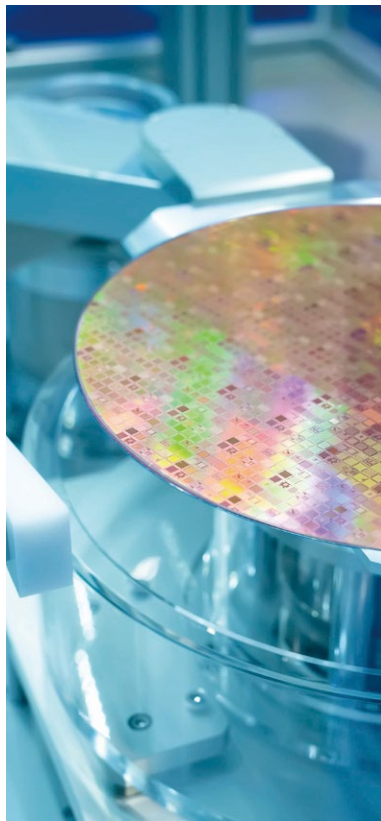
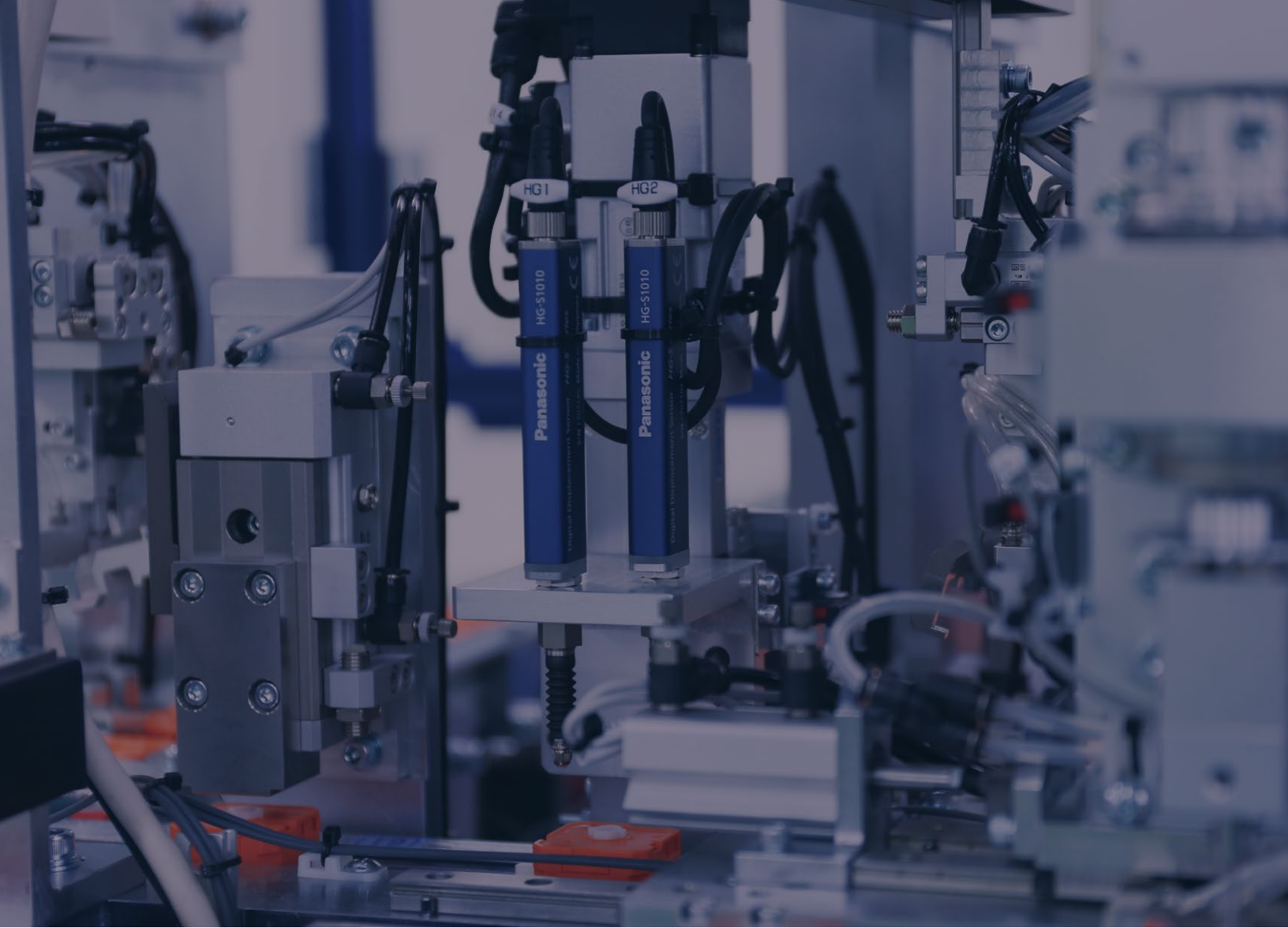


Industrial Automation Key Product Guide





Panasonic offers a diverse portfolio of products and over 40 years of design expertise to provide integrated solutions that fits into various automation markets such as Automotive, Semiconductor and Packaging. Boasting a strong reputation for quality, an established organization of highly experienced professionals and technically advanced products, Panasonic strives to be your trusted partner.

Industrial Automation Products

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Digital Fiber Sensor

FX-550 series

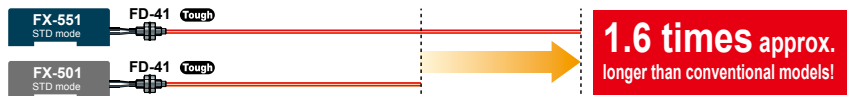
1.6 times longer sensing range than conventional models
Significantly improved stability and usability



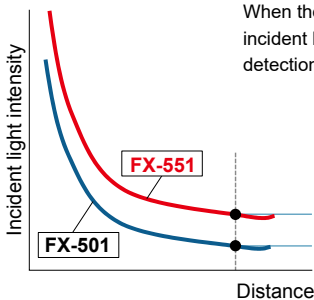
Ample sensing distance even with thin fiber

The sensing range of the thin reflective type fiber is about 1.6 times longer than that of a conventional product (the sensing range of the standard reflective type fiber is about 1.4 times longer). This adds extra flexibility to the sensor layout.

Fiber	Sensing range (STD mode)		Rate of increase in sensing range
	FX-551	FX-501	
FT-31	480 mm 18.898 in	315 mm 12.402 in	152 %
FT-42	1,470 mm 57.874 in	1,130 mm 44.488 in	130 %
FD-41	200 mm 7.874 in	125 mm 4.921 in	160 %
FD-61	620 mm 24.409 in	450 mm 17.717 in	138 %



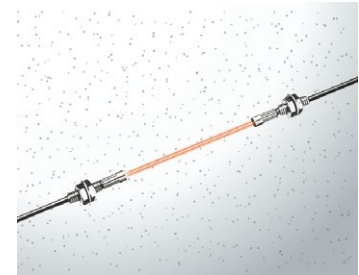
Stable detection



When the hysteresis is the same, the higher incident light intensity results in more stable detection.

Easy adjustment of beam axis

Thanks to the high emission power, a slight deviation of beam axis causes no problem. It is ideal for use in dusty areas* or for detection through an extremely small slit.



*Need to confirm proper operation in installed condition.

Equipped with a mode to minimize the effect of ambient light

When setting to activate the environment resistance mode in the emission frequency setting, the ambient illuminance for LED lights becomes about 2.5 times higher than that in the normal mode. This reduces erroneous detections caused by LED lights.



Amplifier Line-up

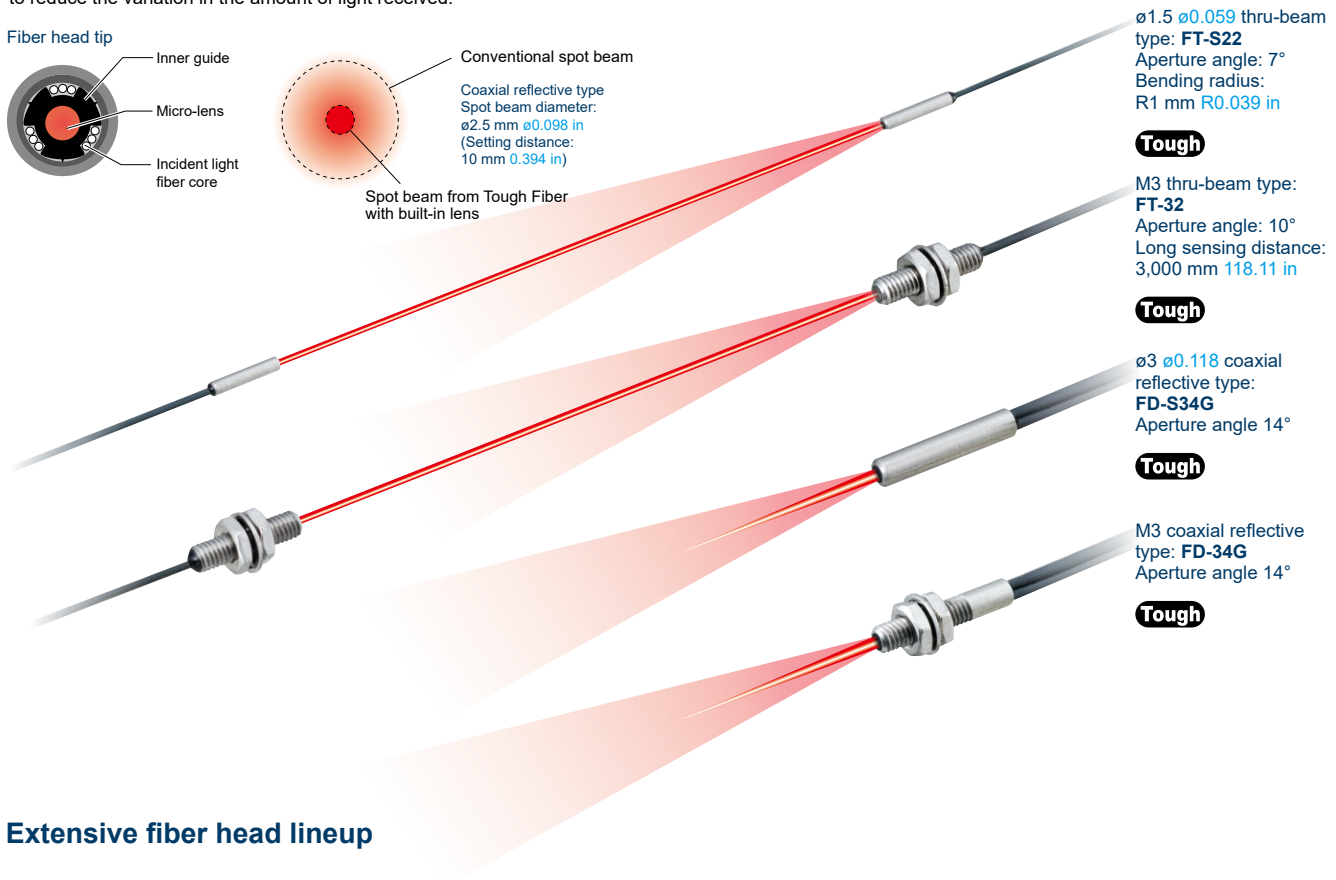
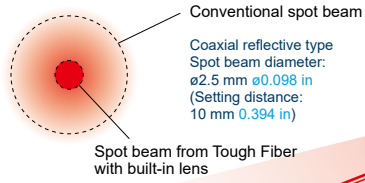
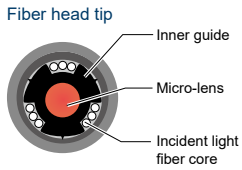
Type	Connector type (Note)		Cable type
Model No.	NPN output	FX-551	FX-551-C2
	PNP output	FX-551P	FX-551P-C2
Supply voltage	12 to 24 V DC $^{+10}_{-15}$ %		
Output	NPN open-collector transistor or PNP open-collector transistor		
Response time	FAST: 60 μ s or less, STD: 250 μ s or less, LONG: 2 ms or less, U-LG: 4 ms or less, HYPR: 24 ms or less, selectable		
Cable	—		0.2 mm ² 3-core cabtyre cable, 2 m long

Note: The cable for amplifier connection is not supplied as an accessory with the connector type amplifier. Make sure to purchase the optional quick-connection cable.

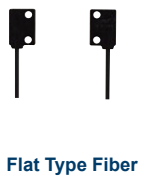
Built-in Lens Tough Fiber

The built-in micro-lens has achieved the small head size.

The compact head with the built-in lens measures only 1.5 mm **0.059 in** in diameter. Furthermore, the reflective type has an inner guide for a uniform layout of fiber cores to reduce the variation in the amount of light received.



Extensive fiber head lineup



Ultra-minute Photoelectric Sensor

Amplifier Built-in EX-Z series



Small size!



EX-Z13□

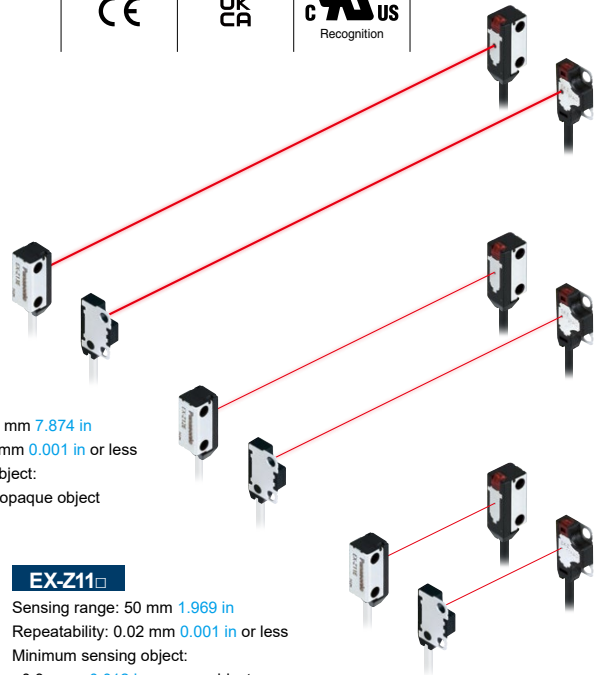
Sensing range: 500 mm **19.685 in**
 Repeatability: 0.05 mm **0.002 in** or less
 Minimum sensing object:
 ø1.0 mm **ø0.039 in** opaque object

EX-Z12□

Sensing range: 200 mm **7.874 in**
 Repeatability: 0.03 mm **0.001 in** or less
 Minimum sensing object:
 ø0.5 mm **ø0.020 in** opaque object

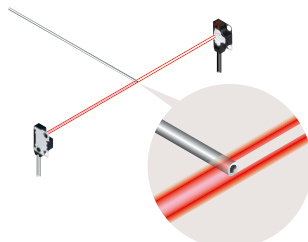
EX-Z11□

Sensing range: 50 mm **1.969 in**
 Repeatability: 0.02 mm **0.001 in** or less
 Minimum sensing object:
 ø0.3 mm **ø0.012 in** opaque object



Capable of sensing an extremely small ø0.3 mm object without slit EX-Z11□

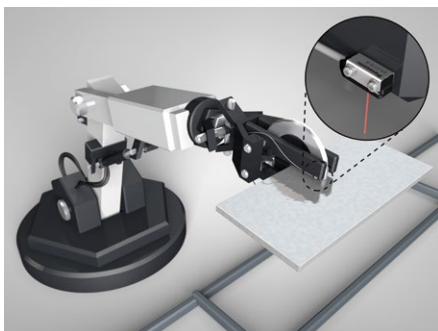
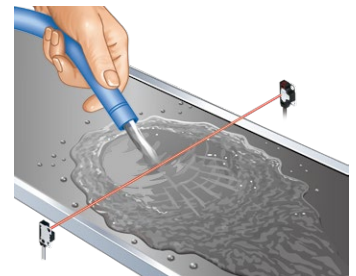
A slit is provided on the front side of the main sensor body. The sensor can detect a ø0.3 mm object without using an optional slit.



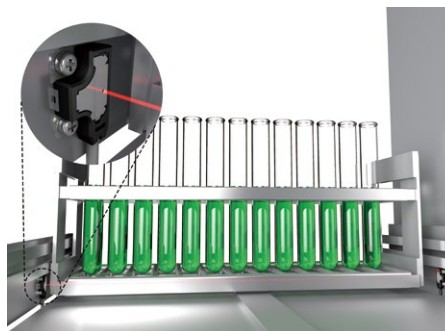
Sensing of end of thin pipe

IP67 protective structure

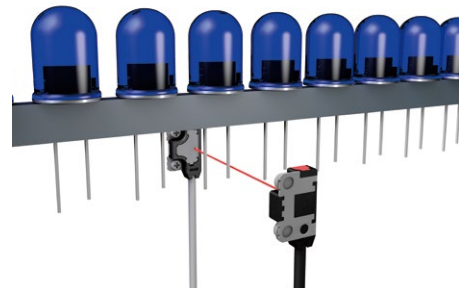
The sensors features an IP67 protective structure to allow their use in process lines where water is used or splashed. Rust-resistant stainless steel sensor mounting brackets and screws are available.



Workpiece detection with robot hand



Detection of presence / absence of test tube tray



Detection of LED lead

Ultra-slim Photoelectric Sensor

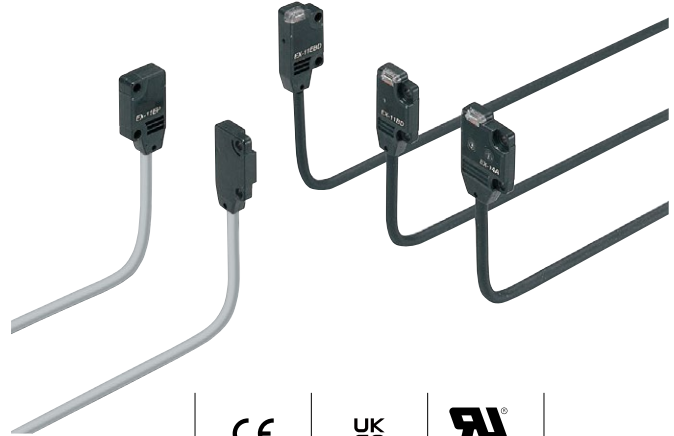
Amplifier Built-in EX-10 series ver.2

Small body: 3.5 mm thick
Freely mountable fingertip size

Freely mountable W10 × H14.5 × D3.5 mm size (thru-beam, front sensing type).
Moreover, easy alignment is possible with the visible red LED beam source.



Six types of mounting brackets, fixable with M3 screws, are available.



Long-range sensing at 1 m with a narrow-beam

EX-19S□

Narrow-beam models deliver long-range sensing at 1 m.

Ultra-compact Photoelectric Sensor

Amplifier Built-in EX-20 series ver.2

Miniature-sized and still mountable with M3 screws
Mountable with M3 screws in spite of miniature size.
Long sensing range

The EX-20 series achieves long distance sensing [thru-beam type: 2 m, retroreflective type: 200 mm (when using the attached reflector), diffuse reflective type: 160 mm], despite its miniature size. Hence, it is usable even on a wide conveyor.

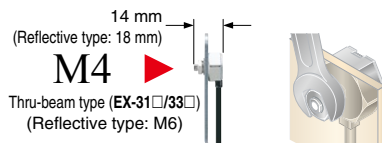


Threaded Miniature Photoelectric Sensor

Amplifier Built-in EX-30 series ver.2

A new alternative to fiber sensors
Can be installed in the same way as standard fibers

The EX-30 series can be screw-mounted (M4 for thru-beam type, M6 for reflective type) in the same way as standard fiber sensors. This means that they can be inserted into production lines in exactly the same way as conventional high-priced fiber sensors.



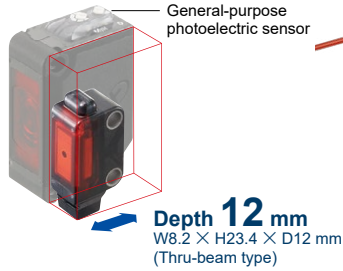
Ultra-compact Laser Sensor

Amplifier Built-in EX-L200 series



Built-in amplifier in this size Ultra-compact Laser sensor

Due to the customized IC and optical design, high precision detection is fulfilled in an ultra-compact size with directivity and visibility achievable only by laser.



EX-L211, EX-L212

Thru-beam type

Sensing range

Minute object detection type (EX-L211):

1 m (3.281 ft)

Long sensing range type (EX-L212):

3 m (9.843 ft)



EX-L221

Spot reflective type

Sensing range

Minute object detection type (EX-L221):

45 mm to 300 mm
(1.772 in to 11.811 in)



EX-L291

Reflective type

Sensing range

Long sensing range type (EX-L291):

4 m (13.123 ft)



EX-L261, EX-L262

Convergent reflective type

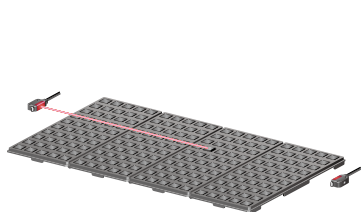
Sensing range

Spot type (EX-L261):

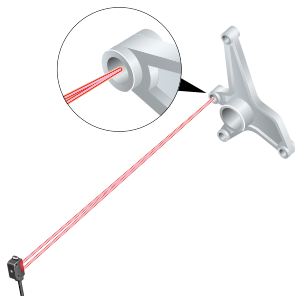
20 mm to 50 mm
(0.787 in to 1.969 in)

Line spot type (EX-L262):

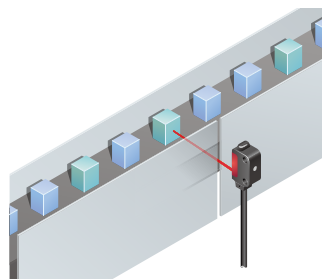
20 mm to 70 mm
(0.787 in to 2.756 in)



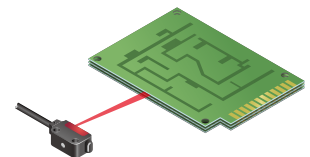
Detecting misaligned ICs across multiple pallets



Detecting processed holes



Detecting workpieces with uneven coloration



Detecting thin workpieces like PCBs

Digital Laser Sensor

Amplifier-separated LS-500 series

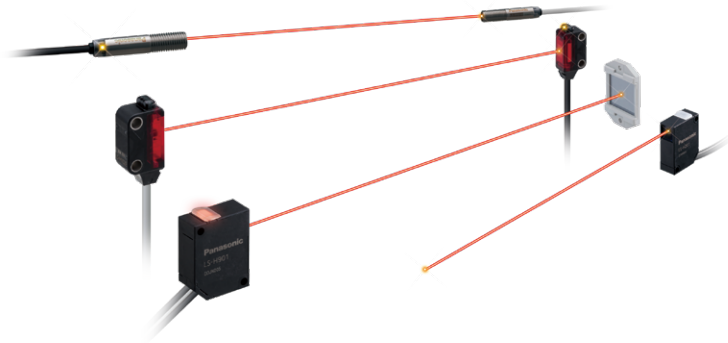
Industry's smallest*

* Smallest amplifier-separated type laser sensor head as of October 2023, in-company survey.

CE

UK
CA

FDA



LS-501



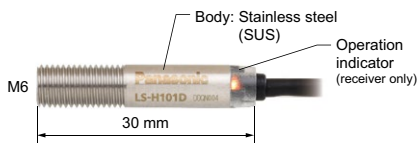
LS-H101

Stainless steel (SUS) body

Featuring stainless steel (SUS) enclosure that won't break when bumped during installation or maintenance.

One-point M6 installation

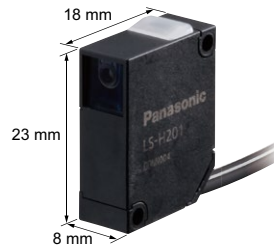
The LS-H101 features an easy-to-install design.



LS-H201/H901

Thinnest design

Size just as thin as W8 X H23 (excluding indicators) X D18 mm.



LS-H102

Waterproof IP67

Featuring waterproof IP67 to allow use in the presence of large amounts of water or dust.

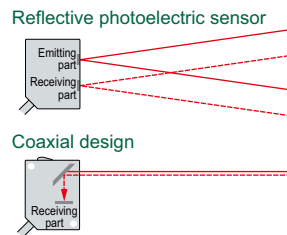
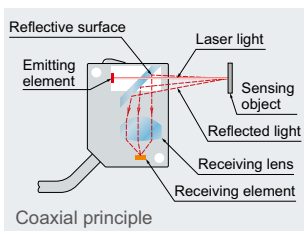
Simple positioning

Check the optimal receiving location at a glance while watching the red spot on the beam axis adjustment screen.



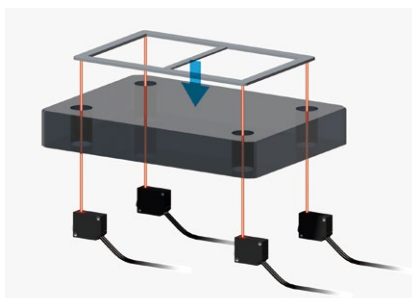
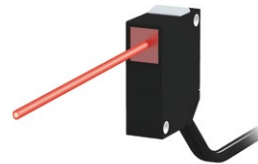
Coaxial design LS-H201

By using a laser with high linearity in a coaxial design, the LS-H201 is able to deliver stable sensing in confined spaces as well as simple installation.

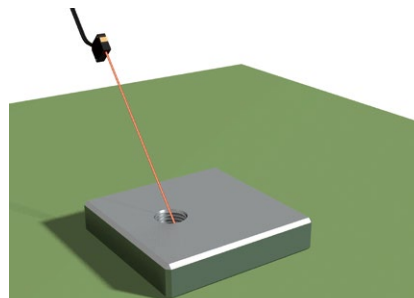


Horizontal symmetry LS-H901

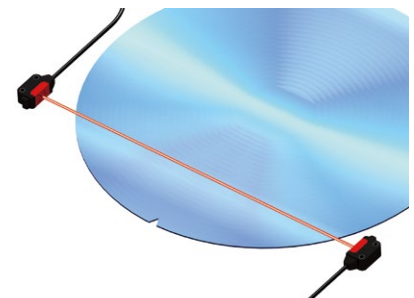
The light source is positioned in the center of the sensor head, which helps to design easier.



Detection of workpieces through a workbench



Detecting processed holes



Wafer inclination detection

U-shaped Micro Photoelectric Sensor

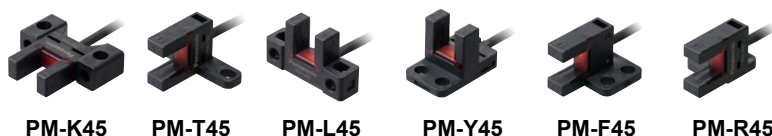
Amplifier Built-in PM-25/45/65 series



Ultra-small / Cable type **PM-25 SERIES**



Compact / Cable type **PM-45 SERIES**



Compact / Connector built-in type **PM-65 SERIES**



Three protection circuits standard on all models

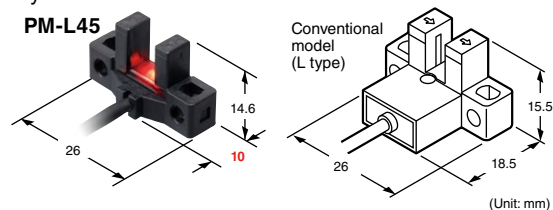
All models are standardly equipped with the following protection circuits in their compact bodies. These protection circuits minimize the possibility of sensor malfunctions caused by erroneous wiring.

- 1 Reverse supply polarity protection circuit
- 2 Reverse output polarity protection circuit
- 3 Output short-circuit protection circuit

Compact size

PM-45 SERIES

All new models require significantly less mounting space than our conventional models when mounted with the same pitch. What's more, the new models can directly replace our conventional models currently in use.



IP64 rating

PM-25 SERIES PM-45 SERIES

Type		Ultra-small / Cable type	Compact / Cable type	Compact / Connector built-in type
Model No.	NPN output	PM-□25 (-C3)	PM-□45 (-C3)	PM-□65 (W)
	PNP output	PM-□25-P	PM-□45-P (-C3)	PM-□65 (W)-P
Sensing range		6 mm (fixed)		
Minimum sensing object		0.8 × 1.2 mm opaque object		
Repeatability		0.01 mm or less		
Supply voltage		5 to 24 V DC ± 10%		
Output		NPN output type: NPN open-collector transistor PNP output type: PNP open-collector transistor		
Response time		Under light received condition: 20 μs or less Under light interrupted condition: 80 μs or less (Maximum response frequency: 3 kHz)		
Ambient temperature		-25 to +55 °C		

Notes: 1) **PM-□-C3** is 3 m cable length type. **PM-□65W** and **PM-□65W-P** are mounting-compatible with conventional models.
2) Bending-resistant cable type (**PM-□25-R**) is available.

Digital Pressure Sensor

For gas DP-0 series

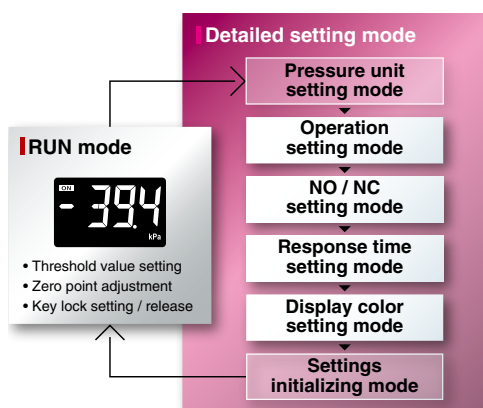
Simpler and easier to use



Simple & easy operation

Two levels of setting mode for easy operation of essential functions

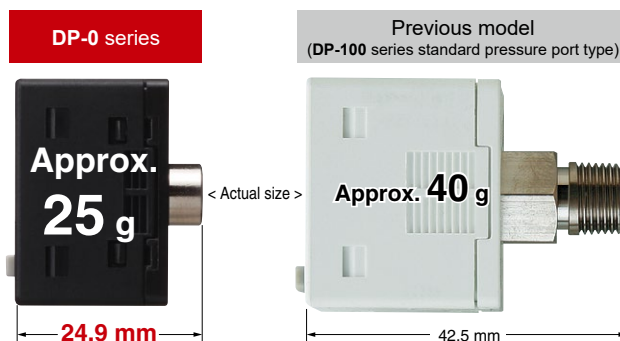
The "RUN mode" is for threshold value setting, zero point adjustment and key lock setting / release setting, and the "detailed setting mode" allows for basic settings for sensor operation. The two-level setting mode configuration enables easy and immediate use of the product.



Compact & light weight design

Extra-short depth and light weight

The unit body measures only 24.9 mm in depth to allow installation in a narrow space. The main unit weighs only about 25 g. The lightweight unit means minimal load when mounted on a moving part such as a robot arm.



Main menu for detailed setting mode

Operation setting mode

Select from EASY mode, hysteresis mode or window comparator mode.

NO / NC setting mode

Set the comparative output operation to NO or NC.

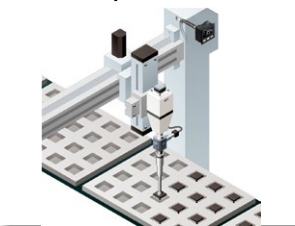
Response time setting mode

Select the response time from 2.5 ms, 25 ms or 250 ms.

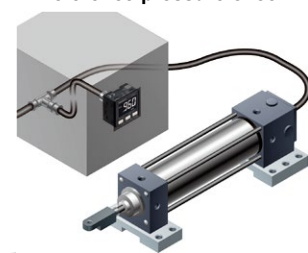
Display color setting mode

Select the comparative output ON / OFF display color and the normal display color from red or white.

Suction confirmation for electronic parts



Reference pressure check



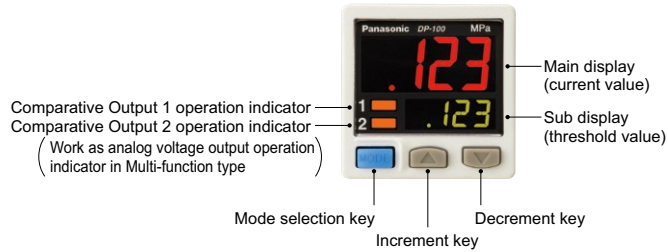
Type	Low pressure	High pressure
Model No.	DP-001	DP-002
	DP-001-P	DP-002-P
Rated pressure range	-100.0 to +100.0 kPa	0.000 to +1.000 MPa
Pressure withstandability	500 kPa	1.5 MPa
Applicable fluid	Air, non-corrosive gas	
Ambient temperature	0 to +50 °C	
Dimensions	W30 × H30 × D24.9 mm	

Dual Display Digital Pressure Sensor

For gas DP-100 series Ver.2

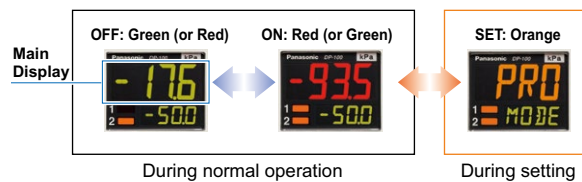
Dual 3-color display makes operation easier!

'Current value' and 'threshold value' can be checked at the same time!



3-color display (Red, Green, Orange)

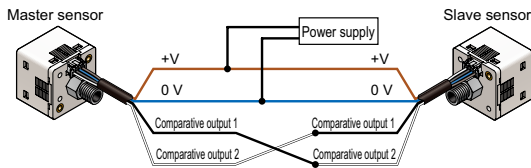
The main display changes color in line with changes in the status of output ON / OFF operation, and it also changes color while setting is in progress. The sensor status can therefore be understood easily, and operating errors can be reduced.



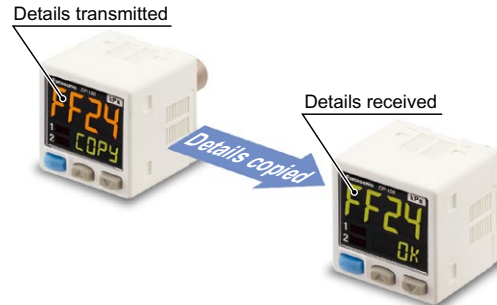
Copy function reduces man-hours and human error

Sensors can be connected to a master sensor one by one, and a copy of the setting details for the master sensor can be transmitted as data to other sensors. If making the same settings for multiple sensors, this prevents setting errors among other sensors and in addition, when machinery design are changed, there would be less change in work orders.

Copying via wiring



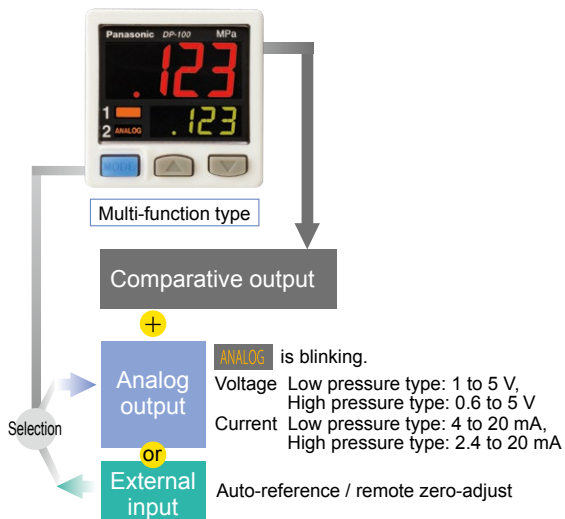
Note: Settings cannot be copied from the new version (Ver. 2) to the old version. However, settings can be copied from the old version to the new version (Ver. 2).



Multi-function type

Possible to switch over analog output and external input

Multi-function type of ver.2 is newly equipped with analog current output, in addition to analog voltage output. Multi-function type that enables the selection of analog output (voltage / current) or external input (auto-reference / remote zero-adjustment) is available. It complies a wide range of applications.



Type	Compound pressure			
	Multi-function		Multi-function	
	For low pressure	For high pressure	For low pressure	For high pressure
Model No.	Asia DP-101(-M)	DP-102(-M)	DP-101A(-M)	DP-102A(-M)
	Europe DP-101-E-P	DP-102-E-P	DP-101A-E-P	DP-102A-E-P
	M8 plug-in connector type DP-111-E-P-J	DP-112-E-P-J	DP-111A-E-P-J	DP-112A-E-P-J
	North America DP-101-N(-P)	DP-102-N(-P)	DP-101A-N(-P)	DP-102A-N(-P)
Rated pressure range	-100.0 to +100.0 kPa	-0.100 to +1.000 MPa	-100.0 to +100.0 kPa	-0.100 to +1.000 MPa
Applicable fluid	Non-corrosive gas			
Supply voltage	12 to 24 V DC ±10 %			
Output	NPN output type: NPN open-collector transistor PNP output type: PNP open-collector transistor			
Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms, 5,000 ms, selectable by key operation			
Display	4 digits + 4 digits 3-color LCD display			
Pressure port	Asia: M5 female thread + R (PT) 1/8 male thread (excluding DP-10□(-M), Europe: M5 female thread + G 1/8 male thread, North America: M5 female thread + NPT 1/8 male thread			
Connecting method	Connector			
Accessories	CN-14A-C2 (Connector attached cable 2 m): 1pc. (excluding DP-11□(-E-P-J)			
Dimensions	W30 × H30 × D42.5 mm (DP-10□(-M): D30 mm, DP-11□(-E-P-J): D47.5 mm)			

Note: Types without connector attached cable are also available.

DC 3-wire Type Cylindrical Inductive Proximity Sensor

Amplifier Built-in GX-300 series

Response frequency of 5 kHz* allows the use of high-speed application

* In the case of GX-303S

The GX-303S boasts a response frequency of 5 kHz and realizes high speed response. The response frequency of other sensor models has been also improved by up to 4 times as compared to our conventional models.

Since the GX-300 series responds quickly to sensor ON/OFF judgement, it works well with a high-speed application and contributes to the reduction of equipment cycle time.



Enhanced a degree of the detection margin

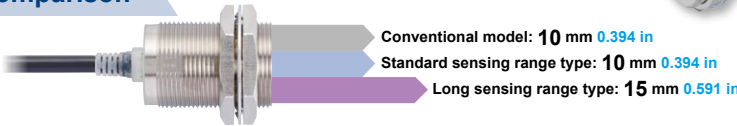
Sensing over long distance

The M8 / M12 / M18 / M30 threaded type sensors are available in standard sensing range type or long sensing range type ("K" at the end of model No.).

The long sensing range means reliable detection with plenty of performance margin to spare.

Sensing range comparison

M30 threaded type, shielded type



M30 threaded type, non-shielded type



- * The indicator light may appear differently depending on ambient environments and brightness.
- * On the M8 and larger threaded type sensors, the indicator light is visible at 2 locations on one side.
- * The operation indicators of the M8 and larger threaded type sensors flash in green during IO-Link communication.

Indicator with significantly improved visibility

In the small-diameter type sensors, the indicator light is visible at 4 locations. In the M8 and larger threaded type sensors, the high-brightness indicator and the resin containing dispersing agent provide clear and highly visible light to facilitate the cumbersome adjustment of installation position.



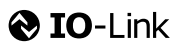
Small-diameter type



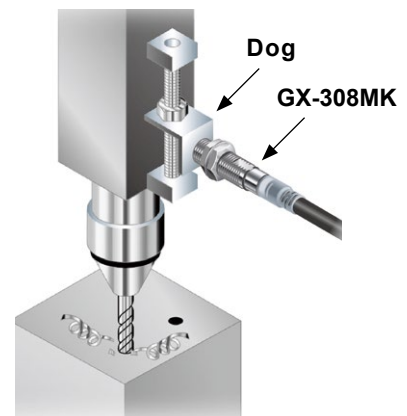
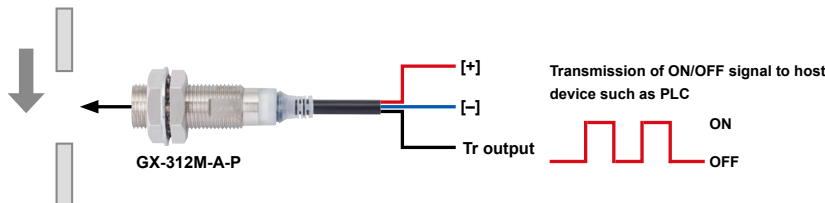
M8 / M12 / M18 / M30 threaded type

IO-Link compatibility

Evolution from ON/OFF judgment sensors to sensors capable of transmitting the detection level and sensor status information



* Only the M8 / M12 / M18 / M30 threaded type, PNP output, normally open type models are compatible with IO-Link.



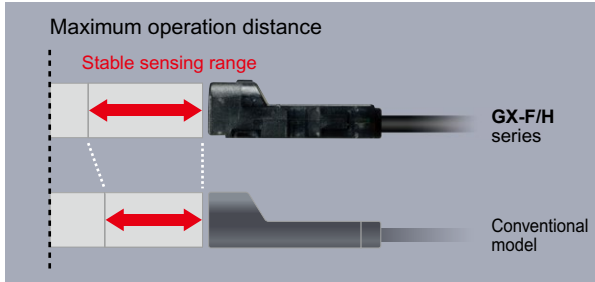
Positioning processing equipment

Ractangular-shaped Inductive Proximity Sensor

Amplifier Built-in GX-F/H series

Flexible Installation in Tight Spaces

This sensor has the longest stable sensing range among the same level of rectangular inductive proximity sensors in the industry. It is easy to install the sensor.



Type	Maximum operation distance	Stable sensing range	
		GX-F/H series	Conventional model
GX-□6	1.6 mm 0.063 in	0 to 1.3 mm 0.051 in	0 to 1.2 mm 0.047 in
GX-□8	2.5 mm 0.098 in	0 to 2.1 mm 0.083 in	0 to 1.8 mm 0.709 in
GX-□12	4.0 mm 0.157 in	0 to 3.3 mm 0.130 in	0 to 3.0 mm 0.118 in
GX-□15	5.0 mm 0.197 in	0 to 4.2 mm 0.165 in	0 to 4.0 mm 0.157 in
Long sensing range	8.0 mm 0.315 in	0 to 6.7 mm 0.264 in	0 to 6.4 mm 0.252 in

* With standard sensing object

Highly resistant to water or oil. IP68G protective construction

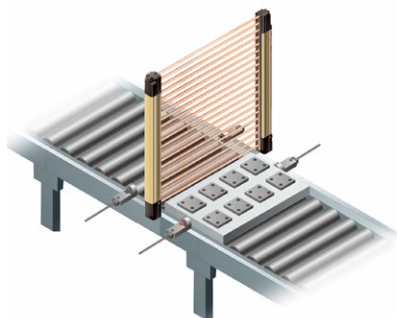
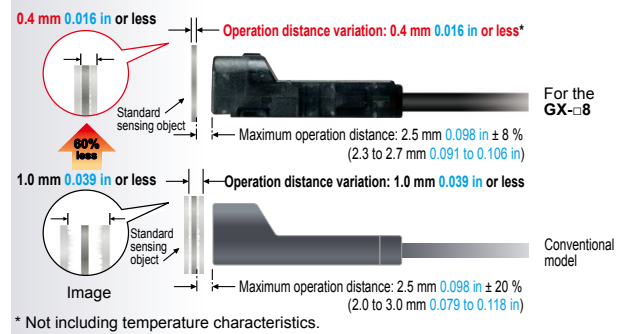
The new integrated construction method used improves environmental resistance performance. The IP68G prevents damage to the sensor by stopping water and oil getting inside.



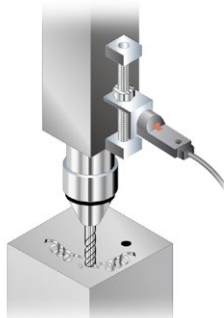
Variation at the maximum operation distance is within ±8 %

Thorough adjustment and control of sensing sensitivity greatly reduces individual sensor differences and variations. The work of adjusting sensor positions when using multiple sensors and when sensors have been replaced is much easier.

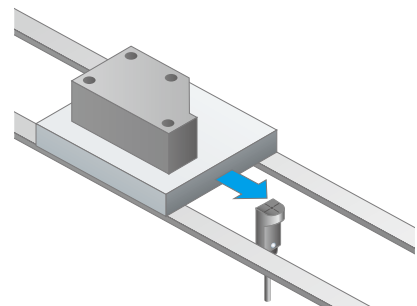
Example: GX-□8



Muting control of light curtains



Positioning processing equipment



Positioning metal pallets

Network Function Integrated Type Laser Displacement Sensor

Amplifier Built-in HL-G2 series

High-precision Displacement Sensors Made Easier to Use



Resolution

0.5 μm (0.020 mil)

Class-top*¹ Linearity*²

± 0.05 % F.S.

Class-top*¹ Sampling Period

100 μs

Temperature Characteristic

0.03 % F.S./ $^{\circ}\text{C}$

Measuring Range*²

**25 to 400 mm
(0.984 to 15.748 in)**

*1: According to our company's survey, as of February 2024.

*2: Specifications vary depending on models.



Built-in controller and communication unit Easy-to-use Integrated Models

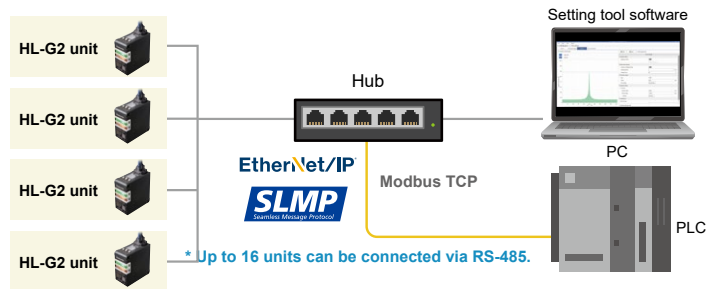
The integrated models feature built-in controllers to facilitate model selection and reduce installation space and cost. The communication type models have built-in communication units for easy connection to a PLC, while the analog output type models are suitable for applications that require continuous acquisition of measurement data from sensors.

* Communication function is provided only in the communication type models.

* EtherNet/IP is a registered trademark of ODVA (Open DeviceNet Vendor Association).

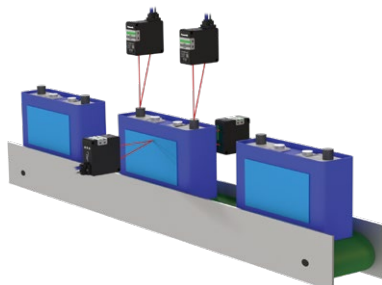
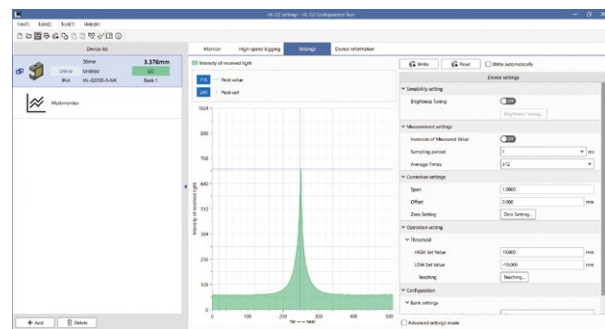
* SLMP is a registered trademark of Mitsubishi Electric Corporation.

* Modbus is a registered trademark of Schneider Electric USA Inc.



Simple and intuitive operations Setting Tool Software

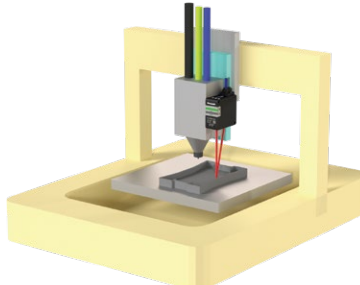
By using the PC installed with the "HL-G2 Configuration Tool" configuration tool software (free to download), parameters can be set easily and simultaneously in multiple HL-G2 units. Since settings can be made in real time while confirming actual data, the time required for adjustment can be reduced



Inspection of battery shape



Inspection of camera actuator operating amount



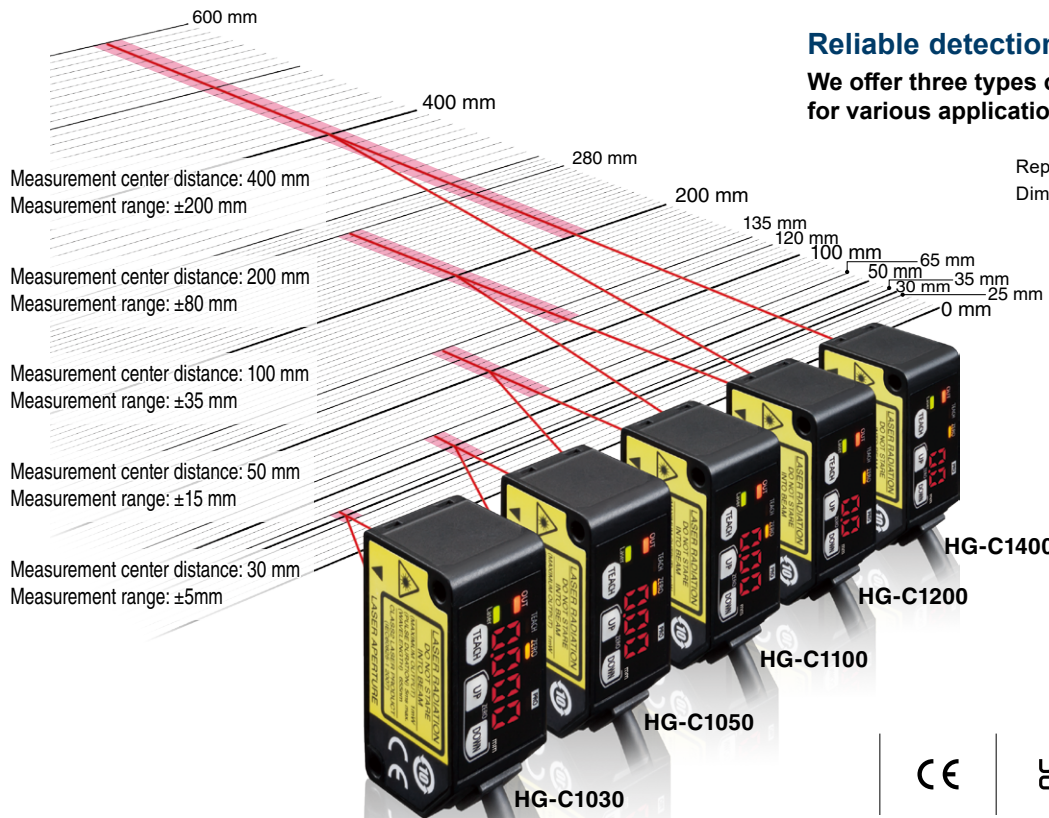
Control of dispenser height



Correction of robot arm position

CMOS type Micro Laser Distance Sensor

Amplifier Built-in HG-C series



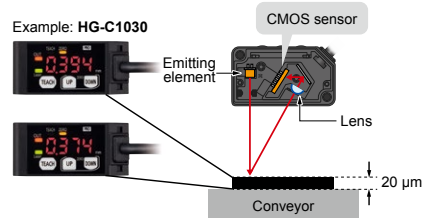
Reliable detection in 10 μm precision
We offer three types of laser sensor heads for various applications

Repeatability: 10 μm (for HG-C1030)
Dimensions : W20 × H44 × D25 mm



Fitted with a precise CMOS image sensor and an original algorithm

Thanks to a precise CMOS image sensor, it is now possible to perform highly precise measurements in the order of 1/100 mm. The existing adjustable range reflective sensors cannot achieve such accuracy.



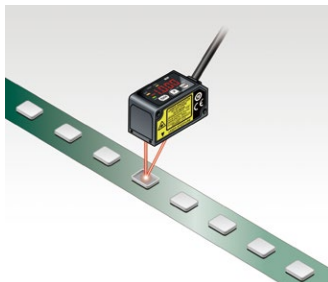
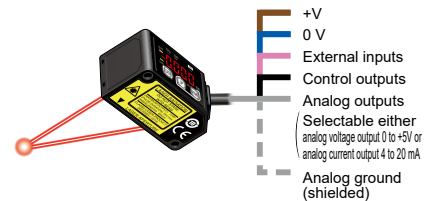
Equipped with 0-5 V analog output and 4 to 20 mA analog current output

Linearity: ±0.1 % F.S.

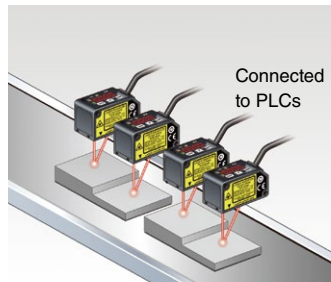
Temperature characteristics: 0.03 % F.S./°C

The value can be measured with a distance measurement sensor.

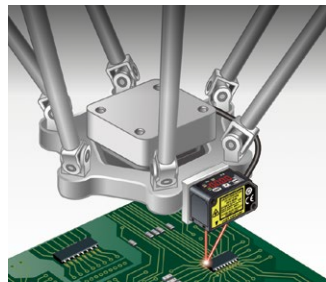
The sensor not only indicates measured values in mm but also produces analog voltage outputs. Various calculations and storage (logging) can be performed when output is taken into a PLC + analog unit.



Judging front or back of cover of electric parts



Measuring the thickness of a part



Controlling the parallel link robot height



Detecting on-vehicle seats

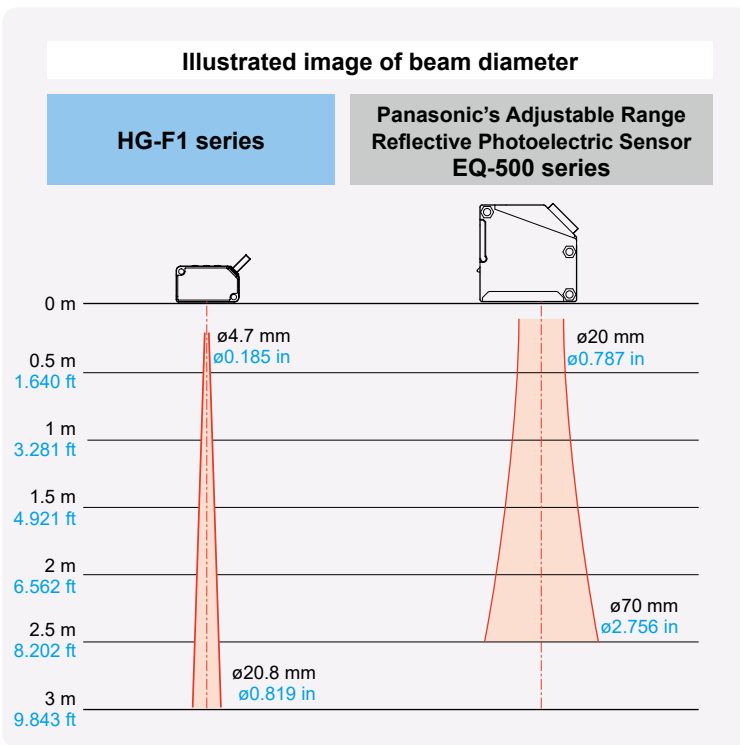
Compact and Long range Laser Distance Sensor

HG-F1 series

Capable of long-range sensing of up to 3 m **9.843 ft**



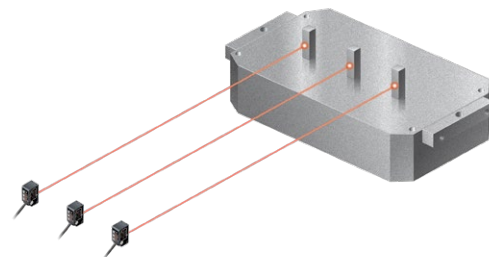
The laser distance sensor **HG-F1** series features a lightweight and high-strength aluminum die-cast case with a built-in TOF sensor module. Determines distance by measuring the time for the emitted beam to be reflected and return so that a single model can cover a measurement range of 250 to 3,000 mm **9.843 to 118.110 in.**



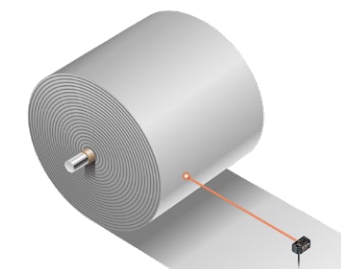
Narrow field sensing

The spot beam is smaller than that of a conventional adjustable-range distance sensor so that pinpoint detection is possible.

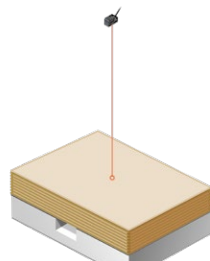
Possible to detect small workpieces



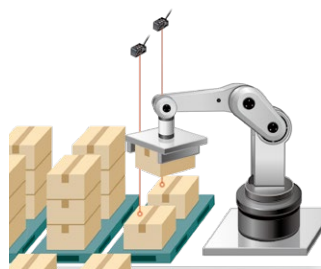
- * The above beam diameters are typical values. Confirm the appropriateness of the beam diameter in actual installation condition.
- * The beam diameter may be affected by the materials of surrounding objects and their distances.
- * The typical beam diameter of the **EQ-501 / EQ-511** is used as the diameter of the **EQ-500** series.



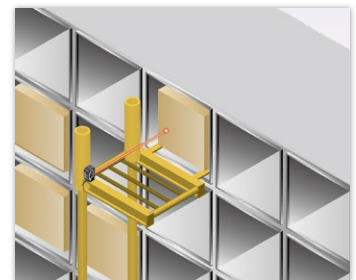
Detection of remaining amount of sheet



Detection of vertically stacked objects



Confirmation of delivery of workpiece / quantity of stacked objects at transfer robot section



Load presence confirmation

Thru-beam Type

Digital Displacement Sensor

HG-T series

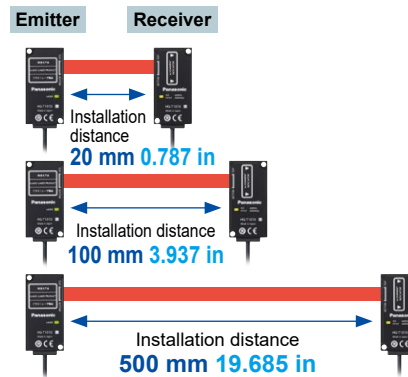
Industry's highest*¹ measurement accuracy



The HG-T series boasts repeatability² of 1 μm 0.039 mil and offers the highest*¹ measurement accuracy in the industry.

*1 As of September 2023, in-company survey

*2 This is the P-P value of digital measurement value with half shading at the middle position of the installation distance.



Repeatability²

1 μm
0.039 mil • Linearity: ±0.12 % F.S. (±12 μm 0.472 mil)
• Average count: 16 times

2.5 μm
0.098 mil • Linearity: ±0.28 % F.S. (±28 μm 1.102 μm)
• Average count: 16 times

5 μm
0.197 mil • Average count: 16 times

- Sampling cycle setting can be selected from two options. Standard: 1 ms, High speed: 0.5 ms.
- Average count setting can be selected from 11 options. 1 time, 2 times, 4 times, 8 times, 16 times, 32 times, 64 times, 128 times, 256 times, 512 times, 1,024 times

Ultra-slim sensor head

Standard type
HG-T1010

Slim type
HG-T1110



Side view attachment is available (optional).

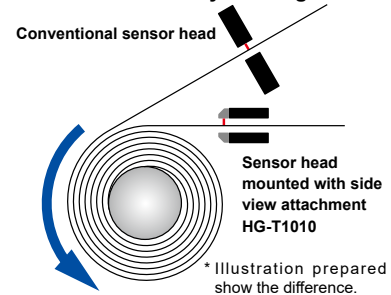
HG-T1010

Side view attachment (optional) is available for the standard type sensor head HG-T1010. This attachment can bend the laser beam at a right angle to allow flexible installation of the sensor head.

Side view attachment HG-TSV10

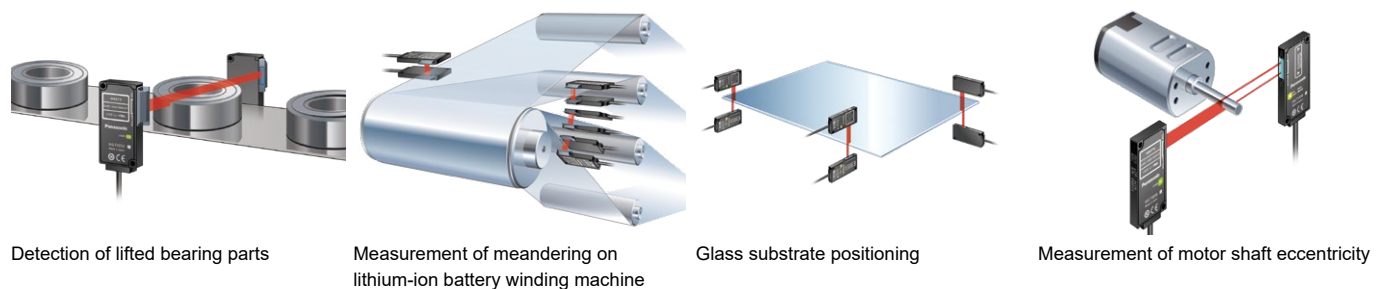


Application example: Lithium-ion battery winding section



* Illustration prepared to show the difference.

Use of the side view attachment enables the installation of the sensor head closer to the winding section than when a conventional sensor head is used, thus contributing to the improvement of winding accuracy.



Compact-Type Digital Displacement Sensor

HG-S series



Slim & robust sensor unit

The slim unit body contains plain bearings with 2-point support structure disperses load and achieves superb durability. The sensor head offers long life and reduces maintenance costs dramatically.



10 mm type

10 mm type

32 mm type

50 mm type

Air-driven type

General type

High-precision sensor head (HG-S1110□)

Resolution
0.1 μm

Indication accuracy

Full range:
1 μm or less
Narrow range:
0.5 μm or less

Resolution
No. 1* in class

Indication accuracy
No. 1* in class

* As of August 2019, in-company survey.

Optical absolute method

Displacement is measured by reading a glass scale with a different slit pattern at each reading position using a high-resolution sensor. This eliminates "value skipping" even when measuring at high speed, and there is no concern of "unset zero point".



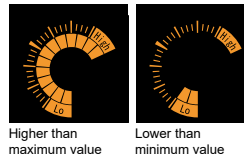
2-point support structure

Glass scale



Equipped with intuitive circle meter

Values between allowable maximum and minimum values are indicated in green. Values outside of the allowable range are indicated in orange. This provides at-a-glance understanding of the margin to the tolerance limits.



High-speed response

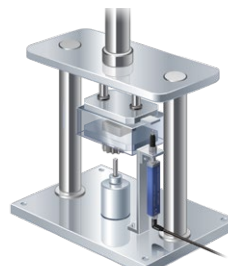
High-speed response of 3 ms in combination with any sensor head.



Automotive parts dimension measurement



Transmission parts height measurement



Management of press-fit points of press-fit parts



Motor shaft eccentricity measurement

IO-Link Compatible Self-monitoring sensor

FX-550L / DP-100L / HG-C1000L

Small Step IoT Starts with IO-Link



Using Panasonic's self-monitoring sensors, incident light intensity, pressure values, and distance measurement values can be sent as digital data with certitude to a host controller.

The sensors diagnose their own state and inform you of the result, making it easy to identify the cause of problems.



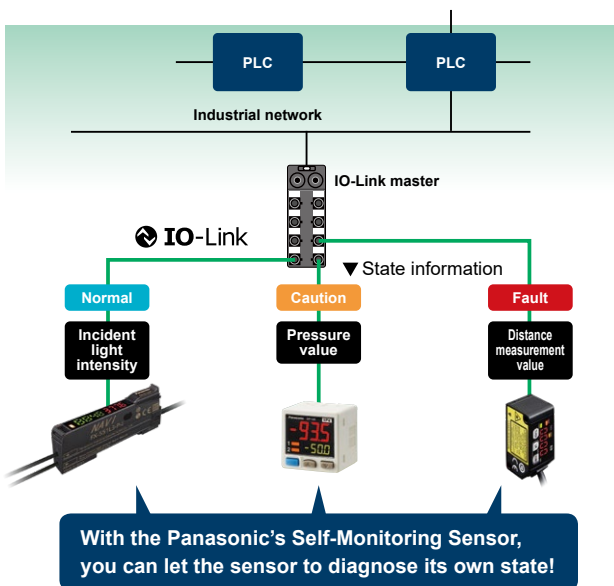
CMOS Type Micro Laser Distance Sensor
HG-C1000L SERIES



Digital Fiber Sensor
FX-550L SERIES



Dual Display Digital Pressure Sensor
DP-100L SERIES



Let the sensor handle its own diagnostics.

- Your role is simply to monitor the sensor's status.
- The PLC can focus solely on device control.
- Detailed information can be accessed whenever needed.

For resetting replaced sensors, rely on the higher-level master system.

- Automatically written from the connected master.
- This not only saves time but also reduces the risk of human error.

Fully utilize the benefits of the IO-Link output.

- It is possible to read from or write to sensor settings through an external interface.
- Multiple sensors can be configured in batch mode.
- Sensor settings can be saved to an external medium.
- It is possible to detect and distinguish individual sensors.

State information

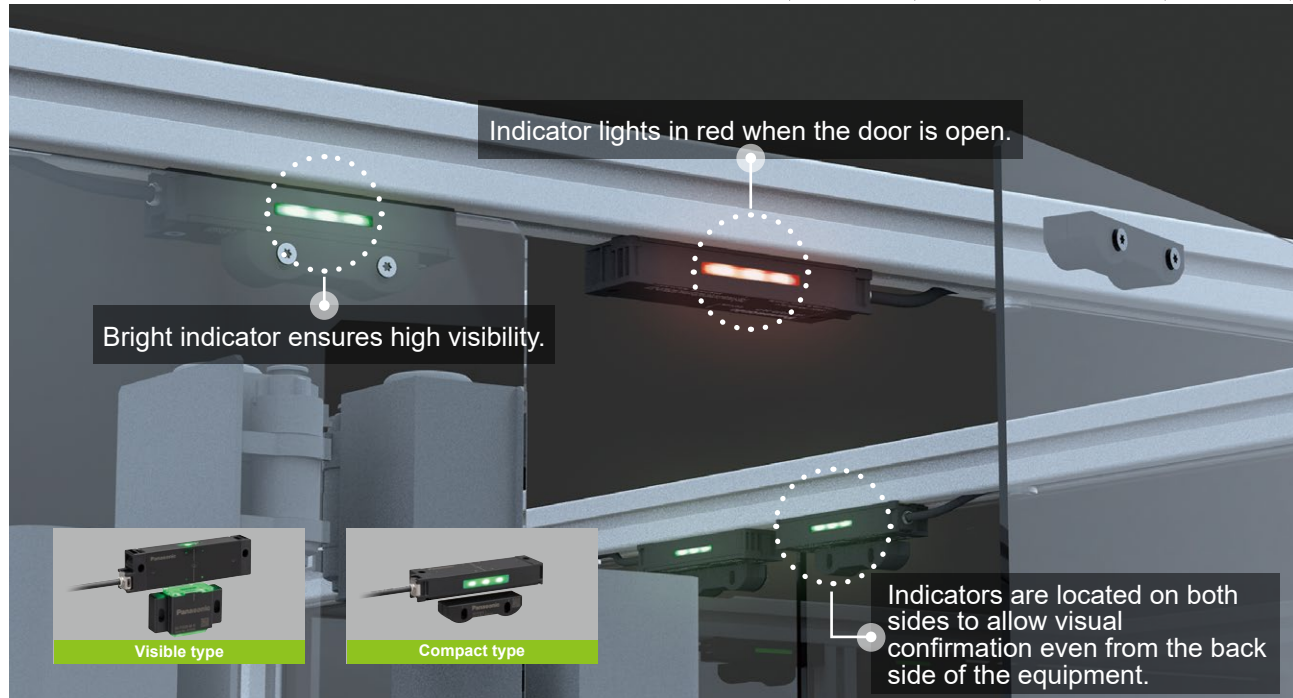
		State information	
Normal	Notification	Operation is normal.	* Recover to the normal state through checking installation and settings. Reduction in the incident light intensity.
		Check the settings. Detected state is faulty.	
Caution		Getting close to the end of service life. Reached the state where the device should be replaced.	* Limitation in the writing frequency into the memory or in the operation hours, etc.
Fault		Short-circuited or broken. Reached the state where it is impossible to control as a device.	* Short-circuited output, damaged EEPROM, etc.

None-Contact Safety Door Switch

SG-P series

Large and Bright Indicators Show the Open / Close Conditions of All Equipment Doors.

Note: This product uses a weak radio signal for its detection operation.
Please confirm compliance with applicable laws in the country of use.

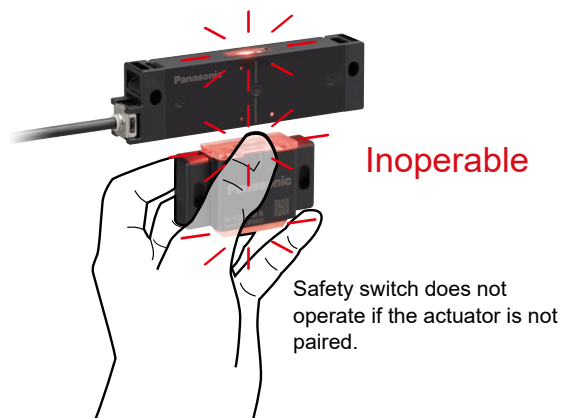


The **SG-P** series offers visible type and compact type safety door switch models for installation on various types of doors. The visible type and compact type models can be used together and interlocked so that the most suitable models can be selected according to the types of equipment doors. Even if there are many equipment doors, up to 30 units can be connected in series and the standard unit used as a master unit can output safety signals from all doors at once.

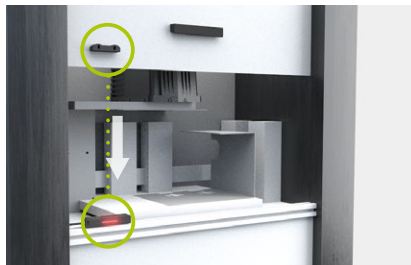
Helps Prevent Intentional Deactivation of Safety Function

The ISO 14119:2013* international standard stipulates a design requirement that deactivations of safety functions shall be minimized. Export of equipment sometimes requires to meet this standard. The SG-P series products are available with two different coding levels: High-code models and Low-code models. The High-code models are compatible with ISO 14119* coding level (high level coded actuators) and prevent intentional deactivation of their safety function.

* ISO 14119: Safety of machinery – Interlocking devices associated with guards – Principles for design and selection



Installation example



Lifting door for laser marker



Sliding door on electronic parts inspection machine



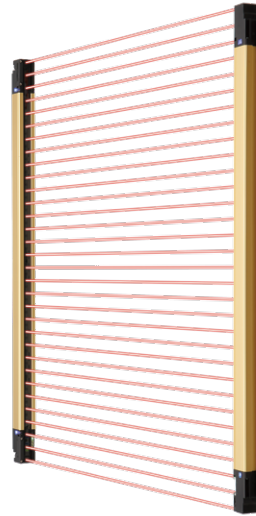
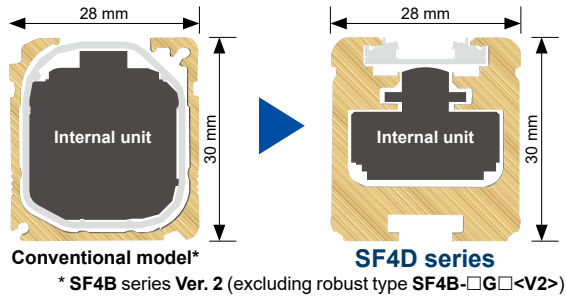
Glass substrate positioning

Compact & Robust Safety Light Curtain

SF4D series

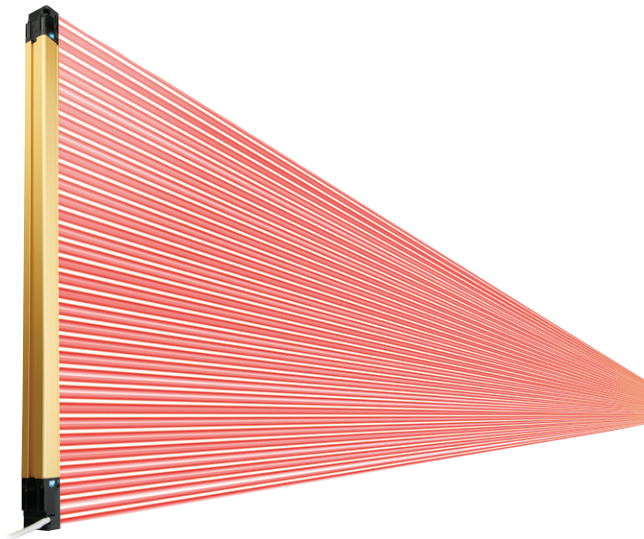
Downsized internal unit, increased case thickness

The internal unit was redesigned and downsized extensively. The internal unit was downsized to less than 40% (volume ratio) as compared to the conventional model while achieving higher performance.



CE	UK CA
TUV SUD	TUV SUD US
Conforming to OSHA / ANSI	CS
JIS	GB

New high power optical system offering stable operation even for long distance setup



Increased power of emitter element

The power of the emitter has been increased significantly. The high resistance to dust and dirt contributes to the reduction of maintenance frequency.

Operating range

■ Short mode (factory setting)

- Finger protection type

0.2 to 7 m
0.656 to 22.966 ft

- Hand protection type
- Arm / Foot protection type

0.2 to 9 m
0.656 to 29.528 ft

■ Long mode

- Finger protection type

0.8 to 12 m
2.625 to 39.370 ft

- Hand protection type
- Arm / Foot protection type

0.8 to 15 m
2.625 to 49.213 ft

Shuts out liquids and dust

The SF4D series complies with IP67 and IP65 (IEC) as well as NEMA Type 13 (NEMA 250).

The unit structure prevents the entry of not only water but also coolant and other liquids to protect the internal unit.



Digital indicator with a numeric display of light incidence margin

The light incidence margin is indicated by the "stable light incidence indicator" and "digital indicator". This function enables appropriate beam adjustment and work quality control during installation of the device.



Stable light incidence indicator

- Stable light incidence: Lights green
- Unstable light incidence: Lights orange
- Light blocked: Off

Digital indicator

- Incident light level 3: Lights green "3"
- Incident light level 2: Lights green "2"
- Incident light level 1: Lights green "1"
- Light blocked: Off

Unstable light incidence



Stable light incidence



Low Margin of incident light intensity High

Remote monitoring of safety light curtain status

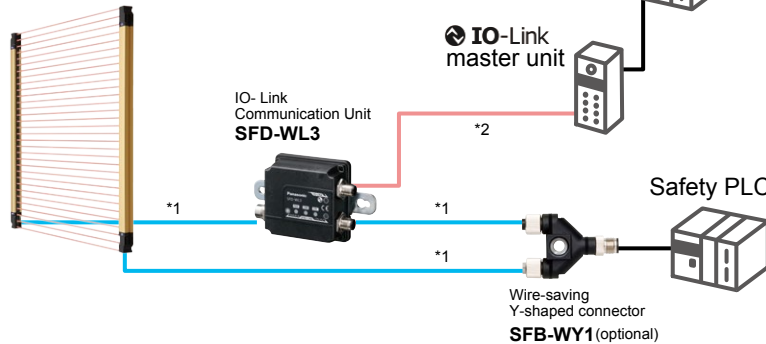
IO-Link Communication Unit

SFD-WL3



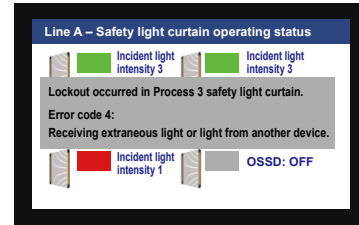
Safety output and IO-Link communication are separated from each other so that the safety light curtain can be monitored without any alteration of the safety circuit.

Safety Light Curtain
SF4D series



*1 8-core cable for safety light curtain (optional)

*2 4-core cable with M12 connector (commercially available product) (Note)



Confirmation of light intensity margin

Incident light intensity information enables the determination of whether maintenance is necessary or not. This helps prevent shut-down of the line due to light beam deviation or dirty sensor. The information is also useful in conducting remote inspection or the like at the start of work.

Confirmation of error history

If an error occurs, the source of the error and its detail can be checked remotely, thus facilitating the identification of the problem location and analysis of the cause.

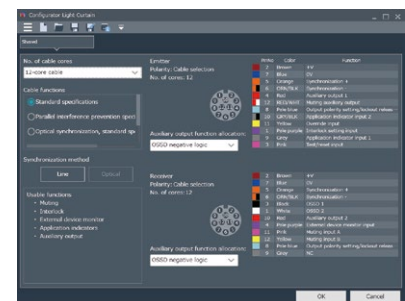
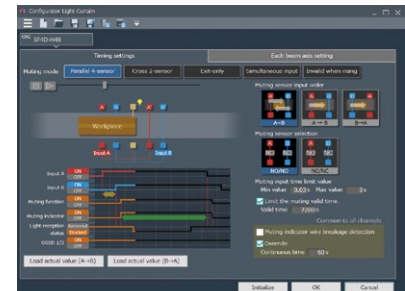


Use the safety light curtain monitoring information obtained via IO-Link only for diagnostic purposes. Do not use it for safety control purposes.

Experience the ease of setting! Simple setup of complex safety control

Setting software Configurator Light Curtain

The handy controller software, which was well-received by users of our previous models, has evolved. The new setting software, **Configurator Light Curtain**, allows visually intuitive operation. It provides powerful support to maintaining stable operation and troubleshooting by allowing the internal setup of the SF4D series product, collection of error history, planning of corrective measures and real-time monitoring of light incidence condition.



Main functions

- Operation monitoring function
 - Monitoring of received light intensity / extraneous light of individual beam
 - I/O monitoring
- Error history display
- Light blockage history, unstable light incidence history
- Muting setting function
- Override setting function
- Blanking setting function
 - Fixed blanking setting function
 - Floating blanking setting function
- External device monitoring setting function
- Auxiliary output setting function

* Note that the usable functions vary depending on the synchronization method (optical synchronization, line synchronization) and the type of cables (5-core, 8-core, 12-core) used. For details, refer to the manual. The manual can be downloaded from our website.

Type	Finger protection type	Hand protection type	Arm / Foot protection type
Model No.	SF4D-F□(-01)	SF4D-H□(-01)	SF4D-A□(-01)
Beam pitch	10 mm	20 mm	40 mm
Operating range	Short mode: 0.2 to 7 m Long mode: 0.8 to 12 m (selectable by DIP switch)		Short mode: 0.2 to 9 m Long mode: 0.8 to 15 m (selectable by DIP switch)
Protective height (Note)	150 to 1,270 mm	150 to 1,910 mm	150 to 1,910 mm
Min. sensing object	ø14 mm opaque object	ø25 mm opaque object	ø45 mm opaque object
Supply voltage	24 V DC ±10 %		
Control output	PNP open-collector transistor / NPN open-collector transistor (selectable)		
Response time	OFF response: 10 ms or less (Not connected in series / parallel), 18 ms or less (Connected in series / parallel) ON response: 50 ms or less		
Degree of protection	IP67, IP65 (IEC), NEMA Type 13 (NEMA 250)		
Dimensions	W 28 × H protective height × D 30 mm		

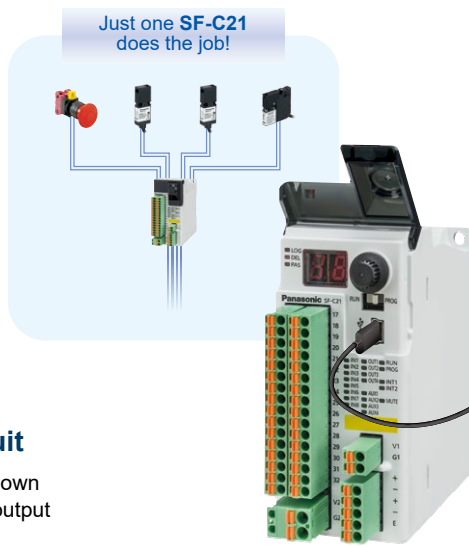
Note: When using as a safety device for a press machine in China or when using SF4D-□-01 as a safety device for a press machine or paper shearing machine in Japan, the protective height is different. Please refer to our website.

Safety Control Unit

SF-C21

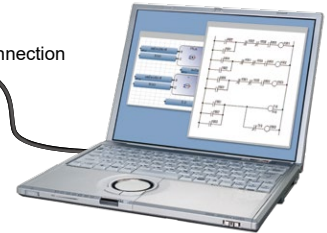
Application-based customization is easy

One SF-C21 can do the work of four safety relay units.



Easy setting from a PC

USB connection



Easy to create a reliable safety circuit

Use our “Configurator SF-C” software to build your own safety circuits of connected devices, control logic, output modes, etc. No programming skills required!

No programming skills required. Just select a preset logic.

Eight preset logics, safety-certified and compatible up to control category 4 PLe, can be selected by simply turning the rotary switch.

Circuits are configured in three easy steps!

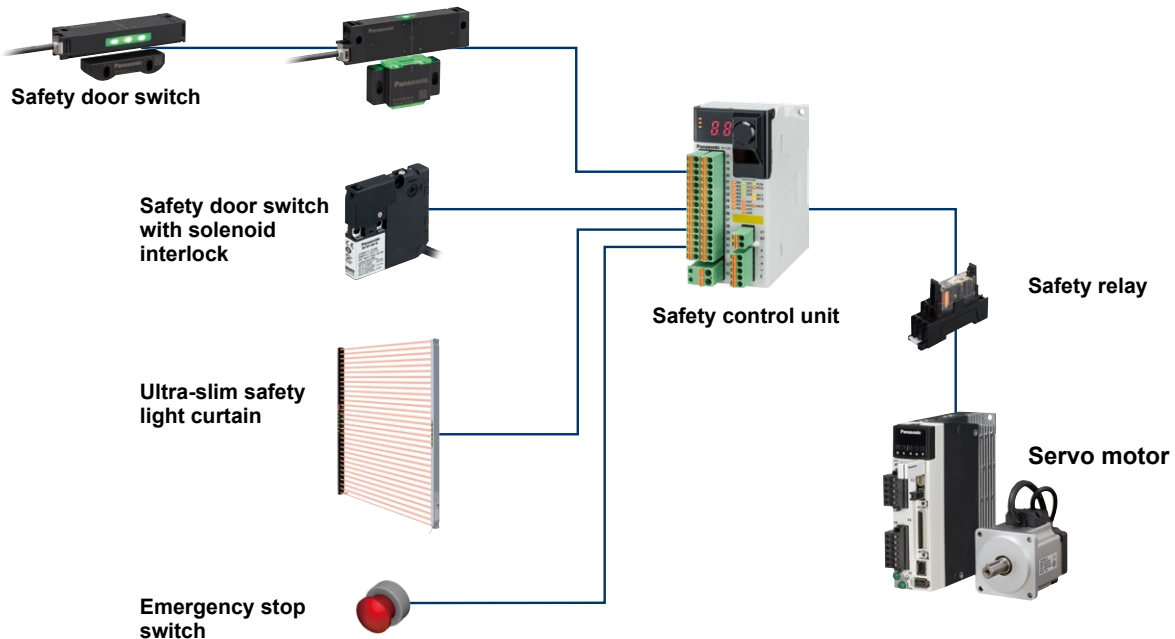


(1) Select a device to connect to

(2) Select an operation logic

(3) Connect

Example of System Configuration



Pulse AC method Area Ionizer

ER-X series

High-speed, Wide area charge removal



Three charge removal modes for diverse application coverage

The ER-X series offers an airless charge removal capability to eliminate the need for compressed air in addition to low pressure and high speed compressed air based modes.

Fast charge removal

Massive ion discharge when using air reduces charge removal time.

Airless or low-pressure

Resolves target movement issues in the presence of compressed air.

Low-pressure (Air pressure: Less than 0.05MPa)

Prevents dust dispersion and cleanliness degradation!

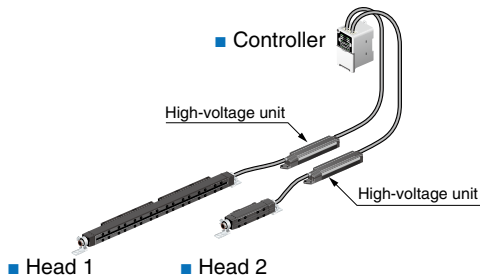
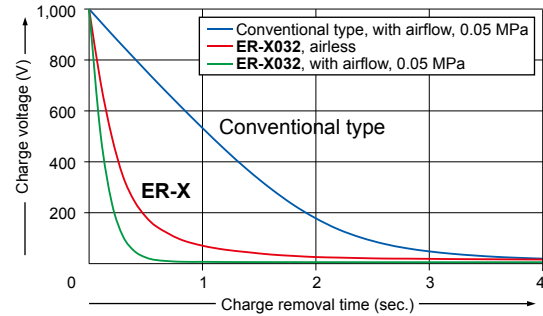


Dual head connections to increase charge removal area and layout expandability

The ER-X series has adopted the pulse AC method that alternately applies positive and negative voltages to each discharge needle. This enables generation and discharge of a large amount of ions, resulting in faster charge removal. Select from eight pulse frequencies according to your application, from 100 Hz for charge removal on nearby or moving workpieces to 1 Hz for charge removal on far-away workpieces or in a threedimensional space.

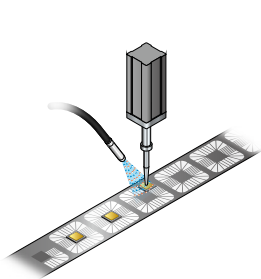
Charge removal time characteristics (TYPICAL)

Measured at a charge removal distance of 100 mm 3.937 in using a 150 × 150 mm 5.906 × 5.906 in CPM (at center of CPM).

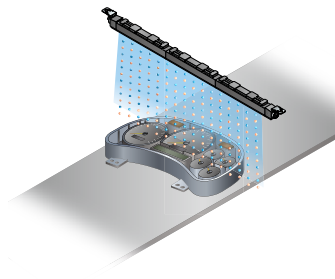


Dual head connections to increase charge removal area and layout expandability

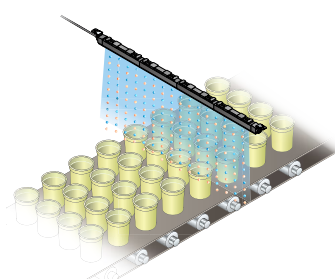
- Different heads can be combined.
- Charge removal is possible with a layout that places heads on either side of the workpiece.
- The charge removal efficiency can be increased by synchronizing the two heads.



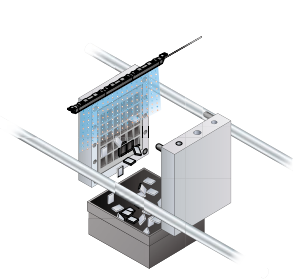
Preventing electrostatic damage during bonding



Removing dust during instrument panel assembly



Removing dust during food product cup transport



Preventing adhesion of molded parts to molds

Ultra-compact Programmable Controller

FP0H series

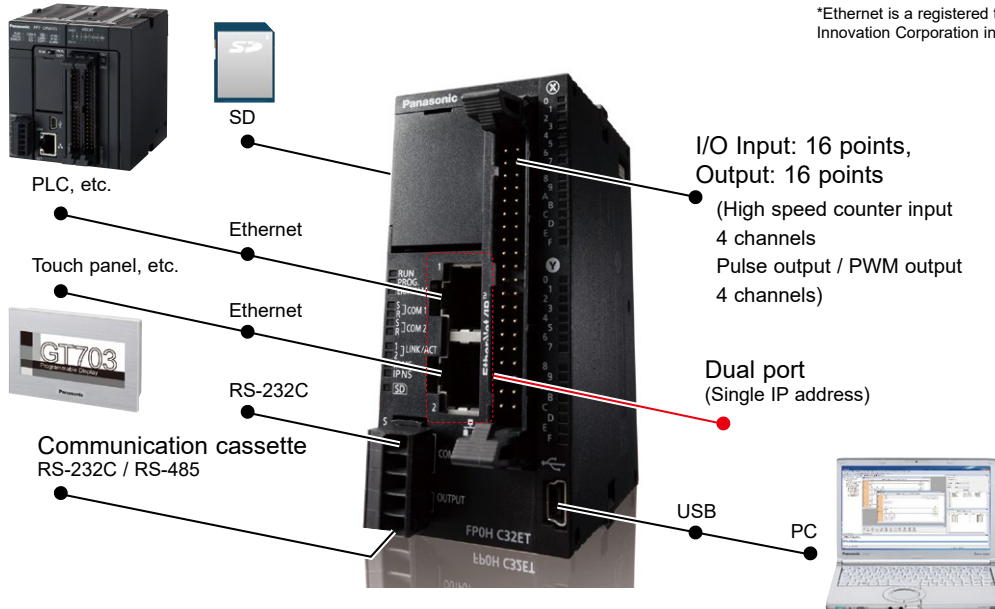
Multiple interfaces that connect with various devices



- EtherNet/IP, Modbus-TCP and MC protocol compatibility
- Easy connection with all kinds of robots and PLCs
- Cassette system reduces unit cost and installation space

- Basic instruction: 10 ns to (up to 10 k steps)
- Program capacity: 64 k / 40 k / 32 k / 24 k Step variable
- Data capacity: 12 k / 24 k / 32 k / 64 k Step variable

*Ethernet is a registered trademark of FUJIFILM Business Innovation Corporation in Japan.

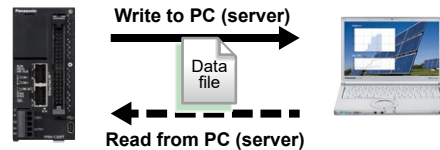


FTP server function (SSL/TLS-compatible)

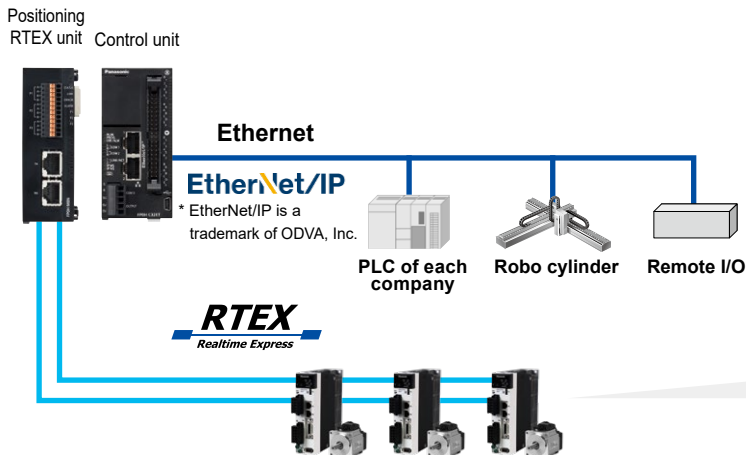
Allows the PC to read the logging data in the FP0H's SD memory card and to write setting values and other parameters.

FTP client function (SSL/TLS-compatible)

The FP0H can generate and write data files to an FTP server on a PC as well as read data files from the FTP server.



Capable of performing motion control through a high-speed network and supporting an open network with a small PLC



Features

Support of network servo drivers MINAS A6N significantly reduces the man-hours in wiring.

A maximum of 16 axes.

Up to two 8-axis units can be installed.

*Synchronous control

4-axis type: Up to six axes including virtual axes (virtual axis: 2 axes)

8-axis type: Up to eight axes including virtual axes

Check the MINAS data on Web sever

Basic information

Monitor position, speed, torque, driver part No., motor part No.

Status display

Servo drive inside temperature
Encoder inside temperature
Deterioration diagnosis

Error information

Error code
Error history

Ultra-compact Programmable Controller

FP7 series

Panasonic PLCs also control information



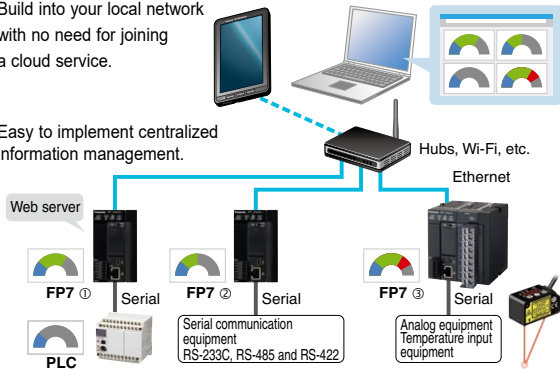
Web server function

Monitor and control the FP7 without the use of custom software. Users can check the accumulated data in the FP7 with a browser.

System configuration

Build into your local network with no need for joining a cloud service.

Easy to implement centralized information management.



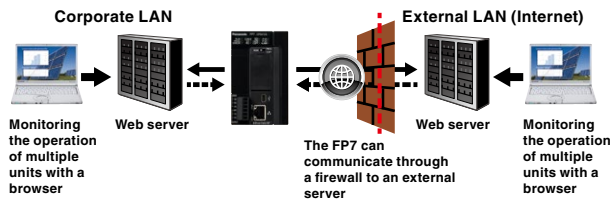
* Wi-Fi is a registered trademark of Wi-Fi Alliance.

* Ethernet is a registered trademark of FUJIFILM Business Innovation Corporation and Xerox Corporation.

HTTP(S) client function (SSL-compatible)

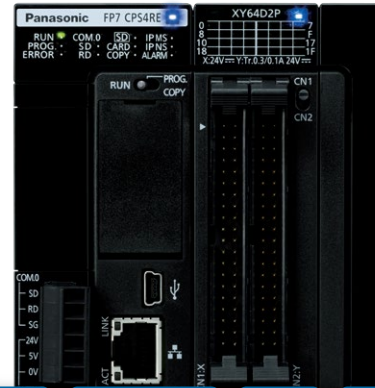
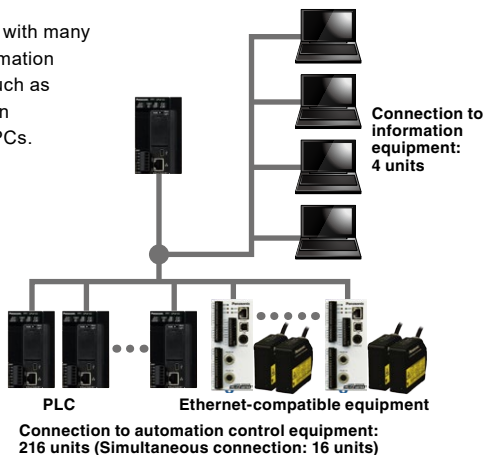
Transfer data from the FP7 to a web server for easy viewing with a browser. Send and receive data from multiple FP7 units on a schedule controlled by the FP7.

Communicate both inside the firewall on an intranet and outside the firewall to the wider world through the Internet.



Communicating with up to 220 equipment units

Communicate easily with many units, including automation control equipment such as PLCs and information equipment such as PCs.



- Operation speed 11 ns
- Max. I/O points: 8,192
- Program capacity 196 k steps
- Tool port USB
- Ethernet
- EtherCAT

Cassette system reduces unit cost and footprint

With ease and at low cost, extend the serial communication and analog functionality of CPU units.

Serial communication cassettes

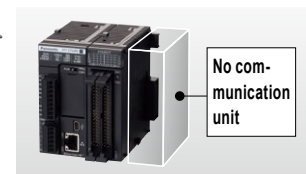
- RS-232C
- RS-422 / RS-485
- 2 channels

Function cassettes

- Analog input
- Analog input and output
- Thermocouple input

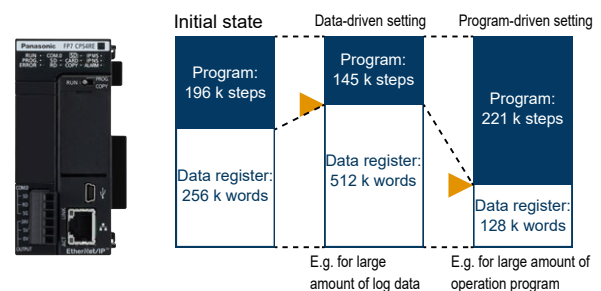
Ethernet communication cassette

* Ethernet is a registered trademark of FUJIFILM Business Innovation Corp and Xerox Corporation in the United States.



Use program and data register sharing to resolve data space shortage. No need repurchase expensive upgrade models.

Example: 196 k steps type CPU unit AFP7CPS4RE(S)

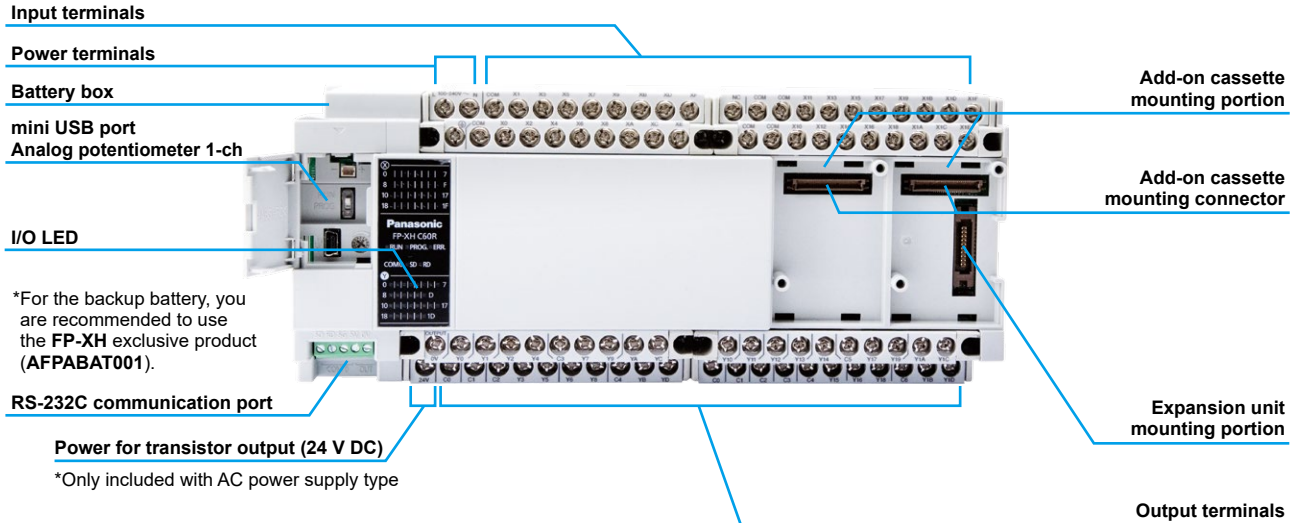


	234 k steps	221 k steps	196 k steps	145 k steps	52 k steps
Program	234 k steps	221 k steps	196 k steps	145 k steps	52 k steps
Data register	64 k words	128 k words	256 k words	512 k words	976 k words

Ultra-compact Programmable Controller

FP-XH series

Compact terminal block type controller.
Superior basic performance and wealth of functions.



*Image shows C60R

High-speed operation

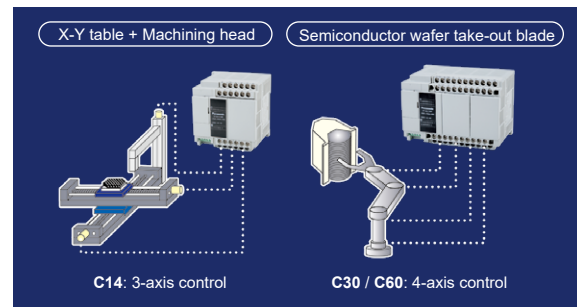
- Basic instruction (ST instruction): 0.04 μ s/step
Up to 7 k steps (ratio to convention: 8 times)

Multi-axis positioning control

- On up to 6 axes, built-in 100 kHz high-speed pulse output function
(Transistor output type has a built-in pulse output function for 3 axes for C14, 4 axes for C30 and 6 axes for C60)

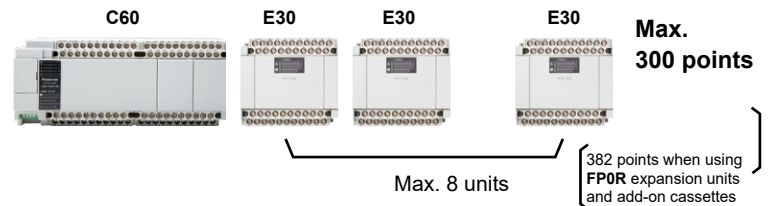
Large capacity program memory

- Program capacity: Max. 40 k steps (For C14: 16 k steps)
24 k / 32 k / 40 k steps selectable



Expandability

- Max. I/O points: 300 points
One control unit connectable to up to 8 expansion units (382 points when using FP0R expansion units and add-on cassettes)
- Up to 4 add-on cassettes can be added (for C30, C60)



Network

- Communication port: Max. 5 channels
Support for up to 5 channels including 2 communication cassettes (2 channels type) and tool port.
- Compatible with Modbus-RTU
Compatible with master / slave of Modbus-RTU, industry standard
- PLC link
Bit data and word data can be shared (linked) via connection with FP-XH (up to 16 units).

PLC + Motion + Communication Motion Controller

GM1 series

For complex motion control applications



With the space-saving Motion Controller from Panasonic Industry you can master your challenges with your multi-axes machines: The **GM1** offers control of up to 32 axes, standardized communication via EtherCAT, easy network integration via EtherNet/IP, and sophisticated programming with CODESYS.



CODESYS

Positioning

Torque control

Speed control

Improves high-speed and high-accuracy

Motion control

RTEX type Real axes: 16

EtherCAT type Real axes: 32

Selectable network

High-speed network for servo



Ethernet: 2 ports

EtherNet/IP* (1 port)

Modbus-TCP

General-purpose communication

General-purpose I/O: 16 points each

Input: 16 points/output: 16 points

NPN/PNP transistor

Expansion unit (64 points) ×

Up to 15 units

RS-232C

Modbus-RTU

General-purpose communication

High-speed counter input: 2 channels

4-multiple, 16 MHz

SD memory card

PWM output: 4 channels

Up to 100 kHz



System configuration



GM Programmer

- PLC programming
- Motion programming
- Various setting
- CODESYS support



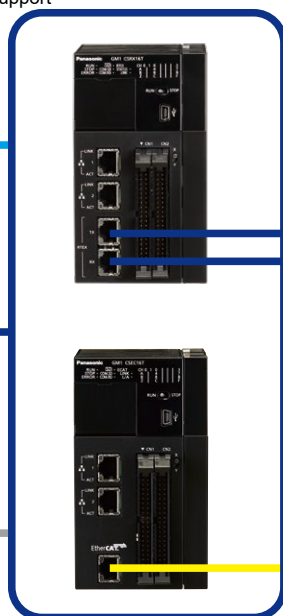
PLC



Various sensor



Various I/O PWM
High-speed counter



Motion Controller GM1



AC servo motor
MINAS A6N

Max. 16 axes



AC servo motor MINAS A6B

Max. 32 axes

*Realtime Express and RTEX are registered trademarks of Panasonic Corporation.

Realtime Express is a high-speed and synchronous motion network exclusively developed by our company.

*The EtherCAT is a registered trademark of patented technology licensed from Beckhoff Automation GmbH in Germany.

*CODESYS is a trademark of CODESYS Development GmbH.

Human machine interface Programmable Display

Information panel WH series

Gateway with Touch Panel Accelerate DX in Manufacturing!

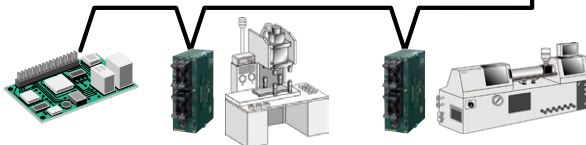


The **WH** series supports OPC UA client/server, MQTT and SQL, etc., and can be connected to higher-level systems such as databases, file servers and various cloud services without programming. The **WH** series can be used as a gateway to existing equipment for data communication with high security using OPC UA and data analysis using various cloud services.

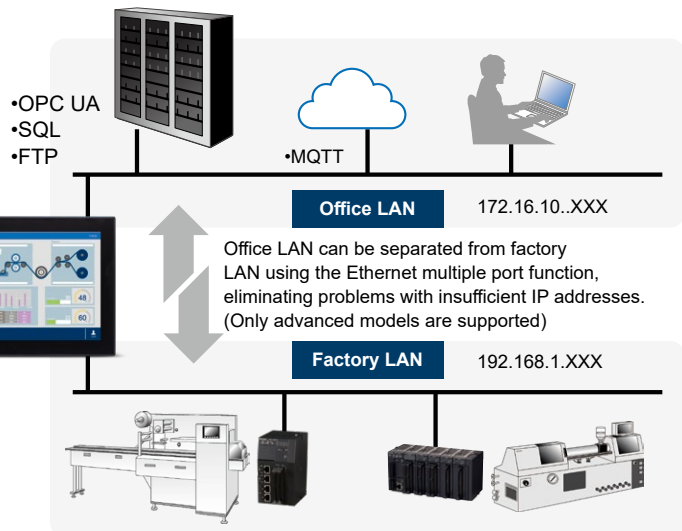
Collection and storage of production site data

International standard IEC 61131-3 compliant, Global variable imports
By importing a PLC's global variable file, there is no need to set tags in WH, making loading data simple.

Data can be collected from existing PLC without the Ethernet via RS-232C or RS-485 serial communication.



Data can be collected from the microcomputer board using general-purpose serial communication and JavaScript program.



•OPC UA
•SQL
•FTP

•MQTT

Office LAN 172.16.10..XXX

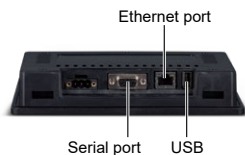
Office LAN can be separated from factory LAN using the Ethernet multiple port function, eliminating problems with insufficient IP addresses. (Only advanced models are supported)

Factory LAN 192.168.1.XXX

Supports the protocol of major PLC manufacturers
Data collection is performed without program coding.

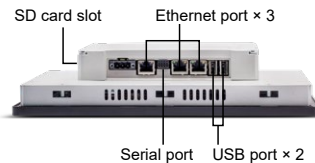
Standard model

Standard model with mid-sized, wide resistive film type for users with focused needs.



Advanced model

Equipped with 3 Ethernet ports* and a capacitive type, the large, high end model enables gesture control.



*AWHA1C050 is equipped with two Ethernet ports.

Standard model

	AWHS1R101	AWHS1R070	AWHS1R043
Screen size	10.1 inch wide	7 inch wide	4.3 inch wide
Resolution	WSVGA	WVGA	WQVGA
	1024 × 600	800 × 480	480 × 272
Memory (RAM)	512 MB	512 MB	512 MB

Advanced model

	AWHA1C215	AWHA1C156	AWHA1C101	AWHA1C070	AWHA1C050
Screen size	21.5 inch wide	15.6 inch wide	10.1 inch wide	7 inch wide	5 inch wide
Resolution	Full HD	HD	WXGA	WVGA	WVGA
	1920 × 1080	1366 × 768	1280 × 800	800 × 480	800 × 480
Memory (RAM)	2 GB	2 GB	1 GB	1 GB	512 MB

Programmable display Human Machine Interface

GT707



Wide screen, small body 7 inch width in space of a 5.7 inch!

Since 7 inch type can fit in a 5.7 inch type space, the screen shows more and the product looks greater.



■ Body dimensions comparison

Installation space is almost the same!

Conventional model	5.7 inch
GT32T-R	
Body dimensions: W163.2 × H128.8 mm W6.425 × H5.071 in	
NEW	7 inch
GT707	
Body dimensions: W186.0 × H122.0 mm W7.323 × H4.803 in	

■ Usable screen comparison

Shows much more!

Conventional model	5.7 inch
GT32T-R	
Screen dimensions: W115.2 × H86.4 mm W4.535 × H3.402 in	
NEW	7 inch
GT707	
Screen dimensions: W153.8 × H85.6 mm W6.055 × H3.370 in	

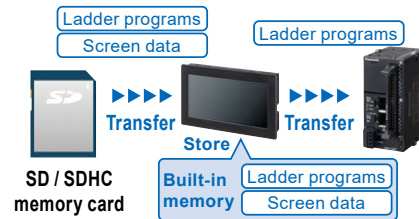
Resolution: 800 × 480 dots **5 times over previous**
Display color: 65,536 colors **16 times over previous**

Built-in SD / SDHC memory card slot

Easy to copy, back up, and restore screen data. Data logging possible.

Transfer programs from Programmable Display to PLC

Transfer of PLC ladder programs and Programmable Display screen data is possible from a SD / SDHC memory card without using a PC. Also, PLC ladder programs can be backed up inside the Programmable Display and restored at any time (except FP7).

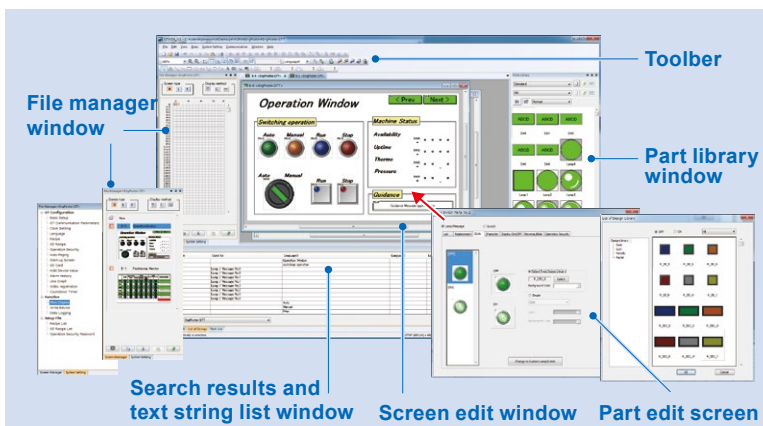


Device monitor shows PLC status without a PC

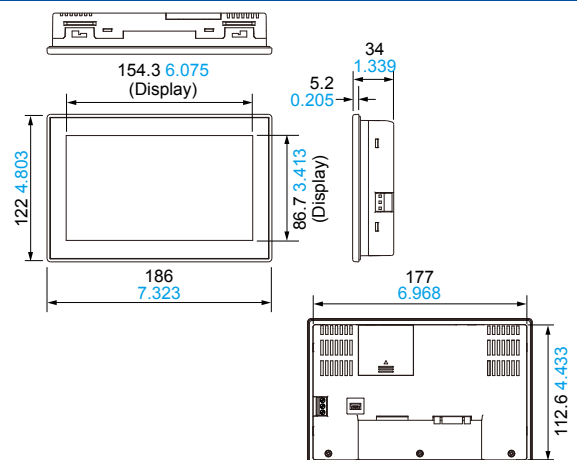
You can directly check PLC devices from the Programmable Display without having to use a PC (FPWIN GR / FPWIN GR7). The device monitor is easily viewed from the system menu, which eliminates the bother of screen creation (except FP7).



Easier to use with upgraded user interface. Terminal GTWIN Ver.3



DIMENSIONS (Unit: mm in)



AC servo system

MINAS A6 family



*There are conditions for standard compliance. Please refer to the product catalog.

New Line-up

High capacity (7.5 kW to 22 kW)
A6 G-Frame, H-Frame
motor / driver

400 V AC input type
Servo motor / driver



RTEX
Realtime Express
EtherCAT
Modbus



RTEX
Realtime Express
EtherCAT
Modbus

Small / light DC input type
A6 V-Frame
Thin type driver

Battery-less absolute encoder motor



RTEX
Realtime Express
EtherCAT
Modbus

RTEX and EtherCAT supports are planned.



* EtherCAT is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Battery-less absolute encoder motor line-up

	80 mm sq. or less Leadwire type						100 mm sq. or more Encoder connector (Small size JN2) type					
	50 W	100 W	200 W	400 W	750 W	1000 W	1.0 kW	1.5 kW	2.0 kW	3.0 kW	4.0 kW	5.0 kW
Low inertia MSMF	100 V 200 V	100 V 200 V	100 V 200 V	100 V 200 V	200 V	200 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V
Middle inertia MQMF		100 V 200 V	100 V 200 V	100 V 200 V								
Middle inertia MDMF	<Table description> Voltage specifications: 100 V (On sale), 200 V (On sale) Voltage specifications: 200 V (Coming soon), 400 V (On sale)						200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V
Middle inertia MGMF							850 W 200 V 400 V	1.3 kW 200 V 400 V	1.8 kW 200 V 400 V	2.4 kW 200 V 400 V	2.9 kW 200 V 400 V	4.4 kW 200 V 400 V
High inertia MHMF	100 V 200 V	100 V 200 V	100 V 200 V	100 V 200 V	200 V	200 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V	200 V 400 V

Motor Line-up

New high power models from 5.5 kW to 22 kW

Inertia	Series	Motor rated output	Voltage specifications (V)	Rated rotational speed (r/min)
Low inertia	MSMF	50 W to 5 kW 1 kW to 5 kW	100 / 200 400	3000
	MQMF	Motors with gear reducers are also available. 100 W to 400 W	100 / 200	3000
Middle inertia	MDMF	1 kW to 22 kW 1 kW to 5 kW	200 400	2000(1 kW-5 kW) 1500(7.5 kW-22 kW)
	MGMF	850 W to 5.5 kW 850 W to 4.4 kW	200 400	1500
High inertia	MHMF	Motors with gear reducers are also available [100 W to 750 W]. 50 W to 7.5 kW 1 kW to 5 kW	100 / 200 400	3000(50 W-750 W) 2000(1 kW-5 kW) 1500(7.5 kW)

Motor Line-up

	Rotary motor			Linear motor / DD motor	
	Basic type A6SE series	RS485 communication type A6SG series	Multifunction type A6SF series	Basic type A6SL series	Multifunction type A6SM series
Position control	●	●	●	●	●
Block operation	(External contact signal only)	(External contact signal or Modbus communication)	(External contact signal or Modbus communication)	(External contact signal or Modbus communication)	(External contact signal or Modbus communication)
Speed control	●	●	●	●	●
Internal velocity command ²	(External contact signal only)	(External contact signal or Modbus communication)	(External contact signal or Modbus communication)	(External contact signal or Modbus communication)	(External contact signal or Modbus communication)
Torque control	●	●	●	●	●
Full-close control	●	●	●	●	●
Block operation	●	●	(External contact signal or Modbus communication)	●	●
Pulse	●	●	●	●	●
Analog	●	●	●	●	●
Modbus	●	●	●	●	●
External scale	●	●	●	●	●
RS-232/RS-485	●	●	●	●	●
STO (Safety Torques Off)	●	●	●	●	●

¹ A6SE series driver (Position control only) does not correspond to the absolute system of using the serial communication with the host device. It supports incremental system only.
² When using internal speed command with Modbus, external servo ON is required.

High speed communication For Realtime Express Network servo driver

	Rotary motor		Linear motor / DD motor	
	Standard type A6NE series	Multifunction type A6NF series	Standard type A6NL series	Multifunction type A6NM series
Control mode	●	●	●	●
Position/Speed/Torque control	●	●	●	●
Full-close control	●	●	●	●
Interface	●	●	●	●
External scale	●	●	●	●
STO (Safety Torques Off)	●	●	●	●

Servo drivers with EtherCAT open network

	Rotary motor		Linear motor / DD motor	
	Standard type A6BE series	Multifunction type A6BF series	Standard type A6BL series	Multifunction type A6BM series
Control mode	●	●	●	●
Position/Speed/Torque control	●	●	●	●
Full-close control	●	●	●	●
Interface	●	●	●	●
External scale	●	●	●	●
STO (Safety Torques Off)	●	●	●	●

Enhanced position detecting resolution enables smoother and more precise positioning

Encoder

23 bits
(8388608 Pulse / rotation)

8 times higher resolution

(A5 Family *1 20 bits)

Communication speed

5 Mbps

Improved

(A5 Family 2.5 Mbps)

Low vibrations High speed and high precision positioning

*1: Incremental encoder

High-speed, high-torque, compact and lightweight

Max. speed	Max. torque	Overall length	Weight
6500 r/min	Approx. 350 %	67.5 mm	750 g
Fast	High	Short	Light
(A5 Family 5000 r/min)	(A5 Family Approx. 300 %)	(A5 Family 99.0 mm)	(A5 Family 960 g)

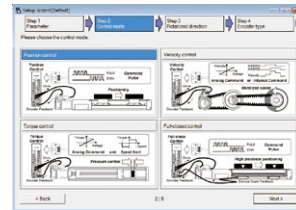
*2: Middle and high inertia types only

Multifunctional software for quick adjustment support PANATERM set-up support software

The PANATERM set-up support software, with many added features. The PANATERM assists users in setting parameters, monitoring control conditions, setup support, and analyzing mechanical operation data on the PC screen, when installed in a commercially available personal computer, and connected to the MINAS A6 Family through the USB interface. Choose either English, Japanese, Chinese, Korean-language display.

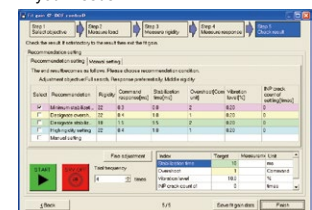
Setup wizard

This wizard supports fundamental settings in each control mode step by step, including reading of default setting. In On-line condition, input data related to each step can be monitored in real time.



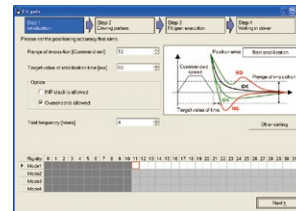
The fit gain function for setting Two-degree-of-freedom control

- 1) Select the adjustment method
- 2) Load measurement
- 3) Confirming results Adjust gain to meet your needs



Fit gain

This function automatically searches the best suitable stiffness setting and mode and adjusts the gain once the target in-position range and setting time are set.



Service life prediction

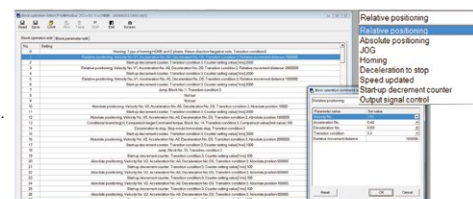
The service life prediction function considers the internal temperature for main components such as the fan and condenser. If the rated value is exceeded, an alarm is displayed. This approach prevents unexpected suspension of operation and allows for planning of systemized maintenance.

Note: The life span prediction value should be considered as a guide only.

Name	Value	Unit	Status
Cooler supply oil temperature	0.0	°C	
Driver temperature	24	degrees	
Number of times of negative resistance	0	times	
Number of times of CE relay changing	0	times	
Fan operation time	0.0	h	
Fan life time integrated value	0.0	%	
Condenser fan life integrated value	0.0	%	
Motor usage	0	%	

Block operation

255 block patterns can be created. Control is easy. Instruction is made to block number by Modbus or I/O signal.



FAYb Laser Marker

LP-ZV series

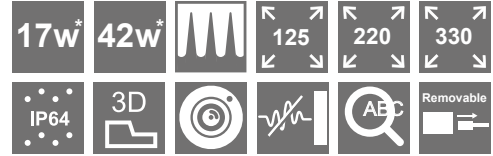
Short-pulse fiber laser marker boasting high marking definition and sustainability to meet future needs

FDA
Conforming to
FDA regulations

CE

**UK
CA**

GB
Conforming to
GB 7247.1



*Average output for marking



Detachable fiber unit

Easy setup and maintenance

Equipped with 3D module

Z-axis' variable range: 50 mm 1.969 in

Built-in camera

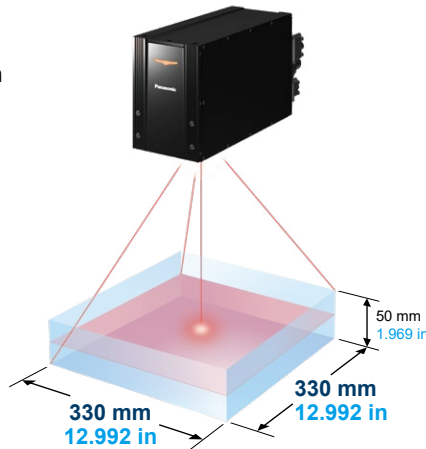
Sharp and clear color image for accurate setup positioning

Short-pulse laser

High marking definition thanks to 1-ns pulse width
(LP-ZV200P / LP-ZV205P / LP-ZV206P)

Wide marking field of
330 × 330 mm 12.992 × 12.992 in
(LP-ZV206P / LP-ZV506P)

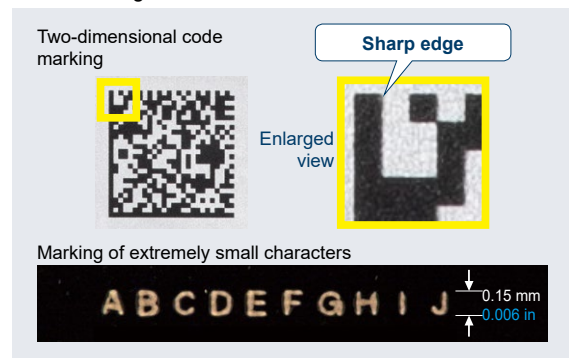
Conventionally, markings on large workpieces or on workpieces made with multi-cavity molds required multiple marking operations. The wide marking field enables large size marking in a single marking operation. This not only improves productivity but also reduces the number of required units or simplifies the facility construction to contribute to cost reduction.



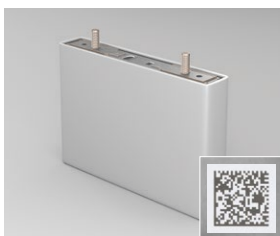
Clear marking with sharp edges

The short-pulse laser minimizes thermal effect while the high-frequency oscillation achieves clear marking of extremely small and fine characters. Shallow engraving results in easy-to-see white markings and code sections with sharp and clear edges.

This contributes to the excellent visibility of small characters and stable scanning of two-dimensional codes.



Examples of marking / processing applications



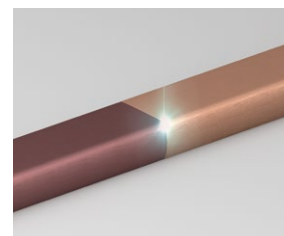
Automotive secondary battery



Automotive sensor



E-Axle



Enamel coating removal

CO₂ Laser Marker

LP-RH series

Improved speed and precision

- High speed marking Laser marker
- Resolution of instruction signals to the galvano improved by four times
- Controller offering high resistance to noise
- Simplifies facility designs
- Interchangeable with previous Panasonic Industry head
- Safety design "interlock redundancy"

FDA
Conforming to
FDA regulations

CE

**UK
CA**

**C
R
US**
Recognition

GB
Conforming to
GB 7247.1



Standard model (horizontal type)

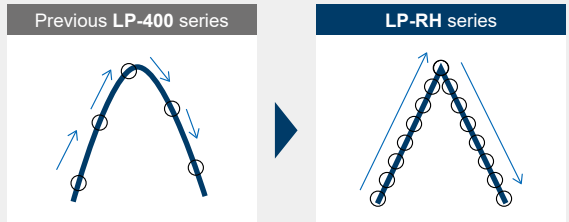
Tower head model (vertical type)

VPE* High-speed vector processing engine (VPE*)

The dedicated engine (VPE*) for the generation of vector data for marking and processing achieves high-speed marking. The resolution of positioning data for laser scan control has been increased fourfold and the communication speed for galvano mirror positioning control has also been made four times faster. The new engine realizes quicker and more precise engraving as compared to our previous models (LP-400 series).

*: Vector Processing Engine.

Resolution of instruction signals to the galvano improved by four times



Smoother values of coordinates for interpolation of lines

○: Coordinate instruction value

Startup time reduced by about 80%*

The time from the startup of the laser marker system to the startup of laser oscillation is reduced by about 80% as compared to our previous model (LP-400 series). The shorter startup time significantly reduces the waiting times at the time of facility startup, at the time of reset from power OFF triggered by safety circuit, etc.

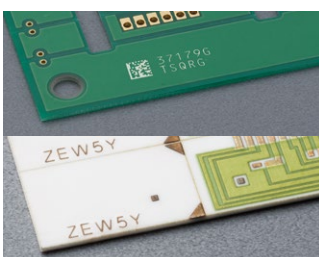
* When compared to previous model (LP-400 series)

■ Comparison of system startup time and laser excitation time

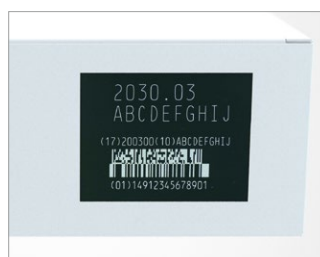
	Previous LP-400 series	LP-RH series
System startup time	Approx. 75 sec.	Approx. 10 sec.
Laser excitation time	Approx. 15 sec.	Approx. 5 sec.

Significant reduction of system startup time and laser excitation time

Examples of marking / processing applications



Circuit boards



Cosmetic products



Retort pouches

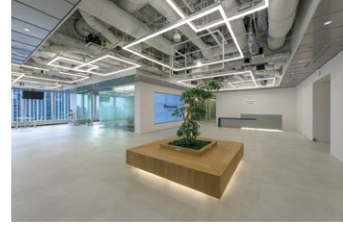


Aluminum packaging materials

Gobal Network

Panasonic Industry has collected together the device technologies refined by the company so far, to engage on a challenge to transform the world you see from places you can't see.

Panasonic Industry Co., Ltd.



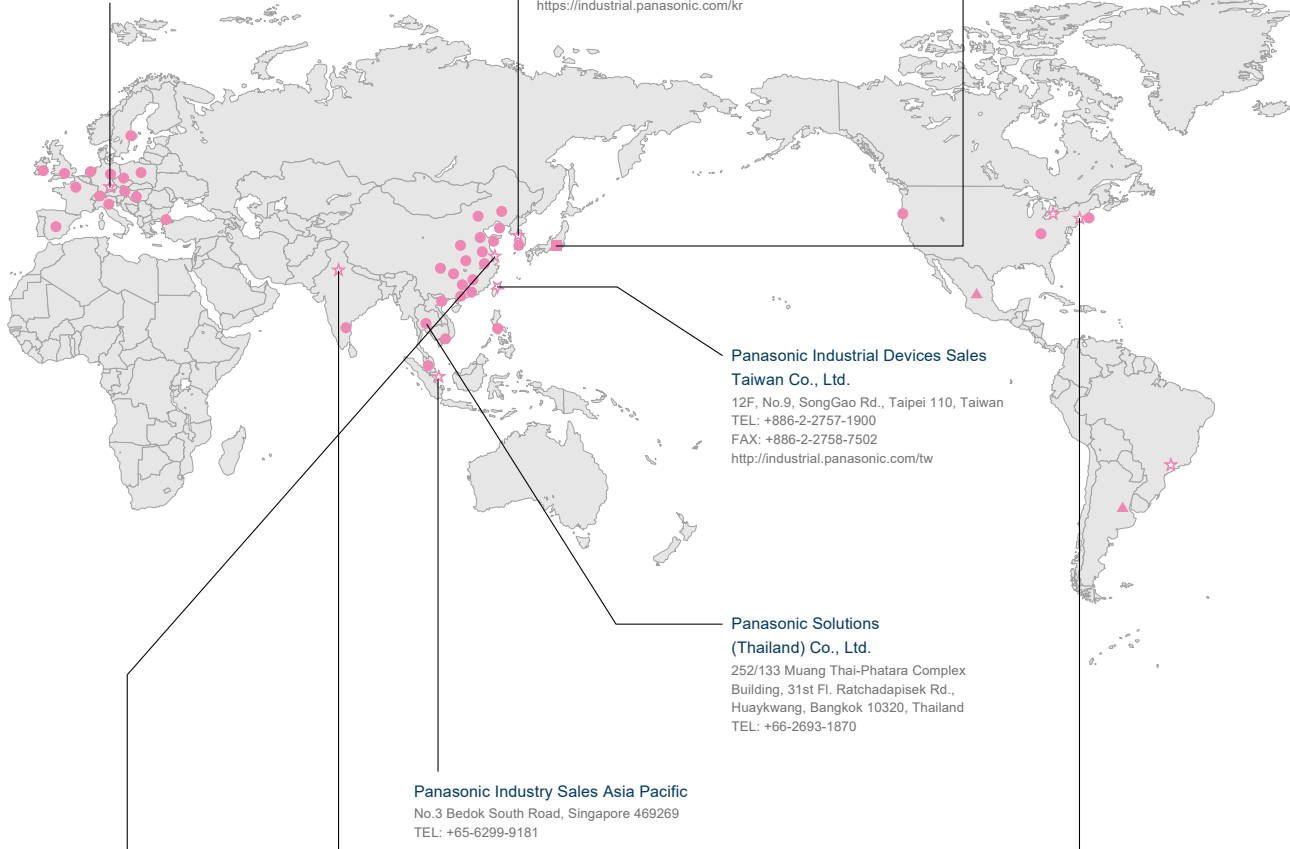
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