

# FQ2 Smart Camera

The New Standard for Image Inspection

New Models with Code Reading  
and OCR with Built-in Dictionary



» Advanced inspection in a compact housing

» Expanded performance and functionality

» Camera, Communications, Software Tools, and Much More

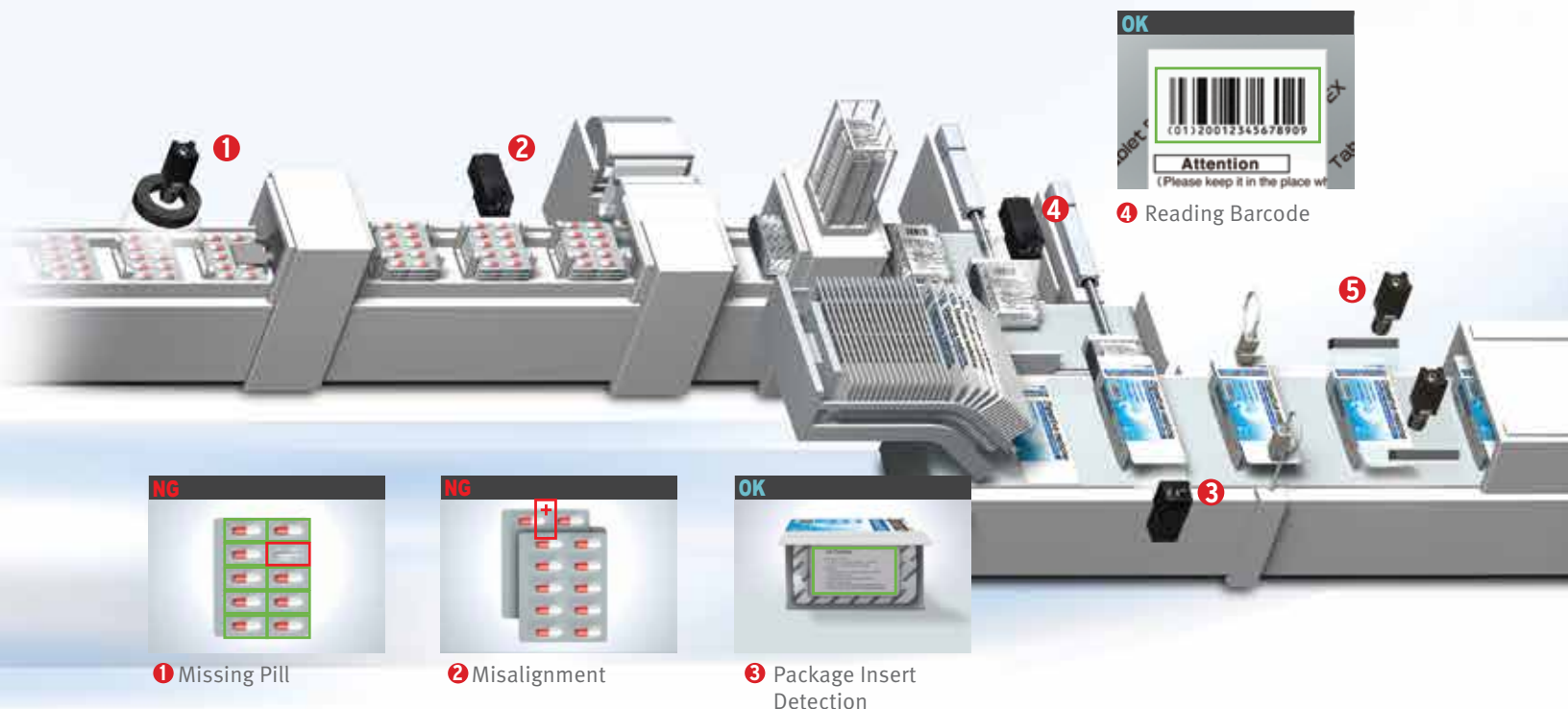
# Introducing the Smart Heavyweight

New Models with Code Reading and OCR with Built-in Dictionary

Flexible inspection capabilities, multiple camera and communication options -- this powerful vision sensor has it all. Omron's FQ2 Series provides all of the best-selling features found in high-end models without the need for a separate controller. This new Smart Camera was designed to solve your toughest inspection challenges.



<b>Code Reader</b>	<b>High-speed</b> image processor	Megapixel capacity	Real color	Monochrome	<b>C</b> -mount	<b>9</b> inspection items	<b>11</b> image filters	<b>32</b> -camera expansion	<b>360°</b> position compensation	<b>Ultra-wide</b> field of view	<b>DAP</b> partial input
<b>OCR</b>	<b>HDR</b>	Sub-pixel processing	High-power lighting	<b>IP67</b>	<b>E-IP</b>	<b>PLC</b> Link	<b>FINS</b>	<b>34 I/O</b> points	<b>RS-232C</b>	Password	Image inversion



# Three Advantages for Effective Machine Design

## Compact Body

### All in One Vision Sensor

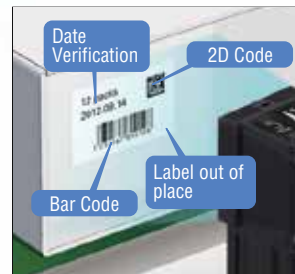
All-in-one compact size that is perfect for use in tight spaces or as an aftermarket option. Compared to more-advanced Vision Sensors with multiple components, this Sensor boasts a much more efficient hardware design.



## Extended Functions

### Image Sensor, OCR, and Code Reader in One

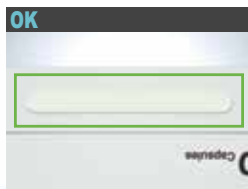
The OCR function adds to the sensing solution and provides a powerful upgrade. It features a "built-in" dictionary ability to recognize 15 Code types.



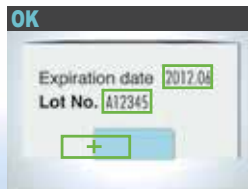
## Diverse Lineup

### A Lineup That Fits a Wide Range of Applications

Expanded inspection menu, camera variations, and communication interfaces. With a wide range of sensors, an option for every application now becomes a standard option.



5 Hot-melt Detection



6 Date Verification and Tape Detection



7 Reading Barcode



# All You Need is One

## Combined Lighting, Controller and Communications

### Image Processor

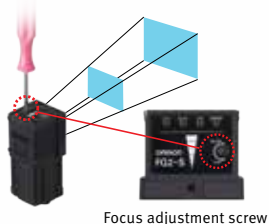
Although previous Vision Sensors placed the image processor in a separate Controller, now we have built the processor into the camera unit.

### High-power Lighting

Built-in high-power lighting capable of evenly lighting across a wide field of view. Providing sufficient lighting even when the polarizing filter is used.

### Adjustable Lens

The focus of the lens can be adjusted for the specific field of view and installation distance you need.



### I/O Power Supply Connector

The external output line for inspection results, the input line for changing the setup, and the power supply line are all combined into one connector.

### Ethernet Connector

Commands can be input from a PLC to control the FQ2, and inspection results and measurement results can be output from the FQ2 to a PLC. You can also transfer images to a computer.



### IP67 Water Resistance



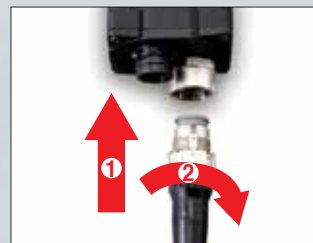
The sensor can be used in wet environments.

### Flexible Cables



All cables from the camera are flexible. This allows the sensor to be used safely on moving parts.

### Smart Click Connectors



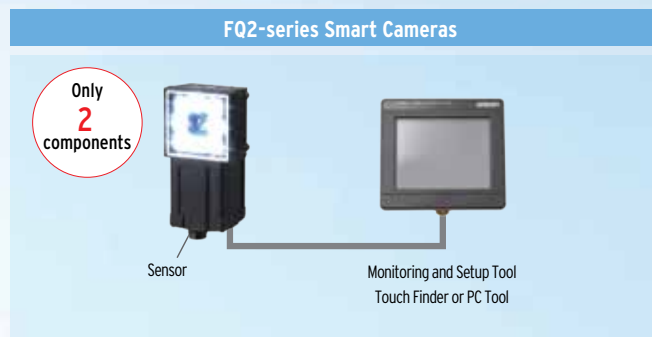
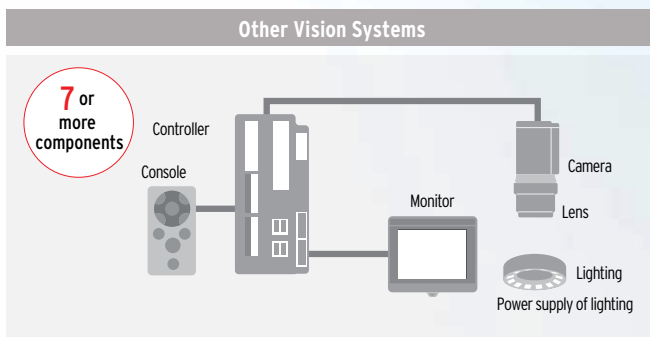
Connection is made quick and easy with a clear, definitive click-into-place mechanism.



# Quick and Easy Design and Installation

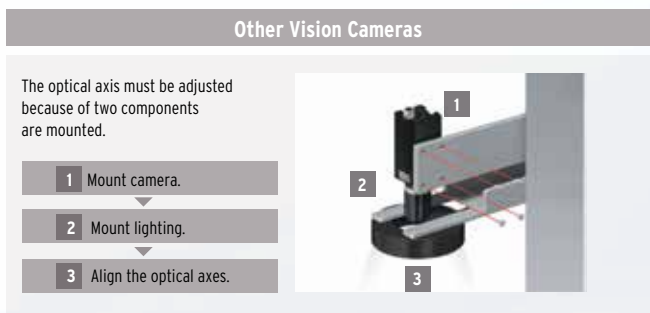
## Easy Product Selection

All you need to do is select the camera based on the field of view and installation distance that you require. There is no need to select and purchase additional lighting or lenses. Furthermore, the time required to wire everything has been drastically reduced due to the low number of components.



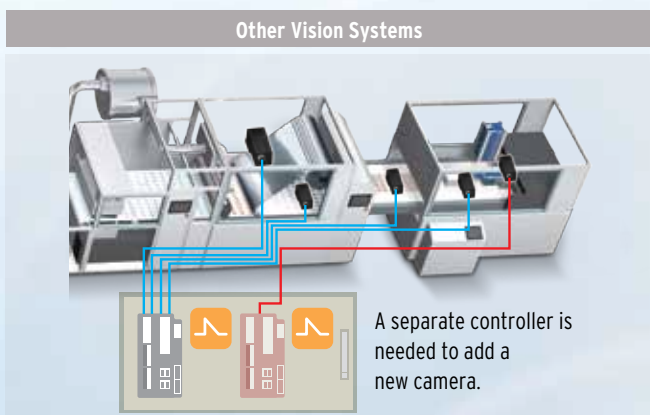
## Easy Installation

The camera and lighting have been integrated into a single unit, so only one camera mounting bracket is required. The sensor comes with a multi-directional mounting bracket that can be attached on any of the four sides of the camera. Axis alignment is not required because the lighting and the camera are integrated into a single unit.



## Easy Expansion Up to 32 Cameras

Simply install the cameras where you need them, when you need them. No control panels are required to house the controllers. Triggers can be input for each camera, so new cameras can be added whenever required without having to worry about timing input design. Up to 32 cameras can be set up from a single Touch Finder without adding new monitors when you need more cameras.



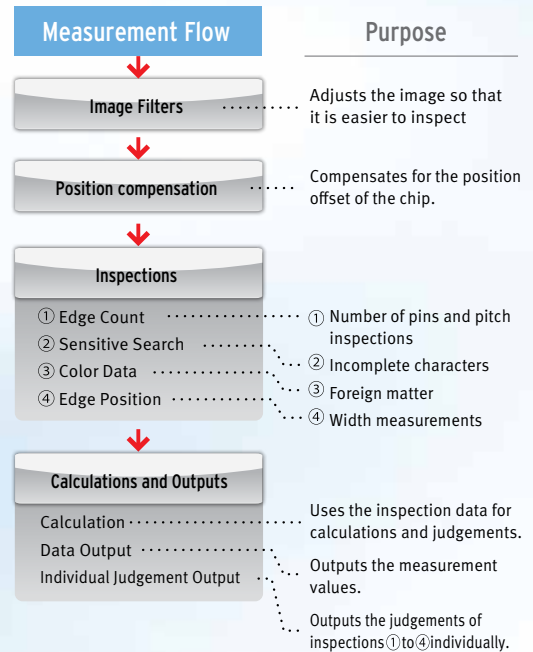
# Easily Perform Both Inspection and Positioning

You can combine multiple inspection items to perform external inspections, positioning, and other tasks all from a single Sensor.

## External Inspection

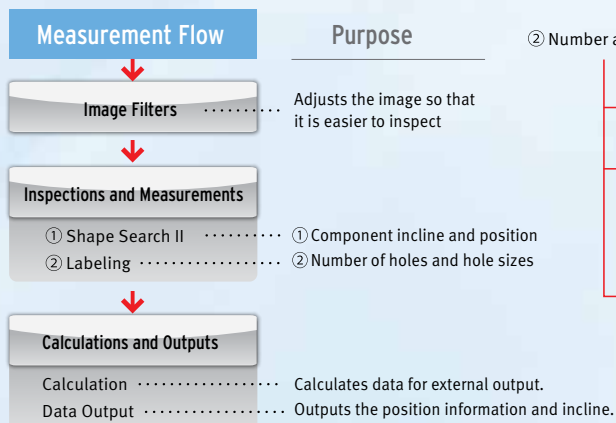
External inspection of ICs can be completed with a single Sensor.

The position offset of the entire pallet before inspection can be adjusted on the image itself, which reduces the amount of work required to increase mechanical positioning accuracy.

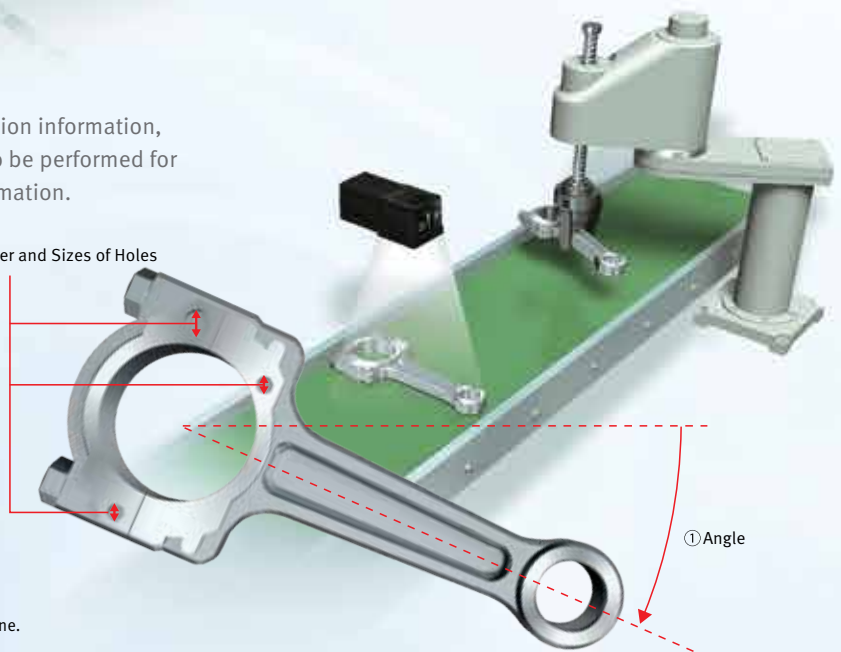


## Component Positioning

The Sensor can measure angles of rotation and other position information, so it can also be used for positioning. Inspections can also be performed for the number and size of holes along with the position information.



② Number and Sizes of Holes

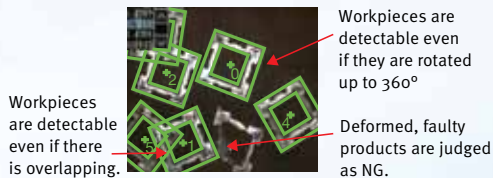


# Incorporating the Best - Inspection Tools from the High-end Vision Systems

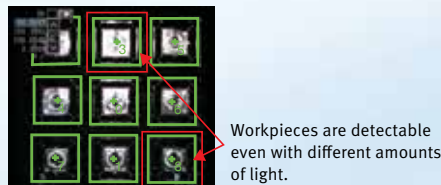
## Search Tools

### Shape Search II Ten Times Faster Than Previous Searching

General searches have a difficult time with overlap or 360° rotation, but this Sensor achieves high-speed, stable searching of any shapes that match the model.

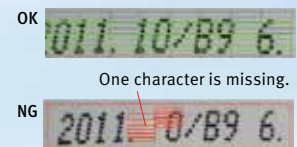


Multiple searches can be performed simultaneously, which enables the inspection of the number of items in a pallet or picking applications.



### Sensitive Search

Through automatic division and matching of the model image, tiny differences that cannot be detected with a normal search can be detected with large numerical differences.



## Search Tools

### Search

This is a standard search inspection item. This type of search is used to detect items like labels, identify shapes, or positions.



Detection of Promotional Stickers

## Edge Tools

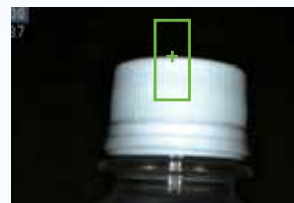
### Edge Pitch

The number of edges in a region can be counted.



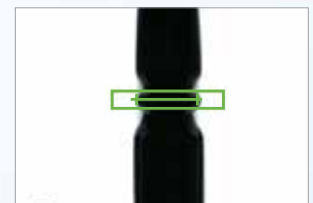
### Edge Position

This inspection item detects edges and measures their positions.



### Edge Width

This inspection item measures the width between edges.



## Area and Color Tools

### Labeling

This inspection item counts how many labels there are of the specified color and size and measures the area or center position of the specified label.



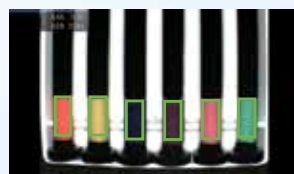
### Area

This inspection item measures the area and center position of the specified color.



### Color Data

Inspections can be performed that compare the difference in color between the workpiece and a registered image of a good product to detect objects and foreign matter.



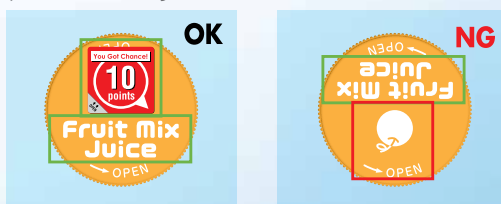
You can also inspect for defects and foreign matter by looking at the color deviation. (Referenced from original sample.)



## Utility Items

### 360° Rotational Position Compensation

Inspections for products with inconsistent position can easily be corrected. Compensation of the placement of inspection regions simplifies the manufacturing process with the ease of product tracking.



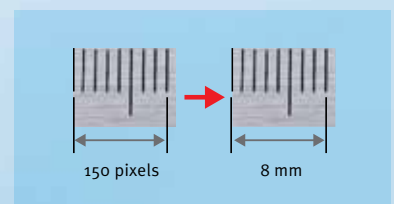
### Image Filters

A total of 11 different image filters are provided, including background suppression to help eliminate patterns that can result in unstable measurements.



### Calibration

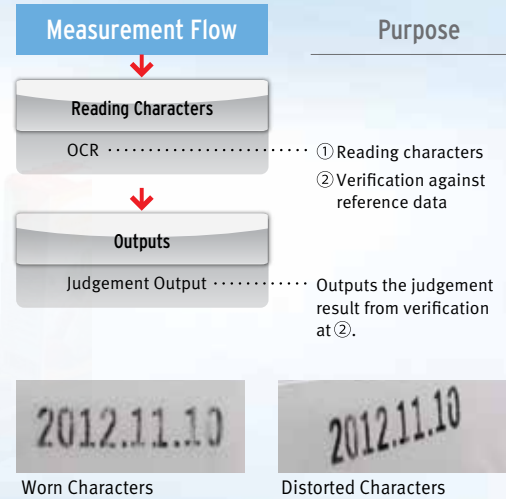
Pixel unit measurement can be converted to user units for the dimensions of a workpiece, providing a user display that is easy to understand.



# New OCR Method without Character Registration into a Dictionary

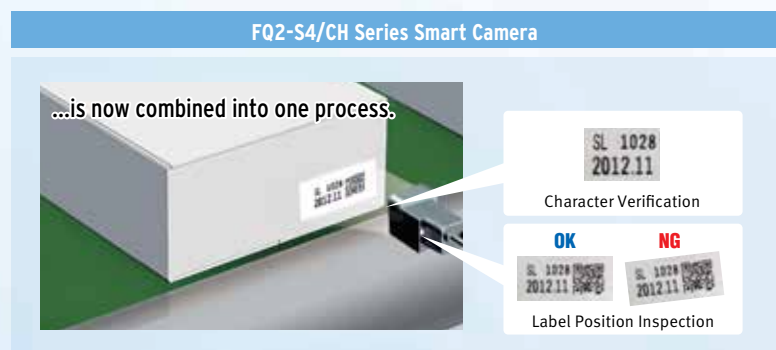
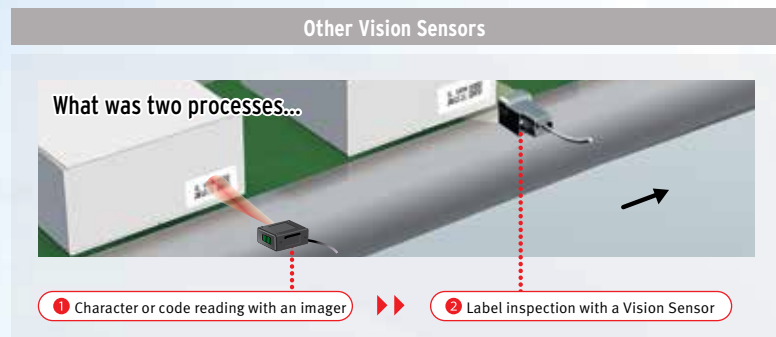
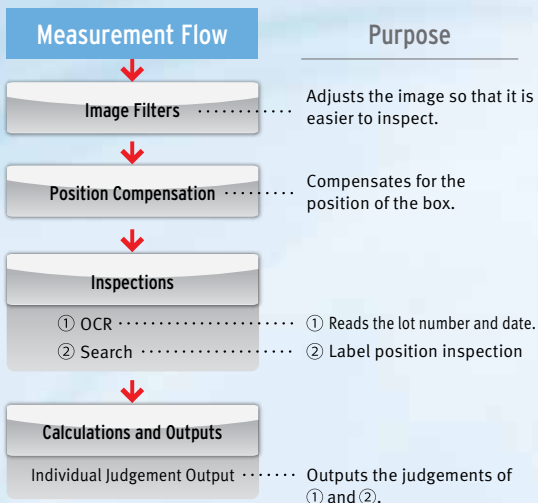
## Date Verification

Even if printing is distorted or unclear due to conveyor line conditions, a unique reading method with a built-in dictionary enables stable reading of characters.



## Character Verification and Label Position Inspection

Although previously performed as separate processes, character verification and inspections can now both be performed with one FQ2 Sensor. This helps you reduce costs and save space.





## OCR with Built-in Dictionary

### OCR

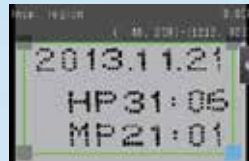
The built-in dictionary contains approximately 80 different fonts that are used on the factory floor. Variations for worn characters, blurred, distorted, different backgrounds, and size changes have been included to enable stable and highly accurate readings. It is not necessary to set parameters to compensate for character contrast or positional offsetting.

#### Conventional OCR

Time is required for character registration into the dictionary.

#### Built-in Dictionary

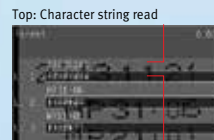
① Draw boxes around characters.



Up to four lines can be read.  
The following characters can be read.

- Letters of the alphabet: A to Z (uppercase)
- Numbers: 0 to 9
- Symbols: '- . : /

② Set the character formats.



The character format is displayed from the read results. Set the character format according to the format of the characters to read.

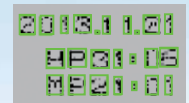
- Letter: \$
- Number: #
- Symbol: @
- Not read: \*
- Number or letter: ?

③ Press the TEACH Button.

TEACH

The character extraction conditions are automatically adjusted according to the conditions of the printed characters.

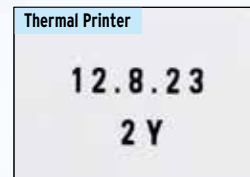
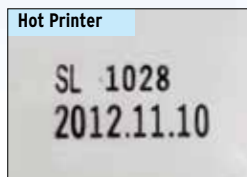
Reading is started.



Different printers use different printing methods.

Characters from most printers can be read, including dot and impact printers.

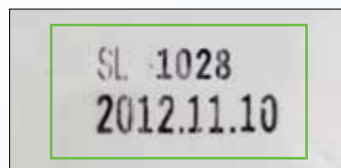
Handles Approx. 80 Fonts



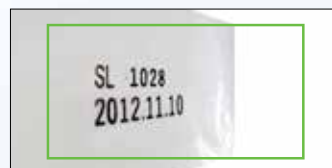
Worn and inclined characters cannot be read.

Unique recognition technology enables stable readings of worn out or distorted characters.

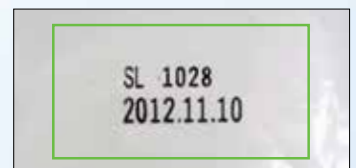
Worn Characters



Inclined Characters



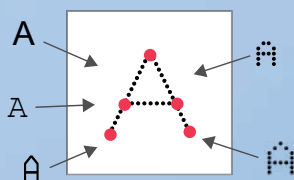
Small Characters



## New OCR Tool: Character Matching with Structural Models

In some applications it is required for image matching methods, but thanks to the structural model matching of specific characteristic points there is no need for character registration.

Structural models record the characteristics of each character in approximately 80 fonts.

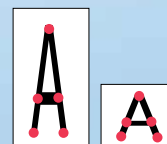


The position and the structure of characteristic points are used to recognize characters.

Background Changes



Size and Font Changes



Worn Characters



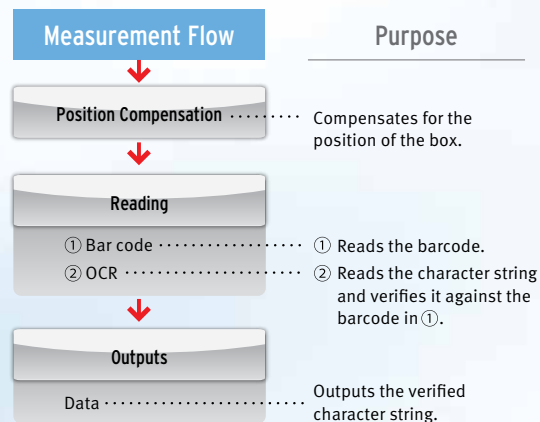
Inclined Characters



# Capability to Read Any of 15 Code Types from Paper Labels to Direct Marking

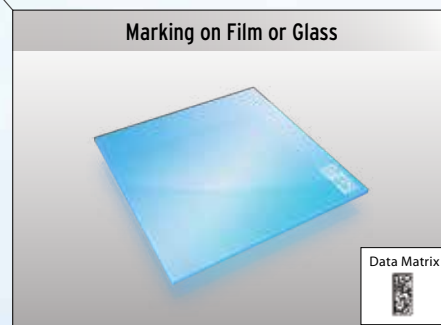
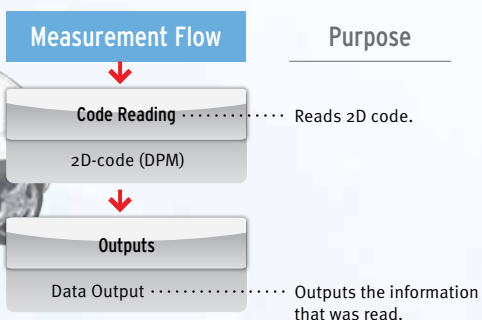
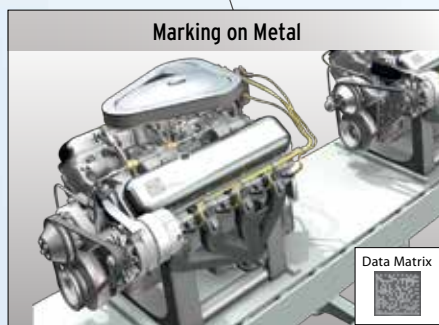
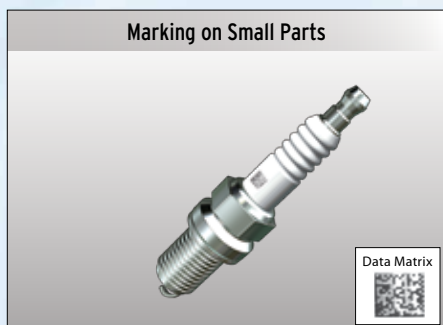
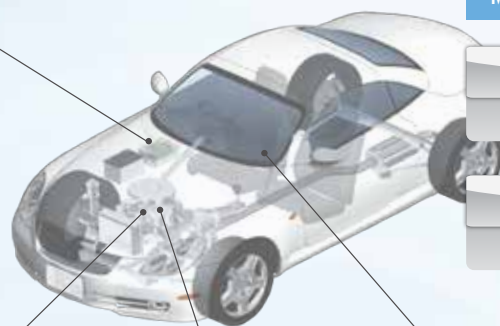
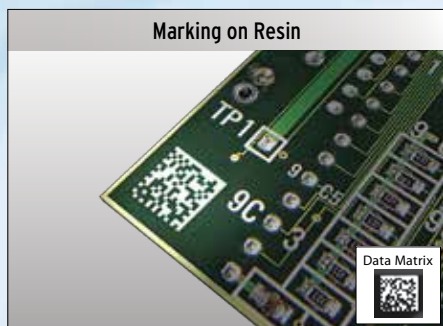
## Code and Character Verification

OCR and Code Reading inspection items can be combined to read codes and verify them against character strings all within the FQ2. No programming of external devices is required.



## Reading Direct Marking Codes

It is common to manage information by using direct marking codes on products. However, differences in materials often causes instability when reading the printed characters. The FQ2 achieves stable reading with unique functionality designed just for DPM (Dot Peen Marking).



## Paper Labels

### Barcodes

The FQ2 can read the main nine types of barcodes. Additionally, the FQ2 can be used in pharmaceutical applications, where verification of barcodes and characters is required.



JAN/EAN/UPC	Code39	Codabar (NW-7)
ITF (Interleaved 2 of 5)	Code93	Code128 / GS1-128
GS1-DataBar	GS1-128 Composite Code	Pharmacode

### 2D Codes

The FQ2 can read the main six types of 2D codes. You do not need to use more than one code reader even for processing that combines different types of codes.



Data Matrix	QR Code	Micro QR Code
PDF417	Micro PDF417	GS1-DataMatrix

## Direct Marking

### 2D DPM (Dot Peen Marking) Codes

When 2D codes are printed on metal, substrates, glass, or other materials, the printed 2D codes can be inconsistent. Even with these difficult-to-read codes, the FQ2 is equipped with filters and retry processing designed just for DPM to allow you to easily and stably read the codes.



Data Matrix(EC200)      QR Code

#### • Types of Filtering

In order to achieve stable readings you can remove printing irregularities and noise by applying up to three of the four unique filters developed by OMRON.

Smooth	Smooths the image.
Dilate	For white codes, increases the cell size. Effective for reading codes with cell spreading.
Erosion	For white codes, reduces the cell size. Effective for reading separated dot codes.
Median	Removes noise.

#### • Combining Filtering

Erosion and dilation can be combined to connect dots without changing the dot thickness.



#### • Retry function

Code readers must overcome environmental and poor printing conditions that cause unstable readings. The FQ2 has a retry function that retries readings by changing the exposure time and other reading conditions.

#### 1 Retrying the Specified Number of Times with the Same Conditions

Reading is performed for the specified number of times for the same scene.



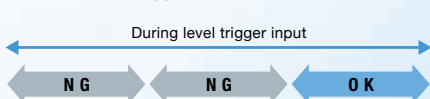
#### 3 Retrying While Changing the Shutter Speed

Reading is performed for the same scene while changing the exposure time in stages.



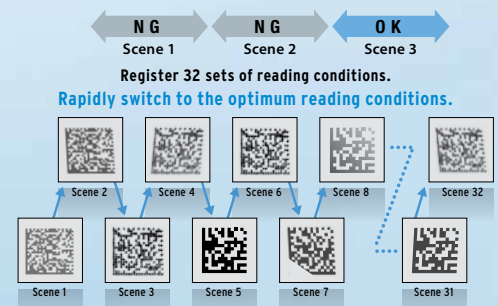
#### 2 Retrying While External Trigger Is Input

Reading is performed until successful, as long as an external level trigger is input.



#### 4 Retrying While Changing the Reading Conditions

When reading DPM codes, inconsistencies in printing conditions can result in NGs if reading is performed with only one set of reading settings. The FQ2 allows you to register up to 32 sets of reading conditions as scenes and retry reading while changing the scenes in order. The system automatically determines the scenes with the highest usage rates and changes the order to start with them to flexibly handle changes in reading conditions. Of course you can specify a fixed order if required.



# A Lineup That Fits a Wide Range of Equipment

## Sensors

We offer a diverse lineup of Sensors so that you can choose the one with the perfect field of view and installation distance for your needs.

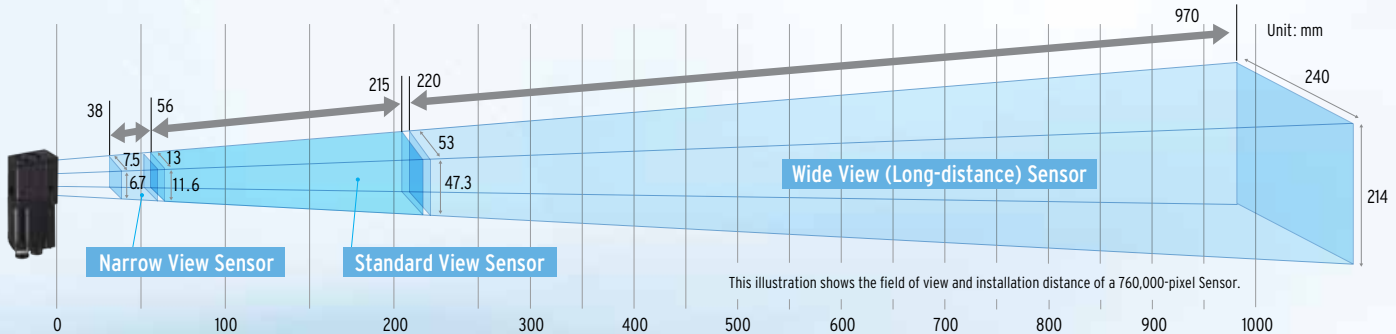
### Integrated Sensor



Monochrome

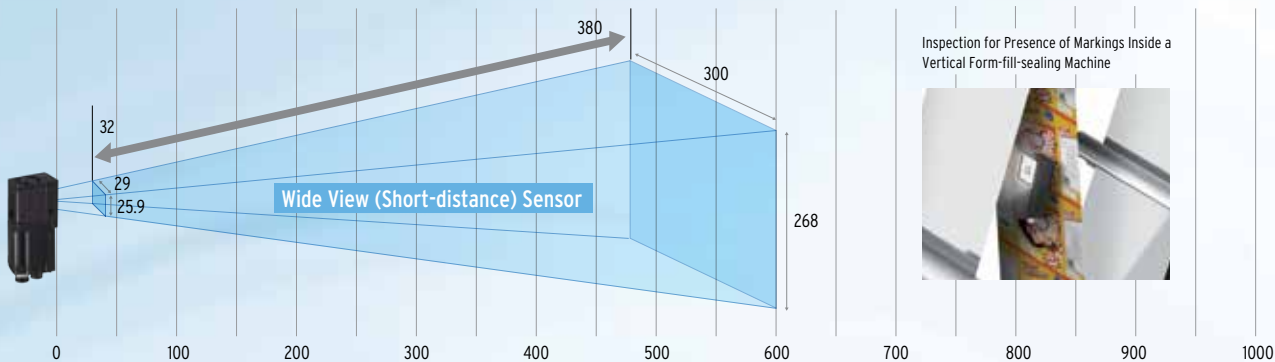
#### • Seamless Field of View Variations

All-in-one Sensors tend to be limited in field of view variations, but we offer a lineup ranging from 7.5 mm up to 240 mm to meet your needs.



#### • Wide View Sensors -- Perfect for Tight Spaces

A side-view wide-angle camera takes images and performs inspections across a wide area, even if the camera is close to the workpiece. Perfect for mounting the sensor in locations with limited space. This also enables the Sensor to be installed alongside an assembly line without protruding in order to perform inspections from the side of the conveyor belt.



Inspection for Presence of Markings Inside a Vertical Form-fill-sealing Machine



### Sensors with C-mount lens



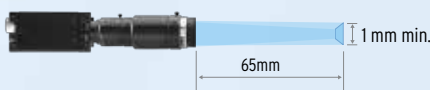
Monochrome

The Sensors with C-mount lens enable freedom of lens selection for long distances over 1 m and narrow fields of view under 1 mm that are not covered by our integrated Sensors. This type of Sensor is also useful when you want to use external illumination.

#### Long Distance



#### Narrow Field of View



Note: A commercially available telecentric lens is required for narrow field of view applications.

#### Lighting Examples

##### Backlighting



External Shape Inspections

##### Low-angle Lighting



Defect and Foreign Matter Inspections



# Communication Interfaces

The Sensor includes communication interfaces to connect with a wide range of host devices. Saving setup time for communications between the sensor and the PLC.

## PLC Link

PLC link greatly reduces the amount of time and work required to create ladder programs.

## FINS

OMRON's exclusive FINS/TCP communications interface can be used to connect to low-cost OMRON PLCs. With this communications interface, no communications controls are required to process the sending and receiving of complex TCP packets. You get faster, simpler connections to OMRON PLCs.

## EtherNet/IP

EtherNet/IP communications enable simple and easy connections to a wide range of EtherNet/IP devices, including OMRON PLCs.

## I/O Expansion Units

Our expansion units enable expansion of up to three times the number of I/O points. This enables the output of individual judgement results for each inspection.

## RS-232C Communications Unit

This Sensor Data Unit supports standard RS-232C communications.

Note: The type of communications interface depends on the model of the Sensor. Refer to page 22 for details.

### Compatible Models

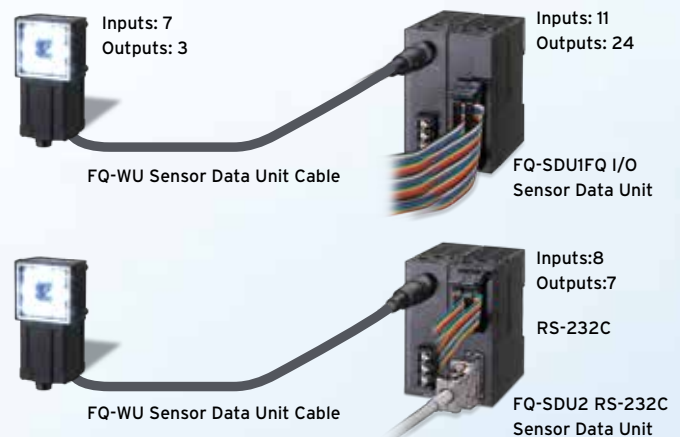
OMRON PLCs: CS, CJ1, CJ2, CP1 and NSJ Series  
Mitsubishi Electric: Q Series

### Compatible Models

OMRON PLCs: CS, CJ1, CJ2, CP1 and NSJ Series

### Compatible Models

OMRON Machine Programmable Controllers: NJ Series  
OMRON PLCs: CS, CJ1 and CJ2 Series



# Setup Tools

We provide two tools for configuration and monitoring of inspection images: the Touch Finder, which can be used onsite to change settings and which can be installed on a control panel, and the Touch Finder for PC software which is Windows XP/7 (32/64 bit compatible).

## Touch Finder

This is a small monitor with a touch panel. It's durable, rugged design is shock-resistant and portable. It has passed our standard 1.3 m drop test.

## PC Tool

Emulates TouchFinder functionality on a PC.



### On-screen Messages in Nine Languages

- English
- Traditional Chinese
- Simplified Chinese
- Korean
- Japanese
- German
- French
- Italian
- Spanish

# Hardware Advancements

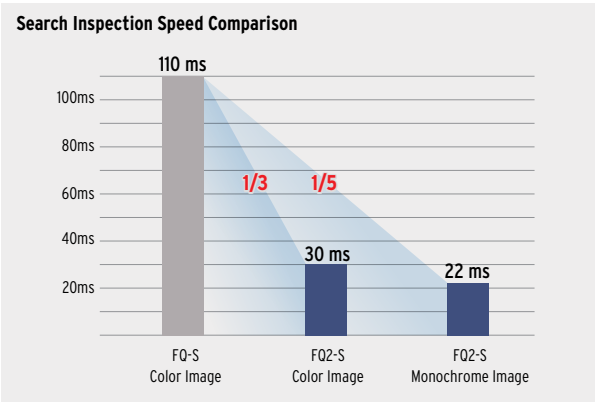
## High-speed Image Processor

3X Faster than Previous Models

### 600 mHz Processor provides faster throughput times!

With our new high-speed image processor we are able to achieve a processing time of 50 ms or less for all primary inspection items.

\* Processing may take longer than 50 ms depending on the settings.

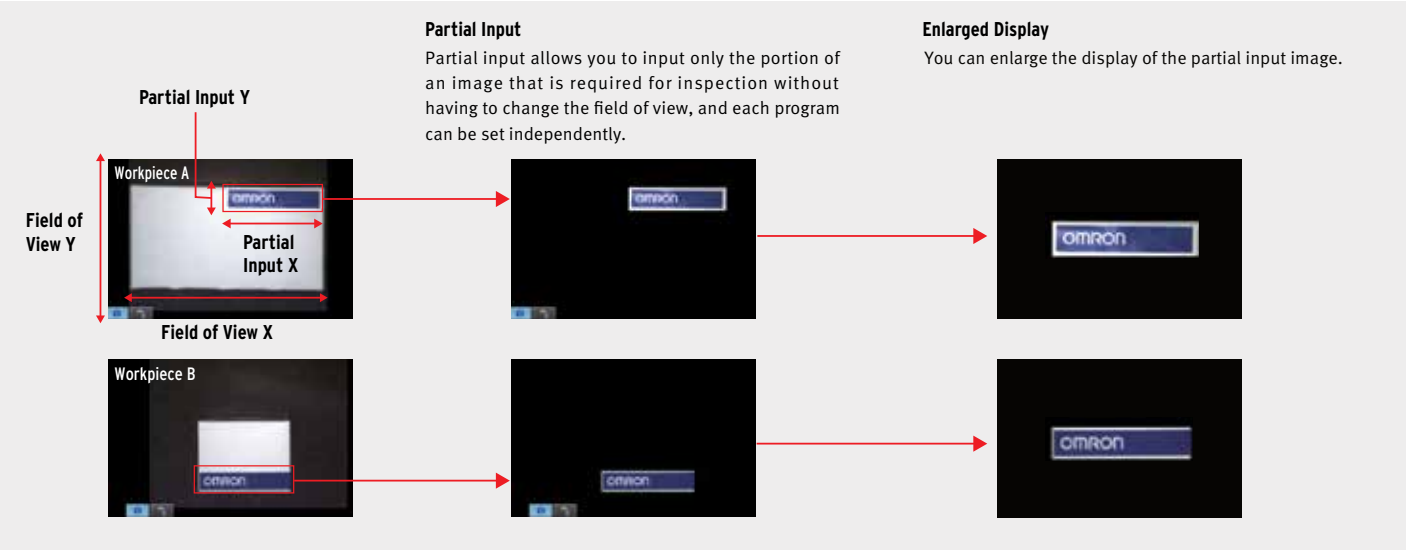


Note: This comparison was conducted with a 752 × 480 pixel image, with no rotational compensation.

### Partial Input with DAP (Dual Axis Partial) Processing

Processing time can be further reduced by limiting the camera image size to an area focused for the inspection. Previous models allowed trimming only in the Y direction, but now you can specify a range across both the X and Y axes while keeping a wide field of view, trim the sections that are not required for inspection in each scene to reduce inspection time.

High-speed Image Processor



# Megapixel CMOS Sensor

4 Times the Pixels

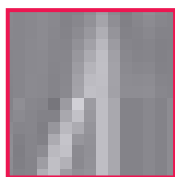
×

1,000 Times the Display Resolution

(Comparisons to previous OMRON models)

## Precision 1.3 Megapixel Camera

Would you like a little more positioning accuracy?  
Do you need a wider field of view?  
We hear you, and that is why we have greatly improved the resolution of our camera.  
The 1.3 megapixels maintain precision and accuracy while also enabling a wider field of view.



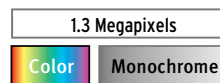
350,000 pixels



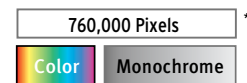
1.3 megapixels



Megapixel CMOS Sensor



Sensor with C-mount

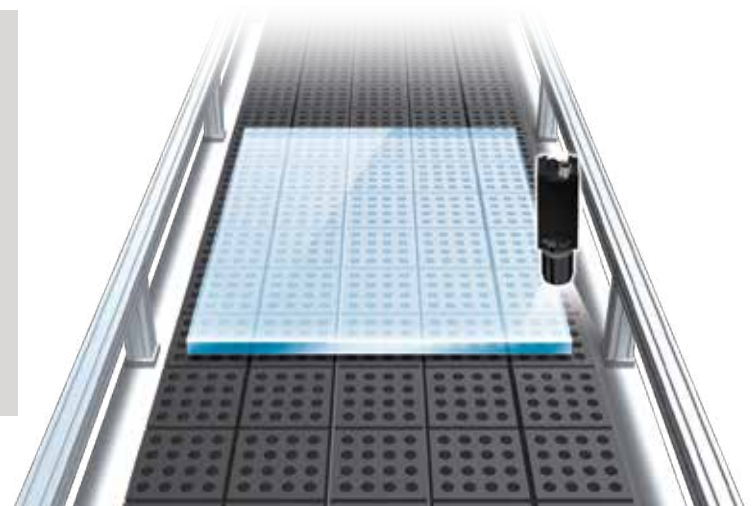
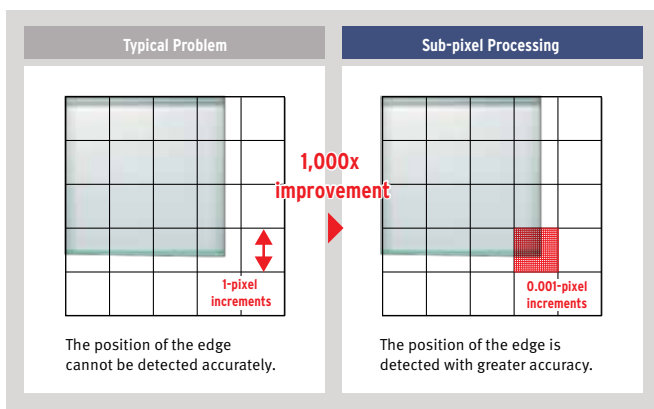


Integrated Sensor

\*.350,000 pixels types are also available.

## Sub-pixel Processing

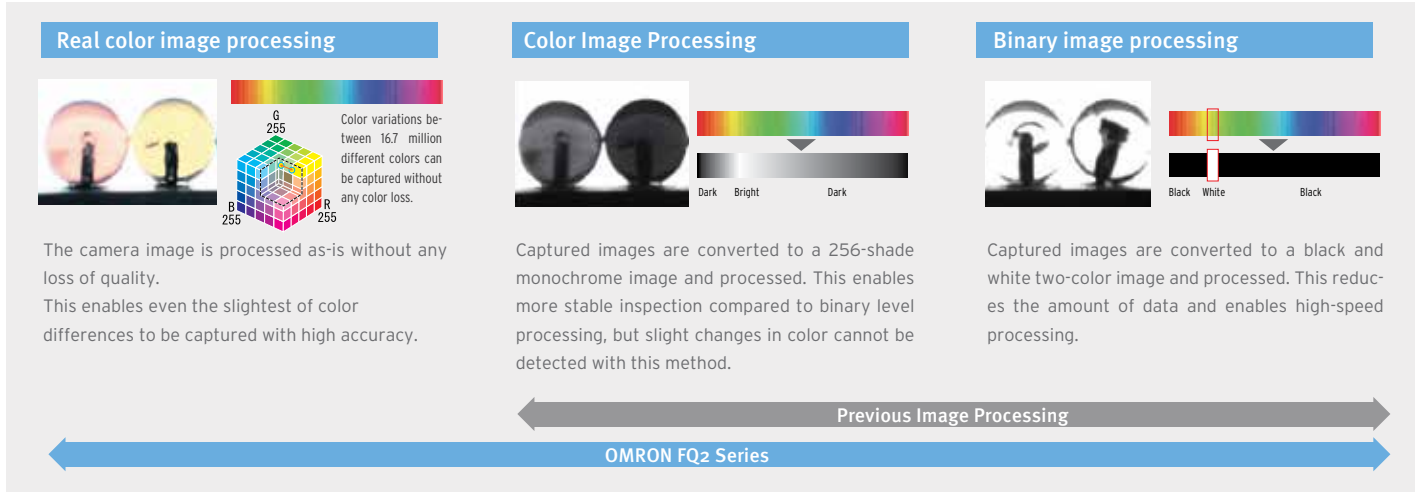
Previously, position information could only be output on a per-pixel basis, but now you can output at a resolution even higher than the number of available pixels. This provides finer measurement values for travel distances and helps to improve positioning accuracy.



# Three Key Technologies for Crystal Clear Images

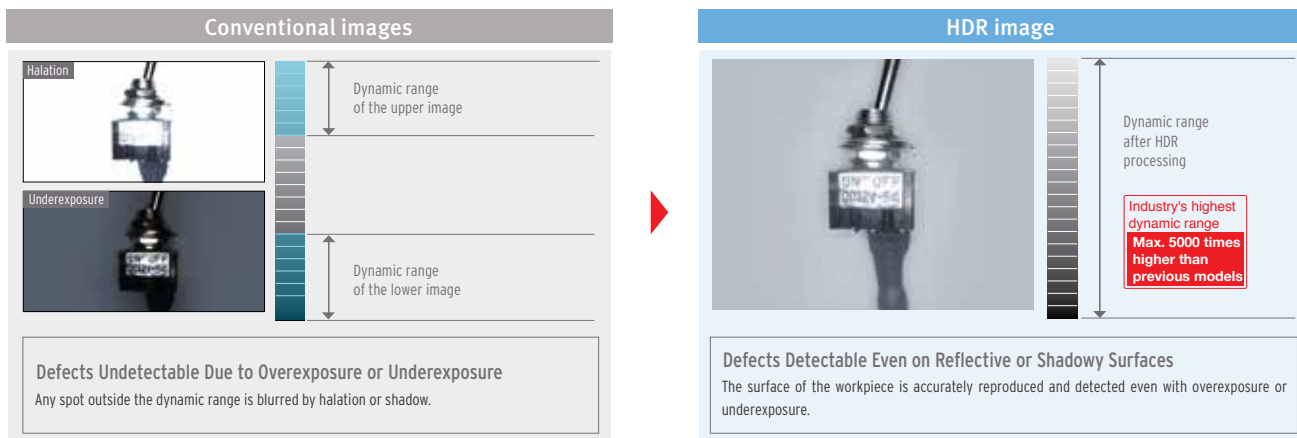
## Real-color Sensing

Real-color processing is an image processing technology that performs high-speed processing of full-color images with a total of 16.7 million colors (256 tones per RGB channel). This means that image processing can be performed with the same color information that is visible to the human eye, and stable measurements can be performed under lighting that closely resembles natural light.



## HDR Sensing

High dynamic range minimizes the effects of lighting such as halation and allows highly precise inspections.



## Polarizing Filter + High-power Lighting

Lighting is required for stable image inspection, but shiny surfaces can reflect light, resulting in incorrect judgements. You can use a polarizing filter to reduce specular reflection, but the entire image will be darker, which can result in insufficient image contrast.

The FQ2 Series is equipped with OMRON's own high-power lighting DR optical system for effective use of LED power. This system provides sufficient lighting for inspection even when the enclosed polarizing filter is used.

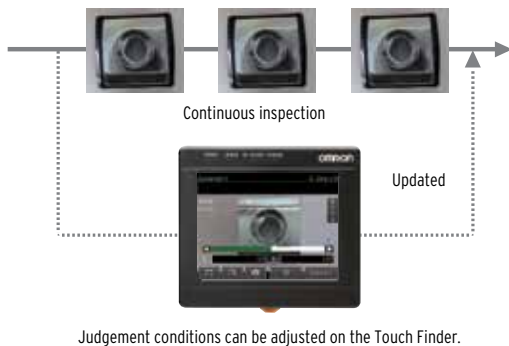




# Useful Onsite Utilities

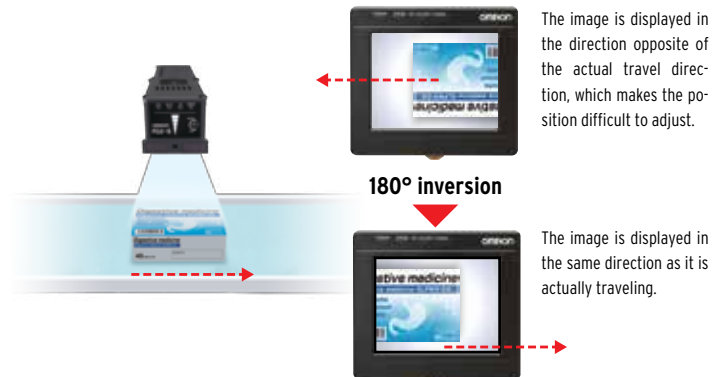
## Real-time Threshold Adjustment

The FQ2 smart camera allows fast and easy judgement adjustment. This eliminates the need to stop the machine for fine tuning of settings, resulting in zero machine downtime.



## 180° Inverted Image Display

Invert images by 180° when an image can only be taken in the incorrect orientation due to the position that the Sensor was mounted in.



## Inspection History Logging

“Recent results logging” is very useful for tracking inspections, logged data can be checked on a time scale in graph form and used to adjust judgement conditions. File Logging is useful in documenting manufacturing history. Large inspection records can be saved on 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)

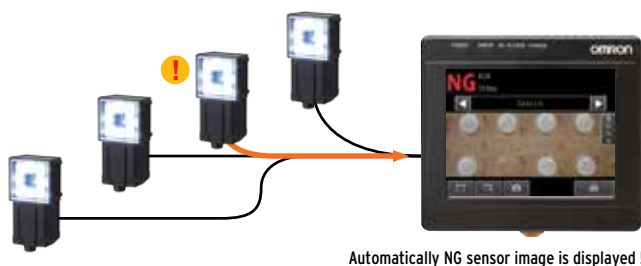
## Password Protection

A password can be set to prevent changes to settings during operation by restricting the ability to change from Run Mode to Setup Mode.



## Auto Detection

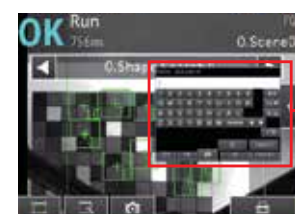
When multiple sensors are connected to the touch finder, the display automatically switches to the image of the sensor which has produced an NG result. This allows dynamic visualisation of reject conditions.



Note. When 32 sensors are connected, the most recent NG sensor of 8 sensors selected for display is displayed.





## Shortcuts




Shortcuts to Setup Menu items that are changed frequently can be added to the Run Mode display. This enables the user to quickly perform adjustments when a problem occurs during operation.






Directly access frequently used functions.

# Lineup ranging from single-function models to full-function models

Inspection Model		Single-function Type	Standard Type	FQ2-S3 Series High-resolution Type	
		Integrated Sensor	Integrated Sensor	Integrated Sensor	C-mount
					
Number of pixels		350,000 pixels	350,000 pixels	760,000 pixels	1.3 million pixels
Color		Real color	Real color	Real color/Monochrome	Real color/Monochrome
Number of simultaneous measurements		1	32	32	32
Number of registered scenes		8	32	32	32
Inspection	Shape search II	•	•	•	•
	Search	•	•	•	•
	Sensitive search	•	•	•	•
	Edge position	•	•	•	•
	Edge width	•	•	•	•
	Edge pitch	•	•	•	•
	Area	•	•	•	•
	Color data	•	•	•	•
	Labeling	•	•	•	•
I/O specifications	Communications(Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)	N/A	N/A	•	•
	Sensor Data Units(I/O)	•	•	•	•
	Sensor Data Units(RS-232C)	N/A	N/A	•	•

Inspection/ID Model		FQ2-S4 Series		
		Integrated Sensor	Integrated Sensor	C-mount
				
Number of pixels		350,000 pixels	760,000 pixels	1.3 million pixels
Color		Real color/Monochrome	Real color/Monochrome	Real color/Monochrome
Number of simultaneous measurements		32	32	32
Number of registered scenes		32	32	32
Inspection	Shape search II	•	•	•
	Search	•	•	•
	Sensitive search	•	•	•
	Edge position	•	•	•
	Edge width	•	•	•
	Edge pitch	•	•	•
	Area	•	•	•
	Color data	•	•	•
	Labeling	•	•	•
ID	Bar code	•	•	•
	2D code	•	•	•
	2D code(DPM)*	•	•	•
	OCR	•	•	•
I/O specifications	Communications(Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)	•	•	•
	Sensor Data Units(I/O)	•	•	•
	Sensor Data Units(RS-232C)	•	•	•

ID Model		FQ2-CH Series Optical Character Recognition Sensor	FQ-CR1 Series Multi Code Reader	FQ-CR2 Series 2D Code Reader
		Integrated Sensor	Integrated Sensor	Integrated Sensor
				
Number of pixels		350,000 pixels	350,000 pixels	350,000 pixels
Color		Monochrome	Monochrome	Monochrome
Number of simultaneous measurements		32	32	32
Number of registered scenes		32	32	32
ID	Bar code	N/A	•	N/A
	2D code	N/A	•	N/A
	2D code(DPM)*	N/A	N/A	•
	OCR	•	N/A	N/A
I/O specifications	Communications(Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)	•	N/A	N/A
	Sensor Data Units(I/O)	•	N/A	N/A
	Sensor Data Units(RS-232C)	•	N/A	N/A

\* Inspection item for directly marked 2D codes.

## Sensors

### Inspection Model

#### FQ2-S1 Series [Single-function Type]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Number of pixels	350,000 pixels			
Color	NPN	FQ2-S10010F	FQ2-S10050F	FQ2-S10100F
	PNP	FQ2-S15010F	FQ2-S15050F	FQ2-S15100F
Field of vision/ Installation distance	Refer to figure 1 on p.20	Refer to figure 2 on p.20	Refer to figure 3 on p.20	Refer to figure 4 on p.20

#### FQ2-S2 Series [Standard Type]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Number of pixels	350,000 pixels			
Color	NPN	FQ2-S20010F	FQ2-S20050F	FQ2-S20100F
	PNP	FQ2-S25010F	FQ2-S25050F	FQ2-S25100F
Field of vision/ Installation distance	Refer to figure 1 on p.20	Refer to figure 2 on p.20	Refer to figure 3 on p.20	Refer to figure 4 on p.20

#### FQ2-S3 Series [High-resolution Type]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)	C-mount
Number of pixels	760,000 pixels				1.3 million pixels
Color	NPN	FQ2-S30010F-08	FQ2-S30050F-08	FQ2-S30100F-08	FQ2-S30100N-08
	PNP	FQ2-S35010F-08	FQ2-S35050F-08	FQ2-S35100F-08	FQ2-S35100N-08
Monochrome	NPN	FQ2-S30010F-08M	FQ2-S30050F-08M	FQ2-S30100F-08M	FQ2-S30100N-08M
	PNP	FQ2-S35010F-08M	FQ2-S35050F-08M	FQ2-S35100F-08M	FQ2-S35100N-08M
Field of vision/ Installation distance	Refer to figure 5 on p.20	Refer to figure 6 on p.20	Refer to figure 7 on p.20	Refer to figure 8 on p.20	Refer to optical chart on p.30.

### Inspection / ID Model

#### FQ2-S4 Series [Standard Type]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Number of pixels	350,000 pixels			
Color	NPN	FQ2-S40010F	FQ2-S40050F	FQ2-S40100F
	PNP	FQ2-S45010F	FQ2-S45050F	FQ2-S45100F
Monochrome	NPN	FQ2-S40010F-M	FQ2-S40050F-M	FQ2-S40100F-M
	PNP	FQ2-S45010F-M	FQ2-S45050F-M	FQ2-S45100F-M
Field of vision/ Installation distance	Refer to figure 1 on p.20	Refer to figure 2 on p.20	Refer to figure 3 on p.20	Refer to figure 4 on p.20

#### [High-resolution Type]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)	C-mount
Number of pixels	760,000 pixels				1.3 million pixels
Color	NPN	FQ2-S40010F-08	FQ2-S40050F-08	FQ2-S40100F-08	FQ2-S40100N-08
	PNP	FQ2-S45010F-08	FQ2-S45050F-08	FQ2-S45100F-08	FQ2-S45100N-08
Monochrome	NPN	FQ2-S40010F-08M	FQ2-S40050F-08M	FQ2-S40100F-08M	FQ2-S40100N-08M
	PNP	FQ2-S45010F-08M	FQ2-S45050F-08M	FQ2-S45100F-08M	FQ2-S45100N-08M
Field of vision/ Installation distance	Refer to figure 5 on p.20	Refer to figure 6 on p.20	Refer to figure 7 on p.20	Refer to figure 8 on p.20	Refer to optical chart on p.30.

### ID Model

#### FQ2-CH Series [Optical Character Recognition Sensor]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Number of pixels	350,000 pixels			
Monochrome	NPN	FQ2-CH10010F-M	FQ2-CH10050F-M	FQ2-CH10100F-M
	PNP	FQ2-CH15010F-M	FQ2-CH15050F-M	FQ2-CH15100F-M
Field of vision/ Installation distance	Refer to figure 1 on p.20	Refer to figure 2 on p.20	Refer to figure 3 on p.20	Refer to figure 4 on p.20

#### FQ-CR1 Series [Multi Code Reader]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Number of pixels	350,000 pixels			
Monochrome	NPN	FQ-CR10010F-M	FQ-CR10050F-M	FQ-CR10100F-M
	PNP	FQ-CR15010F-M	FQ-CR15050F-M	FQ-CR15100F-M
Field of vision/ Installation distance	Refer to figure 1 on p.20	Refer to figure 2 on p.20	Refer to figure 3 on p.20	Refer to figure 4 on p.20





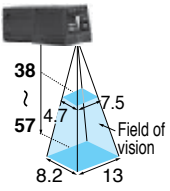
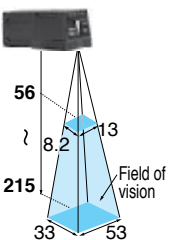
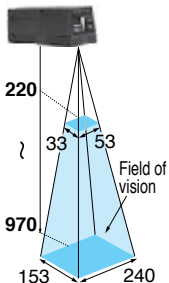
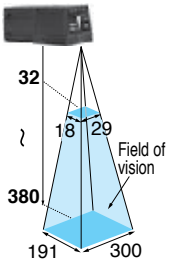
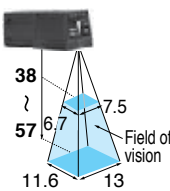
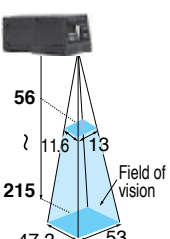
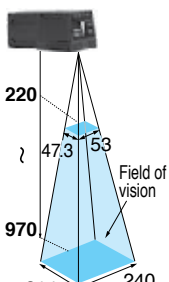
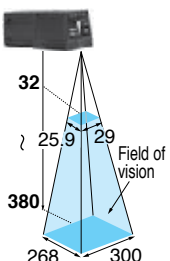
#### FQ-CR2 Series [2D Code Reader]

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Number of pixels	350,000 pixels			
Monochrome	NPN	FQ-CR20010F-M	FQ-CR20050F-M	FQ-CR20100F-M
	PNP	FQ-CR25010F-M	FQ-CR25050F-M	FQ-CR25100F-M
Field of vision/ Installation distance	Refer to figure 1 on p.20	Refer to figure 2 on p.20	Refer to figure 3 on p.20	Refer to figure 4 on p.20

## Specifications

### Sensors Field of vision/Installation distance



(Unit: mm)

Field of vision	Narrow View	Standard View	Wide View(Long-distance)	Wide View(Short-distance)
Appearance				
350,000 pixels Type	<p>Figure 1</p> 	<p>Figure 2</p> 	<p>Figure 3</p> 	<p>Figure 4</p> 
760,000 pixels Type	<p>Figure 5</p> 	<p>Figure 6</p> 	<p>Figure 7</p> 	<p>Figure 8</p> 



### Touch Finder

Type	Appearance	Model
DC power supply		FQ2-D30
AC/DC/battery		FQ2-D31

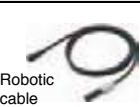



### Cables

Type	Appearance	Cable length	Model
FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC)		2m	FQ-WN002
		5m	FQ-WN005
		10m	FQ-WN010
		20m	FQ-WN020
I/O Cables		2m	FQ-WD002
		5m	FQ-WD005
		10m	FQ-WD010
		20m	FQ-WD020

### Sensor Data Units (FQ2-S3/S4/CH only)

Type	Appearance	Output type	Model
Parallel Interface		NPN	FQ-SDU10
		PNP	FQ-SDU15
RS-232C Interface		NPN	FQ-SDU20
		PNP	FQ-SDU25

### Cables for Sensor Data Units











Type	Appearance	Cable length	Model
Sensor Data Unit Cable		2m	FQ-WU002
		5m	FQ-WU005
		10m	FQ-WU010
		20m	FQ-WU020
Parallel Cable for FQ-SDU1*		2m	FQ-VP1002
		5m	FQ-VP1005
		10m	FQ-VP1010
Parallel Cable for FQ-SDU2*		2m	FQ-VP2002
		5m	FQ-VP2005
		10m	FQ-VP2010
RS-232C Cable for FQ-SDU2		2m	XW2Z-200S-V
		5m	XW2Z-500S-V

\* When using FQ-SDU\*\*, 2 Cables are required for all I/O signals.





## Specifications

### Accessories

Application	Appearance	Name	Model
For Sensor		Mounting Bracket *1	FQ-XL
		Mounting Bracket	FQ-XL2
		Mounting Base for C-mount type *2	FQ-XLC
		Polarizing Filter Attachment *1	FQ-XF1
For Touch Finder		Panel Mounting Adapter	FQ-XPM
		AC Adapter (for AC/DC/battery model)	FQ-AC2
		Battery (for AC/DC/battery model)	FQ-BAT1
		Touch Pen *3	FQ-XT
		Strap	FQ-XH
		SD Card (2 GB)	HMC-SD291

### Industrial Switching Hubs (Recommended)

Appearance	Number of ports	Failure detection	Current consumption	Model
	3	None	0.22 A	W4S1-03B
	5	None	0.22 A	W4S1-05B
		Supported		W4S1-05C

### External Lighting

Type	Model
3Z4S-LT Series	Refer to 3Z4S-LT/LE Series Catalog(Q164)
FL Series	Refer to FL Series Catalog(Q181)










\*1. Included with Integrated Sensor.

\*2. Included with Sensor with C-mount.

\*3. Enclosed with Touch Finder.

### Lenses for C-mount Camera Refer to optical chart on p.30 for selection of a lens.

#### High-resolution, Low-distortion Lenses

Model	3Z4S-LE SV-0614H	3Z4S-LE SV-0814H	3Z4S-LE SV-1214H	3Z4S-LE SV-1614H	3Z4S-LE SV-2514H	3Z4S-LE SV-3514H	3Z4S-LE SV-5014H	3Z4S-LE SV-7525H	3Z4S-LE SV-10028H
Appearance									
Focal length	6mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm	100mm
Brightness	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F2.5	F2.8
Filter size	M40.5 P0.5	M35.5 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M35.5 P0.5	M40.5 P0.5	M34.0 P0.5	M37.5 P0.5

#### Extension Tubes

Model	3Z4S-LE SV-EXR
Contents	Set of 7 tubes (40 mm, 20 mm, 10 mm, 5 mm, 2.0 mm, 1.0 mm, and 0.5 mm) Maximum outer diameter: 30 mm dia.

\* Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0- mm or 2.0-mm Extension Tube are used together.

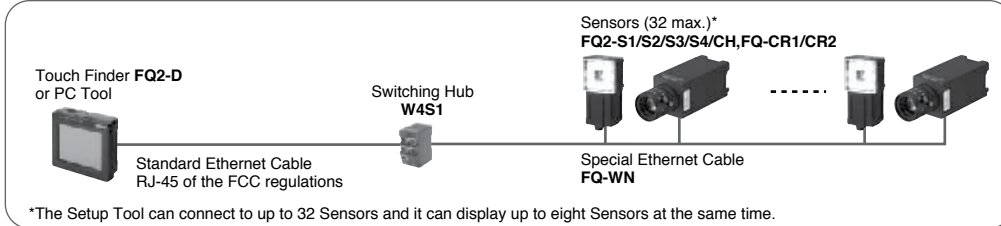
\* Reinforcement is required to protect against vibration when Extension Tubes exceeding 30 mm are used.

# System Configuration

Up to 32 Sensors can be set up and monitored from a single Touch Finder or PC Tool.

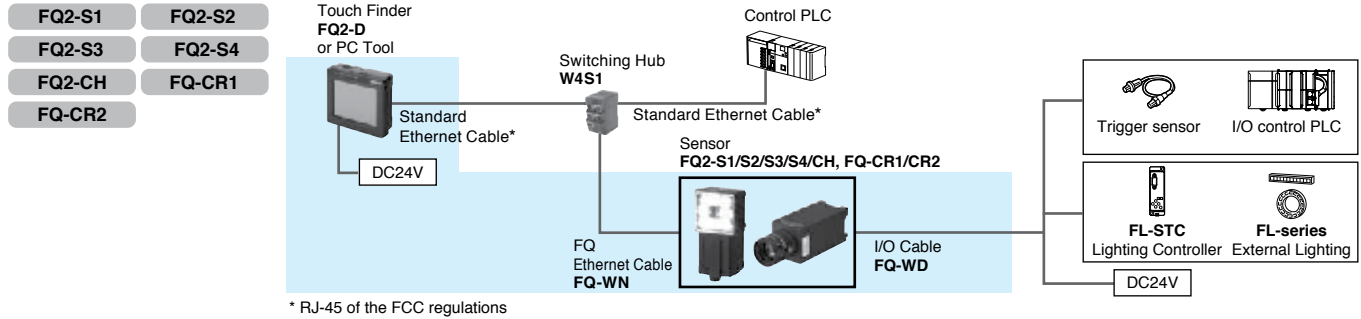
Various types of Sensors can be used at the same time.

However, I/O type and wiring method vary depending on the Sensor, so select the necessary devices.



**Note:** 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 Touch Finder. Refer to the member registration sheet for details.

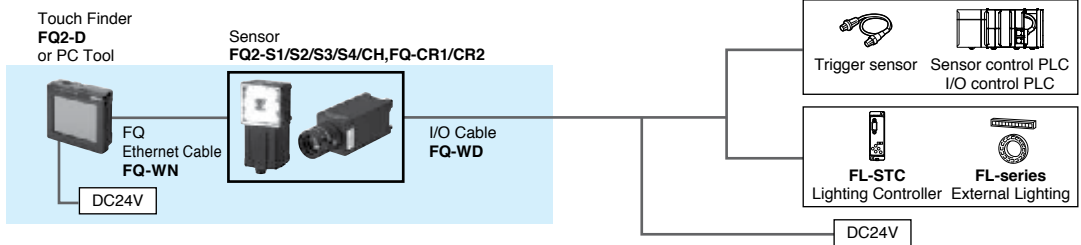
## Ethernet (EtherNet/IP, No-protocol, or PLC Link) Connection



## Parallel Interface Connection

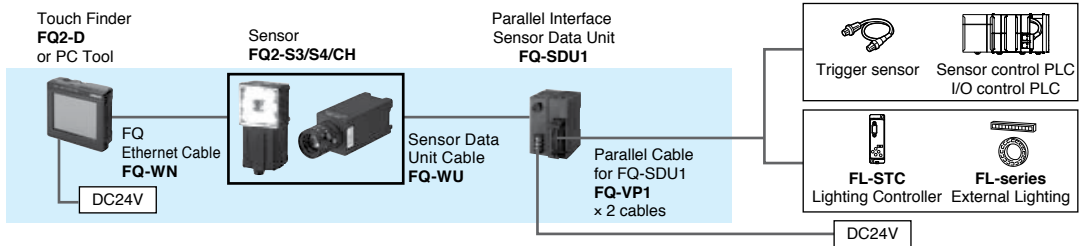
Connection with Standard Parallel Interface of the Sensor

- FQ2-S1
- FQ2-S2
- FQ2-S3
- FQ2-S4
- FQ2-CH
- FQ-CR1
- FQ-CR2



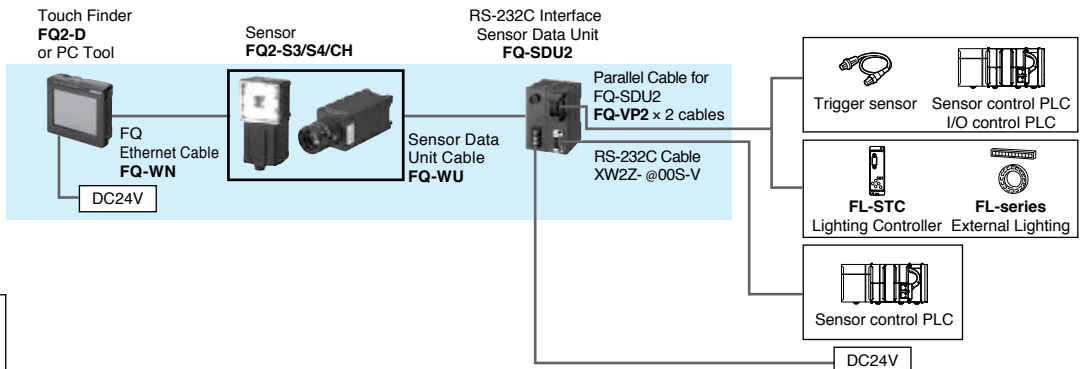
Connection through a Parallel Interface Sensor Data Unit

- FQ2-S1
- FQ2-S2
- FQ2-S3
- FQ2-S4
- FQ2-CH
- FQ-CR1
- FQ-CR2



## RS-232C Serial Connection

- FQ2-S1
- FQ2-S2
- FQ2-S3
- FQ2-S4
- FQ2-CH
- FQ-CR1
- FQ-CR2



Model compatible with communications interface

- Compatible
- Not compatible

# Ratings and Performance

## Sensor [Inspection Model FQ2-S1/S2/S3 Series]

Item		Single-function type		Standard type		High-resolution type		
Model	NPN	FQ2-S10□□□□		FQ2-S20□□□□	FQ2-S30□□□□-08	FQ2-S30□□□□-08M	FQ2-S30-13	FQ2-S30-13M
	PNP	FQ2-S15□□□□		FQ2-S25□□□□	FQ2-S35□□□□-08	FQ2-S35□□□□-08M	FQ2-S35-13	FQ2-S35-13M
Field of view		Refer to Ordering Information on p.19. (Tolerance (field of vision): ±10% max.)						Select a lens according to the field of vision and installation distance.
Installation distance								Refer to the optical chart on p.30.
Main functions	Inspection items	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, and labeling						
	Number of simultaneous measurements	1	32					
	Position compensation	Supported (360° Model position compensation, Edge position compensation)						
	Number of registered scenes	8	32					
	Calibration	Supported						
Image input	Image processing method	Real color				Monochrome	Real color	Monochrome
	Image filter	High dynamic range (HDR), image adjustment(Color Gray Filter, Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression), polarizing filter (attachment), and white balance (Sensors with Color Cameras only)						
	Image elements	1/3-inch color CMOS			1/2-inch color CMOS	1/2-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000			Built-in lighting ON: 1/250 to 1/60,000 Built-in lighting OFF: 1/1 to 1/60,000		1/1 to 1/60,000	
	Processing resolution	752 × 480			928 × 828		1280 × 1024	
	Partial input function	Supported horizontally only.			Supported horizontally and vertically			
	Lens mounts	---						C-mount
Lighting	Lighting method	Pulse						---
	Lighting color	White						---
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.)						
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)						
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)						
I/O specifications	Input signals	7 signals • Single measurement input (TRIG) • Control command input (IN0 to IN5)						
	Output signals	3 signals • Control output (BUSY) • Overall judgement output (OR) • Error output (ERROR) <b>Note:</b> The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).						
	Ethernet specifications	100Base-TX/10Base-T						
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link						
	I/O expansion	---	---	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs				
	RS-232C	---	---	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs				
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)						
	Current consumption	2.4 A max.						0.3 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)			Operating: 0 to 40°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						
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times						
	Shock resistance (destruction)	150 m/s <sup>2</sup> 3 times each in 6 direction (up, down, right, left, forward, and backward)						
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)						IEC 60529 IP40
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					Cover: Zinc-plated steel, Thickness: 0.6 mm Case: Aluminum diecast alloy (ADC-12) Mounting base: Polycarbonate ABS	
Weight		Narrow View/Standard View:Approx.160 g Wide View:Approx.150 g					Approx. 160 g without base, Approx. 185 g with base	
Accessories included with sensor		Mounting Bracket (FQ-XL)(1) Polarizing Filter Attachment (FQ-XF1) (1) Instruction Manual , Quick Startup Guide Member Registration Sheet , Warning Label					Mounting Base(FQ-XLC) (1) Mounting Screw (M3 × 8mm)(4) Instruction Manual , Quick Startup Guide Member Registration Sheet	
LED class		Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)						---
Applicable standards		EN standard EN 61326 and EC Directive No.2004/104/EC			EN 61326-1:2006 and IEC 61010-1			

# Sensor [Inspection/ID Model FQ2-S4 Series]

Item		Inspection/ID Model					
Model	NPN	FQ2-S40②②②②	FQ2-S40②②②②-M	FQ2-S40②②②②-08	FQ2-S40②②②②-08M	FQ2-S40②②②②-13	FQ2-S40②②②②-13M
	PNP	FQ2-S45②②②②	FQ2-S45②②②②-M	FQ2-S45②②②②-08	FQ2-S45②②②②-08M	FQ2-S45②②②②-13	FQ2-S45②②②②-13M
Field of view		Refer to Ordering Information on p.19. (Tolerance (field of vision): ±10% max.)					Select a lens according to the field of vision and installation distance.
Installation distance							Refer to the optical chart on p.30.
Main functions	Inspection items	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, labeling, OCR *1, Bar code *2, 2D-code *2, 2D-code(DMP) *3, and Model dictionary					
	Number of simultaneous measurements	32					
	Position compensation	Supported (360° Model position compensation, Edge position compensation)					
	Number of registered scenes	32					
	Calibration	Supported					
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry					
Image input	Image processing method	Real color	Monochrome	Real color	Monochrome	Real color	Monochrome
	Image filter	High dynamic range (HDR), image adjustment(Color Gray Filter, Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression), polarizing filter (attachment), and white balance (Sensors with Color Cameras only)					
	Image elements	1/3-inch color CMOS	1/3-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000		Built-in lighting ON: 1/250 to 1/60,000 Built-in lighting OFF: 1/1 to 1/60,000		1/1 to 1/60,000	
	Processing resolution	752 × 480		928 × 828		1280 × 1024	
	Partial input function	Supported horizontally only.		Supported horizontally and vertically			
	Lens mounts	---					C-mount
Lighting	Lighting method	Pulse					---
	Lighting color	White					---
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.)					
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)					
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)					
I/O specifications	Input signals	7 signals • Single measurement input (TRIG) • Control command input (IN0 to IN5)					
	Output signals	3 signals • Control output (BUSY) • Overall judgement output (OR) • Error output (ERROR) <b>Note:</b> The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).					
	Ethernet specifications	100Base-TX/10Base-T					
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link					
	I/O expansion	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs					
	RS-232C	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs					
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)					
	Current consumption	2.4 A max.					0.3 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 40°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					
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times					
	Shock resistance (destruction)	150 m/s <sup>2</sup> 3 times each in 6 direction (up, down, right, left, forward, and backward)					
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)					IEC 60529 IP40
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					Cover: Zinc-plated steel, Thickness: 0.6 mm Case: Aluminum diecast alloy (ADC-12) Mounting base: Polycarbonate ABS
Weight		Narrow View/Standard View:Approx.160 g Wide View:Approx.150 g					Approx. 160 g without base, Approx. 185 g with base
Accessories included with sensor		Mounting Bracket (FQ-XL)(1) Polarizing Filter Attachment (FQ-XF1) (1) Instruction Manual , Quick Startup Guide Member Registration Sheet , Warning Label					Mounting Base (FQ-XLC) (1) Mounting Screw (M3 × 8mm)(4) Instruction Manual , Quick Startup Guide Member Registration Sheet
LED class		Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)					---
Applicable standards		EN 61326-1:2006 and IEC 61010-1					

\*1. The types of characters to be read are the same as those of FQ2-CH Optical Character Recognition Sensor(p.25).

\*2. The types of codes to be read are the same as those of FQ-CR1 Multi Code Reader (p.25).

\*3. The types of codes to be read are the same as those of FQ-CR2 2D Code Reader (p.25).



# Sensor [ID Model FQ2-CH, FQ-CR1/CR2 Series]

Item		Optical Character Recognition Sensor		Multi Code Reader		2D Code Reader	
Model	NPN	FQ2-CH10@@@@-M		FQ-CR10@@@@-M		FQ-CR20@@@@-M	
	PNP	FQ2-CH15@@@@-M		FQ-CR15@@@@-M		FQ-CR25@@@@-M	
Field of view		Refer to Ordering Information on p.19. (Tolerance (field of vision): ±10% max.)					
Installation distance							
Main functions	Inspection items	OCR Alphabet   A to Z Number     0 to 9 Symbol   ' - . : / Model dictionary		2D Code(Data Matrix(EC200), QR Code, MicroQR Code, PDF417, MicroPDF417, GS1-DataMatrix)		2D Code (Data Matrix(EC200), QR Code)	
				Bar Code(JAN/EAN/UPC, Code39, Codabar(NW-7), ITF(Interleaved 2 of 5), Code 93, Code128/GS1-128, GS1 DataBar*(Truncated, Stacked, Omni-directional, Stacked, Omnidirectional,Limited, Expanded, Expanded Stacked), Pharmacode, GS1-128 Composite Code(CC-A, CC-B, CC-C))			
	Image filter	Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression		None		Filter function (Smooth, Dilate, Erosion, Median), Code Error Correction Position Display	
	Verification function	Supported		Supported		None	
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry					
	Number of simultaneous measurements	32					
	Position compensation	Supported (360° Model position compensation, Edge position compensation)		None			
	Number of registered scenes	32					
Image input	Image processing method	Monochrome					
	Image filter	High dynamic range (HDR) and polarizing filter (attachment)					
	Image elements	1/3-inch Monochrome CMOS					
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000		1/250 to 1/30,000		1/250 to 1/32,258	
	Processing resolution	752 × 480					
	Partial input function	Supported horizontally only.					
Lighting	Lighting method	Pulse					
	Lighting color	White					
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.)					
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)					
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)		External trigger (single or continuous)			
I/O specifications	Input signals	7 signals • Single measurement input (TRIG) • Control command input (IN0 to IN5)					
	Output signals	3 signals • Control output (BUSY) • Overall judgement output (OR) • Error output (ERROR) <b>Note:</b> The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).		3 signals • Control output (BUSY) • Overall judgement output (OR) • Error output (ERROR) <b>Note:</b> Note:The three output signals can be allocated for the judgements of individual inspection items.			
	Ethernet specifications	100Base-TX/10Base-T					
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link		---			
	I/O expansion	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs		---			
	RS-232C	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs		---			
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)					
	Current consumption	2.4 A max.					
Environmental immunity	Ambient temperature range	Operating: 0 to 40°C, Storage: -25 to 65°C (with no icing or condensation)		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					
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times					
	Shock resistance (destruction)	150 m/s <sup>2</sup> 3 times each in 6 direction (up, down, right, left, forward, and backward)					
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)					
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		Narrow View/Standard View:Approx.160 g Wide View:Approx.150 g					
Accessories included with sensor		Mounting Bracket (FQ-XL)(1), Polarizing Filter Attachment (FQ-XF1) (1), Instruction Manual, Quick Startup Guide, Member Registration Sheet , Warning Label					
LED class		Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001,EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)					
Applicable standards		EN 61326-1:2006 and IEC61010-1					

# Touch Finder

Item		Type	Model with DC power supply	Model with AC/DC/battery power supply
		Model	FQ2-D30	FQ2-D31
Number of connectable Sensor			Number of sensors that can be recognized (switched): 32 max. number or sensor that can displayed on monitor: 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 × 240	
		Display colors	16.7 million	
	Backlight	Life expectancy *1	50,000 hours at 25°C	
		Brightness adjustment	Provided	
		Screen saver	Provided	
Operation interface	Touch screen	Method	Resistance film	
		Life expectancy *2	1,000,000 touch operations	
External interface	Ethernet		100BASE-TX/10BASE-T	
	SD card		SDHC-compliant, Class 4 or higher recommended	
Ratings	Power supply voltage		DC power connection: 21.6 to 26.4 VDC (including ripple)	DC power connection: 21.6 to 26.4 VDC (including ripple) AC adapter (manufactured by Sino-American Japan Co., Ltd) connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery (1cell, 3.7 V)
	Continuous operation on Battery *3		---	1.5 h
	Power consumption		DC power connection: 0.2 A max.	DC power connection: 0.2 A max. Charging battery: 0.4 A max.
Environmental immunity	Ambient temperature range		Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)	Operating: 0 to 50°C when mounted to DIN Track or panel Operation on Battery: 0 to 40°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	
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times	
	Shock resistance (destruction)		150 m/s <sup>2</sup> 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	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 included with Touch Finder			Touch Pen (FQ-XT), Instruction Manual	

\*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.

## Sensor Data Units (FQ2-S3/S4/CH only)

Item			Parallel Interface	RS-232C Interface
Model	NPN		FQ2-SDU10	FQ2-SDU20
	PNP		FQ2-SDU15	FQ2-SDU25
I/O specifications	Parallel I/O	Connector 1	16 outputs(D0 to D15)	6 inputs(IN0 to IN5)
		Connector 2	11 inputs(TRIG, RESET, IN0 to IN7, and DSA) 8 outputs(GATE, ACK, RUN, BUSY, OR, ERROR, STGOUT, and SHTOUT)	2 inputs(TRIG and RESET) 7 outputs(ACK, RUN, BUSY, OR, ERROR, STGOUT, and SHTOUT)
	RS-232C		---	1 channel, 115,200 bps max.
	Sensor interface		FQ2-S3 connected with FQ-WU@ : OMRON interface *Number of connected Sensors: 1	
Ratings	Power supply voltage		21.6 to 26.4 VDC (including ripple)	
	Insulation resistance		Between all DC external terminals and case: 0.5 MΩ min (at 250 VDC)	
	Current consumption		2.5 A max. : FQ2-S@-@-@-@-@-@ and FQ2-SDU@ 0.4 A max. : FQ2-S3@-@-@ and FQ2-SDU@ 0.1 A max. : FQ2-SDU@ only	
Environmental immunity	Ambient temperature range		Operating: 0 to 50°C, Storage: -20 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	
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times	
	Shock resistance (destruction)		150 m/s <sup>2</sup> 3 times each in 6 directions (up, down, right, left, forward, and backward)	
	Degree of protection		IEC 60529 IP20	
Materials			Case: PC + ABS, PC	
Weight			Approx. 150 g	
Accessories included with Sensor Data Unit			Instruction Manual	

## Battery

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1,800 mAh
Rated voltage		3.7 V
Ambient temperature range		Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Charging method		Charged in Touch Finder (FQ2-D31). AC adapter (FQ-AC@) is required.
Charging time *1		2 h
Usage time *1		1.5 h
Battery backup life (See note 2.)		300 charging cycles
Weight		50 g max.

\*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 (32-bit version) Microsoft Windows 7 Home Premium or higher (32-bit/64-bit version)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space *
Monitor	1,024 × 768 dots min.

\*. Available space is also required separately for data logging.

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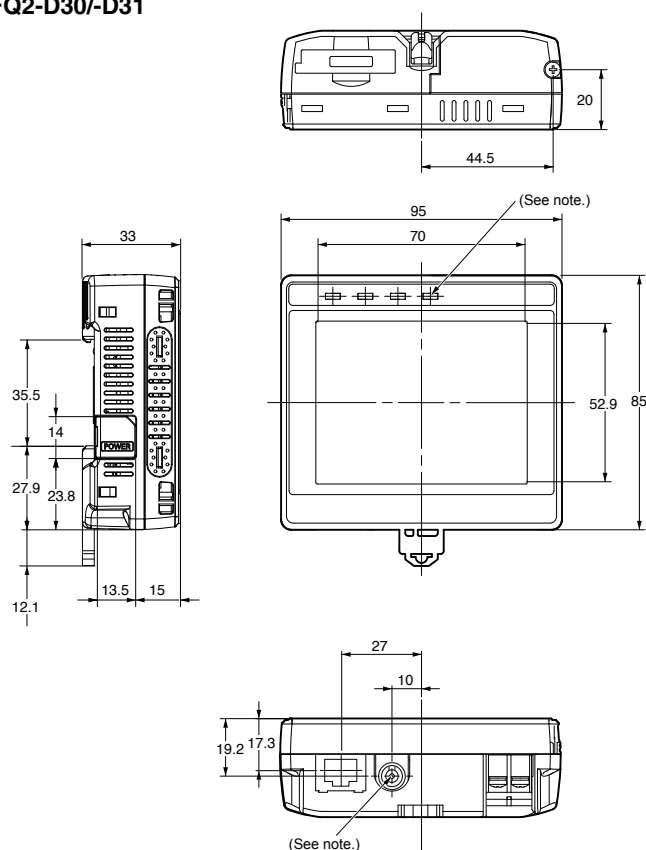




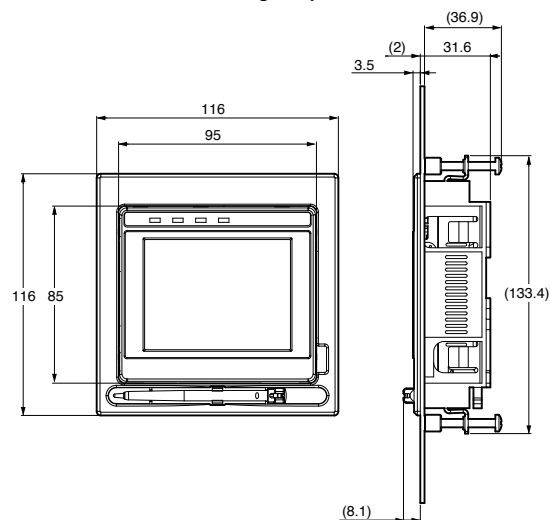
(Unit: mm)

## Touch Finder

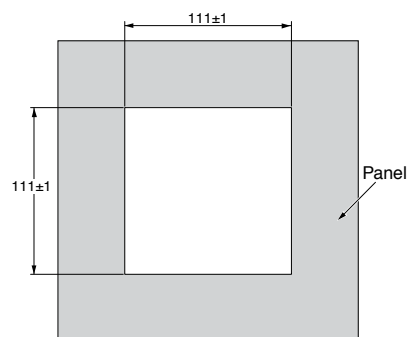
FQ2-D30/-D31



## Panel Mounting Adapter FQ-XPM



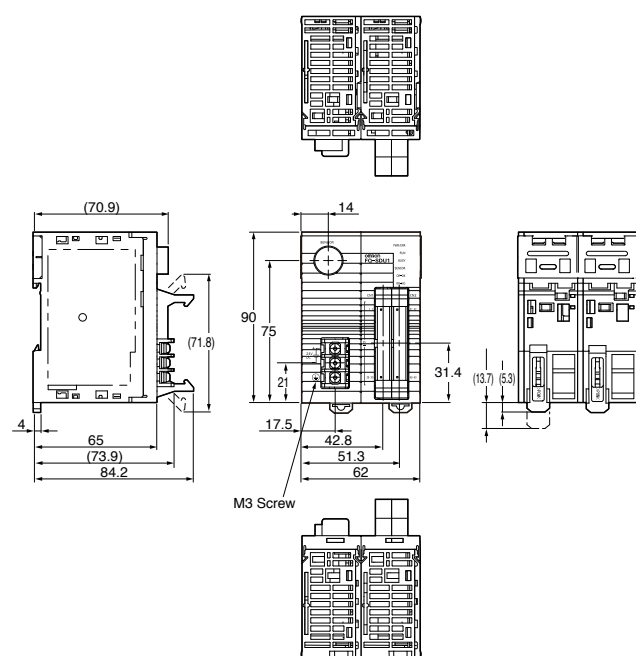
## Panel Cutout Dimensions



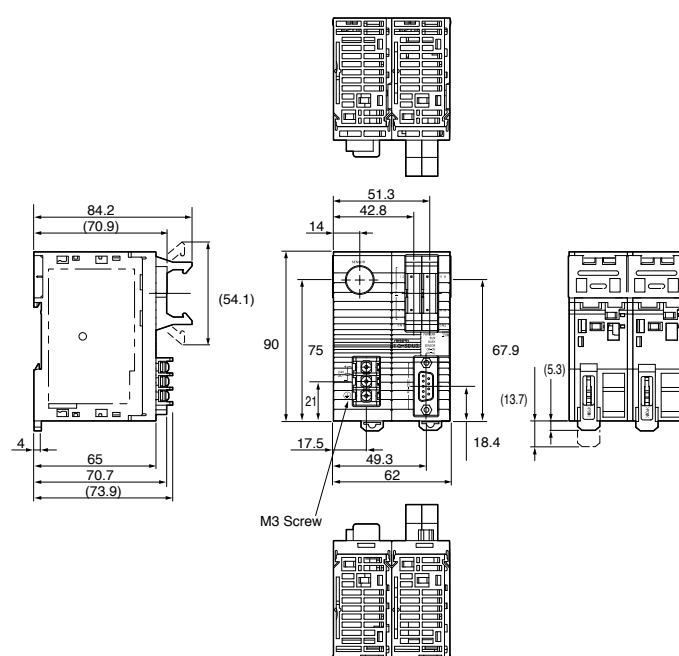
**Note:** Provided with FQ-D31 only.

## Sensor Data Unit

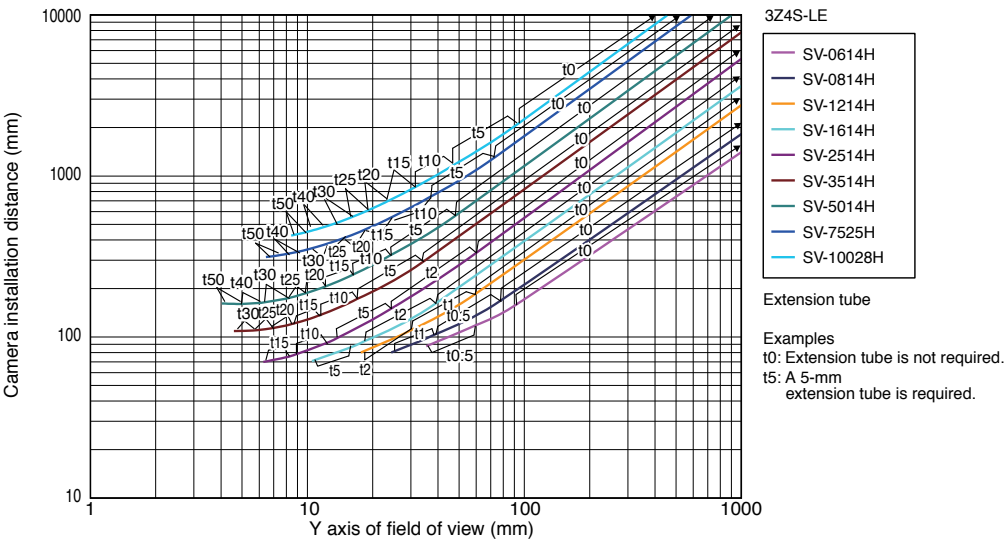
FQ-SDU10/-SDU15



FQ-SDU20/-SDU25



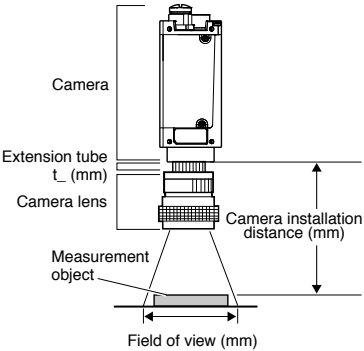
High-resolution, Low-distortion Lenses 3Z4S-LE SV-@@@H



Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) (See Note.), and the Y axis of the optical chart shows the camera installation distance (mm).

**Note:** The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.



Related Manuals

Man.No.	Model number	Manual
Z326	FQ2-S1/S2/S3	Smart Camera FQ2-S1/S2/S3 User's manual
Z330	FQ2-S4	Smart Camera FQ2-S4 User's manual
Z331	FQ2-CH	Optical Character Recognition Sensor FQ2-CH User's manual
Z329	FQ-CR1-M	Fixed Mount Multi Code Reader FQ-CR1-M User's manual
Z316	FQ-CR2	Fixed Mount 2D Code Reader FQ-CR2 User's manual

## Vision Series Lineup

The lineup covers everything from low-cost Smart Cameras to highly customizable PC-based image processing systems.  
Choose the best combination for your budget and needs.



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