Autonics

DIGITAL PRESSURE SENSOR
(Pneumatic type)
PSAN SERIES
M A N U A L

CE

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

■ Caution for your safety

※ Please keep these instructions and review them before using this unit.
※ Please observe the cautions that follow;
⚠ **Warning** Serious injury may result if instructions are not followed.
⚠ **Caution** Product may be damaged, or injury may result if instructions are not followed.

※ The following is an explanation of the symbols used in the operation manual.
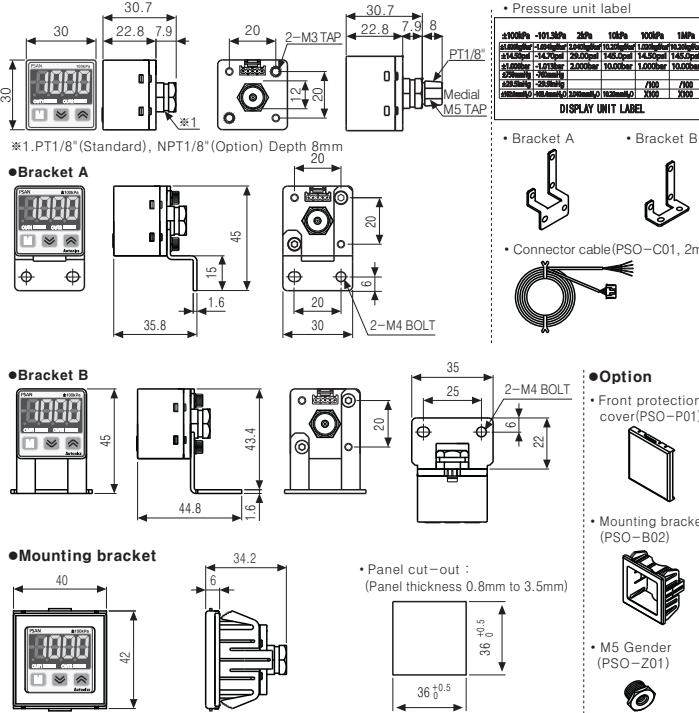⚠ caution: Injury or danger may occur under special conditions.

⚠ Warning

1. In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail–safe device.
   It may cause a fire, human injury or dam
2. Do not use it in flammable gas because it does not have an explosion proof construction.
   It may cause explosion.

⚠ Caution

1. This unit shall not be used outdoors.
   It may shorten the life cycle of the product or cause electric shock.
   It is designed for the indoors environment.
2. Do not apply the pressure beyond the rated pressure.
   It may cause damage to this unit.
3. Do not use it beyond the rated power supply.
   It may cause damage to this unit.
4. Do not make a short circuit for the load.
   It may cause damage to this unit.
5. Please connect wire properly after checking the polarity of wire.
   It may cause damage to this unit.
6. Do not use corrosive gas or liquid as it is only for non-corrosive gas.
   It may cause damage to this unit.
7. Do not give power to its case or twist its case strongly.
   It may cause damage to this unit.

■ Dimensions

(Unit:mm)

●Accessory
 • Pressure unit label
 1.PT1/8"(Standard), NPT1/8"(Option) Depth 8mm

●Bracket A

●Bracket B

●Mounting bracket

●Option
 • Front protection cover(PSO-P01)
 • Mounting bracket (PSO-B02)
 • Panel cut–out : (Panel thickness 0.8mm to 3.5mm)
 • M5 Gender (PSO-Z01)
 • Connector cable(PSO-C01, 2m)

■ Front panel identification and function

1 **Range of rating pressure**: The unit label is changeable. Please use a desired measure unit label.
2 **4 digit LED display(Red)**: Used to indicate measured pressure value, setting value and error message.
3 **Output1 indicator(Red)**: Output 1 is ON, LED will be ON.
4 **Output2 indicator(Green)**: Output 2 is ON, LED will be ON.
5 **M key**: Used to enter into Preset/Parameter setting mode and to save Setting mode.
6 ▼, ▲ **key**: Used to set parameter and preset, peak level check mode, function setting or output change mode.
▼ + ▲ **key**: Used for zero–point adjustment function by pressing ▼ + ▲ keys over 1 sec. simultaneously in RUN mode.

■ Functions

Pressure unit change function
PSAN-V01C(P) and PSAN-C01C(P) has 7 kinds of pressure unit, PSAN-01C(P) and PSAN-1C(P) has 4 kinds of pressure unit. Please select the proper unit for application.
 • PSAN-V01C(P), PSAN-C01C(P) : kPa, kgf/cm², bar, psi, mmHg, inHg, mmH₂O
 • PSAN-01C(P), PSAN-1C(P) : kPa, kgf/cm², bar, psi
 ※When using mmH₂O unit, multiply display value by 100.

Output mode change function
There are 5 kinds of control output mode in order to realize the various pressure detection.
 • Hysteresis mode(HY5A) : When needed to change hysteresis for detecting pressure.
 • Window comparison output mode(Yln) : When needed to detect pressure in certain area.
 • Hysteresis – Window comparison output mode(HY-Y) : When both hysteresis and window comparison output mode are required
 • Automatic sensitivity setting mode(AUto) : When needed to set detection sensitivity automatically at proper position.
 • Forced output control mode(F.oUt) : When needed to display pressure with remaining comparison output OFF regardless of setting value

Control output change function
Type of control output for Out1 and Out2 can be able to set Normally Open and Normally Closed.
 ※ Note that Normally Open and Normally Closed provide opposite output.

Response time change function(Chattering prevention)
It can prevent chattering of control output by changing response time. It is able to set 5 kinds of response time(2.5ms, 5ms, 100ms, 500ms, 1000ms) and if the response time is getting longer, the detection will be more stable by increasing the number of digital filter.

Analog output scale setting and Hold/Auto Shift setting function
 • Analog voltage output scale setting: The scale for analog output voltage (1~5VDC) is not fixed to the rated pressure range. It can be changed for User's application.
 • Analog current output scale setting: The scale for analog output Current (DC4~20mA) is not fixed to the rated pressure range. It can be changed for User's application.
 • Hold/Auto Shift input setting
   ☞Hold function: A function to hold PV and Control output while signal is input.
   ☞Auto Shift function: A function to compensate the setting value for changed value of reference pressure as threshold level if reference pressure change of the device changes.

Key lock function
The key lock function prevents key operations so that conditions set in each mode (preset/parameter mode) are not inadvertently changed. There are 2 kinds of key lock functions available.
 • LoC1 : All keys are locked; therefore it is not available to change parameter settings, preset value, zero adjustment, High/Low peak check, and SHJn data initialization. (Lock setting change is available)
 • LoC2 : Partially locked status; therefore it is not available to change parameter settings only (Lock setting change is available). Other settings are still available.
 • oFF : All of the setting is available, all keys are unlocked.

Zero-point adjustment function
The zero–point adjustment function forcibly sets the pressure value to "zero" when the pressure port is opened to atmospheric pressure. When the zero adjustment is applied, analog output [Voltage or Current] is changed by this function.(Press ▼ + ▲ keys over 1 sec. in RUN mode.)

High Peak / Low Peak Hold function
This function is to diagnosis malfunction of the system caused by parasitic pressure or to check through memorizing the max./min. pressure occurred from the system.

■ Error display function

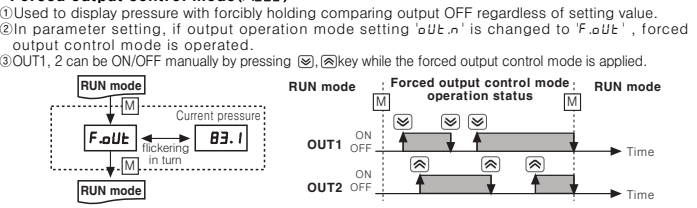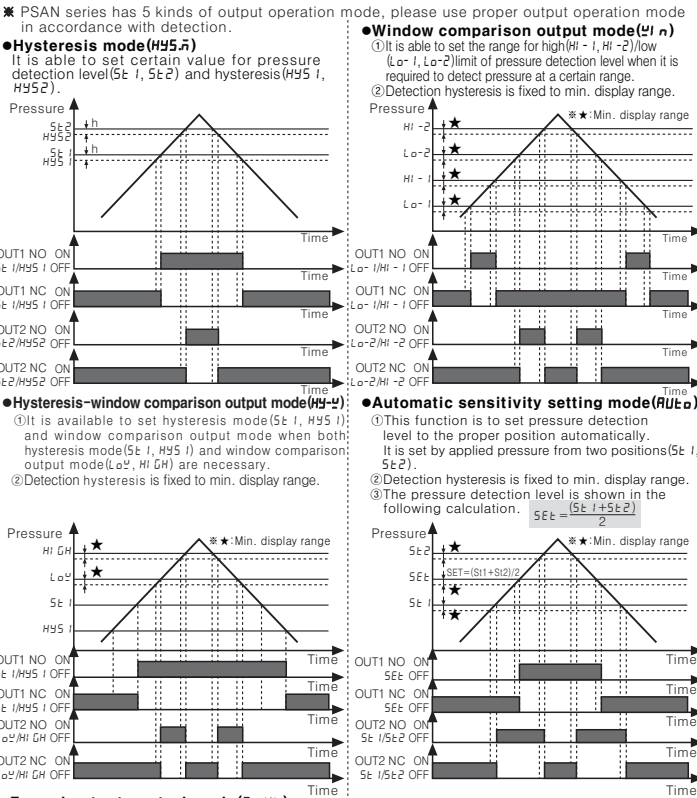| Error display	Description	Troubleshooting
Err 1	When external pressure is input while adjusting zero point	Try again after removing external pressure
Err2	When overload is applied on control output	Remove overload
Err3	When setting condition is not met in Auto sensitivity setting mode	Check setting conditions and set proper setting values
LLLL	When applied pressure exceeds Low–limit of display pressure range	Apply pressure within display pressure range
HHHH	When applied pressure exceeds High–limit of display pressure range	
-HH- / -LL- / -HL-	Auto shift correction error	Set the corrected setting value within setting pressure range.

※The above specifications are subject to change without notice.

■ Specifications

Pressure type	Vacuum pressure type	Gauge pressure		Compound pressure type
		Positive pressure type		
Model (※1) Voltage output	PSAN-V01C(P)V-□	PSAN-01C(P)V-□	PSAN-1C(P)V-□	PSAN-C01C(P)V-□
Current output	PSAN-V01C(P)A-□	PSAN-01C(P)A-□	PSAN-1C(P)A-□	PSAN-C01C(P)A-□
Hold/Auto shift input	PSAN-V01C(P)H-□	PSAN-01C(P)H-□	PSAN-1C(P)H-□	PSAN-C01C(P)H-□
Rated pressure range	0.0 to −101.3kPa	0.0 to 100.0kPa	0.0 to 1,000kPa	−101.3kPa to 100.0kPa
Display pressure range	5.0 to −101.3kPa	−5.0 to 110.0kPa	−50 to 1,100kPa	−101.3kPa to 110.0kPa
Min.display unit(internal resolution)	0.1kPa	0.1kPa	1kPa	0.1kPa
Max. pressure range	2 times of rating pressure		1.5 times of rating pressure	2 times of rating pressure
Applicable fluid	Air, Non–corrosive gas			
Power supply	12–24VDC ±10%(Ripple P-P: Max. 10%)			
Current consumption	Max. 50mA(Analog Current Output type Max 75mA)			
Control output	NPN or PNP open collector output • Load voltage: Max. 30VDC • Load current: Max. 100mA • Residual voltage-NPN: Max. 1V, PNP: Max. 2V			
Hysteresis(※2)	Min. display range			
Repeat error	±0.2% F.S. + Min. display range			
Response time	Selectable 2.5ms, 5ms, 100ms, 500ms, 1000ms			
Short circuit protection	Built–in			
Analog output (※3) Voltage output	• Output voltage: 1~5VDC ±2% F.S. • Linear: Max. ±1% F.S. • Output impedance: 1kΩ • Zero point: Max. 1VDC ±2% F.S. • Span: Max. 4VDC ±2% F.S. • Resolution: 1/2,000(equal to display resolution) • Response Time: 50ms			
Current output	• Output current: DC4~20mA ±2% F.S. • Linear: Max. ±1% F.S. • Zero point: Max. DC4mA ±2% F.S. • Span: Max. DC16mA ±2% F.S. • Resolution: 1/2,000(equal to display resolution) • Response Time: 70ms			
Display method	7 Segment LED Display			

Min. Display interval(※4)	resolution pressure unit	1000	2000	1000	2000	1000	2000	1000	2000
	kPa	0.1	−	0.1	−	1	−	0.1	
	kgf/cm²	0.001	−	0.001	−	0.01	−	0.001	
	bar	0.001	−	0.001	−	0.01	−	0.001	
	psi	−	0.01	−	0.01	−	0.1	−	0.02
	mmHg	−	0.4					−	0.8
	inHg	−	0.02					−	0.03
	mmH₂O	0.1	−					−	0.1

Display accuracy	0 to 50℃: Max. ±0.5% F.S., −10 to 0℃: Max. ±1% F.S.
Insulation resistance	Min. 50MΩ (at 500VDC megger)
Dielectric strength	1000VAC 50/60Hz for 1 minute
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours
Environment Ambient temperature	−10 to 50℃, Storage: −20 to 60℃
Ambient humidity	30 to 80%RH, Storage: 30 to 80%RH
Protection	IP40(IEC Standards)
Material	Front case:PC, Rear case:PC, Pressure port:Nickel Plated Brass
Wire	Connector cable(φ4, 5-wire, Length: 2m, AWG 24, Core diameter: 0.08mm, Number of cores: 40, Insulator diameter: φ1)
Approval	CE
Unit weight	Approx. 80g

※1: (P) is PNP output type, □ of model name is pressure port. RC1/8: PT1/8"model(Standard), NPT1/8: NPT1/8"model(Option) R1/8: PT1/8"model(Option)
※2: In hysteresis output mode, detection difference is variable.
※3: It is allowed to select one analog output type only.
※4: Resolution(1000/2000) of min. display interval is automatically selected depend on pressure units.

※ F.S.: Rated pressure.
※There may be ±1digit hysteresis error by calculation error of pressure unit.
※ Environment resistance is rated at no freezing or condensation.

■ Output operation mode

PSAN series has 5 kinds of output operation mode, please use proper output operation mode in accordance with detection.

●Hysteresis mode(HY5A)
It is able to set certain value for pressure detection level(St1, St2) and hysteresis(HY51, HY52).

●Window comparison output mode(Yln)
①It is able to set 2 limit of pressure detection level when it is required to detect pressure at a certain range.
②Detection hysteresis is fixed to min. display range.

●Hysteresis-window comparison output mode(HY-Y)
①It is available to set hysteresis mode(St1, HY51) and window comparison output mode when both hysteresis mode(St1, HY51) and window comparison output mode(Lo*, HI GH) are necessary.
②Detection hysteresis is fixed to min. display range.

●Automatic sensitivity setting mode(AUto)
①This function is to set pressure detection level to the proper position automatically. It is set by applied pressure from two positions(St1, St2).
②Detection hysteresis is fixed to min. display range.
③The pressure detection level is shown in the following calculation.
$$SEt = \frac{St1 + St2}{2}$$

●Forced output control mode(F.oUt)
①Used to display pressure with forcibly holding comparing output OFF regardless of setting value.
②In parameter setting, if output operation mode setting 'oUt.n' is changed to 'F.oUt', forced output control mode is operated.
③OUT1, 2 can be ON/OFF manually by pressing ▲▼ key while the forced output control mode is applied.

■ Input/Output circuit and diagram

●Analog output circuit (Voltage output PSAN-□□□□V-□, Current output PSAN-□□□□A-□)
 NPN open collector output type
 PNP open collector output type
 ※ ┈: For voltage output type only

●Hold / Auto Shift input type(PSAN-□□□□H-□)
 NPN open collector output type
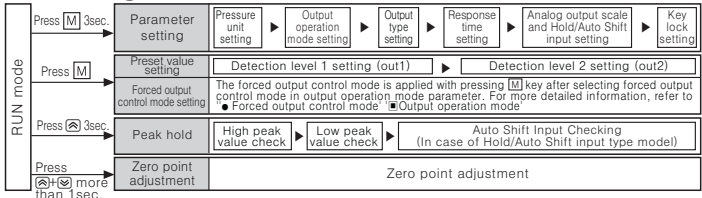 PNP open collector output type
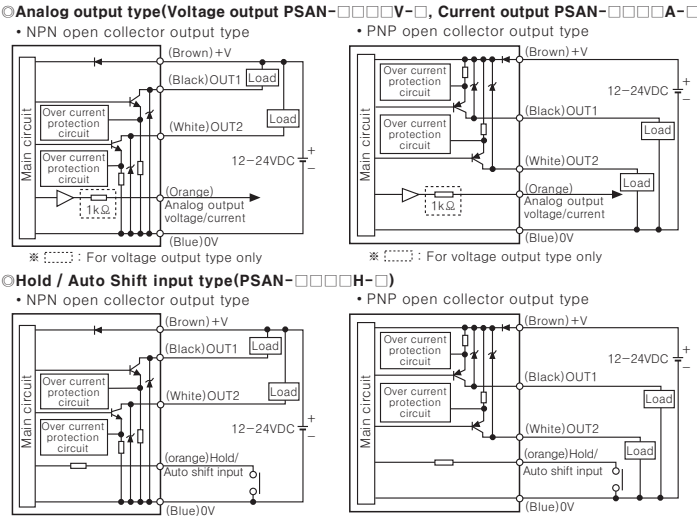
■ Installation

1. Pressure ports are two types: standard and option. Be sure that when using an one touch fitting.
   (Standard: Rc1/8", Option: NPT1/8", R1/8")
2. Please connect it by using spanner(12mm) at the metal part in order not to overload on the body when connecting one touch fitting.
3. Two different fixing brackets are provided for PSAN model. Select the proper bracket with considering your applicable environments.
4. At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing hexagon the wrenchbolt.
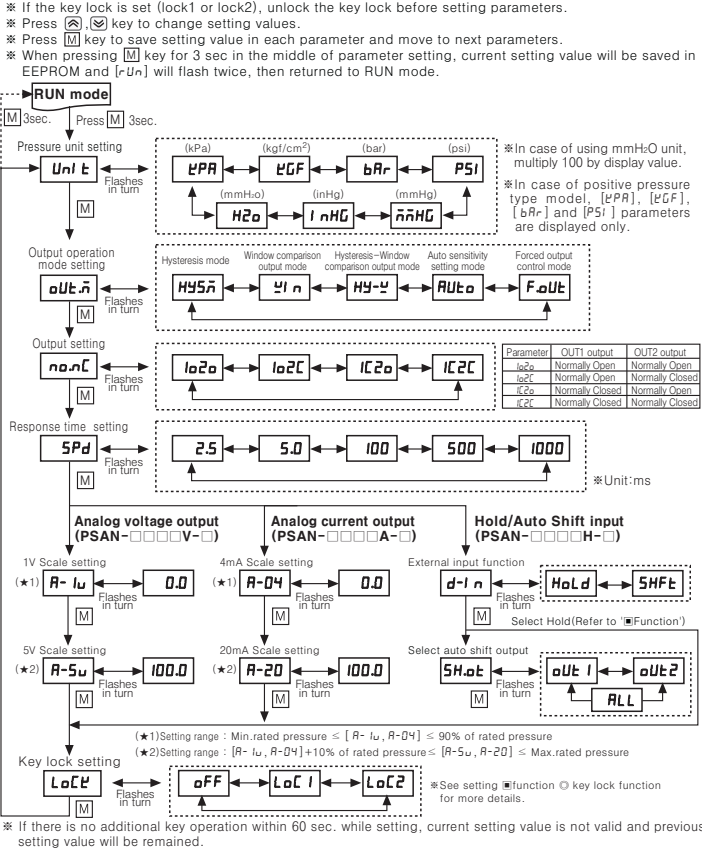   In this case, tightening torque of hexagon wrench bolt be max. 30kgf·cm. It may cause mechanical problems.
5. Bracket(PSO-B02) and Front protection cover (PSO-P01) are optional to sell. Please see the pictures for installation.

⚠ **Caution**
The tightening torque of one touch fitting should be max.100kgf·cm. It may cause mechanical problems.

■ Setting

RUN mode		
Press M 3sec.	Parameter setting	Pressure unit setting ▸ Output operation mode setting ▸ Output type setting ▸ Response time setting ▸ Analog output scale and Hold/Auto Shift setting ▸ Key lock setting
Press M	Preset value setting	Detection level 1 setting (out1) ▸ Detection level 2 setting (out2)
Press M 3sec.	Forced output control mode setting	The forced output control mode is operated by pressing M key after selecting forced output control mode in output operation mode parameter. For more detailed information, refer to 'forced output control mode'
Press ▲	Peak hold	High peak value check / Low peak value check / Auto Shift Input Checking (In case of Hold/Auto Shift input type model)
Press ▼▲ more than 1sec.	Zero point adjustment	Zero point adjustment

■ Parameter setting

※ If the key lock is set (lock1 or lock2), unlock the key lock before setting parameters.
※ Press ▼, ▲ key to change setting values.
※ Press M key to save setting value in each parameter and move to next parameters.
※ When pressing M key for 3 sec in the middle of parameter setting, current setting value will be saved in EEPROM and [rUn] will flash twice, then returned to RUN mode.
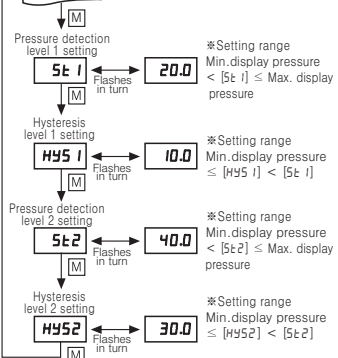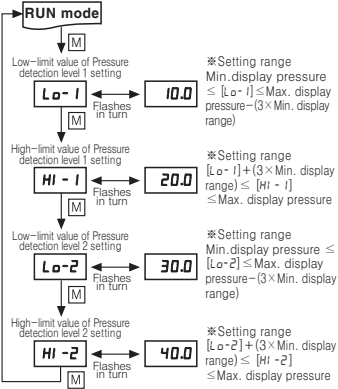
■ Preset Setting

※ If [rUn] will be flickering twice when returning to RUN mode.
※ Press ▼, ▲ key to change setting values.
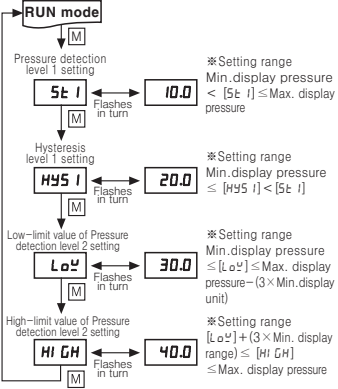※ Press M key to save setting value in each parameter and move to next parameters.

● Zero point adjustment

1. Please press ▼▲ keys for over 1sec. at the same time putting an applied pressure in state of the atmospheric pressure.
2. When the zero point adjustment is completed, it will display [rUn] and return to RUN mode automatically.
※ If executing zero point adjustment on external pressure being at pressure port [Err 1] will flash 5times.
Please execute it in the atmospheric pressure after removing external pressure.
※ Please execute zero point adjustment regularly.

■ Caution for using

1. Do not insert any sharp or pointed object into pressure port.
   It may cause malfunction and damage the sensor.
2. Be sure that this unit must avoid direct touch with water, oil, thinner etc.
3. It is ready to operate 3 sec. after it is turned ON. Be sure not to use the product within 3 sec.
4. When using switching power supply, frame ground (F.G.) terminal of power supply should be grounded.
5. To avoid inductive noise, keep the wiring away from power line, high voltage line. It may cause malfunction.
6. When moving this unit from warm place to cold place, please remove the humidity on the cover then use it.
7. Do not press the setting button with sharp or pointed object.
8. Do not apply a tensile strength in excess of 30N to the cables or connector.
9. When using mmH₂O unit, please multiply display value by 100.
10. Allowable installation environment
   ① Altitude Max. 2,000m
   ② Pollution degree 3   ③ Installation Category II
※ It may cause malfunction if above instructions are not followed.

■ Major products

- Proximity sensors
- Fiber optic sensors
- Door/Door side sensors
- Display units
- Panel meters
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity sensors
- Stepping motors/drivers/motion controllers
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Timers
- Graphic/Logic panels
- Area sensors
- Pressure sensors
- Rotary encoders
- Sensor controllers
- Temperature controllers

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