Multi-maintenance Counter/Timer (DIN 72 x 72)

H8BM-R

CSM_H8BM-R_DS_E_5_1

Nine Built-in Counters/Timers to Measure Equipment Operating Cycles and Times and Forecast Maintenance Timing

- Provides up to nine counters or accumulative timers. (Counter and timer functions can be used at the same time.)
- Individual forecast outputs to indicate maintenance timing.
- Pre-forecast display and machine stoppage output provided.
- IP54 oil-proof type at setting area for resistance to oil and water.
- Separate digit keys to easily change settings.
- Compact, short-body: 72 × 72 × 79 mm (DIN).
- Key protection function prevents incorrect operation.
- Multiple outputs: NPN/PNP.
- Directly connectable to 2-wire DC sensors.
- Complies with UL and CSA.

The H8BM-R can be used as a multi-stage preset counter.

⚠ Refer to *Safety Precautions* on page 7.

Ordering Information

■ Multi-maintenance Counter/Timer

Preset stage	Nameplate lettering	Model
3-stage setting	Japanese	**H8BM-RA**
	English	**H8BM-RB**
1-stage setting	Japanese	**H8BM-RAD**
	English	**H8BM-RBD**

■ Accessories (Order Separately)

Name	Model
Hard Protective Cover (See note 1.)	**Y92A-72C**
Rubber Packing (See note 1.)	**Y92S-25**
Short-circuit plate (See note 2.)	**Y92S-26**

Note 1. A Hard Protective Cover and Rubber Packing are supplied with the Counter.
2. The H8BM-R□ is provided with short input as standard to achieve a Multi-stage Counter without having to use a short-circuit plate and external wiring.

■ Specifications

Item / Model	H8BM-RA/RB	H8BM-RAD/RBD
Classification	3-stage setting	1-stage setting
Mounting method	Flush mounting	
External connections	Screw terminals	
Degree of protection	IP54 oil-proof type (case front)	
Display mode	Up display	
Output mode	F mode (Operation continues even when setting is reached.)	
Reset system	External, manual resets	
Timer operation	Yes	
Input method	Voltage inputs: High and low signal voltages (count, reset, short, counter No. selection, I/O inhibit)	
Control output	No-contact outputs: RUN, forecast, machine stoppage	No-contact outputs: RUN, forecast
Display	Count, preset value, counter number, and error codes displayed on 7-segment LCD Mode, reset, I/O inhibit, re-monitor modes, and key protection displayed on LCD characters Output indication on LCD characters and LEDs	
LCD with backlight	Yes	
Built-in counter number	9 (counters 1 to 9) (See note 1.)	
Preset stage	3-stage (See note 2.)	1-stage (See note 3.)
Digits	Forecast value: 6 digits (999999) Pre-forecast value: –5 digits (See note 4.) Machine stoppage: +5 digits (See note 5.)	Forecast value: 6 digits (999999)
Time ranges	Forecast value: 99999.9 h (0.1 h or longer)/ 99999.9 s (0.1 s or longer) Pre-forecast value: –9999.9 h/–9999.9 s (See note 4.) Machine stoppage: +9999.9 h/+9999.9 s (See note 5.)	Forecast value: 99999.9 h (0.1 h or longer)/99999.9 s (0.1 s or longer)
Memory backup	EEPROM (Data can be written 100,000 times.), Backup time for power interruption: Approx. 10 years	

Note 1. Each channel operates on a separate I/O.
2. The 3-stage are pre-forecast, forecast, and machine stoppage.
Pre-forecast: Displayed only on LCD (no external output is provided).
Forecast: Displayed on LCD and LED and output (output for each counter).
Machine stoppage: Displayed on LCD and LED and output (output when the count value of one or more of counters 1 to 9 has reached its machine stoppage value).
3. This Counter operates on the forecast value only.
4. The pre-forecast value is set as a negative offset in respect to the forecast value.
5. The machine stoppage value is set as a positive offset in respect to the forecast value.

Specifications

■ Ratings

Rated supply voltage	24 VDC
Operating voltage range	85% to 110% of rated supply voltage (See note 1.)
Power consumption	Approx. 1.7 W (at 26.4 VDC)
Max. counting speed	30 Hz for count inputs 1 to 7, Switchable between 30 Hz and 500 Hz for count inputs 8 and 9
Min. counting input signal width	Count inputs 1 to 7: 16.7 ms (ON:OFF = 1:1) Count inputs 8 and 9: 16.7 ms/1 ms selectable (ON:OFF = 1:1) Reset input: 100 ms max. Short input: 30 ms max. Counter number selection input: 30 ms max. I/O inhibit input: 16.7 ms max.
One-shot time	20 ms (See note 2.)
Count, reset, short, counter number selection, and I/O inhibit input	Voltage input High level: 16 to 26.4 VDC Low level: 0 to 3 VDC (input resistance: approx. 2.2 kΩ)
Control output	Open-collector output: 100 mA max. at 30 VDC max.
Surrounding air temperature	−10 to +55°C (with no icing or condensation)
Ambient storage temperature	−25 to +65°C (with no icing or condensation)
Ambient operating humidity	25% to 85%
Case color	Dark gray (Munsell 5Y3/1)

Note 1. Ripple content: 20% max.
2. This signal is output as a carry signal when the Counter is used as a total counter.

■ Characteristics

Insulation resistance		100 MΩ min. (at 500 VDC) (between current-carrying terminals and exposed non-current-carrying metal parts)
Dielectric strength voltage		1,000 VAC, 50/60 Hz for 1 min (between current-carrying terminals and exposed non-current-carrying metal parts)
Impulse withstand voltage		1 kV (between power terminals) 1.5 kV (between current-carrying terminals and exposed non-current-carrying metal parts)
Noise immunity		±480 kV (between power terminals) and ±480 V (between input terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)
Static immunity		Malfunction: 8 kV; destruction: 15 kV
Vibration resistance	**Destruction**	10 to 55 Hz with 0.75-mm single amplitude, 2 hours each in three directions
	Malfunction	10 to 55 Hz with 0.5-mm single amplitude, 10 minutes each in three directions
Shock resistance	**Destruction**	300 m/s² 3 times each in 6 directions
	Malfunction	200 m/s² 3 times each in 6 directions
Weight		Approx. 250 g (Counter only)

■ Applicable Standards

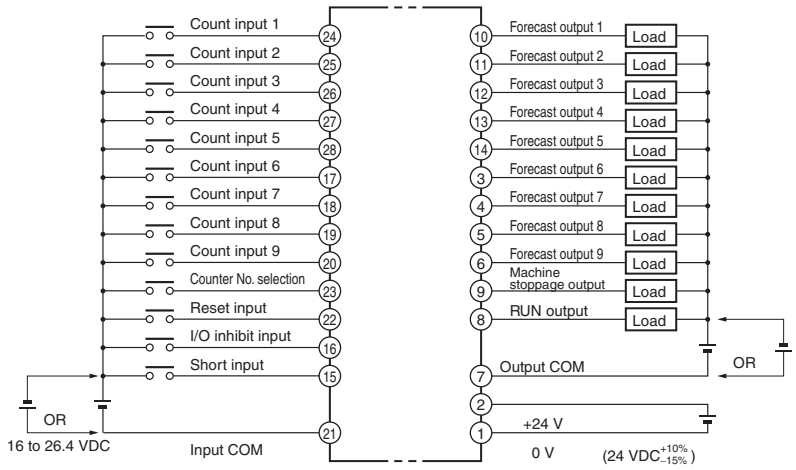
Safety standards	UL508 (See note.)/CSA C22.2 No.14 EN61326	
EMC	(EMI)	EN61326
	Emission Enclosure:	EN61326 (EN55011 Group 1 Class A)
	Emission AC Mains:	EN61326 (EN55011 Group 1 Class A)
	(EMS)	EN61326
	Immunity ESD:	EN61326 (EN61000-4-2): Contact discharge: 4 kV, air discharge: 8 kV
	Radiated electromagnetic field immunity:	EN61326 (EN61000-4-3): 10 V/m (Amplitude modulated, 80 MHz to 1 GHz, 1,400 to 2,000 MHz) 10 V/m (Pulse-modulated, 900 MHz ±5 MHz)
	Immunity Burst:	EN61326 (EN61000-4-4): 2 kV power-line, 1 kV I/O signal-line
	Immunity Surge:	EN61326 (EN61000-4-5): 1 kV line to line (power line), 2 kV line to ground (power line)
	Immunity Conducted Disturbance:	EN61326 (EN61000-4-6): 10 V (0.15 to 80 MHz)

Note: Attach a waterproof cover of Y92A-72N.

Connections

■ Internal Connections

H8BM-R



Note 1. H8BM-RAD/-RBD outputs the forecast and machine stoppage values simultaneously.
2. The I/O terminals are used for both PNP and NPN. There is no polarity.

	RUN, machine stoppage, forecast 1 to 9
Output method	Open collector
Switching capacity	30 VDC max., 100 mA max.
Residual voltage	2 VDC max.
Leakage current	100 μA max.

Note 1. When the load is short-circuited, the internal circuits may be damaged.
2. Connect a diode to suppress Counter surge when an inductive load is connected.

■ I/O Functions

● Inputs

Count 9 inputs	• Input count values. • Used as time count input signal when timer is used. • Max. counting speed receivable: Count inputs 1 to 7: 30 Hz (Min. signal input width: 16.7 ms), Count inputs 8 and 9: 30 Hz/500 Hz (Min. signal input width: 16.7 ms/1 ms)
Reset 1 input	• Resets count/time value of a displayed Counter No. • Counter under reset does not operate as its output is turned OFF. • Reset signal input received while re-monitor function is ON restores reset count/time value of the specified counter. • While reset signal is ON, RESET indicator lights.
Short	• When the short input is ON, an input is also received for one of the count inputs 2 to 9 when an input is received for count input 1. The H8BM can thus be used as a multi-stage preset counter without performing external short-circuit wiring.
Counter No. selection	• Specifies counter whose count/time value is to be displayed.
I/O inhibit	• Inhibits count inputs of all counters. • Turns OFF all forecast outputs, RUN outputs, and machine stoppage outputs. • While I/O inhibit signal is ON, INHB indicator lights.

● Outputs

Forecast 9 outputs	• Each of these outputs turns ON when its forecast value has been reached. • When a total counter is used, output one-shot signals as carry signals. • Retain outputs until count values are reset.
RUN 1 output	• Turns ON when Counter is operating normally.
Machine stoppage 1 output (Common)	• Turns ON when count value of one counter has reached set machine stoppage value. • Retains output until count value is reset.

Note: The input and output signals are enabled when power is applied to the Counter. During a power failure, the input signals are disabled, and the output signals are turned OFF.

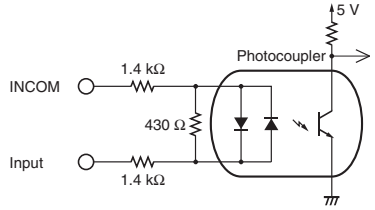
■ Terminal Arrangement

22	23	24	25	26	27	28
15	16	17	18	19	20	21
8	9	10	11	12	13	14
1	2	3	4	5	6	7

22	23	24	25	26	27	28
Reset input	Counter No. selection	Count input 1	Count input 2	Count input 3	Count input 4	Count input 5
15	**16**	**17**	**18**	**19**	**20**	**21**
Short input	I/O inhibit input	Count input 6	Count input 7	Count input 8	Count input 9	Input COM
8	**9**	**10**	**11**	**12**	**13**	**14**
RUN output	Machine stoppage output	Forecast output 1	Forecast output 2	Forecast output 3	Forecast output 4	Forecast output 5
1	**2**	**3**	**4**	**5**	**6**	**7**
Power supply: 0 V	Power supply: 24 V	Forecast output 6	Forecast output 7	Forecast output 8	Forecast output 9	Output COM

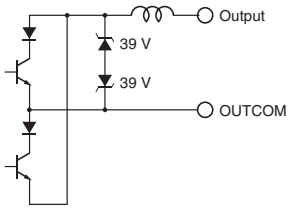
■ I/O Connections

● Input Circuits



Note: Although the input terminals are electrically insulated from the internal circuit, do not conduct an insulation resistance test on these terminals.

● Output Circuits

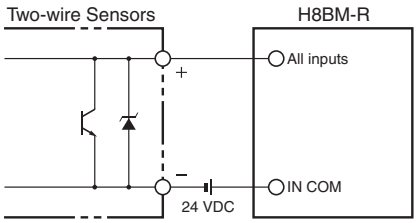


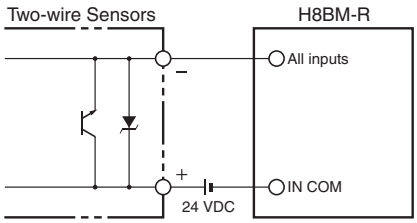
Note: Although the output terminals are electrically insulated from the internal circuit, do not conduct an insulation resistance test on these terminals.

● Example of Input Connections (Solid-state Switches)

Two-wire Sensors

The count input, counter number selection, reset input, I/O inhibit input, and short input signals are input when the two-wire Sensor turns ON.

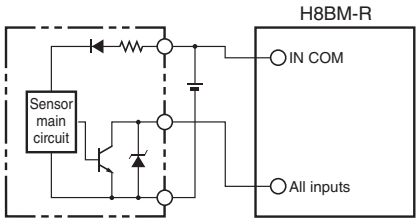


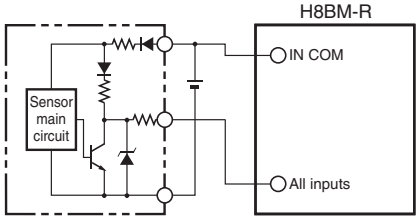


Note: Use the following two-wire Proximity Sensors:
(1) High-level: transistor ON
Switching capacity: 5 mA min. Residual voltage: 4 VDC max.
(2) Low-level: transistor OFF
Leakage current: 1.5 mA max.
(3) Operating voltage range:
20.4 to 26.4 VDC
We recommend using OMRON E2E-X□D□-N Sensors.

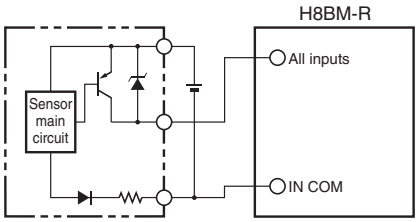
Three-wire Sensors

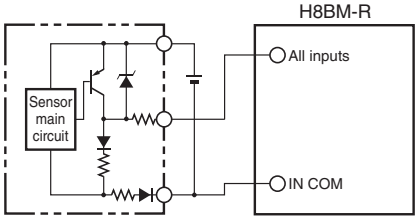
• NPN Type



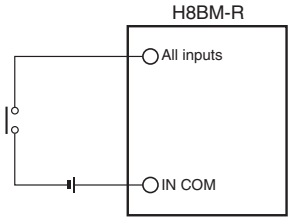


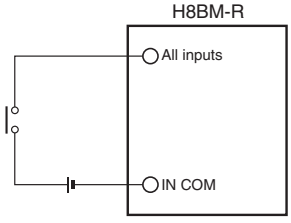
• PNP Type





● Example of Input Connections (Contact Switches)



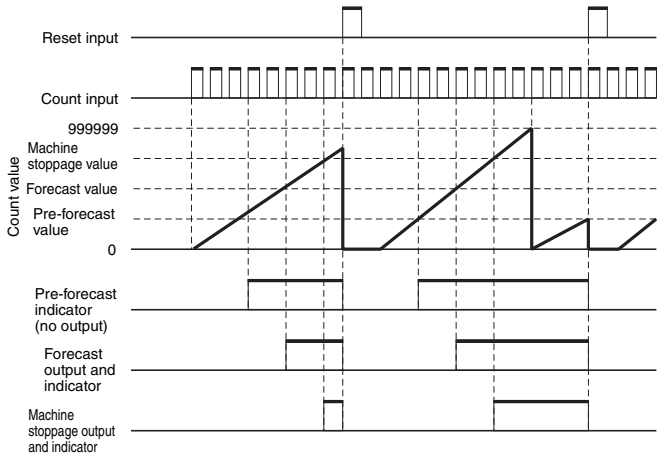


*H: Contact ON.
*Use a contact which can adequately switch 13 mA at 30 V.

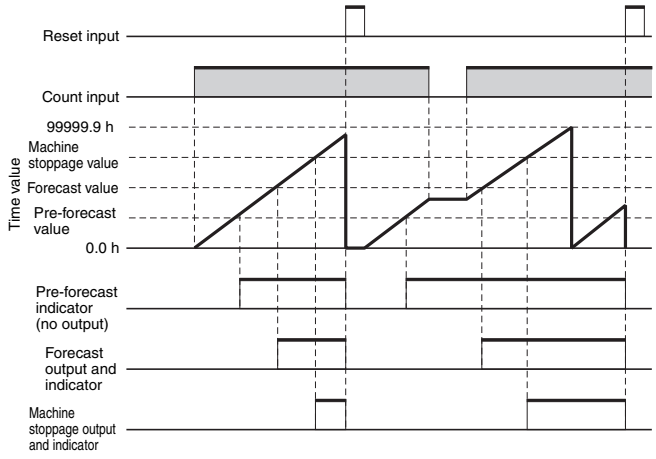
Operating Methods

■ Timing Charts

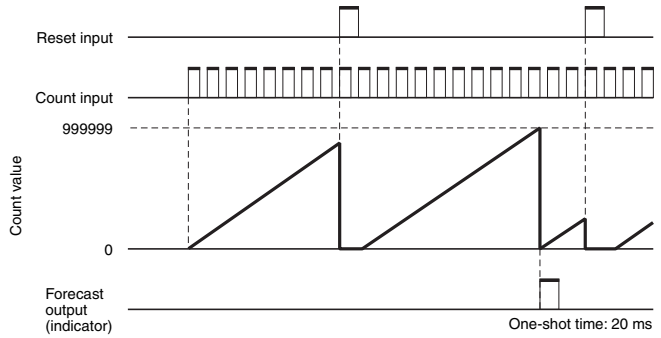
1. Counter (3-stage Preset Operation)



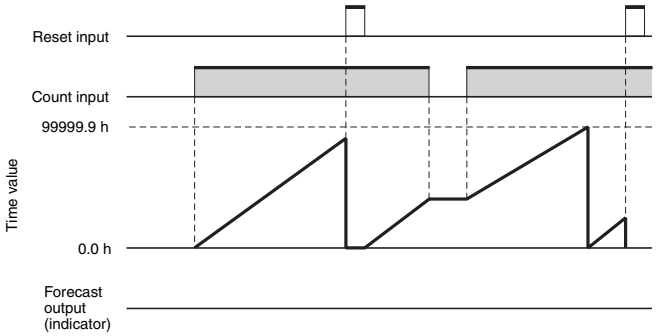
2. Timer (3-stage Preset Operation)



3. Total Counter Operation

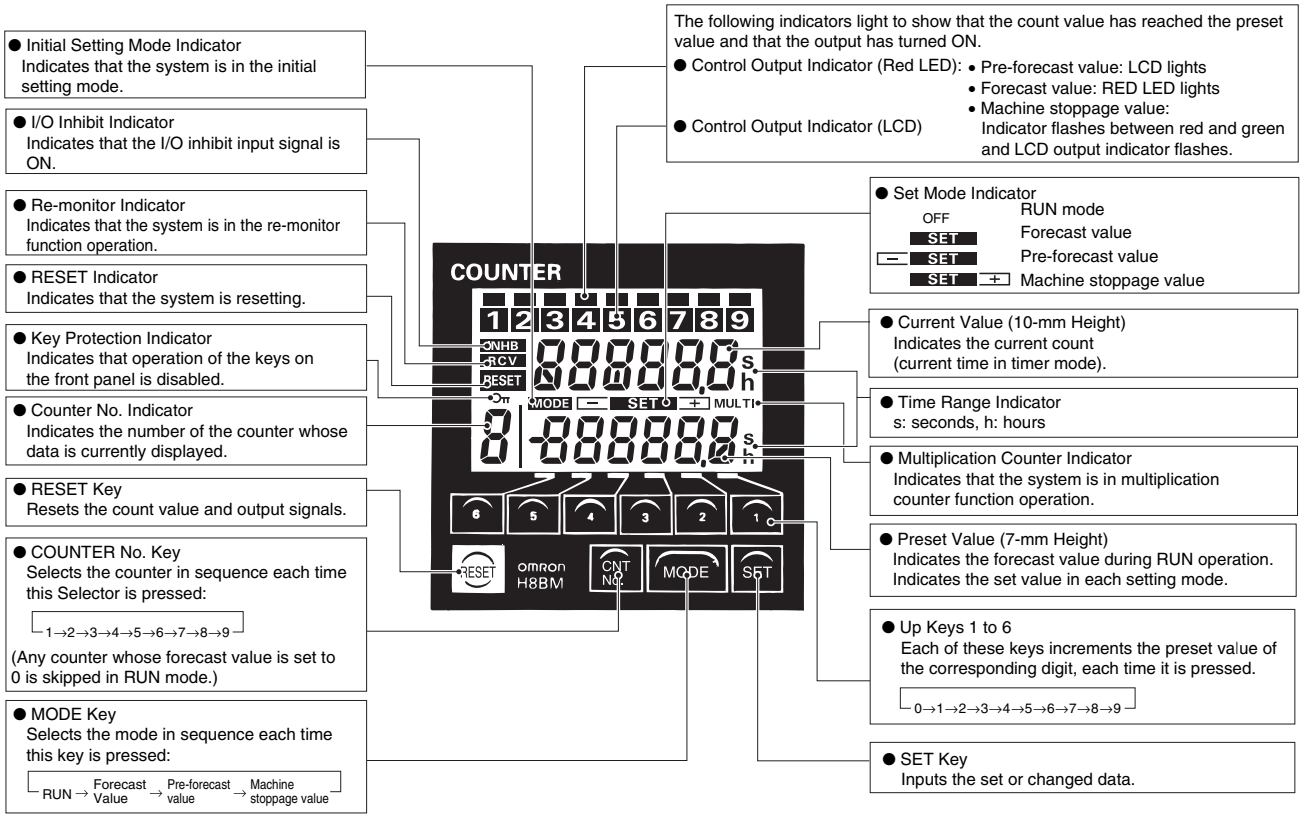


4. Total Timer Operation



Note: The count will return to 0 when 999999 is exceeded.
When the power supply is turned OFF, the display and outputs will turn OFF, but the current count/time value will be stored in internal memory.

Nomenclature



Note: Models with only 1-stage setting (H8BM-RAD/RBD) are not provided with pre-forecast and machine stoppage output function; only the forecast output function is provided.

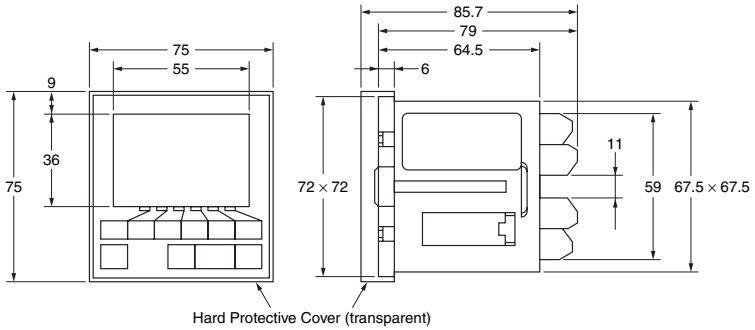
Dimensions

(Unit: mm)

■ Counter

● Counter

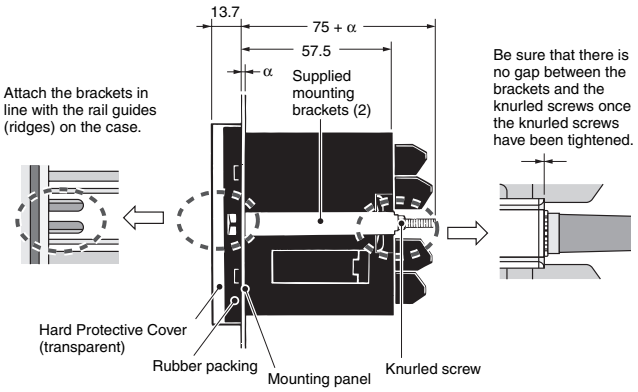
H8BM-R



■ Installation

● Installation Diagram

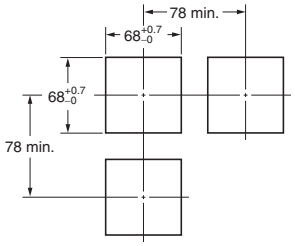
To mount the Counter, attach the two supplied brackets to the left and right sides of the Counter, and securely tighten the knurled screws on the brackets by hand, keeping the Counter balanced on the right and left. The performance may not be satisfactory if the screws are loose or excessively tightened. If the knurled screws are excessively tightened with pliers or other tool, damage may result.



M 3×5 screws are used. Select solderless terminals referring to the figure below.

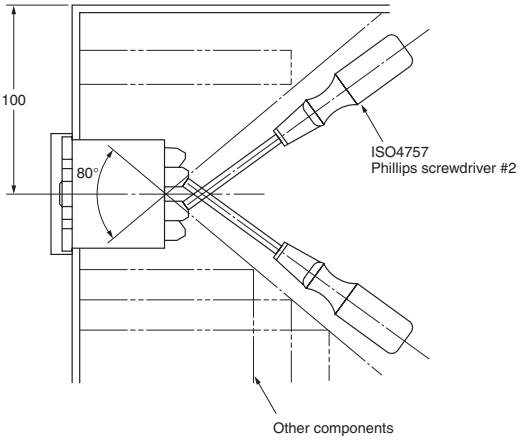
● Panel Cutouts

The panel cutout is as shown below (according to DIN 43700). The mounting panel thickness must be 1 to 5 mm. Mount the Counter so that the ambient temperature will not exceed 55°C.



● Spacing with Other Devices

Provide enough space around the Counter when mounting it to ensure a proper working space.



Safety Precautions

Refer to *Safety Precautions for All Counters*.

⚠ CAUTION

Fire may occasionally occur. Tighten terminal screws securely to a tightening torque of 0.5 to 0.6 N·m.

Minor electric shock, fire, or Product failure may occasionally occur. Do not disassemble, modify, or repair the Product or touch the interior of the Product.

Minor electric shock, fire, or Product failure may occasionally occur. Do not allow any pieces of metal or conductors or any clippings or cuttings resulting from installation work to enter the Product.

Precautions for Safe Use

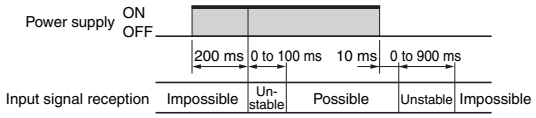
In order to ensure safe operation, be sure to observe the following points.

(1) Store the Counter within the specified temperature range. If the Counter has been stored at a temperature under −10°C, allow the Counter to stand at room temperature for at least 3 hours before using it.
(2) Use the Counter within the ratings specified for ambient operating temperature and ambient operating humidity.
(3) Do not operate the Counter in any of the following locations.
- Locations subject to sudden or extreme changes in temperature.
- Locations where high humidity may result in condensation.

(4) Use the Counter within the specified ratings for vibration and shock.
(5) Do not use the Counter in locations subject to excessive dust, corrosive gases, or direct sunlight.
(6) When using the Counter in environments subject to large amounts of static electricity (e.g., pipes carrying molding materials, powders, or fluid materials), separate the Counter as far as possible from the sources of static electricity.
(7) Use the Counter within the specified ratings for vibration, shock, water immersion, and exposure to oil.
(8) Always use a thermo-switch on the load circuit when a heater is used.
(9) Do not use organic solvents (such as paint thinner or benzene), strong alkalis, or strong acids because they will damage the external finish of the Counter.
(10) Install a switch or circuit breaker that allows the operator to immediately turn OFF the power, and label it to clearly indicate its function.
(11) Be sure that all terminals are wired correctly.
(12) Do not connect more than two crimp terminals to the same terminal.
(13) Use the specified wires for wiring.
Applicable Wires
AWG22 to AWG14
(cross-sectional area of 0.326 to 2.081 mm^2)
Solid or twisted wires of copper
(14) Always maintain the load current within specifications.
(15) Use a switch, relay, or other contact device to turn OFF the power supply instantaneously. Outputs may malfunction and memory errors may occur if the power supply voltage is decreased gradually.
(16) Up to two wires of the same size and type can be inserted into a single terminal.
(17) Separate the input devices, input wiring, and Counter as far as possible from sources of noise and power lines carrying noise.
(18) The life of internal parts may be reduced if Counters are mounted in close proximity to each other.
(19) Maintain voltage fluctuations in the power supply within the specified range.
(20) Use a switch, relay, or other contacts so that the rated power supply voltage will be reached within 0.1 s. If the power supply voltage is not reached quickly enough, the power source may fail to reset or the outputs may fall to operate correctly.
(21) Do not leave the Counter for long periods at a high temperature with output current in the ON state. Doing so may result in the premature deterioration of internal components (e.g., electrolytic capacitors).
(22) Periodically inspect and replace the rubber packing. It may deteriorate, expand, shrink, or harden in some operation environments.
(23) Check that the backlight, output indicators, and LCD are operating normally. Some operating environments may accelerate deterioration of the indicators, LCD, and resin components and cause display malfunctions. Periodically inspect and replace parts.
(24) Be sure that the voltage applied is within the specified range; otherwise, the internal elements of the Counter may be damaged.

Precautions for Correct Use

(1) Be sure that the capacity of the power supply is sufficient. The Counter may not start due to the capacity of the power supply or the inrush current that may flow for an instant (approx. 1.6 A for 12 ms) when the Counter is turned ON.
(2) The Power Supply, input, and output circuits are electrically isolated inside the Counter.
When turning the power ON and OFF, input signal reception is sometimes possible, sometimes not possible, and sometimes unstable, as shown in the diagram below.

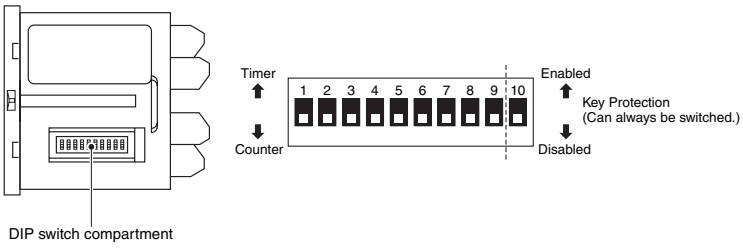


Turn on or off the operating power source all at once by using switch or relay contact.
(3) EEPROM is used to back up the memory if the power fails. Data can be written to EEPROM 100,000 times. Data is written to the EEPROM when the settings are changed or deleted or the power is turned OFF.
(4) The Counter uses a constant read-in system, so outputs will turn ON if the set values are changed during operation such that the set value is equal to or less than the count value.
(5) Dispose of the Counter in accordance with all local industrial waste disposal procedures.
(6) The water and oil resistance will be lost if the front sheet is peeled off or torn.
Do not use the Counter if the front sheet is peeled or torn.

Operation

1. DIP Switch Settings

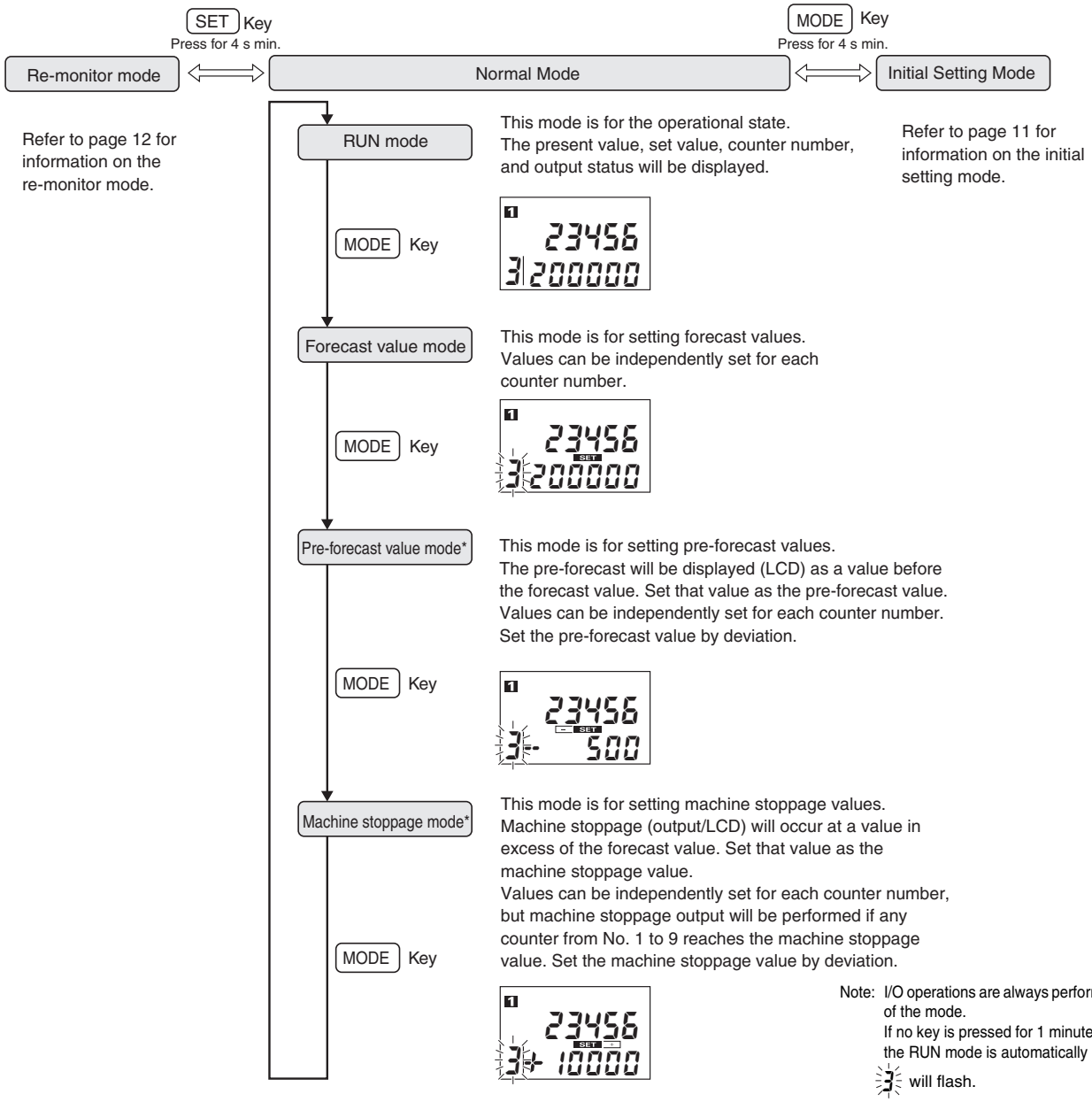
Key protection and whether each counter operates as a counter or a timer are specified on a DIP switch provided on the side panel of the Counter. Open the cover of the switch compartment on the side of the Counter to access the DIP switch.



Note 1. Set the DIP switch (except for Key Protection) before turning ON the power.
Changes to DIP switch settings while the Counter is operating will be ignored. Power must be turned OFF then back ON after changing the settings.
Changes to DIP switch settings are also enabled when changing to initial setting mode because the same operation is performed as when cycling the power.
2. Key protection can be set for each key. Key protection will be performed based on the details set in the initial setting mode. Refer to *Initial Setting Mode* on page 11.

2. Changing Mode

The system will always enter the RUN mode after the power supply is turned ON.



Note: I/O operations are always performed regardless of the mode.
If no key is pressed for 1 minute in each mode, the RUN mode is automatically restored.
will flash.

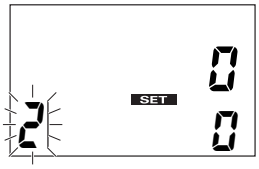
The modes marked * are not provided on the 1-stage type Counter.

3. Setting/Changing Data

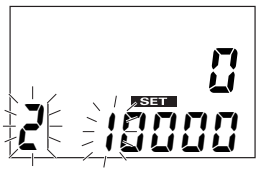
● Setting/Changing Forecast Value

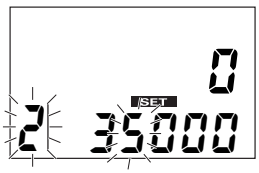
1. In the RUN mode, press the MODE Key to enter the forecast value setting mode.
   - The same counter number as in the RUN mode is displayed after changing to forecast value mode.

2. Press the CNT No. Key (or turn ON the counter number selection input) to select the counter whose data is to be set or changed.
   - The counters are selected in sequence each time the CNT No. Key is pressed, from 1 through 9, then back to 1.
     1→2→3→4→5→6→7→8→9
   - A counter can also be selected by inputting the counter number selection input.



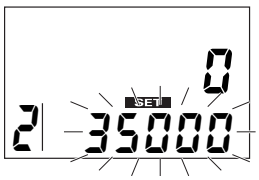
3. Use the UP Keys (1 to 6) to change the values of the digits.
   - When an UP Key is pressed, the corresponding digit starts flashing.
   - The preset value is zero-suppressed. Each time the UP Key is pressed, the value changes in sequence, from 1→2→3→4→5→6→7→8→9→0.
     1→2→3→4→5→6→7→8→9→0



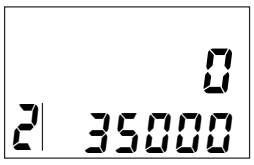


In the following example, the forecast value of counter 2 is set to 35000.

4. Press the SET Key to enter the set value.
   - If no key is pressed within 5 seconds after the SET Key has been pressed, RUN mode is automatically restored.

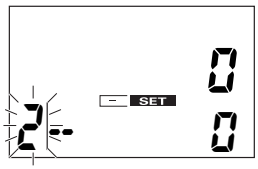


(The display is changed automatically after the set forecast value has flashed.)

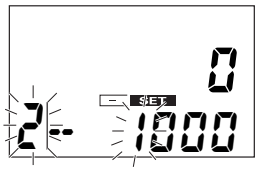


● Setting and Changing Pre-forecast Values (3-stage Type)

1. Press the MODE Key to enter the pre-forecast value setting mode.
   - The same counter number as in the forecast value setting mode is displayed after changing to pre-forecast value mode.
   - "-" is automatically displayed.

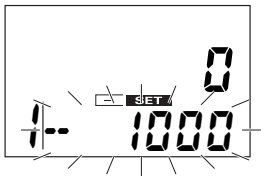


2. Press the CNT No. Key (or turn ON the counter number selection input) to select the counter whose data is to be set or changed. Next, press the UP Key (1 to 5) to set or change the pre-forecast value.



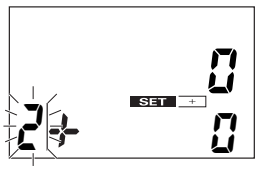
   - The CNT No. Key does not need to be pressed if the counter does not need to be changed.

3. Press the SET Key to enter the set value.
   - If no key is pressed within 5 seconds after the SET Key has been pressed, the RUN mode is automatically restored.

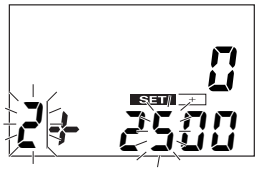


● Setting and Changing the Machine Stoppage Value (3-stage Type)

1. Press the MODE Key to enter the Machine Stoppage Value setting mode.
   - The same counter number as in the pre-forecast value setting mode is displayed after changing to machine stoppage value setting mode.
   - "+" is automatically displayed.

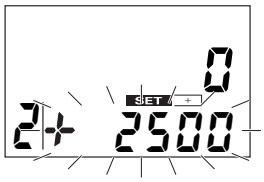


2. Press the CNT No. Key (or turn ON the counter number selection input) to select the counter whose data is to be set or changed. Next, press the UP Key (1 to 5) to set or change the machine stoppage value.



   - The CNT No. Key does not need to be pressed if the counter does not need to be changed.

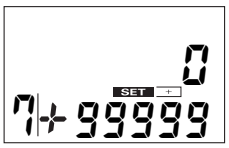
3. Press the SET Key to enter the set value.
   - If no key is pressed within 5 seconds after the SET Key has been pressed, the RUN mode is automatically restored.

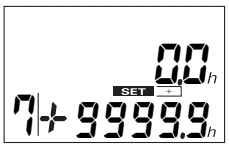


4. Special Set Values

● Setting Counters That Will Not Use the Machine Stoppage Output (3-stage Type)

The machine stoppage output will not be used for counters for which the machine stoppage value has been set to +99999 (+9999.9 h/+9999.9 s).





● Setting Counters That Will Not Be Used

Input and output operations will not occur for counters for which the forecast value has been set to 0 (0.0 h/0.0 s).

- If the forecast value is set to 0 (0.0 h/0.0 s), the pre-forecast and machine stoppage values will automatically be set to 0 (0.0 h/0.0 s).

● Setting Counters to Be Used as Total Counters/Timers

Counters can be used as total counters/timers if the forecast value for that counter is set to 999999 (99999.9 h/99999.9 s).

- The machine stoppage output will no longer be output for that counter.
- When using a counter as a total counter, the forecast output for that counter when the count value changes from 999999 to 0 will be a one-shot output of 20 ms to indicate a carry.

5. Checking Count Values (RUN Mode)

Press the CNT No. Key (or turn ON the counter No. selection input) in RUN mode to check the count value for each counter.

- The counter number changes in sequence each time the CNT No. Key is pressed (or the input turns ON), from 1 through 9, then back to 1.

1→2→3→4→5→6→7→8→9→1

Note: However, any counter whose forecast value is set to 0 (0.0 h/0.0 s) will be skipped.

6. Other Indicators

Timer Operation Display

The period on the count value display will flash while the count input is ON and the Timer is in h mode.

- The timer operation measures time by totaling the ON time of the count input.

7. Deleting Count Value

1. Resetting Individual Counters

(1) Press the CNT No. Key (or turn ON the counter number selection input) to select the counter to be reset.

- The counter value can be reset in all modes except initial setting mode and re-monitor mode.

(2) Press the RESET Key (or turn ON the reset input) to reset the count value to 0 for that counter only.

2. Resetting of All Counters at the Same Time

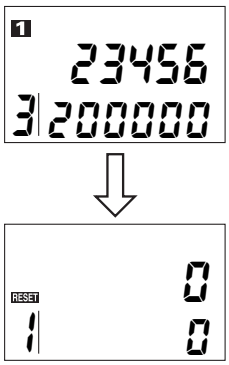
Press and hold both the CNT No. and RESET Keys for 3 seconds to reset the count value for all counters to 0.

- The same operation is achieved by simultaneously turning ON the counter number selection and reset inputs for 3 seconds.

8. All Clear

Press and hold the RESET and SET Keys for 3 seconds to reset the count values, pre-forecast values, forecast values, and machine stoppage values to 0 for all counters.

- The counter number after All Clear has been executed will automatically change to 1.



9. Control Output Display

The pre-forecast value, forecast, and machine stoppage status display will be as follows:

● Pre-forecast Values (3-stage Type)

The output display for counters for which the count value has reached the pre-forecast set value will be lit.

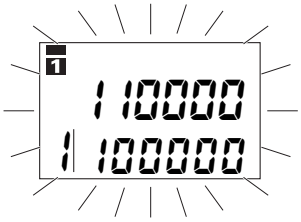
- Pre-forecast values are only displayed as a message and are not output.

● Forecast Outputs

A red indicator will light at the top of the output display section for the lit counter number and the output will turn ON.

● Machine Stoppage Output (3-stage Type)

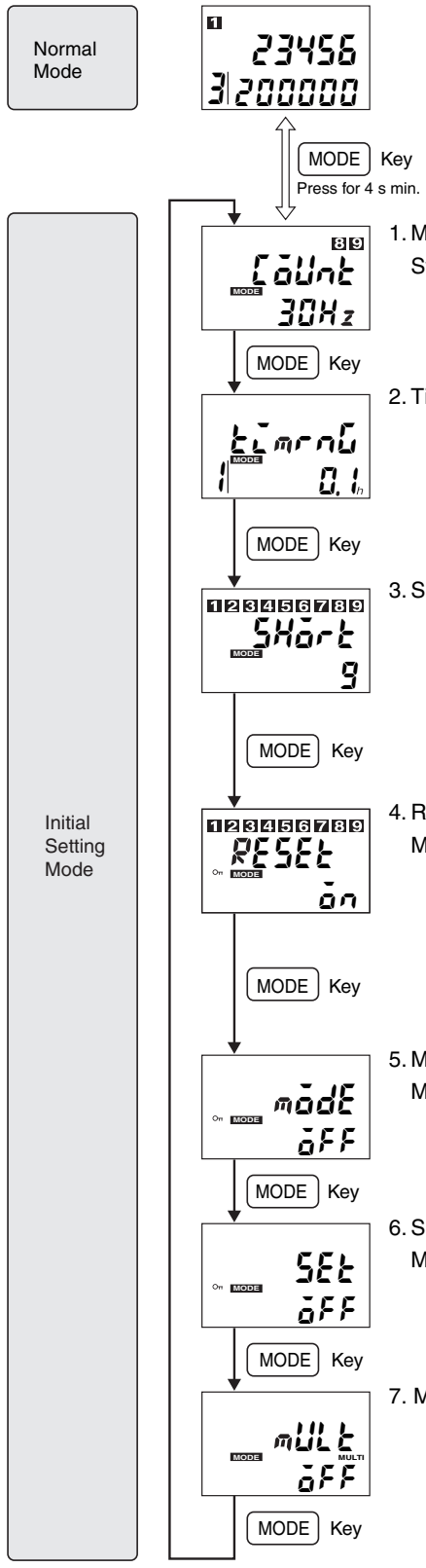
The entire background will alternate between red and green and the output display for the counter with a machine stoppage will flash.



Note: If the pre-forecast, forecast, or machine stoppage output turns ON, the counter number display will automatically change to that number and the count value will be displayed (in RUN mode only).

10. Initial Setting Mode

This mode is for setting a number of convenient functions.



- Refer to page 8 for the normal modes.
- If the mode is switched to the initial setting mode during operation, operation will continue.
- The characters displayed in reverse video are the default settings.

1. Max. Counting Speed Switching

The max. counting speed switching for counters 8 and 9 can be changed.

- Press the UP Key to switch between **30 Hz** and 500 Hz.
- Press the SET Key to enter the set value.

2. Time Rages

The Timer time rages can be changed.

- Press the CNT No. Key to change the time rages. Select the counter number.
- Press the UP Key to switch between **0.1 h** and 0.1 s.
- Press the SET Key to enter the set value.

Note: The time unit is displayed when the counter is set to a timer on the DIP switch.

3. Short Function

Counter 1 inputs can be input to other counters.

ex. if "5" is selected, Counter 1 inputs can be input to counters 2 to 5.

- Press the UP Key and select the number of counters for which the short function is to be enabled.

→ **9** →OFF→2→3→4→5→6→7→8 ┐

- Press the SET Key to enter the setting.

Note: The short input is read only when the power is turned ON. They are ignored if input during operation.

4. RESET Key Protection Mode

The RESET Key can be protected.

- Press the UP Key and select the counter for which RESET Key protection is to be set.

→ **ON (ch1 to 9)** → ON (ch8/9) → ON (ch9) → OFF ┐

- Press the SET Key to enter the setting.

Note 1. The Reset of All Counters and All Clear using the RESET Key are disabled if the RESET Key Protection function is turned ON.
2. Key Protection function is activated by setting the Dip Switch to 10.

5. MODE Key Protection Mode

The MODE Key can be protected.

- Press the UP Key to switch between **off** and on.
- Press the SET Key to enter the setting.

Note: Key Protection function is activated by setting the Dip Switch to 10.

6. SET Key Protection Mode

The SET Key can be protected.

- Press the UP Key to switch between **off** and on.
- Press the SET Key to enter the setting.

Note: Key Protection function is activated by setting the Dip Switch to 10.

7. Multiplication Counter

- Press the UP Key to switch between **off** and on.
- Press the SET Key to enter the setting.

Note: A Multiplication Counter is a batch counter that increments the count of counter 9 each time the forecast value of counter 1 is reached.

11. Re-monitor Mode

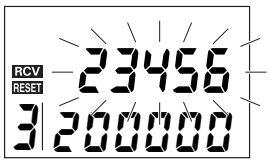
Use this mode to return to the count value before resetting if the count value is mistakenly reset.

1. In the RUN mode, hold the SET Key for 4 seconds min. to change to re-monitor mode.

- The previous values that have been reset will be displayed.
- Only the display changes. Internal counting operations are not affected.
- The counter number remains unchanged on RUN display when the mode is changed to re-monitor display.

2. Press the CNT No. Key (or turn ON the counter number selection input) to select the counter to be re-monitored.

3. When the RESET Key is pressed (or the reset input turns ON), the re-monitor value will flash 3 times and the only the count value for that counter will be returned to the value prior to being reset.



12. Self-diagnosis Function

The following displays are made when errors occur.

Display	Error content	All I/O	Countermeasure
E1	CPU Errors	Prohibited	Turn OFF the power or press the RESET Key to clear the error and restore the settings and count values to the values before the error.
E2	Memory Errors	Prohibited	Turn OFF the power or press the RESET Key to clear the error and return the count values for all counters to 0.
E3	Key Errors	Prohibited	Turn OFF the power supply or press the RESET Key to clear key errors.

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