OMRON
INDUSTRIAL AUTOMATION

FQ VISION SENSOR

Beyond simplicity

» One-touch operation

» Crystal-clear imaging

» Flexible platform

Simply guided & crystal clear

Omron defines a new era of simplicity and performance with the new FQ vision sensor range. Now you can benefit from state-of-the art technology without complex operation instructions or technical know-how. With one-touch control via PC or the intuitive TouchFinder console, you can access all functions and settings quickly and easily.

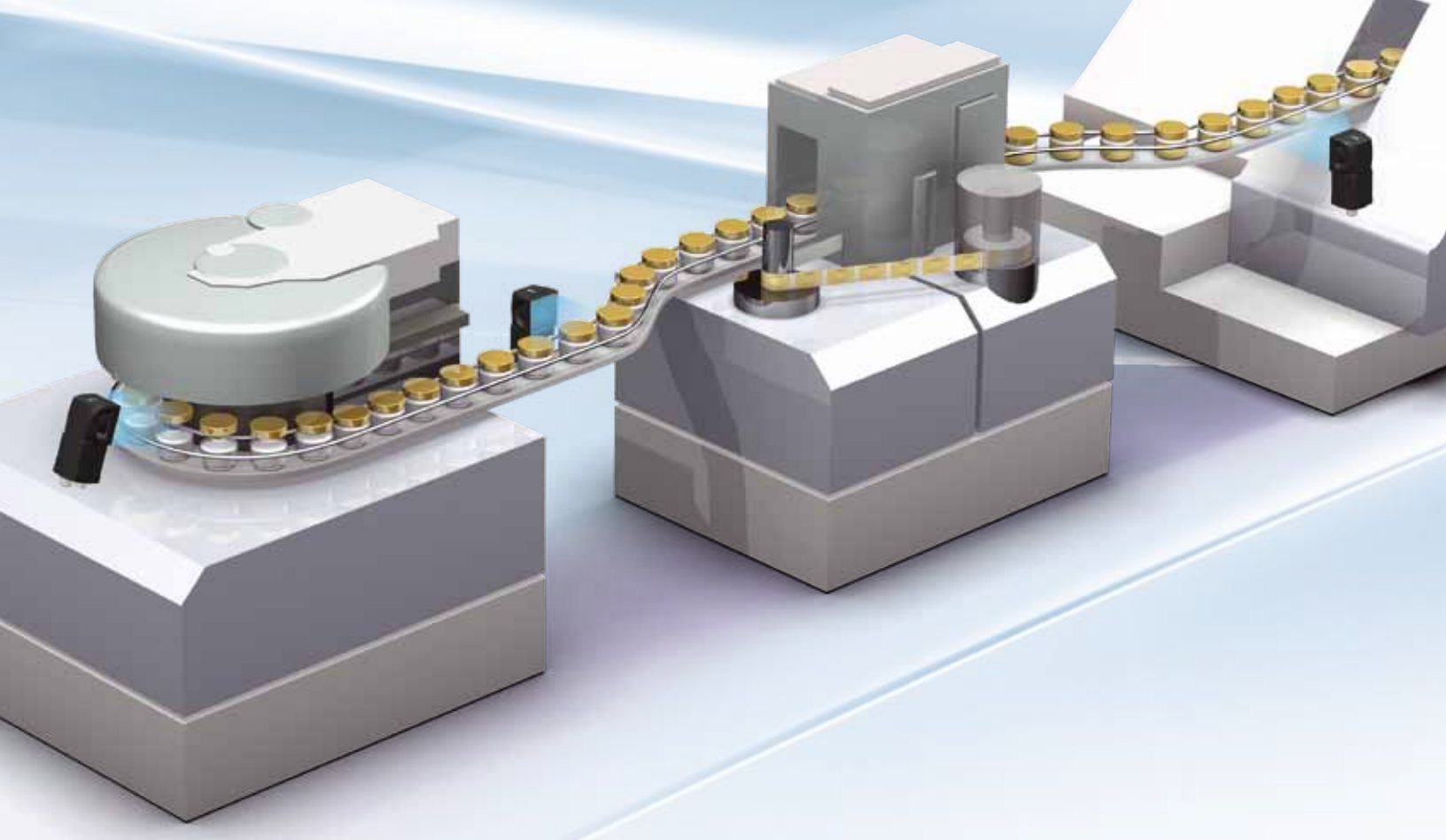
Excellent image quality is achieved from even the most challenging surfaces, with advanced processing tools. And because the FQ Vision Sensor is available in a wide range of models, you won't have to compromise with a choice that has too many or too few features for your needs. So you can be sure of a best-fit solution for your particular application.

Features

- One-touch control via simple, icon-driven menu
- Crystal-clear image quality
- Real Color Processing (16 million colors)
- Operation via PC or handy TouchFinder screen

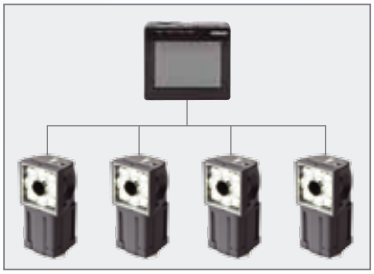
Benefits

- Simple and guided set-up
- Reliable results on any surface
- Remarkable flexibility – always a perfect match and not a compromise for your application



Make it sharp
High performance LEDs and powerful filtering deliver clear images on even the most difficult surfaces.

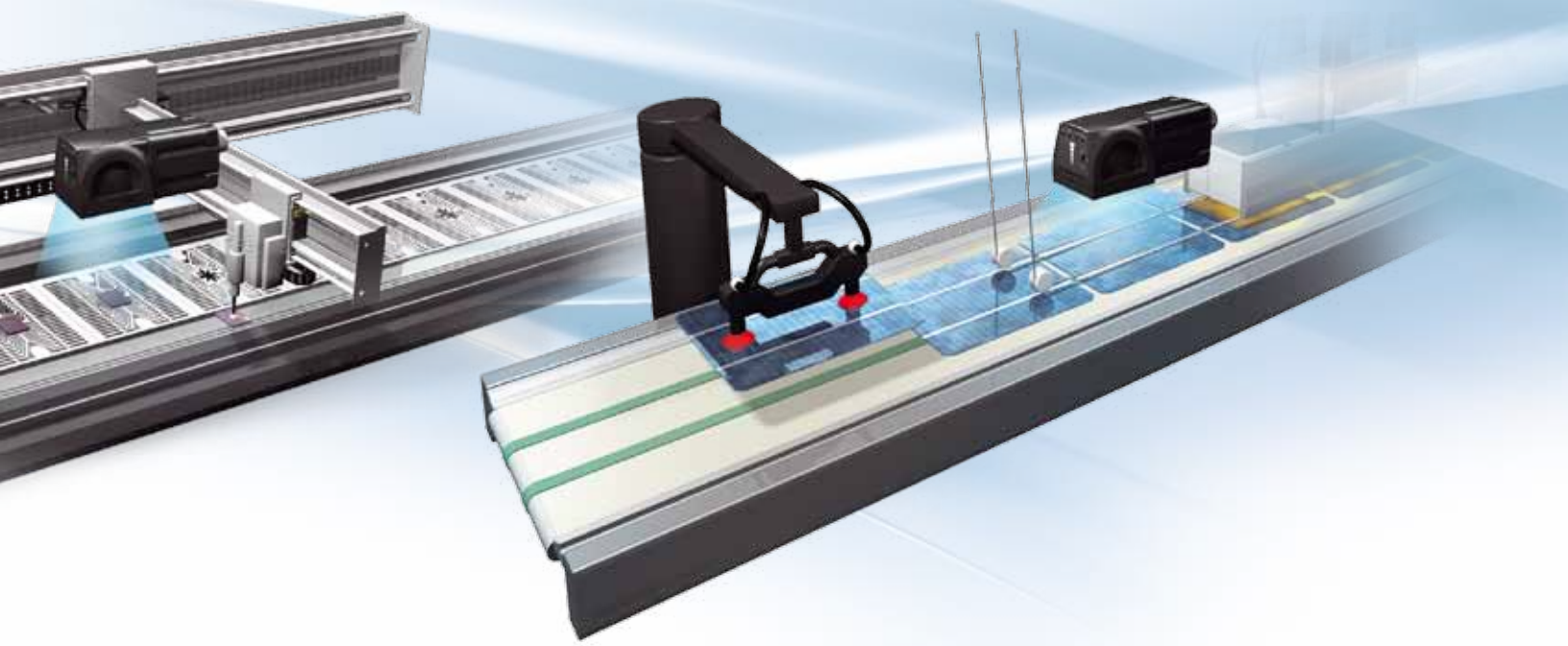
Simple guided
Always know where you are in operation with the simple navigation menu.



Flexible platform
Select the vision sensor that best fits your application and decide how you want to operate it.

Compact and robust

The FQ Vision Sensor is the most compact solution combining a camera and an image processor within one housing. No need for costly and space-consuming external lighting, thanks to the built-in lens and high performance LED. The IP67 protections class enables the FQ to be used even in harsh environments.



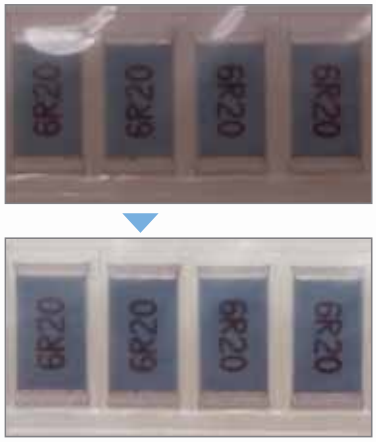
A new benchmark in image clarity

As well as being a landmark in simplicity, the Omron FQ Vision Sensor also gives you the very best in image quality and clarity. For the first time in this class you can now benefit from a range of advanced image capture and processing features. Power LEDs, HDR, polarization and halation filters enable stable inspections on surfaces where conventional vision sensors see nothing. The clear image enables a simple installation, as the angle of view is not critical anymore.

Print industry: multicolor objects

Real color sensing
All RGB gradations (16+ million) are processed directly. No grayscale conversion or color filtering required.

Electrical parts: lowest contrast



High power lighting
Contrast was once a major issue in image processing. With the FQ Vision Sensor however, every image is bright and clear, with perfect contrast for reliable results.

Automotive: shiny and reflective

HDR sensing
Variations in lighting conditions can cause unwanted glare or halation. HDR minimizes these effects, maximizing the stability of inspection results, even countering piece-to-piece variation or misalignment.

Simply the most flexible product of its type

Flexibility meets simplicity in the Omron FQ Vision Sensor, in design, functionality and ease of use. Suitable for all types of processing and packaging applications, it can be tailored to meet even the most demanding requirements, and any operational concept.

You decide how to set-up and configure

- PC or standalone
- Local or remote
- Portable or fixed
- Permanent or temporary

You have full control over the Omron FQ Vision Sensor, including a live image feed. Only connect the Touch Finder console or PC tool when necessary. Choose permanent installation with DIN rails, or the portable version, with rechargeable battery for full freedom of use.

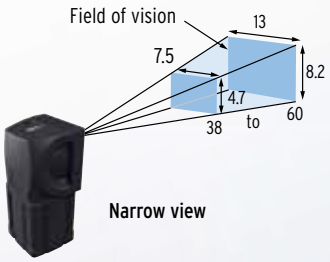
Multi-control – one for all

If your application uses multiple FQ Vision Sensors, they can be linked and controlled via one TouchFinder or PC tool.

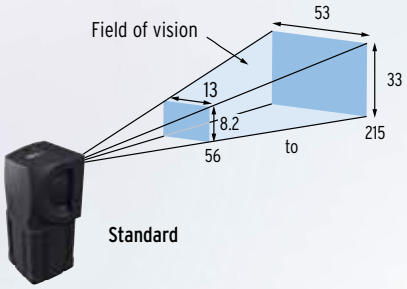
Match your field of view

No matter whether you handle large or small workpieces, the range of Omron FQ Vision Sensors offers a perfect match. Select the FQ model with the appropriate range and adjust the field of view to your application. Focusing is quick and easy too, enabling you to use the sensor for a variety of applications.

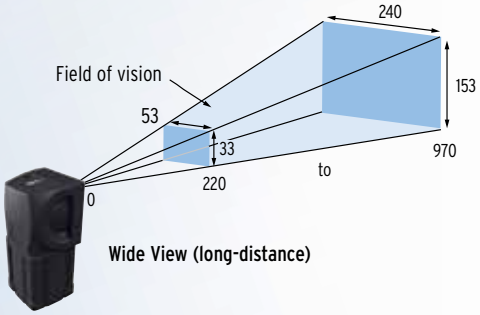
Extensive range: field of view from 7.5 - 300mm.



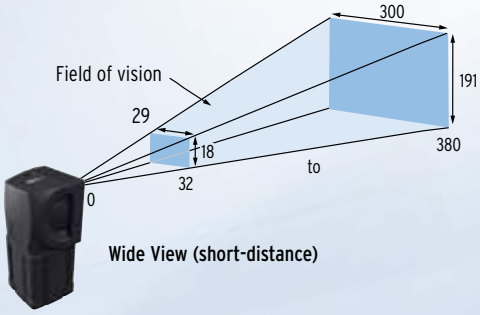
Narrow view



Standard

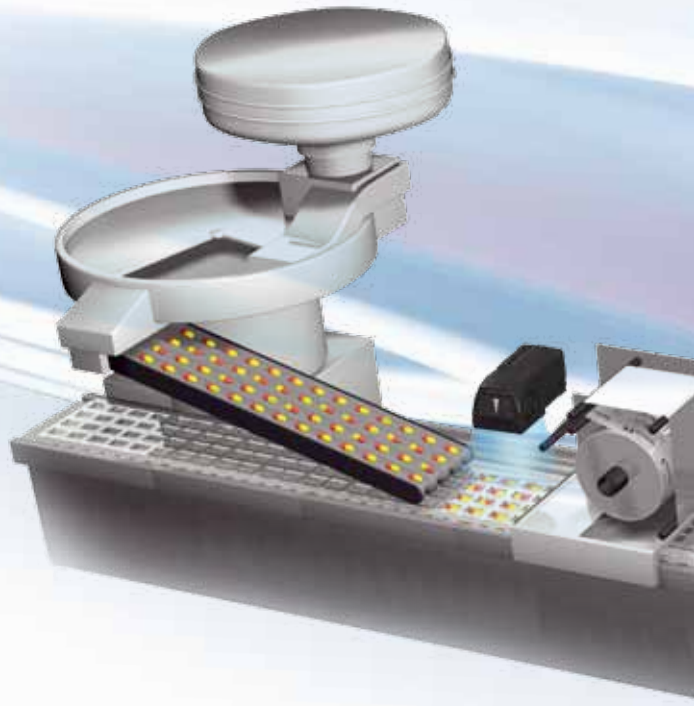


Wide View (long-distance)



Wide View (short-distance)

Guided by simplicity



The FQ Vision Sensor takes you into a new dimension of simplicity and intuitive user guidance. Always know where you are thanks to the innovative navigation menu. You are guided step by step, and will quickly learn how to navigate directly to any set-up item.

Use the powerful auto-functions of the FQ to find the ideal settings. Let the FQ support you through the initial set up and any fine tuning or configuration changes. Users do not need to be experts in image sensors, since the processing intelligence is incorporated in the unit itself.

Various inspection result views are available: overview, detail, trend or distribution. The FQ display options give you the results you need to make informed decisions about your production.

Touch & start – inspection setup

1. Select the inspection item

2. Teach the model

3. Set the thresholds

Get the right results every time, in any format

Overview of results
Display the results of all inspection items in one view. Navigate directly to each result with one touch to see the details.

Trend monitor
See the history of inspection results over time. The trend of the production quality can be easily monitored. Countermeasures can be implemented immediately if quality goes down.

Histogram
Show the distribution of all measurement results, giving you instant overview of overall production quality.

Trouble-free Operation On Site

Real-time Threshold Adjustment

The FQ vision sensor allows fast and easy real-time parameter adjustment.
Eliminating the need to stop the machine for fine tuning and optimisation of settings, resulting in zero machine downtime.

Judgement conditions can be adjusted on the Touch Finder.

Inspection History Logging

Historical results logging is very useful for testing a new line. Samples are fed down the line and inspection results are logged. The logged data can be checked on a time scale in graph form and used to adjust judgement conditions.
File Logging is convenient during operation. Large inspection histories can be saved in SD cards and used later for traceability.

Recent Results Logging

Displays the most recent 1,000 inspection results in graph form.

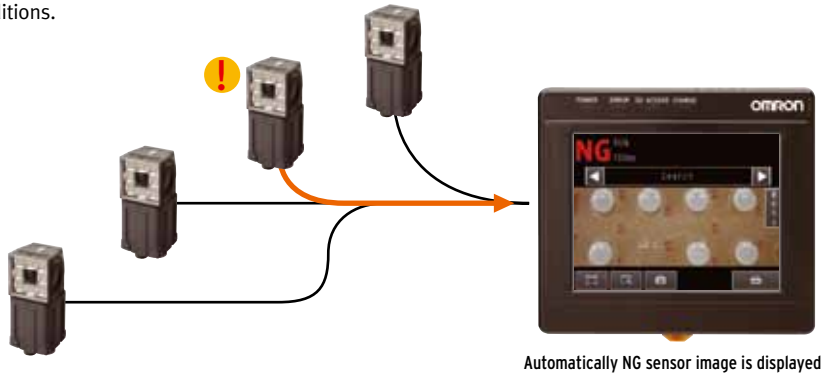
File Logging

SD card

Up to 10 million measurement values or more (for a 4-GB SD card)
Up to 10,000 images or more (for a 4-GB SD card)

Auto Detection

When multiple sensors are connected to the touch finder, the display automatically switches to the image of the sensor which has produced an NG result.
This allows dynamic visualisation of reject conditions.

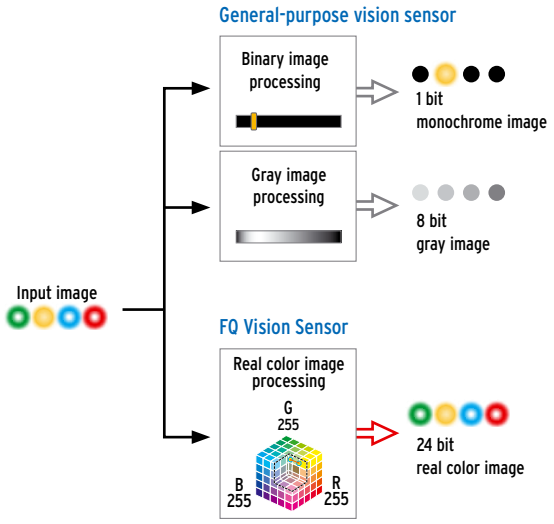


Automatically NG sensor image is displayed !

Authentic Vision Technologies Are Gathered on FQ

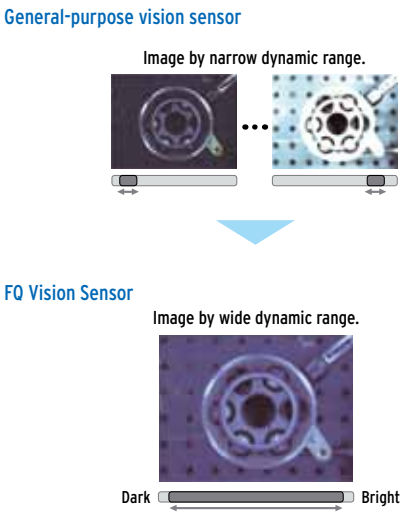
Real Color Sensing

Most vision sensors on the market operate using grayscale image processing, due to the high demand of processing color images. However, many applications may be unsuitable or unstable using grayscale processing due to the requirement of color inspection or poor image contrast.
In order to offer solutions for such issues, the FQ vision sensor combines a high power processor unit and real-color processing technology which enables fast inspections using color images. The same technology is used in Omron's flagship model of vision sensors and is widely utilized throughout industry.



HDR Sensing

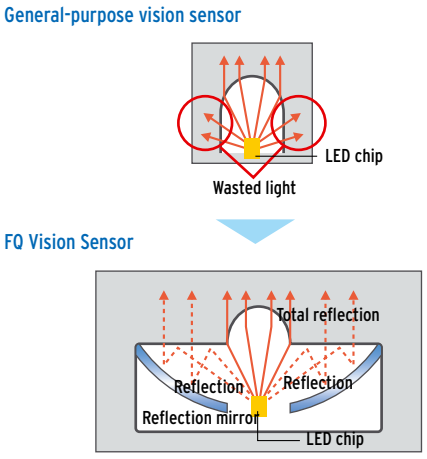
Glossy & highly reflective surfaces can often result in "halation" or uneven brightness across an image, coupled with inconsistent workpiece placement inspections can become unstable and unreliable. Such halation is a result of the narrow dynamic range of standard vision sensors.
The FQ vision sensor uses Omron's High Dynamic Range (HDR) processing technology, which increases the dynamic range of the system upto 16 times that of conventional vision sensors.
The result is stable detection of objects which are highly reflective, even if workpiece placement is not consistent.



High Power Lighting

Providing suitable illumination for inspections can often be the deciding factor between application success or failure. Especially when inspecting large field of views, even and consistent lighting can be difficult to achieve.
In order to handle such issues, a new DR optical system has been developed for the FQ vision sensor. This system effectively uses all of the LED light to maintain consistent brightness across the field of view at four times the brightness of previous models.
The FQ vision sensor also has a polarisation filter, to cut off the specular reflection light which can result from highly reflective objects, resulting in reliable and consistent inspections.

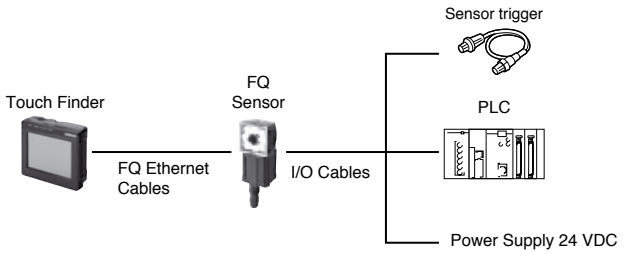
DR optical system : Double-reflection optical system



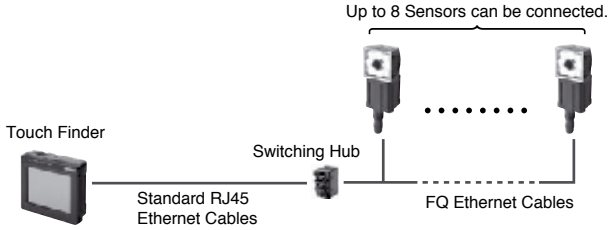
The new DR optical system effectively uses all of the light to achieve four times the brightness of previous models.

System Configuration

Standard Configuration



Multiple Connection



Connect the trigger sensor, PLC, and power supply to each sensor.

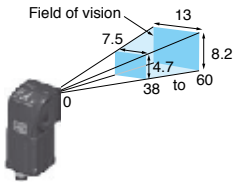
Note: If you register as a member after purchasing a Sensor, you can download free setup software that runs on a PC and can be used in place of the Touch Finder. Refer to the member registration sheet for details.

Ordering Information

Sensor

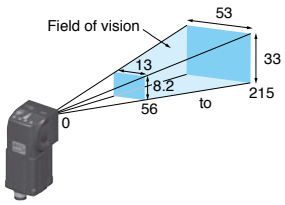
(Unit: mm)

Narrow View



	Single-function models	Standard models
NPN	**FQ-S10010F**	**FQ-S20010F**
PNP	**FQ-S15010F**	**FQ-S25010F**

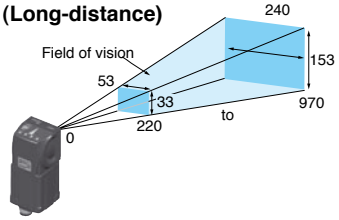
Standard



	Single-function models	Standard models
NPN	**FQ-S10050F**	**FQ-S20050F**
PNP	**FQ-S15050F**	**FQ-S25050F**

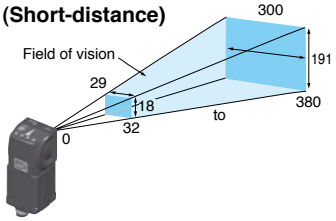
Wide View

(Long-distance)



	Single-function models	Standard models
NPN	**FQ-S10100F**	**FQ-S20100F**
PNP	**FQ-S15100F**	**FQ-S25100F**

(Short-distance)



	Single-function models	Standard models
NPN	**FQ-S10100N**	**FQ-S20100N**
PNP	**FQ-S15100N**	**FQ-S25100N**

Note: Tolerance (field of vision): ±10% max.

Touch Finder

Type	Model
DC power supply	**FQ-D30**
AC/DC/battery	**FQ-D31 (See note.)**

Note: AC Adapter and Battery are sold separately.

Cables (Robot cable)

Type	Cable length	Model
FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC)	2 m	**FQ-WN002**
	10 m	**FQ-WN010**
	20 m	**FQ-WN020**
I/O Cables	2 m	**FQ-WD002**
	10 m	**FQ-WD010**
	20 m	**FQ-WD020**

Industrial Switching Hubs (Recommended)

Appearance	Number of ports	Failure detection	Current consumption	Model
	3	None	0.08A	**W4S1-03B**
	5	None	0.12A	**W4S1-05B**
		Supported		**W4S1-05C**

Accessories

Application	Appearance	Name	Model
For Sensor		Mounting Bracket (enclosed with Sensor)	**FQ-XL**
		Polarizing Filter Attachment (enclosed with Sensor)	**FQ-XF1**
For Touch Finder		Panel Mounting Adapter	**FQ-XPM**
		AC Adapter (for models for DC/AC/Battery)	**FQ-AC□***
		Battery (for models for DC/AC/Battery)	**FQ-BAT1**
		Touch Pen (enclosed with Touch Finder)	**FQ-XT**
		Strap	**FQ-XH**

* AC Adapters for Touch Finder with DC/AC/Battery Power Supply. Select the model for the country in which the Touch Finder will be used.

Plug type	Voltage	Certified standards	Model
A	125 V max.	PSE	**FQ-AC1**
		UL/CSA	**FQ-AC2**
	250 V max.	CCC mark	**FQ-AC3**
C	250 V max.	---	**FQ-AC4**
BF	250 V max.	---	**FQ-AC5**
O	250 V max.	---	**FQ-AC6**

Sensor

Item	Type	Single-function models	Standard models
Model	NPN	FQ-S10□□□□	FQ-S20□□□□
	PNP	FQ-S15□□□□	FQ-S25□□□□
Field of vision		Refer to the table below.	
Installation distance		Refer to the table below.	
Main functions	Inspection items	Search, area, average color, edge position, and edge width	
	Number of simultaneous inspections	1	32
	Position compensation	None	Supported
	Number of registered scenes	8	32
Image input	Image processing method	Real color	
	Image filter	High dynamic range (HDR), polarizing filter (attachment), and white balance	
	Image elements	1/3-inch color CMOS	
	Shutter	1/250 to 1/30,000	
	Processing resolution	752 x 480	
Lighting	Lighting method	Pulse	
	Lighting color	White	
	LED class (See note 1.)	Class 2	
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)	
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)	
Measurement trigger		External trigger (single or continuous)	
I/O specifications	Input signals	7 signals ・Single measurement input (TRIG) ・Command input (IN0 to IN5)	
	Output signals	3 signals ・Control output (BUSY) ・Overall judgement output (OR) ・Error output (ERROR) **Note:** The three output signals can be allocated for the judgements of individual inspection items.	
	Ethernet specification	100BASE-TX/10BASE-T	
	Connection method	Special connector cables ・Power supply and I/O: 1 cable (FQ-WD□□□) ・Touch Finder and computer: 1 cable (FQ-WN□□□)	
Ratings	Power supply voltage	20.4 to 26.4 VDC (including ripple)	
	Current consumption	2.4 A max.	
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gas	
	Degree of protection	IEC 60529 IP67 (with polarizing filter attachment mounted.)	
Materials		Sensor: PBT, PC, SUS Mounting Bracket: PBT Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound I/O connector: Lead-free heat-resistant PVC	
Weight		Depends on field of vision and installation distance. Refer to the table below.	
Accessories		・Mounting Bracket (FQ-XL) (1) ・Polarizing Filter Attachment (FQ-XF1) (1) ・Instruction Manual ・Quick Startup Guide ・Member registration sheet ・Warning Label	

Single-function models		Standard models		Field of view (See note 2.) (Horizontal × Vertical)	Installation distance	Weight
NPN	PNP	NPN	PNP			
FQ-S10010F	FQ-S15010F	FQ-S20010F	FQ-S25010F	7.5 × 4.7 to 13 × 8.2 mm	38 to 60 mm	Approx. 160 g
FQ-S10050F	FQ-S15050F	FQ-S20050F	FQ-S25050F	13 × 8.2 to 53 × 33 mm	56 to 215 mm	Approx. 160 g
FQ-S10100F	FQ-S15100F	FQ-S20100F	FQ-S25100F	53 × 33 to 240 × 153 mm	Long-distance model: 220 to 970 mm	Approx. 150 g
FQ-S10100N	FQ-S15100N	FQ-S20100N	FQ-S25100N	29 × 18 to 300 × 191 mm	Short-distance model: 32 to 380 mm	Approx. 150 g

Note: 1. Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005
2. Tolerance: ±10% max.

Touch Finder

Item \ Type			Model with DC power supply	Model with AC/DC/battery power supply
Item \ Model			FQ-D30	FQ-D31
Number of connectable Sensors			8 max.	
Main functions	**Types of measurement displays**		Last result display, Last NG display, trend monitor, histograms	
	Types of display images		Through, frozen, zoom-in, and zoom-out images	
	Data logging		Measurement results, measured images	
	Menu language		English, German, French, Italian, Spanish, Traditional Chinese, Simplified Chinese, Korean, Japanese	
Indications	**LCD**	**Display device**	3.5-inch TFT color LCD	
		Pixels	320 x 240	
		Display colors	16,777,216	
	Backlight	**Life expectancy** (See note 1.)	50,000 hours at 25ºC	
		Brightness adjustment	Provided	
		Screen saver	Provided	
Operation interface	**Touch screen**	**Method**	Resistance film	
		Life expectancy (See note 2.)	1,000,000	
External interface	**Ethernet**		100BASE-TX/10BASE-T	
	SD card		SDHC-compliant, Class 4 or higher recommended	
Ratings	**Power supply voltage**		DC power connection: 20.4 to 26.4 VDC (including ripple)	DC power connection: 20.4 to 26.4 VDC (including ripple) AC adapter connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery
	Continuous operation on Battery (See note 3.)		---	1.5 h
	Power consumption		DC power connection: 0.2 A	DC power connection: 0.2 A, Charging battery: 0.4 A
Environmental immunity	**Ambient temperature range**		Operating: 0 to 50ºC Storage: -25 to 65ºC (with no icing or condensation)	Operating: 0 to 50ºC when mounted to DIN Track or panel Operation on Battery: 0 to 40ºC Storage: -25 to 65ºC (with no icing or condensation)
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere		No corrosive gas	
	Degree of protection		IEC 60529 IP20 (when SD card cover, connector cap, or harness is attached)	
Weight			Approx. 270 g (without Battery and hand strap attached)	
Materials			Case: ABS	
Accessories			Touch Pen (FQ-XT), Instruction Manual	

Note: 1. This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. The life of the backlight is greatly affected by the ambient temperature and humidity and will be shorter at lower or higher temperatures.
2. This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.
3. This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Battery Specifications

Item \ Model	FQ-BAT1
Battery type	Secondary lithium ion battery
Nominal capacity	1,800 mAh
Rated voltage	3.7V
Ambient temperature range	Operating: 0 to 40ºC Storage: -25 to 65ºC (with no icing or condensation)
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
Charging method	Charged in Touch Finder (FQ-D31). AC adapter (FQ-AC□) is required.
Charging time (See note 1.)	2 h
Battery backup life (See note 2.)	300 charging cycles
Weight	50 g max.

Note: 1. This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions
2. This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

System Requirements for PC tool for FQ

The following Personal Computer system is required to use the software.

OS	Microsoft Windows XP Home Edition/Professional SP2 or higher (See note 1.) Microsoft Windows 7 Home Premium or higher (See note 1.)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space (See note 2.)
Monitor	1,024 x 768 dots min.

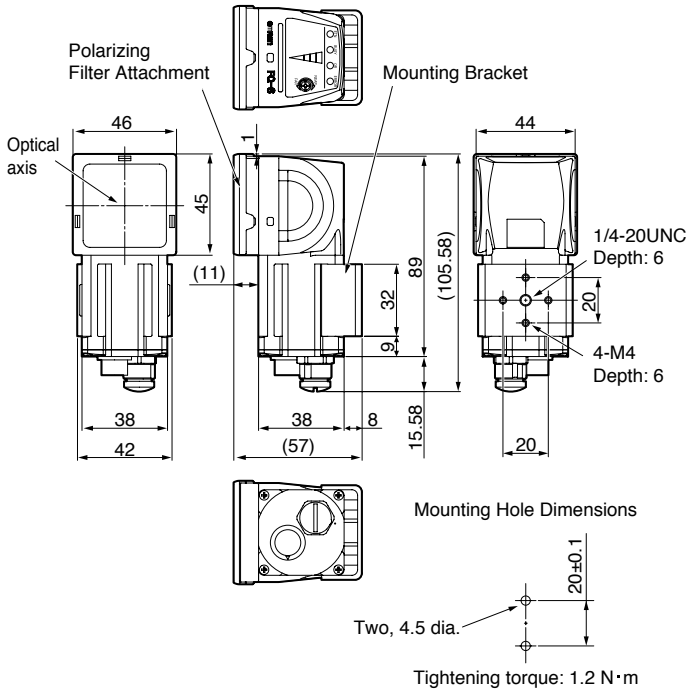
Note: 1. The Japanese and English versions support only 32-bit OS versions.
2. Available space is also required separately for data logging.

Dimensions

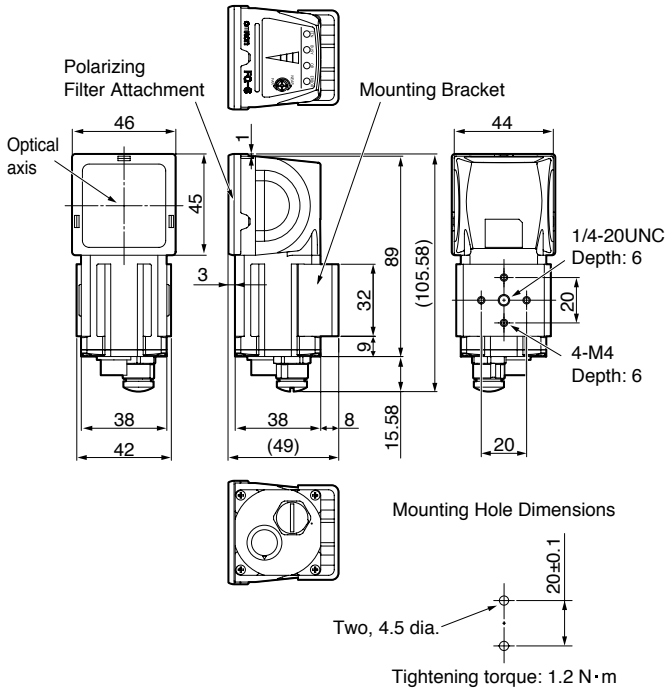
Sensor

(Unit: mm)

FQ-S10010F/-S10050F
FQ-S15010F/-S15050F
FQ-S20010F/-S20050F
FQ-S25010F/-S25050F

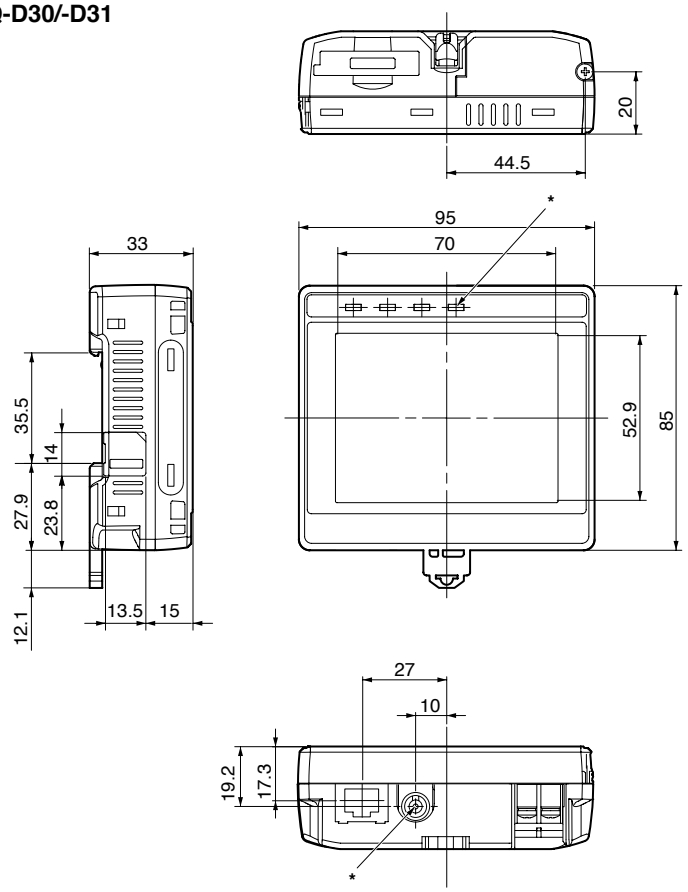


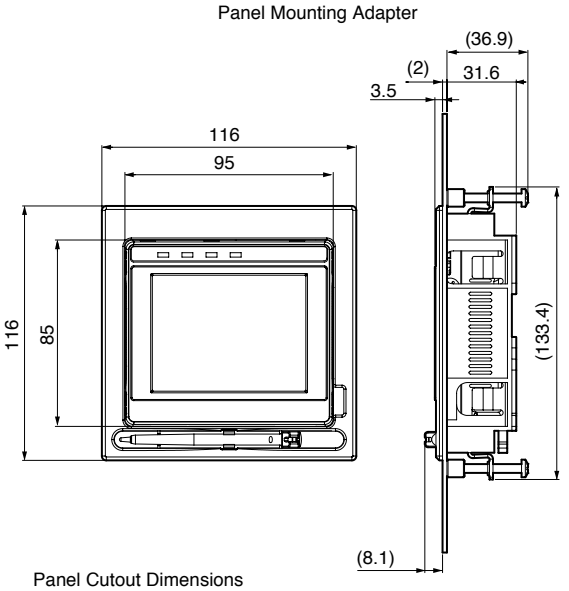
FQ-S10100F/-S10100N/-S20100N
FQ-S15100F/-S15100N/-S25100N
FQ-S20100F
FQ-S25100F

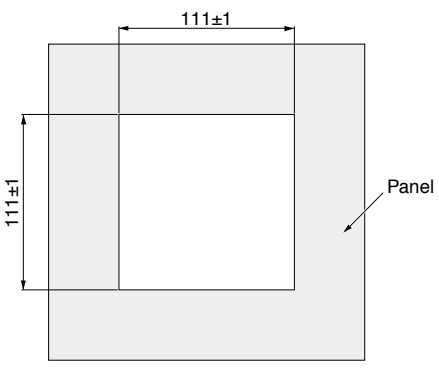


Touch Finder

FQ-D30/-D31







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