



CHNT 正泰

让电尽其所能

Drive Products Training

Benjamin. Yang

全球领先的电气全产业链集成供应商



■ Soft-Starter

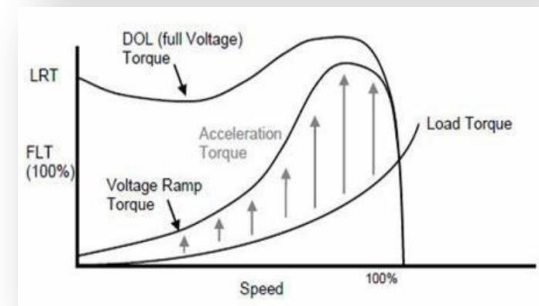
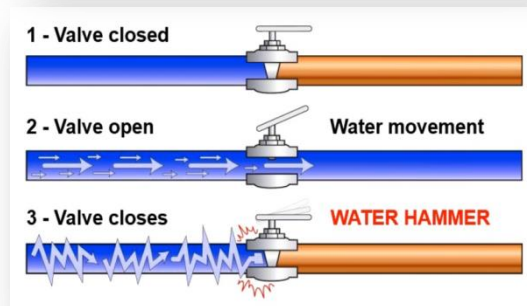
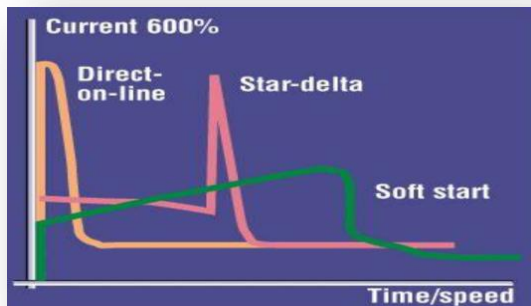
- NJR2-D – Bypass Type 3*380V
- NJR2-T – Bypass Type 3*220V
- NJR2-ZX – Online Type
- NJR2-G – Cabinet Type

■ Inverter

- NVF2G – General purpose normal performance
- NVF3 – General purpose high performance
- NVF3M – Micro
- NVF5 – OEM



Soft Starter

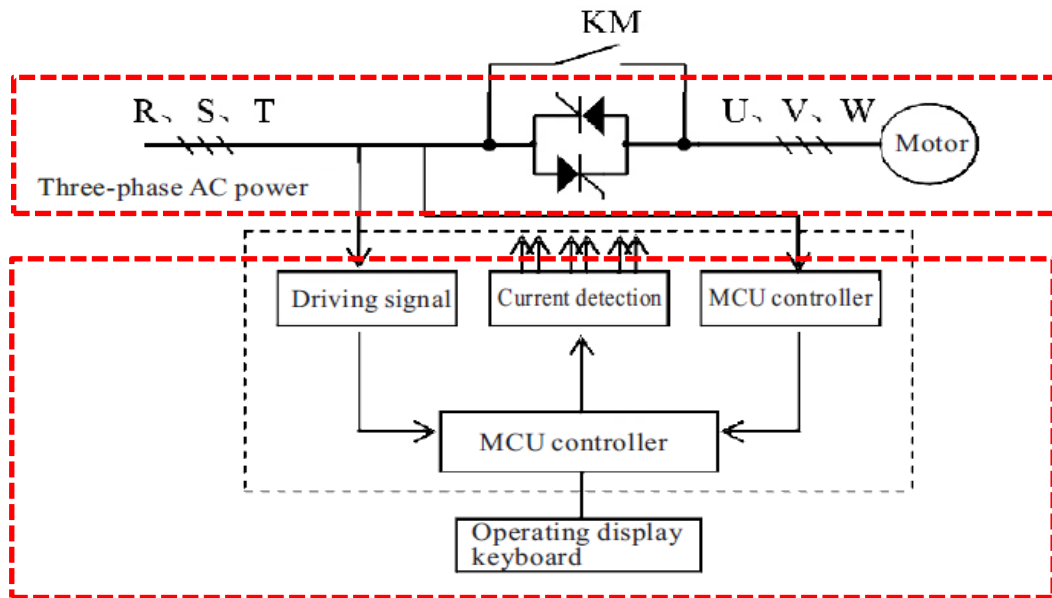


Impact to power grid

Water hammer

Mechanical wear tear

Soft starter is a device used together with AC electrical motors to temporarily reduce the load and torque in the power train and the electric current surge of the motor during **start-up** and **stop**. This reduces the mechanical stress on the motor and shaft, as well as the electrodynamic stresses on the attached power cables and electrical distribution network, **extending the life of the system**. Also the soft starter can provide multiple **protection functions**.



Power Unit

6*Bipolar SCR

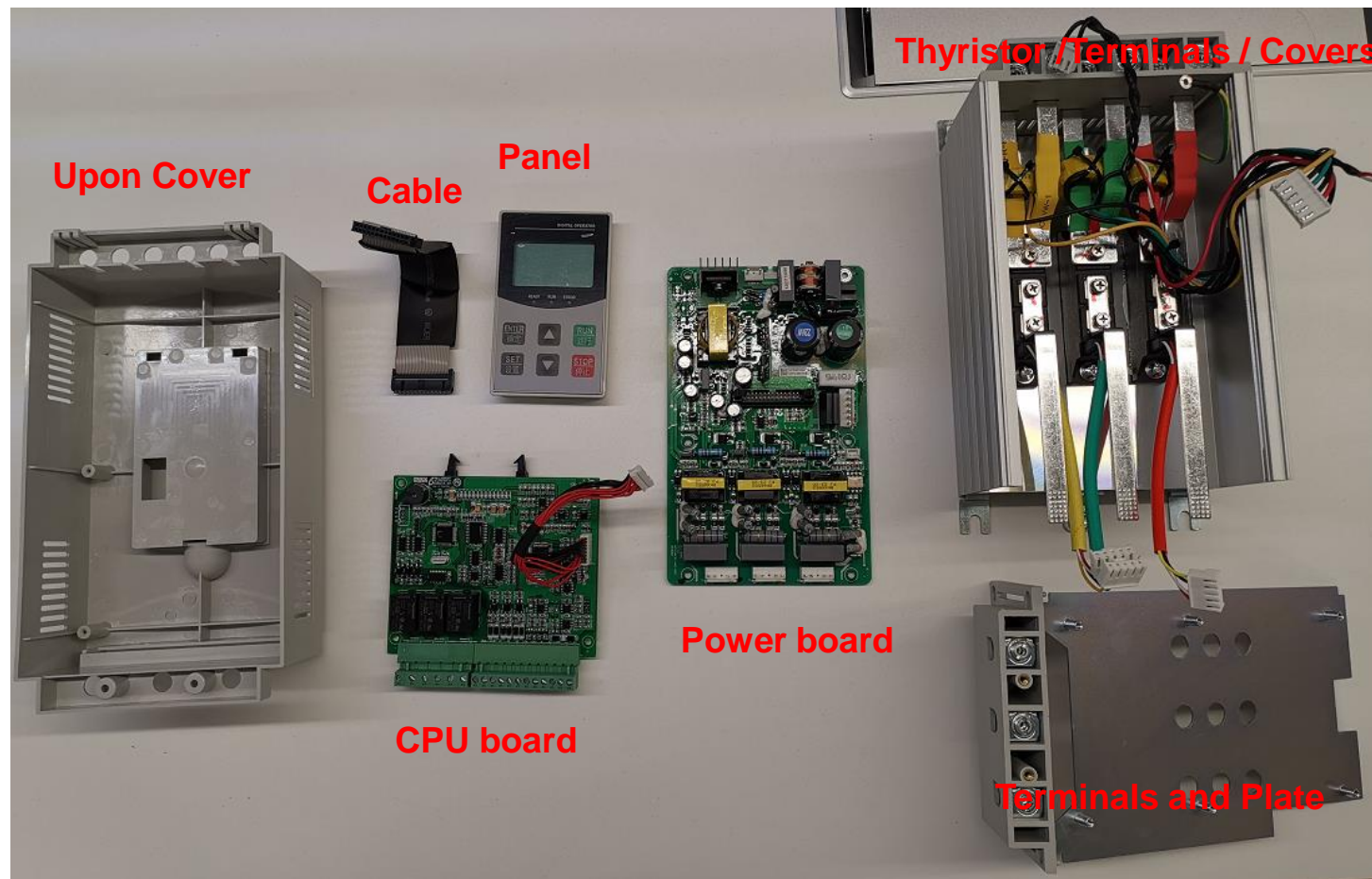
SCR-Silicon Control Rectifier

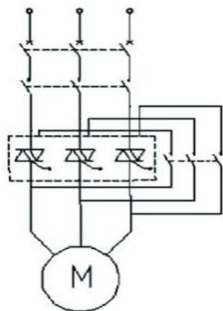
Control Unit

CPU Board

- *Detect the current and voltage
- *Control the current and voltage
- *Warning when devices go wrong

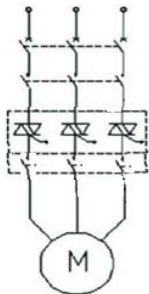
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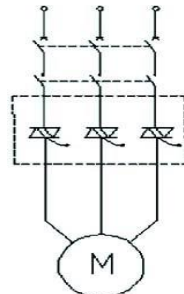
NJR2-D: 3*380V
NJR2-T: 3*220V

External Bypass



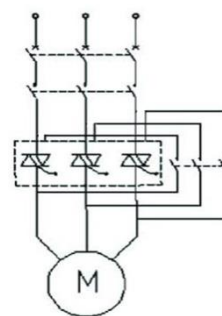
Noark: Ex9QR3
Chint: NJR5

Integrated Bypass
Not released







NJR2-ZX: 3*380V

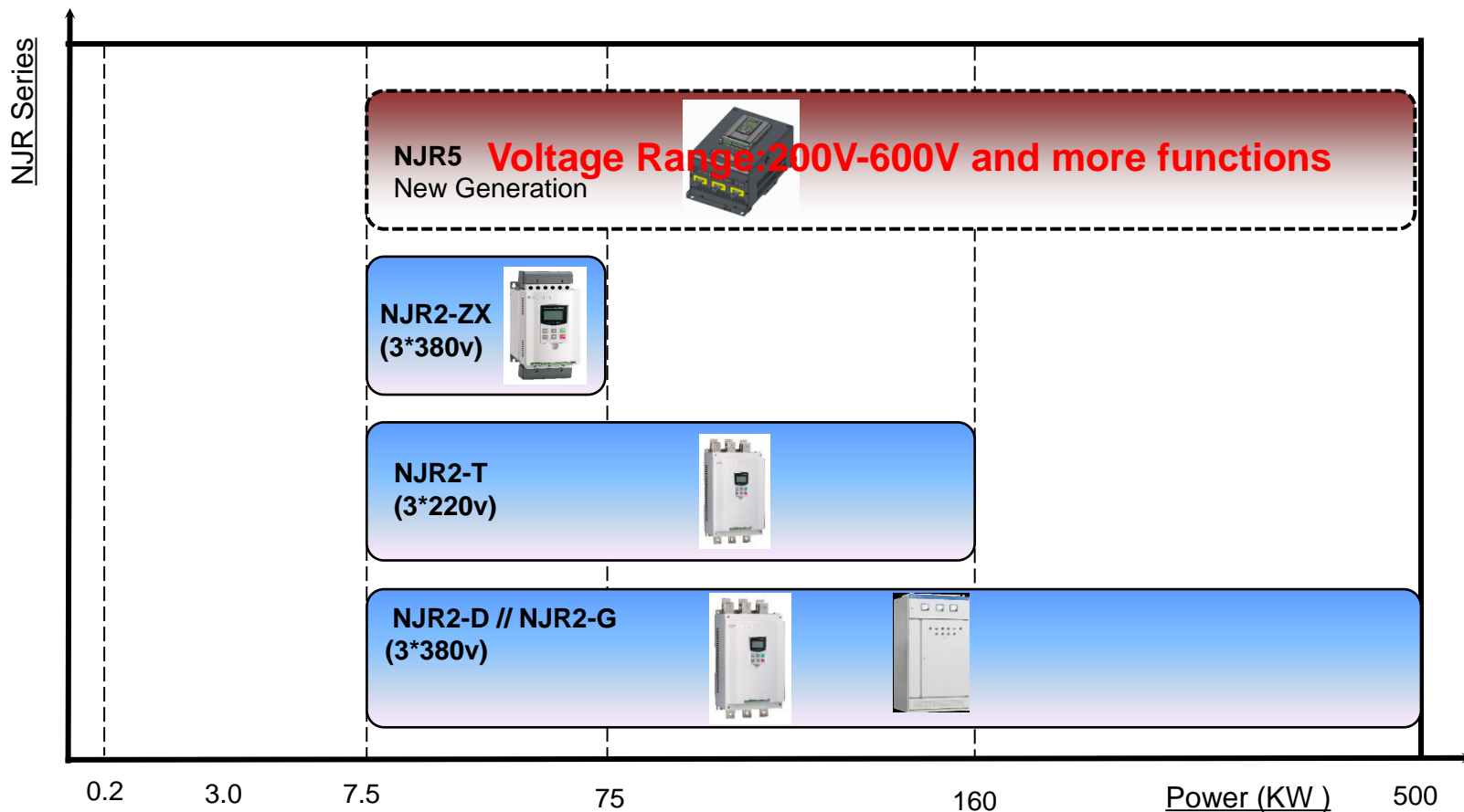
On - Line



NJR2-G: 3*380V

Soft Starter in Cabinet

Model	NJR2-D (3*380V)	NJR2-T (3*220V)	NJR2-ZX(3*380V)	NJR2-G(3*380V)
Type	External bypass	External bypass	On-line	System Integration
Picture				
Power Range	NJR2-D: 7.5 ~ 500kW	NJR2-T: 7.5 ~ 160kW	7.5 ~ 75kW	7.5 ~ 500kW
Advantage	Low cost, can be installed into a multi split cabinet products.	Low cost, can be installed into a multi split cabinet products.	Without Bypass Contactor , debugging convenient connection, small installation space.	The installation is convenient, also can be customized according to customer requirements
Notice	Need to install the Bypass Contactor	Need to install the Bypass Contactor	It has a Cooling fan , and the fan has a life requirements	Large volume, inconvenient transportation
Application	Fan, pump, crusher, ball mill, belt conveyors			



Load type	Start ramp time (s)	Stop ramp time (s)	Initial voltage	Voltage starting (max current-limiting value)	Current-limiting starting (max current-limiting value)
Centrifuge	16	20	40	4	2.5
Ball mill	20	6	60	4	3.5
Fan	26	4	30	4	3.5
Light-duty motor	16	2	30	4	3
Piston compressor	16	4	40	4	3
Hoisting machine	6	10	60	4	3.5
Pug mill	16	2	50	4	3
Crusher	16	10	50	4	3.5
Screw compressor	16	2	40	4	3
Screw transfer machine	20	10	40	4	2
Belt conveyer	20	10	40	4	2.5
Heat pump	16	20	40	4	3

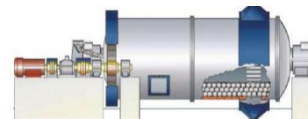
Voltage Ramp Mode for machines with big inertia(Heavy duty) like big fans

Current Limiting Modes for machines need constant starting torque like Belt conveyors.....

When we meet heavy duty machine, **AND** it needs big start torque by friction force we use "**Jump**" modes like Ball mill

"**Current Ramp**" and "**Voltage Ramp & Current Limiting**" will start the motor better.

But note that : the better we start motors, the longer time it will take...



CHINT Soft Starter Benefits (NJR2 VS ATS22/PSE)

➤ Bigger Power Range



7.5kw-500kw

标准应用，208/600V 电源，软起动器标准连接

电机								软起动器 208/600 V (+10% -15%) 50/60 Hz (+/-10%)		
电机额定功率								电机额定	软起动器额定值	软起动器型号
208 V	230 V	230 V	400 V	440 V	460 V	500 V	575 V	电流 I_n (电机 FLA)	I_{cL} (软起动器 FLA)	
HP	HP	kW	kW	kW	HP	kW	HP	A	A	
3	5	4	7.5	7.5	10	9	15	14	17	ATS22D17S6 或 S6U
7.5	10	7.5	15	15	20	18.5	25	27	32	ATS22D32S6 或 S6U
(1)	15	11	22	22	30	30	40	40	47	ATS22D47S6 或 S6U
15	20	15	30	30	40	37	50	52	62	ATS22D62S6 或 S6U
20	25	18.5	37	37	50	45	60	65	75	ATS22D75S6 或 S6U
25	30	22	45	45	60	55	75	77	88	ATS22D88S6 或 S6U
30	40	30	55	55	75	75	100	96	110	ATS22C11S6 或 S6U
40	50	37	75	75	100	90	125	124	140	ATS22C14S6 或 S6U
50	60	45	90	90	125	110	150	156	170	ATS22C17S6 或 S6U
60	75	55	110	110	150	132	200	180	210	ATS22C21S6 或 S6U
75	100	75	132	132	200	160	250	240	250	ATS22C25S6 或 S6U
100	125	90	160	160	250	220	300	302	320	ATS22C32S6 或 S6U
125	150	110	220	220	300	250	350	361	410	ATS22C41S6 或 S6U
150	-(1)	132	250	250	350	315	400	414	480	ATS22C48S6 或 S6U
(1)	200	160	315	315	400	400	500	477	590	ATS22C59S6 或 S6U

(1) 当没有对应的标准化电机时不给出值。

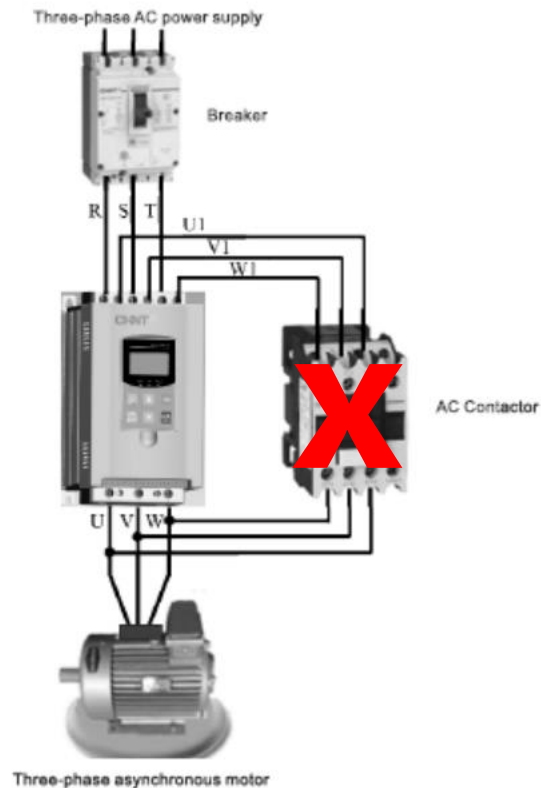
Normal start overview: PSR, PSE and PSTX

		A				B				C				D				E					
		PSR3	PSR6	PSR9	PSR12	PSR16	PSR25	PSR30	PSR37	PSR45	PSR60	PSR72	PSR85	PSR105	PSR142	PSR170	PSR210		PSR250	PSR300	PSR370		
PSR																							
PSE					PSE18	PSE25	PSE30	PSE37	PSE45	PSE60	PSE72	PSE85	PSE105	PSE142	PSE170	PSE210	PSE250	PSE300	PSE370				
PSTX																							
	(400 V) kW	1.5	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	250	315	400
IEC	IEC, Max. A	3.9	6.8	9	12	16	25	30	37	45	60	72	85	105	143	171	210	250	300	370	470	570	720
UL	(440-480 V) hp	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	400	500	600
	UL, Max. A	3.4	6.1	9	11	15.2	24.2	28	34	46.2	59.4	68	80	104	130	169	192	248	302	361	480	590	720

➤ On-line Type



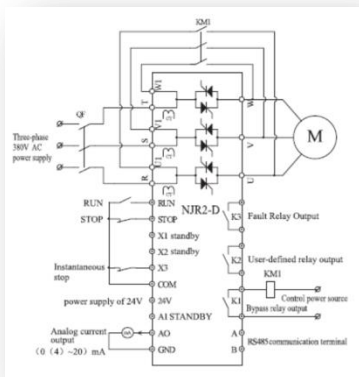
7.5kw-75kw
Save the cost of contactor



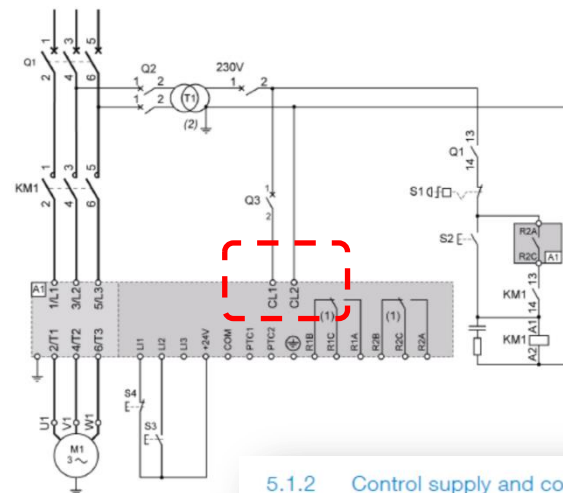
➤ Simpler wiring



Integrated control power



ATS22...Q 和 ATS22...S6; 230 Vac 控制, 逻辑输入 (L) 24 Vdc, 3 线控制



5.1.2 Control supply and control circuit

Wires in industrial control applications are divided into 3 groups: main power supply, control supply and control circuit.

- Main power supply (L1, L2, L3, 2T, 4T, 6T3)
- Control supply voltage (terminals 1 and 2)
- Control circuit (terminals 13 - 21).

5.1.2.1 Control supply voltage - terminals 1 and 2

Connect neutral and phase to terminal 1 and 2.
See **Figure 5.4**.

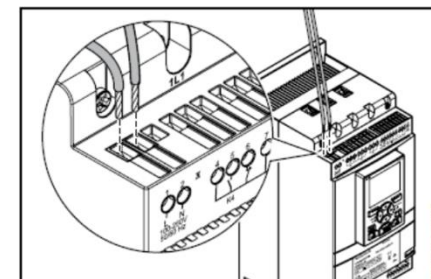


Figure 5.4
Supply voltage and control circuit

➤ More functions



More functions than PSE/ATS22
Especially for protection functions

Softstarter features	PSR	PSE	PSTX
Current limit	-	●	●
Current limit ramp and dual current limit	-	-	●
Electronic motor overload protection	-	●	●
Dual overload protection	-	-	●
Underload protection	-	●	●
Power factor underload protection	-	-	●
Locked rotor protection	-	●	●
Current/Voltage imbalance protection	-	-	●
Phase reversal protection	-	-	●

Softstarter features	PSR	PSE	PSTX
Customer defined protection	-	-	●
Motor heating	-	-	●
PTC/PT100 input for motor protection	-	-	●
Overvoltage/undervoltage protection	-	●	●
Earth-fault protection	-	-	●
Limp mode	-	-	●

● = standard, O = option, — = not available

Softstarter features	PSR	PSE	PSTX
Jog with slow speed	-	-	●
Dynamic brake	●	●	●
Stand still brake	-	-	●
Sequence start	-	●	●
Full voltage start	-	-	●
Kick start	-	-	●
Automatic pump clearing	-	-	●
Programmable warning functions	-	-	●
Diagnostics	-	-	●
Overload time-to-trip	-	-	●
Overload time-to-cool	-	-	●
Analog output	-	●	●
Fieldbus communication	O	●	●
Event log	-	O	●
Multiple languages	-	-	17
Electricity metering	-	-	●

● = standard, O = option, — = not available

➤ Brandware

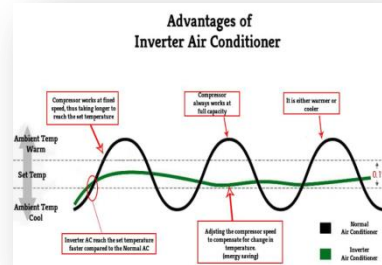
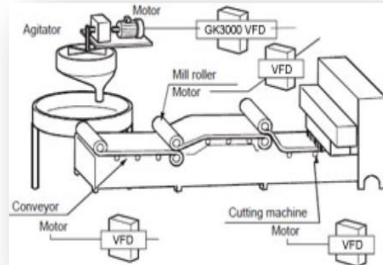
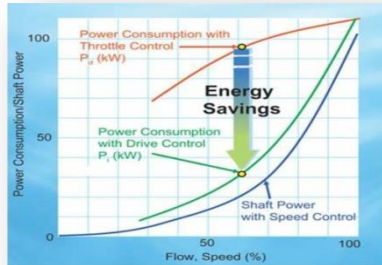


Chint archived bigger market share in china. More than 100 million RMB in china





Invertor



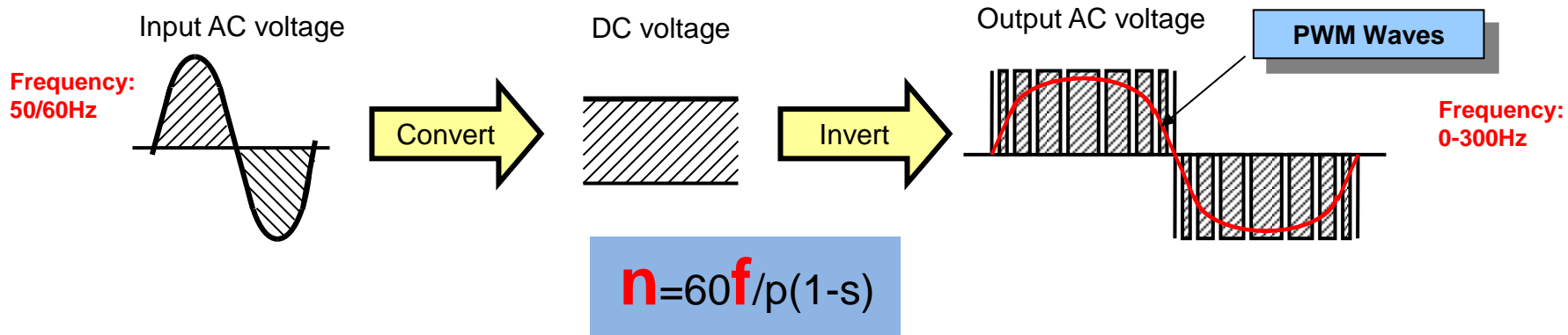
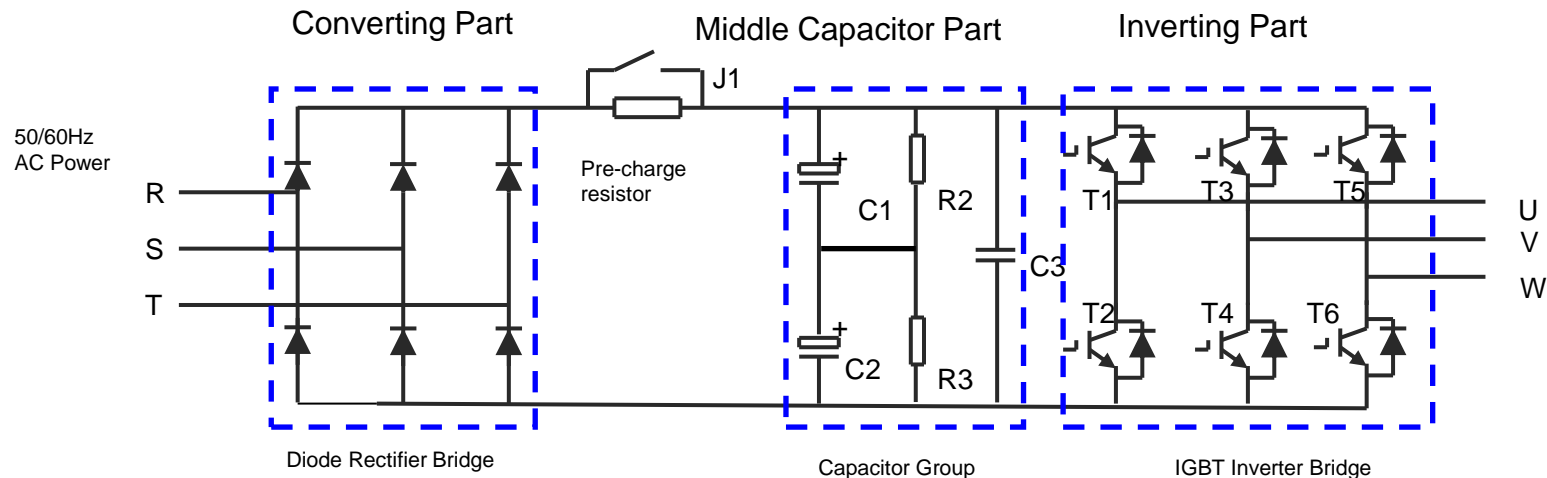
Energy saving

Productivity improving

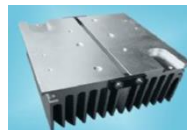
High performance

Ready for Industry 4.0

Inverter Principle



Inverter Principle



Heat sink
& Cooling Fan
& Capacitors



Main Power
Units

OR

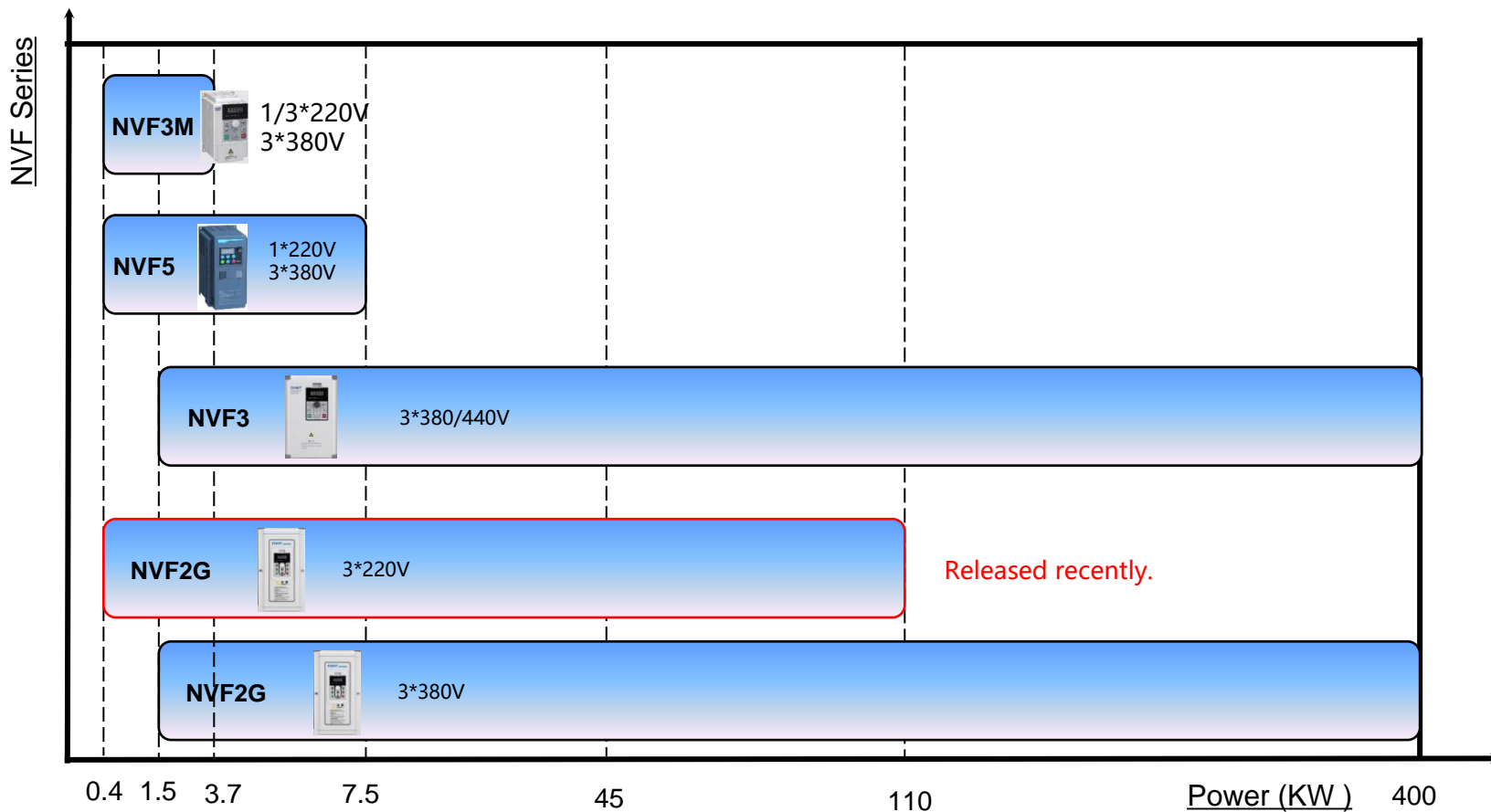


Power Board

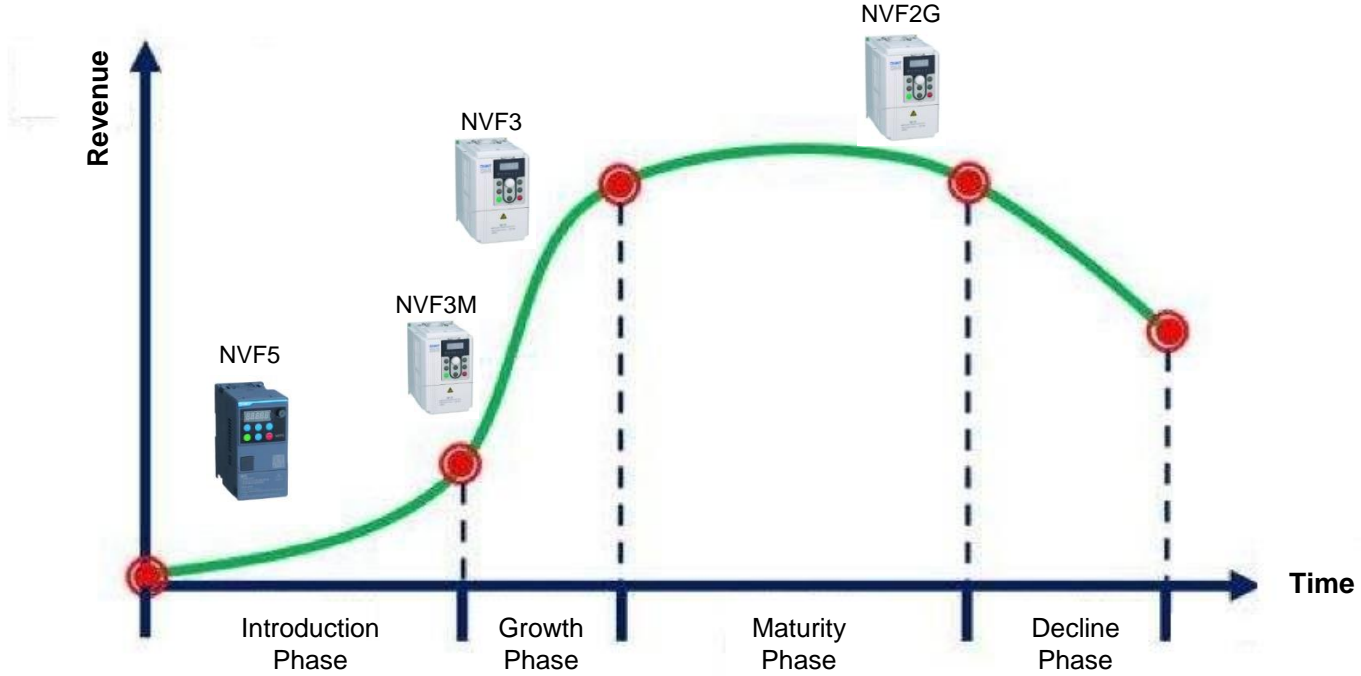


CPU Board
& Panel

CHINT Inverter product portfolio



Product Life Cycle



CHINT Inverter Introduction – NVF2G

■ NVF2G

- **26** Power Level and **11** Frame: 1.5kw-400kw (T type and P type)
 - 380V series: 3*380V(± 15%)
- V/F control mode and Vector Control technology without sensors
- **Speed Control**



Power supply	Model	Power capacity kVA	Input/output Cable	Rated output current (A)	Max. Power of matched motor (kW)	Line switch breaker QF (A)
(3 phase) AC 380V	NVF2G-1.5/T(P) S4	3	1.5	3.7	1.5	6
	NVF2G-2.2/T(P) S4	4.2	2.5	5.0	2.2	10
	NVF2G-3.7/T(P) S4	7.6	4	9.0	3.7	16
	NVF2G-5.5/PS4	9.9	4	11	5.5	20
	NVF2G-5.5/TS4	9.9	4	13	5.5	20
	NVF2G-7.5/T(P) S4	13	6	17	7.5	25
	NVF2G-11/PS4	18	10	22	11	40
	NVF2G-11/TS4	18	10	25	11	40
	NVF2G-15/T(P) S4	25	10	32	15	50
	NVF2G-18.5/T(P) S4	29	16	37	18.5	63
	NVF2G-22/T(P) S4	34	16	45	22	63
	NVF2G-30/T(P) S4	46	25	60	30	100
	NVF2G-37/T(P) S4	57	25	75	37	125
	NVF2G-45/T(P) S4	69	35	90	45	160
	NVF2G-55/T(P) S4	85	35	110	55	160
	NVF2G-75/PS4	114	50	140	75	250
	NVF2G-75/TS4	114	50	150	75	250
	NVF2G-90/T(P) S4	133	70	176	90	250
	NVF2G-110/T(P) S4	160	120	210	110	315
	NVF2G-132/T(P) S4	195	120	253	132	400
	NVF2G-160/T(P) S4	236	120	300	160	630
	NVF2G-185/T(P) S4	267	240	340	185	630
	NVF2G-200/T(P) S4	289	240	380	200	630
	NVF2G-220/T(P) S4	305	150*2	420	220	630
	NVF2G-245/T(P) S4	350	150*2	470	245	800
	NVF2G-280/T(P) S4	403	185*2	520	280	800
NVF2G-315/PS4	464	185*2	600	315	1000	
NVF2G-315/TS4	420	240*2	600	315	1000	
NVF2G-355/T(P) S4	420	240*2	640	355	1000	
NVF2G-400T(P) S4	460	300*2	690	400	1000	

NVF2G is a general purpose Inverter

- NVF2G are optimized for control of stand alone devices like **Fans** and **Pumps**, also for some simple machines such as **Conveyor, Compressors, Centrifuge machine ,Mixers...**
 - V/F Control and Sensorless Vector Control
 - Integrated PID control and Multi-speed control inside
 - Integrated RS-485 communication
 - Remote LED panel for configuration and programming
- NVF2G **CAN NOT** be used for **Hoist application** (such as Crane/Port Machinery/Elevator..);
Winding and Unwinding system (such as textile machine/Metal rolling system/Paper machine system/Wire drawing machine...)



■ NVF3

- **26** Power Level and **11** Frame: 1.5kw-400kw (**T** type and **P** type)
 - 380V series: 3*380V(-15%) ~ 3*440V(+15%)
- Better motor control performance : Sensorless Vector Control technology, responding load changing rapidly, good torque capacity in low frequency, strong overload capability
- **Speed Control / Torque Control**
Torque accuracy: ±5%; Torque response<20ms



Table 1.1 Inverter Specification and Model Table

Type of Inverter		Capacity of power (kVA)	Rated input current (A)	Rated output current (A)	Adaptive moto (kW)	Brake unit (excluding brake resistance)
NVF3-1.5/PS4	NVF3-1.5/TS4	3.0	3.9	3.8	1.5	Standard built-in brake unit
NVF3-2.2/PS4	NVF3-2.2/TS4	3.0	5.8	5.1	2.2	
NVF3-3.7/PS4	NVF3-3.7/TS4	5.9	10.5	9.0	3.7	
NVF3-5.5/PS4	NVF3-5.5/TS4	8.6	14.6	13	5.5	
NVF3-7.5/PS4	NVF3-7.5/TS4	11	17	15	7.5	
NVF3-11/PS4	NVF3-11/TS4	17	28	25	11	
NVF3-15/PS4	NVF3-15/TS4	21	32	30	15	
NVF3-18.5/PS4	NVF3-18.5/TS4	24	38.5	37	18.5	
NVF3-22/PS4	NVF3-22/TS4	30	46.5	45	22	
NVF3-30/PS4	NVF3-30/TS4	40	62	60	30	
NVF3-37/PS4	NVF3-37/TS4	50	78	75	37	Optional built-in braking unit
NVF3-45/PS4	NVF3-45/TS4	60	92	91	45	
NVF3-55/PS4	NVF3-55/TS4	72	113	112	55	
NVF3-75/PS4	NVF3-75/TS4	100	157	150	75	
NVF3-90/PS4	NVF3-90/TS4	116	180	176	90	
NVF3-110/PS4	/	138	214	210	110	Optional external braking unit
/	NVF3-110/TS4	138	214	210	110	
NVF3-132/PS4	NVF3-132/TS4	167	256	253	132	
NVF3-160/PS4	NVF3-160/TS4	200	307	304	160	
NVF3-185/PS4	NVF3-185/TS4	220	345	340	185	
NVF3-200/PS4	NVF3-200/TS4	250	385	377	200	
NVF3-220/PS4	NVF3-220/TS4	265	430	426	220	
NVF3-245/PS4	NVF3-245/TS4	280	468	465	250	
NVF3-280/PS4	NVF3-280/TS4	355	525	520	280	
NVF3-315/PS4	NVF3-315/TS4	388	590	585	315	
NVF3-355/PS4	NVF3-355/TS4	500	665	650	355	
NVF3-400/PS4	NVF3-400/TS4	565	785	725	400	

NVF3 is a High Performance Inverter

- Speed Control and Torque Control
 - Suitable for **Roots Fans/Submerged Pump/Mud Pump/Screw Extrude...** and **Constant torque load type like all kinds of Conveyers**(Overload capability and torque response ability are very important for this kind of application)
 - For some basic winding application , torque regulator can be tried.
- **Better software algorithm** ,better speed and torque control make NVF3 fit for more complicated machines



■ NVF3M

➤ 3 Power Level and 1 Frame

- 220V series: 1/3*220V (± 15%)
 - 380V series: 3*380V (± 15%)
- Advanced synchronous vector control technology without speed sensors
- Various practical functions

Table I.1 Table of Inverter Model and Specifications

Model (NVF300M-)	Maximum applicable motor (kW)	Rated capacity (kVA)	Rated output current (A)
0.4/TD2	0.4	1.0	2.5
0.75/TD2	0.75	1.5	4.0
1.5/TD2	1.5	3.0	7.5
0.4/TS2	0.4	1.0	2.5
0.75/TS2	0.75	1.5	4.0
1.5/TS2	1.5	3.0	7.5
0.4/TS4	0.4	1	1.2
0.75/TS4	0.75	1.5	2.1
1.5/TS4	1.5	3	3.8



NVF3M is a micro size Inverter

- Support **3*220V** voltage beside 1*220V and 3*380V, which make it suitable for more power grid.
- As Micro size Inverter, NVF300M has same performance as NVF3, but better cost structure.
- NVF300M has successful application in **Conveyor Belt / Industrial Washing Machine / Fans and Pump / ...**



■ NVF5

- **7** Power Level and **5** Frame size
 - 220V series: 230 V (±15%)
 - 380V series: 380 V (-15%) ~440 V (+15%)
- NVF5 Series is new generation Inverter
- NVF5 is design for **OEMs**(Machine Builders)
- Less commissioning time and having smallest installation space.



Table 2.1 Inverter Model and Specification

Power Supply	Catalog No.	Power Capacity kVA	Input Current A	Output Current A	Adaptive Motor kW	Brake Unit
Single-Phase AC 230V	NVF5-0.4/TD2	1.0	5.4	2.5	0.4	Optional(embedded)
	NVF5-0.4/TD2-B					
	NVF5-0.75/TD2	1.9	10.3	5	0.75	
	NVF5-0.75/TD2-B					
	NVF5-1.5/TD2	2.9	15.5	7.5	1.5	
	NVF5-1.5/TD2-B					
NVF5-2.2/TD2	4.2	20	10	2.2		
NVF5-2.2/TD2-B						
Three-Phase AC 380V~440V	NVF5-0.4/TS4-B	0.8	2.3	1.5	0.4	Standard(embedded)
	NVF5-0.75/TS4-B	1.5	3.4	2.7	0.75	
	NVF5-1.5/TS4-B	3.0	5.1	4.2	1.5	
	NVF5-2.2/TS4-B	4.0	6.6	5.8	2.2	
	NVF5-3.7/TS4-B	5.9	12.1	10.5	3.7	
	NVF5-5.5/TS4-B	8.6	13.1	13	5.5	
NVF5-7.5/TS4-B	11.0	22.2	17	7.5		

Three Types of Parameter Menus

- **Simple Parameter Menu**
Minimum parameters for using
- **Custom Parameter Menu**
Default to be Empty, choose what you want
- **Engineering Parameter Menu**
All parameters you may need



Simple Parameter Menu



Custom Parameter Menu



Engineering Parameter Menu

- **Compact Design**
20% smaller than competitors
- **Pluggable Cover Plate**
Dust – proof design



NVF5 is an OEM – Oriented Inverter

- The power range from 0.4-7.5kW, the integrated Keypad and Brake system included. Motor self- learning function
- Speed control and Torque control
- NVF5 has successful application in **Conveyor Belt / Wooding machine / all kind the machine builders...**



Inverter Classification

Classification		Power Range	Control Target	Control Method	Accessories	Typical Applications
General Purpose	Micro Drive	0.25kw - 7.5kw	Speed Control	V/F SVC	No	Pump/Fan/Conveyers
	Machinery Drive	0.25kw - 22kw 0.25kw - 75kw	Speed Control Torque Control	V/F SVC FVC PM/SynRM	Feedback Option FieldBus Option Brake STO	Packaging Food Beverage Textile Printing Material handling
	Normal Performance Drive	0.75kw - 500kw	Speed Control	V/F SVC	Fieldbus Option Brake	Pump/Fan/Conveyers General Machinery
	High Performance Drive	0.75kw - 400kw	Speed Control Torque Control	V/F SVC FVC PM/SynRM	Feedback Option Fieldbus Option Brake STO Basic Programming	Packaging Food Beverage Textile Printing material handling Metal Process
	Drive System based DC bus or standalone	0.75kw - 800kw 1.5kw - 5600kw	Speed Control Torque Control Position Control (Optional)	V/F SVC FVC PM/SynRM	Feedback Option Fieldbus Option Brake STO Programing	Paper Making machine Metal Process Mechanical Process Oil&Gas
Industry Focused	Pumps/Fans	0.25kw - 630kw	Speed Control	V/F SVC	No FieldBus Option	1:Multi Pump Control 2:Sleep Mode
	HVAC	0.25kw - 500kw				1:2 PIDs 2:BACnet 3:Fire Mode
	Lift	1.5kw - 110kw	Speed Control Position Control (Optional)	PM		
	Crane	0.4kw - 560kw		V/F		1:Sequence Control 2:Anti-ompact 3:Anti-Sway 4:More motor data 5:Balance between loads
	Textile	0.1kw - 18.5kw	Speed Control Torque Control	V/F SVC	No FieldBus Option Brake Option	Textile: 1: Stop after power shutdown 2:Swing frequency

NVF5



NVF2G



NVF3



NVF3M



Inverter Typical Applications



Process Automation

Control Targets: Flow/Pressure/Temperature....

Discrete Automation

Control Targets: Speed/Torque/Position....



Classified Industry (End user)

	Water	Oil&Gas	Chemical	Construction	Power	Paper	Packaging	Beverage	Textile	Plastic	Electric	Printing	Others
Pump													
Fan													
Conveyer													
Mixer													
Others													
Speed Control													
Torque Control													
	Submersible pump	Oil pumping		Crusher			Winder machine	Mixing/Conveyer/Cutting machine	Washing machine	Injection Molding machine		Synchronous application	???
	Industry washing machine			Hoisting machine			Winder machine						???

Classified by Application

If you have customers and focused applications in your country.

Lets talk the details....



Rock Crusher -- NJR-D



Solution:

- Product: NJR2-D
- Competitors: Shanxi Huiying
- Power: 250kW
- Application: Start big motor smoothly, start torque could achieve 1.3 time of related current, good quality and many protection functions

Benefits:

- NJR2 -D use good quality components and very stable
- Have the Keypad and easy to use
- Wide power range
- Brandware in Market

Plastic Pellet Extruder -- NJR2-D



Solution:

- Product: NJR2-D
- Competitors: Yipu Mengte
- Power: 55kw - 250kw
- Application: Soft start and soft stop to the big motor and meet the requirement....replace the Star/Delta devices, protect the power grid.



Benefits:

- Short delivery time and necessary technical supports
- NJR2 -D use good quality components and very stable
- Wide power range
- Brandware in Market

Pumps in Oil&Water transportation -- NVF3



Solution:

- Product: NVF3
- Competitors: Teco
- Power: 90kw
- Application: Drive the Oil&Water pumps and use RS485 for communications

Benefits:

- Empower the adaption to power grid
- Suit for the tough environments and running outside for a long time
- Use 485 for communication with PLC system

Conveyors in Intralogistics -- NVF5



Solution:

- Product: NVF5
- Competitors: Delta
- Power: 0.4-2.2KW
- Application: use the Inverter to adjust the speed of conveyors, stable speed for packages transportation and selection.



Benefits:

- Excellent start torque control and stable speed control
- Potentiometer in the Keypad and easy to use.
- Easy commissioning menu

Filling machine in Beverage industry -- NVF5



Solution:

- Product: NVF5
- Competitors: Yaskawa(V1000)
- Power: 0.75KW
- Application: use the Inverter to adjust the speed of motor, need fast accelerate speed

Benefits:

- Small size and high stability
- LED keypad and easy to use
- Fast response to customers request – Samples provided

Thanks for Listening