OMRON

FH-1050
FH-3050
FH-1050-□0
FH-3050-□0

Image Processing System

INSTRUCTION SHEET

Thank you for selecting OMRON product. This sheet primarily describes precautions required in installing and operating the product.
Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

TRACEABILITY INFORMATION:
Representative in EU
Omron Europe B.V.
Wegalaan 67-69
2132 JD Hoofddorp,
The Netherlands

Manufacturer
Omron Corporation,
Sensing Devices & Components Div.H.Q.,
Application Sensors Division
Shiokoji Horikawa, Shimogyo-ku,
Kyoto, 600-8530 JAPAN

The following notice applies only to products that carry the CE mark:
Notice:
This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

* 2 2 8 5 5 5 0 - 0 A *

Meanings of Signal Words

●Symbols and the meanings for safety precautions described in this manual.
In order for the product to be used safely, the following indications are used in this book to draw your attention to the cautions. The cautions with the indications describe the important contents for safety.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Meanings of Alert Symbols

The following alert symbols are used in this manual.

	Indicates general prohibitions for which there is no specific symbol.
	Indicates the possibility of electric shock under specific conditions.
	Indicates the possibility of explosion under specific conditions.
	Indicates the possibility of laser radiation.
	Indicates the possibility of injury by high temperature under specific conditions.

Alert statements in this Manual

The following alert statements apply to the products in this manual. Each alert statement also appears at the locations needed in this manual to attract your attention.

⚠ WARNING

This product must be used according to the instruction manual. Failure to observe this may result in impairment of functions and performance of the product.
This product is not designed or rated for ensuring safety of persons. Do not use it for such purposes.
Never connect the AC power supply with this product. When the AC power supply is connected, it causes the electric shock and a fire.
A lithium battery is built into the Controller and may occasionally combust, explode, or burn if not treated properly. Dispose of the Controller as industrial waste, and never disassemble, apply pressure that would deform, heat to 100℃ or higher, or incinerate the Controller.
Since camera that can be connected with this product emits a visible light that may have an adverse effect on the eyes, do not stare directly into the light emitted from the LED. If a specular object is used, take care not to allow reflected light enter your eyes.

⚠ CAUTION

Danger of burns. Do not touch the case while the LED is ON or just after power is turned OFF, since it remains extremely hot.

Precautions for Safe Use

●Installation Environment
- Do not use the product in areas where flammable or explosive gases are present.
- Install the product so that air can flow freely through its cooling vents.
- Clean the vent hole and discharge opening to prevent dust or particles from blocking them. Blocked cooling vents or discharge opening of the fan increasing heat inside, causing malfunction of the product.
- Do not install the product close to high-voltage devices and power devices in order to secure the safety of operation and maintenance.
- Make sure to tighten all installation screws securely.

●Power Supply and Wiring
- Make sure to use the product with the power supply voltage specified by this manual.
- Use the specified wire size (AWG10 to 16).
- Keep the power supply wires as short as possible (Max.2m).
- Use a DC power supply with safety measures against high-voltage spikes(safety extra low-voltage circuits on the secondary side).
- Do the following confirmations again before turning on the power supply.
  - Is the voltage of the power supply correct? (24VDC)
  - Is not the load of the output signal short-circuited?
  - Is the load current of the output signal appropriate?
  - Is not the mistake found in wiring?

●Ground
- The power supply circuit of the FH sensor controller is insulated from the internal circuit.
- Be sure to use a base to install the camera connected with the FH Sensor Controller. Since the exclosure of the camera main body made of metals is short-circuited with the internal circuit, the internal circuit might be short-circuited with FG if no base is used, so that failures or malfunctions may be caused.
- Perform Class D-class grounding (with a grounding resistance of 100ΩΩ or less).
- Keep the ground line as short as possible by setting the grounding point as close as possible.
- Ground the FH Sensor Controller independently. If sharing the ground line with other devices or connecting it with a building beam, the controller might be adversely effected.
- Check wiring again before turning on the Controller.

●Other
- Use only the camera and cables designed specifically for the product. Use of other products may result in malfunction or damage of the product.
- Always turn OFF the Controller's power before connecting or disconnecting a camera or cable. Connecting the cable with power supplied may result in damage of the camera or peripheral devices.
- For the cable that is flexed repeatedly, use the robotic cable type (flexing resistance type) to prevent damages.
- Do not apply torsion stress to the cable. It may damage the cable.
- Secure the minimum bending radius of the cable. Otherwise the cable may be damaged.
- Do not attempt to dismantle, repair, or modify the product.
- Should you notice any abnormalities, immediately stop use, turn OFF the power supply, and contact your OMRON representative.
- The FH Sensor Controller and camera case are hot while power is supplied or directly after the controller is turned off. Do not touch the case.
- Be sure to dispose of the product as industrial waste.
- Do not drop, impose excessive vibration or shock on the product. Doing so may result in malfunction or burning.
- Since a lithium battery is incorporated, there is a rare case when you are seriously injured due to firing or blowout.

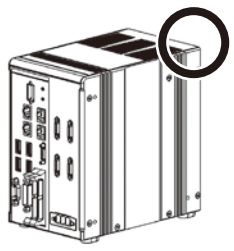
●Regulations and Standards

The FH sensor controller is compliant with the standards below:
EC Directive, 2004/108/EC
EN (European Norm), EN61326-1
UL standard, UL508

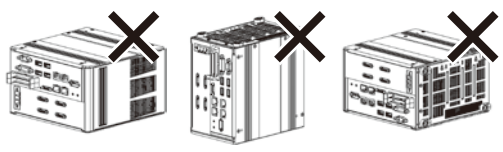
Precautions for Correct Use

●Installation and Storage Sites
Install and store the product in a location that meets the following conditions:
- Surrounding temperature of 0 to 50℃ (-20 to +65℃ in storage)
- No rapid changes in temperature (place where dew does not form)
- Relative humidity of between 35 to 85 %
- No presence of corrosive or flammable gases
- Place free of dust, salts and iron particles
- Place free of vibration and shock
- Place out of direct sunlight
- Place where it will not come into contact with water, oils or chemicals

●Orientation of Product
To keep proper ventilation, install the main unit only in the direction below so that the ventilation holes are not blocked.



Do not install in this orientation.



●Ambient Temperature
- To keep proper air flow, keep the top of the Controller 50mm or more apart from other devices. Install the controller with a clearance of 30mm on the right, left side, and 15mm for rear planes.
- Do not install the product immediately above significant heat sources, such as heaters, transformers, or large-capacity resistors.
- Do not let the ambient temperature exceed 50℃(122°F).
- Provide a forced-air fan cooling or air conditioning if the ambient temperature is near 50℃(122°F) so that the ambient temperature never exceeds 50℃(122°F).

●Noise Resistance
- Do not install the product in a cabinet containing high-voltage equipment.
- Do not install the product within 200 mm of power cables.

●Component Installation and Handling
- Touching Signal Lines
  To prevent damage from static electricity, use a wrist strap or another device for preventing electrostatic discharges when touching terminals or signal lines in connectors.
- Handling a USB Memory/SD card
  To remove a USB memory or SD card, make sure that data is not being read or written to it.
- For USB memory, the LED flashes while data is being read or written, so make sure that it is lit steadily before removing the memory.
- For SD card, the SD BUSY LED flashes while data is being read or written, so make sure that it is turned OFF before removing the memory.
- Turning OFF the Power
  Do not turn OFF the power while a message is being displayed indicating that processing is being performed. Data in memory will be corrupted, and the product may not operate correctly the next time it is started.
- Using the RESET Signal
  Do not use the RESET input immediately after power is turned ON. When using the RESET input to synchronize startup timing,wait at least 15 second after the Controller’ s power supply is turned ON before turning ON the RESET signal.

●Maintenance
Turn OFF the power and take safety precautions before conducting inspections. Electrical shock can result from attempting safety inspections with the power turned ON.
- Clean the lens with a lens-cleaning cloth or air brush.
- Lightly wipe off dirt with a soft cloth.
- Dirt on the CCD must be removed using an air brush.
- Do not use thinners or benzene.

●Communication with High-order Device
After confirming that this product is started up, communicate with the high-order device. When this product has started up, an indefinite signal may be output from the high-order interface. To avoid this problem, clear the receiving buffer of your device at initial operations.

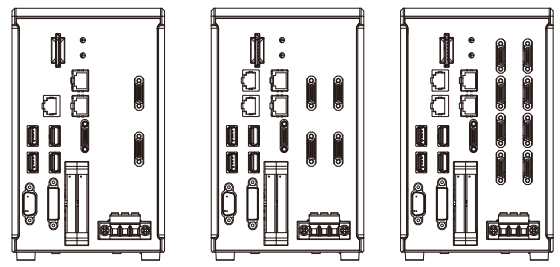
■Basic Configuration

* Items indicated with an asterisk are dedicated items, and cannot be substituted.

*** Sensor controller**

The Controller performs the image processing specified by the user settings and outputs the measurement results.

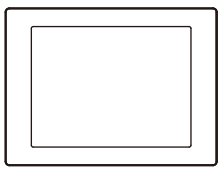
Camera 2ch type	Camera 4ch type	Camera 8ch type
FH-3050	FH-3050-10	FH-3050-20
FH-1050	FH-1050-10	FH-1050-20



*** LCD monitor**

Use the monitor to check images and display the condition-setting menus.

FZ-M08 (8.4-inch)



*** Monitor cable**

FZ-VM (2m, 5m, min. bending radius: 75mm)

*** Monitor conversion cable**

FH-VMRGB

*** Camera cable**

Camera cable
FZ-VS (2m, 5m,10m, min. bending radius: 69mm)
Bend resistant camera cable
FZ-VSB (2m, 5m, 10m min. bending radius: 69mm)
Right-angle camera cable
FZ-VSL (2m,5m,10m min. bending radius: 69mm)
Long-distance camera cable
FZ-VS2 (15m min. bending radius: 93mm)
Long-distance Right-angle camera cable
FZ-VSL2 (15m min. bending radius: 93mm)

*** Camera**

Detects workpieces as images.

Standalone camera
FZ-SC/FZ-S/
FZ-SC2M/FZ-S2M/
FZ-SFC/FZ-SF/
FZ-SPC/FZ-SP/
FZ-SHC/FZ-SH
FH-SC/SM
FH-SC02/SM02
FH-SC04/SM04
FZ-SC5M2/FZ-S5M2

Intelligent compact camera
FZ-SQ010F/FZ-SQ050F/
FZ-SQ100F/FZ-SQ100N

Intelligent camera
FZ-SLC15/FZ-SLC100

Automatic focus camera
FZ-SZC15/FZ-SZC100

Peripheral Device

* USB memory
FZ-MEM2G
FZ-MEM8G

* SD card
HMC-SD291
HMC-SD491

Power Supply

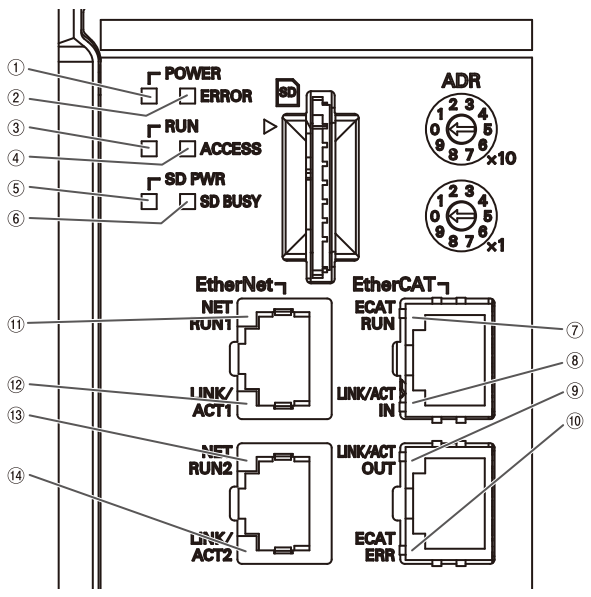
The power supply connected to FH Sensor Controller varies depending on the number of connected cameras and types for various consumption current types. Use is accordingly.
Recommended Model by OMRON:
S8VS series
S8VS-09024, S8VS-12024
S8VS-18024, S8VS-24024
S8VS-48024

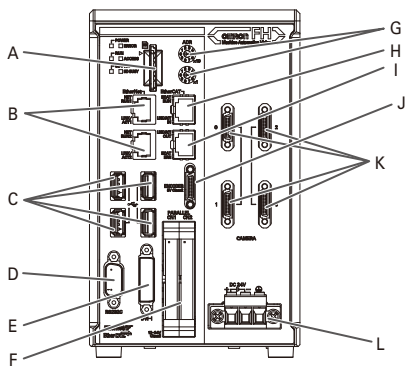
Input Device

Mouse, track ball
(Commercially available USB devices)

■ Component Names and Functions

	LED name	Description
①	POWER LED	Lit while power is ON.
②	ERROR LED	Lit when an error has occurred.
③	RUN LED	Lit while the controller is in Measurement Mode.
④	ACCESS LED	Lit while the memory is accessed.
⑤	SD POWER LED	Lit while power is supplied to the SD card and the card is usable.
⑥	SD BUSY LED	Blinks while the SD memory card is accessed.
⑦	EtherCAT RUN LED	Lit while EtherCAT communications are usable.
⑧	EtherCAT LINK/ACT IN LED	Lit when connected with an EtherCAT device, and blinks while performing communications.
⑨	EtherCAT LINK/ACT OUT LED	Lit when connected with an EtherCAT device, and blinks while performing communications.
⑩	EtherCAT ERR LED	Lit when EtherCAT communications have become abnormal.
⑪	EtherNet NET RUN1 LED	Lit while EtherCAT communications are usable.
⑫	EtherNet NET LINK/ACK1 LED	Lit when connected with an EtherNET device, and blinks while performing communications.
⑬	EtherNet NET RUN2 LED	Lit when EtherNet communications are usable.
⑭	EtherNet NET LINK/ACK2 LED	Lit when connected with an EtherNET device, and blinks while performing communications.





	Connector name	Description
A	SD memory card installation connector	Install the SD memory card. Do not plug or unplug the SD card during measurement operation. Otherwise measurement time may be affected or data may be destroyed.
B	EtherNet connector	Connect an EtherNet device.
C	USB connector	Connect a USB device. Do not plug or unplug it during measurement. Measurement time might be affected otherwise.
D	RS-232C connector	Connect an external device such as a programmable controller.
E	DVI-I connector	Connect a monitor.
F	I/O connector(control lines, data lines)	Connect the controller to external devices such as a sync sensor and PLC.
G	EtherCAT address setup volume	Used to set a station address as an EtherCAT communication device.
H	EtherCAT communication connector (IN)	Connect the opposed EtherCAT device.
I	EtherCAT communication connector (OUT)	Connect the opposed EtherCAT device.
J	Encoder connector	Connect an encoder.
K	Camera connector	Connect cameras.
L	Power supply terminal connector	Connect a DC power supply. Wire the controller independently on other devices. Wire the ground line. Be sure to ground the controller alone. Perform wiring using the attached power supply connector as referring to the description of wiring that connector.

■U.S. California Notice:

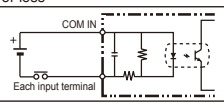
This product contains a lithium battery for which the following notice applies :Perchlorate Material - special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

■Parallel Interface

Common use to all NPN/PNP models. Wire appropriately according to the specification of the external device.

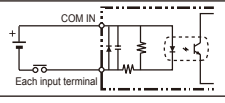
●Internal Specification (for NPN Connection)

[Input] Applicable signals/
No.14 pin : Connect the COMIN1 terminal when using these signals.
No.37 to 46 pins：Connect the COMIN2 terminal when using these signals.

Input voltage	12-24VDC ±10%
ON current *1	Min. 5mA
ON voltage *1	Min. 8.8V
OFF current *2	Max. 0.5mA
OFF voltage *2	Max. 1.1V
ON delay	5ms or less
OFF delay	0.7ms or less
Internal circuit diagram	

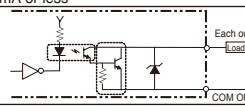
*1 ON current/voltage means the current or voltage value to activate the terminal. The ON voltage value is the potential difference between COM IN and each input terminal.

[Input] Applicable signals/
No.4 to 6, 9 to 11 pins : Connect the COMIN1 terminal when using these signals.
No.7, 8, 12, 13 pins : Connect the COMIN0 terminal when using these signals.

Input voltage	12-24VDC ±10%
ON current *1	Min. 5mA
ON voltage *1	Min. 8.8V
OFF current *2	Max. 0.5mA
OFF voltage *2	Max. 0.8V
ON delay	0.1ms or less
OFF delay	0.1ms or less
Internal circuit diagram	

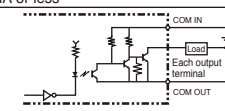
*2 OFF current/voltage means the current or voltage value to deactivate the terminal. The OFF voltage value is the potential difference between COM IN and each input terminal.

[Output] Applicable signals/
No.15 to 19 pins : Connect the COMOUT0 terminal when using these signals.
No.48 to 57 pins : Connect the COMOUT2 terminal when using these signals.
No.58 to 66 pins : Connect the COMOUT3 terminal when using these signals.

Output voltage	12-24VDC ±10%
Load current *	45mA or less
ON residual voltage	2V or less
OFF leakage current	0.2mA or less
Internal circuit diagram	

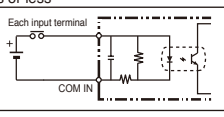
* The current value must be the specified load current or lower.
Exceeding the specified current value may cause damage of the output circuit.

[Output] Applicable signals/
No.20 to 27 pins : Connect the COMOUT1 and COMIN0 terminals when using these signals.

Output voltage	12-24VDC ±10%
Load current *	45mA or less
ON residual voltage	2V or less
OFF leakage current	0.2mA or less
Internal circuit diagram	

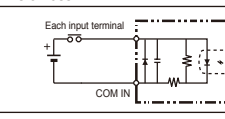
●Internal Specification (for PNP Connection)

[Input] Applicable signals/
No.14 pin : Connect the COMIN1 terminal when using these signals.
No.37 to 46 pint : Connect the COMIN2 terminal when using these signals.

Input voltage	12-24VDC ±10%
ON current *1	Min. 5mA
ON voltage *1	Min. 8.8V
OFF current *2	Max. 0.5mA
OFF voltage *2	Max. 1.1V
ON delay	5ms or less
OFF delay	0.7ms or less
Internal circuit diagram	

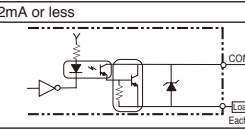
*1 ON current/voltage means the current or voltage value to activate the terminal. The ON voltage value is the potential difference between COM IN and each input terminal.

[Input] Applicable signals/
No.4 to 6, 9 to 11 pins : Connect the COMIN1 terminal when using these signals.
No.7, 8, 12, 13 pins : Connect the COMIN0 terminal when using these signals.

Input voltage	12-24VDC ±10%
ON current *1	Min. 5mA
ON voltage *1	Min. 8.8V
OFF current *2	Max. 0.5mA
OFF voltage *2	Max. 0.8V
ON delay	0.1ms or less
OFF delay	0.1ms or less
Internal circuit diagram	

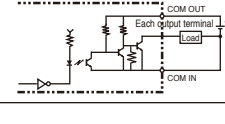
*2 OFF current/voltage means the current or voltage value to activate the terminal. The OFF voltage value is the potential difference between COM IN and each input terminal.

[Output] Applicable signals/
No.15 to 19 pins : Connect the COMOUT0 terminal when using these signals.
No.48 to 57 pins : Connect the COMOUT2 terminal when using these signals.
No.58 to 66 pins : Connect the COMOUT3 terminal when using these signals.

Output voltage	12-24VDC ±10%
Load current *	45mA or less
ON residual voltage	2V or less
OFF leakage current	0.2mA or less
Internal circuit diagram	

* The current value must be the specified load current or lower.
Exceeding the specified current value may cause damage of the output circuit.

[Output] Applicable signals/
No.20 to 27 pins : Connect the COMOUT1 and COMIN0 terminals when using these signals.

Output voltage	12-24VDC ±10%
Load current *	45mA or less
ON residual voltage	2V or less
OFF leakage current	0.2mA or less
Internal circuit diagram	

●Input Connectors

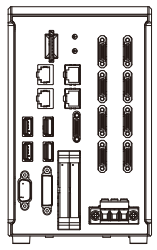
The role of terminals varies depending on the settings of FH Sensor Controller. Check the settings and perform correct wiring.

		Signal name				Remarks
No	I/O	In the 1-line mode	In the 2-line random mode	In the 3 to 4-line random mode	In the 5 to 8-line random mode	
1	—	COMIN0				Common 0 for input signals
2	—	COMIN1				Common 1 for input signals
3	—	Vacant				(Do not connect.)
4	IN	STEP0/ENCTRIG_ZO (*1)	STEP0/ENCTRIG_ZO (*2)	STEP0	STEP0	STEP0～7 : Measurement trigger input ENCTRIG_A0 to 1 : Encoder trigger input (phase A) ENCTRIG_B0 to 1 : Encoder trigger input (phase B) ENCTRIG_Z0 to 1 : Encoder trigger input (phase Z)
5	IN	Unused (*5)	STEP1/ENCTRIG_Z1 (*2)	STEP1	STEP1	
6	IN	Unused (*5)	Unused (*5)	STEP2	STEP2	
7	IN	Unused (*5)	Unused (*5)	STEP3	STEP3	
8	IN	ENCTRIG_AO (*1)	ENCTRIG_A0 (*2)	Unused (*5)	Unused (*5)	
9	IN	Unused (*5)	Unused (*5)	Unused (*5)	STEP4	
10	IN	Unused (*5)	Unused (*5)	Unused (*5)	STEP5	
11	IN	Unused (*5)	ENCTRIG_A1 (*2)	Unused (*5)	STEP6	
12	IN	Unused (*5)	ENCTRIG_B1 (*2)	Unused (*5)	STEP7	
13	IN	ENCTRIG_B0 (*1)	ENCTRIG_B0 (*2)	Unused (*5)	Unused (*5)	
14	IN	Unused (*5)	DI LINE0			DI_LINE0 : Command input (line specified)
15	OUT	RUN0	RUN0	RUN0	READY0	RUN0 to 7 : Measurement Mode ON READY0 to 7 : ON when image input is allowed BUSY0 to 7 : Overall judgment result OR0 to 7 : Overall judgment result ERROR0 to 3 : ON when an error occurs
16	OUT	READY0	READY0	READY0	BUSY0	
17	OUT	BUSY0	BUSY0	BUSY0	OR0	
18	OUT	OR0	OR0	OR0	READY1	
19	OUT	ERROR0	ERROR0	ERROR0	BUSY1	
20	OUT	STGOUT0 (*3)/SHTOUT0	STGOUT0 (*3)/SHTOUT0	STGOUT0 (*3)/SHTOUT0	STGOUT0 (*3)/SHTOUT0	STGOUT0 to 7 : Strobe trigger output SHTOUT0 to 7 : Shutter output
21	OUT	STGOUT1 (*3)	STGOUT1 (*3)/SHTOUT1	STGOUT1 (*3)/SHTOUT1	STGOUT1 (*3)/SHTOUT1	
22	OUT	STGOUT2 (*3)	STGOUT2 (*3)	STGOUT2 (*3)/SHTOUT2	STGOUT2 (*3)/SHTOUT2	
23	OUT	STGOUT3 (*3)	STGOUT3 (*3)	STGOUT3 (*3)/SHTOUT3	STGOUT3 (*3)/SHTOUT3	
24	OUT	STGOUT4 (*3)	STGOUT4 (*3)	STGOUT4 (*3)	STGOUT4 (*3)/SHTOUT4	
25	OUT	STGOUT5 (*3)	STGOUT5 (*3)	STGOUT5 (*3)	STGOUT5 (*3)/SHTOUT5	
26	OUT	STGOUT6 (*3)	STGOUT6 (*3)	STGOUT6 (*3)	STGOUT6 (*3)/SHTOUT6	
27	OUT	STGOUT7 (*3)	STGOUT7 (*3)	STGOUT7 (*3)	STGOUT7 (*3)/SHTOUT7	
28	OUT	Unused (*5)	RUN1	RUN1	OR1	RUN0 to 7 : Measurement Mode ON READY0 to 7 : ON when image input is allowed BUSY0 to 7 : ON during processing OR0～7 : Overall judgment result ERROR0 to 3 : ON when an error occurs
29	OUT	Unused (*5)	READY1	READY1	READY2	
30	OUT	Unused (*5)	BUSY1	BUSY1	BUSY2	
31	OUT	Unused (*5)	OR1	OR1	OR2	
32	OUT	Unused (*5)	ERROR1	ERROR1	READY3	
33	—	COMOUT0				Common 0 for output signals
34	—	COMOUT1				Common 1 for output signals
35	—	COMIN2				Common 2 for output signals
36	—	Vacant				(Do not connect.)
37	IN	DSA0	DSA0	DI_LINE1	DI_LINE1	DSA0 to 1 : Data transmission request DI_LINE1 to 2 : Command inputs (line specified)
38	IN	Unused (*5)	DSA1	Unused (*5)	DI_LINE2	
39	IN	DI0				DI0 to 7 : Command inputs
40	IN	DI1				
41	IN	DI2				
42	IN	DI3				
43	IN	DI4				
44	IN	DI5				
45	IN	DI6				
46	IN	DI7				
47	—	Vacant				(Do not connect.)
48	OUT	ACK				ACK: Instruction execution completion flag
49	OUT	GATE0	GATE0	RUN2	BUSY3	GATE0 to 2 : ON during configured output time DO0 to 15 : Data output RUN0 to 7 : Measurement Mode ON READY0 to 7 : ON when image input is allowed BUSY0 to 7 : ON during processing OR0 to 7 : Overall judgment result ERROR0 to 3 : ON when an error occurs ERROR : ON when an error occurs
50	OUT	Unused (*5)	GATE1	READY2	OR1	
51	OUT	DO0	DO0	BUSY2	READY4	
52	OUT	DO1	DO1	OR2	BUSY4	
53	OUT	DO2	DO2	ERROR2	OR4	
54	OUT	DO3	DO3	RUN3	READY5	
55	OUT	DO4	DO4	READY3	BUY5	
56	OUT	DO5	DO5	BUSY3	OR5	
57	OUT	DO6	DO6	OR3	READY6	
58	OUT	DO7	DO7	ERROR3	BUSY6	
59	OUT	DO8	DO8	Unused (*5)	OR6	
60	OUT	DO9	DO9	Unused (*5)	READY7	
61	OUT	DO10	DO10	Unused (*5)	BUSY7	
62	OUT	DO11	DO11	Unused (*5)	OR7	
63	OUT	DO12	DO12	Unused (*5)	Unused (*5)	
64	OUT	DO13	DO13	Unused (*5)	Unused (*5)	
65	OUT	DO14	DO14	Unused (*5)	Unused (*5)	
66	OUT	DO15	DO15	Unused (*5)	ERROR (*4)	
67	—	COMOUT2				Common 2 for output signals
68	—	COMOUT3				Common 3 for output signals

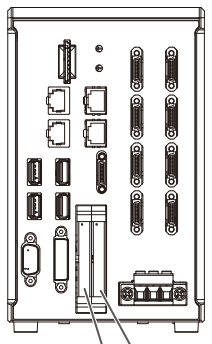
*1 To use a measurement trigger input, use the STEP signal. To use an encoder input, use ENCTRIG_A0/B0/Z0.
*2 In the 2-line random mode, to use a measurement trigger input and a line of encoder input, use ENCTRIG_A0/B0/Z0 and STEP1.
*3 This is the signal used when using a strobe signal for the controller.
*4 This is the ERROR signal commonly used in 1 to 8-line modes.
*5 Do not connect anything for Unused (*5).

●Connection

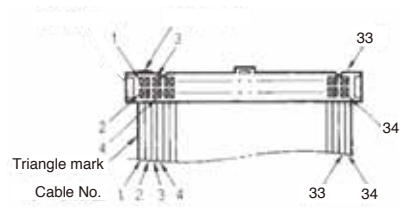
Connect the parallel I/O cable with more than the minimum bending radius.
XW2Z-S013-2
(2m, minimum bending radius: 10mm, sold separately)
XW2Z-S013-5
(5m, minimum bending radius: 10mm, sold separately)



● Pin Assignment



Cable mark



Use another XW2Z-S013-□ for No.35 to 68.

■Encoder Interfaces (Line Driver Type)

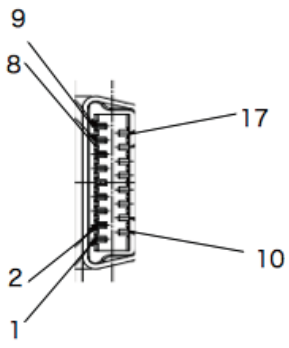
●Specification of Encoder Interface (Line Driver Output Type)

Item	Specifications
Input voltage	EIA standard, RS-422-A line driver level
Input impedance *1	120Ω±5%
Differential input voltage	High-level input voltage I 0.1V, Low-level input voltage I -0.1V
Hysteresis voltage	60mV
Maximum response frequency *2	Phase A/B: single-phase 4MHz (multiplying phase difference of 1MHz by 4 times), Phase Z: 1MHz (When using an I/O cable, model FH-VR 1.5M)

*1 Value when the terminal resistance function is used.
*2 Use this interface as paying attention to the cable length and response frequency of the encoder used.

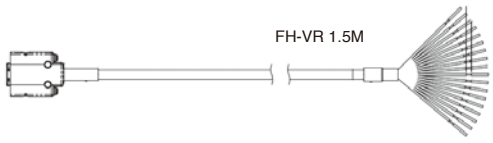
●I/O Connector

No	Signal name	Color
1	ENC0 A+	Black
2	ENC0 A-	Black /Red
3	ENC0 VDD	Brown
4	ENC0 B+	White
5	ENC0 B-	White/Red
6	ENC0 GND	Blue
7	ENC0 Z+	Orange
8	ENC0 Z-	Orange/Red
9	NC	—
10	ENC1 A+	Purple
11	ENC1 A-	Purple/Red
12	ENC1 VDD	Brown/Red
13	ENC1 B+	Pink
14	ENC1 B-	Pink/Red
15	ENC1 GND	Blue/Red
16	ENC1 Z+	Yellow
17	ENC1 Z-	Yellow/Red



●Connection

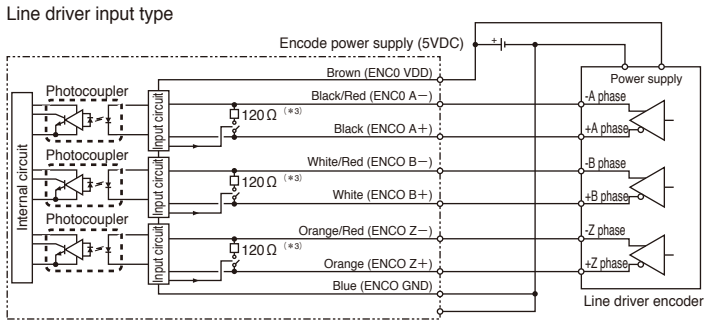
Connect the encoder cable with more than the minimum bending radius.
FH-VR 1.5M (1.5m, minimum bending radius: 65mm, sold separately)



●Circuit Schematics

Line driver input type
CH1

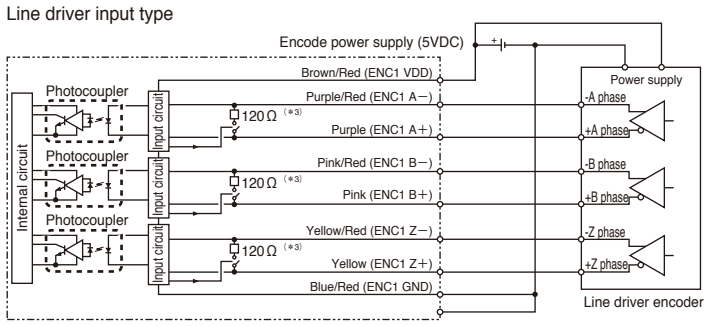
Line driver input type



*3: This 120Ω resistance is a terminating resistance used when the line driver encode is connected. The terminating resistance function can be turned ON/OFF through the settings of the PC tool. Use this function according to your usage environment.

Line driver input type
CH2

Line driver input type



*3: This 120Ω resistance is a terminating resistance used when the line driver encode is connected. The terminating resistance function can be turned ON/OFF through the settings of the PC tool. Use this function according to your usage environment.

■EtherCAT Interfaces

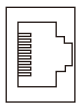
●Cable

Connect a straight LAN cable.
Use an STP cable of category 5e or higher, which is shielded double with an aluminum tape and a braided cord.

●I/O Connector

Use an 8-pin shielded RJ45 modular connecter of category 5e or higher.

・Pin assignment



Pin No.	Signal name	Abbreviation	Signal direction
1	Transmission data +	TD＋	Out
2	Transmission data -	TD－	Out
3	Reception data +	RD＋	In
4	Not connected	NC	－
5	Not connected	NC	－
6	Reception data -	RD－	In
7	Not connected	NC	－
8	Not connected	NC	－
Connector hood	Security ground	FG	－

●Wiring

The cable is maximum 100m long.
However, some cables do not guarantee 100m. If conductor is a twisted cable, transmission performance generally becomes worse than that of straight cables, so that 100m cannot be guaranteed. For details, contact the cable manufacturer.

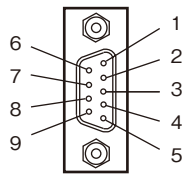
Pin No.	Wire color
1	White・Green
2	Green
3	White・Orange
4	Blue
5	White・Blue
6	Orange
7	White・Brown
8	Brown
Connector food	Shielded cable

Wire color	Pin No.
White・Green	1
Green	2
White・Orange	3
Blue	4
White・Blue	5
Orange	6
White・Brown	7
Brown	8
Shielded cable	Connector food

* Connect both ends of the cable shield with the connector hood.
* Use the T568A wiring method as mentioned above.

■Serial Interface

●I/O Connector



Pin No.	Signal name	Function
1	NC	Not connected
2	RD	Data reception
3	SD	Data transmission
4	NC	Not connected
5	GND	Signal ground
6	NC	Not connected
7	NC	Not connected
8	NC	Not connected
9	NC	Not connected

●Wiring

The maximum cable length is 15m.

Controller	
Signal name	Pin No.
SD	2
RD	3
GND	9

External device to be connected	
Pin No.	Signal name
*	SD
*	RD
*	GND

RS/CS control cannot be used.

Use a shielded cable.

Use a compatible connector.

・Recommended items

	Manufacturer	Model
Sockets	OMRON Corporation	XM3D-0921
Hood	OMRON Corporation	XM2S-0913

CHECK!
Pin numbers will depend on the external device being connected. Refer to the manual for the personal computer or PLC being connected.

●Connection Method

Align the connector with the socket and press it straight into place, then fix it with the screws on both sides of the connector.

CHECK!
Turn OFF the power supply before connecting or disconnecting a Parallel I/O Cable.
Peripheral devices may be damaged if the cable is connected or disconnected with the power ON.

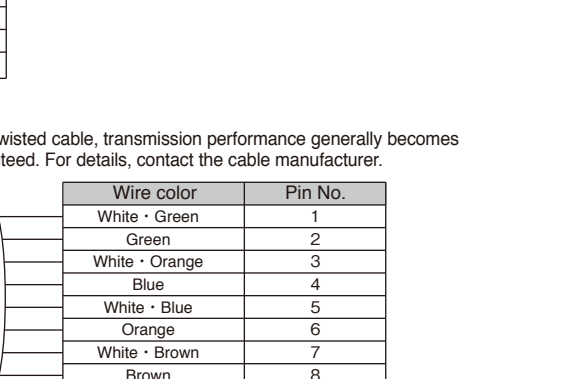
■Wiring

[Important] - Wiring cables incorrectly might cause failures.

●Connection of Terminal Block

1 Insert the end of the signal line (electric wire) into the terminal block connector (male), and tighten the three screws on the connector top to fix the wire.
Recommended tightening torque: 0.7-0.8N·m
2 Insert the terminal block connector (male) into the terminal block connector (female) on the controller side.
3 Fix the terminal block connector (male) by tightening the screws on the right and left sides of it with a flathead screwdriver.
Recommended tightening torque: 0.7-0.8N·m

Pin No.	Display	Signal name	Function
1	＋	24V	Input power supply voltage (24VDC).
2	－	0V	Input power supply voltage (0V).
3	⏚	GND	Input GND.



The power supply connected to the FH sensor controller varies depending on the number of connected cameras and types. Use it accordingly.

Recommended power supply

Item	Camera type	No. of cameras connected	High-speed controller			Standard controller		
			FH-3050	FH-3050-10	FH-3050-20	FH-1050	FH-1050-10	FH-1050-20
Recommended power supply: S8VS	Intelligent camera	2	S8VS-12024	S8VS-18024	S8VS-18024	S8VS-12024	S8VS-12024	S8VS-18024
		4	-	S8VS-18024	S8VS-24024	-	S8VS-18024	S8VS-24024
		8	-	-	S8VS-48024	-	-	S8VS-48024
	Camera of 0.3/2/4/5 million pixels	2	S8VS-12024	S8VS-18024	S8VS-18024	S8VS-09024	S8VS-09024	S8VS-12024
		4	-	S8VS-18024	S8VS-18024	-	S8VS-12024	S8VS-12024
		8	-	-	S8VS-18024	-	-	S8VS-18024

■Ratings/Characteristics

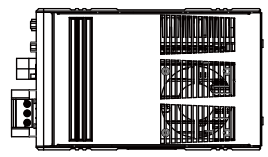
●FH Controller

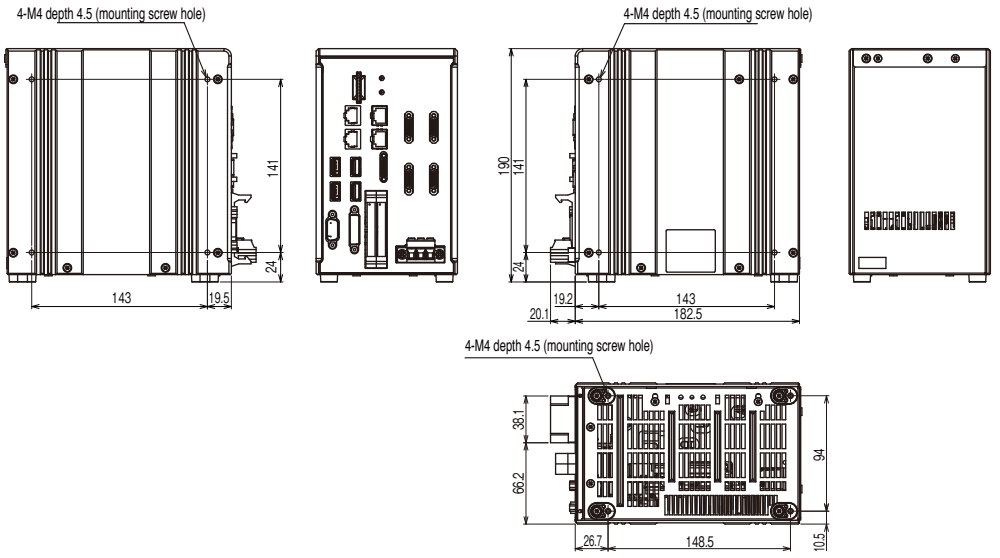
Type				High-speed controller			Standard controller		
Model				FH-3050	FH-3050-10	FH-3050-20	FH-1050	FH-1050-10	FH-1050-20
Major functions	Controller type			BOX type					
	High-grade (HG) processing item			－					
	Number of cameras			2	4	8	2	4	8
	Type of connected camera			All cameras can be connected (FZ-S/FH-S series)					
	Number of scenes			128					
	Operation			Mouse or similar device					
	Settings			Create processing flows by editing them (with a guidance).					
External interface	Serial communications			RS-232C 1 CH					
	Ethernet communications			Non-procedural (TCP/UDP) 1000BASE-T					
				1port	2port	2port	1port	2port	2port
	Ethernet/IP communications			Used Ethernet port Transmission speed : 1Gbps (1000BASE-T)					
	EtherCAT communications			EtherCAT dedicated protocol (100BASE-TX)					
	Parallel I/O			(In the 2-line random trigger mode) 17 inputs (STEP0, ENCTRIG_Z0, STEP1, ENCTRIG_Z1, DSA0 to 1, ENCTRIG_A0 to 1, ENCTRIG_B0 to 1, DI0 to 7) 37 outputs (RUN0 to 1, READY0 to 1, BUSY0 to 1, OR0 to 1, ERROR0 to 1, GATE0 to 1, STGOUT0/SHTOUT0, STGOUT1/SHTOUT1, STGOUT2 to 7, DO0 to 15, ACK) (In the 4-line random trigger mode) 19 inputs (STEP0 to 7, DI_LINE0 to 2, DI0 to 7) 34 outputs (READY0 to 7, BUSY0 to 7, OR0 to 7, ACK, ERROR, STGOUT/SHTOUT0 to 7)					
	Encoder I/F			RS422-A line driver level. Phase A/B: single-phase 4MHz (multiplying phase difference of 1MHz by 4 times), Phase Z: 1MHz					
	Monitor IF			DVI-I output IF x 1ch					
	USBI/F			4 channels (supports USB1.1 and 2.0)					
	SD_card I/F			SDHC standard, Class 4 or higher recommended					
Ratings	Power supply voltage			20.4-26.4VDC					
	Current consumption *	When an intelligent compact camera or autofocus camera is connected*	2 connected	5.0A or less	5.4A or less	6.4A or less	4.7A or less	5.0A or less	5.9A or less
			4 connected	－	7.0A or less	8.1A or less	－	6.5A or less	7.5A or less
			8 connected	－	－	11.5A or less	－	－	10.9A or less
		When a camera of 0.3/2/4/5 million pixels is connected	2 connected	4.1A or less	4.2A or less	5.2A or less	3.6A or less	3.7A or less	4.5A or less
			4 connected	－	4.8A or less	5.6A or less	－	4.3A or less	5.0A or less
			8 connected	－	－	6.8A or less	－	－	6.2A or less
	Insulation resistance			Between DC power supply and controller FG: 20MΩ or higher (rated voltage 250V)					
Operating environment	Noise resistance	Fast transient burst	DC power	Direct infusion: 2KV Pulse rising: 5ns Pulse width: 50ns Burst continuation time: 15ms/0.75ms Period: 300ms Application time: 1 min					
			I/O line	Cramp : 1KV Pulse rising: 5ns Pulse width: 50ns Burst continuation time: 15ms/0.75ms Period: 300ms Application time: 1 min					
	Ambient temperature range			Operating: 0 to 50 °C Storage: −20 to +65 °C (with no icing nor no condensation)					
	Ambient humidity range			Operating and storage: 35 % to 85 % (no condensation)					
	Ambient environment			No corrosive gases					
	Grounding			Type D grounding (100Ω or less grounding resistance) *Conventional type 3 grounding					
	Degree of protection			IEC60529 IP20					
Dimensions	Dimensions			190 x 115 x 182.5mm					
	Weight			Approx.3.2kg	Approx.3.4kg	Approx.3.4kg	Approx.3.2kg	Approx.3.4kg	Approx.3.4kg
	Case materials			Cover: zinc-plated steel plate, side plate: aluminum (A6063)					
Accessories				Controller (1) / user manual (one Japanese and one English versions) / Instruction Installation Manual (1) / Power supply terminal block connector (1) / Ferrite core (2, FH-3050 and FH-1050), 4 (FH-3050-10 and FH-1050-10), and 8 (FH-3050-20 and FH-1050-20)					

* The value of power consumption applies when the maximum number of cameras of each controller is connected with 24VDC. When connecting the lighting with strobe controller, the consumption current is the same as when the intelligent camera is connected.

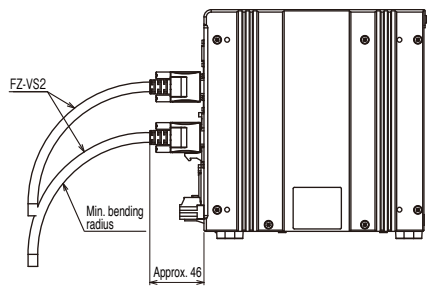
■Dimensions

(Unit: mm)





・Camera link connector mounting

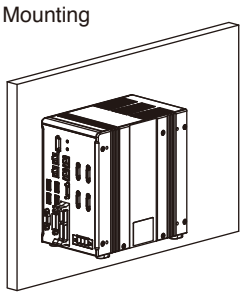


■Mounting

Tighten the screws securely when installing the product.

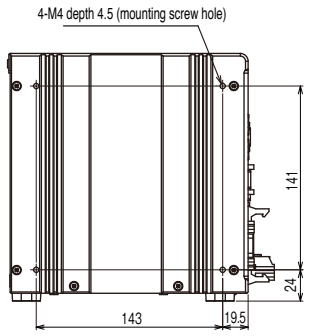
[FH Sensor Controller]

●Side Mounting

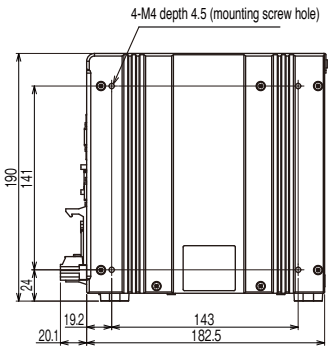


(Unit: mm)

・Left side

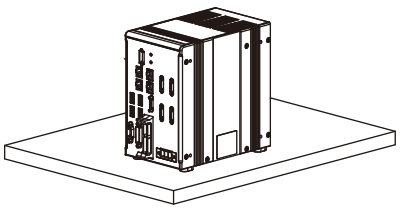


・Right side



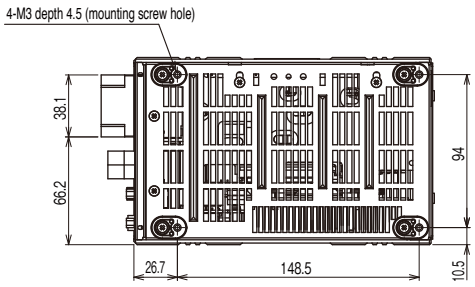
* Recommended tightening torque: 1.2N·m to 1.3N·m

●Bottom Mounting



・Bottom

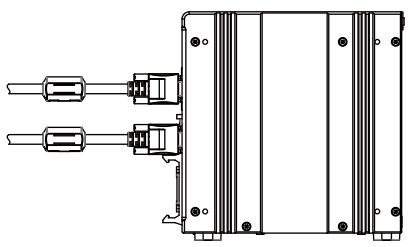
(Unit: mm)



* Do not remove the insulating feet. Fix the insulating feet to secure the ventilation path.
* Recommended tightening torque: 0.54N·m to 0.6N·m

●Ferrite Core

Mount the ferrite core attached to the camera cable to near the Sensor Controller.



Suitability for Use

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

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

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.
Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
See also Product catalog for Warranty and Limitation of Liability.

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