OMRON

Silicon Wafer Mapping Sensor

F3M-S

Allows Simultaneous Mapping of up to 25 Silicon Wafers

- Economical, one sensor detects most wafer types, including dummy wafers
- Models match wafer sizes of 300 mm, 200 mm and 150 mm
- Automatic and remote teaching capability
- Self-diagnostic functions reduce downtime

Ordering Information

Applicable wafer size	Number of cassette slots	Function	Remarks	**Part number**
6 inches (4.76-mm pitch)	25	Self-diagnosis	---	**F3M-S625**
	26	---	---	**F3M-S626**
8 inches (6.35-mm pitch)	25	Self-diagnosis	---	**F3M-S825**
	26	---	---	**F3M-S826**
12 inches (10-mm pitch)	13	Self-diagnosis	CE marking	**F3M-S1213**
	25	Self-diagnosis	CE marking	**F3M-S1225**

Application Examples

Detects Transparent Glass Wafers with a Transparency of 92% (F3M-S6□ and F3M-S8□)

The F3M-S allows the mapping of cassettes that have both silicon wafers and glass wafers. The F3M-S also accurately detects dummy wafers in the carrier used to test coating or processing tolerances.

Automatic Teaching Saves Setting Time

Remote Teaching Available

The F3M-S has an automatic teaching function that ensures easy adjustments within a minimal time. The remote teaching function allows quick, on-the-fly set up.

Answer-back Alarms for Setting Errors and Self-diagnostic Alarms for Operation Errors

These alarms help reduce system downtime and shorten troubleshooting time.

Note: The self-diagnostic output function is not incorporated by the F3M-S826/-S626.

Static Electricity Protection

OMRON's optical system, including an emitter and receiver, prevents Sensor malfunction and damage by protecting the Sensor from static electricity that may be charged on semiconductor wafers at the time of mapping.

Specifications

■ RATINGS/CHARACTERISTICS

Part number		F3M-S625	F3M-S626	F3M-S825	F3M-S826	F3M-S1213	F3M-S1225
Sensing object		6-inch (5-inch) semiconductor silicon wafers and transparent wafers (with transparency of 92% max.) (See Note.)		8-inch semiconductor silicon wafers and transparent wafers (with transparency of 92% max.) (See Note.)		12-inch semiconductor silicon wafers and 12-inch SIC wafers (with transparency of 30% max.)	
Number of channels		25	26	25	26	13	25
Optical axis pitch		4.76 mm		6.35 mm		10 mm	
Optical axis width		1.5 mm					
Light source		Infrared LED (940 nm)					
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.					
Current consumption		120 mA max.					
Output	Control output	Load power supply voltage: 30 VDC Load current: 20 mA max. (residual voltage: 1 V max.) Inflow current: 20 mA Parallel output from all channels, NPN open collector Dark-ON operation					
	Answer-back output	When remote teaching is ON, pin 28 will be used for this function.					
	Self-diagnostic output	Load power supply voltage: 30 VDC max. Load current: 20 mA max. (Residual voltage: 1 V max.) Inflow current: 20 mA NPN open collector	---	Load power supply voltage: 30 VDC max. Load current: 20 mA max. (Residual voltage: 1 V max.) Inflow current: 20 mA NPN open collector	---	Load power supply voltage: 30 VDC max. Load current: 20 mA max. (Residual voltage: 1 V max.) Inflow current: 20 mA NPN open collector	
Indicators	Power	Green indicator is ON when power is being supplied.					
	Warning	Red indicator is ON under the following conditions: Teaching, no sensing object, insufficient light, or error.					
Response time		10 ms max.					
Control output interrupt input		All outputs interrupted: GND and control output interrupt input terminals are short-circuited and 0-V short-circuit current is 1 mA max. Output interrupt reset: GND and control output interrupt input terminals are opened or the voltage is between 9 V and the working power supply voltage.					
Remote teaching input	ON	GND and remote input terminals are short-circuited and 0-V short-circuit current is 1 mA max.					
	OFF	GND and remote input terminals are opened or the voltage is between 9 V and the working power supply voltage.					
Teaching check function		Orange LED indicator					
Ambient temperature	Operating	0°C to 40°C (32°F to 104°F) with no icing or condensation				0°C to 55°C (32°F to 131°F) with no icing or condensation	
	Storage	-25°C to 60°C (-13°F to 140°F)				-25°C to 60°C (-13°F to 140°F)	
Relative humidity		35% to 85% with no condensation					
Ambient illumination		Fluorescent lamp: 1,500 ℓx max.					
Noise resistance		Power supply line: ±480 V in normal mode with noise simulator					
		Static electrical noise: No malfunction or destruction at ±8 kV					
Vibration resistance		10 to 55 Hz, 0.5-mm double amplitude for 2 hrs each in X, Y, and Z axes					
Shock resistance		300 m/s^2 (30G) for 3 times each in X, Y, and Z axes					
Degree of protection		IEC60529 IP40					
Connection		Preleaded cable (standard cable length: 100 mm)				Connector	

(This table continues on the next page.)

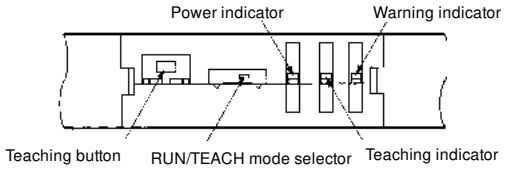
Specifications Table – continued from previous page

Part number		F3M-S625	F3M-S626	F3M-S825	F3M-S826	F3M-S1213	F3M-S1225
Weight (packed state)		Approx. 110 g				Approx. 200 g	Approx. 300 g
Material	Optical axis	Polycarbonate					
	Case	ABS				ABS, aluminum (alumite treated/clear finish)	
	Cable	Vinyl-insulated, bending type				---	
Accessories		Spacer and instruction manual				Instruction manual	

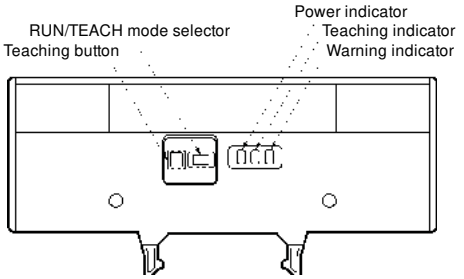
Note: Operating conditions are restricted for the detection of transparent wafers. Contact your OMRON representatives for details.

■ AUTOMATIC TEACHING FUNCTION

F3M-S6□ and F3M-S8□



F3M-S12□



The remote or manual automatic teaching of the F3M-S is possible with the following two sensitivity settings:

1. Max. Sensitivity Setting: Detects semiconductor silicon wafers, translucent dummy wafers, and SIC wafers.
2. Teaching with No Target Object: Detects transparent wafers (except F3M-S12□).

The sensitivity is set to maximum before shipping. Refer to the Instruction Manual when setting the sensitivity of the F3M-S.

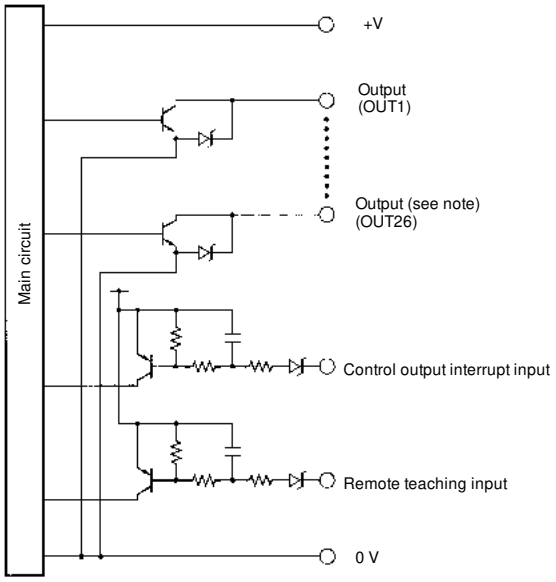
■ ANSWER-BACK FUNCTION AND SELF-DIAGNOSTIC FUNCTION

The F3M-S has an answer-back function to warn the user about setting errors and a self-diagnostic function (except F3M-S626 and F3M-S826) to warn the user about operational errors.

- Answer-back Function: Normal or error teaching output turns ON.
- Self-diagnostic Function: Warning output turns ON for a decrease in optical input.

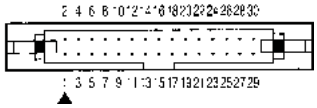
Operation

■ OUTPUT CIRCUIT DIAGRAM



Note: When remote teaching is input, this output will be for answer-back output. For Sensors other than F3M-S626/F3M-S826, this output is for self-diagnostic output. For F3M-S626/F3M-S826, this output is OUT26.

■ I/O TERMINAL ARRANGEMENT



Pin assignment

Pin	Assignment	Pin	Assignment
1	GND (0 V)	16	OUT14
2	V_{CC} (12 to 24 V)	17	OUT15
3	OUT1	18	OUT16
4	OUT2	19	OUT17
5	OUT3	20	OUT18
6	OUT4	21	OUT19
7	OUT5	22	OUT20
8	OUT6	23	OUT21
9	OUT7	24	OUT22
10	OUT8	25	OUT23
11	OUT9	26	OUT24
12	OUT10	27	OUT25
13	OUT11	28	Self-diagnostic output/OUT26 (see note 1)
14	OUT12	29	Control output interrupt input
15	OUT13	30	Remote teaching input

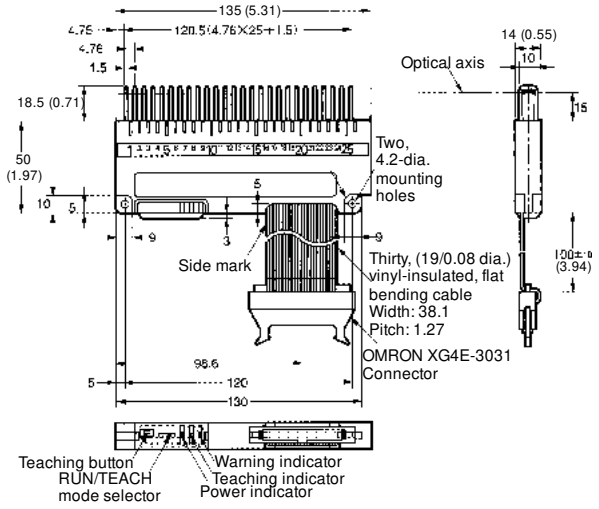
Note: 1. Pin 28 will have answer-back output only when remote teaching input is turned ON. Otherwise, for Sensors other than F3M-S626/F3M-S826, this output is for self-diagnostic output. For F3M-S626/F3M-S826, this output is OUT26.

2. For the F3M-S1213, terminals for pins 16 to 27 are not used.

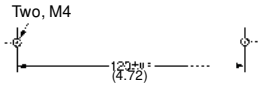
Dimensions

Unit: mm (inch)

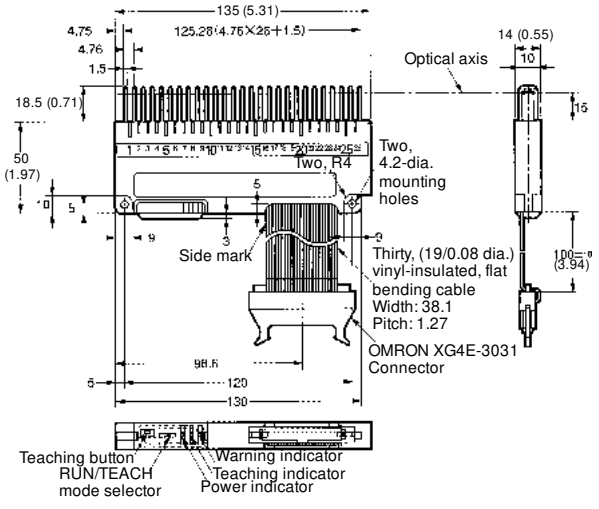
■ F3M-S625



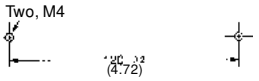
Mounting Dimensions



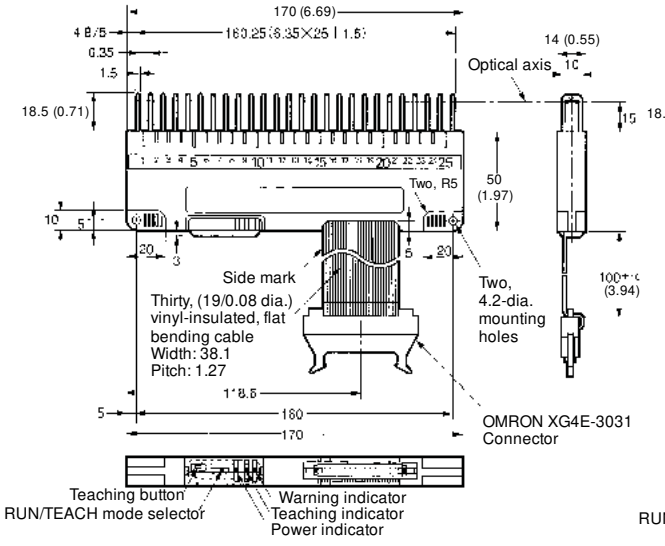
■ F3M-S626



Mounting Dimensions



■ F3M-S825



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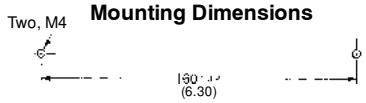
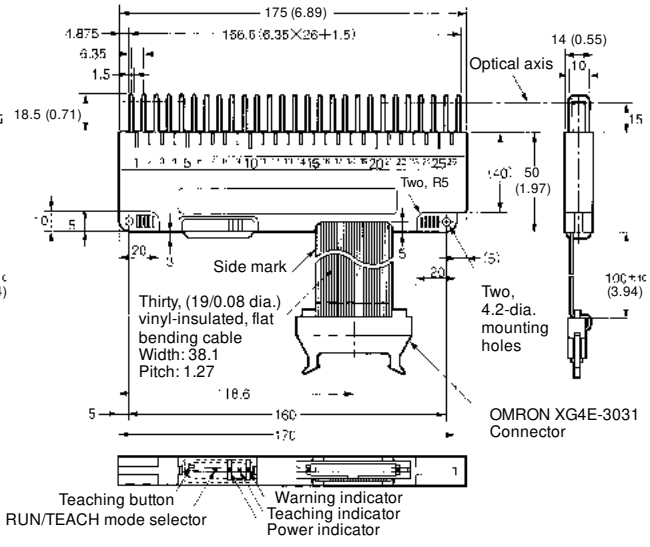


■ F3M-S826



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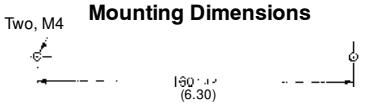
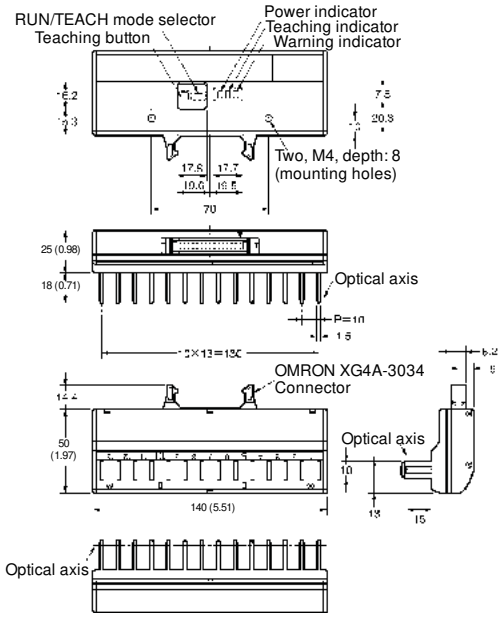
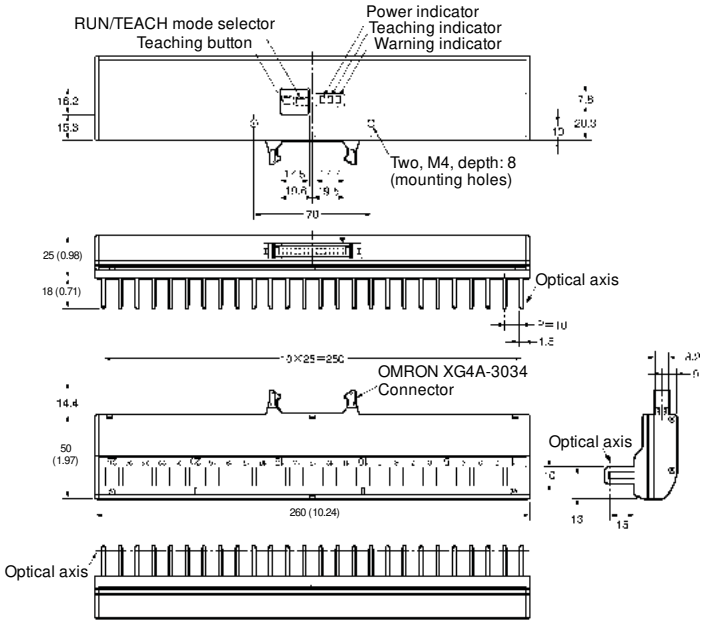


■ F3M-S1213



■ F3M-S1225



Precautions

■ CORRECT USE

Avoid Damage to the F3M-S

- Do not use the F3M-S at a voltage that exceeds the rated voltage range.
- Do not make mistakes in wiring, such as mistakes in polarity.
- Do not short-circuit the load.
- Do not connect AC to the F3M-S.

■ INSTALLATION/ENVIRONMENT

Do NOT use the F3M-S in the following places:

- Places exposed to direct sunlight.
- Places with high humidity that may cause condensation.
- Places with corrosive gas.
- Places with vibration or shock directly affecting the Sensor.

■ CONNECTION AND MOUNTING

- A maximum of 24 VDC+10% can be imposed on the F3M-S. Check that the voltage of the power supply is within the permissible range before turning on the F3M-S. The power supply must be constructed so that the secondary circuit is insulated with an isolating transformer.
- Do not wire power lines or high-tension lines within the same conduit with the lines of the F3M-S, or the F3M-S may be damaged or malfunction due to induction. You must wire the lines of the F3M-S separate from power lines or high-tension lines or laid in an separate, shielded conduit.
- Avoid mechanical impact when mounting the F3M-S, or the water-resistant properties of the F3M-S will be reduced.

■ CLEANING

Do not attempt to clean the F3M-S using paint thinner, to avoid damaging the surface of the F3M-S.

■ POWER SUPPLY

If a standard switching power supply is connected to the F3M-S, be sure to ground the FG (frame ground) and G (ground) terminals of the power supply. The F3M-S may malfunction due to switching noise that will be generated from the power supply if these terminals are not grounded.

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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