# 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:

ACEADILITIAN porter in EU Omron Europe B.V. Wegalaan 67-69 2132 JD Hoofddorp, The Netherlands Shiokoji Horikawa, Shimogyo-ku, Kvoto, 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.

9607479-9A

© OMRON Corporation 2013-2015 All Rights Reserved.

## 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

Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or WARNING may result in serious injury or death Additionally there may be significant property damage. 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 follo	owing alert symbols are used in this manual.					
$\bigcirc$	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.

### A 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.	L
--------------------------------------------------------------------------------------------------------------------------------------------------------------	---

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.

 Power Supply and Wiring
 Make sure to use the product with the power supply voltage specified by this manual.

e the specified wire size (AWG10 to 16)

- Use the specified wire size (AvvG10 to 10).
  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
- supply Is the voltage and polarity of the power supply correct? (24VDC)
- Is not the load of the output signal short-circuited?
   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(ENC0 VDD / ENC0 GND / ENC1 VDD / ENC1 GND) supply ? (5VDC)
- 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 1000 or Level
- $100\Omega$  or less). Keep the ground line as short as possible by setting the groundling residue of ground line as short as possible by setting the grounding setting the groundling the groundling setting the groundling the groundling setting the groundling the g
- Reep the ground mile as short as positions by secure and ground 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 Sensor Controller might be adversely effected.
   Check wiring again before turning on the FH Sensor Controller.
- Other
- Uner
  Use only the camera and cables designed specifically for the
  product. Use of other products may result in malfunction or damage
  of the product.
  Please insert DVI-I connector perpendicularly so that the connector
  resin part and pin are not rubbing against each other. Damaged pin
  may cause contact failure due to generation and invasion of resin
  powder
- powder. Always turn OFF the power of the FH Sensor Controller and peripheral devices before connecting or disconnecting a camera or cable. Connecting the cable with power supplied may result in

- 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 (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.
  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 FH Sensor Controller is turned off. Do not touch the case.

- 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. Fail-safe measures, external to this system, should be in place to ensure safety when using Sensor Controller measurement results to control the movement of a robot and conveyor, or stare.
- to control the movement of a robot and conveyor, or stage.

- ●Regulations of KC marking A급 기기 (업무용 방송통신기자재) 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며,가정외의
- 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

- 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 and left side, and 15mm for rear planes. The clearance is required for installing multiple units side-by-side.
   Clearance is not required for the side mounting.
   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).
   Noise Resistance

- equipment. Do not install the product within 200 mm of power cables. Component Installation and Handling
- 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.

# Basic Configuration

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













- Ambient Temperature

- Noise Resistance
   Do not install the product in a cabinet containing high-voltage

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 out of direct sunlight • Place out of direct sunlight • Place where it will not come into contact with water, oils or chemicals chemicals Orientation of Product

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.

## 

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

- - 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

A

В

- 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
- 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 contented. time it is started.

- 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, 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.
- avoid this problem, clear 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 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-XXXXX to XXXXX "based on the stage/robots range of movement.
- movement. range o
- range of movement. ©In case of connecting the sensor controller and monitor with a switcher and splitter: Do not use devices that may require re-recognition of the monitor by the sensor controller. Re-recognizing the monitor during switch may slow the inspection speed down.

- 11 Connector name Description SD memory card installation connector Install the SD memory card. Do not plug or unplug the SD memory card during measurement peration. Otherwise measurement time may be affected or data may be destroyed. Connect an EtherNet device. EtherNet connector Camera 2ch type Camera 4ch / 8ch type
- ECAT ECAT Upper port : Ethernet port Lower port : Ethernet port and Ethernet port and EtherNet/IP port are EtherNet/IP port are sharing use. LINK/ sharing use Connect a USB device. Do not plug or unplug it during measurement and accessing С USB connector USB device. Measurement time might be affected otherwise. D RS-232C connector Connect an external device such as a PLC Е 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. К Camera connector Connect cameras. 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 (FH-XCN) 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 NPN Connection)

[Input] Applicable signals/

[Input] Applicable signals/



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

\*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 pin, No.28 to 32pin : 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.



\* 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 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

5ms or less

0.7ms or les

Each in

ON delay

OFF delay

liagram

Internal circuit

[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.



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



\*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.

\*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 termina

[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. 0

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	

[Output] Applicable signals/

No.20 to 27 pins : Connect the COMOUT1 and COMIN0 terminals when using these signals



\* 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 signal names and the role of terminals vary depending on the settings of the operation mode of the FH sensor controller. Check the settings and wire correctly. (About the operation mode, please refer to the Vision Sensor FH / FZ5 Series Vision System User's Manual.)

	No	1/0	XW2Z-S013- Wire color	XW2R-34G-T Connector-Terminal Block Conversion Units General surpces devices	In the 1-line mode	Signe	al name In the 3 to 4-line random mode	In the 5 to 8-line random mode	Remarks			
CN1	1	-	Red	A1			MINO	1				
1.1	2	— <sup>•</sup> •	Gray	B1			MIN1					
1.41	3	- ·	Gray	A2			acant	1				
	4	IN	Gray	B2	STEPO/ENCTRIG_ZO (*1)	STEP0/ENCTRIG_ZO (*2)	STEP0	STEP0				
	5 6	IN IN	Green	A3 B3	Unused (*5) Unused (*5)	STEP1/ENCTRIG_Z1 (*2)	STEP1 STEP2	STEP1 STEP2	-			
	7	IN	Gray Gray	A4	Unused (*5)	Unused (*5) Unused (*5)	STEP2	STEP3	-			
	8	IN	Gray	B4	ENCTRIG_AO (*1)	ENCTRIG_A0 (*2)	Unused (*5)	Unused (*5)				
	9	IN	Gray	A5	Unused (*5)	Unused (*5)	Unused (*5)	STEP4	1			
	10	IN	Green	B5	Unused (*5)	Unused (*5)	Unused (*5)	STEP5	1			
	11	IN	Gray	A6	Unused (*5)	ENCTRIG_A1 (*2)	Unused (*5)	STEP6				
	12	IN	Gray	B6	Unused (*5)	ENCTRIG_B1 (*2)	Unused (*5)	STEP7				
	13		Gray	A7	ENCTRIG_B0 (*1)	ENCTRIG_B0 (*2)	Unused (*5)	Unused (*5)	-			
	14		Gray	B7	Unused (*5)		INE0	READY0	4			
	15 16	OUT OUT	Green Gray	A8 B8	RUN0 READY0	RUN0 READY0	RUN0 READY0	BUSYO	-			
	17	OUT	Gray	A9	BUSYO	BUSYO	BUSYO	OR0	1			
	18	OUT	Gray	B9	OR0	OR0	OR0	READY1	1			
	19	OUT	Gray	A10	ERROR0	ERROR0	ERROR0	BUSY1	1			
	20	OUT	Green	B10	STGOUTO ("3)/SHTOUTO	STGOUT0 (*3)/SHTOUT0	STGOUTO (*3)/SHTOUTO	STGOUTO (*3)/SHTOUTO	1			
	21	OUT	Gray	A11	STGOUT1 (*3)	STGOUT1 (*3)/SHTOUT1	STGOUT1 (*3)/SHTOUT1	STGOUT1 (*3)/SHTOUT1	]			
22 OUT Gray B11 STGOUT2 (*3) STGOUT2 (*3) STGOUT2 (*3)SHTOUT2 STGOUT2 (*3)SHTOUT2												
	23	OUT	Gray	A12	STGOUT3 (*3)	STGOUT3 (*3)	STGOUT3 (*3)/SHTOUT3	STGOUT3 (*3)/SHTOUT3	COMIN0 to 2 : Common 0 to 2 for input signals			
	24 OUT	Gray	B12	STGOUT4 (*3)	STGOUT4 (*3)	STGOUT4 (*3)	STGOUT4 (*3)/SHTOUT4	COMOUT0 to 3 : Common 0 to 3 for output signals				
	25	OUT	Green	A13	STGOUT5 (*3)	STGOUT5 (*3)	STGOUT5 (*3)	STGOUT5 (*3)/SHTOUT5				
	26	OUT	Gray	B13	STGOUT6 (*3)	STGOUT6 (*3)	STGOUT6 (*3)	STGOUT6 (*3)/SHTOUT6	DI0 to 7 : Command inputs			
	27 28	OUT OUT	Gray	A14 B14	STGOUT7 (*3)	STGOUT7 (*3) RUN1	STGOUT7 (*3) RUN1	STGOUT7 (*3)/SHTOUT7 OR1	DILINE0 to 2 : Command inputs (line specified) DSA0 to 1 : Data transmission request			
	29	OUT	Gray Gray	A15	Unused (*5) Unused (*5)	READY1	READY1	READY2	ENCTRIG_A0 to 1 : Encoder trigger input (phase A			
	30	OUT	Green	B15	Unused (*5)	BUSY1	BUSY1	BUSY2	ENCTRIG_B0 to 1 : Encoder trigger input (phaseB)			
	31	OUT	Gray	A16	Unused (*5)	OR1	OR1	OR2	ENCTRIG_Z0 to 1 : Encoder trigger input (phase Z			
	32	OUT	Gray	B16	Unused (*5)	ERROR1	ERROR1	READY3	STEP0 to 7 : Measurement trigger input-			
	33	-	Gray	A17			IOUT0	· · · · · · · · · · · · · · · · · · ·				
	34	<u> </u>	Gray	B17		CON	ACK : Instruction execution completion flag					
CN2	35		Red	A1			MIN2		BUSY0 to 7 : ON during processing			
	36	-	Gray	B1 A2	D040		acant	DILINE1	DO0 to 15 : Data output			
	37 38	IN IN	Gray Gray	B2	DSA0 Unused (*5)	DSA0 DSA1	DILINE1 Unused (*5)	DILINE1	ERROR : ON when an error occurs (*4) ERROR0 to 3 : ON when an error occurs			
	39	IN	Green	A3	Ullused ( 5)		010360 ( 5)	DILINEZ	GATE0 to 1 : ON during configured output time			
	40	IN	Gray	B3			011		OR0 to 7 : Overall judgement result			
	41	IN	Gray	A4		D	012		READY0 to 7 : ON when image input is allowed			
	42		Gray	B4			3		RUN0 to 3 : ON while the layout turned on			
	43		Gray	A5			014		output setting is displayed			
	44		Green	B5			015		SHTOUT0 to 7 : Shutter output STGOUT0 to 7 : Strobe trigger output(*3)			
	45	IN	Gray	A6 B6			016					
	46	IN —	Gray	A7			017		-			
	47 48		Gray Gray	B7			cant CK		1			
	49	OUT	Green	A8	GATE0	GATEO	RUN2	BUSY3	1			
	50	OUT	Gray	B8	Unused (*5)	GATE1	READY2	OR3	1			
	51		Gray	A9	DO0	DO0	BUSY2	READY4	]			
	62	OUT	Gray	B9	DO1	DO1	OR2	BUSY4				
	53	OUT	Gray	A10	DO2	DO2	ERROR2	OR4	4			
	54	OUT	Green	B10	DO3	DO3	RUN3	READY5	4			
	55	OUT	Gray	A11	DO4	DO4	READY3	BUSY5	4			
	56		Gray	B11 A12	DO5	DO5	BUSY3	OR5	4			
-	57 58	OUT	Gray Gray	B12	DO6 DO7	DO6 DO7	OR3 ERROR3	READY6 BUSY6	1			
	59	OUT	Green	A13	DO7 DO8	DO8	Unused (*5)	OR6	1			
	60		Gray	B13	DO9	DO9	Unused (*5)	READY7	1			
	61		Gray	A14	DO10	DO10	Unused (*5)	BUSY7	1			
	62	OUT	Gray	B14	DO11	DO11	Unused (*5)	OR7				
	63	OUT	Gray	A15	DO12	DO12	Unused (*5)	Unused (*5)				
	64		Green	B15	DO13	DO13	Unused (*5)	Unused (*5)	4			
	65	OUT	Gray	A16	DO14	DO14	Unused (*5)	Unused (*5)	-			
	66	OUT	Gray	B16	DO15	DO15	Unused (*5)	ERROR (*4)	-			
	67		Gray	A17 B17			IOUT2		4			
	68		Gray			CON	IOUT3		l			





9

### Encoder Interface (Line Driver Type)

tem	Specifications				
Input voltage Input voltage : 5VDC±5% Signal level : EIA Standard, RS-422-A line dri					
nput impedance *1	120Ω±5%				
Differential input voltage	High-level input voltage   0.1V, Low-level input voltage   -0.1V				
-lysteresis voltage	60mV				
Maximum response requency *2	Phase A/B/Z: 1MHz (When using an I/O cable, model FH-VR 1.5M)				

01/0	Connect	or	
No	Signal name	Color	Remarks
1	ENC0 A+	Black	Signal : Ch1 A-Phase(+)
2	ENC0 A-	Black /Red	Signal : Ch1 A-Phase(-)
3	ENC0 VDD	Brown	Power : Power supply for Ch1 (5VDC)
4	ENC0 B+	White	Signal : Ch1 B-Phase(+)
5	ENC0 B-	White/Red	Signal : Ch1 B-Phase(-)
6	ENC0 GND	Blue	Power : Signal ground for Ch1 (0V)
7	ENC0 Z+	Orange	Signal : Ch1 Z-Phase(+)
8	ENC0 Z-	Orange/Red	Signal : Ch1 Z-Phase(-)
9	NC	-	Not connected
10	ENC1 A+	Purple	Signal : Ch2 A-Phase(+)
11	ENC1 A-	Purple/Red	Signal : Ch2 A-Phase(-)
12	ENC1 VDD	Brown/Red	Power : Power supply for Ch2 (5VDC)
13	ENC1 B+	Pink	Signal : Ch2 B-Phase(+)
14	ENC1 B-	Pink/Red	Signal : Ch2 B-Phase(-)
15	ENC1 GND	Blue/Red	Power : Signal ground for Ch2 (0V)
16	ENC1 Z+	Yellow	Signal : Ch2 Z-Phase(+)
17	ENC1 Z-	Yellow/Red	Signal : Ch2 Z-Phase(-)





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





Line driver Line driver input type input type CH1



Line driver



#### 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.

Cameras/Cables Connection Table(Connecting to EH-S Series Camera)

					High-speed C	MOS cameras *			
			300,000-pixel	2 million-pixel		4 million-pixel		12 million-pixel	
Type of	Model	Cable	FH-SM/SC	FH-SM	)2/SC02	FH-SM0	4/SC04	FH-SM	12/SC12
camera		length	-	High speed mode of transmission speed select			Standard mode of transmission speed select	High speed mode of transmission speed select	Standard mode of transmission speed select
		2m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Camera Cable	FZ-VS3	3m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right-angle camera cable	FZ-VSL3	5m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10m	Yes	No	Yes	No	Yes	No	Yes
	FZ-VSB3	2m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
camera cable		Зm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	FZ-VSLB3	5m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
right-angle camera cable		10m	Yes	No	Yes	No	Yes	No	Yes
Long-distance camera cable	FZ-VS4								
ong-distance ight-angle camera cable	FZ-VSL4	15m	Yes	No	Yes	No	Yes	No .	Yes

\*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 FH Sensor Controller. \*4 This is the ERROR signal commonly used in 1 to 8-line modes.

\*5 Do not connect anything for Unused.

\*High-speed CMOS camera is only for the FH series.

#### Cameras/Cables Connection Table(Connecting to FZ-S Series Camera)

			C	igital CCD camer	as	Small digital	High-speed	Intelligent
Type of	Model	Cable length	300,000-pixel	2 million-pixel	5 million-pixel	CCD cameras Pen type/flat type	CCD camera	compact CMOS cameras
camera		length	FZ-S/SC	FZ-S2M/SC2M	FZ-S5M2/ SC5M2	FZ-SF/SFC FZ-SP/SPC	FZ-SH/SHC	FZ-SQ
0.011	57 V00	2m	Yes	Yes	Yes	Yes	Yes	Yes
Camera Cable	FZ-VS3	3m	Yes	Yes	Yes	Yes	Yes	Yes
Right-angle camera cable	FZ-VSL3	5m	Yes	Yes	Yes	Yes	Yes	Yes
camera cable		10m	Yes	Yes	No	Yes	Yes	Yes
Bend resistant	FZ-VSB3	2m	Yes	Yes	Yes	Yes	Yes	Yes
camera cable		3m	Yes	Yes	Yes	Yes	Yes	Yes
Bend resistant right-angle	FZ-VSLB3	5m	Yes	Yes	Yes	Yes	Yes	Yes
camera cable		10m	Yes	Yes	No	Yes	Yes	Yes
Long-distance camera cable	FZ-VS4							
Long-distance right-angle camera cable	FZ-VSL4	15m	Yes	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 connecter of category 5e or higher.

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

# Wiring

Pin ass

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	⊢A	White · Green	1
2	Green	┝───┤──	Green	2
3	White · Orange	└── <u>/</u> /	- White · Orange	3
4	Blue		Blue	4
5	White · Blue		White · Blue	5
6	Orange		Orange	6
7	White • Brown	┝────┤──│	- White · Brown	7
8	Brown	┝───┼┦ ┝────	- Brown	8
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.

Not connected Data reception

Data transmissio

Not connected

Signal ground

Not connected

Not connected

Not connected

### RS-232C(Serial) Interface Wiring

#### I/O Connector

The maximum cable length is 15m.

_	Ô	/1
6 /	Â	2
7 —		3
8	les t	- 4
9	Ô	5

Pin No. Signal name Function

NC

RD

SD

NC

I NC

N NC

NC

GND

FH Sensor Controller			
Pin No.			

RD

SD GND

	External device	to be connected					
	Pin No.	Signal name					
	*	RD					
-	*	SD					
	*	GND					
	RS/CS control cannot be use						

Pin numbers will depend

on the external device being connected.

Refer to the manual for the personal

computer or PLC being connected.

Ĵ,

CHECK

Use a shielded cable

2 3

5

#### Use a compatible connector. Recommended items Manufacturer Model Sockets OMRON Corporation XM3D-0921 Not connected Hood OMRON Corporation XM2S-0911

#### NC 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

2

3

4

5 6

7

8

[Important] - Use the specified wire size (AWG10 to 16). Keep the power supply wires as short as possible (Max.2m). Wiring cables incorrectly might cause failures.

Connection of Terminal Block

- Insert the end of the signal line (electric wire) into the attached 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 (male) into the terminal block connector (female) on the FH Sensor Controller side. 2
- Fix the terminal block connector (male) by tightening the screws on З the right and left sides of it with a flathead screwdriver. Recommended tightening torque: 0.7-0.8N m Terminal block connector(male):FH-XCN (OMRON)
  - Pin No. Display Signal name Function + 24V Input power supply voltage (24VDC)

	2	- ' '	0V	Input power supply voltage (0V).	
	3	Ð	GND	Input GND.	
er	supply conne	ected to the	EH Sensor	Controller varies depending on the nur	'n

The power supply connected to the FH Sensor Controller varies depending on the number of connected cameras and types. When connectin lighting with lighting controller, the consumption current is the same as when the intelligent compact camera is connected. Use it accordingly cting the

## Recommended power supply

ltom	Comerchan	No. of cameras		High-speed controller			Standard controller		
ltem	Camera type	connected	FH-3050	FH-3050-10	FH-3050-20	FH-1050	FH-1050-10	FH-1050-20	
		2	S8VS-12024	S8VS-18024	S8VS-18024	S8VS-12024	S8VS-12024	S8VS-18024	
	Intelligent compact	4	-	S8VS-18024	S8VS-24024	-	S8VS-18024	S8VS-24024	
Recommend		8	-	•	S8VS-48024	-	-	S8VS-48024	
power suppl S8VS	y: Camera of	2	S8VS-12024	S8VS-18024	S8VS-18024	S8VS-09024	S8VS-09024	S8VS-12024	
0010	0.3/2/4/5/12 million	4	-	S8VS-18024	S8VS-18024	-	S8VS-12024	S8VS-12024	
	pixels	8	-	-	S8VS-18024	-	-	S8VS-18024	

## Ratings/Characteristics

Түре				Higi	n-speed control	er	St	andard controller	1	
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					-	
	Number of cameras			2	4	8	2	4	8	
	Type of connected camera				n be connected (	FZ-S/FH-S series	5)			
	Number of scenes			128						
	Operation			Mouse or simila						
	Settings				ng flows by editin	g them.				
	Serial communications			RS-232C 1 CH Non-procedural (TCP/UDP) 1000BASE-T						
	Ethernet communications					2port	1	2port	0	
	EtherNet/IP co	mmunication		1 port	2port	P port are sharing	1 port		2port	
	EtherCAT com			· · · · · · · · · · · · · · · · · · ·	ated protocol (10		use.) mansmiss	ion speed : Toolvib	ps (100BASE-17	
	EulerCAT com	intunications								
External interface	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 : 19inputs, 34 outputs.						
	Encoder I/F			Input voltage: 5	/DC±5%, RS422-	A line driver level,	Phase A/B/Z: 1M	ſHz		
	Monitor I/F			DVI-I(Single Lin	k) output 1ch					
	USBI/F			4 ch(supports USB1.1 and 2.0)						
	SD memory of	ard I/F		SDHC standard						
	Power supply	voltage		20.4 to 26.4VDC						
		When an Intelligent compact 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	
	Current		8 connected	_	-	11.5A or less	-	-	10.9A or less	
Ratings	consumption *	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	
			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 res	istance		Between DC power supply and FH Sensor Controller FG: 20MΩ or higher (rated voltage 250V)						
	Noise	Fast	DC power	Direct infusion: 2kV Pulse rising: 5ns Pulse width: 50ns Burst continuation time: 15ms/0.75ms Period: 300ms Application time: 1 min						
	resistance	transient burst	I/O line	Cramp : 1kV Pulse rising: 5ns Pulse width: 50ns Burst continuation time : 15ms/0.75ms Period: 300ms Application time: 1 min						
	Ambienttemperature range			Operating:0 to 50 °C Storage:-20 to +65 °C (with no icing nor no condensation)						
Operating	Ambienthumidi	v		Operating and storage:35 % to 85 % (no condensation)						
environment	Ambientenviro	nment		No corrosive gases						
environment	Grounding			Type D grounding (100 $\Omega$ or less grounding resistance) *Conventional type 3 grounding						
	Degree of prote	ction		IEC60529 IP20						
	Environmental conditions			Indoor use Maximum allitude of 2,000m Supply voltage fluctuations of +10%, -15% of the rated voltage Installation category I Follution degree 2						
	Dimensions	Dimensions			190mm(H)×115mm(W)×182.5mm(D)					
Dimensions	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)						
Content				FH Sensor Controller (1) / Instruction Sheet (one Japanese and one English version) / Instruction Installation Marual (1) / Terminal: block connector: FH-XCN (1) / Ferrite core 2(FH3050 and FH-1050), 4 (FH-3050-10 and FH-1050-10), and 8 (FH-3050-20 and FH-1050-20)						

Dimensions



4-M4 depth 4.5 (mounting screw hole)



đ 0

.....





4-M3 depth 4.5 (mounting screw hole)



## Mounting

- · Tighten the screws securely when installing the product.
- To keep proper air flow, keep the top of the FH Sensor Controller 50mm or more apart from other devices. Install the EH Sensor Controller with a clearance of 30mm on the right and left side, and 15mm for rear planes. The clearance is required for installing multiple units side-by-side. Clearance is not required for the side mounting. · Do not install the product immediately above significant heat sources, such as heaters, transformers,
- or large-capacity resistors
- Do not install the product in a cabinet containing high-voltage equipment.
- Do not install the product within 200 mm of power cables.





\* Recommended tightening torque: 1.2N·m to 1.3N·m \* The tolerance:  $\pm$  0.2mm.

Bottom



\* 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: ± 0.2mm.



5

De

Terminal block connector (male





Camara cable mounting



(Unit: mm)

.

8808680000000000

(Unit: mm)

(Unit: mm)

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.

# **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

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 approach 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 OMBON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## OMRON

**OMRON Corporation** Industrial Automation Company Tokyo, JAPAN Contact: www.ia.omron.com

**Regional Headquarters** OMRON EUROPE B.V. Wegalaan 67-69,2132 JD Hoofddorp The Netherlands Tel: (31)2356-81-300 Fax: (31)2356-81-388

#### **OMRON ELECTRONICS LLC** 2895 Greenspoint Parkway, Suite 200 Hoffman Estates, IL 60169 U.S.A Tel: (1)847-843-7900 Fax: (1)847-843-7787

## **OMRON ASIA PACIFIC**

PTE. LTD. No. 438A Alexandra Road #05-05/08 (Lobby 2), Alexandra Technopark, Singapore 119967 Tel: (65)6835-3011 Fax: (65)6835-2711

#### OMRON (CHINA) CO.,LTD. Room 2211, Bank of China Tower, 200 Yin Cheng Zhong Road, PuDong New Area, Shanghai, 200120 China Tel: (86)21-5037-2222 Fax: (86)21-5037-2200

Note: Specifications subject to change without notice.