HIOS®

Electric Screwdriver for Automatic Machines

PGFA-3000 / PGFA-5000 / PGFA-7000

Control Unit

PG-01FA

Operation Manual

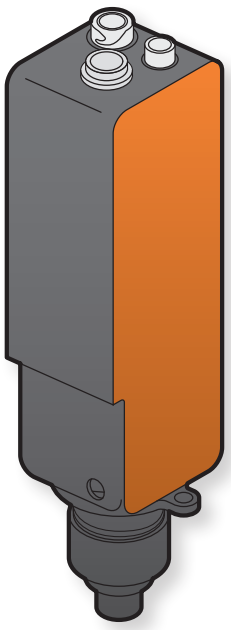


Table of Contents

03 Important Safety Instructions

06 Checking Supplied Accessories

07 Installation

- Wiring Diagram
- Connecting to the Device
- Adjust the Orientation of the Device Case
- Bit
  - Attach a Bit
  - Remove the Bit

12 Parts and Their Functions

- PGFA
- PG-01FA

15 Basic Operations

16 Set the Torque

- Output Torque Guide Table

17 Pass/fail judgment of screw fastening

- Set learning values (teaching)
- Evaluation of Screw Tightening
- Evaluation of Operation Time

20 Screw Suction

- FQ Suction Attachment
  - Set the Attachment
- FR Suction Attachment
  - Spring-on Mouthpiece
  - Spring-on Mouthpiece and Supported Screws
  - Attach the Attachment (PGFA-5000)
  - Attach the Attachment (PGFA-7000)
- Adjust the FR Suction Attachment Extension

31 Output data

- Connect with RS-232C
- PG-01FA Communication Setting Parameters
- Screwdriver Data Import Sheet Operation Environment
  - Data import sheet
  - Collection of Screwdriver Data (Application)
- Data output format
  - At launching PG-01FA
  - Judgment with torque-up
  - Judgment without torque-up

38 Troubleshooting

- When a Problem Cannot Be Solved

40 Maintenance

- Cleaning of the Main Unit
- Cleaning the Device
  - FQ Suction
  - FR Suction
  - Clean the Mouthpiece (FR)
  - Replace the Threaded Bit (FR)

46 After-sales Service

47 Specifications

- PGFA
- PG-01FA

49 Notices

Important Safety Instructions

Before using the device, please carefully read this document to use it correctly. As warnings, cautions and important notes written in this document are for preventing injury to users and other people, and damage to property, please make sure to observe them. Please note that HIOS is not liable for any damages caused as a result of negligence of such warnings, cautions and important notes while using, improper usage, or repair or alteration of the device by persons other than HIOS or a third party specified by HIOS.

⚠ WARNING

Indicates a warning concerning operations that may lead to death or injury to persons if not performed correctly. To use the machine safely, always pay attention to these warnings.

⚠ CAUTION

Indicates a caution concerning operations that may lead to injury to persons if not performed correctly. To use the machine safely, always pay attention to these cautions.

⚠ IMPORTANT

Indicates operational requirements and restrictions. Be sure to read these items carefully to operate the machine correctly, and avoid damage to the machine or property.

Installation

To use this device safely and comfortably, carefully read the following precautions and install the machine in an appropriate location.

⚠ WARNING

- Do not install it where there is a risk of fire or electric shock:
- A place with high humidity or excessive dust
- Outdoor or a place exposed to direct sunlight
- A place with high temperature
- A place with flame
- A place close to flammable solvents such as alcohol and thinner

Other Warnings

- Do not connect the device to anything that is not specified by HIOS. Otherwise, fire or electric shock may be caused.
- Do not put metals like jewelry or containers containing liquid on the device. If such article contacts with any electric component, etc., inside the device, fire or electric shock may be caused.
- Before attaching/detaching replacement parts, etc., please turn off the power of the device and unplug it from the power source. If the power cord is damaged, fire or electric shock may be caused.

⚠ Cautions

Do not install it in the following places:

There is a risk of falling or collapsing, leading to injury.

- Unstable place
- A place with vibrations

Other notes

- When installing the device, do it carefully and slowly so that your hand is not caught between the device and ceiling and/or walls. Otherwise, injury may be caused.

⚠ Important

Do not install it in the following places:

Otherwise, a malfunction of the device may occur.

- A place where there are extreme fluctuations in temperature and/or humidity.
- Experimental lab, etc., where chemical reactions can occur.
- A place where corrosive and/or toxic gas is likely to be contained in the air.
- A place where distortion and/or sinking is likely to occur due to the weight of the device.

Do not install it in any place where condensation occurs:

If you do any of the following, water droplets (condensation) may occur inside the device, and if you continue using the device in such condition, it may cause sensor failure or a malfunction. Leave the device for a while to adjust it to the ambient temperature and

humidity before use.

- When the room is quickly heated
- When the device is moved from a place with low temperature or humidity to a place with high temperature or humidity

Power Supply

Warnings

- Do not use the device with a power supply and voltage other than the ones specified. Otherwise, fire or electric shock may be caused.
- Do not use a power cord other than the supplied one. Otherwise, fire or electric shock may be caused.
- Connect the ground wire to the ground terminal of the outlet. If the ground wire is not connected, there is a risk of electric shock in the event of a leak.
- Do not damage, modify, pull, or forcefully bend the power cord. Also, do not put heavy objects on the power cord. Otherwise, fire or electric shock may be caused.
- Do not plug/unplug the power cord with a wet hand. Otherwise, electric shock may be caused.
- Do not plug multiple power cords in one outlet or use an extension cord. Otherwise, fire or electric shock may be caused.
- Do not bundle or tie the power cord. Otherwise, fire or electric shock may be caused.
- Insert the power plug firmly into the outlet. Failure to firmly plug the power cord can result in fire or electric shock.
- If lightning occurs, unplug the power cord from the outlet. Otherwise, fire, electric shock, or a malfunction may be caused.

Cautions

- Do not place objects around the power plug. It should be disconnected immediately in an emergency.

Important

When connecting the power supply

- Do not connect the power cord to an uninterruptible power supply.
- If the device is connected to an outlet that has multiple connectors, do not connect other devices to the remaining connectors.
- We recommend to use an outlet wired through an indoor ground fault breaker. Connecting the ground wire of the device can prevent not only electric shock but also fires caused by a combination of certain conditions.

Other notes

- Electrical noise can cause the device to malfunction.

How to Handle the Device

Warnings

- If there is strange noise, smell, heat or smoke, immediately unplug the power cord from the outlet and contact your dealer. Continuing to use it in this condition may result in fire or electric shock.
- Do not disassemble or modify the device. It may cause a malfunction or be subject to legal penalty.
- Do not disassemble or modify accessories. Otherwise, a malfunction of the device may occur.
- Do not allow children to touch power cords, cables, internal components, electrical components, etc. It may cause an accident.
- Do not use flammable spray near the device. If any foreign substances such as gas adhere to the electrical components inside the device, fire or electric shock may be caused.
- When moving the device, make sure to turn off the power before unplugging the power plug. Moving the device without turning off the power can damage the power cord and cause fire or electric shock.

Cautions

- Do not put heavy objects on the device. The object may collapse or fall down and cause injury.
- If you do not use this unit for a long time, unplug the plug from the outlet for safety.
- Do not wear items with flowing cuffs, gloves, ties, etc. When measuring rotating objects such as screwdrivers, you may get caught in the rotation and suffer from injury or cause damage to the device.
- Wear appropriate clothing for the work. Cover long hair with a cap or other protective gear to ensure safety when working.

Important

Other notes

- Do not apply strong impact to this device.

Maintenance and Inspection

Warnings

Clean the device regularly. If dust accumulates, the device may not operate properly.
When performing maintenance, be sure to check the following information. If you encounter any operational

problems, refer to "Troubleshooting." If this does not solve the problem, or if you think an inspection is necessary, contact your dealer or HIOS.

- Be sure to turn off the power and unplug the power cord from the outlet before cleaning the device. Cleaning without doing this may cause fire or electric shock.
- Periodically unplug the power cord and wipe off dust and dirt with a dry cloth. Dust absorbs moisture and current flows, and that may cause fire.
- Check power cords and plugs periodically for heat, rust, bends, scratches or cracks. Continued use in a damaged condition may cause fire and electric shock.

Important

- Do not store the device in a place where temperature and humidity change rapidly and condensation is likely to occur.

Other notes

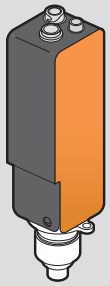
The capacity of automatic screwdrivers is guaranteed within the specified torque range. However, please take the following into consideration when installing them in an automatic machine.

- If there is an inclusion (such as a universal joint) in the joint between the automatic screwdriver body and the bit, conditions such as inertia and resistance may affect the torque. Select a model with a sufficient margin for operating torque.
- Use a model with a sufficient margin, taking into consideration conditions such as power loss and inertia due to the joint shaft between the automatic screwdriver body and the bit, and other factors.
- If a universal joint is inserted or a jig is used, the specified torque value may differ from the actual output torque value.
- If the automatic screwdriver is locked or overloaded, the overload protection function is activated. Please note that if the overload protection function is activated repeatedly, this may be because the operation is exceeding the capacity of the power supply or the screwdriver. Furthermore, if the overload protection function is activated frequently, even if it is properly used, or if an abnormality such as heat generation occurs, immediately discontinue use, turn off the power, unplug the power cord, and contact our service department for repair.
- When fastening screws into workpieces that are prone to static buildup, such as plastic products, be sure to discharge the workpiece before fastening the screws. If the workpiece has not been completely discharged, static electricity may flow in from the tip of the bit and cause malfunctions.
- If you will not be using the device for a long period of time, turn off the power and unplug the power cord.

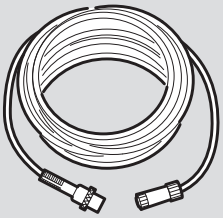
Checking Supplied Accessories

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

Device

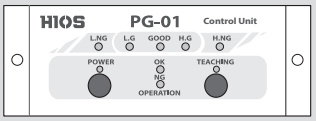


Screwdriver cord

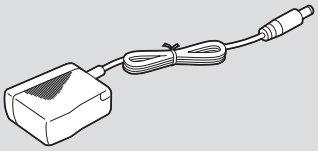


4.5m

PG-01FA

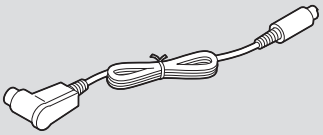


AC adapter for PG-01FA



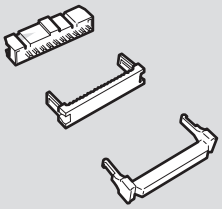
1.5m

Sensor Code

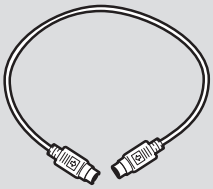


3m

I/O connector for PG-01FA

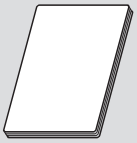


Sensor cord for PG-01FA



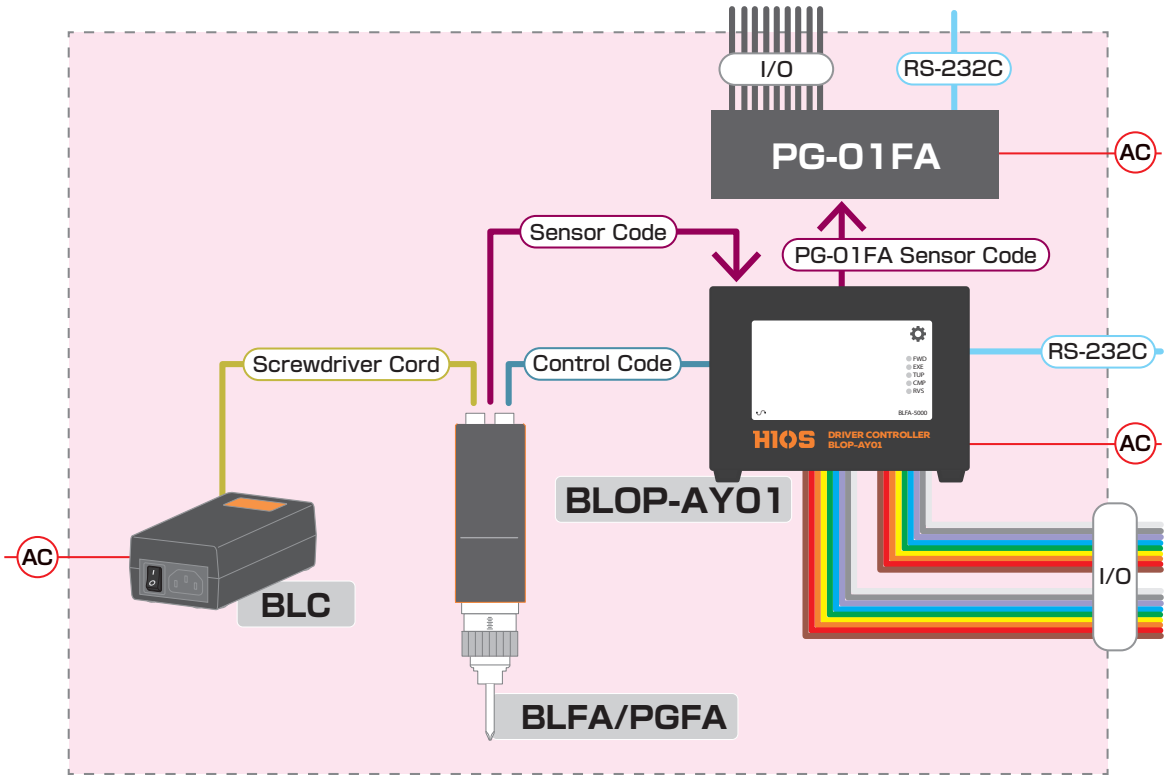
0.4m

Manual



Installation

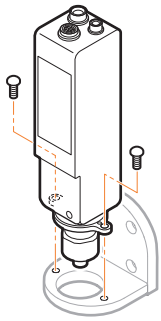
Wiring Diagram

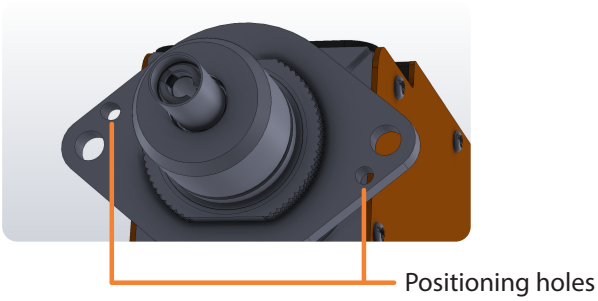


Connecting to the Device

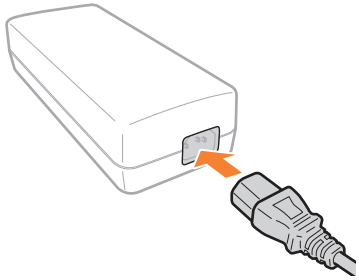
1 Set to the bracket.

- The screw for the flange is M5.
- The flange has positioning holes.

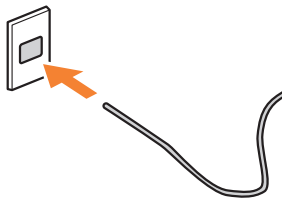




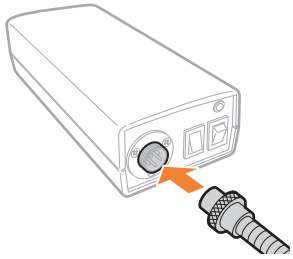
2 Connect the power cord to the controller.



3 Insert the power cord plug into the outlet.

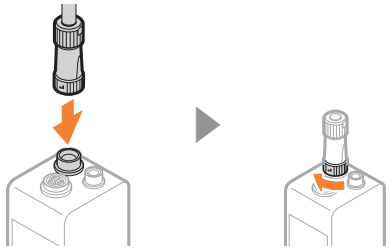


4 Connect the screwdriver cord to the controller.



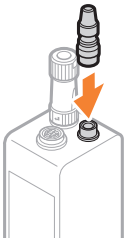
5 Connect the screwdriver cord to this device.

- Lock them.



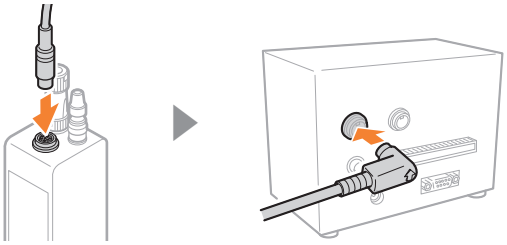
6 Connect BLOP-AY01 control cord.

- Refer to BLOP-AY01 Instruction Manual for details.



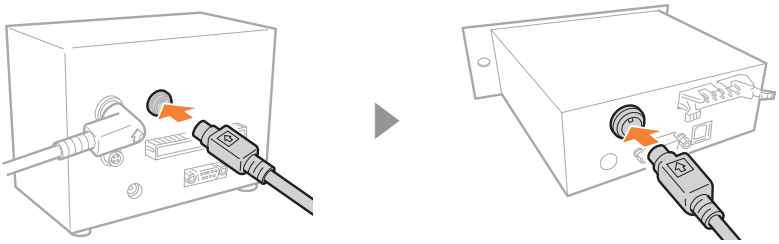
7 Connect the sensor cord.

- Connect the cord to the main unit and BLOP-AY01.

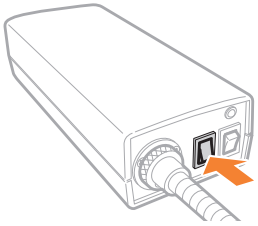


8 Connect PG-01FA sensor cord.

- Connect the cord to BLOP-AY01 and PG-01FA.



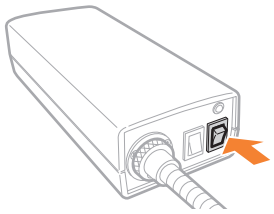
9 Set the voltage output setting switch on the controller to 2.



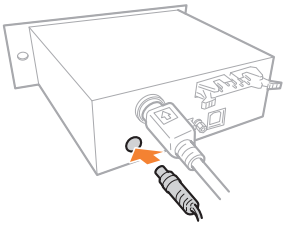
10 Turn on the power.

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

BLC



PG-01FA



Adjust the Orientation of the Device Case

The device case can be turned up to 90 degrees left or right.

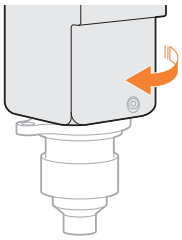
1 Loosen the adjustment screw.



2 Turn the device case

CAUTION

- Do not turn the device case more than 90 degrees. Otherwise, a malfunction may be caused.



Bit

Cautions

- Do not attach or remove a bit while the power is on. It may cause an accident.

Attach a Bit

Precautions for using a hex bit

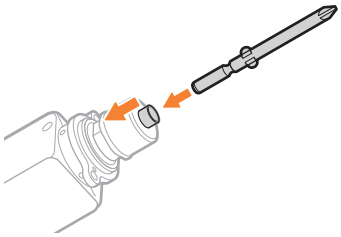
- Hex bit is not included. Please prepare the specified shape separately.



- W bits and double-groove hex bits cannot be used.

1 Attach a bit.

- The handling of the joint shaft collar varies depending on the model.



2 Check if the bit is locked.

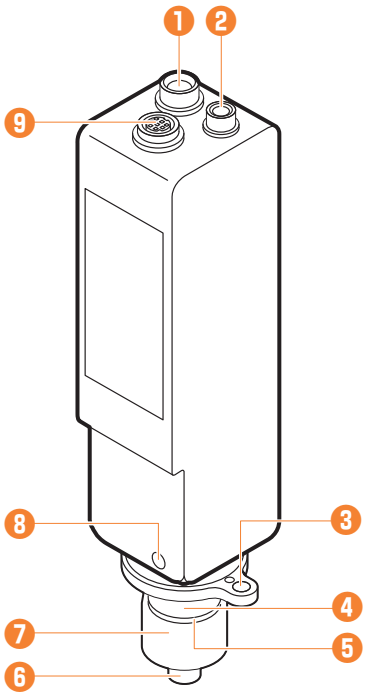
- Check if the bit will not come out by pulling it gently.

Remove the Bit

1 Manipulate the joint shaft collar to remove the bit.

Parts and Their Functions

PGFA



1 Screwdriver cord connector
Connects the screwdriver cord.

2 Control cord connector
Connects the control cord.

3 Flange
This is used when mounting the device on a fixing stand, etc. There is a slotted hole for positioning.

4 Torque adjustment scale
This shows a guideline for output torques for adjustment. For details on torque values, refer to the"Output Torque Guide Table" (P.16).

5 Nut fixing ring
This prevents displacement of the torque adjustment nut. Fit it closely against the torque adjustment nut without any gap.

6 Joint shaft collar
Manipulate this when you fix or remove a bit.

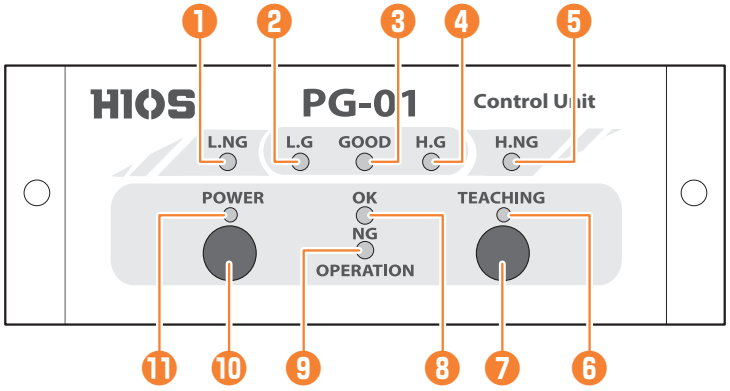
7 Torque adjustment nut
Adjust the output torque with this.

8 Body case orientation adjustment screw
Adjust the device case orientation with this.

9 Sensor Cord Connector
This is used to connect the sensor cord.

PG-01FA

Front



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).

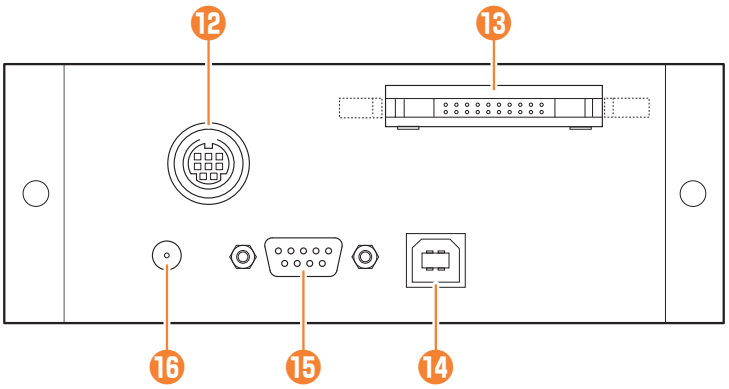
8 OPERATION OK Indicator
This indicator is lit while the screwdriver is rotating positively.

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

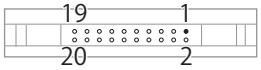


⑫ Sensor cord for PG-01FA

The Sensor cord for PG-01FA 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
12	COM GND
13	L.NG
14	L.G
15	GOOD
16	H.G
17	H.NG

⑭ USB Port (Type-B)

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 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.

Basic Operations

Start/stop of this device is controlled from the operation box "BLOP-AY01." For details, refer to the BLOP-AY01 instruction manual.

About the screwdriver's descending speed

- If the Z-axis descending speed is faster than the screw fastening speed, it will place a heavy load on the screw, increasing the risk of incomplete fastening. Please set the speed appropriate for screw fastening.
- For a tapping screw with a short fastening cycle, if a constant torque is required for screw fastening, you have to check it with the actual device. For details, please contact us.
- With high torque, please take into consideration that the screwdriver's reaction force is large and the rigidity of the mounting flange and Z-axis will affect screw fastening.
- Even if the above setting conditions are met, overload may occur. In that case, please review the installment conditions.

1 Input an external signal to the AY01 to operate the device.

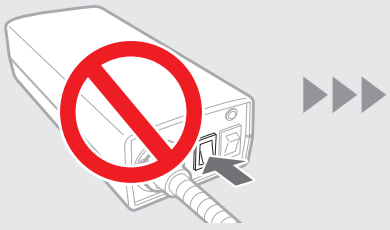


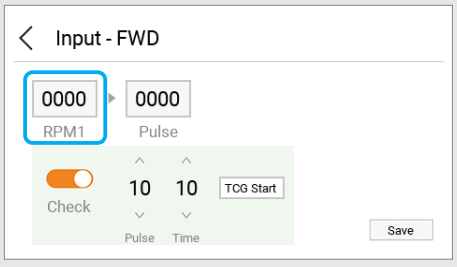
2 After the action mode operation is completed, the rotation stops.

- When the screw is completely fastened, the clutch engages and rotation stops.
- CMP signal is output.

When changing the rotation speed

- Do not set the controller's voltage output setting switch to 1. To change the rotation speed, change the RPM setting in the BLOP-AY01's action mode.





Set the Torque

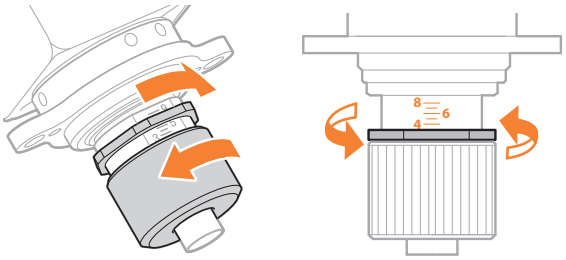
The torque setting can be adjusted by compressing the torque adjustment spring. Turning the torque adjustment nut clockwise increases the torque, and turning it counterclockwise decreases it.

Cautions

- The "Output Torque Guide Table" and torque adjustment scale are guidelines only and do not guarantee the actual set value. For accurate torque check, please use a HIOS torque meter.

1 Turn the torque adjustment nut to set the fastening torque.

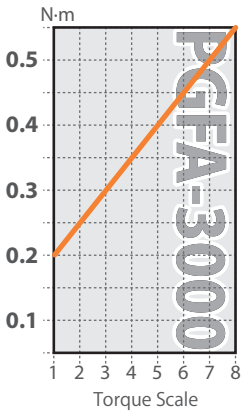
- Adjust the torque adjusting nut so that the end face is directly above the scale.
- Once the position of the nut fixing ring has been determined, align the torque adjusting nut.

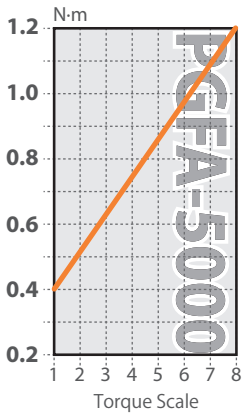


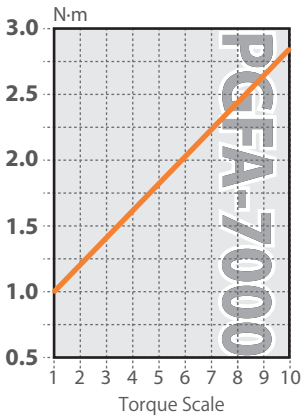
2 Start the screwdriver, fasten the screw, and adjust to the optimum torque value.

Output Torque Guide Table

The output torque is measured using HIOS torque meter and Fidaptor.

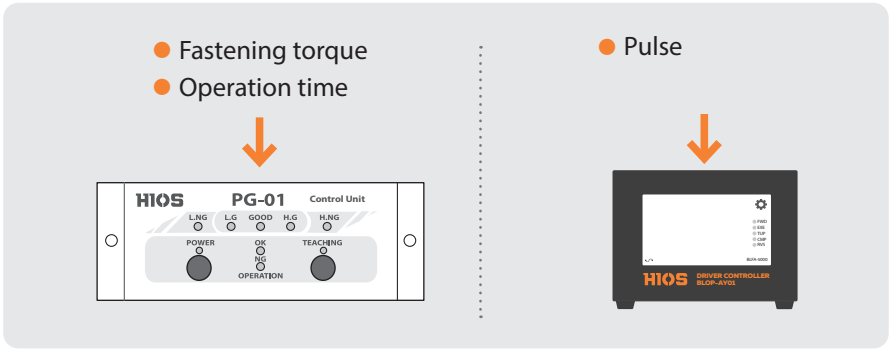






Pass/fail judgment of screw fastening

This device features various screw fastening error detection functions. It detects fastening defects such as incomplete fastening and askew fastening to improve work quality and prevent the leakage of defective products. The error detection functions and control device work as below:



This section describes how to set PG-01FA.

Set learning values (teaching)

Measure the "fastening torque" and "operation 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 range of the learning values and the learned values with a special application or in Excel file.

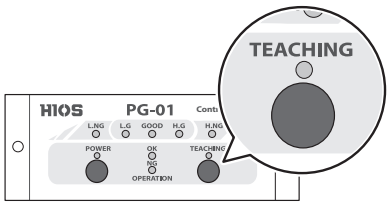
CAUTION

- 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.

NOTE

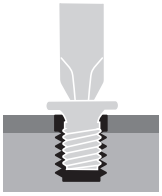
- PG-01FA and BLOP-AY01 can be taught simultaneously.

1 PG-01FA and BLOP-AY01 can be taught simultaneously.



- 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.

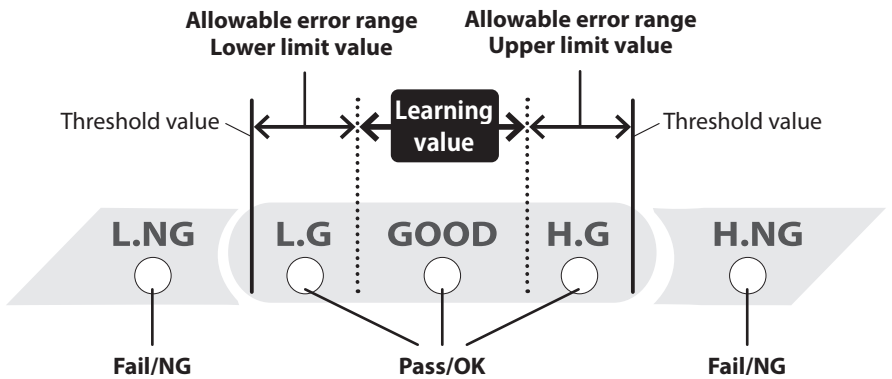
- A buzzer sounds in about 2 seconds and the teaching mode ends.
- The teaching indicator, L.NG indicator and H.NG indicator turn off.

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

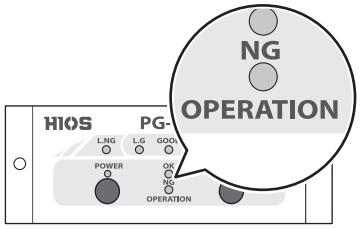
It measures actual screw tightening work in real time, compares the measurement with the learning value, and informs the user of the evaluation result with a indicator and sound.If no error is detected in the screw tightening work, one of L.G, GOOD or H.G indicator is lit and the buzzer sounds.
If the 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.



- 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.

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

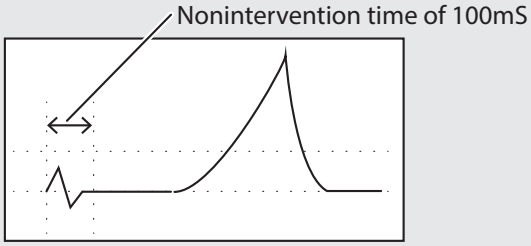
- No torque up signal is sent because of reasons like screwdriver idling.

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)

CAUTION

- 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.

Time Judgment in TMP Mode

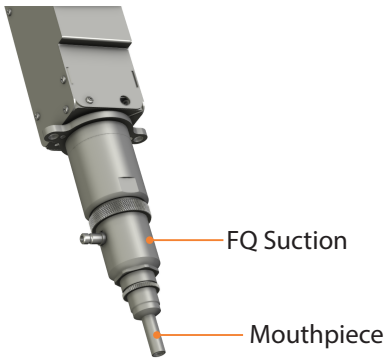
- The TMP mode of BLOP-AY01 is reversed by the specified pulse after seating. During error check or teaching of PG-01FA, as the values are measured only up to the torque up, the actual operation may not be consistent with the judgment result.

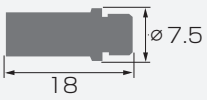
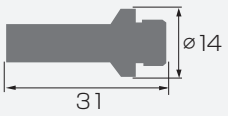
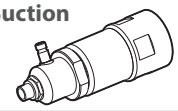
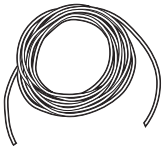
Screw Suction

There are two types of screw suction attachments: FQ Suction and FR Suction. They use negative pressure to suck up screws, so they can even suck up non-ferrous metal materials. Use them when you need to.

FQ Suction Attachment

FQ Suction is the standard suction attachment.



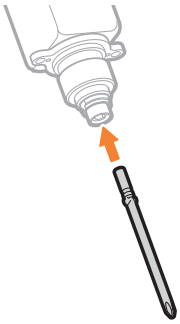
	PGFA-3000	PGFA-5000	PGFA-7000
Supported suction types	PGFQ3-SET	PGFQ5-SET	PGFQ7-SET
Bit drive	H4	H4	H5
Bit length	80mm	80mm	100mm
Mouthpiece type	F3 standard 18mm 		F6 standard 31mm 
Included items	**FQ Suction**  **Zip ties** 	**Hose**  ID4mm×OD7mm,Length 3.5m	

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

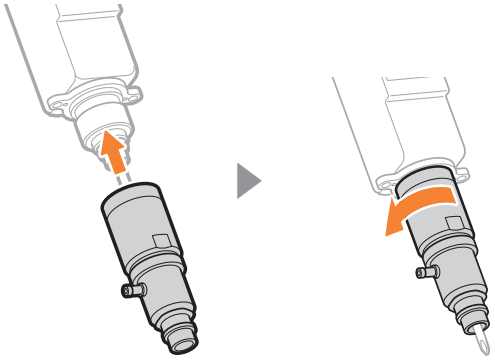
Set the Attachment

1 Attach the bit.

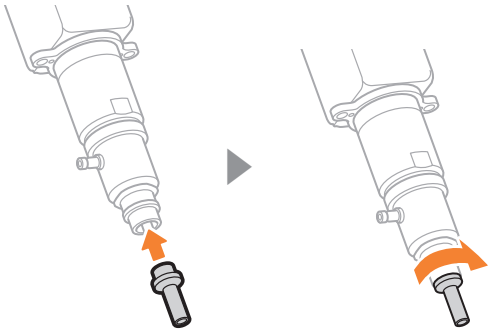
- Please prepare a suction bit.



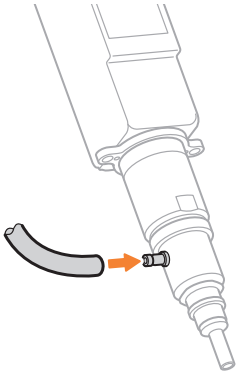
2 Attach the suction attachment.



3 Attach the mouthpiece.

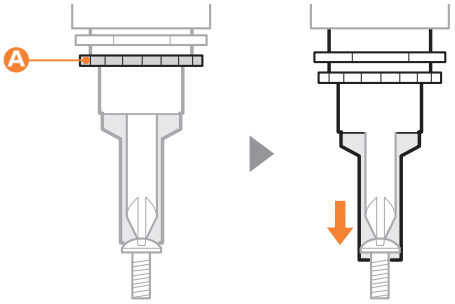


4 Connect the hose.

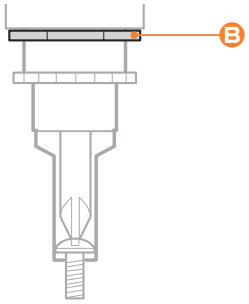


5 Turn Ⓐ to adjust the mouthpiece extension.

- Covering the screw head will prevent wobbling and provide stability.

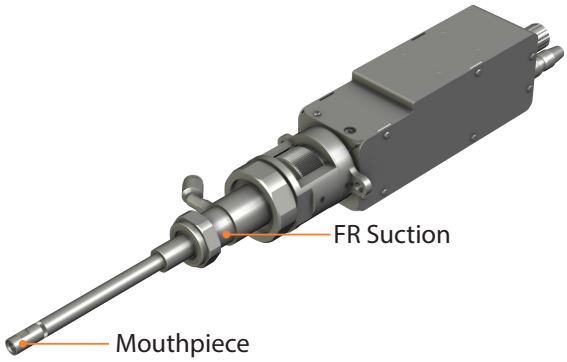


6 Turn Ⓑ to fix.



FR Suction Attachment

It can also be used effectively in difficult screw fastening locations such as deep holes or obstructed walls where a normal suction attachment would interfere with the workpiece.



CAUTION

- The FR Suction bit is attached with a screw-on, so the bit may come loose when used in reverse.

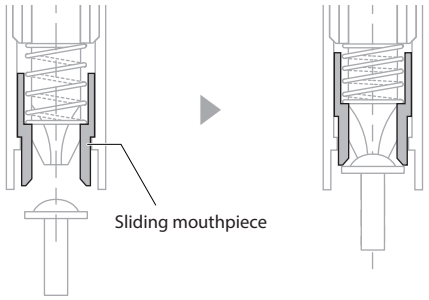
Model	PGFA-5000	PGFA-7000
Suction type	PGFR5-SA	PGFR7-SA
Bit drive	H4	1/4HEX
Bit holder assy	PGFR5-3060	BLFR7-3060
Bit	• Screw-on bit ⊕#1 40mm (RBP4140S) • Screw-on bit ⊕#2 40mm (RBP4240S)	
Mouthpiece type	• Spring-type Mouthpiece: Movement of the Inner Sleeve Type • Spring-type Mouthpiece: Movement of the Outer Sleeve Type	
Suction	**FR Suction**  **Adjustment washer** 	

*Hose is not included. Please purchase it separately or contact us.
Hose dimensions: ⌀4 (inner diameter) x ⌀6 (outer diameter), length: 3.5m

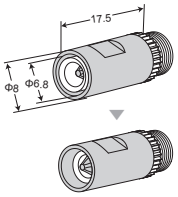
Spring-on Mouthpiece

Inner diameter adjustable type

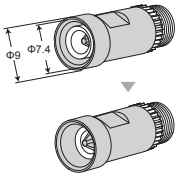
When the screw and bit engage with vacuum pressure, the sliding mouthpiece moves in parallel, supporting the screw head to keep it perpendicular.



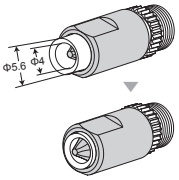
FS61-68



FS61-74

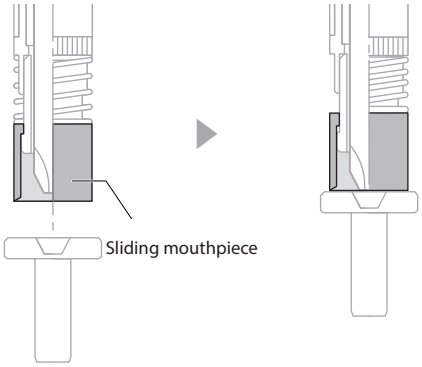


FS61-68S

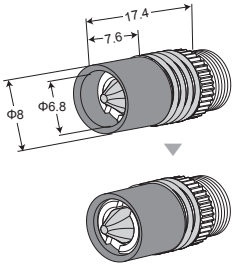


Outer diameter adjustable type

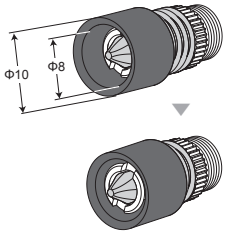
When the screw and bit engage with vacuum pressure, the sliding mouthpiece moves in parallel, supporting the screw head to keep it perpendicular. The mouthpiece is thinner than the outer diameter of the screw, making it possible to fasten screws in narrow spaces.



FS60-68J • FS60-68A



FS60-80J



Depending on the material, the model number will be as follows:
DURACON: FS60-68J
Aluminum: FS60-68A

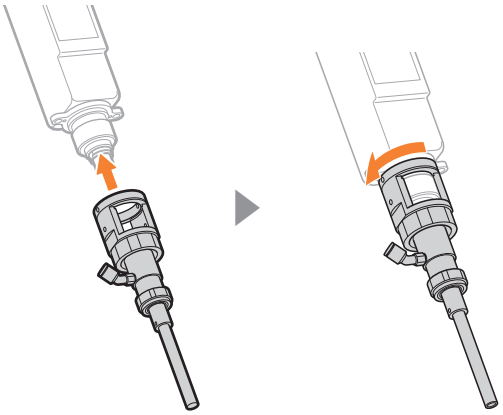
Spring-on Mouthpiece and Supported Screws

For sizes smaller than M2.6, please contact us.

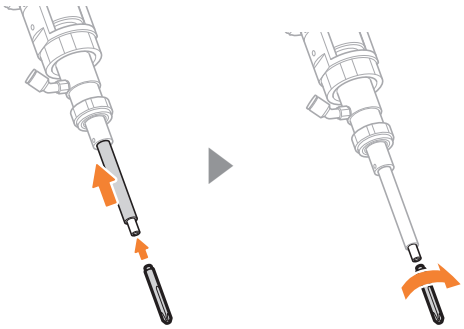
Screw size	M2.6			M3.0			M4.0		
Type	Pan	Binding	Truss	Pan	Binding	Truss	Pan	Binding	Truss
PGFA-5000	FS61-68 FS61-68S			FS61-68 FS61-68S		FS60-68J FS60-68A FS61-68S FS61-74	FS60-68J FS60-68A FS61-68S FS61-74	—	—
PGFA-7000								FS60-80J	

Attach the Attachment (PGFA-5000)

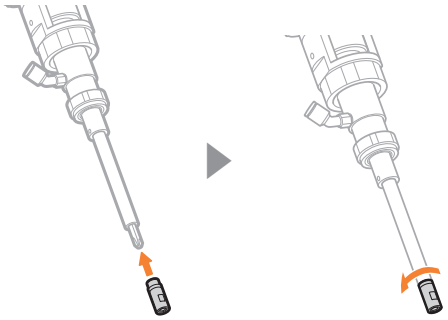
1 Attach the suction.



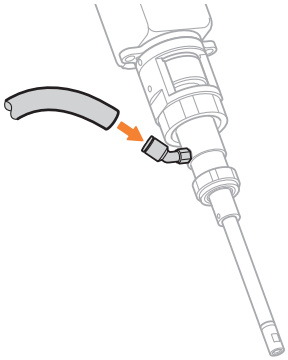
2 Attach the bit.



3 Attach the mouthpiece.

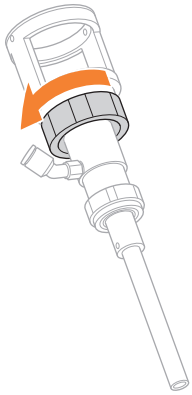


4 Attach the hose.

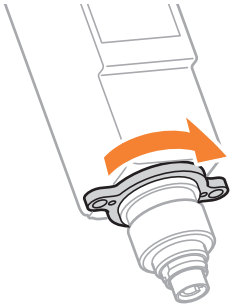


Attach the Attachment (PGFA-7000)

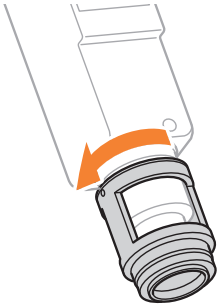
1 Remove the suction base.



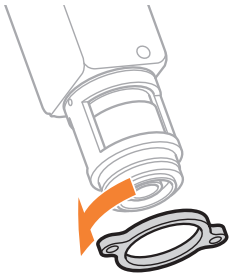
2 Remove the flange from the device.



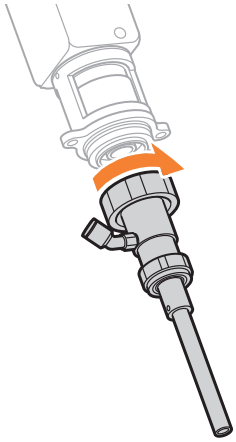
3 Attach the base to the device.



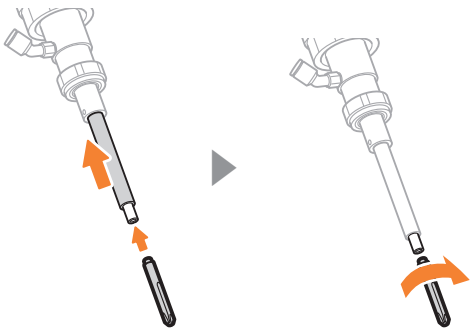
4 Attach the flange.



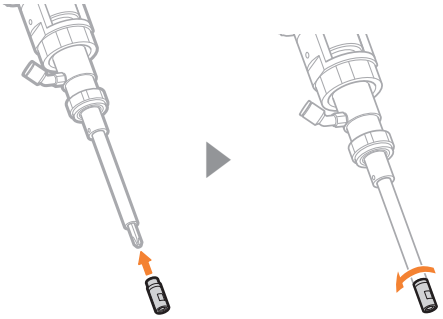
5 Attach the suction.



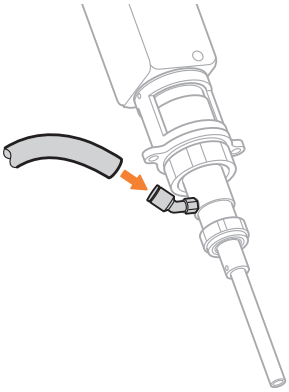
6 Attach the bit.



7 Attach the mouthpiece.

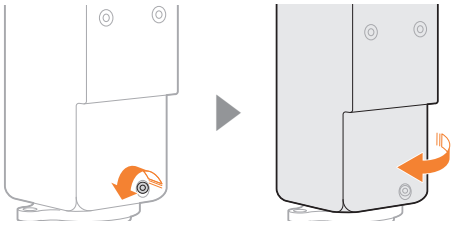


8 Attach the hose.



9 Loosen the adjustment screw to adjust the orientation of the device case.

- The device case can be turned up to 90 degrees left or right.
- Once the flange and the case are aligned, fasten the screws.

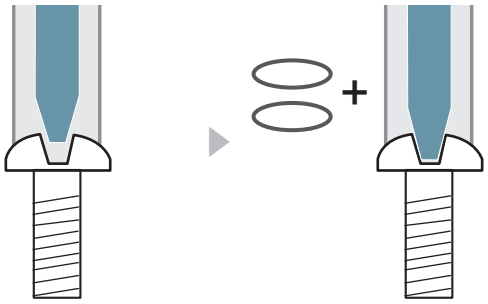


Caution

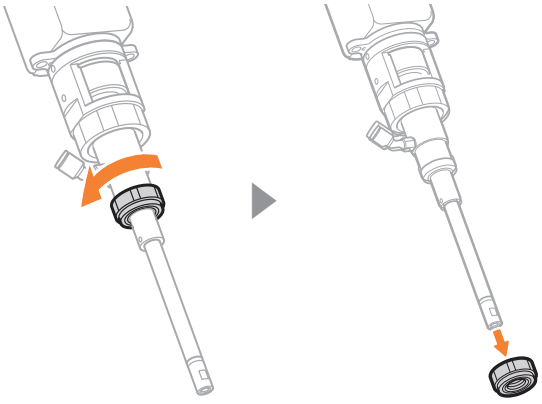
- Do not turn the device case more than 90 degrees. Otherwise, a malfunction may be caused.

Adjust the FR Suction Attachment Extension

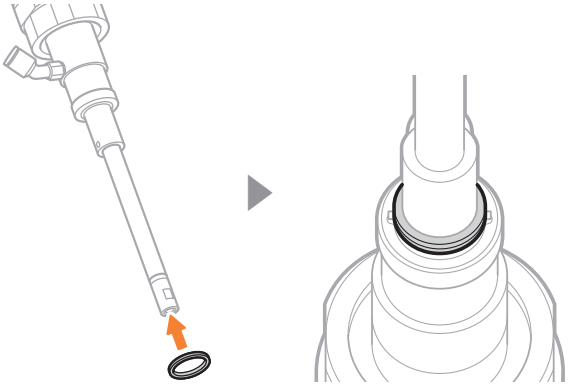
Depending on the shape of the screw head, the bit and screw may not be properly engaged. This can cause the screw to become unstable, resulting in screw fallout or run out and then poor fastening. Check to see if the bit is engaging deeply enough. If it is not, use a washer to adjust the extension.



1 Remove the intake case retaining nut.

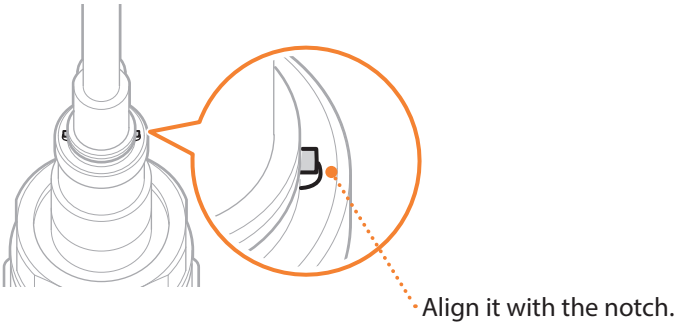


2 Insert the washer.



3 Reassemble the parts.

- When fastening the intake case retaining nut, align the protrusion on the holder with the notch and press down the mouthpiece holder Ⓐ .



Output data

This device outputs measured data so that you can collect and accumulate the data by using an application, etc. You can also output the collected data to a CSV file.
Contact your distributor for application details.

Connect with RS-232C

RS-232C cable is not provided with the device. Please prepare it separately.

1 Connect the cables to the PC and PG-01FA.

2 Check the COM port.

- Right-click the [Start] button ▶ [Device Manager] ▶ [Ports (COM and LPT)] and check the connected serial port.

PG-01FA Communication Setting Parameters

Item	Communication parameters
Baud rate	4,800bps
Data length	8bit
Stop bit	1bit
Parity	N/A
CTS/RTS control	N/A
Format	ASCII
Suffix	CR+LF

Screwdriver Data Import Sheet Operation Environment

The following system environment is required to use the sheet and the application.

- Windows 10 or later
- Microsoft Excel 2019 or later

Data import sheet

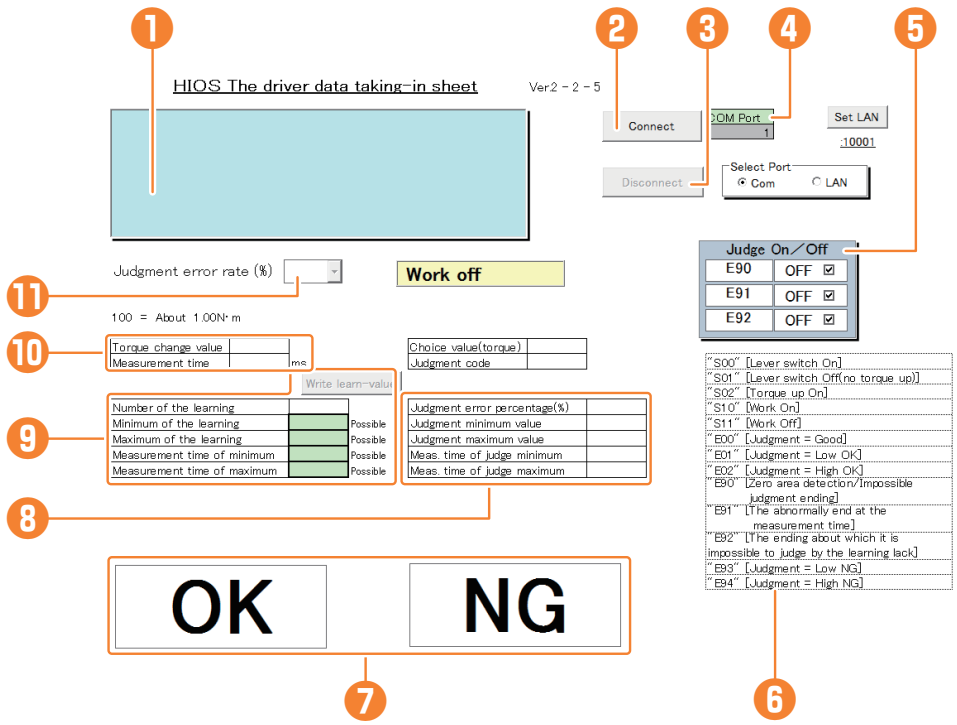
The data import sheet can be used to check screw fastening pass/fail judgment and record measured data on a PC. You can also edit the pass/fail judgment by adjusting threshold and tolerance, etc.

CAUTION

- Enable macros.
- 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.

How to use

1. Enter the port number to which PG-01FA is connected in the COM port cell.
2. Press the screwdriver connection button.
   The connection is complete when the communication log appears in the log window or when the COM port cell turns to yellow.
3. Fasten screws by operating this device.
4. The measured data is entered to the data sheet.Save the file as required.



1 Log window

Information and a message required for data transfer are displayed.

2 Screwdriver connection button

This is the connection button to transfer data to/from the main unit. When this button is pressed, the previous data is deleted.

❸ Disconnect button

This ends data import.

❹ COM port

Enter the port number to which PG-01FA is connected.
Cell color is gray: Screwdriver is not connected.
Cell color is yellow: Screwdriver connected.

❺ 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.

❻ Measurement settings processing table

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

❼ Judgment

This indicates OK/NG of screw tightening with colors.

❽ Data for judgment comparison

Judgment error rate: Indicates the value selected for the judgment error rate setting.
Judgment min. value: Indicates the value converted to torque obtained by adding the coefficient for the judgment error rate to the learning minimum value. Judgment max. value: Indicates the value converted to torque obtained by adding the coefficient for the judgment error rate to the learning maximum value.
Judgment min. measurement time: Indicates the working time calculated by adding the coefficient for the judgment error rate to the learning minimum measurement time.
Judgment max. measurement time: Indicates the working time calculated by adding the coefficient for the judgment error rate to the learning maximum measurement time.

❾ Teaching data

No. of learnings: Indicates the number of teaching cycles performed.
Learning min. value: Indicates the minimum torque value during the teaching. This value can be changed. Learning max. value: Indicates the maximum torque value during the teaching. This value can be changed. Min. meas. learning time: Indicates the minimum amount of time spent in the teaching. This value can be changed.
Max. meas. learning time: Indicates the maximum working time spent in the teaching. This value can be changed.
Write learning value: Torque value for judgment and measurement time can be changed later. When this button is pressed after changing the learned value, the judgment data is updated and sent to PG-01FA.

❿ Measurement data

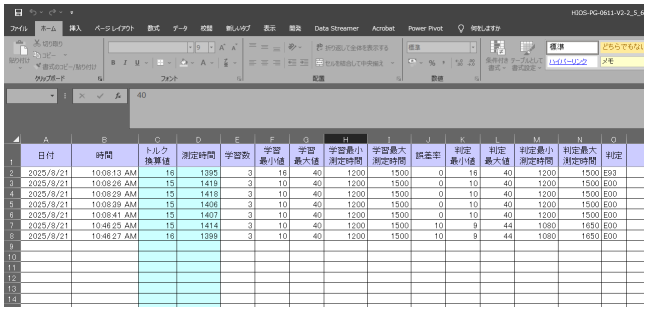
Value converted torque: Indicates the value converted to fastening torque. Measurement time: Indicates the fastening operation time.

⓫ Judgment error rate setting (%)

This sets the acceptable range for the thread fastening judgment threshold. If the threshold is exceeded but within the acceptable range, it is determined as pass.
The data is sent to PG-01FA when the judgment error rate is changed while the screwdriver is connected. Even after disconnecting the PC, the selected value will be retained.
The selectable rates: 0%, 2%, 5%, 10% or 20%

● Data sheet

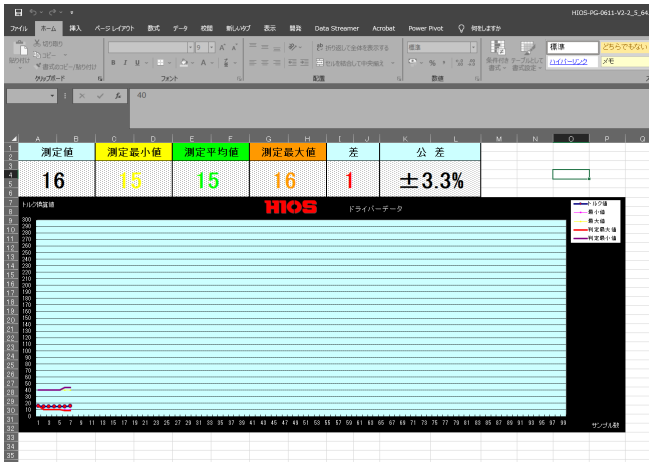
This sheet is used to record measured data.



日付	時間	トルク換算値	測定時間	学習数	学習最小値	学習最大値	学習最小測定時間	学習最大測定時間	誤差率	判定最小値	判定最大値	判定最小測定時間	判定最大測定時間	判定
2025/8/21	10:08:13 AM	16	1395	3	16	40	1200	1500	0	16	40	1200	1500	E93
2025/8/21	10:08:26 AM	15	1419	3	10	40	1200	1500	0	10	40	1200	1500	E00
2025/8/21	10:08:29 AM	15	1418	3	10	40	1200	1500	0	10	40	1200	1500	E00
2025/8/21	10:08:39 AM	15	1406	3	10	40	1200	1500	0	10	40	1200	1500	E00
2025/8/21	10:08:41 AM	15	1407	3	10	40	1200	1500	0	10	40	1200	1500	E00
2025/8/21	10:46:25 AM	15	1414	3	10	40	1200	1500	10	9	44	1080	1650	E00
2025/8/21	10:46:27 AM	16	1399	3	10	40	1200	1500	10	9	44	1080	1650	E00

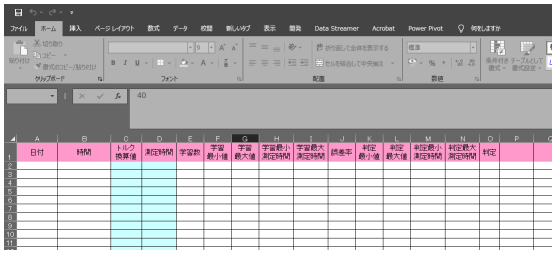
● Graph

This sheet is used to plot the measured data to a graph.



● Irregular

This sheet describes irregular data such as impossible to judge or measurement time NG.



Collection of Screwdriver Data (Application)

The operation data is collected in the same way as the data taking-in sheet. The data is saved in the CSV format.

For details, click [Instructions] on the screen of screwdriver data collection.



Data output format

In this section, message formats of PG-01FA are explained with examples.

At launching PG-01FA

PG-01FA version information and zero adjustment messages are sent.

Message sent
Ver3.04 2012/07/03 [Zero Adj A/D=806 G=212 F=200] [Zero Adj A/D=807 G=213 F=200] [Zero Adj A/D=802 G=214 F=200] [Zero Adjustment end A/D=800 Gain=214] [Job Num = 7] S10 [Work detection ON]

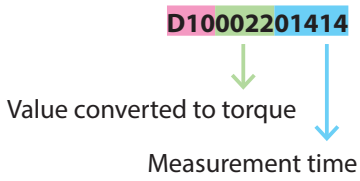
Judgment with torque-up

Measurement data is output when the screwdriver starts operating and torque-up is detected.

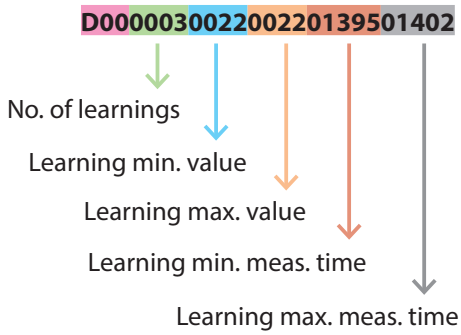
	Message sent	Overview
❶	[Job Num = 4] S10 [Work detection ON] S00 [Lever SW ON] [Job Num = 6] S02 [Torque UP ON]	Measurement start and result message
❷	**D10002201414** **D000003002200220139501402** **D2010001900240125501542**	Ⓐ Measurement Data Ⓑ Recorded Learning Value Ⓒ Judgment reference values
❸	[Judgment=LOW OK] E01 [Judgment end]	Operation check message for debugging

❷ Outline of measurement data

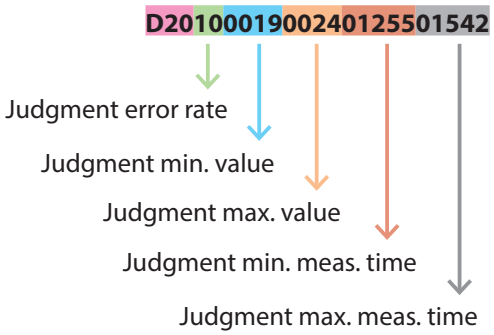
Ⓐ Measurement data



Ⓑ Recorded learned values



Ⓒ Judgment reference values



❸ Judgment

ID	Message	Overview
E00	Judgment=GOOD	OK with the judgment result within the upper and lower limits
E01	Judgment=LOW OK	OK with the judgment result at the lower limit
E02	Judgment=HIGH OK	OK with the judgment result at the upper limit
E90	End which cannot be detected by 0 areas, and judged	Measurement value zero area detection error. In most cases, fastening torque value is below the performance of the screwdriver.
E91	Abnormal termination at measurement time	Measurement time error. In most cases, operation time is outside the threshold.
E92	Study shortage and end which cannot be judged	Insufficient learning. Judgment ends because it is not possible.
E93	Judgment=LOW NG	NG with the judgment result below the lower limit
E94	Judgment=HIGH NG	NG with the judgment result above the upper limit

Judgment without torque-up

Measurement data is not output when there is no torque-up.

Message sent	Overview
[Job Num = 4] S10 [Work detection ON] S00 [Lever SW ON]	Measurement start and result
[Job Num = 5] S01 [LeverSW OFF END of NO Torque UP]	Judgment message

Troubleshooting

If a problem occurs, refer to this chapter for troubleshooting before contacting your dealer or HIOS. If the problem persists, please contact your dealer or HIOS.

The screwdriver does not work.

→ Check that the power is on. If the device does not respond even when the power is on, turn it off, check that the power cord is properly connected, and turn it back on.

Low torque

→ The output torque changes over time. Check the output torque with a torque meter periodically.

The connection mark does not appear on the operation box.

→ Check if the cord is correctly connected.

→ Check if the signal wires are correctly connected.

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.

→ "Pass/fail judgment of screw fastening" (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.

→ "Pass/fail judgment of screw fastening" (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.

→ "Installation" (P.07)

Setting cannot be changed from the tabulation software.

Click the [Write learn-value] button after input of a number. The settings in PG-01 will be updated by clicking the [Write learn-value] button.

→ "Data import sheet" (P.32)

The torque is abnormally low or high.

Make sure that the serial number of this machine is the same as that of PG-01FA. 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.

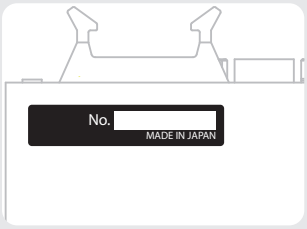
When a Problem Cannot Be Solved

When contacting us, have the following information ready:
Product name (PGFA-3000 / PGFA-5000 / PGFA-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)

● ScrewDriver



● PG-01FA



Maintenance

This section explains how to maintain and care for the device and attachments, including cleaning the main unit.
For comfortable and safe use, clean the device regularly. Before cleaning, read the safety precautions in"Important Safety Instructions" (P.03).
Be sure to turn off the power and unplug the power cord from the outlet when cleaning the device. Otherwise, fire or electric shock may be caused.

Maintenance and Calibration (Excluded from Warranty)

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

Cleaning of the Main Unit

Wipe the surface of the device periodically to keep it clean.

1 Turn off the power and unplug the power cord from the outlet.

2 Wipe the surface of the device.

- Wipe it gently with a soft dry cloth.

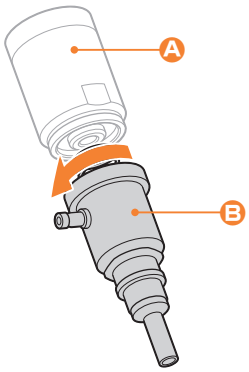
3 Plug the power cord in the outlet and turn on the power.

Cleaning the Device

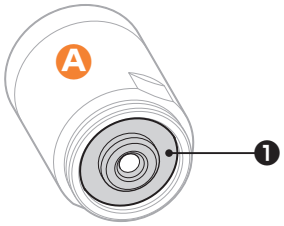
If there is dirt or debris inside the suction device, it may weaken the suction force or prevent screws from being fastened properly. Clean it regularly. Please check the safety precautions before maintenance.

FQ Suction

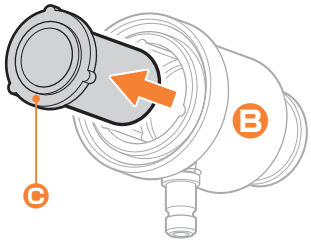
1 Remove the holder base and the mouthpiece.



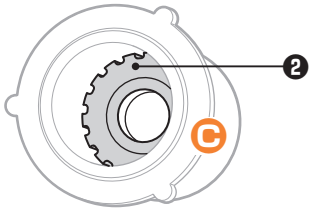
2 Clean the mounting plate A (❶) of the oil seal.



3 Remove the mouthpiece base from B .



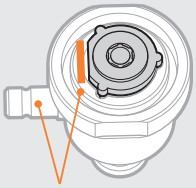
4 Clean the gear (❷) inside the mouthpiece base C .



5 Assemble back the parts.

About the orientation of the mouthpiece base

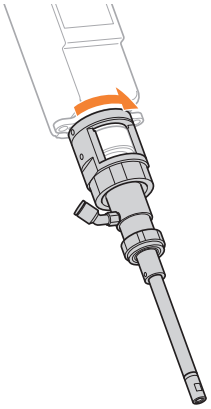
- Attach the mouthpiece base to BLFA-2000/PGFA-3000/PGFA-5000 in specified orientation.



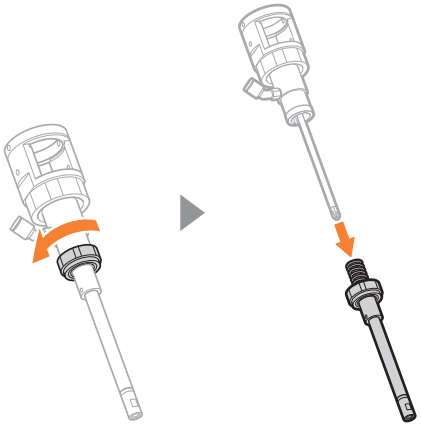
Align the flat end side with the intake nozzle.

FR Suction

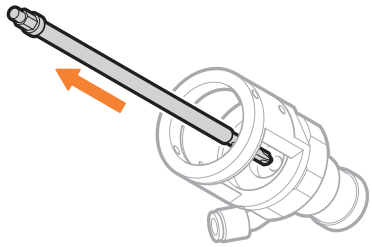
1 Remove the suction.



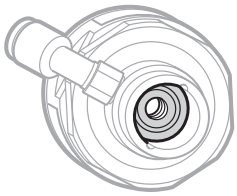
2 Remove the mouthpiece holder.



3 Remove the bit holder.



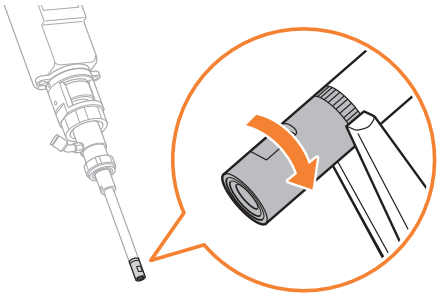
4 Clean the holder assy.



Clean the Mouthpiece (FR)

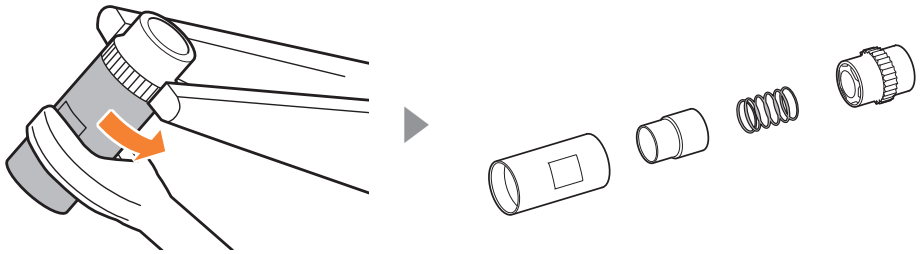
For comfortable and safe use, please clean it regularly.

1 Grasp the knurled part of the mouthpiece and remove it.



2 Disassemble it using a 7mm wrench.

- It has small parts inside, so be careful not to lose them.



3 Clean it.

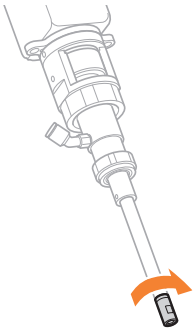
4 Reassemble the parts.

- Check if the sliding mouthpiece moves smoothly.

Replace the Threaded Bit (FR)

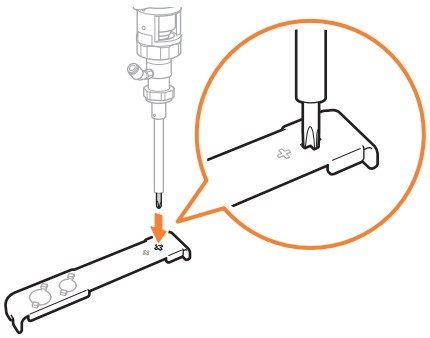
The bit for the FR Suction is attached using a threaded mechanism. When replacing the bit, we recommend to use a tool to clamp it, or use a jig to reverse turn the device for removal. Here, the replacement steps using a jig (sold separately) are explained.

1 Remove the mouthpiece.



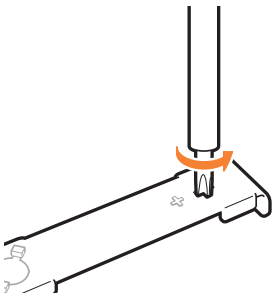
2 Insert it into the jig.

- Fix the plate (Plate part No: RP53 (sold separately)).

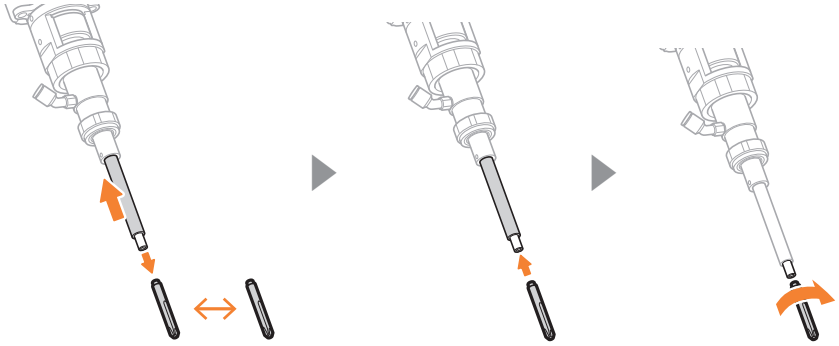


3 Reverse turn it.

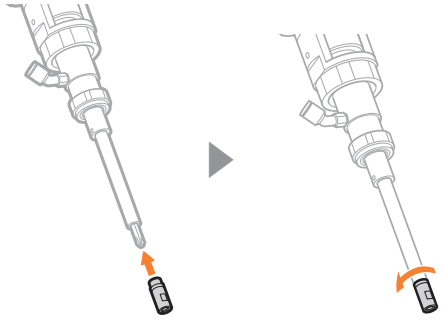
- The bit becomes loose.



4 Replace the bit.



5 Attach the mouthpiece.



After-sales Service

Please direct questions about customer services to HIOS Inc. or your HIOS dealer.

Repair, and Replacement

- We cannot return the items you sent with the after-sales service request. Remove the items (seals, etc.) that you installed after purchase before sending.
- It may be necessary to reconfigure or change the settings of the after-sales service request when the product is repaired or replaced.
- You will be responsible for transportation and other expenses when you request after-sales service.

Cases We Cannot Undertake Repair or Replacement

- There is a trace of inappropriate repair, disassembly, or alteration
- When the serial number is listed on the after-sales service request, the serial label is missing or there is a trace of removal, and there is a trace of tampering with the serial number or conduct that makes it illegible (including a case where the serial number has been removed)
- It is thought to have been damaged during transportation due to inadequate packing
- It is determined that the damage is too severe to maintain the function even after repair
- It is reasonably determined that there are circumstances equivalent to those set forth in the preceding items.

Specifications

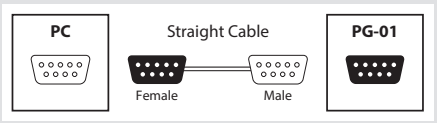
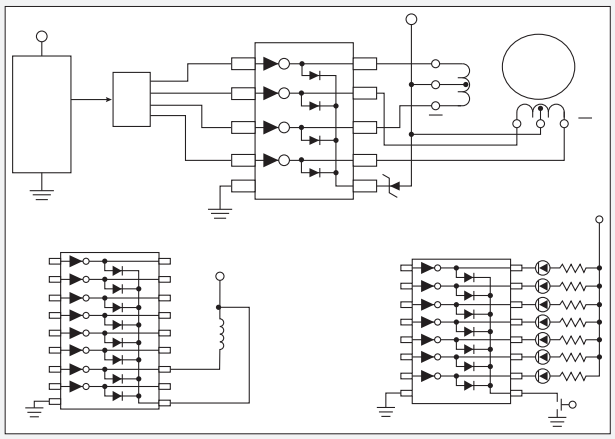
The device is subject to change and improvement without prior notice. We appreciate your understanding in advance.

PGFA

Model		PGFA-3000	PGFA-5000	PGFA-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
Unloaded rotation speed (rpm)		200–900	200–950	300–900
Unloaded rotation Slow speed*1 (rpm)		100–900	100–950	200–900
Screw size (mm)	Machine screw Tapping screw	1.7–2.3 2.0–2.3	2.3–3.0 2.0–2.3	2.6–5.0 2.6–4.0
Bit drive	Standard	H4	H4	H5 and 5HEX
	Option	—	—	1/4HEX
Suction	FQ	●	●	●
	FR	—	●	●
Operation Box		BLOP-AY01		
Controller		BLC-45/ BLC-70	BLC-70	BLC-80
Weight (g)		330	480	780
Operating environment		Temperature: 5 to 40°C Relative humidity: 80% or less (no condensation)		

*1 Cannot be used for tightening.

PG-01FA

Model	PG-01FA
PowerSuply	Input: AC100-240V (50-60Hz) Output: DC12V
Weight (g)	520g
RS-232C communication	
I/O	Common to plus and minus Output: sink type 

Notices

Disclaimer

- Specifications and appearance of the product are subject to change without notice.
- Please note that the contents of this manual are subject to change without prior notice.

Trademarks

- Microsoft and Windows are trademarks or registered trademarks of Microsoft Corporation in the United States and other countries.
- Also, other company names and product names in this manual are trademarks or registered trademarks of respective owners.

Illustrations

Unless otherwise specified, illustrations used in this manual are provided in PGFA-5000. However, if models have differences, multiple illustrations are also displayed with the model names such as "PGFA-2000 / PGFA-5000".

HIOS®

HIOS Inc.
1-35-1 Oshiage, Sumida-ku Tokyo, Japan 131-0045

ET-A076 25A

www.hios.com