



# Electric Screwdrivers and Power Supply Operation Manuals

(February, 2018)

## **Clutch Type Torque Auto Control**

CL-Series	CL-2000, CL-3000, CL-4000, CL-6000, CL-6500 and CL-7000 (NL-Series and Push-to-Start Type)
SS-Series	SS-2000, SS-3000, SS-4000, SS-6500 and SS-7000 (Push-to-Start Type)
$\alpha$ -Series	$\alpha$ -4500, $\alpha$ -5000 and $\alpha$ -6500 (Push-to-Start Type)

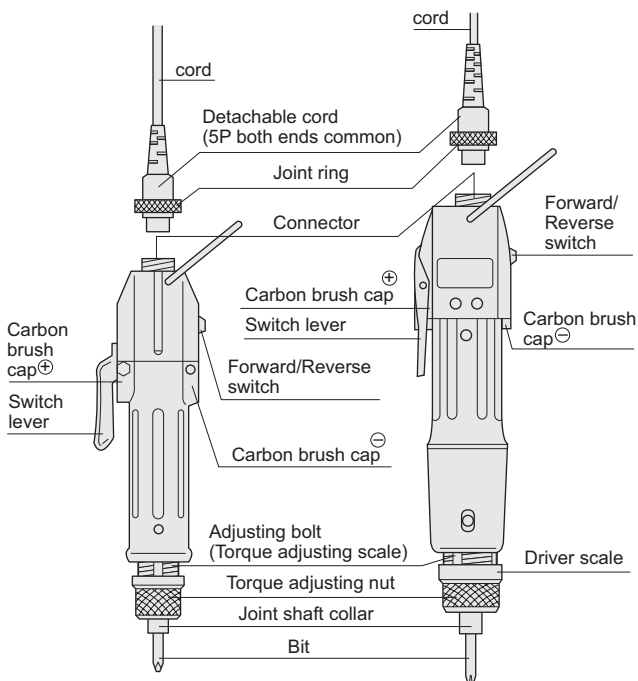
ESD Type •  
Q-CR-ESD Type • Q Type

## **HIOS Inc.**

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Thank you for your purchasing a Hios screwdriver.

## 1. Name of Parts



## 2. Accessories:

- Bits
- Torque adjusting spring
- Carbon brushes

### 3. Specifications

#### CL-Series (NL-Series, ESD, Q-CR-ESD, Q, PS-Type)

Model		CL-2000	CL-3000	CL-4000	CL-6000	CL-6500	CL-7000
Output Torque Range	N.m	0.02 - 0.2	0.03 - 0.2	0.1 - 0.55	0.2 - 1	0.3 - 1.6	0.3 - 2.5
	lbf.in	0.17 - 1.7	0.3 - 1.7	0.9 - 4.8	1.7 - 8.8	2.6 - 14	2.6 - 22
	(kgf.cm)	(0.2 - 2)	(0.3 - 2)	(1 - 5.5)	(2 - 10)	(3 - 16)	(3 - 25)
Torque Switching		Stepless Adjustment					
Unloaded Rotation Speed (r.p.m)	HI	680	1000	1000	800	900	750
	LOW	490	670	690	500	600	—
Screw Size (mm)	Machine Screw	1.0 - 2.3	1.0 - 2.0	1.4 - 2.6	2.0 - 3.0	2.0 - 4.0	2.0 - 5.0
	Tapping Screw	1.0 - 2.0	1.0 - 1.7	1.4 - 2.3	2.0 - 2.6	2.0 - 3.0	2.0 - 4.0
Dimensions (mm)	Grip Diameter	Ø26	Ø32.5	Ø32.5	Ø37	Ø37	Ø37
	Total Length	166	183	197	220	235	255
Bit Drive	HIOS Shank	H4			H5		
	HEX Shank	—	—	1/4HEX or 5HEX			
*1 Weight (g)		200	350(390)	380(430)	600(600)	660(660)	750(750)
Length of screwdriver cord (see the table of attached cord reference)	Standard	1.5m(5p)	1.5m(5p)	1.5m(5p)	2m(5p)	2m(5p)	2m(5p)
	CL-ESD	A	A	A	A	A	A
	CLQ-CR-ESD	B	B	B	B	B	B
	CLQ	C	C	C	D	D	D
*2 Power Supply	CLT-45	○	○	○	○	○	—
	CLT-60	○	○	○	○	○	○
	CLT-100	○	○	○	○	○	—
	MC-70L	○	○	○	○	○	○

#### SS-Series (ESD, Q-CR-ESD, Q, PS-Type)

Model		SS-2000	SS-3000	SS-4000	SS-6500	SS-7000
Output Torque Range	N.m	0.02 - 0.2	0.03 - 0.2	0.1 - 0.45	0.25 - 1.3	0.3 - 2
	lbf.in	0.17 - 1.7	0.3 - 1.7	0.9 - 3.9	2.2 - 11	2.6 - 17.4
	(kgf.cm)	(0.2 - 2)	(0.3 - 2)	(1 - 4.5)	(2.5 - 13)	(3 - 20)
Torque Switching		Stepless Adjustment				
Unloaded Rotation Speed (r.p.m)	HI	680	1000	1000	900	750
	LOW	490	670	690	600	—
Screw Size (mm)	Machine Screw	1.0 - 2.3	1.0 - 2.0	1.4 - 2.6	2.0 - 3.0	2.0 - 4.0
	Tapping Screw	1.0 - 2.0	1.0 - 1.7	1.4 - 2.3		
Dimensions (mm)	Grip Diameter	Ø26	Ø32.5	Ø32.5	Ø39	Ø39
	Total Length	166	183	197	235	255
Bit Drive	HIOS Shank	H4			H5	
	HEX Shank	—	—	1/4HEX or 5HEX		
*1 Weight (g)		200	350(390)	400(450)	660	750
Length of screwdriver cord (see the table of attached cord reference)	Standard	1.5m(5P)	1.5m(5P)	1.5m(5P)	2m(5P)	2m(5P)
	SS-ESD	A	A	A	A	A
	SSQ-CR-ESD	B	B	B	B	B
	SSQ	C	C	C	D	D
*2 Power Supply	CLT-45	○	○	○	○	—
	CLT-60	○	○	○	○	○
	CLT-100	○	○	○	○	—
	MC-70L	○	○	○	○	○

\*1: Numeric data in ( ) is weight of push-to-start driver.

\*2: Circles ( ○ ) indicate that the power packs can be used with the respective tools.

## $\alpha$ -Series (ESD, Q, PS-Type)

Model		$\alpha$ -4500	$\alpha$ -5000	$\alpha$ -6500
Output Torque Range	N.m	0.4 - 0.8	0.4 - 1.2	0.5 - 1.8
	lbf.in	3.5 - 7	3.5 - 10	4.3 - 16
	kgf.cm	4 - 8	4 - 12	5 - 18
Torque Switching		Stepless Adjustment		
Unloaded Rotation Speed (r.p.m)	HI	1700	1000	1700
	LOW	1200	700	—
Screw Size (mm)	Small Size Screw	2.0 - 3.0	2.0 - 3.0	3.0 - 4.0
	Tapping Screw	2.0 - 2.6		2.6 - 3.0
Dimensions (mm)	Grip Diameter	Ø32.5	Ø32.5	Ø37
	Total Length	207	207	235
Bit Drive	HIOS Shank	H4		H5
	HEX Shank	1/4HEX or 5HEX		
**1 Weight (g)		440 (490)		660 (660)
Length of screw-driver cord (see the table of attached cord reference)	Standard	1.5m(5p)	1.5m(5p)	2m(5p)
	$\alpha$ -ESD	A	A	A
	$\alpha$ -Q	C	C	D
**2 Power Supply	CLT-45	○	○	—
	CLT-60	○	○	○
	CLT-100	○	○	—
	MC-70L	○	○	○

\*1: Numeric data in ( ) is weight of push-to-start driver.

\*2: Circles ( ○ ) indicate that the power packs can be used with the respective tools.

Due to the high rotating speed, the tightening torque of  $\alpha$ -series screwdrivers may differ from the setting depending on the screw or board materials being used.

## ● Reference of attached cord for drivers

Type	Attached Cord
A	2m Cord ESD Type (5P)
B	2m Cord ESD Type (5P) & include ESD Vinyl tube
C	1.5m Cord Type (5P) & include Vinyl tube
D	2m Cord Type (5P) & include Vinyl tube

## Precautions on Use

- (1) Do not drop it or otherwise subject it to excessive shock.
- (2) Be careful not to splash water or oil.
- (3) Use HIOS power supplies units. We are not responsible for any malfunctions or troubles caused by using power units other than specified.

## 4. How to Operate

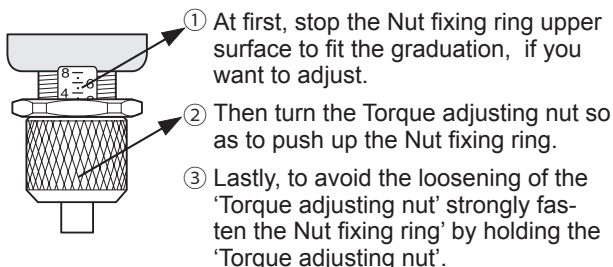
1. Select bit. Push down the joint shaft collar at the top of the screwdriver and insert the bit.
2. See the torque chart and match it with your torque application.
3. Select correct spring by color for corresponding torque according to the torque chart.

Example:

For getting automatic shutting at 8 kgf.cm with CL-6500 you could use either spring Y or W. With Y spring the torque adjusting nut should be set at #3 position on the driver scale; with W spring at #5. For torque over 11 kgf.cm, however, only Y spring is applicable as can be seen on the chart.

4. Plug in the power supplies and check red power indicator. If it is not on, check fuse on power pack or AC supply.
  5. Connect the cord of driver to power supplies. Make sure groove on plug lines up with projection on socket. Tighten knurled ring.
  6. Set torque adjusting nut at proper position on driver scale conferring with torque chart.
  7. For testing purpose, drive one screw until driver stops automatically.
  8. Check the fastened degree of the screw with a torque wrench. (For this checking, HIOS torque meter HDP or HDM Series recommended.) If found too high or too low, adjust the position of nut for further testing.
  9. Once you get best result keep Nut there intact and you will enjoy accurate repeatability of fastening at same torque.
  10. The torque adjusting nut of CL-6000, CL-6500, CL-7000 may be locked after the position is determined. Holding Torque Adjusting Nut, rotate only the metal band around it until a tapped hole is uncovered. Install a M3 x 3 set screw there and tighten it. Return band to original position.
- The torque adjusting nuts of the CL-2000, CL-3000, CL-4000 can be locked by aligning the red mark on the outer casing with any one of two vertical grooves (or three grooves for the standard-type screwdriver) of the bolt located nearest the torque adjusting scale. To change the position, lift and turn the nut outer casing.

- The CL-2000 (SS-2000) Electric Screwdriver have 'Double nut system' (Nut fixing ring and Torque adjusting nut) to avoid loosening from shock or vibration to the driver. To adjust those two nuts, follows ① to ③ steps below.



## 5. Push-to-Start Type

Both the models of Driver have Push-to-Start type that is designed to start by causing a proper thrusting pressure on the bit in place of pressing the Switch Lever by the fore-finger. Drivers of this type are identified by the additional sign PS following the principal Push-to-Start type models. The PS type, therefore, has no lever for starting. All other functions remain same as the principal type.

**Users of this type is specifically cautioned to disconnect the cord to shut off power when handling the Quick Change Collet for replacing bit to avoid danger from surprising starting.**

## 6. Power Supplies

The power pack for CL Drivers requires two basic functions: (1) to convert local AC power to lowered DC Power and (2) to shut off the power by automatical reaction to the pulse emitted from the Driver at the moment the torque at work reaches the regulated limit. The function (2) can be performed, if so opted, by a ready-made unit called Control Box CB-105 installed separately from the unit for the function (1).

## CLT-45

Connects to one CL, SS or  $\alpha$ -series driver. (except the CL-7000, SS-7000,  $\alpha$ -6500, CL-9000 model).



## CLT-60

Connects to one CL, SS or  $\alpha$ -series driver. (except CL-9000 model).



## CLT-100

Connects to two CL, SS or  $\alpha$ -series driver. (except the  $\alpha$ -6500, CL-9000 model).



## ■ Specifications

Power Pack Model	CLT-45	CLT-60	CLT-100
Size (mm)	71.5x146x42.6 (H)	88x210x52 (H)	182x145x132 (H)
Weight (kg)	0.33	0.715	4.0
Input	AC 100 -240V ± 5% 47/63 Hz	AC 100 -240V ± 5% 47/63 Hz	AC 100V ± 5% 50/60 Hz
Output Voltage	LOW/HI	LOW/HI	LOW/HI
AC Cord Length	1.8 m		

**MC-70L** (requires separate control box)



**Max. number of connected drivers:**

Type	max. number of drivers	Note
CL-2000, 3000, 4000 SS-2000, 3000, 4000	20 pcs.	Each driver must be connected to CB-105 (Control Box ).
CL-6000, 6500, 7000 SS-6500, 7000 α-4500, α-5000	10 pcs.	
α-6500	5 pcs.	

**Specifications**

Power Pack Model	MC-70L
Size (mm)	320x220x153 (H)
Weight (kg)	12
Input	AC 100V, 120V or 220-240V 50/60 Hz
Output Voltage	LOW/HI
AC Cord Length	1.8 m
Accessories	Trunk-line wire 20 m 1 line (Black and Red) Branch-line wire 0.5 m 10 lines (Black and Red) U-Element 20 pcs. #560B

**Control Box  
CB-105 (SUB)**

Control boxes for cutting off and supplying current in response to clutch action of drivers. Each driver should be connected to one control box.



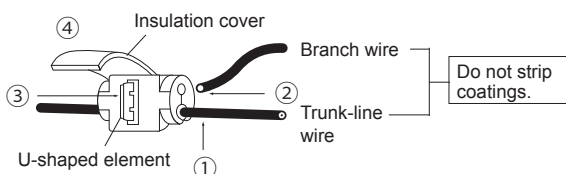
**Specifications**

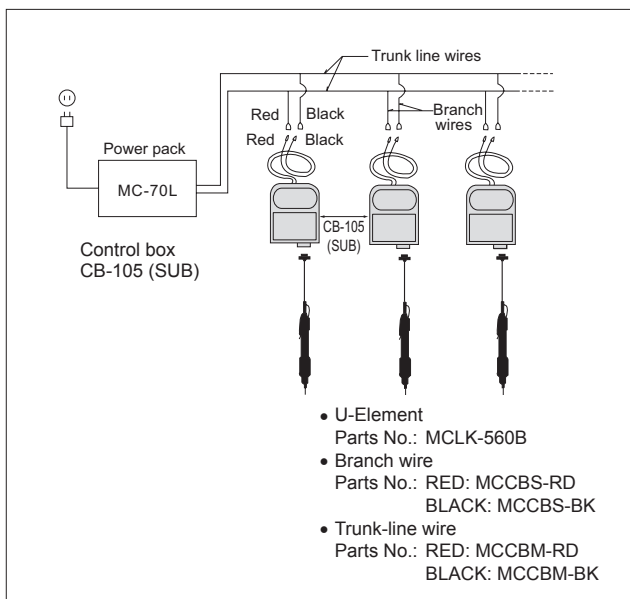
Size (mm)	70x42x100 (H)
Weight (g)	240
Input Cord Length (m)	2
Attachment Plates	2 pieces



## 7. How to connect a control Box

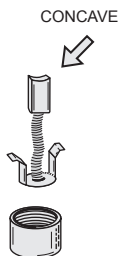
- There are two pairs of output terminals, two (+) and two (-), on the back of the body case. They are provided to divide main wires to two directions from the main unit. When distributing the power pack in one direction only, keep one pair of the terminals idle.
  - When connecting main wires to the terminals, be sure to connect the red wire to (+) and the black wire to (-).
1. Connect the branch wire to the main wire at regular intervals. Use a U-Element for connection. You can connect wires without stripping off the wire coating.
  2. Insert the main wire ① into the groove by widening the lower split (opening) of the U-Element.
  3. Fully insert the branch wire ② into the upper hole until it stops.
  4. Insert a U-shaped element ③ (the comb-shaped metal part) with a pair of pliers to make it flush with the plastic body. Only the coating is broken; both wires still connected.
  5. Put an insulation cover ④ on the element and snap it shut.
  6. The connected branch wires have plug receptacles at their other ends. Connect the control box plugs to these plug receptacles.





## 8. How to replace carbon brushes

1. It is recommended to replace the pair of carbon brushes to maintain performance when worn out to about half the length.
2. Carbon brush caps have a slot. Unscrew them with a flat tip driver to open them. Be careful not to allow the carbon brush inside to jump out as it is kept there under spring pressure.
3. With the mini-type screwdriver, one of the carbon brush covers is located under the switch lever, therefore, the switch lever must be removed before reaching it. Turn the hexagonal head of the axis supporting the switch lever, then they can be removed.
4. Replace the worn carbon brushes with new pair. Note that the end surface of the carbon piece is not exactly flat but of slightly concave face, so see to that the carbon piece is placed in the correct direction when inserted into the holder to have its curved face make smooth meeting with the rotation of the deep inner commutator. Screw the cap tightly.

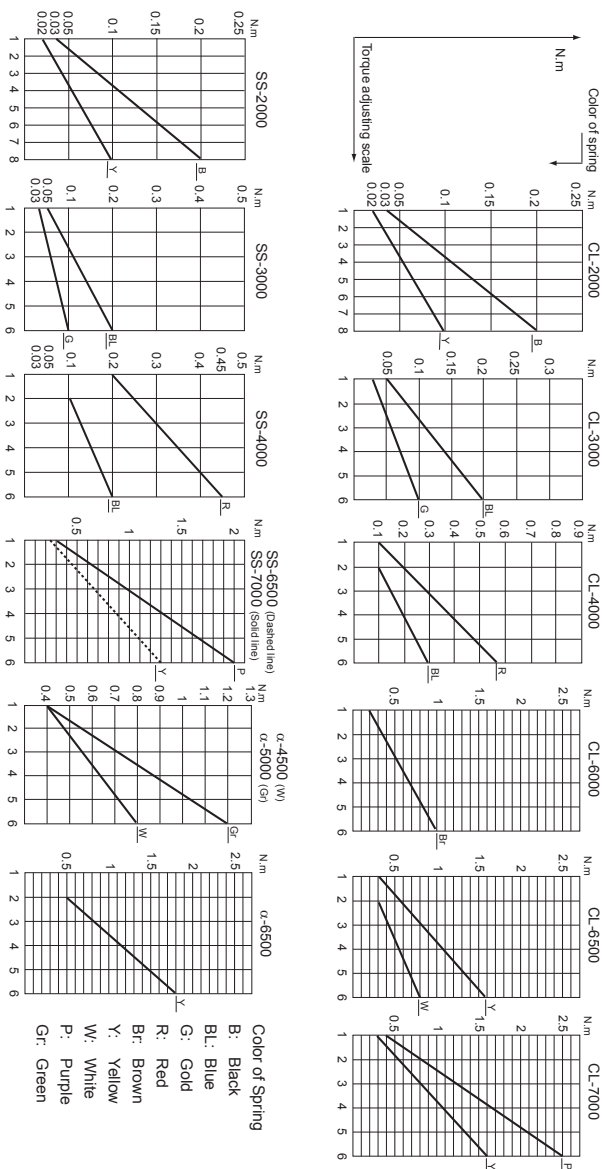


## ■ Proper guidance on output torque (at HI input)

**CL-series** (NL-Series, ESD, Q-CR-ESD, Q, PS-Type)

**SS-series** (ESD, Q-CR-ESD, Q, PS-Type)

**α-series** (ESD, Q, PS-Type)



\* Since α-series screwdrivers feature high-speed rotation, their tightening torque may differ from the setting values depending on the various conditions of screws and parts materials.