FQ Vision Sensor Quick Startup Guide

Box Contents

FQ Vision Sensor

FQ-XL Mounting Bracket

FQ-XF1 Polarizing Filter Attachment

Instruction Manual
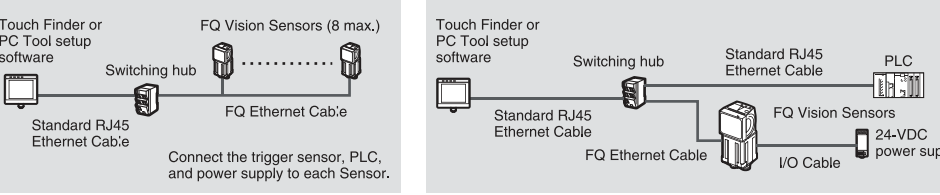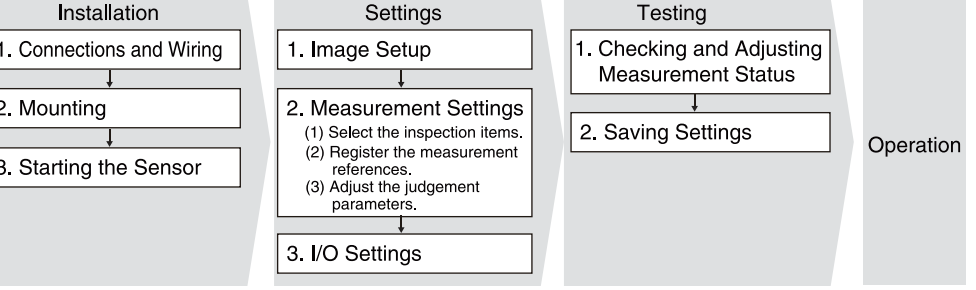
Member Registration Sheet

Quick Startup Guide (this document)

System Overview

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

Touch Finder or PC Tool setup software

FQ Vision Sensor

Trigger Sensor

PLC

FQ Ethernet Cable

I/O Cable

24-VDC power supply

Multiple Connections

Touch Finder or PC Tool setup software

Switching hub

FQ Vision Sensors (8 max.)

FQ Ethernet Cable

Standard RJ45 Ethernet Cable

Connect the trigger sensor, PLC, and power supply to each Sensor.

When one unit is connected (control by Ethernet)

Touch Finder or PC Tool setup software

Switching hub

Standard RJ45 Ethernet Cable

Standard RJ45 Ethernet Cable

FQ Ethernet Cable

FQ Vision Sensors

I/O Cable

PLC

24-VDC power supply

| Product	Model number	Remarks
FQ Vision Sensor	FQ-S□□□□□□	This is the Vision Sensor.
Touch Finder	FQ-D□□	This is a setup console.
PC Tool	---	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 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 Vision Sensor for operation.
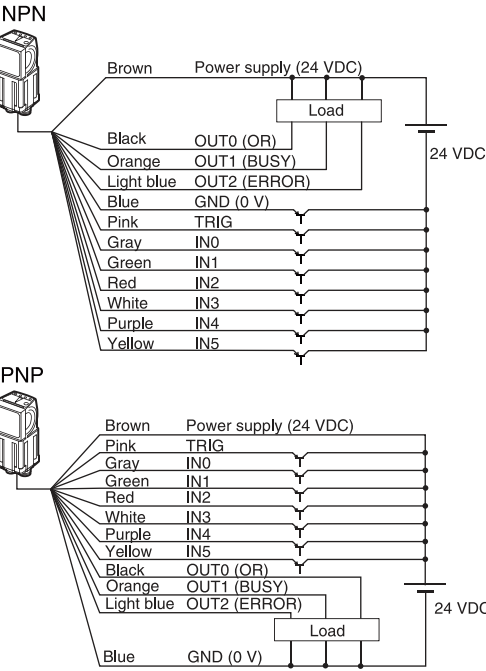
Installation
1. Connections and Wiring
2. Mounting
3. Starting the Sensor

Settings
1. Image Setup
2. Measurement Settings
   (1) Select the inspection items.
   (2) Register the measurement references.
   (3) Adjust the judgement parameters.
3. I/O Settings

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

Operation

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1. Installation

1-1 Connections and Wiring

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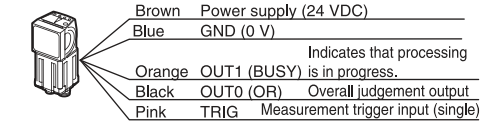
Touch Finder

FQ Vision Sensor

Ethernet connector

FQ-WN0□□ Ethernet Cable

Ethernet connector
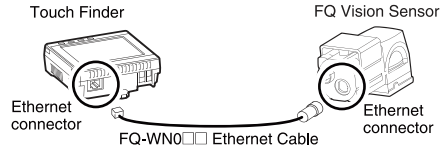
2 Connect the I/O Cable to the Sensor.

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.

1

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 — 1 ms min. — ON / OFF

BUSY (OUT1) — ON / OFF — Processing

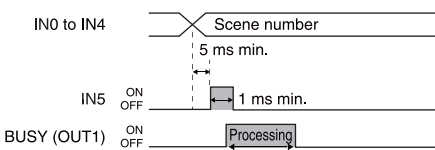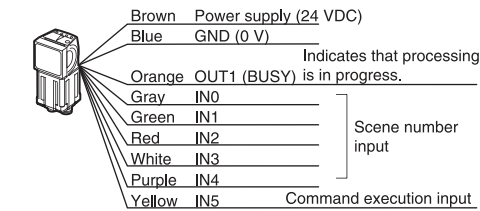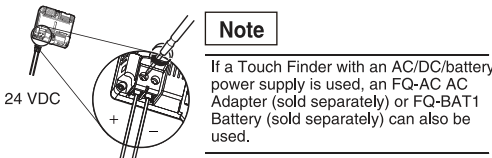OR (OUT0) — Overall judgement
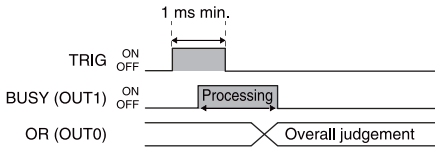
Important

- 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.

24 VDC

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.

1-2 Mounting

1 Check the mounting position.

Use the optical charts in the enclosed Instruction 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-S10050F

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

Installation distance (L) (mm)

210
130
50

115 mm

Imaging range

0   20   40   60

30 mm

Horizontal field of view (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.

Select the language to display on the Touch Finder.

Language

日本語
English
Deutsch
Français
Italiano
Español

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

0.Scene0

Image
Inspect
In/Out
Test
Run

Camera setup
Trigger setup
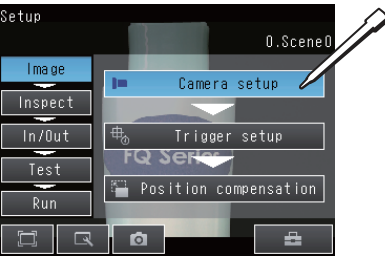Position compensation

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2. Settings

2-1 Image Setup

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

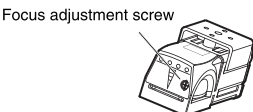**1** Focus the image.

Press [Camera setup].

Setup

0.Scene0

Image
Inspect
In/Out
Test
Run

Camera setup
Trigger setup
Position compensation

The camera image will be displayed.

Image>Camera setup

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FQ Series

Back

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 Vision 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].

Image>Camera setup

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Brightness
White balance
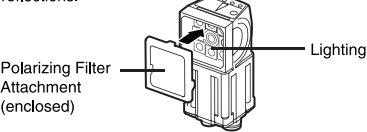Partial input
Lighting control

FQ Series
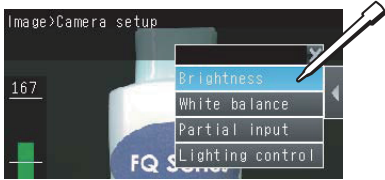
Adjust the brightness with the slider at the bottom of the display.

You can also press [AUTO] to automatically set the brightness according to the image.

Brightness

OFF
HDR
AUTO

Dark

Bright

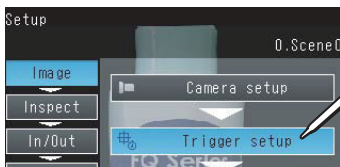L   60

OK   Cancel

Press [OK].

Note

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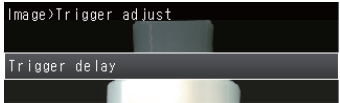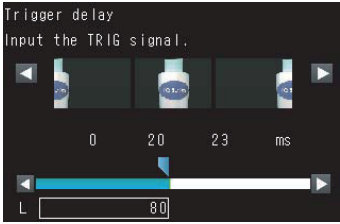- Attach the enclosed Polarizing Filter if the image is blurred by reflections.

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].

Setup

0.Scene0

Image
Inspect
In/Out

Camera setup
Trigger setup

Press [Trigger delay].

Image>Trigger adjust

Trigger delay

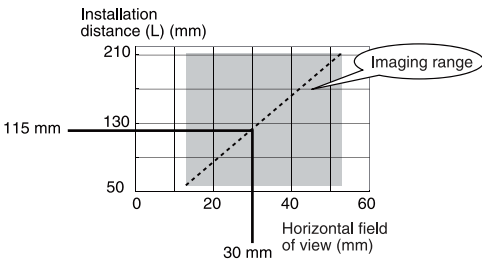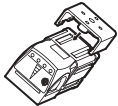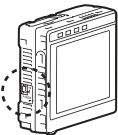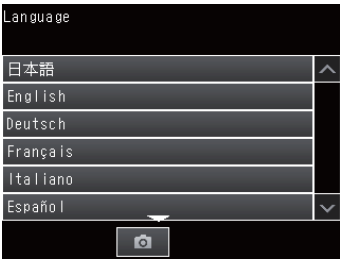After the TRIG signal is input, images will be continuously input.

Trigger delay
Input the TRIG signal.

0   20   23   ms

L   80

Select the image that was taken with the best timing. Press [OK].

4 Set up the Position Compensation. (Standard model only)

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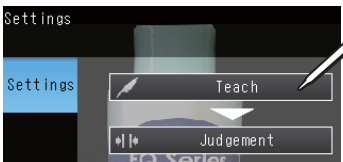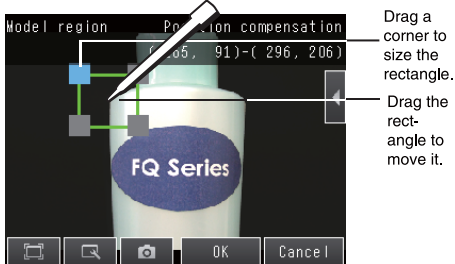
Press [Position compensation].
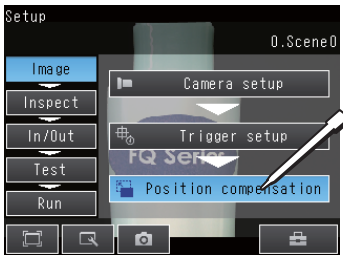
Press [Mode on/off] and then [ON]. Then press [Settings].
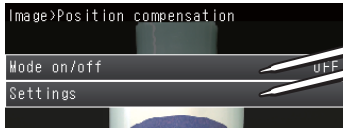
Press [Teach].

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.
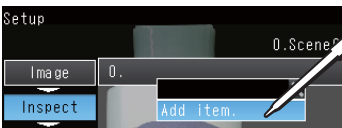
Press [OK].

2-2 Measurement Settings

Select items for the desired measurement and register an image as the reference for the measurement.
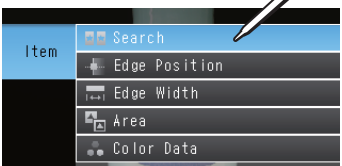
1 Select the inspection items.

Example to Register Search as the Messurement Method

Press [Inspect]. Next, touch [Inspection].

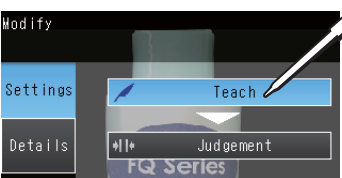Press an unused inspection item number and then press [Add item.] on the menu.
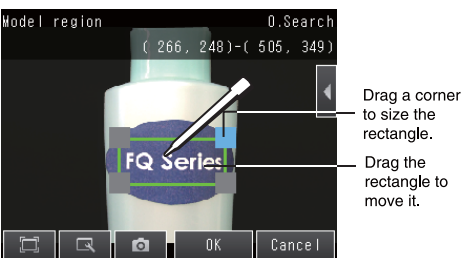

Press [Search].

2 Register the measurement reference.

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 mark to be meaured is inside it.
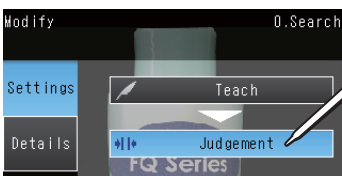

Drag a corner to size the rectangle.
Drag the rectangle to move it.

Check the area, press the [OK] Button, and then press the [TEACH] Button. Register the image as the measurement reference.
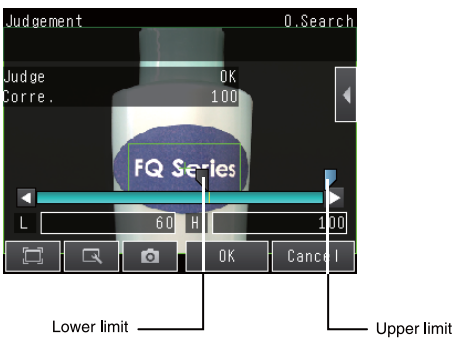

Press [Back].

3 Adjust the judgement parameters.

Press [Judgement].

Adjust the judgement parameters while inputting sample images.

Lower limit   Upper limit

Press [OK].

The calculation settings can be used to perform calculations using the results of multiple inspection items.
Refer to the *User's Manual* for details.

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.
• Commands to register models can be input from an external device.
• If you want to output data externally

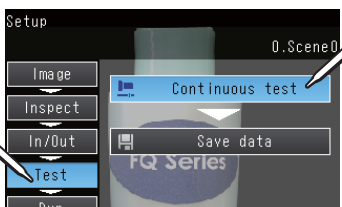Refer to the *User's Manual* for details.

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.
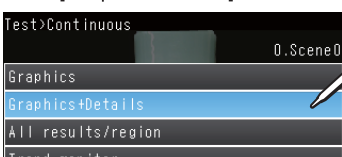
1 Perform tests.

Press [Test].
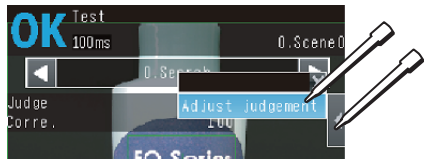Then press [Continous test].

Press [Graphics+Details].

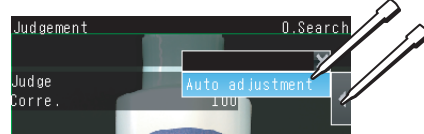Continuous measurements will be performed. Input images of some samples to see if the judgements are correct.

---

2 If correct judgements are not made, adjust the judgement parameters.

Press [◄].
Press [Adjust judgement].

Press [◄].
Press [Auto adjustment].

You can use prepared samples to automatically set the best judgement parameters.
Input a sample of a good object and press [OK Teach].
Input a sample of a bad object and press [NG Teach].
Repeat these steps for at least two samples each.

Press [Back].
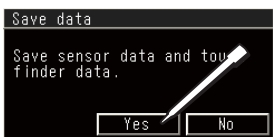The best judgement parameters will be set automatically.

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4. Operation

1 Switch to the Run Mode display.

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

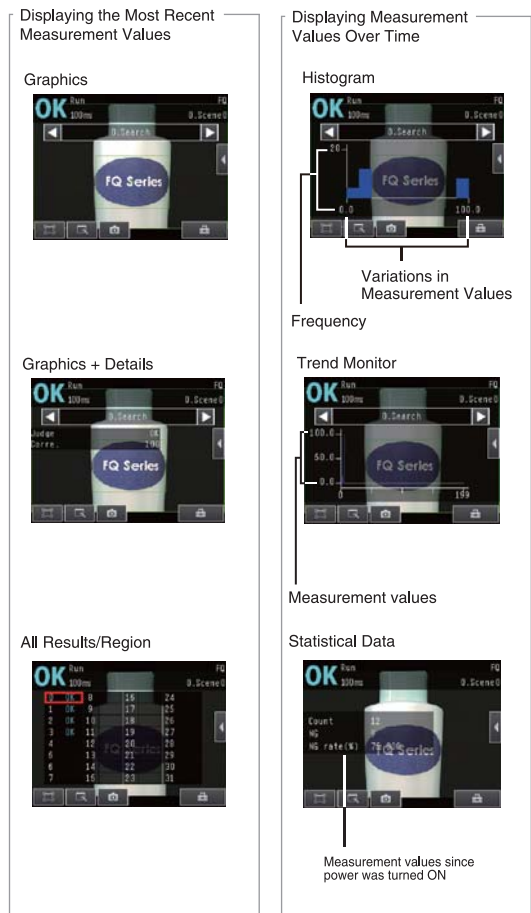### 2 Save the settings.

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

Initia: 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 (Standard model only) |

[Inspect] Tab Page
Select the inspection items and register the reference image and standard values.

Inspection Items

Search	Area
Edge Position	Color Data
Edge Width	

| 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 a:ready set up is connected

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