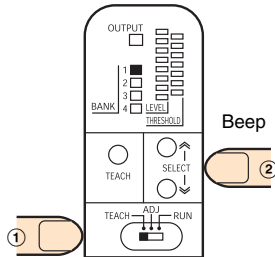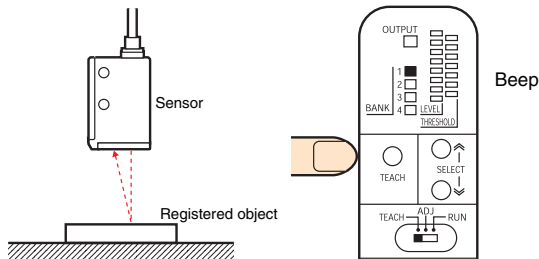# E3MC

ON/OFF Models

Settings

One-output Models (E3MC-A□□/E3MC-X□□/E3MC-Y□□)

(1) Bank Selection

Set the Mode Selector Switch to the TEACH mode and then select the BANK using the SELECT button.
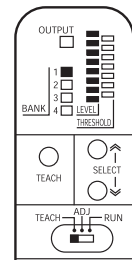
(2) Color Registration

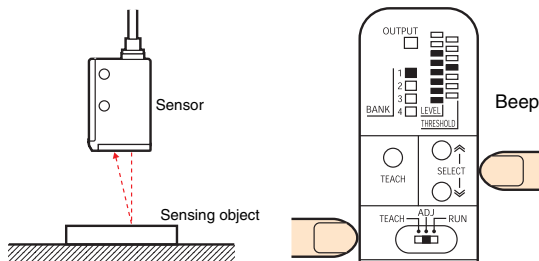Locate the registered object at the detection point and press the TEACH button.

OK →

No Good →

All the red threshold indicators will flash if registration has not been completed. Refer to *Safety Precautions*.
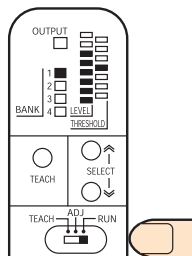→**E3MC**

All the green detection level indicators are ON.
The threshold is set to 4.

(3) Threshold Adjustment (If Required)

Press the SELECT button in ADJ mode with or without the sensing object located at the detection point. The bank selected in the TEACH mode or RUN mode will become the bank for the ADJ mode.

(4) Operation

The detection operation is performed in RUN mode.
Use bank selector input to select the registered color.

Detection Level and Tolerance
As the detected color becomes closer to the registered color, the number of lit detection level indicators increase. The control output of the E3MC will be ON if the detection level exceeds the threshold level and OFF if the detection level does not exceed the threshold level (when set to conformity output mode).
Set the threshold to a higher level for highly-precise color discrimination and to a lower level to ignore minor tint differences or dirt retention.

Detection level

Operation indicator: ON
Control output: ON

Tolerance

Threshold

Operation indicator: OFF
Control output: OFF

Threshold
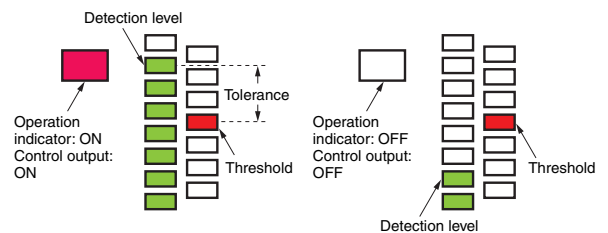
Detection level

Four-output Models (E3MC-MA□□/E3MC-MX□□/E3MC-MY□□)

(1) Channel Selection

Beep
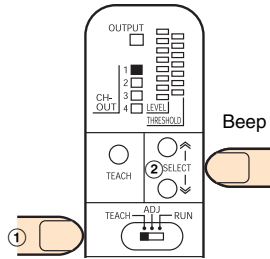
Set the Mode Selector Switch to the TEACH mode and then select the channel using the SELECT button.

(2) Color Registration

Sensor

Registered object

Beep

Locate the registered object at the detection point and press the TEACH button.

No Good

All the red threshold indicators will flash if registration has not been completed. Refer to *Safety Precautions*. →**E3MC**

OK

All the green detection level indicators are ON. The threshold is set to 4.

Detection Level and Tolerance

As the detected color becomes closer to the registered color, the number of lit green detection level indicators increases. The control output of the E3MC will be ON if the green detection level indicators exceed the red threshold level indicators and OFF if the detection level indicators do not exceed the threshold level indicators (when set to conformity output mode).

Set the threshold to a higher level for highly-precise color discrimination and to a lower level to ignore minor tint differences or dirt retention.
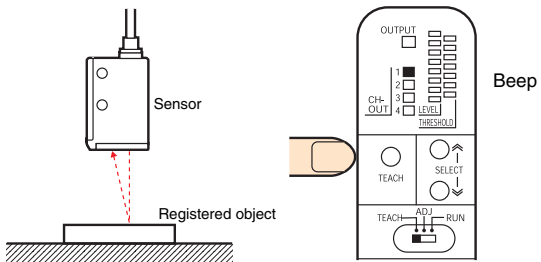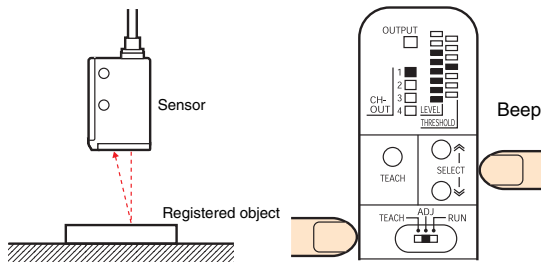
Detection level

Tolerance

Operation indicator: ON
Control output: ON

Threshold

Operation indicator: OFF
Control output: OFF

Threshold

Detection level

(3) Threshold Adjustment (If Required)

Sensor

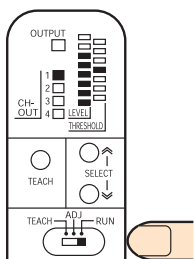Registered object

Beep

Press the SELECT button in ADJ mode with or without the sensing object located at the detection point. Adjustment is possible without any sensing object.

The channel selected in the TEACH mode or RUN mode will become the channel for the ADJ mode.

(4) Operation

For indicating detection level and threshold for other channels.

Press the SELECT button.

For checking which channel is indicated with the operation indicator.
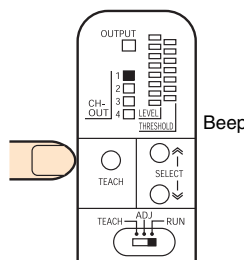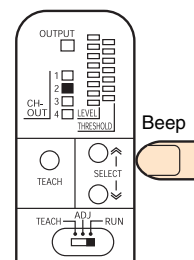
Press the TEACH button.

The detection operation is performed in RUN mode. The ON/OFF status of each channel is displayed on the channel indicators. Doubly displayed channels due to button input can be checked and selected.

Beep

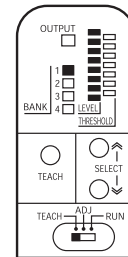Displays the channel whose detection level is currently indicated in the channel indicator for three seconds.

Beep

Displays the selected channel in the channel indicator for three seconds and indicates detection level and threshold of the selected channel.

Registered Color Selection (Bank Selection Input)

One-output Models Only

The E3MC in RUN mode allows bank selection with external bank selection input by combining the bank selection input 1 (yellow) and input 2 (green). The selected bank is indicated with the bank selection indicator.

NPN (E3MC-A11/-X11/-Y11)

Bank	Input 1	Input 2
1	OPEN	OPEN
2	GND	OPEN
3	OPEN	GND
4	GND	GND

PNP (E3MC-A41/-X41/-Y41)

Bank	Input 1	Input 2
1	OPEN	OPEN
2	Vcc	OPEN
3	OPEN	Vcc
4	Vcc	Vcc

External Synchronous Input Function

The control output status will be held if the input of the external synchronous input terminal (pink) is set to ON.
External synchronous input is valid in RUN or ADJ mode. As for the 4-output models, this function applies to the output of all the channels.
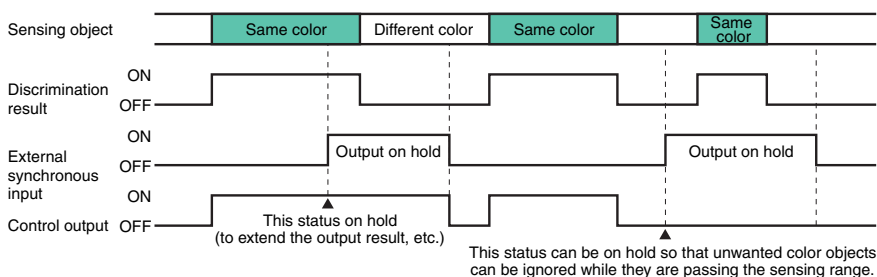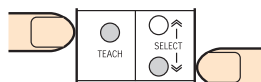

Remote Teaching (Remote Control Function)

Mode Setting

When using the remote control function of the Sensor for remote teaching, be sure to set the Sensor to mode B.
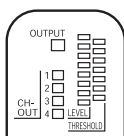
Setting Method

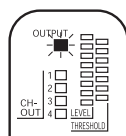Apply power to the Sensor while pressing the SELECT DOWN button and TEACH button together.

Checking Method

Mode A or B of the E3MC will be displayed for 3 s after mode setting. When the mode selector switch is set to TEACH, the mode can be checked from the operation indicator.

Mode A: Operation indicator is OFF.

Mode B: Operation indicator is ON.

Note: 1. The Sensor is set to mode A before shipping.
2. The current mode selected does not change after the Sensor is turned OFF.
3. The remote control function is available in RUN mode and ADJ mode only.
4. The E3MC-M□ has three outputs in mode B and no external synchronous input will be accepted.
5. The same switching procedure can be used for changing to mode A.

Remote Teaching Method

1 Remote teaching with manual input through a mechanical switch

Short-circuit the remote control input for 1.5 s or more to either of the following terminals according to the E3MC model.

NPN type (E3MC-□□11)	Short-circuit to GND (blue) terminal.
PNP type (E3MC-□□41)	Short-circuit to Vcc (Brown) terminal.

2 Remote control of teaching, bank selection, and channel selection through the PLC or PT

Input one of the following signals as a remote control input. There will be an answer-back output for 0.3 s if the signal is correctly received.

No.	Control signal	E3MC-□	E3MC-M□□
1	ON / OFF — 0.3 s	Bank 1 selected.	Channel 1 selected.
2	ON / OFF — 0.6 s	Bank 2 selected.	Channel 2 selected.
3	ON / OFF — 0.9 s	Bank 3 selected.	Channel 3 selected.
4	ON / OFF — 1.2 s	Bank 4 selected.	Not used.
5	ON / OFF — 1.5 s	Teaching of selected bank.	Teaching of selected channel.

The following is an example of ladder programming.

TIM000 set value
No. 1: 0003
No. 2: 0006
No. 3: 0009
No. 4: 00012
No. 5: 00015

Input: 00000
Output: 00100
Others: Work bits

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OMRON
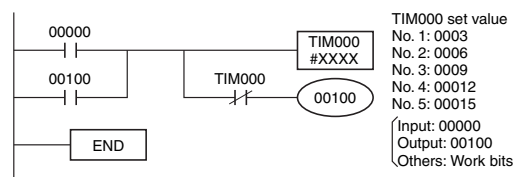
The following is an example of a timing chart of teaching after bank selection.

3 | Remote control of threshold adjustments through the PLC or PT

Input either one of the following signals as remote control input. There will be an answer-back output for 0.3 s if the signal is correctly accepted.

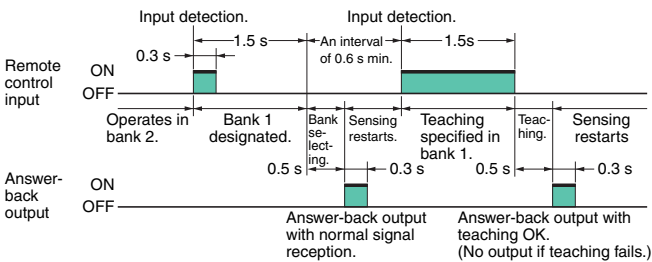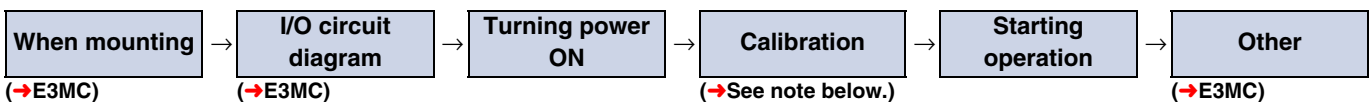| No.	Control signal	All E3MC models	Threshold and Display
6	0.3 s 0.3 s 0.3 s ON OFF	Threshold 1 selected.	Threshold 1
7	0.3 s 0.6 s 0.3 s ON OFF	Threshold 2 selected.	Threshold 2 / Threshold 3
8	0.3 s 0.9 s 0.3 s ON OFF	Threshold 3 selected.	Threshold 4 / Threshold 5
9	0.3 s 0.3 s 0.6 s ON OFF	Threshold 4 selected.	Threshold 6 / Threshold 7
10	0.3 s 0.6 s 0.6 s ON OFF	Threshold 5 selected.	
11	0.3 s 0.3 s 0.9 s ON OFF	Threshold 6 selected.	
12	0.6 s 0.3 s 0.3 s ON OFF	Threshold 7 selected.	

The following is an example of ladder programming for setting control signals. Full control of the E3MC is possible using this function together with function 2.

TIM000, TIM001, TIM002 set values (XXXX, YYYY, ZZZZ)
No. 1: (0000, 0000, 0003)
No. 2: (0000, 0000, 0006)
No. 3: (0000, 0000, 0009)
No. 4: (0000, 0000, 00012)
No. 5: (0000, 0000, 00015)
No. 6: (0003, 0003, 0003)
No. 7: (0003, 0006, 0003)
No. 8: (0003, 0009, 0003)
No. 9: (0003, 0003, 0006)
No. 10: (0003, 0006, 0006)
No. 11: (0003, 0003, 0009)
No. 12: (0006, 0003, 0003)

Input: 00000
Output: 00100
Others: Work bits

Note:1.The permissible error of each signal pulse is ±0.1 s max.
2.A minimum interval of 0.6 s is required between signals.
3.Threshold 4 is set after teaching.

Analog Output Models

The following is the setting procedure for the E3MC-☐81.

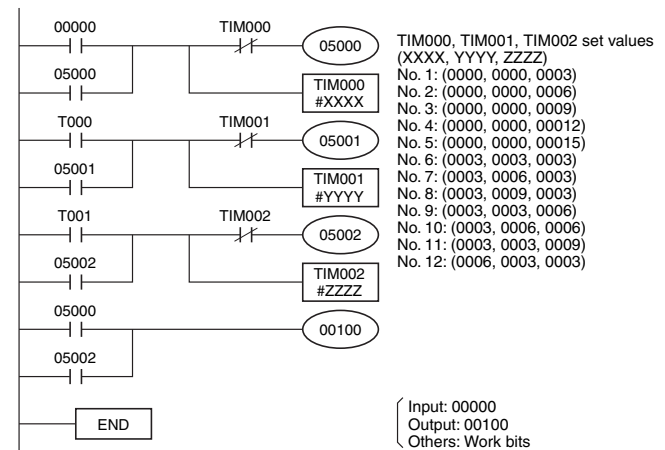| When mounting	→	I/O circuit diagram	→	Turning power ON	→	Calibration	→	Starting operation	→	Other
(➔E3MC)		(➔E3MC)				(➔See note below.)				(➔E3MC)

Make settings in this order to perform the operation.

Calibration

This Sensor is equipped with a calibration function to align the RGB output voltages using a reference white object. The No. 4 terminal (yellow) is used for A and X types, and the outputs are aligned to 10 V. The No. 1 terminal (white) is used for the Y type, and the outputs are aligned to 7 V.
(1)Place the reference white object in the measurement location.
(2)Input a signal of 24 V, 1 ms min. to the calibration terminal.
(3)The calibration requires approximately 600 ms.
(4)Check the RGB output.
(5)Remove the reference white object, and begin the measurement operation.

Note
- If any color other than white is used for the calibration, the output values will not be aligned and the operation will be canceled, with the Unit returning to its original state.
- If the A or X type calibration is performed using the No. 1 terminal (white), the output value will be 7 V. This will not allow the Unit to be utilized to its full potential.
- If the Y type calibration is performed using the No.4 terminal (yellow), the output cannot be compensated, leading to insufficient operation. Be sure to use the No. 1 terminal (white).