating more than one electrical operation device, isolate the devices connecting a relay to each device.
  If the control terminals are directly connected in parallel, a circuit will be formed, and the devices may not normally function.

●Automatic reset (optional)

The automatic reset type has a built-in alarm switch in the circuit breaker and is connected in such a way that the OFF operation circuit is closed when the circuit breaker trips. Therefore, when the circuit breaker trips, it is automatically reset.
However, when the circuit breaker thermally trips, it may not be automatically reset.
If an automatic reset spring charge type (1) is required, the user must wire the device in accordance with the external connection diagram shown in Fig. 1 in (3).

(2) Installation and connection (List of manufacturable)

Table 44

Frame (A) \ Installation and connection method	Front connection type	Rear connection type	Plug-in type (*1)
50~250	○	○	○ (*2)
400~800	○	○	○
1000, 1250	○	○	○
1600	○	○	–

Notes *1 For ELCB, only 3-pole circuit breakers with a frame size of 125 to 400 A can be manufactured.
*2 In the case of 4-pole 125 A frame circuit breakers and U class, the circuit breakers are supplied as special models. Consult us for details.
Remarks: 1. All models of the front connection type are provided with bar terminals (except the spring charge type (1)).
2. 2-pole circuit breakers of all models are obtained by removing the neutral pole conductors from 3-pole circuit breakers.

(3) Structure and operation

■Spring charge type (1)

●Electrical operation

- When the ON operation switch is closed, the relay will operate, the motor will be driven, the latch mechanism will be released, and the closing spring force will instantaneously turn on the circuit breaker.
- When the OFF operation switch is closed, the relay will operate, the motor will be driven, the circuit breaker will be turned off (reset), and, at the same time, the closing spring will be charged.

Note: The charge may not be completed because the circuit protective function operates.

●Manual operation

- After turning the MANUAL/AUTO selection switch on the cover upper surface to MANUAL, press the ON button, and the latch mechanism will be released, and the closing spring force will instantaneously turn on the circuit breaker.
- After turning the MANUAL/AUTO selection switch on the cover upper surface to MANUAL, draw out the manual handle, and move it upward and downward about 10 to 14 times. Then, the circuit breaker will be turned off (reset), and, at the same time, the closing spring will be charged.
  Although the circuit breaker can be turned off even if the switch is not turned to MANUAL, the selection switch should be set to MANUAL because remote operation may be accepted.
- After turning the changeover switch to MANUAL, draw out the OFF lock plate, and lock the circuit breaker in the OFF state with padlocks (to be prepared by the user). Up to three padlocks can be fitted.
  ϕ5 to ϕ8 padlocks can be fitted.

Note: After the completion of manual operation (on-site operation), return the selection switch to AUTO without fail. If it is not returned, electrical operation (remote operation) cannot be performed.

●Display of tripping state

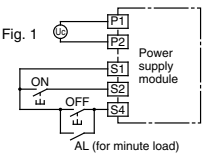
When the circuit breaker trips in the ON state, the tripping state is displayed. When it trips in the OFF state, the OFF state is kept displayed.
Note: When it trips in the OFF state, signals from AL will not be output.

●Cautions for use

① To the ON or OFF operation switch (to be prepared by the user), current only of 24 V DC and 15 to 30 mA flows. Use a switch for minute load.
② Operate the operation switch for 0.1 s or more to turn on and for 20 ms or more to turn off. If it is operated for less than the time, it may not function.
The wire to the operation switch shall be less than 100 m.
③ The power supply module has a built-in switching power supply. Therefore, it may interfere with communication devices near the module. In such a case, install a noise filter on the input side.
④ For the automatic reset type, purchase a circuit breaker with alarm switch (for minute load), and connect the signal circuit (among the terminal numbers S1, S2 and S4) as shown in Fig. 1.

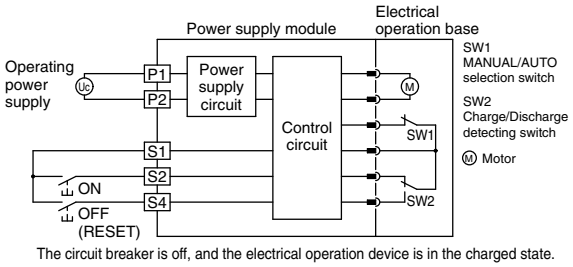
If the circuit breaker in the OFF state is tripped by UVT-N or the like, it cannot be automatically reset. To reset it, it is necessary to turn it on under no current. After this operation, it will be automatically reset.

Fig. 1



AL "a" (alarm switch for minute load)

Operation circuit



The circuit breaker is off, and the electrical operation device is in the charged state.

Symbol	Interpretation of symbol
SW1	MANUAL/AUTO selection switch
SW2	Limit switch (For spring condition detection charge/discharge)
Ⓜ	Motor

Note *1 When power is applied, inrush current (capacitor charging current) of 60 A flows to the breaker and fuse installed on the power supply circuit for 1 ms or so. When selecting the breaker and fuse, make sure that they will not cause problems, such as blowout and malfunction.

■Motor-drive type (2)

●Electrical operation

Forward and reverse motor rotation is changed by ball screw to switch the breaker ON and OFF (reset).

●Manual operation

The manual operation handle can be used to switch the breaker ON and OFF directly.

●Cautions for use

①In the case of a circuit breaker with UVT, if the circuit breaker trips owing to the operation of UVT, the procedure for re-closing the circuit breaker varies depending on the condition of the electrical operation device before the circuit breaker trips.
- Tripping in ON state: Reset (OFF). → Turn on.
- Tripping in OFF state: Turn on (idle tripping). → Reset (OFF). → Turn on.

(If the circuit breaker cannot be turned on (idle tripping), reset (OFF) it, and turn on.)
- When an automatic reset system is configured on a non-reset type circuit breaker with UVT, if UVT is set to the no-voltage state, the operations to turn off (reset), trip, turn off (reset) and trip are repeated.

Therefore, configure the circuit in such a way that power is disconnected from the electrical operation device before the circuit breaker is tripped by the non-reset type UVT.

②Current of about 0.2 A will flow to the ON-OFF switch. Use an appropriate switch.

③Do not apply ON and OFF operation signals continuously.
An interval of 0.5 sec or more is necessary between ON and OFF signals.

④In the case of the automatic reset type device, it will perform the reset operation with an interval of 0.5 sec after NFB performs the tripping action.

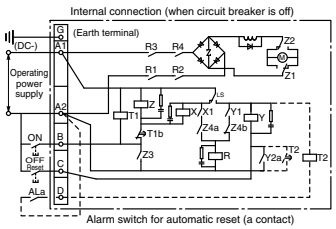
⑤The electrical operation device has a built-in pumping preventing circuit. Therefore, it can operate to turn off the circuit breaker while the ON operation switch is held in the closing state, but it cannot turn on continuously after turning off. To turn on, once turn off the ON operation switch, and turn on the switch. Do not apply the ON operation signal continuously.

⑥The manual operating handle moves at a high speed during electrical operation. Pay attention to the handle. Keep the operation circuit power supply off during manual operation.

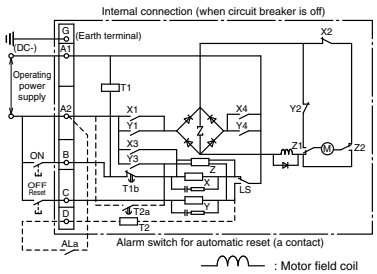
⑦In the manual operation, surely turn the manual operating handle to the position indicated on the nameplate.

●Operation circuit ···· For the automatic reset type, the connections indicated with the dashed lines are added.

●Operation circuit 1
[NF400-CW~NF800-UEW
NV400-CW~NV800-HEW]



●Operation circuit 2
[NF1000-SEW~NF1600-SEW]



Ⓜ : Motor
X : Relay for ON operation
Y : Relay for OFF operation
R : Motor driving relay
Z : Polarity switching relay (Operation circuit 1 or 2)
(R1)~(R4): Relay switches

Z, K: Exciting coil of keep relay (Operation circuit 3)
LS, LS1, LS2: Limit switches
X1~X4, Y1~Y4, Y2a, Z4a, Z4b, Z1, Z2, Z3, K1, T1b, T2a: Relay switches
T_1 : Pumping preventing timer
T_2 : Timer for automatic reset

: Motor field coil
: Surge absorbing circuit
: Surge absorber

■Spring charge type (2)

●Electrical operation

When the ON operation switch is closed, the closing coil will be excited to release the latch mechanism, and the closing spring force will instantaneously turn on the circuit breaker. When the OFF operation switch is closed, the relay will operate to start the motor, turn off (reset) the circuit breaker and, at the same time, charge the closing spring.

●Manual operation

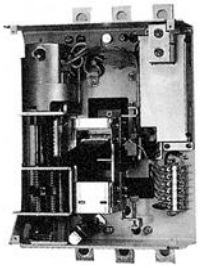
- Press the ON button, and the latch mechanism will be released, and the closing spring force will instantaneously turn on the circuit breaker.
- Turning off (resetting)
  Push the leaf spring, bring out the manual handle, and move the handle upward and downward more than ten times. Then, the circuit breaker will be turned off (reset), and, at the same time, the closing spring will be charged.

●Cautions for use

①In Before installing or removing the electrical operation device to or from the circuit breaker, trip the circuit breaker, and discharge the electrical operation device. After the device is installed to the circuit breaker, the device will not trip the circuit breaker in the OFF state even if the trip button is pressed. This is not a trouble. The electrical operation device takes 3 seconds to turn off the circuit breaker. To open the circuit immediately by remote operation, use a circuit breaker with SHT or UVT.
- The device has a built-in pumping preventing relay.

②Current of about 9 A and 0.2 A will flow to the ON and OFF switches, respectively. Use appropriate switches.

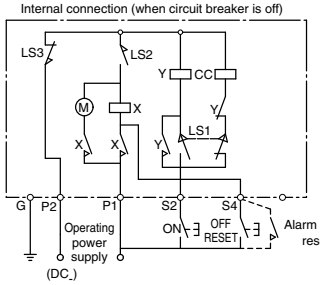
Internal structure of spring charge type



Internal structure of motor-drive type

●Operation circuit

For the automatic reset type, the connections indicated with the dashed lines are added.

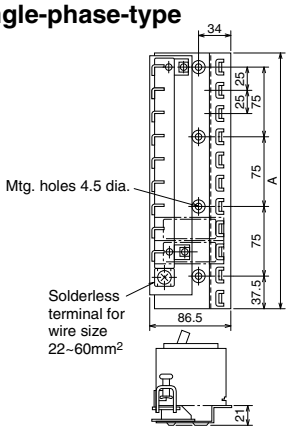


CC : Coil for making
Y : Relay for pumping prevention
X : Relay for self-sustaining on OFF side
LS1: Limit switch interlocking with cam
LS2: Limit switch interlocking with cam
LS3: Limit switch interlocking with OFF lock plate
M : Motor

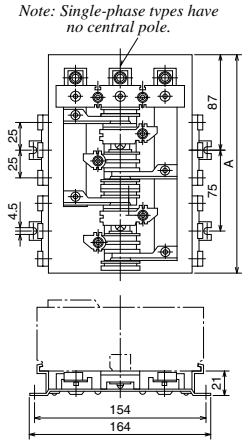
Distribution Board Mounting Parts, Lock Covers and Handle Caps

●BPA-type mounting base (for BH-P)

Single-phase-type



Note: Single-phase types have no central pole.

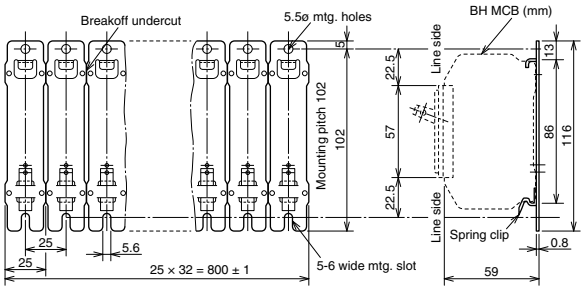


Solderless terminal for wire size :
125A 14~50mm²
250A 22~125mm²

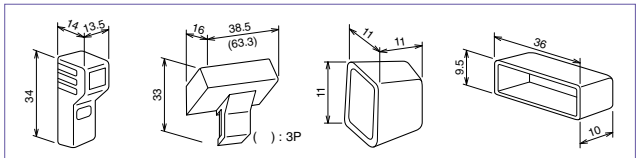
Three-phase-type

Max. no. of ways	1ph, 2w	1ph, 3w		3ph, 4w		Neutral terminal
	Main : 125A	Main : 125A	Main : 250A	Main : 125A	Main : 250A	
6	BPA-1106	BPA-2106	–	BPA-3106	–	NT-06
9	BPA-1109	–	–	–	–	–
12	BPA-1112	BPA-2112	–	BPA-3112	–	NT-12
15	BPA-1115	–	–	–	–	–
18	BPA-1118	BPA-2118	BPA-2218	BPA-3118	BPA-3218	NT-18
24	–	BPA-2124	BPA-2224	BPA-3124	BPA-3224	NT-24
30	–	–	BPA-2230	–	BPA-3230	NT-30
36	–	–	BPA-2236	–	BPA-3236	NT-36
42					BPA-3242	NT-42

●Mounting plate (for BH)



One mounting plate has 32 circuits.
One package includes 10 mounting plates (320 circuits).



a) Lock cover for 1-pole units
b) Lock cover for 2-pole, 3-pole units
c) Handle cap for 1-pole units
d) Handle cap for 2-pole units

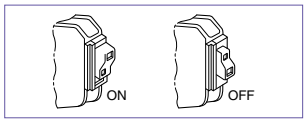
Outlines and dimensions (mm)

●Lock covers and handle caps (for 1-pole, 2-pole and 3-pole types)

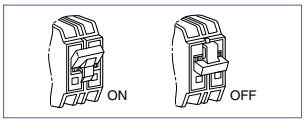
Many panelboards include some restricted-operation circuits, which must either normally remain on, such as all-night lighting or alarms, or must remain off, such as spare circuits, or circuits used in repair or construction work. Breakers for such circuits can be locked by simply installing a lock cover on the handle.

Colors available

Fig. ref.	Item	Poles	Colors		
			Red	Yellow	Green
a)	Lock cover	1	LCBH1R	LCVH1Y	–
b)		2	LCBH2R	LCBH2Y	–
b)		3	LCBH3R	LCBH3Y	–
c)	Cap	1	HC1R	HC1Y	HC1G
d)		2	HC2R	HC2Y	HC2G



Lock cover in place (1-pole unit)



Lock cover in place (2-pole unit)

IEC 35-mm Rail Mounting Adapters

Table 45

Type name	Number of poles of circuit breaker	Applicable model		Fig.
		MCCB	ELCB	
DIN-03CS	2, 3	NF30-CS	–	Fig. 1
(Note1) DIN-05SV	2, 3	NF32-SV NF63-CV/SV/HV	NV32-SV NV63-CV/SV/HV	Fig. 2

Remark: 1. Place an order in units of 10 pieces.

●External dimension

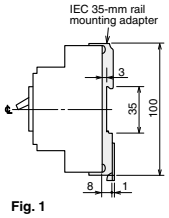


Fig. 1

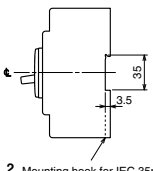


Fig. 2 Mounting hook for IEC 35mm rail [DIN-05SV]

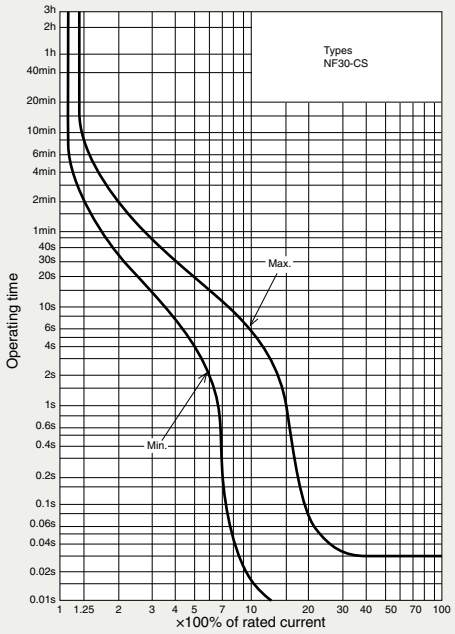
Molded Case Circuit Breakers

NF30-CS

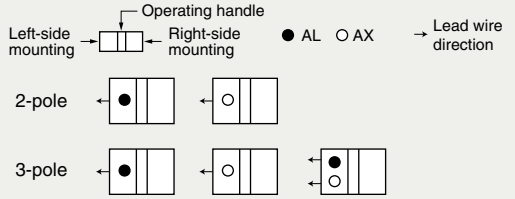
NF30-CS

Model				NF30-CS	
Rated current In (A)				3, 5, 10, 15, 20, 30	
Number of poles				2	3
Rated insulation voltage Ui (V)				500	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–	
			500V	–	
			415V	1.5/1.5	
			380V	1.5/1.5	
			240V	2.5/2	
Standard Attached Parts (Front connection)				Mounting screw: M4×0.7×20 (2pcs)	

Operating Characteristics

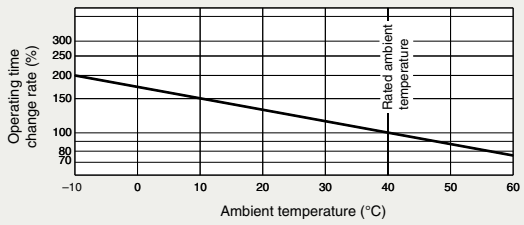


Internal Accessories



Remark: 1. Standard lead wire is drawn from side. However, lead wire drawn by load can be produced upon request.

Temperature Characteristics Curve



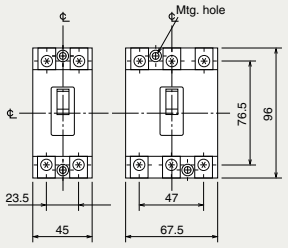
External Accessories

Accessories			Type name
Terminal cover	Small	(TC-S)	TCS-03CS3W (*1)
	Large	(TC-L)	TCL-03CS3W (*1)
	Rear	(BTC)	BTC-03CS3W (*1)
	Skeleton	(TTC)	TTC-03CS (*1)
Handle lock		(HL)	HL-05FH
Lock cover		(LC)	LC03CS
IEC 35mm rail mounting adapter		(DIN)	DIN-03CS

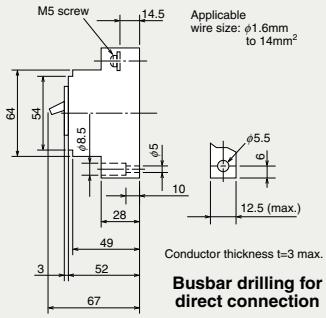
Note *1 The designation depends on the number of poles.

Outline Drawing

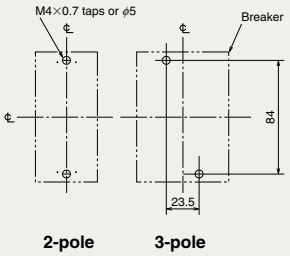
Front connection



2-pole 3-pole



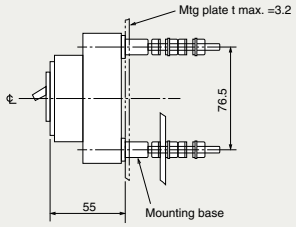
Busbar drilling for direct connection

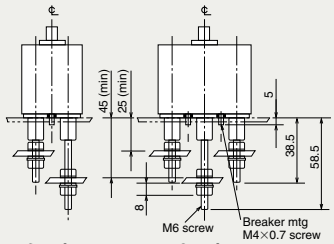


2-pole 3-pole

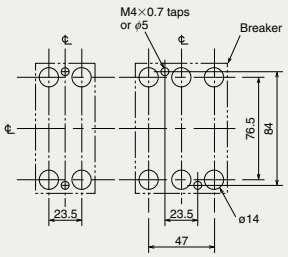
Drilling plan

Rear connection



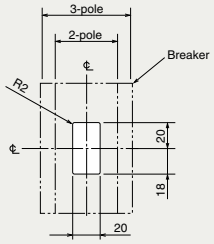


2-pole 3-pole



2-pole 3-pole

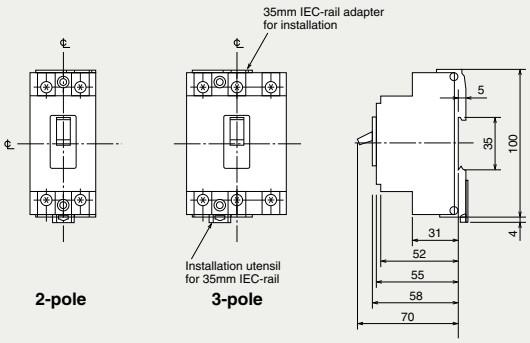
Drilling plan



Front-plate cutout

1mm clearance on each side of handle

IEC Rail Mounting Adapter



2-pole 3-pole

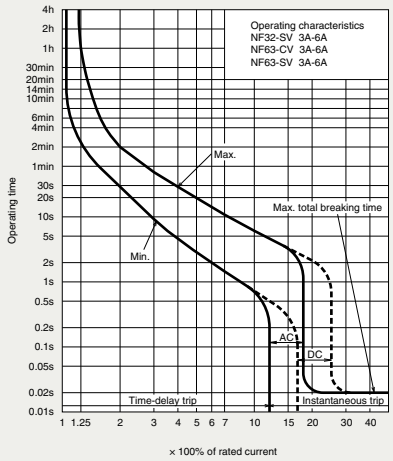
NF32-SV NF63-CV NF63-SV NF63-HV

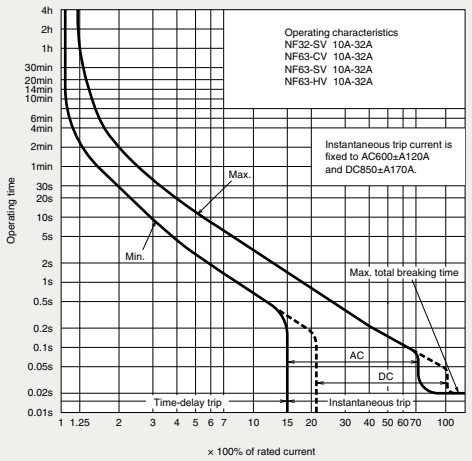
NF63-SV

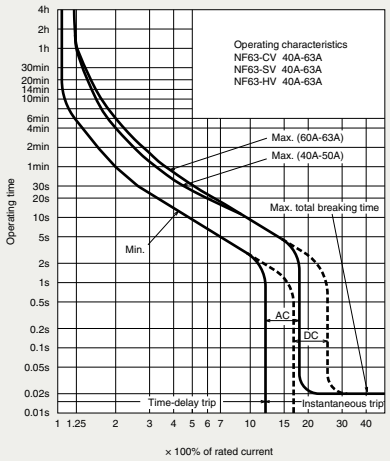
Model				NF32-SV	NF63-CV	NF63-SV	NF63-HV
Rated current In (A)				3 4 (5) 6 10 (15) 16 20 25 (30) 32	3 4 (5) 6 10 (15) 16 20 25 (30) 32 40 50 (60) 63	3 4 (5) 6 10 (15) 16 20 25 (30) 32 40 50 (60) 63	10 (15) 16 20 25 (30) 32 40 50 (60) 63
Number of poles				2 3	2 3	2 3 4	2 3 4
Rated insulation voltage Ui (V)				600	600	600	690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–	–	–	2.5/2.5
			500V	2.5/2.5	2.5/2.5	7.5/7.5	7.5/7.5
			440V	2.5/2.5	2.5/2.5	7.5/7.5	10/8
			415V	2.5/2.5	2.5/2.5	7.5/7.5	10/8
			400V	5/5	5/5	7.5/7.5	10/8
			380V	5/5	5/5	7.5/7.5	10/8
			230V	7.5/7.5	7.5/7.5	15/15	25/19
		DC	250V (*1)	2.5/2.5	2.5/2.5	7.5/7.5	7.5/7.5
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Insulation barrier: (2P: 1pc, 3P: 2pcs, 4P: 3pcs) (*2)			

Notes *1 Use two poles for three- and four-pole products. Not available for use with connection as shown at the bottom of page 672.
*2 Supplied with NF63-SV and NF63-HV.

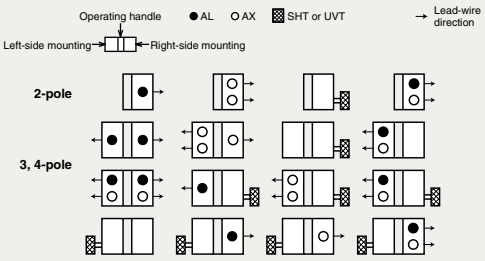
Operating Characteristics



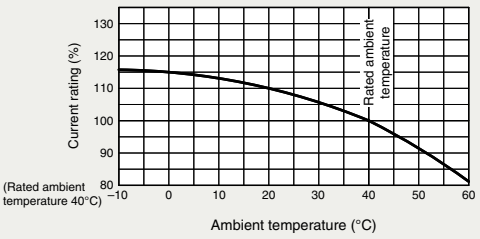




Internal Accessories



Temperature Compensation Curve



External Accessories

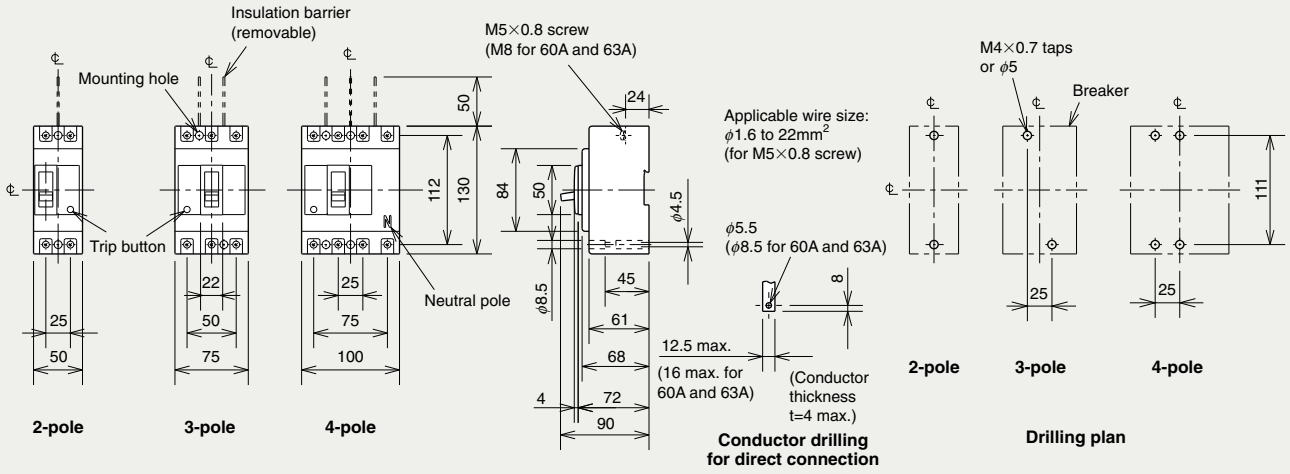
Accessories			Type name
Operating handle	F	2P	F-05SV2
		3, 4P	F-05SV
	V	2P	V-05SV2
		3, 4P	V-05SV
Handle lock device	LC		LC-05SV
	HL (*1)		HLF-05SV
			HLN-05SV
	HL-S		HLS-05SV

Note *1 HLF types are used for OFF lock and HLN types for ON lock.

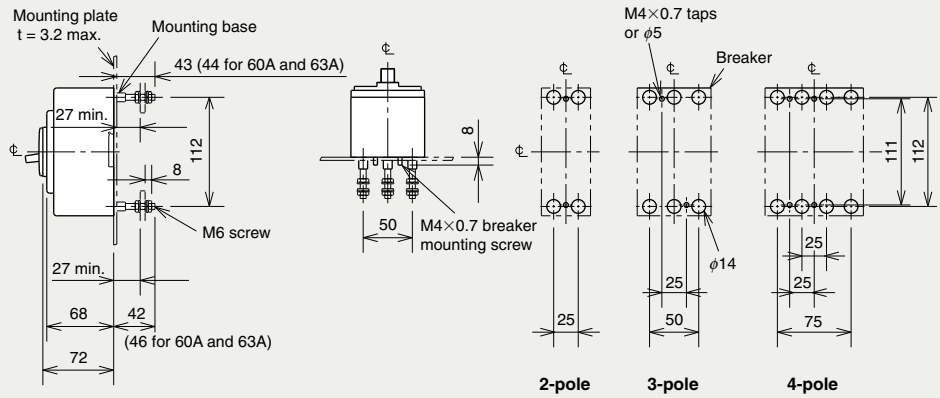
Accessories				Type name
Mechanical interlock		MI	2, 3P	MI-05SV3
			4P	MI-05SV4
Terminal cover	Small	TC-S	2P	TCS-05SV2
			3P	TCS-05SV3
	Large	TC-L	2P	TCL-05SV2
				TCL-05SV2L
			3P	TCL-05SV3
				TCL-05SV3L
			4P	TCL-05SV4
	Skeleton	TTC	2P	TTC-05SV2
			3P	TTC-05SV3
	Rear	BTC	2P	BTC-05SV2
			3P	BTC-05SV3
	Plug-in	PTC	2P	PTC-05SV2
			3P	PTC-05SV3
IEC 35mm rail mounting adapters				DIN-05SV

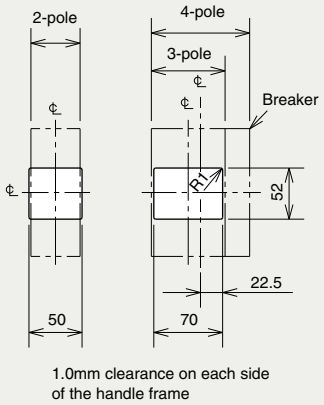
Outline Drawing

Front connection

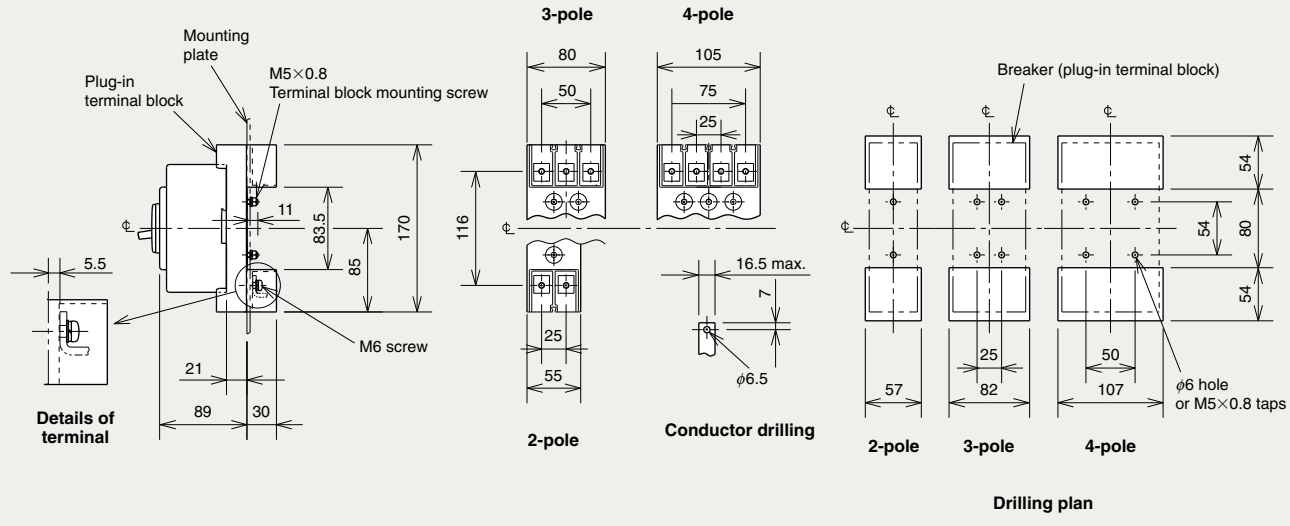


Rear connection





Plug-in



Remark: 1. Only 2-pole and 3-pole models are available for NF32-SV and NF63-CV.

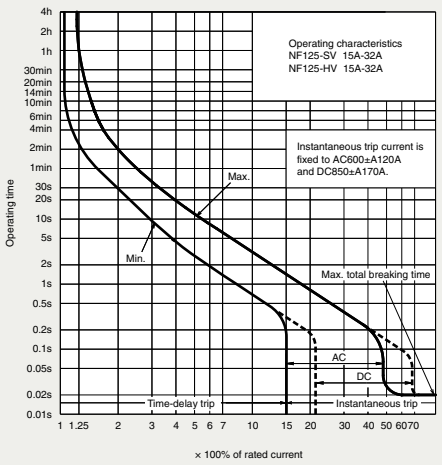
NF125-CV NF125-SV NF125-HV

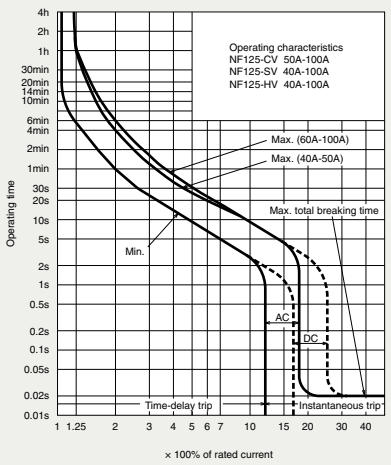
NF125-SV

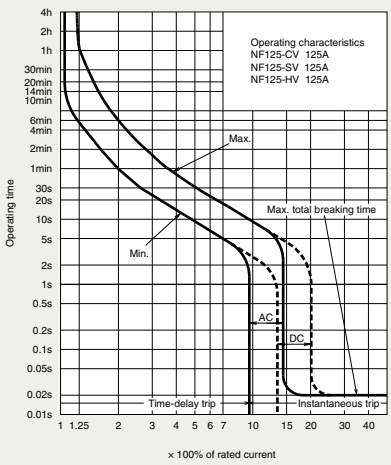
Model				NF125-CV	NF125-SV	NF125-HV
Rated current In (A)				50 (60) 63 (75) 80 100 125	(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100 125	(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100 125
Number of poles				2 3	2 3 4	2 3 4
Rated insulation voltage Ui (V)				600	690	690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–	8/8	10/8
			500V	7.5/4	18/18	30/23
			440V	10/5	25/25	50/38
			415V	10/5	30/30	50/38
			400V	10/5	30/30	50/38
			380V	10/5	30/30	50/38
			230V	30/15	50/50	100/75
		DC	250V (*1)	7.5/4	40/40	–
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) (*2) Insulation barrier: (2P: 1pc, 3P: 2pcs, 4P: 4pcs)		

Notes *1 Use two poles for three- and four-pole products.
If wired as shown at the bottom of page 672, three and four poles can be used for up to 400 and 500VDC, respectively.
*2 Supplied with NF125-SV and NF125-HV.

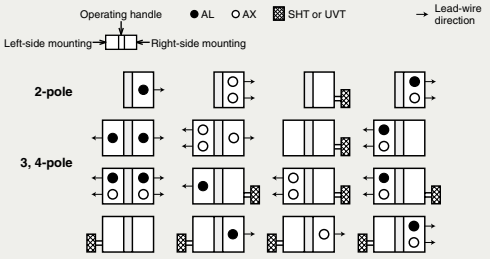
Operating Characteristics



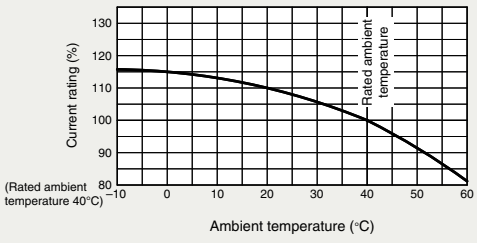




Internal Accessories



Temperature Compensation Curve



External Accessories

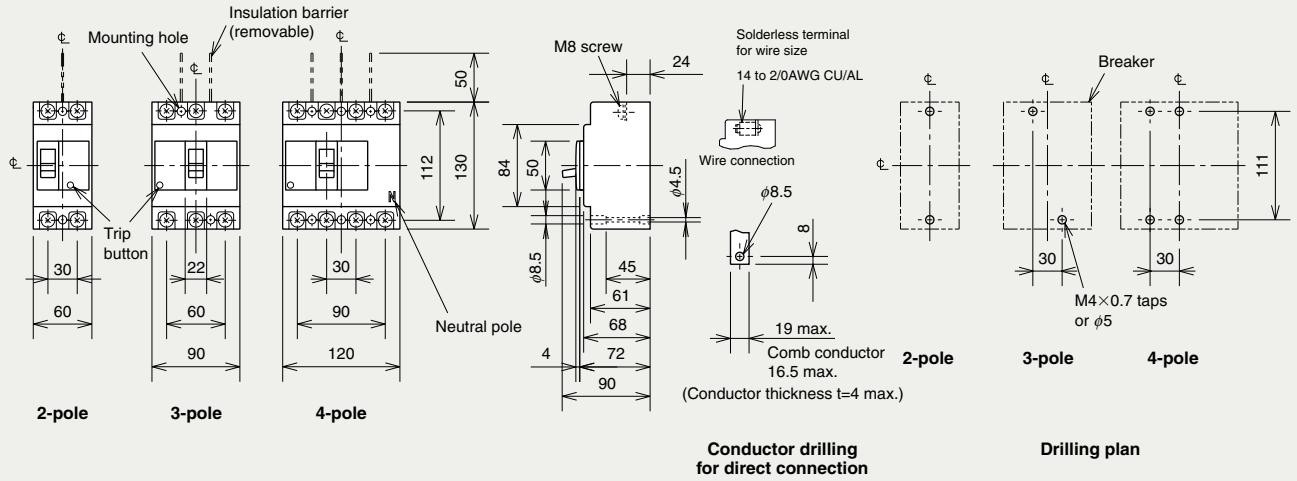
Accessories			Type name
Operating handle	F	2P	F-1SV2
		3, 4P	F-1SV
	V	2P	V-1SV2
		3, 4P	V-1SV
Handle lock device	LC		LC-05SV
	HL (*1)		HLF-05SV
			HLN-05SV
	HL-S		HLS-05SV

Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

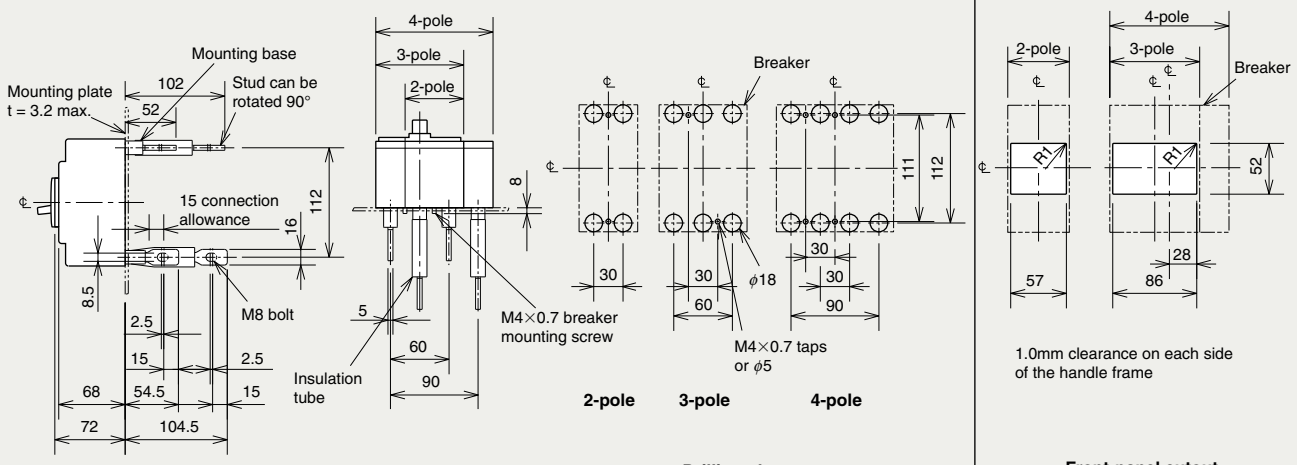
Accessories				Type name
Mechanical interlock		MI	2, 3P	MI-05SV3
			4P	MI-05SV4
Terminal cover	Small	TC-S	2P	TCS-1SV2
			3P	TCS-1SV3
	Large	TC-L	2P	TCL-1SV2
			3P	TCL-1SV3
			4P	TCL-1SV4
	Skeleton	TTC	2P	TTC-1SV2
			3P	TTC-1SV3
	Rear	BTC	2P	BTC-1SV2
			3P	BTC-1SV3
	Plug-in	PTC	2P	PTC-1SV2
			3P	PTC-1SV3
Electrical operation device				(*2)

Outline Drawing

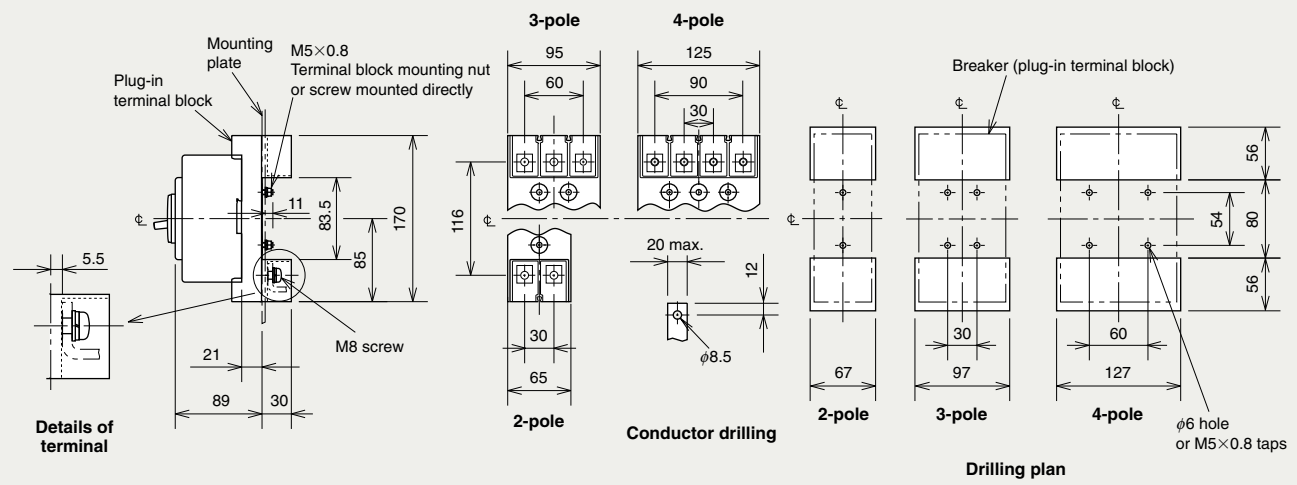
Front connection



Rear connection



Plug-in



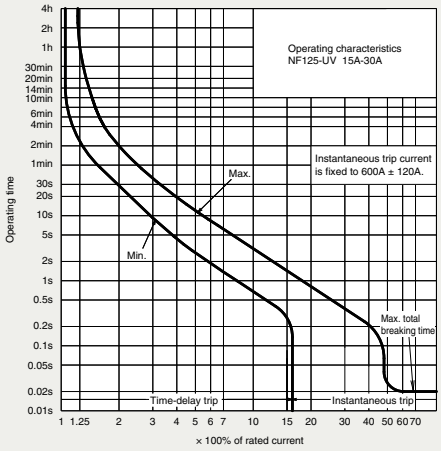
Remarks: 1. The 2-pole models of NF125-HV are 3-pole models with the central pole removed.
2. Only 2-and 3-pole models are available for NF125-CV.

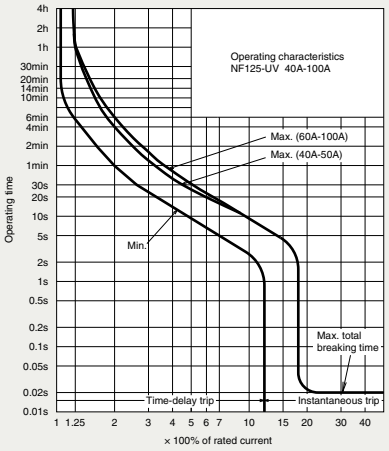
NF125-UV

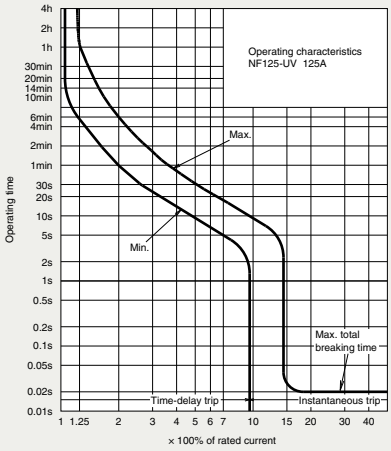
NF125-UV

Model				NF125-UV
Rated current In (A)				15 20 30 40 50 60 75 100 125
Number of poles				2 / 3 / 4
Rated insulation voltage Ui (V)				690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	10/10
			500V	200/200
			440V	200/200
			415V	200/200
			400V	200/200
			380V	200/200
			230V	200/200
		DC	250V	–
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) M4×0.7×73 (2 and 3P: 2pcs)

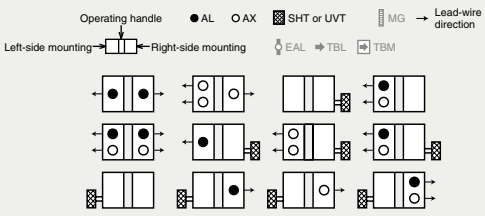
Operating Characteristics



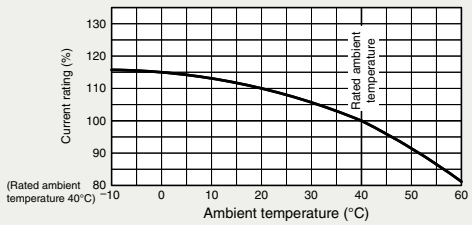




Internal Accessories



Temperature Compensation Curve



External Accessories

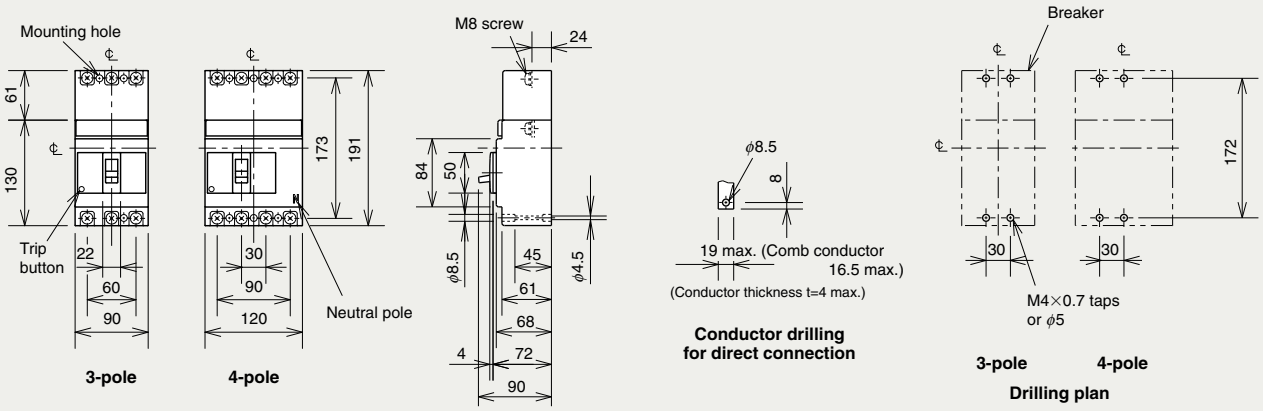
Accessories		Type name
Operating handle	F	F-1UV
	V	V-1UV
Lock cover	LC	LC-05SV
Handle lock device	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-05SV

Accessories				Type name
Mechanical interlock		MI	2, 3P	MI-05SV3
			4P	MI-05SV4
Terminal cover	Small	TC-S	3P	TCS-1SV3
	Large	TC-L	3P	TCL-1SV3
			4P	TCL-1SV4
	Skeleton	TTC	3P	TTC-1SV3
	Rear	BTC	3P	BTC-1SV3
	Plug-in	PTC	3P	PTC-1SV3
Electrical operation device				(*2)

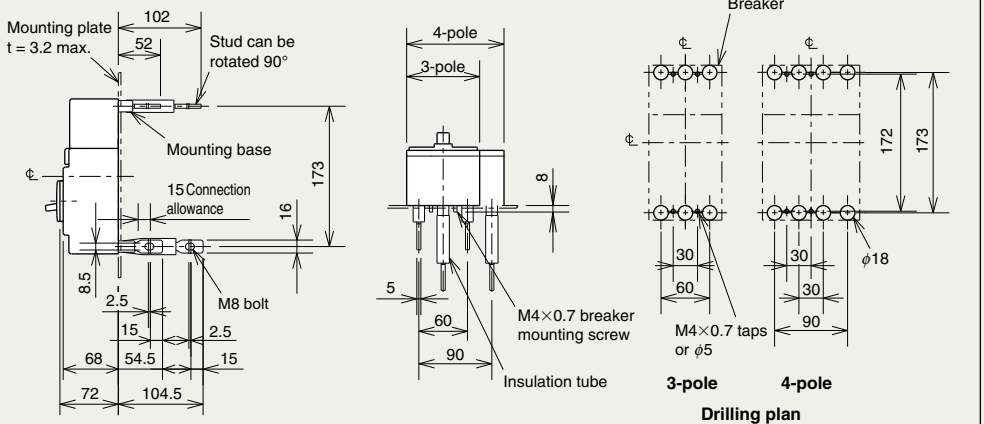
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

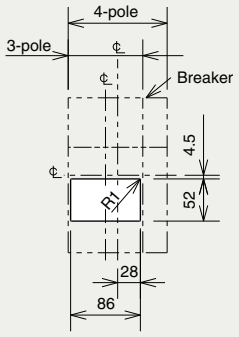
Outline Drawing

Front connection

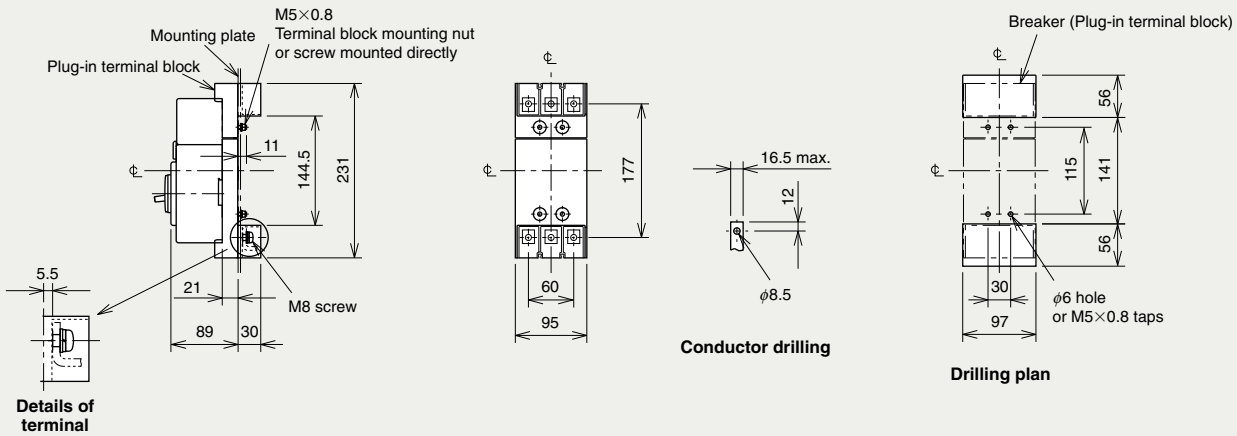


Rear connection





Plug-in



Remark: 1. 2-pole models are 3-pole models with the central pole removed.

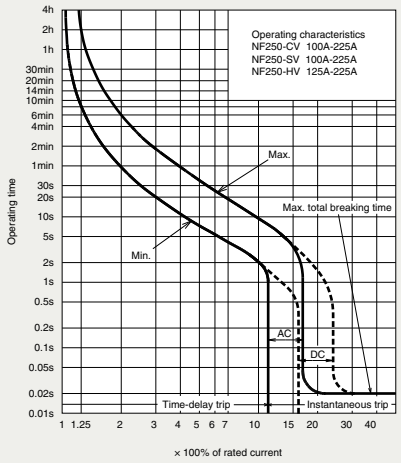
NF250-CV NF250-SV NF250-HV

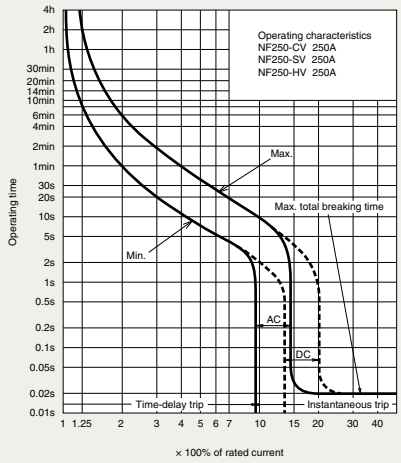
NF250-SV

Model				NF250-CV	NF250-SV	NF250-HV
Rated current In (A)				(*1) (100) 125 150 175 200 225 250	(*1) (100) 125 150 160 175 200 225 250	125 150 160 175 200 225 250
Number of poles				2 3	2 3 4	2 3 4
Rated insulation voltage Ui (V)				600	690	690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–	8/8	10/8
			500V	10/8	30/30	50/38
			440V	15/12	36/36	65/65
			415V	25/19	36/36	70/70
			400V	25/19	36/36	75/75
			380V	25/19	36/36	75/75
			230V	36/27	85/85	100/100
		DC (*1)	250V	15/12	20/20 (300V)	40/40 (300V)
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Insulation barrier: (2P: 2pcs, 3P: 4pcs, 4P: 6pcs)		

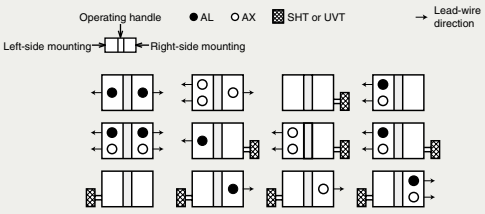
Note *1 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown at the bottom of page 672, three-pole NF250-CV can be used for up to 400VDC, three-pole NF250-SV and NF250-HV up to 500VDC and four-pole products up to 600VDC.

Operating Characteristics

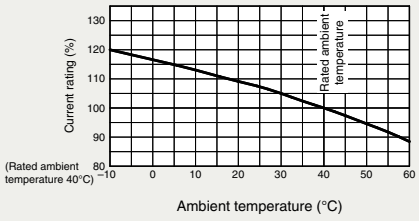




Internal Accessories



Temperature Compensation Curve



External Accessories

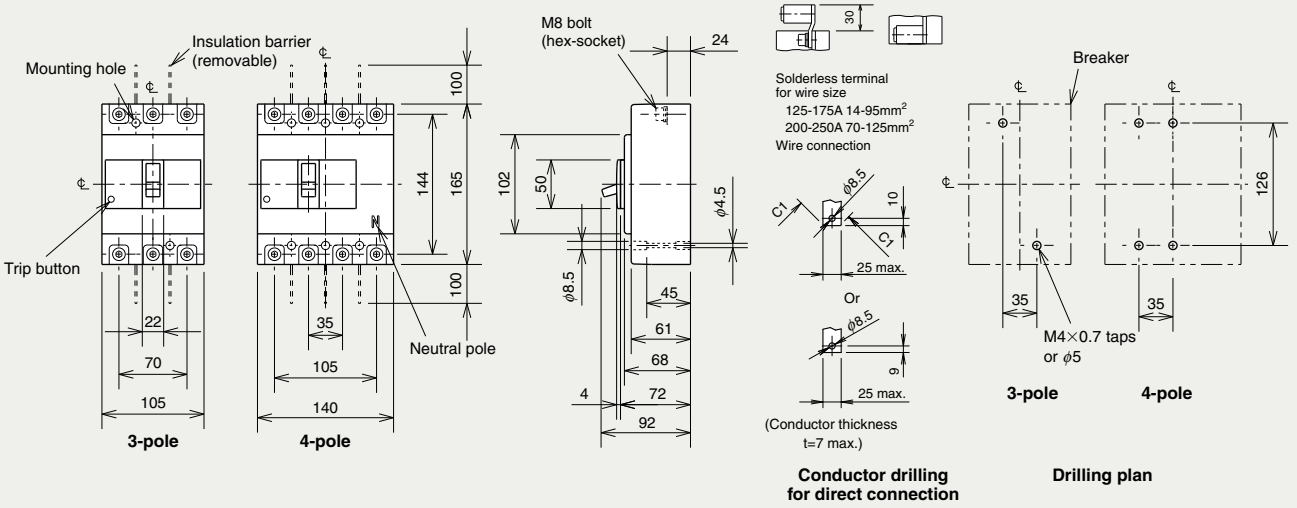
Accessories		Type name
Operating handle	F	F-2SV
	V	V-2SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-2SV

Accessories				Type name
Mechanical interlock		MI	2, 3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	2, 3P	TCS-2SV3
	Large	TC-L	2, 3P	TCL-2SV3
				TCL-2SV3L
			4P	TCL-2SV4
	Skeleton	TTC	2, 3P	TTC-2SV3
	Rear	BTC	2, 3P	BTC-2SV3
	Plug-in	PTC	2, 3P	PTC-2SV3
Electrical operation device				(*2)

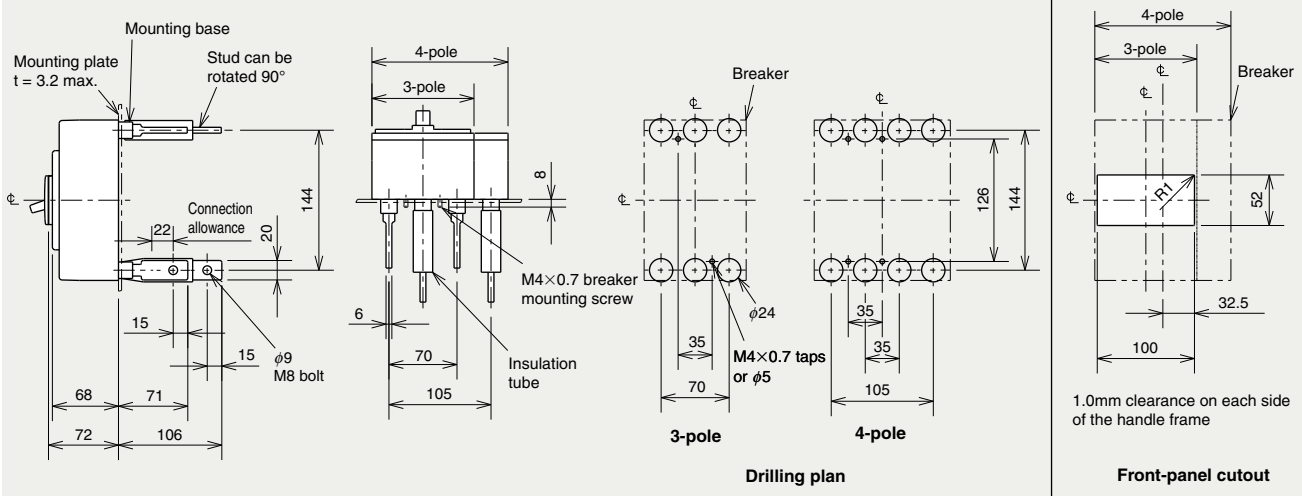
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

Outline Drawing

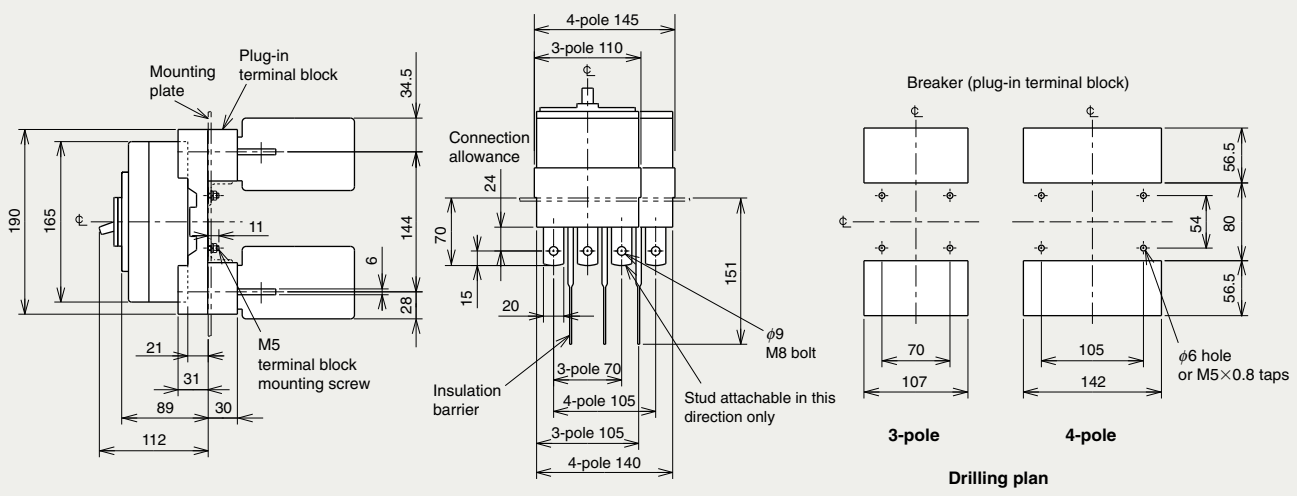
Front connection



Rear connection



Plug-in



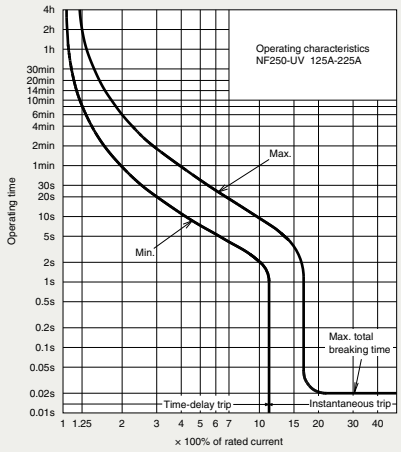
Remarks: 1. 2-pole models are 3-pole models with the central pole removed.
2. Only 2-pole and 3-pole models are available for NF250-CV.

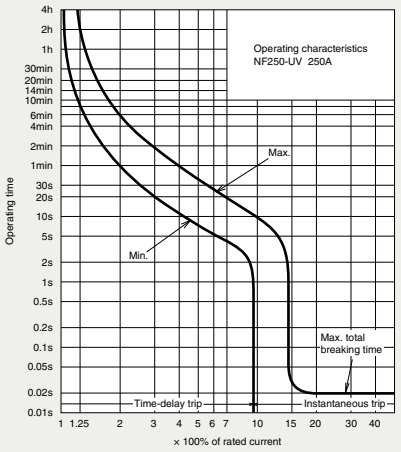
NF250-UV

NF250-UV

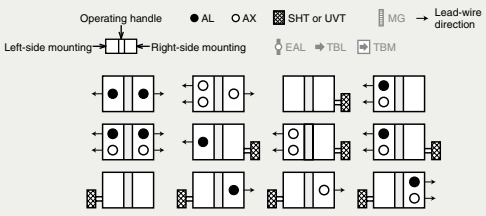
Model				NF250-UV		
Rated current In (A)				125 150 175 200 225 250		
Number of poles				2	3	4
Rated insulation voltage Ui (V)				690		
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	15/15		
			500V	200/200		
			440V	200/200		
			415V	200/200		
			400V	200/200		
			380V	200/200		
			230V	200/200		
		DC	250V	–		
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Mounting screw: M4×0.7×73 (2 and 3P: 2pcs) Insulation barrier: (2P: 2pcs, 3P: 4pcs, 4P: 6pcs)		

Operating Characteristics

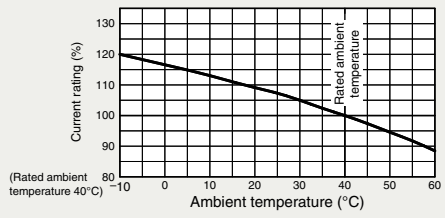




Internal Accessories



Temperature Compensation Curve



External Accessories

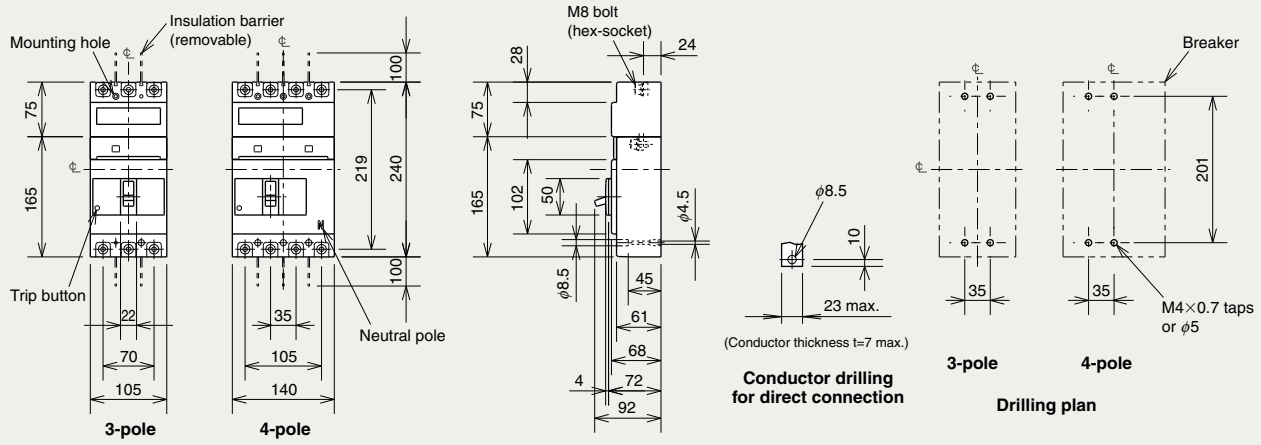
Accessories		Type name
Operating handle	F	F-2UV
	V	V-2UV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-2SV

Accessories				Type name
Mechanical interlock		MI	2, 3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	2, 3P	TCS-2SV3
	Large	TC-L	2, 3P	TCL-2SV3
				TCL-2SV3L
			4P	TCL-2SV4
	Skeleton	TTC	2, 3P	TTC-2SV3
	Rear	BTC	2, 3P	BTC-2SV3
	Plug-in	PTC	2, 3P	PTC-2SV3
Electrical operation device				(*2)

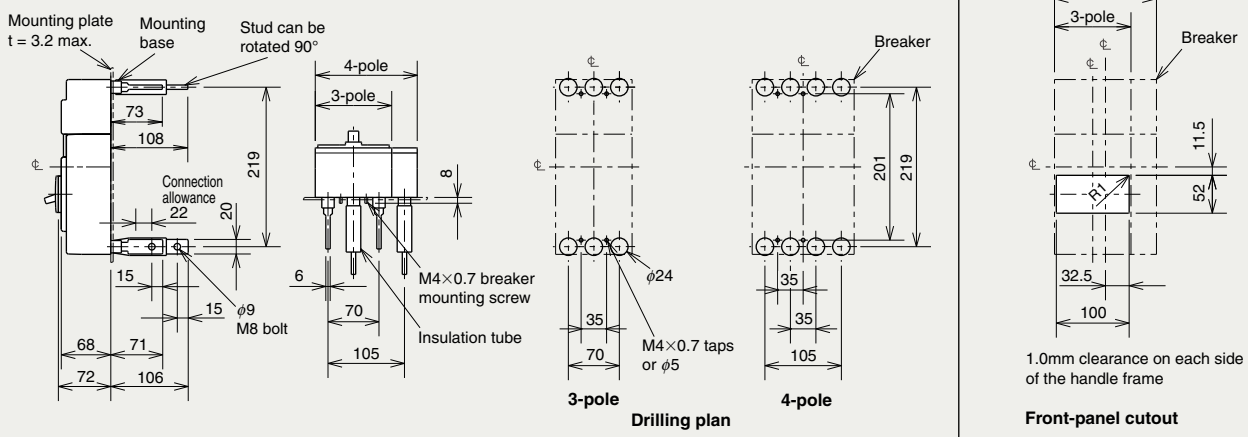
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

Outline Drawing

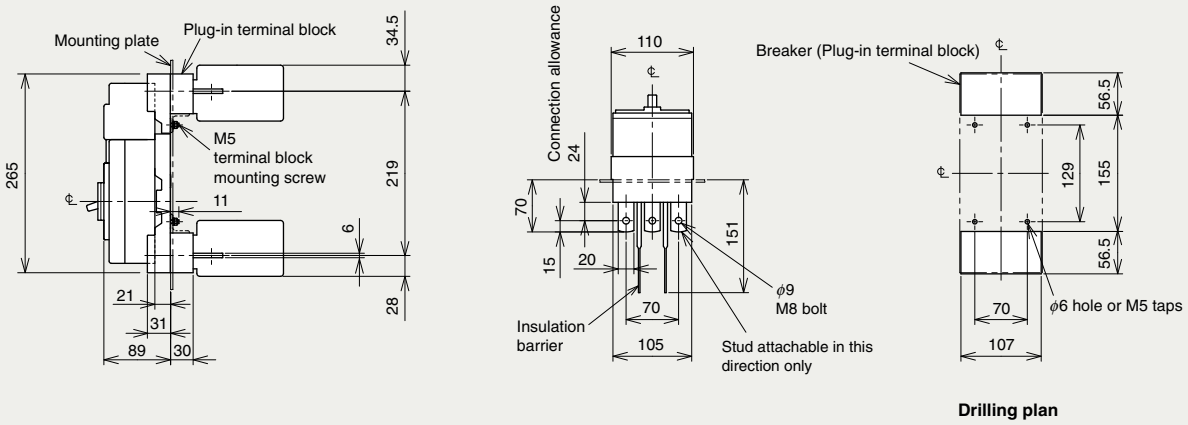
Front connection



Rear connection



Plug-in



Remark: 1. 2-pole models are 3-pole models with the central pole removed.

NF125-SGV NF160-SGV NF250-SGV NF125-LGV NF160-LGV NF250-LGV NF125-HGV NF160-HGV NF250-HGV NF125-RGV NF250-RGV

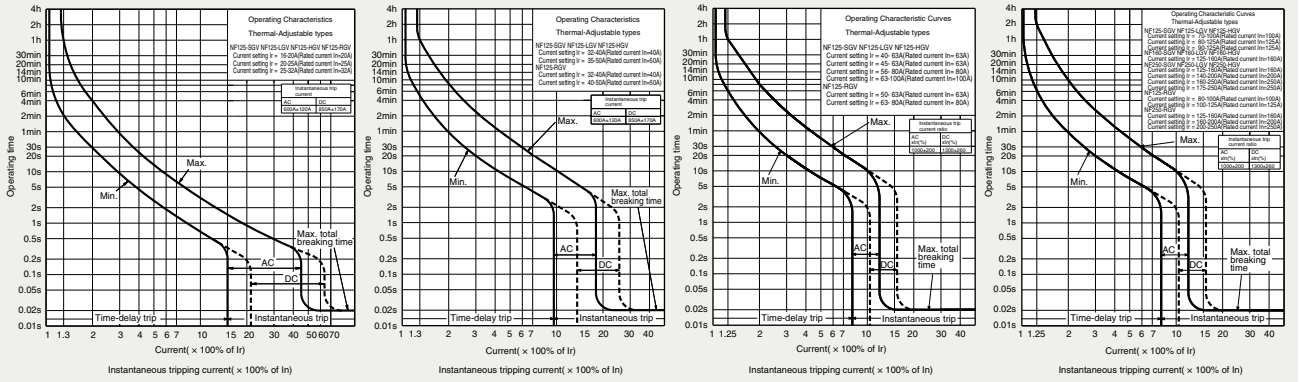
NF250-SGV

Model				NF125-SGV			NF160-SGV			NF250-SGV			NF125-LGV			NF160-LGV			NF250-LGV		
Rated current In (A)				16-20, 20-25, 25-32 32-40, 35-50, 45-63 56-80, 70-100, 90-125			125-160			125-160 140-200 175-250			16-20, 20-25, 25-32 32-40, 35-50, 45-63 56-80, 70-100, 90-125			125-160			125-160 140-200 175-250		
Number of poles				2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
Rated insulation voltage Ui (V)				690			690			690			690			690			690		
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	8/8			8/8			8/8			8/8			8/8			8/8		
			500V	30/30			30/30			30/30			36/36			36/36			36/36		
			440V	36/36			36/36			36/36			50/50			50/50			50/50		
			415V	36/36			36/36			36/36			50/50			50/50			50/50		
			400V	36/36			36/36			36/36			50/50			50/50			50/50		
			380V	36/36			36/36			36/36			50/50			50/50			50/50		
			230V	85/85			85/85			85/85			90/90			90/90			90/90		
			200V	85/85			85/85			85/85			90/90			90/90			90/90		
		DC (*1)	300V	20/20			20/20			20/20			20/20			20/20			20/20		
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Insulation barrier: (2P: 2pcs, 3P: 4pcs, 4P: 6pcs)																	

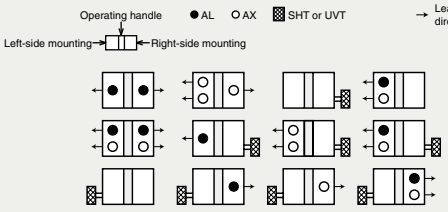
Model				NF125-HGV			NF160-HGV			NF250-HGV			NF125-RGV		NF250-RGV	
Rated current In (A)				16-20, 20-25, 25-32 32-40, 35-50, 45-63 56-80, 70-100, 90-125			125-160			125-160 140-200 175-250			16-20, 20-25, 25-32 32-40, 40-50, 50-63 63-80, 80-100, 100-125		125-160 160-200 200-250	
Number of poles				2	3	4	2	3	4	2	3	4	2	3	2	3
Rated insulation voltage Ui (V)				690			690			690			690		690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	10/8			10/8			10/8			–		–	
			500V	50/38			50/38			50/38			–		–	
			440V	65/65			65/65			65/65			125/125		125/125	
			415V	70/70			70/70			70/70			150/150		150/150	
			400V	75/75			75/75			75/75			150/150		150/150	
			380V	75/75			75/75			75/75			150/150		150/150	
			230V	100/100			100/100			100/100			150/150		150/150	
			200V	100/100			100/100			100/100			150/150		150/150	
		DC (*1)	300V	40/40			40/40			40/40			–		–	
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Insulation barrier: (2P: 2pcs, 3P: 4pcs, 4P: 6pcs)												

Note *1 When wired as shown at the bottom of page 672, three-pole models can be used for up to 500VDC, and four-pole models for up to 600VDC.

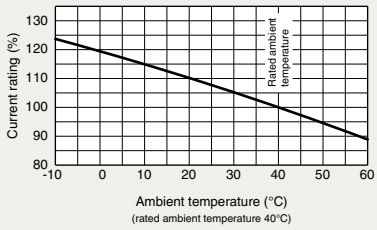
Operating Characteristics



Internal Accessories



Temperature Compensation Curve



External Accessories

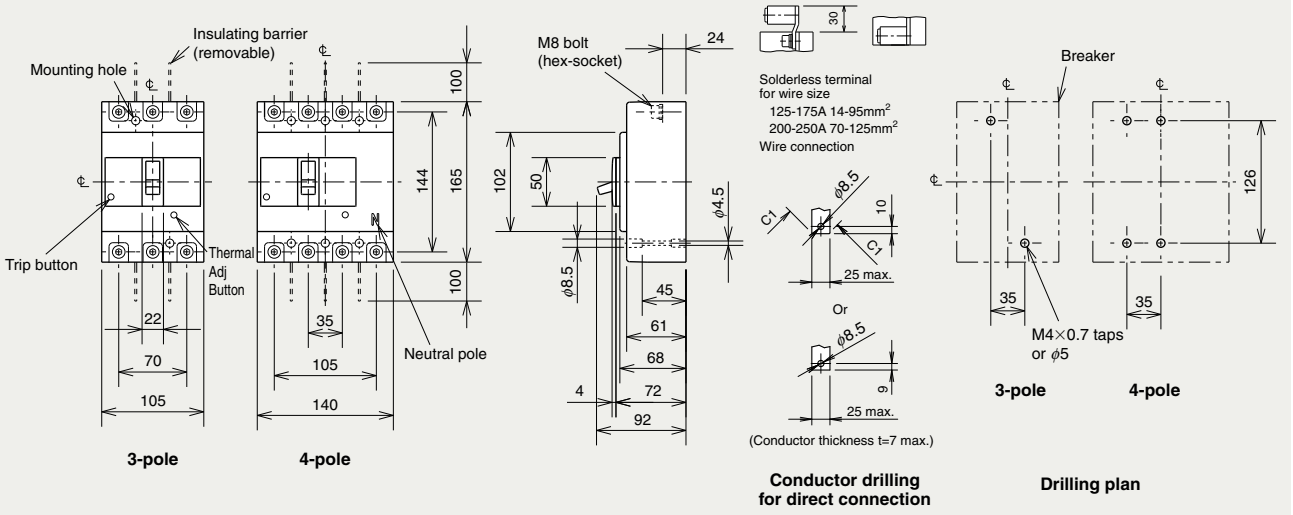
Accessories		Type name
Operating handle	F	F-2SV
	V	V-2SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-2SV

Accessories				Type name
Mechanical interlock		MI	2, 3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	2, 3P	TCS-2SV3
	Large	TC-L	2, 3P	TCL-2SV3
				TCL-2SV3L
			4P	TCL-2SV4
	Skeleton	TTC	2, 3P	TTC-2SV3
	Rear	BTC	2, 3P	BTC-2SV3
	Plug-in	PTC	2, 3P	PTC-2SV3
Electrical operation device				(*2)

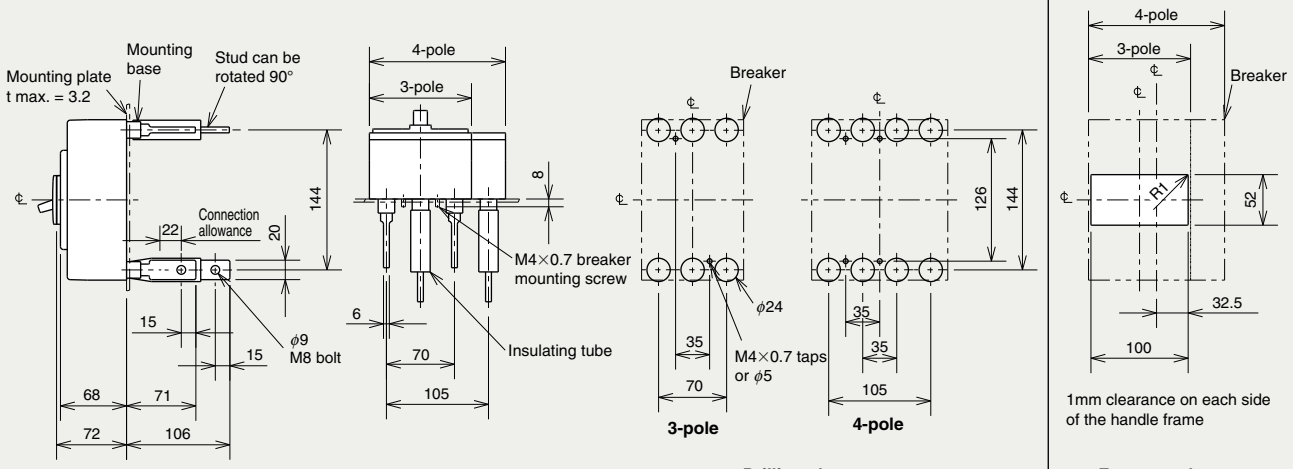
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

Outline Drawing

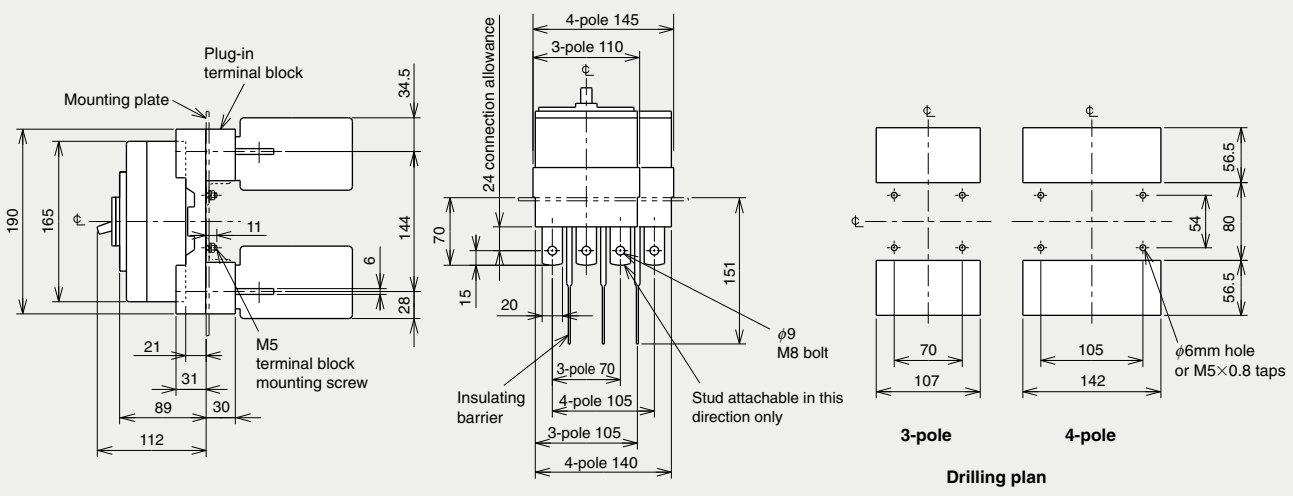
Front connection



Rear connection



Plug-in



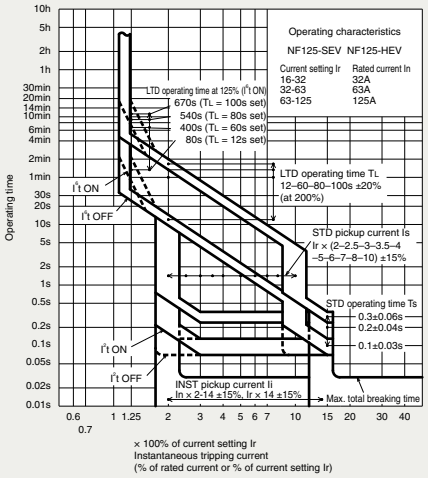
Remark: 1. 2-pole models are 3-pole models with the central pole removed.

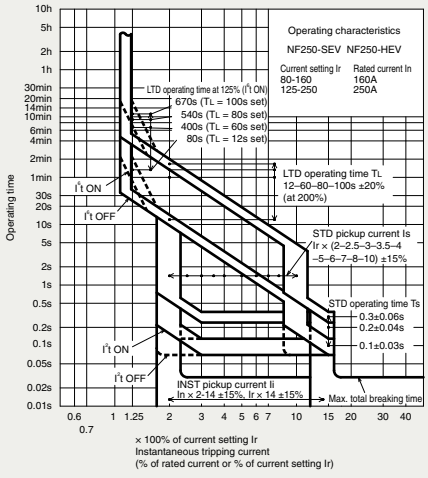
NF125-SEV
NF125-HEV
NF250-SEV
NF250-HEV

NF125-SEV

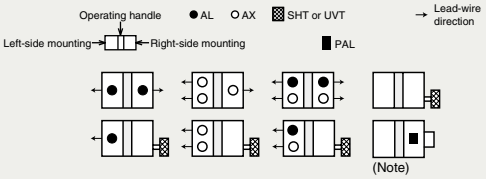
Model				NF125-SEV	NF125-HEV	NF250-SEV	NF250-HEV
Rated current In (A)				32 63 125	32 63 125	160 250	160 250
Current setting Ir (A)				16-32 32-63 63-125	16-32 32-63 63-125	80-160 125-250	80-160 125-250
Number of poles				3 4	3 4	3 4	3 4
Rated insulation voltage Ui (V)				690	690	690	690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	8/8	10/8	8/8	10/8
			500V	30/30	50/38	30/30	50/38
			440V	36/36	65/65	36/36	65/65
			415V	36/36	70/70	36/36	70/70
			400V	36/36	75/75	36/36	75/75
			380V	36/36	75/75	36/36	75/75
			230V	85/85	100/100	85/85	100/100
		DC	250V	–	–	–	–
Standard attached parts (front connection)				Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)			

Operating Characteristics

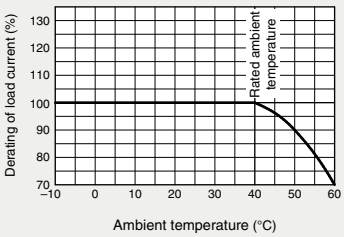




Internal Accessories



Current Reducing Curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C.

External Accessories

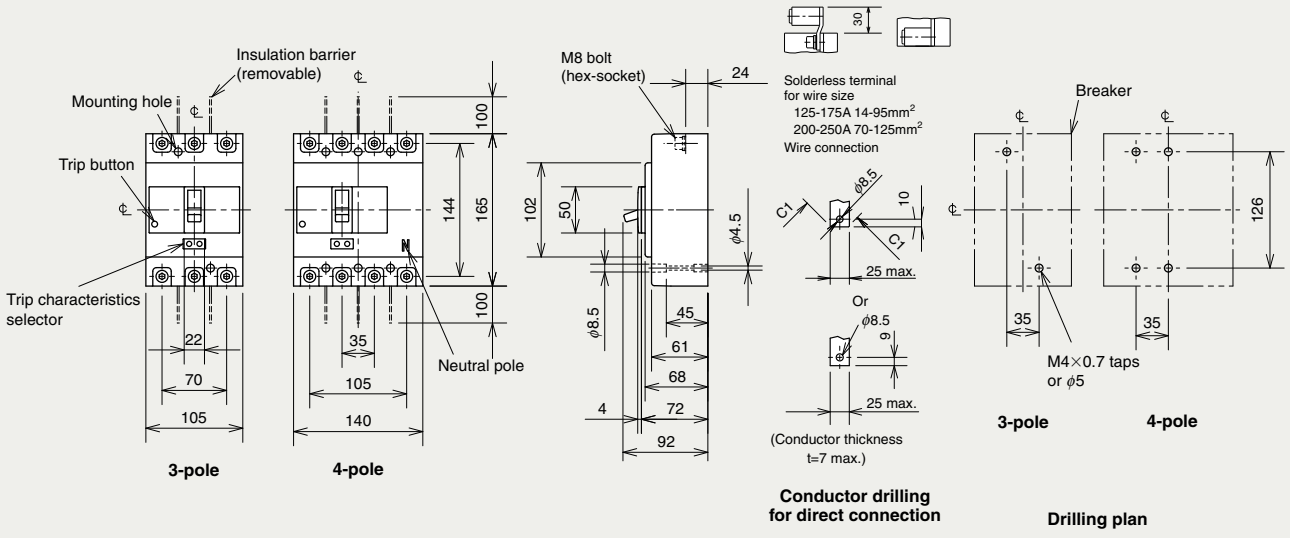
Accessories		Type name
Operating handle	F	F-2SV
	V	V-2SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-2SV

Accessories				Type name
Mechanical interlock		MI	3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	3P	TCS-2SV3
	Large	TC-L	3P	TCL-2SV3
				TCL-2SV3L
			4P	TCL-2SV4
	Skeleton	TTC	3P	TTC-2SV3
	Rear	BTC	3P	BTC-2SV3
	Plug-in	PTC	3P	PTC-2SV3
Electrical operation device				(*2)

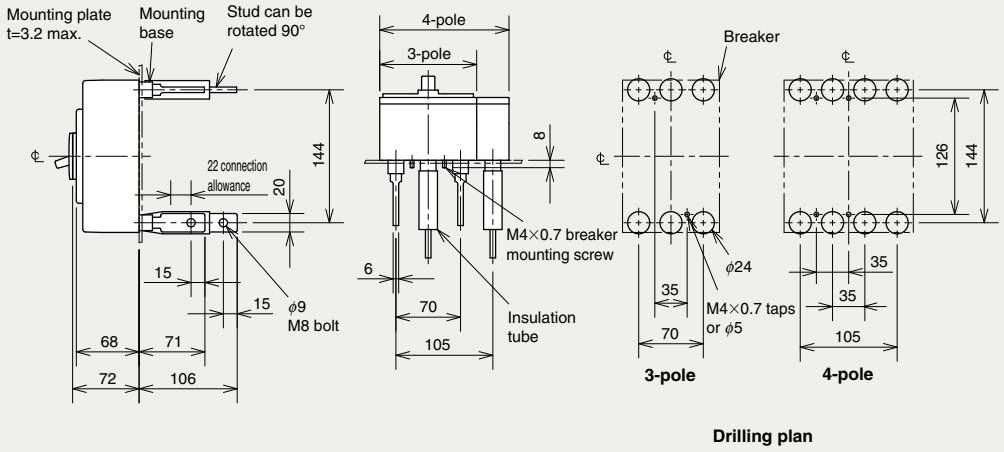
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

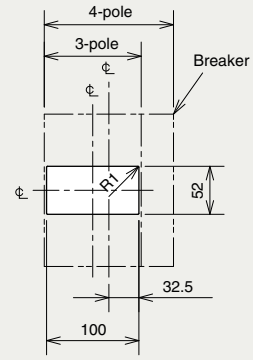
Outline Drawing

Front connection

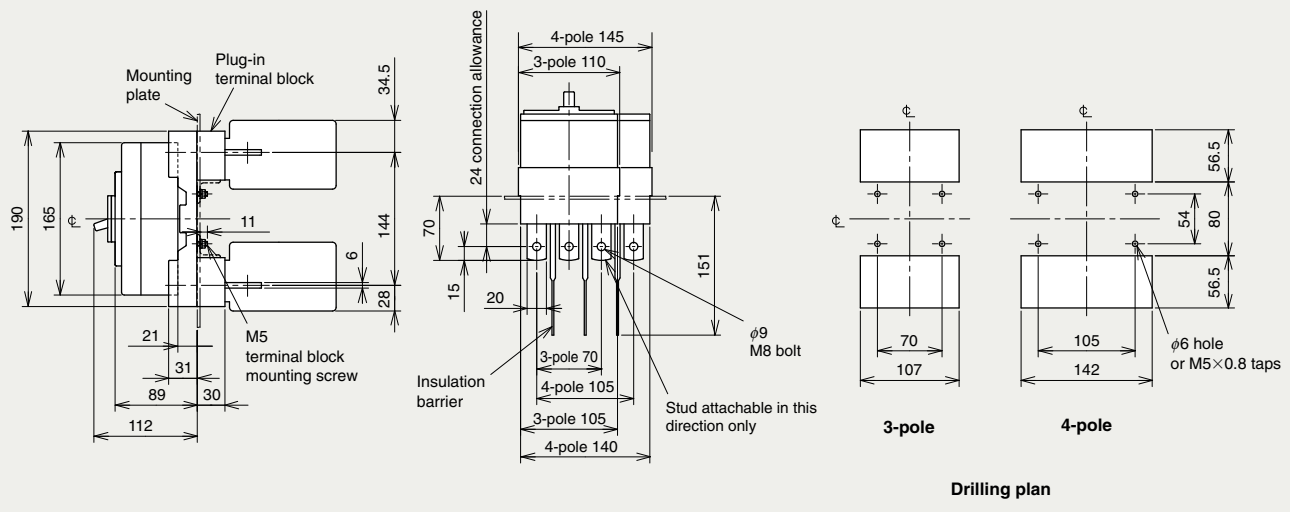


Rear connection





Plug-in



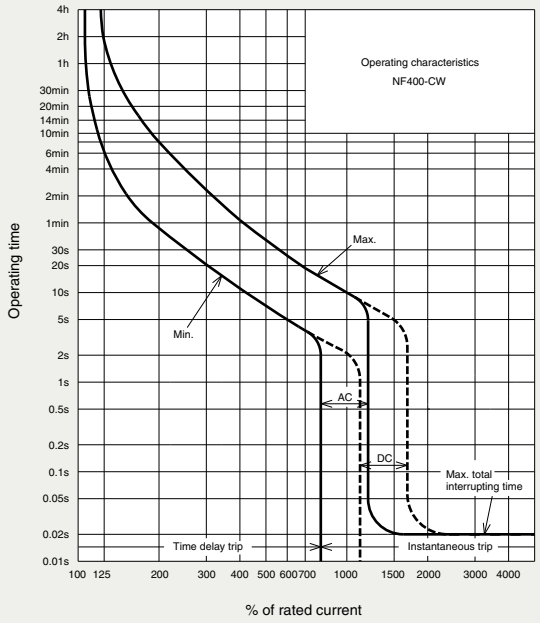
NF400-CW
NF400-SW

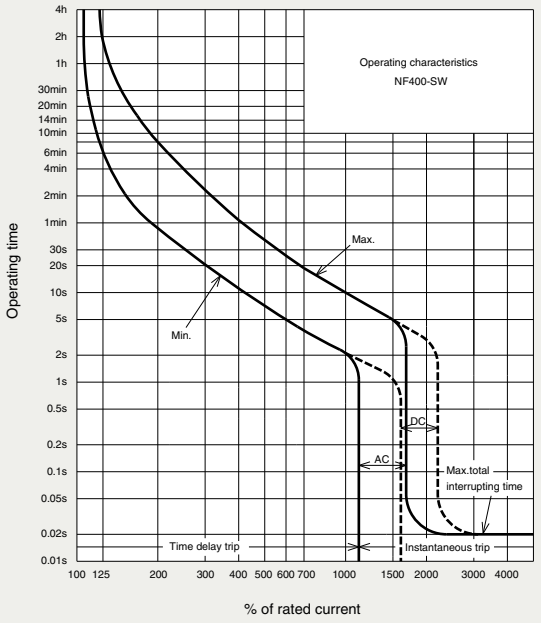
NF400-SW

Model				NF400-CW		NF400-SW		
Rated current In (A)				250 300 350 400				
Number of poles				2	3	2	3	4
Rated insulation voltage Ui (V)				690		690		
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–		10/10		
			500V	15/8		30/30		
			440V	25/13		42/42		
			400V	36/18		45/45		
			230V	50/25		85/85		
		DC (*1)	250V	20/10		40/40		
Standard attached parts			Front connection	Mounting screw: M6×60 (4pcs) Insulating barrier: (2P: 2pcs, 3P: 4pcs, 4P: 6pcs)				
			Rear connection	Mounting screw: M6×72 (4pcs)				

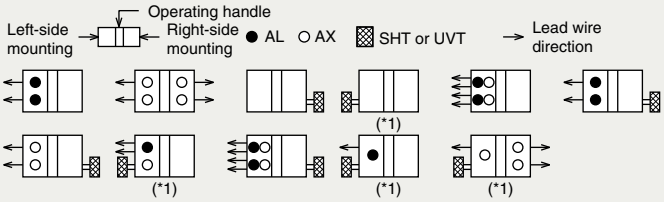
Note *1 When wired as shown at the bottom of page 672, 3-pole models can be used for up to 400VDC, and 4-pole models for up to 500VDC.

Operating Characteristics



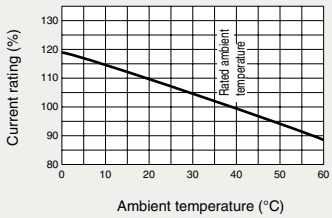


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Temperature Compensation Curve



External Accessories

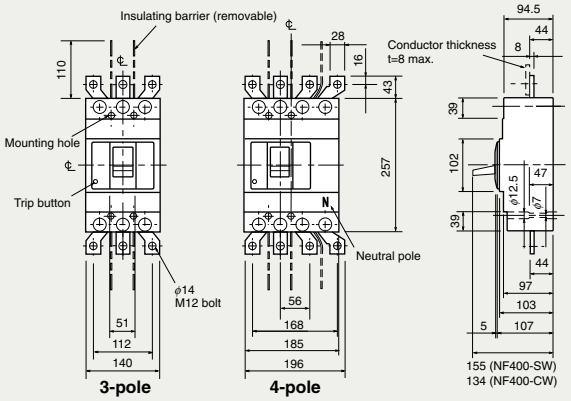
Accessories			Type name
Operating handle	F		F-4S
	V		V-4S
Mechanical interlock	MI	2, 3P	MI-4SW3
		4P	MI-4SW4
Auxiliary handle	HT		HT-4CW, HT-4SW

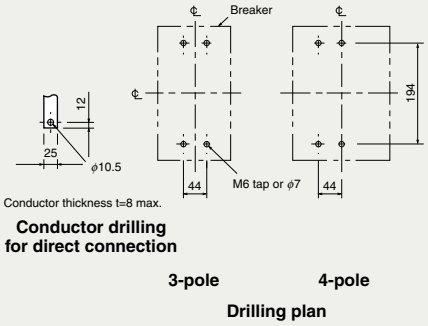
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

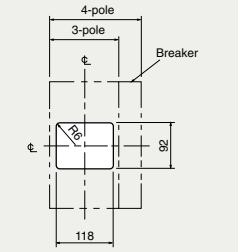
Accessories				Type name
Terminal cover	Large	TC-L	2, 3P	TCL-4SW3
			4P	TCL-4SW4
	Skeleton	TTC	2, 3P	TTC-4SW3
			4P	TTC-4SW4
	Rear	BTC	2, 3P	BTC-4SW3
			4P	BTC-4SW4
Handle lock device		HL		HL-4CW, HL-4SW
		HL-S		HLS-4SW
Electrical operation device		NFM	3P	(*1)
			4P	

Outline Drawing

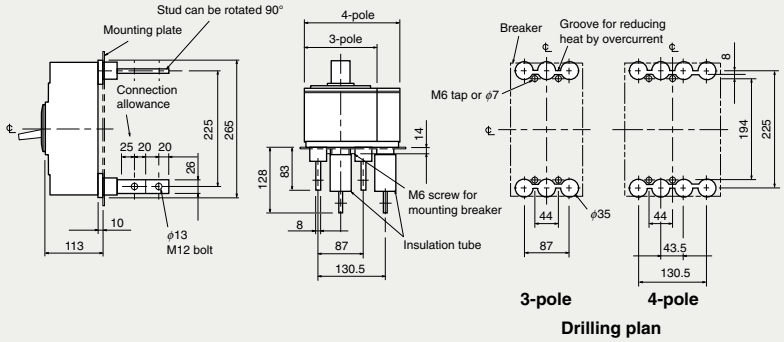
Front connection



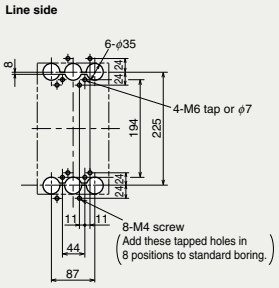




Rear connection

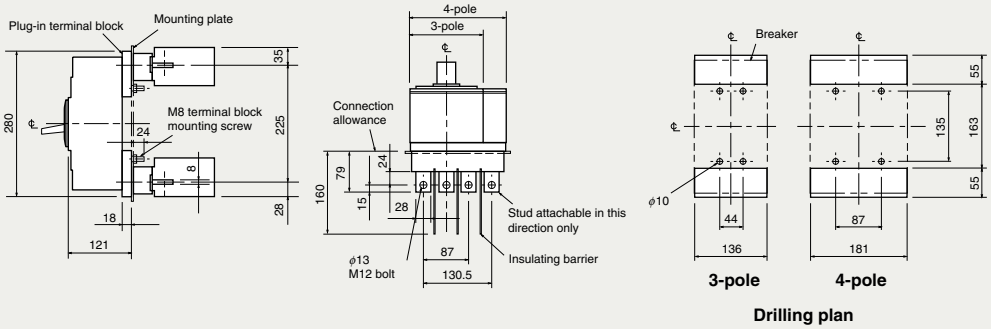


Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in



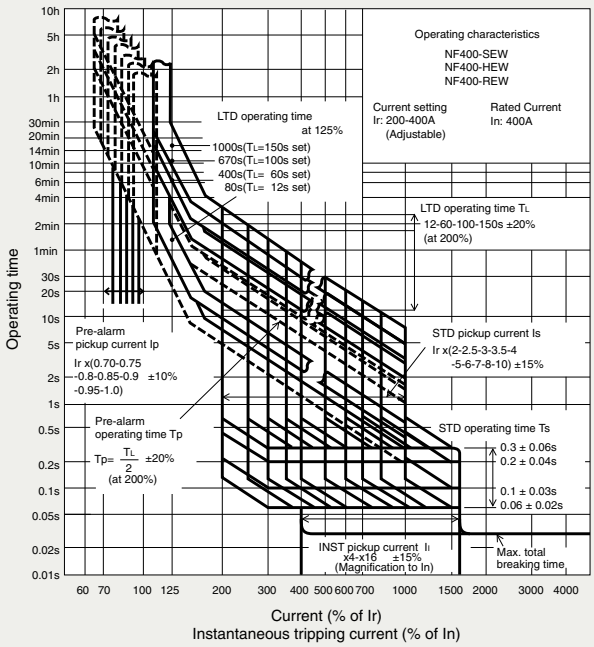
Remark: 1. 2-pole models are 3-pole models with the central pole removed.

NF400-SEW NF400-HEW NF400-REW

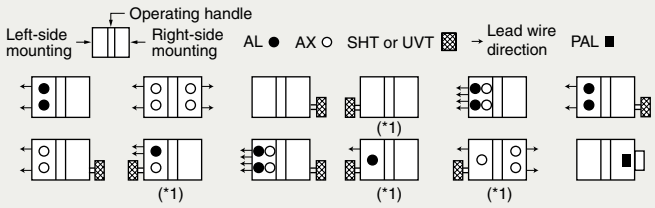
NF400-SEW

Model				NF400-SEW		NF400-HEW		NF400-REW
Rated current In (A)				200-400 adjustable				
Number of poles				3	4	3	4	3
Rated insulation voltage Ui (V)				690		690		690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	10/10		35/18		–
			500V	30/30		50/50		70/35
			440V	42/42		65/65		125/63
			400V	50/50		70/70		125/63
			230V	85/85		100/100		150/75
Standard attached parts			Front connection	Mounting screw: M6×72 (4pcs) Insulating barrier: (3P: 4pcs, 4P: 6pcs)				
			Rear connection	Mounting screw: M6×85 (4pcs)				

Operating Characteristics

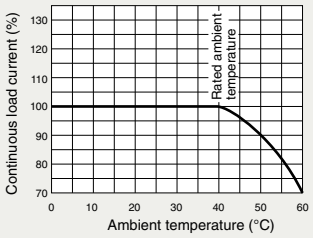


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Current Reducing Curve



External Accessories

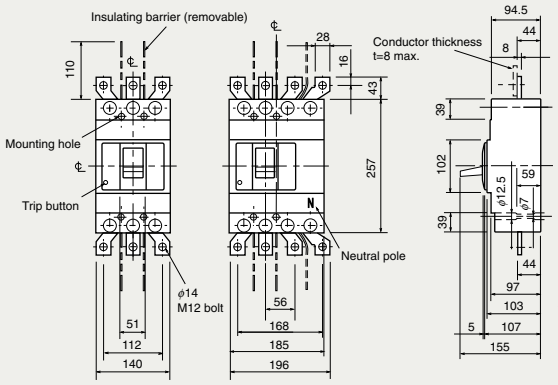
Accessories			Type name
Operating handle	F		F-4S
	V		V-4S
Mechanical interlock	MI	3P	MI-4SW3
		4P	MI-4SW4
Auxiliary handle	HT		HT-4SW

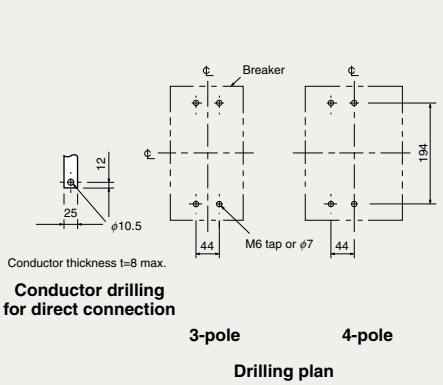
Accessories				Type name
Terminal cover	Large	TC-L	3P	TCL-4SW3 (*2)
			4P	TCL-4SW4 (*3)
	Skeleton	TTC	3P	TTC-4SW3
			4P	TTC-4SW4
	Rear	BTC	3P	BTC-4SW3 (*2)
			4P	BTC-4SW4 (*3)
Handle lock device		HL		HL-4SW
		HL-S		HLS-4SW
Electrical operation device		NFM	3P	(*1)
			4P	

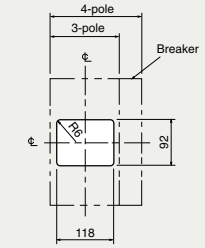
Notes *1 Specify the operation method and voltage. Order in combination with the breaker unit.
*2 This is for NF400-SEW. For rear terminal cover of NF400-HEW/REW, use PTC-4SW3.
*3 This is for NF400-SEW/HEW.

Outline Drawing

Front connection



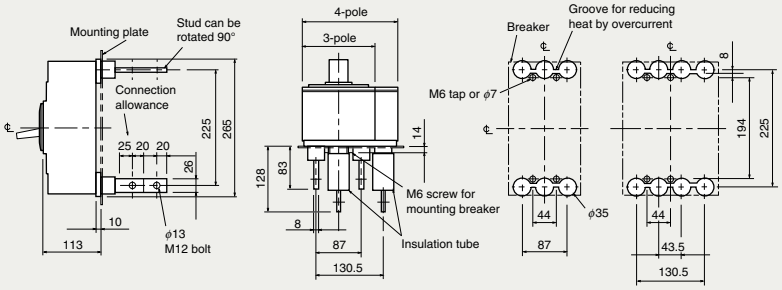




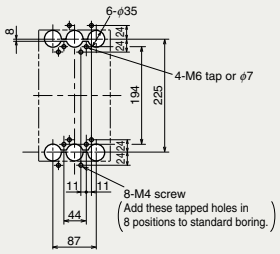
1.0mm clearance on each side of the handle frame.

Front-panel cutout

Rear connection

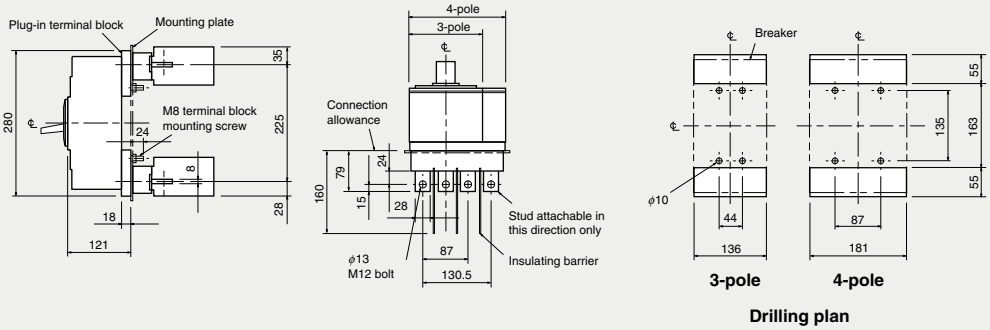


Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in

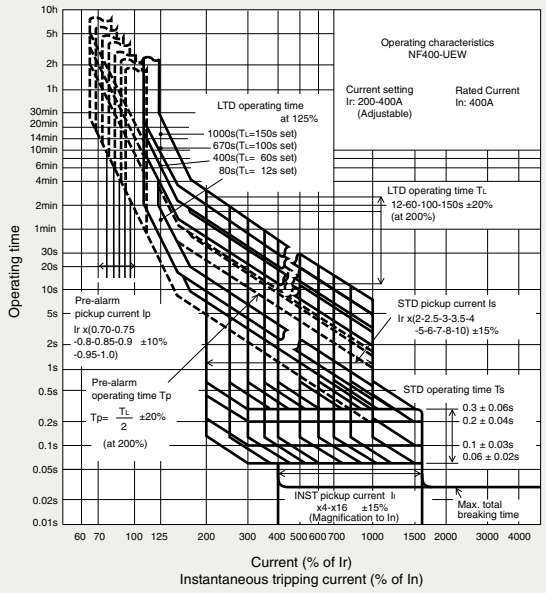


NF400-UEW

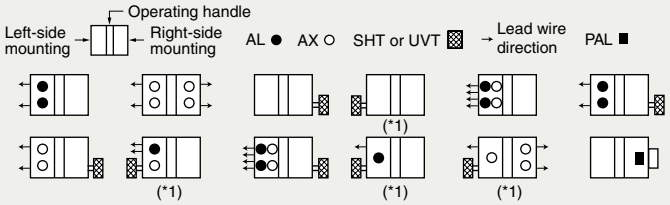
NF400-UEW

Model				NF400-UEW	
Rated current In (A)				200-400 adjustable	
Number of poles				3	4
Rated insulation voltage Ui (V)				690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–	
			500V	170/170	
			440V	200/200	
			400V	200/200	
			230V	200/200	
Standard attached parts (4-pole models are provided with auxiliary handle.)			Front connection	Mounting screw: M6×65 (2pcs), M6×174 (2pcs) Insulating barrier: (3P: 4pcs)	
			Rear connection	Mounting screw: M6×72 (2pcs), M6×181 (2pcs)	

Operating Characteristics

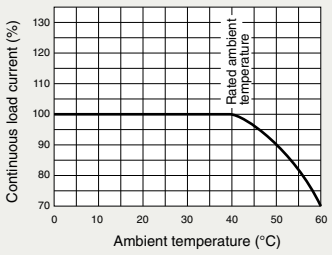


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.
Remarks: 1. Specification of 4-pole model is same as that of NF800-UEW.

Current Reducing Curve



External Accessories

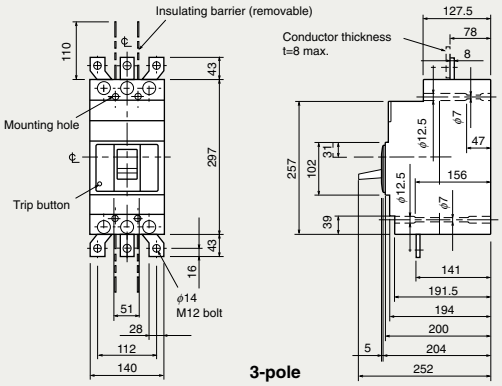
Accessories		Type name
Operating handle	F	F-4U
	V	V-4U
Mechanical interlock	MI	MI-4SW3
Auxiliary handle	HT	HT-4SW

Accessories				Type name
Terminal cover	Large	TC-L	3P	TCL-4SW3
	Skeleton	TTC	3P	–
	Rear	BTC	3P	BTC-4SW3
Handle lock device		HL		HL-4SW
		HL-S		HLS-4UW
Electrical operation device				(*1)

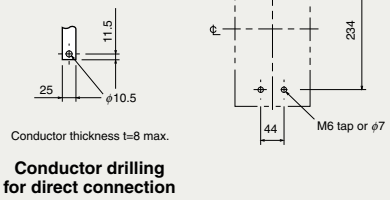
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.
Remark *1 Specification of 4-pole model is same as that of NF800-UEW.

Outline Drawing

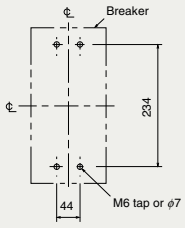
Front connection



3-pole

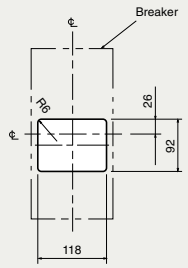


Conductor drilling for direct connection



3-pole

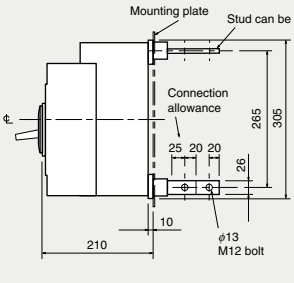
Drilling plan

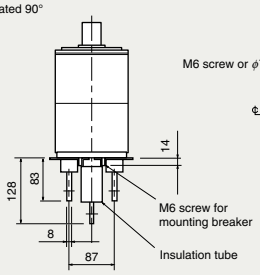


1.0mm clearance on each side of the handle frame.

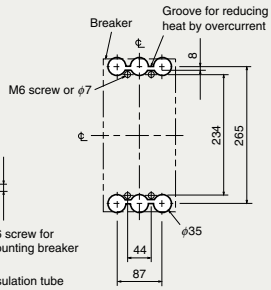
Front-panel cutout

Rear connection





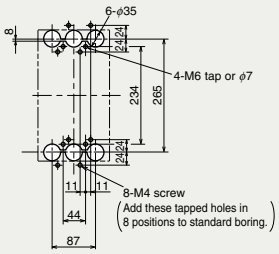
3-pole



Drilling plan

Boring dimensions for rear connection type barriers (3-pole)

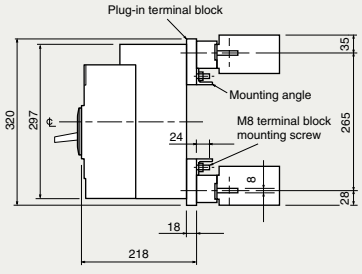
Line side



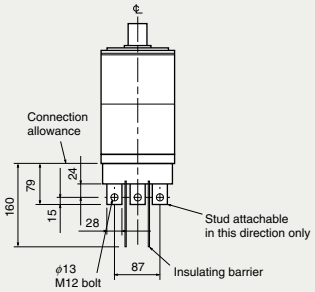
Load side

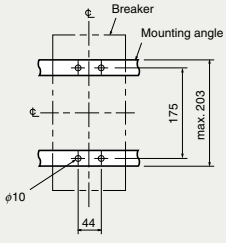
Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in



3-pole





3-pole

Drilling plan

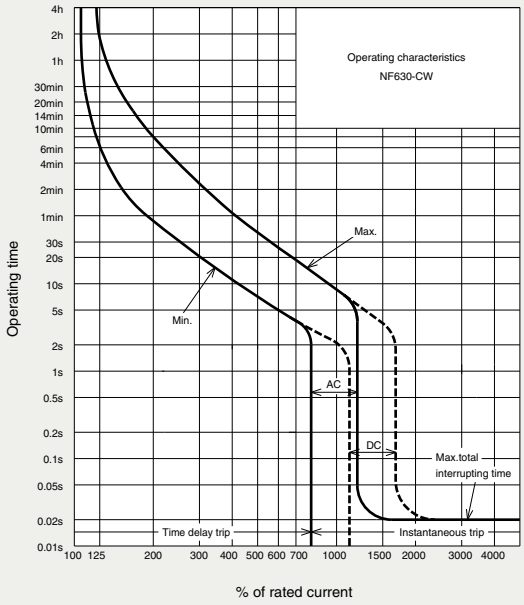
NF630-CW
NF630-SW

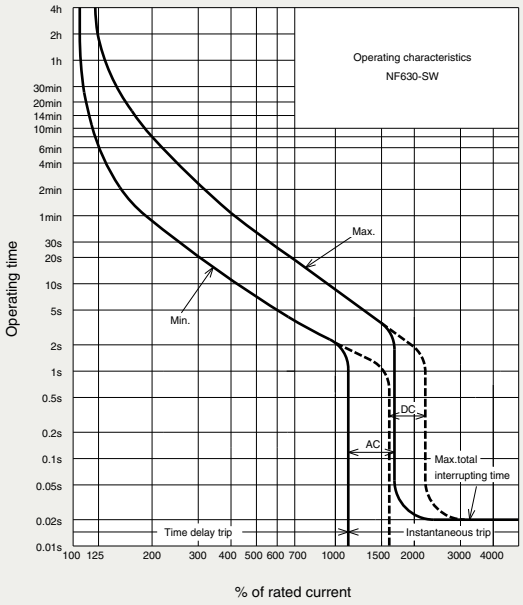
NF630-SW

Model				NF630-CW		NF630-SW		
Rated current In (A)				500 600 630				
Number of poles				2	3	2	3	4
Rated insulation voltage Ui (V)				690		690		
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–		10/10		
			500V	18/9		30/30		
			440V	36/18		42/42		
			400V	36/18		50/50		
			230V	50/25		85/85		
		DC (*1)	250V	20/10		40/40		
Standard attached parts			Front connection	Mounting screw: M6×72 (4pcs) Insulating barrier: (2P: 2pcs, 3P: 4pcs, 4P: 6pcs)				
			Rear connection	Mounting screw: M6×85 (4pcs)				

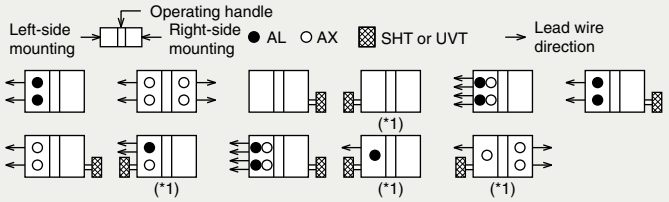
Note *1 When wired as shown at the bottom of page 672, 3-pole models can be used for up to 400VDC, and 4-pole models for up to 500VDC.

Operating Characteristics



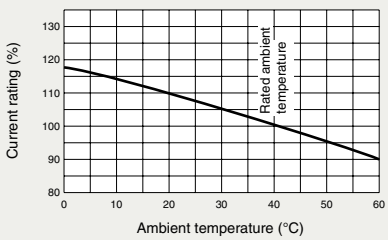


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Temperature Compensation Curve



External Accessories

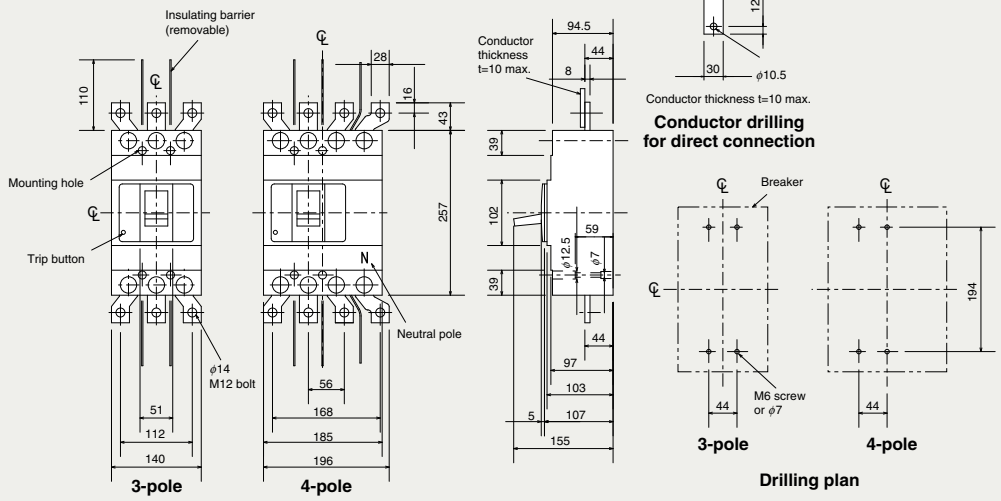
Accessories			Type name
Operating handle	F		F-4S
	V		V-4S
Mechanical interlock	MI	2, 3P	MI-4SW3
		4P	MI-4SW4
Auxiliary handle	HT		HT-4SW

Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

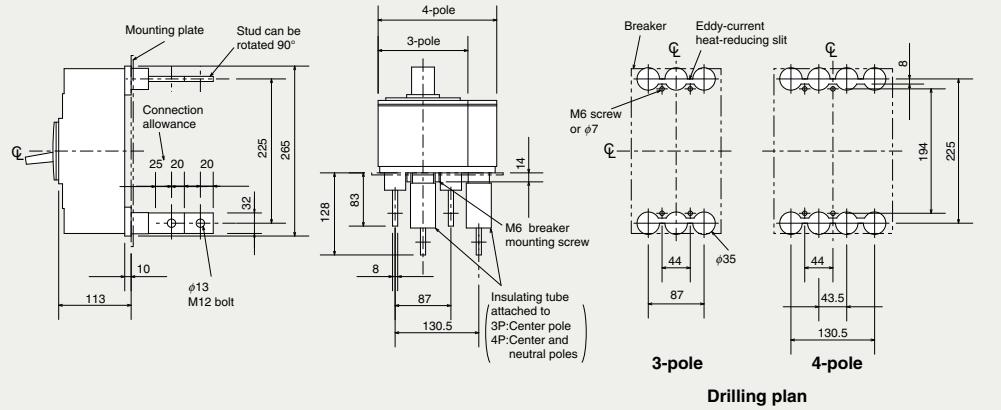
Accessories				Type name
Terminal cover	Large	TC-L	2, 3P	TCL-4SW3
			4P	TCL-4SW4
	Skeleton	TTC	2, 3P	TTC-4SW3
			4P	TTC-4SW4
	Rear	BTC	2, 3P	BTC-4SW3
			4P	BTC-4SW4
Handle lock device		HL		HL-4SW
		HL-S		HLS-4SW
Electrical operation device		NFM	3P	(*1)
			4P	

Outline Drawing

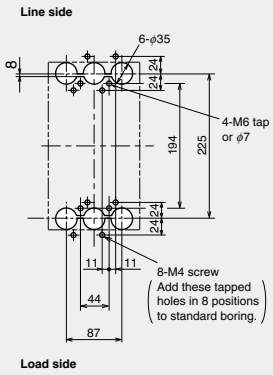
Front connection



Rear connection

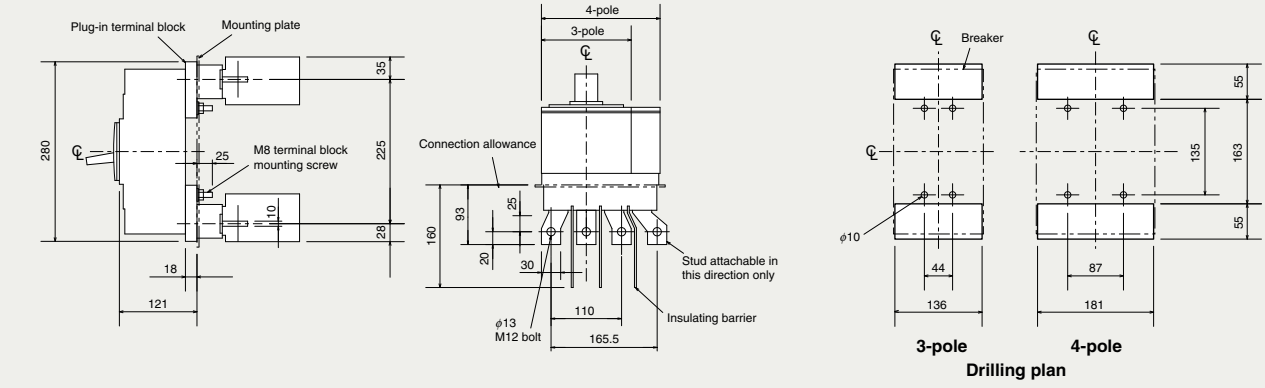


Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in



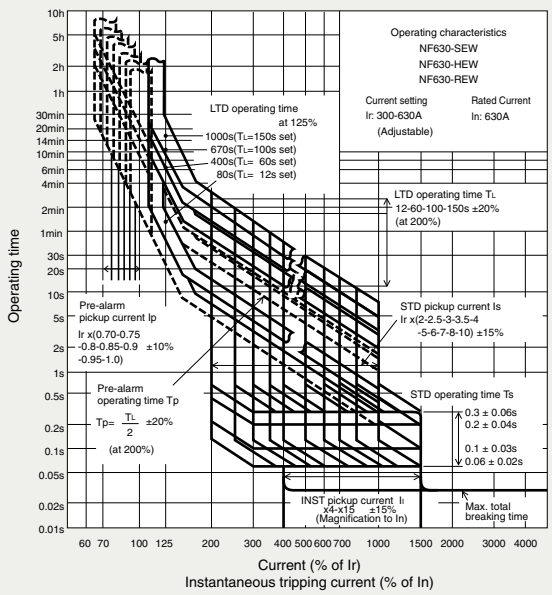
Remark: 1. 2-pole models are 3-pole models with the central pole removed.

NF630-SEW
NF630-HEW
NF630-REW

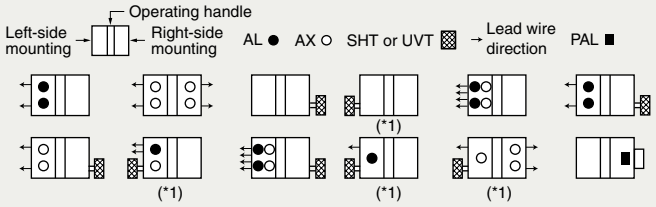
NF630-SEW

Model				NF630-SEW		NF630-HEW		NF630-REW
Rated current In (A)				300-630 adjustable				
Number of poles				3	4	3	4	3
Rated insulation voltage Ui (V)				690		690		690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	10/10		35/18		–
			500V	30/30		50/50		70/35
			440V	42/42		65/65		125/63
			400V	50/50		70/70		125/63
			230V	85/85		100/100		150/75
Standard attached parts			Front connection	Mounting screw: M6×72 (4pcs) Insulating barrier: (3P: 4pcs, 4P: 6pcs)				
			Rear connection	Mounting screw: M6×85 (4pcs)				

Operating Characteristics

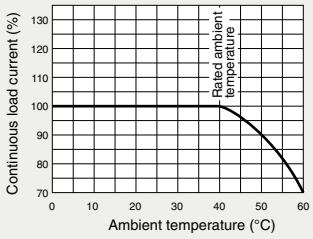


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Current Reducing Curve



External Accessories

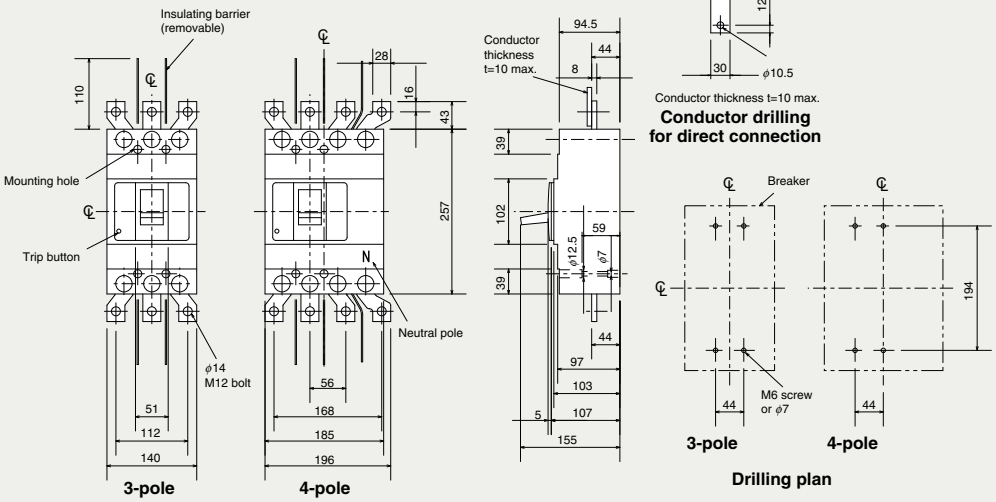
Accessories			Type name
Operating handle	F		F-4S
	V		V-4S
Mechanical interlock	MI	3P	MI-4SW3
		4P	MI-4SW4
Auxiliary handle	HT		HT-4SW

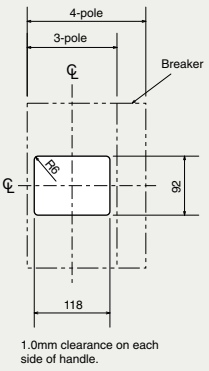
Accessories				Type name
Terminal cover	Large	TC-L	3P	TCL-4SW3 (*2)
			4P	TCL-4SW4 (*3)
	Skeleton	TTC	3P	TTC-4SW3
			4P	TTC-4SW4
	Rear	BTC	3P	BTC-4SW3 (*2)
			4P	BTC-4SW4 (*3)
Handle lock device		HL		HL-4SW
		HL-S		HLS-4SW
Electrical operation device		NFM	3P	(*1)
			4P	

Notes *1 Specify the operation method and voltage. Order in combination with the breaker unit.
*2 This is for NF630-SEW. For rear terminal cover of NF630-HEW/REW, use PTC-4SW3.
*3 This is for NF630-SEW/HEW.

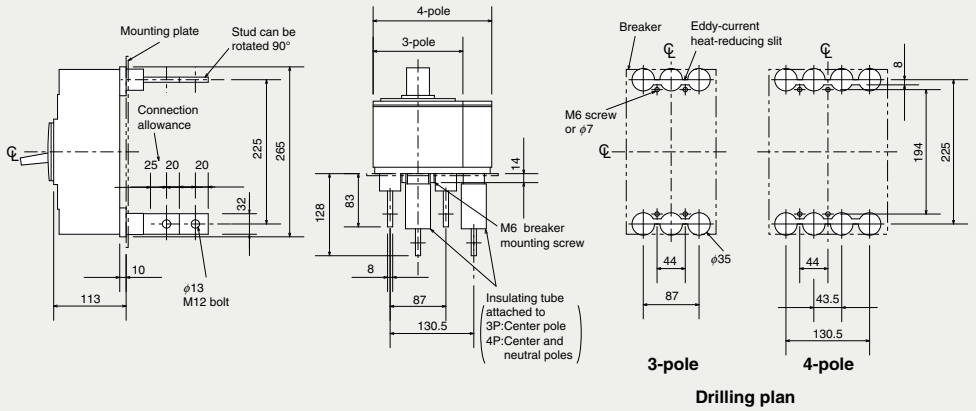
Outline Drawing

Front connection

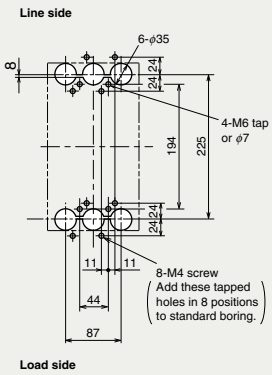




Rear connection

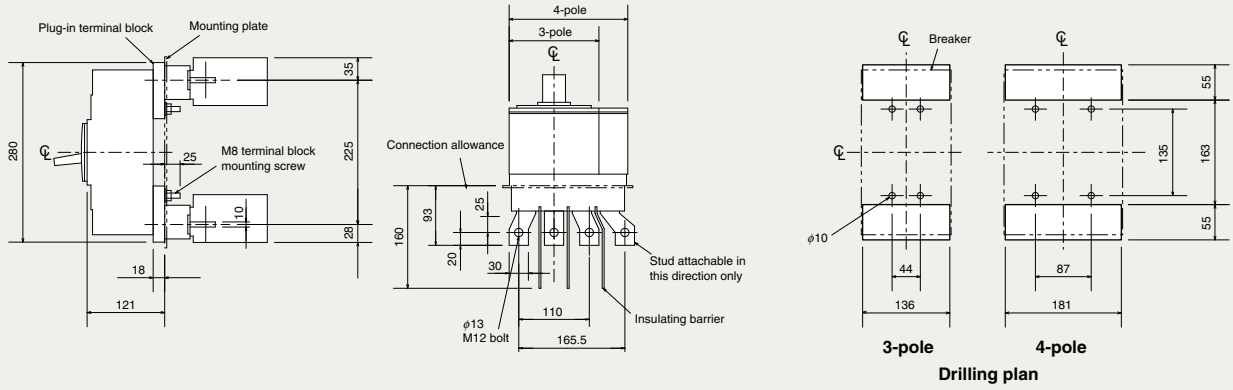


Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in

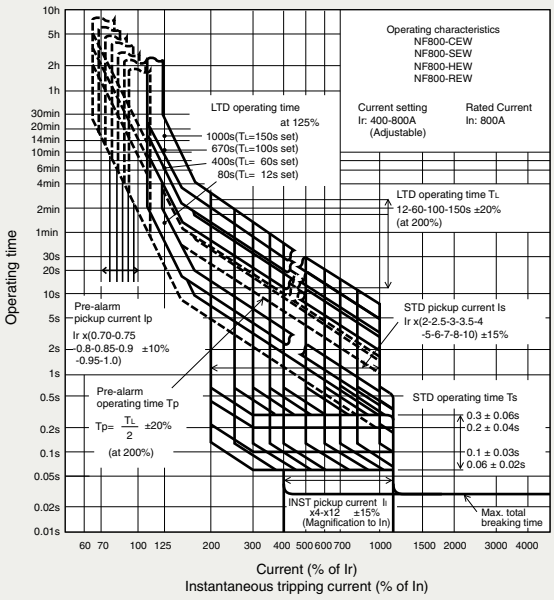


NF800-CEW
NF800-SEW
NF800-HEW
NF800-REW

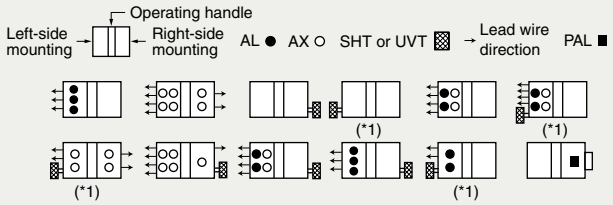
NF800-SEW

Model				NF800-CEW	NF800-SEW	NF800-HEW	NF800-REW
Rated current In (A)				400-800 adjustable			
Number of poles				3	3 4	3 4	3
Rated insulation voltage Ui (V)				690	690	690	690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	–	10/10	15/15	–
			500V	18/9	30/30	50/50	70/35
			440V	36/18	42/42	65/65	125/63
			400V	36/18	50/50	70/70	125/63
			230V	50/25	85/85	100/100	150/75
Standard attached parts (4-pole models are provided with auxiliary handle.)			Front connection	Mounting screw: M6×35 (4pcs) Insulating barrier: (3P: 2pcs, 4P: 3pcs)			
			Rear connection	Mounting screw: M6×40 (4pcs)			

Operating Characteristics

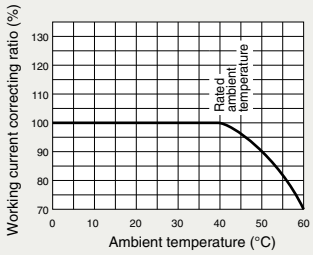


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Current Reducing Curve



External Accessories

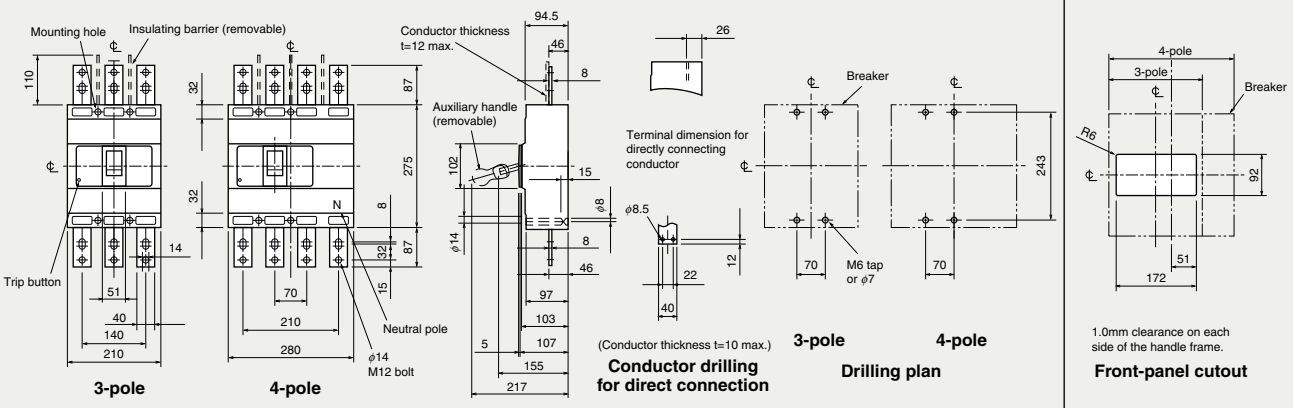
Accessories			Type name
Operating handle	F		F-8S
	V		V-8S
Mechanical interlock	MI	3P	MI-8SW3
		4P	MI-8SW4
Auxiliary handle	HT		HT-4SW

Accessories				Type name
Terminal cover	Large	TC-L	3P	TCL-8SW3
			4P	TCL-8SW4
	Skeleton	TTC	3P	TTC-8SW3
			4P	TTC-8SW4
	Rear	BTC	3P	BTC-8SW3
			4P	BTC-8SW4
Handle lock device		HL		HL-4SW
		HL-S		HLS-8SW
Electrical operation device		NFM	3P	(*1)
			4P	

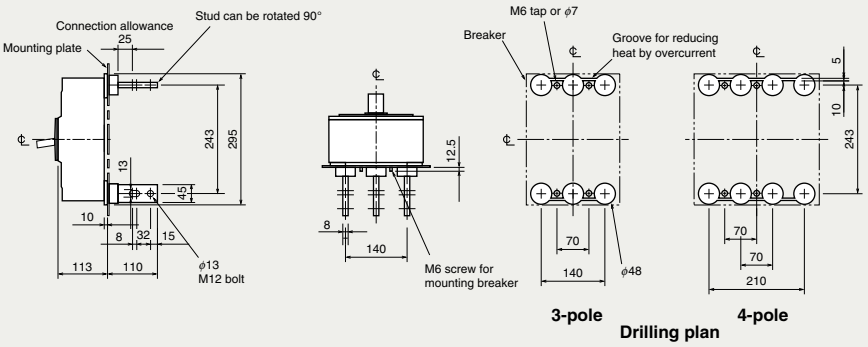
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

Outline Drawing

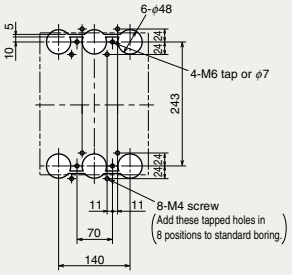
Front connection



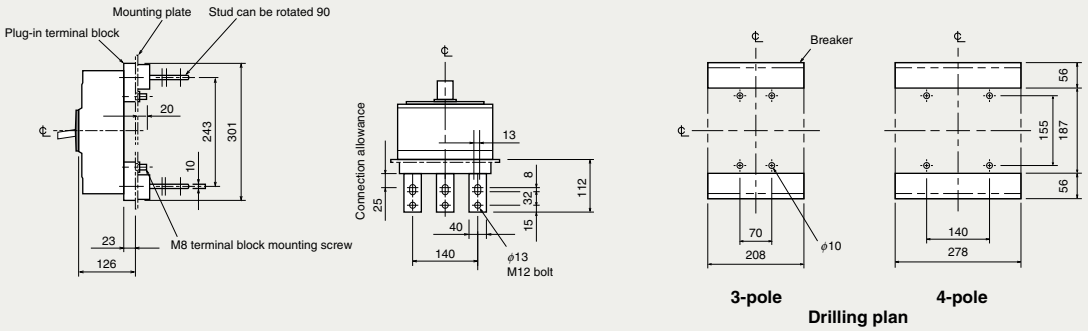
Rear connection



Boring dimensions for rear connection type barriers (3-pole)



Plug-in

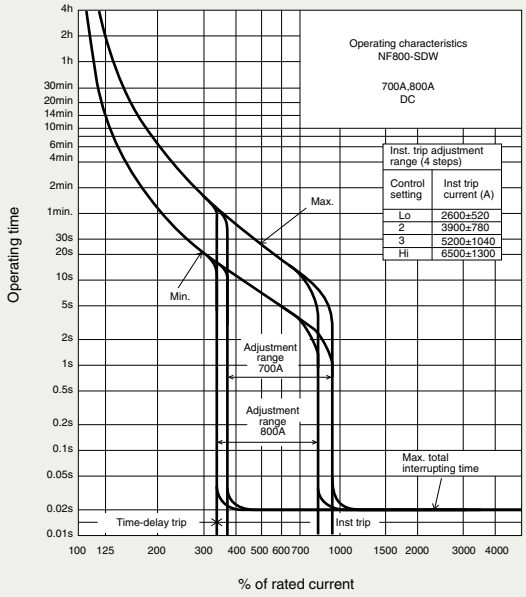


NF800-SDW

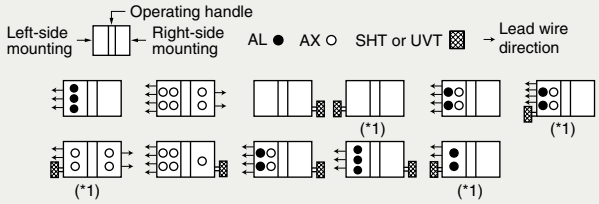
NF800-SDW

Model				NF800-SDW
Rated current In (A)				(700), 800
Number of poles				2
Rated insulation voltage Ui (V)				690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics) Time constant not larger than 10ms	DC	250V	40/40
Standard attached parts (4-pole models are provided with auxiliary handle.)			Front connection	Mounting screw: M6×35 (4pcs) Insulating barrier: (2P: 1pc, 3P: 2pcs, 4P: 3pcs)
			Rear connection	Mounting screw: M6×40 (4pcs)

Operating Characteristics

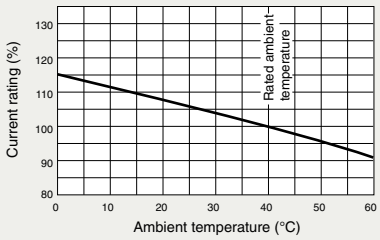


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Temperature Compensation Curve



External Accessories

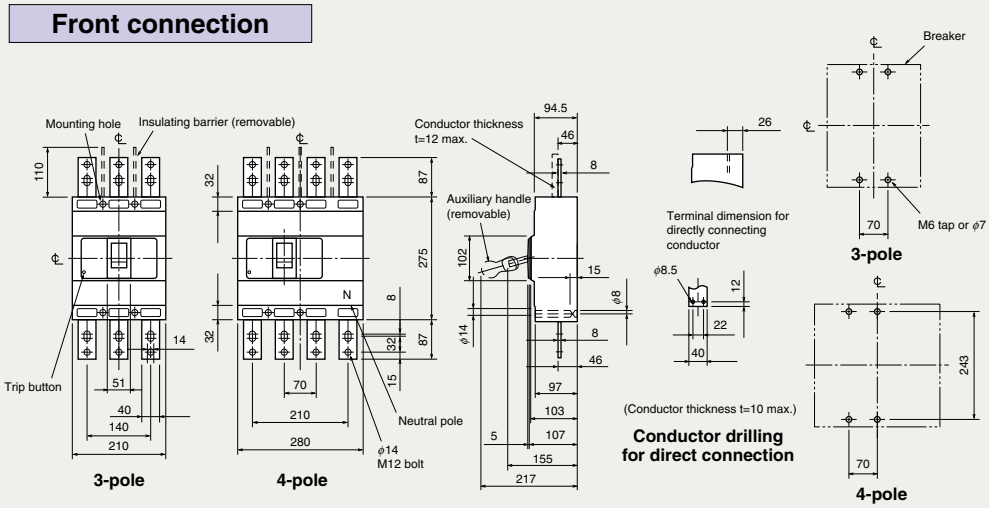
Accessories			Type name
Operating handle	F		F-8S
	V		V-8S
Mechanical interlock	MI	2, 3P	MI-8SW3
		4P	MI-8SW4
Auxiliary handle	HT		HT-4SW

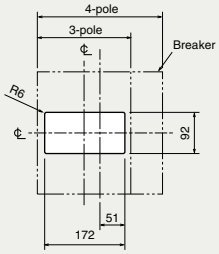
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

Accessories				Type name
Terminal cover	Large	TC-L	2, 3P	TCL-8SW3
			4P	TCL-8SW4
	Skeleton	TTC	2, 3P	TTC-8SW3
			4P	TTC-8SW4
	Rear	BTC	2, 3P	BTC-8SW3
			4P	BTC-8SW4
Handle lock device		HL		HL-4SW
		HL-S		HLS-8SW
Electrical operation device		NFM	2, 3P	(*1)
			4P	

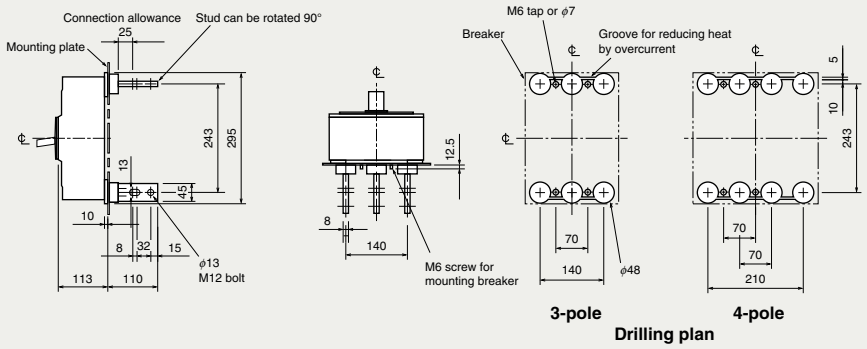
Outline Drawing

Front connection

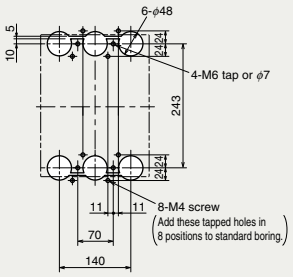




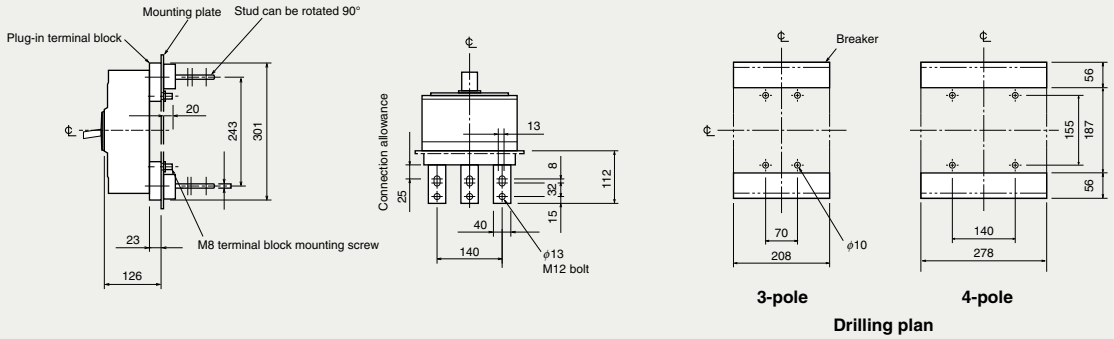
Rear connection



Boring dimensions for rear connection type barriers (3-pole)



Plug-in



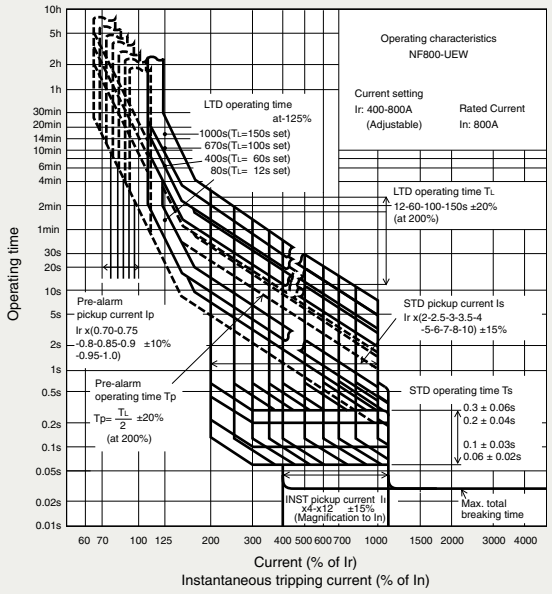
Remarks: 1. Standard specification of NF800-SDW is 2-pole model. 3-pole and 4-pole models are available for DC special voltage.
2. 2-pole models are 3-pole models with the central pole removed.

NF800-UEW

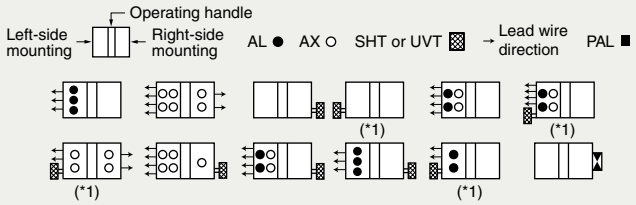
NF800-UEW

Model				NF800-UEW	
Rated current In (A)				400-800 adjustable	
Number of poles				3	4
Rated insulation voltage Ui (V)				690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	35/35	
			500V	170/170	
			440V	200/200	
			400V	200/200	
			230V	200/200	
Standard attached parts (4-pole models are provided with auxiliary handle.)			Front connection	Mounting screw: 3P: M6×35, M6×132 (2pcs each) 4P: M6×35 (3pcs), M6×132 (2pcs) Insulating barrier: (3P: 2pcs, 4P: 3pcs)	
			Rear connection	Mounting screw: 3P: M6×40, M6×137 (2pcs each) 4P: M6×40 (3pcs), M6×137 (2pcs)	

Operating Characteristics

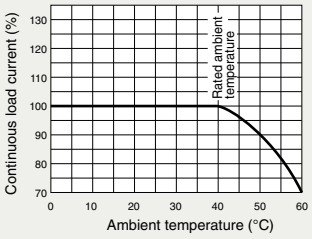


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separately for left-side mounting.

Current Reducing Curve



External Accessories

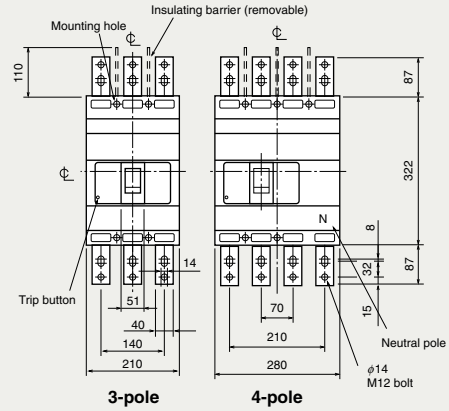
Accessories			Type name
Operating handle	F		F-8U
	V		–
Mechanical interlock	MI	3P	MI-8SW3
		4P	MI-8SW4
Auxiliary handle	HT		HT-4SW

Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

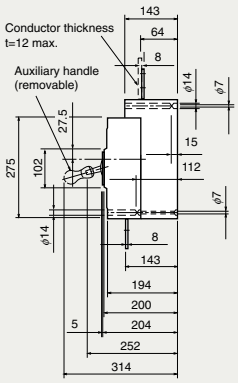
Accessories				Type name
Terminal cover	Large	TC-L	3P	TCL-8UW3
			4P	TCL-8UW4
	Skeleton	TTC	3P	–
			4P	–
	Rear	BTC	3P	BTC-8SW3
			4P	BTC-8SW4
Handle lock device		HL		HL-4SW
		HL-S		HLS-8UW
Electrical operation device				(*1)

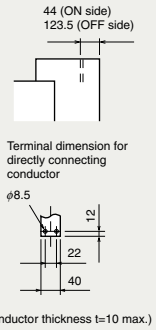
Outline Drawing

Front connection

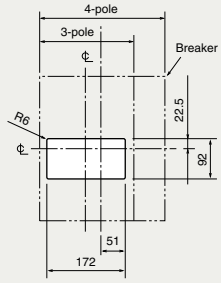


3-pole 4-pole



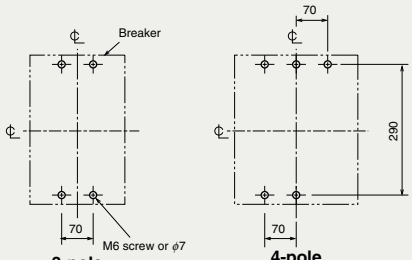


Conductor drilling for direct connection



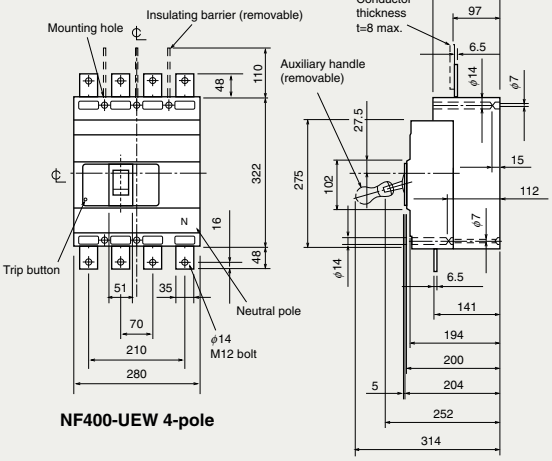
1.0mm clearance on each side of the handle frame.

Front-panel cutout



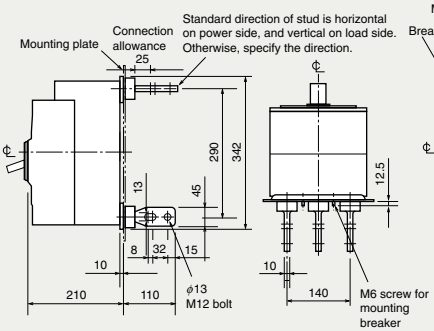
3-pole 4-pole

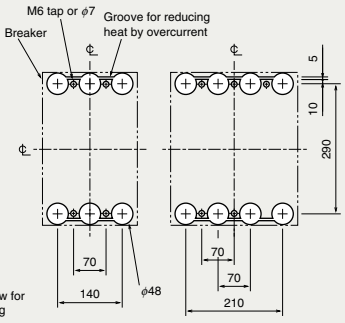
Drilling plan



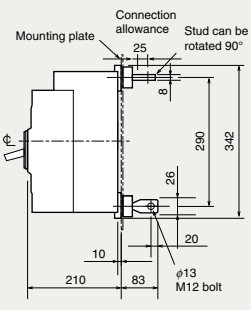
NF400-UEW 4-pole

Rear connection





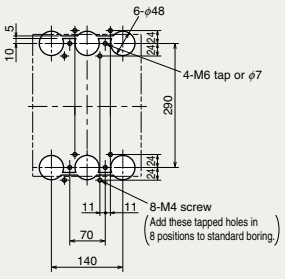
3-pole 4-pole



NF400-UEW 4-pole

Drilling plan

Boring dimensions for rear connection type barriers (3-pole)

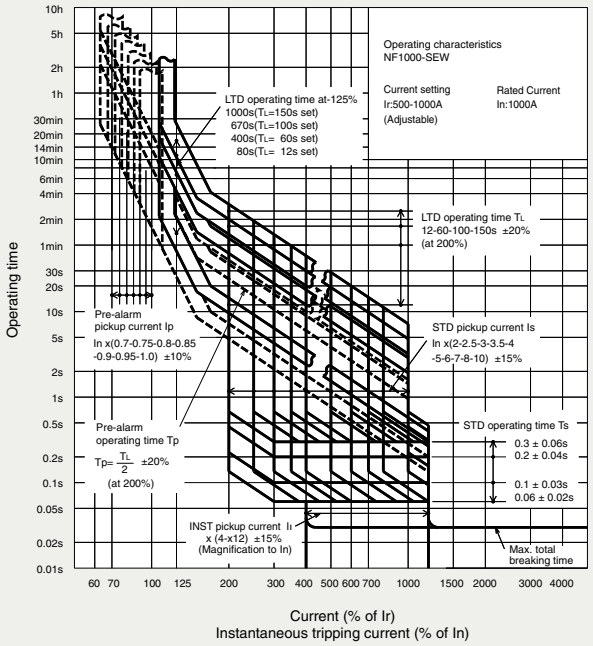


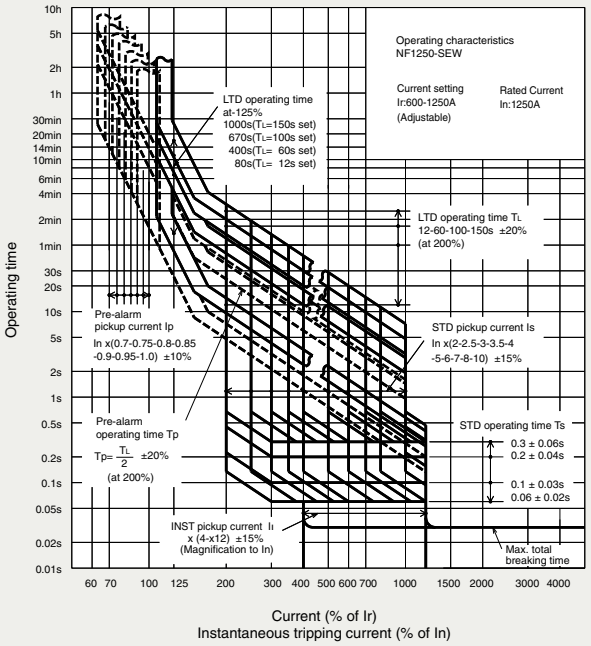
NF1000-SEW NF1250-SEW

NF1250-SEW

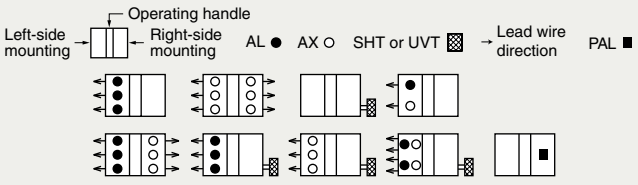
Model				NF1000-SEW		NF1250-SEW	
Rated current In (A)				500–1000 Adjustable		600–1250 Adjustable	
Number of poles				3	4	3	4
Rated insulation voltage Ui (V)				690		690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	25/13		25/13	
			500V	65/33		65/33	
			440V	85/43		85/43	
			400V	85/43		85/43	
			230V	125/63		125/63	
Standard attached parts			Front connection	Mounting screw: M8×40 (4pcs) Insulating barrier: (3P: 2pcs, 4P: 3pcs) Auxiliary handle: (1pc)			
			Rear connection	Mounting screw: M8×40 (4pcs) Insulating barrier: (3P: 2pcs, 4P: 4pcs) Auxiliary handle: (1pc)			

Operating Characteristics

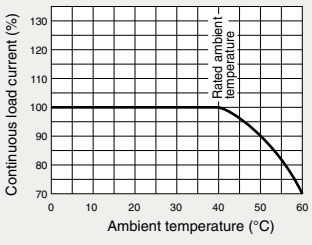




Internal Accessories



Current Reducing Curve



External Accessories

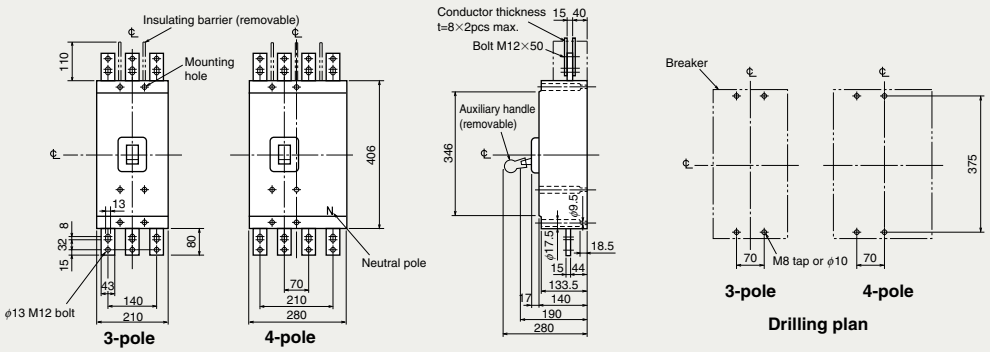
(An order for ☆ should be placed at the same time as an order of circuit breaker main body.)

Accessories			Type name	Accessories			Type name
Operating handle	F	3P	F10SW	Auxiliary handle	HT		HT-10SW
		4P	F10SW4P	Handle lock device	HL		HL (☆)
Mechanical interlock	MI	3P	MI-10SW3	Large terminal cover	TC-L	3P	TCL-10SW3
		4P	MI-10SW4			4P	TCL-10SW4
				Electrical operation device	NFM	3P	(*1)
						4P	

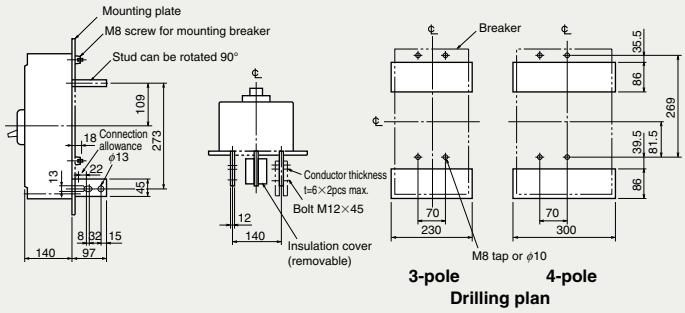
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

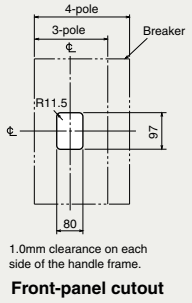
Outline Drawing

Front connection

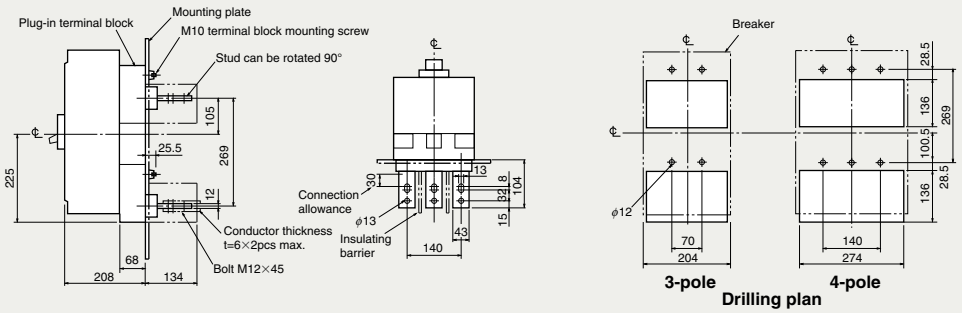


Rear connection





Plug-in

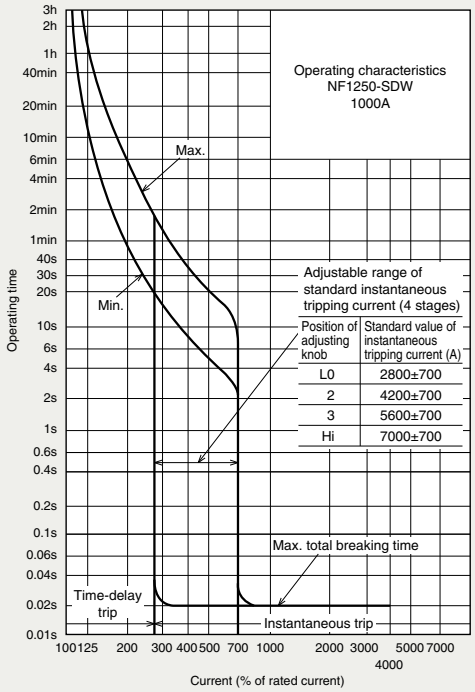


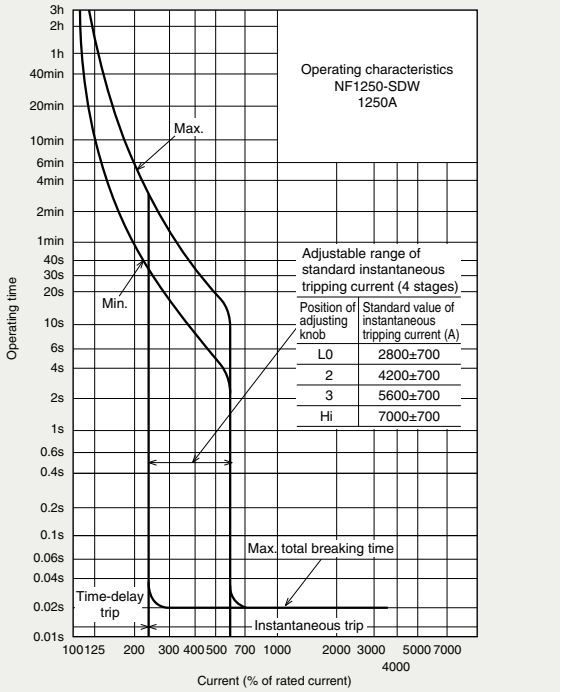
NF1250-SDW

NF1250-SDW

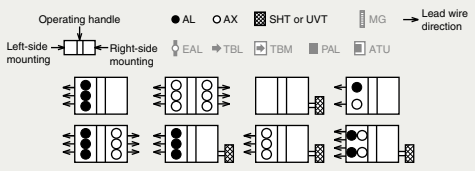
Model				NF1250-SDW
Rated current In (Amp.)				1000, 1250
Number of poles				2
Rated insulation voltage Ui (V)				690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics) Time constant not large than 10ms	DC	250V	40/20
Standard Attached parts			Front connection	Mounting screw: M8×40 (4pcs) Insulating barrier: (2P: 1pc, 3P: 2pcs, 4P: 3pcs) Auxiliary handle: (1pc)
			Rear connection	Mounting screw: M8×40 (4pcs) Insulating barrier: (3P: 2pcs, 4P: 4pcs) Auxiliary handle: (1pc)

Operating Characteristics

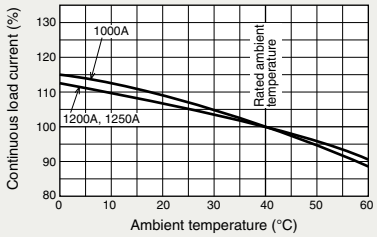




Internal Accessories



Temperature Compensation Curve



External Accessories

(An order for ☆ should be placed at the same time as an order of circuit breaker main body.)

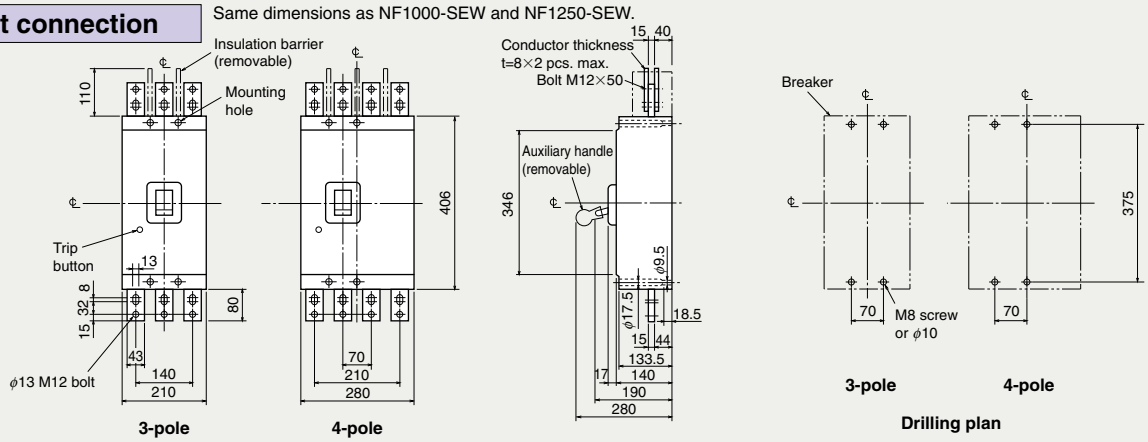
Accessories			Type name	Accessories			Type name
Operating handle	F	2, 3P	F10SW	Auxiliary handle	HT		HT-10SW
		4P	F10SW4P	Handle lock device	HL		HL (☆)
Mechanical interlock	MI	2, 3P	MI-10SW3	Large terminal cover	TC-L	2, 3P	TCL-10SW3
		4P	MI-10SW4			4P	TCL-10SW4
				Electrical operation device	NFM	2, 3P	(*1)
						4P	

Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

Outline Drawing

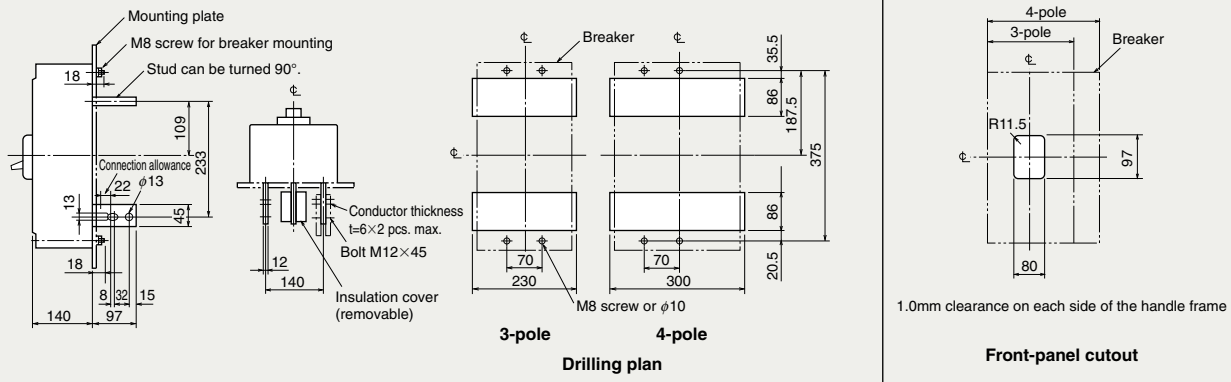
Front connection

Same dimensions as NF1000-SEW and NF1250-SEW.



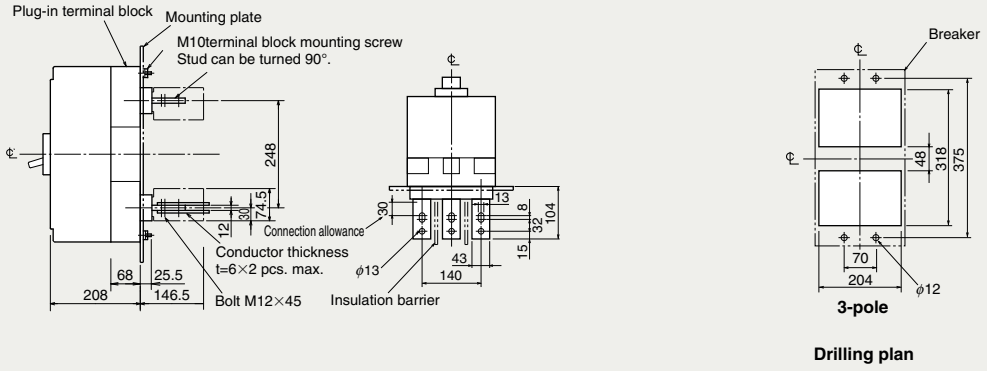
Rear connection

Differing in external dimensions from NF1000-SEW and NF1250-SEW.



Plug-in

Differing in external dimensions from NF1000-SEW and NF1250-SEW.



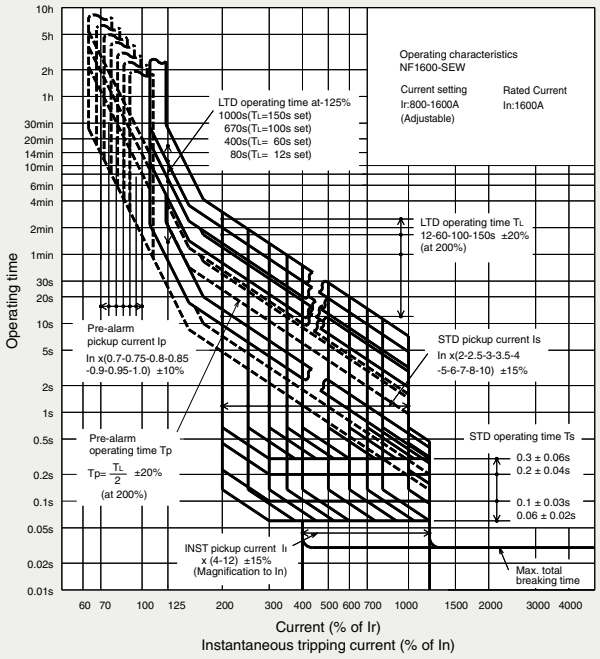
Remarks: 1. Standard specification of NF1250-SDW is 2-pole model. 3-pole and 4-pole models are available for DC special voltage.
2. 2-pole models are 3-pole models with the central pole removed.

NF1600-SEW

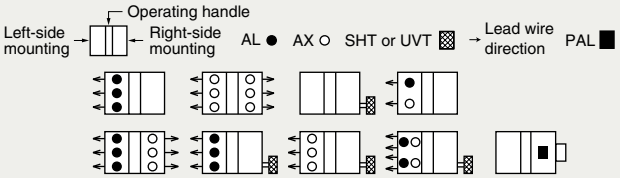
NF1600-SEW

Model				NF1600-SEW	
Rated current In (A)				Adjustable 800–1600	
Number of poles				3	4
Rated insulation voltage Ui (V)				690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	25/13	
			500V	65/33	
			440V	85/43	
			400V	85/43	
			230V	125/63	
Standard attached parts			Front connection	Mounting screw: M8 × 40 (4pcs) Insulating barrier: (3P: 2pcs, 4P: 3pcs) Auxiliary handle: (1pc)	
			Rear connection	Mounting screw: M8 × 40 (4pcs) Auxiliary handle: (1pc)	

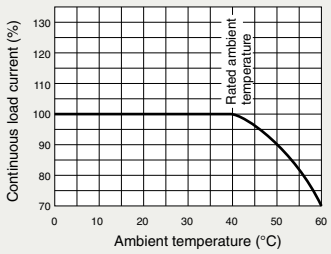
Operating Characteristics



Internal Accessories



Current Reducing Curve



External Accessories

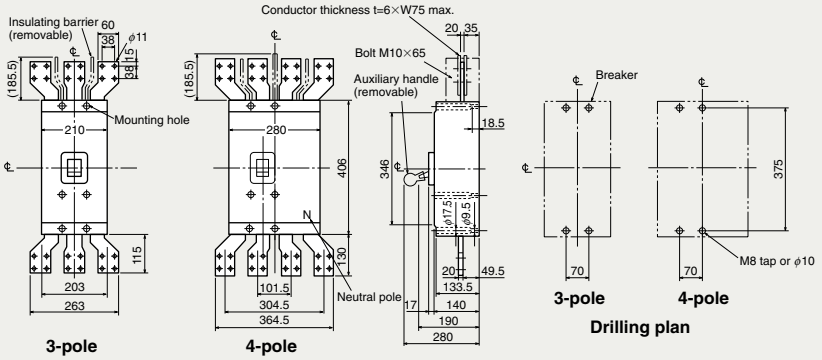
(An order for ☆ should be placed at the same time as an order of circuit breaker main body.)

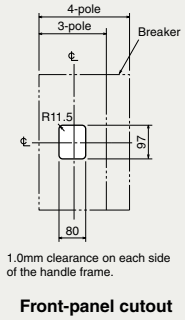
Accessories			Type name	Accessories			Type name
Operating handle	F	3P	F10SW	Auxiliary handle	HT		HT-10SW
		4P	F10SW4P	Handle lock device	HL		HL (☆)
Mechanical interlock	MI	3P	MI-16SW3	Electrical operation device	NFM	3P	(*1)
		4P	MI-16SW4			4P	

Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

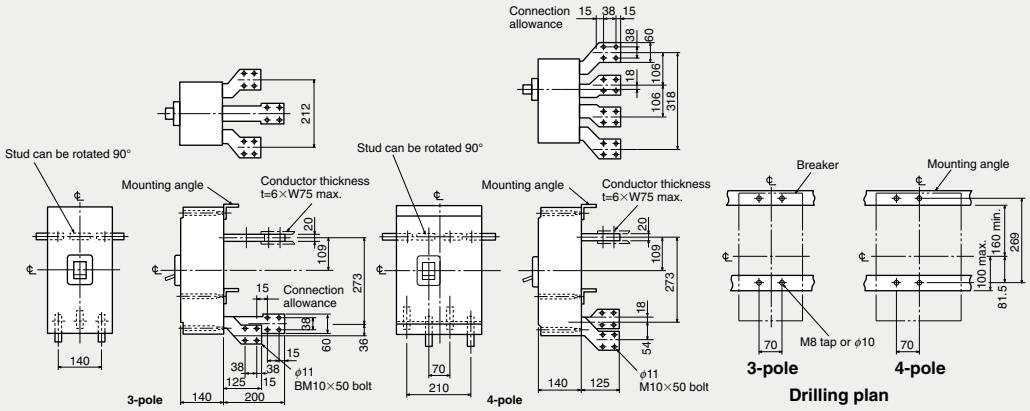
Outline Drawing

Front connection





Rear connection

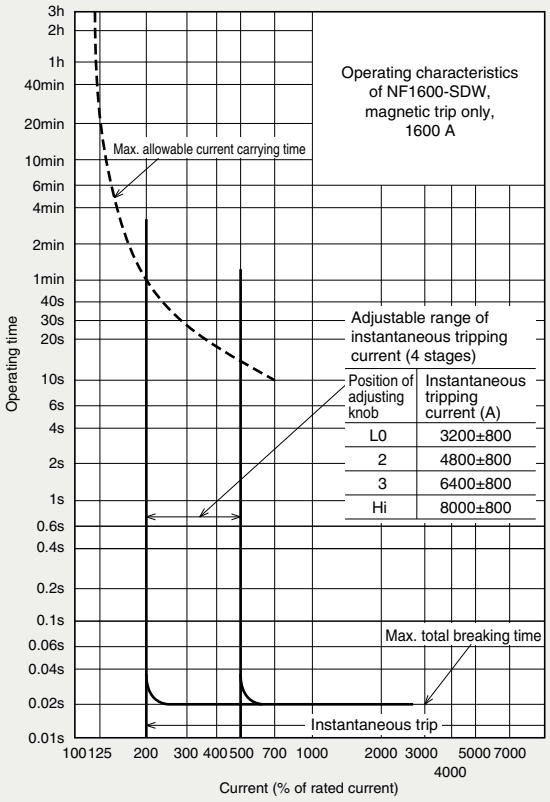


NF1600-SDW

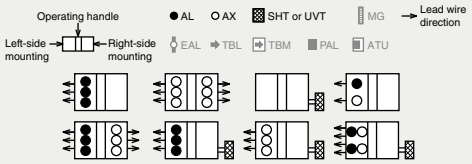
NF1600-SDW

Model				NF1600-SDW
Rated current In (Amp.)				1600
Number of poles				2
Rated insulation voltage Ui (V)				690
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics) Time constant not large than 10msec	DC	250V	40/20
Standard Attached parts			Front connection	Mounting screw: M8×40 (4pcs) Insulating barrier: (2P: 1pc, 3P: 2pcs, 4P: 3pcs) Auxiliary handle: (1pc)
			Rear connection	Mounting screw: M8×40 (4pcs) Auxiliary handle: (1pc)

Operating Characteristics



Internal Accessories



External Accessories

(An order for ☆ should be placed at the same time as an order of circuit breaker main body.)

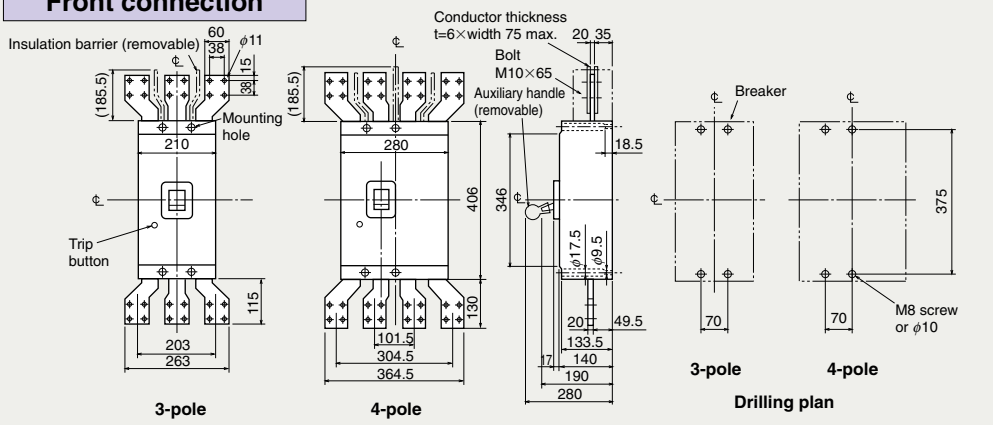
Accessories			Type name	Accessories			Type name
Operating handle	F	2, 3P	F10SW	Auxiliary handle	HT		HT-10SW
		4P	F10SW4P	Handle lock device	HL		HL (☆)
Mechanical interlock	MI	2, 3P	MI-16SW3	Electrical operation device	NFM	2, 3P	(*1)
		4P	MI-16SW4			4P	

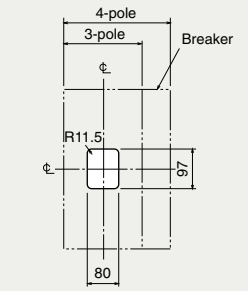
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

Outline Drawing

Front connection

Same dimensions as NF1600-SEW.



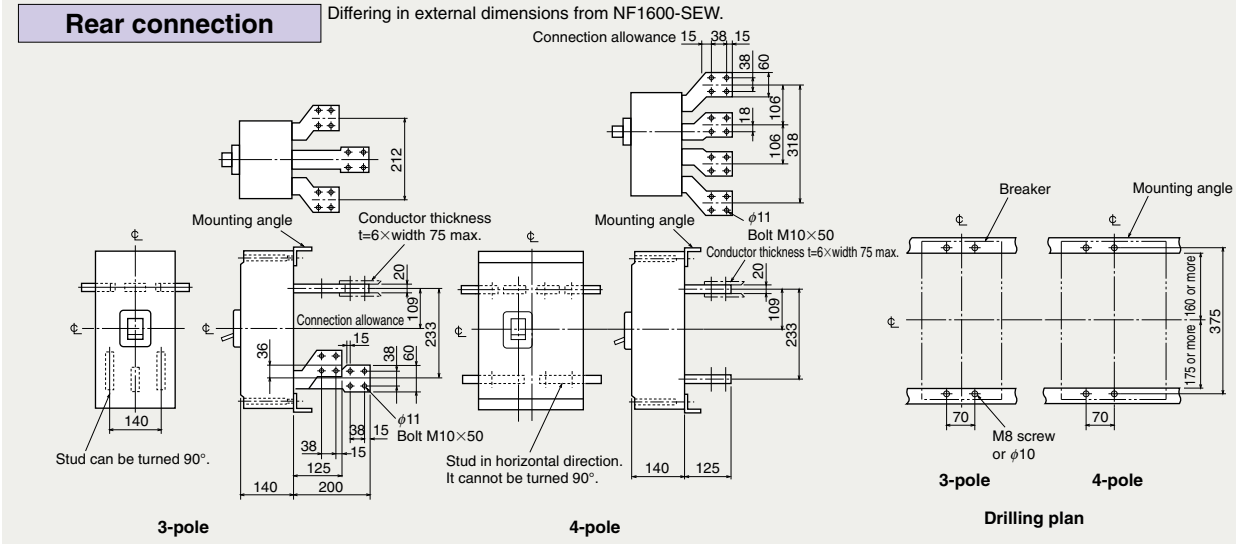


1.0mm clearance on each side of the handle frame

Front-panel cutout

Rear connection

Differing in external dimensions from NF1600-SEW.



Remarks: 1. Standard specification of NF1600-SDW is 2-pole model. 3-pole and 4-pole models are available for DC special voltage.
2. 2-pole models are 3-pole models with the central pole removed.

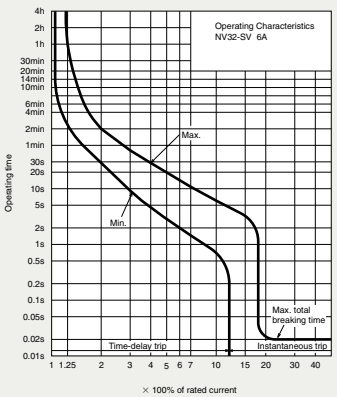
NV32-SV
NV63-CV
NV63-SV
NV63-HV

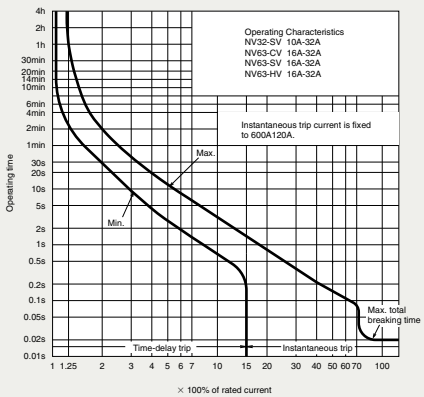
NV63-SV

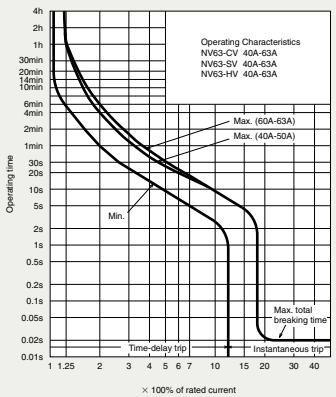
Model				NV32-SV	NV63-CV		NV63-SV		NV63-HV
Rated current In (A)				(5) 6 10 (15) 16 20 25 (30) 32	(5) (10) (15) 16 20 25 (30) 32 40 50 (60) 63		(5) (10) (15) 16 20 25 (30) 32 40 50 (60) 63		(15) 16 20 25 (30) 32 40 50 (60) 63
Number of poles				3	2	3	2	3	3
Phase line				3φ3W, 1φ2W	1φ2W	3φ3W, 1φ2W	1φ2W	3φ3W, 1φ2W	3φ3W, 1φ2W
Rated operational voltage Ue (V)			AC	100-440	100-240	100-440	100-240	100-440	100-440
High-speed type	Rated current sensitivity (mA)			(15) 30 100/200/500 selectable	30	15 30 100/200/500 selectable	(15) 30	(15) 30 100/200/500 selectable	(15) 30 100/200/500 selectable
	Max operating time (s)		at IΔn	0.1	0.1		0.1		0.1
			at 5IΔn	0.04	0.04		0.04		0.04
Time-delay type	Rated current sensitivity (mA)			–	–		–		–
	Max operating time (s)			–	–		–		–
	Inertial operating time (s) (or more)			–	–		–		–
Earth-leakage indication system				Mechanical type (button)	Mechanical type (button)		Mechanical type (button)		Mechanical type (button)
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	440V	5/5	–	2.5/2.5	–	7.5/7.5	10/8
			415V	5/5	–	2.5/2.5	–	7.5/7.5	10/8
			400V	5/5	–	5/5	–	7.5/7.5	10/8
			230V	10/10	7.5/7.5		15/15		25/19
			200V	10/10	7.5/7.5		15/15		25/19
			100V	10/10	7.5/7.5		15/15		25/19
Standard attached parts (Front connection)				Mounting screw: M4×0.7×55 (2pcs) (*1)			Insulation barrier: (2P: 1pc, 3P: 2pcs)		

Note *1 Attached to NV63-SV and NV63-HV.

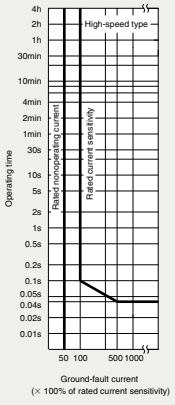
Operating Characteristics





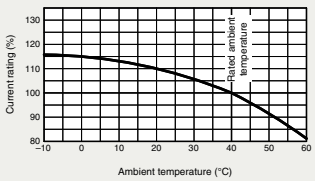


Earth leakage Tripping Characteristics

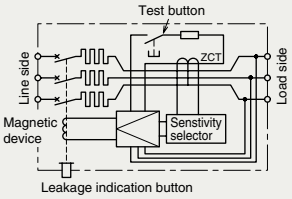


Internal Accessories

Temperature Compensation Curve



Internal Wiring Diagram



External Accessories

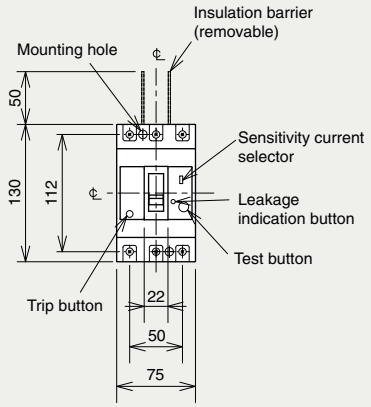
Accessories		Type name
Operating handle	F	F-05SV
	V	V-05SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-05SV

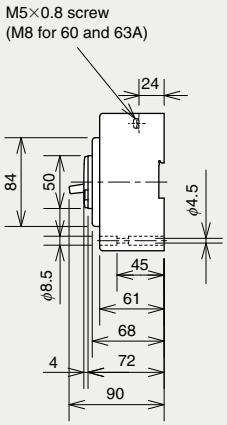
Note *1 HLF types are used for OFF lock and HLN types for ON lock.

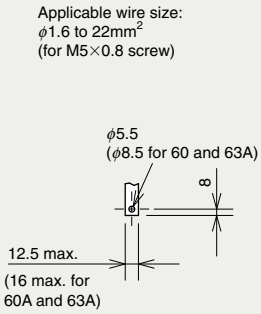
Accessories			Type name
Mechanical interlock		MI	MI-05SV3
Terminal cover	Small	TC-S	TCS-05SV3
	Large	TC-L	TCL-05SV3
			TCL-05SV3L
	Skeleton	TTC	TTC-05SV3
	Rear	BTC	BTC-05SV3
	Plug-in	PTC	PTC-05SV3
IEC 35mm rail mounting adapters			DIN-05SV

Outline Drawing

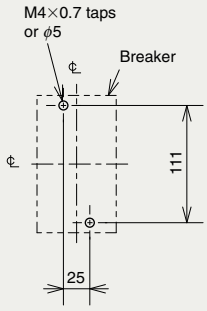
Front connection





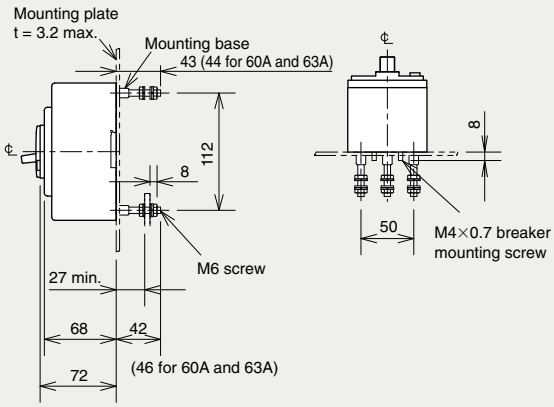


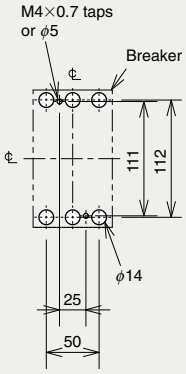
Conductor drilling for direct connection



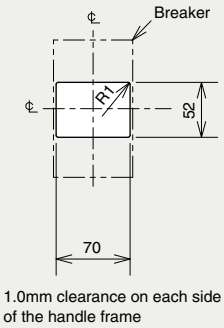
Drilling plan

Rear connection





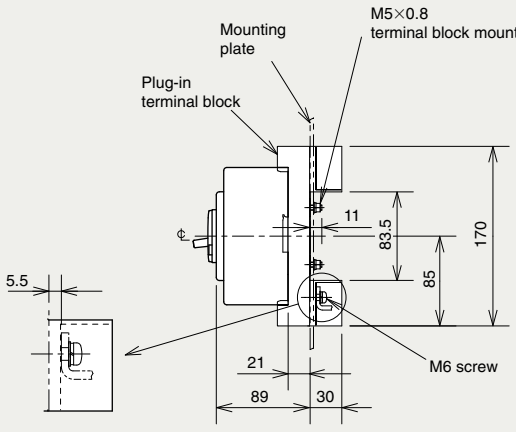
Drilling plan



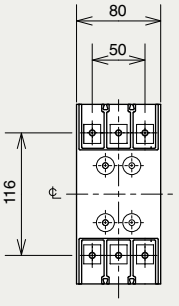
1.0mm clearance on each side of the handle frame

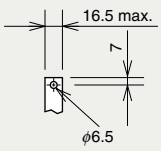
Front-panel cutout

Plug-in

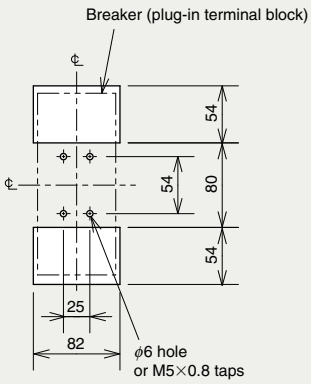


Details of terminal





Conductor drilling



Drilling plan

Remark: 1. 2-pole models are 3-pole models with the central pole removed.

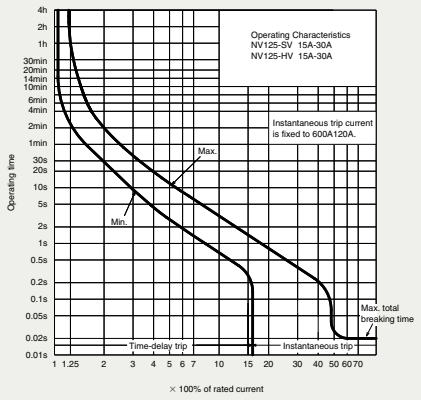
NV125-CV
NV125-SV
NV125-HV

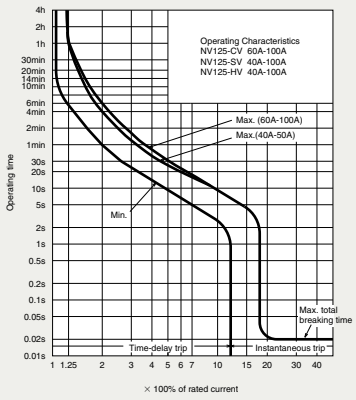
NV125-SV

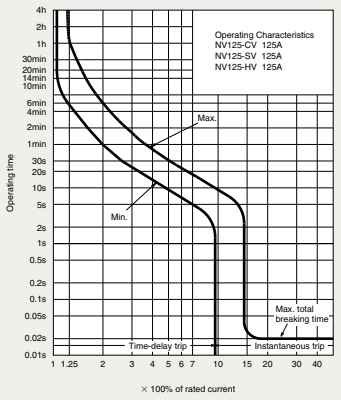
Model				NV125-CV	NV125-SV		NV125-HV	
Rated current In (A)				(60) 63 (75) 80 100 125	(15) 16 20 30 32 40 50 (60) 63 (75) 80 100 125 (*2)		(15) 16 20 (30) 32 40 50 (60) 63 75 80 100 125 (*2)	
Number of poles				3	3	4	3	4
Phase line				3φ3W, 1φ2W	3φ3W, 1φ2W	3φ4W	3φ3W, 1φ2W	3φ4W
Rated operational voltage Ue (V)			AC	100-440	100-440	200-440	100-440	200-440
High-speed type	Rated current sensitivity (mA)			(15) 30 100/200/500 selectable	30 100/200/500 selectable		(30) 100/200/500 selectable	
	Max operating time (s)		at IΔn	0.1	0.1		0.1	
			at 5IΔn	0.04	0.04		0.04	
Time-delay type	Rated current sensitivity (mA)			(100/200/500 selectable)	(100/200/500 selectable)		(100/200/500 selectable)	
	Max operating time (s)			(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)		(0.45/1.0/2.0 selectable)	
	Inertial operating time (s) (or more)			(0.1/0.5/1.0)	(0.1/0.5/1.0)		(0.1/0.5/1.0)	
Earth-leakage indication system				Mechanical type (button)	Mechanical type (button)		Mechanical type (button)	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	440V	10/5	25/25		50/38	
			415V	10/5	30/30		50/38	
			400V	10/5	30/30		50/38	
			230V	30/15	50/50		100/75	
			200V	30/15	50/50		100/75	
			100V	30/15	50/50	–	100/75	–
Standard attached parts (Front connection)				Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) (*1) Insulation barrier: (3P: 2pcs, 4P: 3pcs)				

Notes *1 Attached to NV125-SV and NV125-HV.
*2 In case of time delay type, rated current is produced with 20 amp. or more.

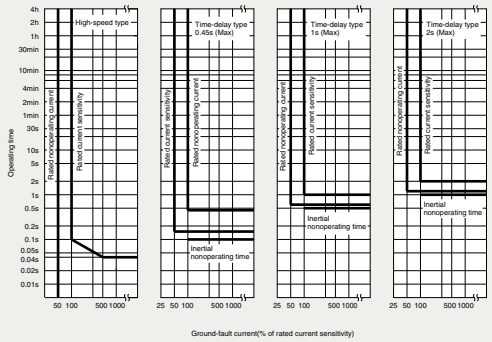
Operating Characteristics



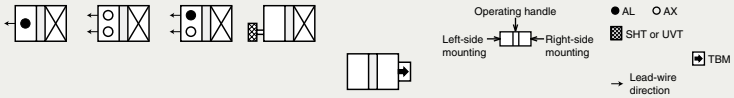




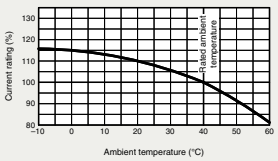
Earth leakage Tripping Characteristics



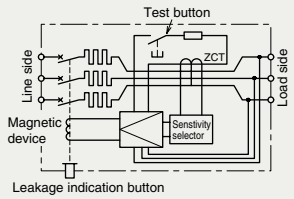
Internal Accessories



Temperature Compensation Curve



Internal Wiring Diagram



External Accessories

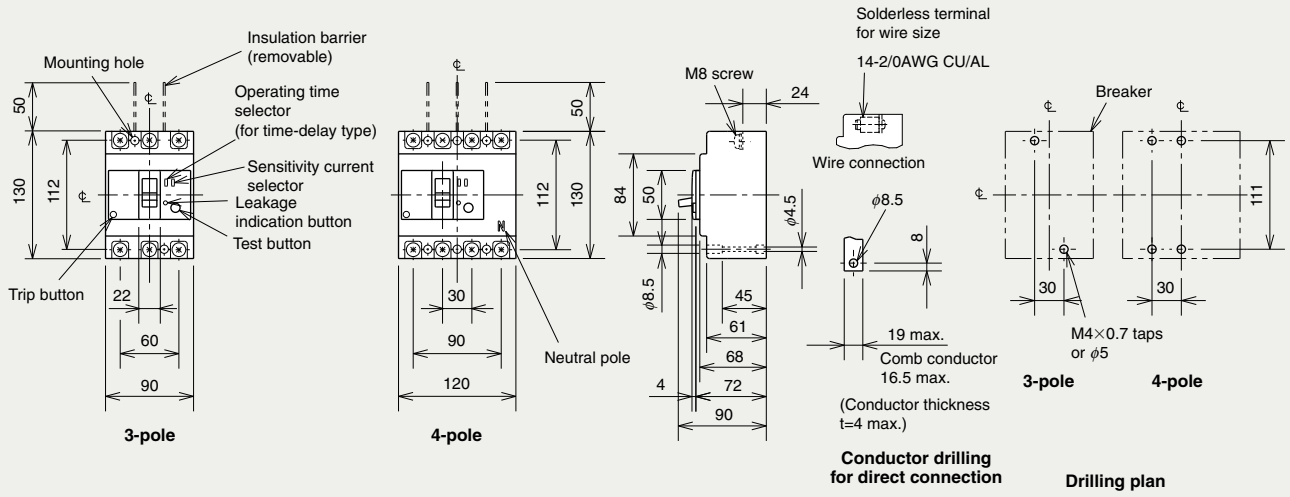
Accessories		Type name
Operating handle	F	F-1SV
	V	V-1SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-05SV

Accessories				Type name
Mechanical interlock		MI	3P	MI-05SV3
			4P	MI-1SV4
Terminal cover	Small	TC-S		TCS-1SV3
	Large	TC-L	3P	TCL-1SV3
			4P	TCL-1SV4
	Skeleton	TTC		TTC-1SV3
	Rear	BTC		BTC-1SV3
	Plug-in	PTC		PTC-1SV3
Electrical operation device				(*2)

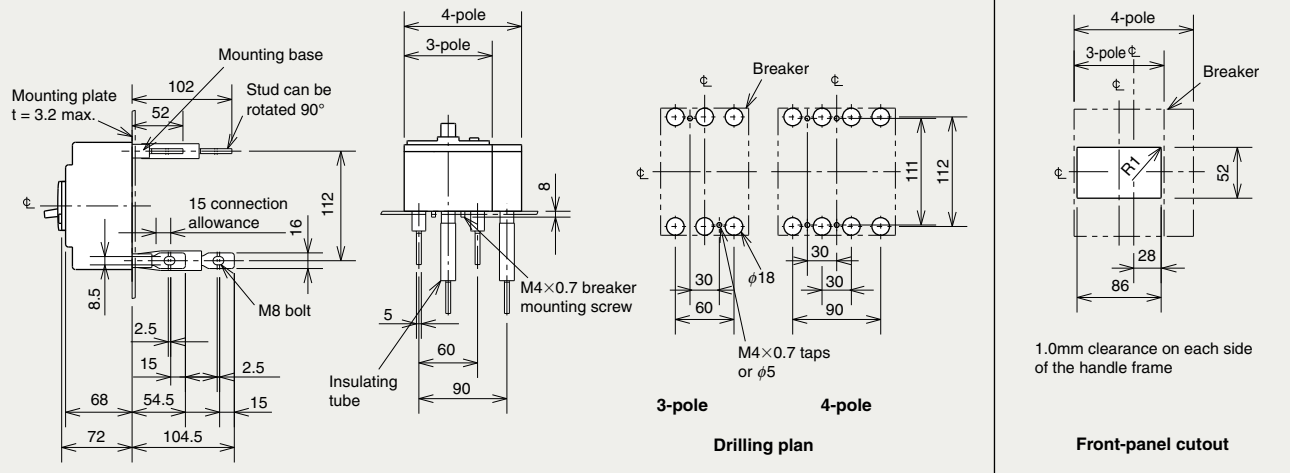
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

Outline Drawing

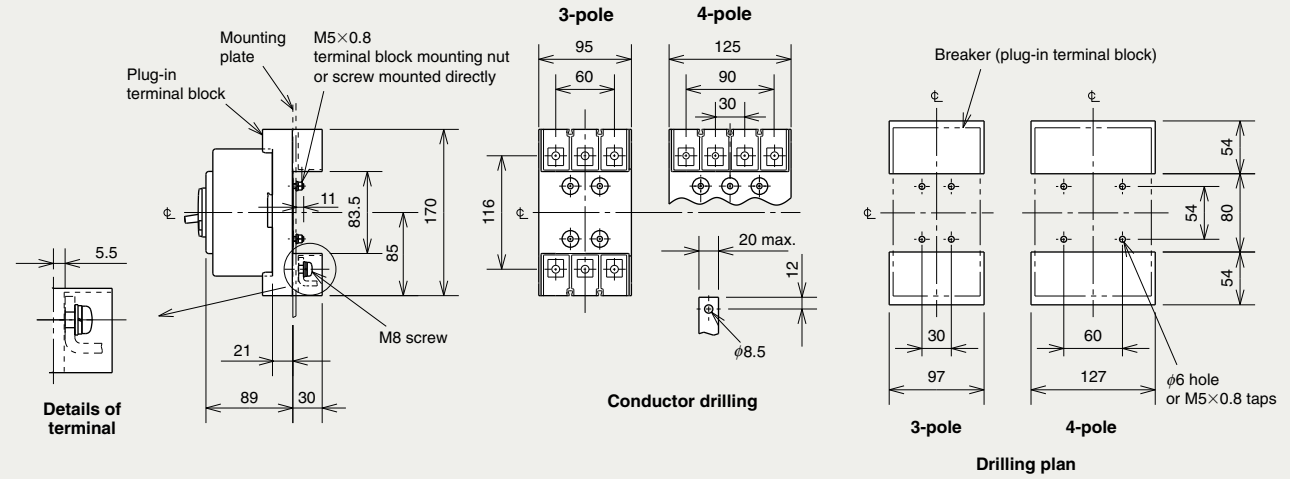
Front connection



Rear connection



Plug-in



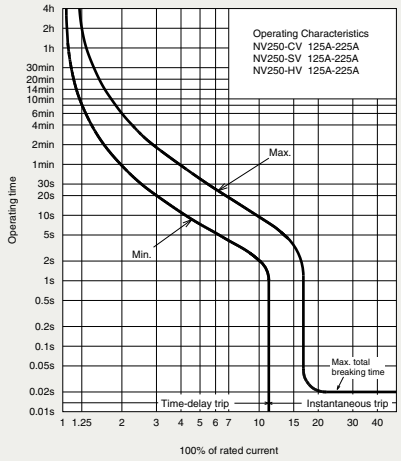
Remark: 1. Only 3-pole models are available for NV125-CV.

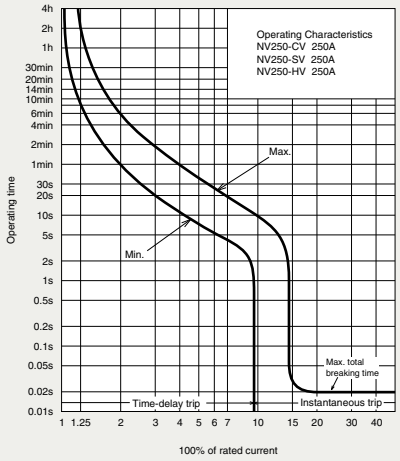
NV250-CV
NV250-SV
NV250-HV

NV250-CV

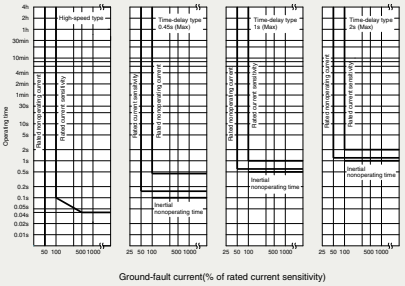
Model				NV250-CV	NV250-SV		NV250-HV	
Rated current In (A)				125 150 175 200 225 250	125 150 175 200 225 250		125 150 175 200 225 250	
Number of poles				3	3	4	3	4
Phase line				3φ3W, 1φ2W	3φ3W, 1φ2W	3φ4W	3φ3W, 1φ2W	3φ4W
Rated operational voltage Ue (V)			AC	100-440	100-440	200-440	100-440	200-440
High-speed type	Rated current sensitivity (mA)			30 100/200/500 selectable	(30) 100/200/500 selectable		(30) 100/200/500 selectable	
	Max operating time (s)	at IΔn		0.1	0.1		0.1	
		at 5IΔn		0.04	0.04		0.04	
Time-delay type	Rated current sensitivity (mA)			(100/200/500 selectable)	(100/200/500 selectable)		(100/200/500 selectable)	
	Max operating time (s)			(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)		(0.45/1.0/2.0 selectable)	
	Inertial operating time (s) (or more)			(0.1/0.5/1.0)	(0.1/0.5/1.0)		(0.1/0.5/1.0)	
Earth-leakage indication system				Mechanical type (button)	Mechanical type (button)		Mechanical type (button)	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	440V	15/12	36/36		65/65	
			415V	25/19	36/36		70/70	
			400V	25/19	36/36		75/75	
			230V	36/27	85/85		100/100	
			200V	36/27	85/85		100/100	
			100V	36/27	85/85	–	100/100	
Standard attached parts (Front connection)				Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)				

Operating Characteristics

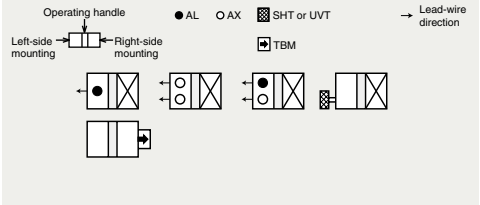




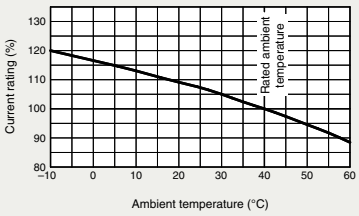
Earth leakage Tripping Characteristics



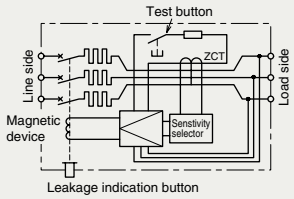
Internal Accessories



Temperature Compensation Curve



Internal Wiring Diagram



External Accessories

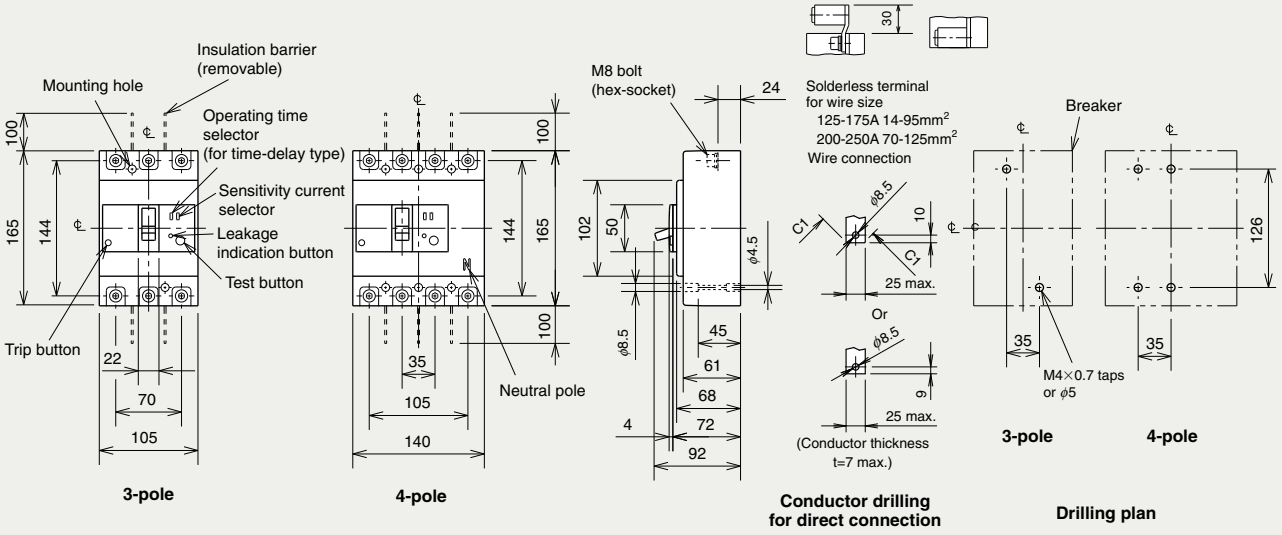
Accessories		Type name
Operating handle	F	F-2SV
	V	V-2SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-2SV

Accessories				Type name
Mechanical interlock		MI	3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	3P	TCS-2SV3
	Large	TC-L	3P	TCL-2SV3
				TCL-2SV3L
			4P	TCL-2SV4
	Skeleton	TTC	3P	TTC-2SV3
	Rear	BTC	3P	BTC-2SV3
	Plug-in	PTC	3P	PTC-2SV3
Electrical operation device				(*2)

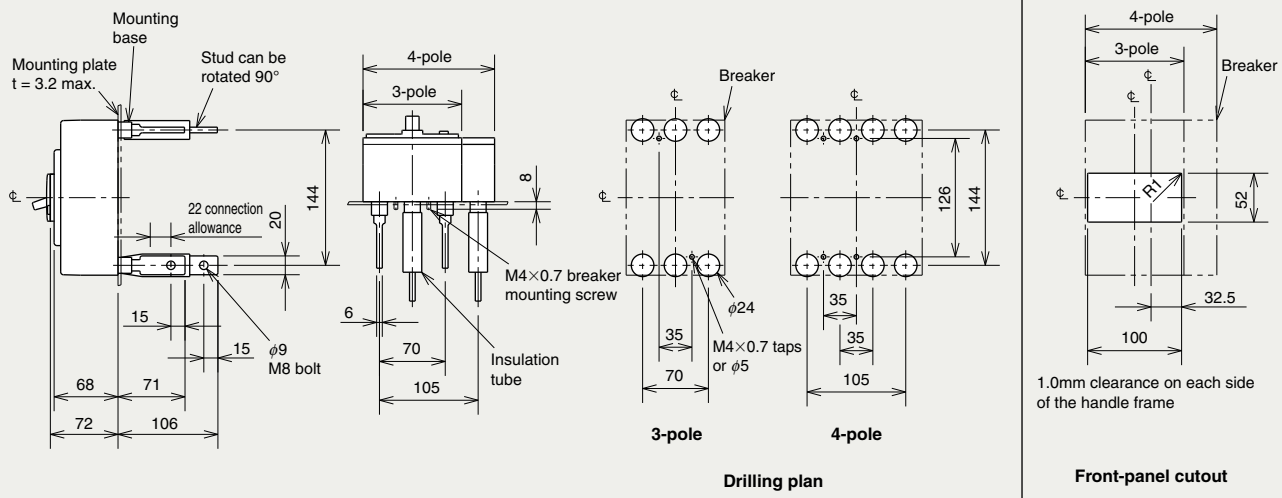
Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

Outline Drawing

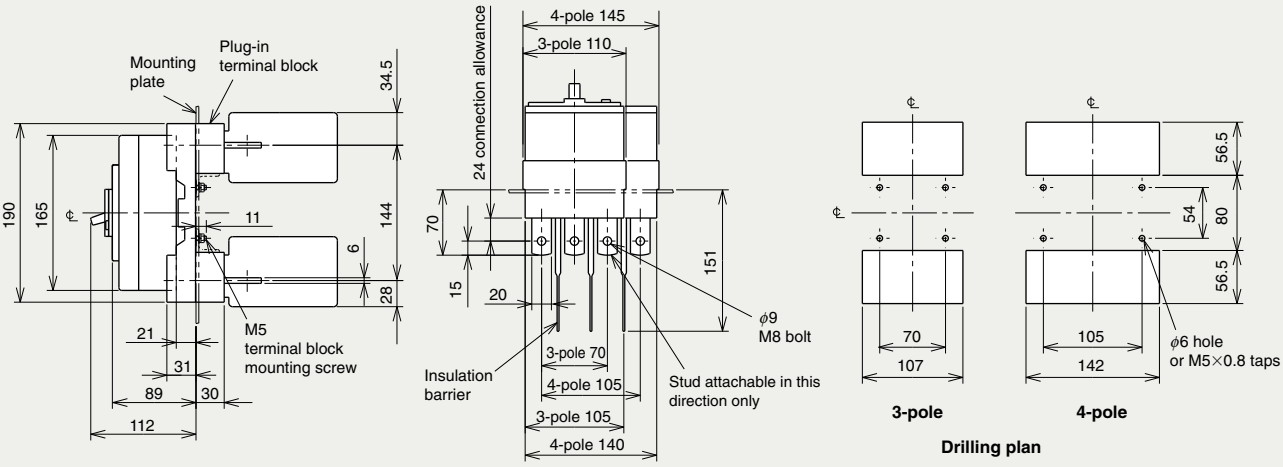
Front connection



Rear connection



Plug-in



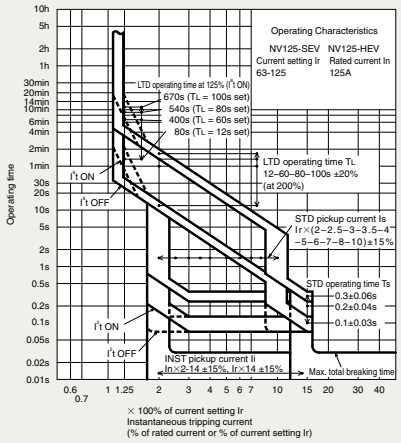
Remark: 1. Only 3-pole models are available for the model of NV250-CV.

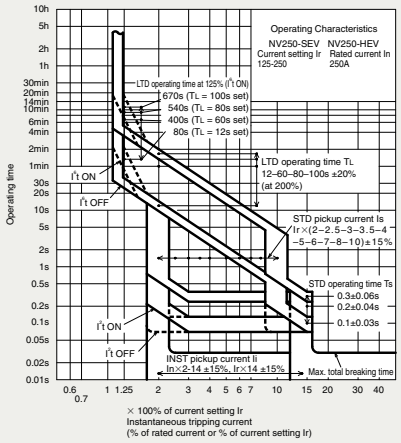
NV125-SEV NV125-HEV NV250-SEV NV250-HEV

NV250-SEV

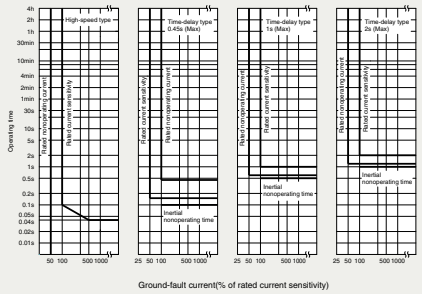
Model				NV125-SEV	NV125-HEV	NV250-SEV	NV250-HEV
Rated current In (A)				125	125	250	250
Current setting Ir (A)				63-125	63-125	125-250	125-250
Number of poles				3 / 4	3 / 4	3	3
Phase line type				3φ3W, 1φ2W / 3φ4W	3φ3W, 1φ2W / 3φ4W	3φ3W, 1φ2W	3φ3W, 1φ2W
Rated operational voltage Ui			V	440	440	440	440
Rated operational voltage Ue (V)			AC	100-440	100-440	100-440	100-440
High-speed type	Rated current sensitivity (mA)			(30) 100/200/500 selectable	(30) 100/200/500 selectable	(30) 100/200/500 selectable	(30) 100/200/500 selectable
	Max operating time (s)		at IΔn	0.1	0.1	0.1	0.1
			at 5IΔn	0.04	0.04	0.04	0.04
Time-delay type	Rated current sensitivity (mA)			(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)	(100/200/500 selectable)
	Max operating time (s)			(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)	(0.45/1.0/2.0 selectable)
	Inertial operating time (s) (or more)			(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)
Earth-leakage indication system				Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	440V	36/36	65/65	36/36	65/65
			415V	36/36	70/70	36/36	70/70
			400V	36/36	75/75	36/36	75/75
			230V	85/85	100/100	85/85	100/100
			200V	85/85	100/100	85/85	100/100
			100V	85/85	100/100	85/85	100/100
Standard attached parts (Front connection)				Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)			

Operating Characteristics

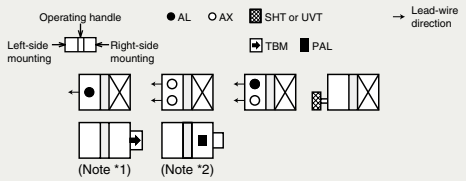




Earth leakage Tripping Characteristics

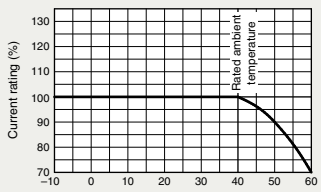


Internal Accessories



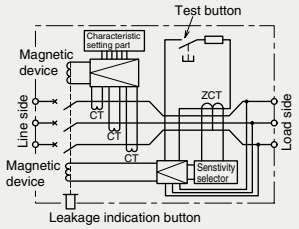
Notes *1 For the 24VDC TBM only instruct us of a control voltage. (The standard shared voltage is 100-240VAC/100-240VDC.)
*2 SLT-equipped is standard. Control voltage (100-200VAC) is necessary.

Current Reducing Curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40°C.

Internal Wiring Diagram



External Accessories

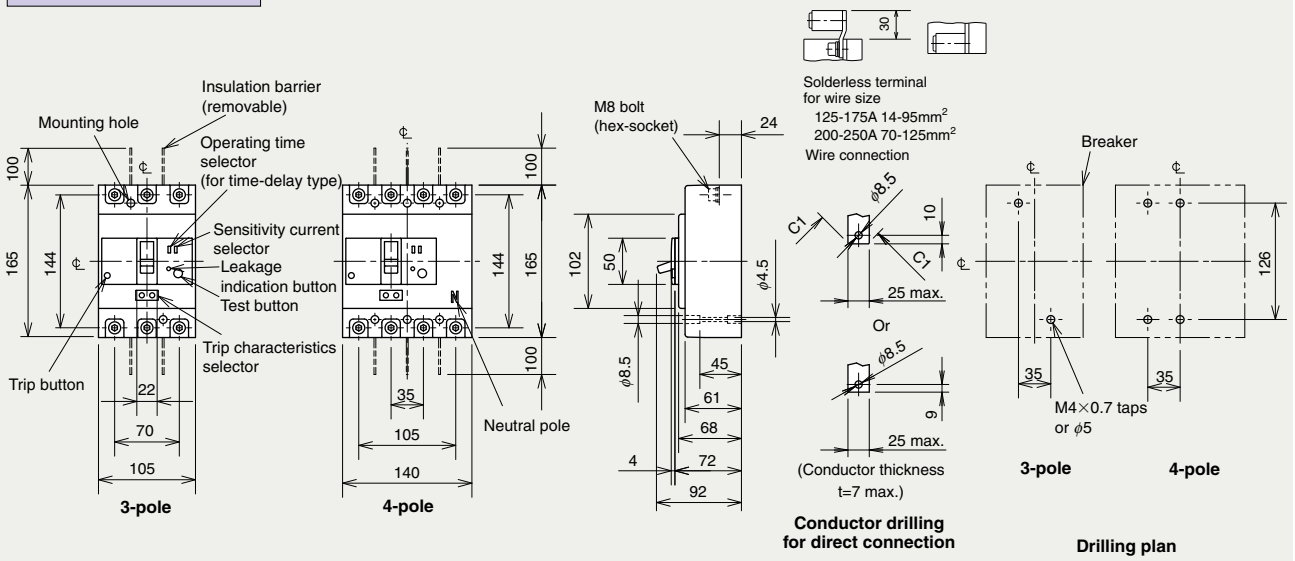
Accessories		Type name
Operating handle	F	F-2SV
	V	V-2SV
Handle lock device	LC	LC-05SV
	HL (*1)	HLF-05SV
		HLN-05SV
	HL-S	HLS-2SV

Notes *1 HLF types are used for OFF lock and HLN types for ON lock.
*2 Specify the working voltage.

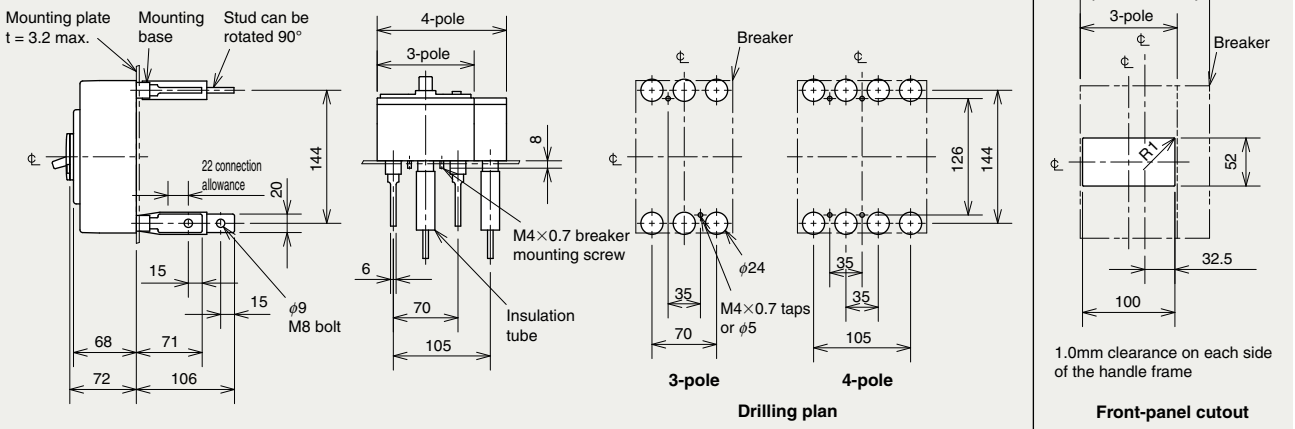
Accessories				Type name
Mechanical interlock		MI	3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	3P	TCS-2SV3
	Large	TC-L	3P	TCL-2SV3
				TCL-2SV3L
			4P	TCL-2SV4
	Skeleton	TTC	3P	TTC-2SV3
	Rear	BTC	3P	BTC-2SV3
	Plug-in	PTC	3P	PTC-2SV3
Electrical operation device				(*2)

Outline Drawing

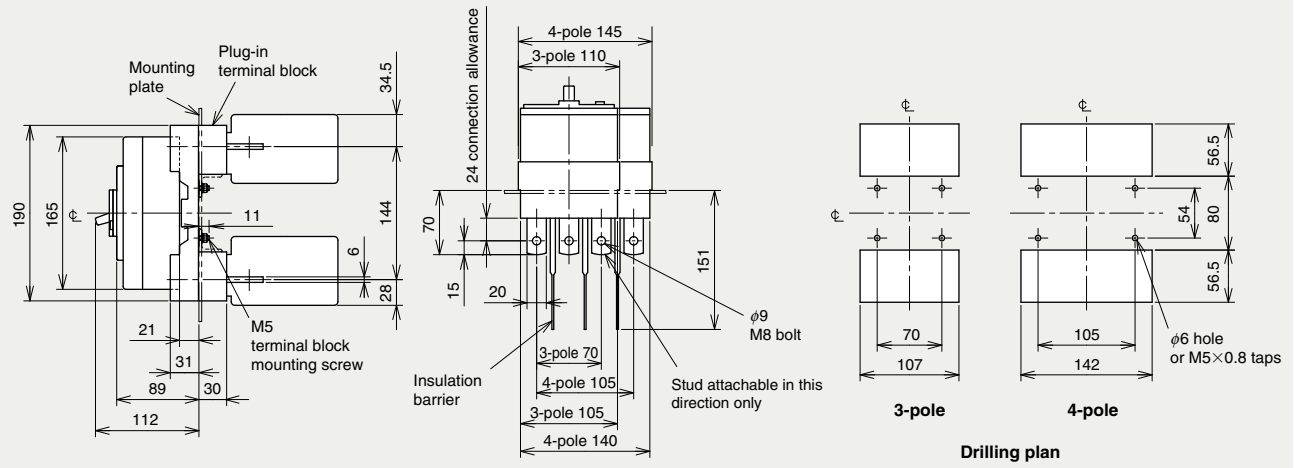
Front connection



Rear connection



Plug-in



Remark: 1. Only 3-pole models are available for the model of NV250-SEV and NV250-HEV.

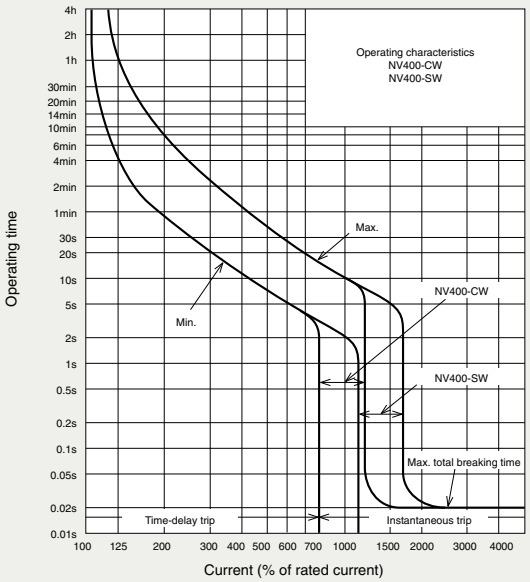
NV400-CW
NV400-SW

NV400-SW

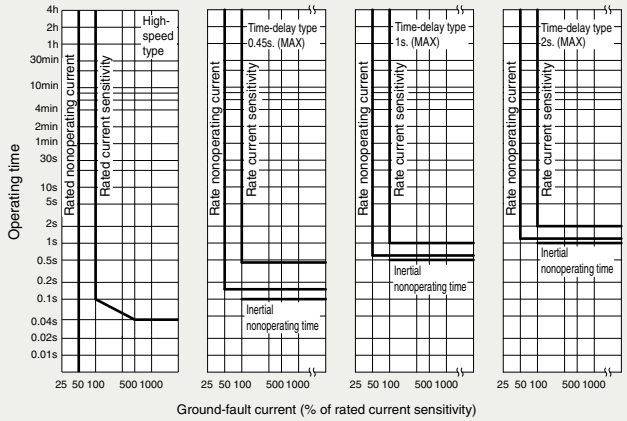
Model			NV400-CW	NV400-SW
Number of poles			3	
Rated operational voltage Ue (V AC) (*1)			100-440 Multi-voltage type	
Rated current In (A)			250 300 350 400	
High-speed type	Rated current sensitivity IΔn (mA)		(30) 100 · 200 · 500 Selectable	
	Max. operating time at 5IΔn (s)		0.04	
Time-delay type	Rated current sensitivity IΔn (mA)		(100 · 200 · 500 Selectable)	
	Max. operating time at 2IΔn (s)		(0.45 · 1.0 · 2.0 Selectable)	
	Inertial non-operating time at 2IΔn (s)		(0.1 · 0.5 · 1.0)	
Earth-leakage indication system			Button	
Rated short-circuit breaking capacity (kA) IEC 60947-2 (Icu/Ics) EN 60947-2	AC	440V	25/13	42/42
		400V	36/18	45/45
		230V	50/25	85/85
Standard attached parts (Front connection)			Mounting screw: M6×60 (4pcs) Insulation barrier: (4pcs)	

Note *1 Rated operational voltage of time-delay type is for 200-440V.

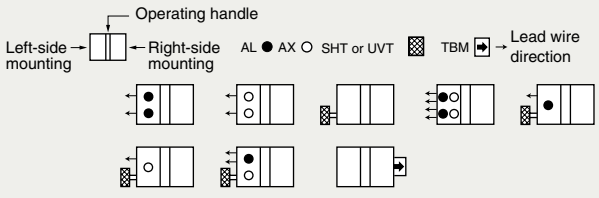
Operating Characteristics



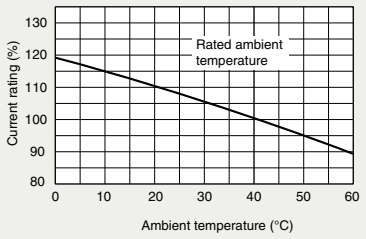
Earth Leakage Tripping Characteristics



Internal Accessories



Temperature Compensation Curve



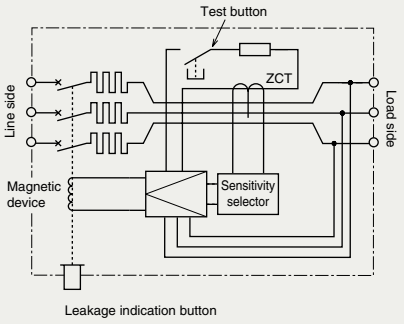
External Accessories

Accessories		Type name
Operating handle	F	F-4S
	V	V-4S
Mechanical interlock	MI	MI-4SW3

Accessories			Type name
Auxiliary handle		HT	HT-4CW, HT-4SW
Terminal cover	Large	TC-L	TCL-4SW3
	Skeleton	TTC	TTC-4SW3
	Rear	BTC	BTC-4SW3
Handle lock device		HL	HL-4CW, HL-4SW
		HL-S	HLS-4SW
Electrical operation device			(*1)

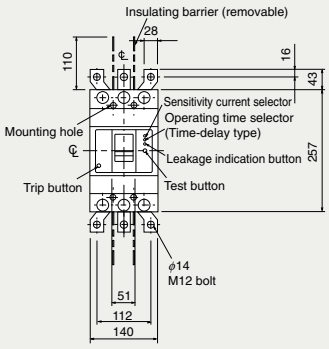
Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

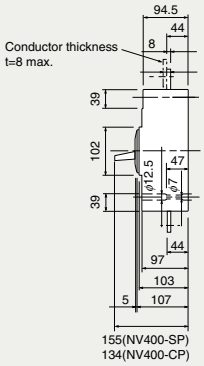
Internal Wiring Diagram

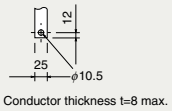


Outline Drawing

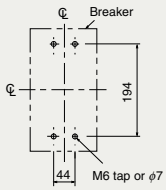
Front connection



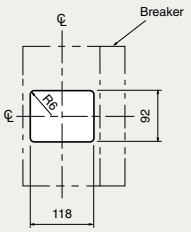




Conductor drilling for direct connection



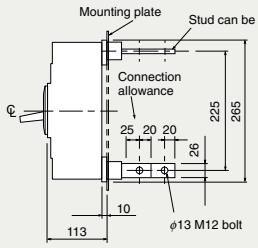
Drilling plan

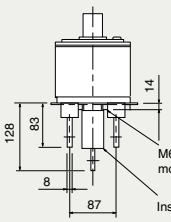


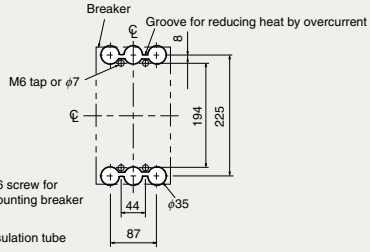
1.0mm clearance on each side of the handle frame.

Front-panel cutout

Rear connection



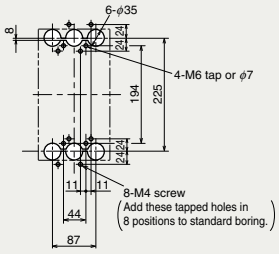




Drilling plan

Boring dimensions for rear connection type barriers (3-pole)

Line side



Load side

Note The bore dimensional drawing shows the breaker viewed from the rear.

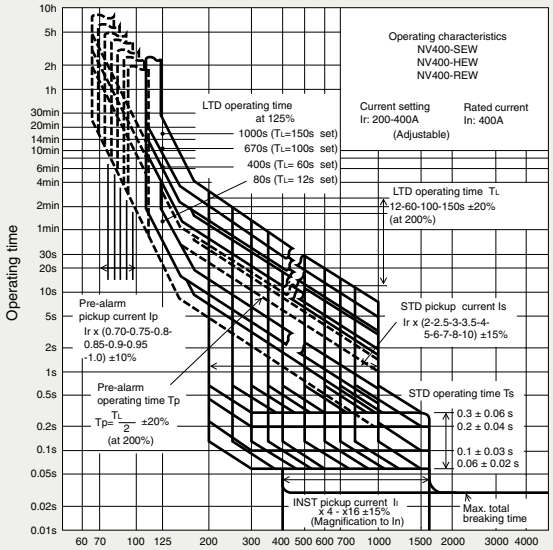
NV400-SEW
NV400-HEW
NV400-REW

NV400-SEW

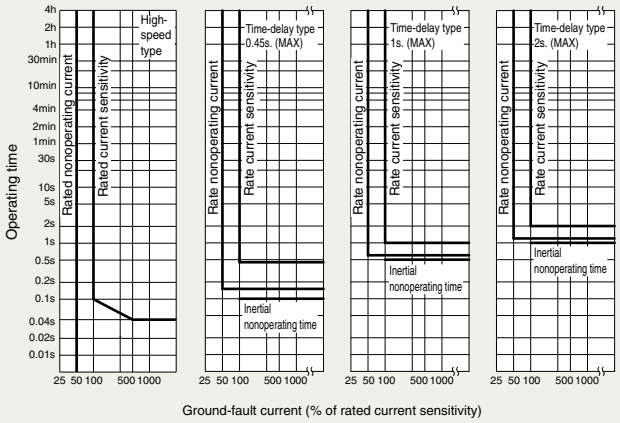
Model			NV400-SEW		NV400-HEW		NV400-REW
Number of poles			3	4	3	4	3
Rated operational voltage Ue (V AC) (*1)			100-440 Multi-voltage type				
Rated current In (A)			200-400 adjustable				
High-speed type	Rated current sensitivity IΔn (mA)		(30) 100 · 200 · 500 Selectable				
	Max. operating time at 5IΔn (s)		0.04				
Time-delay type	Rated current sensitivity IΔn (mA)		(100 · 200 · 500 Selectable)				
	Max. operating time at 5IΔn (s)		(0.45 · 1.0 · 2.0 Selectable)				
	Max. inertial non-operating time at 2IΔn (s)		(0.1 · 0.5 · 1.0)				
Earth-leakage indication system			Button				
Rated short-circuit breaking capacity (kA) IEC 60947-2 (Icu/Ics) EN 60947-2	AC	440V	42/42		65/65		125/63
		400V	50/50		70/70		125/63
		230V	85/85		100/100		150/75
Standard attached parts (Front connection)			Mounting screw: M6×72 (4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)				

Note *1 Rated operational voltage of time-delay type is for 200-440V.

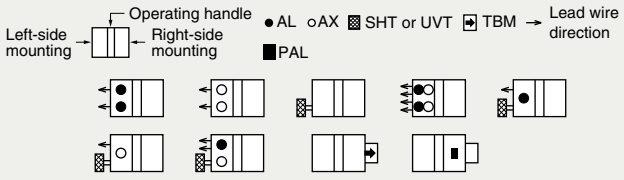
Operating Characteristics



Earth Leakage Tripping Characteristics

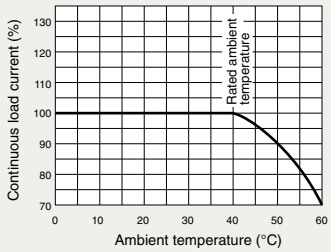


Internal Accessories



Remarks: 1. Instead of TBM, pre-alarm module (PAL) can be attached.

Current Reducing Curve



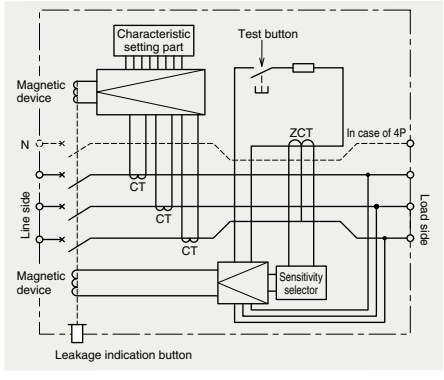
External Accessories

Accessories			Type name
Operating handle	F		F-4S
	V		V-4S
Mechanical interlock	MI	3P	MI-4SW3
		4P	MI-4SW4

Accessories				Type name
Auxiliary handle		HT		HT-4SW
Terminal cover	Large	TC-L	3P	TCL-4SW3 (*1)
			4P	TCL-4SW4 (*1)
	Skeleton	TTC	3P	TTC-4SW3
			4P	TTC-4SW4
	Rear	BTC	3P	BTC-4SW3 (*2)
			4P	BTC-4SW4
Handle lock device		HL		HL-4SW
		HL-S		HLS-4SW
Electrical operation device		NVM	3P	(*3)
			4P	

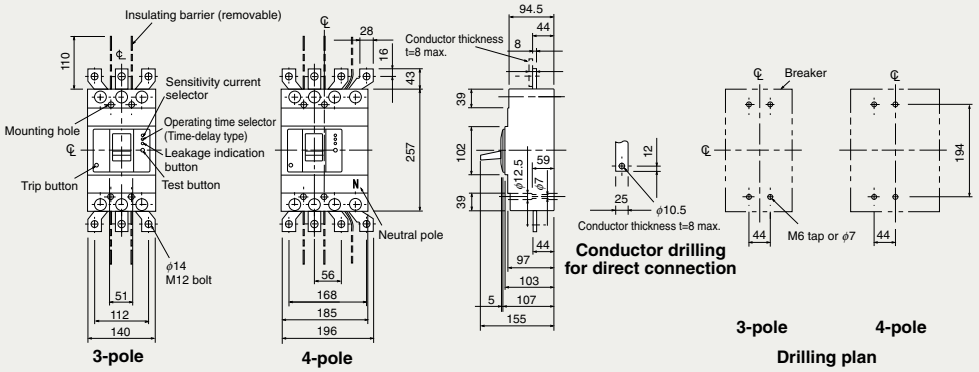
Notes *1 This is for NV400-SEW.
*2 This is for NV400-SEW. For rear terminal cover of NV400-HEW/REW, use PTC-4SW3.
*3 Specify the operation method and voltage. Order in combination with the breaker unit.

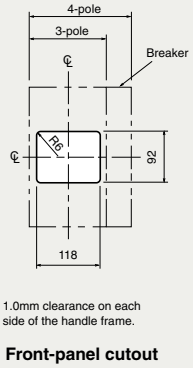
Internal Wiring Diagram



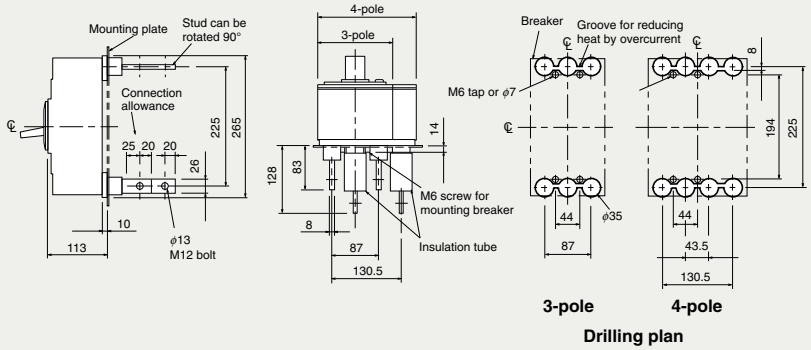
Outline Drawing

Front connection

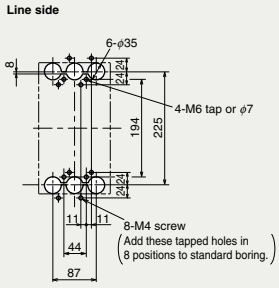




Rear connection



Boring dimensions for rear connection type barriers (3-pole)



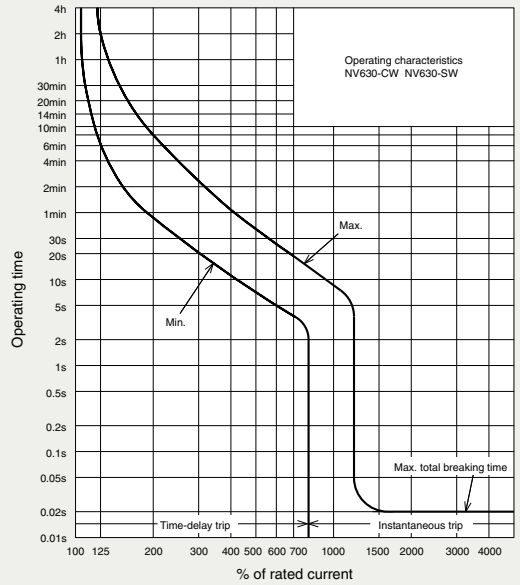
Note The bore dimensional drawing shows the breaker viewed from the rear.

NV630-CW
NV630-SW

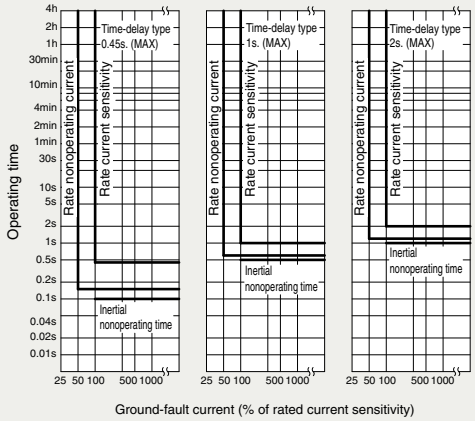
NV630-SW

Model			NV630-CW	NV630-SW
Number of poles			3	
Rated operational voltage Ue (V AC)			100-440 Multi-voltage type	
Rated current In (A)			500 600 630	
High-speed type	Rated current sensitivity IΔn (mA)		–	
	Max. operating time at 5IΔn (s)		–	
Time-delay type	Rated current sensitivity IΔn (mA)		100 · 200 · 500 Selectable	
	Max. operating time at 5IΔn (s)		0.45 · 1.0 · 2.0 Selectable	
	Max. inertial non-operating time at 2IΔn (s)		0.1 · 0.5 · 1.0	
Earth-leakage indication system			Button	
Rated short-circuit breaking capacity (kA) IEC 60947-2 (Icu/Ics) EN 60947-2	AC	440V	36/18	42/42
		400V	36/18	50/50
		230V	50/25	85/85
Standard attached parts (Front connection)			Mounting screw: M6×72 (4pcs) Insulation barrier: (4pcs)	

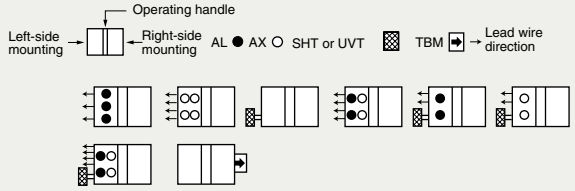
Operating Characteristics



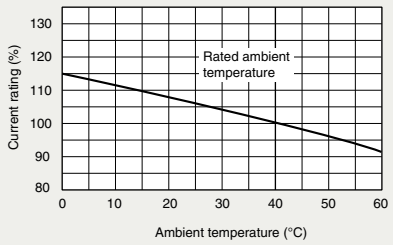
Earth Leakage Tripping Characteristics



Internal Accessories



Temperature Compensation Curve



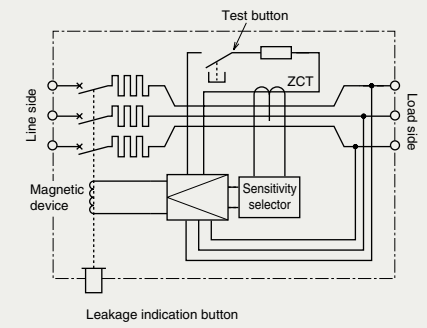
External Accessories

Accessories		Type name
Operating handle	F	F-4S
	V	V-4S
Mechanical interlock	MI	MI-4SW3

Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

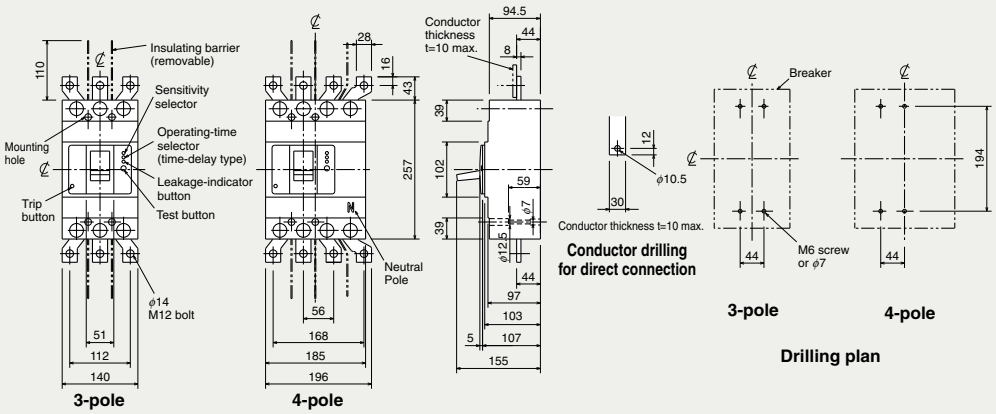
Accessories			Type name
Auxiliary handle		HT	HT-4SW
Terminal cover	Large	TC-L	TCL-4SW3
	Skeleton	TTC	TTC-4SW3
	Rear	BTC	BTC-4SW3
Handle lock device		HL	HL-4SW
		HL-S	HLS-4SW
Electrical operation device			(*1)

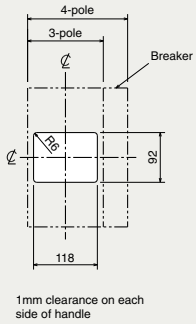
Internal Wiring Diagram



Outline Drawing

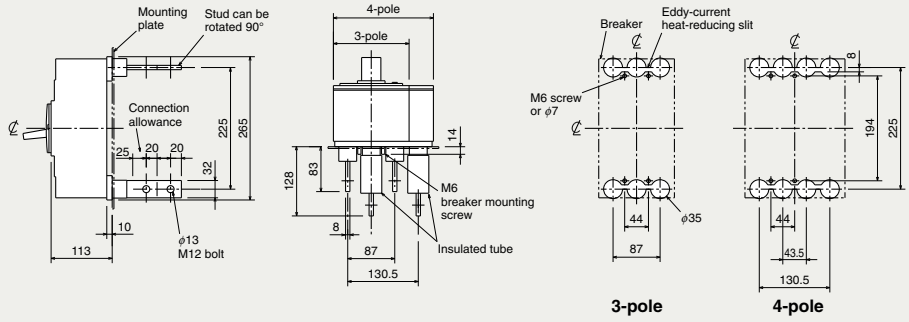
Front connection



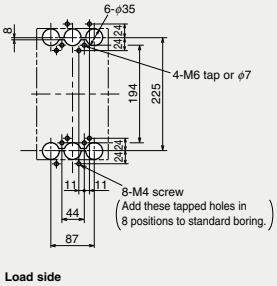


Front-plate cutout

Rear connection



Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

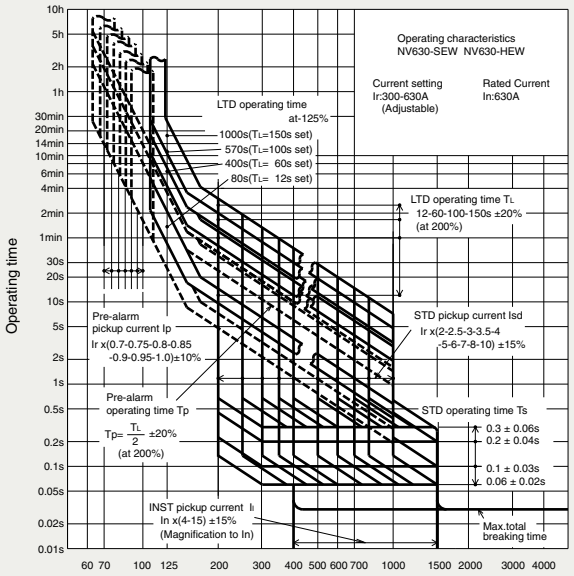
NV630-SEW
NV630-HEW

NV630-SEW

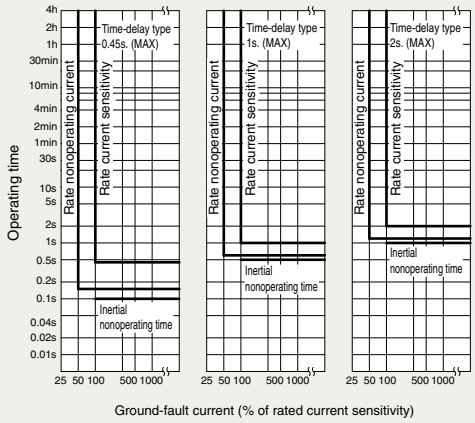
Model		NV630-SEW		NV630-HEW
Number of poles		3	4	3
Rated operational voltage Ue (V AC) (*1)		100-440 Multi-voltage type		
Rated current In (A)		300-630 adjustable		
High-speed type	Rated current sensitivity IΔn (mA)	–		
	Max. operating time at 5IΔn (s)	–		
Time-delay type	Rated current sensitivity IΔn (mA)	(100 · 200 · 500 Selectable)		
	Max. operating time at 5IΔn (s)	(0.45 · 1.0 · 2.0 Selectable)		
	Max. inertial non-operating time at 2IΔn (s)	(0.1 · 0.5 · 1.0)		
Earth-leakage indication system		Button		
Rated short-circuit breaking capacity (kA) IEC 60947-2 (Icu/Ics) EN 60947-2	AC 440V	42/42		65/65
	AC 400V	50/50		70/70
	AC 230V	85/85		100/100
Standard attached parts (Front connection)		Mounting screw: M6×72 (4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)		

Note *1 Rated operational voltage of time-delay type is for 200-440V.

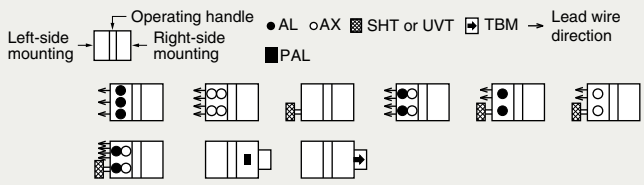
Operating Characteristics



Earth Leakage Tripping Characteristics

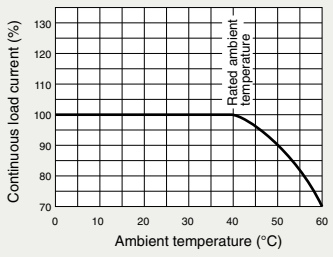


Internal Accessories



Remarks: 1. Instead of TBM, pre-alarm module (PAL) can be attached.

Current Reducing Curve



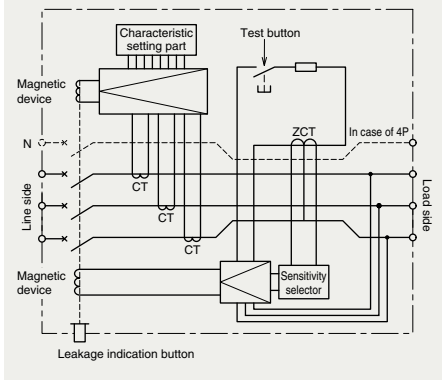
External Accessories

Accessories			Type name
Operating handle	F		F-4S
	V		V-4S
Mechanical interlock	MI	3P	MI-4SW3
		4P	MI-4SW4

Accessories				Type name
Auxiliary handle		HT		HT-4SW
Terminal cover	Large	TC-L	3P	TCL-4SW3 (*1)
			4P	TCL-4SW4 (*1)
	Skeleton	TTC	3P	TTC-4SW3
			4P	TTC-4SW4
	Rear	BTC	3P	BTC-4SW3 (*2)
			4P	BTC-4SW4
Handle lock device		HL		HL-4SW
		HL-S		HLS-4SW
Electrical operation device		NVM	3P	(*3)
			4P	

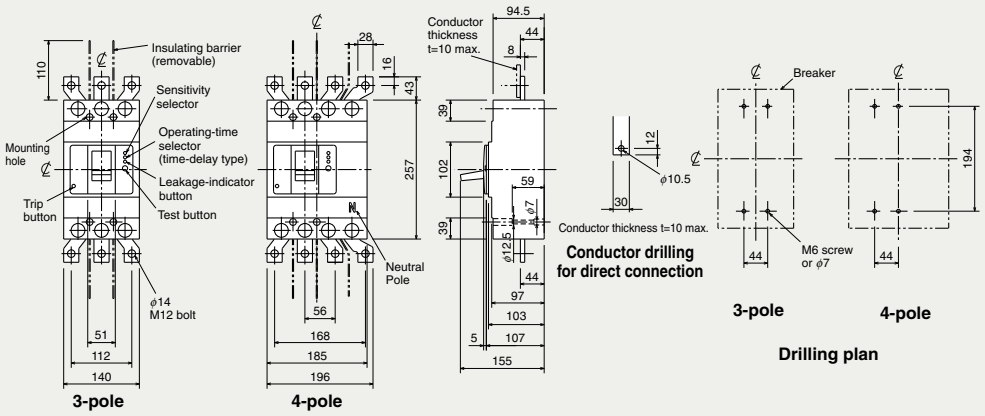
Notes *1 This is for NV630-SEW.
*2 This is for NV630-SEW. For rear terminal cover of NV630-HEW, use PTC-4SW3.
*3 Specify the operation method and voltage. Order in combination with the breaker unit.

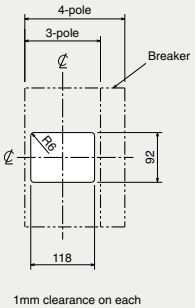
Internal Wiring Diagram



Outline Drawing

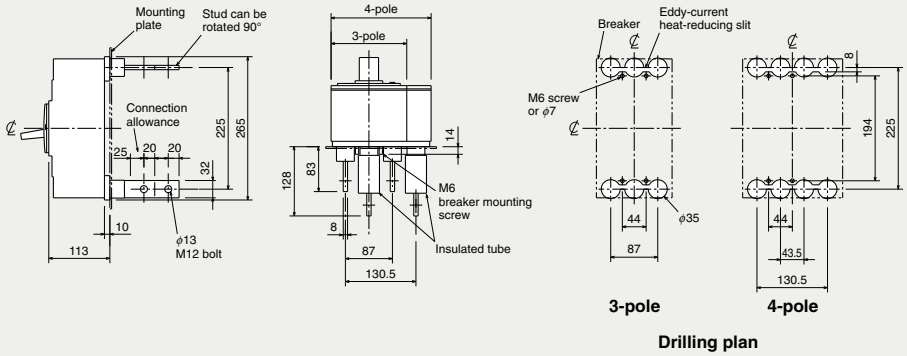
Front connection



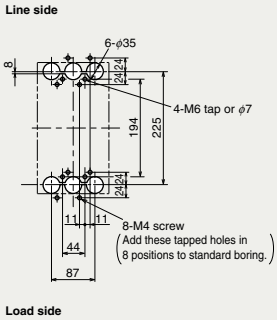


Front-plate cutout

Rear connection



Boring dimensions for rear connection type barriers (3-pole)



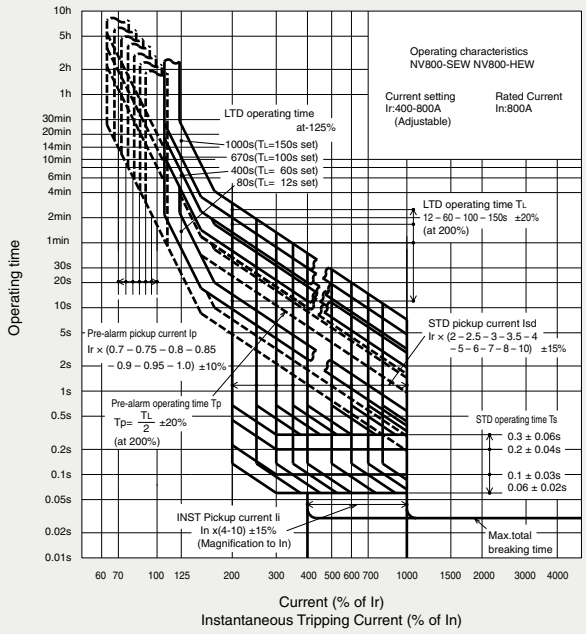
Note The bore dimensional drawing shows the breaker viewed from the rear.

NV800-SEW
NV800-HEW

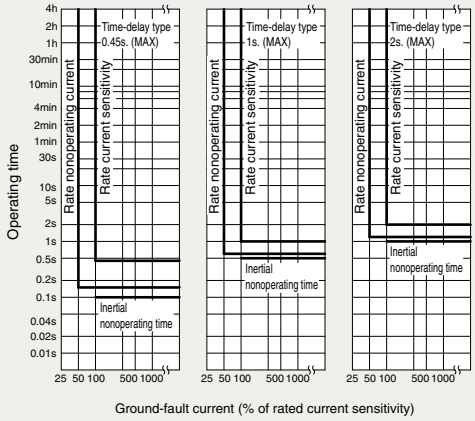
NV800-SEW

Model			NV800-SEW	NV800-HEW
Number of poles			3	
Rated operational voltage Ue (V AC)			100-440 Multi-voltage type	
Rated current In (A)			400-800 adjustable	
High-speed type	Rated current sensitivity IΔn (mA)		–	
	Max. operating time at 5IΔn (s)		–	
Time-delay type	Rated current sensitivity IΔn (mA)		100 · 200 · 500 Selectable	
	Max. operating time at 5IΔn (s)		0.45 · 1.0 · 2.0 Selectable	
	Max. inertial non-operating time at 2IΔn (s)		0.1 · 0.5 · 1.0	
Earth-leakage indication system			Button	
Rated short-circuit breaking capacity (kA) IEC 60947-2 (Icu/Ics) EN 60947-2	AC	440V	42/42	65/65
		400V	50/50	70/70
		230V	85/85	100/100
Standard attached parts (Front connection)			Mounting screw: M6×35 (4pcs) Insulation barrier: (2pcs)	

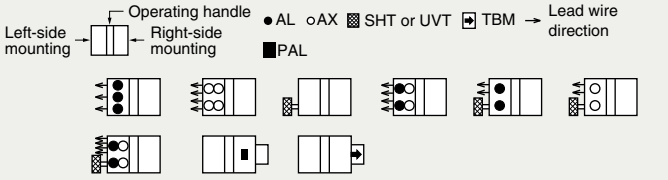
Operating Characteristics



Earth Leakage Tripping Characteristics

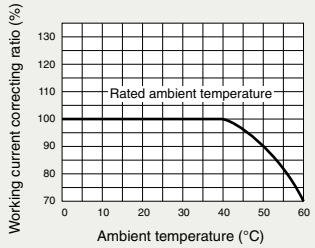


Internal Accessories



Remarks: 1. Instead of TBM, pre-alarm module (PAL) or trip indicator (TI) can be attached.

Current Reducing Curve



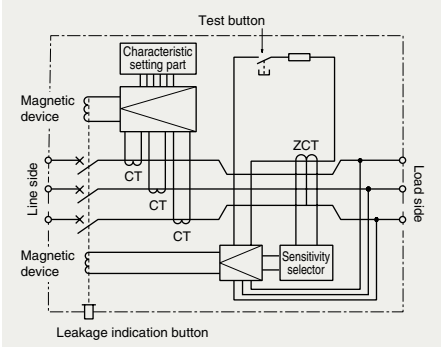
External Accessories

Accessories		Type name
Operating handle	F	F-8S
	V	V-8S
Mechanical interlock	MI	MI-8SW3

Note *1 Specify the operation method and voltage. Order in combination with the breaker unit.

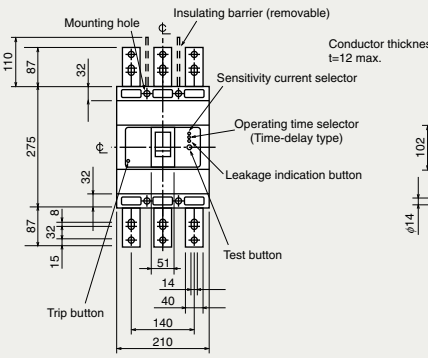
Accessories			Type name
Auxiliary handle		HT	HT-4SW
Terminal cover	Large	TC-L	TCL-8SW3
	Skeleton	TTC	TTC-8SW3
	Rear	BTC	BTC-8SW3
Handle lock device		HL	HL-4SW
		HL-S	HLS-8SW
Electrical operation device			(*1)

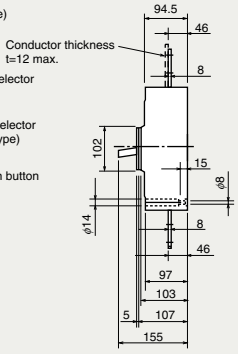
Internal Wiring Diagram

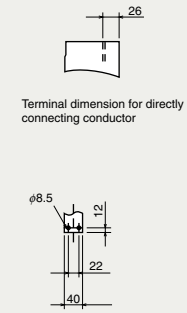


Outline Drawing

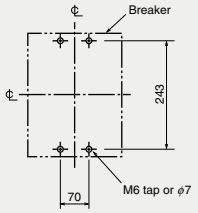
Front connection



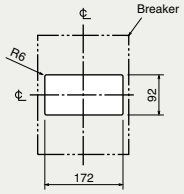




Conductor drilling for direct connection



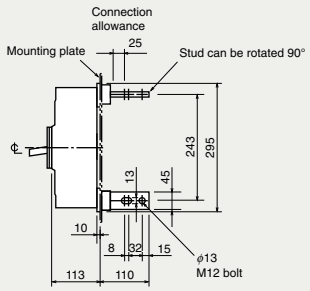
Drilling plan

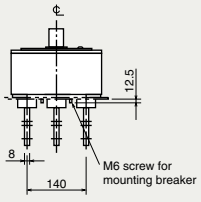


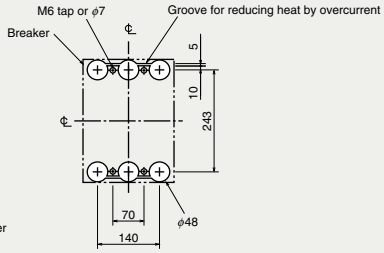
1.0mm clearance on each side of the handle frame.

Front-panel cutout

Rear connection

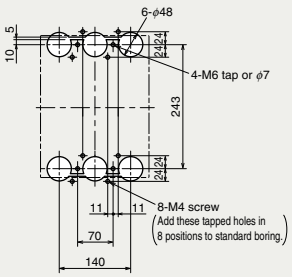






Drilling plan

Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

NF50-SVFU NV50-SVFU

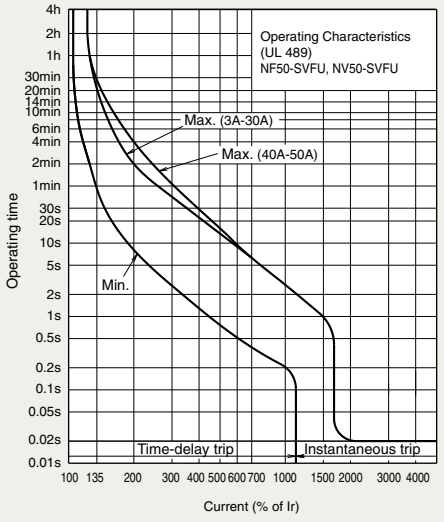
NF50-SVFU

Model				NF50-SVFU	Model				NV50-SVFU	
Rated current In (A) Rated ambient temperature 40°C				(3) 5 10 15 20 30 40 50	Rated current In (A) Rated ambient temperature 40°C				(5) (10) 15 20 30 40 50	
Number of poles				2 3	Number of poles				2	3
Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage VAC		240	Phase line				1φ2W	3φ3W 1φ2W
		AC	600Y/347V	–	Rated voltage VAC	UL 489			120-240	
			480V	–		IEC 60947-2 EN 60947-2			100-240	100-440
			480Y/277V	–	High-speed type	Rated current sensitivity IΔn mA			30 50	30 50 100
			240V	14		Pick-up current UL 1053			75% of IΔn	
			120V	–		Operating time (sec) within AT 5IΔn			0.04 (*1)	
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui V		440		Earth-leakage indication system			Indicator window	
		AC	690V	–	Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	AC	480V	–	
			500V	–				240V	14	
			440V	7.5/4				120V	14	
			415V	10/5		IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	–	7.5/4
			400V	10/5				400V	–	10/5
			380V	10/5				230V	15/8	15/8
			230V	15/8				100V	15/8	15/8
Standard attached parts (Front connection)				IEC35 rail mounting claws						

Note *1 0.1 for UL1053.
Remark: 1. The mounting screws must be prepared by the user. (Recommended size: M4×0.7×65 (2 pcs).)

Operating Characteristics

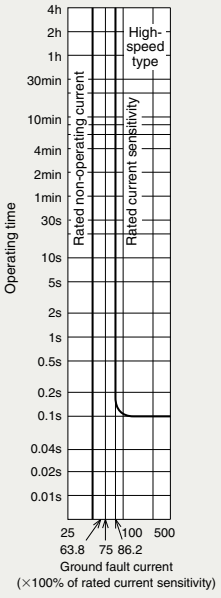
(The CE and CCC characteristics are noted differently. Contact us for more information.)



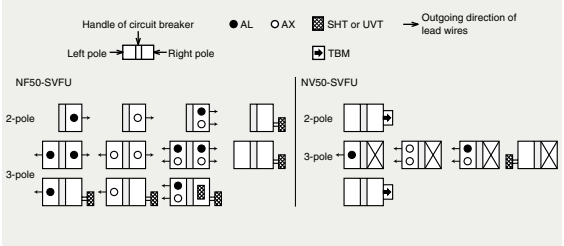
Earth Leakage Tripping Characteristics

(The CE and CCC characteristics are noted differently. Contact us for more information.)

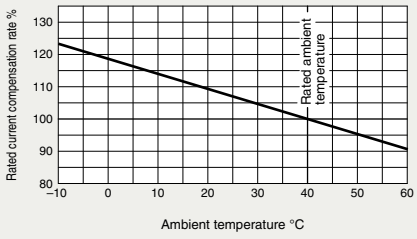
NV50-SVFU
(UL 1053)



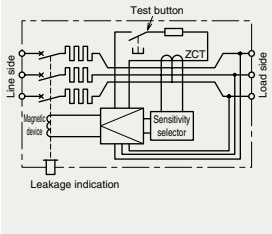
Internal Accessories



Temperature Compensation Curve



Internal Wiring Diagram

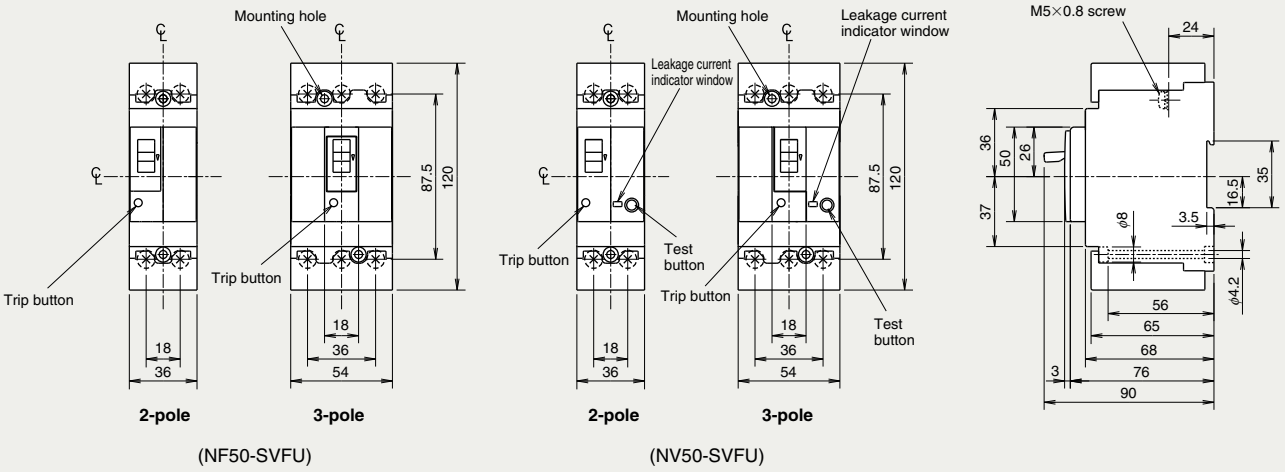


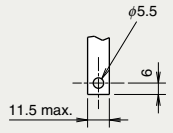
External Accessories

Accessories			Type name	Accessories				Type name
Operating handle	F	2P	F-03SVUL2	Terminal cover	Large	TC-L	2P	TCL-03SVU2
		3P	F-03SVUL				3P	TCL-03SVU3
	V	2P	V-03SVUL2					
		3P	V-03SVUL					
Handle lock device	HL		HLF-03SVU					
	HL-S		HLS-03SVU					

Outline Drawing

Front connection





(Conductor thickness t=4 max.)

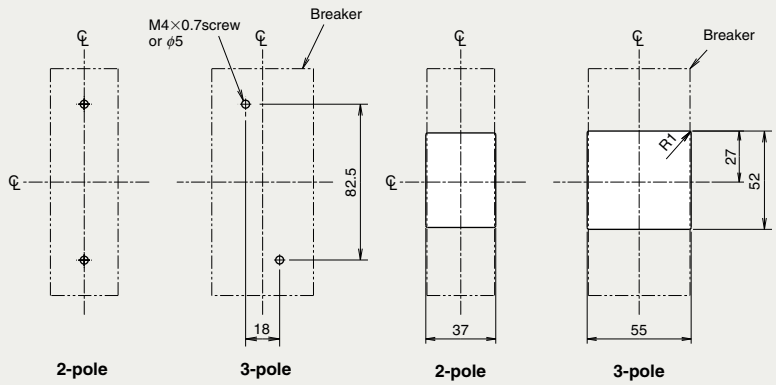
Conductor drilling for direct connection

Remarks: 1. The mounting screws are not enclosed with the breaker.
2. The wires cannot be connected directly.

Compatible crimp terminals Tightening torque 22lb-in (2.5N·m)

Applicable wire range (*1)		Crimp terminal type (*2)	
mm²	AWG (#) (60°C/75°C)	JST	NTM
1.04-2.63	16-14	R2-5 2-M5 V2-5 V2-M5	R2-5 R2-5M
2.63-4.6	12	-	R3.5-5S R3.5-5L
2.63-6.64	12-10	R5.5-5 V5.5-5	R5.5-5 R5.5-5S R5.5-5N
6.64-10.52	8	R8-5	R8-5 R8-5S
10.52-16.78	6	R14-5 14-NK5	R14-5 R14-5S
16.78-26.66	4	22-S5 22-S6	R22-5S

JST: Japan Solderless Terminal Mfg. Co.
NTM: Nichifu Co., Ltd.
Notes *1 14AWG or lager to comply with UL Standards.
*2 When using with a wire connection, use the crimp terminal combination shown above.



The drilling dimensions have a 1.0 mm clearance on each side of breaker window frame.

Drilling plan **Front panel drilling plan**

NF100-CVFU NV100-CVFU

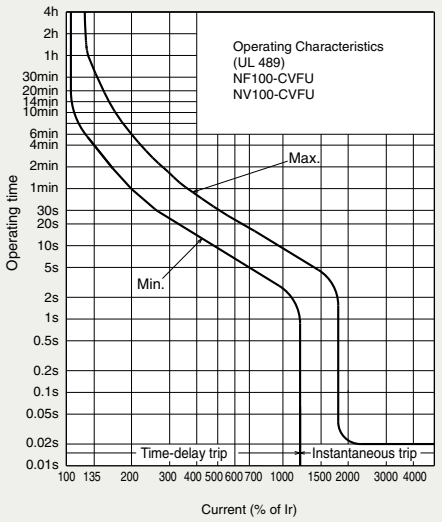
NF100-CVFU

Model				NF100-CVFU	Model				NV100-CVFU
Rated current In (A) Rated ambient temperature 40°C				60 (70) 75 (80) (90) 100	Rated current In (A) Rated ambient temperature 40°C				60 (70) 75 (80) (90) 100
					Number of poles				3
					Phase line				3φ3W 1φ2W
Number of poles				2 3	Rated voltage VAC	UL 489			120-240
Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage VAC		240		IEC 60947-2 EN 60947-2			100-440
		AC	600Y/347V	–	High-speed type	Rated current sensitivity IΔn mA			30/50/ 100/200/500 selectable
			480V	–		Pick-up current UL 1053			75% of IΔn
			480Y/277V	–		Operating time (sec) within AT 5IΔn			0.04 (*1)
			240V	14					
			120V	–					
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui V		600	Earth-leakage indication system				Mechanical button
		AC	690V	–	Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	AC	480V	–
			500V	7.5/4				240V	14
			440V	10/5				120V	14
			415V	10/5		IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	10/5
			400V	10/5				400V	10/5
			380V	10/5				230V	15/8
			230V	15/8				100V	15/8
Standard attached parts (Front connection)				IEC35 rail mounting claws, Insulating barrier (2P: 2pcs, 3P: 4pcs) (Only for type with bar terminal) Mounting screw M4×0.7×55 (2 screws)					

Note *1 0.1 for UL1053.

Operating Characteristics

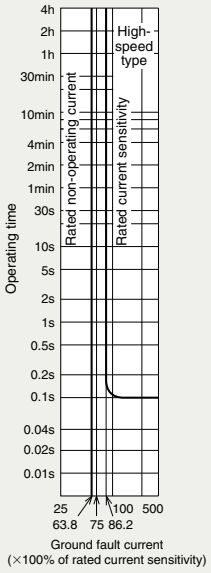
(The CE and CCC characteristics are noted differently. Contact us for more information.)



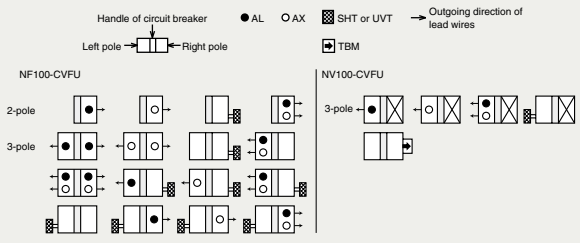
Earth Leakage Tripping Characteristics

(The CE and CCC characteristics are noted differently. Contact us for more information.)

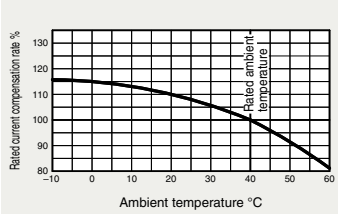
NV100-CVFU
(UL 1053)



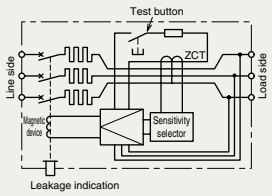
Internal Accessories



Temperature Compensation Curve



Internal Wiring Diagram

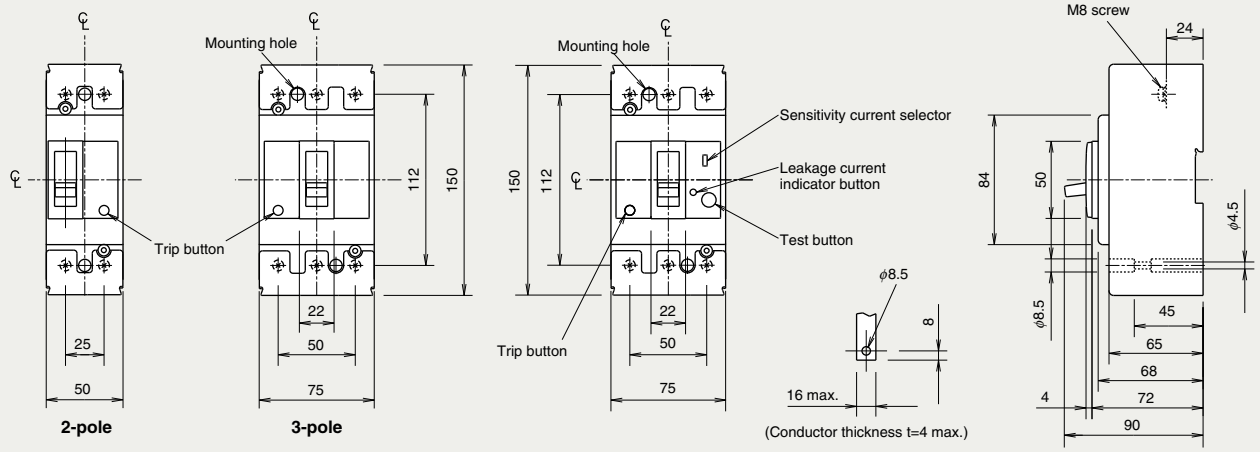


External Accessories

Accessories			Type name	Accessories				Type name
Operating handle	F	2P	F-05SVUL2	Terminal cover	Large	TC-L	2P	TCL-05SVU2
		3P	F-05SVUL					TCL-05SVU2L
	V	2P	V-05SVUL2				3P	TCL-05SVU3
		3P	V-05SVUL					TCL-05SVU3L
Handle lock device	HL		HLF-05SVU					
	HL-S	2P	HLS-05SVU2					
		3P	HLS-05SVU					

Outline Drawing

Front connection



(NF100-CVFU) (NV100-CVFU)

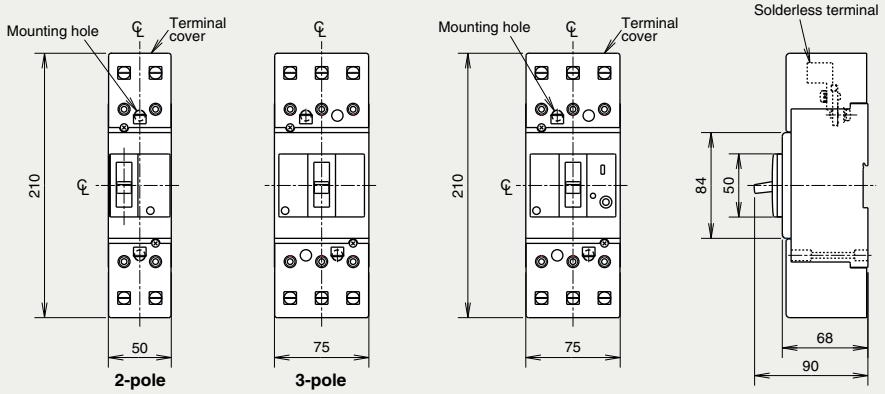
Conductor drilling for direct connection

Compatible crimp terminals Tightening torque 54lb-in (6N·m)

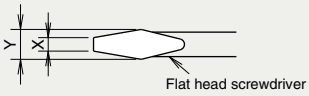
Applicable wire range		Crimp terminal type (*1)	
mm²	AWG (#) (60°C/75°C)	JST	NTM
2.5-2.63	14	R2-8	R2-8
2.63-6.64	12-10	R5.5-8	R5.5-8
6.64-10.52	8	R8-8	R8-8
10.52-16.78	6	R14-8	R14-8 R14-8S
16.78-26.66	4	R22-8	R22-8S
26.66-42.42	2	38-S8	R38-8S
42.42-60.57	1/0	60-2BA 60-S8	CB60-8

JST: Japan Solderless Terminal Mfg. Co.
NTM: Nichifu Co., Ltd.
Note *1 When using with a wire connection, use the crimp terminal combination shown above.

Front connection(solderless terminal)

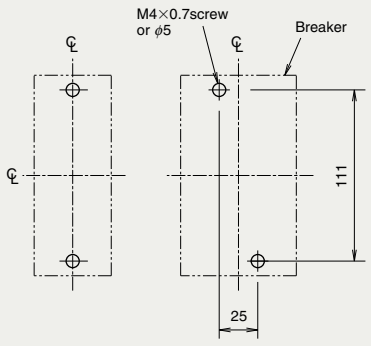


Size of screwdriver with bolting
Please bolt with flat head screwdriver.
The length of X : 6mm-7mm
The length of Y ≦ 9.5mm

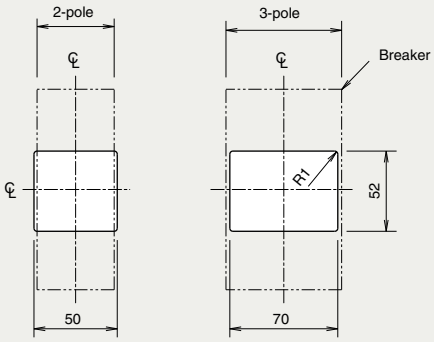


Wire size 60°C/75°C CU ONLY	Number of strands
14AWG	7
12-10AWG	7
8AWG	7
6-4AWG	7
2AWG	7
1-1/0AWG	19

The tightening torque is different according to connected wire.
Refer to instruction manual for details.
Remark: Periodical retightening prevents overheating by the setting of twisted strands or the stress of heating and cooling.



Drilling plan



The drilling dimensions have a 1.0 mm clearance on each side of breaker window frame.

Front panel drilling plan

NF125-SVU
NF125-HVU
NV125-SVU
NV125-HVU

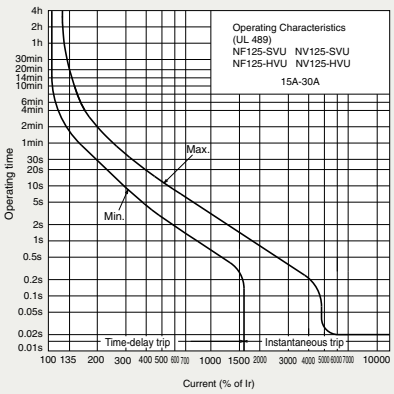
NF125-HVU

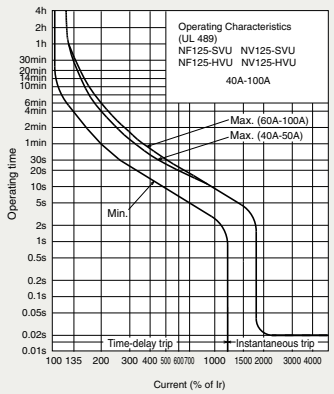
Model				NF125-SVU		NF125-HVU	
Rated current In (A) Rated ambient temperature 40°C				15 20 30 40 50 60 (70) 75 (80) (90) 100	125	15 20 30 40 50 60 (70) 75 (80) (90) 100	125
Number of poles				2	3	3	3
Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage VAC		480	480	600Y/347V	600Y/347V
		AC	600Y/347V	–	–	18	18
			480V	30	30	50	50
			240V	50	50	100	100
			120V	–	–	–	–
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui V		690	690	690	690
		AC	690V	8/4	8/4	10/5	10/5
			500V	18/9	18/9	25/13	25/13
			440V	30/15	30/15	50/25	50/25
			415V	30/15	30/15	50/25	50/25
			400V	30/15	30/15	50/25	50/25
			380V	30/15	30/15	50/25	50/25
			230V	50/25	50/25	100/50	100/50
Standard attached parts (Front connection)				Mounting screw M4×0.7×55 (2 screws), Insulating barrier (2P: 2pcs, 3P: 4pcs)			

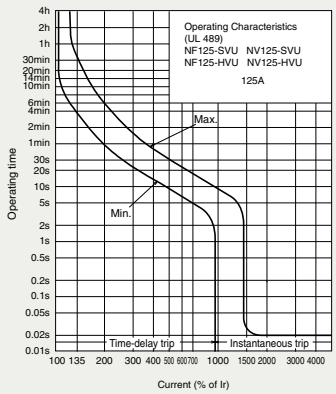
Model				NV125-SVU		NV125-HVU	
Rated current In (A) Rated ambient temperature 40°C				15 20 30 (40) 50 60 75 100	125	15 20 30 (40) 50 60 75 100	125
Number of poles				3	3	3	3
Phase line				3φ3W 1φ2W	3φ3W 1φ2W	3φ3W 1φ2W	3φ3W 1φ2W
Rated voltage VAC	UL 489			120-480	120-480	120-480	120-480
	IEC 60947-2 EN 60947-2			100-440	100-440	100-440	100-440
High-speed type	Rated current sensitivity IΔn mA			30/50/100/200/500 selectable	30/50/100/200/500 selectable	30/50/100/200/500 selectable	30/50/100/200/500 selectable
	Pick-up current UL 1053			75% of IΔn	75% of IΔn	75% of IΔn	75% of IΔn
	Operating time (sec) within AT 5IΔn			0.04 (*1)	0.04 (*1)	0.04 (*1)	0.04 (*1)
Earth-leakage indication system				Mechanical button	Mechanical button	Mechanical button	Mechanical button
Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	AC	480V	30	30	50	50
			240V	50	50	100	100
			120V	50	50	100	100
	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	440V	30/15	30/15	50/25	50/25
			400V	30/15	30/15	50/25	50/25
			230V	50/25	50/25	100/50	100/50
			100V	50/25	50/25	100/50	100/50

Note *1 0.1 for UL1053.

Operating Characteristics (The CE and CCC characteristics are noted differently. Contact us for more information.)



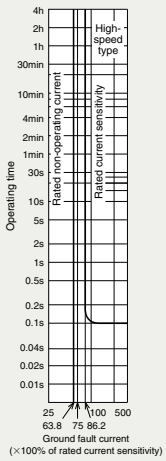




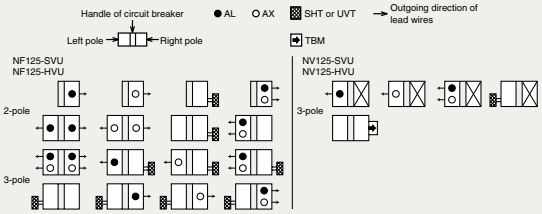
Earth Leakage Tripping Characteristics

(The CE and CCC characteristics are noted differently. Contact us for more information.)

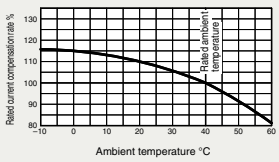
NV125-SVU
NV125-HVU
(UL 1053)



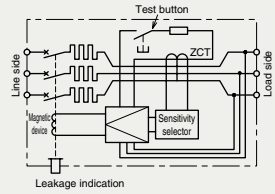
Internal Accessories



Temperature Compensation Curve



Internal Wiring Diagram

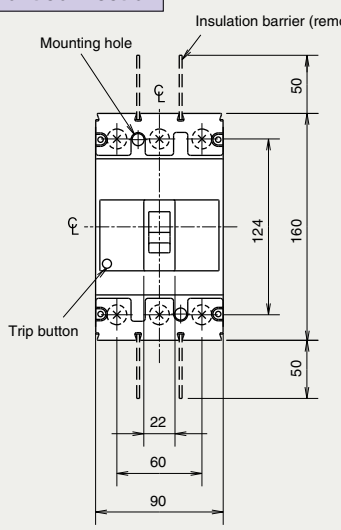


External Accessories

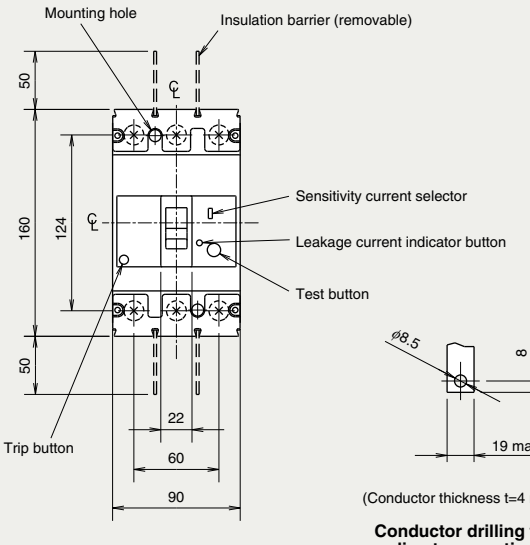
Accessories		Type name	Accessories			Type name
Operating handle	F	F-1SVUL	Terminal cover	Large	TC-L	TCL-1SVU3
	V	V-1SVUL				
Handle lock device	HL	HLF-05SVU				
	HL-S	HLS-05SVU				

Outline Drawing

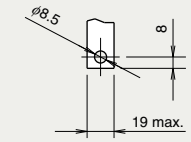
Front connection



(NF125-SVU, NF125-HVU)

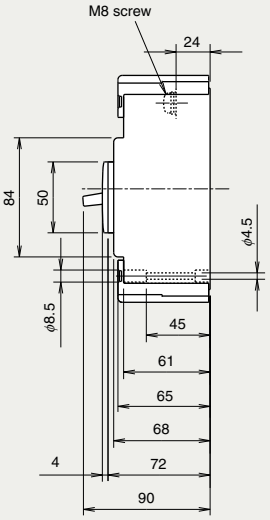


(NV125-SVU, NV125-HVU)



(Conductor thickness t=4 max.)

Conductor drilling for direct connection

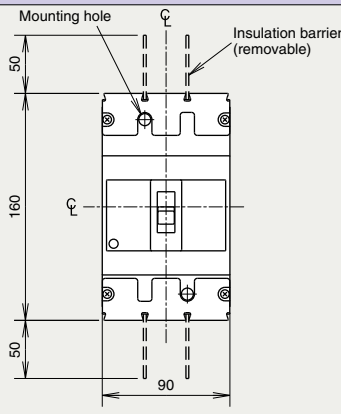


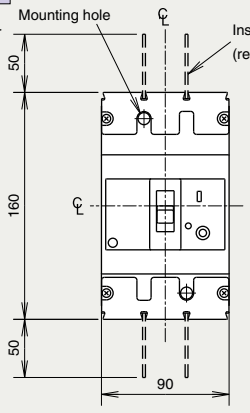
Compatible crimp terminals Tightening torque 54lb-in (6N·m)

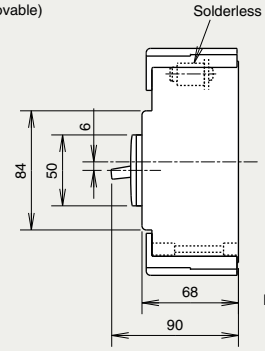
Applicable wire range		Crimp terminal type (*1)	
mm^2	AWG (#) (60°C/75°C)	JST	NTM
2.5-2.63	14	R2-8	R2-8
2.63-6.64	12-10	R5.5-8	R5.5-8
6.64-10.52	8	R8-8	R8-8
10.52-16.78	6	R14-8	R14-8 R14-8S
16.78-26.66	4	R22-8	R22-8S
26.66-42.42	2	38-S8	R38-8S
42.42-60.57	1/0	60-2BA 60-S8	CB60-8

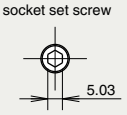
JST: Japan Solderless Terminal Mfg. Co.
NTM: Nichifu Co., Ltd.
Note *1 When using with a wire connection, use the crimp terminal combination shown above.

Front connection (solderless terminal)



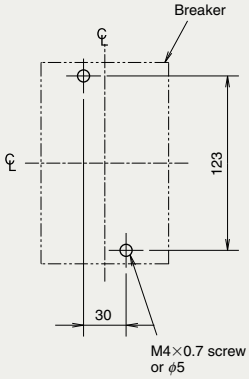




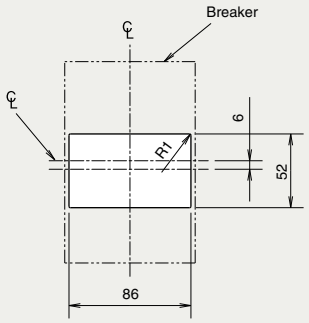


Wire size 60°C/75°C CU ONLY	Number of strands
14AWG	[a] 7
12-10AWG	[a] 7
8AWG	7
6AWG	7
4-2AWG	7
1AWG	19

The tightening torque is different according to connected wire.
Refer to instruction manual for details.
a:Solid copper wire is usable.
Remark: Periodical retightening prevents overheating by the setting of twisted strands or the stress of heating and cooling.



Drilling plan



The drilling dimensions have a 1.0 mm clearance on each side of breaker window frame.

Front panel drilling plan

Remark: 1. 2-pole models are 3-pole with the central pole conductor removed.

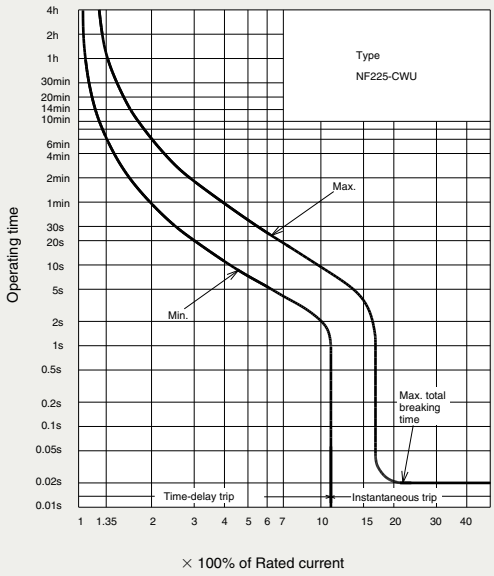
NF225-CWU

NF225-CWU

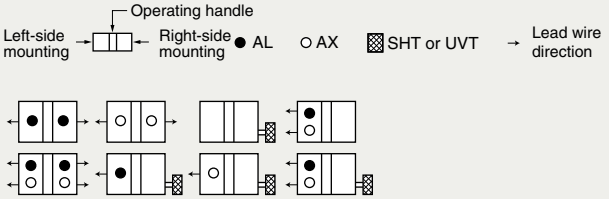
Model				NF225-CWU
Rated current In (A) at ambient temperature 40˚C (IEC30˚C)				125 150 175 200 225
Number of poles				3
Rated short-circuit breaking capacities (kA)	UL 489	Rated voltage (VAC)		240
		AC	240V	35
	IEC 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		600
		AC	500V	10/5
			440V	15/8
			400V	18/9
			230V	35/18
		DC	250V	10/5 (*1)
Standard attached parts				Mounting screw: M4×0.7×55 (2pcs), Insulation barrier: (4pcs), Terminal cover: (1 set) (*2)

Notes *1 Use either two poles. When wired as shown at the bottom of page 690, the models can be used for up to 400 V DC.
*2 The standard configuration contains a protection cover and adopts the IP20 (finger protection) structure.

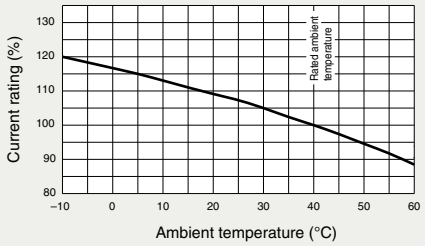
Operating Characteristics



Internal Accessories



Temperature Compensation Curve

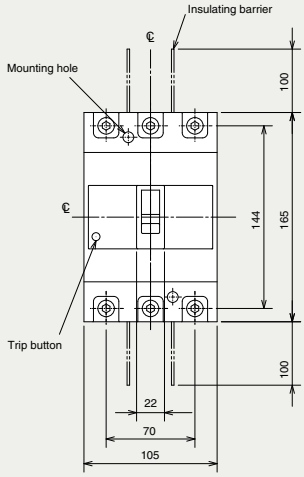


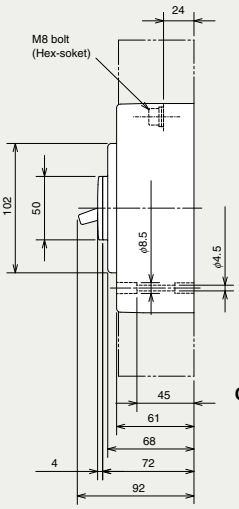
External Accessories

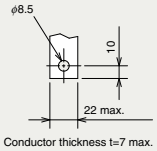
Accessories		Type name	Accessories		Type name
Operating handle	F	F-2SUL	Mechanical interlock	MI	MI-05SWU3
	V	V-2SUL	Terminal cover	Large TC-L	TCL-2SWU3 TCL-2SWU3L
Handle lock device	HL	HLF-2SWU			

Outline Drawing

Front connection





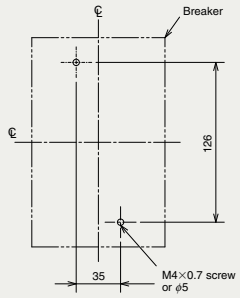


Conductor drilling for direct connection

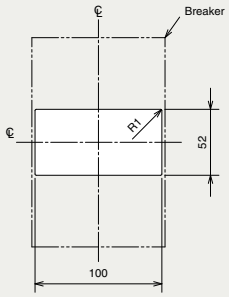
Compatible crimp terminals Tightening torque 90lb-in (10N.m)

Applicable wire range		Crimp terminal type (*1)	
mm²	AWG (#) (60°C/75°C)	JST	NTM
16.78-26.66	4	R22-8 22-S8	R22-8 R22-8S CB22-8S
26.66-42.42	2	R38-8 38-S8	R38-8 R38-8S
42.42-60.57	1/0	R60-8 60-2BA CB60-S8	R60-8 CB60-8 CB60-8S
60.57-76.28	2/0	70-8	R70-8
76.28-96.3	3/0	80-3BA CB80-S8	
96.3-117.2	4/0	100-3BA CB100-S8	

JST: Japan Solderless Terminal Mfg. Co.
NTM: Nichifu Co., Ltd.
Note *1 When using with a wire connection, use the crimp terminal combination shown above.



Drilling plan



Front cover cutout

1mm clearance on each side of handle

NF250-SVU
NF250-HVU
NV250-SVU
NV250-HVU

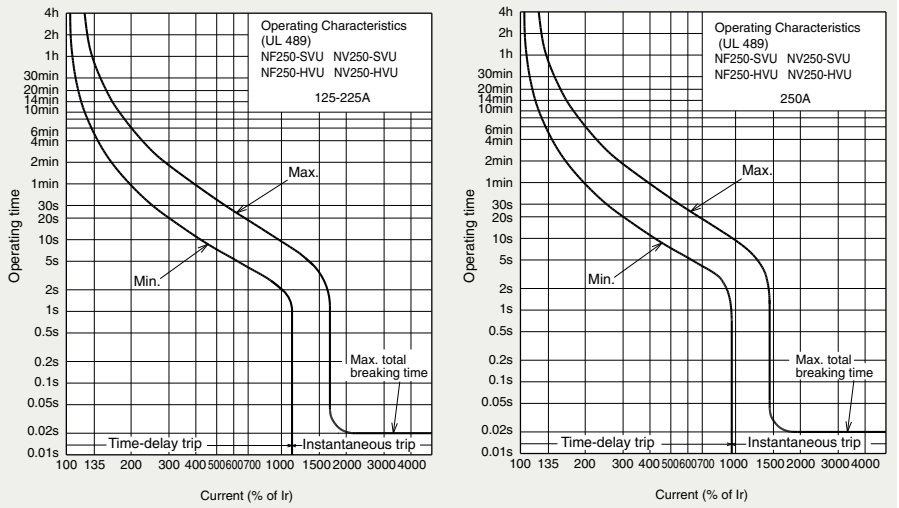
NF250-HVU

Model				NF250-SVU		NF250-HVU	
Rated current In (A) Rated ambient temperature 40°C				125 150 175 200 225	250	125 150 175 200 225	250
Number of poles				3	3	3	3
Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage VAC		480	480	600Y/347V	600Y/347V
		AC	600Y/347V	–	–	18	18
			480V	35	35	50	50
			240V	65	65	100	100
			120V	–	–	–	–
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui V		690	690	690	690
		AC	690V	8/4	8/4	10/5	10/5
			500V	25/13	25/13	36/18	36/18
			440V	36/18	36/18	50/25	50/25
			415V	36/18	36/18	50/25	50/25
			400V	36/18	36/18	50/25	50/25
			380V	36/18	36/18	50/25	50/25
			230V	65/33	65/33	100/50	100/50
Standard attached parts (Front connection)				Mounting screw M4×0.7×55 (2 screws), Insulating barrier (4pcs)			

Model			NV250-SVU		NV250-HVU	
Rated current In (A) Rated ambient temperature 40°C			125 150 175 200 225	250	125 150 175 200 225	250
Number of poles			3	3	3	3
Phase line			3ø3W 1ø2W	3ø3W 1ø2W	3ø3W 1ø2W	3ø3W 1ø2W
Rated voltage VAC	UL 489		120-480	120-480	120-480	120-480
	IEC 60947-2 EN 60947-2		100-440	100-440	100-440	100-440
High-speed type	Rated current sensitivity IΔn mA		30/50/ 100/200/500 selectable	30/50/ 100/200/500 selectable	30/50/ 100/200/500 selectable	30/50/ 100/200/500 selectable
	Pick-up current UL 1053		75% of IΔn	75% of IΔn	75% of IΔn	75% of IΔn
	Operating time s within AT 5IΔn		0.04 (*1)	0.04 (*1)	0.04 (*1)	0.04 (*1)
Earth-leakage indication system			Mechanical button	Mechanical button	Mechanical button	Mechanical button
Rated short-circuit breaking capacity (kA)	UL 489 CSA C22.2 No.5-02	AC 480V	35	35	50	50
		AC 240V	65	65	100	100
		AC 120V	65	65	100	100
	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC 440V	36/18	36/18	50/25	50/25
		AC 400V	36/18	36/18	50/25	50/25
		AC 230V	65/33	65/33	100/50	100/50
		AC 100V	65/33	65/33	100/50	100/50

Note *1 0.1 for UL1053.

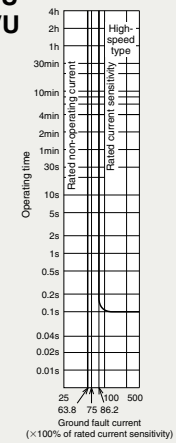
Operating Characteristics (The CE and CCC characteristics are noted differently. Contact us for more information.)



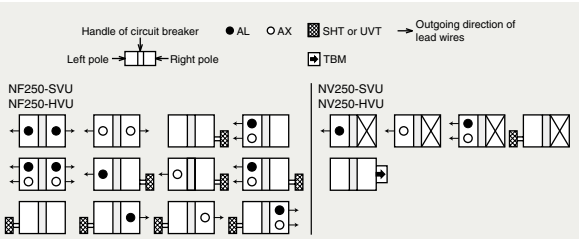
Earth Leakage Tripping Characteristics

(The CE and CCC characteristics are noted differently. Contact us for more information.)

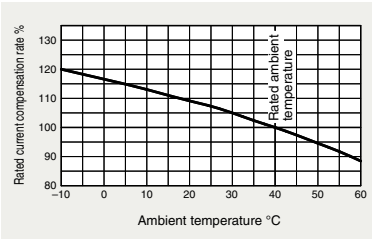
NV250-SVU
NV250-HVU
(UL 1053)



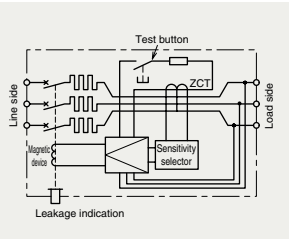
Internal Accessories



Temperature Compensation Curve



Internal Wiring Diagram



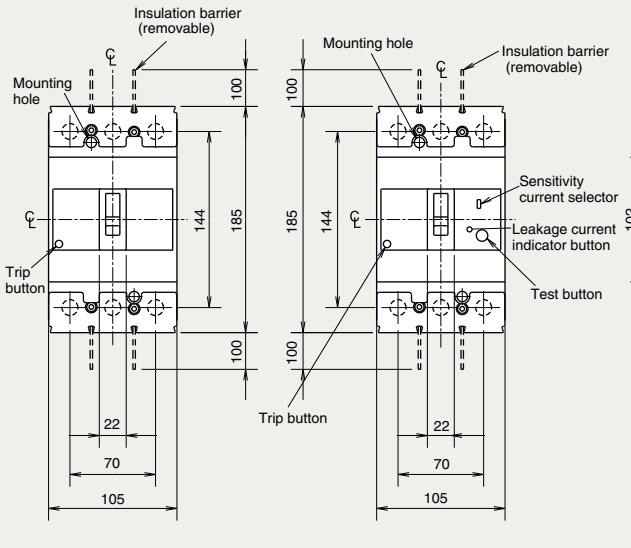
External Accessories

Accessories		Type name
Operating handle	F	F-2SVUL
	V	V-2SVUL
Handle lock device	HL	HLF-05SVU
	HL-S	HLS-2SVU

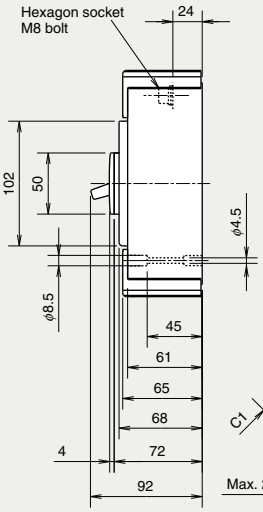
Accessories			Type name
Terminal cover	Large	TC-L	TCL-2SVU3
			TCL-2SVU3L

Outline Drawing

Front connection



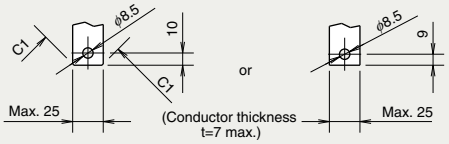
(NF250-SVU, NF250-HVU) (NV250-SVU, NV250-HVU)



Compatible crimp terminals Tightening torque 90lb-in (10N.m)

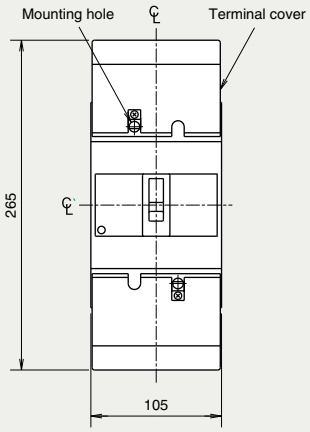
Applicable wire range		Crimp terminal type (*2)	
mm²	AWG (#) (60°C/75°C)	JST	NTM
16.78-26.66	4	R22-8 22-S8	R22-8 R22-8S CB22-8S
26.66-42.42	2	R38-8 38-S8	R38-8 R38-8S
42.42-60.57	1/0	R60-8 60-2BA CB60-S8	R60-8 CB60-8 CB60-8S
60.57-76.28	2/0	70-8	R70-8
76.28-96.3	3/0	80-3BA CB80-S8	
96.3-117.2	4/0	100-3BA CB100-S8	
117.2-152.05	250/300MCM	CB150-S8 (*1)	

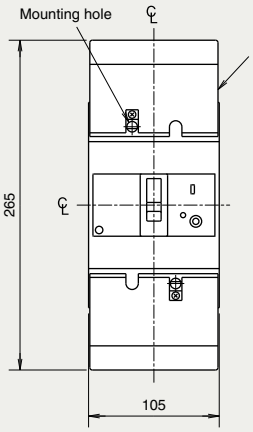
JST: Japan Solderless Terminal Mfg. Co.
NTM: Nichifu Co., Ltd.
Notes *1 TCL-2SVU3L can be mounted when using CB150-S8.
*2 When using with a wire connection, use the crimp terminal combination shown above.

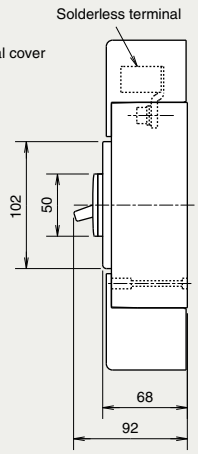


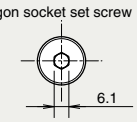
Conductor drilling for direct connection

Front connection (solderless terminal)





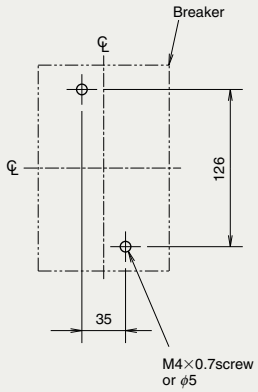




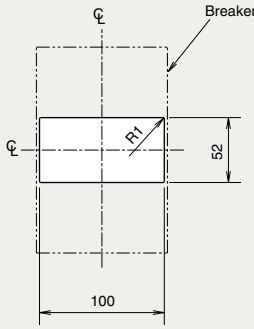
Wire size 60°C/75°C CU ONLY	Number of strands
4-2AWG	7
1-1/0AWG	19
3/0-4/0AWG	19
250-350MCM	37

The tightening torque is different according to connected wire.
Refer to instruction manual for details.

Remark: Periodical retightening prevents overheating by the setting of twisted strands or the stress of heating and cooling.



Drilling plan



The drilling dimensions have a 1.0 mm clearance on each side of breaker window frame.

Front panel drilling plan

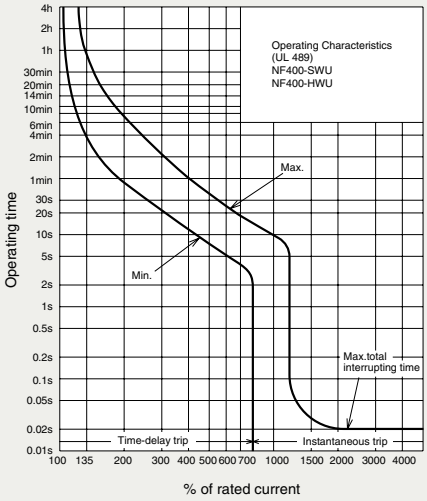
NF400-SWU NF400-HWU

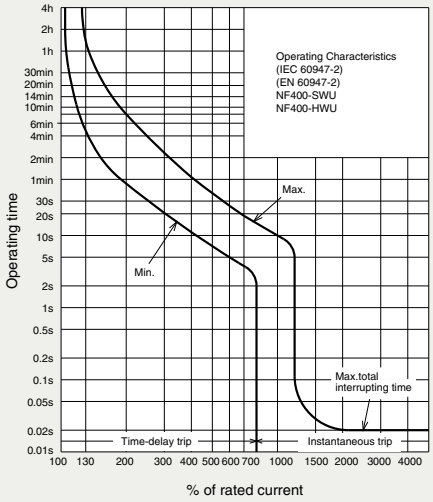
NF400-SWU

Model				NF400-SWU	NF400-HWU
Rated current In (A) at ambient temperature 40˚C				250 300 350 400	250 300 350 400
Number of poles				3	3
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22 2 No.5-02	Rated voltage (VAC)		600Y/347	600Y/347
		AC	600Y/347V	20	25
			480V	35	65
			240V	65	100
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		690	690
		AC	690V	10/10 (5/5) (*1)	15/10
			500V	30/30 (25/25) (*1)	42/42
			440V	42/42 (36/36) (*1)	65/65
			400V	45/45 (36/36) (*1)	70/70
			230V	85/85 (65/65) (*1)	100/100
Standard attached parts				Mounting screw: M6×60 (4screws) Insulating plate (1pce) Insulating barrier (4pcs) (Only for type with bar terminals)	Mounting screw: M6×60 (4screws) Insulating plate (1pce) Insulating barrier (4pcs) (Only for type with bar terminals)

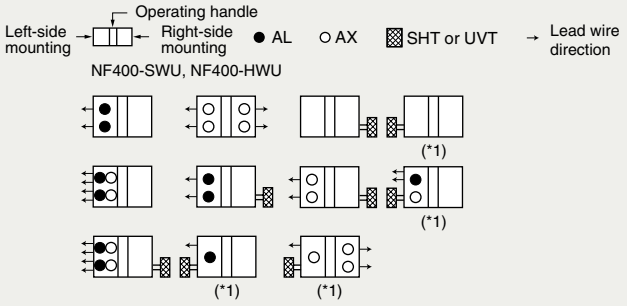
Notes *1 In case of solderless terminal, interrupting capacity reduces: (/).
*2 0.1 for UL1053.

Operating Characteristics



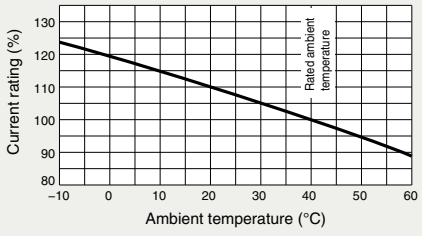


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separataly for left-side mounting.

Temperature Compensation Curve

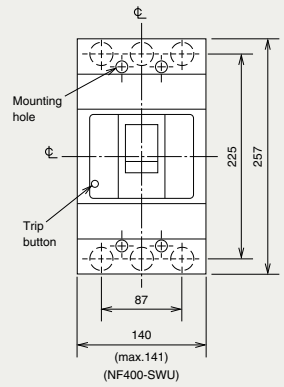


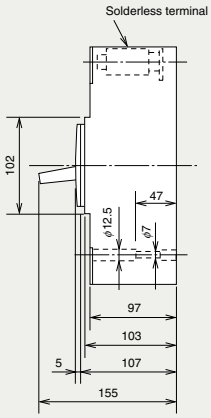
External Accessories

Accessories		Type name	Accessories			Type name
Operating handle	F	F-4SUL	Terminal cover	Large	TC-L	TCL-4SWU
	V	V-4SUL				
Handle lock device	HL	HL-4SWU				

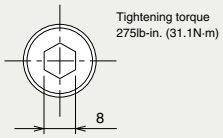
Outline Drawing

Front connection (Solderless terminal)





Hexagon socket set screw



UL

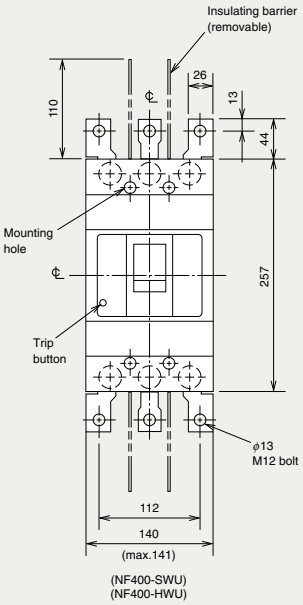
Ampere ratings	Wire size	Number of strands
250A, 300A	250-350kcmil CU	37
250A	350kcmil AL	
350A, 400A	(2) 3/0AWG CU	19

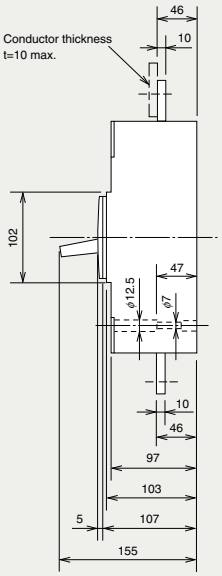
IEC

Ampere ratings	Wire size (IEC 60228)	
	Class 2	Class 5
250A, 300A	70-185mm^2	95-185mm^2
350A, 400A	150-240mm^2	150-185mm^2

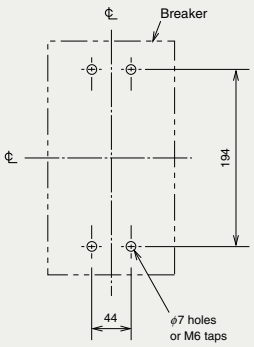
Remarks: 1. Do not remove solderless terminal in any case.
2. When using the solderless terminals, conduct periodic inspections and tightening as the wires may wear down over use.
3. Use a wire size that can carry the rated current.
4. When using IEC Class 5 (multi-core wire), pay attention to strand breakage and pinching, etc., while tightening.
5. The NF400-HWU does not have a solderless terminal.

Front connection (Busbar terminal)

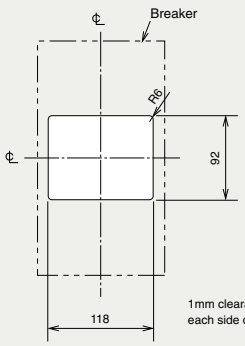




Remark: Do not remove busbar terminal in any case.



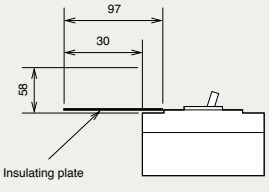
Drilling plan



Front-panel cutout

CAUTION

When mounted in steel or cast box cover must be insulated as shown.
58mm air gap to cover or 0.8mm fibre insulating plate extending 12.7mm out from each side of breaker.



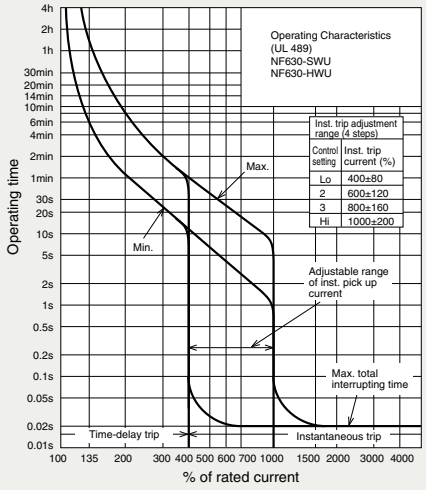
(Line)

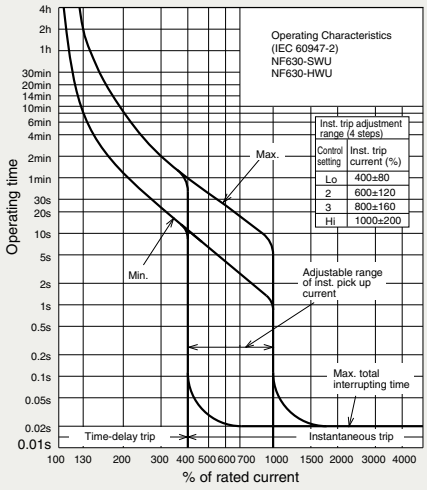
NF630-SWU
NF630-HWU

NF630-SWU

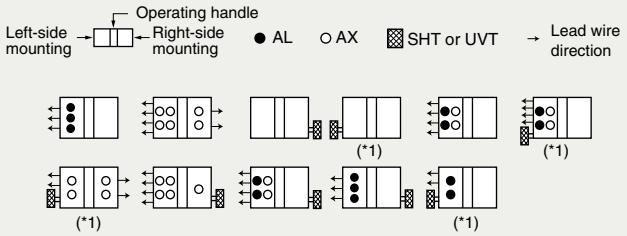
Model				NF630-SWU	NF630-HWU
Rated current In (A) at ambient temperature 40˚C				500 600 630	500 600 630
Number of poles				3	3
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage (VAC)		600Y/347	600Y/347
		AC	600Y/347V	20	25
			480V	35	65
			240V	85	100
	IEC 60947-2 EN 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		690	690
		AC	690V	10/10	15/15
			500V	30/30	42/42
			440V	42/42	65/65
			400V	45/45	70/70
			230V	85/85	100/100
Standard attached parts				Mounting screw: M6×35 (4pcs) Insulating plate (1pce) Insulating barrier (500A,600A: 2pcs, 630A: 4pcs) (Only for type with bar terminals)	Mounting screw: M6×35 (4pcs) Insulating plate (1pce) Insulating barrier (500A,600A: 2pcs, 630A: 4pcs) (Only for type with bar terminals)

Operating Characteristics



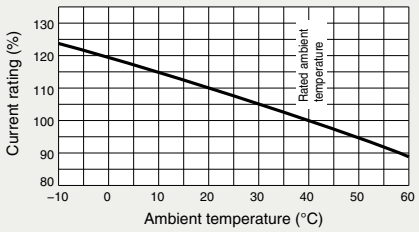


Internal Accessories



Note *1 Right-side mounting is standard of SHT and UVT. Specify separataly for left-side mounting.

Temperature Compensation Curve

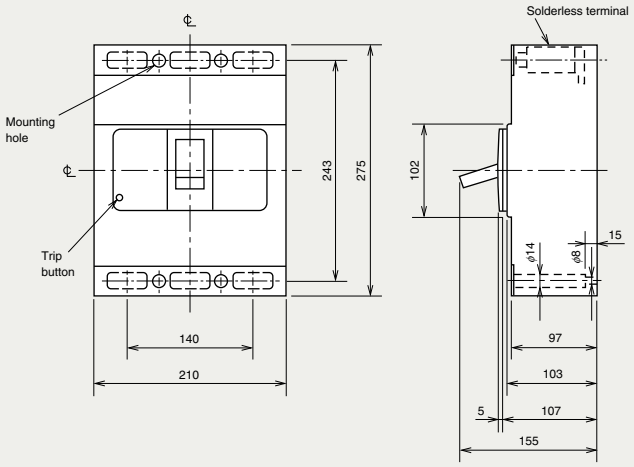


External Accessories

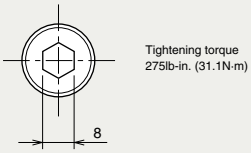
Accessories		Type name	Accessories			Type name
Operating handle	F	F-6SUL	Terminal cover	Large	TC-L	TCL-6SWU
	V	V-6SUL				
Handle lock device	HL	HL-4SWU				

Outline Drawing

Front connection (Solderless terminal)



Hexagon socket set screw



UL

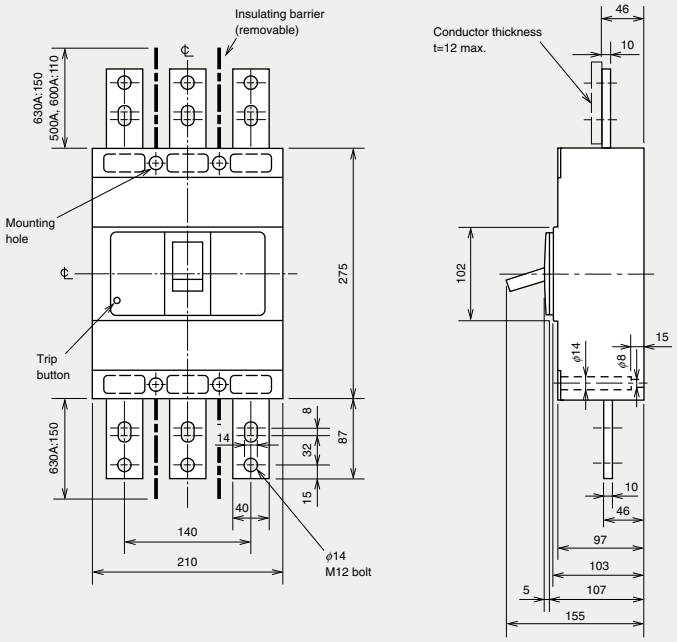
Ampere ratings	Wire size	Number of strands
500A, 600A	(2) 250-350kcmil CU ONLY	37

IEC

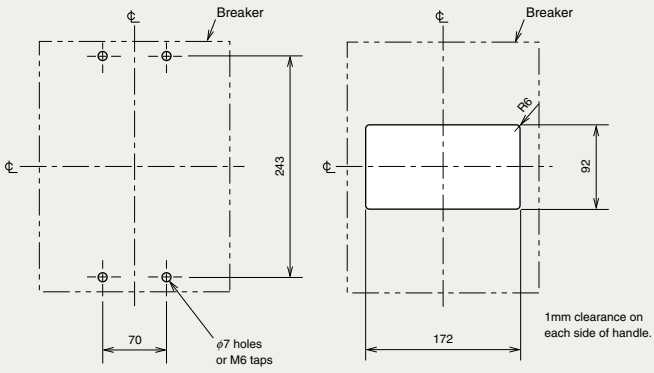
Ampere ratings	Wire size (IEC 60228)	
	Class 2	Class 5
500A, 600A	(2) 95-185mm^2	(2) 120-185mm^2

Remarks: 1. Do not remove solderless terminal in any case.
2. When using the solderless terminals, conduct periodic inspections and tightening as the wires may wear down over use.
3. Use a wire size that can carry the rated current.
4. When using IEC Class 5 (multi-core wire), pay attention to strand breakage and pinching, etc., while tightening.
5. The 630A and NF630-HWU does not have a solderless terminal.

Front connection (Busbar terminal)

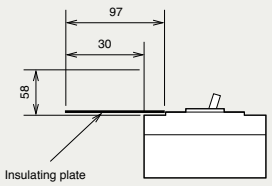


Remark: Do not remove busbar terminal in any case.



CAUTION

When mounted in steel or cast box cover must be insulated as shown.
58mm air gap to cover or 0.8mm fibre insulating plate extending 12.7mm out from each side of breaker.



(Line)

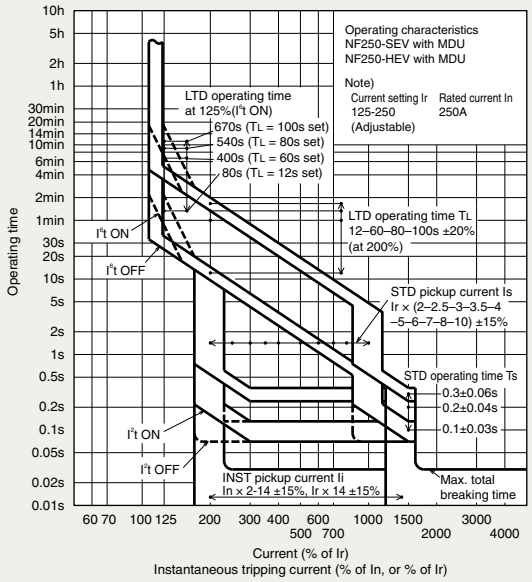
NF250-SEV with MDU
NF250-HEV with MDU

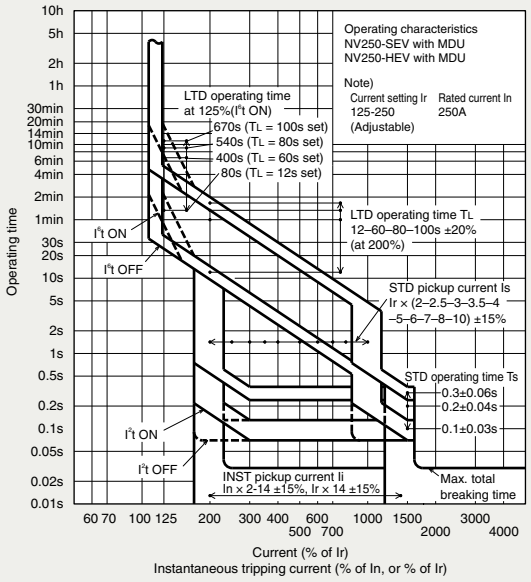
NF250-SEV with MDU (Breaker mounting)

NF250-SEV with MDU (Panel mounting)

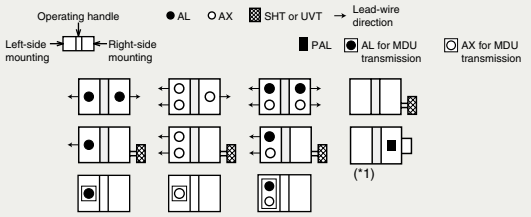
Model				NF250-SEV with MDU		NF250-HEV with MDU	
Rated current In (A) Rated ambient temperature 40°C				250		250	
Current setting Ir (A)				125-250		125-250	
Number of poles				3	4	3	4
Rated insulation voltage Ui (V)				690		690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	8/8		10/8	
			500V	18/18		30/23	
			440V	36/36		50/50	
			415V	36/36		70/70	
			400V	36/36		75/75	
			380V	36/36		75/75	
			230V	85/85		100/100	
		DC	250V	–		–	
Standard attached parts (Front connection)				Mounting screw M4 × 0.7 × 55 (3P: 2psc, 4P: 4pcs) Insulation barrier (3P: 4pcs, 4P: 6pcs)			
MDU accessories		Breaker mounting		MDU, Connection cable (for breaker mounting)			
		Panel mounting		MDU, Panel mounting bracket, Panel mounting screw, Connection cable (for panel mounting)			

Operating Characteristics



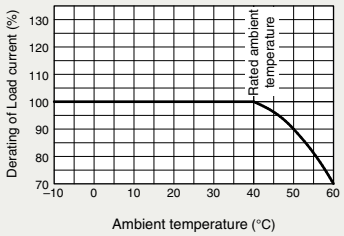


Internal Accessories



Note *1 SLT-equipped is standard. Control voltage (100-240VAC/100-240VDC) is necessary.

Current Reducing Curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C.

External Accessories

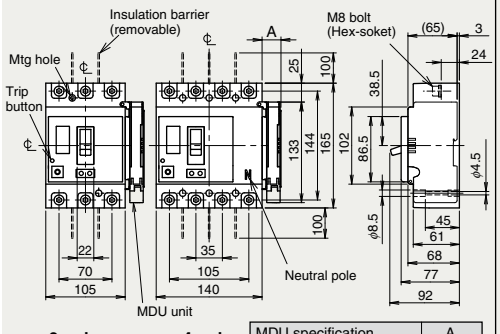
Accessories		Type name
Operating handle (*1)	F	F-2SV
	V	V-2SV
Handle lock device	LC	LC-05SV
	HL (*2)	HLF-05SV
		HLN-05SV
	HL-S (*1)	HLS-2SV

Accessories				Type name
Mechanical interlock		MI (*3)	3P	MI-05SV3
			4P	MI-2SV4
Terminal cover	Small	TC-S	3P	TCS-2SV3 (*5)
	Large	TC-L	3P	TCL-2SV3 (*5)
				TCL-2SV3L (*5)
			4P	TCL-2SV4
	Skeleton	TTC	3P	TTC-2SV3 (*5)
	Rear	BTC	3P	BTC-2SV3 (*5)
Electrical operation device (*1)				(*4)

Notes
*1 Available only for the MDU panel mounting type.
*2 HLF types are used for OFF lock and HLN types for ON lock.
*3 When selecting the MDU breaker mounting, only the MI panel mounting can be manufactured.
*4 Specify the working voltage.
*5 In the case of the MDU breaker mounting type, specify the model name with MP at the end.

Outline Drawing

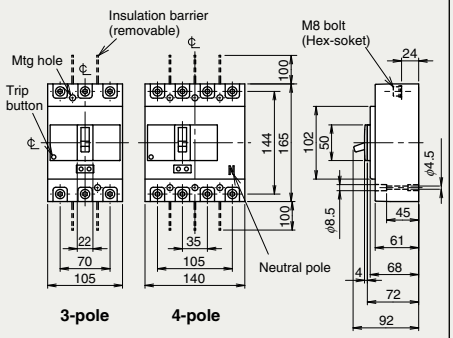
Front connection



3-pole 4-pole

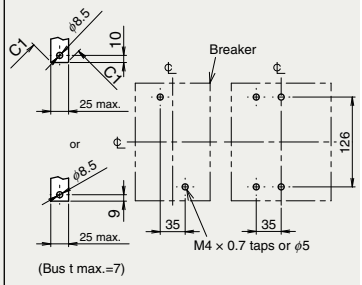
MDU breaker mounting

MDU specification	A
No transmission, pulse output	25
CC-Link	32



3-pole 4-pole

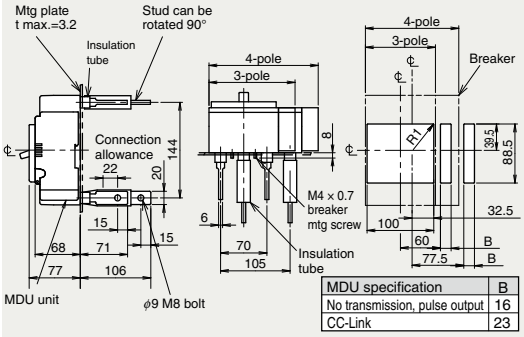
MDU panel mounting



3-pole 4-pole

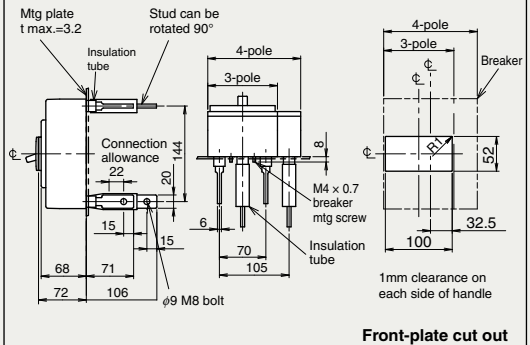
Bus drilling for direct connection **Drilling plan**

Rear mounting



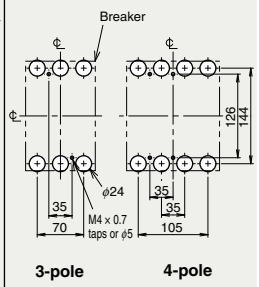
MDU specification	B
No transmission, pulse output	16
CC-Link	23

MDU breaker mounting **Front-plate cut out**



Front-plate cut out

MDU panel mounting

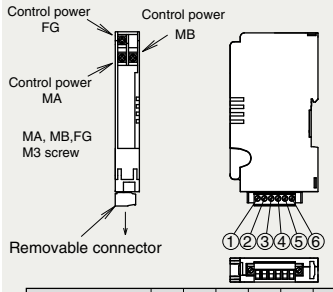


3-pole 4-pole

Drilling plan

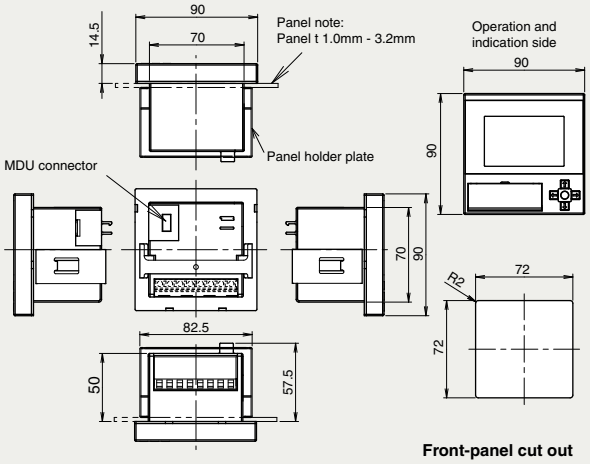
MDU unit terminal for breaker mounting

This figure is without terminal cover.
Please bind wires.



MDU specification	①	②	③	④	⑤	⑥
No transmission	–	–	–	–	–	–
Pulse output	–	–	–	–	Cb	Ca
CC-Link	–	SLD	–	DG	DB	DA

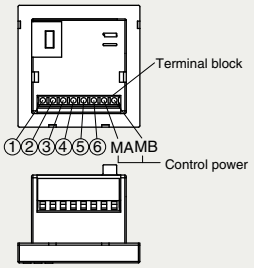
MDU panel mounting



Front-panel cut out

MDU terminal for panel mounting

This figure is without terminal cover.
Please bind wires.



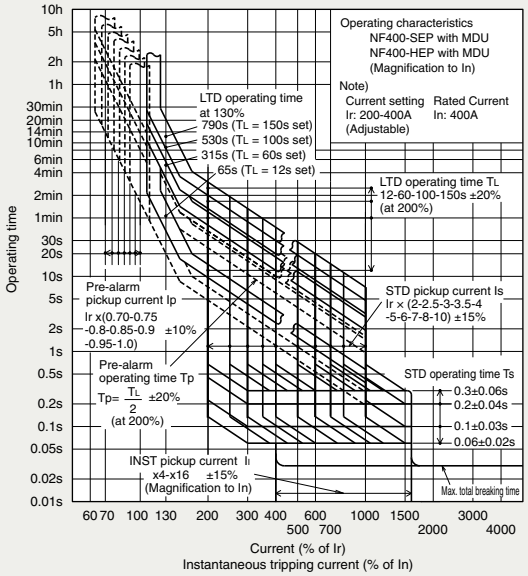
MDU specification	①	②	③	④	⑤	⑥
No transmission	–	–	–	–	FG	–
Pulse output	Ca	Cb	–	–	FG	–
CC-Link	DA	DB	DG	SLD	FG	–

NF400-SEP with MDU
NF400-HEP with MDU

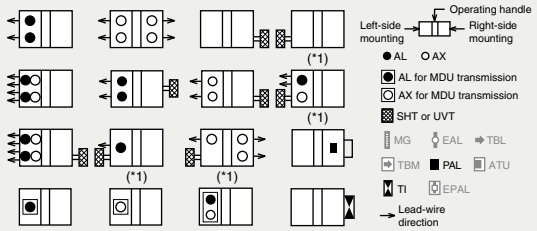
NF400-SEP with MDU (Breaker mounting)

Model				NF400-SEP with MDU		NF400-HEP with MDU	
Rated current In (A) Rated ambient temperature 40°C				200 225 250 300 350 400 Adjustable			
Number of poles				3	4	3	4
Rated operational voltage Ue V				690		690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC	690V	10/10		10/10	
			500V	30/30		50/50	
			440V	42/42		65/65	
			415V	45/45		70/70	
			400V	45/45		70/70	
			380V	45/45		70/70	
			230V	85/85		100/100	
			200V	85/85		100/100	
Standard attached parts (Front connection)		Breaker		Mounting screw M6 × 60 (4pcs) Insulation barrier (3P: 4pcs, 4P: 6pcs)			
MDU accessories		Breaker mounting		MDU, Connection cable (for breaker mounting)			
		Panel mounting		MDU, Panel mounting bracket, Panel mounting screw, Connection cable (for panel mounting)			

Operating Characteristics

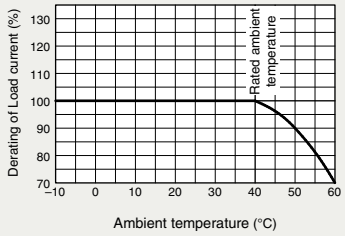


Internal Accessories



Note *1 Right side mounting is standard of SHT and UVT. Specify separately for left side mounting.

Current Reducing Curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40°C.

External Accessories

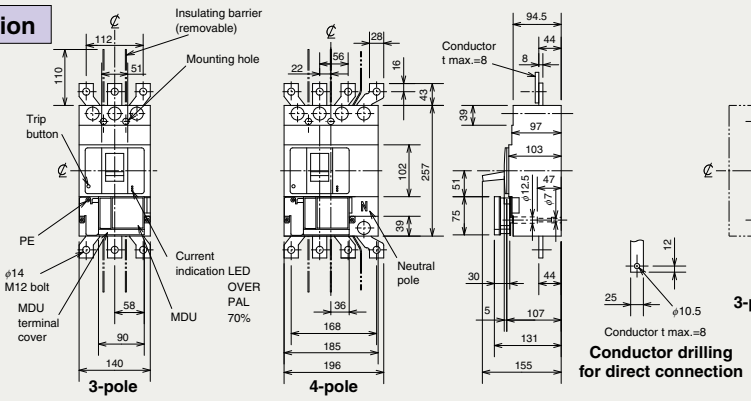
Accessories			Type name	
			Breaker mounting	Panel mounting
Operating handle	F		–	F-4S
	V		–	V-4S
Handle lock device	HL		HL-4SW	HL-4SW
	HL-S		–	HLS-4SW
Mechanical interlock	MI (*2)	3P	MI-4SW3	MI-4SW3
		4P	MI-4SW4	MI-4SW4
Auxiliary handle	HT		HT-4SW	HT-4SW

Accessories				Type name	
				Breaker mounting	Panel mounting
Terminal cover	Large	TC-L	3P	–	TCL-4SW3 (*1)
			4P	–	TCL-4SW4 (*1)
	Skeleton	TTC	3P	TTC-4SW3-MDU	TTC-4SW3
			4P	TTC-4SW4-MDU	TTC-4SW4
	Rear	BTC	3P	BTC-4SW3 (*1) Only line side	BTC-4SW3 (*4)
			4P	BTC-4SW4 Only line side	BTC-4SW4
Electrical operation device		NFM	3P	–	(*3)
			4P		

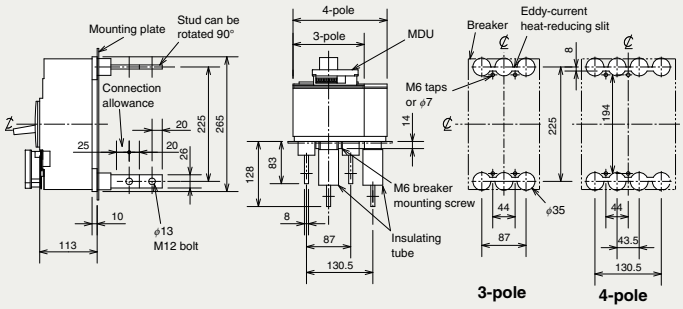
Notes *1 For NF400SEP with MDU.
*2 When selecting the MDU breaker mounting, only the MI panel mounting can be manufactured.
*3 Specify the operation method and voltage. Order in combination with the breaker unit.
*4 This is for NF400-SEP with MDU. For rear terminal cover of NF400-HEP with MDU, use PTC-4SW3.

Outline Drawing

Front connection



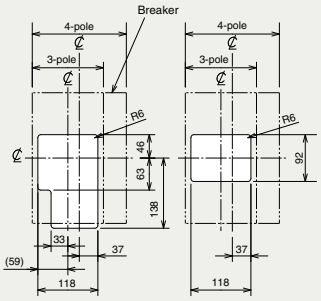
Rear connection



Note The drilling plan is different if insulating barriers are installed.

Front-plate cutout

1mm clearance on each side of handle. (Load side of breaker mounting has given the space to pass wires to the terminal.)



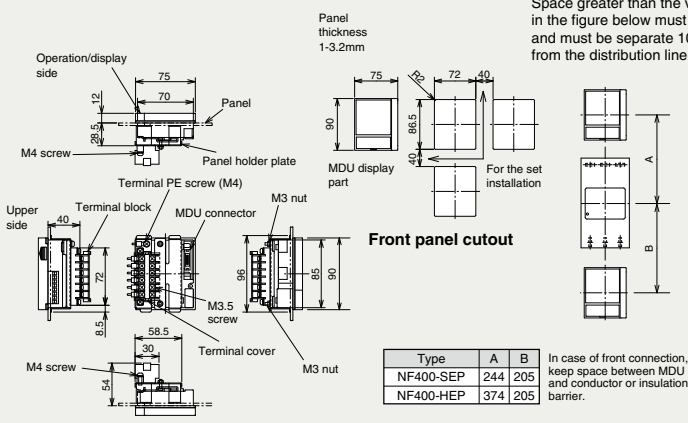
CC-Link ; only MDU panel mounting

NF400-SEP, NF400-HEP with MDU (No transmission, pulse output)

MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.

Space greater than the value shown in the figure below must be secured, and must be separate 10cm or more from the distribution line.



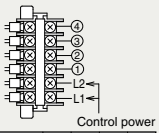
Type	A	B
NF400-SEP	244	205
NF400-HEP	374	205

In case of front connection, keep space between MDU and conductor or insulation barrier.

MDU terminal

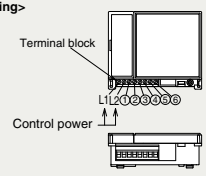
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



	①	②	③	④
No transmission	—	—	—	—
Pulse output	—	—	113	114

<Breaker mounting>



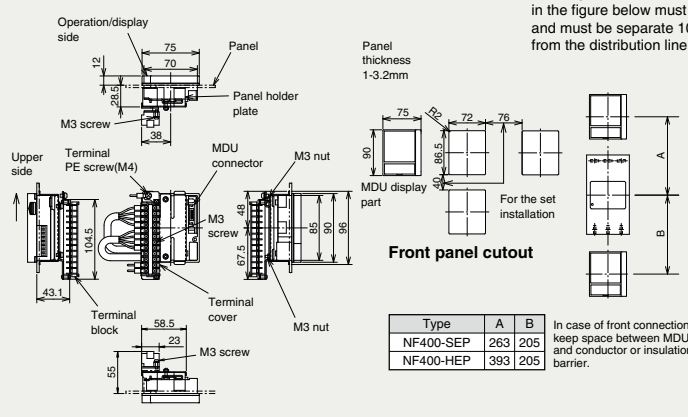
	①	②	③	④	⑤	⑥
No transmission	—	FG	—	—	—	—
Pulse output	—	FG	—	—	113	114

NF400-SEP, NF400-HEP with MDU (CC-Link)

MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.

Space greater than the value shown in the figure below must be secured, and must be separate 10cm or more from the distribution line.



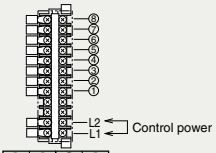
Type	A	B
NF400-SEP	263	205
NF400-HEP	393	205

In case of front connection, keep space between MDU and conductor or insulation barrier.

MDU terminal

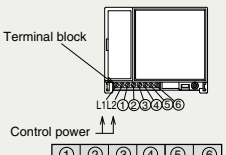
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



①	②	③	④
SLD	DG	DB	DA
⑤	⑥	⑦	⑧
SLD	DG	DB	DA

<Breaker mounting>



①	②	③	④	⑤	⑥
—	FG	SLD	DG	DB	DA

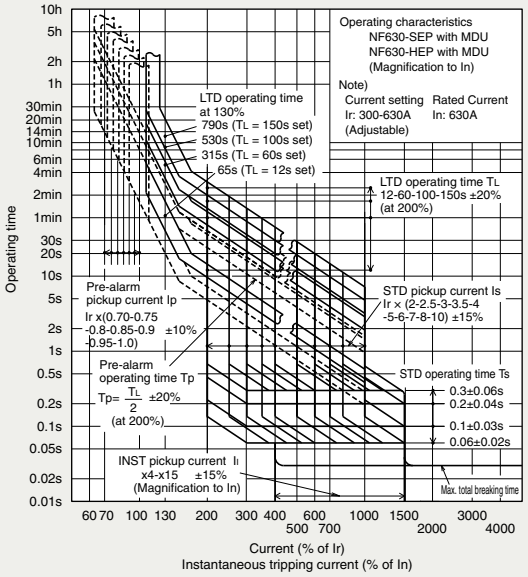
NF630-SEP with MDU
NF630-HEP with MDU
NF800-SEP with MDU
NF800-HEP with MDU

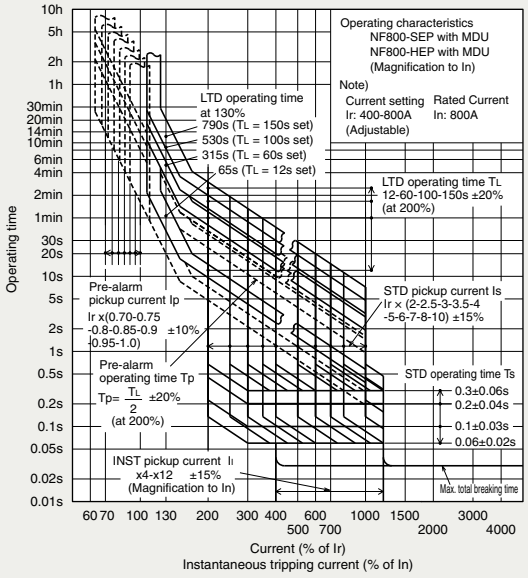
NF630-SEP with MDU (Breaker mounting)

Model			NF630-SEP with MDU		NF630-HEP with MDU		NF800-SEP with MDU		NF800-HEP with MDU	
Rated current In (A) Rated ambient temperature 40°C			300 350 400 500 600 630 Adjustable				400 450 500 600 700 800 Adjustable			
Number of poles			3	4	3	4	3	4	3	4
Rated operational voltage Ue V			690		690		690		690	
Rated short-circuit breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC 690V	10/10		15/15		10/10		15/15	
		AC 500V	30/30		50/50		30/30		50/50	
		AC 440V	42/42		65/65		42/42		65/65	
		AC 415V	45/45		70/70		45/45		70/70	
		AC 400V	45/45		70/70		45/45		70/70	
		AC 380V	45/45		70/70		45/45		70/70	
		AC 230V	85/85		100/100		85/85		100/100	
		AC 200V	85/85		100/100		85/85		100/100	
Standard attached parts (Front connection) (*1)		Breaker	Mounting screw M6 × 35 (4pcs) Insulation barrier (3P: 2pcs, 4P: 3pcs)							
MDU accessories		Breaker mounting	MDU, Breaker mounting plate, Mounting screw for breaker mounting plate, Connection cable (for breaker mounting), MDU Mounting screw							
		Panel mounting	MDU, Panel mounting bracket, Panel mounting nut, Connection cable (for panel mounting), MDU Mounting screw							

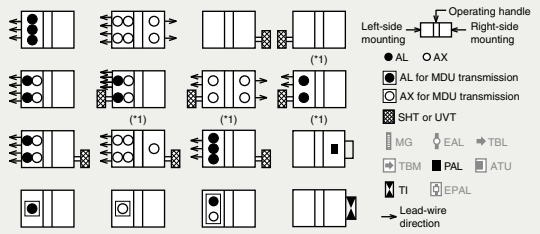
Note *1 4-pole models are provided with auxiliary handle.

Operating Characteristics



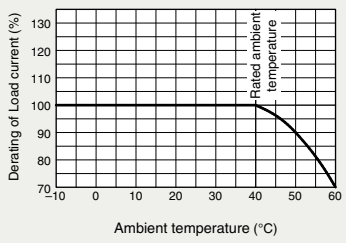


Internal Accessories



Note *1 Right side mounting is standard of SHT and UVT. Specify separately for left side mounting.

Current Reducing Curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40°C.

External Accessories

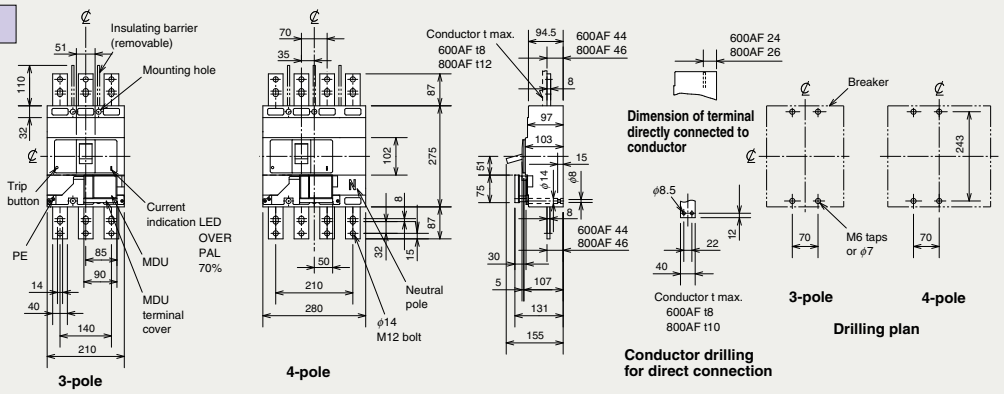
Accessories			Type name	
			Breaker mounting	Panel mounting
Operating handle	F		–	F-8S
	V		–	V-8S
Handle lock device	HL		HL-4SW	HL-4SW
	HL-S		–	HLS-8SW
Mechanical interlock	MI (*1)	3P	MI-8SW3	MI-8SW3
		4P	MI-8SW4	MI-8SW4
Auxiliary handle	HT		HT-4SW	HT-4SW

Accessories				Type name	
				Breaker mounting	Panel mounting
Terminal cover	Large	TC-L	3P	–	TCL-8SW3
			4P	–	TCL-8SW4
	Skeleton	TTC	3P	TTC-8SW3-MDU	TTC-8SW3
			4P	TTC-8SW4-MDU	TTC-8SW4
	Rear	BTC	3P	BTC-8SW3 Only line side	BTC-8SW3
			4P	BTC-8SW4 Only line side	BTC-8SW4
Electrical operation device		NFM	3P	–	(*2)
			4P		

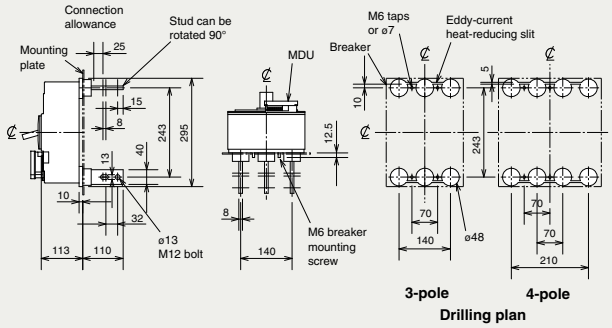
Notes *1 When selecting the MDU breaker mounting, only the MI panel mounting can be manufactured.
*2 Specify the operation method and voltage. Order in combination with the breaker unit.

Outline Drawing

Front connection



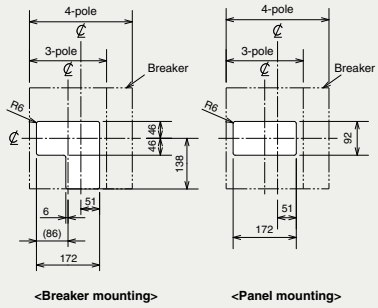
Rear connection



Note The drilling plan is different if insulating barriers are installed.

Front-plate cutout

1mm clearance on each side of handle. (Load side of breaker mounting has given the space to pass wires to the terminal.)



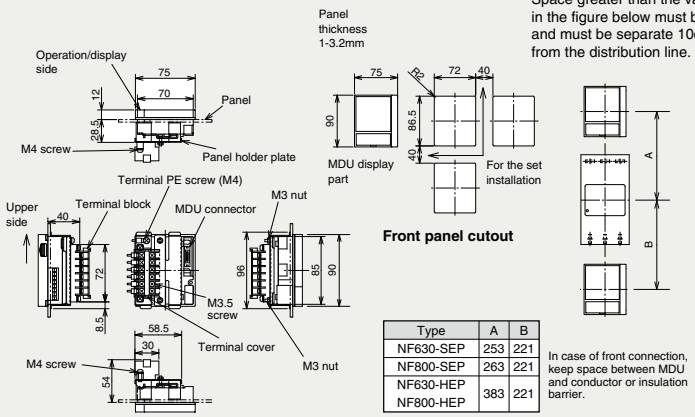
CC-Link ; only MDU panel mounting

NF630-SEP, NF630-HEP, NF800-SEP, NF800-HEP with MDU (No transmission, Pulse output)

MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.

Space greater than the value shown in the figure below must be secured, and must be separate 10cm or more from the distribution line.



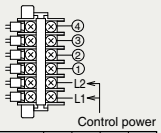
Type	A	B
NF630-SEP	253	221
NF800-SEP	263	221
NF630-HEP	383	221
NF800-HEP		

In case of front connection, keep space between MDU and conductor or insulation barrier.

MDU terminal

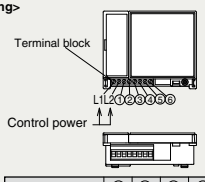
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



	①	②	③	④
No transmission	—	—	—	—
Pulse output	—	—	113	114

<Breaker mounting>



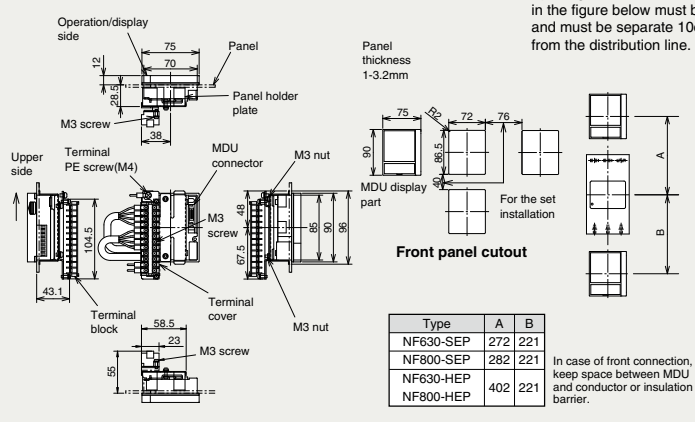
	①	②	③	④	⑤	⑥
No transmission	—	FG	—	—	—	—
Pulse output	—	FG	—	—	113	114

NF630-SEP, NF630-HEP, NF800-SEP, NF800-HEP with MDU (CC-Link)

MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.

Space greater than the value shown in the figure below must be secured, and must be separate 10cm or more from the distribution line.



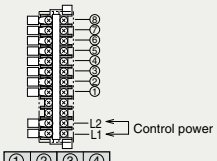
Type	A	B
NF630-SEP	272	221
NF800-SEP	282	221
NF630-HEP	402	221
NF800-HEP		

In case of front connection, keep space between MDU and conductor or insulation barrier.

MDU terminal

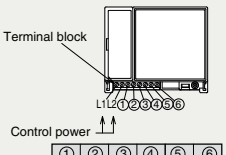
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



①	②	③	④
SLD	DG	DB	DA
⑤	⑥	⑦	⑧
SLD	DG	DB	DA

<Breaker mounting>



①	②	③	④	⑤	⑥
—	FG	SLD	DG	DB	DA

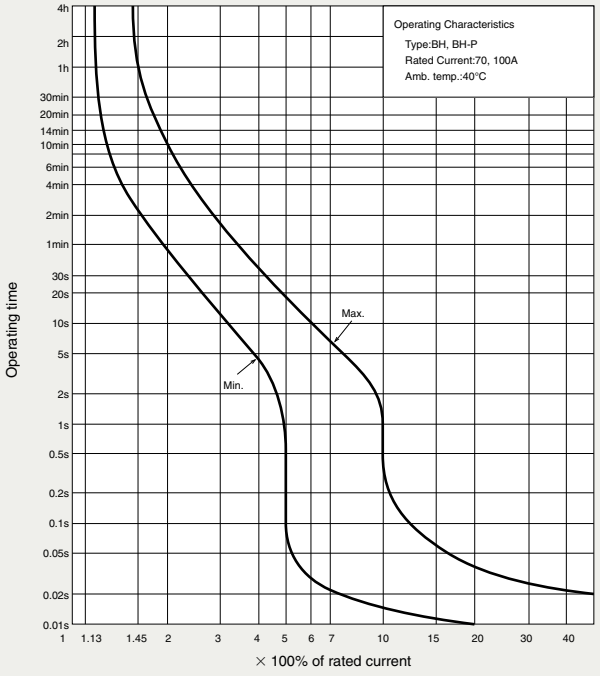
BH
BH-P

BH

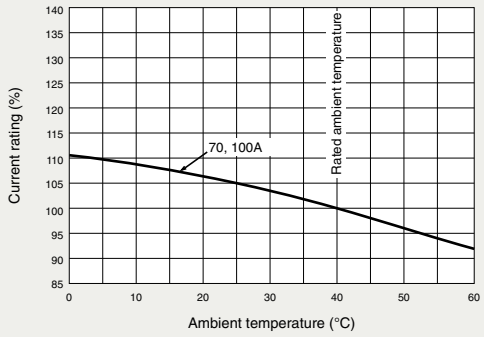
BH-P

Model			BH			BH-P		
Number of poles			1	2	3	1	2	3
Rated current (A) at ambient temperature 40˚C			70	70, 100	70, 100	70	70, 100	70, 100
Rated voltage (V)		AC	230/400			230/400		
		DC	125			125		
Rated short circuit capacity (kA)	IEC 60898-1	AC230/400V	3	–		3	–	
		AC400V	–	3		–	3	
	–	DC125V	1			1		

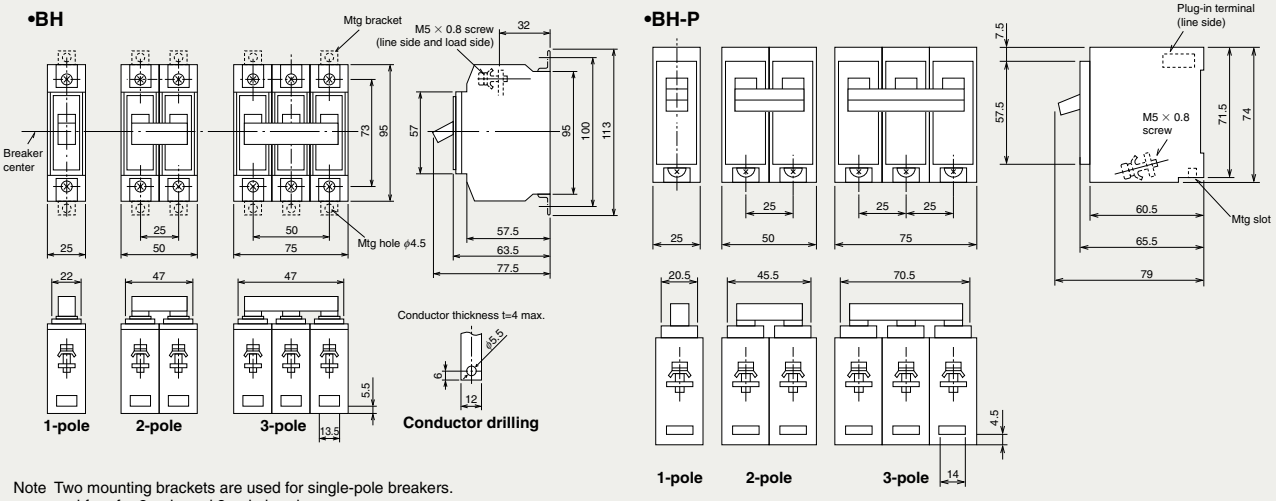
Operating Characteristics



Temperature Compensation Curve



Outline Drawing



Note Two mounting brackets are used for single-pole breakers.
and four for 2-pole and 3-pole breakers.

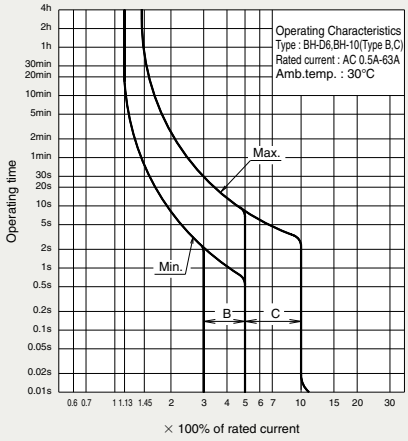
BH-D6
BH-D10

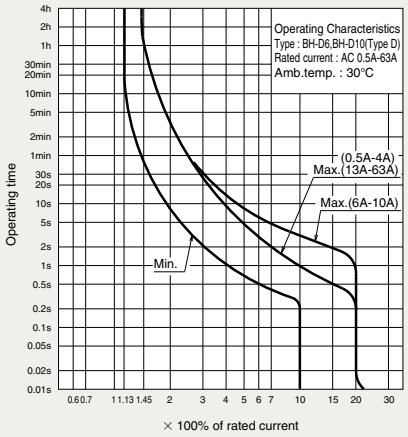
BH-D6

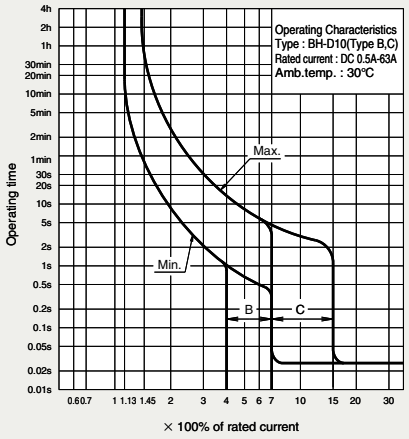
Model				BH-D6					BH-D10				BH-D10 (For DC)	
Number of poles (P)				1	2	3	4(3+N) (*1)	2(1+N) (*1)	1	2	3	4(3+N) (*1)	1	2
Instantaneous tripping				Type B, C, D				Type B, C	Type B, C, D				Type B, C	
Rated insulation voltage Ui (V)				440					440				250	
Rated current In (A) at ambient temperature 30°C				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40	0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63	
Rated short-circuit capacity (kA)	IEC60898-1 GB10963.1 (Icn)	AC	230V	6	–			6	10	–			6	–
			230/400V	6	–			–	10	–			6	–
			400V	–	6			–	–	10			–	6
	IEC60898-2 GB10963.2 (Icn)	DC	125V	–					–				10	–
			250V	–					–				–	10

Note *1 N pole is a switched neutral pole (without overcurrent release device).

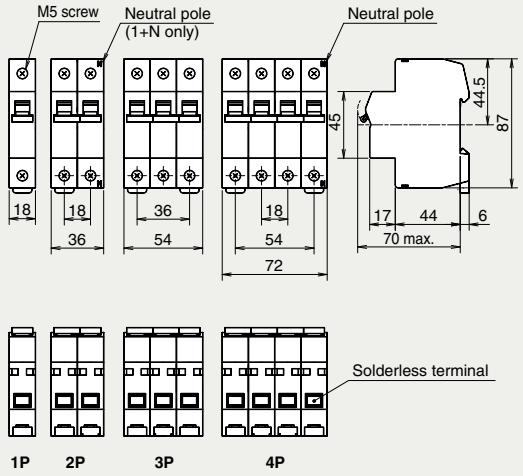
Operating Characteristics



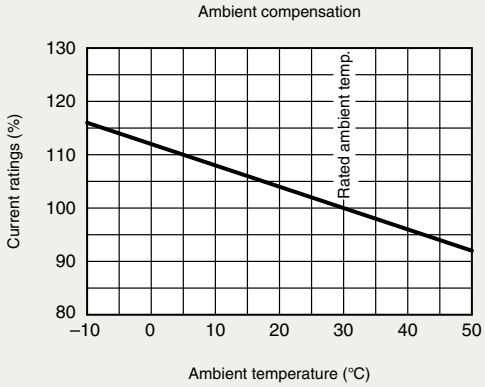




Outline Drawing



Temperature Compensation Curve



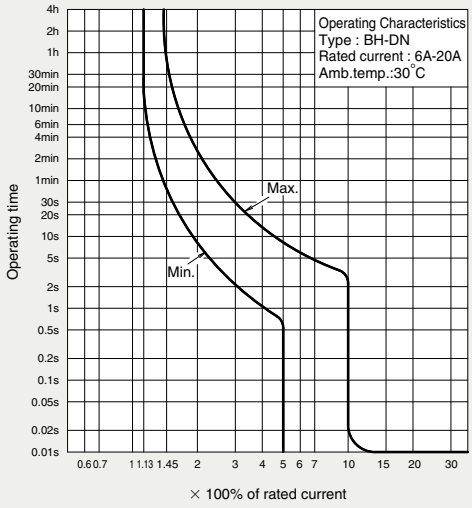
BH-DN

BH-DN

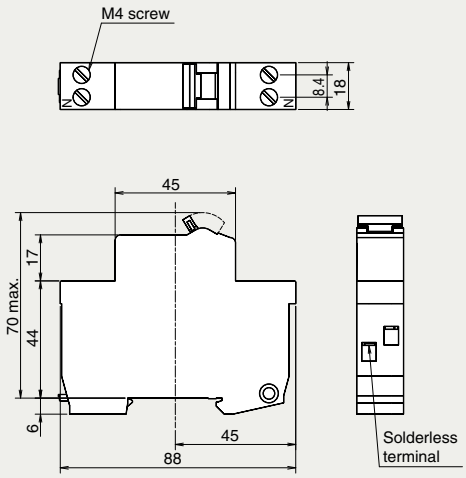
Model				BH-DN
Number of poles (P)				2 (1+N) (*1)
Instantaneous tripping				Type C
Rated insulation voltage Ui (V)				230
Rated current In (A) at ambient temperature 30˚C				6, 10, 16, 20
Rated short-circuit capacity (kA)	IEC60898-1 GB10963.1 (Icn)	AC	230V	4.5

Note *1 N pole is a switched neutral pole (without overcurrent release device).

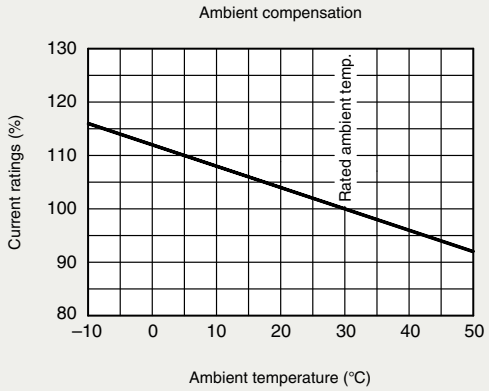
Operating Characteristics



Outline Drawing



Temperature Compensation Curve



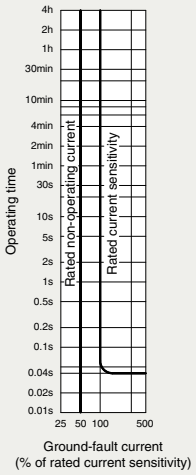
BV-D

BV-D

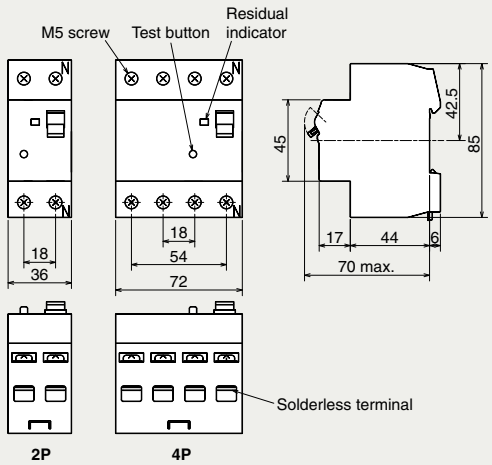
Model	BV-D	
Number of poles (P)	2 (1+N) (*1)	4 (3+N) (*1) (*2)
Rated operational voltage Ue (VAC)	230	230/400
Rated current In (A) at ambient temperature 30°C	25, 40, 63	
Rated current sensitivity IΔn (mA)	30, 300	
Max. operating time at 5IΔn (s)	0.04	
Pulsating current sensitivity	Type AC	
Residual operation	Dependent on line voltage	
Rated making and breaking capacity Im (A)	500 (In 25, 40A) 630 (In63A)	
Rated conditional short-circuit current Inc (kA)	6	
Rated residual making and breaking capacity IΔm (A)	500 (In 25, 40A) 630 (In63A)	
Rated conditional residual short-circuit current IΔc (kA)	6	

Notes *1 N pole is a switched neutral pole (without overcurrent release device).
*2 For use to three phase 4-wire type. When using, it be sure to connect the neutral wire to the neutral phase. Not available for use to three phase 3-wire type.

Operating Characteristics



Outline Drawing



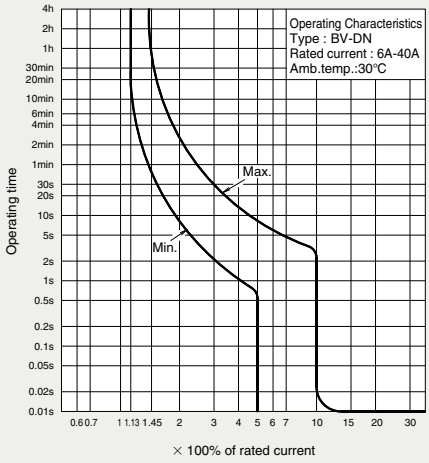
BV-DN

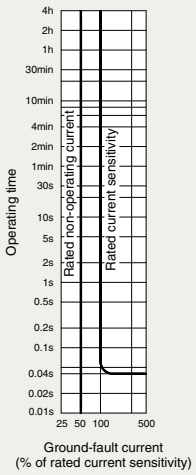
BV-DN

Model				BV-DN
Number of poles (P)				2 (1+N) (*1)
Rated operational voltage Ue (VAC)				230
Rated current In (A) at ambient temperature 30˚C				6, 10, 16, 20, 25, 32, 40
Instantaneous tripping				Type C
Rated current sensitivity IΔn (mA)				30, 100, 300
Max. operating time at 5IΔn (s)				0.04
Pulsating current sensitivity				Type AC
Residual operation				Dependent on line voltage
Rated short-circuit capacity (kA)	IEC61009-1 GB16917.1 (Icn)	AC	230V	4.5

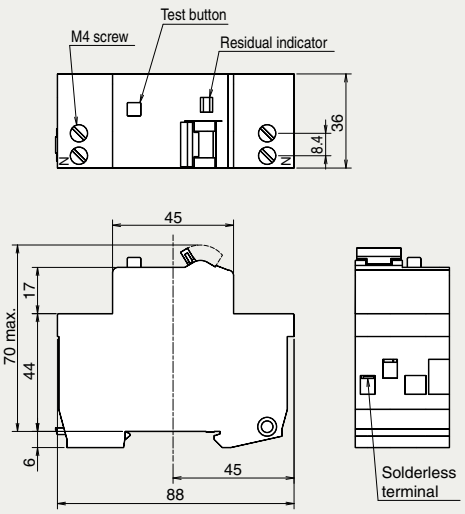
Note *1 N pole is a switched neutral pole (without overcurrent release device).

Operating Characteristics

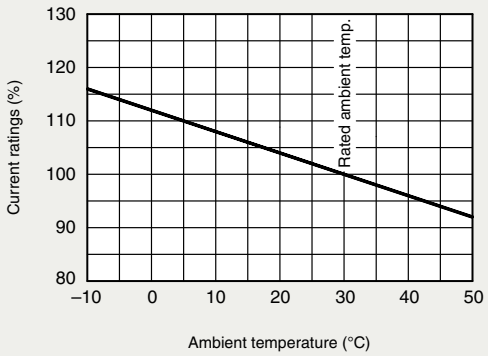




Outline Drawing



Temperature Compensation Curve



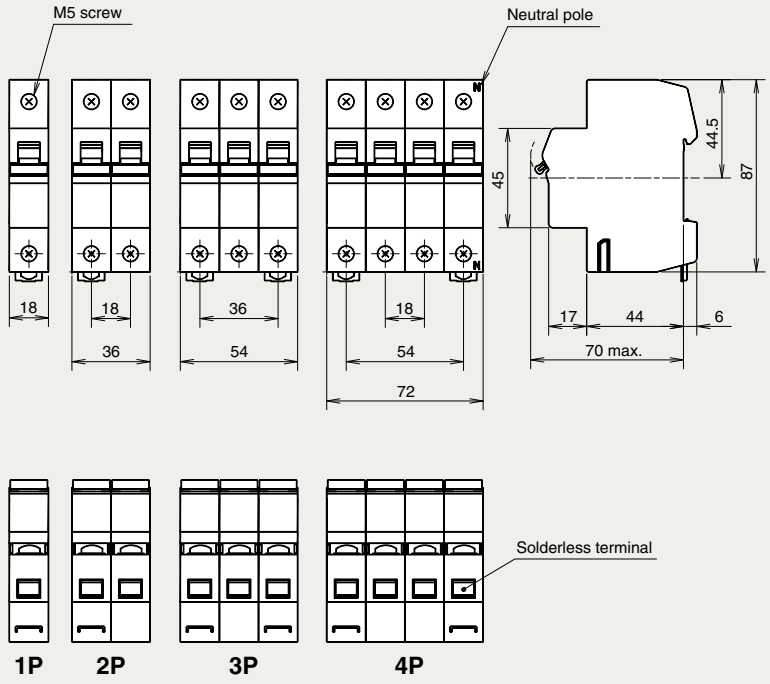
KB-D

KB-D

Model	KB-D			
Number of poles (P)	1	2	3	4 (3+N) (*1)
Utilization category	AC22A class			
Rated insulation voltage Ui (V)	250	440		
Rated voltage Ue (VAC)	230	400		
Rated current In (A) at ambient temperature 30˚C	32, 63, 80			
Short-time withstand current (A)	20×In , 1sec			
Short-time making current (A)	20×In			

Note *1 N pole is a switched neutral pole (without overcurrent release device).

Outline Drawing

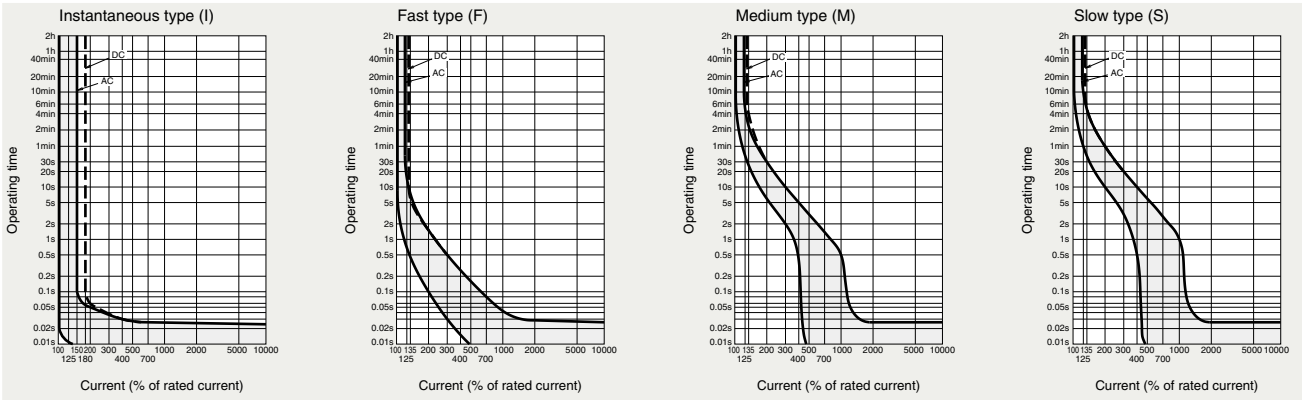


CP30-BA

CP30-BA

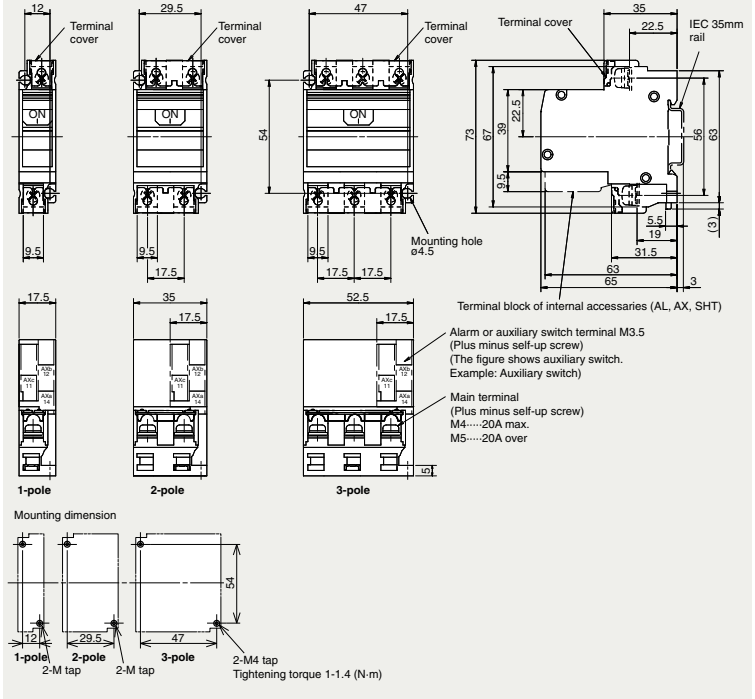
Frame (A)				30		
Model				CP30-BA		
Number of poles				1	2	3
Rated impulse withstand voltage Uimp (kV)				2.5		
Rated current (A)				0.1, 0.25, 0.3, 0.5, 1, 2, 3, 5, 7, 10,15, 20, 30		
Rated short-circuit capacity (kA)	UL 1077 CSA C22.2 No.235	Rated voltage (V)	AC (V)	250		
			DC (V)	65	125	–
		AC		2.5kA at 250V		
		DC		2.5kA at 65V	2.5kA at 125V	–
	IEC 60934 EN 60934	Rated insulation voltage Ui (V)		250		
		AC		2.5kA at 230V		
		DC		2.5kA at 60V	2.5kA at 120V	–
	EN 60947-2 IEC 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)		250		
		AC		2.5/2.5kA at 230V		
		DC		2.5/2.5kA at 60V	2.5/2.5kA at 120V	–
AC-DC common use				●		–
Operating characteristics				Instantaneous type (I) Medium type (M),(MD) Slow type (S),(SD) Fast type (F)		
Mode of tripping				Instantaneous type (I): magnetic only Other type (M, MD, S, SD, F):hydraulic-magnetic		

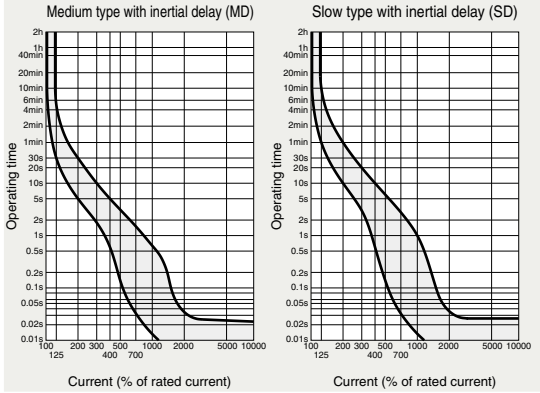
Operating Characteristics



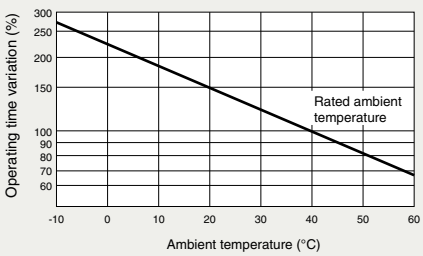
Outline Drawing

•CP30-BA





Temperature Characteristics Curve



(1) Dimensions of electrical operated circuit breakers

The following concept is applied for the dimensions of the electrical operated circuit breaker. Please understand this before using this type of breaker.

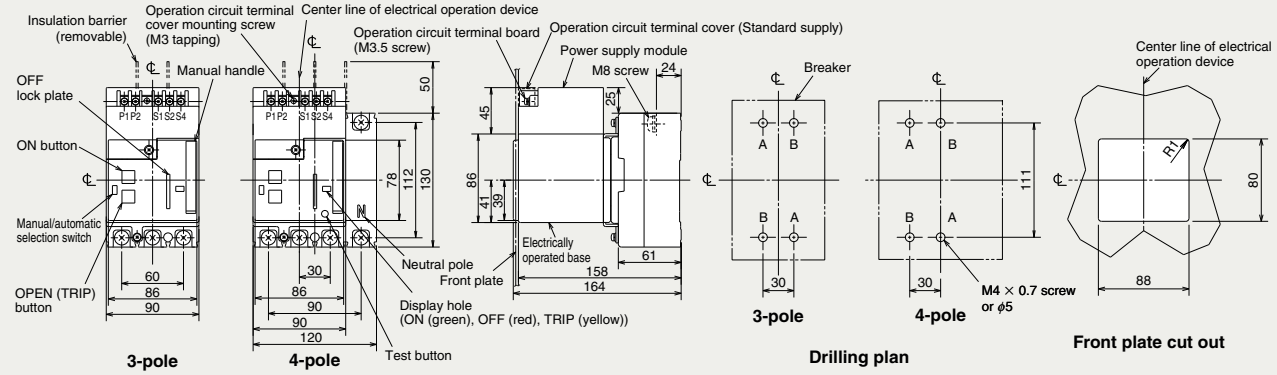
Connection method	Outline dimensions listing method
Front connection (Rear connection)	See table below
Rear connection Plug-in	The drilling dimensions and connection related dimensions are the same as the dimensions for the breaker body. Refer to the dimension drawings of each model. Note that for the rear connection type, four mounting holes are required even for the 2-pole or 3-pole types.

Model	Listed page	Model	Listed page
NF125-CV/SV/HV NV125-CV/SV/HV	845	NF400-CW/SW/SEW/HEW/REW NF630-CW/SW/SEW/HEW/REW	846
NF125-UV	767	NF400-UEW (3P) NV400-CW/SW/SEW/HEW/REW NF400-UEW (4P) NV630-CW/SW/SEW/HEW	
NF125-SEV/HEV/RV/ZEV NF250-CV/SV/HV/SEV/HEV NF250-RV NF125-SGV/LGV/HGV/RGV NF160-SGV/LGV/HGV NF250-SGV/LGV/HGV/RGV NV125-SEV/HEV NV250-CV/SV/HV/SEV/HEV	845	NF800-CEW/SEW/HEW/REW/SDW NF800-UEW NV800-SEW/HEW	847
		NF1000-SEW, NF1250-SEW/SDW NF1600-SEW/SDW	848
NF250-UV	771		

(2) Front connection (Rear connection)

NF125-CV, NF125-SV, NF125-HV
NV125-CV, NV125-SV, NV125-HV

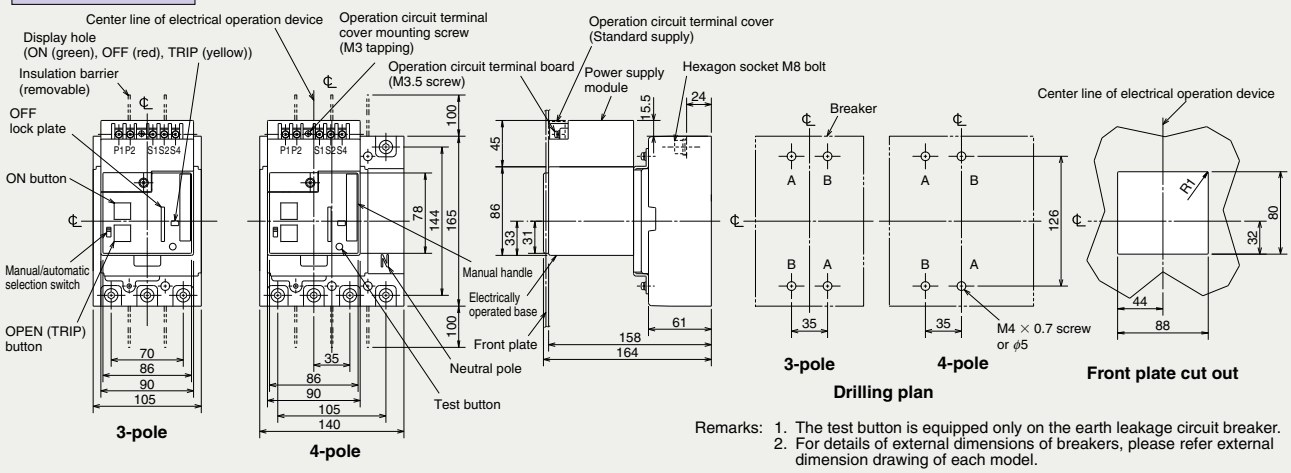
Front connection



Remarks: 1. This cannot be mounted on the 2-pole breaker.
2. The test button is equipped only on the earth leakage circuit breaker.

NF125-SEV, NF125-HEV, NF125-RV
NF250-CV, NF250-SV, NF250-HV, NF250-SEV, NF250-HEV, NF250-RV
NV125-SEV, NV125-HEV
NV250-CV, NV250-SV, NV250-HV, NV250-SEV, NV250-HEV
NF125-SGV/LGV/HGV/RGV
NF160-SGV/LGV/HGV
NF250-SGV/LGV/HGV/RGV

Front connection

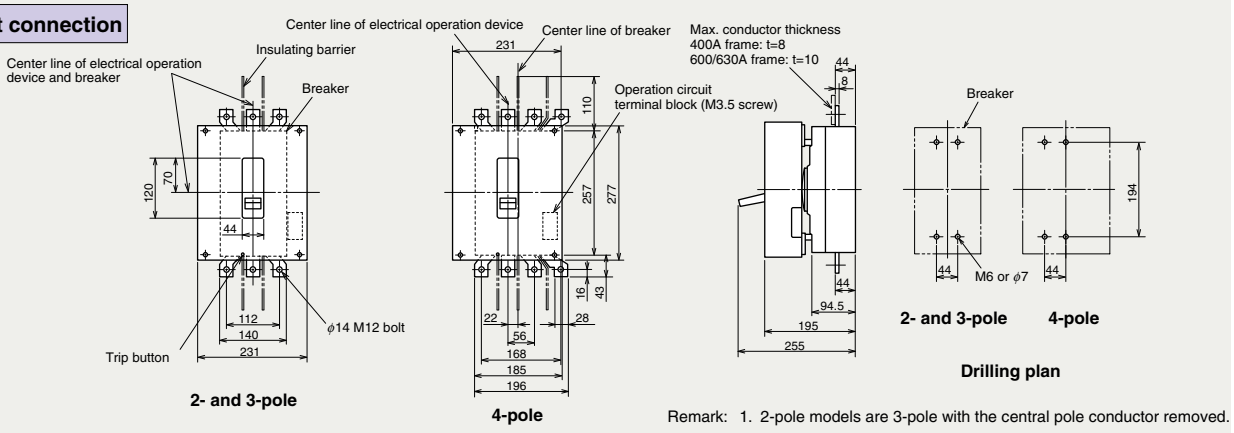


Remarks: 1. The test button is equipped only on the earth leakage circuit breaker.
2. For details of external dimensions of breakers, please refer external dimension drawing of each model.

Outline Drawing

NF400-CW, NF400-SW, NF400-SEW, NF400-HEW, NF400-REW, NF630-CW, NF630-SW, NF630-SEW, NF630-HEW, NF630-REW Motor drive type

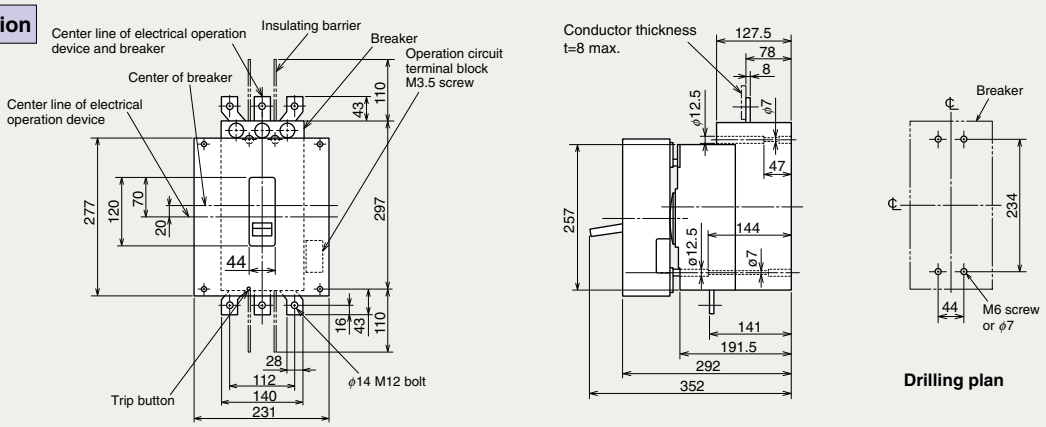
Front connection



Remark: 1. 2-pole models are 3-pole with the central pole conductor removed.

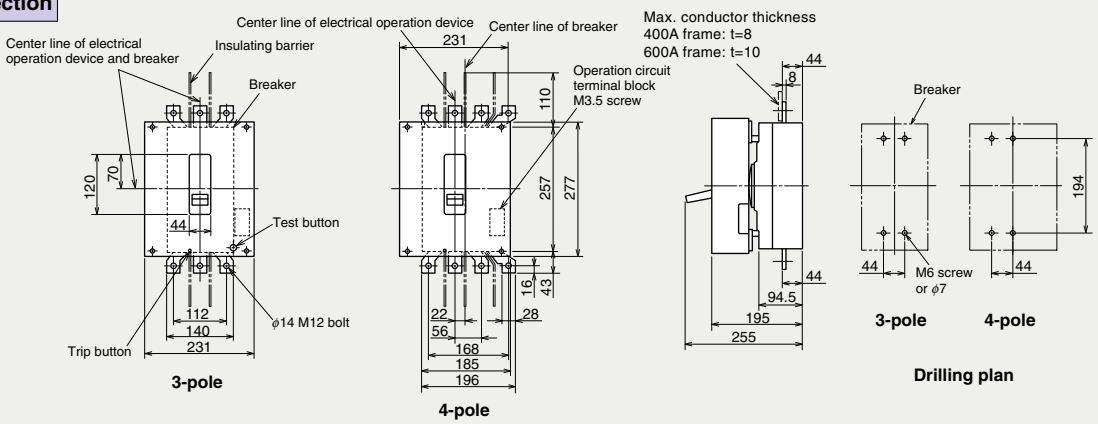
NF400-UEW (3-pole) Motor drive type

Front connection



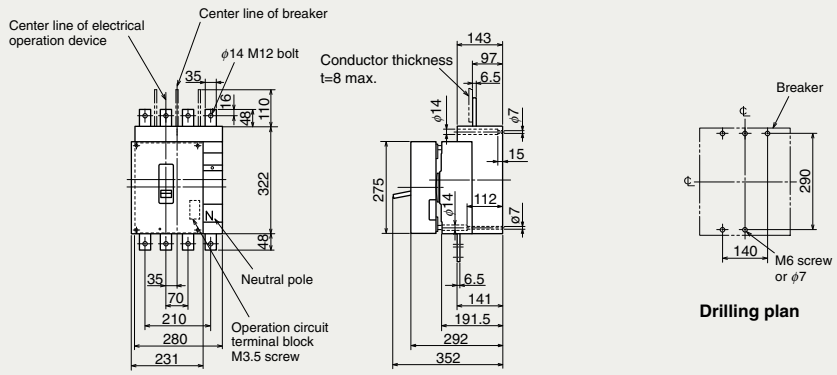
NV400-CW, NV400-SW, NV400-SEW, NV400-HEW, NV400-REW, NV630-CW, NV630-SW, NV630-SEW, NV630-HEW Motor drive type

Front connection



NF400-UEW (4-pole) Motor drive type

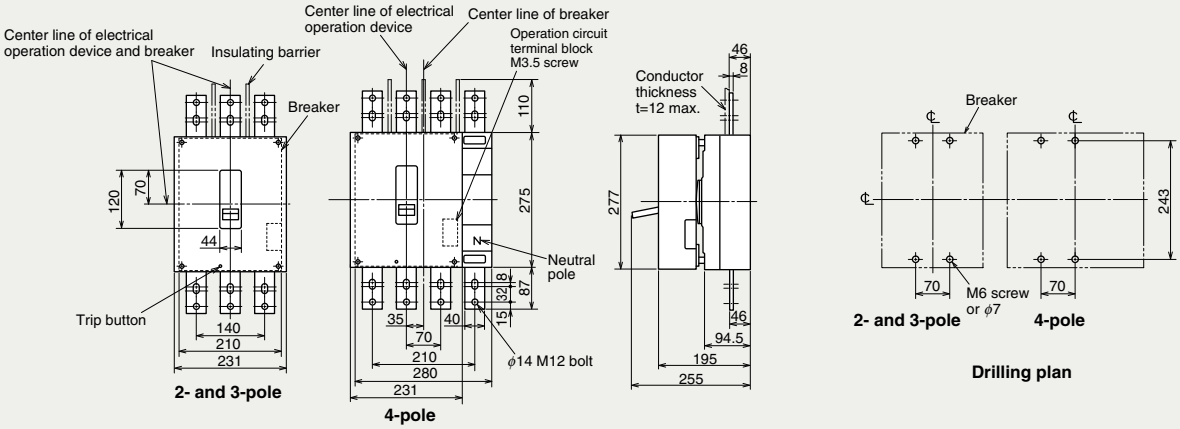
Front connection



Outline Drawing

NF800-CEW, NF800-SDW, NF800-SEW, NF800-HEW, NF800-REW Motor drive type

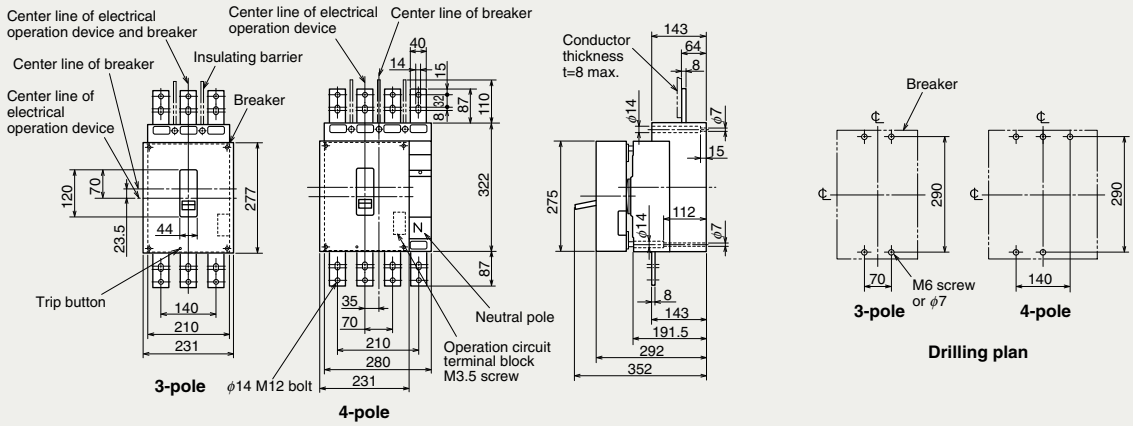
Front connection



Remark: 1. 2-pole models are 3-pole with the central pole conductor removed.

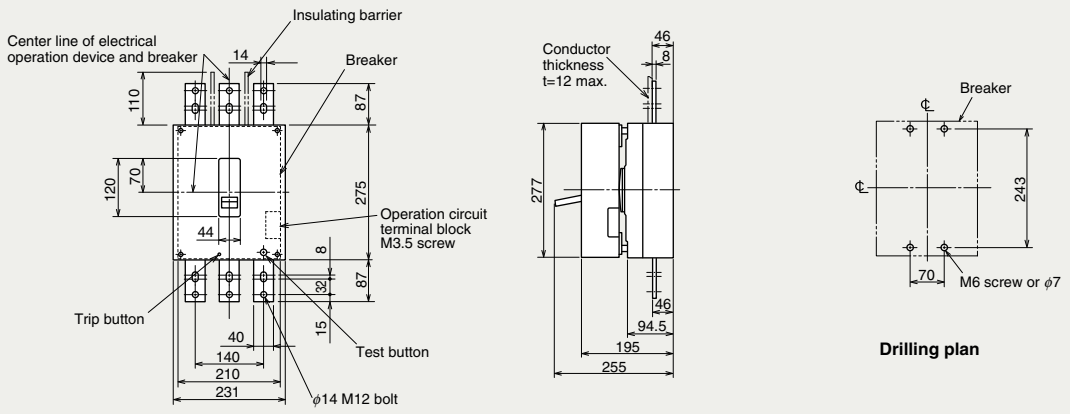
NF800-UEW Motor drive type

Front connection



NV800-SEW, NV800-HEW Motor drive type

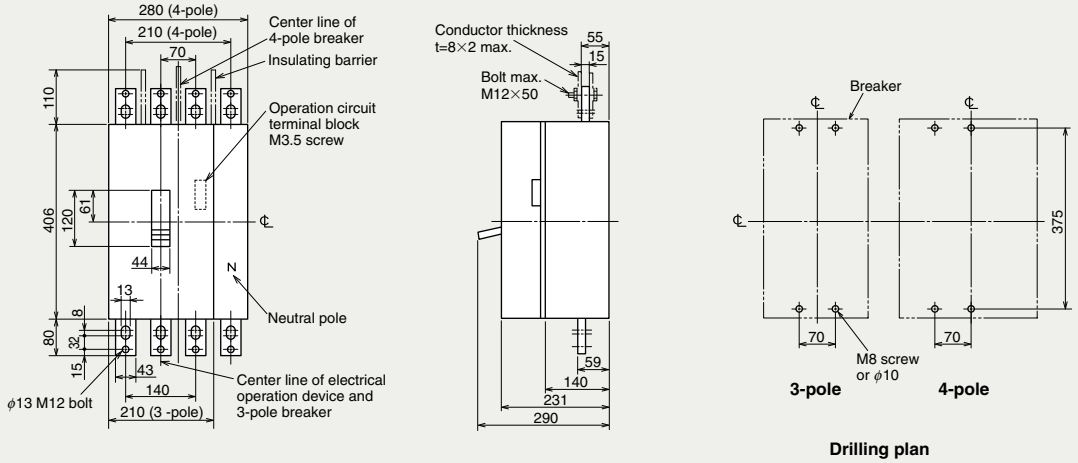
Front connection



Outline Drawing

NF1000-SEW, NF1250-SEW, NF1250-SDW Motor drive type

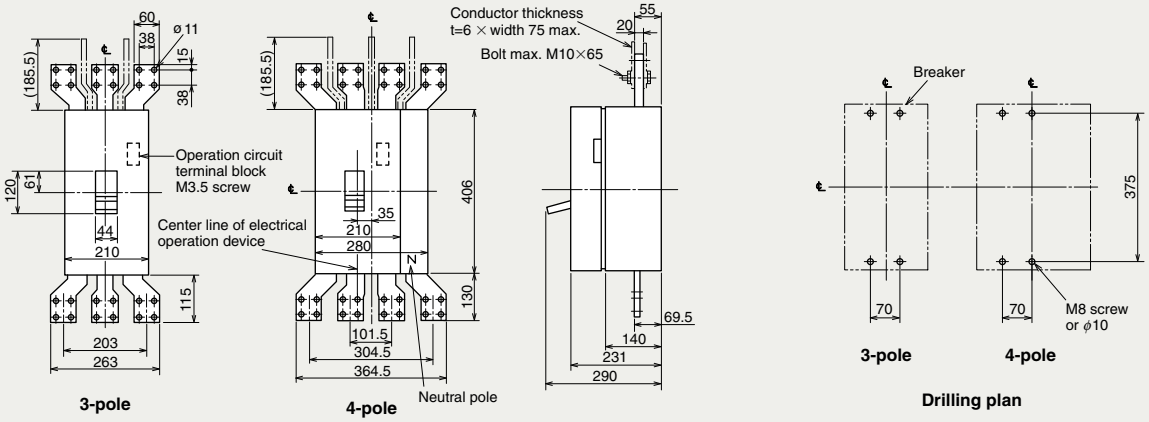
Front connection



Remark: 1. 2-pole models are 3-pole with the central pole conductor removed.

NF1600-SEW, NF1600-SDW Motor drive type

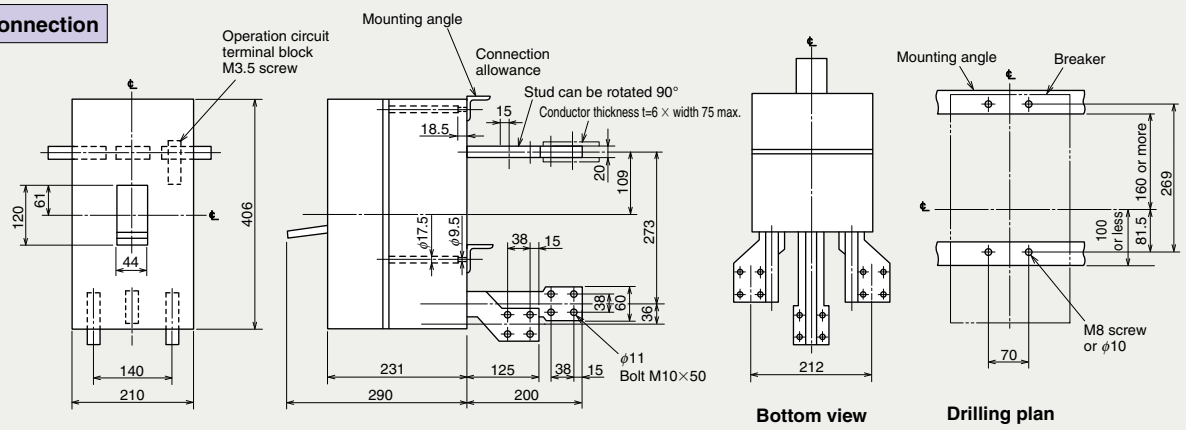
Front connection



Outline Drawing

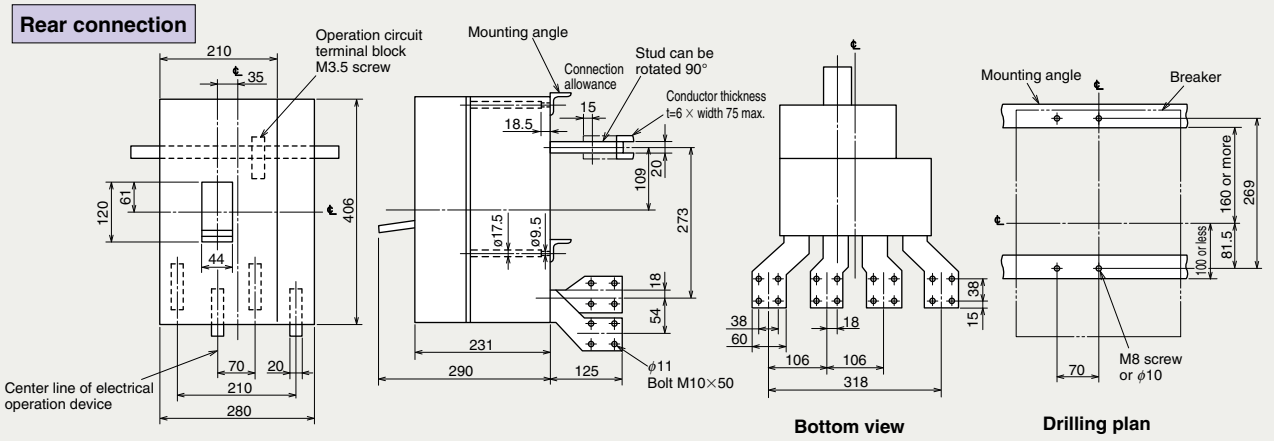
NF1600-SEW (3-pole) Motor drive type

Rear connection



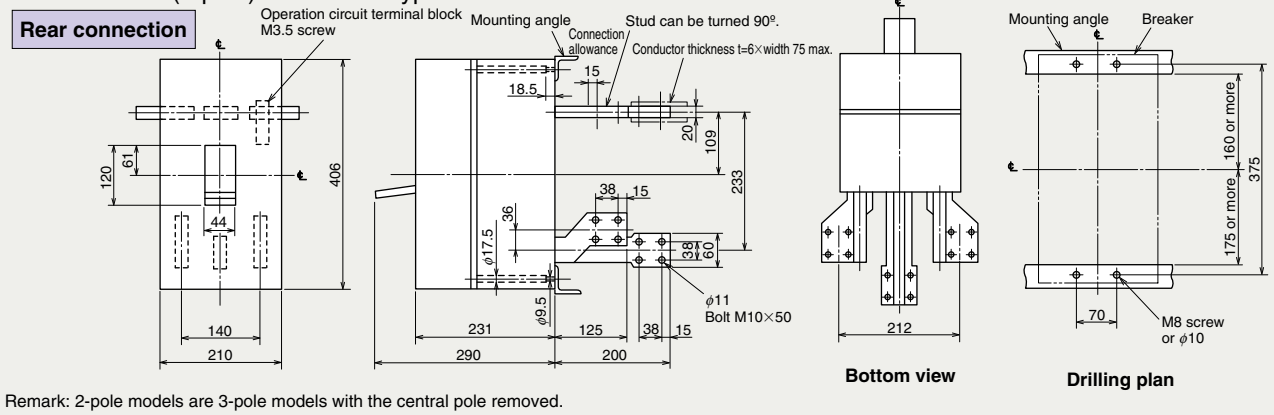
NF1600-SEW (4-pole) Motor drive type

Rear connection



NF1600-SDW (3-pole) Motor-drive type

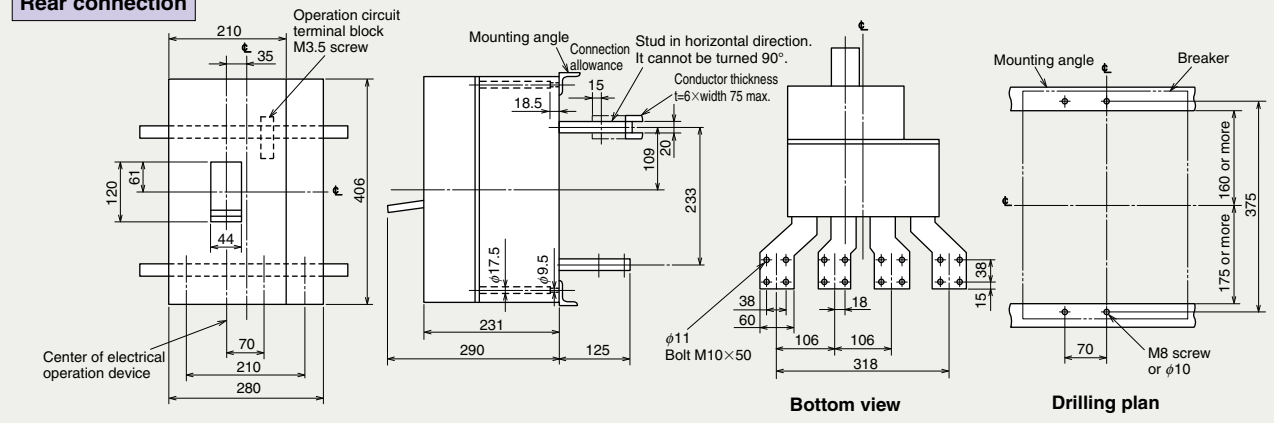
Rear connection



Remark: 2-pole models are 3-pole models with the central pole removed.

NF1600-SDW (4-pole) Motor-drive type

Rear connection



Magnetic Contactor and Starters

A wide variety of lineup to meet all demands

The MS-T/N Series Magnetic Starters are eco-friendly, ready for global use, compact, easy-to-use, and built with safety in mind. Compatible with many international standards and highly-reliable to meet various situations from switchboards to equipment.

Magnetic Starters

All models in the MS-T series are equipped with terminal covers.
Also, the series includes a wider range of operating coils. (10-100A)

List of Produced Models P.861 | Selections P.864 | Specifications P.873

Magnetic Contactors

All models in the MS-T series are equipped with terminal covers.
Also, the series includes a wider range of operating coils. (10-100A)

List of Produced Models P.861 | Selections P.864 | Specifications P.875

Contactor Relays

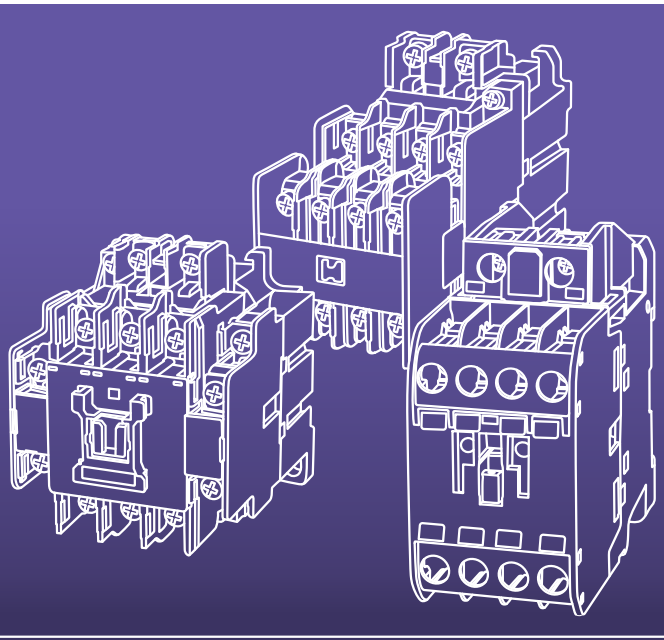
Can be used as control relays for magnetic contactors,
using the large number of contacts to transmit signals.

List of Produced Models P.862 | Selections P.865 | Specifications P.887

Thermal Overload Relays

Can be used to protect motors against burning out when overloaded or
under locking.

List of Produced Models P.862 | Selections P.865 | Specifications P.881



Definite Purpose Magnetic Contactors

Our lineup of magnetic contactors responds to a diverse range of customer needs.

List of Produced Models P.862 | Selections P.864 | Specifications P.882

Solid State Contactors

We have a lineup of high frequency switching, maintenance free, long life products that are ideal for applications where a switching sound is not desired.

List of Produced Models P.892

Optional Units

These products can be easily attached to, or combined with, magnetic contactors, contactor relays and thermal relays.
There are a range of options available that have been designed with concern for safety and ease of use.

Selections P.865 | Specifications P.889

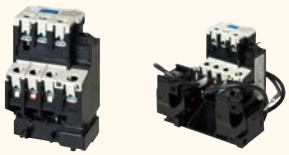
Motor Circuit Breaker

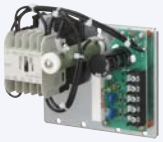
Our wide lineup of related devices is ideal for controlling or protecting motors and other devices.

Specifications P.894

Magnetic Contactor and Starters

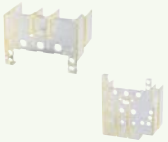
Product designation by purpose		MS-T/N Series Magnetic Starters/Magnetic Contactors			
		Standard (AC operated type)	Reversing	DC operated type	Mechanically latched type
External appearance of representative models	MS-T Series	 MS-T MSO-T S-T	 MS-2×T MSO-2×T S-2×T	 MSOD-T  SD-T	 SL/SLD-T
	MS-N Series	 MS-N MSO-N S-N	 MS-2×N MSO-2×N S-2×N	 MSOD-N  SD-N	 SL/SLD-N
Purpose/ Functions		・Can be used for general purpose activities such as starting and stopping a motor or to protect a motor against burning out.	・Applicable for normal and reverse rotation, and reverse phase braking (plugging), together with use as a switch between normal and emergency power sources.	・Can be used with DC control circuits. (The main circuit can be used with both AC or DC)	・The switch's state is mechanically maintained, so that no release will occur during blackouts or drops in power voltage. ・Uses ・Roadway lighting ・Memory circuits in industrial plants, etc. ・As an power switch between power purchase and private power generation

Product designation by purpose		MS-T/N Series Magnetic Starters/Magnetic Contactors		Thermal Overload Relays
		With fast wiring terminal	3 Pole Magnetic Contactors	
External appearance of representative models	MS-T Series	 MSO-T□BC S-T□BC	 S-T32	 TH-T TH-T□SR
	MS-N Series	–	 S-N□8	 TH-N TH-N□SR
Purpose/ Functions		・Providing safety during maintenance inspections, such as by allowing easy wiring operations and protecting against electric shocks without the need to install a protective cover.	・Because there are only 3 main contacts and no auxiliary contacts installed, the contact area for attachment to the circuit board is reduced. ・An auxiliary contact unit can also be attached to provide auxiliary contacts.	・Can be used to protect motors against burning out when overloaded or under locking. Overload phase failure protection models (TH-T/N□KP), delayed trip models (TH-T/N□SR) and quick trip models (TH-T/N□FS, TH-T□FSKP & TH-N□KF) are also available.

	MS-T/N Series Magnetic Starters/Magnetic Contactors				
	Delay open type	Magnetic Starter with Overload, Phase Failure Protections	Magnetic Starter with Thermal Relays and Saturable Reactors	Magnetic Starters with Quick-trip Thermal Relays	Magnetic Starters with Push Button switch
	 MSO/S-T□DL	 MSO-T□KP	 MSO-T□SR	 MSO-T□FSKP	 MS-T□PM
	 MSO/S-N□DL	 MSO-N□KP	 MSO-N□SR	 MSO-N□FS/KF	 MS-N□PM
	・Contactor prevent instantaneous drop-out when connected motors, resulting from momentary voltage drop or power interruption caused by lighting or similar. Starter or contactor remain closed for 1 to 4 seconds. ・Uses ・Temporary memory circuits for automated control equipment, etc.	・Protection functionality is provided against motor overloads, locking and phase failure.	・Capable of providing protection against overloads and locking, and preventing unnecessary motions of thermal relays, for motors with long startup time or a large inrush current.	・Appropriate for protection of motors with a short allowed time during periods of locking, such as underwater motors and compressors.	・Because a push button is integrated to magnetic starter, it can be operated without installing a separate push button.

	Contactor type Contactor Relay				
	Standard (AC operated type)	DC operated type	Mechanically latched type	Delay open type	With fast wiring terminal
	 SR-T	 SRD-T	 SRL-T SRLD-T	 SR-T□DL	 SR/SRD-T□BC
	–	–	–	–	–
	・Can be used as control relays for magnetic contactors, etc., using the large number of electrical contacts to transmit signals.	・Can be used with DC control circuits. (The contact part can be used with both alternating or direct current)	・The switch's state is mechanically maintained, so that no release will occur during blackouts or drops in power voltage.	・Contactor prevent instantaneous drop-out when connected motors, resulting from momentary voltage drop or powor interruption caused by lighting or similar. Starter or contactor remain closed for 1 to 4 seconds.	・Providing safety during maintenance inspections, such as by allowing easy wiring operations and protecting against electric shocks without the need to install a protective cover.

Magnetic Contactor and Starters

Product designation by purpose	Optional Units (Magnetic Starters/Magnetic Contactors/Contactor Relays)	
	UT Series	UN Series
External appearance of representative models	 Operation coil surge absorber unit UT-SA  Auxiliary contact blocks UT-AX  Mechanical interlocks UT-ML  DC/AC interface unit for operating coils UT-SY  Single attachment unit UT-HZ  Reset release for thermal relays UN-RR	 Protective cover units for charging parts UN-CV/UN-CZ  Protective cover units for terminals UN-CW  Operation coil surge absorber unit UN-SA  Auxiliary contact blocks UN-AX  Auxiliary contact unit with contacts for low level signals UN-LL22  DC/AC interface unit for operating coils UN-SY  LED display for thermal relays UN-TL  Mechanical interlocks UN-ML  Reset release for thermal relays UN-RR
Purpose/ Functions	・These products can be easily attached to, or combined with, magnetic contactors, contactor relays and thermal relays. Please choose the appropriate product to match your intended purpose. ・Uses ・UT/UN-CV/CZ: Protection of the charging part ・UT/UN-SA: Suppressing switching surges in the coil ・UN-LL: Switching of low voltage and minute electric current ・UT/UN-SY: Making it possible to switch magnetic contactors operating on alternating current using programmable controller output (24VDC) ・UN-TL: Displaying whether thermal relays are tripped. ・UT/UN-ML: Preventing simultaneous closure of reversing magnetic contactors ・UT/UN-RR: Enabling thermal resets outside the control board ・UT/UN-CW: Protection of the terminal part ・UT/UN-AX: Increasing the number of auxiliary contacts	

Product designation by purpose	Related Components		
	Solid State Contactors	Optional Unit for Use with Solid State Contactors	Electronic Motor Protection Relay
External appearance of representative models	 US-N  US-K  US-H	 Driving unit with output UA-SH  Driving unit UA-DR1  Power control unit UA-PC	 ET-N
Purpose/ Functions	・High frequency switching, maintenance free, long life products that are ideal for applications where a switching sound is not desired. ・Uses ・Facilities such as hotels and clean rooms ・Heater load switch for equipment such as injection molding machines	・The range of applications is expanded when used in combination with US-N/K US-H series solid state contactors. ・Uses ・UA-DR1: For controlling alternating current control circuits ・UA-PC: For power control	・Electronic motor protection relay capable of protecting against overloads, locking and phase failure during startup and operation of alternating current motors, and detecting phase reversals.

	Definite Purpose Magnetic Starters, Connectors and Contactor Relays			Definite Purpose Magnetic Contactors
	DC Interface Contactors	NC Main Contact Contactors	DC Contactors	Medium Voltage Vacuum Contactors
	 MSOD-Q  SD-Q  SD-QR (Reversing)	 B(D)-N	 DU(D)-N	 SH-V
	・Can be operated directly using transistor output (24VDC0.1A) from programmable controllers, etc.	・b contacts (always closed contacts) are used as the main circuit contacts, so it has applications in motor controls and power switches for electric light circuits. ・Uses ・For short circuits during the startup resistance of motors ・For ensuring smooth startup of alternating current motors	・Can be applied to controlling direct current motors of 440V or under and switching of general direct current circuits ・Uses ・Controller for variable speed motors ・For use in dynamic brakes	・Exceptionally safe high capacity magnetic contactor with no arcing, as a result of the breaker inside the vacuum bulb

	Related Components			Low Voltage / Reduced Voltage Starter
	Pneumatic Time Delay Relays	Voltage Detecting Relay	Re-Starting Relay	Star-Delta Starters
	 SRT(D)-N	 SRE	 UA-DL2	 EYD/EY/EYF-N
	・A pneumatic timer for time intervals between 0.1 and 60 seconds where a precise time interval is not required.	・Can be used for detecting drops in power supply voltage, such as for switching to private power generation as a result of a power outage, or when used in a voltage drop alarm.	・A relay that automatically restarts a loaded device, that has stopped as a result of voltage drops for a short time and momentary blackouts, upon the resumption of power supply. ・Uses ・Motor and heater overload circuits for various kinds of industrial plants	・Can be used to reduce electrical and mechanical shock by reducing startup voltage and controlling startup torque.

MS-T Series Introduction

Down-sizing Small

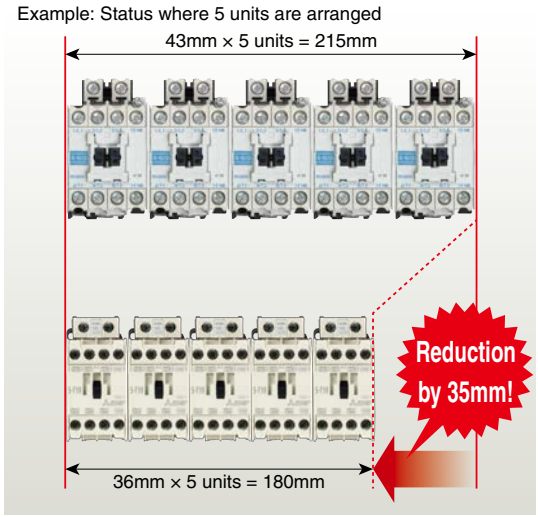
10A frame model is over 16% smaller with a width of just 36mm!!

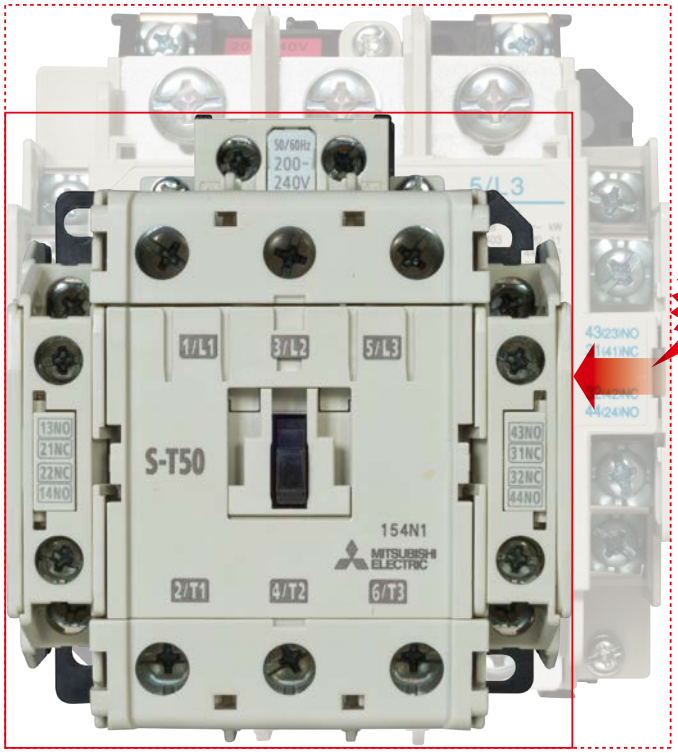
There is a saying that "every bit helps" and now with the industries smallest* general purpose Magnetic Contactor in its class, customers are able to more easily down-size their boards than ever before.

For AC-operated 10A frame class general-purpose Magnetic Contactor (based on survey conducted by Mitsubishi dated September 2016)

S-T10 (actual size)

Example: Status where 5 units are arranged

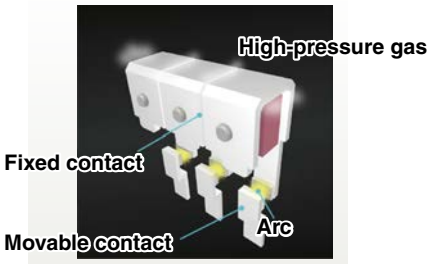




S-T50 (actual size)

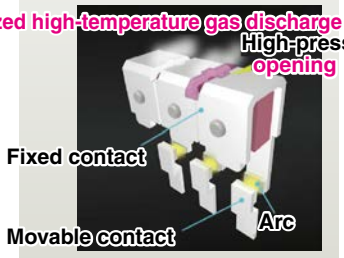
The optimized high-temperature gas discharge structure and arc runner shape streamline the outline dimensions!!

Traditional MS-N Series

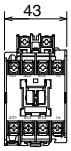
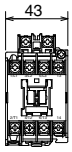
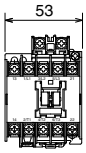
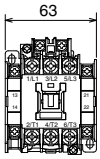
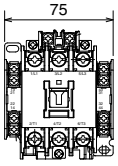
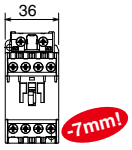
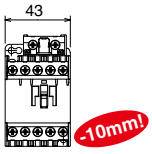
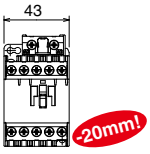
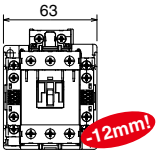
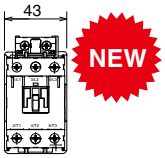


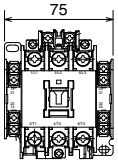
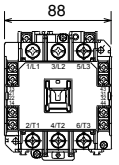
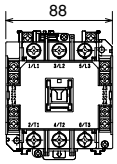
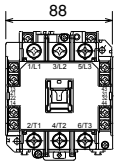
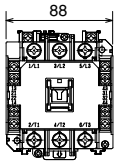
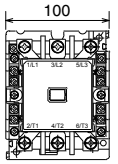
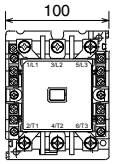
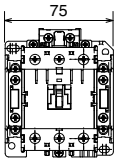
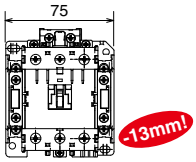
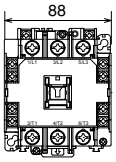
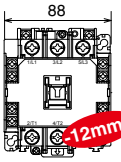
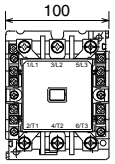
New MS-T Series

Optimized high-temperature gas discharge structure

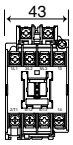
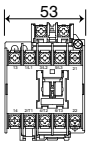
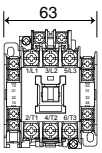
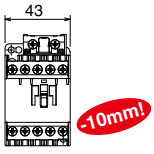
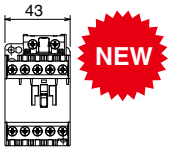
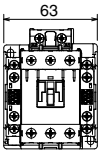
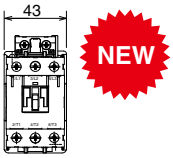


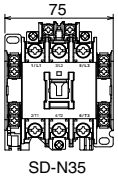
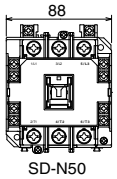
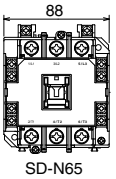
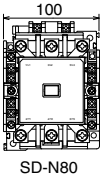
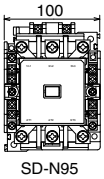
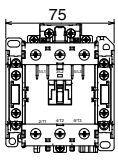
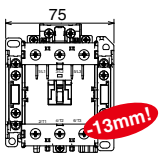
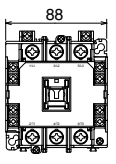
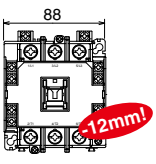
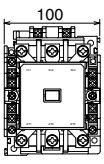
<AC operated type>

Frame size		11A	13A		20A	25A	32A
Traditional MS-N Series	Front view	 S-N10	 S-N11 (Auxiliary 1-pole)	 S-N12 (Auxiliary 2-pole)	 S-N20	 S-N25	–
New slimline MS-T Series	Front view	 -7mm! S-T10	 -10mm! S-T12 (Auxiliary 2-pole)		 -20mm! S-T20	 -12mm! S-T25	 NEW S-T32

Frame size		35A	50A		65A		80A	100A
Traditional MS-N Series	Front view	 S-N35	 S-N50	 S-N50AE	 S-N65	 S-N65AE	 S-N80	 S-N95
New slimline MS-T Series	Front view	 S-T35	 -13mm! S-T50		 S-T65		 -12mm! S-T80	 S-T100

<DC operated type>

Front view		13A		18A	20A	32A
Traditional SD-N Series	Front view	 SD-N11	 SD-N12	–	 SD-N21	–
New slimline SD-T Series	Front view	 -10mm! SD-T12		 NEW SD-T20	 SD-T21	 NEW SD-T32

Front view		35A	50A	65A	80A	100A
Traditional SD-N Series	Front view	 SD-N35	 SD-N50	 SD-N65	 SD-N80	 SD-N95
New slimline SD-T Series	Front view	 SD-T35	 -13mm! SD-T50	 SD-T65	 -12mm! SD-T80	 SD-T100

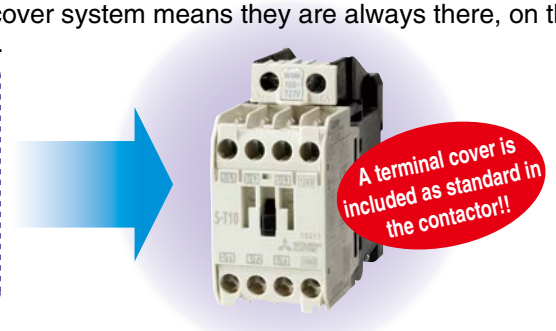
Standardization

New integrated terminal covers

Target frame : 10A to 50A frame

The perennial issues of remembering to order the terminal covers, fitting them correctly or loosing them in the process are challenges of the past. The integrated terminal cover system means they are always there, on the Magnetic Contactor or its Auxiliary contact, ready to be used.

Traditional solution: Cover + Contactor



Reduce your coil inventory by up to 50%

Target frame : 10A to 35A frame

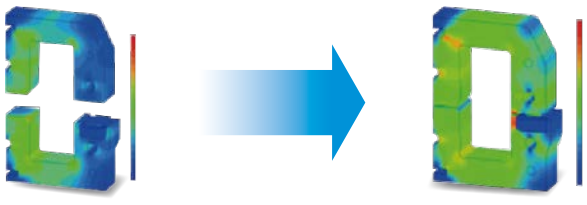
The 14 types of operation coil ratings available with the SN Series have been halved to 8 types with that increasing the applicable voltage range. Users can reduce their inventory, and by integrating the types of coils manufactured, a shorter delivery can be realized.

Coil designation	Rated voltage [V]	
	50Hz	60Hz
12VAC	12	12
24VAC	24	24
48VAC	48–50	48–50
100VAC	100	100–110
120VAC	110–120	115–120
127VAC	125–127	127
200VAC	200	200–220
220VAC	208–220	220
230VAC	220–240	230–240
260VAC	240–260	260–280
380VAC	346–380	380
400VAC	380–410	400–440
440VAC	415–440	460–480
500VAC	500	500–550

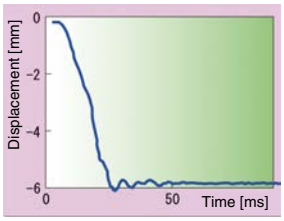
Coil designation	Rated voltage [V]
	50Hz/60Hz
12VAC	12
24VAC	24
48VAC	48–50
100VAC	100–127
200VAC	200–240
300VAC	260–340
400VAC	380–440
500VAC	460–550

* The conventional eight types are available for the 50A and larger frames.

By integrating the electromagnetic field analysis and drive analysis, inconsistency in the electromagnetic attraction force is suppressed and rise of the coil temperature is reduced.



OFF state　　ON state



When 150VAC 60Hz is applied on 200VAC coil

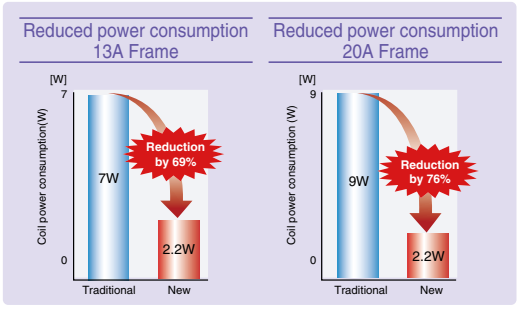
Capable of direct drive with transistor output of PLC, etc

Target frame : 10A to 32A frame *DC-operated models

The adopted high-efficiency polarized electromagnet greatly reduces the coil power consumption, and enables all models to be directly driven with a 24VDC, 0.1A rating transistor output. (24VDC coil)

	Conventional Model	New Model	Lowering Rate
13A Frame (Coil:12/24VDC)	7W	2.2W	69%
20A Frame (Coil:12/24VDC)	9W	2.2W	76%
32A Frame (Coil:12/24VDC)	–	2.2W	–

*48VDC to 220VDC:3.3W



Safety & Quality

Terminal cover with finger protection function

Target frame : 10A to 50A frames

In addition to the Magnetic Contactor, a terminal cover has been provided as a standard for the thermal, magnetic relay and auxiliary contact unit options. This realizes a finger protection function that complies with the DIN and VDE Standards, prevents electric shocks, and increases safety during maintenance and inspections.
[Finger Protection]
In the provisions regarding worker safety and accident protection during use of low-voltage switchgear and control-gear assemblies set forth with DIN EN 50274/VDE 0660 Teil 514, the range for providing protection against contact of live sections is divided into "Finger Safe (preventing finger contact)" and "Back of hand safe (protecting back of hand contact), and standards are provided. The MS-T Series terminal cover satisfies the requirements of these provisions.

A light touch

Target frame : All S-T Series

The MS-T Series' auxiliary contacts can operate with load as light as 20V 3mA making it suitable for direct control/operation from a PLC output.

Smart wiring

Smart design means Smart wiring

Target frame : 10A to 50A frames

The integrated terminal covers have an additional benefit in that they act as a guide to improve wiring efficiency but also retain the terminal screw in place: no mislaying the screw, no dropping it or having trouble reinserting it in to the terminal block just fast efficient wiring. Fast wiring terminals (model name with suffix “BC”) are also available to further improve wiring efficiency, workability and hence productivity.

① Screw holder lifts up the screw.
② Insert a ring crimp lug
③ Tighten the screw

Easy branch circuit wiring with Motor Circuit Breaker and optional connection conductor unit

Target frame : 10A to 32A frames

Easy wiring is available for the new MS-T Series by using the Motor Circuit Breaker and optional connection conductor unit, contributing your productivity improvement.

Global Standard Global Standard

Complies with main International Standards

In addition to compliance with the main International Standards including IEC, JIS, UL, CE, and CCC, we plan to acquire compliance with Shipping Standards and other International Standards.
We hope to contribute to your business expansions overseas.

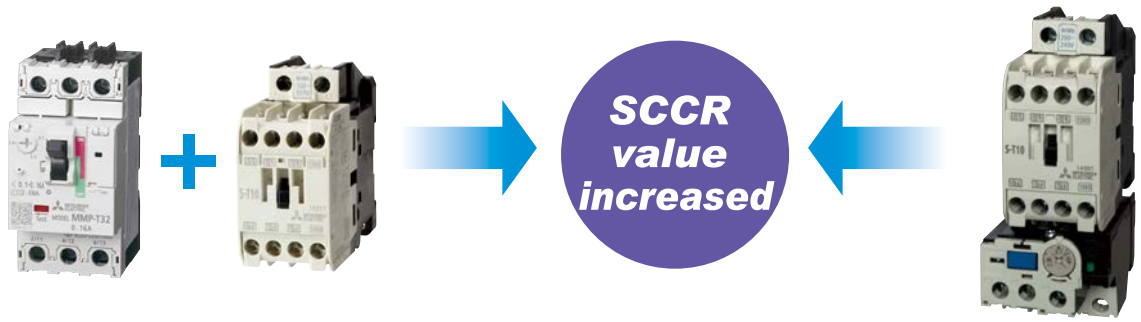
	Applicable standard					Safety certification standard
	International	Japan	European countries		China	U.S. & Canada
Standards	IEC Note	JIS	EN EC directive	Certificate authority	GB	c UL us
			CE	TÜV Rheinland	CCC	

Note : Also compliant with the requirements for mirror contacts comply with IEC60947-4-1 Annex F.

Higher SCCR value achieved by using with Motor Circuit Breaker

When the MMP-T Series and the MS-T Series are used together, the higher SCCR (UL short-circuit current rating) value, can be achieved. That will be a great support for your business in North America.

* For details on the SCCR value when used in combination with the Motor Circuit Breaker, refer to the Motor Circuit Breaker catalog.



List of Produced Models

●Magnetic Starters/Magnetic Contactors (NonReversing)

New release

Frame				T10	T12	T20	T21	T25	T32	T35	T50	T65	T80	T100	N125	N150	N180	N220	N300	N400	N600	N800
Category AC-3 Rated capacity [kW]		220V		2.5 [2.2]	3.5 [2.7]	4.5 [3.7]	5.5 [4]	7.5 [5.5]	7.5 [7.5]	11 [7.5]	15 [11]	18.5 [15]	22 [19]	30 [22]	30	37	45	55	75	110	160	200
		440V		4 [2.7]	5.5 [4]	7.5 [7.5]	11 [7.5]	15 [11]	15 [15]	18.5 [15]	22 [22]	30 [30]	45 [37]	55 [45]	60	75	90	110	150	200	300	400
Auxiliary contact (Note 6)		standard		1a	1a1b	1a1b	← 2a2b →		—	← 2a2b →												
Model Name		special		1b	2a	2a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Magnetic Starters	Enclosed	Standard specifications	MS-□	○	○	–	○	–	–	○	○	○	○	○	○	○	○	○	○	○	–	–
		With push button	MS-□PM	○	○	–	○	–	–	○	○	○	○	○	–	–	–	–	–	–	–	–
		3-element (2E) thermal	MS-□KP	○	○	–	○	–	–	○	○	○	○	○	○	○	○	○	○	○	–	–
		Open time quick motion type	MS-□QM	–	–	–	–	–	–	–	–	○	○	○	○	○	○	○	○	○	–	–
	Open type	Standard specifications	MSO-□	○	○	○	○	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–
			MSOD-□	–	○	○	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
		3-element (2E) thermal	MSO-□KP	○	○	○	○	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–
			MSOD-□KP	–	○	○	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
		With saturable reactor	MSO-□SR	○	○	○	○	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–
			MSOD-□SR	–	○	○	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
		3-element (2E) thermal With saturable reactor	MSO-□KPSR	–	–	–	○	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–
			MSOD-□KPSR	–	–	–	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
		2-element Quick-acting characteristics thermal	MSO-□FS	–	–	–	○	○	–	○	○	○	○	○	–	–	–	–	–	–	–	–
			MSOD-□FS	–	–	–	○	–	–	○	○	○	○	○	–	–	–	–	–	–	–	–
		3-element (2E) Quick-acting characteristics thermal	MSO-□FSKP	○	○	○	○	○	–	○	○	○	○	○	–	–	–	–	–	–	–	–
			MSOD-□FSKP	–	○	○	○	–	–	○	○	○	○	○	–	–	–	–	–	–	–	–
		3-element (2E) Quick-acting characteristics thermal	MSO-□KF	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Open time quick motion type	MSO-□QM	–	–	–	–	–	–	–	–	○	○	○	○	○	○	○	○	○	–	–
		Surge absorber mounted type	MSO-□SA	○	○	○	○	○	–	○	○	–	–	–	–	–	–	–	–	–	–	–
			MSOD-□SA	–	○	○	○	–	–	○	○	–	–	–	–	–	–	–	–	–	–	–
		Wiring streamlining terminal	MSO-□BC	○	○	○	○	○	–	○	○	–	–	–	–	–	–	–	–	–	–	–
			MSOD-□BC	–	○	○	○	–	–	○	○	–	–	–	–	–	–	–	–	–	–	–
		Anticorrosion treatment	MSO-□YS	○	○	○	○	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–
			MSOD-□YS	–	○	○	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
		Delay open type	MSO-□DL	–	○	–	○	–	–	○	○	○	○	○	–	○	–	○	○	○	–	–
		Mechanically latched type	MSOL-□	–	–	–	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
			MSOLD-□	–	–	–	○	–	–	○	○	○	○	○	○	○	–	○	○	○	–	–
		With terminal cover	MSO-□CW	–	–	–	–	–	–	–	–	○	○	–	–	–	–	–	–	–	–	–
Magnetic Contactors	Open type	Standard specifications	S-□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			SD-□	–	○	○	○	–	○	○	○	○	○	○	○	○	–	○	○	○	○	○
		Surge absorber mounted type	S-□SA (Note3)	○	○	○	○	○	○	○	○	–	–	–	–	–	–	–	–	–	–	–
			SD-□SA	–	○	○	○	–	○	○	○	–	–	–	–	–	–	–	–	–	–	–
		Anticorrosion treatment	S-□YS	–	–	–	–	–	–	○	○	○	○	○	○	○	○	○	○	○	○	○
		Open time quick motion type	S-□QM	–	–	–	–	–	–	–	–	○	○	○	○	○	○	○	○	○	–	–
		Wiring streamlining terminal	S-□BC	○	○	○	○	○	○	○	○	–	–	–	–	–	–	–	–	–	–	–
			SD-□BC	–	○	○	○	–	○	○	○	–	–	–	–	–	–	–	–	–	–	–
		With terminal cover	S-□CW	–	–	–	–	–	–	–	–	○	○	–	–	–	–	–	–	–	–	–
		Delay open type	S-□DL	–	○	–	○	–	–	*	*	*	*	*	–	○	–	○	○	○	–	–
		Mechanically latched type	SL-□	–	–	–	○	–	–	○	○	○	○	○	○	○	–	○	○	○	○	○
			SLD-□	–	–	–	○	–	–	○	○	○	○	○	○	○	–	○	○	○	○	○
		Class 2 heat resistance	S-□FN	–	○	–	○	–	–	*	*	–	*	*	–	○	–	–	–	○	–	–
		Class 2 heat resistance Mechanically latched type	SL-T□FN	–	–	–	○	–	–	–	*	–	*	*	–	○	–	–	–	○	–	–
			SLD-T□FN	–	–	–	○	–	–	–	*	–	*	*	–	○	–	–	–	○	–	–

Note 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

● Magnetic Starters/Magnetic Contactors (Reversing)

New release

Frame			2X T10	2X T12	2X T20	2X T21	2X T25	2X T32	2X T35	2X T50	2X T65	2X T80	2X T100	2X N125	2X N150	2X N180	2X N220	2X N300	2X N400	2X N600	2X N800
Category AC-3 Rated capacity [kW]		220V	2.5 [2.2]	3.5 [2.7]	4.5 [3.7]	5.5 [4]	7.5 [5.5]	7.5 [7.5]	11 [7.5]	15 [11]	18.5 [15]	22 [19]	30 [22]	30	37	45	55	75	110	160	200
		440V	4 [2.7]	5.5 [4]	7.5 [7.5]	11 [7.5]	15 [11]	15 [15]	18.5 [15]	22 [22]	30 [30]	45 [37]	55 [45]	60	75	90	110	150	200	300	400
Auxiliary contact (Notes 4 to 6)		Standard	(1a×2) +2b	(1a1b×2)+2b					← 2a2b×2					→	← 3a3b×2				→	← 4a4b×2	→
Model Name		Special	(1b×2) +2b	(2a×2)+2b		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Magnetic Starters	Enclosed	Standard specifications	MS-□	—	—	—	○	—	—	○	○	○	○	○	○	○	○	○	○	○	—	—
	Enclosed	3-element (2E) thermal	MS-□KP	—	—	—	○	—	—	○	○	○	○	○	○	○	○	○	○	○	—	—
	Open type	Standard specifications	MSO-□	○	○	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	—	—
			MSOD-□	—	○	○	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
		3-element (2E) thermal	MSO-□KP	○	○	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	—	—
			MSOD-□KP	—	○	○	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
		With saturable reactor	MSO-□SR	○	○	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	—	—
			MSOD-□SR	—	○	○	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
		3-element (2E) thermal With saturable reactor	MSO-□KPSR	—	—	—	○	○	—	○	○	○	○	○	○	○	○	○	○	○	—	—
			MSOD-□KPSR	—	—	—	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
		2-element Quick-acting characteristics thermal	MSO-□FS	—	—	—	○	○	—	○	○	○	○	○	—	—	—	—	—	—	—	—
			MSOD-□FS	—	—	—	○	—	—	○	○	○	○	○	—	—	—	—	—	—	—	—
		3-element (2E) Quick-acting characteristics thermal	MSO-□FSKP	○	○	○	○	○	—	○	○	○	○	○	—	—	—	—	—	—	—	—
			MSOD-□FSKP	—	○	○	○	—	—	○	○	○	○	○	—	—	—	—	—	—	—	—
		3-element (2E) Quick-acting characteristics thermal	MSO-□KF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Surge absorber mounted type	MSO-□SA	○	○	○	○	○	—	○	○	—	—	—	—	—	—	—	—	—	—	—
			MSOD-□SA	—	○	○	○	—	—	○	○	—	—	—	—	—	—	—	—	—	—	—
		Wiring streamlining terminal	MSO-□BC	○	○	○	○	○	—	○	○	—	—	—	—	—	—	—	—	—	—	—
			MSOD-□BC	—	○	○	○	—	—	○	○	—	—	—	—	—	—	—	—	—	—	—
		With terminal cover	MSO-□CW	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	—	—	—	—
		Anticorrosion treatment	MSO-□YS	○	○	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	—	—
			MSOD-□YS	—	○	○	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
		Mechanically latched type	MSOL-□	—	—	—	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
			MSOLD-□	—	—	—	○	—	—	○	○	○	○	○	○	○	—	○	○	○	—	—
Magnetic Contactors	Open type	Standard specifications	S-□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			SD-□	—	○	○	○	—	○	○	○	○	○	○	○	○	—	○	○	○	○	○
		Surge absorber mounted type	S-□SA (Note3)	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—	—	—	—
			SD-□SA	—	○	○	○	—	○	○	○	—	—	—	—	—	—	—	—	—	—	—
		Anticorrosion treatment	S-□YS	—	—	—	—	—	—	○	○	○	○	○	○	○	○	○	○	○	○	○
		Wiring streamlining terminal	S-□BC	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—	—	—	—
			SD-□BC	—	○	○	○	—	○	○	○	—	—	—	—	—	—	—	—	—	—	—
		With terminal cover	S-□CW	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	—	—	—	—
		Mechanically latched type	SL-□	—	—	—	○	—	—	○	○	○	○	○	○	○	—	○	○	○	○	○
			SLD-□	—	—	—	○	—	—	○	○	○	○	○	○	○	—	○	○	○	○	○
		Class 2 heat resistance	S-□FN	—	○	—	○	—	—	○	○	—	○	○	—	○	—	—	—	○	—	—
		With reversible conductor (both power supply and load side)	S-□SD	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			SD-□SD	—	○	○	○	—	○	○	○	○	○	○	○	○	—	○	○	○	○	○
		3-pole common on power supply side with crossover conductor	S-□SG	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			SD-□SG	—	○	○	○	—	○	○	○	○	○	○	○	○	—	○	○	○	○	○
		3-pole common on load side with crossover conductor	S-□SX	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			SD-□SX	—	○	○	○	—	○	○	○	○	○	○	○	○	—	○	○	○	○	○
		3-pole reverse-phase switch on load side with crossover conductor	S-□SF	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			SD-□SF	—	○	○	○	—	○	○	○	○	○	○	○	○	—	○	○	○	○	○

Notes 1: —indicates out of manufacturing range, and * indicates to be released soon.
2: The value given in brackets for the Class AC-3 rated capacity applies to the enclosed Magnetic Starter.
3: The T65 to N800 type AC operation coils are a surge absorber-installed type so the coil does not generate an open/close surge. Therefore, the surge absorber for coils is not required.
4: The +2b for the T10 to T20 auxiliary contact arrangements in the Reversing type represents the b contact built into the UT-ML11 interlock unit. This does not need to be specified when ordering.
5: For the auxiliary contact arrangement in the reversing type, the auxiliary contact arrangement combination for two Magnetic Contactors is indicated as ×2. When using the standard contact arrangement, there is no need to make a special designation, but when using the special arrangement, designate the contact arrangement for two units.
<Designation example> In case of 1b × 2 + 2b: 2B
6: The auxiliary contact arrangement for the mechanically latched type differs from the delay open type.

●Thermal Overload Relays

New release

Frame			T18	T25	T50	T65	T100	N120	N120TA	N220	N400	N600
Heater designation (Standard specifications)			0.12 to 15	0.24 to 22	24 to 50	12 to 65	54 to 100	42 to 82	105 to 125	82 to 180	105 to 330	250 to 660
Thermal Overload Relays	Standard specifications	TH-☐	○	○	○	○	○	○	○	○	○	○
	With saturable reactor	TH-☐SR	○	○	○	○	○	○	○	○	○	○
	2-element Quick-acting characteristics thermal	TH-☐FS	—	○	○	○	○	—	—	—	—	—
	3-element (2E) thermal	TH-☐KP	○	○	○	○	○	○	○	○	○	○
	3-element (2E) thermal With saturable reactor	TH-☐KPSR	—	○	○	○	○	○	○	○	○	○
	3-element (2E) Quick-acting characteristics thermal	TH-☐FSKP	○	○	○	○	○	—	—	—	—	—
		TH-☐KF	—	—	—	—	—	—	—	—	—	—
	With terminal cover	TH-☐CW	—	—	—	○	—	—	—	—	—	—
	Wiring streamlining terminal	TH-☐BC	○	○	○	—	—	—	—	—	—	—
	Anticorrosion treatment	TH-☐YS	○	○	○	○	○	○	○	○	○	○

Note 1: —indicates out of manufacturing range.

●Contactor Relays

Frame		T5	T9
Number of contact		5	9
Contact arrangement		5a	9a
		4a1b	7a2b
		3a2b	5a4b
Standard	SR-☐	○	○
DC operated type	SRD-☐	○	○
Mechanically latched type	SRL-☐	○	—
	SRLD-☐	○	—
With large rated auxiliary contacts	SR-☐JH	○	○
	SRD-☐JH	○	○
With overlap contact	SR-☐LC	○	○
	SRD-☐LC	○	○
Delay open type	SR-☐DL	○	○
With fast wiring terminal	SR-☐BC	○	○
	SRD-☐BC	○	○
With surge absorber	SR-☐SA	○	○
	SRD-☐SA	○	○

Notes 1: —indicates out of manufacturing range.
2: Refer to the individual rating table for the contact rating when using a type with large capacity contact or type with overlap contact. The value given in brackets is the value for switching the load with two poles installed in a series.
3: When using the mechanically latched type (SRL-☐, SRLD-☐), one each can be mounted on the opening coil and closing coil.
4: Only the side-on auxiliary contact unit UT-AX11 can be mounted on the mechanically latched type SRL-T5 or SRLD-T5. Only UN-AX11 can be mounted on SRL-N4 or SRLD-N4.
5: Both the surge absorber unit and DC/AC interface unit cannot be additionally mounted onto the Contactor Relay's coil terminal.
6: A live section protection cover is provided as a standard.
7: The minimum applicable load level for the contacts at the SR(D)-T9 head-on section (four terminals on upper level) is the same as UT-AX2/4.

Composition of the Model Code

Magnetic Starters

Note 1. For details of product manufacturing specifications and applicable devices, please refer to the table of all models manufactured (pages 871 and 872) and also to the individual pages for each model. Also, some combinations of model codes may not be able to be manufactured. If you are uncertain about whether particular models can be combined, please contact us for further advice.

●Enclosed Magnetic Starters

MS — 2× T21 KP SA PM

Basic type	
MS	AC operated type

Non-Reversing/Reversing	
No code	Non-Reversing
2×	Reversing

Frame size
T10,T12,T21,T35,T50,T65,T80,T100

Combined Thermal Overload Relays	
No code	Manual reset (standard)
AR	Automatic reset

Combined Thermal Overload Relays	
No code	With 2-element Thermal Overload Relays
KP	With 3-element Thermal Overload Relays
FS	With 2-element quick trip type Thermal Overload Relays
FSKP	With 3-element quick trip type Thermal Overload Relays

Push-button operation (only non-reversible type)	
No code	Standard specifications without push-button
PM	With push-button (with thermal reset)
PS	With push-button (without thermal reset)

Operation coil specifications	
No code	Standard
SA	Surge absorber mounting type

●Open type Magnetic Starters

MSO — 2× T10 BC KP SA YS

Basic type	
MSO	AC operated type
MSOD	DC operated type
MSOL	Mechanically latched AC operated type
MSOLD	Mechanically latched DC operated type

Non-Reversing/Reversing	
No code	Non-Reversing
2×	Reversing

Frame size
T10-T100

Finger protection		Applicable model
No code	Standard	T10-T50
BC	With fast wiring terminal	
CW	With terminal cover	T65, T80

Reset method of Thermal Overload Relays	
No code	Manual reset (standard)
AR	Automatic reset

Combined Thermal Overload Relays	
No code	With 2-element Thermal Overload Relays
KP	With 3-element Thermal Overload Relays
SR	With 2-element delay trip type Thermal Overload Relays
KPSR	With 3-element delay trip type Thermal Overload Relays
FS	With 2-element quick trip type Thermal Overload Relays
FSKP	With 3-element quick trip type Thermal Overload Relays

Special environment		Applicable model
No code	Standard	T10-T100
YS	Anticorrosion treatment specification	

Operation coil and operation circuit specification		Applicable model
No code	Standard	T10-T50
SA	With surge absorber	
DL	Delay open type	T12, T21

■Magnetic Contactors

S — 2× T10 BC SA

Basic type	
S	AC operated type
SD	DC operated type
SL	Mechanically latched AC operated type
SLD	Mechanically latched DC operated type

Non-Reversing/Reversing	
No code	Non-Reversing
2×	Reversing

Frame size
T10-T100

Finger protection		Applicable model
No code	Standard	T10-T50
BC	With fast wiring terminal	
CW	With terminal cover	T65, T80

Operation coil and operation circuit specification		Applicable model
No code	Standard	T10-T50
SA	With surge absorber	
DL	Delay open type	T12, T21

With special auxiliary contact		Applicable model
No code	Standard	All series
JH	With large rated auxiliary contacts	T10-T100

Thermal Overload Relays

TH — T18 BC KP YS

Basic type

TH	Thermal Overload Relays

Frame size

T18, T25, T50, T65, T100

Note: Frame size classification by mounting type
Magnetic Starters for independent mounting → T25
For Magnetic Starters → T18

Reset method of Thermal Overload Relays

No code	Manual reset (standard)
AR	Automatic reset
Combined Thermal Overload Relays	
No code	2-element Thermal Overload Relays
KP	3-element Thermal Overload Relays
SR	2-element delay trip type (with saturable reactor)
KPSR	3-element delay trip type (with saturable reactor)
FS	2-element quick trip type
FSKP	3-element quick trip type

Finger protection

		Applicable model
No code	Standard	T18, T25, T50
BC	With fast wiring terminal	
CW	With terminal cover	T65

Special environment

		Applicable model
No code	Standard	T18, T25, T50, T65, T100
YS	Anticorrosion treatment specification	

Contactor Relays

SR — T5 BC SA

Basic type

SR	AC operated type
SRD	DC operated type
SRL	Mechanically latched AC operated type
SRLD	Mechanically latched DC operated type

Frame size

T5, T9

Finger protection

		Applicable model
No code	Standard	T5, T9
BC	With fast wiring terminal	

Operation coil and operation circuit specification

		Applicable model
No code	Standard	T5, T9
SA	With surge absorber	

With special contact

		Applicable model
No code	Standard	T5, T9
JH	With large rated auxiliary contacts	
DL	Delay open type	
LC	With overlap contact	

Optional Units

UT — AX 4 BC

Basic type

UT	Optional units

Unit type

		Application
AX	Additional auxiliary contacts	UT
ML	Mechanical interlocks	UT
SA	Surge absorbers	UT
HZ	For thermal relay independent mounting	UT
SD	Reversible connection wire (conductor)	UT
SG	Crossover connection wire (conductor)	UT
SY	DC/AC interface for operation coil	UT

Finger protection

		Applicable model
No code	Standard	All units
BC	With fast wiring terminal	AX, ML, HZ

Unit specification, applicable model, and others

1 to 2-digit number

Explanation of terms

Item	Purpose	Meaning of terms	Name and display of representative models (Numbers go inside ☐)
1. Devices	(1) Magnetic starter (magnetic switch)	Combines an magnetic contactor and thermal relay.	Sealed model: MS Open model: MSO(D), MSOL(D)
	(2) Magnetic contactor	This is a contactor that switches the main contact parts using the power of the electromagnet. Accordingly, there are both AC and DC magnetic contactors, depending on the type of main circuit (AC or DC).	For use with both alternating current and direct current main circuits: S(D), SL(D) For use with direct current main circuits only: DU(D)
	(3) AC magnetic contactor	An magnetic contactor that uses an electromagnet powered by an AC power source.	S
	(4) DC magnetic contactor	An magnetic contactor that uses an electromagnet powered by a DC power source.	SD
	(5) Magnetic contactor with mechanical latch	A contactor where the contacts are closed (ON) by electrical (via a closing coil) or mechanical operation, and the closed state is maintained by the mechanical latch even if that controlling force is removed. Opening the circuit (OFF) is achieved by electrically (via a tripping coil) or mechanically tripping the contacts.	SL(D)
	(6) Delayed release magnetic contactor	A contactor that can maintain a closed circuit contact for a few seconds by discharging the capacitor, in the event of a voltage drop or momentary power interruption occurring to the control circuit.	S-☐DL
	(7) Reversing magnetic contactor	A magnetic contactor which can reverse the motor by switching the contacts	S-(D)-2x☐, SL(D)-2x☐
	(8) Thermal relay	When the motor experiences excess overcurrent (overload) as a result of overloading, locking or phase failure, the bimetal strips inside the relay are bent by the heat, which trips the output contacts on the magnetic contactor and opens the circuit, preventing the motor from burning out.	TH
2. Rating	(1) Rated insulation voltage	The voltage that is used as the standard for guaranteeing the withstand voltage and determining the insulation distance.	☐V (both AC and DC)
	(2) Rated operating voltage	The voltage that determines closed circuit capacity, interrupting capacity, switching frequency and switching durability.	☐-☐VAC, ☐VDC
	(3) Rated Capacity	The capacity of the maximum load capable of being applied at the rated operating voltage.	Motor ☐ ϕ ☐ kW, Resistance ☐ ϕ ☐ kW
	(4) Rated operating current	The maximum amount of current capable of being applied at the rated operating voltage while maintaining satisfactory performance.	AC-3☐A, AC-4☐A, DC1☐A
	(5) Open thermal current (Ith)	The amount of current that allows the passage of electric current for 8 hours without the temperatures of the individual parts rising above their rated values and without switching magnetic contactors.	Ith=☐A
	(6) Operating Coil	Drives the switching action of an magnetic contactor by magnetizing the iron core of an electromagnet and then demagnetizing it, creating and then removing the attractive force.	——
	・ Operating Coil Designations	The model code which must be specified at time of order and indicates a representative value of the rated operating voltage.	AC☐V, DC☐V
	・ Operating Coil Ratings	The rated operating voltage for the operating coil (nominal voltage) and the frequency (AC only).	☐V☐Hz, DC☐V
3. Performance	(1) Closed Circuit Capacity	The current value at which the circuit can be closed (contacts ON) under the conditions determined by the standard.	☐A
	(2) Interrupting Capacity	The current at which the circuit can be broken (contacts OFF) under the conditions determined by the standard.	☐A
	(3) Switching Frequency	The number of times the conductor can be switched under the conditions determined by the standard.	☐ times/hr
	(4) Switching Durability (Lifespan)	The maximum number of times an magnetic contactor can be switched, in actual operation without interference, under the conditions determined by the standard.	☐ x 10,000 times
	・ Mechanical durability	Durability against mechanical wear while being switched, without electrical current passing through the main circuit, under the conditions determined by the standard.	☐ x 10,000 times
	・ Electrical durability	Durability against electrical wear while being switched, with electrical current passing through the main circuit, under the conditions determined by the standard.	☐ x 10,000 times
4. Characteristic	(1) Operating Voltage	The minimum voltage, in the case where the magnetic contactor excites the operating coil, at which the contacts can be closed (ON). (In the case of mechanical latch format, closing voltage and tripping voltage)	☐ to ☐ V (Specified value: 85% or less of rated operating voltage)
	(2) Open voltage	Maximum voltage at which the contacts are opened (OFF), when the voltage applied to the magnetic contactor's operating coil is gradually reduced.	☐ to ☐ V (Specified value: 20% or more of rated operating voltage during alternating current operation 10% or more during direct current operation)
	(3) Operating time	The time from when the operating coil is excited, or from when it is demagnetized, until the operation of the contacts (ON or OFF) is completed.	☐ms
	(4) Operating Coil	[According to 2.(6)]	——
	・ Instantaneous power input	The instantaneous capacitance (input VA) immediately after the operating coil is excited. In the case of direct current operate, this is lower than the continuous power input.	Alternating current: ☐VA, Direct current: ☐W (=☐VA)
	・ Continuous power input	The capacitance of the coil (power consumption) after the operating coil has been excited and the contacts closed.	Alternating current: ☐VA, Direct current: ☐W (=☐VA)
5. Operation Others	(1) Inching	Inching or jogging is where the startup current is frequently switched by small rotations of the motor, etc.	——
	(2) Plugging (reverse phase braking)	Stopping the motor by suddenly switching the connection of the contacts to the reverse phase.	——
	(3) Self Maintenance of Status	This uses auxiliary a contacts of an magnetic contactor that has already been switched ON, to maintain the ON status of the circuit that passes current though the operating coil of that contactor, even if there is no ON signal. This is canceled by an OFF operation or a power interruption, etc.	
	(4) Interlock	As in the reversing format, when two magnetic contactors must not be set to ON at the same time, in order to make sure that one contactor cannot be switched to ON, the magnetic contactor that has already been switched ON prevents the other magnetic contactor from switching to ON. The two types of interlock are mechanical interlock, which uses a mechanical structure, and electrical interlock which uses auxiliary b contacts.	
	(5) a contact	This is a contact that is normally open, and which closes when power is supplied to the operating coil. It is also called an NO (Normally Open) contact.	—— 
	(6) b contact	This is a contact that is normally closed, and which opens when power is supplied to the operating coil. It is also called an NC (Normally Closed) contact.	
	(7) Main circuit	Circuits with a large electric current flow (from several A to around 1000A), such as motors and electric light circuits, etc., are switched by the main contact. (Terminal number between 1/L1-2/T1, 3/L2-4/T2, 5/L3-6/T3)	
	(8) Operating (control) circuit	Circuits with small current flows (from several tens of mA to several A), such as the operating coil of an magnetic contactor or display circuits, are switched with auxiliary a and b contacts.	——
	(9) Line starting	This is the most common way starting a motor, where the entire voltage is applied to the motor to start or stop it. Also called full voltage starting.	——
	(10) Star-delta starting	When starting the motor, the winding is arranged in a star to reduce the electrical and mechanical shock. After starting the winding is changed to a delta connection. The current used during starting is 1/3 of that for line starting, making this the cheapest reduced voltage starting method.	——
	(11) Category AC-3	Responsible for switching to start and stop the motor during continuous operation. (Durability testing uses 6 times the rated operating current for closing the circuit and current equal to the rated operating current for breaking the circuit)	
	(12) Category AC-4	Responsible for switching the startup current of the motor. (Durability testing uses 6 times the rated operating current for both closing and breaking the circuit), Can also be applied to inching and plugging.	
	(13) Category AC-1	Responsible for switching the electric heat and resistance load, etc., so that inrush current during starting is almost zero. (Durability testing uses current equal to the rated operating current for closing and breaking the circuit)	
	(14) 2E and 3E	2E: A motor protection relay that provides overloading/locking + phase failure protection, and has a thermal relay and electronics. 3E: An electronic motor protection relay that provides overload/locking + phase failure + antiphase (reverse phase) protection.	TH-☐KP, ET-N☐ ET-N☐

Coil characteristics

●Alternating voltage operation type

●For S-T10 to T50 types, SR-T5 and T9 types

Coil designation	Rated voltage [V] 50Hz/60Hz	Coil indication
24VAC	24	Rated voltage and frequency
48VAC	48-50	
100VAC	100-127	
200VAC	200-240	
300VAC	260-300	
400VAC	380-440	
500VAC	460-550	

Notes 1 : Even when the single rating (example: 200V60Hz) is specified for an order, the above rating voltage is indicated on the product.
2 : Even when the single rating (example: 200V60Hz) is specified for an order, the above rating voltage is indicated on the product.

●For S-T10SA to T50SA types, SR-T5SA and T9SA types

Coil designation	Rated voltage [V] 50Hz/60Hz	Coil indication	Varistor voltage [V]
24VAC	24	Rated voltage and frequency	120
48VAC	48-50		120
100VAC	100-127		470
200VAC	200-240		470
300VAC	260-300		910
400VAC	380-440		910

Notes 1 : Add "SA" to the end of the type name to order the operation coil surge absorber mounting type (varistor).
Example: S-T10SA 100VAC
2 : Even when the single rating (example: 200V60Hz) is specified for an order, the above rating voltage is indicated on the product.

●For S-N35, N50AE, N65AE, B-N20 types, For SR-K100 type, For SRT-NN/NF types

Coil designation	Rated voltage [V] 50Hz/60Hz		Coil indication
12VAC	12	12	Rated voltage and frequency
24VAC	24	24	
48VAC	48-50	48-50	
100VAC	100	100-110	
120VAC	110-120	115-120	
127VAC	125-127	127	
200VAC	200	200-220	
220VAC	208-220	220	
230VAC	220-240	230-240	
260VAC	240-260	260-280	
380VAC	346-380	380	
400VAC	380-415	400-440	
440VAC	415-440	460-480	
500VAC	500	500-550	

Note 1 : Even when the single rating (example: 200V60Hz) is specified for an order, the left rating voltage is indicated on the product.
Designations of the coils with the following voltage and frequency specifications are as follows.
220V60Hz→Designation 200VAC
380V50Hz→Designation 400VAC
240V50Hz→Designation 230VAC
220V50Hz→Designation 230VAC
415V50Hz→Designation 400VAC

●For S-N35SA, B-N20SA types, For SRT-NNSA/NFSA types

Coil designation	Rated voltage [V] 50Hz/60Hz		Coil indication	Varistor voltage [V]
12VAC	12	12	Rated voltage and frequency	120
24VAC	24	24		120
48VAC	48-50	48-50		120
100VAC	100	100-110		470
120VAC	110-120	115-120		470
127VAC	125-127	127		470
200VAC	200	200-220		470
220VAC	208-220	220		470
230VAC	220-240	230-240		470

Notes 1 : Add "SA" to the end of the model name to place an order for Magnetic Contactor with surge absorber (varistor).
Example: S-N35SA 100VAC
2 : Even when the single rating (example: 200V60Hz) is specified for an order, the left rating voltage is indicated on the product.
Designations of the coils with the following voltage and frequency specifications are as follows.
220V60Hz→Designation 200VAC
240V50Hz→Designation 230VAC
220V50Hz→Designation 230VAC
3 : Variations other than those indicated on the left cannot be manufactured.
4 : S-N50AE and N65AE are already equipped with a varistor. Therefore, no need to add "SA" to the end of model name for an order.

●For S-T65 to T100 types, For S-N50 to N800, B-N65/N100, DU-N30 to N 260 types

Coil designation	Rated voltage [V] 50Hz/60Hz	Coil indication
24VAC (Note 1)	24	Rated voltage and frequency
48VAC (Note 1)	48-50	
100VAC	100-127	
200VAC	200-240	
300VAC	260-350	
400VAC	380-440	
500VAC	460-550	

Notes 1 : The 24VAC and 48VAC coils for the following model names cannot be manufactured.
24VAC coil: S-N180/N220, N300/N400, N600/N800
DU-N180, N260
48VAC coil: S-N600/N800
2 : The coil ratings are different for some application models such as the delay open type (S-T□DL, S-N□DL). Please refer to the corresponding page.

●For S-T65QM to T100QM types, For S-N50QM to N400QM types

Coil designation	Rated voltage [V] 50Hz/60Hz	Coil indication
100VAC	100-127	Rated voltage and frequency
200VAC	200-240	

Note 1 : Variations other than coil designations of 100VAC and 200VAC cannot be manufactured.

Coil designation is the model code which must be specified at time of order. For information about whether or not a product with a special coil of the rated voltage designation can be manufactured, please contact your dealer or our company. Note that a special coil is manufactured without certifications for the various standards (no standard marks).

●DC operated type

●For SD-T12 to T100 types, SRD-T5 and T9 types

Coil designation	Rated voltage	Coil indication
12VDC	12VDC	Rated voltage
24VDC	24VDC	
48VDC	48VDC	
100VDC	100VDC	
110VDC	110VDC	
125VDC	120-125VDC	
200VDC	200VDC	
220VDC	220VDC	

Notes 1 : The operating coil terminal has a polarity (excluding T35 to T100 types). Connect the positive side to terminal number A1 (+) and the negative side to A2 (-).
2 : If the operation power supply is a rectifier, open and close the coil on the DC side.

●For SD-T12SA to T50SA types, SRD-T5SA and T9SA types

Coil designation	Rated voltage	Coil indication	Varistor voltage [V]
12VDC	12VDC	Rated voltage	47
24VDC	24VDC		47
48VDC	48VDC		120
100VDC	100VDC		470
110VDC	110VDC		470
125VDC	120-125VDC		470
200VDC	200VDC		470
220VDC	220VDC		470

Notes 1 : If the type with surge absorber for operation coil (varistor) is required, add “SA” to the end of the model when placing your order. Example: SD-T21SA 100VDC
2 : The operating coil terminal has a polarity (excluding T35SA to T50SA types). Connect the positive side to terminal number A1 (+) and the negative side to A2 (-).
3 : Variations other than the above cannot be manufactured.

●For SD-N35 to SD-N400, BD-N20 to N100, DUD-N30 to N260 types, For SRD-K100 type, For SRTD-NN/NF types

Coil designation	Rated voltage	Coil indication
12VDC	12VDC	Rated voltage
24VDC	24VDC	
48VDC	48VDC	
100VDC	100VDC	
110VDC	110VDC	
125VDC	120-125VDC	
200VDC	200VDC	
220VDC	220VDC	

Notes 1 : The coils do not have polarity.
2 : If the operation power supply is a rectifier, open and close the coil on the DC side.
3 : Two coils are internally connected in series for SD-N80 to SD-N400 and DUD-N60 to DUD-N260 types.

●For SD-N35SA, SRTD-NNSA/NFSA types, For BD-N20SA type

Coil designation	Rated voltage	Coil indication	Varistor voltage [V]
12VDC	12VDC	Rated voltage	120
24VDC	24VDC		120
48VDC	48VDC		120
100VDC	100VDC		470
110VDC	110VDC		470
125VDC	120-125VDC		470
200VDC	200VDC		470
220VDC	220VDC		470

Notes 1 : Add “SA” to the end of the model name to place an order for Magnetic Contactor with surge absorber (varistor).
Example: SD-N21SA 100VDC
2 : The coils do not have polarity.
3 : Variations other than the above cannot be manufactured.

●For D-N600/N800 types

Coil designation	Rated voltage	Coil indication
24VDC	24VDC	Rated voltage
48VDC	48VDC	
100VDC	100-110VDC	
125VDC	120-125VDC	
200VDC	200-220VDC	

Notes 1 : The operating coil terminal has polarity. Connect the positive side to terminal number A1 (+) and the negative side to A2 (-).
2 : If the operation power supply is a rectifier, open and close the coil on the DC side.
3 : Products with the 12VDC coil designation cannot be manufactured.

●Mechanically latched type

●For SL(D)-T21 to T100, SL(D)-N35 to SL(D)-N800, SRL(D)-T5 types

For alternating current		
Coil designation	Rated voltage [V] 50Hz/60Hz	Coil indication
100VAC	100-127	Rated voltage and frequency
200VAC	200-240	
300VAC	260-350	
400VAC	380-440	
500VAC	460-550	

For direct current		
Coil designation	Rated voltage	Coil indication
12VDC (Note 2)	12VDC	Rated voltage
24VDC	24VDC	
48VDC	48VDC	
100VDC	100V-110VDC	
125VDC	120V-125VDC	
200VDC	200V-220VDC	

Notes 1 : In addition to the alternating current coils with the rated voltages and frequencies indicated on the left, products with the following can be manufactured.
· For SRL-T5 or SL-T21 and SL-N35 to SL-N80
24VAC (24V, 50/60Hz), 48VAC(48-50V, 50/60Hz)
· For SRL-T5 or SL-T21
12VAC (12V, 50/60Hz)
2 : A coil with the rated voltage of 12VDC cannot be manufactured for N80 to N800 types.
3 : The coils for direct current do not have polarity.

Application to motor load

●Full-voltage starting

In the case of standard operation (not including inching), select a frame where the rated capacity of the magnetic starters and contactors is greater than the rated capacity of the motor.

● Can be applied to a standard 3 phase (3 ϕ) motor

Indicates the heater designation of a thermal relay for a standard 3 phase motor and the frame of the magnetic starter applicable to it.

Motor capacity [kW]	200 to 220V		400 to 440V	
	Heater designation [A] (setting range)	Magnetic Contactors frame	Heater designation [A] (setting range)	Magnetic Contactors frame
(0.015)	0.12 (0.1 to 0.16)	T10	–	
(0.025)	0.17 (0.14 to 0.22)	T10	–	
(0.03)	0.24 (0.2 to 0.32)	T10	–	
(0.035)	0.35 (0.28 to 0.42)	T10	–	
0.05	0.35 (0.28 to 0.42)	T10	0.24 (0.2 to 0.32)	T10
(0.07)	0.5 (0.4 to 0.6)	T10	0.35 (0.28 to 0.42)	T10
0.1	0.7 (0.55 to 0.85)	T10	0.35 (0.28 to 0.42)	T10
(0.15)	0.9 (0.7 to 1.1)	T10	0.5 (0.4 to 0.6)	T10
0.2	1.3 (1 to 1.6)	T10	0.7 (0.55 to 0.85)	T10
(0.3)	1.7 (1.4 to 2)	T10	0.9 (0.7 to 1.1)	T10
0.4	2.1 (1.7 to 2.5)	T10	1.3 (1 to 1.6)	T10
(0.55)	2.5 (2 to 3)	T10	1.3 (1 to 1.6)	T10
0.75	3.6 (2.8 to 4.4)	T10	1.7 (1.4 to 2)	T10
(1.0)	5 (4 to 6)	T10	2.5 (2 to 3)	T10
1.5	6.6 (5.2 to 8)	T10	3.6 (2.8 to 4.4)	T10
(1.9)2.2	9 (7 to 11)	T10	5 (4 to 6)	T10
(2.5)	11 (9 to 13)	T12	5 (4 to 6)	T10
(3.0)	11 (9 to 13)	T12	6.6 (5.2 to 8)	T12
3.7	15 (12 to 18)	T12	6.6 (5.2 to 8)	T12
5.5	22 (18 to 26)	T20, T21	11 (9 to 13)	T12
7.5	29 (24 to 34)	T20, T21	15 (12 to 18)	T20, T21
(9.0)	35 (30 to 40)	T25	15 (12 to 18)	T20, T21
11	42 (34 to 50)	T25	22 (18 to 26)	T25
15	54 (43 to 65)	T35	29 (24 to 34)	T25
18.5	67 (54 to 80)	T35	35 (30 to 40)	T35
22	82 (65 to 100)	T50	42 (34 to 50)	T35
30	105 (85 to 125)	T50	54 (43 to 65)	T50
37	125 (100 to 150)	T65	67 (54 to 80)	T50
45	150 (120 to 180)	T80	82 (65 to 100)	T65
(50)	180 (140 to 220)	T100	105 (85 to 125)	T65
55	180 (140 to 220)	T100	105 (85 to 125)	T80
(60)	180 (140 to 220)	T100	105 (85 to 125)	T80
75	250 (200 to 300)	N125	125 (100 to 150)	T100
90	330 (260 to 400)	N150	150 (120 to 180)	T100
110	330 (260 to 400)	N150	180 (140 to 220)	N125
132	500 (400 to 600)	N180	250 (200 to 300)	N125
150	500 (400 to 600)	N220	250 (200 to 300)	N150
160	500 (400 to 600)	N300	250 (200 to 300)	N180
200	660 (520 to 800)	N400	330 (260 to 400)	N220
300		N600	500 (400 to 600)	N300
400		N800	660 (520 to 800)	N400

Notes 1: Heater designation is the model code which must be specified at time of order.
2: For choices of heater designation with voltage, motor capacity other than those shown above, refer to page 870.
3: N600/N800 should be used in combination with the TH-N600 and a transformer (Mitsubishi CW-□model) sold separately.
4: The figures in brackets ( ) for motor capacity indicate special capacity.

●Applied to standard single phase (1 ϕ) motor

Indicates the frame of an magnetic starter that is applicable to a heater designation of a thermal relay used in a single phase motor.

Motor capacity [kW]	100 to 110V		200 to 220V	
	Heater designation [A] (setting range)	Magnetic Contactors frame	Heater designation [A] (setting range)	Magnetic Contactors frame
0.035	1.7 (1.4 to 2)	T10	0.9 (0.7 to 1.1)	T10
0.065	2.5 (2 to 3)	T10	1.3 (1 to 1.6)	T10
0.1	3.6 (2.8 to 4.4)	T10	1.7 (1.4 to 2)	T10
0.15	5 (4 to 6)	T10	2.5 (2 to 3)	T10
0.2	5 (4 to 6)	T10	2.5 (2 to 3)	T10
0.25	6.6 (5.2 to 8)	T12	3.6 (2.8 to 4.4)	T12
0.3	6.6 (5.2 to 8)	T12	3.6 (2.8 to 4.4)	T12
0.4	9 (7 to 11)	T12	5 (4 to 6)	T12
0.55	11 (9 to 13)	T20, T21	5 (4 to 6)	T20, T21
0.75	15 (12 to 18)	T20, T21	6.6 (5.2 to 8)	T20, T21
		T25		T25
		T35		T35

Notes 1: Heater designation is the model code which must be specified at time of order.
2: For choices of heater designation with voltage, motor capacity other than those shown above, refer to page 870.
3: In the case of the enclosed models (MS-T12 model), the applicable capacity of the 100 to 110V motors is 0.4kW.

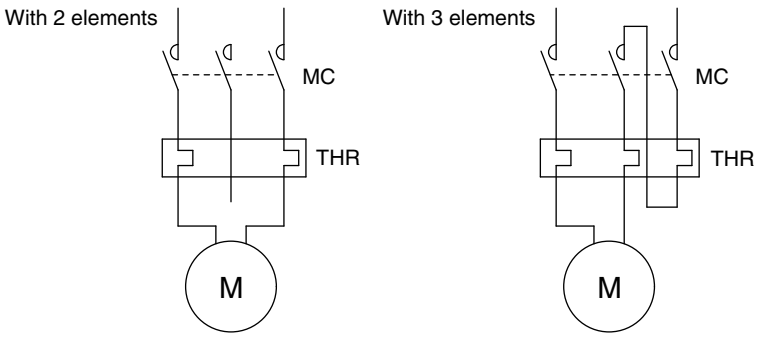
Thermal Relay Heater Designation Selection Table

●Thermal relay heater designation selection table

The table below shows a general guidance to select a thermal relay.

Voltage / Motor capacity [kW]	3 phase motor								Single phase motor				Voltage / Motor capacity [kW]
	200 to 220V	230 to 240V	346 to 350V	380V	400 to 440V	460 to 500V	550 to 600V	660V	100 to 110V	115 to 120V	200 to 220V	230 to 240V	
0.03	0.24A	0.24A	—	—	—	—	—	—					0.03
0.035	0.35A	0.24A	0.24A	0.24A	—	—	—	—	1.7A		0.9A		0.035
0.05	0.35A	0.35A	0.24A	0.24A	0.24A	—	—	—					0.05
0.06 to 0.065	0.5A	0.35A	0.35A	0.24A	0.24A	0.24A	—	—	2.5A		1.3A		0.06 to 0.065
0.07	0.5A	0.5A	0.35A	0.35A	0.35A	0.24A	—	—					0.07
0.09	0.7A	0.7A	0.35A	0.35A	0.35A	0.24A	0.24A	—					0.09
0.1	0.7A	0.7A	0.35A	0.35A	0.35A	0.35A	0.24A	—	3.6A		1.7A		0.1
0.12	0.9A	0.7A	0.5A	0.5A	0.5A	0.35A	0.24A	—		3.6A		2.1A	0.12
0.15	0.9A	0.9A	0.7A	0.7A	0.5A	0.5A	0.35A	—	5A		2.5A		0.15
0.18	1.3A	0.9A	0.7A	0.7A	0.7A	0.5A	0.5A	—	5A	5A		2.5A	0.18
0.2	1.3A	0.9A	0.7A	0.7A	0.7A	0.7A	0.5A	—	5A		2.5A		0.2
0.25	1.7A	1.3A	0.9A	0.9A	0.7A	0.7A	0.5A	—	6.6A	6.6A	3.6A	3.6A	0.25
0.3	1.7A	1.3A	0.9A	0.9A	0.9A	0.9A	0.7A	—	6.6A		3.6A		0.3
0.37 to 0.4	2.1A	2.1A	1.3A	1.3A	1.3A	0.9A	0.7A	—	9A	9A	5A	5A	0.37 to 0.4
0.55	2.5A	2.5A	1.7A	1.7A	1.3A	1.3A	0.9A	—	11A	11A	5A	6.6A	0.55
0.75	3.6A	3.6A	2.1A	2.1A	1.7A	1.7A	1.3A	1.3A	15A	15A	6.6A	9A	0.75
1.0	5A	5A	2.5A	2.5A	2.5A	2.1A	1.7A	1.7A					1.0
1.1	5A	5A	3.6A	2.5A	2.5A	2.1A	1.7A	1.7A	22A	22A	9A	9A	1.1
1.3	6.6A	5A	3.6A	3.6A	2.5A	2.5A	2.1A	2.1A					1.3
1.5	6.6A	6.6A	3.6A	3.6A	3.6A	2.5A	2.5A	2.1A	29A	22A	15A	11A	1.5
2.2	9A	9A	5A	5A	5A	3.6A	3.6A	3.6A					2.2
3	11A	11A	6.6A	6.6A	6.6A	5A	5A	3.6A		35A		15A	3
3.7 to 4	15A	15A	9A	9A	6.6A	6.6A	5A	5A		54A		29A	3.7 to 4
5.5	22A	22A	15A	11A	11A	9A	9A	6.6A		82A		42A	5.5
7.5	29A	29A	15A	15A	15A	11A	9A	9A		105A		54A	7.5
9	35A	29A	22A	22A	15A	15A	11A	11A					9
11	42A	42A	22A	22A	22A	22A	15A	15A					11
15	54A	54A	35A	29A	29A	22A	22A	15A					15
18.5 to 19	67A	67A	42A	35A	35A	29A	22A	22A					18.5 to 19
22	82A	82A	54A	42A	42A	35A	29A	22A					22
25	82A	82A	54A	54A	54A	35A	35A	29A					25
30	105A	105A	67A	54A	54A	42A	42A	35A					30
37	125A	125A	82A	67A	67A	54A	54A	42A					37
45	150A	150A	105A	82A	82A	67A	54A	54A					45
55 to 60	180A	180A	125A	105A	105A	82A	67A	67A					55 to 60
75	250A	250A	150A	125A	125A	105A	105A	82A					75
90	330A	330A	180A	150A	150A	125A	105A	105A					90
110	330A	330A	250A	180A	180A	150A	125A	105A					110
132	500A	500A	250A	250A	250A	180A	150A	150A					132
150 to 160	500A	500A	330A	250A	250A	250A	180A	180A					150 to 160
185	660A	500A	330A	330A	330A	250A	250A	180A					185
200	660A	660A	500A	330A	330A	330A	250A	180A					200
220	660A	660A	500A	500A	500A	330A	250A	250A					220
250	—	—	500A	500A	500A	330A	330A	250A					250
300 to 315	—	—	660A	500A	500A	500A	330A	330A					300 to 315
370 to 400	—	—	—	660A	660A	500A	500A	500A					370 to 400

Notes 1: When ordering based on motor capacity, use this table to determine the heater designation for the thermal relay. Please accurately specify the voltage and capacity.
2: Where the number of poles on the three phase motor is different, or in the case of a special generator, the full load current values may be different. In that case, specify the heater designation after checking the full load current of the motor.
3: As for a single phased motor, the full load current values may be different depending on its mode of startup and operation. Therefore, the table above should be used as a guideline, and the full load current should be checked in actual use when determining an appropriate heater designation. In the case of a single phase motor, please connect the motor as shown in the diagram below.



Connecting the thermal relay to a single phase motor

Magnetic Starters/Magnetic Contactors Specifications

Frame				T10	T12	T20	T21	T25	T32	T35	T50	T65	T80	T100
Applicable standard				IEC60947-4-1, EN60947-4-1, GB14048.4, JIS C8201-4-1										
Model name	Magnetic Contactors (Without Thermal Overload Relays, Open type)		Non-Reversing	S-T10	S-T12	S-T20	S-T21	S-T25	S-T32	S-T35	S-T50	S-T65	S-T80	S-T100
			Reversing	S-2×T10	S-2×T12	S-2×T20	S-2×T21	S-2×T25	S-2×T32	S-2×T35	S-2×T50	S-2×T65	S-2×T80	S-2×T100
	Magnetic Starters (With standard 2-element, With Thermal Overload Relays)	Open type	Non-Reversing	MSO-T10	MSO-T12	MSO-T20	MSO-T21	MSO-T25	–	MSO-T35	MSO-T50	MSO-T65	MSO-T80	MSO-T100
			Reversing	MSO-2×T10	MSO-2×T12	MSO-2×T20	MSO-2×T21	MSO-2×T25	–	MSO-2×T35	MSO-2×T50	MSO-2×T65	MSO-2×T80	MSO-2×T100
		Enclosed	Non-Reversing	MS-T10	MS-T12	–	MS-T21	–	–	MS-T35	MS-T50	MS-T65	MS-T80	MS-T100
			Reversing	–			MS-2×T21	–	–	MS-2×T35	MS-2×T50	MS-2×T65	MS-2×T80	MS-2×T100
		Combined Thermal Overload Relays		TH-T18			TH-T25		–	TH-T25/T50	TH-T25/T50	TH-T65	TH-T65/T100	TH-T65/T100
	Magnetic Starters (With Open type 3-element(2E), With Thermal Overload Relays)		Non-Reversing	MSO-T10KP	MSO-T12KP	MSO-T20KP	MSO-T21KP	MSO-T25KP	–	MSO-T35KP	MSO-T50KP	MSO-T65KP	MSO-T80KP	MSO-T100KP
			Reversing	MSO-2×T10KP	MSO-2×T12KP	MSO-2×T20KP	MSO-2×T21KP	MSO-2×T25KP	–	MSO-2×T35KP	MSO-2×T50KP	MSO-2×T65KP	MSO-2×T80KP	MSO-2×T100KP
		Combined Thermal Overload Relays		TH-T18KP			TH-T25KP		–	TH-T25/T50KP	TH-T25/T50KP	TH-T65KP	TH-T65/T100KP	TH-T65/T100KP
Main contact rating	Rated insulation voltage [V]			690										
	Rated impulse withstand voltage [kV]			6										
	Rated frequency [Hz]			50/60										
	Pollution degree			3										
	Rated operational current / power Category AC-3 (Three-phase squirrel-cage motor load standard responsibility) (Note 1) [kW/A]		220 to 240VAC	2.5/11 [2.2/11]	3.5/13 [2.7/13]	4.5/18 [3.7/18]	5.5/25 [4/20]	7.5/30(26) [5.5/26]	7.5/32 [7.5/32]	11/40 [7.5/35]	15/55 [11/50]	18.5/65 [15/65]	22/85 [19/80]	30/105 [22/100]
			380 to 440VAC	4/9 [2.7/7]	5.5/12 [4/9]	7.5/18 [7.5/18]	11/23 [7.5/20]	15/30(26) [11/25]	15/32 [15/32]	18.5/40 [15/32]	22/48 [22/48]	30/65 [30/65]	45/85 [37/80]	55/105 [45/93]
			500VAC	4/7 [2.7/6]	5.5/9 [5.5/9]	7.5/17 [7.5/17]	11/17 [7.5/17]	15/24 [11/20]	15/24 [11/20]	18.5/32 [15/26]	25/38 [22/38]	37/60 [30/45]	45/75 [45/75]	55/85 [45/75]
			690VAC	4/5	5.5/7	7.5/9	7.5/9	11/12	11/12	15/17	22/26	30/38	45/52	55/65
	Rated operational current / power Category AC-4 (Three-phase squirrel-cage motor load inching responsibility) [kW/A]		200 to 220VAC	1.5/8	2.2/11	3.7/18		4.5/20	5.5/26	5.5/26	7.5/35	11/50	15/65	19/80
			380 to 440VAC	2.2/6	4/9	5.5/13		7.5/17	11/24	11/24	15/32	22/47	30/62	37/75
			500 to 550VAC	2.7/6	5.5/9	5.5/10		7.5/12	7.5/13	11/17	15/24	22/38	30/45	37/55
	Single-phase motor maximum applicable load/ maximum capacity (Category AC-3) [kW/A]		100 to 110VAC	0.4/11	0.55/13	0.75/18	0.9/18(20)	1.2/26	1.5/32	1.7/34(35)	–	–	–	–
			200 to 220VAC	0.8/11	1.0/13	1.5/18	1.8/18(20)	–	–	–	–	–	–	–
	Rated operational current / power Category AC-1 (Resistance, heater load)		100 to 220VAC	20			32			60	80	100	120	150
			380 to 440VAC	11	13		32			60	80	100	120	150
	Conventional free air thermal current Ith [A]			20			32			60	80	100	120	150
Auxiliary contact rating	Contact arrangement	Standard accessory (Note 5)	Non-Reversing	1a	1a1b		2a2b		–	2a2b	2a2b	2a2b	2a2b	2a2b
			Reversing (Note 6, Note 8)	1a×2+2b	1a1b×2+2b		2a2b×2		2a2b×2	2a2b×2	2a2b×2	2a2b×2	2a2b×2	2a2b×2
		Max. number of additional options (Note 7)	Non-Reversing	One optional UT-AX2 or UT-AX4 and up to two optional UT-AX11 can be added.								One optional UN-AX2 or UN-AX4 and up to two optional UN-AX11 can be added.		4a4b
			Reversing (Note 6, Note 8)	Up to two optional UT-AX2, UT-AX4, or UT-AX11 can be added.					–	Up to two optional UT-AX2, UT-AX4, or UT-AX11 can be added.		Up to two optional UN-AX2, UN-AX4, or UN-AX11 can be added.		3a3b×2
	Rated operational current (Category AC-15 : Alternating current coil load) [A]		100 to 120VAC	6	6	6	6	6	–	6	6	6	6	6
			200 to 240VAC	3	3	3	3	3	–	3	3	3	3	3
	Conventional free air thermal current Ith [A]			10	10	10	10	10	–	10	10	10	10	10
Performance	Mechanical durability [ten thousand times]			1000								500		
	Electrical durability [ten thousand times]		Category AC-3	200 (Note 4)								200	100	
			Category AC-4	3 (Note 4)										
			Category AC-1	50										
	Switching frequency [time/hour]		Category AC-3	1800							1200			
			Category AC-4	300										
			Category AC-1	1200										600
Characteristic	Coil consumption [VA]		Sealed [VA]	7			7		4.5	10		20		23
			Inrush [VA]	45			75		55	110		115		210
Outside dimensions	Magnetic Contactors (without Thermal Overload Relays) (Width × Height × Depth) [mm]		Non-Reversing	36×75×78	43×75×78		63×81×81		43×81×81	75×89×91		88×106×106	88×106×106	100×124×127
			Reversing	82×85×78	97×85×78		136×81×81		96×81×111	160×114×97		216×115×112	216×115×112	270×140×137
	Open type Magnetic Starters (Width × Height × Depth) [mm]		Non-Reversing	45×115×79			63×128×82		–	75×157.5×91		90×158×106	90×169.5×106	100×191×127
			Reversing	90×125×79	97×125×79		136×138×82		–	160×179×97		216×169×112	216×180.5×112	270×208×137
Model names of attachable options (Note 9)	Auxiliary contact blocks	(Contact structure 1a1b)		UT-AX2/AX11								UN-AX2/AX11		UN-AX80
		(Contact structure 2a2b)		UT-AX4								UN-AX4		–
		With contact for low level signals		–								UN-LL22		–
	Operation coil surge absorber unit (Note 3)	(Varistor) (Note 2)		UT-SA21								–		–
		(Varistor + LED display)		UT-SA22								–		–
		(CR)		UT-SA23								–		–
		(Varistor + CR)		UT-SA25								–		–
	DC/AC interface	TRIAC output		UT-SY21								UN-SY31		–
		Contact output		UT-SY22								UN-SY32		–
	Charging part protection cover	For Electromagnetic Starters	Non-Reversing	–								UN-CZ500+UN-CZ501		UN-CZ800+UN-CZ801
			Reversing	–								UN-CZ504		UN-CZ804
		For Electromagnetic Contactors	Non-Reversing	–								UN-CZ500×2		UN-CZ800×2
			Reversing	–								UN-CZ502		UN-CZ802
	Terminal cover	For Magnetic Starters (non-reversing)		(Standard accessory)								UT-CW800+UT-CW655		–
		For Magnetic Contactors (non-reversing)		(Standard accessory)								UT-CW800		–
	Mechanical interlocks			UT-ML11			UN-ML21							UN-ML80

Notes 1: The figure inside the brackets ( ) for rated operating current is applicable to magnetic contactors (without thermal relays). The figure inside the brackets ( ) for motor capacity is applicable to enclosed magnetic starters.
2: We can also manufacture coil surge absorption built-in models (□-□SA models) for alternating current operated types T10 to T50 and direct current operated types T12 to T50.
3: The T65 to N800 alternating current operating coils incorporate surge absorption function, so that a surge absorption unit for the coil is not required because coil switching surges do not occur.
4: 1,000,000 times for T20 AC-3 Class 380V or higher, and 15,000 times for T35 to N800 AC-4 Class 380V or higher.
5: The auxiliary contact structures for mechanical latch and delayed release models are different. For details of mechanical latch models, refer to page 879.
6: +2b of T10 to T20 auxiliary contact arrangements in Reversing type represents b contact built in the UN-ML11 interlock unit.
7: The main unit and the auxiliary contact units need to be attached by customers as separate processes. The auxiliary contact unit for sealed models, and the head on auxiliary contact for mechanical latched models, cannot be attached as additions.
For details of the auxiliary contact unit, refer to pages 890.
8: For auxiliary contact arrangement in Reversing type, ×2 is displayed as combined auxiliary contact arrangement of two Magnetic Contactors. Please specify the contact arrangement for which two main units are combined must be designated. <Designation example> In case of 1b × 2 + 2b: 2B
9: In the case of using an option as an applied product, be aware that some options are unable to be attached. For details of combinations, refer to pages 890 to 891.
10: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

Frame				N125	N150	N180	N220	N300	N400	N600	N800
Applicable standard				IEC60947-4-1,EN60947-4-1,GB14048.4, JIS C8201-4-1							
Model name	Magnetic Contactors (Without Thermal Overload Relays, Open type)		Non-Reversing	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
			Reversing	S-2×N125	S-2×N150	S-2×N180	S-2×N220	S-2×N300	S-2×N400	S-2×N600	S-2×N800
	Magnetic Starters (With standard 2-element, With Thermal Overload Relays)	Open type	Non-Reversing	MSO-N125	MSO-N150	MSO-N180	MSO-N220	MSO-N300	MSO-N400	–	–
			Reversing	MSO-2×N125	MSO-2×N150	MSO-2×N180	MSO-2×N220	MSO-2×N300	MSO-2×N400	–	–
		Enclosed	Non-Reversing	MS-N125	MS-N150	MS-N180	MS-N220	MS-N300	MS-N400	–	–
			Reversing	MS-2×N125	MS-2×N150	MS-2×N180	MS-2×N220	MS-2×N300	MS-2×N400	–	–
		Combined Thermal Overload Relays		TH-N120(TA)	TH-N120(TA)	TH-N220RH	TH-N220RH	TH-N400RH	TH-N400RH	TH-N600(+CT)	TH-N600(+CT)
	Magnetic Starters (With Open type 3-element(2E), With Thermal Overload Relays)		Non-Reversing	MSO-N125KP	MSO-N150KP	MSO-N180KP	MSO-N220KP	MSO-N300KP	MSO-N400KP	–	–
			Reversing	MSO-2×N125KP	MSO-2×N150KP	MSO-2×N180KP	MSO-2×N220KP	MSO-2×N300KP	MSO-2×N400KP	–	–
		Combined Thermal Overload Relays		TH-N120(TA)KP	TH-N120(TA)KP	TH-N220RHKP	TH-N220RHKP	TH-N400RHKP	TH-K400RHKP	TH-N600KP(+CT)	TH-N600KP(+CT)
Main contact rating	Rated insulation voltage [V]			690							
	Rated impulse withstand voltage [kV]			6							
	Rated frequency [Hz]			50/60							
	Pollution degree			3							
	Rated operational current / power Category AC-3 (Three-phase squirrel-cage motor load standard responsibility) (Note 1) [kW/A]		220 to 240VAC	30/125	37/150	45/180	55/220	75/300	110/400	160/630	200/800
			380 to 440VAC	60/120	75/150	90/180	110/220	150/300	200/400	300/630	400/800
			500VAC	60/90	90/140	110/180	132/200	160/250	200/350	300/500	400/720
			690VAC	70	100	120	150	220	300	420	630
	Rated operational current / power Category AC-4 (Three-phase squirrel-cage motor load inching responsibility) [kW/A]		200 to 220VAC	22/93	30/125	37/150	45/180	55/220	75/300	110/400	160/630
			380 to 440VAC	45/90	55/110	75/150	90/180	110/220	150/300	200/400	300/630
			500 to 550VAC	45/65	55/80	75/140	90/140	110/200	150/250	200/350	300/500
	Single-phase motor maximum applicable load/ maximum capacity (Category AC-3) [kW/A]		100 to 110VAC	–	–	–	–	–	–	–	–
			200 to 220VAC	–	–	–	–	–	–	–	–
	Rated operational current / power Category AC-1 (Resistance, heater load)		100 to 220VAC	150	200	260	260	350	450	660	800
			380 to 440VAC	150	200	260	260	350	450	660	800
	Conventional free air thermal current Ith [A]			150	200	260	260	350	450	660	800
Auxiliary contact rating	Contact arrangement	Standard accessory (Note 5)	Non-Reversing	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b
			Reversing (Note 6, Note 8)	2a2b×2	3a3b×2	3a3b×2	3a3b×2	3a3b×2	3a3b×2	4a4b×2	4a4b×2
		Max. number of additional options (Note 7)	Non-Reversing	4a4b	4a4b	4a4b	4a4b	4a4b	4a4b	4a4b	4a4b
			Reversing (Note 6, Note 8)	3a3b×2	–	–	–	–	–	–	–
	Rated operational current (Category AC-15 : Alternating current coil load) [A]		100 to 120VAC	6	6	6	6	6	6	6	6
			200 to 240VAC	3	3	3	3	3	3	3	3
	Conventional free air thermal current Ith [A]			10	10	10	10	10	10	10	10
Performance	Mechanical durability [ten thousand times]			500							
	Electrical durability [ten thousand times]		Category AC-3	100					50		
			Category AC-4	3 (Note 4)							
			Category AC-1	50							
	Switching frequency [time/hour]		Category AC-3	1200							
			Category AC-4	300						150	60
			Category AC-1	600							
Characteristic	Coil consumption [VA]		Sealed [VA]	24	24	40	40	50	50	90	90
			Inrush [VA]	270	270	440	440	440	440	790	790
Outside dimensions	Magnetic Contactors (without Thermal Overload Relays) (Width × Height × Depth) [mm]		Non-Reversing	100×150×137	120×160×145	138×204×175	138×204×175	163×243×195	163×243×195	290×310×235	290×310×235
			Reversing	276×150×148	296×160×156	370×215×189	370×215×189	395×250×209	395×250×209	660×435×254	660×435×254
	Open type Magnetic Starters (Width × Height × Depth) [mm]		Non-Reversing	112×239×137	120×250×145	144×282×180.5	144×282×180.5	163×360×195	163×360×195	–	–
			Reversing	276×251×148	296×276×156	370×304×194.5	370×304×194.5	395×392×209	395×392×209	–	–
Model names of attachable options (Note 9)	Auxiliary contact blocks	(Contact structure 1a1b)		UN-AX80	UN-AX150					–	–
		(Contact structure 2a2b)		–	–	–	–	–	–	UN-AX600	
		With contact for low level signals		–	–	–	–	–	–	–	–
	Operation coil surge absorber unit (Note 3)	(Varistor) (Note 2)		–	–	–	–	–	–	–	–
		(Varistor + LED display)		–	–	–	–	–	–	–	–
		(CR)		–	–	–	–	–	–	–	–
		(Varistor + CR)		–	–	–	–	–	–	–	–
	DC/AC interface	TRIAC output		–	–	–	–	–	–	–	–
		Contact output		–	–	–	–	–	–	–	–
	Charging part protection cover	For Electromagnetic Starters	Non-Reversing	UN-CZ1250+ UN-CZ1251	UN-CZ1500+ UN-CZ1501	UN-CZ2200+UN-CZ2201		UN-CZ3000+UN-CZ3001		–	–
			Reversing	UN-CZ1254	UN-CZ1504	UN-CZ2204		UN-CZ3004		–	–
		For Electromagnetic Contactors	Non-Reversing	UN-CZ1250×2	UN-CZ1500×2	UN-CZ2200×2		UN-CZ3000×2		–	–
			Reversing	UN-CZ1252	UN-CZ1502	UN-CZ2202		UN-CZ3002		–	–
	Terminal cover	For Magnetic Starters (non-reversing)		–	–	–	–	–	–	–	–
		For Magnetic Contactors (non-reversing)		–	–	–	–	–	–	–	–
	Mechanical interlocks			UN-ML80	UN-ML150	UN-ML220				–	–

Notes 1: The figure inside the brackets ( ) for rated operating current is applicable to magnetic contactors (without thermal relays). The figure inside the brackets ( ) for motor capacity is applicable to enclosed magnetic starters.
2: We can also manufacture coil surge absorption built-in models (□-□SA models) for alternating current operated types T10 to T50 and direct current operated types T12 to T50.
3: The T65 to N800 alternating current operating coils incorporate surge absorption function, so that a surge absorption unit for the coil is not required because coil switching surges do not occur.
4: 1,000,000 times for T20 AC-3 Class 380V or higher, and 15,000 times for T35 to N800 AC-4 Class 380V or higher.
5: The auxiliary contact structures for mechanical latch and delayed release models are different. For details of mechanical latch models, refer to page 879.
6: +2b of T10 to T20 auxiliary contact arrangements in Reversing type represents b contact built in the UN-ML11 interlock unit.
7: The main unit and the auxiliary contact units need to be attached by customers as separate processes. The auxiliary contact unit for sealed models, and the head on auxiliary contact for mechanical latched models, cannot be attached as additions.
For details of the auxiliary contact unit, refer to pages 890.
8: For auxiliary contact arrangement in Reversing type, ×2 is displayed as combined auxiliary contact arrangement of two Magnetic Contactors. Please specify the contact arrangement for which two main units are combined must be designated. <Designation example> In case of 1b × 2 + 2b: 2B
9: In the case of using an option as an applied product, be aware that some options are unable to be attached. For details of combinations, refer to pages 890 to 891.

Magnetic Starters

■MS-T series (non-Reversing) : Enclosed
■MS-2xT series (Reversing) : Enclosed


MSO-T10

Model name		MS-T10	MS-T12	MS-T21	MS-T25	MS-T35	MS-T50	MS-T65	MS-T80	MS-T100
	Reversing	–	–	MS-2XT21	MS-2XT25	MS-2XT35	MS-2XT50	MS-2XT65	MS-2XT80	MS-2XT100
Rated capacity (kW) Category AC-3 (Note 1)	220 to 240VAC	2.5[2.2]	3.5[2.7]	5.5[4]	7.5[5.5]	11[7.5]	15[11]	18.5[15]	22[19]	30[22]
	380 to 440VAC	4[2.7]	5.5[4]	11[7.5]	15[11]	18.5[15]	22[22]	30[30]	45[37]	55[45]
	500VAC	4[2.7]	5.5[5.5]	11[7.5]	15[11]	18.5[15]	22[22]	37[30]	45[45]	55[45]
Heater rating (designation) of standard Thermal Overload Relays (A)		0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9	0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22 29 35	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22 29 35 42	15 22 29 35 42 54	15 22 29 35 42 54 67 82	15 22 29 35 42 54 67 82 95
Operation coil rating		Refer to page 876								
Auxiliary contact arrangement	Non-Reversing Standard	1a	1a1b	2a2b						
	Non-Reversing Special	1b	2a	–						
	Reversing Standard	–		2a2bx2						
	Reversing Special	–		–						
B C A (unit: mm)	Non-reversing A	165		176		231		282		317
	Non-reversing B	76		104		135		160		190
	Non-reversing C	97.5		110		126		145		163
	Reversing A	–		192		247		282		347
	Reversing B	–		220		300		320		410
	Reversing C	–		115		130		140		154

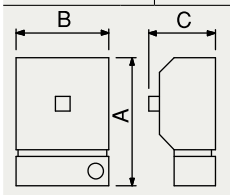
Note 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

■MSO-T series (non-Reversing) : Open type
■MSO-2xT series (Reversing) : Open type

Model name		MSO-T10	MSO(D)-T12	MSO(D)-T20	MSO(D)-T21	MSO-T25
	Reversing	MSO-2×T10	MSO(D)-2×T12	MSO(D)-2×T20	MSO(D)-2×T21	MSO-2×T25
Rated capacity (kW) Category AC-3 (Note 1)	220 to 240VAC	2.5[2.2]	3.5[2.7]	4.5[3.7]	5.5[4]	7.5[5.5]
	380 to 440VAC	4[2.7]	5.5[4]	7.5[7.5]	11[7.5]	15[11]
	500VAC	4[2.7]	5.5[5.5]	7.5[7.5]	11[7.5]	15[11]
Heater rating (designation) of standard Thermal Overload Relays (A)		0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9	0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11	0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22
Operation coil rating		Refer to pages 876				
Auxiliary contact arrangement	Non-Reversing Standard	1a	1a1b	1a1b	2a2b	2a2b
	Non-Reversing Special	1b	2a	2a	–	–
	Reversing Standard	1ax2+2b	1a1bx2+2b	1a1bx2+2b	2a2bx2	2a2bx2
	Reversing Special	1bx2+2b	2ax2+2b	2ax2+2b	–	–
B C A (unit: mm)	Non-Reversing A	115	115	115	128	128
	Non-Reversing B	45	45	45	63	63
	Non-Reversing C	79	79(101)	79(101)	82(109)	82
	Reversing A	125	125	125	138	138
	Reversing B	90	97	97	136	136
	Reversing C	79	79(101)	79(101)	82(115)	82
IEC 35mm rail mounting type		◄				►
Option	Front clip-on auxiliary contact block mounting type	◄				►
	Side clip-on auxiliary contact block mounting type	◄				►
	Surge absorber mounting type	◄				►

Note 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

■MSO-T series (non-Reversing) : Open type
■MSO-2xT series (Reversing) : Open type

Model name			MSO(D)-T35	MSO(D)-T50	MSO(D)-T65	MSO(D)-T80	MSO(D)-T100
	Non-Reversing		MSO(D)-2×T35	MSO(D)-2×T50	MSO(D)-2×T65	MSO(D)-2×T80	MSO(D)-2×T100
Rated capacity (kW) Category AC-3 (Note 1)	220 to 240VAC		11[7.5]	15[11]	18.5[15]	22[19]	30[22]
	380 to 440VAC		18.5[15]	22[22]	30[30]	45[37]	55[45]
	500VAC		18.5[15]	22[22]	37[30]	45[45]	55[45]
Heater rating (designation) of standard Thermal Overload Relays (A)			0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22 29 35	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22 29 35 42	15 22 29 35 42 54	15 22 29 35 42 54 67 82	15 22 29 35 42 54 67 82 95
Operation coil rating			Refer to pages 876				
Auxiliary contact arrangement	Non-Reversing	Standard	2a2b	2a2b	2a2b	2a2b	2a2b
		Special	–	–	–	–	–
	Reversing	Standard	2a2b×2	2a2b×2	2a2b×2	2a2b×2	2a2b×2
		Special	–	–	–	–	–
 (unit: mm)	Non-Reversing	A	157.5		158(160)	174.5(176.5)	196(206)
		B	75		90	90	100
		C	91(123)		106(133)	106(133)	127(157)
	Reversing	A	179		169	185.5	213
		B	160		216	216	270
		C	97(129)		112(139)	112(139)	137(167)
IEC 35mm rail mounting type			←		→		–
Option	Front clip-on auxiliary contact block mounting type		←		→		–
	Side clip-on auxiliary contact block mounting type		←		→		
	Surge absorber mounting type		←		–		

Note 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

●Thermal Overload Relays configuring the Magnetic Starters

Thermal Overload Relays models and heater types that configure Magnetic Starters

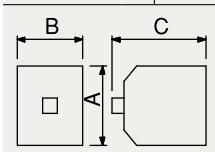
Magnetic Contactors frame	Thermal Overload Relays model	Heater designation (adjustable range of stabilized current) (A)
T10, T12, T20	TH-T18	0.12(0.1 to 0.16), 0.17(0.14 to 0.22), 0.24(0.2 to 0.32), 0.35(0.28 to 0.42), 0.5(0.4 to 0.6), 0.7(0.55 to 0.85), 0.9(0.7 to 0.1), 1.3(1 to 1.6), 1.7(1.4 to 2), 2.1(1.7 to 2.5), 2.5(2 to 3), 3.6(2.8 to 4.4), 5(4 to 6), 6.6(5.2 to 8), 9(7 to 11), 11(9 to 13)*, 15(12 to 18)*
T21, T25	TH-T25 (Note 3)	0.24(0.2 to 0.32), 0.35(0.28 to 0.42), 0.5(0.4 to 0.6), 0.7(0.55 to 0.85), 0.9(0.7 to 1.1), 1.3(1 to 1.6), 1.7(1.4 to 2), 2.1(1.7 to 2.5), 2.5(2 to 3), 3.6(2.8 to 4.4), 5(4 to 6), 6.6(5.2 to 8), 9(7 to 11), 11(9 to 13), 15(12 to 18), 22(18 to 26)*
T35	TH-T25	0.24 (0.2 to 0.32), 0.35 (0.28 to 0.42), 0.5 (0.4 to 0.6), 0.7 (0.55 to 0.85), 0.9 (0.7 to 1.1), 1.3 (1 to 1.6), 1.7 (1.4 to 2), 2.1 (1.7 to 2.5), 2.5 (2 to 3), 3.6 (2.8 to 4.4), 5 (4 to 6), 6.6 (5.2 to 8), 9 (7 to 11), 11 (9 to 13), 15 (12 to 18), 22 (18 to 26)
	TH-T50	29 (24 to 34)
T50	TH-T25	0.24 (0.2 to 0.32), 0.35 (0.28 to 0.42), 0.5 (0.4 to 0.6), 0.7 (0.55 to 0.85), 0.9 (0.7 to 1.1), 1.3 (1 to 1.6), 1.7 (1.4 to 2), 2.1 (1.7 to 2.5), 2.5 (2 to 3), 3.6 (2.8 to 4.4), 5 (4 to 6), 6.6 (5.2 to 8), 9 (7 to 11), 11 (9 to 13), 15 (12 to 18), 22 (18 to 26)
	TH-T50	29 (24 to 34), 35 (30 to 40), 42 (34 to 50)
T65	TH-T65	15 (12 to 18), 22 (18 to 26), 29 (24 to 34), 35 (30 to 40), 42 (34 to 50), 54 (43 to 65)
T80	TH-T65	15 (12 to 18), 22 (18 to 26), 29 (24 to 34), 35 (30 to 40), 42 (34 to 50), 54 (43 to 65)
	TH-T100	67 (54 to 80)
T100	TH-T65	15 (12 to 18), 22 (18 to 26), 29 (24 to 34), 35 (30 to 40), 42 (34 to 50), 54 (43 to 65)
	TH-T100	67 (54 to 80), 82 (65 to 100)

Notes 1: Select the value closer to the heater designation if the stabilized current has two values.
2: Heater designation marked with * has Magnetic Starters frames that cannot be applied. For information on the applicable Magnetic Starters frames, refer to the "Heater rating (designation) of standard Thermal Overload Relays" field in the above table.
3: The connection conductor kit UN-TH21 is required to use in combination with the Magnetic Contactor to make a Magnetic Starters.

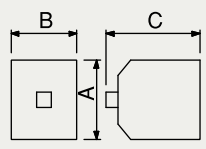
Magnetic Contactors

■S-T series (non-Reversing)
■S-2xT series (Reversing)


S-T10

Model name		Non-Reversing	S-T10	S(D)-T12	S(D)-T20	S(D)-T21	S-T25	S(D)-T32
		Reversing	S-2×T10	S(D)-2×T12	S(D)-2×T20	S(D)-2×T21	S-2×T25	S(D)-2×T32
Rated operational current (A) Category AC-3 (Note 1, 2)		220 to 240VAC	11[11]	13[13]	18[18]	25[20]	30(26)[26]	32[32]
		380 to 440VAC	9[7]	12[9]	18[18]	23[20]	30(26)[25]	32[32]
		500VAC	7[6]	9[9]	17[17]	17[17]	24[20]	24[20]
Conventional free air thermal current Ith (A)			20	20	20	32	32	32
Operation coil rating			Refer to pages 876					
Auxiliary contact arrangement	Non-Reversing	Standard	1a	1a1b	1a1b	2a2b	2a2b	–
		Special	1b	2a	2a	–	–	–
	Reversing	Standard	1a×2+2b	1a1b×2+2b	1a1b×2+2b	2a2b×2	2a2b×2	–
		Special	1b×2+2b	2b×2+2b	2b×2+2b	–	–	–
 (unit: mm)	Non-Reversing	A	75	75	75	81	81	81
		B	36	43	43	63	63	43
		C	78	78(100)	78(100)	81(108)	81	81(108)
	Reversing	A	85	85	85	81	81	81
		B	82	97	97	136	136	96
		C	78	78(100)	78(100)	81(114)	81	111(138)
IEC 35mm rail mounting type			←					→
Option	Front clip-on auxiliary contact block mounting type		←					→
	Side clip-on auxiliary contact block mounting type		←					→
	Surge absorber mounting type		←					→

Notes 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.
2: The content within ( ) of rated capacity and rated operational current is applied to the Magnetic Contactor.

Model name		Non-Reversing	S(D)-T35	S(D)-T50	S(D)-T65	S(D)-T80	S(D)-T100
		Reversing	S(D)-2×T35	S(D)-2×T50	S(D)-2×T65	S(D)-2×T80	S(D)-2×T100
Rated operational current (A) Category AC-3 (Note 1)		220 to 240VAC	40[35]	55[50]	65[65]	85[80]	105[100]
		380 to 440VAC	40[32]	50[50]	65[65]	85[80]	105[93]
		500VAC	32[26]	38[38]	60[45]	75[75]	85[75]
Conventional free air thermal current Ith (A)			60	80	100	120	150
Operation coil rating			Refer to pages 876				
Auxiliary contact arrangement	Non-Reversing	Standard	2a2b	2a2b	2a2b	2a2b	2a2b
		Special	–	–	–	–	–
	Reversing	Standard	2a2b×2	2a2b×2	2a2b×2	2a2b×2	2a2b×2
		Special	–	–	–	–	–
 (unit: mm)	Non-Reversing	A	89		106		124(134)
		B	75		88		100
		C	91(123)		106(133)		127(157)
	Reversing	A	114		115		140(147)
		B	160		216		270
		C	97(129)		112(139)		137(167)
IEC 35mm rail mounting type			←				–
Option	Front clip-on auxiliary contact block mounting type		←				–
	Side clip-on auxiliary contact block mounting type		←				→
	Surge absorber mounting type		←		–		

Note 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

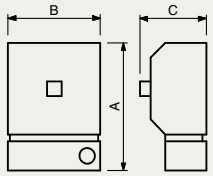
Open Model Magnetic Starters

■MSO-N series (non-Reversing) : Open type
■MSO-2xN series (Reversing) : Open type


MSO-N150


MSO-N220

Delivery date category	
▭	Standard item
○	Substandard item
●	Special Item

Model name	Non-Reversing		MSO-N125	MSO-N150	MSO-N180	MSO-N220	MSO-N300	MSO-N400
	Reversing		MSO-2×N125	MSO-2×N150	MSO-2×N180	MSO-2×N220	MSO-2×N300	MSO-2×N400
Rated capacity (kW) Category AC-3	220 to 240VAC		30	37	45	55	75	110
	380 to 440VAC		60	75	90	110	150	200
	500VAC		60	90	110	132	160	200
Heater rating (designation) of standard Thermal Overload Relays (A)			42 54 67 82 105	42 54 67 82 105 125	82 105 125 150	82 105 125 150 180	105 125 150 180 250	105 125 150 180 250 330
Operation coil rating			Refer to the table below					
Auxiliary contact arrangement	Non-Reversing	Standard	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b
		Special	–	–	–	–	–	–
	Reversing	Standard	2a2b×2	3a3b×2	○3a3b×2	3a3b×2	○3a3b×2	○3a3b×2
		Special	–	–	–	–	–	–
	Non-Reversing	A	239	250	282		360	
		B	112	120	144		163	
		C	136	145	178		195	
		Product weight [kg]	3.5	4.6	8.0		12	
	Reversing	A	251	276	304		392	
		B	276	296	370		395	
		C	147	156	194.5		209	
		Product weight [kg]	7	8.3	17		26	
IEC 35mm rail mounting type			–	–	–	–	–	–
Option	Front clip-on auxiliary contact block mounting type		–	–	–	–	–	–
	Side clip-on auxiliary contact block mounting type		◄———					———►
	Surge absorber mounting type		◄———		General purpose coil models contain a surge absorber			———►
	Reversing mechanical interlock attachment		◄———					———►
Special Specifications	Anti-corrosion treatment	MSO-☐YS	●	●	●	●	●	●
	Delay open type	MSO-☐DL	–	●	–	●	●	●
Special specification thermal relay	Quick response model (with 2E)	MSO-☐KF	–	–	–	–	–	–
	Saturated reactor attached	MSO-☐SR	○	○	○	●	●	●
	With 2E (3 elements)	MSO-☐KP	○	○	●	●	●	●

Notes 1: *MSO-2xN18 model has auxiliary contacts (head on unit) as a standard attachment.
2: "CX" of the model name refers to the CAN terminal attachments.
3: The** mark means that CAN terminal attachments cannot be manufactured for this model.

●Thermal relay combined with an magnetic starter

Model names and types of heaters for thermal relays that can be combined with magnetic starters

Magnetic Contactors frame	Thermal Overload Relays model	Heater designation (adjustable range of stabilized current) (A)
N125, N150	TH-N120(KP)	42(34 to 50), 54(43 to 65), 67(54 to 80), 82(65 to 100)
	TH-N120TA(KP)	105(85 to 125), 125(100 to 150)*
N180, N220	TH-N220RH(KP)	82(65 to 100), 105(85 to 125), 125(100 to 150), 150(120 to 180), 180(140 to 220)*
N300, N400	TH-N400RH(KP)	105(85 to 125), 125(100 to 125), 150(120 to 180), 180(140 to 220), 250(200 to 300), 330(260 to 400)*
N600, N800	TH-N600(KP)	250(200 to 300):400/5A, 330(260 to 400):500/5A, 500(400 to 600):750/5A, 660(520 to 800)*:1000/5A

Notes 1: Where the stabilized current value is between two heater designations, choose the heater designation to which the current value is closer.
2: Use the TH-N600 model thermal relay combined with the transformer (CW-15☐ model/15VA by Mitsubishi Electric) whose current transformation ratio is shown in the table.
3: The N600 and N800 models should be combined with the TH-N600. (An MSO model cannot be manufactured.)
4: "CX" of the model name refers to the CAN terminal attachments.
5: Heater designations with the *mark have magnetic starter frames to which they cannot be applied, so please refer to the heater rating (designation) column of the standard model thermal relay on the table above, for applicable magnetic starter frames.

●Coil Ratings

Operating coil rating (Alternating current operate) for S-N125 to N800

Coil designation	Ratings		Coil designation	Ratings		Coil designation	Ratings	
100VAC	100–127V	50Hz	300VAC	260–350V	50Hz	500VAC	460–550V	50Hz
	100–127V	60Hz		260–350V	60Hz		460–550V	60Hz
200VAC	200–240V	50Hz	400VAC	380–440V	50Hz	(24VAC)	24V	50/60Hz
	200–240V	60Hz		380–440V	60Hz	(48VAC)	48–50V	50/60Hz

Note 1: 24VAC cannot be manufactured for N180 to N800, 48VAC cannot be manufactured for N600 and N800.

Magnetic Contactors

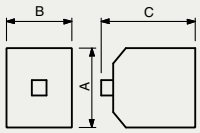
■S-N series (non-Reversing)
■S-2x series (Reversing)


S-N125


S-N220


S-N600

Delivery date category	
▭	Standard item
○	Substandard item
●	Special Item

Model name			S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
	Non-Reversing		S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
	Reversing		S-2×N125	S-2×N150	S-2×N180	S-2×N220	S-2×N300	S-2×N400	S-2×N600	S-2×N800
Rated capacity (kW) Category AC-3	220 to 240VAC		125	150	180	220	300	400	630	800
	380 to 440VAC		120	150	180	220	300	400	630	800
	500VAC		90	140	180	200	250	350	500	720
Conventional free air thermal current Ith [A]			150	200	260	260	350	450	660	800
Operation Coil Ratings			Refer to the table below							
Auxiliary contact arrangement	Non-Reversing	Standard	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	●2a2b
		Special	–	–	–	–	–	–	–	–
	Reversing	Standard	2a2b×2	3a3b×2	3a3b×2	3a3b×2	○3a3b×2	○3a3b×2	●4a4b×2	●4a4b×2
		Special	–	–	–	–	–	–	–	–
	Non-Reversing	A	150	160	204		243		310	
		B	100	120	138		163		290	
		C	137	145	175		195		235	
		Product weight [kg]	2.7	3.3	5.5		9.5		24	
	Reversing	A	150	160	215		250		435	
		B	276	296	370		395		660	
		C	147	156	189		209		254	
		Product weight [kg]	6	7	12.8		21		54	
IEC 35mm rail mounting type			–	–	–	–	–	–	–	–
Option	Front clip-on auxiliary contact block mounting type		–	–	–	–	–	–	–	–
	Side clip-on auxiliary contact block mounting type		◄———					———►	–	–
	Surge absorber mounting type		–	–	–	–	–	–	–	–
	Reversing mechanical interlock attachment possible		◄———					———►	–	–
Special Specifications	Anti-corrosion treatment	S-□YS	●	●	●	●	●	●	●	–
	Delay open type	S-□DL	–	●	–	●	●	●	–	–

Notes 1: *S-2xN18 model has auxiliary contacts (head on unit) as a standard attachment.
2: "CX" of the model name refers to the CAN terminal attachments.
3: The** mark means that CAN terminal attachments cannot be manufactured for this model.

●Coil Ratings

Operating coil rating (Alternating current operate) for S-N125 to N800

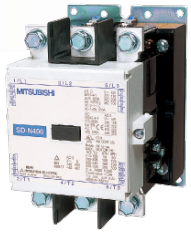
Coil designation	Ratings		Coil designation	Ratings		Coil designation	Ratings	
100VAC	100—127V	50Hz	300VAC	260—350V	50Hz	500VAC	460—550V	50Hz
	100—127V	60Hz		260—350V	60Hz		460—550V	60Hz
200VAC	200—240V	50Hz	400VAC	380—440V	50Hz	(24VAC)	24V	50/60Hz
	200—240V	60Hz		380—440V	60Hz	(48VAC)	48—50V	50/60Hz

Note 1: 24VAC cannot be manufactured for N180 to N800, 48VAC cannot be manufactured for N600 and N800.

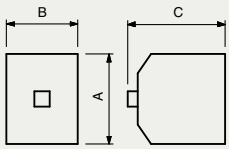
DC Operate magnetic Contactors

■SD-N series (non-Reversing)
■SD-2xN series (Reversing)

SD-N125



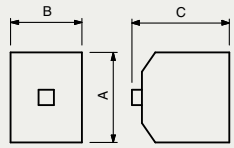
SD-N400

Model name	Non-Reversing		SD-N125	SD-N150	SD-N220	SD-N300	SD-N400	SD-N600	SD-N800
	Reversing		SD-2×N125	SD-2×N150	SD-2×N220	SD-2×N300	SD-2×N400	SD-2×N600	SD-2×N800
Rated capacity (kW) Category AC-3	200 to 220VAC		125	150	220	300	400	630	800
	380 to 440VAC		120	150	220	300	400	630	800
Conventional free air thermal current Ith [A]			150	200	260	350	450	660	800
Operating coil voltage (designation)			12VDC, 24VDC*, 48V, 100V, 110V, 125V (120 to 125V), 200V, 220V [Figures in brackets ( ) indicates rated values]						
Auxiliary contact arrangement (Both standard and special)	Non-Reversing		2a2b	2a2b	2a2b	2a2b	○2a2b	○2a2b	○2a2b
	Reversing		○2a2b×2	○3a3b×2	○3a3b×2	○3a3b×2	○3a3b×2	●4a4b×2	●4a4b×2
	Non-Reversing	A	150	160	204	243		310	
		B	100	120	138	163		371	
		C	162	170	200	221		235	
		Product weight [kg]	4.3	4.8	7.5	13.5		29	
	Reversing	A	150	160	215	250		435	
		B	276	296	370	395		800	
		C	173	181	214	235		254	
		Product weight [kg]	9.2	10	17	29		64	
IEC 35mm rail mounting type			—	—	—	—	—	—	—

Notes 1: "CX" of the model name refers to the CAN terminal attachments.
2: Ratings with an * mark are for special products, rated at SD-N220 and above.
3: 12VDC cannot be manufactured for SD-N600 and N800.

Magnetic Contactor with Mechanical Latch

- SL-T series (AC closing coil, non-reversing)
- SL-N series (AC closing coil, non-reversing)
- SLD-N series (DC closing coil, non-reversing)
- SL-2×N series (AC closing coil, reversing)
- SLD-2×N series (DC closing coil, reversing)

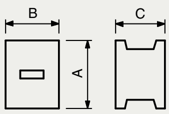
Model name									
	Non-Reversing	SL-T21(BC)	SL/SLD-N125	SL/SLD-N150	SL/SLD-N220	SL/SLD-N300	SL/SLD-N400	SL/SLD-N600	SL/SLD-N800
	Reversing	–	SL/SLD-2×N125	SL/SLD-2×N150	SL/SLD-2×N220	SL/SLD-2×N300	SL/SLD-2×N400	SL/SLD-2×N600	SL/SLD-2×N800
Rated capacity (kW) Category AC-3	200 to 220VAC	20	125	150	220	300	400	630	800
	380 to 440VAC	20	120	150	220	300	400	630	800
Conventional free air thermal current Ith [A]		32	150	200	260	350	450	660	800
Operating coil voltage (designation)		Alternating current operate: 100V, 200V, 300V, 400V, 500V Direct current operate: 12VDC, 24VDC, 48VDC, 100V (100 to 110V), 125V (120 to 125V), 200V (200 to 220V) [Figures in brackets ( ) indicate rated values]							
Auxiliary contact arrangement (Both standard and special)	Non-Reversing	2a2b	1a2b	1a2b	1a2b	1a2b	○1a2b	○1a2b	○1a2b
	Reversing	●2a2b	●1a2b×2	●2a3b×2	●2a3b×2	●2a3b×2	●2a3b×2	●3a4b×2	●3a4b×2
	Non-Reversing A	81	194	203	227	262		392	
	Non-Reversing B	63	100	120	138	163		290	
	Non-Reversing C	136.5	137	145	175	195		235	
	Non-Reversing Product weight [kg]	0.55	3.1	3.7	6	10		27	
	Reversing A	81	194	203	232.5	265.5		467	
	Reversing B	136	276	296	370	395		660	
	Reversing C	136.5	148	156	189	209		254	
	Reversing Product weight [kg]	1.15	7	8	14	22		60	
IEC 35mm rail mounting type		◄——►	–	–	–	–	–	–	–

Notes 1: Operating coils are rated for 15 minutes
2: "CX" of the model name refers to the CAN terminal attachments.
3: 12VDC cannot be manufactured for SD-N600 and N800.

DC Interface Contactors

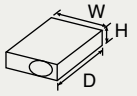
■SD-Q, MSOD-Q series (Non-Reversing)
■SD-QR, MSOD-QR series (Reversing)

SD-Q11

Model name	Type		Non-Reversing		Reversing	
	Magnetic Contactors SD-		Q11	Q12	QR11	QR12
	Magnetic Starters MSOD-		Q11	Q12	QR11	QR12
Combined Thermal Overload Relays	Model name		TH-N12(KP)		TH-N12(KP)	
	Heater designation Applicable range [A]		0.12 to 11		0.12 to 11	
Rated capacity (kW) Category AC-3	200 to 240V		2.5		2.5	
	380 to 440V		4		4	
Rated operational current (A) Category AC-3	200 to 240V		12		12	
	380 to 440V		9		9	
Conventional free air thermal current Ith [A]			20		20	
Auxiliary contact arrangement	Standard		1a	1a1b	2b	2a2b
	Special		● 1b	● 2a	–	–
	Magnetic Contactors	A	51	52	59	59
		B	45	56	90	112
		C	66.5	67.5	66.5	67.5
		Product weight [kg]	0.19	0.21	0.42	0.46
	Magnetic Starters	A	91	92.5	98.5	98.5
		B	49.5	56	94.5	112
		C	77	77	77	77
		Product weight [kg]	0.3	0.31	0.52	0.56
IEC 35mm rail mounting type			◄────►			
Coil Ratings			24VDC			

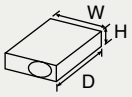
Thermal Overload Relays Specification

TH-T series

Frame			T18	T25
Appearance				
Model name	with 2-elements	For Magnetic Starters	TH-T18	TH-T25
		For independent mounting	–	
	with 3-elements	For Magnetic Starters	TH-T18KP	TH-T25KP
		For independent mounting	–	
	Outside dimensions [mm] W×H×D	For Magnetic Starters	45×55×76.5	63×51×79
		For independent mounting	–	
	Product weight [kg]	For Magnetic Starters	0.11	0.16
		For independent mounting	–	
Applicable standard			IEC60947-4-1, EN60947-4-1, JIS C8201-4-1, GB14048.4	
Use condition		Ambient temperature [°C]	-10 to +40 (Standard: 20°C; maximum temperature on the board: 55°C)	
		Frequency [Hz]	0(DC) to 400	
Main circuit specifications	Rated insulation voltage [V]		690	
	Rated impulse withstand voltage [kV]		6	
	Pollution degree		3	
	Heater designation (adjustable range of stabilized current) [A] (Rated operational voltage : 550V maximum)		0.12 (0.1 to 0.16) 0.17 (0.14 to 0.22) 0.24 (0.2 to 0.32) 0.35 (0.28 to 0.42) 0.5 (0.4 to 0.6) 0.7 (0.55 to 0.85) 0.9 (0.7 to 1.1) 1.3 (1 to 1.6) 1.7 (1.4 to 2) 2.1 (1.7 to 2.5) 2.5 (2 to 3) 3.6 (2.8 to 4.4) 5 (4 to 6) 6.6 (5.2 to 8) 9 (7 to 11) 11 (9 to 13) 15 (12 to 18)	0.24 (0.2 to 0.32) 0.35 (0.28 to 0.42) 0.5 (0.4 to 0.6) 0.7 (0.55 to 0.85) 0.9 (0.7 to 1.1) 1.3 (1 to 1.6) 1.7 (1.4 to 2) 2.1 (1.7 to 2.5) 2.5 (2 to 3) 3.6 (2.8 to 4.4) 5 (4 to 6) 6.6 (5.2 to 8) 9 (7 to 11) 11 (9 to 13) 15 (12 to 18) 22 (18 to 26)
	Power consumption [VA/element] at minimum/maximum stabilization		0.8 / 1.8	1.5 / 3.0
	Terminal screw size		M3.5	M4
	Compatible with terminal	Electric wire size [mm²]	ϕ1.6, 0.75 to 2.5	ϕ1.6 to 2.6, 1.25 to 6
		Crimp lug size	1.25-3.5 to 2-3.5, 5.5-S3	1.25-4 to 5.5-4
Operation circuit (contact) specifications	Contact arrangement		1a1b	1a1b
	Conventional free air thermal current Ith [A]		2	5
	Rating Operational Current [A] Category AC-15 (AC operated Magnetic Contactors Coil opening and closing) a contact/b contact. The value in brackets indicates the rating for automatic reset.	24VAC	2(0.5) / 2(0.5)	2(0.5) / 3(0.5)
		120VAC	2(0.5) / 2(0.5)	2(0.5) / 3(0.5)
		240VAC	1(0.5) / 1(0.5)	1(0.5) / 2(0.5)
		550VAC	0.3(0.3) / 0.3(0.3)	0.3(0.3) / 0.3(0.3)
	Rating Operational Current [A] Category DC-13 (DC operated Magnetic Contactors Coil opening and closing) The value in brackets indicates the rating for automatic reset.	24VDC	0.5(0.3)	1(0.3)
		110VDC	0.2(0.2)	0.2(0.2)
		220VDC	0.1(0.1)	0.1(0.1)
	Minimum applicable load level		20V 5mA	20V 5mA
	Terminal screw size		M3.5	M3.5
	Compatible with terminal	Electric wire size [mm²]	ϕ1.6, 0.75 to 2.5	ϕ1.6, 0.75 to 2.5
		Crimp lug size	1.25-3.5 to 2-3.5	1.25-3.5 to 2-3.5
Characteristics/Functions	Trip class		10A	
	Operating characteristic curve description page		Page 886	
	Vibration resistance (vibration resistance malfunction performance)		10 to 55 Hz, 19.6 m/s²	
	Trip-free		◎	◎
	Reset method		Manual/Automatic switchable	Manual/Automatic switchable
	Operation indication (lever indication)		◎	◎
	Manual trip check		◎	◎
Applied products	With saturable reactor	TH-□SR	○	○
	With 3-element (2E) thermal saturable reactor	TH-□KPSR	○	○
	2-element quick-acting characteristics thermal	TH-□FS	○	○
	With 3-element (2E) thermal quick-acting characteristics	TH-□FSKP	○	○

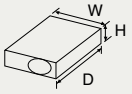
Notes 1: The ambient temperature compensator is mounted on all types.
2: The ◎ mark indicates standard equipment.

TH-T series

Frame			T50	T65	T100
Appearance					
Model name	with 2-elements	For Magnetic Starters	TH-T50	TH-T65	TH-T100
		For independent mounting	–		–
	with 3-elements	For Magnetic Starters	TH-T50KP	TH-T65KP	TH-T100KP
		For independent mounting	–		–
	Outside dimensions [mm] W×H×D	For Magnetic Starters	74.3×72×83.5	89×57×83.5	89×73.5×83.5
		For independent mounting	–		–
	Product weight [kg]	For Magnetic Starters	0.2	0.26	0.32
		For independent mounting	–		–
Applicable standard			IEC60947-4-1, EN60947-4-1, JIS C8201-4-1, GB14048.4		
Use condition		Ambient temperature [°C]	-10 to +40 (Standard: 20°C; maximum temperature on the board: 55°C)		
		Frequency [Hz]	0(DC) to 400		
Main circuit specifications	Rated insulation voltage [V]		690		
	Rated impulse withstand voltage [kV]		6		
	Pollution degree		3		
	Heater designation (adjustable range of stabilized current) [A] (Rated operational voltage : 550V maximum)		29 (24 to 34) 35 (30 to 40) 42 (34 to 50)	15 (12 to 18) 22 (18 to 26) 29 (24 to 34) 35 (30 to 40) 42 (34 to 50) 54 (43 to 65)	67 (54 to 80) 82 (65 to 100)
	Power consumption [VA/element] at minimum/maximum stabilization		1.6/3.2	2.4/5.5	2.5/6.0
	Terminal screw size		M5	M6	M6
	Compatible with terminal	Electric wire size [mm²]	ϕ5.5 to 14	–	–
		Crimp lug size	5.5-5 to 14-5	5.5-6 to 22-6	14-6 to 22-6, 38-S6
Operation circuit (contact) specifications	Contact arrangement		1a1b	1a1b	1a1b
	Conventional free air thermal current Ith [A]		5	5	5
	Rating Operational Current [A] Category AC-15 (AC operated Magnetic Contactors Coil opening and closing) a contact/b contact The value in brackets indicates the rating for automatic reset.	24VAC	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)
		120VAC	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)
		240VAC	1(0.5) / 2(0.5)	1(0.5) / 2(0.5)	1(0.5) / 2(0.5)
		550VAC	0.3(0.3) / 0.3(0.3)	0.5(0.5) / 1(0.5)	0.5(0.5) / 1(0.5)
	Category DC-13 (DC operated Magnetic Contactors Coil opening and closing) The value in brackets indicates the rating for automatic reset.	24VDC	1(0.3)	1(0.3)	1(0.3)
		110VDC	0.2(0.2)	0.2(0.2)	0.2(0.2)
		220VDC	0.1(0.1)	0.1(0.1)	0.1(0.1)
	Minimum applicable load level		20V 5mA	20V 5mA	20V 5mA
	Terminal screw size		M3.5	M4	M4
	Compatible with terminal	Electric wire size [mm²]	ϕ1.6, 1.25 to 2	ϕ1.6, 1.25 to 2	ϕ1.6, 1.25 to 2
		Crimp lug size	1.25-3.5 to 2-3.5	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4
Characteristics/Functions	Trip class		10A	15 to 42A:10 54A:10A	67A:10 82A:10A
	Operating characteristic curve description page		Page 886		
	Vibration resistance (vibration resistance malfunction performance)		10 to 55Hz 19.6m/s²		
	Trip-free		◎	◎	◎
	Reset method		Manual/Automatic switchable	Manual/Automatic switchable	Manual/Automatic switchable
	Operation indication (lever indication)		◎	◎	◎
	Manual trip check		◎	◎	◎
Applied products	With saturable reactor	TH-□SR	○ (TH-T50SR)	○ (TH-T65SR)	○ (TH-T100SR)
	With 3-element (2E) thermal saturable reactor	TH-□KPSR	○ (TH-T50KPSR)	○ (TH-T65KPSR)	○ (TH-T100KPSR)
	2-element quick-acting characteristics thermal	TH-□FS	△ (TH-T50FS)	△ (TH-T65FS)	△ (TH-T100FS)
	With 3-element (2E) thermal quick-acting characteristics	TH-□FSKP	△ (TH-T50FSKP)	△ (TH-T65FSKP)	△ (TH-T100FSKP)

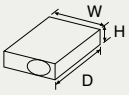
Notes 1: The ambient temperature compensator is mounted on all types.
2: The ◎ mark indicates standard equipment, the ○ indicates substandard items.

TH-N series

Frame			N120	N120TA	N220
Appearance					
Model name	with 2-elements	For Magnetic Starters	TH-N120	TH-N120TA	TH-N220RH
		For independent mounting		TH-N120TAHZ	TH-N220HZ
	with 3-elements	For Magnetic Starters	TH-N120KP	TH-N120TAKP	TH-N220RHKP
		For independent mounting		TH-N120TAHZKP	TH-N220HZKP
	Outside dimensions [mm] W×H×D	For Magnetic Starters	103×67×105	112×87×105	144×114×179.5
		For independent mounting		112×103×105	144×104×166.5
	Product weight [kg]	For Magnetic Starters	0.48	0.75	2.5
		For independent mounting		1.0	2.5
Applicable standard			JIS, JEM, IEC, VDE, BS, UL, GB		
Use condition		Ambient temperature [°C]	-10 to +40 (Standard: 20°C; maximum temperature on the board: 55°C)		
		Frequency [Hz]	0 (DC) to 400		50 to 60
Main circuit specifications	Heater designation (adjustable range of stabilized current) [A] (The dotted lines (---) on the table to the right show the compatibility with the frames of magnetic contactors) (For heater designations of applied products, refer to the relevant portion of the main document)		42 (34 to 50) 54 (43 to 65) 67 (54 to 80) 82 (65 to 100)	105 (85 to 125) 125 (100 to 150)	82 (65 to 100) 105 (85 to 125) 125 (100 to 150) 150 (120 to 180) 180 (140 to 220)
	Power consumption [VA/element] at minimum/maximum stabilization		3.0 / 7.1	3.8 / 8.6	1.0 / 2.3 (Note 5)
	Terminal screw size		M8	M8	M10
	Compatible with terminal	Electric wire size [mm^2]	–	–	–
		Crimp lug size	8-8 to 38-8	38-8 to 100-8	22-10 to 150-10
Operation circuit (contact) specifications	Contact arrangement		1a1b	1a1b	1a1b
	Conventional free air thermal current Ith [A]		5	5	5
	Rating Operational Current [A] Category AC-15 (AC operated Magnetic Contactors Coil opening and closing) a contact/b contact. The value in brackets indicates the rating for automatic reset.	24VAC	2 / 3	2 / 3	2 / 3
		120VAC	2 / 3	2 / 3	2 / 3
		240VAC	1 / 2	1 / 2	1 / 2
		550VAC	0.5 / 1	0.5 / 1	0.5 / 1
	Category DC-13 (DC operated Magnetic Contactors Coil opening and closing). The value in brackets indicates the rating for automatic reset.	24VDC	1	1	1
		110VDC	0.2	0.2	0.2
		220VDC	0.1	0.1	0.1
	Minimum applicable load level		20V 5mA	20V 5mA	20V 5mA
	Terminal screw size		M4	M4	M4
	Compatible with terminal	Electric wire size [mm^2]	ϕ1.6, 1.25 to 2	ϕ1.6, 1.25 to 2	ϕ1.6, 1.25 to 2
		Crimp lug size	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4
Characteristics/Functions	Operating characteristic curve description page		Page 886		
	Vibration resistance (vibration resistance malfunction performance)		10 to 55Hz 19.6m/s2		
	Trip-free		◎	◎	◎
	Reset method		Manual/Automatic switchable	Manual/Automatic switchable	Manual/Automatic switchable
	Operation indication (lever indication)		◎	◎	◎
	Manual trip check		◎	◎	◎
Frame of magnetic contactor that can be combined with the product			N125, N150	N125, N150 N150	N180, N220 N220
Applied product	Delayed reaction model	With 2 elements (TH-□SR)	○(TH-N120SR)	○(TH-N120TASR)	○(TH-N220□SR)
		2E format (TH-□KPSR)	○(TH-N120KPSR)	○(TH-N120TAKPSR)	○(TH-N220□KPSR)
	Quick response model	With 2 elements (TH-□SR)	–	–	–
		2E format (TH-□KPSR)	–	–	–
Option	Charging part protection cover		–	–	–
	Reset release		◎(UN-RR□6)	◎(UN-RR□6)	◎(UN-RR□6)
	Operating status display		◎(UN-TL60)	◎(UN-TL60)	◎(UN-TL60)
	Main unit / IEC35mm rail attachment unit		–	–	–
	Cover to prevent mistaken operation		◎(UN-CV603)	◎(UN-CV603)	◎(UN-CV603)

Notes 1: The ambient temperature compensator is mounted on all types.
2: The ◎ mark indicates a standard model (standard equipment), the ○ indicates substandard models, the △ indicates a special product, the – indicates that this item cannot be manufactured.
3: In the case of a single unit attachment to the model with CAN terminal, the model name will be TH-N20CXHZ or TH-N20CXHZKP.
4: The TH-N600 (KP) model should be used in combination with a transformer made for measuring instruments (Rated secondary load of 15VA and above). Recommended models for use with the 250, 330 and 500A are the CW-15LM or the CW-15L. In case of 660A is the CW-40LM. The current transformation ratio is listed in the heater designation column of the table.
5: The power consumption shown includes only the power consumed by the heating element. (The power consumed by the transformer in N220 - N600 frames is not included)
6: TH-N18DM (KP) meets the specification to use in combination with SD-Q19. The structure of the TH-N18 (KP) is different, but the other points (specifications, properties, functionality) are same.

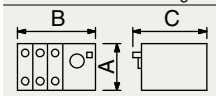
TH-N series

Frame			N400	N600
Appearance				
Model name	with 2-elements	For Magnetic Starters	TH-N400RH	TH-N600 (Note 4)
		For independent mounting	TH-N400HZ	
	with 3-elements	For Magnetic Starters	TH-N400RHKP	TH-N600KP (Note 4)
		For independent mounting	TH-N400HZKP	
	Outside dimensions [mm] W×H×D	For Magnetic Starters	144×160×193.5	63×42×83.5
		For independent mounting	144×173×166.5	
	Product weight [kg]	For Magnetic Starters	2.7	0.14
		For independent mounting	2.7	
Applicable standard			JIS, JEM, IEC, VDE, BS, UL, GB	
Use condition		Ambient temperature [°C]	-10 to +40 (Standard: 20°C; maximum temperature on the board: 55°C)	
		Frequency [Hz]	50 to 60	
Main circuit specifications	Heater designation (adjustable range of stabilized current) [A] (The dotted lines (---) on the table to the right show the compatibility with the frames of magnetic contactors) (For heater designations of applied products, refer to the relevant portion of the main document)		105 (85 to 125) 125 (100 to 150) 150 (120 to 180) 180 (140 to 220) 250 (200 to 300) 330 (260 to 400) * The thermal relay parts of heater designations of 180A and below are same with the N220 frame.	250 (200 to 300) (Current transformation ratio: 400/5A) 330 (260 to 400) (Current transformation ratio: 500/5A) 500 (400 to 600) (Current transformation ratio: 750/5A) 660 (520 to 800) (Current transformation ratio: 1000/5A)
	Power consumption [VA/element] at minimum/maximum stabilization		1.0 / 2.3 (Note 5)	1.0 / 2.3 (Note 5)
	Terminal screw size		M12	–
	Compatible with terminal	Electric wire size [mm²]	–	–
		Crimp lug size	22-12 to 200-12	–
Operation circuit (contact) specifications	Contact arrangement		1a1b	1a1b
	Conventional free air thermal current Ith [A]		5	5
	Rating Operational Current [A] Category AC-15 (AC operated Magnetic Contactors Coil opening and closing a contact/b contact) The value in brackets indicates the rating for automatic reset.	24VAC	2 / 3	2 / 3
		120VAC	2 / 3	2 / 3
		240VAC	1 / 2	1 / 2
		550VAC	0.5 / 1	0.5 / 1
	Category DC-13 (DC operated Magnetic Contactors Coil opening and closing) The value in brackets indicates the rating for automatic reset.	24VDC	1	1
		110VDC	0.2	0.2
		220VDC	0.1	0.1
	Minimum applicable load level		20V 5mA	20V 5mA
	Terminal screw size		M4	M4
	Compatible with terminal	Electric wire size [mm²]	ϕ1.6, 1.25 to 2	ϕ1.6, 1.25 to 2
		Crimp lug size	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4
Characteristics/Functions	Operating characteristic curve description page		Page 886	
	Vibration resistance (vibration resistance malfunction performance)		10 to 55Hz 19.6m/s2	
	Trip-free		◎	◎
	Reset method		Manual/Automatic switchable	Manual/Automatic switchable
	Operation indication (lever indication)		◎	◎
	Manual trip check		◎	◎
Frame of magnetic contactor that can be combined with the product			N300, N400 N400	N600, N800
Applied product	Delayed reaction model	With 2 elements (TH-□SR)	○(TH-N400□SR)	○(TH-N600SR)
		2E format (TH-□KPSR)	○(TH-N400□KPSR)	○(TH-N600KPSR)
	Quick response model	With 2 elements (TH-□SR)	–	–
		2E format (TH-□KPSR)	–	–
Option	Charging part protection cover		–	–
	Reset release		◎(UN-RR□6)	◎(UN-RR□6)
	Operating status display		◎(UN-TL60)	◎(UN-TL60)
	Main unit / IEC35mm rail attachment unit		–	–
	Cover to prevent mistaken operation		◎(UN-CV603)	◎(UN-CV603)

Notes 1: The ambient temperature compensator is mounted on all types.
2: The ◎ mark indicates a standard model (standard equipment), the ○ indicates substandard models, the △ indicates a special product, the – indicates that this item cannot be manufactured.
3: In the case of a single unit attachment to the model with CAN terminal, the model name will be TH-N20CXHZ or TH-N20CXHZKP.
4: The TH-N600 (KP) model should be used in combination with a transformer made for measuring instruments (Rated secondary load of 15VA and above). Recommended models for use with the 250, 330 and 500A are the CW-15LM or the CW-15L. In case of 660A is the CW-40LM. The current transformation ratio is listed in the heater designation column of the table.
5: The power consumption shown includes only the power consumed by the heating element. (The power consumed by the transformer in N220 - N600 frames is not included)
6: TH-N18DM (KP) meets the specification to use in combination with SD-Q19. The structure of the TH-N18 (KP) is different, but the other points (specifications, properties, functionality) are same.

Thermal Overload Relays (Product Introductions)

TH-T series

Model name		TH-T18	TH-T25	TH-T50	TH-T65	TH-T100
Application		MSO-T10 -T12 -T20 MSOD-T12 -T20	MSO-T21 -T25 -T35 -T50 MSOD-T21 -T35 -T50	MSO-T35 -T50 MSOD-T35 -T50	MSO-T65 -T80 -T100 MSOD-T65 -T80 -T100	MSO-T80 -T100 MSOD-T80 -T100
Standard heater rating (designation) (A)		0.12, 0.17, 0.24, 0.35, 0.5, 0.7, 0.9,1.3, 1.7, 2.1, 2.5, 3.6, 5, 6.6, 9, 11, 15	0.24, 0.35, 0.5, 0.7, 0.9, 1.3, 1.7, 2.1, 2.5, 3.6, 5, 6.6, 9, 11, 15, 22	29, 35, 42	15, 22, 29 35, 42, 54	67, 82
Contact arrangement		1a1b	1a1b	1a1b	1a1b	1a1b
 (Unit: mm)	A	55	53	74	57	73.5
	B	45	63	74.3	89	89
	C	76.5	80	88	83.5	83.5

Heater types

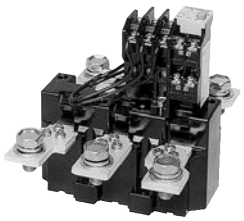
Heater types of TH type Thermal Overload Relays

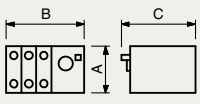
Model	For Magnetic Starters		For single mounting		Heater designation (adjustable range of stabilized current) (A)
	2-element	3-element (2E)	2-element	3-element (2E)	
Standard	T18	T18KP	– (Note 1)	– (Note 1)	0.12(0.1 to 0.16) 0.17(0.14 to 0.22) 0.24(0.2 to 0.32) 0.35(0.28 to 0.42) 0.5(0.4 to 0.6) 0.7(0.55 to 0.85) 0.9(0.7 to 1.1) 1.3(1 to 1.6) 1.7(1.4 to 2) 2.1(1.7 to 2.5) 2.5(2 to 3) 3.6(2.8 to 4.4) 5(4 to 6) 6.6(5.2 to 8) 9(7 to 11) 11(9 to 13) 15(12 to 18)
	T25	T25KP	T25 (Note 1)	T25KP (Note 1)	0.24(0.2 to 0.32) 0.35(0.28 to 0.42) 0.5(0.4 to 0.6) 0.7(0.55 to 0.85) 0.9(0.7 to 1.1) 1.3(1 to 1.6) 1.7(1.4 to 2) 2.1(1.7 to 2.5) 2.5(2 to 3) 3.6(2.8 to 4.4) 5(4 to 6) 6.6(5.2 to 8) 9(7 to 11) 11(9 to 13) 15(12 to 18) 22(18 to 26)
	T50	T50KP	–	–	29(24 to 34) 35(30 to 40) 42(34 to 50)
	T65	T65KP	T65	T65KP	15(12 to 18) 22(18 to 26) 29(24 to 34) 35(30 to 40) 42(34 to 50) 54(43 to 65)
	T100	T100KP	–	–	67(54 to 80) 82(65 to 100)
Quick trip type	–	T18FSKP	– (Note 1)	– (Note 1)	2.1(1.7 to 2.5) 3.6(2.8 to 4.4) 5(4 to 6) 6.6(5.2 to 8) 9(7 to 11) 11(9 to 13) 15(12 to 18)
	T25FS	T25FSKP	T25FS	T25FSKP	2.1(1.7 to 2.5) 3.6(2.8 to 4.4) 5(4 to 6) 6.6(5.2 to 8) 9(7 to 11) 11(9 to 13) 15(12 to 18) 22(18 to 26)
	T50FS	T50FSKP	–	–	29(24 to 34) 35(30 to 40) 42(34 to 50)
	T65FS	T65FSKP	T65FS	T65FSKP	42(34 to 50) 54(43 to 65)
	T100FS	T100FSKP	–	–	67(54 to 80) 82(65 to 93)
Delay trip type	T18SR	–	– (Note 1)	–	0.24(0.2 to 0.32) 0.35(0.28 to 0.42) 0.5(0.4 to 0.6) 0.7(0.55 to 0.85) 0.9(0.7 to 1.1) 1.3(1 to 1.6) 1.7(1.4 to 2) 2.1(1.7 to 2.5) 2.5(2 to 3) 3.6(2.8 to 4.4) 5(4 to 6) 6.6(5.2 to 8) 9(7 to 11) 11(9 to 13) 15(12 to 18)
	T25SR	T25KPSR	T25SR (Note 1)	T25KPSR (Note 1)	0.24(0.2 to 0.32) 0.35(0.28 to 0.42) 0.5(0.4 to 0.6) 0.7(0.55 to 0.85) 0.9(0.7 to 1.1) 1.3(1 to 1.6) 1.7(1.4 to 2) 2.1(1.7 to 2.5) 2.5(2 to 3) 3.6(2.8 to 4.4) 5(4 to 6) 6.6(5.2 to 8) 9(7 to 11) 11(9 to 13) 15(12 to 18) 22(18 to 26)
	T50SR	T50KPSR	–	–	29(24 to 34) 35(30 to 40) 42(34 to 50)
	T65SR	T65KPSR	T65SR	T65KPSR	15(12 to 18) 22(18 to 26) 29(24 to 34) 35(30 to 40) 42(34 to 50) 54(43 to 65)
	T100SR	T100KPSR	–	–	67(54 to 80) 82(65 to 100)

Note 1: Combining UT-HZ18 allows the T18 frame to be used singly (screw mounting or IEC 35 mm rail mounting).
Combining UN-RM20 allows the T25 frame for single mounting to have the IEC 35mm rail mounted.

TH-N series


TH-N120TA


TH-N400HZKP

Model name		TH-N120	TH-N120TA	TH-N120TAHZ	TH-N220RH	TH-N220HZ	TH-N400RH	TH-N400HZ	TH-N600
Application		MSO-N125 -N150 Single attachment possible	MSO-N125 -N150	For single mounting	MSO-N180 -N220	For single mounting	MSO-N300 -N400	For single mounting	This should be used in combination with a transformer for use with measuring instruments (15VA).
Standard heater rating (designation) (A)		42, 54 67, 82	105, 125		82, 105, 125 150, 180		105, 125, 150 180, 250, 330		250 (transformer 400/5A) 330 (transformer 500/5A) 500 (transformer 750/5A) 660 (transformer 1000/5A)
Contact arrangement (rated)		1a1b (a contact 110VAC2A, 220VAC1A, b contact 110VAC 3A, 220VAC2A)							
	A	67	87	103	114	104	160	173	42
	B	103	112	112	144	144	144	144	63
	C	105	105	105	178	167	194	167	83.5
	Product weight [kg]	0.46	0.57	1.0	2.5	2.5	2.7	2.7	0.14
Standard item with 2 elements	TH-☐			●					●
Special Specifications: Quick response model (with 2E)	TH-☐FS	–	–	–	–	–	–	–	–
Special Specifications: Saturated reactor attached	TH-☐SR	○	○	–	○	○	●	●	●
Special Specifications: Corrosion resistant model	TH-☐YS	●	●	●	●	●	●	●	●

Notes 1: For single attachment models, it is possible to attach only the thermal relays with wiring.
2: "CX" of the model name refers to the CAN terminal attachments.

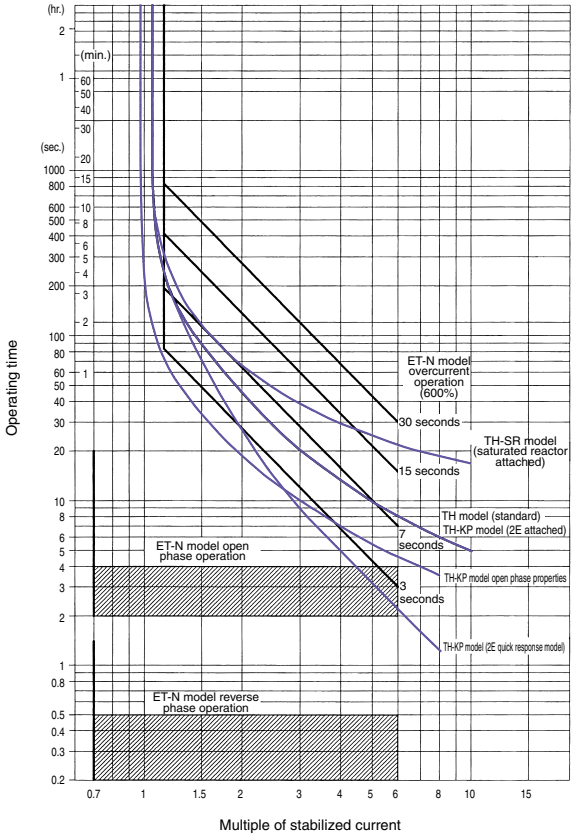
●Heater types

Types of heaters in TH model thermal relays

For Magnetic Starters		For single mounting		Heater designation (adjustable range of stabilized current) (A)
2-element	(2E)3-element	2-element	(2E)3-element	
N120	N120KP	N120	N120KP	42(34 to 50) 54(43 to 65) 67(54 to 80) 82(65 to 100)
N120TA	N120TAKP	N120TAHZ	N120TAHZKP	105(85 to 125) 125(100 to 150)
N220RH	N220RHKP	N220HZ	N220HZKP	82(65 to 100) 105(85 to 125) 125(100 to 150) 150(120 to 180) 180(140 to 220)
N400RH	N400RHKP	N400HZ	N400HZKP	105(85 to 125) 125(100 to 150) 150(120 to 180) 180(140 to 220) 250(200 to 300) 330(260 to 400)
N600	N600KP	–	–	250(200 to 300) 330(260 to 400) 500(400 to 600) 660(520 to 800) * When combined with a transformer (see notes)

Notes 1: The TH-N600 (KP) model should be used in combination with a transformer for measuring instruments (Rated load of 15VA and current transformation ratio as follows; 250A: 400/5A, 330A: 500/5A, 500A: 750/5A, 660A: 1000/5A).
2: "CX" of the model name refers to the CAN terminal attachments.

●Comparison of operating properties of various motor protection relays



TH model standard (2 elements attached) thermal relay
General overloading/locking protection for the motor.

TH-KP model thermal relay with 2E (can also be used with 3 elements)
General overloading/locking/phase failure protection for the motor.
Overloading/locking/phase failure protection for motors with a 3-phase 4-wire system of power distribution.

TH-SR model thermal relay with saturated reactor
Overloading/locking protection for motors with a long startup time or for motors that are frequently used for inching or intermittent operation.

TH-KF model thermal relay with quick response properties (also used with 2E)
Protection for motors with a short allowable time for locking such as underwater motors, etc.

TH-FS model thermal relay with quick response properties and 2 elements
Locking protection for refrigerator compressor motors etc.

ET-N model electronic motor protection relay
Protection from overloading and locking of motors, as well as a wide range of phase failure and phase reversals, etc.

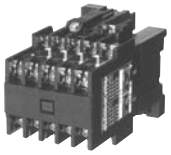
Contactor Relays Specification

SR-T series

Model name				SR-T5	SR-T9
Number of poles				5	9
Contact arrangement				5a	9a
				4a1b	7a2b
				3a2b	5a4b
Rated insulation voltage [V]				690	
Applicable standard				IEC60947-5-1, EN60947-5-1, JIS C8201-5-1	
Rated impulse withstand voltage [kV]				6	
Rated frequency [Hz]				50/60	
Pollution degree				3	
Contact rating (Note 1)	AC rated operational current [A]	Category AC-15 (Coil load)	120VAC	6	
			240VAC	3	
			440VAC	1.5	
			550VAC	1.2	
		Category AC-12 (resistive load)	120VAC	10	
			240VAC	8	
			440VAC	5	
			550VAC	5	
	DC rated operational current [A]	Category DC-13 (large coil load)	24VDC	3	
			48VDC	1.5	
			110VDC	0.6(2)	
			220VDC	0.3(0.8)	
		Category DC-12 (resistive loads)	24VDC	10	
			48VDC	8	
			110VDC	5(8)	
			220VDC	1(3)	
	Minimum applicable load level			20V 3mA	
Performance	Mechanical durability [ten thousand times]			1,000	
	Electrical durability [ten thousand times]			50	
	Switching frequency [time/hour]			1,800	
Characteristic	Coil consumption (Note 3)	Inrush [VA]		45	
		Sealed [VA]		7	
	Power consumption (Note 3) [W]			2.2	
Optional unit (Note 2)	Surge absorber unit			○	○
	Additional auxiliary contact block			○	×
IEC 35mm rail mounting				○	○

Notes 1: The value in brackets indicates the current when switching the load with two poles installed in series.
2: In the optional unit field, ○ and × indicate mountable and non-mountable, respectively.
3: Coil consumption are average values in case of applying 220V60Hz to AC200V coil.

SR-K series

Frame				K100
Appearance				 SR-K100
Number of poles				10
Contact arrangement				10a, 9a1b
				8a2b, 7a3b
				6a4b, 5a5b
Contact rating (Note 2)	Conventional free air thermal current Ith [A]			16
	AC rated operational current [A]	Category AC-15 (Coil load)	110VAC	6
			220VAC	5
			440VAC	3
			550VAC	3
		Category AC-12 (resistive load)	110VAC	16
			220VAC	12
			440VAC	5
			550VAC	5
	DC rated operational current [A]	Category DC-13 (large coil load)	24VDC	5
			48VDC	3
			110VDC	0.8(2)
			220VDC	0.2(0.8)
		Category DC-12 (resistive loads)	24VDC	10
			48VDC	8
			110VDC	5(8)
			220VDC	1(3)
Standard			SR-□	◎
DC operated type			SRD-□	◎
Mechanically latched type			SRL-□	◎
			SRLD-□	◎
With large rated auxiliary contacts			SR-□JH	○
			SRD-□JH	○
With overlapping contacts			SR-□LC	○
			SRD-□LC	○
With terminal cover			SR-□CX	–
			SRD-□CX	–
Optional unit	With surge absorber (Note 3) (Note 4)			◎
	DC/AC interface (Note 4)			◎
	Charging part protection cover			◎
IEC 35mm rail mounting type				◎
690V applicable				◎

Notes 1: ◎ mark is standard, ○ mark is substandard, – is not able to be manufactured.
2: Where large capacity or overlapping contacts are included, the rating of the contacts can be found by referring to the individual ratings table. Values in brackets ( ) are for two pole straight line load switching.
3: In the case of mechanical latch (SRL-K100, SRLD-K100) models, one absorber can be attached to each of closing and tripping coils.
4: Surge absorption units and DC/AC interface units cannot be attached together as additions to the coil terminal of an contactor relay at the same time.
5: The ■ mark in the option unit column indicates that this option can be manufactured; the □ indicates that it cannot be manufactured.

Optional Units Model List

MS-T series

Model name		Auxiliary contact blocks			Operation coil surge absorber unit				Mechanical interlocks
Type		UT-AX4	UT-AX2	UT-AX11	UT-SA23	UT-SA21	UT-SA22	UT-SA25	UT-ML11
Mounting		Front clip-on		Side clip-on	Mounting on top				Side clip-on
Specification/ Function		Twin contact built-in 4-pole auxiliary contact (4a, 2a2b, 3a1b)	Twin contact built-in 2-pole auxiliary contact (2a, 1a1b, 2b)	Twin contact built-in 2-pole auxiliary contact (1a1b)	Operation coil surge absorber: With CR 200VAC	With varistor 48VAC (Shared with DC) 200VAC (Shared with DC) 400VAC	With varistor + indicating LED 200VAC (Shared with DC)	With varistor + CR 48VAC (Shared with DC) 200VAC (Shared with DC)	Combining it with two single Magnetic Contactors configures the reversing type. ML11 is the electrical interlock 2b contact built-in type.
Appearance (Typical example)		 UT-AX4	 UT-AX2	 UT-AX11	 UT-SA21				 UT-ML11
Applied model	Magnetic Starters	T10-T32		T10-T32	T10-T32				T10-T20
	Magnetic Contactors								
	Contactor Relays	SR-T5		SR-T5	SR-T5/T9				–
Others		Combination with UT-AX11 is not available.		Combination with UT-AX2/4 is not available.	–				–

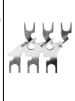
MS-T/N series

Model name	Auxiliary contact blocks									Auxiliary contact unit for low level signals	
Type	UT-AX2(BC)	UT-AX4(BC)	UT-AX11(BC)	UN-AX2(CX)	UN-AX4(CX)	UN-AX11(CX)	UN-AX80	UN-AX150	UN-AX600	UN-LL22(CX)	
Mounting	Front clip-on		Side clip-on	Front clip-on		Side clip-on				Front clip-on	
Specification/ Function	Twin contact built-in 2-pole auxiliary contact (2a, 1a1b, 2b)	Twin contact built-in 4-pole auxiliary contact (4a, 2a2b, 3a1b)	Twin contact built-in 2-pole auxiliary contact (1a1b)	Twin contact built-in 2-pole auxiliary contact (2a, 1a1b, 2b)	Twin contact built-in 4-pole auxiliary contact (4a, 2a2b, 3a1b)	Twin contact built-in 2-pole auxiliary contact (1a1b)	Twin contact built-in 2-pole auxiliary contact (1a1b)	Twin contact built-in 2-pole auxiliary contact (1a1b)	Twin contact built-in 4-pole auxiliary contact (2a2b)	A combination of 2 low level signal contacts and twin (standard) contacts, for a total 4 pole auxiliary contact structure For low level signals 1a1b (5V 5mA) Twin contact 1a1b (20V 5mA)	
Appearance											
(Typical example)	UT-AX2	UT-AX4	UT-AX11	UN-AX2	UN-AX4	UN-AX11	UN-AX80	UN-AX150	UN-AX600	UN-LL22	
Standard compliance achieved	UL · CSA	UL · CSA	UL · CSA	UL · CSA	UL · CSA	UL · CSA	UL · CSA	UL · CSA	UL · CSA	UL · CSA	
Product weight [g]	20	50	50	30	50	40	55	35	200	60	
Others	Combination with UT-AX11(BC) is not available.		Combination with UT-AX2, 4(BC) is not available.	Combination with UN-AX11(CX) is not available.		Combination with UN-AX2, 4, LL22(CX) is not available.	–			Combination with UN-AX11(CX) is not available.	

Model name	DC/AC interface unit for operating coils								Protective cover units								
Type	UT-SY21(BC)	UT-SY22(BC)	UN-SY11	UN-SY12	UN-SY21(CX)	UN-SY22(CX)	UN-SY31	UN-SY32	UN-CV□0	UN-CV251, CV□2	UN-CZ605	UN-CZ□0	UN-CZ□2	UN-CZ□1	UN-CZ□4	UT-CV□, UN-CV□	UT-CW□, UN-CW□
Mounting	Mounting on top		For Independent mounting		Mounting on top				Front clip-on								
Specification/ Function	The magnetic contactor and contactor relay operating on alternating current can be controlled with 24VDC.								Charging part protection cover							Mistaken operation prevention cover	terminal cover
	TRIAC output Input 24VDC 15mA	Relay output Input 24VDC 10mA	TRIAC output Input 24VDC 15mA	Relay output Input 24VDC 10mA	TRIAC output Input 24VDC 15mA	Relay output Input 24VDC 10mA	TRIAC output Input 24VDC 15mA	Relay output Input 24VDC 10mA	For magnetic contactor For contactor relays	For magnetic starters (MSO-)	Thermal relay for (TH-T65, TH-N60)	For magnetic contactors (power source side and load side) For magnetic starters (power source side)	For reversing magnetic contactors	For magnetic starters (load side)	For reversing magnetic starters	UN-CV117 For use with magnetic contactors and contactor relays UN-CV□3 For thermal relay (TH-) UN-CV30 For pneumatic timers	For magnetic contactor For contactor relays For thermal relay
Appearance																	
(Typical example)	UT-SY21		UN-SY11		UN-SY21		UN-SY32		UN-CV250		UN-CZ605	UN-CZ500		UN-CZ501		UN-CV103	UT-CW110
Standard compliance achieved																	
Product weight [g]	30	60	40	40													
Others	–				–												

Notes 1: There are limits on types, rated voltage and use in combination with other models.
2: There is also the UN-RY10 (applicable models: 2XN10 & N11), which integrates the 3 connecting conductors each on the power source and load sides.
3: There is also the UN-RY10L (applicable models: 2XN10 & N11), which integrates 3 connecting conductors.

	Operation coil surge absorber unit														Main circuit surge absorption unit	
	UT-SA□3	UT-SA21	UT-SA22	UT-SA25	UN-SA□3	UN-SA21	UN-SA22	UN-SA25	UN-SA721	UN-SA712	UN-SA722	UN-SA713	UN-SA723	UN-SA725	UT-SA33□	UN-SA33
	Mounting on top														Front clip-on	Independent mounting
	Operation coil surge absorber														Main circuit surge absorber	
	With CR UT-SA23 200VAC UT-SA13 200VDC	With varistor 48VAC (Shared with DC) 200VAC (Shared with DC) 400VAC	With varistor + indicating LED 200VAC (Shared with DC)	With varistor + With CR 48VAC (Shared with DC) 200VAC (Shared with DC)	With CR UN-SA13 200VDC UN-SA23 200VAC	With varistor 200VAC (Shared with DC) 400VAC	With varistor + indicating LED 200VAC (Shared with DC)	With varistor + With CR 48VAC (Shared with DC) 200VAC (Shared with DC)	With varistor 48VAC (Shared with DC) 100VAC (Shared with DC) 200VAC (Shared with DC) 400VAC	With varistor + indicating LED 100VAC (Shared with DC) 200VAC (Shared with DC)		With CR 200VDC	With CR 200VAC	With varistor + With CR 48VAC (Shared with DC) 100VAC (Shared with DC) 200VAC (Shared with DC	With CR 240VAC (AC100 to 240V)	
	 UT-SA21	 UT-SA22	 UN-SA21	 UN-SA22	 UN-SA721	 UN-SA712	 UN-SA722	 UN-SA713	 UN-SA723	 UN-SA725	 UT-SA33□	 UN-SA33		
	UL · CSA	UL · CSA		UL · CSA	UL · CSA	UL · CSA		UL · CSA	UL · CSA							
	13		18	17	13		18	17	20	25	25	25	20	25		78
	–														–	

	Mechanical interlock unit			Main circuit conductor kit							3 pole parallel connection unit	Connecting conductor kit	Fault detection unit	Reset release		LED display	Single attachment unit	
	UT-ML11 (BC)	UT-ML20 (BC)	UN-ML□	UT-SD□	UN-SD□	UT-SG□	UN-SG□	UN-YG□	UT-YD20	UN-YD□	UT-YY20, UN-YY□	UT-TH50, UN-TH□	UN-FD□ (CX)	UT-RR□	UN-RR□	UN-TL□	UT-HZ18 (BC)	UN-RM20
	Side clip-on			Main cuit									Independent mounting	Front clip-on		Front clip-on	–	
	Combined with two single units of magnetic contactors to form a reversing model. The model incorporates an electric interlock 2b contact	Combined with two single units of magnetic contactors to form a reversing model. The model incorporates an electric interlock 2b contact	Combined with two single units of magnetic contactors to form a reversing model. The ML11(CX) incorporates an electric interlock 2b contact	Connecting conductor for reversing model magnetic contactors		Connecting conductor for jumper connecting reversing model magnetic contactors		3 pole connecting conductor for short circuits	2 pole connecting conductor for short circuits		3 pole parallel connecting conductor	Conductor for connecting magnetic contactors and thermal relays	Detecting the conduction mode (contact welds) of the main circuit 100VAC 200VAC	For use in thermal resets outside the circuit board 200mm 400mm 550mm 700mm		Thermal relay trip display 100VAC 200VAC 24VDC	Can be attached with TH-T18, using screws or with the IEC35mm rails.	Can be attached with TH-T25 and TH-20, using screws or with the IEC35mm rails.
	 UT-ML11	 UT-ML20	 UN-ML21										 UN-FD4				 UT-HZ18	 UN-RM20
	UL · CSA	UL · CSA	UL · CSA															
													120				35	20
	–			–									–	–		–	–	

Solid State Contactors Model List

■US-N□/K□ Model Solid State Contactors (Standard Models)

200VAC series

AC-1 rated operating current [A]		5	8	20	30	40	50	70	80
Heater capacity [kW]	1φ200V (Note 2)	1	1.6	4	6	8	10	14	16
	3φ200V	1.7	2.7	6.9	10.3	13.8	17.3	24.2 (Note 1)	27.7
Maximum applicable motor capacity [kW] 3φ200V (Note 3)		0.4	0.4	2.2	3.7	5.5	5.5	11 (Note 1)	11
For 3 phase load US-N□ US-K□		 US-N5SS US-N5SSTE	 US-N8SS US-N8SSTE	 US-N20 US-N20TE	 US-N30 US-N30TE (Note 4)	 US-N40 US-N40TE	 US-N50 US-N50TE (Note 4)	 US-N70NS US-N70NSTE	 US-N80NS US-N80NSTE
For single phase load For combined 3 phase load US-K□								 US-K70	

400VAC series

AC-1 rated operating current [A]				20	30	40	50	70	80
Heater capacity [kW]	1φ400V (Note 2)			8	12	16	20	28	32
	3φ400V			13.8	20.7	27.7	34.6	48.5 (Note 1)	55.4
Maximum applicable motor capacity [kW] 3φ400V (Note 3)				3.7	7.5	11	11	22 (Note 1)	22
For 3 phase load US-N□ US-NH□ US-KH□				 US-N20 US-N20TE	 US-N30 US-N30TE (Note 4)	 US-N40 US-N40TE	 US-N50 US-N50TE (Note 4)	 US-NH70NS US-NH70NSTE	 US-NH80NS US-NH80NSTE
For single phase load For combined 3 phase load US-KH□								 US-KH70	

IEC 35mm rail mounting type	Can be manufactured with standard products	(Note 6)			
Charging part protection cover unit	Equipped with standard products (Except US-K70, KH70)				
Driving unit		UA-DR1			
Driving unit with output	UA-SH8 (Note 8)	UA-SH1			
Reversing unit	UA-RE				
Fault Detection Unit	UN-FD (for 200V main circuit) & UN-FD4 (for 400V main circuit)				
Power control unit	UA-PC				

Option

(Note 5)


UA-SH8


UA-DR1


UA-SH1


UA-RE

	100	120	150	200
	20	24	30	40
	34.6 (Note 1)	41.5	52 (Note 1)	69 (Note 1)
	15 (Note 1)	15	18.5 (Note 1)	22 (Note 1)
	 US-K100TE	 US-K120TE	 US-K150TE	
	 US-K100		 US-K150	 US-K200

	100	120	150	200
	40	48	60	80
	69.3 (Note 1)	83	103.9 (Note 1)	138.5 (Note 1)
	30 (Note 1)	30	37 (Note 1)	45 (Note 1)
	 US-KH100TE	 US-KH120TE	 US-KH150TE	
	 US-KH100		 US-KH150	 US-KH200


UN-FD


UA-PC

US-KD8 Model Solid State Contactor (For Direct Current Load)

Direct Current	DC-1 rated operating current [A]	8
	Rated voltage	DC24 to 110V
	For direct current load US-KD8	 US-KD8
IEC 35mm rail mounting type		Can be manufactured with standard products
Option	Driving unit with output	UA-SH8

US-H□ Model Solid State Contactor

AC-1 rated operating current [A] (-10 to 40°C)		20	30	40	50
Heater capacity [kW] (-10 to 40°C) (Note 8)	1ϕ200V	4	6	8	10
	3ϕ200V	6.9	10.3	13.8	17.3
	3ϕ400V	13.8	20.7	27.7	34.6
US-H□		 US-H20 US-H20DD	 US-H30 US-H30DD	 US-H40 US-H40DD	 US-H50 US-H50DD
IEC 35mm rail mounting type		(Note 6)			
Option	Fault Detection Unit	UN-FD (for 200V main circuit) & UN-FD4 (for 400V main circuit)			
	Power control unit	UA-PC			
	Charging part protection cover unit	UN-CV501US			

Notes 1: When used with the US-K(H)□ model, this shows the capacity when applied to a 3 phase load by combining two or three units of the US-K(H)□ model for single phase load together.
2: Shows the capacity for each pole.
3: Motor load application capacity will vary depending on the conditions of use.
4: The photograph shows the US-N□TE model. The external dimensions of the US-N□ model are smaller.
5: The option unit ▭ column shows the extent of application.
6: Can be attached with the specialized product (US-□RM).
7: This shows the values when the main circuit control format is controlled collectively.
8: When the US-N5SS/N8SS (TE) model is attached to the UA-SH8 driving unit with output, remove the cover of the US-N□ model main unit.

Motor Circuit Breakers

■MMP-T series

●Features

● Protects failure of the industrial motor by means of a single device

One Motor Circuit Breaker can detect overload operation and phase-loss operation of a motor and also makes it possible to cut off short-circuit current. This compact body Motor Circuit Breaker achieves a rated short-circuit breaking capacity of 100kA (200/240V).

● Improves safety during product maintenance

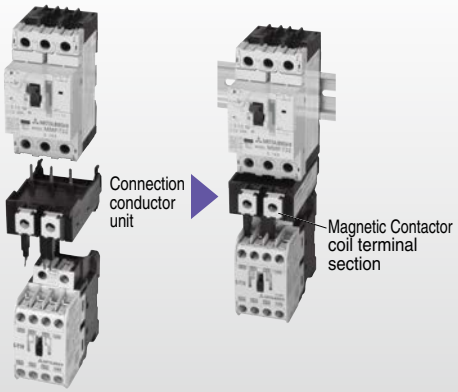
The Motor Circuit Breaker is provided with a DIN and VDE standards-compliant charging part protection cover as standard. This cover helps to improve safety during maintenance work.

MMP-T32

● Reduces the size of the control board and distribution board

The internal structure of the Motor Circuit Breaker has been optimized to reduce depth. When a connection conductor unit (UT-MT□) is used, it will further reduce the size of the control board and distribution board. Furthermore, it can be assembled with an auxiliary contact/alarm contact unit as well as a short-circuit indicator unit (displays in red when short-circuit occurs) in a 45mm-width body.

Example of wiring with connection conductor unit



●Model Code

■MMP-T series

MMP – T32 BC ▲ 32A

Model name	Model
MMP	AC operated type

Frame	Specification
T32	32A

Code	Specification
BC	With fast wiring terminal

Heater designation (A)	Current setting range (A)
0.16	0.1 – 0.16
0.25	0.16 – 0.25
0.4	0.25 – 0.4
0.63	0.4 – 0.63
1	0.63 – 1
1.6	1 – 1.6
2.5	1.6 – 2.5
4	2.5 – 4
6.3	4 – 6.3
8	5.5 – 8
10	7 – 10
13	9 – 13
18	12 – 18
25	18 – 25
32	24 – 32

●Specification List

Frame A			32									
Type name			MMP-T32						MMP-T32BC*1			
Standard			JIS C8201-2-1 Ann.1, JIS 8201-4-1, EN60947-2, EN60947-4-1, IEC60947-2, IEC60947-4-1, GB14048.2									
Number of poles			3									
Handle shape			Tumbler handle									
Rated current In [A]			0.1 to 32									
Rated operational voltage Ue [V.]			200 to 690									
Rated frequency [Hz]			50/60									
Rated insulation voltage Ui [V]			690									
Rated impulse withstand voltage Uimp [kV]			6									
Rated short-circuit breaking capacity [kA]	Rated current Ie [A]*2		200/240V		400/415V		440/460V		500V		600/690V	
	Heater designation	Current setting range	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics
JIS C8201-2-1 Ann.1 IEC60947-2	0.16	0.1 – 0.16	100		100		100		100		100	
	0.25	0.16 – 0.25	100		100		100		100		100	
	0.4	0.25 – 0.4	100		100		100		100		100	
	0.63	0.4 – 0.63	100		100		100		100		100	
	1	0.63 – 1	100		100		100		100		100	
	1.6	1 – 1.6	100		100		100		100		100	
	2.5	1.6 – 2.5	100		100		100		100		8	6
	4	2.5 – 4	100		100		100		100		8	6
	6.3	4 – 6.3	100		100		100		100		6	5
	8	5.5 – 8	100		100		50	38	42	32	6	5
	10	7 – 10	100		100		50	38	42	32	6	5
	13	9 – 13	100		100		50	38	42	32	6	5
	18	12 – 18	100		50	38	35	27	10	8	4	3
	25	18 – 25	100		50	38	35	27	10	8	4	3
	32	24 – 32	100		50	38	35	27	10	8	4	3
Selectivity category	JIS C8201-2-1 Ann.1 IEC60947-2		Cat.A									
Utilization category	JIS C8201-4-1 IEC60947-4-1		AC-3									
Trip class (JIS C8201-4-1, IEC60947-4-1)			10									
Instantaneous release current			13 × Maximum Ie									
Durability	Mechanical [times]		100,000									
	Electrical [times]		100,000									
Phase loss sensitive			Yes									
Trip display			Yes									
Test trip function			Yes									
Auxiliary contact unit			UT-MAX (1a or 1b) AC-12: 125V/5A, 250V/3A									
Alarm contact unit			UT-MAL (1a or 1b) DC-12: 125V/0.4A, 250V/0.2A									
Short-circuit indicator unit			UT-TU									
Weight [g]			330									

*1: MMP-T32BC type is based on the specification of wiring streamlining terminal.
*2: UL-compliant rated working current is described on a different page.

●How to Order

At time of your order, please specify your desired products as shown below. (A space should be inserted in the ▲ -marked position.)

Model	Heater nominal
MMP-T32 MMP-T32BC	▲ 32A

●How to Order the Options

	Type name	Contact arrangement
Auxiliary contact unit	UT-MAX	▲ 1a
	UT-MAX	▲ 1b
Alarm contact unit	UT-MAL	▲ 1a
	UT-MAL	▲ 1b
Short-circuit indicator unit	UT-TU	

●Type 1 Coordination (Non-reversing/Reversing, Full-voltage)

The rated short-circuit breaking capacity given in the table below applies when MMP-T32 and Magnetic Contactor are used in combination.

● MMP-T32 Motor Circuit Breaker combined with S(D)-T Magnetic Contactor

Three-phase AC motor (AC-3) IEC												Motor Circuit Breaker		
200/240V			400/415V			440/460V			500V			Model name	Heater designation	Rated current setting range [A]
P[kW]	Ie[A]	Iq[kA]	P[kW]	Ie[A]	Iq[kA]	P[kW]	Ie[A]	Iq[kA]	P[kW]	Ie[A]	Iq[kA]			
–	–	–	0.2	0.55	50	0.2	0.58	50	0.2	0.5	50	MMP-T32 (BC)	0.63	0.4 to 0.63
0.1	0.65	50	0.4	1	50	0.4	1	50	0.4	0.8	50		1	0.63 to 1
0.2 0.3	1.1 1.5	50	0.4	1	50	0.4	1	50	0.75	1.4	50		1.6	1 to 1.6
0.4	2	50	0.75	1.7	50	0.75	1.7	50	1.5	2.5	50		2.5	1.6 to 2.5
0.75	3.3	50	1.5	3.1	50	1.5	3	50	2.2	3.6	50		4	2.5 to 4
1.5	6	50	2.2	4.5	50	2.2	4.2	50	3.7	5.7	50		6.3	4 to 6.3
1.5	6	50	3.7	7.1	50	3.7	6.5	50	3.7	5.7	42		8	5.5 to 8
2.2	8.6	50	3.7	7.1	50	5.5	9.8	50	5.5	8.4	42		10	7 to 10
–	–	–	5.5	10.5	50	5.5	9.8	50	7.5	11.2	42		13	9 to 13
3.7	13.4	50	7.5	14	50	7.5	12.7	35	11	16.4	10		18	12 to 18
5.5	19.8	50	11	20.5	50	11	18.5	35	–	–	–		25	18 to 25
7.5	26.4	50	15	27	50	15	24.5	35	–	–	–		32	24 to 32

Notes 1: Model names of the units (such as connection conductor unit) used for combining Motor Circuit Breaker and Magnetic Contactor are as follows.
S-T10(BC) to S-T20(BC): UT-MT20, S-T21(BC)/T25(BC): Electric wire connection, S-T32(BC): UT-MT32
SD-T12(BC)/T20(BC): UT-MT20D+UT-BT32D, SD-T21(BC): Electric wire connection, SD-T32(BC): UT-MT32D+UT-BT32D
S-2×T10(BC): UT-MT20+UT-RT10+UT-BT20 (2 units), S-2×T12(BC)/T20(BC): UT-MT20+UT-RT20+UT-BT20 (2 units), S-2×T21(BC)/T25(BC): Electric wire connection, S-2×T32(BC): UT-MT32+UT-RT32+UT-BT32 (2 units)
SD-2×T12(BC)/T20(BC): UT-MT20D+UT-RT20+UT-BT32D (2 units), SD-2×T21(BC): Electric wire connection, SD-2×T32(BC): UT-MT32D+UT-RT32+UT-BT32D (2 units)
2. The above table indicates combinations of Motor Circuit Breaker with Magnetic Contactor selected based on the SF-JR 4-pole standard three-phase motor (manufactured by Mitsubishi Electric).

● MMP-T32 Motor Circuit Breaker combined with SD-Q Magnetic Contactor

Three-phase AC motor (AC-3) IEC												Motor Circuit Breaker		
200/240V			400/415V			440/460V			500V			Model name	Heater designation	Rated current setting range [A]
P[kW]	Ie[A]	Iq[kA]	P[kW]	Ie[A]	Iq[kA]	P[kW]	Ie[A]	Iq[kA]	P[kW]	Ie[A]	Iq[kA]			
–	–	–	0.2	0.55	50	0.2	0.58	50	0.2	0.5	50	MMP-T32 (BC)	0.63	0.4 to 0.63
0.1	0.65	50	0.4	1	50	0.4	1	50	0.4	0.8	50		1	0.63 to 1
0.2 0.3	1.1 1.5	50	0.4	1	50	0.4	1	50	0.75	1.4	50		1.6	1 to 1.6
0.4	2	50	0.75	1.7	50	0.75	1.7	50	1.5	2.5	50		2.5	1.6 to 2.5
0.75	3.3	50	1.5	3.1	50	1.5	3	50	2.2	3.6	50		4	2.5 to 4
1.5	6	50	2.2	4.5	50	2.2	4.2	50	3.7	5.7	50		6.3	4 to 6.3
1.5	6	50	3.7	7.1	50	3.7	6.5	50	3.7	5.7	42		8	5.5 to 8
2.2	8.6	50	3.7	7.1	50	–	–	–	–	–	–		10	7 to 10

Note: The above table indicates combinations of Motor Circuit Breaker with Magnetic Contactor selected based on the SF-JR 4-pole standard three-phase motor (manufactured by Mitsubishi Electric).

Magnetic Contactors (Non-Reversing /Reversing)		Various units
Model name		Model name
200/240V	S-(2X)T10(BC)	Note 1
	S(D)-(2X)T12(BC)	
	S(D)-(2X)T20(BC)	
	S(D)-(2X)T21(BC)	
	S-(2X)T25(BC)	
	S(D)-(2X)T32(BC)	
400/415V	S-(2X)T10(BC)	
	S(D)-(2X)T12(BC)	
	S(D)-(2X)T20(BC)	
	S(D)-(2X)T21(BC)	
	S-(2X)T25(BC)	
	S(D)-(2X)T32(BC)	
440/460V	S-(2X)T10(BC)	
	S(D)-(2X)T12(BC)	
	S(D)-(2X)T20(BC)	
	S(D)-(2X)T21(BC)	
	S-(2X)T25(BC)	
	S(D)-(2X)T32(BC)	
500V	S-(2X)T10(BC)	
	S(D)-(2X)T12(BC)	
	S(D)-(2X)T20(BC)	
	S(D)-(2X)T21(BC)	
	S-(2X)T25(BC)	
	S(D)-(2X)T32(BC)	

Magnetic Contactors (Non-Reversing /Reversing)		Connection conductor unit
Model name		Model name
SD-Q(R)11	SD-Q(R)12	UT-MQ12

●Usage Environment

(1) Ambient temperature (Applied to the outside of the control panel) : -10°C to 40°C
Average daily atmospheric temperature: 35°C (Max.), Average yearly atmospheric temperature: 25°C (Max.)

(2) Maximum temperature of the inside of the control panel : 55°C (Yearly average temperature of the inside of the control panel should be 40°C or less.)
Please note that the operating characteristic may vary with the ambient temperature.

(3) Ambient temperature : 45% to 85%RH However, dew condensation and freezing should be avoided.

(4) Height above sea level : 2000m or less

(5) Vibration : 10 to 55Hz, 19.6m/s^2 or less

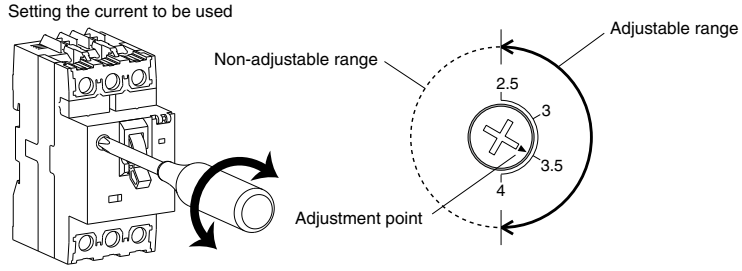
(6) Impact : 49m/s^2 or less

(7) Atmosphere : Inclusion of dust, smoke, corrosive gas, moisture, salt content and the like in the atmosphere should be avoided as much as possible.
Please note that continuing to use the device in a closed condition for a long period may cause contact failure.
Never use the device under an atmosphere that contains flammable gas.

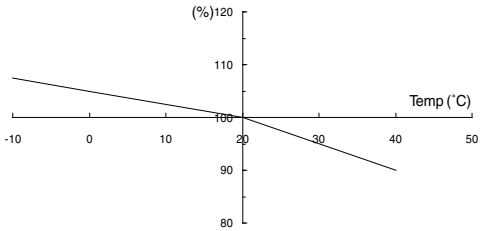
(8) Storage temperature/Relative humidity : -30°C to 65°C 45% to 85%RH However, dew condensation and freezing should be avoided.
The storage temperature is ambient temperature during transportation or storage and should be within the usage temperature when starting to use the device.

(9) Precaution on use : Set the position of adjustment dial by taking ambient temperature and mounting conditions into consideration.

Setting the current to be used



<Fig. 1 Ambient temperature compensation characteristics>

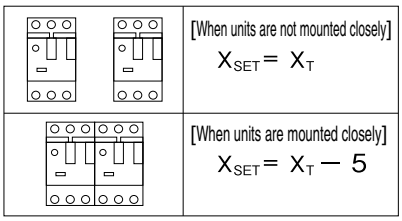


$I_{SET} = I / X_{SET} \times 100$

(I : Rated current of motor
X_{SET} : The dial position is set based on the information in Fig. 1 and Fig. 2 on the right.)

Example: When the units are mounted closely for 2.8A rated current of motor (I) and 40°C ambient temperature
$I_{SET} = 2.8 / (90-5) \times 100 \fallingdotseq 3.3A$ →
Set the position of adjustment dial to 3.3A.

<Fig. 2 Mounting condition compensation>

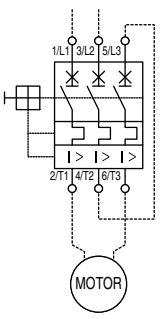


(10) Connection

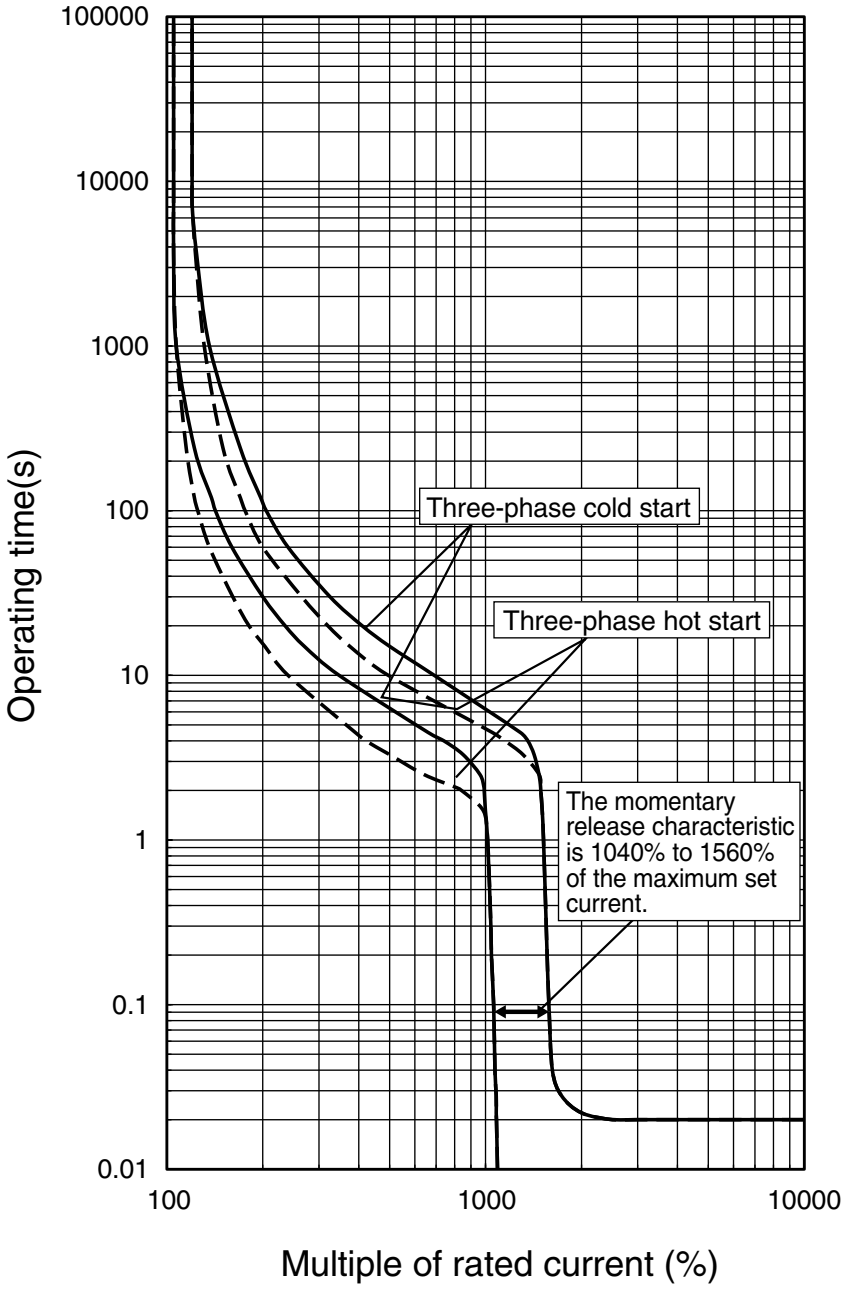
Model name		MMP-T32	UT-MAX(LL), UT-MAL(LL)
Terminal screw size		M4	M3.5
Recommended insulation coating (L) peel-off length when the electric wire strand is connected		10mm	8.5mm
Applicable wire size	Single wire [mm]	ϕ1.6, ϕ2.6	ϕ1.6
	Stranded wire [mm^2]	1 to 6	0.5 to 2
	UL Electric wire (60/70˚C, Copper only)	#14 to #8	#16 to #14
Crimp lug size		R1.25-4 to R5.5-4 8-4NS (Note 3)	0.5-3.7A to 2-S3A (Note 3)
Terminal screw tightening torque [N·m]		1.7	1.0

Notes 1: In each terminal, two wires or two crimp lugs are allowed to be connected.
2: As for handling, temperature adjustment, and closely-attached installation, please read the Instruction Manual.

(11) Application to single-phase motor : Select the appropriate heater designation by checking the value of full-load currents of the motor. Since the Motor Circuit Breaker is provided with protection functionality of open-phase, connect as shown on the right-side figure when using it for a single-phase motor.



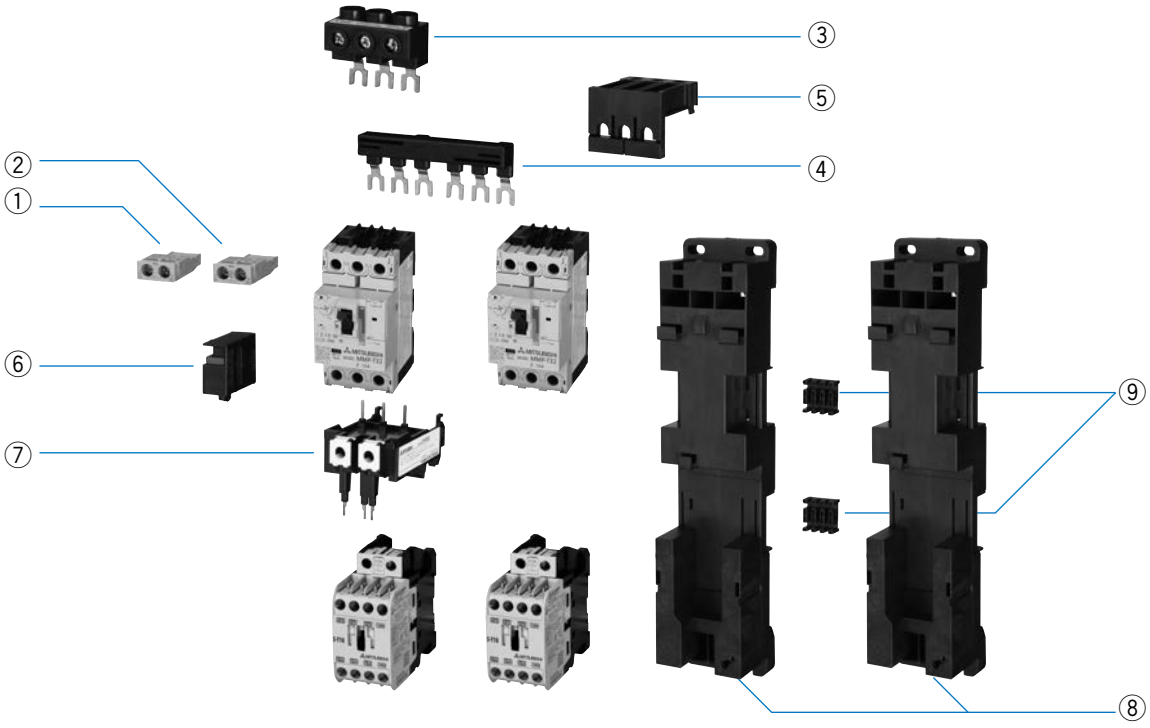
● Operating Characteristic Curve



●List of Options

Number	Product name	Model	Specification	Description	Applied model
①	Auxiliary contact unit (to be internally installed)	UT-MAX	1a	Contact of the unit operates in conjunction with ON/OFF operation of MMP-T32.	MMP-T32
			1b		
		UT-MAXLL (for subtle load)	1a		
			1b		
②	Alarm contact unit (to be internally installed)	UT-MAL	1a	The contact of this unit operates in sync with the tripping function (any one of short-circuit, overload, or open-phase) of the main unit. (The contact does not operate in sync with the ON/OFF state of the main unit.)	
			1b		
		UT-MALLL (for subtle load)	1a		
			1b		
③	3 phase feed-in terminal	UT-EP3		This terminal block unit is used for connecting the strands of electric wires (single-core wires or stranded wires) of the power supply side when the main unit is connected in parallel using a bus bar.	
④	Bus bar	UT-2B4	45mm	This unit supplies power individually to two or three main units without using electric wires (parallel connection).	
			Twin type		
		UT-3B4	45mm		
			Triple type		
		UT-2B5	57mm		
			Twin type		
		UT-3B5	57mm		
			Triple type		
⑤	Line side terminal adapter kit	UT-CV3		Power supply-side terminal cover to respond to UL60947-4-1A, Type E/F.	
⑥	Short-circuit indicator unit	UT-TU		This unit has a feature that the red lamp is lit only when the device is tripped due to short-circuit. This unit is required for application to UL60947-4-1A, Type E/F.	
⑦	Connection conductor unit	UT-MT20		A unit to connect and link the MMP-T32 and Magnetic Contactor electrically and mechanically. This unit is required for application to UL60947-4-1A, Type E/F.	
		UT-MT20D			
		UT-MT32			
		UT-MT32D			
		UT-MQ12			
⑧	Mounting base unit	UT-BT20		A plate to install the combination starter with MMP-T32 and Magnetic Contactor combined. Rail mounting and screw mounting are available.	
		UT-BT32			
		UT-BT32D			
⑨	Jointing block unit	UT-RT10		A set of the blocks for mechanically connecting two mounting base units. This unit is required for combining MMP-T32 with a reversing magnetic contactor.	
		UT-RT20			
		UT-RT32			

●Option combination Diagram



Compatibility with Japanese and Overseas Standards

Series	Model		Type	Compliant/applicable standard					Safety Certification Standard(Note 5)				EC Directives	Third party(Note 5) certification organization	CCC(Note 5) Certification	Shipping Certification Standards(Note 5)				Heat Resistance Certification Standards	
				JIS(Note 4)	JEM	IEC	DIN VDE	BS EN	Electric parts	UL		CSA	CE mark	TÜV	GB	NK	KR	BV	LR	Heat resistance type 1	Heat resistance type 2(Note 5)
				Japan	Japan	Inter-national	Germany	United Kingdom Europe	Japan	United States		Canada	Europe		China	Japan	Korea	France	United Kingdom	Japan	
MS-T Series	Magnetic Contactors	Non-reversing	S-T10 to T32	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	◎	◎	◎	◎	–	☆
			S-T35 to T100	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	◎	◇	◇	◎	–	☆
		Reversing	S-2×T10 to T100	○	–	○	○	○	✻	–	◎	◎	○	–	◎	–	–	–	–	–	☆
		Direct current operate	SD-T12 to T100	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	◎	–	◇	◎	–	–
		Mechanical latch	SL(D)-T21 to T100	○	–	○	○	○	✻	–	☆	☆	–	–	◎	–	–	–	–	–	☆
	Open Model Magnetic Starters	Non-reversing 2 elements	MSO-T10 to T100	○	–	○	○	○	✻	–	–	–	–	–	–	–	–	–	–	–	–
		Non-reversing 3 elements(2E)	MSO-T10KP to T100KP	○	–	○	○	○	✻	–	–	–	○	–	◎	–	–	–	–	–	–
		Reversing 2 elements	MSO-2×T10 to T100	○	–	○	○	○	✻	–	–	–	–	–	–	–	–	–	–	–	–
		Reversing 3 elements(2E)	MSO-2×T10KP to T100KP	○	–	○	○	○	✻	–	–	–	○	–	◎	–	–	–	–	–	–
		Direct current operate 2 elements	MSOD-T12 to T100	○	–	○	○	○	✻	–	–	–	–	–	–	–	–	–	–	–	–
		Direct current operate 2 elements(2E)	MSOD-T12KP to T100KP	○	–	○	○	○	✻	–	–	–	○	–	◎	–	–	–	–	–	–
	Enclosed Magnetic Starters	Non-reversing 2 elements	MS-T10 to T100	○	–	○	○	○	○	–	–	–	–	–	–	–	–	–	–	–	–
		Non-reversing 3 elements(2E)	MS-T10KP to T100KP	○	–	○	○	○	○	–	–	–	–	–	–	–	–	–	–	–	–
	Thermal Overload Relays	2 elements	TH-T18 to T100	○	–	○	○	○	✻	–	–	–	–	–	–	✻	✻	–	–	–	–
		3 elements(2E)	TH-T18KP/T25KP	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	✻	✻	◎	◎	–	–
			TH-T50KP to T100KP	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	✻	✻	◇	◎	–	–
	Contactor Relays	Alternating current operate	SR-T5/T9	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	✻	✻	◎	◎	☆	☆
		Direct current operate	SRD-T5/T9	○	–	○	○	○	✻	–	◎	◎	○	◎	◎	✻	✻	◇	◎	–	–
		Mechanical latch	SRL(D)-T5	○	–	○	○	○	✻	–	–	–	–	–	◎	–	–	–	–	–	☆
	Option Unit	Additional auxiliary contacts	UT-AX2, 4, 11	○	–	○	○	○	✻	◎	–	–	○	◎	◎	✻	✻	◎	◎	–	–
		Surge Absorption	UT-SA23, 21, 22	○	–	○	○	○	✻	◎	–	–	–	–	✻	✻	✻	–	–	–	–
		Mechanical interlocks	UT-ML11/ML20	○	–	○	○	○	✻	◎	–	–	○	–	✻	✻	✻	–	–	–	–
MS-N Series	Magnetic Contactors	Non-reversing	S-N35 to N400	○	○	○	○	○	✻	◎	◎	◎	○	◎	◎	◎	◎	◎	◎	☆	☆
		Reversing	S-2×N35 to N400	○	○	○	○	○	✻	◎	◎	◎	○	–	◎	–	–	–	–	☆	☆
		Direct current operate	SD-N35 to N400	○	○	○	○	○	✻	◎	◎	◎	○	◎	◎	◎	–	◎	◎	–	–
		Mechanical latch	SL-N35 to N400	○	○	○	○	○	✻	☆	–	–	–	–	◎	☆	–	–	–	–	☆
	Open Model Magnetic Starters	Non-reversing 2 elements	MSO-N35/N50 to N400	○	○	○	○	○	✻	–	–	–	–	–	◎/–	–	–	–	–	–	–
		Non-reversing 3 elements(2E)	MSO-N35 to 400KP	○	○	○	○	○	✻	◎	◎	◎	○	–	◎	–	–	◎	◎	–	–
		Reversing 2 elements	MSO-2×N35/2×N50 to N400	○	○	○	○	○	✻	–	–	–	–	–	◎/–	–	–	–	–	–	–
		Reversing 3 elements(2E)	MSO-2×N35KP to N400KP	○	○	○	○	○	✻	☆	☆	☆	○	–	◎	–	–	–	–	–	–
		Direct current operate 2 elements	MSOD-N35/N50 to N400	○	○	○	○	○	✻	–	–	–	–	–	◎/–	–	–	◎	◎	–	–
		Direct current operate 3 elements(2E)	MSOD-N35 to N400KP	○	○	○	○	○	✻	–	–	–	○	–	◎	–	–	◎	◎	–	–
	Enclosed Magnetic Starters	Non-reversing 2 elements	MS-N35/N50 to N400	○	○	○	○	○	○	–	–	–	–	–	◎/–	–	–	–	–	–	–
		Non-reversing 3 elements(2E)	MS-N35 to N400KP	○	○	○	○	○	○	–	–	–	–	–	◎	–	–	–	–	–	–
	Thermal Overload Relays	Standard 2 elements	TH-N20 to N20TA/N60 to N400	○	○	○	○	○	✻	–	–	–	–	–	◎/–	✻	✻	–	–	–	–
		3 elements(2E)	TH-N20KP to N400KP	○	○	○	○	○	✻	–	◎	◎	○	◎	◎	✻	✻	◎	◎	–	–
	Contactor Relays	Direct current operate	SRD-N	○	○	○	○	○	✻	◎	◎	◎	○	◎	◎	✻	✻	◎	◎	–	–
		Mechanical latch	SRL-N	○	○	○	○	○	✻	–	–	–	–	–	◎	✻	✻	–	–	–	☆
	Option Unit	Additional auxiliary contacts	UN-AX2, 4, 11/80, 150	○	○	○	○	○	✻	◎	–	–	○	◎	◎/◉	✻	✻	◎	◎	–	–
		Surge Absorption	UN-SA	○	○	○	○	○	✻	◎	–	–	–	–	✻	✻	✻	–	–	–	–
		Mechanical interlocks	UN-ML	○	○	○	○	○	✻	◎	–	–	○	–	✻	✻	✻	–	–	–	–
Specific Uses	High Sensitivity Contactors	Non-reversing	SD-Q	○	○	○	○	○	✻	◎	◎	◎	○	◎	◎	–	–	–	–	–	–
		Reversing	SD-QR11/QR12	○	○	○	○	○	✻	◎	◎	◎	○	◎	◎	–	–	–	–	–	–
Product Marking (is marked on the product)			Standard number																		
			Certification mark							Note 2	Note 2		Note 3	Note 2	Note 2						
			Certification number																		

Notes 1: ○: standards compliant product
◎: certification acquired as a standard product
☆: certification acquired as an exclusive product
◉: Certification acquired, add "CN" at the end of the model name when ordering.
◇: Model for which acquisition (application) of certification is expected
✻: Model outside the application of standards certification
–: Model for which the acquisition (application) of certification was not carried out

2: If there is any unclear point regarding standards certification labels or product model name indications, please contact your dealer or our company.
3: Self-certified labels of the manufacturer. These labels are not standards certifications.
4: In the case where a JIS compliance statement is required, please request us.
5: If the terminal cover (included in MS-T Series as standard) is removed, the product will not qualify for Safety Certification Standard (UL Certification, CSA Certification), standards certified by CB, CCC Certification, Shipping Certification Standards, and Heat Resistance Certification Standards (Heat resistance type 2).

Order Procedure

Magnetic Starters/Magnetic Contactors

Note

For orders, specify products as shown below. Insert a space where ▲ is present.
If adding multiple two-character codes (such as SA, BC, and KP) after a frame size (T10 or others) of type name, specify them in alphabetical order of the first letters. (Example: MSO-T10BCKPSA)
(If they are not in alphabetical order, the type code is automatically changed.)

1. Standard (AC operated) Magnetic Starters

●MS (-2x) T model (sealed)

Model name	motor capacity	Main circuit voltage	Operation coil designation or operation circuit voltage	Auxiliary contact
MS-T21	▲ 3.7kW	▲ 200V	▲ 200VAC	▲
MS-T10		▲ 200V	▲ 200VAC	▲ 1B
Refer to page 864, 873	Select from page 869, 870.	Do not add AC to the main circuit voltage. (To distinguish it from the operation circuit voltage)	Select coil designation from page 876 or specify the working operation circuit voltage.	Specify the auxiliary contact arrangements.from page 873.

●MSO (-2x) T model (open model)

Model name	Motor capacity or heater designation (setting current)	Main circuit voltage	Operation coil designation or operation circuit voltage	Auxiliary contact
MSO-T10	▲ 9A	▲ 200V	▲ 200VAC	▲ 1B
Refer to page 864, 873	Select from page 869, 870.	Do not add AC to the main circuit voltage. (To distinguish it from the operation circuit voltage)	Select coil designation from page 876 or specify the working operation circuit voltage.	Specify the auxiliary contact arrangements.from page 873.

2. Standard (AC operated) Magnetic Contactors

●S-T model, S-2x T model

Model name	Operation coil designation or operation circuit voltage	Auxiliary contact
S-T20	▲ 200VAC	▲ 2A
S-T20	▲ 100VAC50Hz	
Refer to page 864, 875.	Select coil designation from page 876 or specify the working operation circuit voltage.	Specify the auxiliary contact arrangements. from page 876.

3. Direct current operated type magnetic starter/contactor

●MSOD-T model

Model name	Motor capacity or heater designation (setting current)	Main circuit voltage	Operating Coil designation	Auxiliary contact
MSOD-T21	▲ 3.7kW	▲ 200V	▲ 100VDC	▲
Refer to page 864, 876.	Select from page 870, 871.	Do not add AC to the main circuit voltage.	Select the coil designation on page 875.	Specify the auxiliary contact arrangements. from page 875.

●SD-T model

Model name	Operating Coil designation	Auxiliary contact
SD-T21	▲ 110VDC	▲
Refer to page 875.	Select the coil designation on page 867.	Specify the auxiliary contact arrangements. from page 875.

4. Magnetic starter/contactor with mechanical latch

●MSOL-T model

Model name	Motor capacity or heater designation (setting current)	Main circuit voltage	Closing coil	Tripping coil
MSOL-T21	▲ 3.7KW	▲ 200V	▲ MC-200VAC	▲ MT-200VAC
When a closing coil uses direct current, its model name is "MSOLD." Please refer to page 879.	Select from page 869, 870.	Do not add AC to the main circuit voltage. (To distinguish it from the operation circuit voltage)	Select the coil designation on page 868.	

●SL-T model, SLD-T model

Model name	closing coil designation	Tripping coil designation
SL-T21	▲ MC-100VAC	▲ MT-100VAC
Please refer to page 879. • When a closing coil uses direct current, its model name becomes SLD.	Select the coil designation on page 868.	

●SL-2×T model, SLD-2×T model

When the left and right side closing and tripping coils have the same coil rating, specify the above SL-T model when placing an order.
If the left and right side coils have different coil rating, however, specify the product as indicated below.

Model name	closing coil designation (left side)	Tripping coil designation (left side)	closing coil designation (right side)	Tripping coil designation (right side)
SL-2XT21	▲ MC1-100VAC	▲ MT1-100VAC	▲ MC2-100VAC	▲ MT2-100VDC
Please refer to page 879. • When a closing coil uses direct current, its model name becomes SLD.	Select the coil designation on page 868.			

5. Delay open type Magnetic Starters/Magnetic Contactors

●MSO-T☐DL model, S-T☐DL model

Model name	Main circuit voltage	Operating Coil
MSO-T21DL S-T12DL	▲ 15A ▲ 200V ▲ 200V	▲ 200VAC ▲ 200VAC
Specify from page 873, 875.	Specify the Thermal Overload Relays heater designation and the main circuit rated voltage. Be sure to specify the rated voltage also for Magnetic Contactors, since this specification is a required condition for internal wiring.	AC100V and AC200V are available for the operation coil designation.

Thermal Overload Relays

●TH-T model Thermal Overload Relays

Model name		Heater designation
TH-T25	▲	15A
To place an order for a Thermal Overload Relay, specify the model name code given below.		Specify the heater designation according to page 886. When the full load current is included in the two heater designations, give priority to the heaters on the table below.

●Model name code of Thermal Overload Relays

TH	—	T18
		Frame
		T18
		T25
		T50
		T65
		T100

KP	▲	Heater designation
Code		Specification
None		With 2-elements
KP		With 3-elements (2E)
FS		With 2-element quick trip type
FSKP		With 3-elements (2E) quick trip type
SR		With saturable reactor
KPSR		With 3-elements (2E) With saturable reactor
BC		With fast wiring terminal

Contactor model contactor relay

1. Standard model contactor relay

●SR-T□ model

Model name		Operating Coil designation		Contact structure
SR-T5	▲	200VAC	▲	2A2B
Refer to page 868, 887, 888.		Specify the operating coil and designation (or coil voltage and frequency) according to the ratings on pages 876.		Specify the contact structure according to pages 887 and 888.

Definite purpose magnetic starters and contactors

1. High sensitivity contactors

●SD-Q□ model

Model name		Operating coil designation or operating circuit voltage	Auxiliary contact
SD-Q11	▲	24VDC	
SD-QR12	▲	24VDC	
Refer to page 880.		Select the coil designation on page 880.	Specify the auxiliary contact arrangements. If not specified, this will be a standard contact structure. Please refer to page 880.

●MSOD-Q□ model

Model name		Motor capacity or heater designation (rectified current set value)		Main circuit voltage		Operating coil designation or operating circuit voltage	Auxiliary contact
MSOD-Q11	▲	9A	▲	200V	▲	24VDC	
MSOD-QR12	▲	9A	▲	200V	▲	24VDC	
Refer to page 880.		Select from page 869, 870.		Do not add AC to the main circuit voltage. (To distinguish it from the operation circuit voltage)		Select the coil designation on page 880.	Specify the auxiliary contact arrangements. If not specified, this will be a standard contact structure. Please refer to page 880.

Related devices

1. Solid State Contactors

●US-N model

Model name
US-N20TE
Refer to page 892.

●US-K model (3 phase load use)

Model name
US-K100TE
Refer to page 893.

●US-K model (Single phase and combined 3 phase load use)

Model name
US-K70
Refer to page 892.

●US-KD model (direct current load use)

Model name
US-KD8
US-KD8 is the only direct current load use model.

●US-H model (dedicated heater load use)

Model name
US-H20
Refer to page 893.