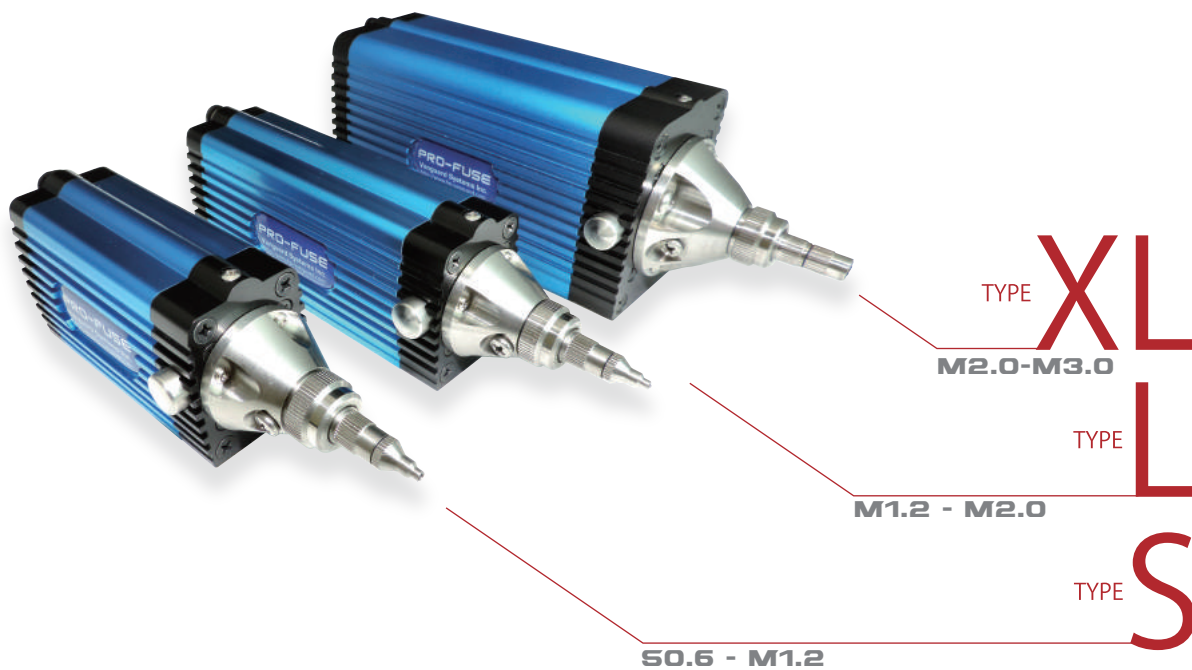


*An intellectualized tool \_\_\_\_\_*

*a newly-evolved electric driver*

# PRO-FUSE®



Precision Driver for

**S 0.6**

**I**

**M 3.0**

ultra-fine screws



SO.6-M3.0 ULTRA-FINE SCREWS



*An intellectualized tool* \_\_\_\_\_

*a newly-evolved electric driver*

# PRO-FUSE®

## *Precision Driver*

### ■ An ultra-fine screw can be tightened.

SO.6-M3.0 screw is available. Bit will be customized by a design of customers target screw.

### ■ One stop solution

Vanguard Systems provide a driver, controller, software, bit, mouthpiece and screw feeder as a one stop solution.

### ■ Small/lightweight

An industry-top-class small/lightweight screwdriver is achieved by our unique mechanisms design. It is easy to be mounted to X-Y robot or multi-articulated robot. Our screwdriver can contribute to an automation of screw tightening.

### ■ Torque management

Our unique control technologies enable setting and management of a tightening process torque and a result torque. A precise torque control is achieved ( $\pm 5\%$  current equivalent value).

### ■ Traceability

An attached dedicated application "ProE-Expert" can trace a torque of whole screw tightening process in real-time.

### ■ Screw tightening process can be controlled from higher level equipment

You can control PRO-FUSE from a higher level equipment, such a PC or a PLC(sequencer) through Modbus/TCP communication protocol. This feature enables you easier to set up your system.

### ■ High-speed, High-torque

Maximum rating rotation speed 1,500rpm and maximum tightening torque 700mN.m is achieved by our unique software tuning.

### ■ Energy conservation

It is a very energy efficient electric driver because of using DC24V(3A) power supply.

### ■ Programmable screw tightening condition setup.

Maximum 16 groups of the optimized condition setting parameters can be registered in the controller.

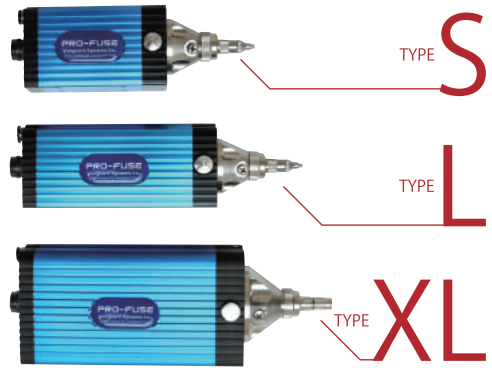
### ■ Multidrop connections

One windows PC can get a status/screw tightening result of maximum 250 PRO-FUSE units.

## Basic set

- PRO-FUSE : Electric driver (Choose from S, L or XL ; Torque range is different)
- Controller
- Connection Cable
- ProE-Expert (Dedicated control application software)

- \* Bit/mouthpiece will not contain in this product.
- \* Please purchase bit/mouthpiece that fits your target screw design separately.

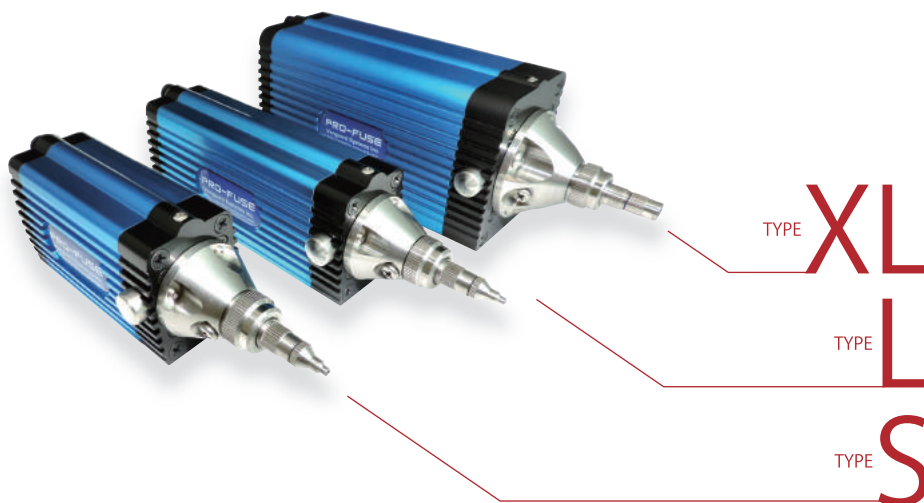


## One stop total solution

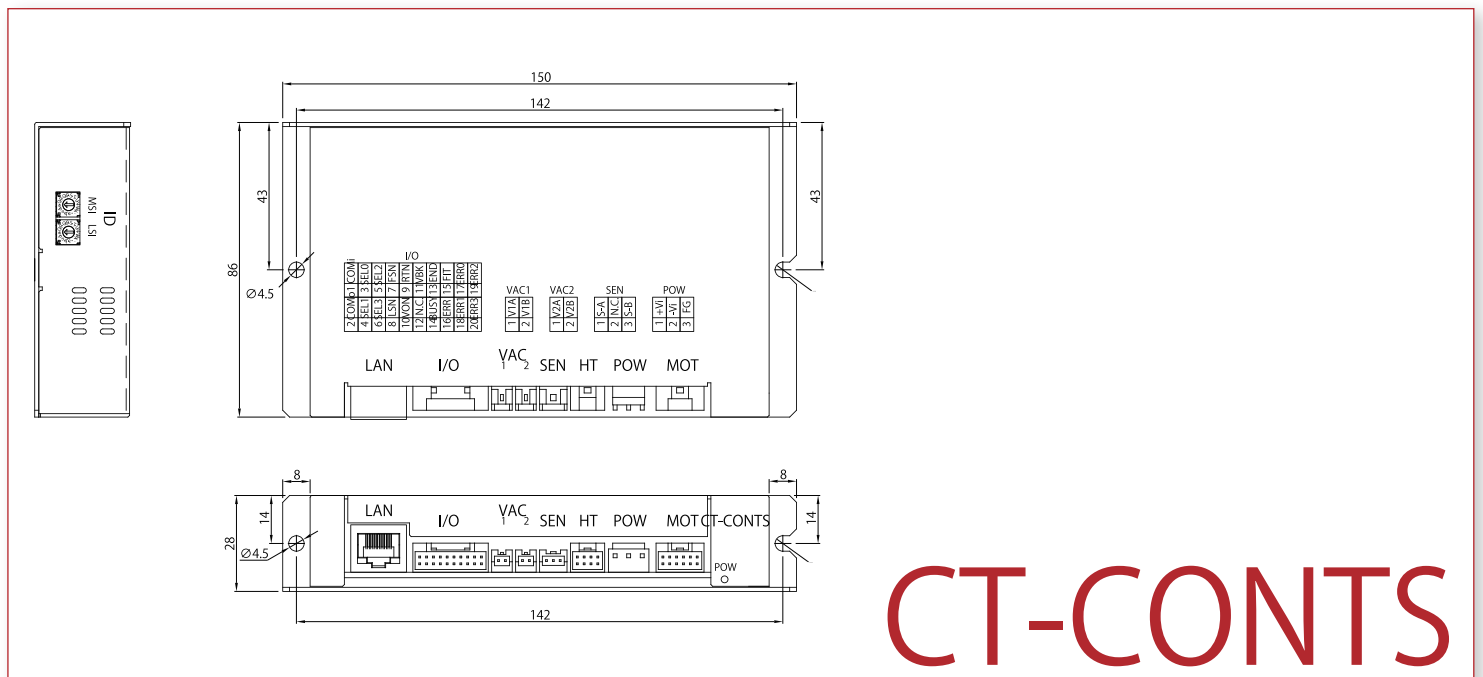
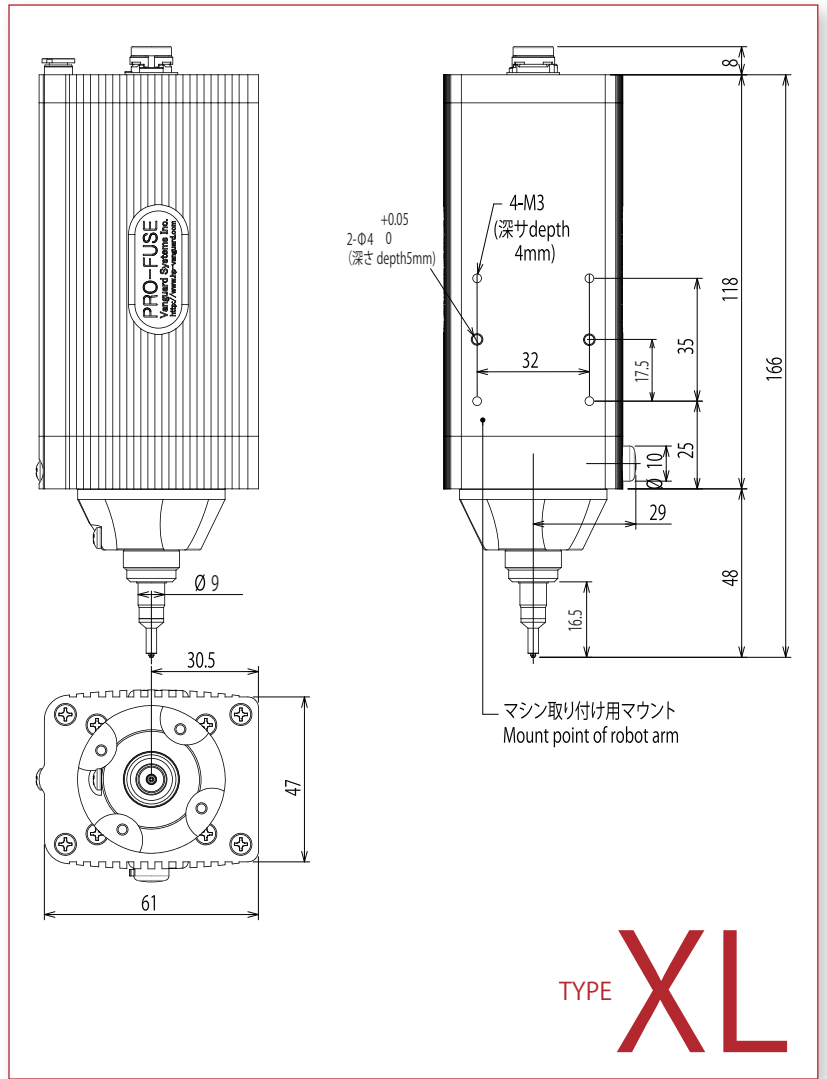
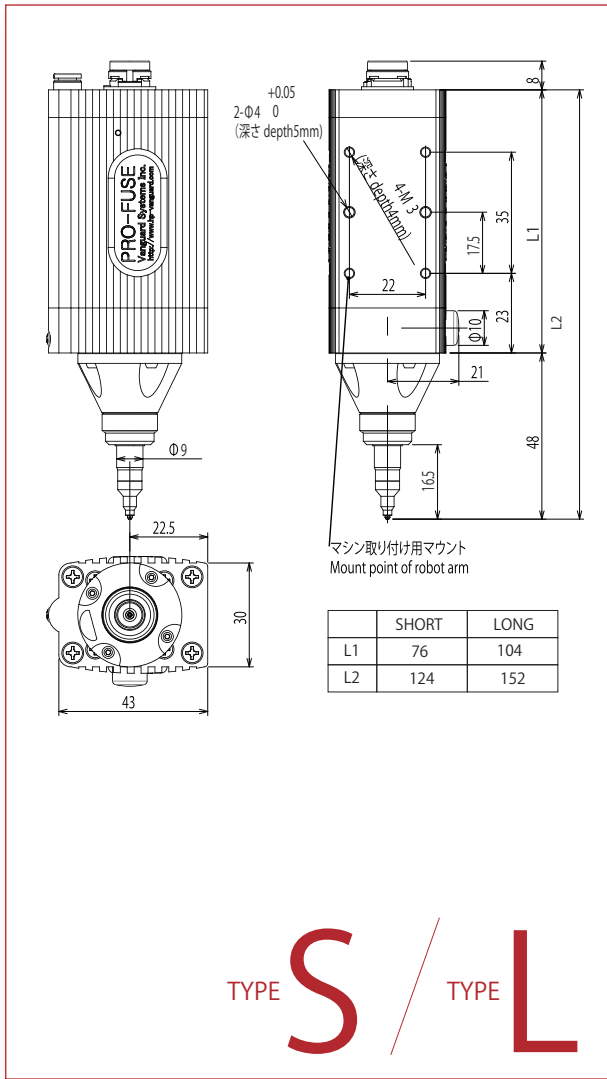


## Basic specification

basic set model Item	Unit	PF-1-01-02-02-01-W <b>TYPE S</b>	PF-1-01-04-04-01-W <b>TYPE L</b>	PF-1-01-06-07-01-W <b>TYPE XL</b>
Screw size	mm	S0.6 - M1.2	M1.2 - M2.0	M2.0 - M3.0
Control method		Closed loop		
Motor		Stepping motor		
Processing mode		3 mode (Normal, Tapping, High speed)		
Target torque setting range	mN.m	15.0-45.0(Norm)/10.0-45.0(Tapping,HS)	50.0-180.0(Norm)/30.0-180.0(Tapping,HS)	200.0-700.0(Norm)/200.0-700.0(Tapping,HS)
Maximum rotation speed	RPM (min-1)	1000(Normal, Tapping) / 1500(High Speed)		
Outer size(Width)	mm	30		47
Outer size(Length)	mm	124(without connector)	152(without connector)	166(without connector)
Weight	g	280 (Approx.)	405 (Approx.)	980 (Approx.)
Rotation direction		Define rotation direction CW:Clockwise CCW:Counter Clockwise		
Start point detection offset	mN.m	0.0-10.0		
Initial tapping torque	mN.m	15.0-45.0(Norm)/10.0-45.0(Tapping,HS)	50.0-180.0(Norm)/30.0-180.0(Tapping,HS)	200.0-700.0(Norm)/180.0-700.0(Tapping,HS)
Torque-up detection time	sec	0.01-1.00		
-turn limit offset	turn	-10.0-0.0		
+turn limit offset	turn	0.0-10.0		
Retightening angle	°	-360.0-360.0		
Program memory		16		
Input signal		Program : 4Bits		
		Tighten/Loosen : 2Bits		
		Rotation : 1Bit		
		Option : 1Bit		
Output signal		Reserved : 2Bits		
		Torque up : 1Bit		
		Busy : 1Bit		
		Error : 5Bits		
Power supply input		Reserved : 1Bit		
		DC24V (3A)		



# Dimensions



※ 詳細形状は、変更する場合があります

※ Detail dimensions are subject to change without prior notice

単位: Unit mm

## Interface

100BASE-T LAN connector (PC/PLC/others)

Robot communication terminal (ROBOT/PLC/others)

Power supply connection terminal (DC+24V)

Controller/electric driver control signal connection terminal

LAN I/O POW MOT CT-CONTS

CT-CONTS

Precision Driver **PRO-FUSE®**

Terminal name	Symbol	Vendor	Connector model	Cables, housing
100BASE-T LAN	<b>LAN</b>	STD	RJ45	Prepare by customer
Robot communication terminal	<b>I / O</b>	JST	S20B-PUDSS-1	Prepare by customer
Power supply connection terminal	<b>POW</b>	JST	B3PS-VH	Prepare by customer
Controller/electric driver control signal connection terminal	<b>MOT</b>	-	Vanguard specific	Included with this set

## Dedicated application "ProE-Expert" (Attached to the basic set)

### Advanced function "Window" (Standard feature)



- ProE-Expert will support setting up conditions of screw tightening parameters easily and visually.
- ProE-Expert can trace a torque of whole screw tightening process in almost real-time.
- Compatible with Windows 7/8/10.
- A "Window" feature will provide more detailed control method that enabling multi-step judgment during a screw tightening process. It also helps to expand possibility toward various special screws: such as adhesive-coated screw, tapping screw, plastic screw.

### Result log

取得日時	PRG No.	ターン数	トルク値	締付時間	結果	エラー詳細
2015/05/28 14:36:08	0	10.3	14.9	3.208	OK	
2015/05/28 14:36:25	0	10.3	14.9	3.211	OK	
2015/05/28 14:36:43	0	10.3	14.9	3.207	OK	
2015/05/28 14:36:59	0	10.3	14.9	3.211	OK	
2015/05/28 14:37:17	0	10.3	14.9	3.209	OK	
2015/05/28 14:37:34	0	10.3	14.9	3.204	OK	
2015/05/28 14:37:51	0	10.3	14.9	3.210	OK	
2015/05/28 14:38:09	0	10.4	14.9	3.224	OK	
2015/05/28 14:38:26	0	10.3	14.9	3.212	OK	
2015/05/28 14:38:43	0	10.3	14.9	3.205	OK	
2015/05/28 14:39:00	0	10.3	14.9	3.205	OK	
2015/05/28 14:39:17	0	10.3	14.9	3.207	OK	
2015/05/28 14:39:34	0	10.3	14.9	3.211	OK	
2015/05/28 14:39:52	0	10.3	14.9	3.209	OK	
2015/05/28 14:40:09	0	10.3	14.9	3.217	OK	
2015/05/28 14:40:26	0	10.3	14.9	3.208	OK	
2015/05/28 14:40:43	0	10.3	14.9	3.208	OK	
2015/05/28 14:41:01	0	10.3	14.9	3.207	OK	
2015/05/28 14:41:18	0	10.3	14.9	3.204	OK	
2015/05/28 14:41:35	0	10.3	14.9	3.207	OK	
2015/05/28 14:41:52	0	10.3	14.9	3.208	OK	
2015/05/28 14:42:10	0	10.4	14.9	3.209	OK	
2015/05/28 14:42:27	0	10.3	14.9	3.205	OK	
2015/05/28 14:42:44	0	10.3	14.9	3.203	OK	
2015/05/28 14:43:01	0	10.4	14.9	3.221	OK	

- It is indicated PRG No./Turn counts/Torque value/judgment result/Error code(Available CSV file output)
- A customer's communication applications (software) can be collected. log of screw tightening result by the Modbus(LAN) PRO-FUSE is also available to control from communication application of the robot system.

## Lineup of peripherals and services

\* Please contact our sales person for more detail information.

### Bit



A dedicated bit for PRO-FUSE. Bit should be customized by a design of customers target screw. Please provide target screw drawing and samples

in advance. 1 set = 10 pieces of bit : bit will be sold by set.

### Mouthpiece



A dedicated mouthpiece sucks a screw by vacuum at tip of PRO-FUSE electric driver unit. Mouthpiece should be customized by a

design of customers target screw. Please provide target screw drawing and samples in advance.

### Robot I/O cable



An I/O signal interface cable that connects between the basic set controller and a customers robot/PLC. An appropriate connector is attached at

one end of cable so that a customer easily connect to "I/O terminal" on the controller. On the other hand, another end of cable is parallel open wire.

### Power supply cable



A power supply cable that connects between the basic set controller and a customer's DC power supply. An appropriate connector is attached at one end of

cable so that a customer easily connect to "POW terminal" on the controller. On the other hand, another end of cable is parallel open wire.

### Z-Axis damper

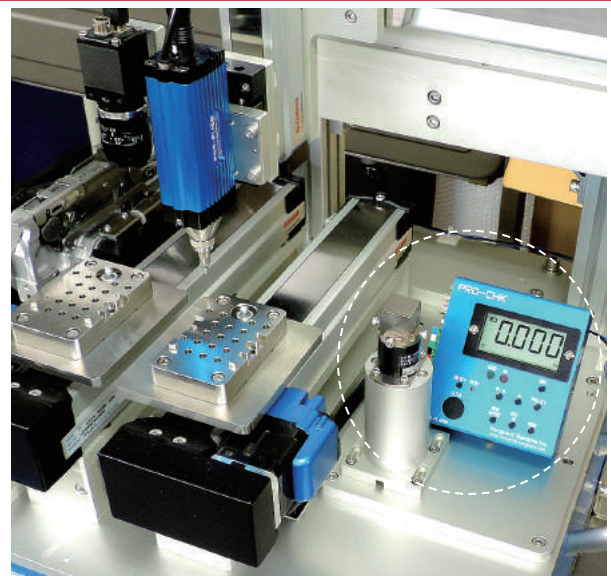
There is no Z-axis damping mechanism inside the electric driver unit to achieve accurate torque control. This z-axis damper enables 1-2 kg impact absorption by maximum 4mm strokes of spring. Please note that an appropriate Z-axis damping mechanisms for each robots or production lines are different each others.



## PRO-CHK



A simplified torque checker that can be used in factory line to check a torque of PRO-FUSE in case of abnormality or daily check. Vanguard Systems also plan to provide a calibration service to the torque checker.





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