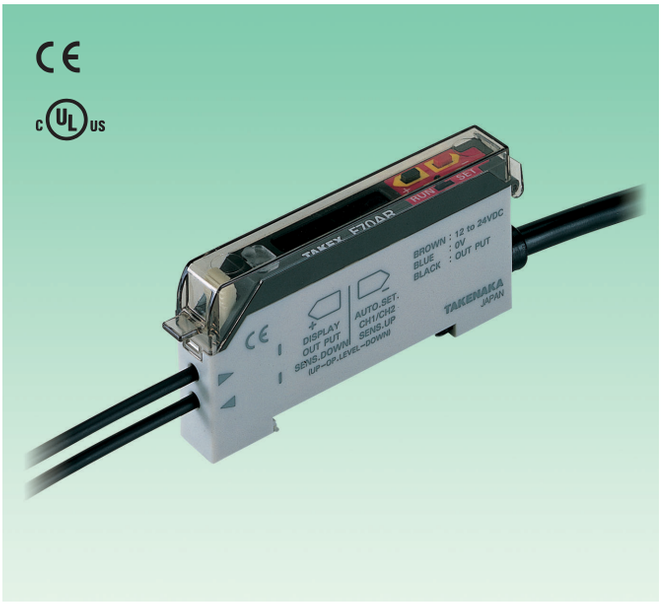
F70A series

Digital display
Fiber optic sensors



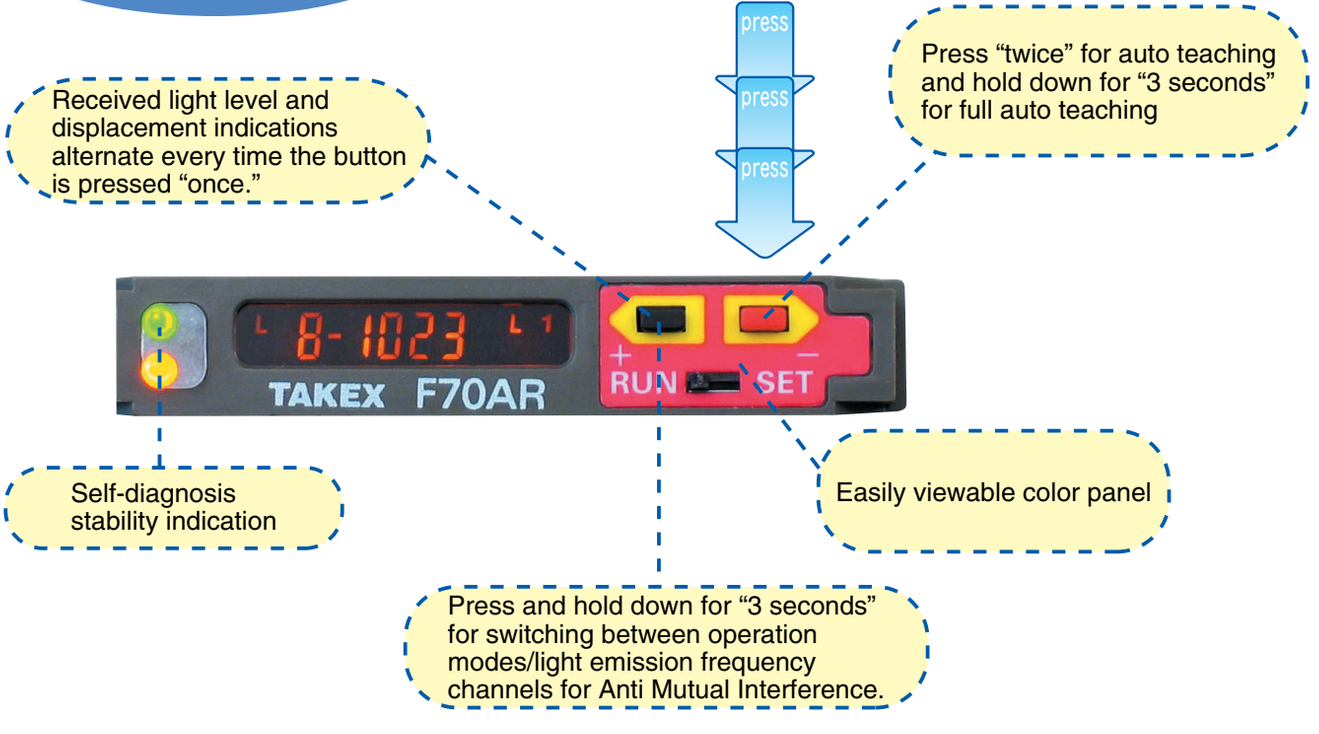
- Digital indication of sensing information
- Simple operation for setting functions
- Direct reading of stablility level is available along with received light level and displace-ment indications
- LCD with backlight for ease of reading
- Various convenient functions provided
  - Full auto/auto teaching
  - Anti Mutual Interference
  - Manual sensitivity setting
  - Off-delay timer

Variation

Type	Model		Light source	Output mode
	NPN output	PNP output		
Digital display general-purpose type	**F70AR**	**F70ARPN**	Red LED	Open collector (NPN/PNP)
	F70AG	**F70AGPN**	Green LED	
	F70AB	**F70ABPN**	Blue LED	
	F70AW	**F70AWPN**	White LED	

Simple operation

Simple operation featured



2 types of received light level indication

Level indication mode

The level of received light is indicated in 4-digit number.
Min. = 0 / Max. = 1023

Position on the electronic volume: 8

The sensitivity position on the electronic volume and the current received light level are displayed.

There may be an error of ± 1-2 between the value on the LCD and the actual value.

Displacement indication mode

The example above shows that the current receive light level is -123 with reference to the activation level.

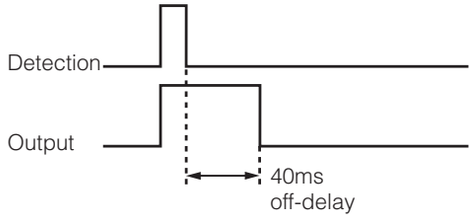
The level of received light is indicated in positive or negative value with reference to the activation level.

The activation level is taken as the reference (± 0) and the level of received light with work used is indicated as a deviation from the reference in a positive or negative value.

Enhanced teaching features (sensitivity setting)

- **Full auto teaching**
  Simply pressing the button allows easy teaching; even for an object moving at a high speed.
- **Auto teaching**
  2-point teaching “with” and “without” the work allows the detection of slight level difference such as the thickness of a piece of work and the presence of a film.
- **Position teaching**
  This feature is ideal for high-accuracy positioning that requires accurate determination of a detecting point.
- **Maximum sensitivity setting**
  For applications requiring maximum sensitivity setting such as the detection of work with a through-beam type fiber optic cable, the extra-powerful light allows for use in an adverse environment.
- **Manual setting**
  Arbitrary manual increase and decrease of a “set-point” allows level setting while checking the operation.

Secure detection of an instantaneous signal is ensured with the off-delay timer



A small object moving at a high speed can be securely detected, thus allowing for a wider range of input conditions for the connected devices.

F70 series

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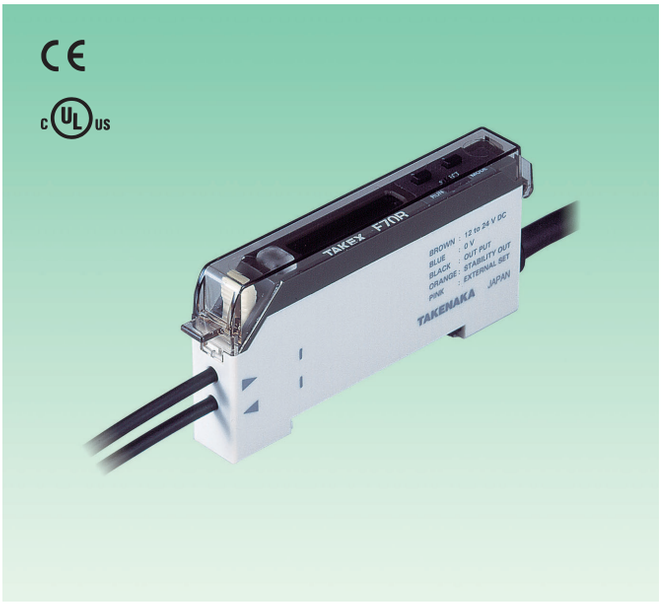


- Digital indication of sensing information
- Various advanced functions provide for optimum use of the sensor
- Unparalleled “high resolution” allows highly accurate detection
- LCD with backlight for ease of reading
- Longer detecting distance
  (about 2-X that of a conventional Takex model)

Variation

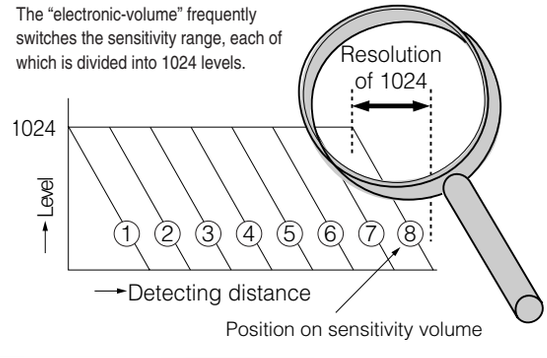
Type	Model		Light source	Output mode
	NPN output	PNP output		
Digital display high-performance type	**F70R**	**F70RPN**	Red LED	Open collector (NPN/PNP)
	F70G	**F70GPN**	Green LED	
	F70B	**F70BPN**	Blue LED	
	F70W	**F70WPN**	White LED	

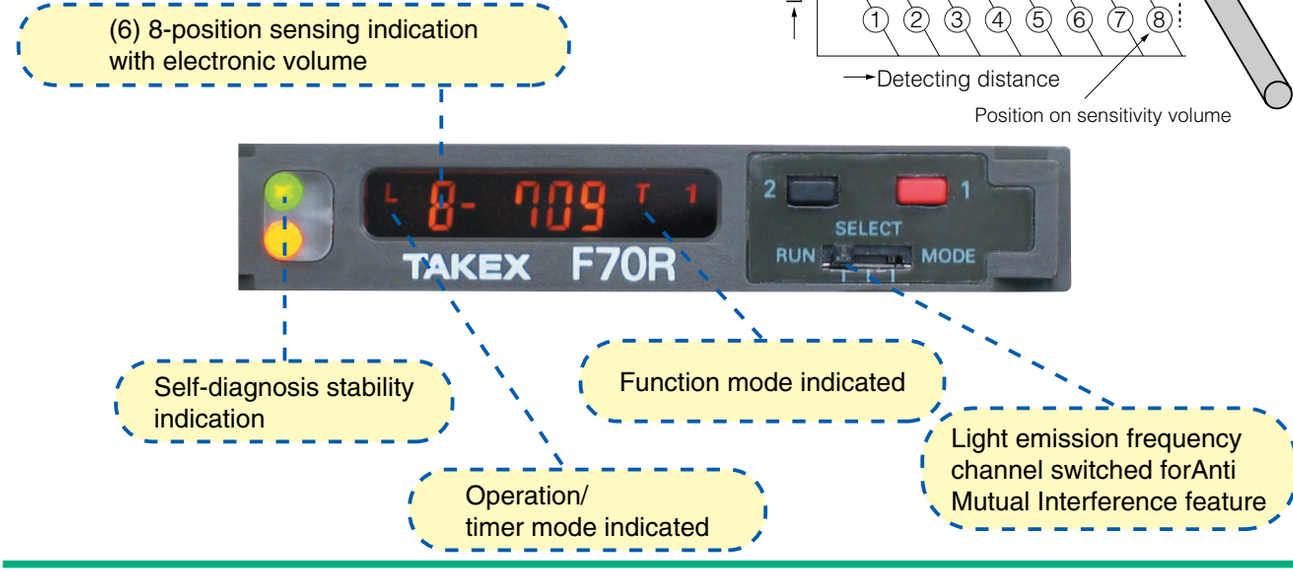
Excellent detection performance

Buitl-in high-resolution provides highly accurate detection

Wide dynamic range and high resolution are achieved at the same time

High resolution is maintained even with a wide dynamic range. The provided electronic volume feature has both a wide dynamic range and high resolution.

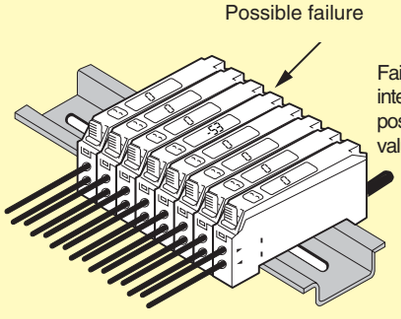




Display function :(beyond received light level)

Displacement indication function

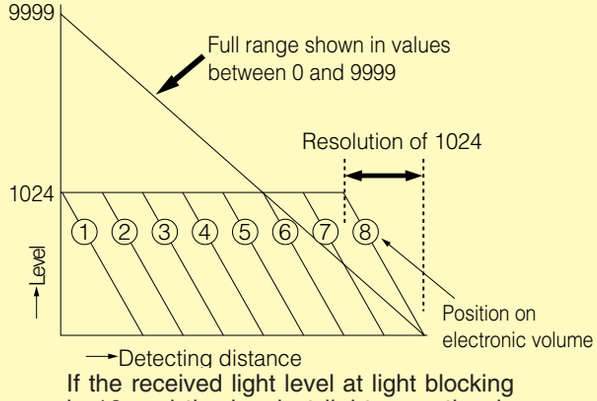
All amplifiers should show “0” with no work.



The value for a deviation (positive or negative) of received light level from the original level is shown at the time of detection, which allows central management of sensors.

Absolute value indication

Received light level indication going beyond the



If the received light level at light blocking is 10 and the level at light reception is 6000, the light blocking / light reception ratio is calculated as 600 times.

supporting high resolution

Enhanced teaching features (sensitivity setting)

- **Full auto teaching**
  Simply pressing the button allows easy teaching of an object moving at a high speed.
  The teach hold feature allows indication of the maximum and minimum data.
- **Auto teaching**
  2-point teaching with and without the presence of work, allows the detection of slight level differences such as the thickness of a piece of work and/or the presence of a film.
- **Positioning teaching**
  This feature is ideal for high-accuracy positioning that requires accurate determination of a detecting point.
- **Maximum sensitivity setting**
  For applications requiring a “maximum” sensitivity setting such as the detection of work with a through-beam type-fiber optic cable. The incorporated extra powerful light would allow use in an adverse environment.
- **Manual setting**
  Arbitrary manual increase and decrease of a set-point level allows level setting while checking the operation.

Auto sensing function compensates for adverse environment

The level of received light is constantly monitored and fluctuation is detected and automatically adjusts the activation/deactivation level.
Stable detection at optimum sensitivity is ensured even if the received light level frequently fluctuates due to dust or water drops.

Manual hysteresis setting feature

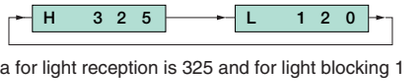
The hysteresis can be arbitrarily set according to the application, allowing setting of a small hysteresis for severe, high-accuracy detection and a large hysteresis for detection of large variation and prevention of chattering.

Timer functions

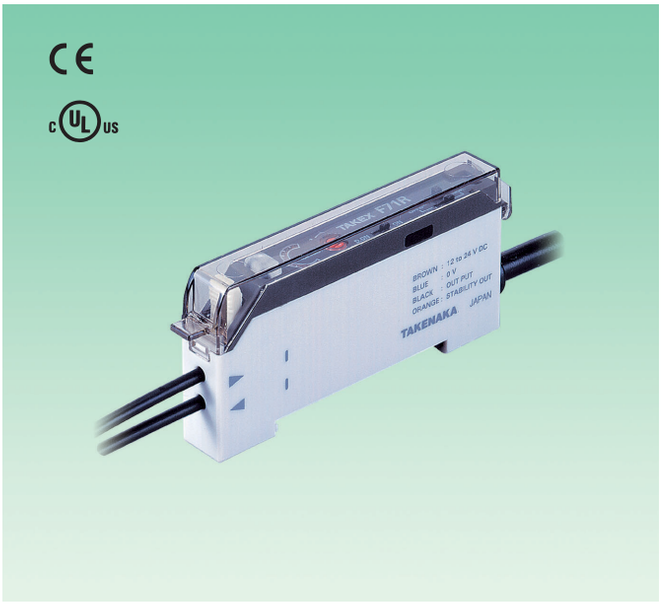
On-delay, off-delay and on-off delay timer functions are provided, which allows for a wide range of detecting and input conditions from the connected devices.
The delay time setting is variable between:
10 ms, 20 ms, 40 ms, 60 ms, 80 ms, 100 ms and 120 ms.

Teach hold function

The sensor has the ability to hold instantaneous data for an object moving at a high rate of speed during full auto teaching. This data is displayed when the teaching has been completed.



(Data for light reception is 325 and for light blocking 120.)



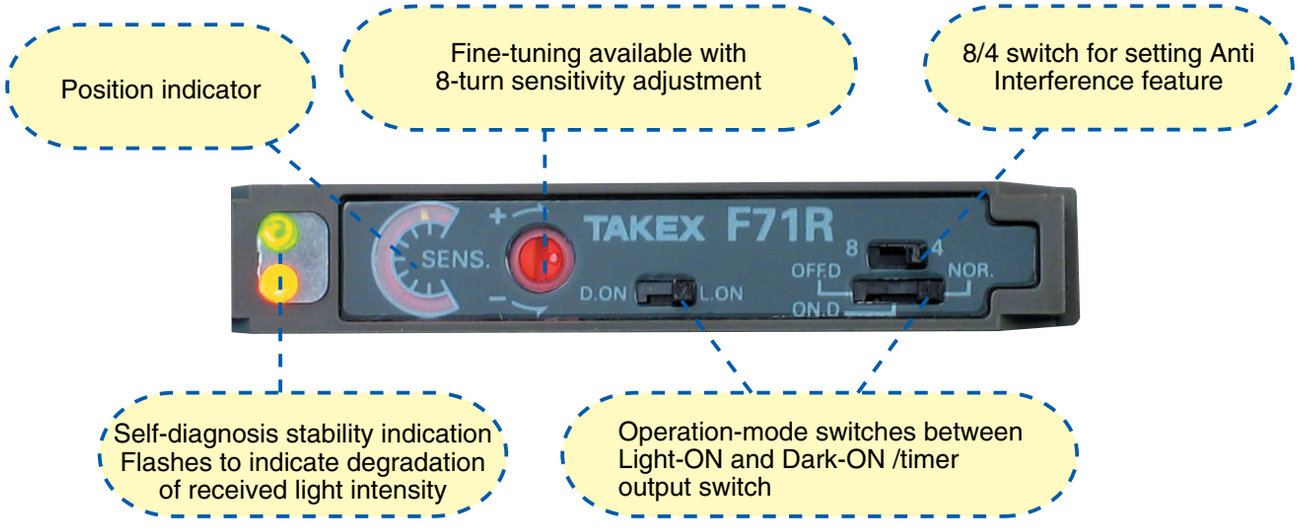
- Adjacent installation of up to 8 units
  - Proprietary Anti Interference feature is used -
- High-accuracy-8-turn sensitivity adjustment
  - Position indicator is provided -
- High-speed response of 30 μs
  - H type sensor -

Variation

Type	Model		Light source	Output mode
	NPN output	PNP output		
Manual setting general-purpose type	**F71R**	**F71RPN**	Red LED	Open collector (NPN/PNP)
	F71G	**F71GPN**	Green LED	
	F71B	**F71BPN**	Blue LED	
	F71W	**F71WPN**	White LED	
Manual setting high-speed type	**F71RH**	**F71RHPN**	Red LED	
	F71GH	**F71GHPN**	Green LED	
	F71BH	**F71BHPN**	Blue LED	
	F71WH	**F71WHPN**	White LED	

Manual high performance model

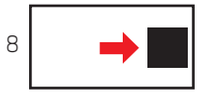
High-accuracy 8-turn adjustment is equipped with a position indicator, which allows direct reading of the adjustment position.



Useful 8-unit detection

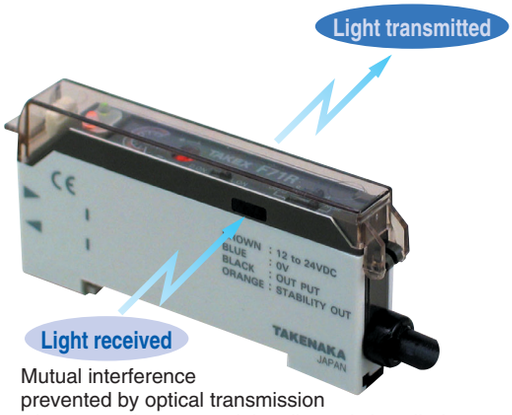
Optical transmission-type Anti Interference feature

The Anti Interference feature prevents false operation due to mutual interference even if up to 8 units are installed adjacently.



Anti Interference for up to 4 sensors (response time: 250 μs)

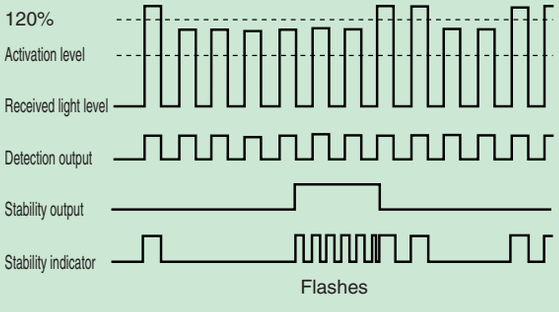
Anti Interference for up to 8 sensors (response time: 500 μs, turbo function enabled)



Mutual interference prevented by optical transmission when more than one unit is adjacently installed.

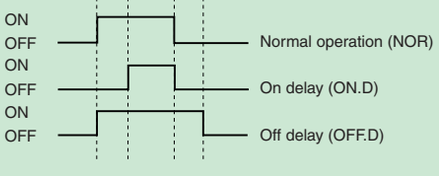
Easy-to-understand stability function

When four consecutive detections with a received light level of 120% or lower of the activation level have occurred, the stability output is activated. At the same time, the stability indicator flashes an alert.



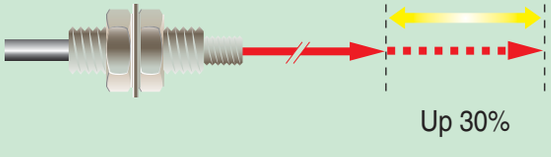
Timer operation

A delay timer of about 40 ms is provided to allow for a range of input conditions of the connected devices.
The timer is also useful for stabilization of detection output such as canceling signal chattering.



Turbo function increases detecting distance by 30%

When it is desirable to increase the detecting distance for the current condition of use, enabling the turbo function allows a distance increase of about 30%.



F70A · F70series

Type

• Amplifier (main unit)

Type	Model		Light source	Output mode	Connection
	NPN output	PNP output			
Digital display general-purpose type	**F70AR**	**F70ARPN**	Red LED	Open collector (NPN/PNP)	Permanently attached cord (M8 connector type also available)
	F70AG	**F70AGPN**	Green LED		
	F70AB	**F70ABPN**	Blue LED		
	F70AW	**F70AWPN**	White LED		
Digital display high-speed type	**F70R**	**F70RPN**	Red LED		
	F70G	**F70GPN**	Green LED		
	F70B	**F70BPN**	Blue LED		
	F70W	**F70WPN**	White LED		

• Fiber optic cable

For different types of fiber optic cables, see pp. 59-.

• M8 connector type

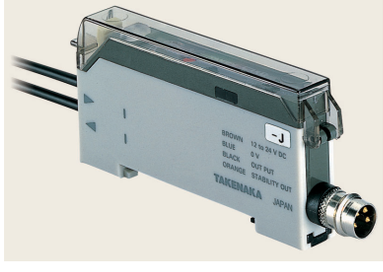
M8 connector connection type is separately available for all models, which is identified by “-J” following the model number. “-JE” and “-JS” are available depending on the input/output specification.

For connector specifications, see p. 23.

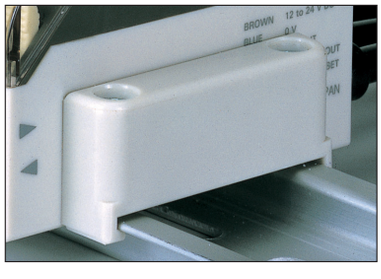
<Type of cords with M8 connector>

・Model：FBC-4R2S (equipped with straight M8 connector and 2-m cord)

・Model：FBC-4R2L (equipped with angled M8 connector and 2-m cord)



End unit



• Optional parts

Type	Model	Description
End unit	**FA7EU**	DIN rail mounting stopper
Mounting bracket*	**AC-BF2**	Amplifier unit mounting bracket

*Accessory

Rating/Performance/Specification

Rating/performance	Model	NPN type	F70AR	F70AG	F70AB	F70AW	F70R	F70G	F70B	F70W
		PNP type	F70ARPN	F70AGPN	F70ABPN	F70AWPN	F70RPN	F70GPN	F70BPN	F70WPN
	Power supply		12-24V DC ±10% / Ripple 10% max.							
	Current consumption	NPN type	39 mA max.							
		PNP type	50 mA max.							
	Output mode	Control output (*) NPN type	Open collector output / Rating: sink current 100 mA (30 VDC max.) / Residual voltage: 1 V or less							
		Control output (*) PNP type	Open collector output / Rating: source current 100 mA (30 VDC max.) / Residual voltage: 2 V or less							
		Stability output (*) NPN type	———				Open collector output / Rating: sink current 50 mA (30 VDC max.) / Residual voltage: 1 V or less			
		Stability output (*) PNP type					Open collector output / Rating: source current 50 mA (30 VDC max.) / Residual voltage: 2 V or less			
	Operation mode		Light-ON/Dark-ON selectable							
	Timer		Off delay/disabled selectable Delay time: 40 ms fixed				On delay/off delay/on-off delay/disabled selectable Delay time: selectable between 10, 20, 40, 60, 80, 100 and 120 ms / Default: 40 ms			
	Response time		Light emission frequency channel 1: 600 μs max. Light emission frequency channel 2: 700 μs max.				Light emission frequency channel 1: 500 μs max. Light emission frequency channel 2: 600 μs max.			
Specification	Light source (wavelength)		Red LED (660mm)	Green LED (525mm)	Blue LED (470mm)	White LED	Red LED (660mm)	Green LED (525mm)	Blue LED (470mm)	White LED
	Indicator		Operation indicator: orange LED / Stability (STB) indicator: green LED							
	Display		LCD display with backlight							
	Switch		2 set buttons / Mode selector switch: RUN/SET				2 set buttons / Mode selector switch: RUN/SELECT/MODE			
	Sensitivity setting		Full auto teaching / Auto teaching							
	Sensitivity setting input		Set button input				Set button input/external input			
	Sensitivity adjustment function		Provided (manual sensitivity adjustment)							
	Functions		• Anti Mutual Interference feature • Short circuit protection feature				• Sensor function: AUTO/TEACH/LOCK • Auxiliary function: S for manual adjustment of sensitivity and activation level H for manual hysteresis setting V for displacement indication and absolute value indication modes • Anti Mutual Interference feature • Self-diagnosis feature • Short circuit protection feature			
	Material		Polycarbonate							
	Connection		Permanently attached cord (outer dimension: dia. 4.8) 0.2sq. 3 core 2 m length				Permanently attached cord (outer dimension: dia. 4.8) 0.2sq. 5 core 2 m length			
			For M8 connector specifications, see p. 23.							
	Mass		Approx. 80 g (including 2-m cord and mounting bracket)							
	Accessory		Mounting bracket / Operation manual							

(*) Avoid the transient condition (0.5 seconds) immediately after power-up for output.

Environmental Specification

Environment	Ambient light	Incandescent lamp: 10,000 lx / Sunlight: 20,000 lx
	Ambient temperature	1-3 adjacent units in operation: −25 - +55 °C 4-10 adjacent units in operation: −25 - +50 °C 11-16 adjacent units in operation: −25 - +45 °C Storage: −40 - +70 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP40
	Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 direction
	Shock	500 m/s² / 3 times each in 3 directions