OMRON

CODE READER FQ-CR SERIES

Exceptional Reading Performance with Easy Operation



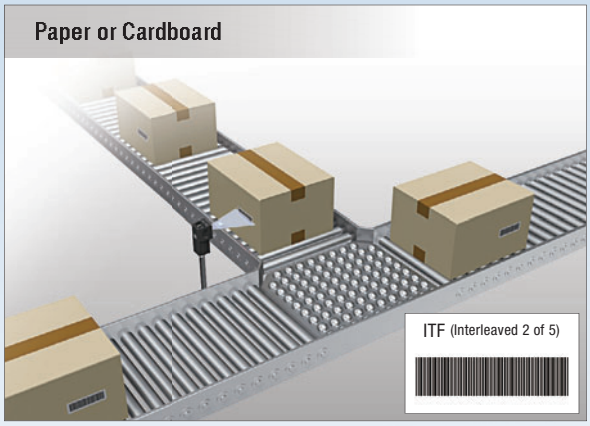
» Read from everything from paper and labels to metal, PCBs, and glass for a wide range of applications.

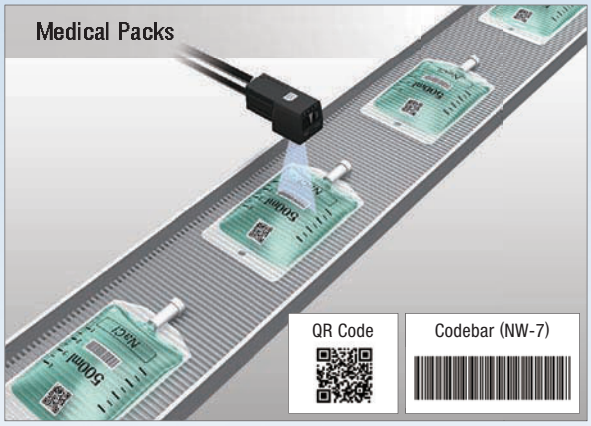
realizing

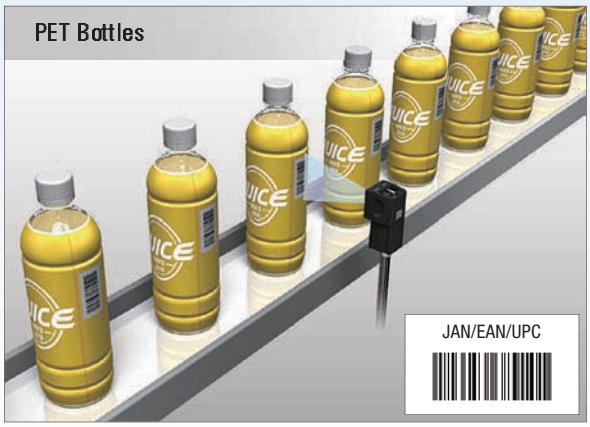
Solve a variety off different applications with one product series

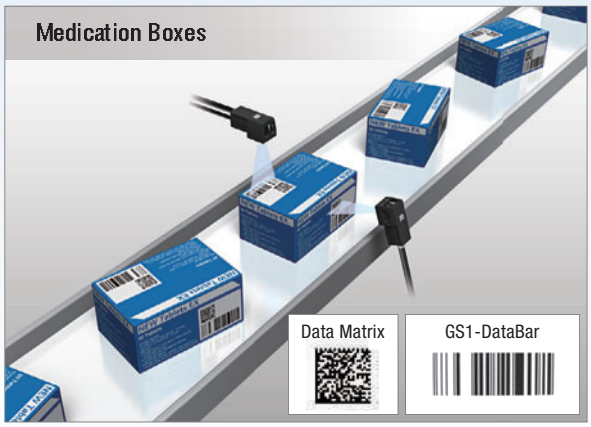
Read Codes Printed on Paper or Labels

Multi Code Reader FQ CR1 Series









Reads 14 Different Codes

FQ CR1

Many different codes are used for different applications. And for some products, different codes are printed together.
The FQ-CR1 can read many different codes without requiring any changes to its settings.

Barcodes: Reads 9 different codes.	JAN/EAN/UPC	Code39	Codabar (NW-7)
	ITF (Interleaved 2 of 5)	Code93	Code128 / GS1-128
	GS1-DataBar	GS1-128 Composite Code	Pharmacode

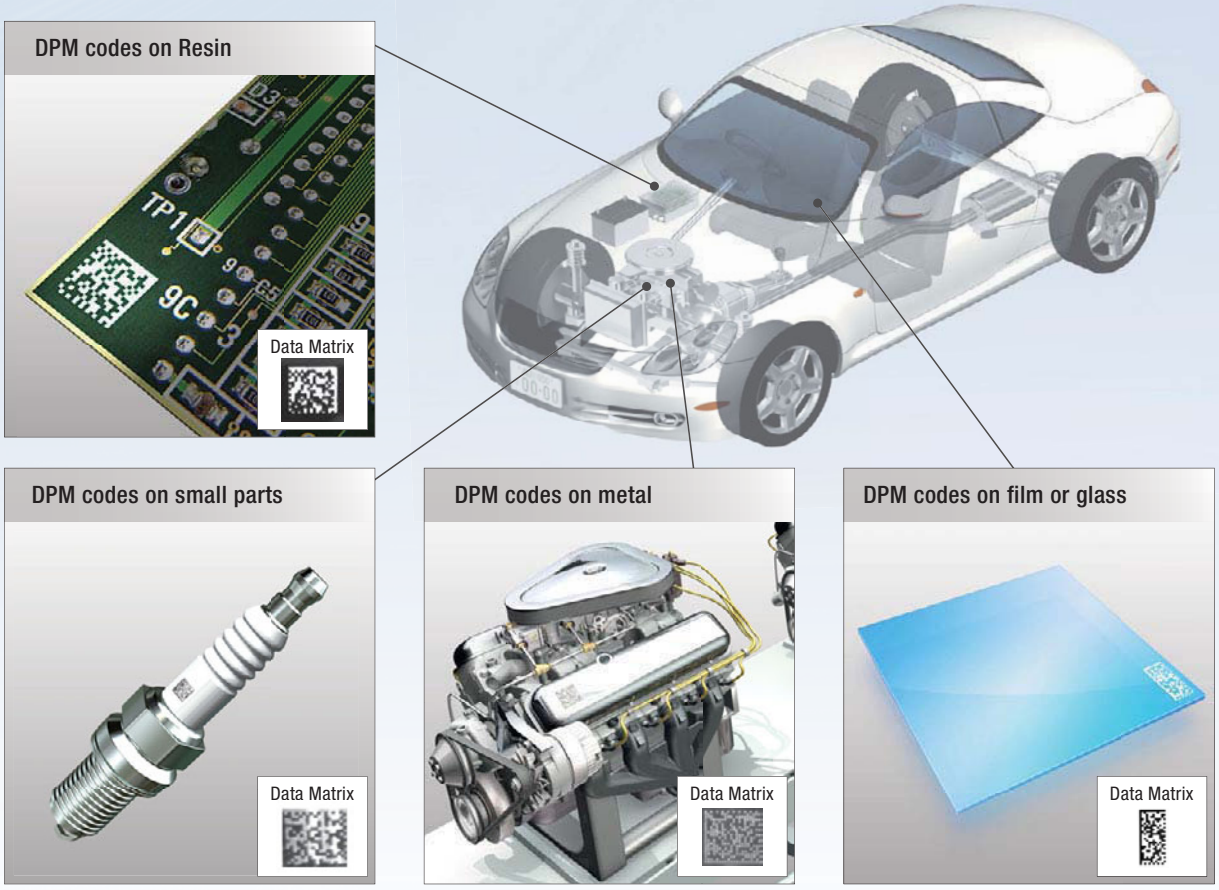
2D codes: Reads 5 different codes.	Data Matrix	QR Code	Micro QR Code
	PDF417	Micro PDF417	

• QR code is the registered trademark of DENSO WAVE.

There are many instances when different barcode or 2D code systems are used together in the same manufacturing process.
Code printing quality can also vary due to imperfect printing or low contrast.
The FQ-CR Series handles these and many other conditions.
The FQ-CR Series can be easily introduced without using different code readers and operating procedures for each of the different processes.

Reads Direct Part Marking (DPM) Codes

2D Code Reader for Direct Part Marking (DPM) codes **FQ-CR2** Series



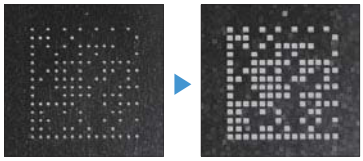
Easily reads difficult codes

FQ-CR2

Just read the code and register it, and then let the following functions automatically tune the settings.
Depending on the conditions of the code, the automatic retry and code error correction functions let, essentially anyone, easily adjust the settings.

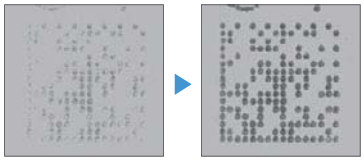
Filter function

Three stages of filtering are automatically selected for the read image from Smooth, Dilate, Erosion, and Median filtering.



Retry function

You can retry the settings until reading is successful while automatically changing the exposure time and other reading parameters.



Code Error Correction

Code omissions and errors are automatically corrected when the code is read.



FQ-CR2

OMRON's Unique Algorithm Provides Superior Reading Ability for Direct Part Marking codes



Removal of Printing Irregularities or Noise

Filter function

You can apply up to three of the four unique filters developed by OMRON in the desired order to remove printing irregularities and noise, in order to achieve a stable reading.

Types of Filtering

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

Combining Filtering

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





Automatic Parameter Adjustment Until Reading is Successful

Retry function

Code Readers must be able to read codes even for poor printing conditions. You can automatically retry reading while changing the exposure time and other reading conditions, even for changing workpieces or environments, to enable a stable reading.

The following retry functions are provided.

1

Retrying the Specified Number of Times with the Same Conditions

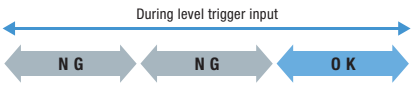
Reading is performed the specified number of times for the same scene.



2

Retrying While External Trigger Is Input

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



3

Retrying While Changing the Shutter Speed

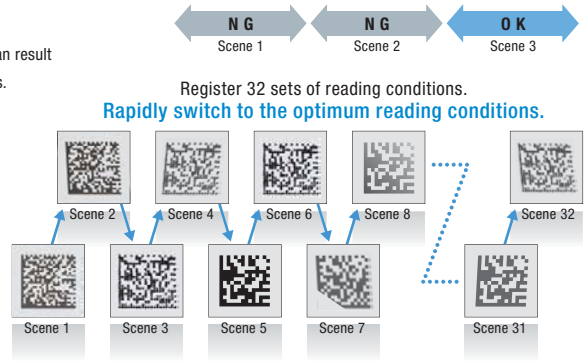
Reading is performed for the same scene while changing the exposure time in stages.



4

Retrying While Changing the Reading Conditions

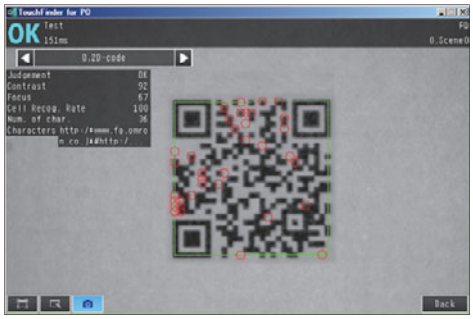
When reading DPM codes, inconsistencies in printing conditions can result in NGs if reading is performed with only one set of reading settings. The FQ-CR allows you to register up to 32 sets of reading conditions as scenes and retry reading while changing the scenes in order. The system automatically 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.



Easy Confirmation of Code Quality

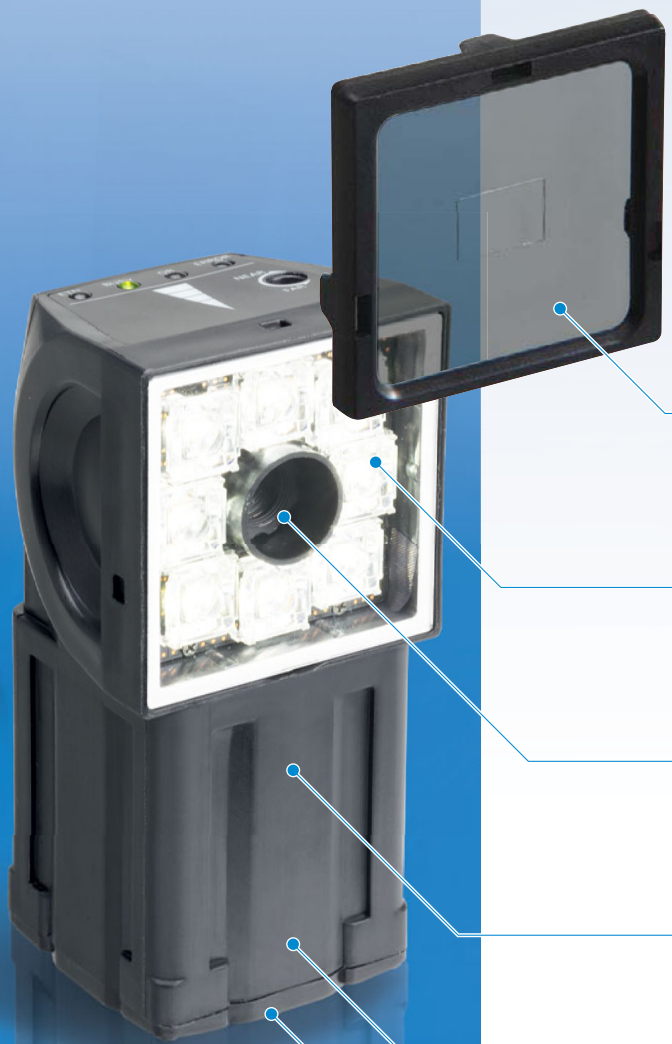
Code Error Correction Position Display

Red circles are displayed on cells
for which the code was corrected on the display.
This clearly shows where the code quality was poor.



FQ-CR1 FQ-CR2

Stable Reading Functions Packed into a Compact Body



Actual Size

Polarization filter

Cuts specular reflections.

High power LEDs

Four times the brightness of previous models.

Lens and Camera

simple fine tuning of camera focus.

Decoder

Built-in HDR function.

Robust housing: IP67

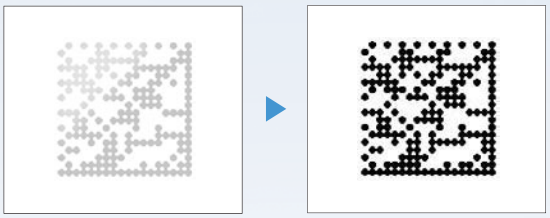
Ethernet Output

Output read codes on Ethernet.

Reads Codes Even with Low Contrast

High-power LEDs

The wider the field of view, the more difficult it is to maintain consistent lighting within the field, causing errors in reading. The built-in LEDs of the FQ-CR Series use a unique OMRON DR optical system for effective light usage to maintain consistent lighting within the field of vision at a brightness that is four times that of previous models.



Previous Lighting

High-power Lighting

Cuts Light Interference

HDR Function

The HDR (high dynamic range) function minimizes the influence of changes in lighting conditions and light reflection. This enables stable inspections even for materials that are difficult to light evenly, such as metal parts or glossy films, or in locations subject to external light interference.



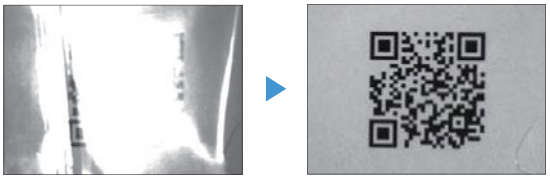
Halation

Stable Detection for Metal Surfaces Subject to Gloss and Inconsistent Lighting

Cuts Specular Reflections

Polarizing Filter

A polarizing filter is included to cut specular reflection from glossy surfaces. This enables stable code reading even for metallic or other glossy surfaces.



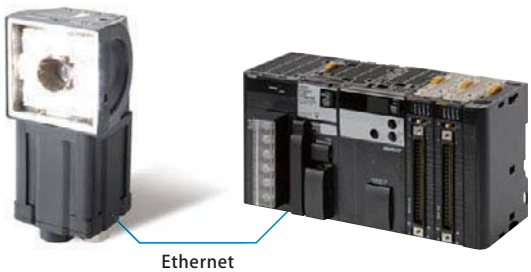
Without Polarizing Filter

With Polarizing Filter

Communications with Host Devices

Ethernet Connection

The compact body also provides an Ethernet connector so that you can transfer read data and images via Ethernet. Smoothly transfer data to PLCs, computers, or other host devices.



FQ-CR1 FQ-CR2

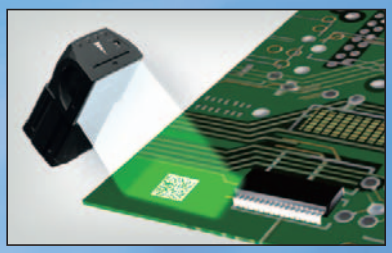
Essentially, Simple Enough for Anyone to Set Up

Setup is as easy as displaying codes on the monitor and registering settings with a simple procedure.
Then, the FQ-CR will automatically tune the settings to achieve the optimum conditions.

You can automatically tune all of these reading conditions just by making the basic settings.

Optimum Tuning in Three Steps

Read a code.



Select the type of code.





Touch Finder

Two Set-up Tools

Use the convenient Touch Finder
for on-site settings and control panel installations,
or use a set-up tool on a computer.



TouchFinder for PC (Free)

After purchasing the Code Reader,
you can download the TouchFinder for PC free from the member's website.

Set-up and Adjustment

Exposure Time | Gain | Dynamic Range | Filtering

Press the TEACH Button.



Check to see if the conditions are correct as a reference.



▶ END

Menu Displays in Nine Languages

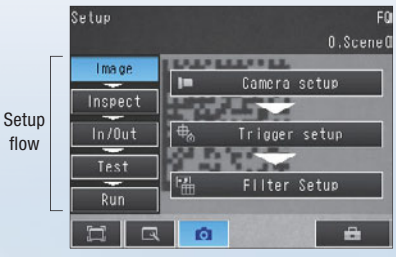
The nine language support for menus means that you can easily introduce systems into factory sites in other countries.
In addition, you can easily change the language on a menu.

English	German
Japanese	French
Traditional Chinese	Italian
Simplified Chinese	Spanish
Korean	



Operation Navigation

Navigation menus for operating procedures from image adjustment through to testing and starting operation are provided so that even beginners can operate the Code Reader.



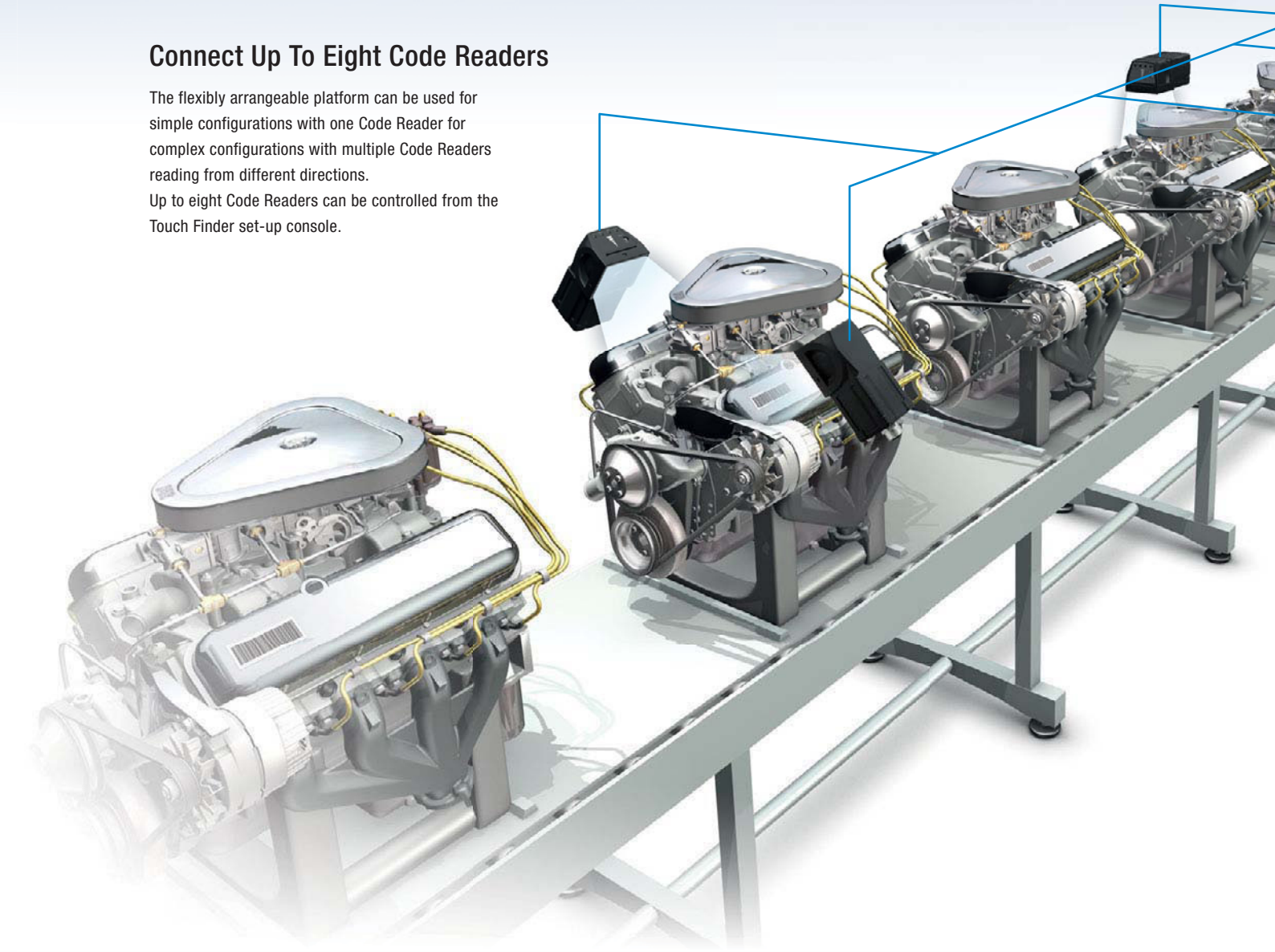
Setup flow

FQ-CR1 FQ-CR2

Flexible System Configuration

Connect Up To Eight Code Readers

The flexibly arrangeable platform can be used for simple configurations with one Code Reader for complex configurations with multiple Code Readers reading from different directions.
Up to eight Code Readers can be controlled from the Touch Finder set-up console.



Code Quality Management

The FQ-CR2 contains state-of-the-art algorithms that enable the reading of codes even with poor reading quality. However, even if the code quality continues to deteriorate for some reason, auto-correction and retrying are used to enable reading, making it impossible to tell where quality was lost simply from the OK/NG reading information. Here, you can use the cell recognition rate information. The cell recognition rate changes with code printing quality, position inconsistency, installation conditions, and noise. You can log the cell recognition rate and image together to manage quality trends. The logging of recent results is useful for testing when commissioning a line. Run through some sample products and log the cell recognition rate. You can then display the results in a time-based graph to see how much leeway there is in reading performance.

* For the FQ-CR1, the number of detected characters is logged instead of the cell recognition rate.

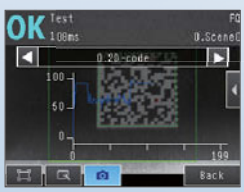
File Logging



SD Card

Cell recognition rate
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)

Logging of Recent Results



Displays the most recent 1,000 cell recognition rate in graph form.



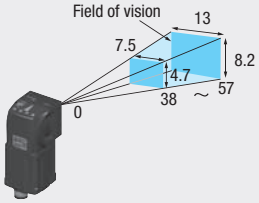
Touch Finder

TouchFinder for PC

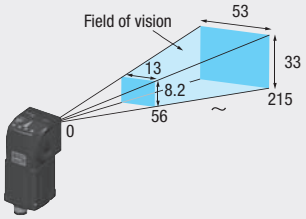
Match your field of view

No matter whether you handle large or small workpieces, the range of Omron FQ-CR Code Readers offers a perfect match. Select the FQ-CR 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.

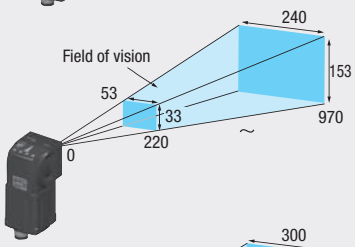
Narrow view



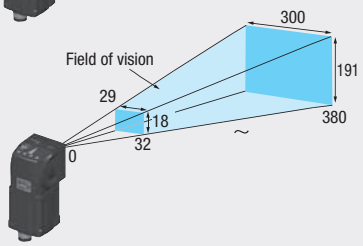
Standard



Wide View (long-distance)

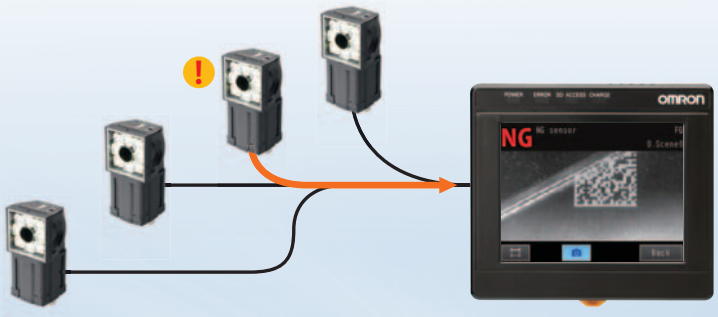


Wide View (short-distance)



Automatic Notification of NGs

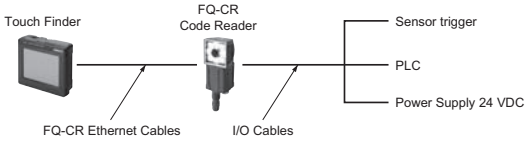
If you leave the Touch Finder installed on-site, the recent NG sensor display is very useful. Even if you are monitoring more than one Code Reader with the Touch Finder, the display automatically changes to the Code Reader where an NG occurred so that you can quickly confirm conditions.



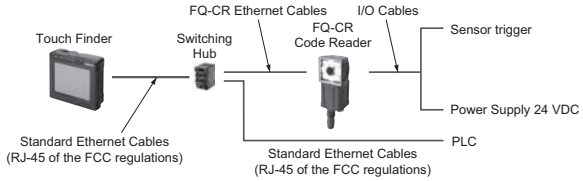
System Configuration

Connections for One Code Reader

Control by parallel input/output

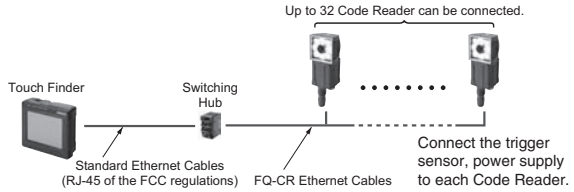


Control by Ethernet

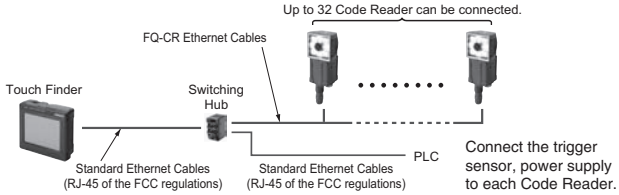


Connections for Multiple Code Reader

Control by parallel input/output



Control by Ethernet



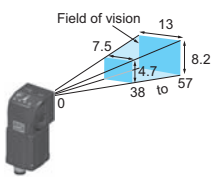
Note: If you register as a member after purchasing a Code Reader, you can download the free set-up software TouchFinder for PC that runs on a PC and can be used in place of the Touch Finder. Refer to the member registration sheet for details.

Ordering Information

Code Reader

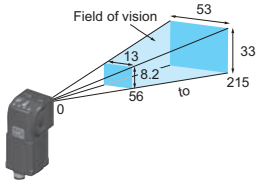
(Unit: mm)

Narrow View



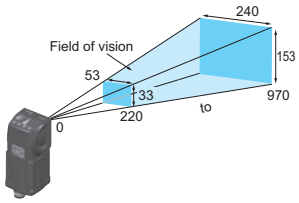
	2D Code Reader	Multi Code Reader
NPN	**FQ-CR20010F-M**	**FQ-CR10010F-M**
PNP	**FQ-CR25010F-M**	**FQ-CR15010F-M**

Standard



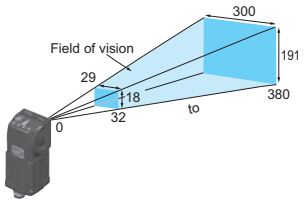
	2D Code Reader	Multi Code Reader
NPN	**FQ-CR20050F-M**	**FQ-CR10050F-M**
PNP	**FQ-CR25050F-M**	**FQ-CR15050F-M**

Wide View (Long-distance)



	2D Code Reader	Multi Code Reader
NPN	**FQ-CR20100F-M**	**FQ-CR10100F-M**
PNP	**FQ-CR25100F-M**	**FQ-CR15100F-M**

(Short-distance)



	2D Code Reader	Multi Code Reader
NPN	**FQ-CR20100N-M**	**FQ-CR10100N-M**
PNP	**FQ-CR25100N-M**	**FQ-CR15100N-M**

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

Touch Finder

Type	Model
DC power supply	**FQ2-D30**
AC/DC/battery	**FQ2-D31 (See note.)**

Note: AC Adapter and Battery are sold separately.

Cables (Robot cable)

Type	Cable length	Model
FQ Ethernet Cables (connect Code Reader to Touch Finder, Code Reader 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	0.22 A	**W4S1-03B**
	5	None	0.22 A	**W4S1-05B**
		Supported		**W4S1-05C**

Accessories

Application	Appearance	Name	Model
For Code Reader		Mounting Bracket (enclosed with Code Reader)	**FQ-XL**
		Mounting Bracket for highprecision sensing ✻1 (sold separately)	**FQ-XL2**
		Polarizing Filter Attachment (enclosed with Code Reader)	**FQ-XF1**
For Touch Finder		Panel Mounting Adapter	**FQ-XPM**
		AC Adapter (for models for DC/AC/Battery)	**FQ-AC1**
		Battery ✻2 (for models for DC/AC/Battery)	**FQ-BAT1**
		Touch Pen (enclosed with Touch Finder)	**FQ-XT**
		Strap	**FQ-XH**
		SD Card (2 GB)	**HMC-SD291**

✻1. A mounting Bracket with improved resistance to vibrations and other external stresses that cause displacement of the optical axis and field of view.

✻2. The Battery uses a lithium ion secondary battery. Confirm any applicable laws and regulations in the destination country if you export the Battery.

Code Reader

Item	Type	2D Code Reader	Multi Code Reader
Model	NPN	FQ-CR20□□□□-M	FQ-CR10□□□□-M
	PNP	FQ-CR25□□□□-M	FQ-CR15□□□□-M
Field of vision		Refer to the table below.	
Installation distance			
Minimum resolution		FQ-CR2□010F-M/-CR1□010F-M: 0.040 mm FQ-CR2□050F-M/-CR1□050F-M: 0.070 mm FQ-CR2□100F-M/-CR1□100F-M: 0.282 mm FQ-CR2□100N-M/-CR1□100N-M: 0.155 mm	
Main functions	Code	2D Code (DataMatrix (EC200), QR Code)	2D Code (DataMatrix (EC200), QR Code, MicroQR Code, PDF417, MicroPDF417, GS1-DataMatrix)
			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 Omni-directional, Limited, Expanded and Expanded Stacked), Pharmacode and GS1-128 Composite Code (CC-A, CC-B, CC-C))
	Image filter	Filter function (Smooth, Dilate, Erosion,Median), Retry function, Code Error Correction Position Display	None
	Verification function	None	Supported
	Number of simultaneous inspections	32	
	Number of registered scenes	32	
Image input	Image filter	High dynamic range (HDR), polarizing filter (attachment)	
	Image elements	1/3-inch monochrome CMOS	
	Shutter	1/250 to 1/32,258 s	1/250 to 1/30,000 s
	Processing resolution	752 × 480	
Lighting	Lighting method	Pulse	
	Lighting color	White	
	LED class	Risk Group 2 (IEC62471)	
Data logging	Measurement data	In Code Reader:1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)	
	Images	In Code Reader: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) • Control command inputs (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	Numerical outputs and control commands are supported with no-protocol communications. 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	21.6 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 (Except when Polarizing Filter Attachment is mounted.)	
Materials		Code Reader: 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	
Accessories		• Mounting Bracket (FQ-XL) (1) • Polarizing Filter Attachment (FQ-XF1) (1) • Instruction Manual • Member registration sheet	

2D Code Reader		Multi Code Reader		Field of view (See note) (Horizontal × Vertical)	Installation distance	Weight
NPN	PNP	NPN	PNP			
FQ-CR20010F-M	FQ-CR25010F-M	FQ-CR10010F-M	FQ-CR15010F-M	7.5 × 4.7 to 13 × 8.2 mm	38 to 57 mm	200 g max.
FQ-CR20050F-M	FQ-CR25050F-M	FQ-CR10050F-M	FQ-CR15050F-M	13 × 8.2 to 53 × 33 mm	56 to 215 mm	
FQ-CR20100F-M	FQ-CR25100F-M	FQ-CR10100F-M	FQ-CR15100F-M	53 × 33 to 240 × 153 mm	Long-distance model: 220 to 970 mm	
FQ-CR20100N-M	FQ-CR25100N-M	FQ-CR10100N-M	FQ-CR15100N-M	29 × 18 to 300 × 191 mm	Short-distance model: 32 to 380 mm	

Note: Tolerance: ±10% max.

Touch Finder

Item		Type / Model	Model with DC power supply FQ2-D30	Model with AC/DC/battery power supply 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 25ºC	
		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 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	
	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^2 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.

Battery Specifications

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 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 TouchFinder for PC

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 × 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.

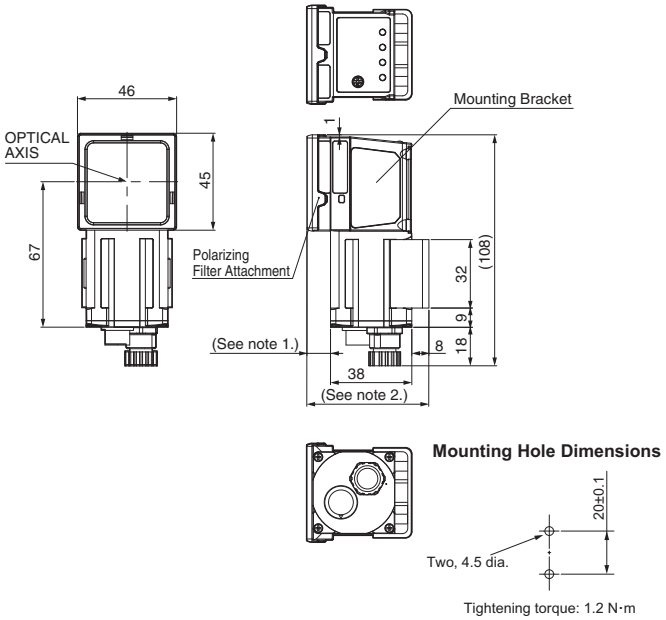
Dimensions

(Unit: mm)

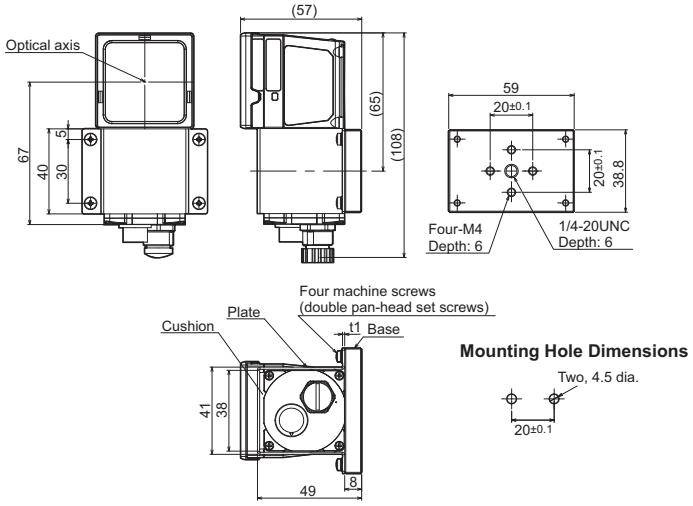
Code Reader (Dimensional drawings are provided here only for the products that have undergone design changes as of June 2012.)

FQ-CR

Mounting with the FQ-XL Mounting Bracket



Mounting with the FQ-XL2 Mounting Bracket

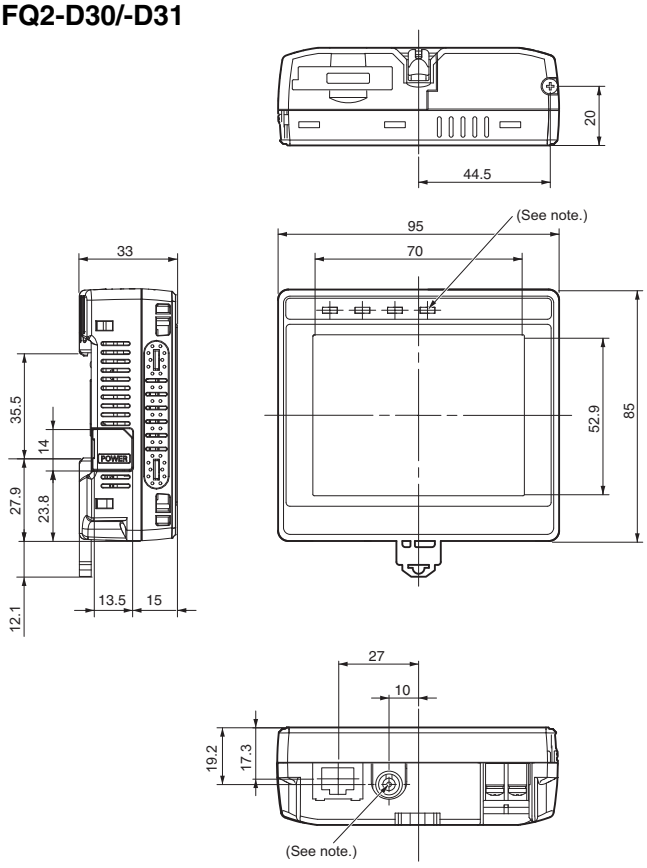


✻Dimentions with the FQ-XL Mounting Bracket

Type	Model	Note 1.	Note 2.
Narrow View, Standard	FQ-CR1□010F-M/-CR2□010F-M/ -CR1□050F-M/-CR2□050F-M	11	57
Wide View	FQ-CR1□100F-M/-CR2□0100F-M/ -CR1□100N-M/-CR2□100N-M	3	49

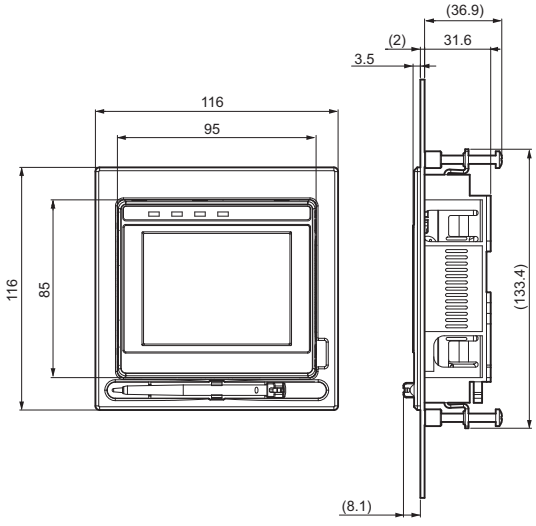
Touch Finder

FQ2-D30/-D31

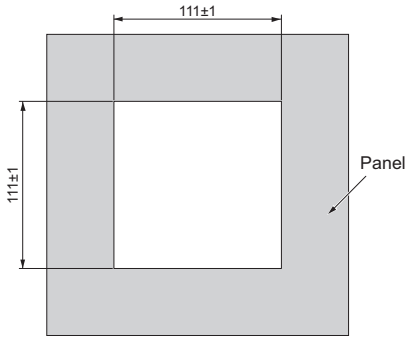


Note: Provided with FQ2-D31 only.

Panel Mounting Adapter



Panel Cutout Dimensions



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