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You can read the recommendations in the user guide, the technical guide or the installation guide for OMRON FQ. You'll find the answers to all your questions on the OMRON FQ in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

**User manual OMRON FQ**  
**User guide OMRON FQ**  
**Operating instructions OMRON FQ**  
**Instructions for use OMRON FQ**  
**Instruction manual OMRON FQ**

**OMRON**

**Vision Sensor**  
FQ



**Short Manual**



Cat. No. Z306-E1-01



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**Manual abstract:**

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.....@@@@To set up or monitor the sensors, either the touch screen based console 'Touch Finder' or a 'PC Tool' can be used. Setup, Image Confirmation, and Logging Tools Touch Finder FQ Vision Sensor Used to check images and set the judgement parameters. It can also be used to save measurement results and check status during operation.

PC Tool Includes the camera, lighting, measurement processor, and I/O functions. After the Sensor has been set up, it can be operated alone to perform measurements without the Touch Finder or PC Tool. The same functions as those that are provided by the Touch Finder can be performed from a computer. The PC Tool is available free of charge. FQ-series Vision Sensors are available in two different models. The differences are given in the following table.

Model Model number Number of simultaneous measurements Number of registered scenes Position compensation Standard model FQ-S2@@@@@ 32 32 Supported Single-function model FQ-S1@@@@@ 1 8 Not supported 4 FQ-series Vision Sensors FQ Short Manual 1-2 Measurement Process This section describes the basic flow of the measurement process. · The measurement is started by inputting a trigger signal from an external Trigger input device. 1

Introduction · Images are taken according to the trigger. Take image · The image is measured to see if it matches the configured settings.

Measurement · The overall judgement of all inspection items are output using OR logic. Overall judgement output · Measurement data and image data can be

logged in memory in the Sensor or Logging in an SD card. FQ Short Manual Measurement Process 5 1-3 Startup Display and Display Elements Startup Display 1 The Sensor is automatically detected by the Touch Finder when power supply to the Sensor and Touch Finder is turned ON. The Auto Connect Display will appear if the Sensor cannot be detected. Check that cables are connected correctly to the Sensor and Touch Finder, and then press [Auto connect]. 2 When the Sensor is detected, the following display will appear. · The Setup Mode will appear if a Sensor that has not been set up is connected. · The Run Mode will appear if a Sensor that has been set up is connected. Note When the Touch Finder is started, IP addresses are automatically set for each Sensor. To allocate specific IP addresses, set the IP address of each Sensor and the Touch Finder.

Setting Up Ethernet: p. 20 6 Startup Display and Display Elements FQ Short Manual Display Elements This Sensor has a Setup Mode and a Run Mode. Setup Mode 1 In Setup Mode, you can set the image conditions, judgement parameters, and I/O settings for the Sensor. The name of the mode or the menu hierarchy is displayed. The name of the Sensor being set up is displayed.

The selected scene number is displayed. Introduction The menu changes according to the selected tab page. · Buttons will appear on the right according to the mode. · If the [ ] Button appears, pressing it will display the sub-menu or commands. The setup flow is shown by these five tabs.

[Image]: Used to adjust the image. [Inspect]: Used to set the inspection items. [In/Out]: Used to set the I/O. [Test]: Used to test and adjust the set measurements. [Run]: Used to switch to Run Mode. This button menu is always displayed. Only-image Button: Used to select either displaying the camera image and messages, or only the camera image. Display Button: Capture Button: Tool Button: Used to select the source of the image or to zoom the image. Used to capture the current screen to the SD card. Used to call functions, such as saving data or select scenes.

Note The Display Button can be used to switch between the following images. · Live: · Freeze: · Log: · File: The live image is displayed. The image that was taken last is displayed. An image saved in internal memory is displayed. An image saved on an SD card is displayed. Run Mode In Run Mode, measurements are performed, and measurement results are output. p. 53 FQ Short Manual Startup Display and Display Elements 7 1-4 Basic Operational Flow The following flow shows the basic operation of FQ-series Vision Sensors. Connections and Wiring Section 2 Installation and Connections Section 1 1-3 Startup Display and Display Elements Section 3 Taking Images Section 4 Setting Up Inspections Starting the Sensor Image Setup ([Image] Tab Page) Inspection Setup ([Inspect] Tab Page) Registering Inspection Items Teaching Setting Judgement Parameters Setup Evaluation\*1 Output Settings ([In/Out] Tab Page) Section 7 Communications with External Devices Section 5 Testing and Saving Settings Testing ([Test] Tab Page) Test Measurement and Results Verification Adjusting Judgement Parameters Saving the Settings Section 6 Operation Operation\*2 Starting Operation (Run Mode) \*1: In Setup Mode, the Sensor can be set up and adjusted, but it does not output signals on the I/O lines.



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\*2: In Run Mode, the Sensor performs measurements and outputs signals on the I/O lines.

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. . . . . 20 2-1 System Configuration Standard Configuration Setup Tool Touch Finder or PC Tool Trigger Sensor FQ Vision Sensor PLC FQ Ethernet Cable 24-VDC power supply I/O Cable 24-VDC power supply Multiple Connection Sensors Setup Tool Touch Finder or PC Tool Switching Hub Standard RJ45 Ethernet Cable FQ Vision Sensors (8 max.) Connect the trigger sensor, PLC, and power supply to each Sensor. FQ Ethernet Cable Product FQ Vision Sensor Touch Finder PC Tool Model number FQ-S@@@@@ FQ-D@@@ --- Remarks This is the Vision Sensor. This is a setup console.

The PC Tool can be used instead of the Touch Finder. 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 that is enclosed with the Sensor for the member registration procedure and the download procedure for special member software. Connects the Sensor to the Touch Finder or computer. Connects the switching hub to the Touch Finder or computer.

(STP (shielded twisted-pair) cable, category 5e or 6, impedance: 100 ) Connects the Sensor to the power supply and external devices. Used to connect multiple Sensors to one Touch Finder or PC Tool. FQ Ethernet Cable Standard RJ45 Ethernet Cable I/O Cable Switching Hub FQ-WN0@@ --- FQ-WD0@@ W4S1-0@@ Important Do not connect network devices other than PLCs on the same network as the Touch Finder or computer. If another device is connected, the responsiveness of displays and settings of the Touch Finder or computer may become slow. 10 System Configuration FQ Short Manual 2-2 Installation Installing the Sensor Installation Procedure 1 2 3 Align the tabs on one side of the Mounting Bracket with the slot on the Sensor.

The FQ-XL Mounting Bracket can be attached to the back, side, or front of the Sensor. Press the Mounting Bracket onto the Sensor until the other tabs click into place. Use the following optical charts to check the field of view and installation distance of the Sensor so that it is mounted at the correct position.

Tightening torque (M4): 1.2 N·m Horizontal field of view Vertical field of view The optical chart indicates the horizontal field of view. The vertical field of view will be approximately 60% of the horizontal field of view. Note: The tolerance is ±10%. Mounting Bracket 2 Installation and Connections Installation distance (L) FQ-S10010F, FQ-15010F, FQ-S20010F, or FQ-25010F Installation distance (L) (mm) 55 FQ-S10100F, FQ-S15100F, FQ-S20100F, or FQ-S25100F Installation distance (L) (mm) 1,000 45 600 35 6 8 12 10 14 Horizontal field of view (mm) 200 0 200 300 100 Horizontal field of view (mm) FQ-S10050F, FQ-S15050F, FQ-S20050F, or FQ-S25050F Installation distance (L) (mm) 210 FQ-S10100N, FQ-S15100N, FQ-S20100N, or FQ-S25100N Installation distance (L) (mm) 400 130 50 0 40 20 60 Horizontal field of view (mm) 0 0 200 400 Horizontal field of view (mm) FQ Short Manual Installation 11 Important &mid cause the Sensor to malfunction or may damage it. Inputs Outputs TRIG IN0 to IN5 OUT0 (OR) OUT1 (BUSY) OUT2 (ERROR) This terminal is the trigger signal input. These are the command input terminals.

By default, this is the OR output signal (overall judgement). The assignment can be changed to an individual judgement signal from OR0 to OR31. By default, this is the BUSY output signal. The assignment can be changed to an individual judgement signal from OR0 to OR31. By default, this is the ERROR output signal. The assignment can be changed to an individual judgement signal from OR0 to OR31. FQ Short Manual Wiring 15 I/O Signal Circuit Diagrams NPN Brown Power supply (24 VDC) Black OUT0 (OR) Orange OUT1 (BUSY) Light blue OUT2 (ERROR) Internal circuits Load PNP Brown Pink Gray Green Red White Purple Yellow Power supply (24 VDC) TRIG IN0 IN1 IN2 IN3 IN4 IN5 24 VDC Light blue OUT2 (ERROR) Orange OUT1 (BUSY) Black OUT0 (OR) Blue Load GND (0V) 24 VDC Blue GND (0V) Pink TRIG Gray IN0 Green IN1 IN2 Red White IN3 Purple IN4 Yellow IN5 Important Preventing Chattering · The Sensor is equipped with an anti-chattering function, but if the chattering is 100 µs or longer, a faulty input may occur. (Input signals of 99 µs or shorter are ignored. Signals of 100 µs or longer are treated as input signals.) · Use no-contact output devices (e.g., SSR or PLC transistor output) for the input signals. If contacts (e.g., relay) are used, chattering may cause the trigger to be input again during execution of a measurement.

Power Supply Specifications When a Switching Regulator Is Connected Use a power supply that meets the following specifications. (The power supply is sold separately.) Item Power supply voltage Output current Recommended Power Supply External power supply terminal screws Description 24 VDC (21.6 to 26.4 V) 3.

75 A min. S8VS-09024@ (24 VDC, 3.75 A) M4 (tightening torque: 1.2 N·m) Important Supply power from a DC power supply for which measures have been

*applied to prevent high voltages (e.g., a safety extra low voltage circuit). If UL certification is required for the overall system, use a UL Class II DC power supply. Attaching the LED Warning Label Attach the enclosed LED warning label to the cable or other location. The LED warning label must be attached to a location that is readily visible from the Sensor. Attachment Example Warning Label LED RADIATION DO NOT STARE INTO BEAM Max.*

*60mW 400msec 400-700nm Max.60mW 400msec 400-700nm CLASS 2 LED PRODUCT IEC 60825-1:1993 +A1:1997 +A2:2001 Warning Label JIS C 6802:2005 16 Wiring Internal circuits FQ Short Manual Wiring the Touch Finder Power Supply Wiring Connecting the Power Supply 1 2 3 Loosen the two terminal screws using a Phillips screwdriver. Attach crimp terminals to the power lines. Secure the positive and negative lines as indicated using M3 screws. Power supply tightening torque: 0.54 Nm In environments where there is excessive noise, attach a ferrite core (ZCAT1730-0730 from TDK or the equivalent) to the power supply cable. 2 Installation and Connections 24 VDC + - When you attach the ferrite core to the power supply cable, wrap the cable only one time. Turning ON the Touch Finder 1 2 Remove the cover from the power switch on the left side of the Touch Finder. Press the switch toward ON. 1 2 ON OFF Power Supply Specifications Use a power supply that meets the following specifications.*



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(The power supply is sold separately.) Item Power supply voltage Output current Recommended Power Supply External power supply terminal screws  
Recommended power line wire size Description 24 VDC (21.6 to 26.4 V) 2.5 A min.  
S8VS-06024@ (24 VDC, 2.5 A) M4 (tightening torque: 1.2 Nm) AWG16 to AWG22 (length of 5 m max.) Important · Supply power from a DC power supply  
for which measures have been applied to prevent high voltages (e.g.  
, a safety extra low voltage circuit). If UL certification is required for the overall system, use a UL Class II DC power supply. · When using the FQ-D31, do  
not connect a switching regulator and AC Adapter (FQ-AC@) at the same time. FQ Short Manual Wiring 17 Charging the Battery This section describes how  
to charge and install the FQ-D31 Battery and provides applicable precautions. Charge the Battery while it is attached to the Touch Finder. Use the AC  
adapter to charge the battery. Mounting the Battery in the Touch Finder 1 Remove the screw from the battery cover on the top of the Touch Finder, slide the  
cover in the direction of the arrow, and open the battery cover. 2 Face the rounded side of the battery toward the back of the Touch Finder and insert the  
battery. Important Do not insert the battery in the wrong orientation. 3 Close the battery cover, slide the battery cover in the direction of the arrow, and  
tighten the screw on the battery cover.

4 Attach the AC adapter to the Touch Finder to start charging the battery. The CHARGE indicator will be lit while the battery is being charged. It will go out  
when charging the battery has been completed. CHARGE indicator Note The Touch Finder will operate even if the AC adapter is connected when no battery  
is mounted in the Touch Finder. 18 Wiring FQ Short Manual Important · If the Touch Finder (FQ-D31) will be installed permanently or semi-permanently,  
remove the Battery (FQ-BAT1). If the rated temperature is exceeded with the Battery inserted, the protective circuit may activate and stop the Touch Finder. ·  
The battery complies with the following recycling regulation. Japan EU Taiwan 2 Li-ion00 · California regulations concerning perchlorate: This product is a  
lithium battery that contains perchlorate, which is regulated by the State of California. Please comply with these regulations. For details see the following  
URL: [www.dtsc.ca.gov/hazardouswaste/perchlorate/](http://www.dtsc.ca.gov/hazardouswaste/perchlorate/)

Installation and Connections 19 FQ Short Manual Wiring 2-4 Setting Up Ethernet Connecting to Sensors from the  
Touch Finder When the Sensor is used with a Touch Finder, IP addresses are automatically assigned. No settings are required to use Ethernet. However, if a  
Sensor or Touch Finder is connected to a network where a PLC or computer is already connected, the Ethernet must be set to be compatible with the existing  
network.

· Sensor (Setup Mode) - [Sensor settings] - [Ethernet] 1 2 1 Set [Auto connection] to [OFF]. Set the IP address and subnet mask according to the network  
settings. · Touch Finder (Setup Mode) - [TF settings] - [Ethernet] Set the IP address and subnet mask according to the network settings. Connecting to  
Sensors from a Computer Using the PC Tool When connecting the Sensor directly to a computer using an Ethernet Cable, set the network settings on the  
computer as given below. Setting a fixed IP address is not required if there is a hub between the computer and Sensor and a DHCP server is used.  
The following procedure is for Windows XP. 1 2 3 Select [Control Panel] from the Windows Start Menu. Click [Network and Internet Connections] in the  
control panel and then double-click [Network Connections]. Right-click the [Local Area Connection] Icon and select [Properties]. 20 Setting Up Ethernet FQ  
Short Manual 4 On the [General] Tab Page, double-click Internet Protocol (TCP/IP). 2 Installation and Connections 5 6 Select the Use the following IP  
address Option and enter the following IP address and subnet mask. · IP address: 10.5.5.101 · Subnet mask: 255.

255.255.0 Click the [OK] Button. This completes the settings. FQ Short Manual Setting Up Ethernet 21 MEMO 22 Setting Up Ethernet FQ Short Manual  
Taking Images 3 Taking Images 3-1 Selecting a Sensor for Configuration. . . . .  
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. . . . . 25 3-3 Adjusting the Object Position . . . . .

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. . . . . 30 3-1 Selecting a Sensor for Configuration If multiple Sensors are connected to a single Touch Finder or computer, you can select the Sensor that  
you want to set up. 1 2 Press [Run].

This will enable setting the current Sensor into RUN Mode before selecting another Sensor. Then press [Switch to Run mode]. 3 Press [Yes]. 4 5 6 Press -  
[Switch Sensor]. Select the Sensor to be set up.

Press Mode. - [Sensor settings] to return to Setup 7 Press [Yes]. 24 Selecting a Sensor for Configuration FQ Short Manual 3-2 Adjusting Image Quality  
Adjusting the Focus [Image] - [Camera setup] 1 Display the Camera Setup Display. The focus can be seen as a numerical value. The higher the value, the  
better the focus.

3 Focus Level Taking Images 2 Manually adjust the focus using the focus adjustment screw on the Sensor while checking the image and focus value on the  
Touch Finder. In the default settings, the field of view is set to the narrowest setting. Press [Back]. Focus adjustment screw Turn clockwise to focus on closer  
objects. (The field of view will narrow.) 3 Turn the screw counterclockwise to focus on objects at a distance. (The field of view will widen.) Important · Turn  
the focus adjustment screw clockwise or counterclockwise a little bit to make sure that it has not already reached the dead stop. Do not force the screw if it  
does not rotate anymore. This will damage the Sensor.

· Do not turn the focus adjustment knob with a force that is greater than 0.1 N·m. This may damage it. FQ Short Manual Adjusting Image Quality 25 Adjusting  
the Brightness To achieve stable measurements, the brightness of the camera image must be adjusted so that the characteristic to be measured is clearly  
visible. Dark Brightness of image Bright 0 [Image] - [Camera setup] 100 1 2 Press [ play. ] - [Brightness] on the right side of the dis- Move the bar to the left  
or right to adjust the brightness. Moving it to the right will make the image brighter, while moving it to the left will reduce the brightness of the image. Press  
[AUTO] to automatically adjust the brightness according to the image. 3 Press [OK]. Important The exposure time will be longer for larger values.  
This may cause the image to blur if the object is moving fast. If the Sensor is used on a high-speed line, check that the images are not blurred under actual



*operating conditions.*



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*Taking Clear Images of Moving Objects* For quick moving objects, the effect of blurring can be reduced by decreasing the exposure time. Fast 0 Moving speed Slow 100 1/30,000 Exposure time 1/250 [Image] [Camera setup] [ ] [Brightness] Adjusting the Brightness: p. 26 Important The image becomes darker the smaller the exposure time.

If the Sensor is used in a dark environment, make sure that the darkness of the image does not cause the measurements to be unstable. 26 Adjusting Image Quality FQ Short Manual Improving the Image Quality of Metallic and other Shiny Surfaces When objects with shiny surfaces are being measured, the lighting may be reflected off the surface and affect the image. To remove reflections, one of the following two functions can be used. Function Description HDR (High Dynamic Range) If objects have contrasting light and dark areas, the dynamic range can be made wider to improve the quality of the images.

Polarizing filter Specular reflections can be eliminated from an image by attaching a polarizing filter to the Sensor.

· Selection Tips · When the measurement object is not moving · When the measurement object is moving Use the HDR function. Use a polarizing filter. 3 HDR Function Taking Images The HDR function is used for objects that have a large difference between light and dark areas. For this kind of object, clear images cannot be achieved with the standard brightness setting. The HDR function combines several images of different brightnesses (exposure times) so that the resulting image has a lower degree of contrast and can be measured stably for the desired characteristic. Inputting Images with a Limit Range of Brightness Combining Images to Create an Image with a Wide Dynamic Range Dark Bright FQ Short Manual Adjusting Image Quality 27 Observe the following precautions. · Use the HDR function only for objects that are not moving to avoid image blurring. Several images are taken with different shutter speeds and combined. If the object moves while the image is being taken, the image will become blurred. · Images with different brightnesses are combined, so the resulting image will have a lower degree of contrast.

[Image] - [Camera setup] 1 2 Press [ ] - [Brightness] on the right side of the display. Press the [HDR ON] Button. The best HDR mode will be selected automatically. The enabled range will appear in blue on the brightness adjustment bar. Press the [OK] Button. 3 Note · If the measurement object is changed after setting the HDR function, press the [AUTO] Button to automatically set the HDR mode again. · If the automatic selection does not achieve the desired results, press the [HDR] Button and manually set the best HDR mode. As shown below, the higher the level, the wider the combined dynamic range will be. Level 1 Level 2 Level 3 Level 4 Dark Bright · If the reflections cannot be sufficiently removed using the HDR function, use a polarizing filter as well. Using a Polarizing Filter Specular reflections can be eliminated from an image by attaching a FQ-XF1 Polarizing Filter to the Sensor.

Observe the following precautions. · The image will be darker compared to when no filter is used. · If the image becomes too dark, adjust the brightness. p. 26 · Mounting the Filter 1 Hook the filter in the hole at the top of the Sensor.

28 Adjusting Image Quality FQ Short Manual 2 Using the top section as a pivot point, pull down the filter so that it attaches to the Sensor. Adjusting the Colors of the Image (White Balance) If external lighting is used, the image may appear as having different colors than the actual object. If this is the case, adjust the white balance. If the lighting built in to the Sensor is used, the white balance is already adjusted. No setting is required in this case.

[Image] - [Camera setup] 1 2 3 4 5 Input a picture of white paper or cloth. 3 Press [ ] [White balance] on the right side of the display. Press the [Auto] Button. The Sensor will automatically adjust the colors. Move the bar to the left (light) or right (dark) to finetune the colors. Press [OK]. Taking Images 29 FQ Short Manual Adjusting Image Quality 3-3 Adjusting the Object Position If objects are moving, the position in the image of the characteristic that is to be measured will vary according to the timing of the trigger signal. The FQ Vision Sensor offers two different ways to adjust this position variation. Function Position compensation Trigger delay Description If the timing of the trigger is accurate, the FQ Vision Sensor can correct variations in the position of the object for each measurement with the Position Compensation function. A delay can be applied from when the trigger (the TRIG signal) is input until when the image is input, to synchronize the timing of image input with the speed of the moving objects.

Reference p. 30 p. 32 Position Compensation The FQ Vision Sensor performs measurements in measurement regions that are set to a fixed shape and position by the operator. A measurement is not performed properly if the object is not positioned inside this measurement region (e.g., the result will be NG even if the object is OK). In machines in which the position of the object varies for each image, stable measurements would be impossible. To cope this problem, the Position Compensation function aligns the whole image so that the object to be measured is moved exactly to the measurement region. Reference position (as set by the operator) The measurement object is properly within the measurement region. Measurement region Object Object is out of place: The measurement object is outside the measurement region.

The image is aligned so that the object is returned to the reference position before performing measurements. Position compensation applied... The object is measured properly within the measurement region.

[Image] [Position compensation] [Mode on/off] 1 2 Press [ON] for [Mode on/off] Press [Settings]. 30 Adjusting the Object Position FQ Short Manual 3 4 5 6 7 8 9 Press [Teach]. Adjust the image so that the measurement object is in the center. Press [ ] [Model region]. Drag the rectangle to move it. Move the rectangle so that the characteristic part for position compensation is inside it. Press [OK]. Press [Teach]. The characteristic part and reference position for position compensation will be registered. Press [OK] to save the settings. Drag a corner to size the rectangle. 3 Taking Images 31 Adjusting the Object Position FQ Short Manual Adjusting the Image Timing The internal timing for taking an image can be set to be delayed in relation to the external trigger signal. This can be used to adjust the object position in the image, e.g., if an external trigger sensor is used.

If the object position still varies in the image the Position Compensation function must also be used.



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Delay time Delay from when the trigger is input until when Sensor input is started. Trigger input Sensor [Image] - [Trigger setup] - [Trigger delay] 1 2 3 4 A TRIG signal is input. Images are input continuously. Select the image with the measurement object in the center using [ ] and [ ]. Press the image. Press [OK]. Note The delay time can be set using the adjustment bar or by directly entering a value. Move the bar to the left or right. Or Directly input the delay time.

32 Adjusting the Object Position FQ Short Manual Setting Up Inspections 4-1 Inspection Item Selection Guide . . . . .

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42 4-7 Inspecting with Color Data Inspection Item . . . . .

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. . . . 44 4-1 Inspection Item Selection Guide The FQ Vision Sensor uses inspection items to judge measurement objects. There are five different measurement objects. Select the best inspection items for the characteristics of the measurement object that are being judged. Inspection Judging according to shapes Example Judging if there is a mark Inspection Refer items used since Search p. 36 OK ITJ NG ITJ NG ITJ OK OK Judging according to positions Measuring the position offset of a seal Edge Posi- p.

38 tion OK NG Judging according to widths Measuring the width between lead wires Edge Width p. 40 OK NG Judging according to sizes Judging if there is silver paste Area p. 42 OK NG Judging according to colors Detecting parts Color Data p. 44 OK NG NG 34 Inspection Item Selection Guide FQ Short Manual 4-2 Setup Procedure for Inspection Items The basic steps for setting up inspection items are shown below. Step 1 Configuring Inspection Items Step 2 Teaching Step 3 Setting Judgement Parameters If measurements are unstable Step 4 Setting Detailed Items 4 Setting Up Inspections Step 5 Re-teaching Note . Only one inspection item can be used with a single-function model (FQ-S1 Sensors).

Up to 32 inspection items can be combined and used with a standard model (FQ-S2 Sensors). FQ Short Manual Setup Procedure for Inspection Items 35 4-3 Inspecting with the Search Inspection Item Search Inspection Item This inspection item is used to perform inspections for shapes or for presence. The image pattern that is to be measured is registered in advance and measurements are performed to see if the pattern is present or if the shape is different. The image pattern that is registered in advance is called the model. @@@@Move the rectangle to the location to be measured.

Press [OK]. Press [TEACH] on the lower right of the display. @@@@Set the correlation range for an OK judgement. @@Press [OK] to accept the value. @@@@Places where the color changes greatly are called edges. @@@@Move the rectangle to the location to be measured. Press [OK]. Press [TEACH] on the lower right of the display. @@Press [Back] to end teaching. Drag to move the region.

@@the measurement region. Moves the end point of the measurement region. @@Set the range within which the D. Position is judged as OK. @@@@Red for NG. Item Judgement Parameter Parameter D. @@Places where the color changes greatly are called edges. @@Press [Edge Width]. 40 Inspecting with the Edge Width Inspection Item FQ Short Manual Step 2 Teaching Teaching means to store the region and the edge width in the region as reference data for the measurement. [Inspect] - [Add item].

] - [Edge Width] - [Settings] Tab Page 1 2 3 4 5 6 Press [Teach]. @@Move the rectangle to the location to be measured. Press [OK]. Press [TEACH] on the lower right of the display. @@Press [Back] to end teaching.

Moves the Drag to Changes the move the width of the starting point of the region. measurement region. ment region. Moves the end point of the measurement region. The middle arrow is the direction for detecting an edge.

4 Setting Up Inspections The following data is stored as the measurement reference. Item Reference data Parameter Reference width Description The reference edge width is set automatically. Step 3 Adjusting the Judgement Parameters [Inspect] - [Add item.] - [Edge Width] - [Settings] Tab Page 1 2 3 Press [Judgement]. Set the D. Width range for an OK judgement. @@Press [OK] to enter the value. Lower limit Upper limit Blue for OK. Red for NG. Item Judgement Parameter Parameter D.

Width Setting Range: -893 to 893 Default: Lower limit: -893, Upper limit: 893 Description Set the upper and lower limits of the reference width for an OK judgement. FQ Short Manual Inspecting with the Edge Width Inspection Item 41 4-6 Inspecting with the Area Inspection Item Area Inspection Item This inspection item is used to measure sizes. It measures the amount of a color within the measurement region. The size is calculated as a number of pixels and it is called the area. Sample Settings Measurement region Sample Measurement Judges according to the number of pixels (area) of the specified color. Specified color OK NG Setup Procedure for Area Step 1 [Inspect] Selecting the Inspection Item 1 2 Press an unused inspection item number and press [Add item.]. Press [Area]. 42 Inspecting with the Area Inspection Item FQ Short Manual Step 2 Teaching Teaching means to store the region and the color area in the region as reference data for the measurement. [Inspect] - [Add item].

] - [Area] - [Settings] Tab Page 1 2 3 4 5 6 Item Press [Teach]. @@Move the rectangle to the location to be measured. Press [OK]. Press [TEACH] on the lower right of the display. @@Press [Back] to end teaching.

Drag the rectangle to move it. Drag a corner to size the rectangle. The following data is stored as the measurement reference. Parameter Extract color Reference area Description If the extract color has not been set, the target color will be automatically extracted. The area to use as a reference is set automatically.

Reference data 4 Setting Up Inspections Step 3 Adjusting Judgement Parameters [Inspect] - [Add item.] - [Area] - [Settings] Tab Page 1 2 3 Press [Judgement]. Set the D. Area range for an OK judgement. @@Press [OK] to enter the value. Lower limit Upper limit Blue for OK. Red for NG. Item Judgement Parameter Parameter D. Area Setting Range: -360,960 to 360,960 Default: Lower limit: -360,960, Upper limit: 360,960 Description Set the upper and lower limits for an OK judgement. The set range is the difference between the reference area and the measured areas.

FQ Short Manual Inspecting with the Area Inspection Item 43 4-7 Inspecting with Color Data Inspection Item Color Data Inspection Item This inspection item is used to perform inspections for foreign matter with a different color or for presence.



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The region is set for a portion of the image with the color that is to be measured. This region is called the measurement region. The average color within the measurement region is measured. Sample Settings Measurement region Sample Measurement Judges using the average color of the measurement region. OK NG Setup Procedure for Color Data Inspection Item Step 1 [Inspect] Selecting the Inspection Item 1 2 Press an unused inspection item number and press [Add item.]. Press [Color Data]. 44 Inspecting with Color Data Inspection Item FQ Short Manual Step 2 Teaching Teaching means to store the region and the average color in the region as reference data for the measurement. [Inspect] - [Add item.] - [Color Data] - [Settings] Tab Page 1 2 3 4 5 6 Item Press [Teach]. @@Move the rectangle to the location to be measured. Press [OK]. Press [TEACH] on the lower right of the display. @@Press [Back] to end teaching.

Drag the rectangle to move it. Drag a corner to size the rectangle. The following data is stored as the measurement reference. Parameter Hue Saturation Brightness Description 4 Reference data The hue to use as a reference is set automatically. The saturation to use as a reference is set automatically. The brightness to use as a reference is set automatically. Setting Up Inspections Step 3 Adjusting Judgement Parameters [Inspect] - [Add item.] - [Color Data] - [Settings] Tab Page 1 2 Press [Judgement]. Set the range of color differences that are to be judged as OK. @@@@Red for NG. Item Judgement Parameter Parameter Color Dif. Setting Range: 0 to 442 Default: Lower limit: 0, Upper limit: 442 Description Sets the upper and lower limits of the difference between the average color and reference color that is to be judged as OK. FQ Short Manual Inspecting with Color Data Inspection Item 45 MEMO 46 Inspecting with Color Data Inspection Item FQ Short Manual Testing and Saving Settings 5-1 Performing Test Measurements...

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.....48 5-2 Adjusting the Judgement Parameters..

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.....49 5-3 Checking a List of All Inspection Item Results .

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.....51 5-4 Saving Data to the Sensor.....

.....52 5 Testing and Saving Settings 5-1 Performing Test Measurements After completing the settings in the [Image], [Inspect], and [In/Out] Tab Pages, move to the [Test] Tab Page. The displayed image is measured automatically. This is called a test measurement. A test measurement is used to verify that the settings that have been made will produce stable results and, if necessary, to fine-tune the settings. An overall judgement of all inspection items can be performed.

Test measurements can be performed for through images (default) or saved images. Performing Test Measurements with Samples [Test] - [Continuous test] 1 2 3 Press [Graphics+Details]. Input an image of a previously prepared object. Check the judgement results. When you finish checking the results, press [Back].

Note The same five types of displays are available for the [Continuous test] on the [Test] Tab Page, i.e., [Graphic], [Graphics + Details], [All results/region], [Trend monitor], and [Histogram]. Press the [Back] Button to access the menu to change the display. Changing the Run Mode display: p. 56 48 Performing Test Measurements FQ Short Manual 5-2 Adjusting the Judgement Parameters Adjusting Judgement Parameters While Looking at Measurement Results If correct judgements are not possible, you can move directly from the Setup Mode display to the judgement parameters display to make adjustments. [Test] [Continuous test] (Either display) 1 2 Press [ ] - [Adjust judgement] on the right of the display. Adjust the judgement parameters. Upper limit Lower limit Setting Up the Best Judgement Parameters Automatically The judgement parameters of the selected inspection items can be automatically adjusted by using actual workpieces which are considered as good and faulty products. 5 Testing and Saving Settings [Test] - [Continuous test] 1 Move to the inspection item for which you want to automatically adjust the judgement parameters and press [ ] [Adjust judgement] on the right side of the display. Press [ ] [Auto adjustment]. 2 3 Display a sample image of a good object and press [OK Teach]. Display a sample image of a bad object and press [NG Teach]. 4 5 6 Repeat these steps for at least two samples each. Press [Back].

The best judgement parameters will be set automatically. Press [OK]. FQ Short Manual Adjusting the Judgement Parameters 49 Note You can select one of the following three patterns as the judgement method. [ ] - [Select the method.] on the right side of the display 1) Threshold (minimum): The lower limit of the variations between OK object is used as the judgement condition. 2) Threshold (average): The median value between the OK object variations and NG object variations is used as the judgement condition. 3) Threshold (maximum): The upper limit of the variations between NG object is used as the judgement condition. Number of registered samples Press [NG Teach] to register. Press [OK Teach] to register. Measurement value 3) 2) 1) 50 Adjusting the Judgement Parameters FQ Short Manual 5-3 Checking a List of All Inspection Item Results Individual judgement results for all inspection items can be checked in a list. The individual inspection items can be selected to change the judgement parameters. [Test] - [Continuous test] 1 Press [All results/region] to display the list. Note Judgement parameters can also be changed from this display. Select an inspection item and press [ ] [Adjust judgement]. 5 Testing and Saving Settings 51 Checking a List of All Inspection Item Results FQ Short Manual 5-4 Saving Data to the Sensor Until you have saved your settings explicitly to the memory in the FQ Vision Sensor, the settings are only stored temporarily. They will be lost if the power is turned OFF. Execute [Save data] after you have finished making your settings. The FQ Vision Sensor will remind you to do so with a message if you switch from Setup Mode to Run Mode. You can use this feature to keep the previous settings and discard the new settings if desired, but keep in mind that all settings that are not saved explicitly are replaced by the settings that are stored in the memory of the FQ Vision Sensor the next time you turn ON the FQ Vision Sensor. Important Do not turn the power supply OFF while data is being saved. The data that is being saved may become corrupted. [Test] 1 2 Press [Save data]. Press [Yes]. Note · Scene data and system data can be saved in this way. 52 Saving Data to the Sensor FQ Short Manual Operation 6-1 Starting Operation. . . . .

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. . 56 6-3 Adjusting Judgement Parameters during Operation . . . . .

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58 6 Operation 6-1 Starting Operation When test measurements and adjustments in Setup Mode have been finished, the display moves to Run Mode and actual measurements begin.



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In Run Mode, the Sensor operates stand-alone and outputs the measurement judgement results on the I/O lines accordingly to the settings. If the Touch Finder or the PC Tool is connected via network to the Sensor, the operation of the Sensor can be monitored in the following ways. Run Mode Display The present display name. Overall judgement Measurement processing time The time taken from when an image is input until all measurements have been completed.

Inspection results can be displayed in six formats, such as in a list or as a trend graph. p. 56 These buttons are displayed both in Setup and Run Mode. p. 6 Tool Button or OK Button Selected inspection item Connected Sensor name Selected scene number Sub-menu Moving to Run Mode You can move from Setup Mode to Run Mode by using the following procedure. 1 2 Press [Run]. Press [Switch to Run mode.]. 3 Press [Yes]. If you press [No], the setting will not be saved and you will move to Run Mode.

54 Starting Operation FQ Short Manual Note - Returning to Setup Mode Press and press [Sensor settings]. · Signal Status When Moving to Run Mode When moving to Run Mode, the signal will change as shown below and data can be input from and output to an external device. Display Setup Mode Run Mode The BUSY signal that was always ON will turn OFF. ON BUSY signal OFF 6 Operation 55 Starting Operation FQ Short Manual 6-2 Configuring the Run Mode Display There are six types of displays that can be used, as shown below. Select the display as desired. Checking the Judgement Results of Inspection Items Graphics Graphics + Details Checking the Overall Judgement Result History Statistical data The image and region currently being measured will appear. In addition to [Graphics] display, individual judgement results and measurement values of selected inspection items will appear. The currently measured image and history of the overall judgement results (measurement count, NG count, and NG rate) will appear. Checking the Judgements of All Inspection Items in a List All results/region (Standard Models Only) Displaying Measurement Result Histories Trend monitor Histogram The judgement results of all inspection items can be checked in a list. The statistical data for the currently selected inspection item can be checked against time.

The distribution of measurement results of the currently selected inspection item can be checked. (Run Mode) - [Select display] 56 Configuring the Run Mode Display FQ Short Manual Specifying the Startup Run Mode Display The display that appears when power supply is turned ON can be set. The default setting is [Graphics]. (Setup Mode or Run Mode) - [TF settings] - [Startup display] - [Display pattern] Displaying the Inspection Item Results You can scroll through the measurement results of all the configured inspection items by using the following operations. Switches to the previous inspection item.

Switches to the next inspection item. Note The following are also displayed in addition to the measurement results for each inspection item. · Camera input: The image that is being measured is displayed. · Position comp.: The result of position compensation is displayed.

· All Region: The measurement regions for all inspection items are displayed. 6 Operation 57 FQ Short Manual Configuring the Run Mode Display 6-3 Adjusting Judgement Parameters during Operation This Sensor enables judgement parameters to be adjusted while measurements are being performed. Downtime can be eliminated with this feature because the production line does not have to be stopped while making adjustments. Preparations This function is switched OFF as a default to prevent it from inadvertently working during operation. Turn ON the function if you want to use it. (Setup Mode) - [Sensor settings] - [Adjustment mode in Run] 1 Press [ON]. Changing the Judgement Parameters in Run Mode This section describes how to change the judgement parameters without stopping measurement in Run Mode. Run Mode 1 2 Select the inspection item for which you want to adjust the judgement parameters using the and Buttons. Press [ ] [Adjust judgement]. 3 4 Change the adjustment parameters with the slider.

Press [OK]. The judgement results with the changed judgement parameters will appear. Important The changed judgement parameters will not be reflected in the measurement result until [OK] is pressed. 58 Adjusting Judgement Parameters during Operation FQ Short Manual Communications with External Devices 7-1 Operation with Default Configuration . . . . .

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. . . . . 60 7-2 Setting the Measurement Trigger . .

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. . . . . 65 7-4 Controlling the Sensor from an External Device. . .

. . . . 68 7 Communications with External Devices 7-1 Operation with Default Configuration This section describes the basic connections and signal flow with external devices. With the default settings, the Sensor operates in the following manner. Trigger Sensor FQ Vision Sensor External device (1) Measurement trigger input (3) Judgement results output (2) Measurements performed (1) Measurement trigger input (TRIG signal) ON OFF The trigger to perform measurements once is turned ON. You can confirm if measurements are in progress. ON while measurements are in progress This signal stays ON until the next measurement trigger can be input. Turned ON when overall judgement is NG.

Retained until the next judgement results are output. (2) Executing ON measurement OFF processing (BUSY signal) (3) Judgement results output (overall judgement: OR signal) Important · Create the ladder program to control the TRIG and IN5 input signals so that they do not turn ON while the BUSY signal is ON. If not, a TRIG input error will occur and the ERROR signal will turn ON. · Operation When the Sensor Power Supply Is Turned ON The BUSY signal will operate as shown below when the Sensor's power supply is turned ON. Create the ladder program in the PLC or other external device so that the BUSY signal is ignored while it turns OFF, ON, and OFF again for up to 5 s after the power supply is turned ON. 24 V Power supply 0V 1.5 s ON BUSY OFF Sensor system is initializing 3.5 s\* Turns OFF when the Sensor is ready for operation. \* Depends on the scene data. Configuring the Operation The following settings can be selected depending on the system configuration and application.

Type of change Changing the type of measurement trigger Changing the output method of the judgement results Change Performing continuous measurements Obtaining individual judgement results Reference p. 62 p. 66 60 Operation with Default Configuration FQ Short Manual 7-2 Setting the

*Measurement Trigger The measurement trigger can be chosen from the following two types: · One-shot measurement: One measurement is performed for each external trigger.*



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· Continuous measurement: Measurements are performed continuously. Performing One Measurement for Each External Trigger A measurement trigger is input as the TRIG signal from a proximity sensor, PLC, or other external device.

One measurement is performed when the TRIG signal turns ON. (1) TRIG signal ON Or other device Trigger input Sensor (2) Performs measurements once Wiring Color Pink Black Signal TRIG OUT0 (OR) Description Trigger signal Overall judgement (default assignment) Processing in progress (default assignment) The signals shown at the left are used. Refer to the following information for signal wiring. Wiring: p. 15 Orange OUT1 (BUSY) Timing Chart ON TRIG signal OFF ON for 1 ms min.

7 ON BUSY signal OFF Communications with External Devices ON while measurements are being processed (depends on BUSY output conditions) OR signal Turned ON when overall judgement is NG. (Output polarity: ON for NG) 1. Turn ON the TRIG signal while the BUSY signal is OFF. 2. Measurement begins and the BUSY signal is turned ON during the measurement process. 3. When the measurement has been finished, the measurement result is output using an OR signal, and the BUSY signal is turned OFF. \*1 \*1: You can also set the signal to be turned OFF after data logging, image logging, or displaying results in the [BUSY output]. FQ Short Manual Setting the Measurement Trigger 61 Sample Ladder Program The following sample program is used to input a TRIG signal to perform a single measurement. A single measurement will be performed when W0.

00 turns ON. W0.00 OUT1 SET TRIG Single BUSY signal measurement command bit TRIG TRIG signal When the single measurement command bit (W0.00) turns ON, the TRIG signal is turned ON if the BUSY signal is OFF. TMHH 0000 #2 The TRIG signal is kept ON for 2 ms and then turned OFF. T0000 RSET TRIG RSET W0.00 OUT1 BUSY signal OUT0 OR signal OUT0 OR signal ++L 1000 ++L 1002 When the BUSY signal turns OFF to indicate that the measurement has been finished, the judgement result is added to the total count. OK measurements: CIO 1000 NG measurements: CIO 1002 I/O Signal Allocations Signal Output signals OUT0 (OR signal) OUT1 (BUSY signal) Input signals TRIG Address CIO 0.00 CIO 0.01 CIO 1.

00 Important The BUSY signal will remain ON while the measurement is being executed. Performing Continuous Measurements Continuous measurements are performed while the continuous measurement command is input from an external device. Immediately after a measurement is performed, the next measurement is performed. This is repeated while a continuous measurement command is input with the IN0 to IN5 signals. (1) IN5 signal ON (IN0 to IN4 are OFF) Or other device PLC (2) Performs continuous measurements Note This function can be used only when the input mode is set to Expanded Mode.

62 Setting the Measurement Trigger FQ Short Manual Wiring Color Gray Green Red White Purple Yellow Black Orange Signal IN0 IN1 IN2 IN3 IN4 IN5 OUT0 (OR) OUT1 (BUSY) State OFF OFF OFF OFF OFF ON --- Description Command parameters for continuous measurements The signals shown at the left are used. Refer to the following information for signal wiring. Wiring: p. 15 Command input for continuous measurements Overall judgement (default assignment) Processing in progress (default assignment) Timing Chart ON IN0 to IN4 signals are OFF Allow 5 ms min. and then turn ON IN5.

OFF ON IN5 signal OFF Start continuous measurements ON BUSY signal OFF ON while measurements are being processed (depends on BUSY output conditions) End continuous measurements Turned ON when overall judgement is NG. (Output polarity: ON for NG) OR signal 1. Turn ON IN5 while IN0 to IN4 are OFF. If status is held while the BUSY signal is OFF, continuous measurements will begin and the BUSY signal will remain ON while continuous measurements are being performed. 2. Continuous measurements end when IN5 is turned OFF. 7 Communications with External Devices Settings [In/Out] - [I/O setting] - [Input] - [Input mode] Press [Expanded mode]. FQ Short Manual Setting the Measurement Trigger 63 Sample Ladder Program The following sample program is used to input a IN5 signal to perform continuous measurements. Continuous measurements will be started when W0.00 turns ON and stopped when W0.

01 turns ON. W0.00 Continuous measurement command bit W0.00 Continuous measurement command bit T0000 OUT1 BUSY signal MOV #0000 Q:1 When the continuous measurement command bit (W0.00) turns ON, the command parameter for continuous measurements (00000) is output to Q:1 (IN0 to IN4). TMHH 0000 #5 If the BUSY signal is OFF 5 ms after the command parameter is output, the command input for continuous measurements (IN5) is turned ON and continuous measurements start SET IN5 RSET W0.00 W0.01 Continuous measurement stop bit When the continuous measurement stop bit (W0.01) turns ON, the command input for continuous measurements (IN5) is turned OFF and continuous measurements stop. RSET IN5 RSET W0.

00 I/O Signal Allocations Signal Output signals Input signals OUT1 (BUSY signal) IN0 IN1 IN2 IN3 IN4 IN5 Address CIO 0.01 CIO 1.08 CIO 1.09 CIO 1.10 CIO 1.

11 CIO 1.12 CIO 1.15 64 Setting the Measurement Trigger FQ Short Manual 7-3 Setting the Outputs Using the Overall Judgement Result When the results of the inspection items are judged, if even one individual judgement result is NG, the OR output signal is turned ON. Individual judgement results Inspection item 0 Inspection item 1 OK NG Overall judgement NG (OR signal ON) If there is even one NG judgement, the overall judgement will be NG and the output will be turned ON. Inspection item 31 OK Wiring Color Black Signal OUT0 (OR) Description Overall judgement (default assignment) The signals shown at the left are used.

Refer to the following information for signal wiring. 2-3 Wiring: p. 15 Timing Chart The OR signal that is output is held until the next overall judgement is output. ON TRIG signal OFF ON BUSY signal OFF ON while measurements are being processed (depends on BUSY output conditions) ON for 1 ms min. 7 Turned ON when overall judgement is NG. (Output polarity: ON for NG) Communications with External Devices OR signal Overall judgement \*1 \*1: The timing for updating the OR signal is when the measurement results are finalized, regardless of the output settings of the BUSY signal (BUSY output conditions). FQ Short Manual Setting the Outputs 65 Obtaining Individual Judgement Results Up to three judgement results of individual inspection items (individual judgement signals OR0 to OR31) can be assigned to terminals OUT0 to OUT2 and output to external devices. Output terminal OUT0 Output signals that can be assigned · OR (Total judgement)...

(default) · OR0 (Item 0 judgement) to OR31 (Item 31 judgement) · BUSY (default) · OR0 (Item 0 judgement) to OR31 (Item 31 judgement) · ERROR (default) · OR0 (Item 0 judgement) to OR31 (Item 31 judgement) OUT1 OUT2 Wiring Example: Signals are assigned to terminals OUT0 to OUT2 as shown below.



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· OUT0: Inspection number 2 (OR2) · OUT1: Inspection number 5 (OR5) · OUT2: Inspection number 14 (OR14) Color Black Orange Light blue Signal OUT0 (OR2) OUT1 (OR5) OUT2 (OR14) Description Outputs the judgement for OR2. Outputs the judgement for OR5. Outputs the judgement for OR14. The signals shown at the left are used. Refer to the following information for signal wiring. 2-3 Wiring: p. 15 As described above, if terminals OUT0 to OUT2 are all assigned to individual judgement output signals, the BUSY signal and ERROR signal assigned as the default settings will no longer be output. 66 Setting the Outputs FQ Short Manual Timing Chart Output OR0 to OR31 signals are held until the next judgement output. TRIG signal ON OFF ON BUSY signal OFF Example: OR0 signal ON while measurements are being processed (depends on BUSY output conditions) Turned ON when individual judgement is NG. (Output polarity: ON for NG) Turned ON when individual judgement is NG. (Output polarity: ON for NG) Individual judgement\*1 \*1: The timing for updating the OR signal is when the measurement results are finalized, regardless of the output settings of the BUSY signal (BUSY output conditions). ON for 1 ms min. OR1 signal Settings [In/Out] - [I/O setting] - [Output] 1 2 3 Press [OUT0]. Press [OR2 (Item 2 judgement)].

OR2 output signal was assigned to OUT0. Assign the others in the following manner. OUT1: OR5 OUT2: OR14 7 Communications with External Devices 67 Setting the Outputs FQ Short Manual 7-4 Controlling the Sensor from an External Device The following Sensor functions can be controlled with command inputs from an external device without connecting the Touch Finder. Function Switching the scene Re-registering the model or reference color Clearing an error Continuous measurement Description This command changes the scene when the line process changes. This command re-registers the judgement references for measurement when levels are changed.

This command turns the ERROR signal OFF. Continuous measurement is performed while this command is input. Reference p. 68 p. 70 p. 73 p. @@ Refer to the following information for signal wiring. 2-3 Wiring: p. @@ and then turn ON IN5. IN5 signal ON ON for 1 ms min.

@@@3 The BUSY signal turns ON while the scene is being switched. End scene change \*1: In Expanded Mode, specify scene numbers 0 to 15 using the IN0 to IN3 signals. 68 Controlling the Sensor from an External Device FQ Short Manual Settings [In/Out] - [I/O setting] - [Input] - [Input mode] The scene numbers that can be used depend on the input mode. [Standard mode] (default): Scene 0 to 31 [Expanded mode]: Scene 0 to 15 Sample Ladder Program This sample program is used to change the scene when the input mode is set to Expanded Mode. The scene changes to scene 1 when W0.00 turns ON. W0.00 Scene change bit W0.00 Scene change bit T0000 OUT1 BUSY MOV #1100 Q:1 When the scene change bit (W0.00) turns ON, the scene number is input to IN0 to IN3 and IN4 is turned ON.

TMHH 0000 #5 If the BUSY signal is OFF 5 ms after the scene number is input, the trigger to change the scene (IN5) is turned ON. SET IN5 RSET W0.00 IN5 TMHH 0001 #2 The trigger to change the scene (IN5) is kept ON for 2 ms and then turned OFF. T0001 RSET IN5 BUSY SET W0.01 When the BUSY signal turns OFF to indicate that the scene has been changed, processing after changing the scene is performed (W0.01 turned ON). 7 Communications with External Devices I/O Signal Allocations Signal Output signals Input signals OUT1 (BUSY signal) IN0 IN1 IN2 IN3 IN4 IN5 Address CIO 0.01 CIO 1.08 CIO 1.09 CIO 1.10 CIO 1.11 CIO 1.12 CIO 1.15 Note The BUSY signal will be ON while the scene it being changed. FQ Short Manual Controlling the Sensor from an External Device 69 Important If the cycle time is too long, the PLC may not be able to detect when the BUSY signal is ON. If necessary, turn OFF W0.00 after a suitable time elapses. Registering the Measurement Reference Again The model and reference color can be re-registered with commands from an external device, such as a PLC, based on the image that was just input when the line process was changed. Inspection item Search Color data Edge Position, Edge Width, Area Re-registered data Model data Reference color (hue, saturation, and brightness) None Note · Application is possibly only from the Run Mode · If the parameter is applicable to more than one inspection item, it will be re-registered for all inspection items. Settings [In/Out] - [I/O setting] - [Input] - [Input mode] Press [Expand mode].

Wiring Color Gray Green Red White Purple Yellow Signal IN0 IN1 IN2 IN3 IN4 IN5 State OFF OFF OFF ON OFF ON -- Description Command parameter for registering the model again The signals shown at the left are used. Refer to the following information for signal wiring. 2-3 Wiring: p. 15 Command input for registering the model again Processing in progress (default) Orange OUT1 (BUSY) 70 Controlling the Sensor from an External Device FQ Short Manual Timing Chart 1 Turn OFF IN 0 to IN4 and turn ON IN3. 2 Turn ON the IN5 signal while the BUSY signal is OFF to register the model data and reference color again from the image that was just input. 3 The BUSY signal turns ON while the parameters are being re-registered. IN0 to IN4 signals Allow 5 ms min. and then turn ON IN5. ON for 1 ms min. ON IN5 signal OFF ON OFF BUSY signal Start re-registering End re-registering Sample Ladder Program This sample program is used to input IN5 to re-register a model.

W0.00 Model re-register bit W0.00 Model re-register bit T0000 OUT1 BUSY MOV #800 Q:1 When the mode re-register bit (W0.00) turns ON, IN3 is turned ON. TMHH 0000 #5 If the BUSY signal is OFF 5 ms after IN3 turns ON, the command input for registering the mode again (IN5) is turned ON. SET IN5 RSET W0.00 IN5 7 TMHH 0001 #2 The command input for registering the mode again (IN5) is kept ON for 2 ms and then turned OFF. Communications with External Devices T0001 RSET IN5 BUSY SET W0.01 When the BUSY signal turns OFF to indicate that model has been re-registered, processing after re-registration is performed (W0.01 turned ON).

FQ Short Manual Controlling the Sensor from an External Device 71 I/O Signal Allocations Signal Output signals Input signals OUT1 (BUSY signal) IN0 IN1 IN2 IN3 IN4 IN5 Address CIO 0.01 CIO 1.08 CIO 1.09 CIO 1.10 CIO 1.11 CIO 1.12 CIO 1.15 Note The BUSY signal will be ON while the model is being re-registered. Important If the cycle time is too long, the PLC may not be able to detect when the BUSY signal is ON. If necessary, turn OFF W0.00 after a suitable time elapses. 72 Controlling the Sensor from an External Device FQ Short Manual Turning the ERROR Signal OFF The ERROR signal turns ON when an error occurs. After removing the cause of the error, turn the ERROR signal OFF using one of the following methods.



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