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Pressure Sensor

E8MS/E8M

Four-Input-Channel Pressure Sensor with Versatile Features and Functions




Pressure Sensors

Sensing Guide

Pressure Sensors

Other Information

 Be sure to read *Safety Precautions* on page 1199.

Ordering Information

Sensors

E8MS

Pressure range		Output configuration	Model
Positive pressure	0 to 100 kPa	Linear output: 1 to 5 V	E8MS-01
	0 to 1 MPa		E8MS-10
Negative pressure	0 to -101 kPa		E8MS-N0
Compound pressure	-101 to 101 kPa		E8MS-N1 *

* E8MS-N1 is only 1-channel pressure sensor controller. E80-C2 can be used. For more details, please refer to E80 catalogue.

E8M

Pressure range		Output configuration	Model
Minute pressure differential	Differential pressure from 0 to 1,000 Pa between positive and negative ports	Linear output: 1 to 5 V	E8M-A1-S
Positive pressure	0 to 1 MPa		E8M-10
Negative pressure	0 to -101 kPa		E8M-N0




Controller

Power supply voltage	Output configuration	Number of sensor inputs	Model
24 VDC	NPN open collector	4ch	E8M-MP8

Note: 1. E8MS-@@ is 1-channel pressure sensor controller. E80-C2 needs to be prepared. For more details, please refer to E80 catalogue. Please refer to *Sensor and Controller* section of the following page.


Accessories (Order Separately)

Sensor I/O Connectors

Applicable model	Appearance	Model	Specifications	Unit	Remarks
E8M		E89-M3-S *	4-pin connector with 3-m-long cable	1	Provided with one XN2A-1430 E-CON Connector.
E8MS		E89-M4-S	3-pin connector with 3-m-long cable		
E8MS		E89-M4-1	3-conductor, 3-m-long cable with connectors on both ends		Cutting/extension is not possible.

* E8M-A1 does not require the Sensor I/O Connector.

Pin Controller Connector

Appearance	Model	Applicable wire size (mm ²)	Quantity	Minimum order unit	Remarks
	XN2A-1430	0.08 to 0.5	1	10	One unit is provided with each E89-M3 and E89-M4.

Note: Orders are accepted in multiples of the minimum order unit.

Power and Output Connector

Model	Specifications	Quantity
E89-M5-S	8-pin connector with 2-m cable	1

Adapter

Model	Quantity	Remarks
Y92F-37-S	1	One unit is provided with E8M-MP8.

Note: Orders are accepted in multiples of the minimum order unit.

Hard Cover

Model
Y92A-40-S

Adapter for □48 Panel Hole

Model
Y92F-48-S

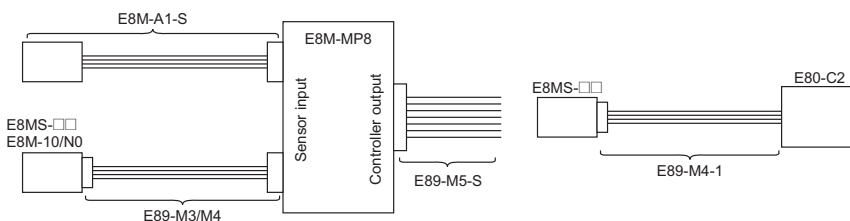
Sensor and Controller Combinations

Use the Pressure Controllers in the following combinations. The E89-M3/M4 is required when using the Sensor as a single unit.

Model	E89-M3-S	E89-M4-S	E8M-MP8	E89-M5-S	E80-C2	E89-M4-1
E8MS-01	No	Yes	Yes	Yes	Yes	Yes
E8MS-10	No	Yes	Yes	Yes	Yes	Yes
E8MS-N0	No	Yes	Yes	Yes	Yes	Yes
E8MS-N1	No	No	No	No	Yes	Yes
E8M-A1	No	No	Yes	Yes	No	No
E8M-10	Yes	No	Yes	Yes	No	No
E8M-N0	Yes	No	Yes	Yes	No	No

Yes: Required No: Not required

Sensor and Controller Connection



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E8MS/E8M

E8Y

E8Y-□-F□

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Ratings and Specifications

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E8MS

Item	Model	E8MS-01	E8MS-10	E8MS-N0	E8MS-N1
Power supply voltage		12 VDC ±10%, ripple (p-p) of 5% max.			
Current consumption		25 mA max.			
Pressure type		Gauge pressure			
Applicable fluid		Non-corrosive gas and non-flammable gas			
Rated pressure range		0 to 100 kPa	0 to 1 MPa	0 to -101 kPa	-101 to 100 kPa
Withstand pressure		400 kPa	1.5 MPa	400 kPa	
Linearity		±1% F.S. max.			
Hysteresis		±1% F.S. max.			
Linear output		Voltage output: 1 to 5 V with an output impedance of 1 kΩ			
Protection circuits		Reverse polarity protection, load short-circuit protection			
Ambient temperature		Operating: 0 to 50°C Storage: -15 to 60°C (with no icing)			
Ambient humidity		Operating/Storage: 35% to 85% (with no condensation)			
Temperature influence		±0.12% F.S./°C max.			
Voltage influence		±1% F.S. max.			
Insulation resistance		100 MΩ min. (at 500 VDC) between current-carrying parts and case			
Dielectric strength		1,000 VAC for 1 minute			
Vibration resistance		Destruction: 10 to 150 Hz, 0.35-mm single amplitude or 50 m/s ² , 10 times each for 8 min in X, Y and Z directions			
Shock resistance		Destruction: 500 m/s ² 3 times each in X, Y and Z directions			
Degree of protection		IP50 (IEC60529)			
Pressure port		R (PT) 1/8 taper screw and M5 female screw			
Connection method		Connector			
Weight (packed state)		Approx. 6 g			
Material	Pressure port	Aluminum			
Accessories		Instruction manual			

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E8Y

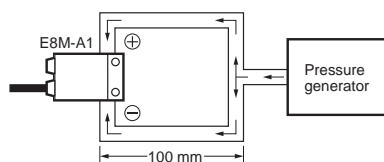
E8Y-□-□

E8M

Item	Model	E8M-A1-S	E8M-10	E8M-N0
Power supply voltage		12 VDC \pm 10%, ripple (p-p) of 5% max.		
Current consumption		30 mA max.		
Pressure type		Differential pressure	Gauge pressure	
Applicable fluid		Non-corrosive gas and non-flammable gas		
Rated pressure range		Differential pressure from 0 to 1,000 Pa between positive and negative ports	0 to 1 MPa	0 to -101 kPa
Withstand pressure		Differential pressure from 0 to 2,500 Pa between positive and negative ports *	1.5 MPa	400 kPa
Accuracy		\pm 3% F.S. max.	\pm 5% F.S. max.	
Linearity		\pm 1% F.S. max.		
Hysteresis		\pm 1% F.S. max.		
Linear output		Voltage output: 1 to 5 V with an output impedance of 1 k Ω		
Protection circuits		Reverse polarity protection, load short-circuit protection		
Ambient temperature		Operating: 0 to 40°C Storage: -15 to 50°C (with no icing)		
Ambient humidity		Operating/Storage: 35% to 85% (with no condensation)		
Temperature influence		\pm 0.25% F.S./°C max.	\pm 0.12% F.S./°C max.	
Voltage influence		\pm 3% F.S. max.		
Insulation resistance		100 M Ω min. (at 500 VDC) between current-carrying parts and case		
Dielectric strength		1,000 VAC for 1 minute		
Vibration resistance		Destruction: 10 to 150 Hz, 0.75-mm single amplitude or 100 m/s ² , 4 times each for 8 min in X, Y and Z directions		
Shock resistance		Destruction: 300 m/s ² 3 times each in X, Y and Z directions		
Degree of protection		IP50 (IEC60529)		
Pressure port		M5 female screw	R (PT) 1/8 and M5 female screw	M5 male screw
Connection method		Pre-wired cable (standard length: 3 m)	Connector	
Weight (packed state)		Approx. 130 g	Approx. 30 g	Approx. 20 g
Material	Pressure port	Stainless steel (SUS303)	Stainless steel (SUS304)	
	Case	ABS	Aluminum, polyether sulfonic resin	
Accessories		Pin Controller Connector, instruction manual	Instruction manual	

* The absolute pressure value of each port is 100 kPa.

Measurement method



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Controller

Item	Model	E8M-MP8		
Connectable Pressure Sensor	E8M-A1-S * Differential pressure from 0 to 1,000 Pa between positive and negative ports	E8MS-01 (0 to 100 kPa)	E8MS-10 E8M-10 (0 to 1 MPa)	E8MS-N0 E8M-N0 (0 to -101 kPa)
Power supply voltage	24 VDC ±10%, ripple (p-p) of 10% max.			
Current consumption	200 mA max. (Sensor section consumed electric current 30 mA / 1ch included)			
Sensor power supply	Supplied from the Controller, 12 VDC±10% (30 mA max. for each channel)			
Input	Sensor input (through 4-pin one-touch connector)	Input voltage range: 1 to 5 VDC (Input impedance 800 kΩ)		
Out-put	Comparative output	NPN open collector Maximum load current: 80 mA max. Load voltage: 30 VDC max. Residual voltage: 0.8 V max. with a flow current of 30 mA, 0.4 V max. with a flow current of 16 mA NO or NC (selectable) independent output in hysteresis or window mode (selectable) on each channel		
Automatic shift input		Non voltage input (contact point or non-contact point), input for more than 10ms		
Indi- ca- tors	Measurement value	4 column LED indicator (orange color) (character height: 9 mm)		
	Message	4 column LED indicator (orange color) (character height: 9 mm)		
	Measurement and setting channel	1 column LED indicator (red color) (character height: 5 mm)		
	Comparative output	LED indicator (red color) that is lit when Tr is turned ON		
Response speed		5 ms max. (When chattering prevention function is enabled, it changes to either 20 ms, 160 ms or 640 ms)		
Set resolution		±0.1% F.S. max.		
Display accuracy		±0.5% F.S. max. ±1 digit (ambient temperature 25°C)		
Protection circuits		Reverse polarity protection, load short-circuit protection		
Ambient temperature		Operating: 0 to 50°C Storage: -10 to 60°C (with no icing)		
Ambient humidity		Operating/Storage: 35% to 85% (with no condensation)		
Temperature influence		±0.5% F.S. max. (at 25°C)		
Voltage influence		±1% F.S. max.		
Insulation resistance		100 MΩ min. (at 500 VDC) between current-carrying parts and case		
Dielectric strength		1,000 VAC for 1 min		
Vibration resistance		Destruction: 10 to 150 Hz, 0.75-mm single amplitude or 100 m/s ² , 4 times each for 8 min in X, Y and Z directions		
Shock resistance		Destruction: 300 m/s ² 3 times each in X, Y and Z directions		
Degree of protection		IP65 IEC60529 standard, Front section only: IP65 (at the time of panel installation), others: IP30		
Connection method		Panel mounting Power supply and output: 8-pin Terminal Sensor I/O: 4-pin e-CON Connector		
Weight (packed state)		Approx. 55 g (Accessories not included)		
Accessories		Instruction manual, adapter and waterproof gasket		

* Pressure differentials are displayed with a minus (-) sign.

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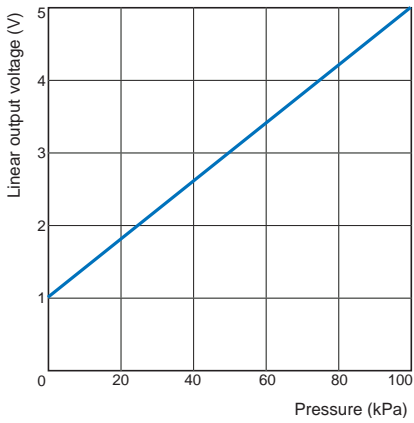
E8Y

E8Y-□-□

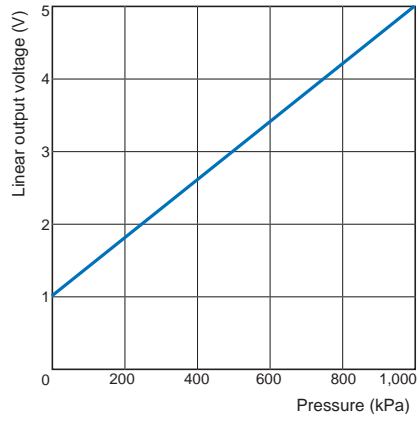
Engineering Data (Typical)

Linear Output Voltage vs. Pressure

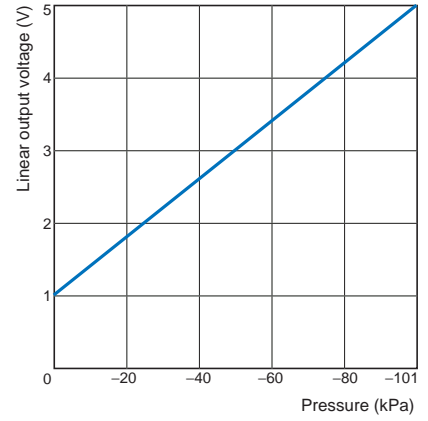
E8MS-01



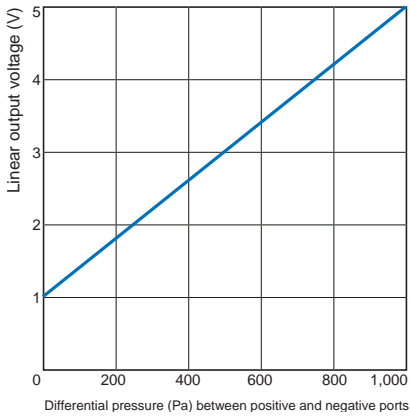
E8MS-10/E8M-10



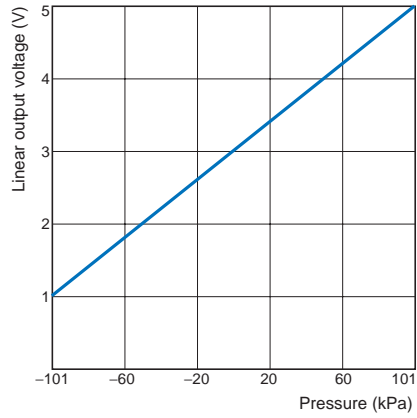
E8MS-N0/E8M-N0



E8M-A1-S



E8MS-N1



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E8MS/E8M

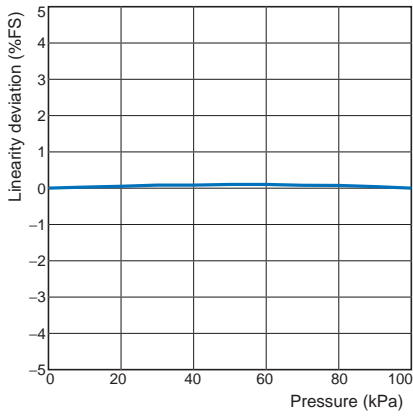
E8Y

E8Y□-F□

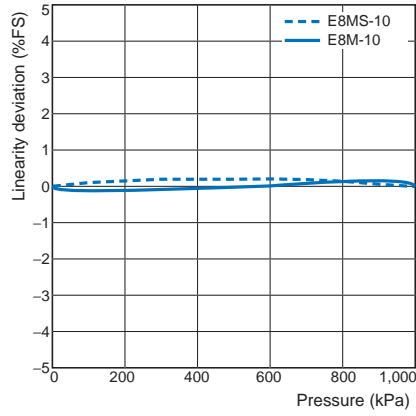
E8MS/E8M

Output Linearity

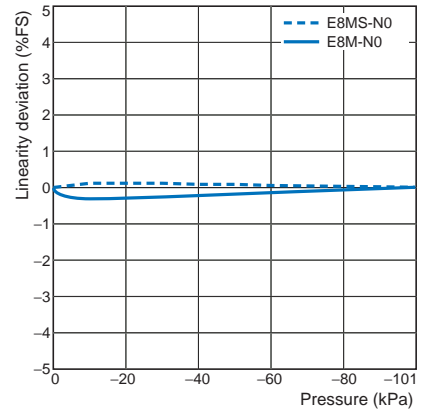
E8MS-01



E8MS-10/E8M-10

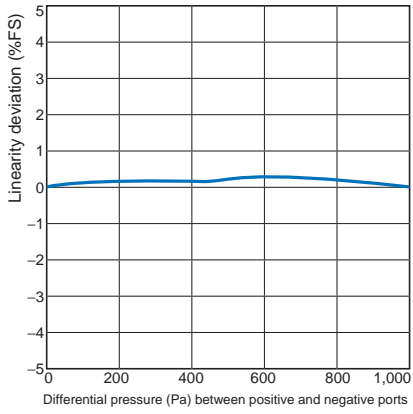


E8MS-N0/E8M-N0

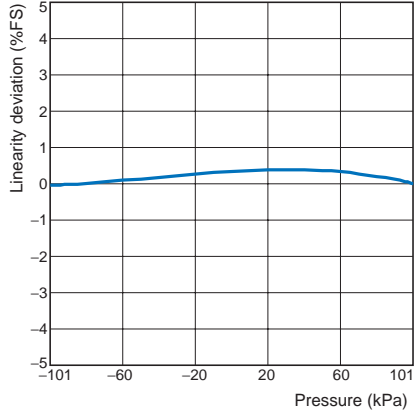


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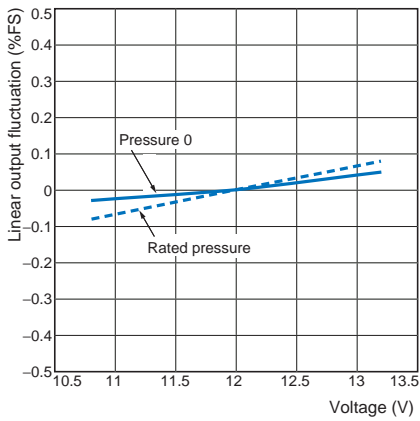
E8MS
/E8M

E8Y

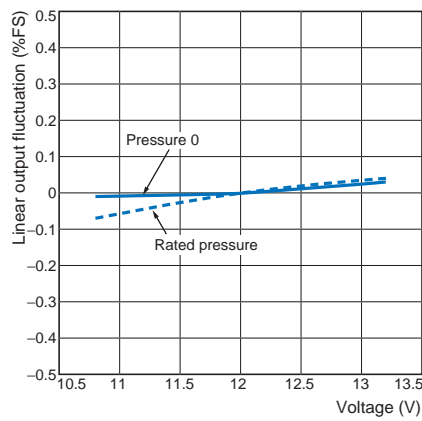
E8Y-□-□

Linear Output Fluctuation vs. Voltage

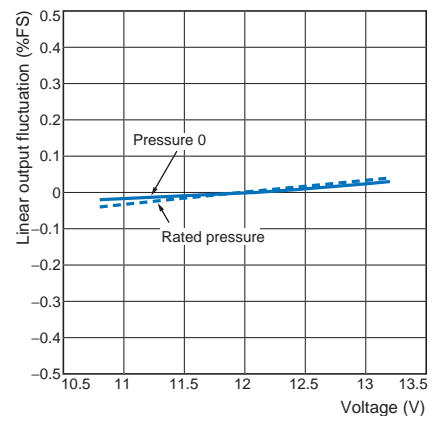
E8MS-01



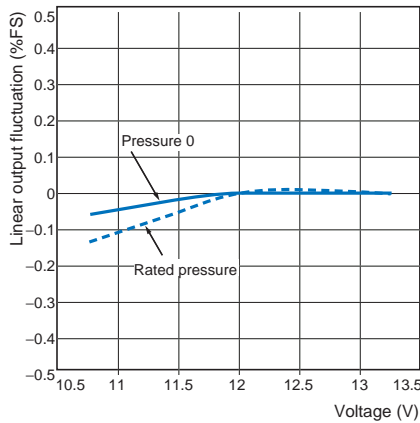
E8MS-10



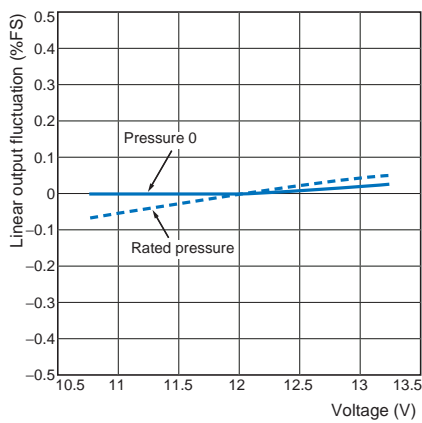
E8MS-N0



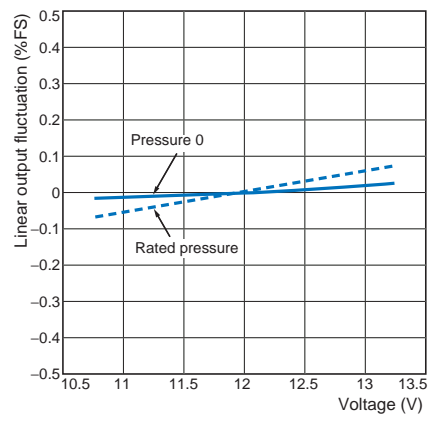
E8M-A1-S



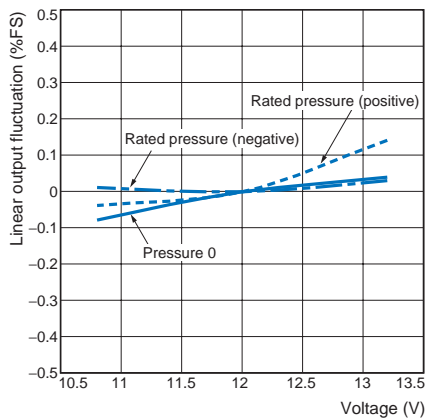
E8M-10



E8M-N0



E8M-N1



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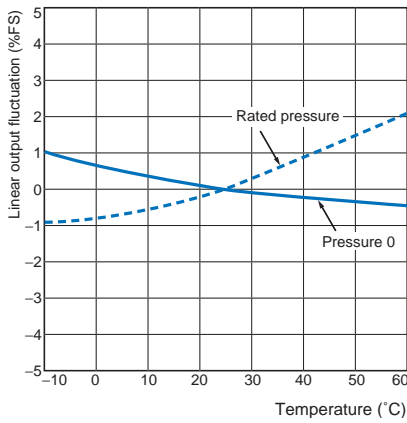
E8MS
/E8M

E8Y

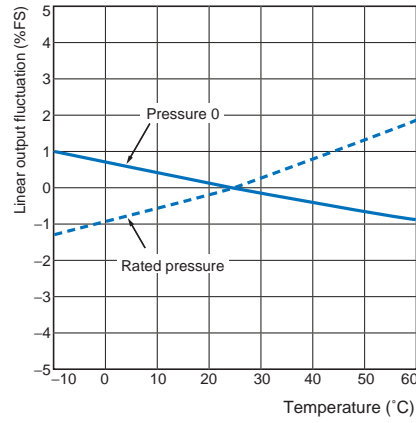
E8Y□-F□

Linear Output Fluctuation vs. Temperature

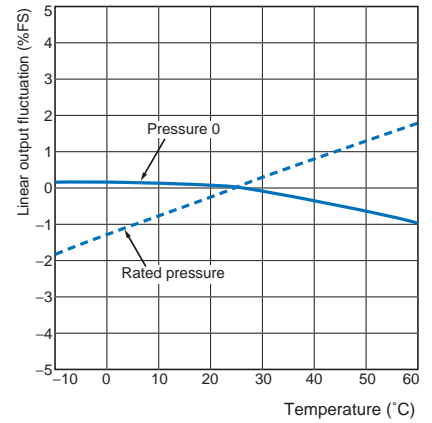
E8MS-01



E8MS-10

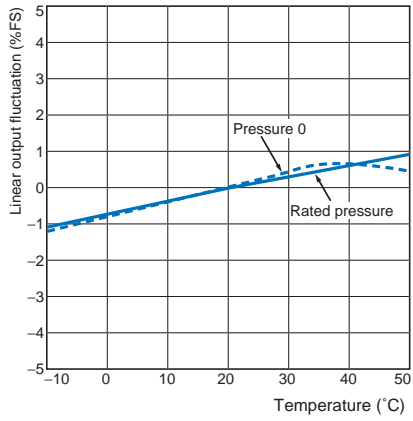


E8MS-N0

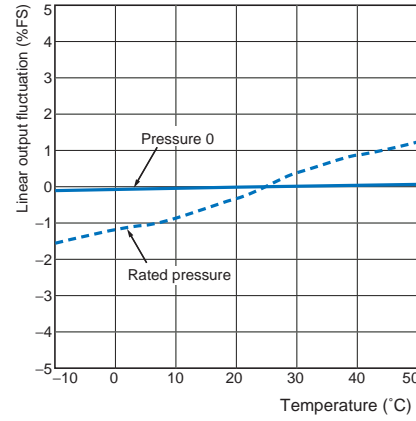


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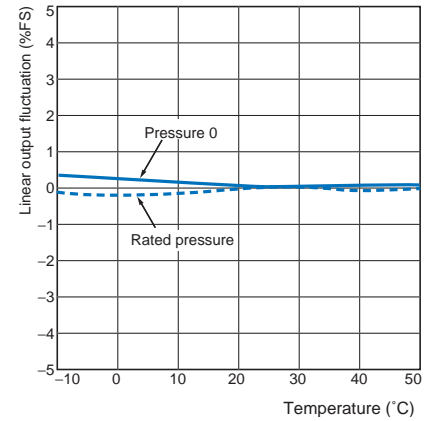
E8M-A1-S



E8M-10



E8M-N0

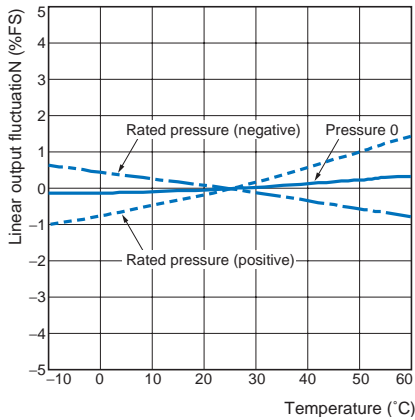


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I/O Circuit Diagrams

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Output configuration	Model	Output circuit
1 to 5 V linear output	E8MS-01 E8MS-10 E8MS-N0 E8MS-N1	
	E8M-A1-S	
	E8M-10 E8M-N0	

* Input for lighting the power supply indicator.
5 V supplied: lit, 0 V: not lit

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Controller

Output configuration	Model	Output circuit
NPN output	E8M-MP8	

Note: Bk-Black, Be-Blue, P-Pink, Bn-Brown

Note: The wire colors shown on the left are the wire colors of E89-M5-S (Controller power supply/output connector cables).

E8F2

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E8Y

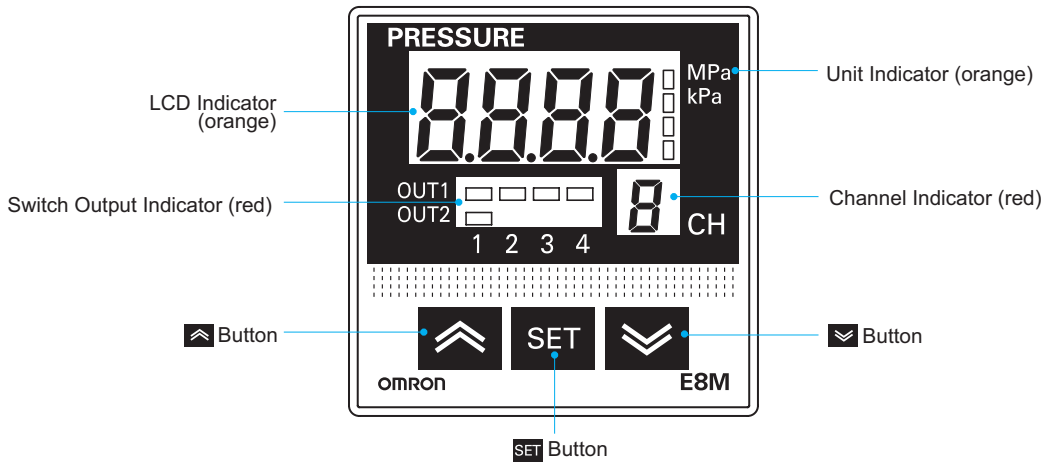
E8Y-□-F□

E8MS/E8M

Nomenclature

Pressure Sensor Controller

E8M-MP8



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Switch output indicator (red): Output OUT1 (CH1~ 4), OUT2 (only CH1) are lit up when ON
LCD indicator (orange): Present pressure, state of setting mode, unit, and error code are indicated.

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▲ Button: The values and ON/OFF specification of mode are increased by pressing the Up button.
▼ Button: The values and ON/OFF specification of mode are decreased by pressing the Down button.

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SET Button: Used for modification of each mode and selection of specification.

Other Information

Unit indicator (orange): The unit, which is selected, is lit up. Available SI units: MPa and kPa.

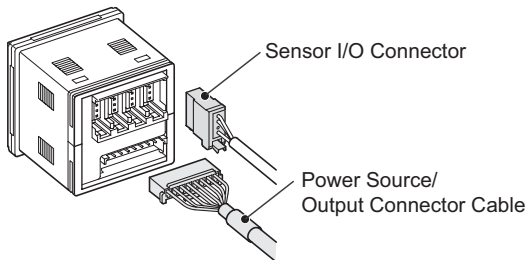
Channel indicator (red): The selected channel (CH1 ~ CH4) is lit up.

Accessories

Accessory Panel Mount Adapter Y92F-37-S
 (M3×8L (2 units))

Mounting Options

Power Source Output Connector Cable (2 m). . . . E89-M5-S



Front Wire Protector Y92A-40-S

□48 Conversion Adapter Y92F-48-S

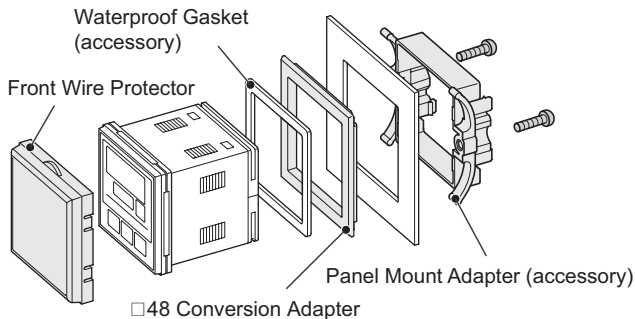
(For K3C Series panel size, install E8M-MP8 Adapter)

E8F2

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E8Y

E8Y-□-□



Safety Precautions

Refer to *Warranty and Limitations of Liability* on page F-2.

WARNING

This product is not designed or rated for ensuring safety of persons. Do not use it for such purpose.



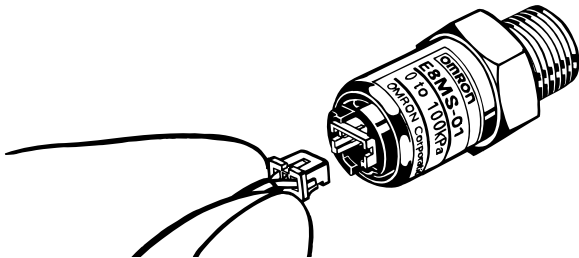
Precautions for Correct Use

Do not use this product in atmospheres or environments that exceed product ratings.

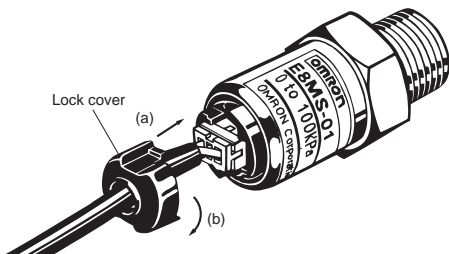
Installation

Connecting and Locking the E8MS Sensor I/O Connector (E89-M4)

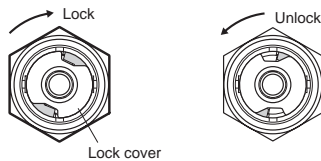
(1) Hold both ends of the female connector connected to the Sensor I/O Connector so that the protrusion on the female connector faces upward, orientate the hole in the male connector on the Sensor upwards, and insert the female connector into the hole until the protrusion clicks in.



(2) A lock cover is slid through the Sensor I/O Connector to prevent it from coming free due to vibration or shock. Insert the lock cover facing in the correct direction (a) as shown in the following figure, and rotate it clockwise (b) until it clicks in.



(3) To unlock the connector, rotate the lock cover counterclockwise until it clicks, then pull it towards you. To disconnect the connector, hold both ends of the connector, then pull it towards you.



Note: Forcibly pulling the cable to disconnect the connector may damage the pressure-welded portion. Be sure to hold both ends of the connector when disconnecting it.

Other Installations

E8MS-□□/ E8M-10

- (1) The pressure-introducing section (aluminum for E8MS, SUS304 for E8M) is fixed with tapered R(PT)1/8 male screws and M5 female screws.
- (2) When using tapered screws, use tapered Rc(PT)1/8 female screws. Wrap the tapered R(PT)1/8 male screws with sealing tape to prevent any leakage. Tighten the male screws to a torque no more than 3.9 N·m.
- (3) Tighten M5 female screws to a torque no more than 1 to 1.5 N·m.
- (4) When tightening a screw, hold by its hexagonal head, not by its body.

E8M-N0

- (1) The pressure port (SUS304) is fixed with M5 male screws.
- (2) Tighten male screws to a torque no more than 1 to 1.5 N·m.
- (3) When tightening a male screw, hold by its hexagonal head, not by its body.

E8M-A1

- (1) The pressure port (SUS303) is fixed with M5 female screws (7 mm deep).
- (2) Tighten screws for the pressure port to a torque no more than 1 to 1.5 N·m.
- (3) M4 female screws are used for the product mounting sections.
- (4) When mounting the product, tighten the screws while holding a metal part of the product, not a resin part.
- (5) Tighten the product mounting screws to a torque no more than 1.2 N·m.
- (6) If the positive pressure section is released and positive pressure is applied to the negative pressure section, a positive pressure may be displayed.

E8M-MP8

- (1) Install the Sensor horizontally.
- (2) The recommended panel thickness is 0.5 to 8 mm.
- (3) Do not install the Sensor in an environment subject to strong vibration or shock.
- (4) Do not install the Sensor under dusty conditions.
- (5) Do not install the Sensor in an environment subject to corrosive gases, particularly sulfide and ammonia gases.
- (6) Do not install the Sensor near equipment that generates strong high-frequency noise such as high-frequency welders or sewing machines.

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E8Y

E8Y-□-□

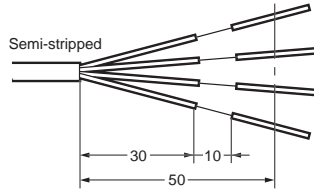
E8MS/E8M

■ Installation

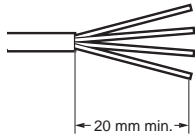
Connector Assembly Procedure

1. Processing the Sensor I/O Connector Cable End

(1) The cable end is semi-stripped.



(2) Cut the ends as shown in the illustration on the right, and do not peel the shield.



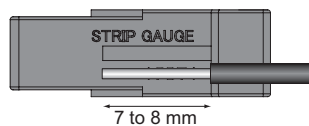
2. Fitting Controller Conductors to Cable Connector Cover

(1) Terminal numbers are engraved on the cover. Refer to the following and be sure that these terminal numbers correspond to the wire colors correctly.

Model	E89-M4-S	E89-M3-S
Terminal No.	I/O code	
1	Black (Output)	
2	---	Pink (LED lighting input)
3	Brown (Vcc)	
4	Black (IN: 1 to 5 V)	

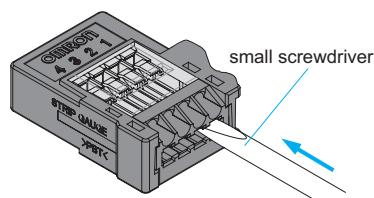
Preparation of Electric Wire

The coating of the wire is cut and peeled, showing 7 to 8 mm of stranded wire. Twirl the stranded wire and inserted into the side with "STRIP GAUGE" indicated on it.

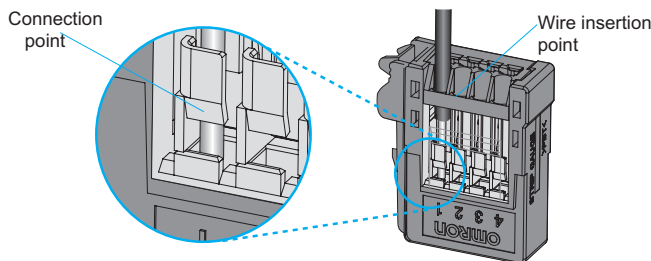


Connection Procedure

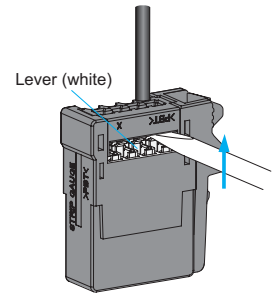
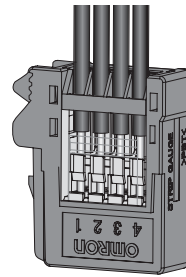
1. Press the negative bar, push the stranded wire in and lock it.



2. The open electric wire is inserted to the inner part. The coating section of the wire is also entered into the electric line insertion opening. Please verify that the lead wire section point passes the wiring section.



3. The removable point is inserted with negative bar, and the lever is pulled back lightly. The control lever returns when a click sound is heard.



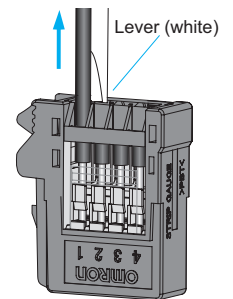
4. Lastly, verify the below:

- The lever is being pulled back lightly.
- Verify again Point (2). (There is slight resistance when the electric wire is pulled lightly.)

Connected Cancellation Procedure

1. The control lever is pushed in and electric wire is being pulled out.

2. After completion of connection cancellation, please ensure that the control lever is returned to its original position. If wiring job is to be continued, please do not return the control lever.



Others

- (1) Do not use the Sensor in an environment subject to corrosive or combustible gases.
- (2) Do not use the Sensor alongside a high-tension voltage line or power line.
- (3) Do not expose the Sensor to water.
- (4) Be sure to use the Sensor under the rated pressure.
- (5) Do not insert any wire into the pressure port. Doing so may damage the pressure elements and cause a malfunction.
- (6) Do not apply any tensile strength in excess of 20N for E8MS, 30N for E8M to the cables or connectors.
- (7) Compressor oil and air-borne water may form droplets at the pressure receiving section of the Sensor. Remove the oil and water using an air filter to prevent damage to Sensor elements.
- (8) Do not pull the cables. When removing the connectors for external connection, be sure to use the lock lever.

Pressure Sensors

Sensing Guide

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Other Information

E8F2

E8MS/E8M

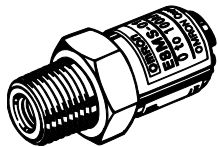
E8Y

E8Y-C-FD

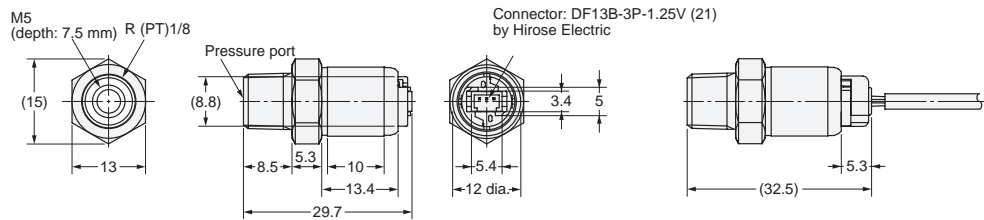
Dimensions

Sensors

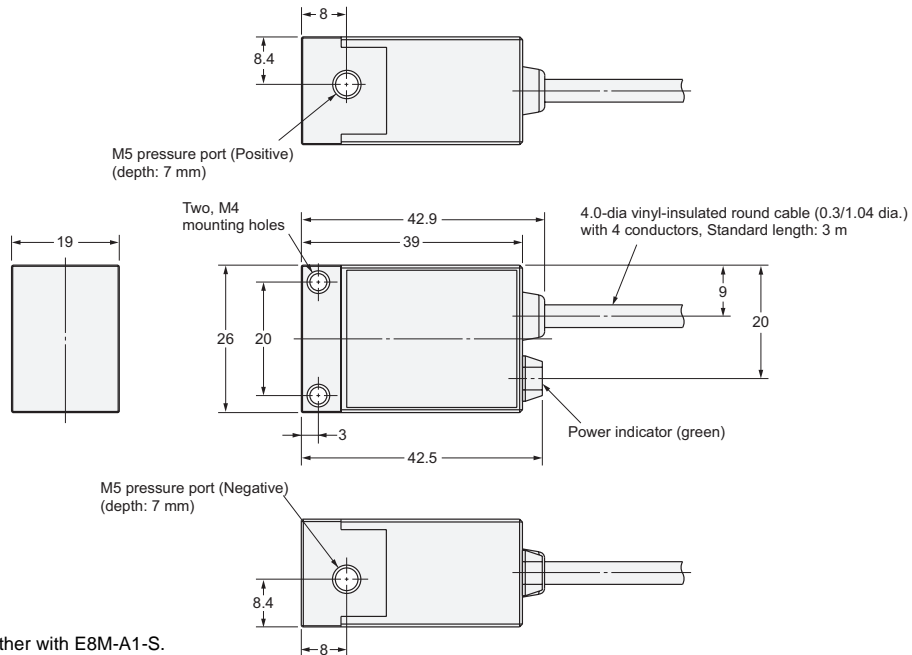
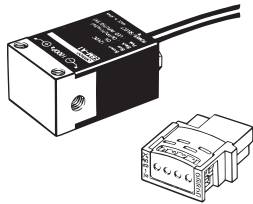
E8MS-01
E8MS-10
E8MS-N0
E8MS-N1



Connection with E89-M4 Sensor I/O Connector

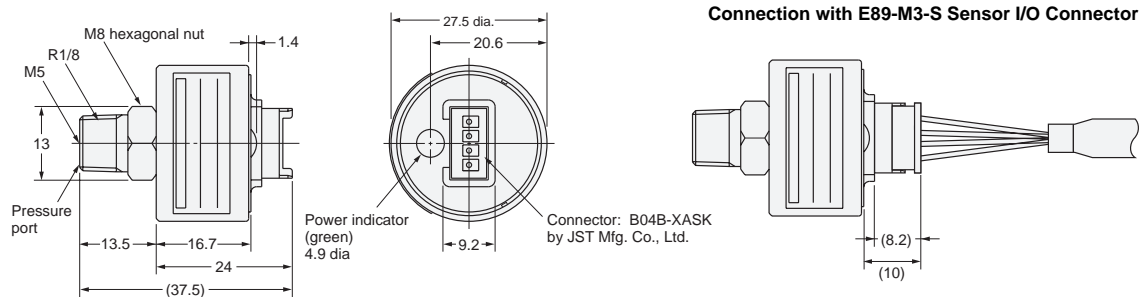
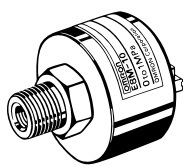


E8M-A1-S

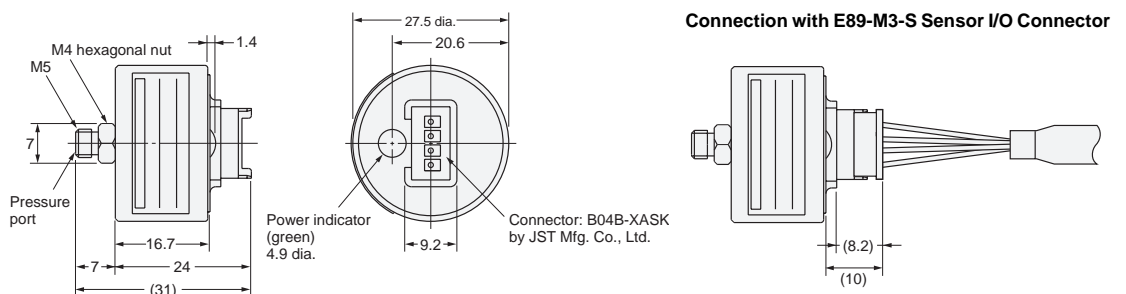
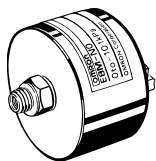


Note: One XN2A-1430 is supplied together with E8M-A1-S.

E8M-10



E8M-N0



Pressure Sensors

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Other Information

E8F2

E8MS/E8M

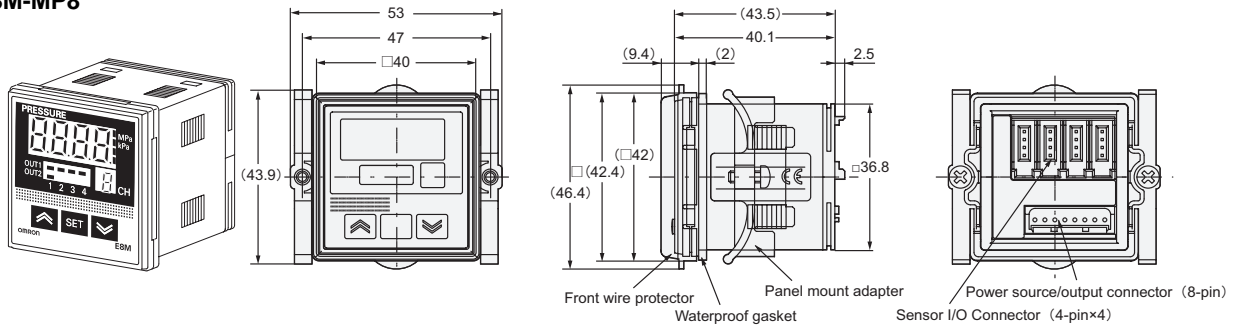
E8Y

E8Y□□□

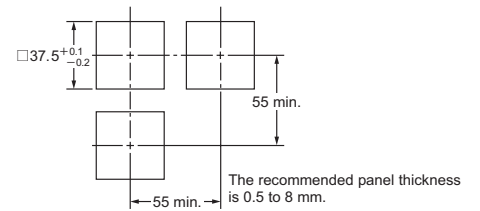
E8MS/E8M

Controller

E8M-MP8



Panel Cut Dimensions



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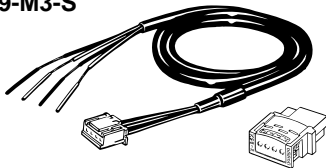
Accessories (Order Separately)

Sensor I/O Connectors

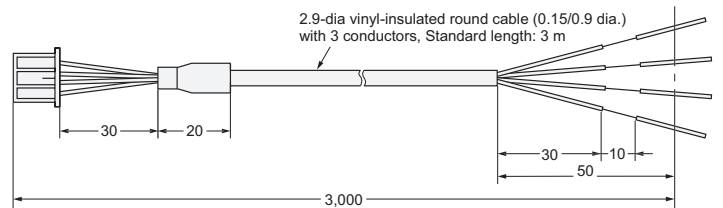
Other
Information

For the E8M Only

E89-M3-S

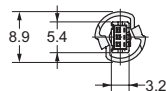
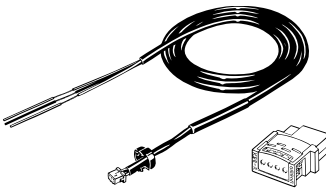


Note: One XS8A-0442 is provided with the E89-M3.

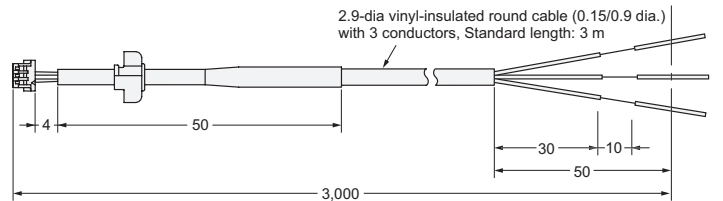


For the E8MS Only

E89-M4-S

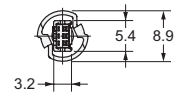
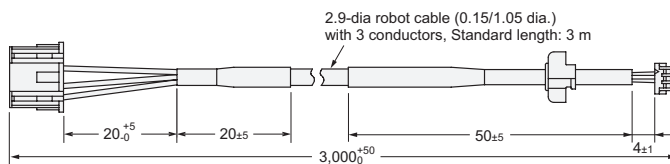
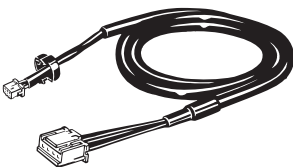


Note: One XS8A-0442 is provided with the E89-M4.

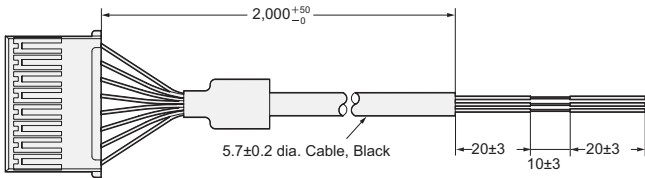


For E8MS/E80-C2 Connection

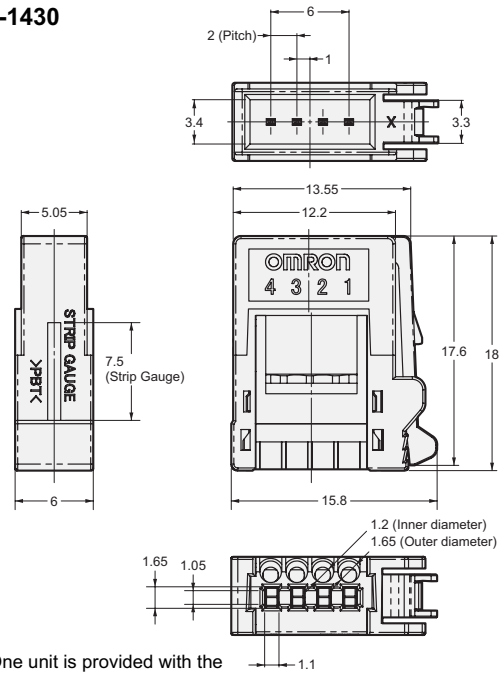
E89-M4-1



Power Source/Output Connector Cable E89-M5-S

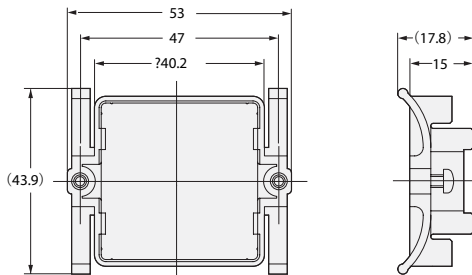


Pin Controller Connector XN2A-1430



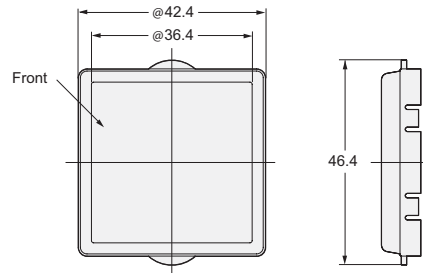
Note: One unit is provided with the E89-M3-S or E89-M4-S.

Adapter Y92F-37-S

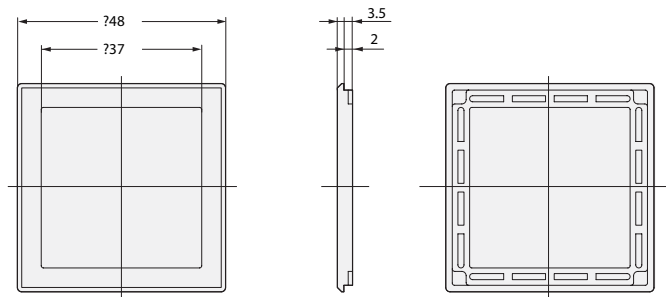


Note: One unit is provided with E8M-MP8.

Front Wire Protector Y92A-40-S



@48 Conversion Adapter Y92F-48-S



Cat. No. F832-E1-02

In the interest of product improvement, specifications are subject to change without notice.

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Other
Information

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E8MS
/E8M

E8Y

E8Y-e-F@



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