FQ-CR1□□□□□-M Fixed Mount Multi CodeReader Quick Startup Guide

Box Contents

- FQ-CR1 Sensor
- FQ-XL Mounting Bracket
- FQ-XF1 Polarizing Filter Attachment
- Instruction Manual
- Member Registration Sheet
- Quick Startup Guide (this document)
- Warning Label

System Overview

When one unit is connected (control by parallel input/output)

- Touch Finder or PC Tool setup software
- FQ-CR1 Sensor
- Trigger Sensor
- FQ Ethernet Cable
- I/O Cable
- 24-VDC power supply
- PLC

Multiple Connections

- Touch Finder or PC Tool setup software
- FQ-CR1 Sensor (8 max.)
- Switching hub
- Standard RJ45 Ethernet Cable
- Standard RJ45 Ethernet Cable
- FQ Ethernet Cable
- FQ Ethernet Cable
- Standard RJ45 Ethernet Cable

When one unit is connected (control by Ethernet)

- Touch Finder or PC Tool setup software
- Standard RJ45 Ethernet Cable
- Switching hub
- Standard RJ45 Ethernet Cable
- FQ-CR1 Sensors
- FQ Ethernet Cable
- I/O Cable
- PLC
- 24-VDC power supply

| Product	Model number	Remarks
FQ-CR1 Sensor	FQ-CR1□□□□□-M	This is the FQ-CR1 Sensor.
Touch Finder	FQ□-D□□	This is a setup console. (Software version must be 1.6 or higher)
PC Tool	---	The PC Tool can be used instead of the Touch Finder. (Software version must be 1.6 or higher) If you register as a member, you can download the free PC Tool as a special service to purchasers. Refer to the Member Registration Sheet for member registration procedures and the download procedure for special member software.
FQ Ethernet Cable	FQ-WN0□□	Connects the Sensor to the Touch Finder or computer.
Standard RJ45 Ethernet Cable	---	Connects the switching hub to the Touch Finder or computer. (STP (shielded twisted-pair) cable, category 5e or 6, impedance: 100 Ω)
I/O Cable	FQ-WD0□□	Connects the Sensor to the power supply and external devices.

Flow of Operation

The following steps are required to prepare the FQ-CR1 Sensor for operation.

Installation
1. Connections and Wiring
2. Mounting
3. Starting the Sensor

Settings
1. Image Setup
2. Measurement Settings
   (1) Select the inspection items.
   (2) Set the read conditions.
   (3) Adjust the judgement parameters.
3. I/O Settings

Testing
1. Checking and Adjusting Measurement Status
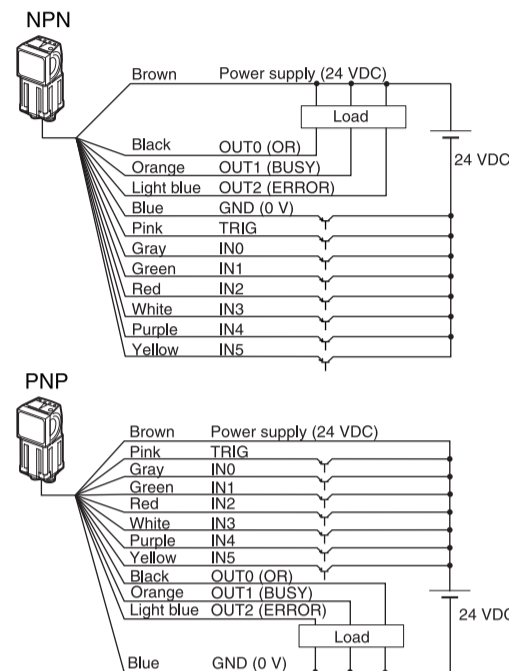2. Saving Settings

Operation
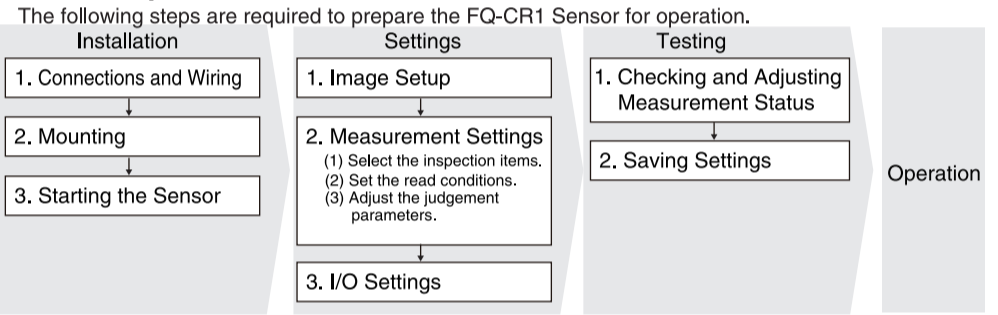
1. Installation

1-1 Connections and Wiring

1 Connect the Sensor to the Touch Finder or Computer via the FQ-WN0□□ Ethernet Cable.

- Touch Finder
- Ethernet connector
- FQ-WN0□□ Ethernet Cable
- FQ-CR1 Sensor
- Ethernet connector
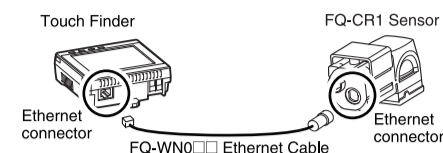
2 Connect the I/O Cable to the Sensor.

The I/O Cable includes lines for the power supply and I/O. Connect the required lines.

NPN

Brown	Power supply (24 VDC)
Black	OUT0 (OR)
Orange	OUT1 (BUSY)
Light blue	OUT2 (ERROR)
Blue	GND (0 V)
Pink	TRIG
Gray	IN0
Green	IN1
Red	IN2
White	IN3
Purple	IN4
Yellow	IN5

Load — 24 VDC

PNP

Brown	Power supply (24 VDC)
Pink	TRIG
Gray	IN0
Green	IN1
Red	IN2
White	IN3
Purple	IN4
Yellow	IN5
Black	OUT0 (OR)
Orange	OUT1 (BUSY)
Light blue	OUT2 (ERROR)
Blue	GND (0 V)

Load — 24 VDC

I/O	Signal	Function
Inputs	TRIG	Measurement trigger input (single)
	IN0 to IN5	Command input
Outputs	OUT0 (OR)	Overall judgement output
	OUT1 (BUSY)	Indicates that processing is in progress.
	OUT2 (ERROR)	Indicates an error has occurred.

Example 1

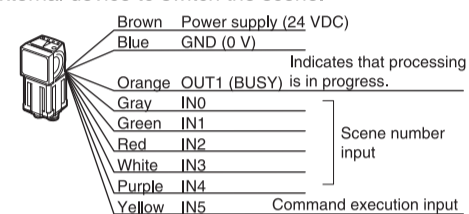Here, measurements are performed when the trigger signal is input and the overall judgement is output.

Brown	Power supply (24 VDC)	
Blue	GND (0 V)	
Orange	OUT1 (BUSY)	Indicates that processing is in progress.
Black	OUT0 (OR)	Overall judgement output
Pink	TRIG	Measurement trigger input (single)
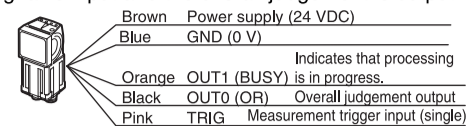
The TRIG signal is not received while the BUSY signal is ON. Turn ON the TRIG signal while the BUSY signal is OFF.

- TRIG ON/OFF — 1 ms min.
- BUSY (OUT1) ON/OFF — Processing
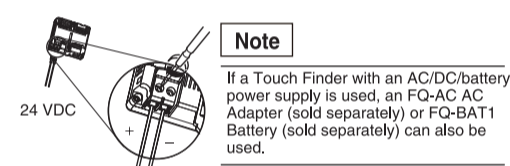- OR (OUT0) — Overall judgement

Important

- When brightness correction mode is ON, the brightness is stable but a delay of 25 ms occurs.
  Refer to the *User's Manual* for details.
- Use a no-contact output device (e.g., SSR or PLC transistor output) for the TRIG signal. If a contact (e.g., relay) is used, contact bound may cause the trigger to be input again during execution of a measurement.

Example 2

Here, a process switching signal is input from an external device to switch the scene.

Brown	Power supply (24 VDC)	
Blue	GND (0 V)	
Orange	OUT1 (BUSY)	Indicates that processing is in progress.
Gray	IN0	
Green	IN1	
Red	IN2	Scene number input
White	IN3	
Purple	IN4	
Yellow	IN5	Command execution input

- IN0 to IN4 — Scene number — 5 ms min.
- IN5 ON/OFF — 1 ms min.
- BUSY (OUT1) ON/OFF — Processing

3 Connect a power supply to the Touch Finder.

Note

If a Touch Finder with an AC/DC/battery power supply is used, an FQ-AC AC Adapter (sold separately) or FQ-BAT1 Battery (sold separately) can also be used.

24 VDC
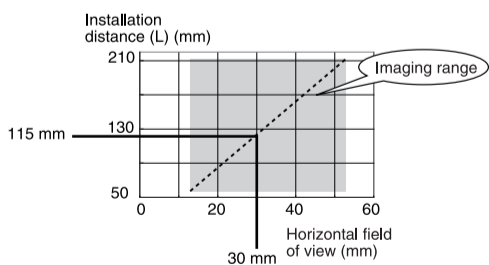
1-2 Mounting

1 Check the mounting position.

Use the optical charts in the *User's Manual* and check the installation distance to be sure it is suitable for the field of view to be measured.

- Horizontal field of view
- Vertical field of view
- Installation distance (L)
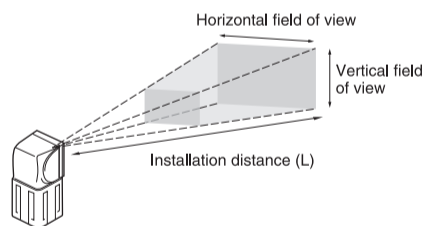
The horizontal field of view is given in the optical chart. The vertical field of view is approx. 60% of the horizontal field of view.

Example: FQ-CR10050F

For a 30-mm field of view, the Sensor must be installed at an installation distance of 115 mm.

- Installation distance (L) (mm)
- Imaging range
- 210 / 130 / 50 / 115 mm
- 0 / 20 / 40 / 60
- Horizontal field of view (mm)
- 30 mm

2 Attach the Mounting Bracket to the Sensor and mount the Sensor at the correct position.
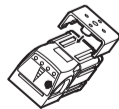
Installing the PC Tool

To use the PC Tool, register as a member, download the PC Tool, and install the PC Tool on your computer.
Use the following network settings on your computer if you connect the computer directly to the Sensor. If you connect the computer and Sensor through a hub using a DHCP server, the following IP address does not need to be set.
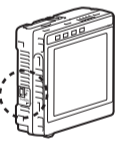
- IP address: 10.5.5.101
- Subnet mask: 255.255.255.0

1-3 Starting the Sensor

1 Power ON the Sensor.

2 Power ON the Touch Finder.

Turn ON the power switch on the side of the Touch Finder, too.

To use the PC Tool, click [Program] - [OMRON] - [FQ] - [PC tool for FQ] from the Windows Start Menu.

Confirm that the software version for the Touch Finder and also the PC Tool is version 1.6 or higher.

Select the language to display on the Touch Finder.

If more than one Sensor is connected, a display will appear to select the Sensor to be set. Select the Sensor.

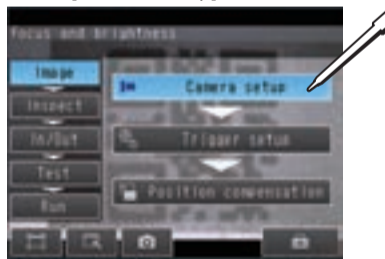The following initial display will appear when the Sensor is selected.

Setup

2. Settings

2-1 Image Setup

Make sure the image is stable and adjust the brightness and image input timing.

1 Focus the image.
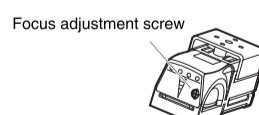
Press [Camera setup].

The camera image will be displayed.

The higher the value, the better the focus.

Use the focus adjustment screw on the top of the Sensor to focus the image.

Focus adjustment screw

2 Adjust the brightness.

The FQ-CR1 Sensor will automatically adjust the brightness according to the measurement object. If the resulting brightness is not suitable, it can be adjusted manually.

Press [◀] and then [Brightness].

Adjust the brightness with the slider at the bottom of the display.
You can also press [AUTO] to automatically set the brightness according to the image.

- Dark
- Bright

Press [OK].

Note

- Turning ON the [HDR] function improves the image quality for shiny objects. Refer to the *User's Manual* for details.
- Attach the enclosed Polarizing Filter if the image is blurred by reflections.
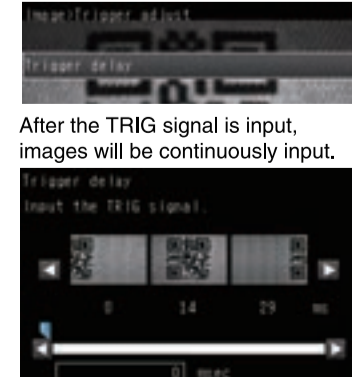
- Polarizing Filter Attachment (enclosed)
- Lighting
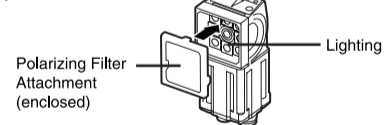
3 Adjust the image input timing.

Adjust the delay from when the trigger is input until the image is input.
Press [Trigger setup].

Press [Trigger delay].

After the TRIG signal is input, images will be continuously input.
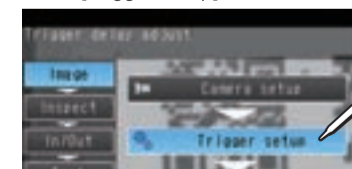
Select the image that was taken with the best timing.
Press [OK].

4 Set up the Position Compensation.

To enable measurement even if the location of the measurement object is not consistent, register a mark that exists on all measurement objects. This function is called position compensation.
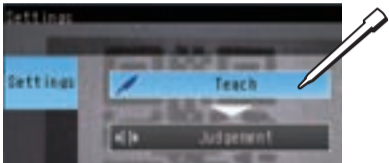
Press [Position compensation].

Press [Mode on/off] and then [ON].
Then press [Settings].
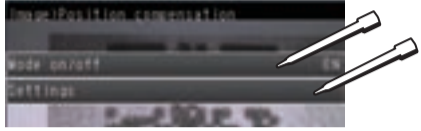
Press [Teach].

Place the object that is to be used as the measurement reference in front of the camera. Move the rectangle so that the characteristic part for position compensation is inside it.

Drag a corner to size the rectangle.
Drag the rectangle to move it.

Check the area, press the [OK] Button, and then press the [TEACH] Button. The characteristic part and reference position for position compensation will be registered.

Press [OK].

2-2 Measurement Settings

Select an item that is appropriate for the purpose of measurement, and set the measurement settings. The procedure for automatically setting the 2D-code measurement settings is shown here.
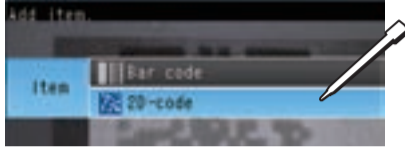
1 Select the inspection items.

Ex.: Reading 2D-codes

Press [Inspect]. Next, touch [Inspection]. Press an unused inspection item number and then press [Add item.] on the menu.
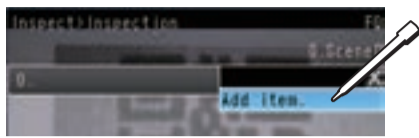
Touch [2D-code].
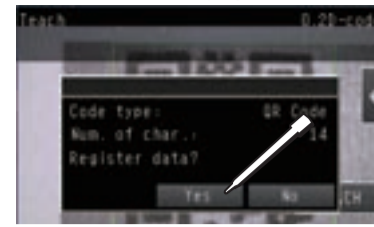

2 Set the 2D-code read conditions.

Press [Teach].

Confirm that the 2D-code is inside the green frame and touch [OK].

Drag a corner to size the rectangle.
Drag the rectangle to move it.

Press [Teach].
If reading is successful, the 2D-code type and num. of characters will display.

Touch [Yes].
Press [Back] to end teaching.

The text string read in as master data will display.


Press [Back].

To register additional master data, follow the procedure shown below.
• Touch the master data to be registered.
• Touch [Automatic Registration].
• Touch [TEACH].

To manually register master data, follow the procedure shown below.
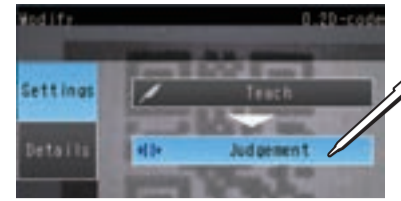• Touch the master data to be registered.
• Touch [Manual Registration].
• Input the text string to be registered.

If reading is unsuccessful, check the condition of the workpiece and the lighting, and then perform the teaching process again.

---
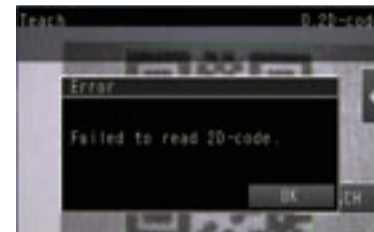
3 Adjust the judgement parameters.
Press [Judgement].

Adjust the judgement parameters for the num. of characters and the text string while inputting images of a number of sample items.

Lower limit   Upper limit
Press [OK].

2-3 I/O Settings

The data that is output to external devices and the input signal assignments can be changed. (Changes are not normally required.) For example, the following can be input or output.
• Judgements for individual inspection items can be output.
• If you want to output characters
• If you want to output data externally

Refer to the *User's Manual* for details.

3. Testing

Tests are made with some samples to see if correct measurements are possible.
When Test Mode is entered, images are measured continuously. A trigger input is not required. Measurement results are only displayed. They are not output to an external device.

---

1 Perform tests.
Press [Test].
Then press [Continous test].

Press [Graphics+Details].

Continuous measurements will be performed. Input images of some samples to see if the judgements are correct.

2 If correct judgements are not made, adjust the judgement parameters.
Press [◄].
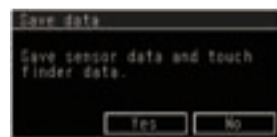Press [Adjust judgement].

---

4. Operation

1 Switch to the Run Mode display.

Press [Run].
Then press [Switch to Run mode].
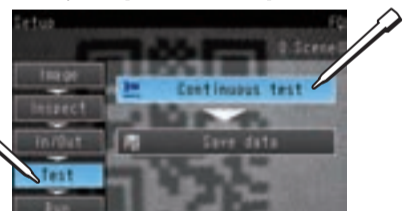

2 Save the settings.
Press [Yes].

3 Execute measurements.

Measurements will be executed according to the trigger signal input. And the result of measurement will be output to an external device.
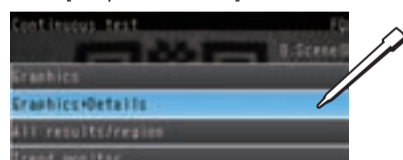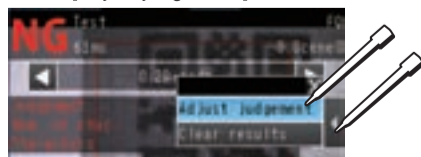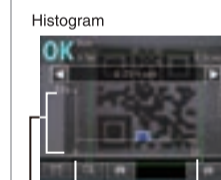

Note

There are six types of displays that can be used, as shown below. Press the [▥] Button and then press [Select display] to display the following selections.
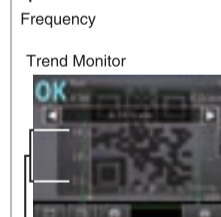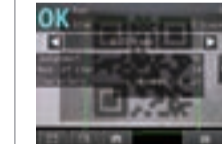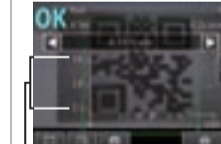
Displaying the Most Recent Measurement Values

Graphics

Graphics + Details

All Results/Region

Displaying Measurement Values Over Time
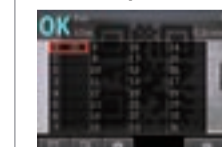
Histogram

Variations in Measurement Values
Frequency

Trend Monitor
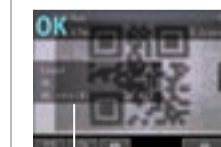

Measurement values

Statistical Data

Measurement values since power was turned ON

Note

• To return to the Setup Display, press the [▥] Button and then press [Sensor settings].
• To switch to another Sensor, press the [▥] Button and then press [Switch sensor].

Menu Structure

Power ON
Initial startup

Setup Mode
Inspection items are set and adjusted.

[Image] Tab Page
Adjust images to the best input status.
- Camera setup
- Trigger setup
- Position compensation

[Inspect] Tab Page
Select the inspection items and set the read conditions.
Inspection Items
- Bar code
- 2D-code
- Teach
- Judgement

[In/Out] Tab Page
Make settings to output measurement results.
- Log setting
- I/O setting
- I/O monitor

[Test] Tab Page
Test and adjust the set inspections.
- Continuous test
- Save data

When a Sensor that is already set up is connected

Run Mode
The inspections that were set on the Setup Mode are used to perform measurements.