



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 E.V.
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2302 DZ Hoofddorp,
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Manufacturer
Omron Corporation,
Sensing Devices & Components Div. H.O.,
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Shikoku Hokuriku, Shirogane-ku,
Yoko 300-8530 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.



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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 Sensor Controller and may occasionally combust, explode, or burn if not treated properly. Dispose of the Sensor Controller as industrial waste, and never disassemble, apply pressure that would deform, heat to 100°C or higher, or incinerate the Sensor 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.
Do not touch the terminals while the power supply is ON. Doing so may result in electrical shock.
Please take external safety measures so that the system as a whole should be on the safe side even if a failure of a Sensor Controller or an error due to an external factor occurred. An abnormal operation may result in serious accident.
Please take fail-safe measures on your side in preparation for an abnormal signal due to signal conductor disconnection and/or momentary power interruption. An abnormal operation may result in a serious accident.

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 and polarity 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?
 - Is the voltage and polarity of the encoder power(ENCO VDD / ENCO GND / ENC1 VDD / ENC1 GND) supply ? (5VDC)
- Ground
 - The power supply circuit of the FH Sensor Controller is installed from the internal circuit.
 - Be sure to use a base to install the camera connected with the FH Sensor Controller. Since the enclosure 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 100Ω 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, connecting it with a building beam, the Sensor Controller might be adversely affected.
 - Check wiring again before turning on the FH Sensor 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 FH Sensor 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 type cable (Bend resistant camera cable) 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.
 - When 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 FH Sensor 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
 - Regulations of KC marking
 - A 급 기기 (업무용 방송통신기자재)
 - 이 기기는 업무용 (A 급) 전자파 방출기기로서 판매자 또는 사용자는 이 점을 주의하시기 바랍니다. 가설외의 지역에서 사용하는 것을 목적으로 합니다.

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°C (-20 to +65°C 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.



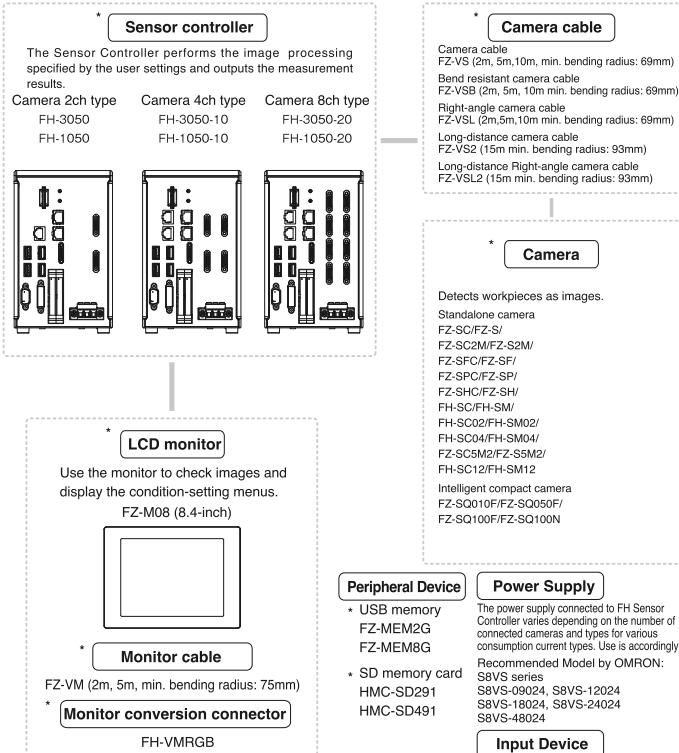
Do not install in this orientation.



- Ambient Temperature
 - To keep proper air flow, keep the top of the FH Sensor Controller 50mm or more apart from other devices. Install the FH Sensor Controller with a clearance of 30mm on the right, left side, and 15mm for rear panels.
 - 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°C (122°F).
 - Provide a forced-air fan cooling or air conditioning if the ambient temperature is near 50°C (122°F) so that the ambient temperature never exceeds 50°C (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 memory card
 - To remove a USB memory or SD memory 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 memory 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.
 - When you insert the SD memory card, please do not insert in the reverse, do not insert at an angle and do not insert while twisting.
 - 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.
- 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 image element 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, a definite signal may be output from the high-order interface. To avoid this problem, check the receiving buffer of your device at initial operations.
 - Fail-Safe Measures
 - If you wish to operate a stage and/or a robot using a measurement result from a FH Sensor Controller (e.g. axis movement amount output based on calibration/alignment measurement), always take safety measures so that the measurement result should be checked by the stage/robot if it is within the range of movement of the stage/robot before operation.
 - On a FH Sensor Controller's side, supplementarily use operations and branches of the FH Sensor Controller to configure a check flow such as "data should not be externally provided if the data is in a range from-XXXX to XXXX" based on the stage/robot's range of movement.

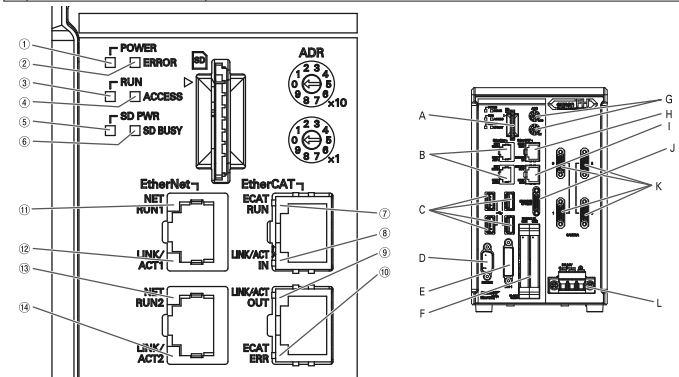
Basic Configuration

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



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 layout turned on output setting is displayed.
④ ACCESS LED	Blinks while the internal nonvolatile memory is accessed.
⑤ SD POWER LED	Lit while power is supplied to the SD memory 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 EtherNet 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 memory card during measurement operation. Otherwise measurement time may be affected or data may be destroyed.						
B EtherNet connector	Connect an EtherNet device. <table border="1"> <tr> <th>Camera 2ch type</th> <th>Camera 4ch / 8ch type</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>Ethernet port and EtherNet/IP port are sharing use.</td> <td>Upper port : Ethernet port Lower port : Ethernet port and EtherNet/IP port are sharing use.</td> </tr> </table>	Camera 2ch type	Camera 4ch / 8ch type			Ethernet port and EtherNet/IP port are sharing use.	Upper port : Ethernet port Lower port : Ethernet port and EtherNet/IP port are sharing use.
Camera 2ch type	Camera 4ch / 8ch type						
Ethernet port and EtherNet/IP port are sharing use.	Upper port : Ethernet port Lower port : Ethernet port and EtherNet/IP port are sharing use.						
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 PLC.						
E DVI-I connector	Connect a monitor.						
F I/O(Parallel) 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 (00 to 99) 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	Camera connector No. is consistent with Camera Image Input No. of Sensor controller software. Check and connect them.						
L Power supply terminal connector	Connect a DC power supply. Wire the FH Sensor Controller independently on other devices. Wire the ground line. Be sure to ground the FH Sensor Controller alone. Perform wiring using the attached terminal block connector as referring to the description of wiring that connector.						


Parallel Interface

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

Internal Specification (for PNP Connection)

[Input] Applicable signals/
No.14 pin: Connect the COM1N1 terminal when using these signals.
No.37 to 46 pins: Connect the COM1N2 terminal when using these signals.

Input voltage	12-24VDC ±10%
ON current *1	Min. 5mA
ON voltage *1	Min. 8.2V
OFF current *2	Max. 0.5mA
OFF voltage *2	Max. 1.1V
ON delay	5ms or less
OFF delay	0.7ms or less

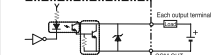


*1 ON current/voltage means the current or voltage value to activate the terminal. The ON voltage value is the potential difference between COM IN and each input terminal.

[Output] Applicable signals/
No.15 to 19 pin, No.28 to 32 pin: 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 *1	45mA or less
ON residual voltage	2V or less
OFF leakage current	0.2mA or less




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

Internal Specification (for PNP Connection)

[Input] Applicable signals/
No.14 pin: Connect the COM1N1 terminal when using these signals.
No.37 to 46 pins: Connect the COM1N2 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

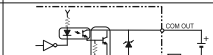


*1 ON current/voltage means the current or voltage value to activate the terminal. The ON voltage value is the potential difference between COM IN and each input terminal.

[Output] Applicable signals/
No.15 to 19 pin, No.28 to 32 pin: Connect the COMOUT0 terminal when using these signals.

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OFF leakage current	0.2mA or less



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

I/O Connectors

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

No.	I/O	In the 1-line mode	In the 2-line random mode	In the 3-line 4-line random mode	In the 5 to 8-line random mode	Remarks
1	—	COM1N0	—	—	—	
2	—	COM1N1	—	—	—	
3	—	Vacant	—	—	—	
4	IN	STEP/ENCRIG_20 (*)	STEP/ENCRIG_20 (2)	STEP1	STEP0	
5	IN	Unused (5)	STEP/ENCRIG_21 (2)	STEP1	STEP1	
6	IN	Unused (5)	Unused (5)	STEP2	STEP2	
7	IN	Unused (5)	Unused (5)	STEP2	STEP2	
8	IN	ENCRIG_A0 (*)	ENCRIG_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)	ENCRIG_A1 (2)	Unused (5)	STEP5	
12	IN	Unused (5)	ENCRIG_B1 (2)	Unused (5)	STEP7	
13	IN	ENCRIG_B0 (1)	ENCRIG_B0 (2)	Unused (5)	Unused (5)	
14	IN	Unused (5)	DILINE0	—	—	
15	OUT	RUN0	RUN0	READY0	BUSY0	
16	OUT	READY0	READY0	READY0	BUSY0	
17	OUT	BUSY0	BUSY0	BUSY0	OR0	
18	OUT	OR0	OR0	OR0	READY1	
19	OUT	ERROR0	ERROR0	BUSY1	—	
20	OUT	STGOUT0_3SH/OUT0	STGOUT0_3SH/OUT0	STGOUT0_3SH/OUT0	STGOUT0_3SH/OUT0	
21	OUT	STGOUT1 (3)	STGOUT1_3SH/OUT1	STGOUT1_3SH/OUT1	STGOUT1_3SH/OUT1	
22	OUT	STGOUT2 (3)	STGOUT2 (3)	STGOUT2_3SH/OUT2	STGOUT2_3SH/OUT2	
23	OUT	STGOUT3 (3)	STGOUT3 (3)	STGOUT3_3SH/OUT3	STGOUT3_3SH/OUT3	
24	OUT	STGOUT4 (3)	STGOUT4 (3)	STGOUT4_3SH/OUT4	STGOUT4_3SH/OUT4	
25	OUT	STGOUT5 (3)	STGOUT5 (3)	STGOUT5_3SH/OUT5	STGOUT5_3SH/OUT5	
26	OUT	STGOUT6 (3)	STGOUT6 (3)	STGOUT6_3SH/OUT6	STGOUT6_3SH/OUT6	
27	OUT	STGOUT7 (3)	STGOUT7 (3)	STGOUT7_3SH/OUT7	STGOUT7_3SH/OUT7	
28	OUT	Unused (5)	RUN1	RUN1	OR1	
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	—	—	—	
34	—	COMOUT1	—	—	—	
35	—	COMIN2	—	—	—	
36	—	Vacant	—	—	—	
37	IN	DSAO	DILINE1	DILINE1	DILINE1	
38	IN	Unused (5)	DSA1	Unused (5)	DILINE2	
39	IN	Unused (5)	DIO	—	—	
40	IN	—	D11	—	—	
41	IN	—	D2	—	—	
42	IN	—	D3	—	—	
43	IN	—	D4	—	—	
44	IN	—	D5	—	—	
45	IN	—	D6	—	—	
46	IN	—	D7	—	—	
47	—	Vacant	—	—	—	
48	OUT	GATE0	ACK	—	—	
49	OUT	GATE0	GATE0	RUN2	BUSY3	
50	OUT	Unused (5)	GATE1	READY2	OR3	
51	OUT	D03	D03	BUSY2	READY4	
52	OUT	D01	D01	OR2	BUSY4	
53	OUT	D02	D02	ERROR2	OR4	
54	OUT	D03	D03	RUN3	READY5	
55	OUT	D04	D04	READY3	BUSY5	
56	OUT	D05	D05	BUSY3	OR5	
57	OUT	D06	D06	OR3	READY6	
58	OUT	D07	D07	ERROR3	BUSY6	
59	OUT	D08	D08	Unused (5)	OR6	
60	OUT	D09	D09	Unused (5)	READY7	
61	OUT	D010	D010	Unused (5)	BUSY7	
62	OUT	D011	D011	Unused (5)	OR7	
63	OUT	D012	D012	Unused (5)	Unused (5)	
64	OUT	D013	D013	Unused (5)	Unused (5)	
65	OUT	D014	D014	Unused (5)	Unused (5)	
66	OUT	D015	D015	Unused (5)	ERROR1 (*)	
67	—	COMOUT2	—	—	—	
68	—	COMOUT3	—	—	—	

*1 To use a measurement trigger input, use the STEP signal. To use an encoder input, use ENCRIG_A0/B0/Z0.

*2 In the 2-line random mode, to use a measurement trigger input and a line of encoder input, use ENCRIG_A0/B0/Z0 and STEP1.

*3 This is the signal used when using a strobe signal for the FH Sensor Controller.

*4 This is the ERROR1 signal commonly used in 1 to 8-line modes.

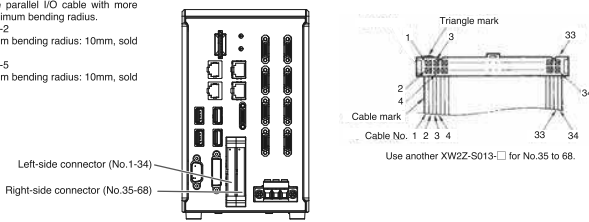
*5 Do not connect anything for Unused.

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



Encoder Interface (Line Driver Type)

Specification of Encoder Interface (Line Driver Output Type)

Item	Specifications
Input voltage	Input voltage : 5VDC±5% Signal level : EIA Standard, RS-422-A line driver level
Input impedance *1	120Ω±5%
Differential input voltage	High-level input voltage 1.0 V, Low-level input voltage 1.0 - 0.1 V
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.

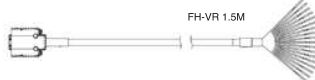
I/O Connector

No.	Signal name	Color	Remarks
1	ENCO A+	Black	Signal: Ch1 A-Phase(+)
2	ENCO A-	Black/Red	Signal: Ch1 A-Phase(-)
3	ENCO VDD	Brown	Power: Power supply for Ch1 (5VDC)
4	ENCO B+	White	Signal: Ch1 B-Phase(+)
5	ENCO B-	White/Red	Signal: Ch1 B-Phase(-)
6	ENCO GND	Blue	Power: Signal ground for Ch1 (0V)
7	ENCO Z+	Orange	Signal: Ch1 Z-Phase(+)
8	ENCO Z-	Orange/Red	Signal: Ch1 Z-Phase(-)
9	NC	—	Not connected
10	ENCI A+	Purple	Signal: Ch2 A-Phase(+)
11	ENCI A-	Purple/Red	Signal: Ch2 A-Phase(-)
12	ENCI VDD	Brown/Red	Power: Power supply for Ch2 (5VDC)
13	ENCI B+	Pink	Signal: Ch2 B-Phase(+)
14	ENCI B-	Pink/Red	Signal: Ch2 B-Phase(-)
15	ENCI GND	Blue/Red	Power: Signal ground for Ch2 (0V)
16	ENCI Z+	Yellow	Signal: Ch2 Z-Phase(+)
17	ENCI Z-	Yellow/Red	Signal: Ch2 Z-Phase(-)

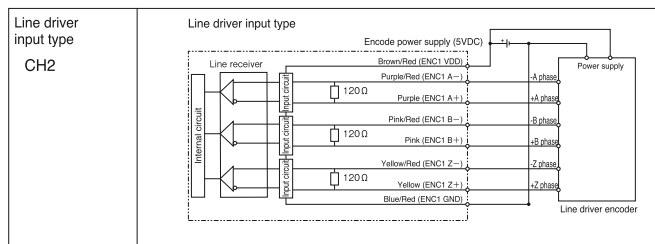
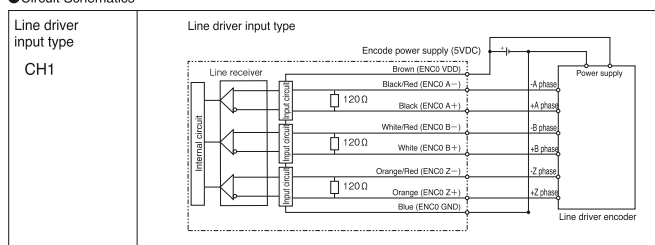
Connection

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



Camera cable

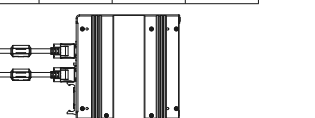
The maximum cable length depends on the Camera being connected, and the model and length of the Cable being used. For further information, please refer to the "Cameras/Cables Connection Table". Be sure to secure at least the minimum bending radius of the cable.

Type of camera	Model	Cable length	High-speed CMOS cameras *			
			300,000-pixel FH-SM/SC	2 million-pixel FH-SM02/SC02	4 million-pixel FH-SM04/SC04	12 million-pixel FH-SM12/SC12
Camera Cable Right-angle camera cable	FZ-VS	2m	Yes	Yes	Yes	Yes
	FZ-VSL	5m	Yes	Yes	Yes	Yes
Bend resistant camera cable	FZ-VSB	2m	Yes	Yes	Yes	Yes
	FZ-VSL2	15m	Yes	No	Yes	No

Type of camera	Model	Cable length	Digital CCD cameras		Small digital CCD cameras Pen type/lattice type	High-speed CCD camera	Intelligent compact CMOS cameras
			300,000-pixel FZ-S/SC	2 million-pixel FZ-S2M/SC2M	FZ-SF/SFC FZ-SF/SFC	FZ-SH/SHC	FZ-SQ □
Camera Cable Right-angle camera cable	FZ-VS	2m	Yes	Yes	Yes	Yes	Yes
	FZ-VSL	5m	Yes	Yes	Yes	Yes	Yes
Bend resistant camera cable	FZ-VSB	2m	Yes	Yes	Yes	Yes	Yes
	FZ-VSL2	15m	Yes	No	Yes	Yes	Yes

Mounting of Ferrite core

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



EtherCAT Interface

- 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 connector 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

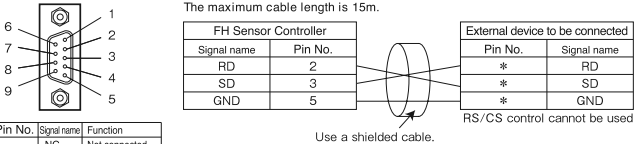
The cable is maximum 100m long. However, some cables do not guarantee 100m. If conductor is a twisted cable, transmission performance generally becomes worse than that of straight cables, so that 100m cannot be guaranteed. For details, contact the cable manufacturer.

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

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

RS-232C(Serial) Interface

- I/O Connector**
- Wiring**



Use a compatible connector.

- Recommended items

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

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.

- 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

- 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
- Insert the terminal block connector (female) into the terminal block connector (female) on the FH Sensor Controller side.
- 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

Terminal block connector(male)/PC5/3-STF1-7.62 BK(PHOENIX CONTACT)

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: SBVS	Intelligent compact camera	2	SBVS-12024	SBVS-18024	SBVS-18024	SBVS-12024	SBVS-12024	SBVS-18024
		4	-	SBVS-18024	SBVS-24024	SBVS-18024	SBVS-24024	SBVS-24024
		8	-	-	SBVS-48024	-	-	SBVS-48024
Camera of 0.3/2.4/5/12 million pixels	2	2	SBVS-12024	SBVS-18024	SBVS-18024	SBVS-09024	SBVS-09024	SBVS-12024
		4	-	SBVS-18024	SBVS-18024	SBVS-12024	SBVS-12024	SBVS-12024
		8	-	-	SBVS-18024	-	-	SBVS-18024

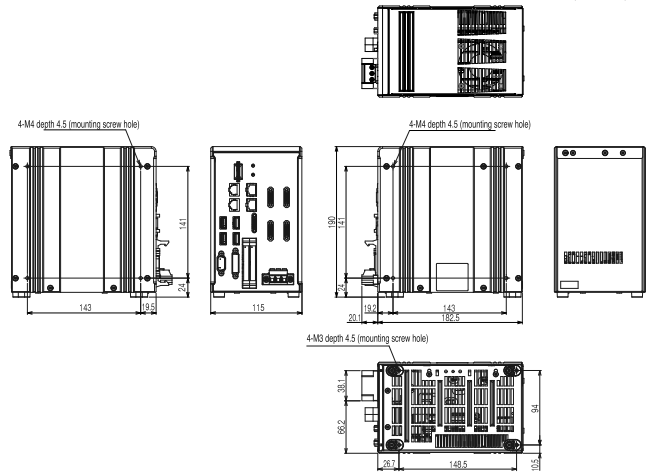
Ratings/Characteristics

Type	High-speed controller						Standard controller		
Model	NPN	PNP	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)						
External interface	Number of scenes		128						
	Operation		Mouse or similar device						
	Serial communications		Create processing flows by editing them (with a guidance).						
	Settings		RS-232C 1 CH						
External interface	Ethernet communications		Non-procedural (TCP/UDP) 1000BASE-T						
	EtherNet/IP communications		1 port	2 port	2 port	1 port	2 port	2 port	
	EtherCAT communications		1 port (Ethernet port and EtherNet/IP port are sharing use.) Transmission speed: 100Mbps (100BASE-TX)						
	Parallel I/O		In 1-line mode: 12 inputs, 31 outputs. In the 2-line random trigger mode: 17 inputs, 37 outputs. In the 3-to 4-line random trigger mode: 14 inputs, 29 outputs. In the 5 to 8-line random trigger mode: 19 inputs, 34 outputs.						
Ratings	Encoder I/F		RS422-A line driver level. Phase A/B: single-phase 4MHz (multiplying phase difference of 1MHz by 4 times). Phase 2: 4kHz						
	USB I/F		DVI4 output 1ch						
	SD memory card I/F		4 ch (supports USB1.1 and 2.0)						
	Power supply voltage		SDHC standard, Class 4 or higher recommended						
Ratings	Current consumption	When an intelligent compact camera is connected	2 connected	5.0A or less	5.4A or less	5.4A or less	4.7A or less	5.0A or less	5.9A or less
	Insulation resistance	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 0.3/2.4/5/12 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
Operating environment	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	-	-	
	Noise resistance	Fast transient burst	Between DC power supply and FH Sensor Controller (FD: 20mA) or higher (rated voltage 280V). Direct inductance: 2kV. Pulse rising time: 50ns. 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 +85 °C (with no icing nor no condensation)						
Dimensions	Ambient humidity range		Operating and storage: 35 % to 85 % (no condensation)						
	Ambient environment		No corrosive gases						
	Grounding		Type D grounding (1000 Ω or less grounding resistance) *Conventional type 3 grounding						
	Degree of protection		IEC60529 IP20						
Content	Environmental conditions		Indoor use Maximum altitude of 2,000m Supply voltage fluctuations of +10%/-15% of the rated voltage Installation category 1 Pollution degree 2						
	Dimensions		190mm(H) × 115mm(W) × 162.5mm(D)						
	Weight		Approx. 2.3kg	Approx. 2.4kg	Approx. 3.4kg	Approx. 3.2kg	Approx. 3.4kg	Approx. 3.4kg	
	Case materials		Cover: zinc-plated steel plate. Side plate: aluminum (A6063)						

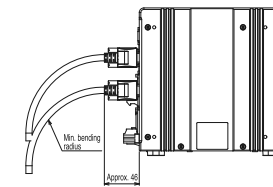
* The value of power consumption applies when the maximum number of cameras of each FH Sensor Controller is connected with 24VDC. When connecting the lighting with lighting controller, the consumption current is the same as when the intelligent compact camera is connected.

Dimensions

(Unit: mm)



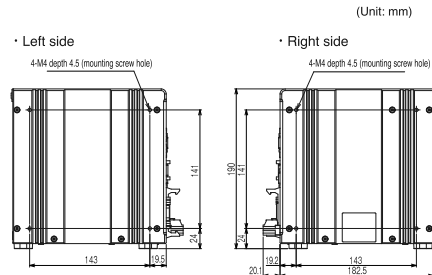
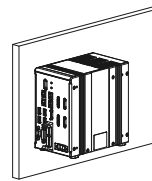
Camera cable mounting



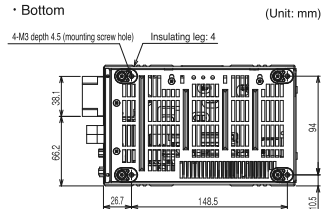
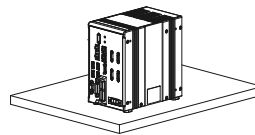
Mounting

Tighten the screws securely when installing the product.

Side Mounting



Bottom Mounting



- Recommended tightening torque: 1.2N·m to 1.3N·m
- The tolerance is ± 0.2mm.

- Do not remove the Insulating leg. Fix the Insulating leg to secure the ventilation path.
- Recommended tightening torque: 0.54N·m to 0.6N·m
- The tolerance is ± 0.2mm.

Suitability for Use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT 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(S) IS/ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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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