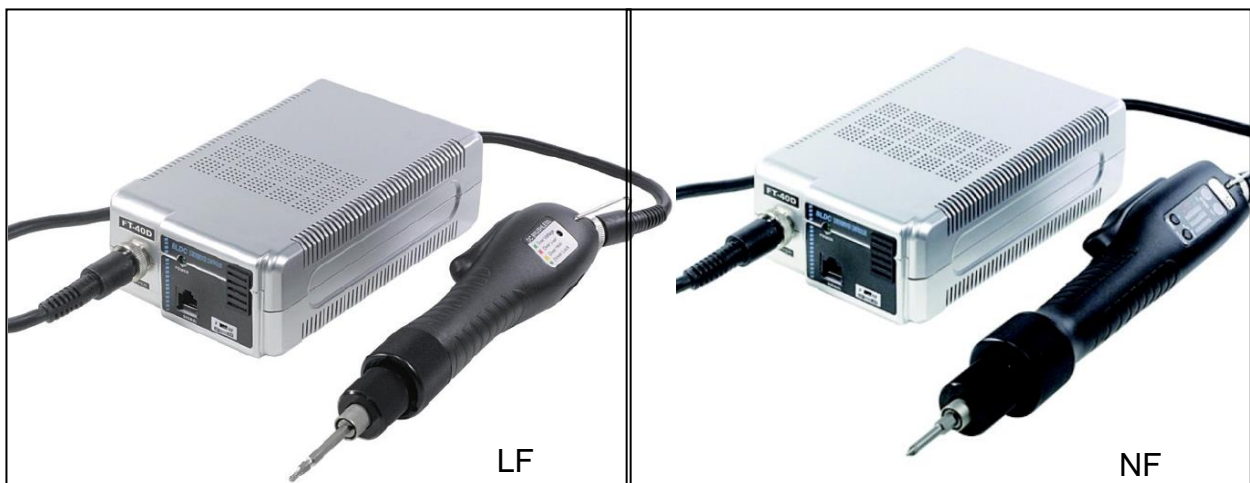
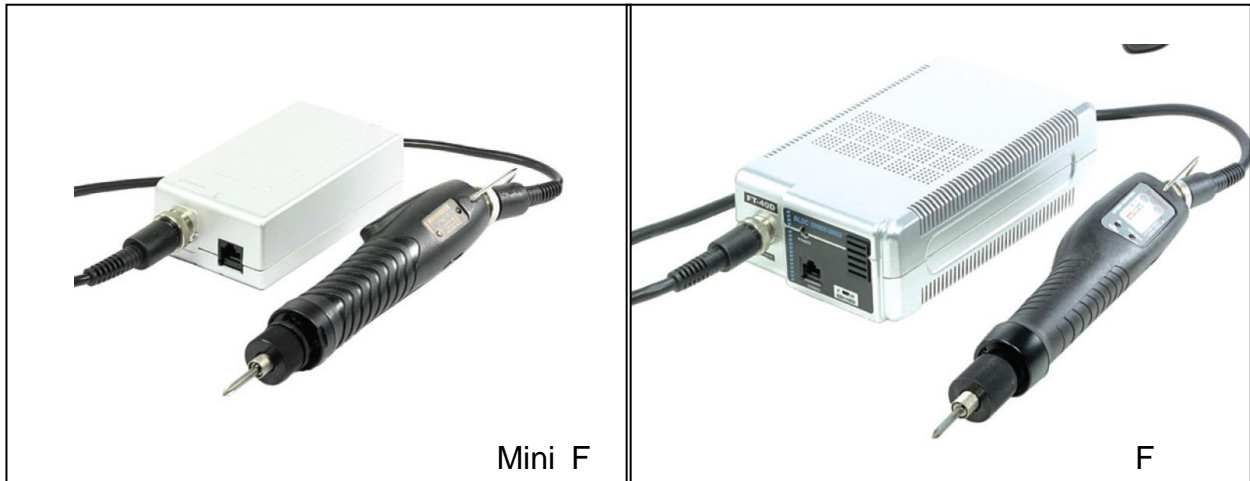


OPERATION MANUAL

F, LF, NF Screwdrivers



1. GENERAL SAFETY RULES

ENGLISH

WARNING! Read and understand all instructions. Failure to follow all instructions listed below, may result in electric shock, fire and/or serious personal injury

SAVE THIS INSTRUCTIONS

1.1 Work Area

- **Keep your work area clean and well lit.** Cluttered benches and dark areas invite accidents.
- **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Power tools create sparks which may ignite the dust or fumes.
- **Keep bystanders, children, and visitors away while operating a power tool.** Distractions can cause you to lose control.

1.2 Electrical Safety

- **Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. Never remove the grounding prong or modify the plug in any way. Do not use any plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.** If the tools should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.
- **Avoid body contact with grounded surface ad pipes, radiators, ranges and refrigerators.** There is an increased risk of electric shock if your body is grounded.
- **Don't expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock
- **Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately.** Damaged cords increase the risk of electric shock.
- **When operating a power tool outside, use an outdoor extension cord marked W-A or W.** These cords are rated for outdoor use and reduce the risk of electric shock.

1.3 Personal Safety

- **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.
- **Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts.** Loose clothes, jewelry, or long hair can be caught in moving parts.
- **Avoid accidental starting. Be sure switch is off before plugging in.** Carrying tools with your finger on the switch or plugging in tools may result in personal injury.
- **Remove adjusting keys or switches before turning the tool on.** A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
- **Do not overreach. Keep proper footing and balance at all times.** Proper footing and balance enables better control of the tool in unexpected situations.

- **Use safety equipment. Always wear eye protection.** Dust mask, non-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

1.4 Tool use and Care

- **Use clamps or other practical way to secure and support the workplace to a stable platform.** Holding the work by hand or against your body is unstable and may lead to loss of control.
- **Do not force tool. Use the correct tool for your application.** The correct tool will do the job better and safer at the rate for which it is designed.
- **Do not use tool if switch does not turn it on or off.** Any tool that cannot be controlled with the switch is dangerous and must be repaired.
- **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool.** Such preventive safety
- **Store idle tools out of reach of children and other untrained persons.** Tools are dangerous in the hands of untrained users.
- **Maintain tools with care. Keep cutting tools sharp and clean.** Properly maintained tools, with sharp cutting edges are less likely to bind and are easier to control.
- **Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.** Many accidents are caused by poorly maintained tools.
- **Use only accessories that are recommended by the manufacturer for your model.** Accessories that may be suitable for one tool, may become hazardous when used on another tool.

1.5 SERVICE

- **Tool service must be performed only by qualified personnel.** Service or maintenance performed by unqualified personnel could result in a risk of injury
- **When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual.** Use of unauthorized parts or failure to follow Maintenance instructions may create a risk of electric shock or injury.

2. SPECIFIC SAFETY RULES

2.1 Hold tool by insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord. Contact with a "live" wire will make exposed metal parts of the tool "live" and shock the operator.

2.2 Never lubricate aerosol oil on to the electrical part.

AVERTISSEMENT ! Vous devez lire et comprendre les instructions. Le non-respect, même partiel, des instructions ci-près entraîne un risque de choc électrique, d'incendie et/ou de blessures graves

CONSERVEZ CES INSTRUCTIONS

1.1 Aire de travail

- **Veillez à ce que l'aire de travail soit propre et bien éclairée.** Le désordre et le manque de lumière favorisent les accidents.
- **N'utilisez pas d'outils électriques dans une atmosphère explosive, par exemple en présence de liquides, de gaz ou de poussières inflammables.** Les outils électriques créent des étincelles qui pourraient enflammer les poussières ou les vapeurs.
- **Tenez à distance les curieux, les enfants et les visiteurs pendant que vous travaillez avec un outil électrique.** Ils pourraient vous distraire et vous faire une fausse manœuvre.

1.2 Sécurité électrique

- **Les outils mis à la terre doivent être branchés dans une prise de courant correctement installée et mise à la terre conformément à tous les codes et règlements pertinents. Ne modifiez jamais la fiche de quelque façon que ce soit, par exemple en enlevant la broche de mise à la terre. N'utilisez pas d'adaptateur de fiche. Si vous n'êtes pas certain que la prise de courant est correctement mise à la terre, adressez-vous à un électricien qualifié.** En cas de défaillance ou de défektivité électrique de l'outil, une mise à la terre offre un trajet de faible résistance à l'électricité qui autrement risquerait de traverser l'utilisateur.
- **Évitez tout contact corporel avec des surfaces mises à la terre (tuyauterie, radiateurs, cuisinières, réfrigérateurs, etc.).** Le risque de choc électrique est plus grand si votre corps est en contact avec la terre.
- **N'exposez pas les outils électriques à la pluie ou à l'eau.** La présence d'eau dans un outil électrique augmente le risque de choc électrique.
- **Ne maltraitez pas le cordon. Ne transportez pas l'outil par son cordon et ne débranchez pas la fiche en tirant sur le cordon. N'exposez pas le cordon à la chaleur, à des huiles, à des arêtes vives ou à des pièces en mouvement.**
Remplacez immédiatement un cordon endommagé. Un cordon endommagé augmente le risque de choc électrique.
- **Lorsque vous utilisez un outil électrique à l'extérieur, employez un prolongateur pour l'extérieur marqué "W-A" ou "W".** Ces cordons sont faits pour être utilisés à l'extérieur et réduisent le risque de choc électrique.

1.3 Sécurité des personnes

- **Restez alerte, concentrez-vous sur votre travail et faites preuve de jugement. N'utilisez pas un outil électrique si vous êtes fatigué ou sous l'influence de drogues, d'alcool ou de médicaments.** Un instant d'inattention suffit pour entraîner des blessures graves.
- **Habillez-vous convenablement. Ne portez ni vêtements flottants ni bijoux. Confinez les cheveux**

longs. N'approchez jamais les cheveux, les vêtements ou les gants des pièces en mouvements.

Des vêtements flottants, des bijoux ou des cheveux longs risquent d'être happés par des pièces en mouvement.

- **Méfiez-vous d'un démarrage accidentel. Avant de brancher l'outil, assurez-vous que son interrupteur est sur ARRÊT.** Le fait de transporter un outil avec le doigt sur la détente ou de brancher un outil dont l'interrupteur est en position MARCHE peut mener tout droit à un accident.
- **Enlevez les clés de réglage ou de serrage avant de démarrer l'outil.** Une clé laissée dans une pièce tournante de l'outil peut provoquer des blessures.
- **Ne vous penchez pas trop en avant. Maintenez un bon appui et restez en équilibre en tout temps.** Une bonne stabilité vous permet de mieux réagir à une situation inattendue.
- **Utilisez des accessoires de sécurité. portez toujours des lunettes ou une visière.** Selon les conditions, portez aussi un masque antipoussière, des bottes de sécurité antidérapantes, un casque protecteur et/ou un appareil antibruit.

1.4 Utilisation et entretien des outils

- **Immobilisez le matériau sur une surface stable au moyen de brides ou de toute autre façon adéquate.** Le fait de tenir la pièce avec la main ou contre votre corps offre une stabilité insuffisante et peut amener un dérapage de l'outil.
- **Ne forcez pas l'outil. Utilisez l'outil approprié à la tâche.** L'outil correct fonctionne mieux et de façon plus sécuritaire. Respectez aussi la vitesse de travail qui lui est propre.
- **N'utilisez pas un outil si son interrupteur est bloqué.** Un outil que vous ne pouvez pas commander par son interrupteur est dangereux et doit être réparé.
- **Débranchez la fiche de l'outil avant d'effectuer un réglage, de changer d'accessoire ou de ranger l'outil.** De telles mesures préventives de sécurité réduisent le risque de démarrage accidentel de l'outil.
- **Rangez les outils hors de la portée des enfants et d'autres personnes inexpérimentées.** Les outils sont dangereux dans les mains d'utilisateurs novices.
- **Prenez soin de bien entretenir les outils. Les outils de coupe doivent être toujours bien affûtés et propres.** Des outils bien entretenus, dont les arêtes sont bien tranchantes, sont moins susceptibles de coincer et plus faciles à diriger.
- **Soyez attentif à tout désalignement ou coincement des pièces en mouvement, à tout bris ou à toute autre condition préjudiciable au bon fonctionnement de l'outil. Si vous constatez qu'un outil est endommagé, faites-le réparer avant de vous en servir.** De nombreux accidents sont causés par des outils en mauvais état.
- **N'utilisez que des accessoires que le fabricant recommande pour votre modèle d'outil.** Certains accessoires peuvent convenir à un outil, mais être dangereux avec un autre.

1.5 RÉPARATION



- **La réparation des outils électriques doit être confiée à un réparateur qualifié.** L'entretien ou la réparation d'un outil électrique par un amateur peut avoir des conséquences graves.
- **Pour la réparation d'un outil, n'employez que des pièces de rechange d'origine. Suivez les directives données à la section Réparation de ce manuel.** L'emploi de pièces non autorisées ou le non-respect des instructions d'entretien peut créer un risque de choc électrique ou de blessures.

2. RÉGLE DE SÉCURITÉ PARTICULIÈRE

2.1 **Tenez l'outil par ses surfaces de prise isolées pendant toute opération où l'outil de coupe pourrait venir en contact avec un câblage dissimulé ou avec son propre cordon.** En cas de contact avec un conducteur sous tension, les pièces métalliques à découvert de l'outil transmettraient un choc électrique à l'utilisateur

2.2 **Never lubricate aerosol oil on to the electrical part.**

3. Electric specification

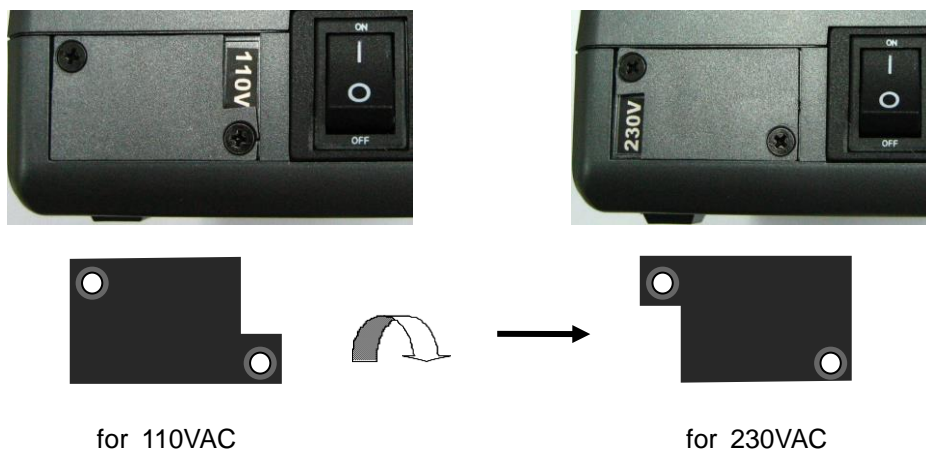
Items	Power controller	Screwdriver
Model	FT-40D	F series, LF series, NF series
Input	110 / 230VAC (selectable)	DC40V
Output	30/40VDC (selectable)	
Rated power	2.5A 95W	
Maximum output current	8 A	
Intermittent operation	10s On / 30s Off	
Safety certification	CE, NRTL(C+U)	
		 Detailed specification article 6 on page 4

4. Mechanical specification of FT-40D

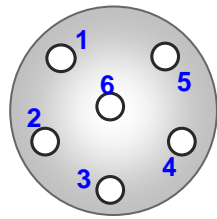
Size : 192 x 115 x 60H (mm)
 Weight : 860 gr
 Power cord : 1.5 m
 Fuse : 10 A 250V

5. INPUT Power select

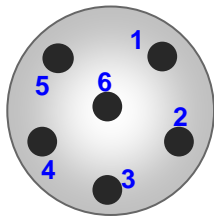
By replacing the position of cover as below, the input power can be selected for 110V or 230V.



6. Pin configuration of output



View of controller

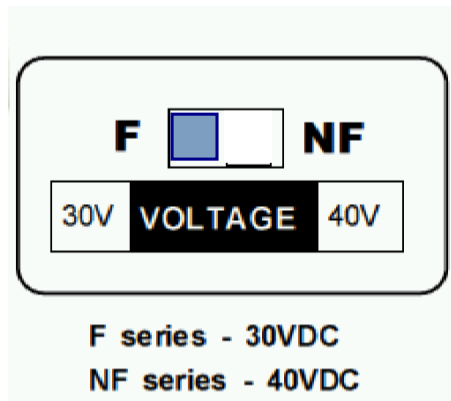


View of cable side

- 1 : DC (+)
- 2 : Limit (Torque up)
- 3 : Ground
- 4 : Start
- 5 : DC (-)
- 6 : Driver Lock or Remote start
(for "A" option driver)

Caution : Do not connect the others except the listed screwdrivers.
It may cause electric shock, fire and any dangerous situation.

7. Driver model select of controller output voltage

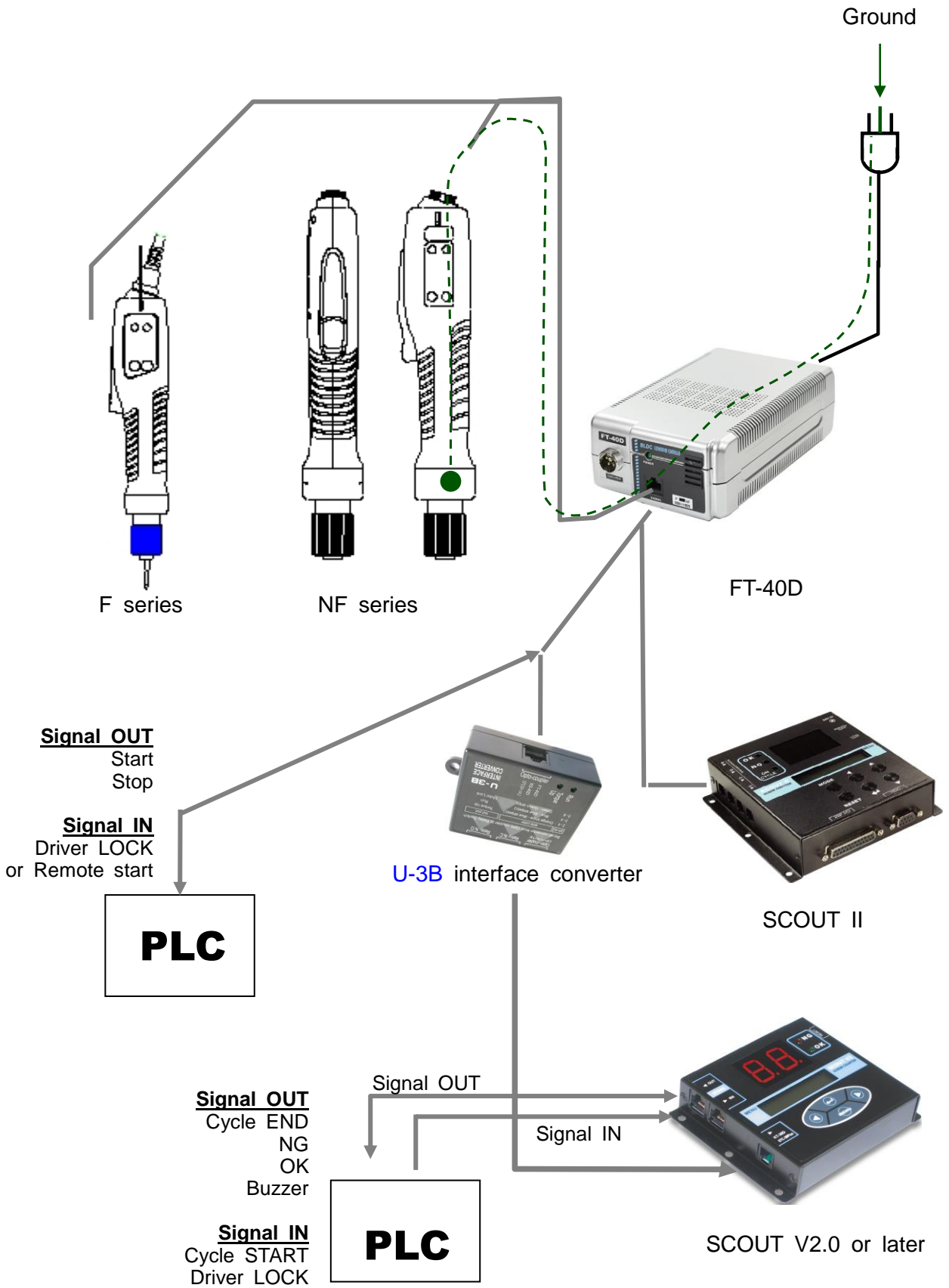


Depend on the connected screwdriver model,
the output voltage should be selected properly.

8. Over Current Protection (Overload), Over heat protection and reset

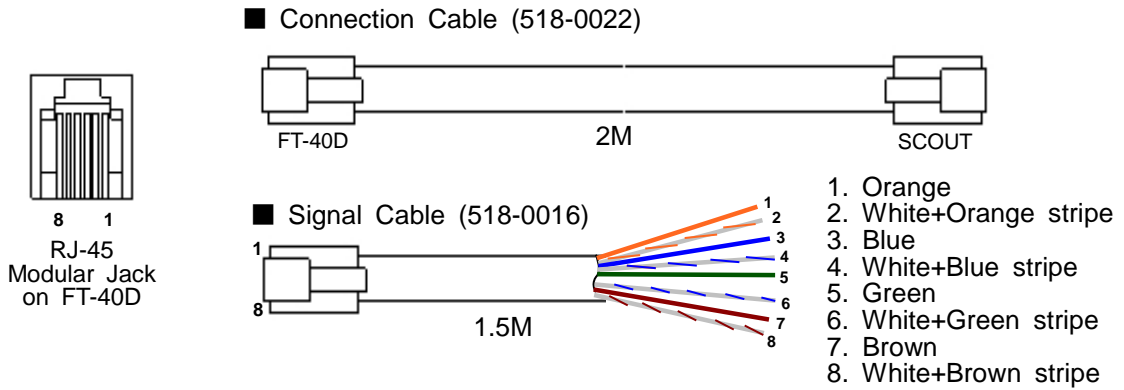
Description		Over Current Protection	Over Heat Protection
Detection	Limit	8A current	90°C
	Time duration	immediately	
Protection		Whole power shut down permanently	
Protection signal	LED	No power	
	Buzzer	No power	
Recovery		Turn off the power switch and on after 1 min.	Turn the power switch off and on at lower than 90°C temperature.

9. Connections

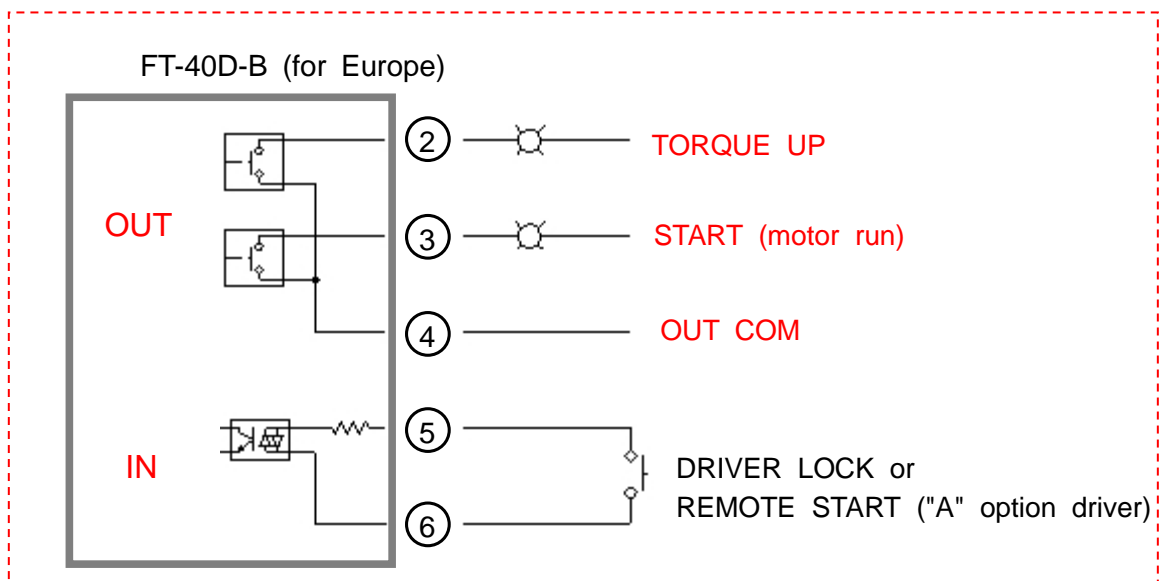
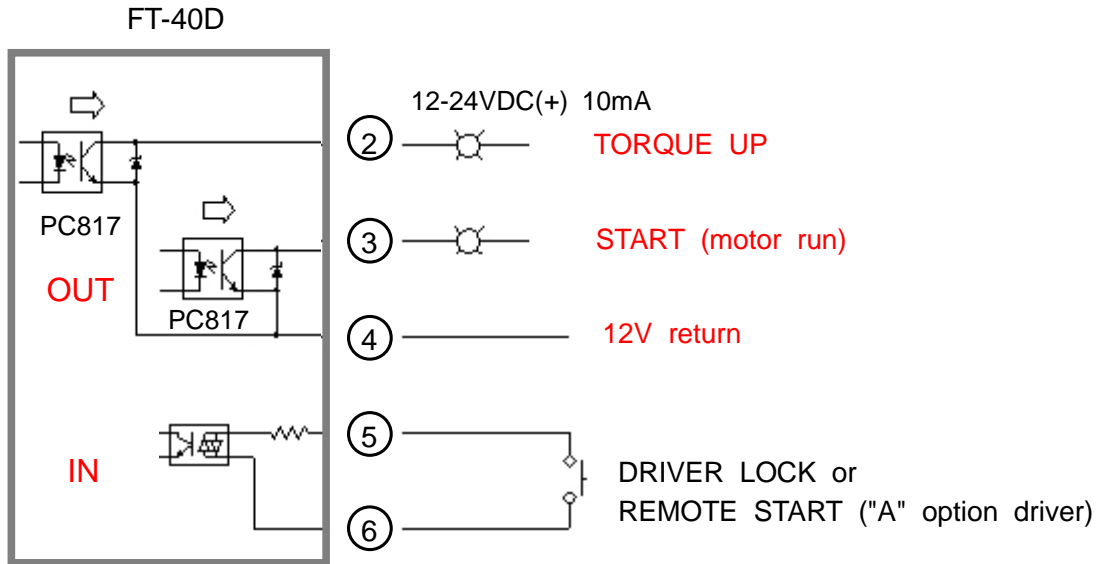


10. Interface with FT-40D controller

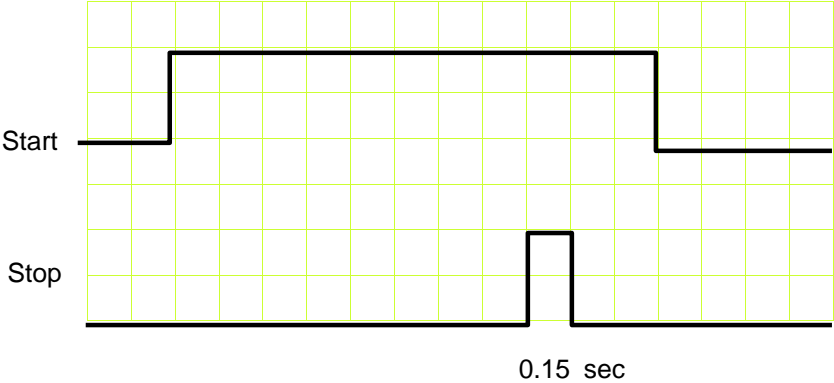
10-1. Connector and cables



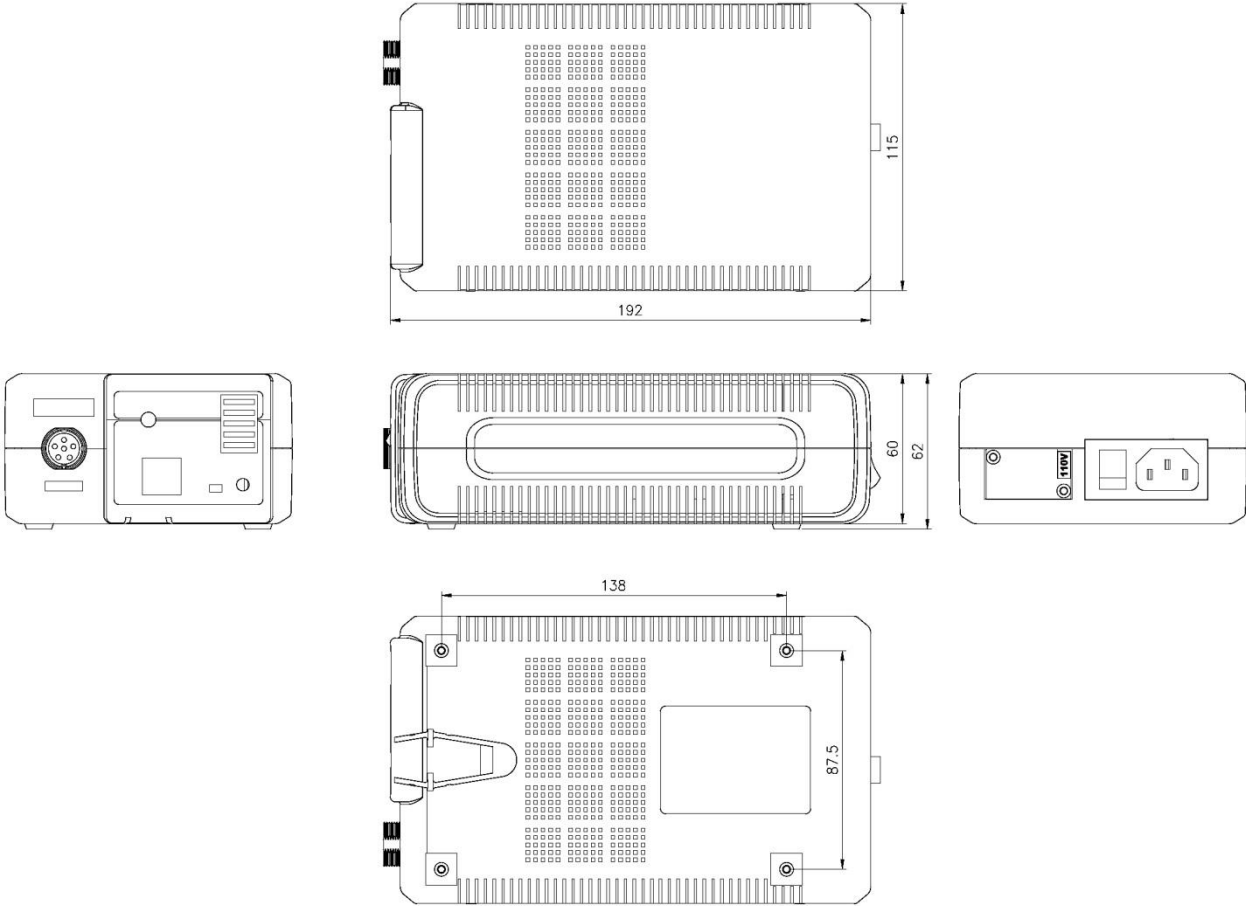
10-2. Interface for Start / Stop signal



10-3. Timing chart of Start / Stop signal



10-4. Dimensional drawing



10-5. Interface converter U-3B (Option)

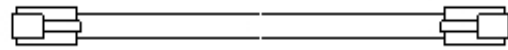
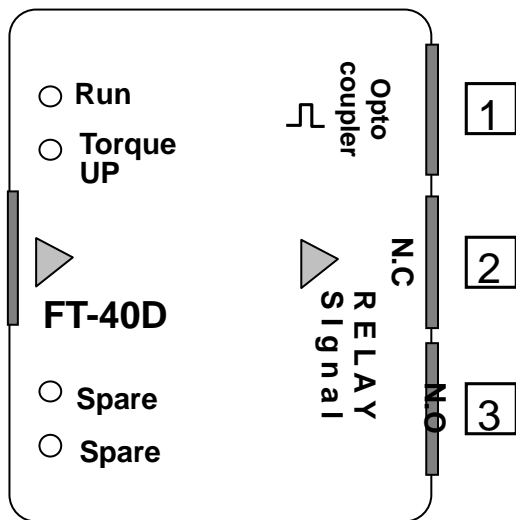
Interface converter convert the electronic signal by opto coupler to opposite direction as below.

Also it provide additional dry contact signals in both Normal Closed and Normal Open by the built-in relay.

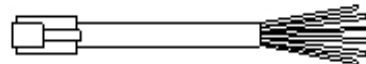


Interface converter U-3B (ECA5914)	
Size	75 x 60 x 28mm (h)
Weight	103gr
Opto coupler	12-24V 10mA max
Relay contact	30VDC 1A max

IN (from FT-40D)



RJ-45 8PIN 2m long



RJ-45 8PIN 1.5m long

Standard accessory cables



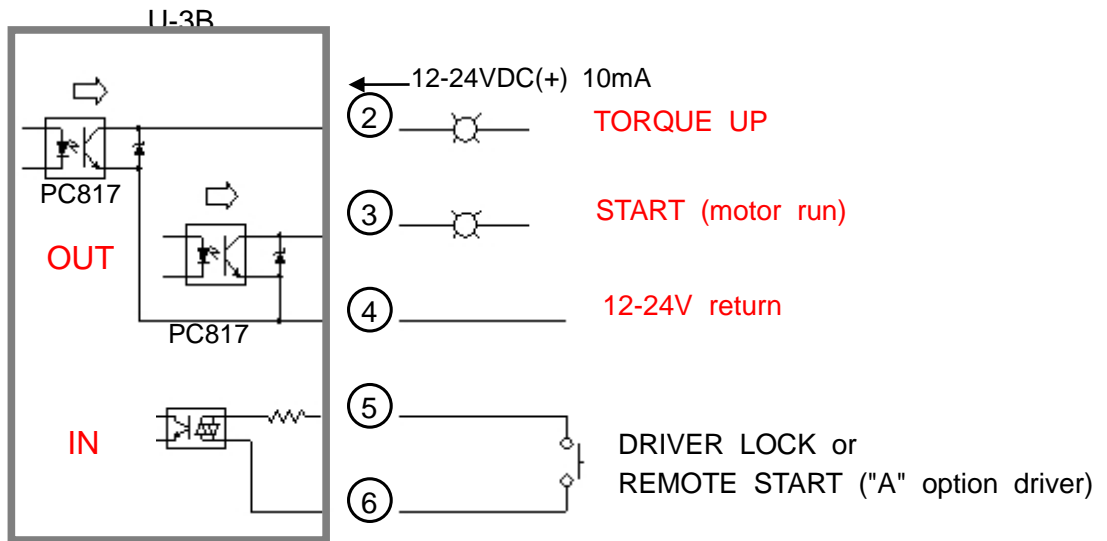
Relay power off when not use

8PIN Configuration and Output

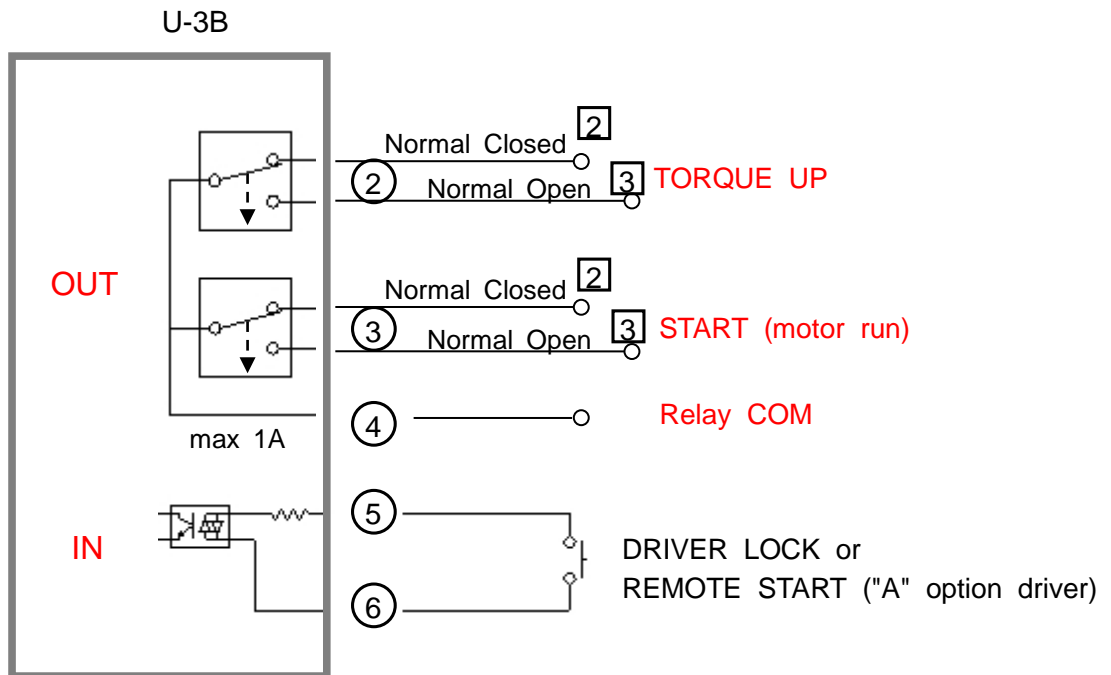
No	Color	Interface Signal	FT-40D	U-3B Interface converter I/O port		
				1	2	3
1	ORANGE	Spare				
2	ORANGE STRIPE	Torque Up				
3	BLUE	Motor Run				
4	BLUE STRIPE	Common for 2&3 wire				
5	GREEN	Motor Lock or Remote Start				
6	GREEN STRIPE					
7	BROWN	No use				
8	BROWN STRIPE	Spare				

■ U-3B interface converter I/O details




1 Opto-coupler port



2 & 3 Relay N.C & N.O port

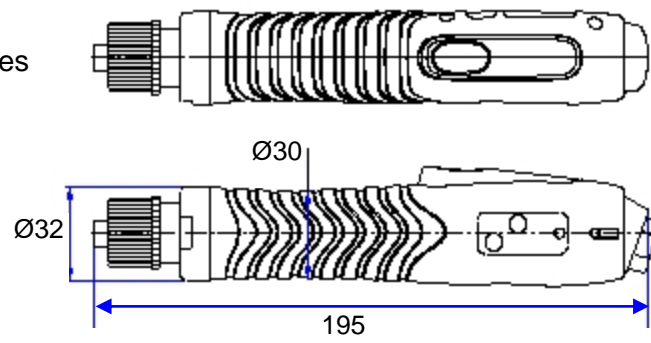


11. Screwdriver Specification

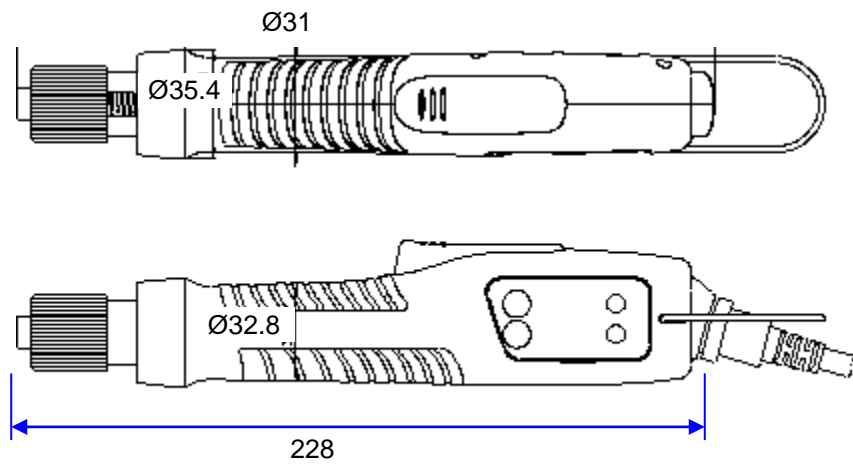
Type	Model	Start	Torque (Kgf.cm)	No load speed (rpm)	Bit size	Weight (Kg)	Voltage
Mini F series							
Speed control	F035	LEVER	0.2~3.5	300~1,100	E :  4mm	0.24	DC30V
	F045		0.4~4.5	300~700			
F series							
Speed control + Soft start	F060	LEVER	1.5 ~ 6	700 ~ 1600	E :  4mm A : Hex1/4"	0.41	DC30V
	F080		1 ~ 8	670 ~ 1000			
	F120		2 ~ 12	460 ~ 700			
	F060P	PUSH	1.5 ~ 6	700 ~ 1600			
	F080P		1 ~ 8	670 ~ 1000			
	F120P		2 ~ 12	460 ~ 700			
Soft start + Double hit (+ option)	F060+	LEVER	1.5 ~ 6	700 ~ 1600			
	F080+		1 ~ 8	670 ~ 1000			
	F120+		2 ~ 12	460 ~ 700			
Angle control + Auto reverse	FT060	LEVER	1.5 ~ 6	700 ~ 1600			
	FT080		1 ~ 8	670 ~ 1000			
	FT120		2 ~ 12	460 ~ 700			
LF series							
Single speed	LF060	LEVER	1 ~ 6	1,550	E :  4mm A : Hex1/4" B :Hex 5mm	0.44	DC30V
	LF080		2 ~ 8	1,250			
	LF120		3 ~ 12	1,000			
	LF180		4 ~ 18	700			
	LF080P	PUSH	1 ~ 6	1,550			
	LF080P		2 ~ 8	1,250			
	LF120P		3 ~ 12	1,000			
	LF180P		4 ~ 18	700			
NF series							
Speed control + Soft start	NF150	LEVER	3~15	800~1700	A : Hex1/4" B :Hex 5mm	0.52	DC40V
	NF220		6~22	600~1250			
	NF350		6~35	360~740			
	NF450		7~45	300~600			
	NF150P	PUSH	3~15	800~1700			
	NF220P		6~22	600~1250			
	NF350		6~35	360~740			
	NF450P		7~45	300~600			
Soft start + Double hit	NF150+	LEVER	3~15	800~1700			
	NF220+		6~22	600~1250			
	NF350+		6~35	360~740			
	NF450+		7~45	300~600			
Angle control & Auto reverse	NFT150	LEVER	3~15	800~1700			
	NFT220		6~22	600~1250			
	NF350		6~35	360~740			
	NFT450		7~45	300~600			

12. Screwdriver Dimensions

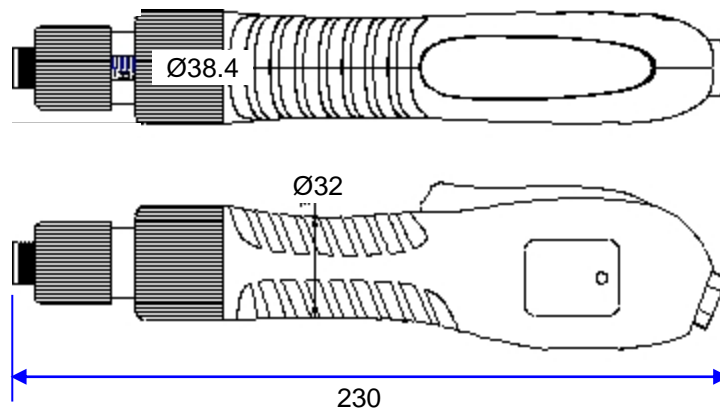
■ Mini F series



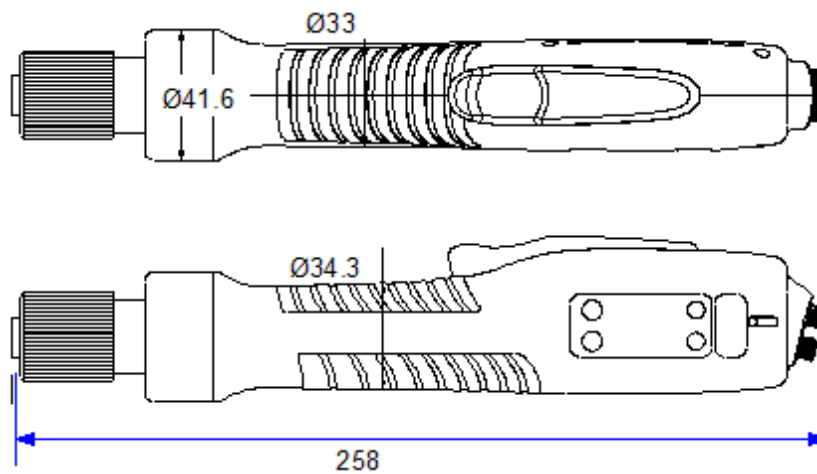
■ F series



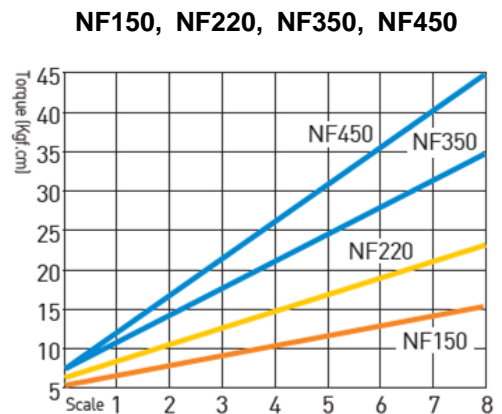
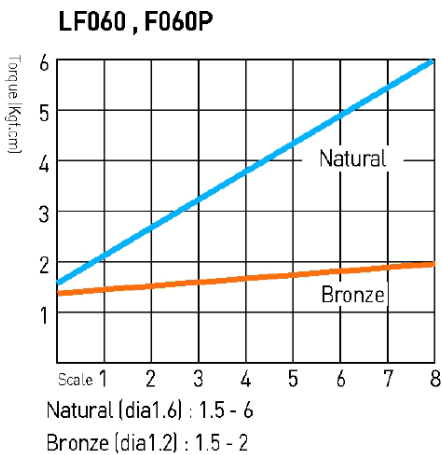
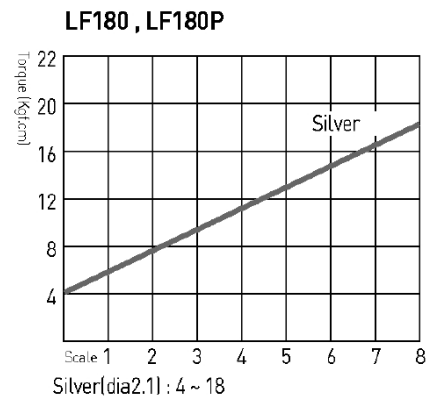
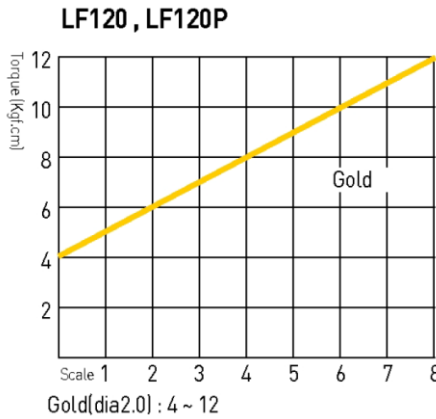
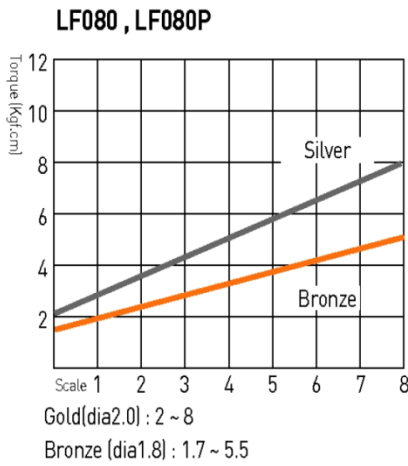
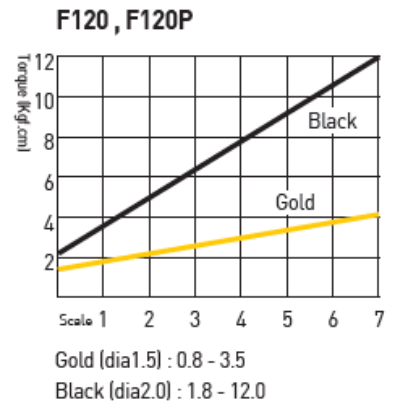
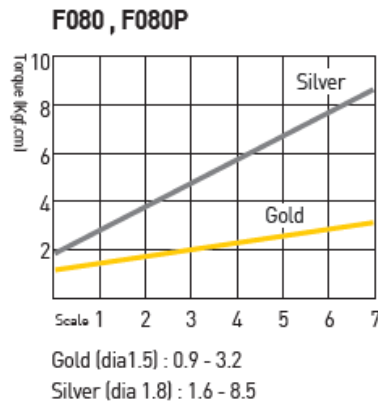
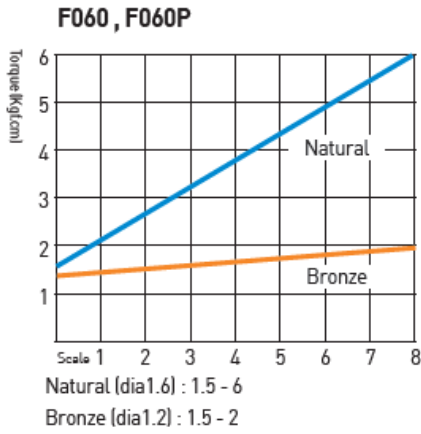
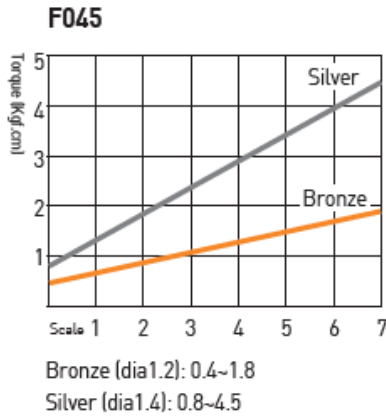
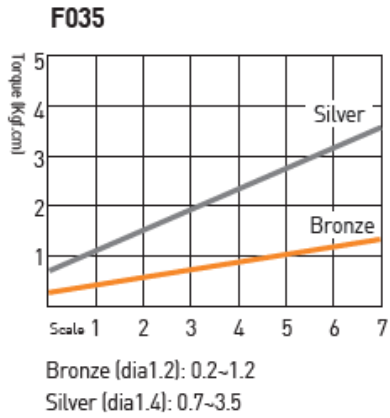
■ LF series



■ NF series



13. Torque curve (at No load Max. speed)

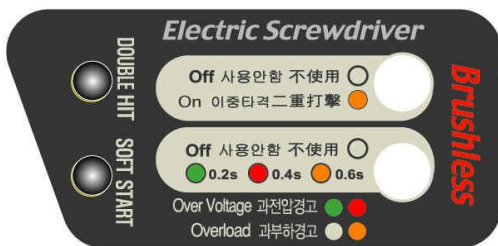


14. Panel of each model

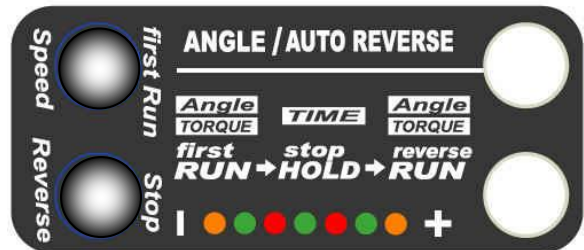
■ Standard



■ Soft start & Double hit (+ option)



■ Angle control & Auto reverse (T option)

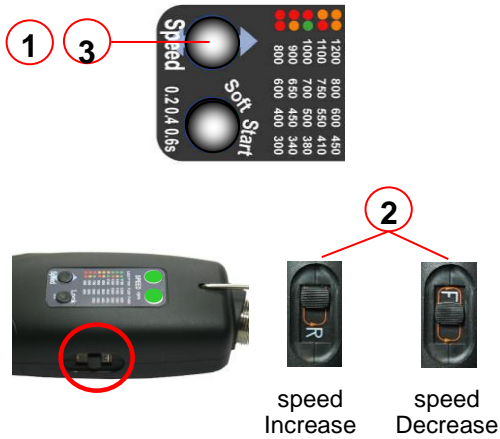


15. Alarm display by LED

no	Alarm	Description	Reset
1	Over Voltage (over 44V)	●●↔●● Green & Red lights blinks	Auto reset under 44V
2	Overload (4A/0.5s)	●● Two Red lights blinks.	Auto reset after 5s
3	Overheat(over 80℃_motor)	●● Two Orange light blinks	Auto reset lower than 80℃
4	Driver Lock by ext. signal	●● Two Green lights blinks	Auto reset by signal off

16. Operation

16.1 Speed change in standard model (F, NF)



- 1) Keep pressing the Speed button for 2 second to visit to PROGRAM mode. Then two LED lights will display the set speed.
- 2) Select "Reverse" of F/R switch for increasing speed. or select "Forward" of F/R switch for decreasing speed.
- 3) Press "Speed" button and select the target speed. The set speed can be recognized by the colors of two LED as below
- 4) By operating screwdriver, it goes back to operating (work) mode.

Speed display by two LED colors (Standard model)

Model	LED	●●	●●	●●	●●	●●	●●	●●	●●	●●
		1th	2nd	3rd	4th	5th	6th	7th	8th	9th
F060	RPM	650	750	850	950	1,050	1150	1250	1350	1500
F080	RPM	380	450	520	580	640	700	780	850	950
F120	RPM	300	350	395	440	480	535	590	625	690
NF150	RPM	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,700
NF220	RPM	600	650	700	750	800	900	1000	1100	1250
NF350	RPM	400	450	500	550	600	650	700	750	800
NF450	RPM	300	340	380	415	450	490	530	565	600

16.2 Soft start & Double hit (+ option, available for F and NF)

The Plus option drivers have the single speed of the maximum in the speed range.

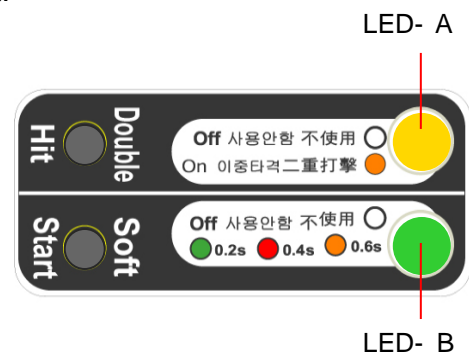
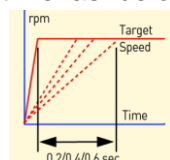
Double Hit

When "Double Hit" is chosen by the Double Hit button, LED A will light Orange color. During the motor run, LED A will display Green light.

Soft Start

The rotation speed reaches to the target speed gradually after the soft start time as below.

- Green : 0.2 second
- Red : 0.4 second
- Orange : 0.6 second



16.3 Angle control & Auto reverse (T option, available for F, NF)

One triggering by the lever can make 3 step operation sequence in a cycle

■ Start, Stop and Direction in a cycle

Step	1	2	3
Sequence	first RUN	stop HOLD	reverse RUN
Rotating direction	Clockwise or Counterclockwise by F/R switch		Reverse
Activating	Screwdriver run and stop at the target angle when the angle is set. It always stop at the set torque, even it does not reach to the target angle.	delay for set time	Rotate reverse until releasing the lever or stop at the target torque
Angle run & Time delay	29 steps 1/4 to 30 turns	14 steps 0.2 to 3 sec	29 steps 1/4 to 30 turns

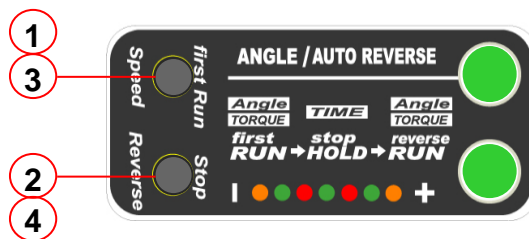
- Screwdriver stops immediately when the lever is released in any sequence.
- Sliding F/R switch works for Increasing or decreasing of setting

■ Operating (Work) mode

- ① Rotating direction (FOR-REV)

■ PROGRAM mode

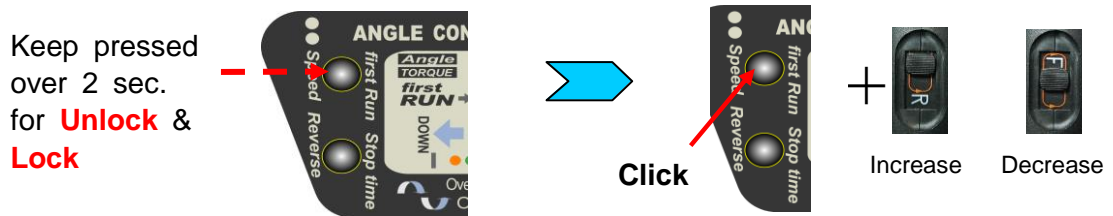
- ① First run angle (Increase / Decrease) together with "First Run(Speed)" button
- ② Time (Increase / Decrease) together with "Stop(Reverse)" button
- ③ Rotation speed (Increase / Decrease) together with "Speed(First Run)" button
- ④ Reverse run angle (Increase / Decrease) together with "Reverse(Stop)" button



■ Angle setting for first RUN

- ① Keep the **first Run** button pressed over 2 sec. for angle setting.
Then press one by one for the desired rotating angle
- ② Select the R position of F/R switch for increasing set angle or F position for decreasing set angle
- ③ Keep the **first Run** button pressed over 2 sec. for Lock & operating mode.

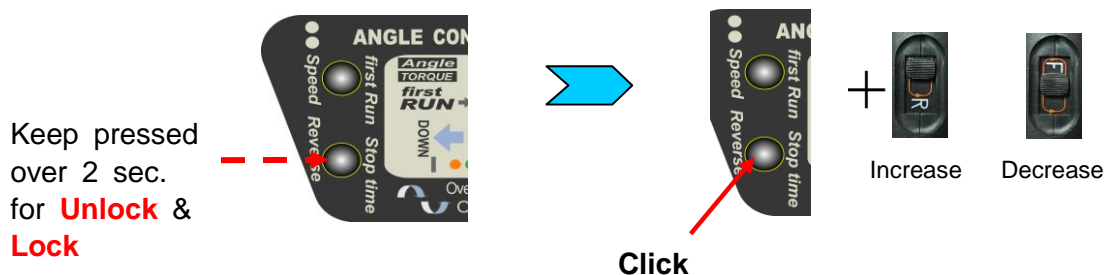
Click	0	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Turns	Off	1/4	2/4	3/4	1	5/4	6/4	7/4	2	9/4	10/4	11/4	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30
LED	O	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	O



■ Time setting for stop HOLD

- ① Keep the **stop time** button pressed over 2 sec. Then click the stop time button one by one for desired stop holding time
- ② Select the R position of F/R switch for increasing set time or F position for decreasing set time
- ③ Keep the **stop time** button pressed over 2 sec. for Lock & operating mode.

Click	0	1th	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th
Time (second)	Off	0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
LED	Orange	R	G	R	G	R	G	R	G	R	G	R	G	R	O



■ Rotating speed setting

- ① Keep the both **first Run** & **stop time** buttons pressed over 2 sec. for unlock. Then click one by one for the desired rotating speed.
- ② Select the R position of F/R switch for increasing speed or F position for decreasing speed
- ③ Keep the **first Run** button pressed over 2 sec. for Lock & operating mode.

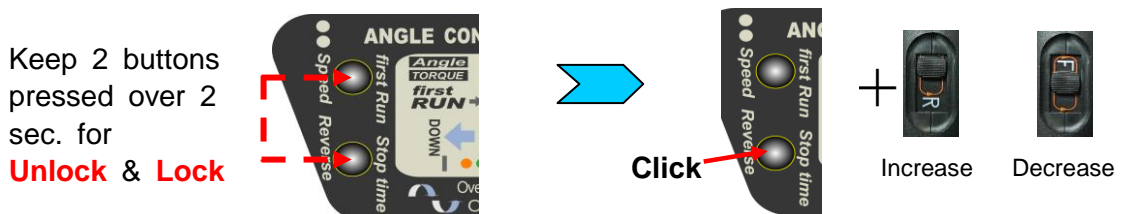


※ Refer the Speed by LED display on page 14. / Standard driver speed display

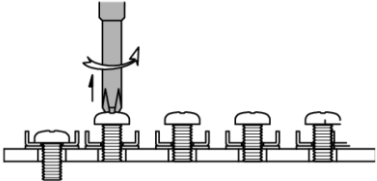
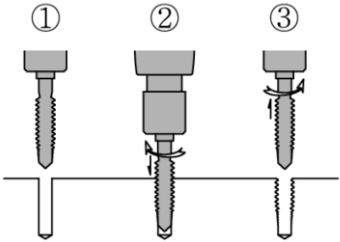
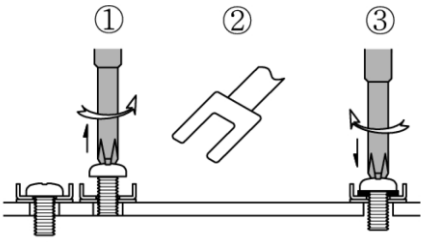
■ Angle setting for Reverse RUN

- ① Keep the both **first Run** & **stop time** buttons pressed over 2 sec. for unlock. Then click **stop time** button one by one for the desired angle
- ② Select the R position of F/R switch for increasing set angle or F position for decreasing set angle
- ③ Keep the **stop time** button pressed over 2 sec. for Lock & operating mode.

Click	0	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Turns	Off	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	1	$\frac{5}{4}$	$\frac{6}{4}$	$\frac{7}{4}$	2	$\frac{9}{4}$	$\frac{10}{4}$	$\frac{11}{4}$	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30
LED	O	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	O



■ Application Example

	first RUN <i>Angle</i>	stop HOLD <i>Time</i>	Auto Reverse <i>Angle</i>	Applications with different sequence in a cycle
Normal screwdriver	off	off	off	Normal screwdriver It stops at the set torque
Angle control	ON(1)	off	off	 <p>It stops at set angle(1)</p>
Tapper or Insert fastening	ON(1)	ON(2)	ON(3) or OFF	 <p>It stops at set angle(1) and waits for set time(2), and makes reverse rotation to the set angle(3) or until the lever is released</p>
Wire inserting on terminal block	ON(1)	ON(2)	OFF	 <p>It stops at set angle(1) and waits for set time(2), and makes reverse rotation and stops at set torque</p>