

Cat. No. Z123-E1-1

# F-30 Vision Sensor



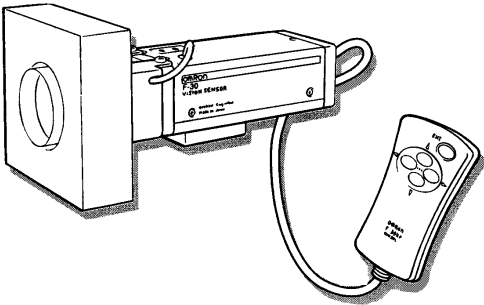
# OPERATION MANUAL

# OMRON

# F-30 Vision Sensor

## Operation Manual

*Produced July 1998*



## General Precautions

When the product is used under the circumstances below, ensure adherence to the limitations of the ratings and functions. Also, take countermeasures for safety precautions such as fail-safe installations.

1. Use under the circumstances or environment which are not described in the operation manuals.
2. Use for the equipment which requires higher level of safety such as nuclear devices, railroad, aircrafts, vehicles, combustion devices, amusement equipment/machinery, medical equipment, safety devices.
3. Use for the application where death, serious injury, or property damage is possible and extensive safety precautions are required.

## Safety Precautions



**Caution** Do not use the F-30 in environments with flammable or explosive gases.



**Caution** Install the F-30 away from high-voltage equipment or motors to ensure safety during operation and maintenance.



**Caution** Use the power supply cables and crimp terminals of specified sizes.



**Caution** Use at the power supply voltages specified in this manual.



**Caution** Be sure to securely tighten the screws when mounting F-30 components.



**Caution** Do not dismantle, repair, or modify any F-30 components.



**Caution** Dispose of F-30 components as industrial waste.

## Visual Aids

The following headings will help you locate different types of information.

**Note** Indicates information of particular interest for efficient and convenient operation of the product.

Indicates pages where additional information can be found.

**1** Indicates a procedure. The step numbers in the procedure correspond to the numbers in any related illustrations.

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# 1 Introduction

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## 1-1 Operational Flow

The F-30 operation is as follows:

### Illumination/image reading

The object to be measured is illuminated by a red LED light source. A signal from an external device TRIGGERS the shutter, and the object's image is captured.

### Measurement

The image is binarized, then measured.

### Judgment inspection

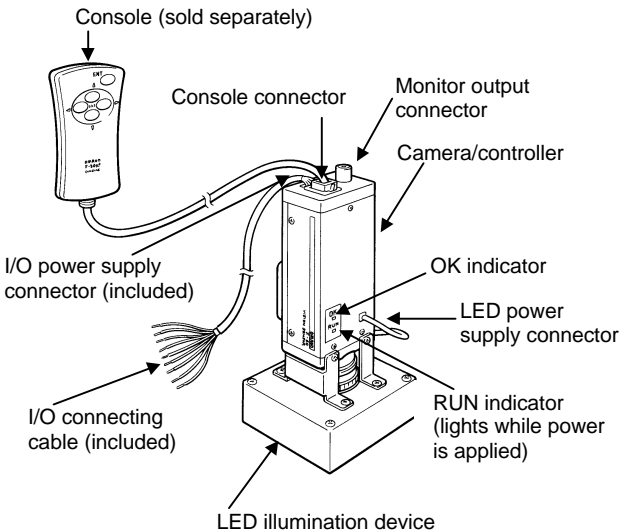
The measured object is judged against the set measurement conditions.

### Display/signal output

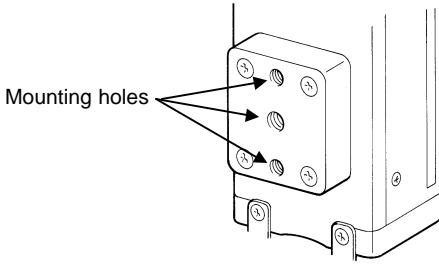
The judgment result and image are displayed. The judgment result signal and control signal (GATE signal) are sent to an external device. The judgment result signal can be HIGH: the object is too large, OK: the object's size is acceptable, or LOW: the object is too small.

## 1-2 Nomenclature

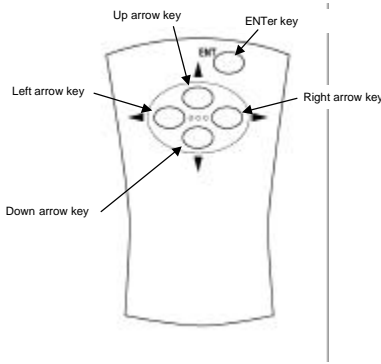
### 1-2-1 Camera/Controller



### 1-2-2 Back of Controller



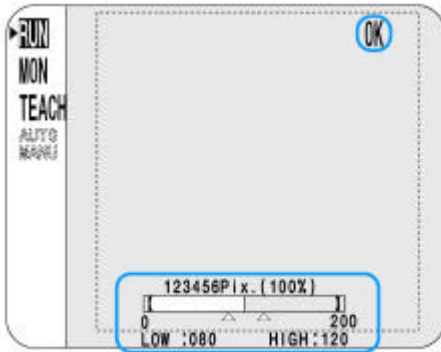
### 1-3 Console (sold separately)



Up and down arrow keys	Highlight modes/menus. Specifies setting values.
Left and right arrow keys	Specify setting values.
ENTER key	Selects specified (highlighted) mode/menu.

## 1-4 Screen Display

The F-30 is operated by selecting the functions displayed on the screen.



### Mode Display

The right arrow indicates the current mode or menu.

### Cursor

The cursor (reverse display) is used to highlight the desired function. The function is selected when ENTER is pressed.

### Region of Interest

A selected area of the image to be inspected and analyzed. The region of interest is designated by a dotted line box.

### Judgment Result

The judgment result is displayed.

Note: If a commercially available television (overscan display) is used for the monitor, it may not be possible to see all the display. With an underscan monitor, everything will be visible.

# 1-5 Modes

The following functions are always displayed on the screen.

<b>Mode</b>	<b>Explanation</b>
Settings: TEACH	This mode is used to register the pass/fail conditions. Settings can be done in AUTO or MANUal.
AUTO	A simple means of setting the reference image, and each measurement criterion.
MANUal	The pass/fail conditions are set manually.
Confirmation: MONitor	This mode is used to confirm whether the measurement and judgment process is being performed accurately based on the pass/fail conditions. The TRIGGER signal is accepted, and the measurement result is displayed. No signal is output.
Measurement: RUN	This is the mode used for actual inspection. The object's image is recorded and measured when the TRIGGER signal is received from the external device. The judgment result is displayed on the monitor. The judgment result signal (HIGH/OK/LOW) and control signal (GATE signal) are sent to an external device. If the judgment result is OK, the OK indicator also lights.

The F-30 power can be turned OFF in any mode (screen). When the power is turned ON, the F-30 defaults to RUN mode.



## 2 Setup

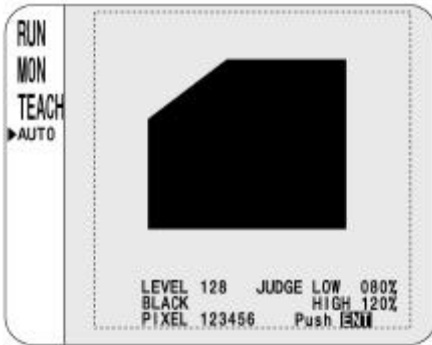
---

### 2-1 Settings: TEACH Mode

A few seconds after applying power, RUN mode begins, and measuring starts.

#### 2-1-1 AUTO

AUTO sets the reference image, and pass/fail conditions automatically. This is the simplest way to get started. If AUTO is run after setting the criteria in MANUAL, the MANUAL settings will be lost.



(Binary image)

Use the following steps to set the reference image and pass/fail conditions:

1. Highlight TEACH and press ENTER.  
AUTO and MANUal will be displayed. The cursor will highlight AUTO as the default, and the pass/fail conditions and original image will be displayed.
2. Press ENTER again.  
Criteria registration is now possible.  
The cursor waits at ENTER, and black and white is the default.
3. Move the object to be registered as the reference image until it is within the region of interest.
4. Press ENTER.  
The reference image and pass/fail conditions are registered.

To change the registered settings, just follow the above steps again. Settings can be changed as often and as many times as desired.

Because a red LED is used for illumination, a red object may not convert properly to binary.

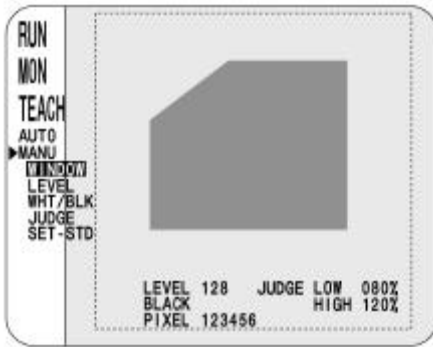
Note: If AUTO mode is entered by accident, it can be exited without changing any settings by pressing any of the arrow keys.

The factory default settings are as follows:

Measurement	Setting
WINDOW (region of interest) size	40mm x 40mm
LEVEL (binary conversion level)	128
WHT/BLK (target color for measuring)	Black
JUDGE (judgment criteria range)	Low: 80% High: 120%

## 2-1-2 MANUal

MANUal mode can be used to set the measurement conditions individually. It can also be used to change some settings after setting all conditions with the AUTO mode.



(Original image)

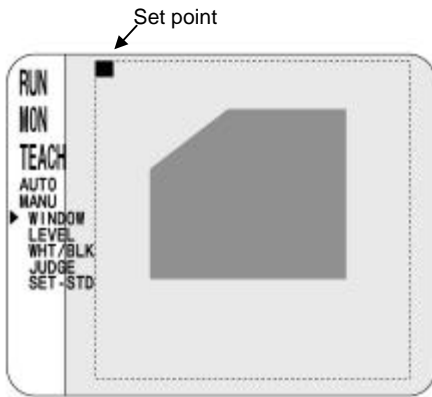
Use the following steps to set the reference image and pass/fail conditions:

1. Highlight TEACH and press ENTER. AUTO and MANUal will be displayed.
2. Highlight MANUal, and press ENTER again. Each criterion can now be set. WINDOW, LEVEL, WHT/BLK, JUDGE, SET-STD are displayed. The cursor waits at WINDOW.
3. Highlight the WHT/BLK menu to set, and press ENTER. The menu for the selected setting will be displayed.

Note: If AUTO mode is entered by accident, it can be exited without changing any settings by pressing any of the arrow keys.

## WINDOW Menu

The WINDOW menu is used to set the size of the region of interest. The region of interest is displayed as a dotted line box on the monitor.



(Original image)

Highlight WINDOW and press ENTER.

The set point is initially displayed in the upper-left of the frame.

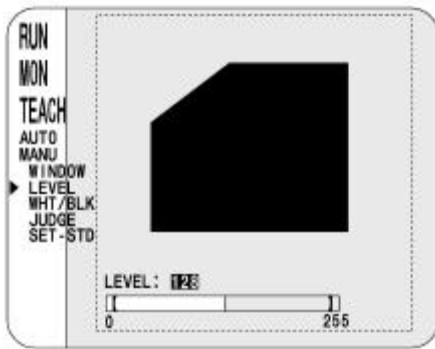
1. Use the arrow keys to adjust the position of the upper-left corner of the frame. Pressing up and left together, or down and right together will adjust the corner diagonally.
2. Press ENTER when the upper-left corner is adjusted as desired.
3. The set point moves to the lower-right corner of the frame. Use the arrow keys to adjust the position of the lower-right corner of the frame. Pressing up and left together, or down and right together will adjust the corner diagonally.
4. Press ENTER when the lower-right corner is adjusted as desired.

Note 1: Setting the size and position of the region of interest also updates the reference image. Always have the object being used as the reference image in position when setting the window menu.

Note 2: To change the registered settings, just follow the above steps again. If a commercially available television (overscan display) is used for the monitor, it may not be possible to see all the display. With an underscan monitor, everything will definitely be visible.

## LEVEL Menu

The LEVEL menu is used to set the binary conversion level.



(Binary image)

Highlight LEVEL and press ENTER.

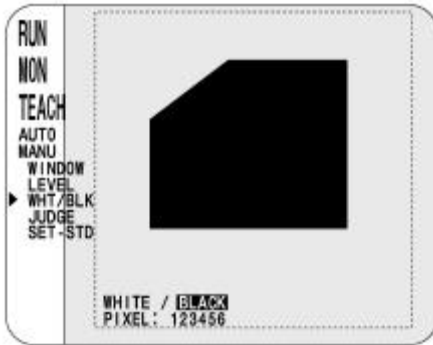
The cursor is displayed on the binary conversion value.

1. Use the arrow keys to adjust the conversion level. The display will be updated simultaneously.
2. Press ENTER when the conversion is adjusted as desired.

Note: Setting the conversion level also updates the reference image. Always have the object being used as the reference image in position when setting the LEVEL menu.

## WHT/BLK Menu

The WHT/BLK menu is used to set whether the image is displayed in black or white.



(Binary image)

Highlight [WHT/BLK] and press ENTER.

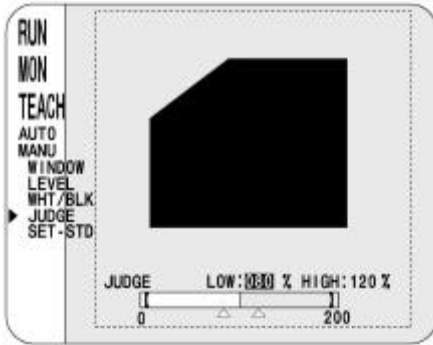
The cursor is displayed on the previous selection (BLACK or WHITE).

1. Use the left or right arrow key to highlight the desired selection.
2. Press ENTER to set the desired selection.

Note: Setting the WHT/BLK selection also updates the reference image. Always have the object being used as the reference image in position when setting the WHT/BLK menu.

## JUDGE Menu

The JUDGE menu is used to set the HIGH/OK/LOW ranges for judgment.



(Binary image)

Highlight [JUDGE] and press ENTER  
The cursor is displayed on LOW.

1. Use the arrow keys to set the desired LOW percentage.
2. Press ENTER when the LOW value is set as desired.
3. Use the arrow keys to set the desired HIGH percentage.
4. Press ENTER when the HIGH value is set as desired.

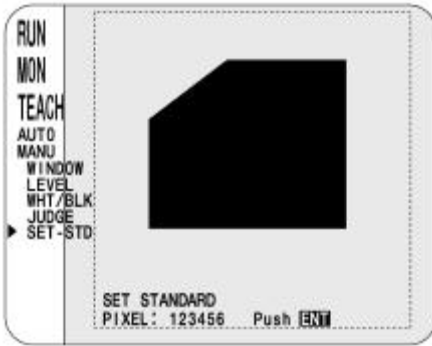
Note 1: The LOW setting must be less than the HIGH setting. LOW can be 0 to 998; HIGH can be 1 to 999.

Note 2: Setting the JUDGE menu doesn't update the standard image.

Note 3: To change the registered settings, just follow the above steps again.

## SET-STD Menu

This menu is used to set the base image.



(Binary image)

Highlight [SET-STD] and press ENTER.  
The cursor is displayed on LOW.

1. Move the object to be registered as the reference image until it is within the region of interest.
2. Press ENTER when the object is positioned properly.

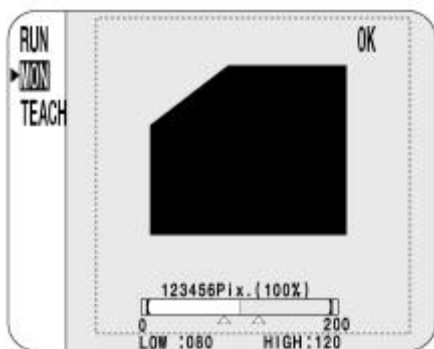
The base image setting can be confirmed by confirming that the pixel value is updated.

Note 1: To change the registered settings, just follow the above steps again. Criterion will be updated by the last registration.

Note 2: To be back to the previous selected menu from [SET-STD] entered by accident, press any of the arrow keys.

## 2-2 Confirmation: MONitor Mode

Operation is tested based on the data registered. No output signal is generated. This mode is only for confirming operation.



(Binary image)

1. Highlight MONitor and press ENTER.  
The MONitor mode screen will be displayed.

2. Position the object to measure, and press ENTER again.  
The judgment result and image are displayed on the monitor. Confirm that the appropriate result (HIGH/OK/LOW) is displayed on the screen. If the result is OK, the OK indicator will also light.

Note 1: None of the signals are output when testing in MONitor mode.

Note 2: If the judgement result keeps OK, the OK indicator also keeps lighting.

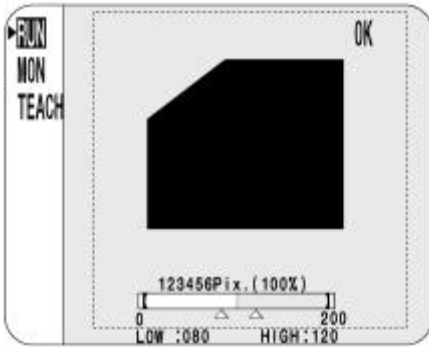
Note 3: When the judgement result is NG, HIGH or LOW indicator lights.

Operation will be tested each time ENTER is pressed. Once proper operation has been confirmed, change to RUN mode to begin normal operation.



## 2-3 Operation: RUN Mode

Normal measuring operation is performed after all pass/fail conditions have been confirmed.



(Binary image)

1. Highlight RUN and press ENTER.  
The RUN mode screen will be displayed.

2. The object's image is recorded and measured when the TRIGGER signal is received.

The judgment result is displayed on the monitor. The judgment result signal (HIGH/OK/LOW) and control signal (GATE signal) are sent to an external device. If the judgment result is OK, the OK indicator also lights.

Note 1: Do not press ENTER when measuring by the TRIGGER signal. Measuring is initiated by either the TRIGGER signal or pressing ENTER. To avoid inaccurate results, remove the console when operating in RUN mode.

Note 2: Red LED illumination darkens in time. It is therefore necessary to re-register the reference image periodically to get new readings as the LED darkens. The LED darkens at a rate of about 30% after 10,000 hours of operation.

## 3 Installation

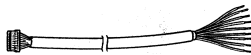
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### 3-1 Preparing to Install

The following items are required to install the F-30.

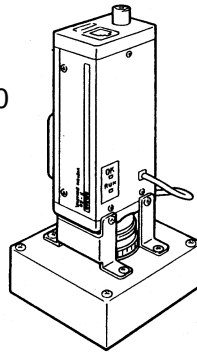
#### 3-1-1 Items Included

- F-30
- I/O power supply cable (cable length: 1.5 m (59.1"))
- Console connector cover
- Monitor output connector cover
- Lens cover
- This manual



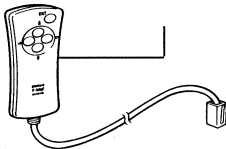
I/O power supply cable

F-30



#### 3-1-2 Items Sold Separately

- Console (F-30KP; cable length: 1.5 m (59.1"))



#### 3-1-3 Items Commercially Available

- Monitor
- Video signal cable (RCA pin plug)
- 12VDC power supply (10 W min.)
- External devices (PLC, etc.)
- Screw driver

Note: Some monitors may not make it available to connect the video input connector with RCA pin plug.

### 3-1-4 Environment

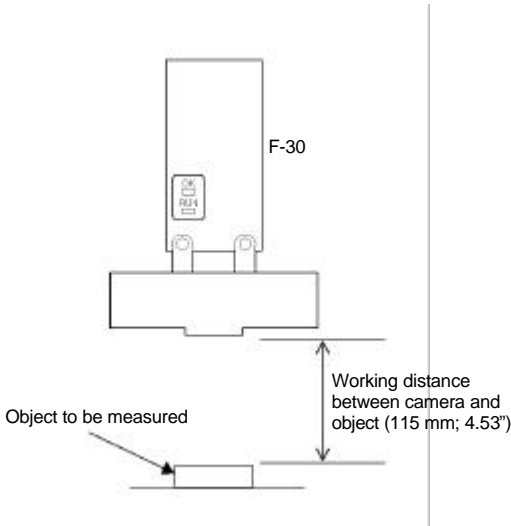
The location of the installation must meet the following criteria:

- Ambient temperature: 0 to 40 ° (32 to 104 ° F)
- Avoid sudden temperature changes
- No condensation
- Avoid exposure to direct sunlight
- Avoid sudden changes in lighting
- Ambient humidity: 35 to 80%
- Avoid locations subject to vibration or impact
- Avoid excessive dust, salt, iron
- Avoid splatter from water, oil, and chemicals
- Avoid corrosive and flammable gases

Note: Have the original image displayed in TEACH mode, and confirm the setting of F-30.

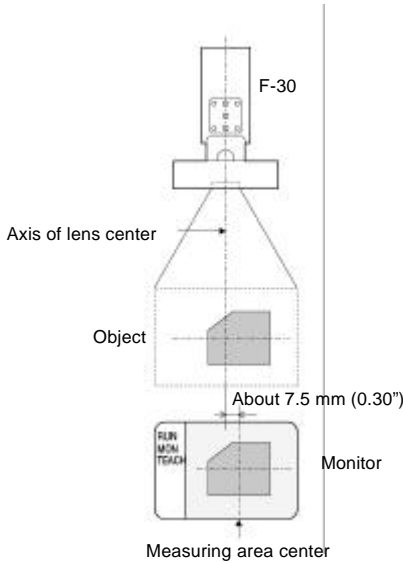
### 3-1-5 Distance from Object

Refer to the following figure to determine the proper mounting distance from the object to be measured:



When the F-30 is shipped from the factory, the lens is positioned to be in focus at the distance shown above. Do not loosen the lens mounting screws. Any adjustment to the lens may result in inaccurate operation.

The center of the measuring area is 7.5 mm (0.30") off the horizontal center of the lens. Be sure to check the positioning on the monitor before mounting the camera.

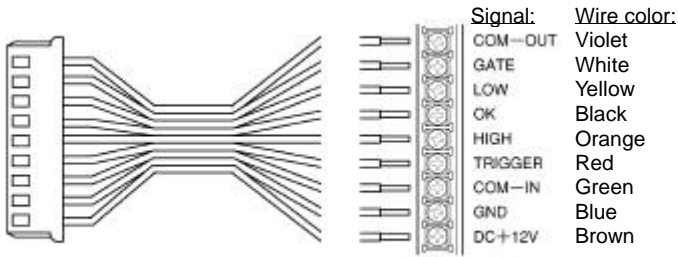


### 3-2 I/O Power Supply Cable

1. Strip the ends of the wires on the I/O power supply cable.
2. Confirm the correct connections and secure each wire to the appropriate terminal of the power supply. Refer to the figure below.
3. Attach the I/O power supply cable connector to the F-30.
4. Use a voltmeter to confirm that the voltage across each connection is appropriate. Improper voltage will cause a malfunction.

Use regular screwdriver when disconnecting the I/O power supply cable.

Note: Be sure no weight is applied to the I/O power supply cable. If there is a chance that more than 0.5 kg will be applied, secure the cable firmly near the connector on the controller.



### 3-2-1 I/O Interface

Input		Output	
No. of inputs	1 (TRIGGER)	No. of outputs	3 result: HIGH/OK/LOW 1 control: GATE
Input voltage	12 to 24VDC 10%	Output voltage	12 to 24VDC 10%
ON current	3 to 10 mA	Load current	50 mA, max.
ON voltage	8.8V	ON residual voltage	3V, max.
OFF current	1 mA, min.	Leakage current	0.4 mA, max.
OFF voltage	4.5V, min.	Internal circuit diagram	
Internal circuit diagram		Internal circuit diagram	

### Removal

1. Disconnect all the devices from DC12 V and F-30.
  2. Grasp the plug of I/O interface and pull it out of F-30.
- Note: Do not force the connector when disconnecting.

### 3-2-2 Connecting the Red LED Illuminator

Connect the LED illuminator connecting cable securely to the LED power supply connector on the F-30.

### **3-2-3 Disconnecting the Red LED Illuminator**

1. Disconnect the power to the F-30.
2. Hold the connector firmly to remove it from the F-30. (Never pull on the wires.)

Note: Do not force the connector when disconnecting.

### **3-2-4 Connecting the Monitor**

Connect the RCA pin plug video cable securely to the monitor output connector on the F-30.

Note: Be sure to use the cover to keep the connector clean whenever the monitor is not connected.

### **3-2-5 Connecting the Console**

Connect the console cable securely to the console connector on the F-30. It will click into place when connected properly.

#### **Disconnecting the console**

1. Pull the plug out of the console connector on the F-30 with pushing down its pick.

Note 1: Do not force the connector when disconnecting.

Note 2: Be sure to use the cover to keep the connector clean whenever the console is not connected.

## 4 SPECIAL Mode

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### 4-1 Accessing SPECIAL Mode

There is normally no need to change settings in this mode, but if it is necessary, go into TEACH mode, and while simultaneously pressing the left and right arrows, press ENTER. The following menus can be selected:

- CHanGe DEFault
- MODE
- SHUTTER
- GATE

Function symbol	Description	Default settings
CHG-DEF (CHanGe DEFault)	Used for changing measurement conditions under the AUTO mode.	WINDOW: 40 mm x 40 mm LEVEL: 128 WHT/BLK: BLACK JUDGE: LOW=80%, HIGH= 120%
MODE	Used for changing the measurement mode.	TRIGGER
SHUTTER	Used for selecting the shutter speed.	1/1000
GATE	Used for setting the output time of gate signals.	10 ms.

#### 4-1-1 CHanGe DEFault

This menu is used to change the default values used in the AUTO mode. The default values for the following items can be changed:

- WINDOW
- LEVEL
- WHT/BLK
- JUDGE

#### 4-1-2 MODE

This menu is used to select the method of initiating measuring.

TRIGGER	Measuring is initiated by the TRIGGER signal.
CONTINUE	Measuring is continuous. When set to CONTINUE, do not allow input of the TRIGGER signal. Pressing ENTER will not affect operation.

Use the left and right arrow keys to highlight the desired setting, and press ENTER.

### 4-1-3 SHUTTER

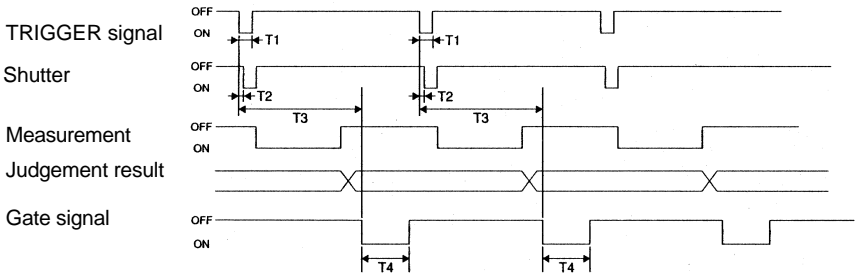
This menu is used to set the shutter speed. Watching the display, use the left and right arrow keys to highlight the desired shutter speed, and press ENTER. Possible selections are as follows:

- 1/60 second
- 1/100 second
- 1/250 second
- 1/500 second
- 1/1000 second
- 1/2000 second
- 1/4000 second

### 4-1-4 GATE

This menu is used to set the control signal length. Refer to the following time charts, and use the arrow keys to set the desired time, then press ENTER. The time that can be set is 1-99 ms.

#### TRIGGER Measuring



T1: TRIGGER signal pulse width (50µs, min.)

T2: Delay from TRIGGER signal input to shutter operation (0.1 ms, max.)

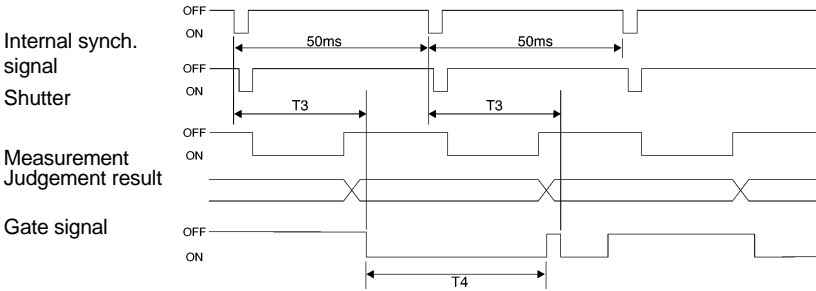
T3: Delay from TRIGGER signal input to GATE signal output (50 ms, max.); this time depends on the shutter time.

T4: GATE signal output time; set this time so that T2 and T3 do not exceed the minimum length of time between TRIGGER signals. The TRIGGER signal is not accepted during measurement processing.

Signal	Function
TRIGGER	Initiates measurement; ignored during measurement processing.
HIGH/OK/LOW	Indicates judgment result; time delay from TRIGGER input depends on the shutter speed setting.
GATE	On during judgment result signal output; duration can be set from 1 to 99 ms.



# CONTINUE Measuring



T3: Delay from shutter (internal synchronization signal) start to GATE signal output. If the shutter speed is set to 1/100 max., this time is about 33.4 ms; at a shutter speed of 1/60, it is about 50 ms.

T4: GATE signal output time; the above timing chart is based on this time being set to 1 to 46 ms. The shutter is opened, and measurement processing performed every 50 ms. If this time is set to 47 to 96 ms, measurement processing is performed every 100 ms.

## 5 Troubleshooting

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### 5-1 Problems and Causes

Refer to the following table to determine the cause of any difficulty, and implement the countermeasures indicated. If the problem persists, contact your Omron representative.

<b>Problem</b>	<b>Cause/countermeasure</b>
RUN indicator does not light.	Confirm that the power supply, and I/O power supply are both connected with the correct voltage.
OK indicator does not light.	If the monitor indicates that the judgment result is OK, but the OK indicator does not light, the F-30 needs to be repaired.
Nothing is displayed on the monitor.	Power is not supplied to the monitor; the monitor is not securely connected to the F-30, or the monitor is broken.
The image is not displayed. (Frame and mode are.)	The lens cover is on the lens, the LEVEL needs adjustment, or the object is red.
The monitor image is distorted.	The monitor horizontal/vertical controls need adjustment, or electrical noise is affecting the video signal.
The judgment result is not displayed on the monitor.	The F-30 is not in RUN or MONitor mode, or nothing is being measured (no TRIGGER signal is received (RUN), or ENTER is not being pressed (MON)).
The mode indicator (arrow) is not displayed.	An overscan monitor is being used. The full screen may not fit on an overscan monitor.
Console input is not accepted.	The console is not properly connected.
The TRIGGER signal is not accepted.	The F-30 is not in RUN or MONitor mode, or the cables are not connected properly.
Output signals are not being output.	The F-30 is not in RUN mode, cables are not connected properly, GATE signal output time is too short, or nothing is being measured (no TRIGGER signal is received, or ENTER is not being pressed).
The LED illumination device does not light.	The power is not supplied to the F-30, or to the LED illumination device.
Part of the LED illumination device does not light.	Some of the LEDs are burnt out, or the LED illumination device needs repair.
The F-30 does not measure properly.	The image is not being read properly (i.e., LED illumination is insufficient, TRIGGER signal timing is not accurate, etc.), or the judgment criteria are not set properly.

## 6 Inspection and Maintenance

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### 6-1 Periodic Inspections

Inspect the following items periodically:

Item	Condition	Tools
Power supply voltage	Use a voltmeter to confirm that the voltage supplied to the controller is 10.8 to 13.2VDC.	Tester
Ambient temperature	Confirm that the ambient temperature is 0 to 40 ° (32 to 104 F).	Thermometer
Ambient humidity	Confirm that the ambient humidity is 35 to 80%.	Hygrometer
Mounting condition	Confirm that all cable connections are secure. Be sure that the controller, the LED illumination device, and the lens are all mounted and tightened firmly.	Phillips screwdriver
Monitor output connector	If the monitor is not connected, be sure the monitor output connector cover is in place.	—
LED illumination device	Be sure that all the LEDs light when power is supplied. The expected life span of the LED illumination device is about 10,000 hours. It is best to replace the device at about that point, before the old one darkens completely.	—
Console connector	Be sure that the console connector cover is in place if the console is not connected.	—
Other	Confirm that there is no condensation, no dust or dirt, etc. anywhere on the controller, lens, LEDs, etc.	—

### 6-2 Maintenance

#### 6-2-1 Cleaning

Use a soft cloth to remove any dust or dirt from the F-30 controller

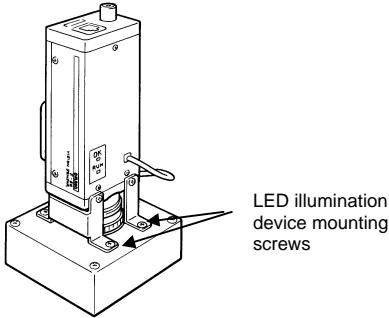
To remove dust or dirt from the lens or LED illumination device, use a special lens cloth or air brush.

Note: Do not use benzene or thinner on any part of the Controller, at any time.

## 6-2-2 LED Illumination Device

The LED illumination device should be replaced approximately every 10,000 hours.

1. Disconnect the power and all the other cables from the F-30.
2. Remove the F-30 from its mounted location.
3. Disconnect the LED illumination device cable from the F-30.
4. Remove the 4 screws holding the LED illumination device.



5. Attach the new LED illumination device, and secure it with the 4 mounting screws.
6. Connect all the cables, and power supply.
7. Confirm that all the LEDs light properly.
8. Register the level and base image with the new LED illumination device.

## A Specifications

Item	Description
Judgment method	Surface area measurement by binary conversion (level: 256)
Measuring surface	Black or white selectable
Visual area	50 mm (1.97") x 50 mm (1.97") (at working distance=115 mm (4.53")); with an underscan monitor)
Working distance range	100 to 130 mm (3.94 to 5.12")
Setting method	Automatic or manual
Operation method	Menu selection
Window	1 rectangular window
Binary conversion level	256
Processing speed	50 ms, max. (at shutter speed=1/100 second, max.)
Judgment result output	3 levels of output signal (HIGH/OK/LOW) and monitor display
Interface input	1 TRIGGER, pulse width: 50 $\mu$ s, min.
Interface output	3 judgment: HIGH, OK, LOW 1 control: GATE
Shutter timing	TRIGGER: external signal CONTINUE: internal signal
Image element	CCD fixed element (0.5 inch)
No. of pixels used	510 H x 492 V
Processing pixels	407 H x 480 V
Lens mount	C mount
Scanning method	2:1 interlaced
Video output	EIA (RS-170 standard)
Video signal output	1.0Vpp/75 $\Omega$ (pin plug) (See note)
Settings memory	EEPROM (no. of writes: 100,000)
Input power supply	12VDC 10%
Power consumption	10W, max. (1A, max.)
Noise resistance	Normal mode: 400Vpp Common mode: 1,500Vpp Pulse width 1 $\mu$ s, leading edge 1 ns
Operating temperature	0 to 40 °C (32 to 104 °F)
Operating humidity	35 to 80% (no condensation)
Environment	No corrosive gases
Storage temperature	-20 to 60 °C (-4 to 140 °F)
Storage humidity	20 to 80% (no condensation)
Vibration resistance	10 to 150 Hz (each vibration: 0.15 mm)
Impact resistance	200 m/s <sup>2</sup> (20G)
Weight	About 430 g (15 oz.)

Note: Use an NTSC monitor with an external video input terminal.

## Accessories

Item	Part number
Console	F-30KP (cable length: 1.5 m (59.1"))

## Recommended Power Supplies

Omron recommends use of one of the following power supplies:

Input voltage	Output current	Capacity	Part number
100-240VAC	1.2A	15W	S82K-01512
100-240VAC	2.5A	30W	S82K-03012
200-240VAC	1.0A	10W	S82J-6112
200-240VAC	2.1A	25W	S82J-6212
200-240VAC	4.2A	50W	S82J-6512

Note: Built-in noise filter with 20ms min. voltage retention at 2% pp max. ripple voltage.

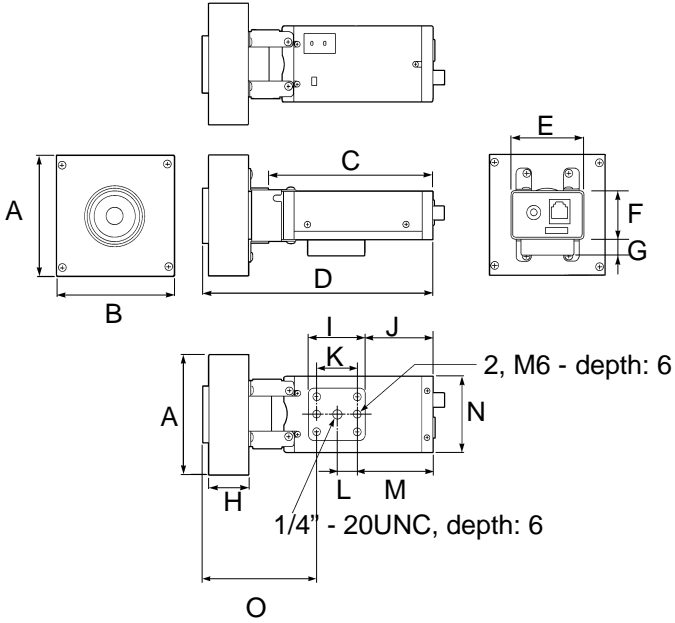
## Replacement Parts

Item	Part number
LED illumination device	F-30L1

# B Dimensions

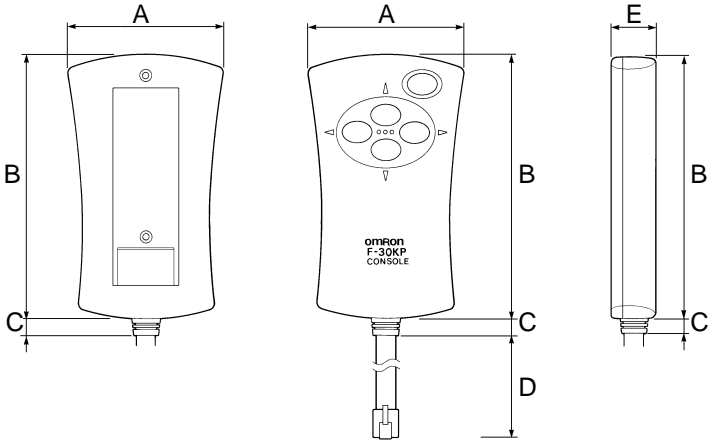
Unit: mm

## F-30 Controller



Location	Dimension	Location	Dimension
A	70.3 (2.77")	I	33 (1.3")
B	72.3 (2.85")	J	43.5 (1.7")
C	100 (3.94")	K	22 (0.9")
D	139 (5.48")	L	11 (0.4")
E	44 (1.73")	M	49 (1.93")
F	29 (1.14")	N	44 (1.73")
G	8 (0.32")	O	68 (2.67")
H	24 (0.95")		

# Console



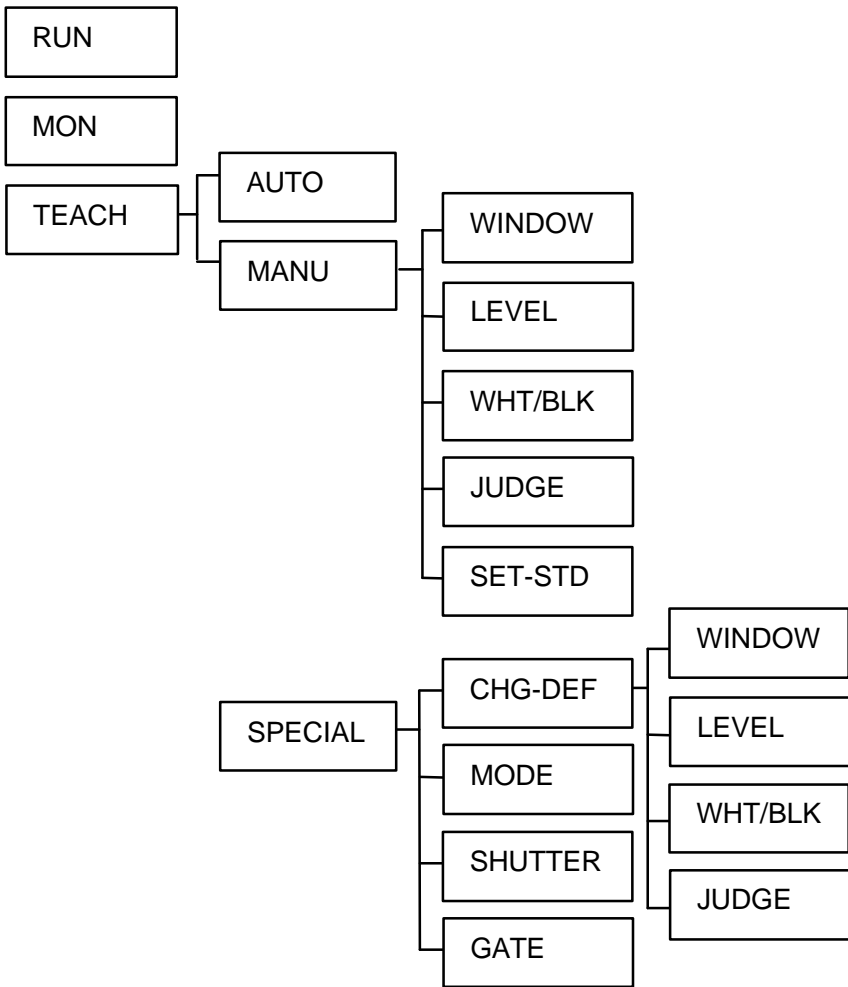
Location	Dimension	Location	Dimension
A	49 (1.93")	D	1500 (59.1")
B	80 (3.15")	E	13 (0.5")
C	5 (0.2")		



## C Menu Tree

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The menu tree is as follows:



# Glossary

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## Area Array Camera

A solid-state, imaging device with both rows and columns of pixels, forming an array that produces two-dimensional images.

## Binary Image

An image that has been converted from its original state to black and white (or binary).

## Binary

An image representation or conversion in which only two light intensities are used for each pixel: black or white. A threshold level is set so that any intensity above this level is converted to white, and any intensity below is converted to black (or vice-versa).

## Binary Level

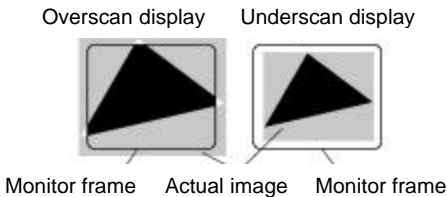
The intensity level that is used to divide the image into black and white. Also referred to as threshold level. (See Binary Image, above.)

## Original Image

The F-30 captures images that contain 256 different gray scale intensities. Also referred to as a raw, or analog image.

## Overscan Display

An overscan display magnifies the image read by the camera. As a result, the full image may not fit on the screen. Refer to the figure below.



## Pixel

An acronym for Picture Element. A pixel is a discrete location in the image that is represented by an intensity level. A two-dimensional array of pixels is used to create an image. An image captured by the F-30 is comprised of a grid of 510 horizontal pixels, and 492 vertical pixels.

## Reference Image

An image of an ideal part. All subsequent inspections and judgments will be based on the criteria of the reference image.

**Region of Interest (ROI)**

A selected area of an image to be inspected and analyzed. The area is usually designated by the elements enclosed in a dotted line boundary.

**Shutter camera**

A video camera that can be set to extremely high speed to read clear images of objects moving rapidly.

**Threshold Level**

See Binary Level, above.

**OMRON CORPORATION**

Advanced Sensors Division  
Sensing Devices and Components Division H.Q.  
28th Fl., Crystal Tower Bldg.,  
1-2-27, Shiromi, Chuo-ku,  
Osaka 540-6028 Japan  
Phone: (81)6-949-6105 Fax: (81)6-949-6021

**Regional Headquarters**

**OMRON EUROPE B.V.**

Wegalaan 67-69, NL-2132 JD Hoofddorp  
The Netherlands

Tel: (31)2356-81-300/Fax: (31)2356-81-388

**OMRON ELECTRONICS, INC.**

1 East Commerce Drive, Schaumburg, IL 60173  
U.S.A.

Tel: (1)847-843-7900/Fax: (1)847-843-8568

**OMRON ASIAPACIFIC PTE. LTD.**

83 Clemenceau Avenue,  
#11-01, UE Square,  
Singapore 239920

Tel: (65)835-3011/Fax: (65)835-2711

# OMRON

**Authorized  
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