OMRON

Code Reader/OCR

Tracing Products Group Catalog

High-accuracy, Multifunctional Readers

LOT. NO. S4153 2013

12packs 2013.01.15

Ultra-compact, High-speed Readers

realizing

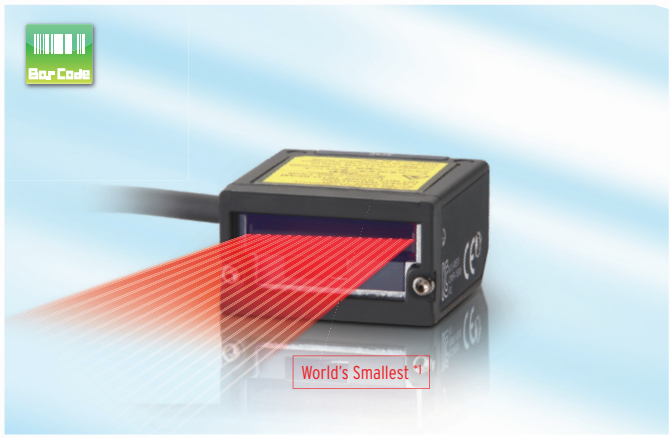
Code Reader

You can select the optimum products from

We provide Readers for everything from Bar Codes and 2D Codes

The lineup also includes Readers that

Ultra Compact and Fast



Laser-type Bar Code Reader

V500-R2 Series

- High speed: 1,000 scans/s
- Long distance: 270 mm
- World's Smallest

▶▶P4

Multi Code Reader

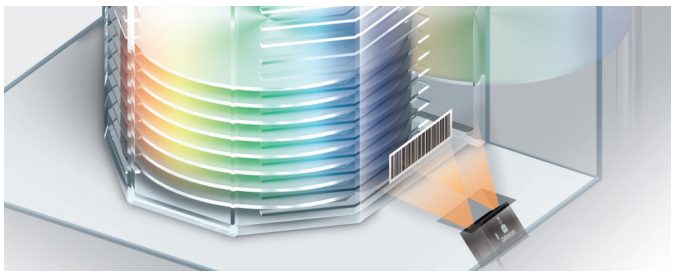
V400-R2 Series

- Fastest reading in the class:
  Reads moving objects at up to 500 m/min *2
- Long distance: 125 mm
- Ultra compact

▶▶P8

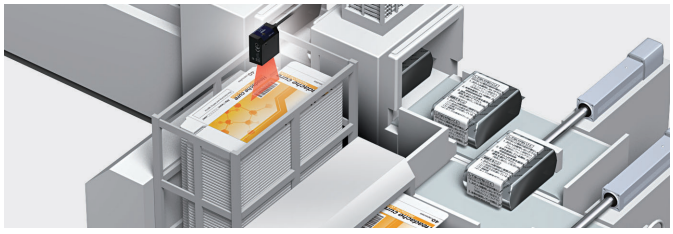
Conveyors

・Ultra compact for possible mounting in rail gaps.
・Stable reading of high-speed moving objects.



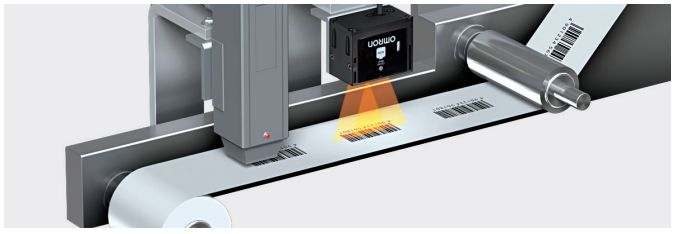
Semiconductor Manufacturing Equipment

・World's smallest reader handles 300-mm wafer loading ports.



Cartoners

・Prevention of mixing of different cartons by reading bar codes.



Labeler

・Reading to check printing conditions.

*1.According to OMRON investigation in January 2013.
*2.Performance may depend on the code that is read and the printing conditions.

and OCR Lineup

OMRON's wide lineup of tracing products.
printed on paper or labels to DPM directly printed on workpieces.
can read expiration dates and other text.

High-accuracy and Multifunctional

Multi Code Reader
FQ-CR1 Series

- HDR function to cut out ambient light interference.
- Polarizing filter to cut specular reflections.
- Verification with master data.

▶▶P 12

2D Code Reader for DPM
FQ-CR2 Series

- Reads direct part marking codes.
- Cuts halation from metallic surfaces.
- High-power LED that is effective for low contrast.

▶▶P 12

Optical Character Recognition Sensor
FQ2-CH Series

- New OCR algorithm.
- Easy application with no dictionary registration.
- Handles dot characters, stamped characters, and more.

▶▶P 16

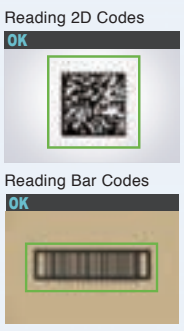
Smart Camera
FQ2-S4 Series

- Code reader, OCR, and inspections.
- Lineup includes Integrated Sensors and C-mounts.
- High resolution of 760,000 or 1,300,000 pixels.

▶▶P 20

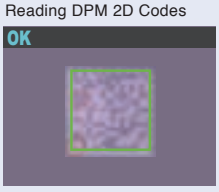
Case Packers

- Lineup of models with many installation distances from 38 to 970 mm.
- Stable reading of low-contrast codes.



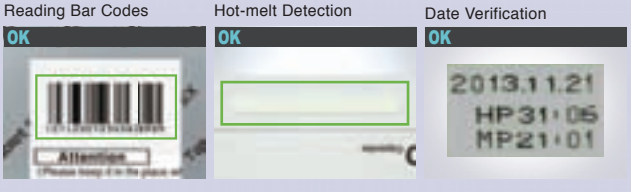
Automotive Processing Machines

- High-performance filters that cut specular reflections from metallic or glossy surfaces.



Cartoners

- Multi-processing of everything needed for cartoners: character verification, code reading, and inspections.



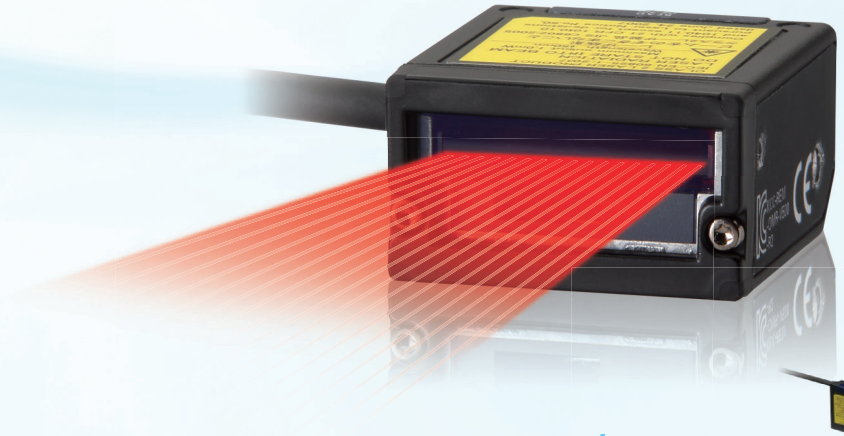
The World's Smallest* Bar Code Reader That Fits Essentially Anywhere

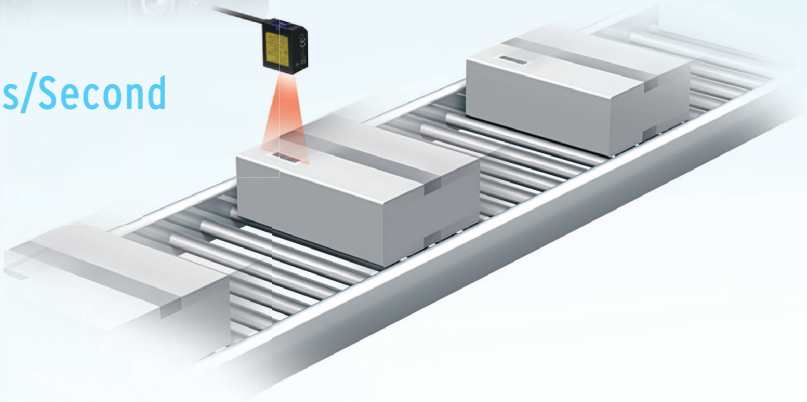
*According to OMRON investigation in January 2013.

Laser-type Bar Code Reader

V500-R2 Series

About 1/6th the Size of a Business Card



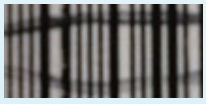
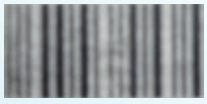
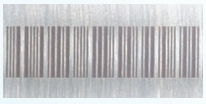
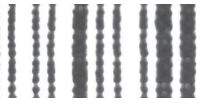


High-speed Reading at 1,000 Scans/Second

A high-speed motor and new algorithm gives surprising performance for the size to achieve stable reading even in high-speed takt machines of around 66,000 items/hour.

Enables Reading Imperfect Codes

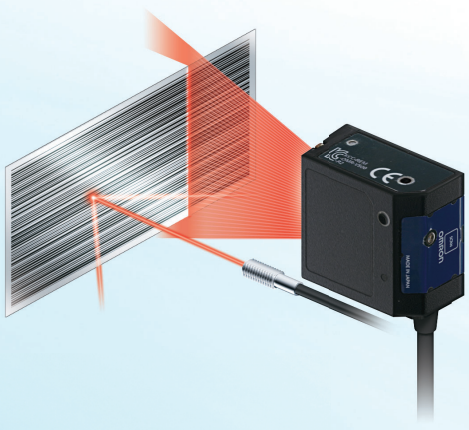
Even though it is small, the V500-R2 with its new algorithm is adept at reading even the most imperfect codes. Raster scanning enables reading Bar Codes even if they are partially dirty or missing.

Dirt	Wear	Blurring	Shiny background	Inconsistent background	Dots
					

Resists Ambient Light Interference

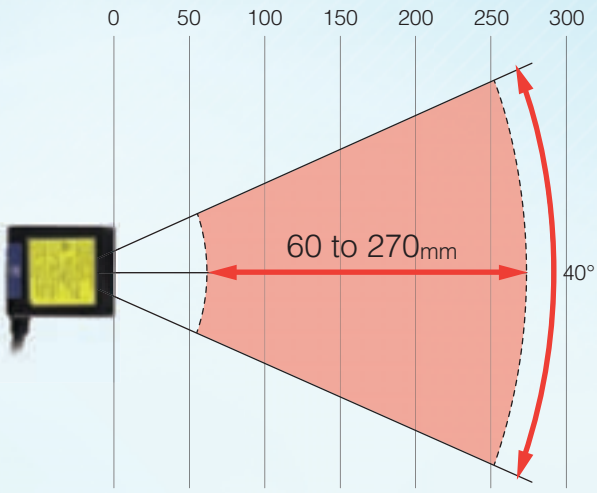
Operation is possible with ambient illumination of up to 80,000 lx (sunlight), so the Code Reader can stably read even near Photoelectric Sensors with little influence from ambient light.

Ambient Light Interference Guidelines	
Florescent light	4,000 lx max.
Sunlight	80,000 lx max.



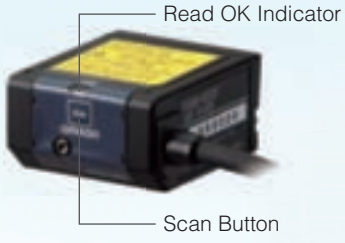
Long Range Up to 270 mm

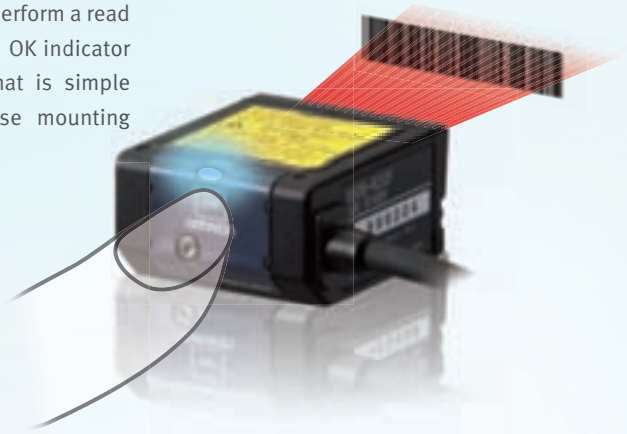
The wide reading distance from 60 to 270 mm lets you handle variations in conveying and workpiece height without changing the installation.



Reading Test Switch Provided

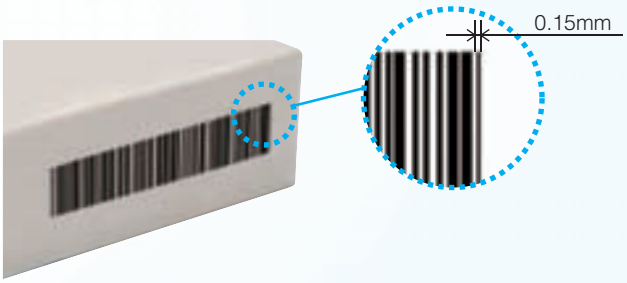
Just press the Scan button on the Reader to perform a read test. The results are provided with the Read OK indicator and buzzer. We achieved an operation that is simple enough for essentially anyone to increase mounting efficiency.





Minimum Readable Narrow Bar Width: 0.15 mm

Reading is even possible for Bar Codes with narrow bars of 0.15 mm.

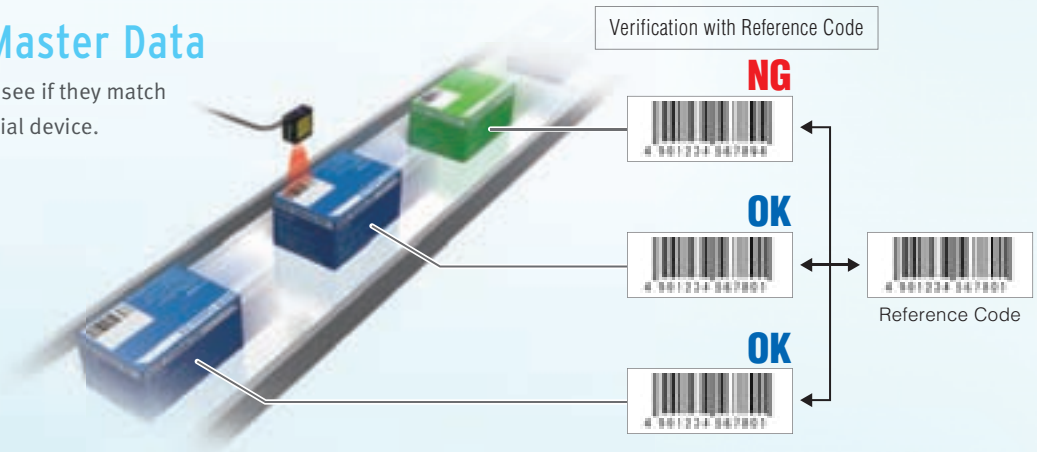


GS1-Databar (RSS) Supported

The data-rich GS1-Databar (RSS code) Bar Codes can also be read.

Verification with Master Data

You can verify character strings to see if they match preset master data without a special device.



Ordering Information

Type		Model
Laser-type Bar Code Reader		**V500-R2CF**
OMRON PLC connecting cable	D-sub 9-pin, 0.8M	**V509-W011**
	D-sub 9-pin, 5M	**V509-W016**
PC/AT Connecting cable	D-sub 9-pin, 0.8M	**V509-W011D**
	D-sub 9-pin, 5M	**V509-W016D**

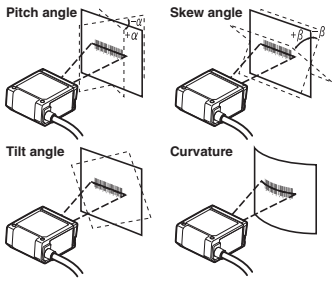
Ratings and Performance

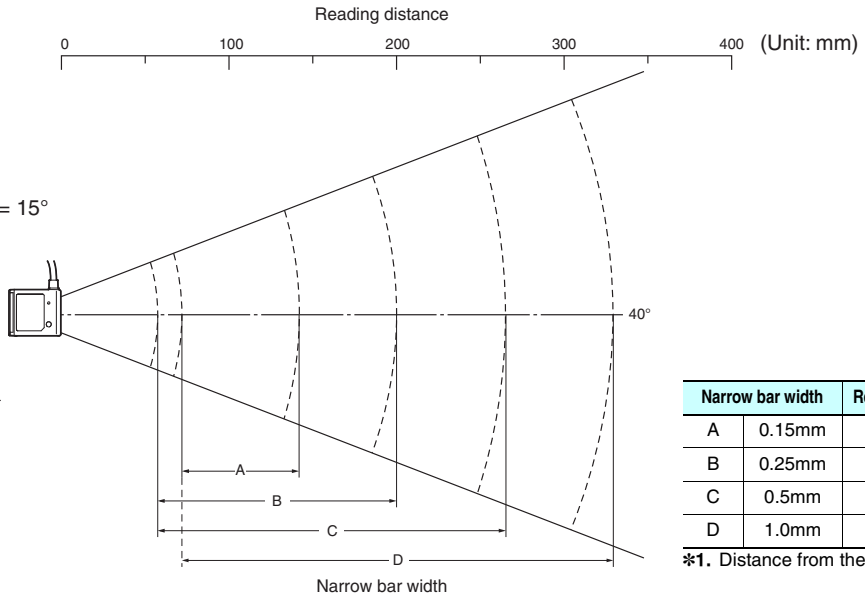
Model		V500-R2CF
Direction of view		Front view
Applicable codes	**Bar code**	WPC(JAN/EAN/UPC), Codabar(NW-7), ITF, Industrial 2 of 5(STF), Code39, Code93, Code128, GS1-128(EAN-128), GS1-Databar(RSS-14), GS1-Databar Limited(RSS Limited), GS1-Databar Expanded(RSSExpanded)
	Number of reading digits	No upper limit (depends on bar width and reading distance)
Reading performance(*)	**Minimum resolution**	Bar code: 0.15 mm
	Contrast (PCS)	0.45 or more (white reflectance 70 % or more)
	Reading distance	60 to 270 mm (At narrow bar: 0.5 mm)
	Reading angle	Within 40° (Including margins at left and right sides)
	Pitch angle (α)	±30°
	Skew angle (β)	±60° (However, exclude from 10° upper side to 8° lower side)
	Tilt angle (γ)	±25°
	Reading of bar codes on curved surfaces (R)	R ≧ 20mm (UPC 12 digit)
	Light source	Red laser diode (Wave length: 650 nm)
	Light output	1.0m W or less (Correspond to JIS class 2)
	Scan type	Raster scan
	Number of scan	1000 scan/sec.
Interface	**Communication specification**	RS-232C
	OK/NG outputs	NPN open collector output (cable work required)
Function setting method		Menu sheet reading method or host command method
Functional specifications	**Reading trigger**	External trigger (Transistor input), Trigger by command (RS-232C), Trigger a test reading by pressing the SCAN button on the product
	OK/NG signals	• When the label is not registered OK signal : ON when reading is successful NG signal : ON when reading fails • When the label is registered OK signal : ON when reading result matches registered label NG signal : ON when reading fails or reading result does not match registered label
	Indication LED	Read confirmation LED (green) illuminates when reading is successful. Read confirmation LED (red) blinks when motor is in abnormal operation.
	Buzzer	Notifies a successful reading with a buzzer sound (Muting available)
Power supply specification	**Power voltage**	4.5 to 5.5 VDC
	Consumption current	During operation: 500 mA or less; during standby: 150 mA or less
	Inrush current	2.0 A MAX
Environmental specifications	**Ambient temperature range**	At operation: 0 to + 45°C At storage: -10 to + 60°C
	Ambient humidity range	At operation and storage: 20 to 85% RH (with no icing or condensation)
	Ambient atmosphere	No corrosive gases
	Ambient light	Fluorescent lamp: 4,000lx or less, Sunlight: 80,000lx or less
	Vibration resistance	10 to 150 Hz, half amplitude 0.35 mm, 3 directions (X/Y/Z), 8 minutes each 10 times
Degree of protection		IP54 (IEC60529)
Weight	**Main unit only**	Approximately 80 g
	Including accessories	Approximately 190 g (including mounting bracket, insulation plate and screws)
	Packaged weight	Approximately 270 g (including packing carton)
Dimensions	**Main unit**	Approximately 29(W) × 34.5(D) × 17(H)mm
	Packing carton	Approximately 245(W) × 110(D) × 40(H)mm
Input/output connector		Round DIN connector
Code length		Approximately 1.5 m
Minimum bending radius of cord		Approximately 23 mm
Accessories		Operation manual, menu sheet, mounting bracket, insulation plate, M3 × 6 screw (two), M3 × 8 screws (one), M5 × 10 screws (two)
Material, Color	**Upper case**	Magnesium diecast, black
	Front panel	PC, black
	Labels	PET
	Reading window	PMMA, transparent
	Cable	Polyvinyl chloride (PVC), black
	Insulation plate	ABS, black
	Mounting bracket	SUS304, silver

✻ Unless otherwise specified, use a JAN x1 , MRD 63% or higher (PCS = 0.9 or higher) bar code with a pitch angle α = 0°, a skew angle β = 15°, a tilt angle γ = 0°, and a curvature R = ∞.

Reading range performance (typical example)

Explained with examples of following conditions:
- Contrast: MRD 63 % (PCS = 0.9)
- Bar code: CODE39
- Installation condition:
  Pitch angle α = 0°, skew angle β = 15°
  Tilt angle γ = 0°, curvature R = ∞





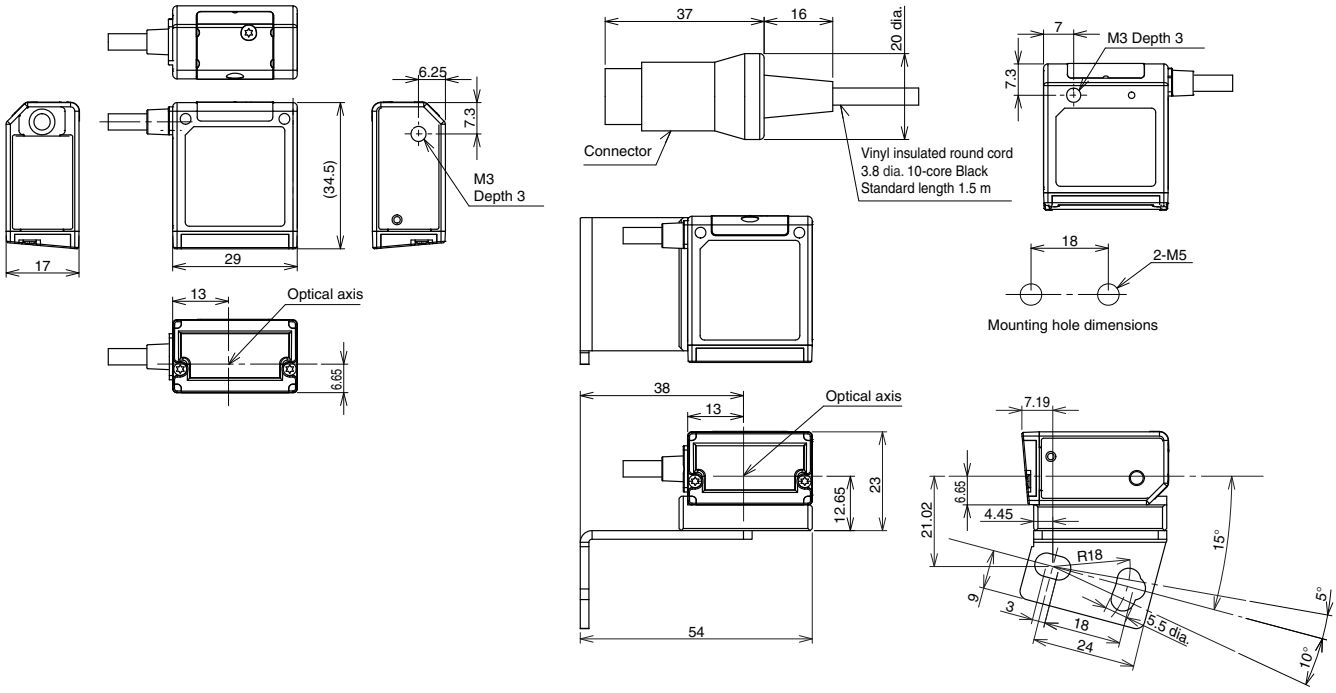
Narrow bar width		Reading distance (*1)
A	0.15mm	70 to 140mm
B	0.25mm	60 to 200mm
C	0.5mm	60 to 270mm
D	1.0mm	70 to 330mm

*1. Distance from the end of the case.

Dimensions

(Unit: mm)

Bar Code Reader
V500-R2CF



Safety Precautions for Laser Equipment

⚠ WARNING

Avoid eye exposure to direct or scattered radiation reflected by a mirror surface.
Laser beam emitted from a laser has high power density and may become blind when the beam is directed into eyes.

Laser Label Indications

This warning label is attached to the Bar Code Reader.
Never remove this label or place objects in front of it.

Related Manuals

Man.No.	Model number	Manual
Z334	V500-R2	Laser-Type Bar Code Reader V500-R2 Series User's Manual

The Ultra-small Multi-code Reader That Can Handle Speed

Multi Code Reader
V400-R2 Series

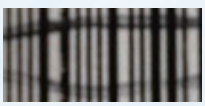
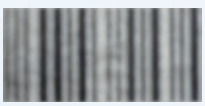
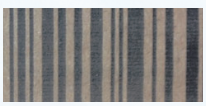
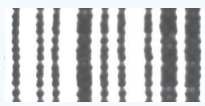
Improves Machine Takt Time with the Fastest Reading in the Class: Reads Moving Objects at Up to 500 m/min*

It is not just the size that makes this Reader easy to build into equipment. It enables stable reading of moving objects on high-speed lines. Build it into equipment to read moving objects, which is achieved with a new algorithm.

* Performance may depend on the code that is read and the printing conditions.

Stable Reading of Imperfect Codes

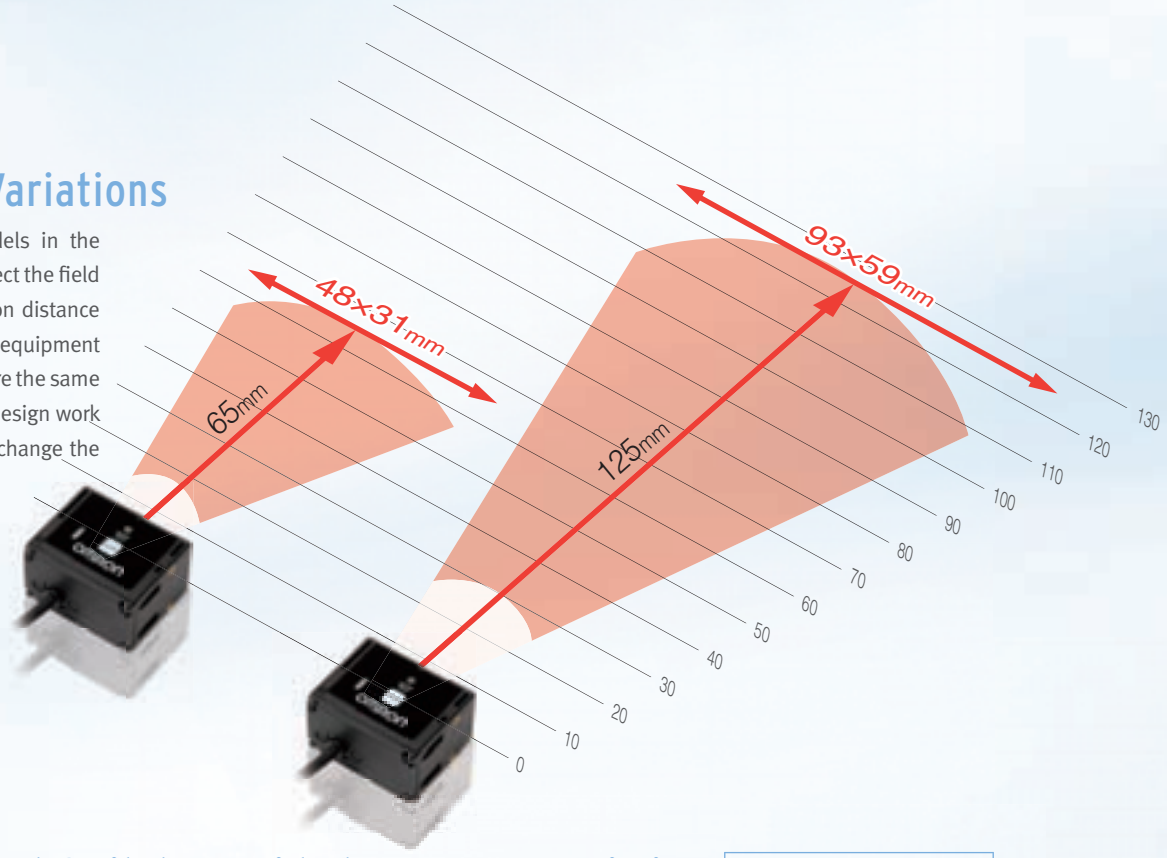
The V400-R2 with its new algorithm is adept even the most imperfect codes. Even for codes that were previously difficult to read, you can change the exposure time and gain to achieve the optimum settings to enable reading.

Dirt	Wear	Blurring	Shiny background	Inconsistent background	Dots
					

Standard	Wear	Damage	Low contrast	Distortion	Dots

Distance Variations

There are two models in the lineup to let you select the field of view or installation distance that is best for the equipment type. Both models are the same size, so additional design work is not necessary to change the model.

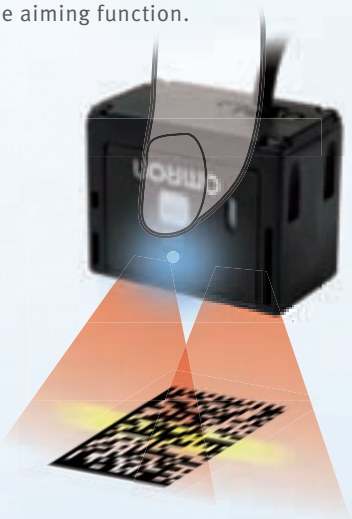


Reading Test Switch Provided

We achieved an operation that is simple enough for essentially anyone. Just press the Scan button on the Reader to perform a read test. The results are provided with the Read OK indicator and buzzer.

Aiming Positioning Function

A guide light lets you easily find the ideal installation position. You can easily and quickly position the codes with the aiming function.



Body Resists Environments to IP65

IP65 protection is provided because that is generally the level that is required to build devices into equipment. That enables reliable application in harsh environments subject to water and mist.

GS1-Databar (RSS) Supported

The data-rich GS1-Databar (RSS code) Bar Codes can also be read. This enables reliable applications in the pharmaceutical industry, where GS1-Databar (RSS code) Bar Codes are becoming popular.

Verification with Master Data

You can verify character strings to see if they match preset master data without a special device.

Ordering Information

Type		Model
Multi Code Reader	Working distance 65mm	**V400-R2CF65**
	Working distance 125mm	**V400-R2CF125**
OMRON PLC connecting cable	D-sub 9-pin, 0.8M	**V509-W011**
	D-sub 9-pin, 5M	**V509-W016**
PC/AT Connecting cable	D-sub 9-pin, 0.8M	**V509-W011D**
	D-sub 9-pin, 5M	**V509-W016D**

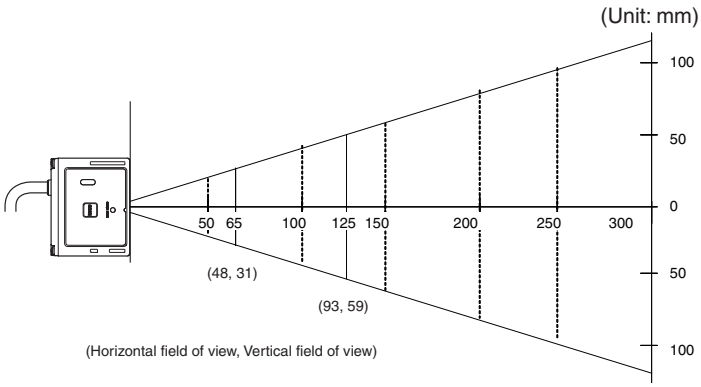
Ratings and Performance

Model		V400-R2CF65	V400-R2CF125
Direction of view		Front view	
Applicable codes ✻1	**Bar code**	WPC(JAN/EAN/UPC), Codabar(NW-7), ITF, Industrial 2 of 5(STF), Code39, Code93, Code128, GS1-128(EAN-128), GS1-Databar(RSS-14), GS1-Databar Limited(RSS Limited), GS1-Databar Expanded(RSS Expanded), GS1-Databar Composite(RSS Composite)	
	2D code	QR code, DataMatrix(ECC200), MicroQR code, PDF417, AztecCode, MaxiCode, Codablock-F	
Reading performance ✻2	**Number of reading digits**	No upper limit (depends on bar width and reading distance)	
	Light source	Two red LEDs (wave length: 617 nm)	
	Aiming light	One green LED (wave length: 528 nm)	
	Minimum resolution	Bar code: 0.076 mm 2D code: 0.127 mm	Bar code: 0.127 mm 2D code: 0.212 mm
	Image capture device	Monochrome CMOS	
	Effective number of pixels	754 × 480 pixels	
	Working distance (WD)	65mm	125mm
	Field of view	Approximately 48 × 31(for WD = 65 mm)	Approximately 93 × 59(for WD = 125 mm)
	Pitch angle (α)	±50°	
	Skew angle (β)	±50°	
	Tilt angle (γ)	±180°	
	Reading of bar codes on curved surfaces (R)	R ≧20mm (UPC 12 line)	
Interface	**Communication specification**	RS-232C	
	OK/NG outputs	NPN open collector output (cable work required)	
Function setting method		Menu sheet reading, Sending commands from upper equipment, or SCAN button (only when executing code condition teaching)	
Functional specifications	**Reading trigger**	External trigger (Transistor input) Trigger by command (RS-232C) Trigger a test reading by pressing the SCAN button on the product	
	OK/NG signals	• When the label is not registered OK signal: ON when reading is successful NG signal: Not used • When the label is registered OK signal: ON when reading result matches registered label NG signal: ON when reading result does not match registered label	
	Indication LED	• When reading Read confirmation LED (green) illuminates when reading is successful. • When teaching Read confirmation LED (green) blinks during execution. When teaching is successful, read confirmation LED (green) illuminates and buzzer sounds. When teaching fails, read confirmation LED (red) illuminates and BAD buzzer sounds. ✻3	
	Buzzer	Notifies a successful reading with a buzzer sound (Muting available)	
Power supply specification	**Power voltage**	4.5 to 5.5 VDC	
	Consumption current	During operation: 265 mA or less; during standby: 70 mA or less	
Environmental specifications	**Ambient temperature range**	At operation: 0 to + 45°C; At storage: -10 to + 60°C	
	Ambient humidity range	At operation and storage: 20 to 85% RH (with no icing or condensation)	
	Ambient atmosphere	No corrosive gases	
	Ambient light	Fluorescent lamp: 10,000lx or less, Sunlight: 100,000lx or less	
	Vibration resistance	10 to 150 Hz, half amplitude 0.35 mm, 3 directions (X/Y/Z), 8 minutes each 10 times	
Degree of protection		IP65 (IEC60529)	
Weight	**Main unit only**	Approximately 90 g	
	Including accessories	Approximately 200 g (including mounting bracket and screws)	
	Packaged weight	Approximately 280 g (including packing carton)	
Dimensions	**Main unit**	Approximately 41(W) × 33(D) × 24(H) mm	
	Packing carton	Approximately 240(W) × 110(D) × 40(H) mm	
Input/output connector		Round DIN connector	
Code length		Approximately 1.5 m	
Minimum bending radius of cord		Approximately 23 mm	
Accessories		Operation manual, menu sheet, mounting bracket, M2 × 6 screws (two), M5 ×10 screws (two)	
Material, Color	**Case**	PC, PET, black	
	Reading window	PMMA, transparent	
	Cable	Polyvinyl chloride (PVC), black	
	Mounting bracket	SUS304, silver	

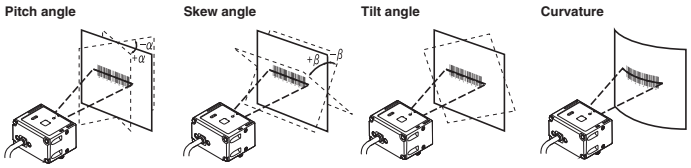
✻1. These are the code types supported based on Omron's read capability validation standard. It is recommended that the customer do its own validation in its actual work environment.
✻2. Unless otherwise specified, the reading performance is defined with angle α = 0°, β = +15°, γ = 0°, R = ∞; illuminance:100 to 2001x, reading rate: 90% or more.
✻3. The BAD buzzer is two low-pitched buzz sounds.

•QR code is the registered trademark of DENSO WAVE.

Reading range performance (typical example)



Explained with examples of following conditions:
•Contrast: MRD 63% (PCS = 0.9)
•Installation condition:
Pitch angle α = 0°, skew angle β = 15°
Tilt angle γ = 0°, curvature R = ∞
•Reading rate: 90% or more in 10 tries



V400-R2CF125
2D code (typical example)

Code types	Resolution	Reading distance	Field-of-view size at reading distance
QR Code	0.212	95 to 115	70×44 to 85×54
	0.381	60 to 185	44×28 to 137×87
Data Matrix	0.254	80 to 145	59×38 to 107×68
PDF417	0.169	85 to 130	63×40 to 96×61
	0.254	65 to 180	48×30 to 133×85

Bar code (typical example)

Code types	Resolution	Reading distance	Field-of-view size at reading distance
Code39	0.127	90 to 125	66×42 to 93×59
	0.254	70 to 190	52×33 to 141×89
	0.508	65 to 235	48×30 to 174×110
Code128	0.2	80 to 160	59×38 to 118×75
UPC	0.33	55 to 185	40×25 to 137×87

V400-R2CF65
2D code (typical example)

Code types	Resolution	Reading distance	Field-of-view size at reading distance
QR Code	0.169	70 to 80	51×33 to 59×38
	0.381	45 to 110	33×21 to 81×52
Data Matrix	0.212	65 to 90	48×31 to 66×42
PDF417	0.127	65 to 80	48×31 to 59×38
	0.254	65 to 110	48×31 to 81×52

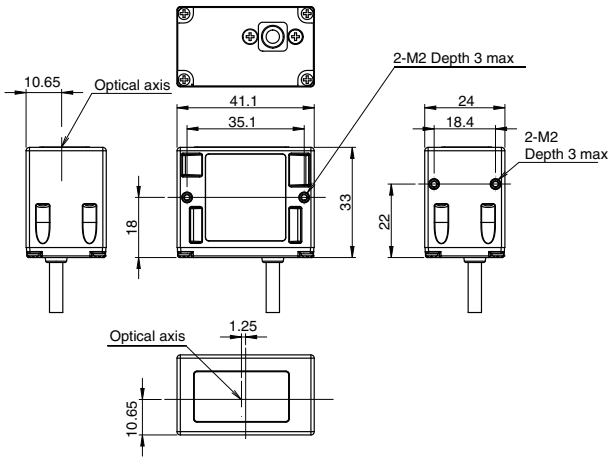
Bar code (typical example)

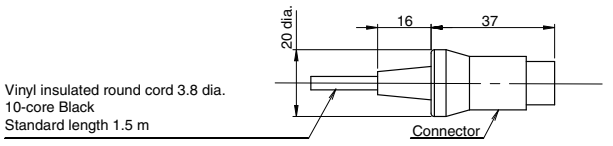
Code types	Resolution	Reading distance	Field-of-view size at reading distance
Code39	0.127	65 to 85	48×31 to 62×40
	0.254	60 to 110	44×28 to 81×52
Code128	0.18	55 to 100	40×26 to 74×47
UPC	0.33	60 to 125	44×28 to 92×58

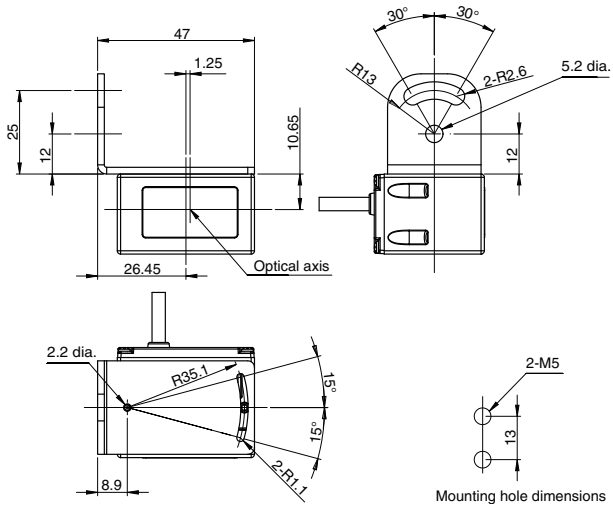
Dimensions

(Unit: mm)

Multi Code Reader
V400-R2CF65/R2CF125







Related Manuals

Man.No.	Model number	Manual
Z333	V400-R2	Multi Code Reader V400-R2 Series User's Manual

Multi Code Reader FQ-CR1 series

2D Code Reader for DPM FQ-CR2 series

Highly Advanced, Multi-functional Code Reader That Can Handle Low-contrast and Glossy Surfaces

Multi Code Reader
FQ-CR1 Series

2D Code Reader for Direct Part Marking codes
FQ-CR2 Series

FQ-CR1 | FQ-CR2

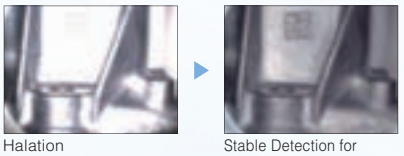
High-power LEDs

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 view at a brightness that is four times that of previous models.

Previous Lighting | High-power Lighting

HDR Function to Cut Out Ambient Light Interference

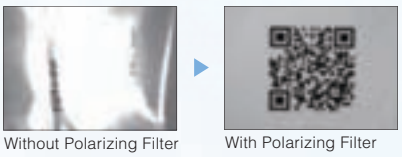
The HDR (high dynamic range) function minimizes the influence of changes in lighting conditions and light reflection. This enables stable inspections even for materials that are difficult to light evenly, such as metal parts or glossy films, or in locations subject to external light interference.



Halation | Stable Detection for Metal Surfaces Subject to Gloss and Inconsistent Lighting

Polarizing Filter to Cut Specular Reflections

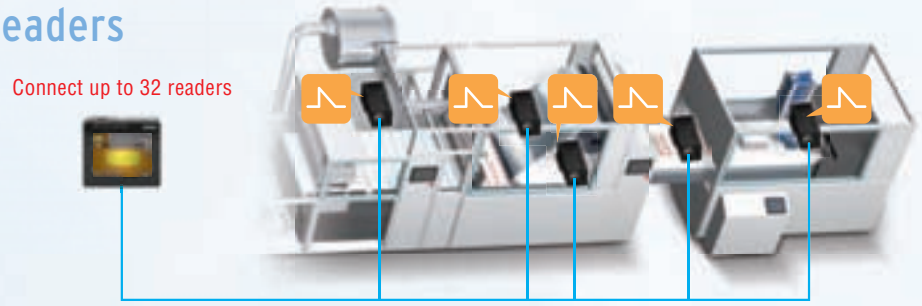
A polarizing filter is included to cut specular reflection from glossy surfaces. This enables stable code reading even for metallic or other glossy surfaces.



Without Polarizing Filter | With Polarizing Filter

Connection of Up to 32 Readers

Up to 32 Code Readers can be controlled from the Touch Finder setup console. Expansion of required processes is simple.



FQ-CR2

Removing Printing Irregularities or Noise

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.

Combining Filtering

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

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.

Retry Reading Until Successful

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.

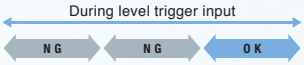
The following retry functions are provided.

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**

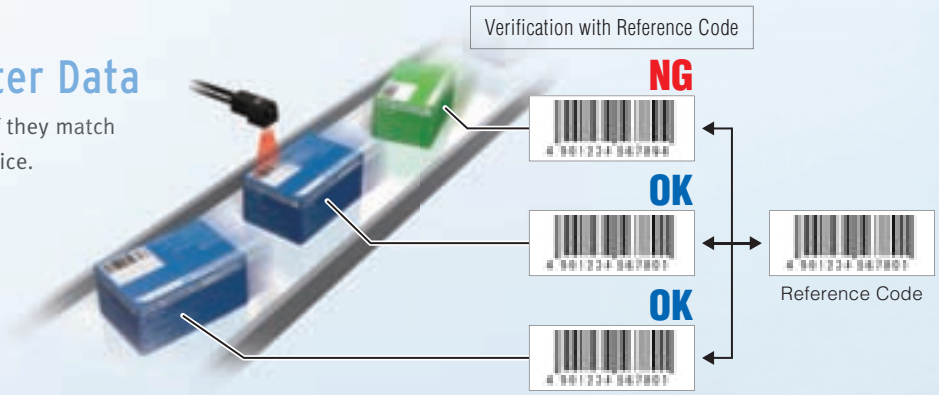
When reading DPM codes, inconsistencies in printing conditions can result in NGs if reading is performed with only one set of reading settings. The FQ-CR allows you to register up to 32 sets of reading conditions as scenes and retry reading while changing the scenes in order. The system automatically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

Register 32 sets of reading conditions.
Rapidly switch to the optimum reading conditions.

FQ-CR1

Verification with Master Data

You can verify character strings to see if they match preset master data without a special device.

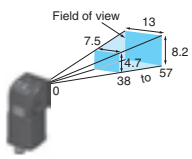


Ordering Information

Code Reader

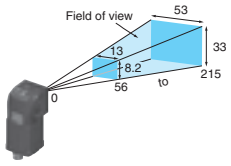
(Unit: mm)

Narrow View



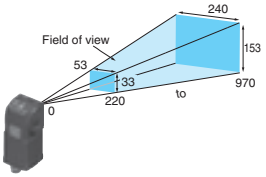
	2D CodeReader	Multi Code Reader
NPN	**FQ-CR20010F-M**	**FQ-CR10010F-M**
PNP	**FQ-CR25010F-M**	**FQ-CR15010F-M**

Standard



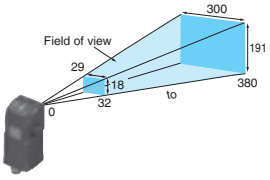
	2D CodeReader	Multi Code Reader
NPN	**FQ-CR20050F-M**	**FQ-CR10050F-M**
PNP	**FQ-CR25050F-M**	**FQ-CR15050F-M**

Wide View(Long-distance)



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

(Short-distance)



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

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

Touch Finder

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

Refer to the FQ2 Smart Camera Catalog (Cat. No. Q193) for other devices.

Cables

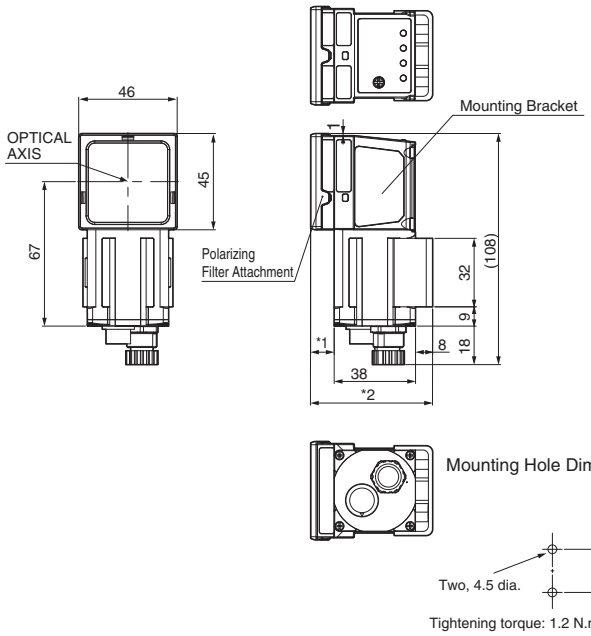
Type	Cable length	Model
FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC)	2m	**FQ-WN002**
	5m	**FQ-WN005**
	10m	**FQ-WN010**
	20m	**FQ-WN020**
I/O Cables	2m	**FQ-WD002**
	5m	**FQ-WD005**
	10m	**FQ-WD010**
	20m	**FQ-WD020**

Dimensions

(Unit: mm)

Code Reader

FQ-CR



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

Ratings and Performance

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 view		Refer to Ordering Information on p.14 (Tolerance (field of view): ±10% max.)	
Installation distance			
Minimum resolution		FQ-CR2□010F-M/-CR1□010F-M: 0.040mm FQ-CR2□050F-M/-CR1□050F-M: 0.070mm FQ-CR2□100F-M/-CR1□100F-M: 0.282mm FQ-CR2□100N-M/-CR1□100N-M: 0.155mm	
Main functions	Code	2D Code (DataMatrix (EC200), QR Code)	2D Code (DataMatrix (EC200), QR Code, MicroQR Code, PDF417, MicroPDF417, GS1-Data Matrix
			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	
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), Communications trigger (Ethernet TCP no-protocol)	
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	100BASE-TX/10BASE-T	
	Communications	Ethernet TCP no-protocol	
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	
	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	
	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	
Weight		Narrow View/Standard View:Approx.160 g Wide View:Approx.150 g	
Accessories		• Mounting Bracket (FQ-XL) (1) • Polarizing Filter Attachment (FQ-XF1) (1) • Instruction Manual • Member registration sheet	
LED class		Risk Group 2 (IEC62471)	

Related Manuals

Man.No.	Model number	Manual
Z329	FQ-CR1-M	Fixed Mount Multi Code Reader FQ-CR1-M User's manual
Z316	FQ-CR2-M	Fixed Mount 2D Code Reader FQ-CR2-M User's manual

An OCR Sensor with Built-in Dictionary for Reading Expiration Dates and Lot Numbers

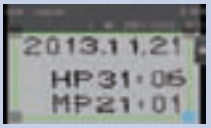
Optical Character Recognition Sensor
FQ-CH Series

Approx. 80 Built-in Fonts

The large amount of data in the built-in dictionary contains approximately 80 different fonts that are used on FA sites.Variations for worn characters, blurring, distortion, different backgrounds, and size changes have been included to enable stable and highly accurate reading with the built-in dictionary even for some variations in the characters.It is not necessary to set parameters to compensate for character contrast or positional offsetting.

Time is required for character registration in the dictionary.

① Draw boxes around characters.

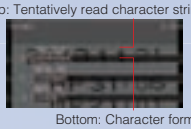


Up to four lines can be read. The following characters can be read.

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

② Set the character formats.

Top: Tentatively read character string



Bottom: Character format

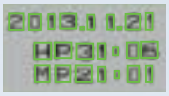
The character format is displayed from the read results. Set the character format according the format of the characters to read.

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

③ Press the TEACH Button.

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

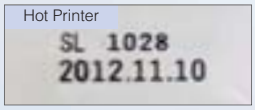
Reading is started.



Different printers use different printing devices.

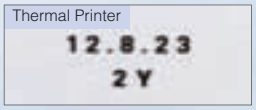
Characters from most printers can be read, including dot and impact printers. Handles Approx. 80 Fonts

Hot Printer

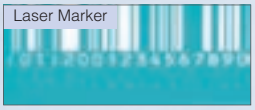


Inkjet Printer

Thermal Printer



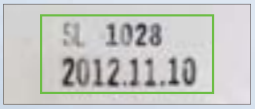
Laser Marker



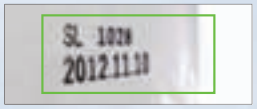
Worn and inclined characters cannot be read.

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

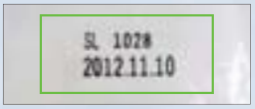
Worn Characters



Inclined Characters



Small Characters



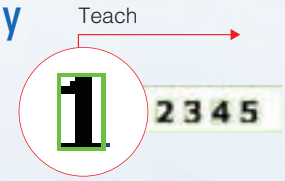
Utilities That Make Everyday Operation Easier

Verification to Reduce Setup Work

You can verify the read character data against the character data registered in the master data. Master data registration is easy. A character string is read and the result is registered in the master data. This reduces setting time and mistakes in setting character strings. You can register up to 32 character strings in the master data and easily change the current master data with an external signal.

Registration in Model Dictionary

You can add characters to the dictionary. You can achieve reliable operation when reading special fonts even if reading was not stable with the default settings.



Registered

Logging Images and Reading Data

The read images and reading results can be temporarily saved in the sensor, and up to 10,000 images and 10,000,000 reading results can be saved in a 4-GB SD card. You can select logging both OK and NG results or only NG results to aid in traceability.

Sensor

Images: 20
Reading results: 1,000 max.

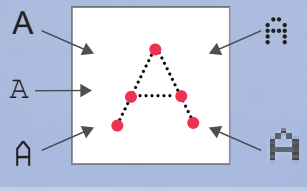
Touch Finder

Images: Approx. 10,000
Reading results: Approx. 10,000,000 (with 4-GB SD card)

New OCR Algorithm: Matching with Structural Models

Even in cases like the following one, where character registration is required for image matching methods, no character registration is required to read the characters with this new method, which matches structural models of characteristic points.

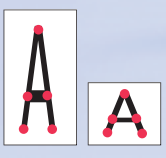
Structural models record the characteristics of each character in approximately 80 fonts.



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

Background Changes

Size and Font Changes



Worn Characters

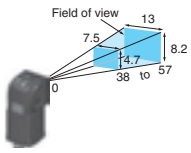
Inclined Characters

Ordering Information

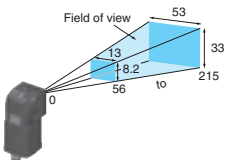
Optical Character Recognition Sensor

(Unit: mm)

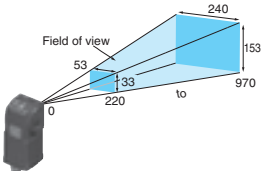
Narrow View



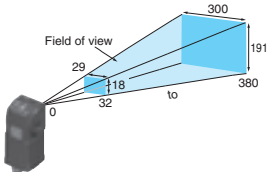
Standard



Wide View(Long-distance)



(Short-distance)



Field of view		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Monochrome	NPN	**FQ2-CH10010F-M**	**FQ2-CH10050F-M**	**FQ2-CH10100F-M**	**FQ2-CH10100N-M**
	PNP	**FQ2-CH15010F-M**	**FQ2-CH15050F-M**	**FQ2-CH15100F-M**	**FQ2-CH15100N-M**

Touch Finder

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

Refer to the FQ2 Smart Camera Catalog (Cat. No. Q193) for other devices.

Cables

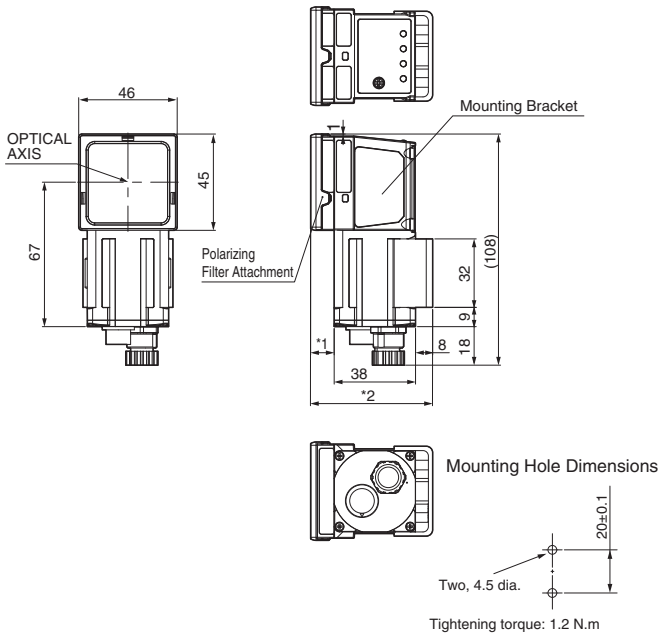
Type	Cable length	Model
FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC)	2m	**FQ-WN002**
	5m	**FQ-WN005**
	10m	**FQ-WN010**
	20m	**FQ-WN020**
I/O Cables	2m	**FQ-WD002**
	5m	**FQ-WD005**
	10m	**FQ-WD010**
	20m	**FQ-WD020**

Dimensions

(Unit: mm)

Optical Character Recognition Sensor

FQ2-CH



Type	Model	Note 1.	Note 2.
Narrow View, Standard	FQ2-CH1□010F-M/-CH1□050F-M	11	57
Wide View	FQ2-CH1□100F-M/-CH1□100N-M	3	49

Ratings and Performance

Item		Optical Character Recognition Sensor
Model	NPN	FQ2-CH10□□□□-M
	PNP	FQ2-CH15□□□□-M
Field of view		Refer to Ordering Information on p.18. (Tolerance (field of view): ±10% max.)
Installation distance		
Main functions	Inspection items	OCR • Alphabet A to Z • Number 0 to 9 • Symbol ' - . : / Model dictionary
	Image filter	Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression
	Verification function	Supported
	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, Linear correction)
	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 s Built-in lighting OFF: 1/1 to 1/50,000 s
	Processing resolution	752 × 480
	Partial input function	Supported horizontally only
	Image display	Zoom-in/Zoom-out/Fit, Rotating by 180°
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		Statistical data, Test Measurements, I/O monitor, Password function, Simulation software, Sensor error history, Calibration, Math (arithmetic, calculation functions, trigonometric functions, and logic functions)
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET)
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) **Note:** The assignments of the three output signals (OUT0 to OUT2) can also be changed to the following: • READY • RUN • STG (Strobe trigger) • OR0 (Item0 judgement) to OR31 (Item31 judgement) • Exp.0 judgement to Exp.31 judgement
	Ethernet specifications	100Base-TX/10Base-T
	Communications	Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET
	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)
	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 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, Member Registration Sheet
LED class		Risk Group 2 (IEC 62471)

Related Manuals

Man.No.	Model number	Manual
Z337	FQ2-S1/S2/S3/S4/CH	Smart Camera FQ2-S/CH Series User's manual
Z338	FQ2-S1/S2/S3/S4/CH	Smart Camera FQ2-S/CH Series User's manual (Communication Settings)

✻ EtherNet/IP™ is the trademark of ODVA.

Smart Camera

The High End of OMRON Tracing Products That Operates as a Code Reader or OCR and Also Performs Inspections

Smart Camera
FQ2-S4 Series

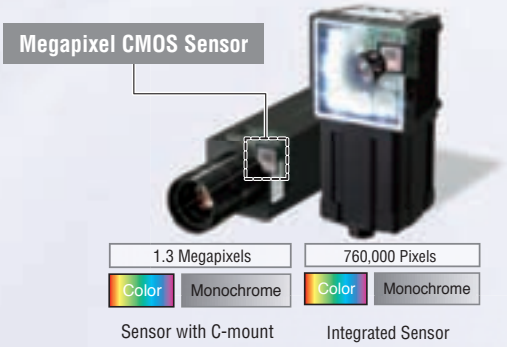
A Complete Range of Top-end Functions

A complete set of functions for stable reading even with low contrast or shiny surfaces along with high-demand communications interfaces. Printed character checking, Bar Code checking, packaging condition inspections, and much more with just one Smart Camera.

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

Reads both Codes and Characters in One View with 1.3 Megapixels

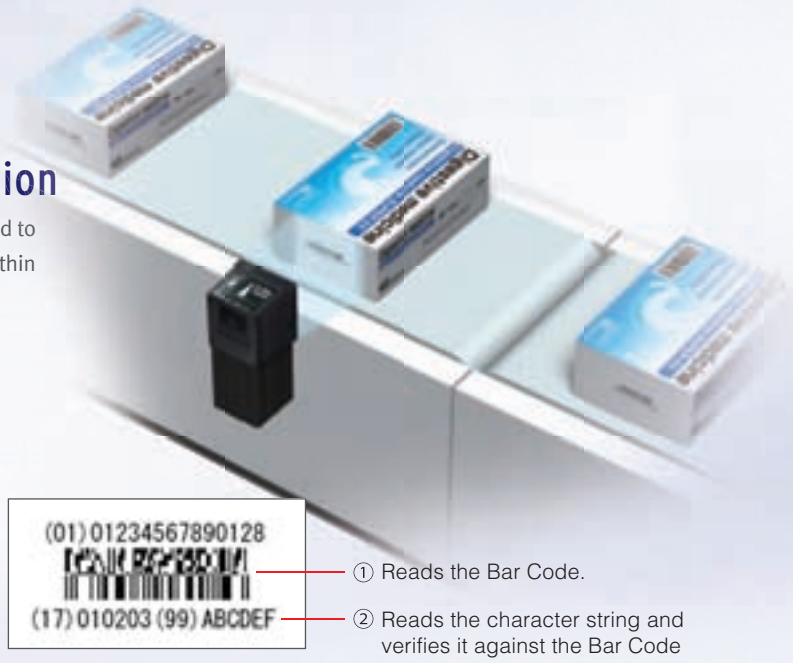
It is generally said that a resolution of 700,000 pixels or higher is required to read both codes and characters in one field of view. The FQ2-S4 Series includes 760,000-pixel models with built-in lighting as well as 1,300,000-pixel models with C-mounts for a flexible selection of fields of view so you can stably read information-heavy codes with one read image.



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.

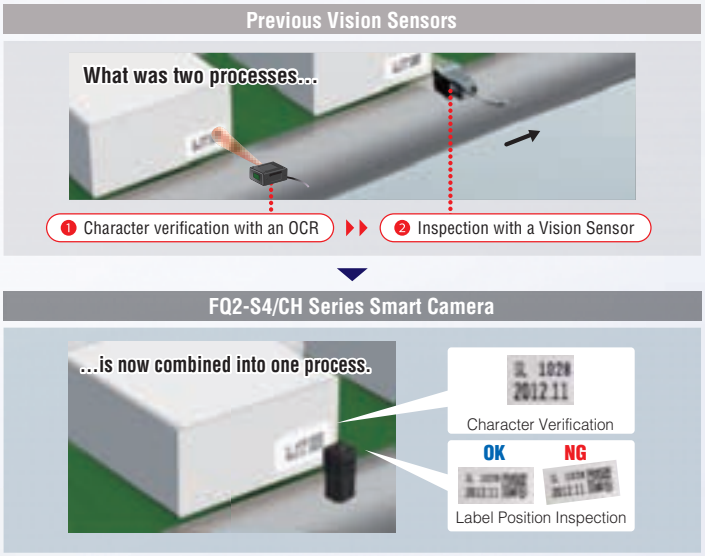
Measurement Flow	Purpose
Position Compensation	Compensates for the position of the box.
Reading	
① Bar Code	① Reads the Bar Code.
② OCR	② Reads the character string and verifies it against the Bar Code in ①.
Outputs	
Data	Outputs the verified character string.



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.

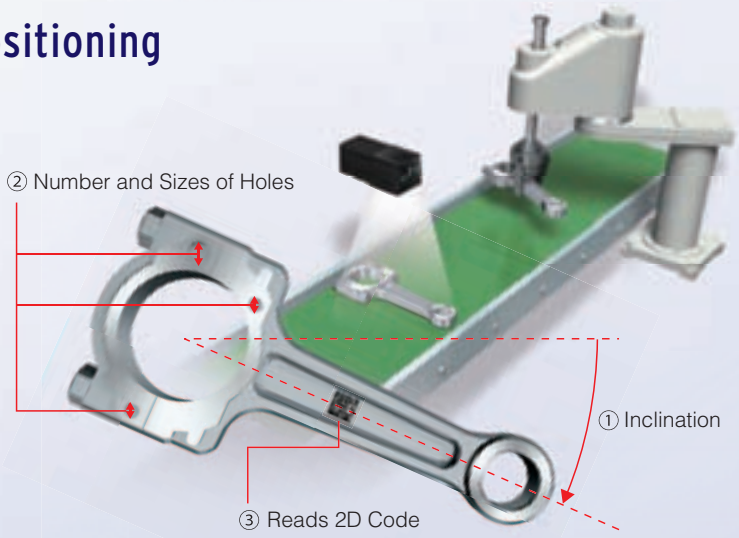
Measurement Flow	Purpose
Image Filters	Adjusts the image so that it is easier to inspect.
Position Compensation	Compensates for the position of the box.
Inspections	
① OCR	① Reads the lot number and date.
② Search	② Label position inspection
Calculations and Outputs	
Individual Judgement Output	Outputs the judgements of ① and ②.



Code Reading and 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.

Measurement Flow	Purpose
Image Filters	Adjusts the image so that it is easier to inspect
Inspections and Measurements	
① Shape Search II	① Component incline and position
② Labeling	② Number of holes and hole sizes
③ 2D-code(DPM)	③ Reads 2D Code
Calculations and Outputs	
Calculation	Calculates data for external output.
Data Output	Outputs the position information and incline.



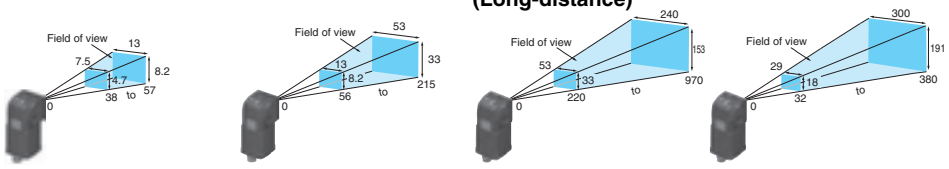
Ordering Information

Smart Camera

(Unit: mm)

[Standard Type]

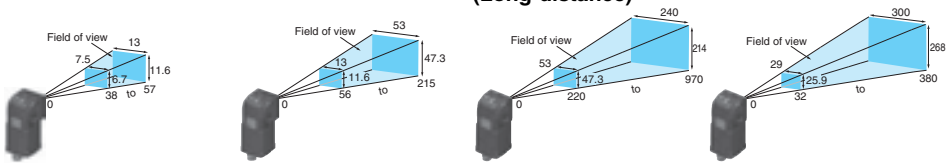
Narrow View **Standard** **Wide View (Long-distance)** **(Short-distance)**



Field of view		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	FQ2-S40100N
	PNP	FQ2-S45010F	FQ2-S45050F	FQ2-S45100F	FQ2-S45100N
Monochrome	NPN	FQ2-S40010F-M	FQ2-S40050F-M	FQ2-S40100F-M	FQ2-S40100N-M
	PNP	FQ2-S45010F-M	FQ2-S45050F-M	FQ2-S45100F-M	FQ2-S45100N-M

[High-resolution Type]

Narrow View **Standard** **Wide View (Long-distance)** **(Short-distance)**



C-mount type needs a lens. Refer to the optical chart on the FQ2 Catalog (Cat. No. Q193).

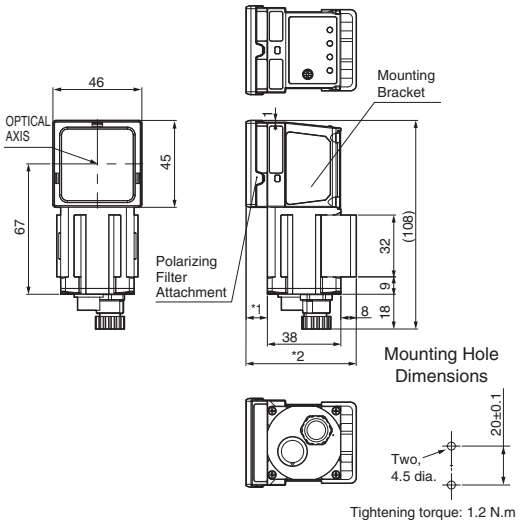
Field of view		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)	C-mount
Number of pixels		760,000 pixels				1.3 million pixels
Color	NPN	FQ2-S40010F-08	FQ2-S40050F-08	FQ2-S40100F-08	FQ2-S40100N-08	FQ2-S40-13
	PNP	FQ2-S45010F-08	FQ2-S45050F-08	FQ2-S45100F-08	FQ2-S45100N-08	FQ2-S45-13
Monochrome	NPN	FQ2-S40010F-08M	FQ2-S40050F-08M	FQ2-S40100F-08M	FQ2-S40100N-08M	FQ2-S40-13M
	PNP	FQ2-S45010F-08M	FQ2-S45050F-08M	FQ2-S45100F-08M	FQ2-S45100N-08M	FQ2-S45-13M

Refer to the FQ2 Smart Camera Catalog (Cat. No. Q193) for other devices.

Dimensions

(Unit: mm)

Integrated Sensor
FQ2-S4□□□□□□ (-□□□)

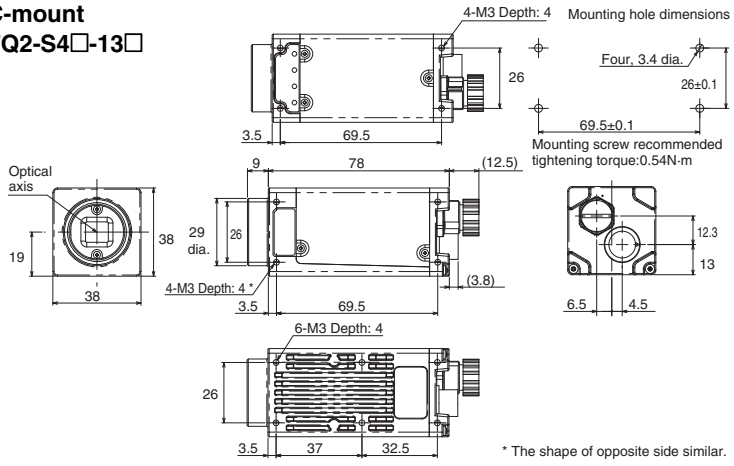


Tightening torque: 1.2 N.m

✻ Dimentions with the Mounting Bracket

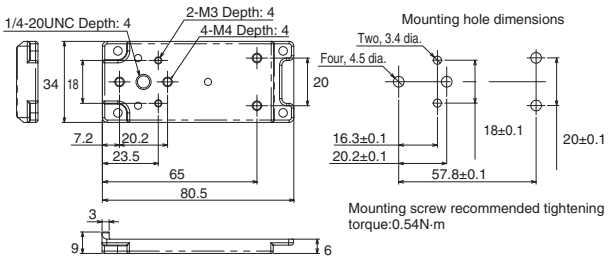
Type	Model	Note 1.	Note 2.
Narrow View, Standard	FQ2-S4□010F (-□□□) FQ2-S4□050F (-□□□)	11	57
Wide View	FQ2-S4□100F (-□□□) FQ2-S4□100N (-□□□)	3	49

C-mount
FQ2-S4□-13□



* The shape of opposite side similar.

Mounting Base
FQ-XLC
(included with Sensor)



Ratings and Performance

Sensor [Inspection/ID Model FQ2-S4 Series]

Item		Inspection/ID Model					
Model	NPN	FQ2-S40□□□□	FQ2-S40□□□□-M	FQ2-S40□□□□-08	FQ2-S40□□□□-08M	FQ2-S40-13	FQ2-S40-13M
	PNP	FQ2-S45□□□□	FQ2-S45□□□□-M	FQ2-S45□□□□-08	FQ2-S45□□□□-08M	FQ2-S45-13	FQ2-S45-13M
Field of view		Refer to Ordering Information on p.22. (Tolerance (field of view): ±10% max.)				Select a lens according to the field of view and installation distance. Refer to the optical chart on the FQ2 Catalog (Cat. No. Q193).	
Installation distance							
Main functions	Inspection items	Shape search III, shape search II, search, 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 (360º Model position compensation, Edge position compensation, Linear correction)					
	Number of registered scenes	32 *4					
	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), Brightness Correction					
	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 s Built-in lighting OFF: 1/1 to 1/50,000 s		Built-in lighting ON: 1/250 to 1/60,000 s Built-in lighting OFF: 1/1 to 1/4,155 s		1/1 to 1/4,155 s	
	Processing resolution	752 × 480		928 × 828		1280 × 1024	
	Partial input function	Supported horizontally only.		Supported horizontally and vertically			
	Image display	Zoom-in/Zoom-out/Fit, Rotating by 180º					
	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		Statistical data, Test Measurements, I/O monitor, Password function, Simulation software, Sensor error history, Calibration, Math (arithmetic, calculation functions, trigonometric functions, and logic functions)					
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET)					
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) **Note:** The assignments of the three output signals (OUT0 to OUT2) can also be changed to the following: • READY • RUN • STG (Strobe trigger) • OR0 (Item0 judgement) to OR31 (Item31 judgement) • Exp.0 judgement to Exp.31 judgement					
	Ethernet specifications	100Base-TX/10Base-T					
	Communications	Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET					
	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 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 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, Member Registration Sheet				Mounting Base (FQ-XLC) (1) Mounting Screw (M3 × 8mm)(4) Instruction Manual, Member Registration Sheet	
LED class		Risk Group 2 (IEC 62471)				---	

✻1. The types of characters to be read are the same as those of FQ2-CH Optical Character Recognition Sensor (p.19).
✻2. The types of cedes to be read are the same as those of FQ-CR1 Multi Code Reader (p.15).
✻3. The types of cedes to be read are the same as those of FQ-CR2 2D Code Reader (p.15).
✻4. Depending on the settings, the number of scenes that can be registered is reduced due to memory restrictions.

Related Manuals

Man.No.	Model number	Manual
Z337	FQ2-S1/S2/S3/S4/CH	Smart Camera FQ2-S/CH Series User's manual
Z338	FQ2-S1/S2/S3/S4/CH	Smart Camera FQ2-S/CH Series User's manual (Communication Settings)

READ AND UNDERSTAND THIS CATALOG

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

SUITABILITY FOR USE

THE PRODUCTS CONTAINED IN THIS CATALOG ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PERFORMANCE DATA

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

COPYRIGHT AND COPY PERMISSION

This document shall not be copied for sales or promotions without permission.

This document is protected by copyright and is intended solely for use in conjunction with the product. Please notify us before copying or reproducing this document in any manner, for any other purpose. If copying or transmitting this document to another, please copy or transmit it in its entirety.

Note: Do not use this document to operate the Unit.

OMRON Corporation **Industrial Automation Company**
Tokyo, JAPAN
Contact: www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.
Wegalaan 67-69-2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ELECTRONICS LLC
One Commerce Drive Schaumburg,
IL 60173-5302 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

© OMRON Corporation 2013 All Rights Reserved.
In the interest of product improvement,
specifications are subject to change without notice.

CSM_12_4_0416 Printed in Japan
Cat. No. Q195-E1-01 0313(0313)