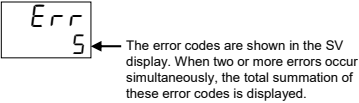


5. ERROR DISPLAYS

■ Self-diagnostic error

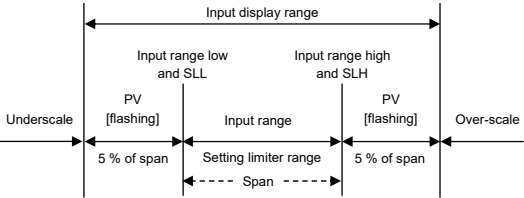
Error code	Description	Action	Solution
1	Adjustment data error	Display: Error display (Err)	Turn off the power once.
2	EEPROM error	Control output: All outputs are OFF	If an error occurs after the power is turned on again, please contact RKC sales office or the agent.
4	A/D conversion error	Alarm output: All outputs are OFF	
8	RAM check error		
128	Watchdog timer error		

Example: When the adjustment data error (1) and A/D conversion error (4) occurs simultaneously



■ Over-scale and Underscale

Display	Description	Solution
Measured value (PV) is flashing	PV is outside of input range.	WARNING To prevent electric shock, always turn off the power before replacing the sensor. Check Input type, Input range and connecting state of sensor. Confirm that the sensor or wire is not broken.
oooo flashing 	Over-scale: PV is above the high input display range limit.	
uuuu flashing 	Underscale: PV is below the low input display range limit.	



SLH: Setting limiter [high limit]
SLL: Setting limiter [low limit]

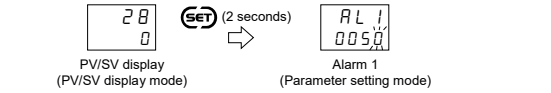
6. GO TO ENGINEERING MODE

WARNING

Parameters in the Engineering mode 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.

■ Procedures

1. Select the Parameter setting mode
Press and hold the SET key for 2 seconds in the PV/SV display mode state to transfer to Parameter setting mode.



The displayed parameter varies depending on the product specifications.

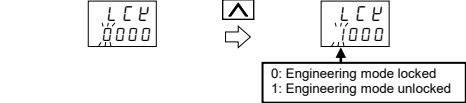
2. Select the Set data lock (LCK) display
Press the SET key several times until Set data lock (LCK) display will be displayed.



3. Shift the blinking digit
Press the <R/S key to blink the thousands digit. The blinking digit indicates which digit can be set.



4. Change the set value
Press the UP key to change the number to 1.



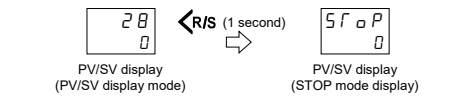
5. Store the set value
Press the SET key to store the new set value. The display goes to the next parameter, and the Engineering mode is unlocked.



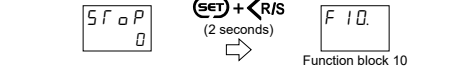
6. Select the PV/SV display mode
Press and hold the SET key for 2 seconds to change to the PV/SV display mode.



7. Press and hold the <R/S key for 1 second to change the Operation mode from RUN mode to STOP mode.



8. Press and hold the <R/S key for 2 seconds while pressing the SET key to go to the Engineering mode. Thus, the symbol "F10." for function block is displayed first.



7. PARAMETER LIST

Some parameters may not be displayed depending on the conditions. These parameters are displayed when you specify them when ordering or when you have made settings to use the function. Parameters with "▲" in the name will be displayed only when all the display conditions are satisfied.

A. PV/SV Display Mode

No.	Symbol	Name	Display range	Factory set value
1	—	Measured value (PV) display	Within input range. 1, 2	—
2	—	Set value (SV) display	Within input range. 1, 3	—

¹ Varies with the setting of the Decimal point position.
² Setting limiter [low limit] – (5 % of span) to
Setting limiter [high limit] + (5 % of span)
³ Setting limiter [low limit] to Setting limiter [high limit]

B. SV Setting Mode

No.	Symbol	Name	Display or data range	Factory set value
3	—	Set value (SV) setting	Within input range. 1, 2	TC/RTD inputs: 0 (0.0) Voltage/ Current inputs: 0.0
4	5B1 (SV1) ▲	Set value (SV1) setting	—	—
5	5B2 (SV2) ▲	STEP set value (SV2) setting	Within input range. 1, 2	—
6	5B1 (SV) ▲	Set value during its changes (SV) ▲	—	—
7	5B1 (MV) ▲	Heat-side manipulated output value (MV) ▲	–5.0 to +105.0 %	—
8	5B2 (MV2) ▲	Cool-side manipulated output value (MV2) ▲	–5.0 to +105.0 %	—
9	1Lr (ILr) ▲	Alarm interlock release (ILr) ▲	on: Alarm interlock state off: Alarm interlock release	—

¹ Varies with the setting of the Decimal point position.
² Setting limiter [low limit] to Setting limiter [high limit]

C. Parameter Setting Mode

No.	Symbol	Name	Data range	Factory set value
9	LbA (LbA) ▲	Control loop break alarm (LbA) ▲	0.0 to 200.0 minutes (0.0: OFF)	8.0
10	LbD (LbD) ▲	LbA deadband (LbD) ▲	0 (0.0) to Span ¹ (However, 9999 digits or less)	TC/RTD inputs: 0 (0.0) Voltage/ Current inputs: 0.0
11	RL1 (AL1) ▲	Alarm 1 (ALM1) ▲	Process alarm, SV alarm: Same as input range. 1, 2 Deviation alarm: –Span to +Span ¹ (However, within –1999 to +9999 digits)	TC/RTD inputs: 50 (50.0) Voltage/ Current inputs: 5.0
12	RL2 (AL2) ▲	Alarm 2 (ALM2) ▲	—	TC/RTD inputs: 50 (50.0) Voltage/ Current inputs: 5.0
13	ATU (ATU) ▲	Autotuning (AT) ▲	on: AT start or execution off: AT end or cancel When the Autotuning (AT) is finished, the control will automatically return to "off."	off
14	STU (STU) ▲	Self-tuning (ST) ▲	on: Self-tuning ON off: Self-tuning OFF	off
15	P (P) ▲	Heat-side proportional band (P) ▲	0 (0.0) to Span ¹ (However, 9999 digits or less) 0 (0.0): ON/OFF action	TC/RTD inputs: 30 (30.0) Voltage/ Current inputs: 3.0
16	I (I) ▲	Integral time (I) ▲	0 to 3600 seconds (0: PD action)	240
17	D (D) ▲	Derivative time (D) ▲	0 to 3600 seconds (0: PI action)	60
18	ARW (ARW) ▲	Anti-reset windup (ARW) ▲	0 to 100 % of heat-side proportional band (0: Integral action OFF)	100
19	T (T) ▲	Heat-side proportioning cycle time ³ ▲	1 to 100 seconds	Relay contact output: 20 Voltage pulse output: 2
20	Pc (Pc) ▲	Cool-side proportional band ▲	1 to 1000 % of heat-side proportional band	100
21	db (db) ▲	Overlap/Deadband ▲	–Span to +Span ¹ (However, within –1999 to +9999 digits)	TC/RTD inputs: 0 (0.0) Voltage/ Current inputs: 0.0
22	t (t) ▲	Cool-side proportioning cycle time ▲	1 to 100 seconds	Relay contact output: 20 Voltage pulse output: 2
23	Pb (Pb) ▲	PV bias ▲	–Span to +Span ¹ (However, within –1999 to +9999 digits)	TC/RTD inputs: 0 (0.0) Voltage/ Current inputs: 0.0
24	Pr (Pr) ▲	PV ratio (Pr) ▲	0.500 to 1.500 times	1.000
25	dF (dF) ▲	Digital filter ▲	0 to 100 seconds (0: Digital filter OFF)	0
26	Ro (Ao) ▲	Transmission output (AO) specification ▲	Pb: Measured value (PV) Sd: Set value (SV) dEb: Deviation (DEV) rD: Manipulated output value (MV)	Pb
27	RAH5 (AHS) ▲	Transmission output scale high (AHS) ▲	Measured value (PV): Same as input range 1, 4 Set value (SV): Same as input range 1, 4 Deviation (DEV): –Span to +Span 1, 5 (However, within –1999 to +9999 digits) Manipulated output value (MV): 0.0 to 100.0 % ⁶	TC/RTD inputs: Input range high Voltage/ Current inputs: 100.0

¹ Varies with the setting of the Decimal point position.
² Setting limiter [low limit] to Setting limiter [high limit]
³ This parameter is displayed for relay contact output or voltage pulse output.
⁴ Transmission output scale low to Setting limiter [high limit]
⁵ Transmission output scale low to –Span
⁶ Transmission output scale low to 100 %

No.	Symbol	Name	Data range	Factory set value
28	RL5 (ALS) ▲	Transmission output scale low (ALS) ▲	Measured value (PV): Same as input range 1, 2 Set value (SV): Same as input range 1, 2 Deviation (DEV): –Span to +Span 1, 3 (However, 9999 digits or less) Manipulated output value (MV): 0.0 to 100.0 % ⁴	TC/RTD inputs: Input range low Voltage/ Current inputs: 0.0
29	Sb-U (SVrU) ▲	Setting change rate limiter (Up) ▲	TC/RTD inputs: 0 (0.0) to Span °C [°F]/unit time 1, 5 (However, 9999 digits or less)	TC/RTD inputs: 0 (0.0) Voltage/ Current inputs: 0.0
30	Sb-d (SVrD) ▲	Setting change rate limiter (Down) ▲	Voltage/Current inputs: 0 (0.0) to Span/unit time 1, 5 (However, 9999 digits or less)	TC/RTD inputs: 0 (0.0) Voltage/ Current inputs: 0.0
31	LCK (LCK) ▲	Set data lock (LCK) ▲	Parameter which can be changed 0000: All parameters ⁶ 0001: SV, Alarms (ALM1, ALM2) 0010: All parameters except for Alarms (ALM1, ALM2) ⁶ 0100: All parameters except for SV ⁶ 0011: SV 0101: Alarms (ALM1, ALM2) 0110: All parameters except for SV and Alarms (ALM1, ALM2) ⁶ 0111: No parameters (All locked)	0000

¹ Varies with the setting of the Decimal point position.
² Setting limiter [low limit] to Transmission output scale high
³ –Span to Transmission output scale high
⁴ 0.0 % to Transmission output scale high
⁵ The unit time can be set by the "Setting change rate limiter time."
(Factory set value: 60 seconds)
⁶ However, the parameters of the Engineering mode cannot be changed.

D: Communication Setting Mode

No.	Symbol	Name	Data range	Factory set value
32	AdD (Add) ▲	Device address ▲	0 to 99	0
33	bPS (bPS) ▲	Communication speed ▲	240: 2400 bps 480: 4800 bps 960: 9600 bps 1920: 19200 bps 3840: 38400 bps 5760: 57600 bps	960
34	blF (blF) ▲	Data bit configuration ▲	See the following Data bit configuration table.	8n1
35	Int (Int) ▲	Interval time set value ▲	0 to 250 ms	10

Data bit configuration table

Set value	Data bit	Parity bit	Stop bit
7n1 (7n1)	7	None	1
7n2 (7n2)	7	None	2
7E1 (7E1)	7	Even	1
7E2 (7E2)	7	Even	2
7o1 (7o1)	7	Odd	1
7o2 (7o2)	7	Odd	2
8n1 (8n1)	8	None	1
8n2 (8n2)	8	None	2
8E1 (8E1)	8	Even	1
8E2 (8E2)	8	Even	2
8o1 (8o1)	8	Odd	1
8o2 (8o2)	8	Odd	2

■: Not settable for Modbus

E. Engineering Mode

No.	Symbol	Name	Data range	Factory set value
36	F10 (F10) ▲	Function block 10	This is the first parameter symbol of Function block 10.	—
37	SPCH (SPCH) ▲	STOP display screen selection	0: STOP is displayed on the PV display unit. (TYPE 1) 1: STOP is displayed on the SV display unit. (TYPE 2) 2: No selection from RUN to STOP by the front key can be made.	0
38	dCHG (dCHG) ▲	Monitor display configuration selection	0: PV/SV display 1: Only PV display 2: Only SV display	0
39	MVd (MVd) ▲	MV display selection	0: MV display not provided 1: MV display provided	0

No.	Symbol	Name	Data range	Factory set value
40	F21 (F21) ▲	Function block 21	This is the first parameter symbol of Function block 21.	—
41	INP (INP) ▲	Input type selection	0: Thermocouple K ¹ 1: Thermocouple J ¹ 2: Thermocouple R ¹ 3: Thermocouple S ¹ 4: Thermocouple B ¹ 5: Thermocouple E ¹ 6: Thermocouple N ¹ 7: Thermocouple T ¹ 8: Thermocouple C (WRa/W26Re) ¹ 9: Thermocouple PL II ¹ 10: Thermocouple U ¹ 11: Thermocouple L ¹ 12: RTD Pt100 ¹ 13: RTD JPt100 ¹ 14: 0 to 5 V DC or 0 to 20 mA DC 1, 2 15: 1 to 5 V DC or 4 to 20 mA DC 1, 2 16: 0 to 10 V DC ¹	Factory set value varies depending on the instrument specification.
42	UnT (UnT) ▲	Display unit selection	0: °C 1: °F	0
43	PGdP (PGdP) ▲	Decimal point position setting	0: No digit below decimal point 1: 1 digit below decimal point 2: 2 digits below decimal point 3: 3 digits below decimal point	Factory set value varies depending on the instrument specification.
44	SLH (SLH) ▲	Setting limiter [high limit] ▲	–1999 to +9999 Set the Setting limiter by referring to the input range code table in the SA100 Installation Manual (MR01J09-XD). This instrument sets the input range with the Setting limiter. Please note that changing the Setting limiter will also change the input range.	Factory set value varies depending on the instrument specification.
45	SLL (SLL) ▲	Setting limiter [low limit] ▲	—	Factory set value varies depending on the instrument specification.
46	PrSL (PrSL) ▲	PV ratio function selection	0: Disable PV ratio function 1: Enabled PV ratio function	0
47	SMP (SMP) ▲	Sampling cycle	0: 250 ms (0.25 seconds) 1: 500 ms (0.5 seconds)	1

¹ Input type (TC/RTD to voltage/current inputs or voltage/current inputs to TC/RTD) cannot be changed because the hardware is different.
² For the current input specification, a resistor of 250 Ω must be connected between the input terminals.

No.	Symbol	Name	Data range	Factory set value
48	F22 (F22) ▲	Function block 22	This is the first parameter symbol of Function block 22.	—
49	dSL (dSL) ▲	Contact input logic operation selection	0: D11: STEP function D12: RUN/STOP transfer 1: D11: STEP function D12: Alarm interlock release 2: D11: Alarm interlock release D12: RUN/STOP transfer	0

No.	Symbol	Name	Data range	Factory set value
50	F30 (F30) ▲	Function block 30	This is the first parameter symbol of Function block 30.	—
51	LoGC (LoGC) ▲	Output logic operation selection	001: OUT1: Control output OUT2: OR output of Alarm 1 and Alarm 2 (Energized) 002: OUT1: Heat-side control output OUT2: Cool-side control output (In case of direct action or reverse action, it is OFF) 003: OUT1: Control output OUT2: Alarm 1 output (De-energized) 004: OUT1: Control output OUT2: AND output of Alarm 1 and Alarm 2 (Energized) 005: OUT1: Control output OUT2: OR output of Alarm 1 and Alarm 2 (De-energized) 006: OUT1: Control output OUT2: AND output of Alarm 1 and Alarm 2 (De-energized) 007: OUT1: Control output OUT2: Not output (The Alarm state can be checked via communication or by lamp lighting) 008: OUT1: Control output OUT2: Alarm 1 output only (Energized) (Alarm 2 can be checked via communication or by lamp lighting) 009: OUT1: Alarm 1 output (Energized) OUT2: Alarm 2 output (Energized) 010: OUT1: Alarm 1 output (Energized) OUT2: Alarm 2 output (De-energized) 011: OUT1: Alarm 1 output (De-energized) OUT2: Alarm 2 output (De-energized) 012: OUT1: Transmission output OUT2: Control output 013: OUT1: Transmission output OUT2: OR output of Alarm 1 and Alarm 2 (Energized) 014: OUT1: Transmission output OUT2: OR output of Alarm 1 and Alarm 2 (De-energized) 015: OUT1: Transmission output OUT2: AND output of Alarm 1 and Alarm 2 (Energized) 016: OUT1: Transmission output OUT2: AND output of Alarm 1 and Alarm 2 (De-energized) 017: OUT1: Transmission output OUT2: Alarm 1 output (Energized) 018: OUT1: Transmission output OUT2: Alarm 1 output (De-energized) 019: OUT1: Cool-side control output (In case of direct action or reverse action, it is OFF) OUT2: Heat-side control output	Factory set value varies depending on the instrument specification.

No.	Symbol	Name	Data range	Factory set value
52	F41 (F41) ▲	Function block 41	This is the first parameter symbol of Function block 41.	—
53	AS1 (AS1) ▲	Alarm 1 type selection	0: Alarm not provided 1: SV high alarm 2: SV low alarm 3: Process high alarm 4: Process low alarm 5: Deviation high alarm 6: Deviation low alarm 7: Deviation high/low alarm 8: Band alarm 9: Control loop break alarm (LbA) ¹	Factory set value varies depending on the instrument specification
54	RAH1 (RAH1) ▲	Alarm 1 hold action selection	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Effective when the power is turned on, or operation is changed from STOP to RUN or the SV is changed.	Factory set value varies depending on the instrument specification
55	RAH1 (AH1) ▲	Alarm 1 differential gap setting	0 (0.0) to Span ² (However, 9999 digits or less)	TC/RTD inputs: 2 (2.0) Voltage/ Current inputs: 0.2
56	RAE1 (AEo1) ▲	Alarm 1 process abnormality action selection	0: Normal processing 1: Forcibly turned on when abnormal	Alarm 1 not provided or LbA: 0 Alarm 1 provided: 1
57	ILS1 (ILS1) ▲	Alarm 1 interlock function selection	0: Disable Alarm 1 interlock function 1: Enable Alarm 1 interlock function	0

¹ When the instrument is set to "Heat/Cool PID action with autotuning," the Control loop break alarm (LbA) setting does not activate.
² Varies with the setting of the Decimal point position.

No.	Symbol	Name	Data range	Factory set value
58	F42 (F42) ▲	Function block 42	This is the first parameter symbol of Function block 42.	—
59	AS2 (AS2) ▲	Alarm 2 type selection	0: Alarm not provided 1: SV high alarm 2: SV low alarm 3: Process high alarm 4: Process low alarm 5: Deviation high alarm 6: Deviation low alarm 7: Deviation high/low alarm 8: Band alarm	Factory set value varies depending on the instrument specification.
60	RAH2 (AHO2) ▲	Alarm 2 hold action selection	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Effective when the power is turned on, or operation is changed from STOP to RUN or the SV is changed.	Factory set value varies depending on the instrument specification
61	RAH2 (AH2) ▲	Alarm 2 differential gap setting	0 (0.0) to Span ¹ (However, 9999 digits or less)	TC/RTD inputs: 2 (2.0) Voltage/ Current inputs: 0.2
62	RAE2 (AEo2) ▲	Alarm 2 process abnormality action selection	0: Normal processing 1: Forcibly turned on when abnormal	Alarm 2 not provided: 0 Alarm 2 provided: 1
63	ILS2 (ILS2) ▲	Alarm 2 interlock function selection	0: Disable Alarm 2 interlock function 1: Enable Alarm 2 interlock function	0

¹ Varies with the setting of the Decimal point position.

No.	Symbol	Name	Data range	Factory set value
64	F51 (F51) ▲	Function block 51	This is the first parameter symbol of Function block 51.	—
65	oS1 (oS1) ▲	Control action type selection	0: PID action with autotuning (Direct action) [D type] 1: PID action with autotuning (Reverse action) [F type] 2: Heat/Cool PID action with autotuning (Water cooling) [W type] 3: Heat/Cool PID action with autotuning (Air cooling) [A type]	Factory set value varies depending on the instrument specification.
66	oH (oH) ▲	ON/OFF action differential gap setting	0 (0.0) to Span ¹ (However, 9999 digits or less)	TC/RTD inputs: 2 (2.0) Voltage/ Current inputs: 0.2

¹ Varies with the setting of the Decimal point position.

No.	Symbol	Name	Data range	Factory set value
67	F61 (F61) ▲	Function block 61	This is the first parameter symbol of Function block 61.	—
68	CMPS (CMPS) ▲	Communication protocol selection	0: RKC standard protocol 1: Modbus protocol	Factory set value varies depending on the instrument specification.

No.	Symbol	Name	Data range	Factory set value
69	F71 (F71) ▲	Function block 71	This is the first parameter symbol of Function block 71.	—
70	5B-5 (SVr5) ▲	Setting change rate limiter Used/Unused	0: Unused 1: Used	0
71	5B-F (SVrF) ▲	Setting change rate limiter time	1 to 3600 seconds	60

No.	Symbol	Name	Data range	Factory set value
72	F91 (F91) ▲	Function block 91	This is the first parameter symbol of Function block 91.	—
73	1376 (1376) ▲	ROM version	Display the version of loading software.	—
74	dT (dT) ▲	Integrated operating time	0 to 99999 hours	—
75	TCJ (TCJ) ▲	Holding peak ambient temperature	0.0 to 999.9 °C	—
76	PHLd (PHLd) ▲	Peak hold	Within input range 1, 2	—
77	bHLd (bHLd) ▲	Bottom hold	Within input range 1, 2	—
78	HLdR (HLdR) ▲	Hold reset	0: Hold reset execution After executing the hold reset, the value automatically returns to "1."	1

¹ Varies with the setting of the Decimal point position.
² Setting limiter [low limit] to Setting limiter [high limit]

Modbus is a registered trademark of Schneider Electric.
Company names and product names used in this manual are the trademarks or registered trademarks of the respective companies.