HIOS®

Real-Time OK/Error Detecting Screwdriver

PG Brushless®

Brushless Driver Series

Pass-guard System Setup and Connections

● Setup

PG Brushless Driver
Control Unit PG-01 (Checker)
Block
Driver Power supply T-70BL (Sold Separately)
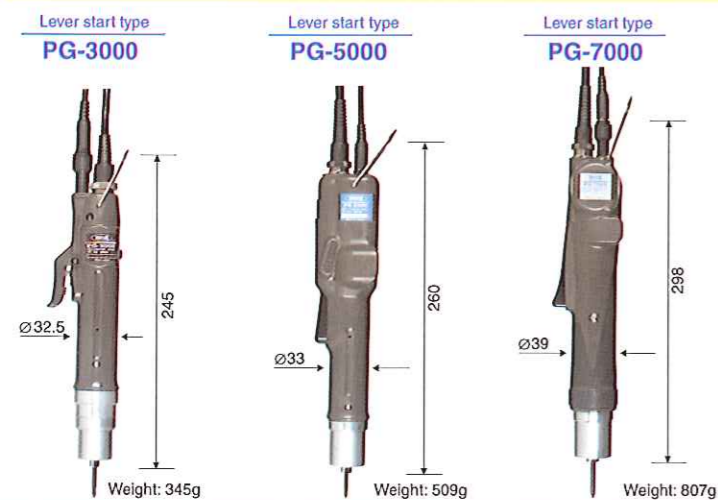
● Connections

USB
PC → A Block / B Block / C Block

RS-232C
PC → A Block / A Block
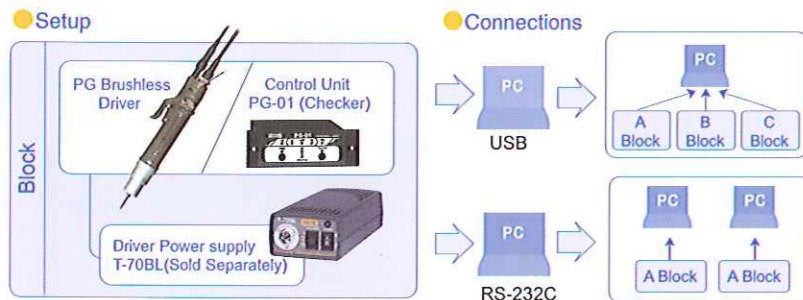
Driver Power Supply T-70BL (Sold separately)

● Specifications

Model	T-70BL (Supports 1 driver)
Input voltage	AC100V-240V (47-63 Hz)
Power consumption	70W
Secondary output	2 step HI / LOW
External Dimensions (mm)	88x210x52 (H) mm
Weight (g)	830g
Power cord length (m)	1.8m (Insulated)
Accessories	Mounting brackets (2), Mounting screws (4)

PG Brushless Drivers

Lever start type
PG-3000

Lever start type
PG-5000

Lever start type
PG-7000

Ø32.5 — 245

Ø33 — 260

Ø39 — 298

Weight: 345g

Weight: 509g

Weight: 807g

● Specifications   *PG Drivers are available only lever-start type

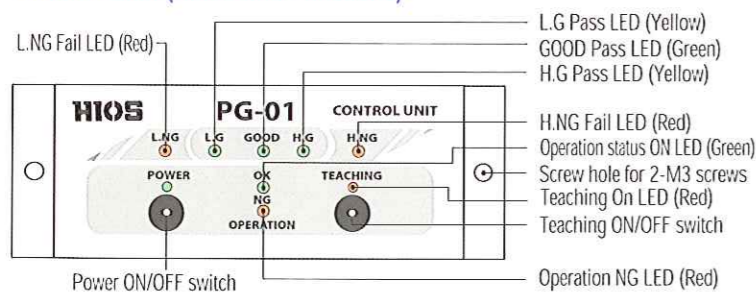| Model			PG-3000	PG-5000	PG-7000
Output Torque Range		N·m	0.2-0.55	0.4-1.2	0.7-2.8
		lbf·in	1.7-4.8	3.5-10	6.1-24
		(kgf·cm)	(2- 5.5)	(4-12)	(7-28)
Torque Switching			Stepless Adjustment		
Unloaded Rotation Speed (r.p.m) ±10%	High		980	900	960
	Low		680	590	630
Screw Size (mm)	Small Size Screw		1.7-2.3	2.3-3.0	2.6-5.0
	Tapping Screw		2.0-2.3	2.0-2.3	2.6-4.0
Bit Type			Hios H4	Hios H4	Hios H5 or 1/4HEX
Driver cord length / Sensor cord length(m)			2m(6P) / 2m	2m(6P) / 2m	2m(6P) / 2m
Included accessories			HIOS bit, Sampling Demo software (Windows XP Excel), RS-232C cable, USB cable, AC adapter (AC100-240V compatible)		

N,B: Windows XP and Excel is Trade mark of Microsoft.

The PG Brushless body uses an antistatic body case to prevent the generation of static electricity, which is suitable for the assembly of precision equipment and electronic parts.
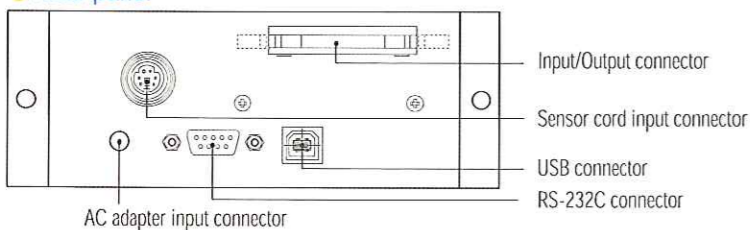
RoHS The PG Brushless is RoHS compliant.

Control Unit PG-01 (Checker)

● Front Panel (Name and Functions)

L.NG Fail LED (Red)

HIOS PG-01 CONTROL UNIT
L.NG L.G GOOD H.G   H.NG
POWER   OK   TEACHING
              NG
         OPERATION

Power ON/OFF switch

L.G Pass LED (Yellow)
GOOD Pass LED (Green)
H.G Pass LED (Yellow)
H.NG Fail LED (Red)
Operation status ON LED (Green)
Screw hole for 2-M3 screws
Teaching On LED (Red)
Teaching ON/OFF switch
Operation NG LED (Red)

● Rear panel

Input/Output connector
Sensor cord input connector
USB connector
RS-232C connector

AC adapter input connector

● Specifications

Model				PG-01	
RS-232C Communication	Communication speed	Start Bit	Stop Bit	Data	Data format
	4800BPS	1 Bit	1 Bit	8 Bit	ASCII
External Dimensions (mm)					

120 118
2-M3
44
149 49
*Dimensions do not include protrusions

Weight(g)	520g
AC Adaptor	Input:AC100V-240V (50 / 60 Hz), Output:DC12V

● I/O input / output connector

Pin No.	Output Signal	Description
13	L.NG (Fail)	Torque is below the LOW GOOD value (L.G)
14	L.G (Pass)	Torque is within the allowed percentage range of the LOW GOOD value
15	GOOD (Pass)	Within the HI and LOW values
16	H.G (Pass)	Torque is within the allowed percentage range of the HI GOOD value
17	H.NG (Fail)	Torque is above the HI GOOD value (H.G)
18	COM GND	—

Hios Inc.

⚠ Safety Precautions | Please read the instruction manuals before use. These products should be used only for their intended purposes. The proper and recommended power supply and voltages must be used.

Are those screws properly tightened?

Pass-guard, for tightening all screws

Tighten   Check   Save

HIOS PG-01 CONTROL UNIT

The color of actual drivers may differ from the picture

Is that screw really tightened?

You can check in realtime, if each and every screw is tightened properly. Prevents incomplete tightening and provides absolute confirmation and reliable "screw tightening quality."

Pass-guard
PG Brushless (DC Type)

All fastening operations are monitored and checked by the criteria, whose value is registered in advance the PG system. The problems in fastening operations such as insufficient torque, wrong thread joint and screw going askew are monitored and prevented from passing through the production line. PG Brushless drivers, which has data collecting function, is a part of "New Fastening System" that meets the demand of latest requirement where zero defect control is required.

The new style of 100% monitoring and control

NEW
Pass-guard "Tighten," "Check," "Save"

- Instantly determines if a screw passes or fails (OK/NG). (Items checked: torque and time)
- All items can be checked at the same time as the operation is conducted.
- Torque can be monitored for each tightening procedure.
- Can be connected to a PC for data recording.
- Job data can be checked at a glance.

PG-7000   PG-5000   PG-3000

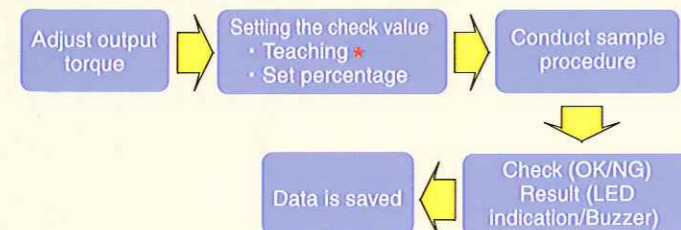### It's time for environmentally friendly "Brushless driver"

- By using high precision brushless motors, carbon particle emissions are eliminated.
- With a simplified design there is no malfunction nor accident caused by parts.
- A consistently clean environment can be maintained.
- In addition to long life, consistent and stable high precision torque control is promising.
- Minimum heat emissions. (Reduced by approximately 30% according to in-house comparisons)

Flow of setting Pass Guard System

1. Setting the Pass / Fail values

Screw tightening quality can be controlled by setting the checking criteria.

Setting Pass/Fail checking criteria (learned values)

Adjust output torque → Setting the check value · Teaching ★ · Set percentage → Conduct sample procedure → Check (OK/NG) Result (LED indication/Buzzer) → Data is saved

★ The learned values can be changed from the PC default settings screen.

Teaching
The checking criteria (learned values) is set by conducting actual screw tightening procedure, the torque value, minimum work time (Main), maximum work time (Max) are then stored.

Percentage Setting
Range selection ± (2%, 5%, 10%, 20%)
The acceptable range of passing values for torque, work time minimum and work time maximum can be set individually.

Pass/Fail Value

Fail	Passing range			Fail
L.NG	L.G	GOOD	H.G	H.NG
Below LOW GOOD value	Within the allowed percentage of LOW GOOD value	Within the HI GOOD and LOW GOOD values	Within the allowed percentage of HI GOOD value	Above HI GOOD value

Min value + (Min % value) — Minimum value (Min) — Maximum value (Max) — Max value + (Max % value)

《Torque value》

	L.G		GOOD		H.G	
	78	2%	80	100	2%	102
	76	5%	80	100	5%	105
	72	10%	80	100	10%	110
	64	20%	80	100	20%	120

《Work time ms》

	L.G		GOOD		H.G	
	780	2%	800	1000	2%	1020
	760	5%	800	1000	5%	1050
	720	10%	800	1000	10%	1100
	640	20%	800	1000	20%	1200

Example:
The table abode indicates minimum value set at 0.80N·m (Converted to 80), maximum value set at 1.00N·m (Converted to 100) with to minimum work time set to 800ms and maximum work time set to1000ms.

2. All data is saved as work is done

By managing data, it is possible to verify past work details.

Data display
Measurement data can be displayed in Excel format. Graphs are also generated automatically. You can also develop customized programs to meet the current needs and the current work environment of your application.

Data sheet (Excel)

Close-up of data sheet (Displayed items)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	A Actual work values				**B Teaching**					**C Set Percentages**					**D**
1	Date	Time	Converted Torque Value (Torque value)	Measurement time (Work time)	Number of times learned (Torque)	Minimum learned value (Torque)	Maximum learned value (Torque)	Minimum learned Measurement time (Work time)	Minimum learned Measurement time (Work time)	Variance	Minimum check value (Torque)	Minimum check value (Torque)	Minimum learned measurement time (Work time)	Minimum learned measurement time (Work time)	★ Check
2	2009/03/01	1:20:19PM	82	850	3	80	100	800	1000	2	78	102	780	1020	E00
3	2009/03/01	1:20:22PM	79	890	3	80	100	800	1000	2	78	102	780	1020	E01
4	2009/03/01	1:20:24PM	103	850	3	80	100	800	1000	2	78	102	780	1020	E94
5	2009/03/01	1:20:27PM	77	850	3	80	100	800	1000	2	78	102	780	1020	E93
6	2009/03/01	1:20:30PM	82	850	3	80	100	800	1000	2	78	102	780	1020	E00

★ Description of check symbols ● E00 (Check=GOOD) ● E01 (Check=LOW OK) ● E02 (Check=HIGH OK) ● E90 (Ended with zero range detected-check not possible) ● E91 (Ended with measurement time error) ● E92 (Ended with incomplete learning-check not possible) ● E93 (Check=LOW NG) ● E94 (Check HIGH NG) Other

PC Screen (Excel)

HIOS Driver Data Sheet   Ver.2

Log data window. (Just for reference)

Check variance setting (%) 02   Work Detection ON

1100 = approximately 1.00N·m (As for PG-3000,1000 ≒1.00N·m)

Converted torque value 82 Ⓐ
Measurement time 850 ms

Real Valume

Number of times learned 3 Ⓑ
Minimum learned value 80 editable
Maximum learned value 100 editable
Minimum learned measurement time 800 editable
Maximum learned measurement time 1000 editable

More than 3 measurment is roquired. After 11th data, the oldest data will be

Click to receive data.
port 3
LAN setup
No of PC com port
Option only

Driver connection
Driver disconnected

Port selection ● Com ○ Lan

To see in the graph Value

Ⓒ Converted torque value (selected value) 90
Measurement code

Check variance (%) 2
Minimum check value 78
Maximum check value 102
Minimum work time value 780
Maximum work time value 1020

Check ON/OFF
E90 OFF ☑
E91 OFF ☑
E92 OFF ☑

"Check" to see in the data sheet "No check" to see in the irregular sheat.

Ⓓ
"S00" : Lever SW ON
"S10" : Lever SW OFF ended without torque-up
"S02" : Torque-up ON
"S10" : Work ON
"S11" : Work OFF
"E00" : Check=GOOD
"E01" : Check=LOW OK
"E02" : Check=HIGH OK
"E90" : Ended with zero range detected-check not possible
"E91" : Ended with measurement time error
"E92" : Ended with incomplete learning-check not possible
"E93" : Check =LOW NG
"E94" : Check =HIGH NG

List of status code

OK   NG

① ②

DIsplays the results of fastening referring to the values of ② in yellow.

② : Gives ±5% of acceptable limit referring to the values of ①. You can choose limit from 2%,5%, 10%, 15% or 20%.

3. Indications during every tightening procedure

OK/NG results can be confirmed by LED and buzzer while work is in process.

OK/NG is displayed on the PC and measurement values are displayed in the data sheet.

OK   NG
★NG: Not OK