



Brushless Screwdriver with Torque sensor

# PGF-3000 / PGF-5000 / PGF-7000

Control Unit

## PG-01

### Instruction Manual

(May 2019)



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# Safety Instructions

Please read this instruction manual carefully before use to ensure proper operation.

## Installation

- Do not install this unit in the places listed below. It may cause a fire or a malfunction.
  - A place with high humidity or lots of dust
  - A place that becomes too hot
  - A place with naked flames
  - A place exposed to direct sunlight
  - A place with corrosive gas in the air
  - An unstable place

## Power supply

- Be sure to install an earth leakage breaker and a safety breaker to the commercial power supply to be used.
- Do not connect anything other than specified parts to the connection part of this unit.
- Do not damage the power cord or allow oil to touch it. Also, do not place heavy objects on the power cord. It may cause a fire.
- When connecting/disconnecting the power cord or screwdriver cord, etc., always hold the plug.

## How to handle this unit

- Do not disassemble or remodel this unit. It may cause a malfunction.
- Do not cause severe impacts or apply excessive force. It may cause a malfunction.
- Do not operate this unit with wet or oily hands.
- Do not work with an unsteady posture or in an unstable place.
- Set an appropriate overtime period as the screw tightening time and avoid situations where this unit rotates continuously more than necessary.
- If uneven rotations, abnormal noise, overheating, activation of the breaker, etc., occur during usage, immediately stop using the screwdriver for repair. However, overheating is possible due to usage frequency and screw types. To prevent such overheating, get a spare screwdriver of the same unit and use it alternately, or review the selection of the screwdriver model.
- Do not place an overload large enough to make the clutch unable to run out. It may cause the motor to malfunction.
- Do not touch the rotating screwdriver. It may cause an injury or malfunction.

- Do not wear clothes with large cuffs, gloves, neckties etc. They may get caught in the rotating screwdriver and cause an injury or malfunction.
- Wear suitable clothing and protective eyewear for work. Cover long hair with a hat etc., so that you can work safely.
- Please contact our distributor if you cannot attach/remove a bit according to the instruction manual.

## Maintenance

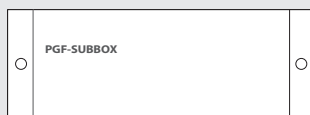
- If you do not use this unit for a long time, turn off the power and unplug the plug from the outlet for safety.
- If you do not use this unit for a long time, remove the accessories from it and store them in the packing box.
- Keep this unit in a place where appropriate temperatures and humidity are controlled.
- Keep this unit in a place out of reach of people other than authorized workers.

## Check the Accessories

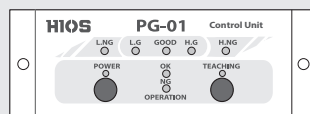
If anything is missing or damaged, please contact the dealer from whom you purchased this unit.



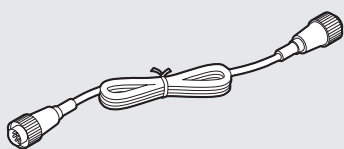
Main Unit



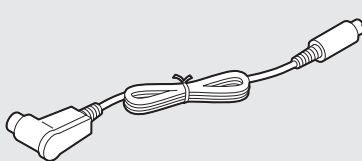
PGF-SUBBOX



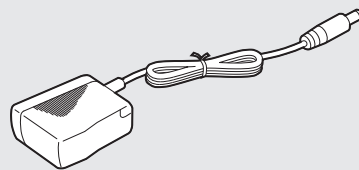
PG-01



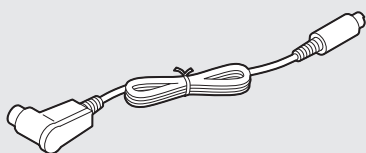
Screwdriver Cord (3 m)



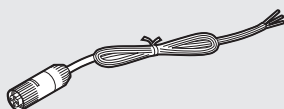
Cord for PGF-SUBBOX (40 cm)



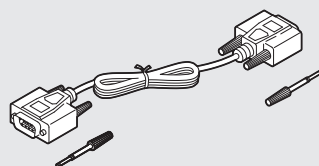
AC Adaptor (1.5 m)



Sensor Cord (3 m)



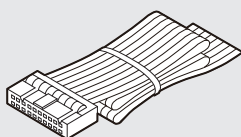
Start/Torque-up Cable (50 cm)



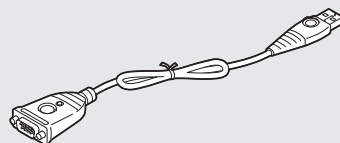
• RS-232C Cable (2 m)  
• Spare Fixing Inch Screws×4



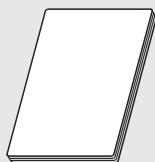
CD-ROM



I/O Flat Cable (30 cm)



USB / RS-232C Converter (35 cm)



Instruction Manual

- A USB cable is not included. Please procure it as necessary.
- For "USB to RS-232 Adapter" Users  
Driver CD for "USB to RS-232 Adapter" may not be included depending on time period. You can download the newest driver at ATEN website as needed.  
<http://www.aten.com/global/en/products/usb-&-thunderbolt/usb-converters/uc232a/>

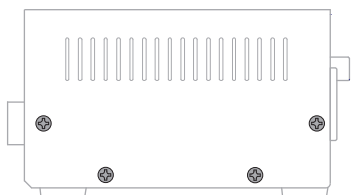
## Switch to the Start Reading Mode



### Note:

The pulse start mode is set for this unit by default. Since its start mode is compatible only to the reading start, it is necessary to change the start mode.

- 1 Unscrew the eight screws on the side of the power supply to remove the cover.**

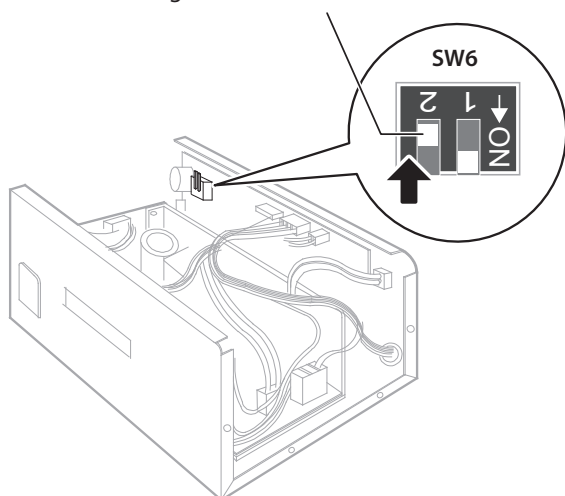


- 2 Turn off the switch (No. 2 of SW6) for reading/pulse located on the front side board inside the cover.**

- Be careful that foreign matter does not enter inside while working.

Power supply: BLT-AY-61 / BLT-AY-71 Inside the cover

Reading / Pulse Select Switch

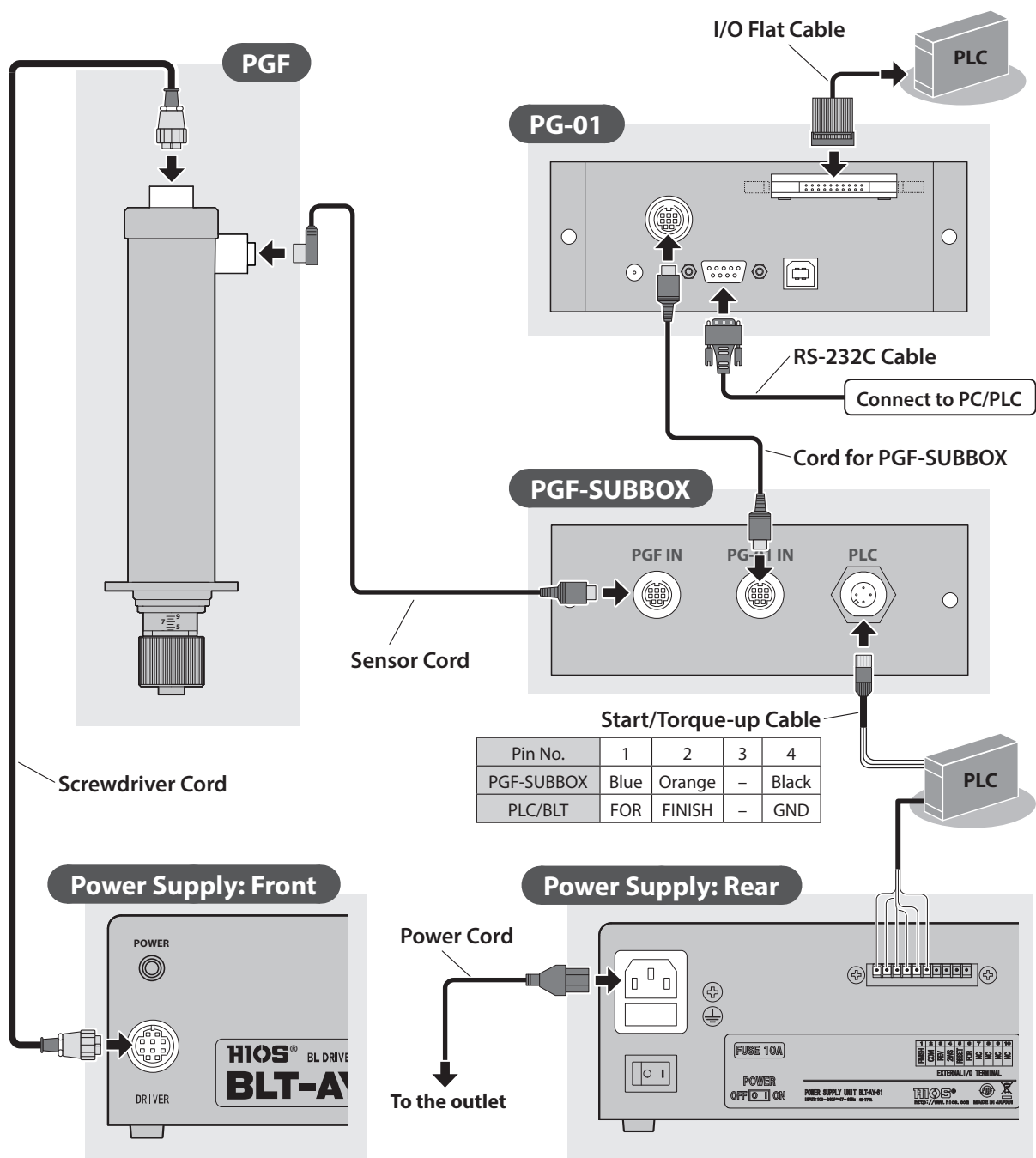


- 3 Replace the cover after changing to the start mode.**

## Connect the Cords

Connect the cords included.

After connecting all the cords, start the power supply by inserting the plug into the outlet.

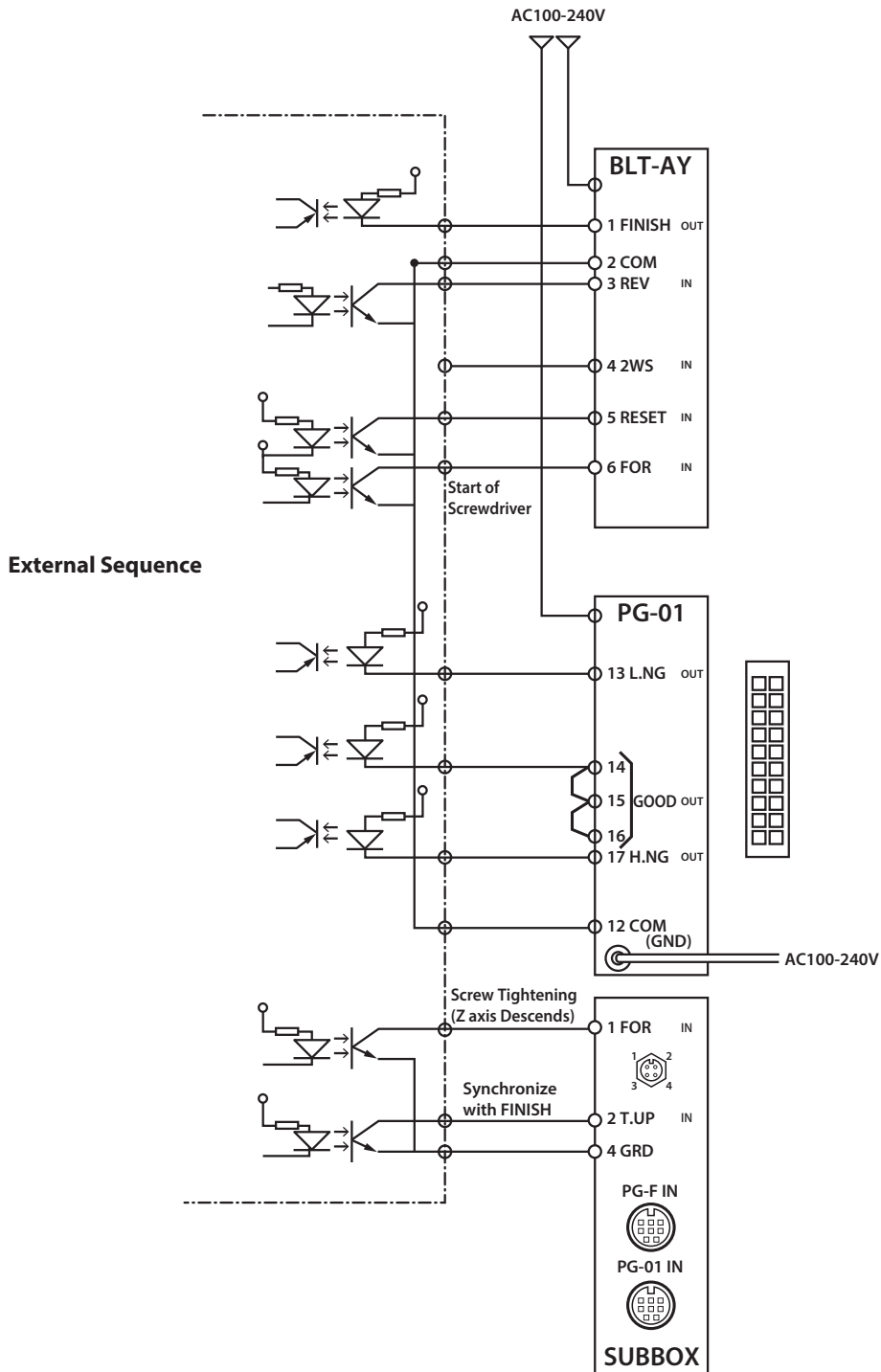


# System Configuration of the Screwdriver



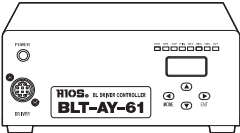
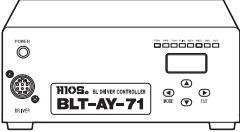
## Note:

Since PLC needs to send a FOR signal separately to PGF-SUBBOX either from BLT-AY-61 or BLT-AY-71, do not synchronize the FOR signals forcibly.



## ■Check the Combination of the Screwdriver and the Power Supply

Refer to the instruction manual for operating method of power supply.

Screwdriver	Compatible Power Supply
PGF-3000/PGF-5000	BLT-AY-61 
PGF-7000	BLT-AY-71 

## ■Installation Precautions



**Note:**

Do not use this unit with a universal joint. If you use a universal joint or jig, etc., the actual torque may differ from the specified torque.

## ■Turn on the Power

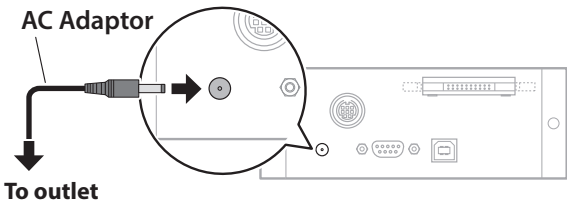
PG-01 automatically turns on when the AC adaptor is connected.



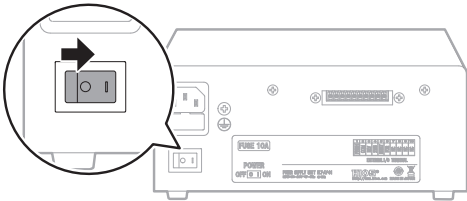
**Note:**

PG-01 performs automatic zero adjustment when the power is turned on. Do not apply a load to the tip of the screwdriver or do not drive it during adjustment.

### PG-01



### Power supply: Rear



## Change Power Supply Setting

For details of how to set up the power supply, refer to the instruction manual of the power supply.



### Note:

As this unit does not support the setting of the torque up trigger and multiple impacts, please set the power supply as described below.

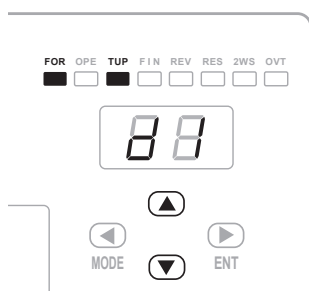
### 1 Press and hold the button.

- The buzzer will sound twice in about two seconds after that. The setting mode will be enabled.
- The LED for operation and the segment for setting value will be lit.

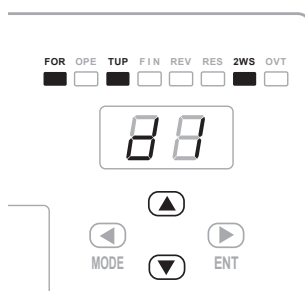
### 2 Use the button to select the setting for the number of forward rotation impacts and the torque up trigger.

### 3 Use the / button to change the setting to <d1>.

- Set HIGH and LOW respectively.



Rotation: HIGH



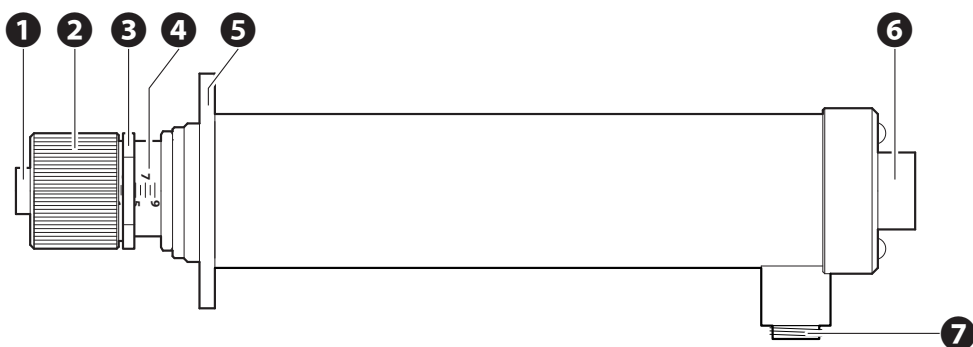
Rotation: LOW

### 4 Press and hold the button.

- The buzzer will sound twice about two seconds after that. The setting mode will be disabled.
- The LED for operation and the segment for setup value will turn off.

## Parts and Their Functions

### ■ PGF-3000/PGF-5000/PGF-7000



#### ❶ Joint Shaft Collar

This is used when a bit is attached or removed.

#### ❷ Torque Adjustment Nut

This is to adjust the output torque.

#### ❸ Nut Fixing Ring

This is to prevent misalignment of the torque adjustment nut. It should be fitted closely to the torque adjustment nut without a gap.

#### ❹ Torque Adjustment Scale

It indicates the reference value for adjustment of output torque. For details of torque value, refer to "Reference Table of Output Torque" (P.15).

#### ❺ Flange

This is used to install the screwdriver to a fixing base.

#### ❻ Screwdriver Cord Connector

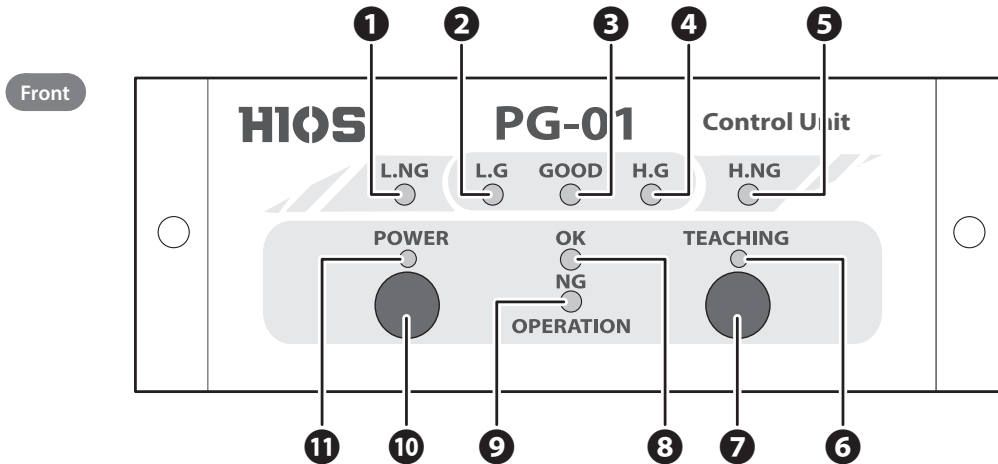
This is used to connect the screwdriver cord.

#### ❼ Sensor Cord Connector

This is used to connect the sensor cord.

## PG-01

The measurement result of tightening a screw will be informed by the indicator and sound.  
For setting of OK/NG judgment, refer to "Set Learning Values (Teaching)" (P.17).



### 1 L.NG Indicator

This indicator is lit when the measured value is no good (smaller than the minimum pass value).

### 2 L.G Indicator

This indicator is lit when the measured value is good (larger than the minimum pass value and below the minimum learning value).

### 3 GOOD Indicator

This indicator is lit when the measured value is good (larger than the minimum learning value and smaller than the maximum learning value).

### 4 H.G Indicator

This indicator is lit when the measured value is good (larger than the maximum learning value and below the maximum pass value).

### 5 H.NG Indicator

This indicator is lit when the measured value is no good (larger than the maximum pass value).

### 6 Teaching Indicator

This indicator is lit when in the teaching mode (for setting of learning values).

### 7 Teaching Button

This is for setting to the teaching mode. Pressing and holding this button (2 seconds or longer) in the teaching mode will cancel the mode. For details of teaching, refer to "Set Learning Values (Teaching)" (P.17).

### 8 OPERATION OK Indicator

This indicator is lit while the screwdriver is rotating positively.

### 9 OPERATION NG Indicator

- This indicator is lit when the operation ends without torque up.
- This blinks when the operation ends due to an abnormal measurement time.

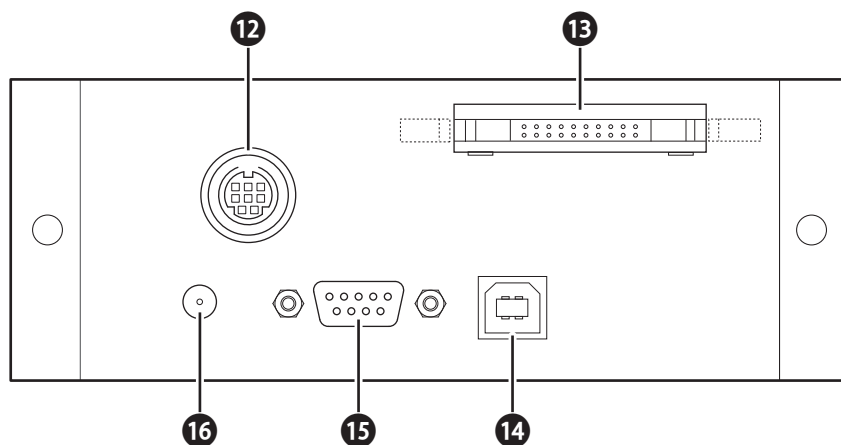
### 10 Power Button

This is not used for this unit. When the AC adaptor is connected, power will be supplied automatically.

### 11 Power Indicator

This indicator is lit when power is supplied.

Rear

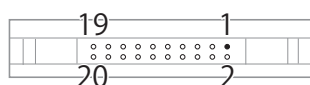


### 12 Connector for the PGF-SUBBOX Cord

The PGF-SUBBOX cord is connected here.

### 13 I/O Connector

The I/O flat cable is connected here for the evaluation result to be output. The output format is an open collector. Use this when you cannot connect with RS-232C.



Pin No.	Output signal	Description
12	COM GND	—
13	L.NG (NG)	Output when the measurement value is NG (below the minimum pass value)
14	L.G (OK)	Output when the measurement value is OK (equal to or larger than the minimum pass value and smaller than the minimum learning value)
15	GOOD (OK)	Output when the measurement value is OK (equal to or larger than the minimum learning value and smaller than the maximum learning value)
16	H.G (Pass)	Output when the measurement value is good (equal to or larger than the minimum learning value and smaller than the maximum learning value)
17	H.NG (Fail)	Output when the measurement value is no good (larger than the maximum pass value).

### 14 USB Port

A USB cable is connected here. No USB cable is provided with the unit. Procure one if necessary.

### 15 RS-232C Connector

An RS-232C cable is connected here.

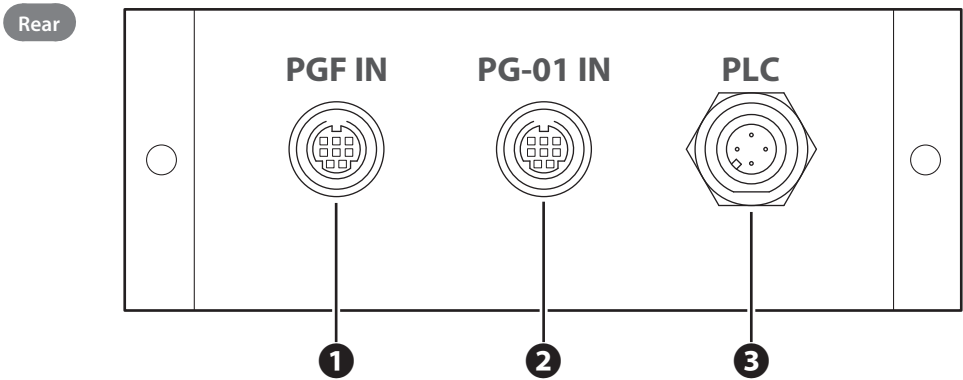
Pin assignment (the terminals not described are unused)

Pin No.	Signal name	I/O
2	RXD	OUT
3	TXD	IN
5	GND	

### 16 AC Adaptor Connector

An AC adaptor is connected here. Power will be automatically supplied when an AC adaptor is connected.

PGF-SUBBOX



1 Sensor Cord Connector

A sensor cord connector is connected here.

2 Connector for PGF-SUBBOX Cord

The PGF-SUBBOX cord is connected here.

3 Start/Torque up Cable Connector

A start/torque up cable is connected here.

Pin No.	1	2	3	4
PGF-SUBBOX	Blue	Orange	—	Black
PLC/BLT-AY	FOR (START)	FINISH (T.UP)	—	GND

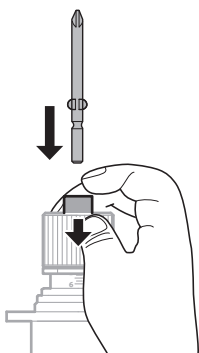
## Attach a Bit



### Notes:

- Do not attach or remove a bit while the screwdriver is powered. It may cause an unexpected accident.
- Use of a special bit may not fully demonstrate the original performance of PGF. Please contact us for details.

### 1 Insert a bit while pushing the joint shaft collar into the main unit.



### 2 Release the joint shaft collar and check if the bit is locked.

- Pull the bit lightly and check if it will come out.

## Remove a Bit

### 1 Pull out a bit while pushing the joint shaft collar into the main unit.

## Precautions when Using a Hexagonal Bit

- No hexagonal bit is provided with this unit. Procure bits of any shape according to your requirement.
- A double bit or a hexagonal bit with two grooves cannot be used.

Bit Drive	5HEX (WAF: 5mm)	1/4HEX (WAF: 6.35mm)
Shape		

# Adjust Torque



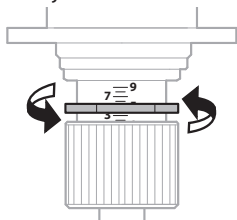
## Note:

The "reference table of output torque" and the torque adjustment scale are approximate and do not guarantee actual setting values.

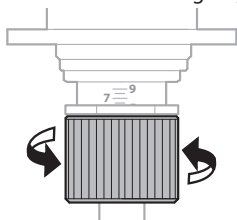
For accurate torque check, please use an HIOS torque meter and Fidaptor.

## 1 If the torque is determined beforehand, turn the torque adjustment nut and nut fixing ring referring to the "reference table of output torque".

- Turn the torque adjustment nut clockwise to increase the torque and turn it counterclockwise to decrease the torque.
- Adjust it so that the end face of the nut fixing ring is right above the scale.



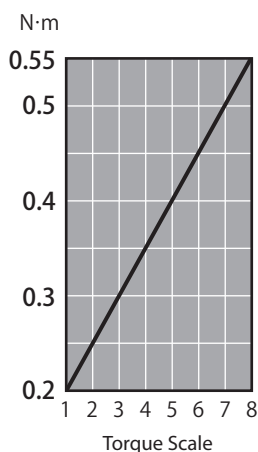
- After the nut fixing ring is positioned, fit the torque adjustment nut accordingly.



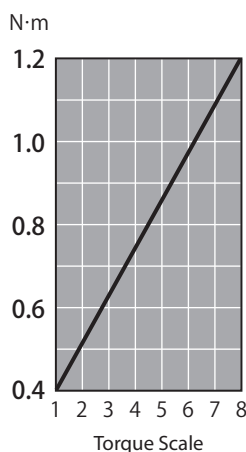
## 2 Try to fasten a screw and check how it is fastened after the screwdriver stops and adjust the most appropriate torque.

### Reference Table of Output Torque

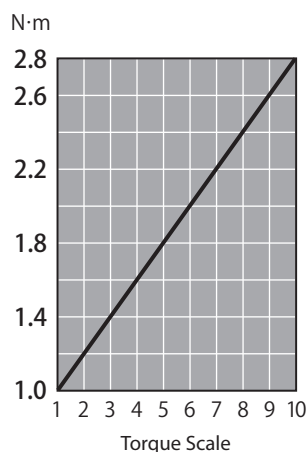
PGF-3000



PGF-5000



PGF-7000



# Activation and Stop of Screwdriver



## Note:

This unit is designed to be used eight hours a day (about 4,000 shots).

## ■ Activate Screwdriver

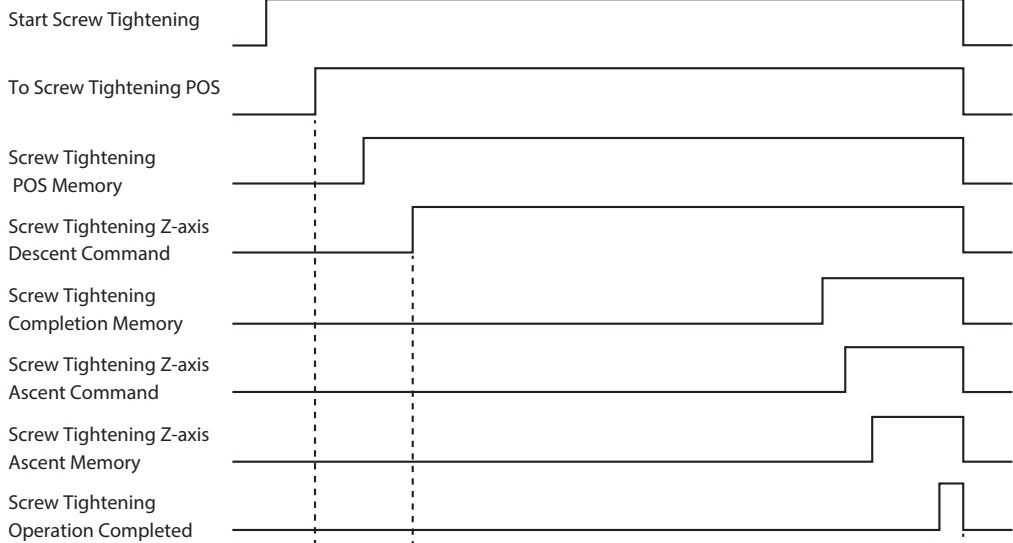
- 1 Input a FOR signal to the power supply.

## ■ Stop Screwdriver

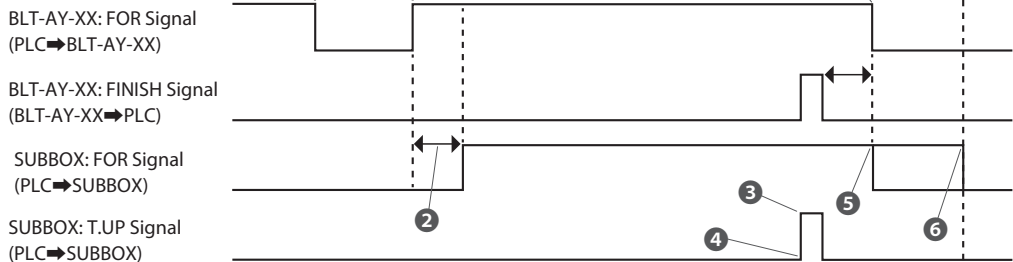
- 1 Either turn off a FOR signal or input a RESET signal.

## ■ Timing Chart of Screw Tightening

### PLC Internal Sequence



### PLC↔HIOS Product



- 1 PLC sends OFF signal 100ms after it receives FINISH signal from BLT.
- 2 PLC sends a signal 100ms later
- 3 PLC sends ON signal to SUBBOX after it receives FINISH signal from BLT
- 4 The torque in T.UP signal sent to SUBBOX is saved.
- 5 PLC sends OFF signal 100ms after it receives FINISH signal from BLT-AY-XX (the torque is sent from PG-01 to PLC within 100ms).
- 6 The screwdriver turns off when the Z-axis ascent sensor turns on (after a time lag of over 100ms).

## Set Learning Values (Teaching)

Measure the "tightening torque" and "working time" by using screws and materials actually used to set the reference values for work. The two values recorded are the minimum and maximum, respectively.

Also, after teaching, it is possible to change the error tolerance of the learning values and the learned values in the attached application or Excel file.

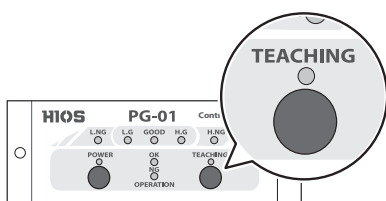


### Note:

Teaching should be done under the same conditions as actual operation.

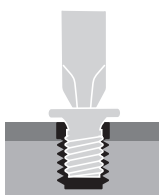
An error may occur in the measured value if the screw to be used, the materials to be fastened, the attaching method of the screw, etc., are different from actual operation.

### 1 Press and hold the teaching button.



- A buzzer sounds in about 2 seconds and the teaching mode is enabled.
- The teaching indicator is lit.
- L.NG indicator and H.NG indicator blinks.

### 2 Using the screws and materials to be actually used, perform tightening more than 3 times.



- Every time after tightening is completed, a buzzer sounds once, and the measured value is recorded.
- The measured values of the third to tenth trials are recorded and the values after the eleventh trial will overwrite the old values.

### 3 Press and hold the teaching button.

- A buzzer sounds in about 2 seconds and the teaching mode ends.
- The teaching indicator, L.NG indicator and H.NG indicator turn off.

## About Learning Values

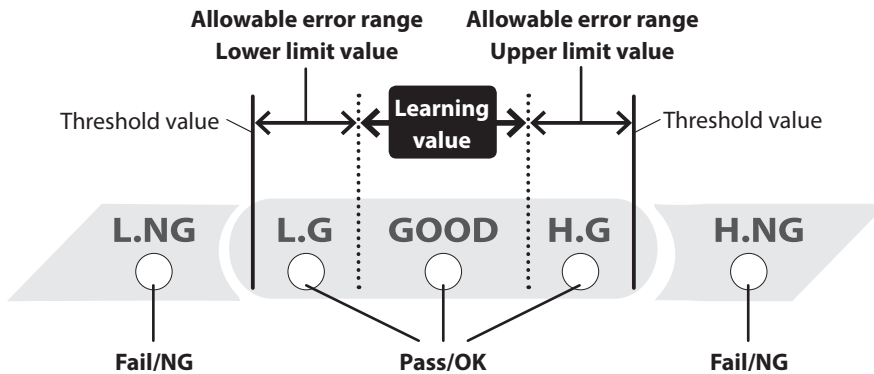
- The learned values do not disappear even when the power is turned off.
- To reset the learned values, perform teaching again. The previous learned values will be deleted when the teaching mode is enabled.
- After purchasing, please perform teaching with PG-01 for the first time. Otherwise, it is not possible to set learning values with the attached application.

## Evaluation of Screw Tightening

- It measures actual screw tightening work in real time, compares the measurement with the learning value, and informs the user of the evaluation result with a indicator and sound.
- The reverse rotation of the screwdriver is not evaluated.
- The allowable error range at the time of purchase is set to 10% for both upper and lower limits. If you want to change it, please use the attached application.

### ■ OK/NG Judgment of Tightening Torque Value

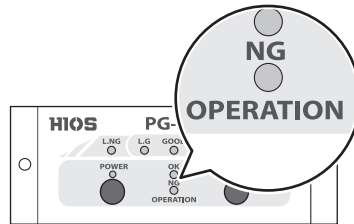
If no error is detected in the screw tightening work, one of L.G, GOOD or H.G indicator is lit and the buzzer sounds.



If the torque is within the learning values, the GOOD indicator will be lit, and if it falls within the allowable error range, either L.G or H.G indicator will be lit. Conversely, when the torque is less than the lower limit value, the L.NG indicator will be lit, and when the torque exceeds the upper limit value, the H.NG indicator will be lit, which means fail.

## ■ Evaluation of Operation Time

- The operation time from start of rotation to stop of the screwdriver is evaluated against the learning values.
- The blinking and lighting of the OPERATION NG indicator will turn off when the START signal is entered again.



### Main reasons why OPERATION NG indicator is lit

- No torque up signal is sent because of reasons like screwdriver idling.

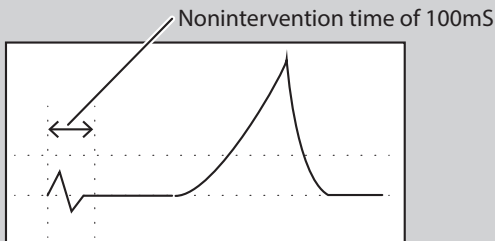
### Main reasons why OPERATION NG indicator blinks

- A torque up signal was not sent during the learning measurement period.  
If it is not necessary to strictly measure the operation time, by using the application, change the setting value so that the learning interval will become larger.
- Continuous ON/OFF operations at the end of tightening (pushing the button twice or three times in a row)



#### Note:

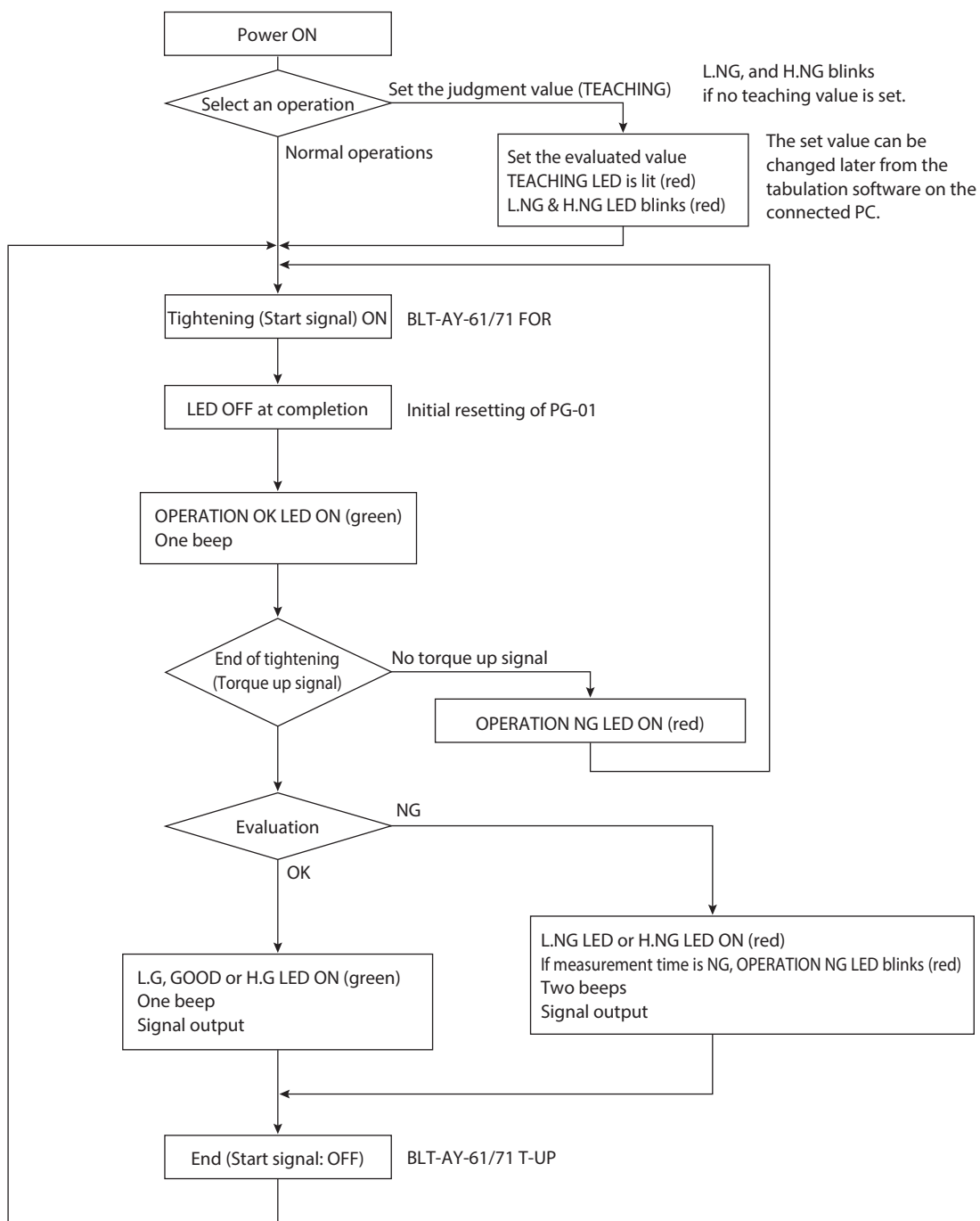
There is a nonintervention time of 100mS for torque measurement and evaluation after the START signal is input.



If the screwdriver output is given to a screw even after tightening, the value will be larger than the measuring value and not the expected tightening value.

To perform proper screw tightening, please do not perform continuous operations.

## ■ Flowchart of Judgment

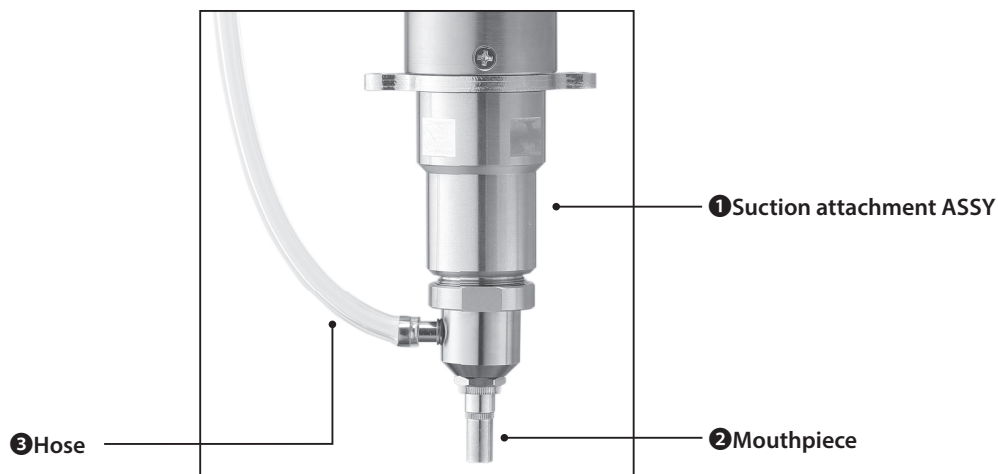


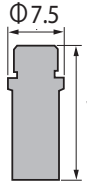
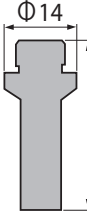
## Screw Suction (Optional: Suction Attachment)

With the suction attachment (optional), it is possible to suck a screw to the bit end by using the negative pressure of the pump. There are two shapes of the suction attachment.

The pump to generate negative pressure is not provided with the unit. Please procure it by yourself or contact us.

### ■ Configuration of PGFQ Type



Model	①P/N	②Type	Compatible bit	Accessories
PGF-3000	PGFQ3-SET	F3 	Φ4, L80mm	③Hose (L: 3.5m, I/D: Ø4, O/D: Ø7)
PGF-5000	PGFQ5-SET		Φ4, L80mm	
PGF-7000*	PGFQ7-SET	F6 	Φ5, L100mm	

\* If the socket of the bit is 1/4HEX, please contact us.

## Assemble the Attachments

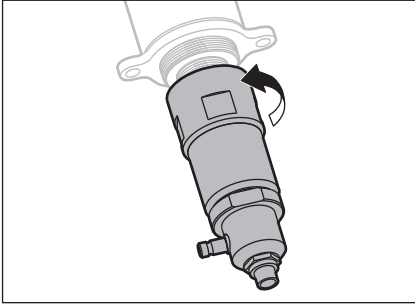
---

### 1 Attach a bit as required.

- A bit longer than an ordinary one is preferable.

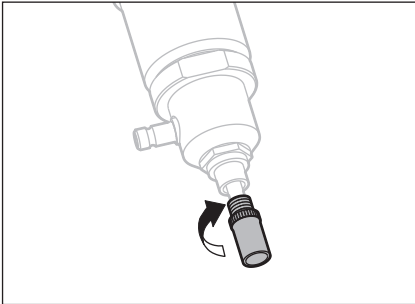
### 2 Attach the suction attachment.

- Turn it counterclockwise.

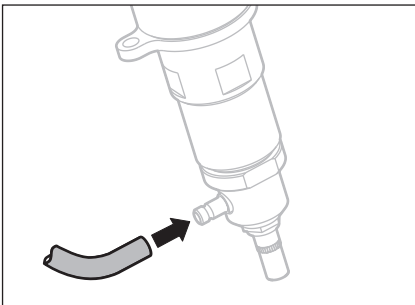


### 3 Attach a mouthpiece.

- Turn it clockwise.



### 4 Connect the hose.



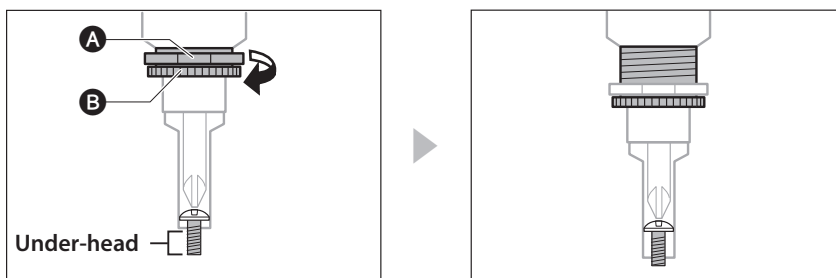
## Adjust the Under-head Length

---

It is possible to adjust the under-head length (margin) of a screw at the mouthpiece end.

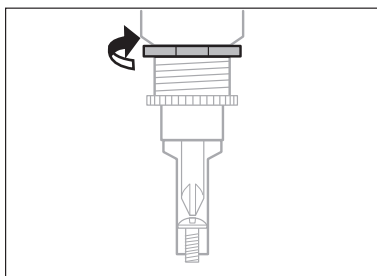
### 1 Turn **A** and **B** counterclockwise at the same time to loosen them.

- It becomes loose and the holder slides.



### 2 After length adjustment, turn **A** clockwise.

- Fix (A) closely to the screwdriver unit.



## ■ Configuration of PGFR

The special suction attachment PGFR with a long holder to be assembled to PGF-5000 and PGF-7000 (socket: 1/4HEX) is available. Before purchasing PGFR, it is necessary to check the sizes below: ❶ the suction attachment ASSY, ❷ bit and ❸ spring-type mouthpiece. The accessories are all optional.

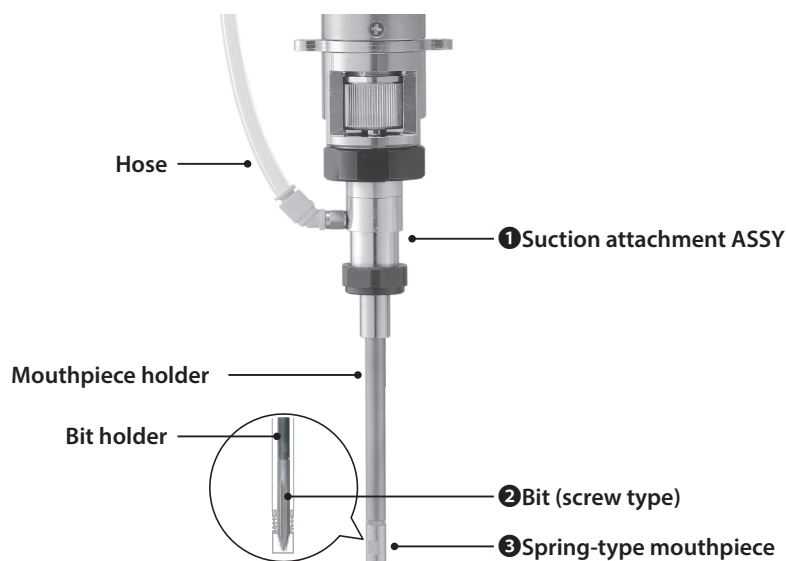


### Notes:

The bit (❷) is attached to the holder by turning it clockwise. So, if the screwdriver is used in the reverse rotation, the bit may become loose.

The hose is not provided with the unit. Please procure it by yourself or contact us.

The specifications of the hose:  $\Phi 4$  (I/D) x  $\Phi 6$  (O/D)



Model	❶ P/N	❷ End shape (screw diameter, P/N); length; end diameter			❸ P/N
PGFR-5000	PGFR5-SA	+ #1 (M2.0-M2.6, RBP4140S) + #2 (M3.0-M5.0, RBP4240S)	40mm	$\Phi 4$	See "Spring-type Mouthpiece" (P.25).
PGFR-7000 (1/4HEX)	PGFR7-SA				

## Variations

- The standard length of the mouthpiece and its holder is 85L. There are other special options including 32L, 56L, 60L, 95L, 100L and 125L.
- The mouthpiece with a deep hole comes in 41L and 61L in addition to the standard 27L.

\*It may take some time for the delivery of the products with special specifications depending on inventory. Contact us before placing an order.

## Spring-type Mouthpiece

The spring-type mouthpiece has two variations: with a movable inner sleeve and a movable outer sleeve. Select one according to your needs.

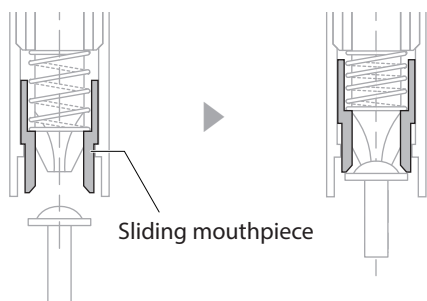
### How to Read the Part No.

**FS60-80J**

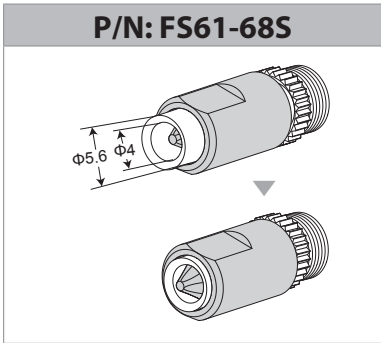
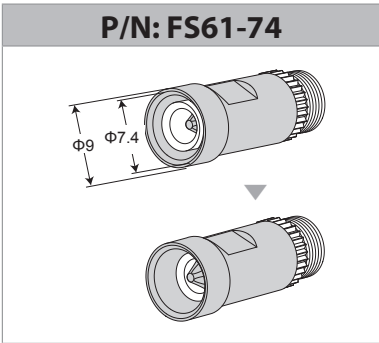
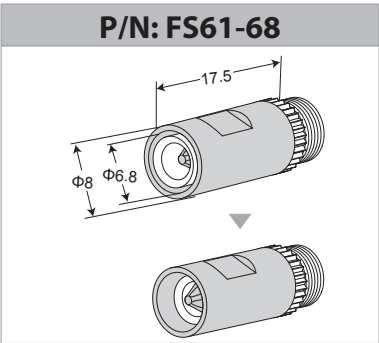
1 2 3 4 5 6

1	Type: F3, F6
2	With a spring
3	Classification of screwdriver torque range
4	Movable sleeve: outer (0), inner (1)
5	I/D (example: 80 stands for 8.0)
6	Material and shape: J: Duracon, A: aluminum, S: stepped

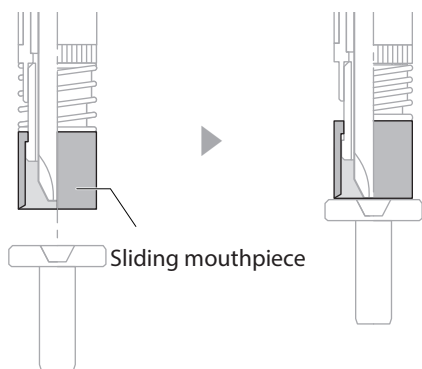
### Movement of the Inner Sleeve Type



When a screw and the bit are fitted by vacuum pressure, the sliding mouthpiece moves horizontally to keep the screw vertical and supports the screw head.

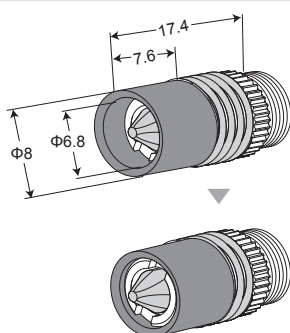


## Movement of the Outer Sleeve Type

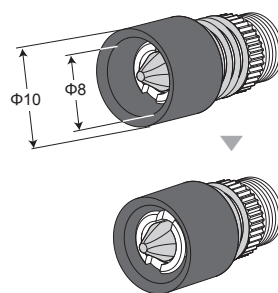


When a screw and the bit are fitted by vacuum pressure, the sliding mouthpiece moves horizontally to keep the screw vertical and supports the screw head. Since the diameter of the mouthpiece is smaller than the outer diameter of a screw, it is good for screw tightening in a tight space.

**P/N: FS60-68J / FS60-68A**



**P/N: FS60-80J**



## Reference Table of Suitable Screw Sizes

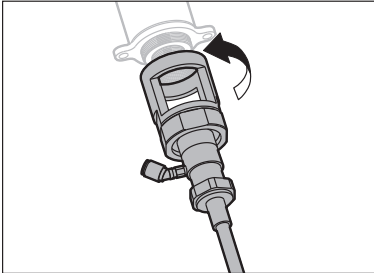
Size		M2.6			M3.0			M4.0		
Screw Type		Pan	Binding	Truss	Pan	Binding	Truss	Pan	Binding	Truss
Model	PGFR-5000	FS61-68 FS61-68S			FS61-68 FS61-68S		FS60-68J FS60-68A FS61-68S FS61-74	FS60-68J FS60-68A FS61-68S FS61-74	—	—
	PGFR-7000								FS60-80J	

Special products to be able to hold small screws (less than 2.6mm) are available. Contact us for details. It may take some time for the delivery of the products with special specifications depending on inventory. Contact us before placing an order.

**1 Remove the bit attached to the screwdriver if required.**

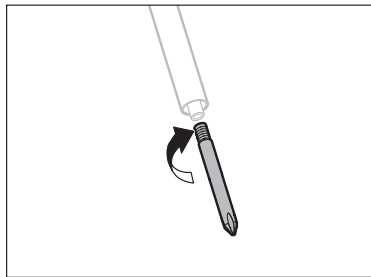
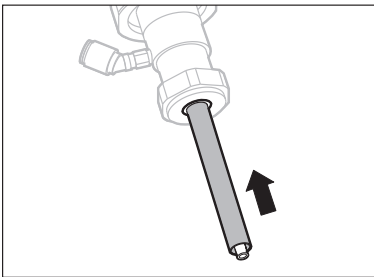
**2 Attach the suction attachment.**

- Turn it counterclockwise.



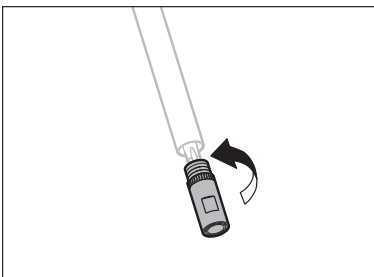
**3 Attach the bit to the mouthpiece holder.**

- Push the mouthpiece holder into the main unit.
- Attach the bit to the bit holder by turning it clockwise.

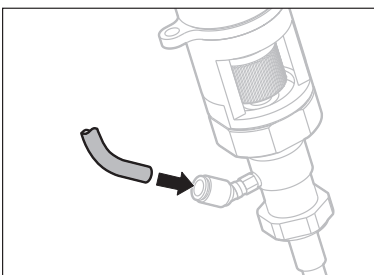


**4 Attach the mouthpiece.**

- Turn it counterclockwise.



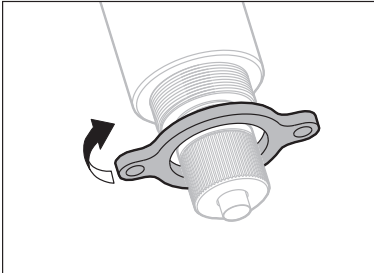
**5 Connect the hose.**



**1 Remove the bit attached to the screwdriver when necessary.**

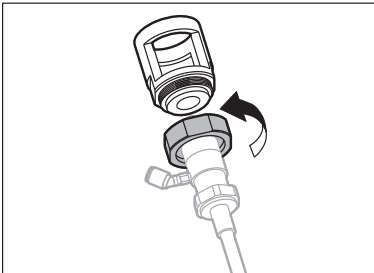
**2 Remove the flange**

● Turn it clockwise.



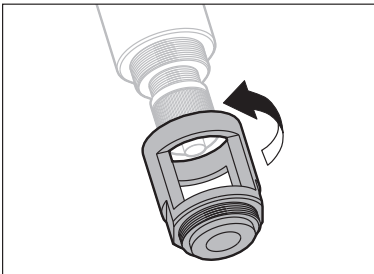
**3 Remove the base from the suction attachment.**

● Turn it counterclockwise.



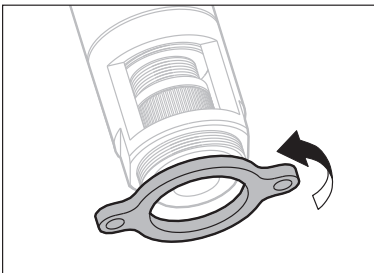
**4 Attach the base from the attachment to the main unit.**

● Turn it counterclockwise.



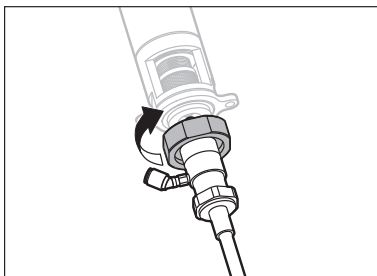
**5 Attach the flange.**

● Turn it counterclockwise.



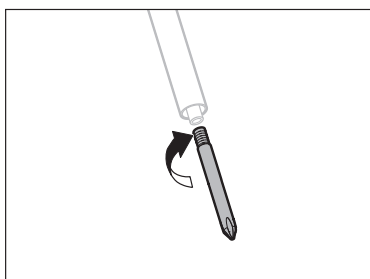
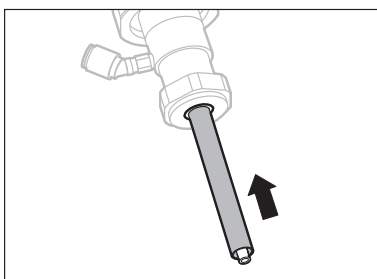
## 6 Attach the suction attachment.

- Turn it clockwise.



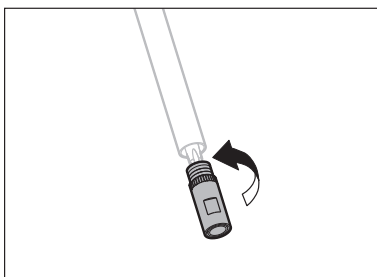
## 7 Attach the bit to the mouthpiece holder.

- Push the holder into the main unit.
- Attach the bit to the holder by turning it clockwise.

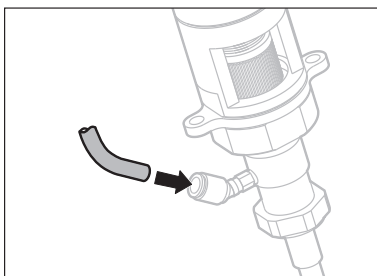


## 8 Attach the mouthpiece.

- Turn it counterclockwise.



## 9 Connect the hose.



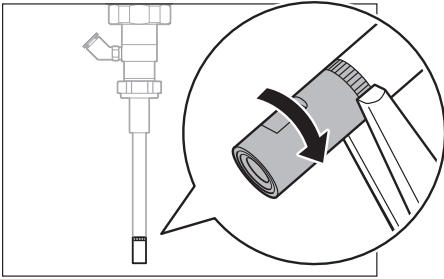
## Clean the Mouthpiece

---

Clean the mouthpiece regularly for safe use.

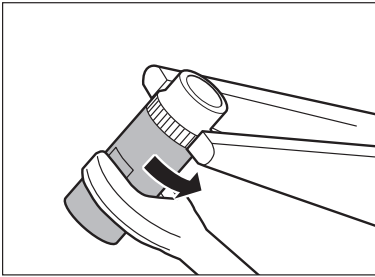
### 1 Remove the mouthpiece by holding the knurled part.

- Turn it clockwise.

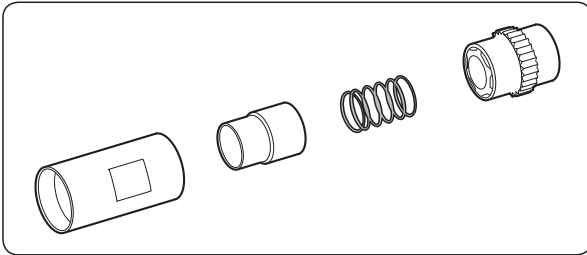


### 2 Dismantle it using a spanner of 7 mm across flats.

- Turn it clockwise.



- Be careful not to lose internal small parts.



### 3 Clean the mouthpiece.

### 4 Reassemble the mouthpiece to the original condition and check if the sliding mouthpiece moves smoothly.

## Connect to PC (USB)

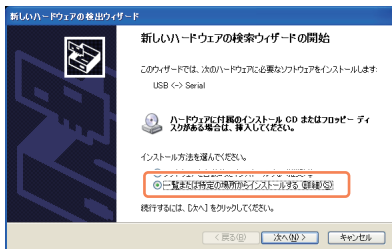
Make sure that PG-01 is powered on before connecting.

### ■ Installation of Device Driver

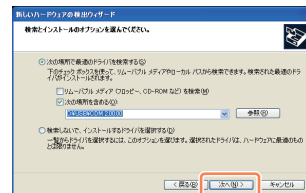
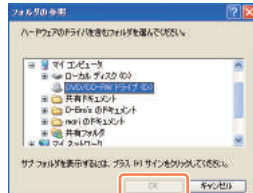
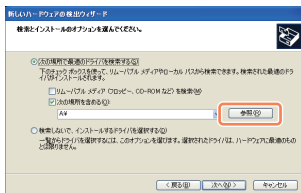
#### 1 Connect PG-01 to PC with a USB cable.

- The wizard screen is displayed.

#### 2 Select <Install from a list or a specific location> and click <Next>.



#### 3 <Reference>, Select [USB-CDM 2.00.00] in the attached CD-ROM and click <OK> and <Next>.



- Installation begins.



## 4 After installation is finished, click <Finish> on the wizard.



- This ends the initial setting.



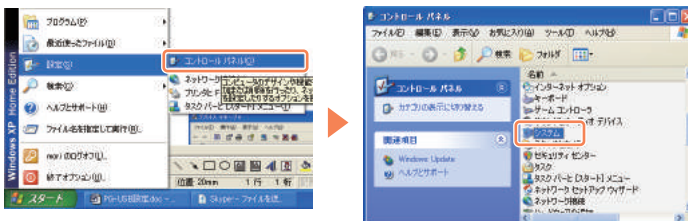
### Note:

Depending on your environment, the installation screen may be displayed again. In that case, please follow the same procedure as above.

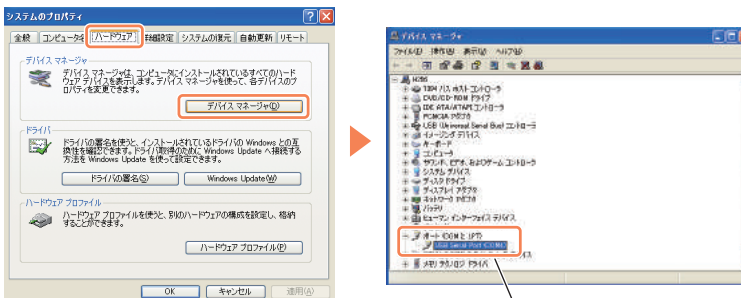
## ■ Checking the Port

This step checks which port the USB is connected to.

### 1 Select [Start] menu, [Setting], [Control Panel] and [System].



### 2 Click [Hardware] tab and [Device Manager] to display the connection port by [Port (COM and LPT)].



USB in this case is [COM4].

## ■ Data Output Format by Either RS-232C or USB Connection

### Output of Data for Judgment

The data for judgment is output for each measurement in the three formats in the sequence below.

#### 1 Measurement Data

D10 XXXX XXXXX <LF>  
└───┬───┘  
    └───┘ Measurement time – 5 digits (unit: mS)  
    └───┘ Torque conversion value – 4 digits

#### 2 Recorded Learning Value

D00 XXXX XXXX XXXX XXXXX XXXXX <LF>  
          └───┘  
          └───┘ Display maximum learning measurement time  
          └───┘ Display learning maximum value  
          └───┘ Display minimum learning measurement time  
          └───┘ Display learning minimum value  
          └───┘ Display learning number

#### 3 Judgment reference values

D20 XX XXXX XXXX XXXXX XXXXX <LF>  
     └───┘  
     └───┘ Judgment measurement time maximum value  
     └───┘ Judgment maximum value  
     └───┘ Judgment measurement time minimum value  
     └───┘ Judgment minimum value  
     └───┘ Judgment error rate

### Error-related Output

E90	End which cannot be detected by 0 areas, and judged	[Zero area detection/Impossible judgment ending]
E91	Abnormal termination at measurement time	[The abnormally end at the measurement time]
E92	Study shortage and end which cannot be judged	[The ending about which it is impossible to judge by the learning lack]
E93	Judgment=LOW NG	[Judgment = Low NG]
E94	Judgment=HIGH NG	[Judgment = High NG]

### Measurement Judgment Output

E00	Judgment=GOOD	[Judgment = Good]
E01	Judgment=LOW OK	[Judgment = Low OK]
E02	Judgment=HIGH OK	[Judgment = High OK]

## ■ PC Input

### Hyper terminal (Example: Windows XP)

---

After the PC is turned on and the version information is displayed, auto-zero correction is performed. The following messages for debugging are displayed that are not directly related to measurement.

Ver3.04 2012/07/03

[Zero Adj A/D=7C2 G=1EA F=200]

[Zero Adj A/D=806 G=1EB F=200]

[Zero Adj A/D=808 G=1EC F=200]

[Zero Adj A/D=803 G=1ED F=200]

[Zero Adjustment end A/D=7FF Gain=1ED]

### Example of a Measurement OK Message

In general, messages are either operation check messages or measurement data.

[Job Num = 4] S00 [Lever SW ON] [Job Num = 6] S02 [Torque UP ON]	Operation check message for debugging
D10026900668 D000005026903150033701891 D2002026303210033001928	Measurement data
M21 [Judgment=LOW OK] E01 [Judgment end]	Operation check message for debugging

### Abnormal Conditions

This displays the condition when judgment results are abnormal.

[Job Num = 4] S00 [Lever SW ON] [Job Num = 6] S02 [Torque UP ON]	Operation check message for debugging
D10028600590 D000006009600010000101894 D2002140513090131201931	Measurement data
[Abnormal termination at measurement time] E91	Operation check message for debugging

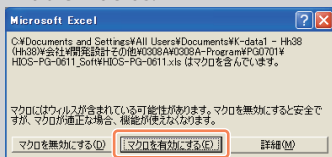
## Data Taking-in Sheet (HIOS-PG-0611-V2-2\_5)

By using the data taking-in sheet in the attached CD-ROM, you can check the OK/NG of screw tightening on the PC or record the measurement data.



### Notes:

- Enable macros.



- Start settings after turning on PG-01 and connecting it to the PC.
- When using USB, the PC may turn off PG-01 automatically in some cases. In that case, please disconnect and reconnect the screwdriver.
- There is no reaction to the reverse rotation of the screwdriver.
- If you want to take in two types of data, create two files (for example, test1.xls and test2.xls) in advance. Then, start up two applications, and then open each file.  
If you open files by double-clicking them in Windows Explorer, two files are opened in the same application and the application cannot be used.

## Operating Environment

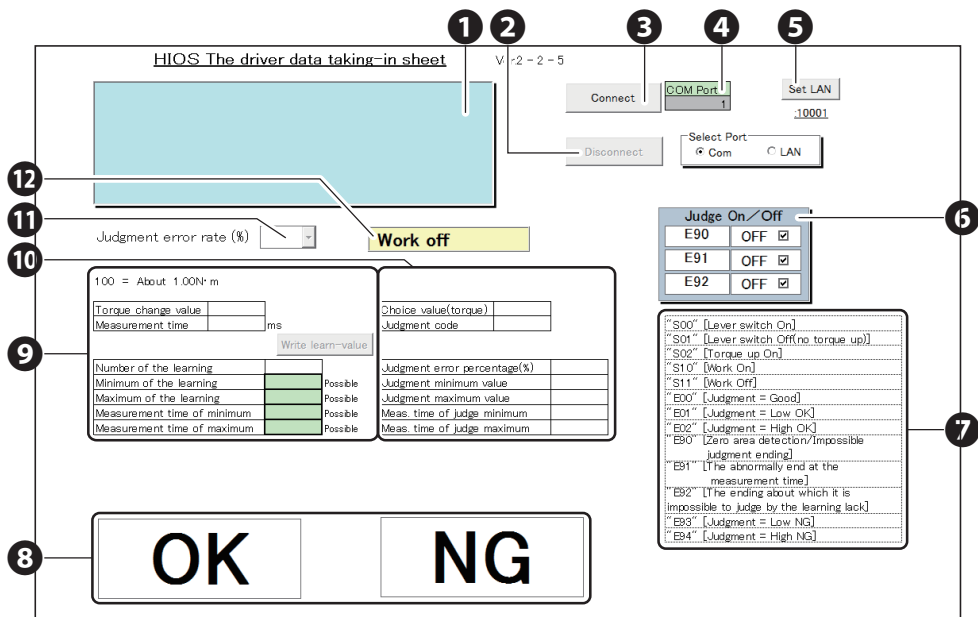
The data taking-in sheet was confirmed to be effective in the following environments:

- Microsoft Windows XP
- Microsoft Excel 2003

If it is not functioning, select application type "screwdriver data collection".

Please be aware that maintenance and support services are unavailable since this is sample software.

## Configuration of the Screen



### ① Connection confirmation window

The login information is displayed.

### ② Disconnect button

This ends data import.

### ③ Connect button

This makes the data import standby. If the previous data is necessary, please save the current data first and then connect the screwdriver. (The previous data will be cleared upon connection.)

### ④ COM port

Check the port number and enter it. Then, press [Enter] on the keyboard. Usually, select COM as the port.

#### Cell colors

- Gray: the screwdriver is not connected.
- Yellow: the screwdriver is connected.

### ⑤ LAN settings

Optional

### ⑥ Judge On/Off

Errors E90/E91/E92 can be turned ON/OFF.

ON: the measured values are entered in the datasheet.

OFF: the measured values are entered in the irregular sheet.

### ⑦ Measurement settings processing table

The table shows commands and settings processing that are displayed in the log.

### ⑧ Judgment

This indicates OK/NG of screw tightening with colors.

### ⑨ Output data

Torque equivalent value: this indicates values taken during actual operation.

Measurement time: this indicates the time from screw tightening to torque-up.

Number of the learning: indicates the number of teaching operations performed.

After inputting a number, press [Enter] on the keyboard.

- These learning-related values will be sent to PG-01 by clicking the [Write learn-value] button after entering a number.
- If the [Learned value change] button is not pressed, the memory in PG-01 won't be updated and the previous value will be recovered after the next torque-up operation.

Meas. Time of judge maximum: indicates the amount of the time plus the % setting for the learning maximum measurement time.

The selectable rates: 0%, 2%, 5%, 10% or 20% (02=2%)

Normally this turns on automatically when an operation is performed.

[illegible]

## Troubleshooting

If you have any problem while using this machine, please check the items in this section before making inquiries. Then, if the problem persists, please contact your dealer or us.

### **The L.NG or H.NG indicator blinks when the power is turned on.**

There is a possibility that the learning values are not set correctly. Repeat teaching 3 times or more to set the learning values.

➡ "Set Learning Values (Teaching)" (P.17)

### **The L.NG or H.NG indicator flashes even when the teaching mode is ended and measurement cannot be performed.**

There is a possibility that data for evaluation comparison is insufficient. If the learning count is less than 3, the indicator will keep flashing even if the teaching mode ends. Repeat teaching 3 times or more again to set the learning values.

➡ "Set Learning Values (Teaching)" (P.17)

In the following cases it is difficult to make an evaluation, and it may not be counted as learning.

- Torque value is 10 or less ("E90" [Zero area detection/Impossible judgment ending])
- Idling of the screwdriver occurs or the measurement time is 100 mS or shorter. ("S01" [Lever switch Off(no torque up)])

### **Teaching or evaluation cannot be done properly.**

Make sure that the start mode of the power has been changed to the reading mode. Also, turn off power to check if the cords are connected correctly and then turn on the power again.

➡ "Switch to the Start Reading Mode" (P.05)

➡ "Connect the Cords" (P.06)

### **Setting cannot be changed from the tabulation software.**

Click the [Write learn-value] button after input of a number. The settings in PG-1 will be updated by clicking the [Write learn-value] button.

➡ "Data Taking-in Sheet (HIOS-PG-0611-V2-2\_5)" (P.35)

### **The torque is abnormally low or high.**

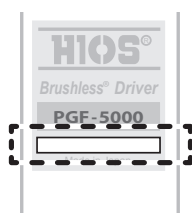
Make sure that the serial number of this machine is the same as that of PG-01/PGF-SUBBOX. Also, turn off the power to check if the cords are connected correctly and then turn on the power again.

If the problem persists, replace the sensor cord.

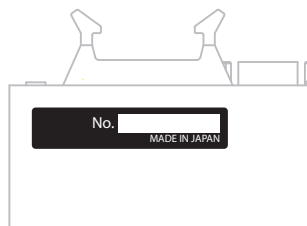
## ■ When a Problem Cannot Be Solved

When contacting us, have the following information ready:

- Product name (PGF-3000 / PGF-5000 / PGF-7000)
- Dealer where this machine was purchased
- Description of the problem (detailed description of the operation performed and its result, etc.)
- Serial number (on the label of the product)



**Main Unit**



**PG-01**



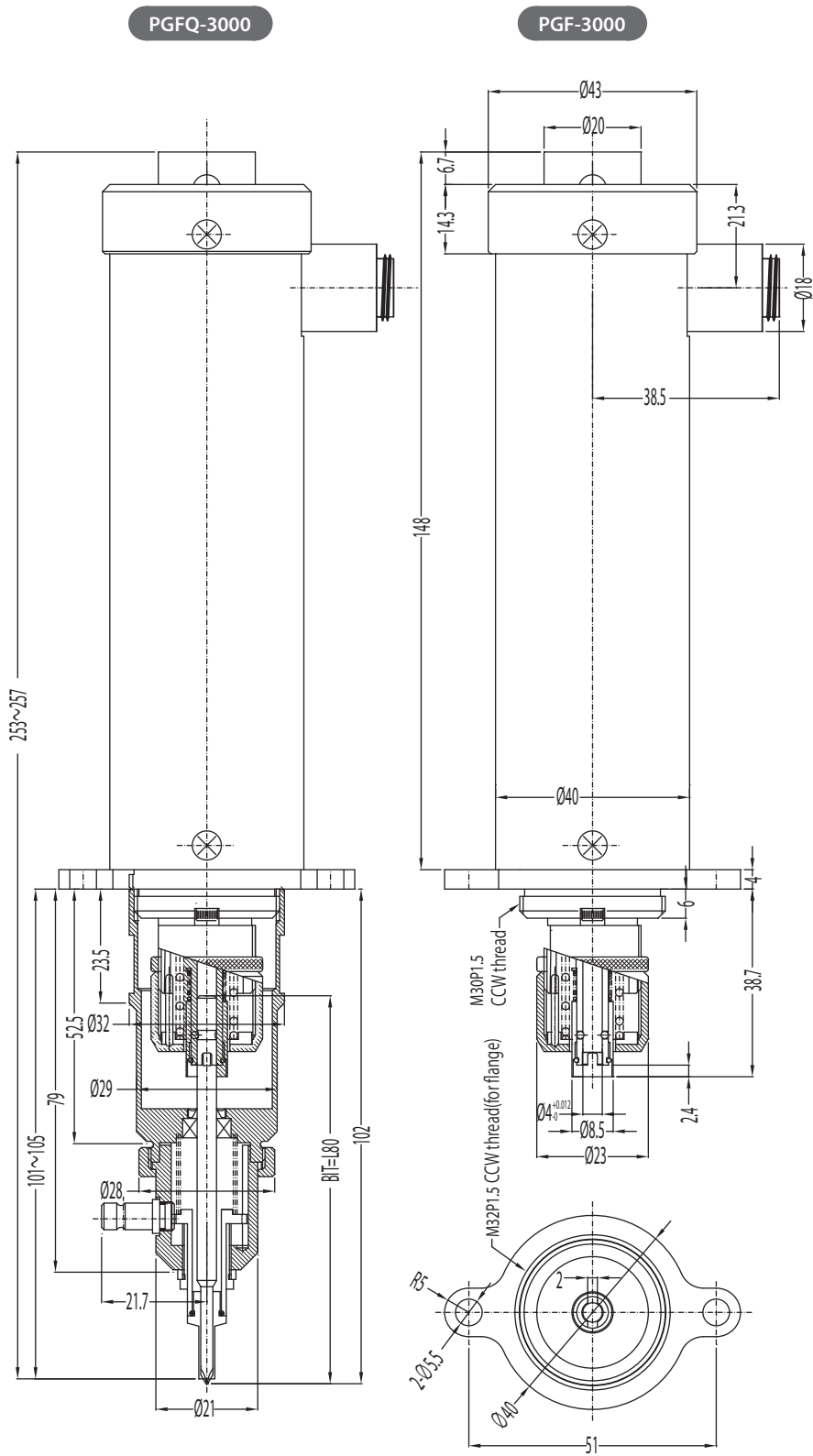
**PGF-SUBBOX**

## Specifications

The product specifications are subject to change without prior notice due to improvements of the product.  
The external dimension drawings are not full-scale.

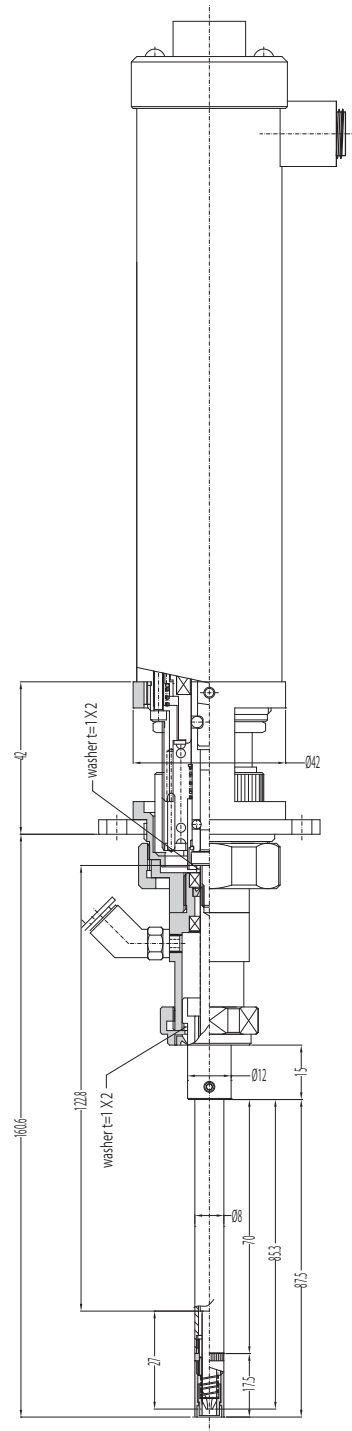
### ■ Specifications of PGF-3000/PGF-5000/PGF-7000

Model		PGF-3000	PGF-5000	PGF-7000
Output Torque Range	N·m	0.2-0.55	0.4-1.2	1.0-2.8
	Kgf·cm	(2-5.5)	(4-12)	(10-28)
Torque Switching		Stepless Adjustment		
Unloaded Rotation Speed (rpm) ±10%	HI (11 steps)	625-950	690-985	645-935
	LOW (11 steps)	115-325	115-320	210-595
Screw Size (mm)	Machine Screw	1.7-2.3	2.3-3.0	2.6-5.0
	Tapping Screw	2.0-2.3	2.0-2.3	2.6-4.0
Bit Drive	HIOS Shank	H4	H4	H5 and 5HEX
	HEX Shank	—	—	1/4HEX
Power supply		BLT-AY-61		BLT-AY-71
Weight		363g	494g	809g
Dimensions		See the external dimension drawing		





PGFR-7000+FS61-68

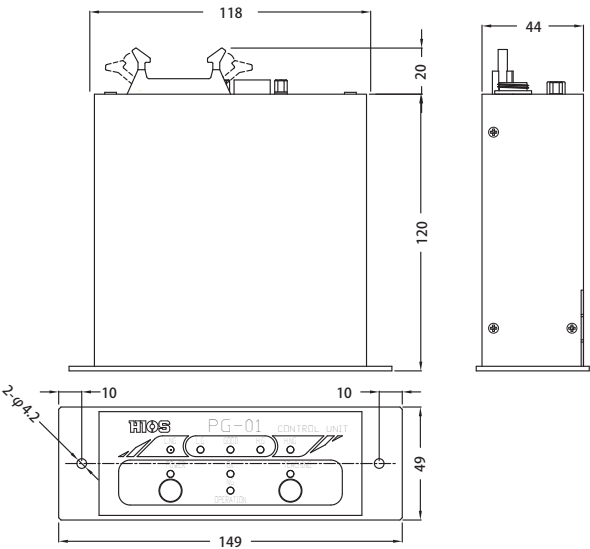


# Specifications of PG-01

AC Adaptor	Input: AC100-240V (50-60Hz) Output: DC12V	
Weight	513g	
Dimensions	See the external dimension drawing	
RS-232C communication	Speed: 4800bps Start bit: 1Bit Stop bit: 1Bit Data length: 8Bit Data format: ASCII Parity: none Standard: RS-232C Terminal: D-SUB 9 pins	
I/O input output	Common to plus and minus Output: sink type	

## External Dimension Drawing of PG-01

mm

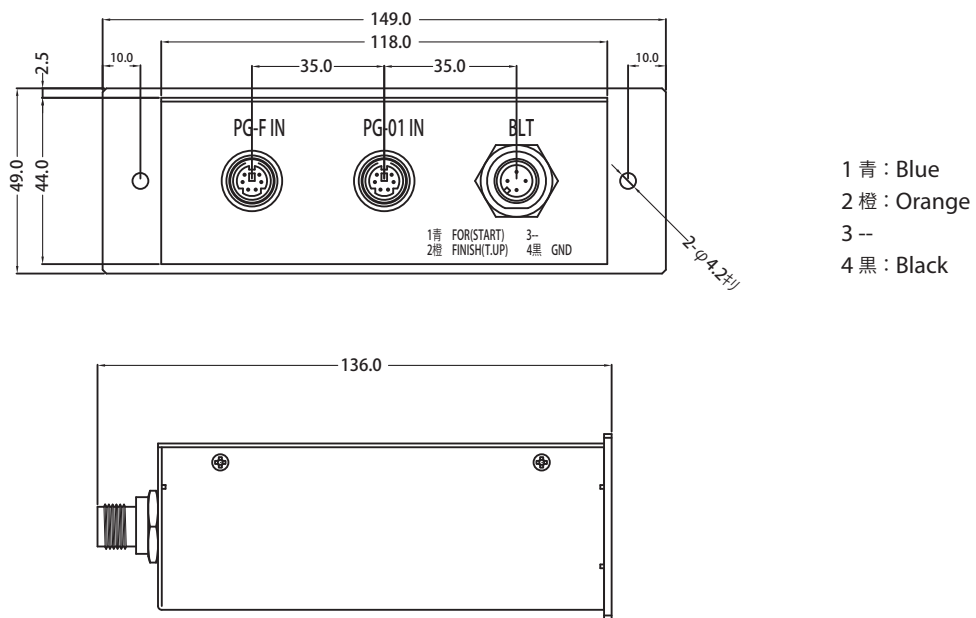


# **Specifications of PGF-SUBBOX**

Weight	391g
Dimensions	See the external dimension drawing

External Dimension Drawing of PGF-SUBBOX

mm



## Maintenance and Calibration (Excluded from Warranty)

Because transducer is installed in PGF, an overhaul or a calibration is recommended every 6 months. Please make sure to enclose PG-01 that has the same serial number as PGF when you ask for a maintenance.

## China RoHS2 Table

If you are asked by China Customs, please show this table to them.

有害物质名称及含量标识格式						
产品中有害物质的名称及含量						
部件名称	有害物质					
	铅(pb)	汞(Hg)	镉(Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板总成	×	○	○	○	○	○
电机单品	×	○	○	○	○	○
齿轮	×	○	○	○	○	○
外壳	○	○	○	○	○	○
螺丝刀线	×	○	○	○	○	○
电源适配器	×	○	○	○	○	○
-						
-						

本表格依据 SJ/T 11364 的规定编制。  
○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。  
×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

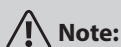
In addition, the China RoHS marks also is required at the product and product box.

At the product, you can find it at the bottom and it is marked on the product box.

If you cannot find the mark, please ask your distributor.

In case of emergency, please cut the mark below and stick at the bottom of product and on the product box.

China RoHS mark



**Note:**

Minimum size of China RoHS mark is 5mm at outer diameter.

# Disclaimer

## ■Disclaimer

The information in this document is subject to change without notice.

## ■Trademarks

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Also, other company names and product names in this manual are trademarks or registered trademarks.

## ■Illustrations

Illustrations used in this manual are those for PGF-5000 unless otherwise noted. However, if models have differences, multiple illustrations are also displayed with the model names such as "PGF-XXXX / PGF-XXXX".

## ■Abbreviations

The following product names used in this manual are abbreviated.

Microsoft Windows XP operating system → Windows XP



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