Capacitance type level indicator

RMC-500 Parameter List

 IMR02G02-E1

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.

This manual describes the parameter of the RMC-500.

For installation, parts description, specifications, adjustment and communication, please refer to the following separate manuals:

- RMC-500 Installation Manual (IMR02G01-E□): Enclosed with RMC-500
- RMC-500 Quick Operation Manual (IMR02G03-E□): Enclosed with RMC-500

These manuals can be downloaded from the official RKC website: http://www.rkcinst.com/english/manual_load.htm.

Be sure to adjust before operation

For proper measurement, zero and span adjustments must be performed before operation. Before attempting operation, be sure to perform zero and span adjustments referring to the **RMC-500 Quick Operation Manual (IMR02G03-E□)**.
When using reference function, EMPTY adjustment is necessary before attempting zero and span point adjustments.

The following parameters are explained in the **RMC-500 Quick Operation Manual (IMR02G03-E□)**. Consult the manual for details.

Parameter name	Items to be referred to in the RMC-500 Quick Operation Manual
Empty adjustment	**5. EMPTY ADJUSTMENT**
Auto-zero	**4.1 Auto-zero**
Auto-span	**4.2 Auto-span**
Event 1 to 6 set value	**6. SETTING OF EVENT (setting with actual liquid)**
PV Bias	**4.4 PV Bias**
Auto-span Bias	**4.3 Auto-span Bias**
Linearizing point 1 to 5	**4.5 Linearizing Adjustment**
Linearizing point 1 to 5 input value	**4.5 Linearizing Adjustment**

☞ For the data setting, refer to **2. CHANGING DATA SETTINGS** of **RMC-500 Quick Operation Manual (IMR02G03-E□)**.

1. ERROR DISPLAYS

■ Display when input error occurs

Prior to replacing the sensor, always turn OFF the power.

Display	Description	Event output	Solution
PV [Flashing] *	PV exceeds the Level display high/low.	Output depending on the event action at input error	Check Input type, Input range and connecting state of sensor. Confirm that the sensor or wire is not broken.
	PV exceeds the Input error determination point (high/low limit).		
	Flashes when any of Events 1 to 6 has occurred. (The PV and event number are displayed alternately)	Output depending on the normal event action	
▫▫▫▫ [Flashing]	Over-scale PV is above the Level display high + (5 % of display span).	Output depending on the event action at input error	
▫▫▫▫ [Flashing]	Underscale PV is below the Level display low – (5 % of display span)		

* The PV flashes depending on the PV display condition (dSoP) of Engineering mode F10.

■ Self-diagnostic error

If an error is detected by the Self-diagnostic function, the "Err" and error code are displayed alternately on the PV display unit. If two or more errors occur simultaneously, the total summation of these error codes is displayed.

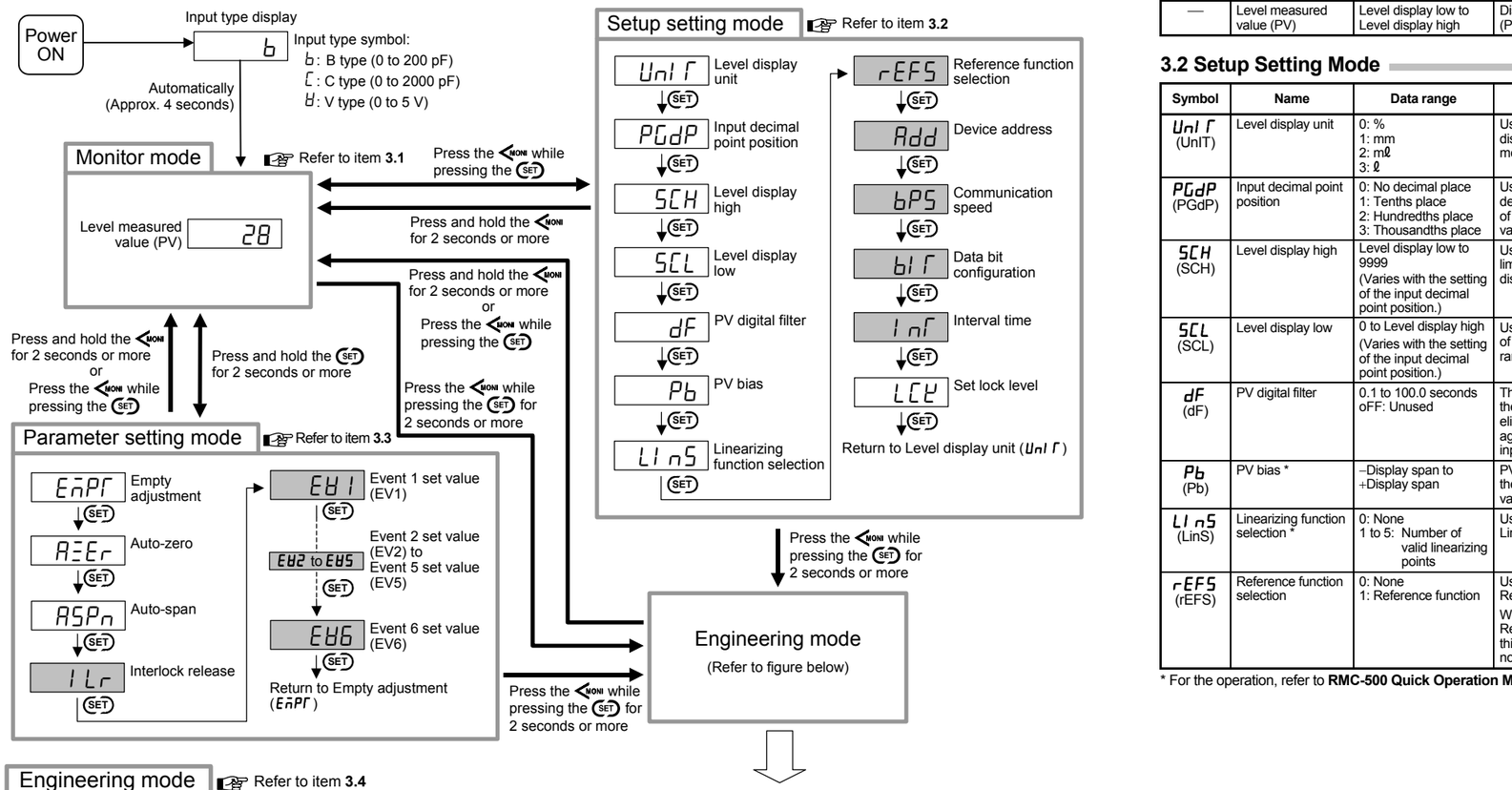
Solution: Turn off the power once. If an error occurs after the power is turned on again, please contact RKC sales office or the agent.

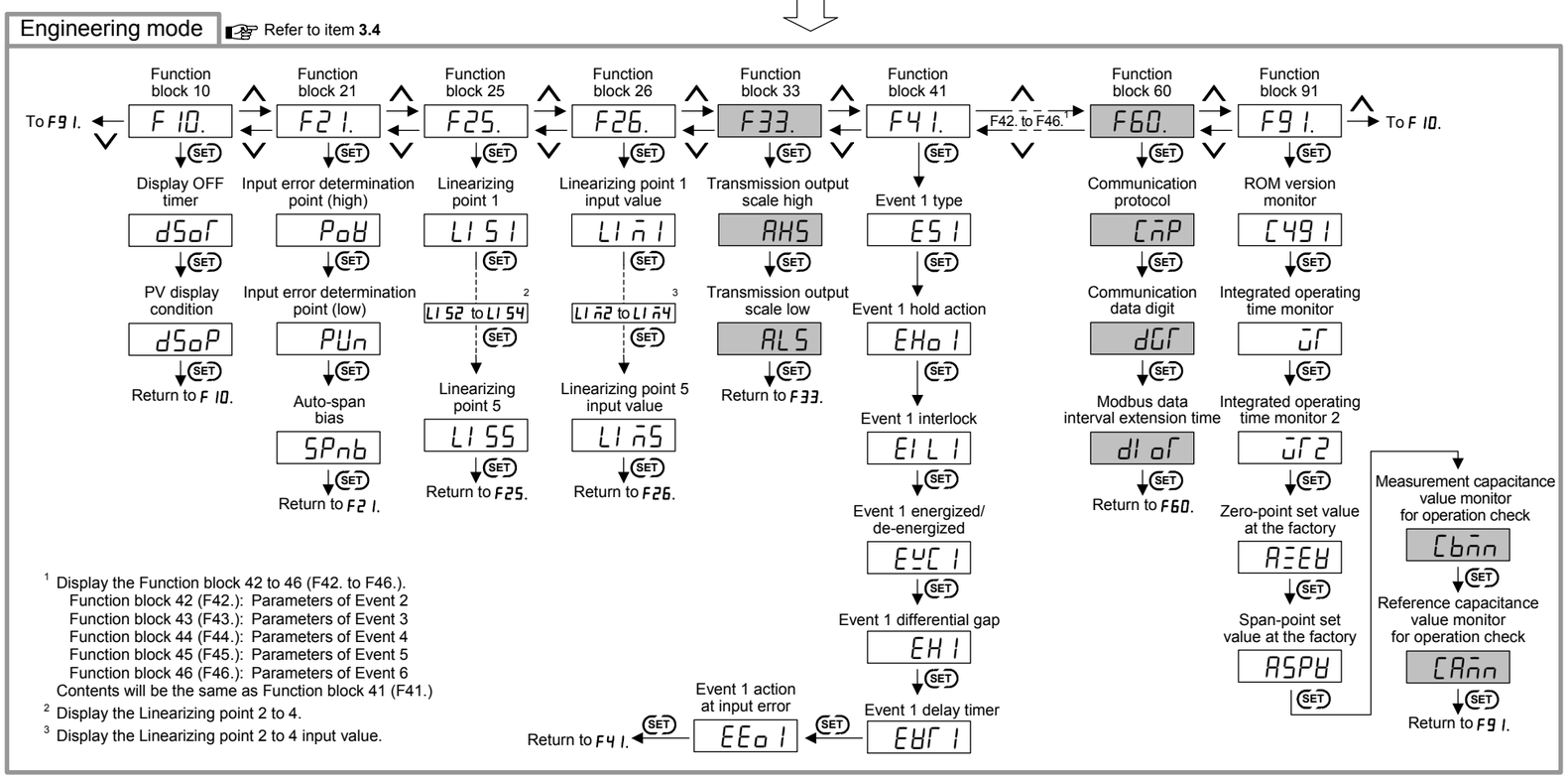
PV display	Description	Display/ Communication	Output action
1	Adjustment data error	Display: Error display (Err and error number) Communication: Send the error code	Event output: OFF Transmission output (AO): Transmission output scale low FAIL output: Contact open (When FAIL is selected for the Event 6)
2	Back-up error		
4	A/D conversion error		
128	Watchdog timer error		
256	Stack overflow		
2048	Program error (busy)		
All display is OFF	CPU error	Display: All display is OFF Communication: Stop	
	RAM check error		

2. TRANSFER TO EACH MODE AND PARAMETER

Displays return to Level measured value (PV) screen, if no key operation is performed within 1 minute.

: When there is no function, this screen does not appear.





[1] Display the Function block 42 to 46 (F42. to F46.).
Function block 42 (F42.): Parameters of Event 2
Function block 43 (F43.): Parameters of Event 3
Function block 44 (F44.): Parameters of Event 4
Function block 45 (F45.): Parameters of Event 5
Function block 46 (F46.): Parameters of Event 6
Contents will be the same as Function block 41 (F41.)

[2] Display the Linearizing point 2 to 4.

[3] Display the Linearizing point 2 to 4 input value.

3. PARAMETER LIST

3.1 Monitor Mode

Symbol	Name	Data range	Description
—	Level measured value (PV)	Level display low to Level display high	Display the Level measured value (PV).

3.2 Setup Setting Mode

Symbol	Name	Data range	Description	Factory set value
UnIT (UnIT)	Level display unit	0: % 1: mm 2: mℓ 3: ℓ	Use to select the display unit for Level measured value (PV) .	0
PGdP (PGdP)	Input decimal point position	0: No decimal place 1: Tenths place 2: Hundredths place 3: Thousandths place	Use to select the decimal point position of the Level measured value (PV).	0
SCH (SCH)	Level display high	Level display low to 9999 (Varies with the setting of the input decimal point position.)	Use to set the high limit of the Level display range.	100
SCL (SCL)	Level display low	0 to Level display high (Varies with the setting of the input decimal point position.)	Use to set the low limit of the Level display range.	0
dF (dF)	PV digital filter	0.1 to 100.0 seconds oFF: Unused	This item is the time of the first-order lag filter eliminate noise against the measured input.	oFF
Pb (Pb)	PV bias *	–Display span to +Display span	PV bias adds bias to the Level measured value (PV).	0
LInS (LinS)	Linearizing function selection *	0: None 1 to 5: Number of valid linearizing points	Use to select the Linearizing function.	0
rEFS (rEFS)	Reference function selection	0: None 1: Reference function	Use to select the Reference function. When there is no Reference function, this parameter does not appear.	Without Reference: 0 With Reference: 1

* For the operation, refer to **RMC-500 Quick Operation Manual (IMR02G03-E□)**.

(Continued on the rear page.)

Symbol	Name	Data range	Description	Factory set value
Add (Add)	Device address	This parameter is displayed when there is the Communication function [Optional].		
bPS (bPS)	Communication speed			
bIT (bIT)	Data bit configuration			
InT (InT)	Interval time			
LCK (LCK)	Set lock level	0: Unlock 1: Lock Set to "0" or "1" for each digit.	The Set lock level restricts parameter setting changes by key operation (Set data lock function).	Note1
		0000 ← PV display Parameters other than Event set value (EV1 to EV6). Event set value (EV1 to EV6) Auto-zero and Auto-span Empty adjustment		

Note1: Without Reference: 1000 With Reference: 0000

3.3 Parameter Setting Mode

Symbol	Name	Data range	Description	Factory set value
EnPY (EMPT)	Empty adjustment *	B type: 0 to 180 pF C type: 0 to 1800 pF V type: 0 to 4.5 V DC	Acquires the capacitance value when the measuring tank is empty. Adjustment is started by pressing the ∧ key while pressing the ∨ key.	—
AZEr (AZEr)	Auto-zero * (Zero-point adjustment)	B type: 0 to 180 pF C type: 0 to 1800 pF V type: 0 to 4.5 V DC	Acquires the capacitance value when the measuring liquid is set to the Level display low position. Adjustment is started by pressing the ∧ key while pressing the ∨ key.	—
ASPn (ASPn)	Auto-span * (Span-point adjustment)	B type: 3 to 200 pF C type: 30 to 2000 pF V type: 0.075 to 5 V DC	Acquires the capacitance value when the measuring liquid is set to the Level display high position. Adjustment is started by pressing the ∧ key while pressing the ∨ key.	—
ILr (ILr)	Interlock release	— This parameter is not displayed when the Event 1 to 6 interlock are set to "0: Unused."	If the event state is interlocked, interlock can be released. The interlock states of all events are released.	—
	[Procedure] Level measured value (PV) 28 → (SET) → Empty adjustment EnPY → (SET) → Interlock release ILr → Interlock is released. (2 seconds or more; Several times; Press the ∧ while pressing the ∨.)			
EV1 (EV1)	Event 1 set value (EV1) *	Level display low to Level display high This parameter is not displayed when the Event type is set to "0: None." When the type of Event 6 is FAIL, Event 6 set value is invalid.	Use to set the set value of the event action. Signals are output from the Event outputs (DO1 to DO6) if exceeding the Event set value. In addition to setting a numerical value, the ∧ key can be pressed while holding down the ∨ key to acquire the Level measured value (PV) of the actual liquid and use this as the set value.	0
EV2 (EV2)	Event 2 set value (EV2) *			20
EV3 (EV3)	Event 3 set value (EV3) *			40
EV4 (EV4)	Event 4 set value (EV4) *			60
EV5 (EV5)	Event 5 set value (EV5) *			80
EV6 (EV6)	Event 6 set value (EV6) *			100

* For the operation, refer to **RMC-500 Quick Operation Manual (IMR02G03-E□)**.

3.4 Engineering Mode

WARNING

Parameters in the Engineering mode (F10 to F91) should be set according to the application before setting any parameter related to operation. Once the Parameters in the Engineering mode are set correctly, no further changes need to be made to parameters for the same application under normal conditions. If they are changed unnecessarily, it may result in malfunction or failure of the instrument. RKC will not bear any responsibility for malfunction or failure as a result of improper changes in the Engineering mode.

Symbol	Name	Data range	Description	Factory set value
F10. (F10)	Function block 10	This is the first parameter symbol of Function block 10.		
dSoT (dSoT)	Display OFF timer	0 to 100 seconds (0: Always ON)	The time until the PV display (excluding lamps) turns off when there is no key input.	0
dSoP (dSoP)	PV display condition	0 to 255 (Decimal) Bit 0: Minus display of PV value Bit 1: Input error [a] Bit 2: Event 1 occurs Bit 3: Event 2 occurs Bit 4: Event 3 occurs Bit 5: Event 4 occurs Bit 6: Event 5 occurs Bit 7: Event 6 occurs Data Bit 0 0: Minus display 1: Non-minus display Bit 1 to Bit 7 0: Non-flashing display 1: Flashing display	Sets the condition for flashing display of the Level measured value (PV) and minus display of the PV [Valid only when the voltage input is selected.] When an event occurs and flashing is enabled, the Level measured value (PV) and event number are alternately displayed. Bit data 00000000 (Bit 7 ····· Bit 0) Set the bit data after converting it to decimal.	2
F21. (F21)	Function block 21	This is the first parameter symbol of Function block 21.		
PoV (PoV)	Input error determination point (high)	Level display low – (5 % of display span) to Level display high + (5 % of display span)	If the Level measured value (PV) exceeds the Input error determination point (high), event action at input error will be taken.	+105
PUn (PUn)	Input error determination point (low)	Level display low – (5 % of display span) to Level display high + (5 % of display span)	If the Level measured value (PV) exceeds the Input error determination point (low), event action at input error will be taken.	–5
SPnb (SPnb)	Auto-span bias [b]	0.0 to 100.0 % Actual liquid level converted to percentage.	Actual liquid level when Auto-span is executed. When measuring liquid is low and 100 % cannot be attained, set the volume of the actual liquid for Auto-span.	100.0
F25 (F25)	Function block 25	This is the first parameter symbol of Function block 25.		
LIS1 (LIS1) … LI55 (LIS5)	Linearizing point 1 [b] … Linearizing point 5 [b]	Note 1	Set the Level measured value (PV) that you wish to display at each linearizing point.	0
F26 (F26)	Function block 26	This is the first parameter symbol of Function block 26.		
LIM1 (LIM1) … LIM5 (LIM5)	Linearizing point 1 input value [b] … Linearizing point 5 input value [b]	Note 2	Set the Level measured value (PV) of the actual liquid that corresponds to the Level measured value (PV) [display value] set in Function block 25 (F25).	0.0
			In addition to setting a numerical value, the ∧ key can be pressed while holding down the ∨ key to acquire the Level measured value (PV) of the actual liquid and use this as the set value.	
F33. (F33)	Function block 33	This is the first parameter symbol of Function block 33. This function block does not appear when there is no Transmission output (AO) function.		
AHS (AHS)	Transmission output scale high	Transmission output scale low to Level display high	Use to set a scale high limit value of the Transmission output.	100
ALS (ALS)	Transmission output scale low	Level display low to Transmission output scale high	Use to set a scale low limit value of the Transmission output.	0

[a] When flashing is enabled, the Level measured value (PV) flashes at the following times:
- Level measured value (PV) exceeds the Level display high/low.
- Level measured value (PV) exceeds the Input error determination point (high/low limit).

[b] For the operation, refer to **RMC-500 Quick Operation Manual (IMR02G03-E□)**.

Note1: Point 1: Level display low to Level display high
Point 2: Linearizing point 1 to Level display high
Point 3: Linearizing point 2 to Level display high
Point 4: Linearizing point 3 to Level display high
Point 5: Linearizing point 4 to Level display high

Note 2: Point 1: 0.0 to 100.0 % of display span
Point 2: Linearizing point 1 input value to 100.0 % of display span
Point 3: Linearizing point 2 input value to 100.0 % of display span
Point 4: Linearizing point 3 input value to 100.0 % of display span
Point 5: Linearizing point 4 input value to 100.0 % of display span

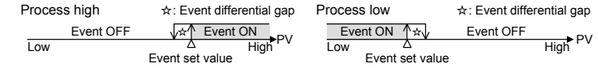
Symbol	Name	Data range	Description	Factory set value
F41. (F41) … F46. (F46)	Function block 41 … Function block 46	This is the first parameter symbol of Function block 41 to 46. F41: Parameters of Event 1 F42: Parameters of Event 2 F43: Parameters of Event 3 F44: Parameters of Event 4 F45: Parameters of Event 5 F46: Parameters of Event 6		
ES1 (ES1) … ES6 (ES6)	Event 1 type … Event 6 type	0: None 1: Process high 2: Process low 3: FAIL (FAIL can set only event 6)	Use to select the action type of the Event.	Based on model code. When not specifying: 1
EHo1 (EHo1) … EHo6 (EHo6)	Event 1 hold action … Event 6 hold action	0: OFF 1: Hold action ON When the type of Event 6 is FAIL, Event 6 hold action is invalid.	Use to select the Hold action for the Event.	Based on model code. When not specifying: 0
EIL1 (EIL1) … EIL6 (EIL6)	Event 1 interlock … Event 6 interlock	0: Unused (OFF) 1: Used	Use to select the Interlock function for the Event.	0
EXC1 (EXC1) … EXC6 (EXC6)	Event 1 energized/ de-energized … Event 6 energized/ de-energized	0: Energized 1: De-energized When the type of Event 6 is FAIL, the Event 6 output is fixed at de-energized.	Use to select the Event energized or de-energized.	0
EH1 (EH1) … EH6 (EH6)	Event 1 differential gap … Event 6 differential gap	0 to Display span When the type of Event 6 is FAIL, Event 6 differential gap is invalid.	Use to set a Differential gap of the Event.	2
EVT1 (EVT1) … EVT6 (EVT6)	Event 1 delay timer … Event 6 delay timer	0.0 to 600.0 seconds When the type of Event 6 is FAIL, Event 6 delay timer is invalid.	Event delay timer is to set an output delay time for Event outputs	0.0
EEo1 (EEo1) … EEo6 (EEo6)	Event 1 action at input error … Event 6 action at input error	0: Normal event action 1: Forced event ON when Level measured value (PV) exceeds the Input error determination point (high or low limit). When the type of Event 6 is FAIL, Event 6 action at input error is invalid.	Event action at input error is to select the event action when the Level measured value (PV) reaches the Input error determination point (high or low limit).	0
F60. (F60)	Function block 60	This is the first parameter symbol of Function block 60. This function block does not appear when there is no Communication function.		
CMP (CMP)	Communication protocol	0: RKC communication 1: Modbus	Use to select a protocol of Communication function.	Based on model code. When not specifying: 0
dGT (dGT)	Communication data digit	0: 6 digits 1: 7 digits	The number of Communication data digits in RKC communication	1
dIoT (dIoT)	Modbus data interval extension time	0 to 250 ms	Extension time for the data interval timeout in Modbus communication.	0
F91. (F91)	Function block 91	This is the first parameter symbol of Function block 91.		
C491 (C491)	ROM version monitor	0 to 999 (C491-□□□)	Displays the version of the ROM on the instrument.	—
WT (WT)	Integrated operating time monitor	0 to 9999 hours Reverts to 0 when 10,000 hours is reached.	Displays the integrated total operating time of the instrument.	
WT2 (WT2)	Integrated operating time monitor 2	0 to 200 (Units of 10,000 hours) Values are displayed in units of 10,000 hours.	Displays the integrated total operating time of the instrument.	
AZEV (AZEV)	Zero-point set value at the factory	0000 to FFFFh	Factory shipping zero-point set value.	0
ASPV (ASPV)	Span-point set value at the factory	0000 to FFFFh	Factory shipping span-point set value.	7530
CbMn (CbMn)	Measurement capacitance value monitor for operation check *	B type: 0.0 to 200.0 pF C type: 0 to 2000 pF	This is a value of the capacitance value (Cb). When the type of input is V (0 to 5 V DC), this parameter does not appear.	—

* Measurement capacitance monitor (CbMn) is used only for checking the operation.Input accuracy is not satisfied. DO NOT use this parameter for actual measurement.

Symbol	Name	Data range	Description	Factory set value
CAMn (CAMn)	Reference capacitance value monitor for operation check	0.00 to 6.00 pF	This is a value corresponding to the reference input (CA). When there is no Reference function (Model code: N), this parameter does not appear	—

■ Event function

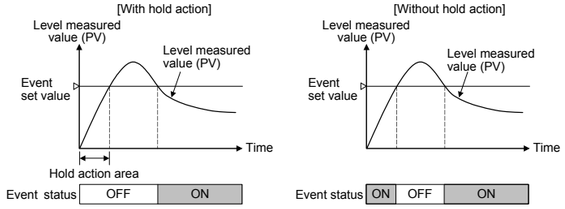
Action: When the Level measured value (PV) reaches the Event set value, event ON occurs.



● Event hold action

When hold action is ON, the event action is suppressed at start-up (Power ON) until the Level measured value (PV) has entered the non-event range.

Example: When the Event hold action function is used for Process low



● Event interlock

The Event interlock function is used to hold the event state.

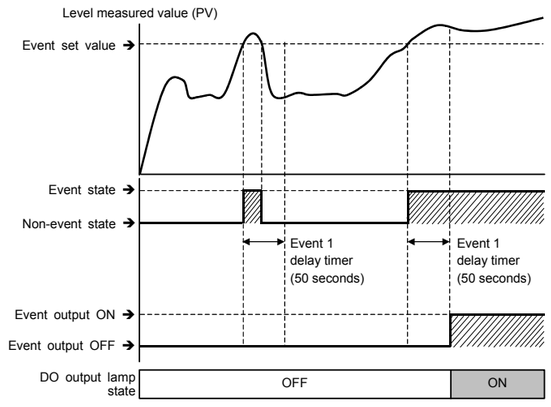
● Event differential gap

It prevents chattering of event output due to the Level measured value (PV) fluctuation around the Event set value.

● Event delay timer

When an event condition becomes ON, the output is suppressed until the Delay timer set time elapses. If the event output is still ON after time is up, the output will resume.

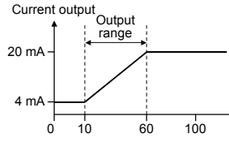
Example: When the setting of Event 1 delay timer is 50 seconds



■ Transmission output (AO) function [Optional]

The Transmission output (AO) function is used to output any Level measured value (PV) as the voltage/current output. In addition, any range of the Level measured value (PV) can be output with the Transmission output scale low and Transmission output scale high set.

Example: When a Level measured value (PV) of 10 to 60 % needs to be recorded on a recorder at a Level display range of 0 to 100 %.



Output type: Current output, 4 to 20 mA DC
Transmission output scale high (AHS): 60 %
Transmission output scale low (ALS): 10 %

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