Capacitance type level indicator

RMC-500 Quick Operation Manual

Thank you for purchasing the 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 this manual in a convenient location for easy reference.

This manual describes the adjustment method of the RMC-500. For installation, parts description, specifications, parameters and communication, please refer to the following

- RMC-500 Installation Manual (IMR02G01-E□): Enclosed with RMC-500
- RMC-500 Parameter List (IMR02G02-E□): Enclosed with RMC-500 These manuals can be downloaded from the official RKC website:

http://www.rkcinst.com/english/manual_load.htm.

1. OUTLINE

RMC-500 provides the following adjustment functions

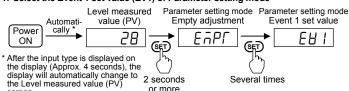
Rivic-500 provides the following adjustment functions.	
Zero-point adjustment/ Span-point adjustment	Sets the capacitance range for level display; Zero-point adjustment is used to set a value to be displayed at Level display low (5CL). Span-point adjustment is used to set a value to be displayed at Level display high (5CH).
	Level sensor. Span-point (Level display high) Level display range Tank
	Zero and span points can be adjusted with the following method: • Auto-zero and Auto-span (adjustment with actual liquid).
Empty adjustment	Acquires the capacitance value when the measuring tank is empty. Empty adjustment automatically corrects capacitance value at zero and span points.
Auto-span bias	When attempting the Span point adjustment (Auto-span) with the actual measured liquid level, the liquid level may be too low to reach the Level display high (5LH). This function converts the Level measurement value (PV) of the liquid to be adjusted for Auto-span to percentage.
PV bias	PV bias adds bias to the Level measured value (PV).
Linearizing adjustment	In case of measuring a tank which has a shape that gives non-linear change of the Level measured value (PV) and the capacitance value, more accurate level measurement can be achieved by entering Level measured values (PV) [displayed value] at inflexion points and the Level measured values (PV) [input value] of the actual liquid.

2. CHANGING DATA SETTINGS

To store a new value for the parameter, always press the (SET) key. After a new value is displayed on the display by using \wedge and \vee keys, if no key operation is performed within 1 minute without pressing (SET) key, this instrument returns to the Level measured value (PV) screen and the set value will not be changed.

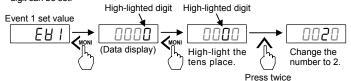
Example: Changing the Event 1 set value (EV1) to 20 %

1. Select the Event 1 set value (EV1) of Parameter setting mode



2. Change the Event 1 set value (EV1) to 20 %

Pressing the Key displays the data display. The high-lighted digit indicates which digit can be set



3. Store the Event 1 set value (EV1)

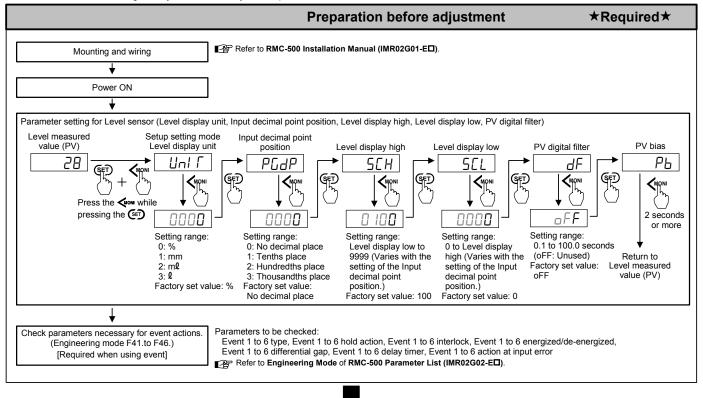


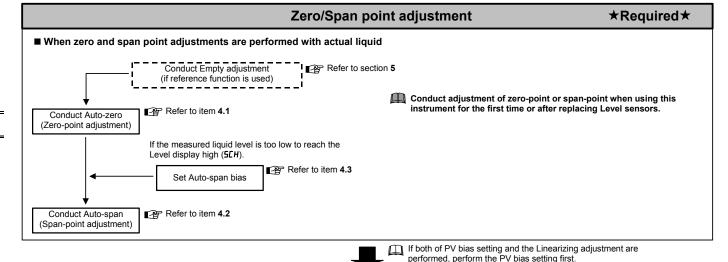
Do not turn off the power for at least 2 seconds after storing a setting. If the power is turned off before the setting is stored in backup memory, the data will not be retained.

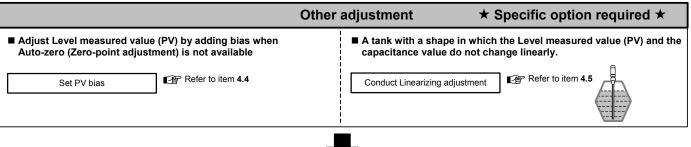
Other data can also be set by the same procedures as described in steps 1 to 3.

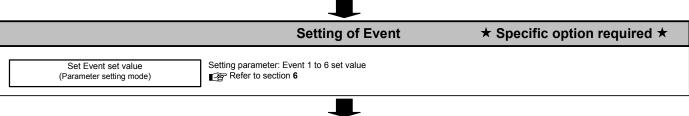
3. SETUP PROCEDURES PRIOR TO RUNNING THE INSTRUMENT

Perform as follows to make setting and adjustment necessary for the operation









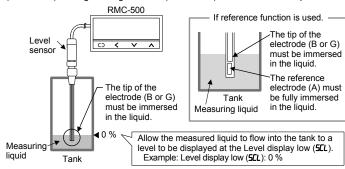
Operation In this section adjustment and event related settings are described. If there is any other parameter to be set, refer to the RMC-500 Parameter List (IMR02G02-ED)

4. ADJUSTMENT WITH ACTUAL LIQUID

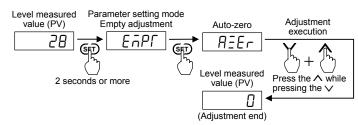
4.1 Auto-zero

Auto-zero takes capacitance values displayed at the Level display low (5CL). Auto-zero also resets the PV bias (Pb) to zero.

1. Allow the measured liquid to flow into the tank to a desired level to be displayed at the Level display low (5CL). Make sure that the reference electrode (electrode A) is fully immersed (if reference function is used), and the tip of the measuring electrode (electrode B) or the grounding electrode (electrode G) is immersed in the liquid.



2. Auto-zero is started by pressing the \land key while pressing the \lor key at Auto-zero screen. If this Auto-zero operation normally ends, the screen returns to the Level measured value (PV) screen



If an error occurs, the "REEr" and "Err" are displayed alternately on the PV display unit. Press any of the keys (€1), <∞1, ∨, ∧) to clear the error and return to the Level measured value (PV) screen.

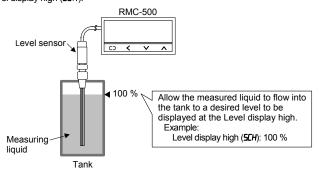
If the Set Lock level (LCL) [Setup setting mode] is set to the Auto-zero lock, the display "AEEr" remains displayed and the Auto-zero is not performed.

4.2 Auto-span

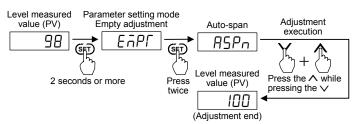
Execution of Auto-span allows the RMC-500 to take capacitance value to be displayed at the Level display high (5CH).

Execution of Auto-span also resets the PV bias (Pb) to zero.

1. Allow the measured liquid to flow into the tank to a desired level to be displayed at the Level display high (5CH).



2. Auto-span is started by pressing the ∧ key while pressing the ∨ key at Auto-span screen. If this Auto-span operation normally ends, the screen returns to the Level measured value (PV) screen



If an error occurs, the "ASPn" and "Err" are displayed alternately on the PV display unit. Press any of the keys (), <∞, ∨, ∧) to clear the error and return to the Level measured value (PV) screen.

If the Set lock level (LCL) [Setup setting mode] is set to Auto-span lock, the display "R5Pn" remains displayed and Auto-span is not performed.

If the measured liquid level is too low to reach the Level display high (5CH), with the use of the Auto-span bias (5Pnb), Auto-span can be performed under such conditions. (Refer to item 4.3)

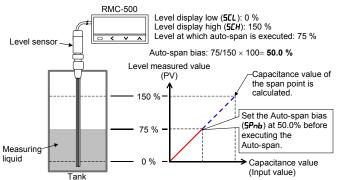
4.3 Auto-span Bias

When the Span adjustment (Auto-span) is performed with the actual liquid, if the liquid level is too low to reach the Level display high (5CH), convert the amount of liquid to percentage and set the Auto-span bias (5Pnb). This enables the Auto-span to be executed at the low measured liquid level.

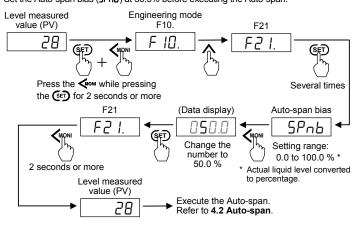
The Auto-span bias calculates the span value (capacitance value) assuming that the values to the span vary linearly.

This may cause a difference in levels between the actual level and the Level measured value (PV) of RMC-500.

Example:As the liquid level cannot reach the 150 % level (span point), the Auto-span is executed at 75 % level.

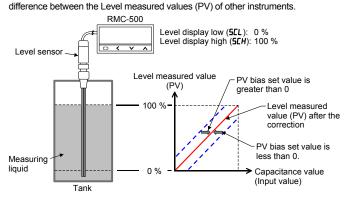


Set the Auto-span bias (5Pnb) at 50.0% before executing the Auto-span.

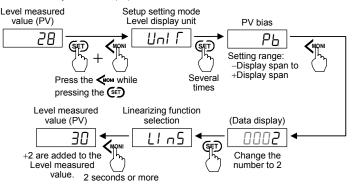


4.4 PV Bias

If the Zero-point adjustment (Auto-zero) or the Span-point adjustment (Auto-span) cannot be performed, set the PV bias (Pb) to correct the Level measured value (PV). The PV bias is used to correct the individual variations in the level sensors or when there is



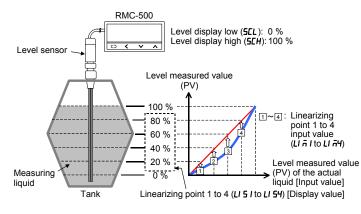
Example: In case the level sensor was replaced with the sensor with a different length (same type and same measuring range), adjust the Level measured value (PV) by adding 2% by the PV bias (Pb).



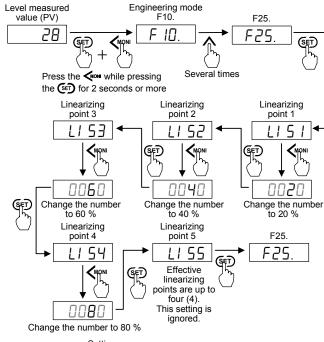
4.5 Linearizing Adjustment

When the shape of the tank is such that the Level measured value (PV) of the measuring liquid and the capacitance value do not change linearly, the accuracy of measuring can be increased by setting the Level measured values (PV) [Display values] of the inflection points of the tank that you wish to display and the Level measured values (PV) [Input values] of the actual liquid.

Example: In case linearization points are four (4) and need to be set as follows.



1. Set the Linearizing points 1 to 4 at 20, 40, 60, and 80% [Display value].



Setting range:

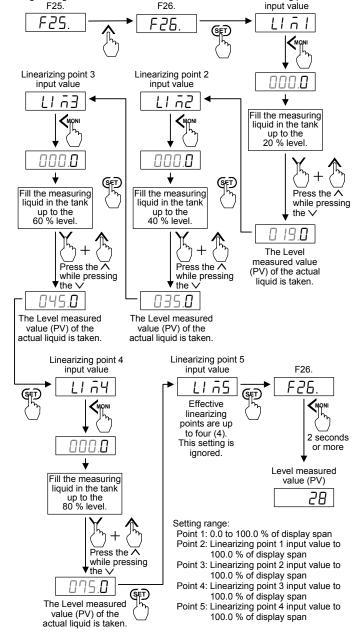
Point 1: Level display low to Level display high Point 2: Linearizing point 1 to Level display high

Point 3: Linearizing point 2 to Level display high

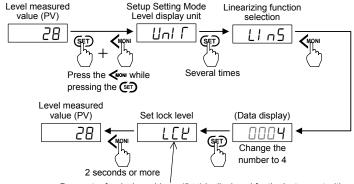
Point 4: Linearizing point 3 to Level display high Point 5: Linearizing point 4 to Level display high 2. Takes the Level measured value (PV) of the actual liquid to the Linearizing points 1-4 as a set value.

Linearizing point 1

Engineering mode



- The linearizing point input value not only takes the Level measured value (PV) as a set value but also accepts direct setting with a numeric value.
- **3.** Set the number of effective linearizing points to four (4). The function is started by enabling the effective linearizing points.



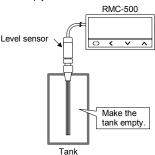
Parameter for device address (*Rdd*) is displayed for the instrument with communication function

5. EMPTY ADJUSTMENT

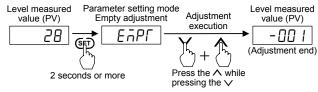
Execution of Empty adjustment allows the initial capacitance value (capacitance value in case of an empty tank) to be taken and automatically corrects the capacitance values at zero and span points. Execution of Empty adjustment also resets the PV bias (*Pb*) to zero.

Empty adjustment may be necessary when:

- Reference function is used.
- Instruments without the Reference function (model code: N) are shipped with the Empty adjustment function disabled (lock) by the Setting lock level (LCL). To perform the Empty adjustment, enable the setting (release the lock) referring to the RMC-500 Parameter List (IMR02G02-EII).
- 1. Fully make the tank empty.



 Empty adjustment is started by pressing the ∧ key while pressing the ∨ key at Empty adjustment screen. If this Empty adjustment operation normally ends, the screen returns to the Level measured value (PV) screen.



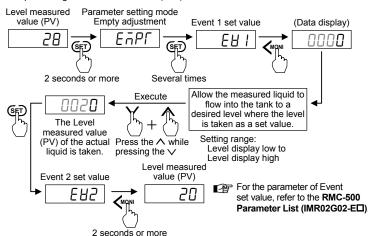
If an error occurs, the "ĦĀPF" and "Err" are displayed alternately on the PV display unit. Press any of the keys (⑤), ←, ∨, ∧) to clear the error and return to the Level measured value (PV) screen.

If the Set lock level $(L \hat{L} P)$ is set to disable the Empty adjustment setting (locked), the parameter "EnPF" remains displayed and the Empty adjustment is not performed.

6. SETTING OF EVENT (setting with actual liquid)

Event set values can be set with numeric values and the Level measured value (PV) taken as a set value.

Example: Change the Event 1 set value (EV1)



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