

Digital Temperature Controller

RB series
(RB100/400/500/700/900)

Parameter
List

All Rights Reserved, Copyright © 2009, RKC INSTRUMENT INC.

IMR02C40-E2

Some parameters are not displayed depending on the model and the specifications.

For detailed parameters, refer to separate **RB series Instruction Manual (IMR02C15-E□)**.
The manual can be downloaded from the official RKC website:
http://www.rkcinst.com/english/manual_load.htm.

1. Monitor Display Mode

Display	Name	Display range	Factory set value
	Measured value (PV)/ Set value (SV) monitor	PV display: PV is displayed. Input scale low to Input scale high SV display: The target value for control is displayed. Set value (SV) [AUTO mode] Manual manipulated output value (MV) [MAN mode]* *MAN lamp lights	—
	Current transformer 1 (CT1) input value monitor	0.0 to 30.0 A (CTL-6-P-N) 0.0 to 100.0 A (CTL-12-S56-10L-N)	—
	Current transformer 2 (CT2) input value monitor	0.0 to 30.0 A (CTL-6-P-N) 0.0 to 100.0 A (CTL-12-S56-10L-N)	—
	Manipulated output value (MV1) monitor [heat-side]	Within output limiter range	—
	Manipulated output value (MV2) monitor [cool-side]	Within output limiter range	—
	Remaining time monitor	0 minutes 00 seconds to 99 minutes 59 seconds or 0 hours 00 minutes to 99 hours 59 minutes	—

2. SV Setting Mode

Display	Name	Data range	Factory set value
	Measured value (PV)/ Set value (SV)	Setting limiter low to Setting limiter high The target value for control can be set.	0 (0.0)
	Measured value (PV)/ Manipulated output value (MV)	PID control: Output limiter low to Output limiter high Heat/Cool PID control: —Output limiter low to +Output limiter high When in MAN mode, Manual manipulated output value (MV) can be set.	0.0

3. Mode Switching

Display and Name	Data range	Factory set value
Auto (AUTO)/Manual (MAN) transfer 	0000: Auto (AUTO) mode 0001: Manual (MAN) mode	0000
Set data unlock/lock transfer * 	0000: Unlock 0001: Lock *Factory shipment: Data lock function OFF (All parameters can be changed) To validate the Data lock function, settings are required in Set Lock level of Engineering mode.	0000
Interlock release * 	0000: Interlock release 0001: Interlock state (only monitor) *Factory shipment: Interlock function OFF To validate the Interlock function, it is necessary to set interlock to "1: Used" in Engineering mode.	0000

4. Parameter Setting Mode

Display	Name	Data range	Factory set value
	Set value 1 (SV1)	Setting limiter low to Setting limiter high	0 (0.0)
	Set value 2 (SV2)		0 (0.0)
	Set value 3 (SV3)		0 (0.0)
	Set value 4 (SV4)		0 (0.0)
	SV selection	1 to 4 One of the 4 set values can be selected and used for control. [Effective when Timer function 1 or 2 is selected.]	1
	Timer 1	00 minutes 01 seconds to 99 minutes 59 seconds or 00 hours 01 minutes to 99 hours 59 minutes	00:01
	Timer 2	[Factory set value of time unit of Timer: 0 (min..sec.)]	00:01
	Timer 3		00:01
	Timer 4		00:01
	Timer function	0 (Unused), 1 (Timer function 1) to 4 (Timer function 4) For Timer function, refer to separate RB series Instruction Manual (IMR02C15-ED) .	0
	Repeat execution times	0 to 9999 (9999: Infinite times) [Effective when Timer function 3 or 4 is selected.]	0
	Setting change rate limiter (up)	1(0.1) to Input span (Unit: °C [°F])/unit time (0: Unused) [Factory set value of unit time: 0 (minute)]	0 (0.0)

Display	Name	Data range	Factory set value
	Setting change rate limiter (down)	1(0.1) to Input span (Unit: °C [°F])/unit time (0: Unused) [Factory set value of unit time: 0 (minute)]	0 (0.0)
	Event 1 set value (EV1)	<Displayed when event code A to T, V or W is selected.> Deviation action: -Input span to +Input span Input value or set value action: Same as input range	TC/RTD: 50 (50.0) V/I: 5.0
	Event 1 set value (EV1) [high]	<Displayed when event code U, X, Y or Z is selected.> -Input span to +Input span	TC/RTD: 50 (50.0) V/I: 5.0
	Event 1 set value (EV1') [low]		TC/RTD: -50 (-50.0) V/I: -5.0
	Event 2 set value (EV2)	The data range is the same as Event 1 set value (EV1).	TC/RTD: 50 (50.0) V/I: 5.0
	Event 2 set value (EV2) [high]	The data range is the same as Event 1 set value (EV1) [high].	TC/RTD: 50 (50.0) V/I: 5.0
	Event 2 set value (EV2') [low]	The data range is the same as Event 1 set value (EV1') [low].	TC/RTD: -50 (-50.0) V/I: -5.0
	Event 3 set value (EV3)	The data range is the same as Event 1 set value (EV1).	TC/RTD: 50 (50.0) V/I: 5.0
	Event 3 set value (EV3) [high]	The data range is the same as Event 1 set value (EV1) [high].	TC/RTD: 50 (50.0) V/I: 5.0
	Event 3 set value (EV3') [low]	The data range is the same as Event 1 set value (EV1') [low].	TC/RTD: -50 (-50.0) V/I: -5.0
	Event 4 set value (EV4)	The data range is the same as Event 1 set value (EV1).	TC/RTD: 50 (50.0) V/I: 5.0
	Event 4 set value (EV4) [high]	The data range is the same as Event 1 set value (EV1) [high].	TC/RTD: 50 (50.0) V/I: 5.0
	Event 4 set value (EV4') [low]	The data range is the same as Event 1 set value (EV1') [low].	TC/RTD: -50 (-50.0) V/I: -5.0
	Autotuning (AT)	0: PID control 1: AT	0
	Startup tuning (ST)	0: ST unused 1: Execute once 2: Execute always	0
	Proportional band [heat-side]	TC/RTD inputs: 1(0.1) to Input span (Unit: °C [°F]) [Resolution of 0.1 °C (°F): Within 999.9 °C (°F)] Voltage (V)/Current (I) inputs: 0.1 to 100.0 % of Input span 0 (0.0): ON/OFF action	TC/RTD: 30 (30.0) V/I: 3.0
	Integral time	1 to 3600 seconds (0: PD action)	240
	Derivative time	1 to 3600 seconds (0: PI action)	60
	Anti-reset windup (ARW)	1 to 100 % of Proportional band [heat-side] (0: Integral action is always OFF)	100
	Proportional band [cool-side]	1 to 1000 % of Proportional band [heat-side] (ON/OFF control of cool-side only is not possible)	100
	Overlap/Deadband	TC/RTD inputs: -10 (-10.0) to +10 (+10.0) °C [°F] Voltage (V)/Current (I) inputs: -10.0 to +10.0 % of Input span Minus (-) setting results in overlap.	0 (0.0)
	Fine tuning setting	-3 to +3 (0: Unused)	0
	Heater break alarm 1 (HBA1) set value	0.0 to 100.0 A (0.0: Unused [Current value can be monitored])	0.0
	Heater break alarm 2 (HBA2) set value	[Displayed when event code "1" is selected.]	0.0
	Control loop break alarm (LBA) time	0 to 7200 seconds (0: Unused) [Displayed when event code "2" is selected.]	480
	LBA deadband (LBD)	0 to Input span [Displayed when event code "2" is selected.]	0
	Proportional cycle time [heat-side]	0 to 100 seconds (0: Setting below 1 second is possible for Time setting of proportional cycle time [heat-side] in the Engineering mode F51) [Displayed when OUT1 code M, V, T or D is selected.]	Relay contact output: 20 Voltage pulse output, Ttsc output, Open collector output: 2
	Minimum ON/OFF time of proportioning cycle [heat-side]	0 to 1000 ms [Displayed when OUT1 code M, V, T or D is selected.]	0
	Output limiter high [Heat-side output limiter (high)]	PID control: Output limiter low to 105.0 % Heat/Cool PID control: 0.0 to 105.0 %	105.0
	Output limiter low [Cool-side output limiter (high)]	PID control *: -5.0 % to Output limiter high * Output limiter high > Output limiter low Heat/Cool PID control: 0.0 to 105.0 %	PID control: -5.0 Heat/Cool PID control: 105.0
	Proportional cycle time [cool-side]	0 to 100 seconds (0: Setting below 1 second is possible for Time setting of proportional cycle time [cool-side] in the Engineering mode F51) [Displayed when OUT2 code M, V, T or D is selected.]	Relay contact output: 20 Voltage pulse output, Ttsc output, Open collector output: 2
	Minimum ON/OFF time of proportioning cycle [cool-side]	0 to 1000 ms [Displayed when OUT2 code M, V, T or D is selected.]	0
	PV bias	TC/RTD inputs: -1999 (-199.9) to +9999 (+999.9) °C [°F] Voltage (V)/Current (I) inputs: -Input span to +Input span	0 (0.0)
	PV digital filter	0 to 100 seconds (0: Unused)	1
	Manual manipulated output value (MV)	PID control: Output limiter low to Output limiter high Heat/Cool PID control: -Cool-side output limiter (high) to +Heat-side output limiter (high)	0.0

5. Engineering Mode

**WARNING**

Parameters in the Engineering mode (F21 to F70) 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.

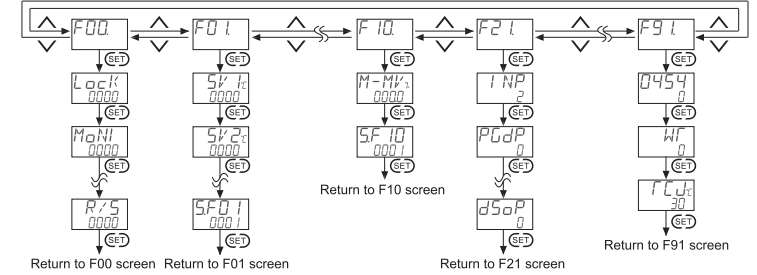
5.1 Function block (F□□) structure in the Engineering mode

Setting items are classified into groups (Function block: F□□) within the Engineering mode. Set to meet application requirements.

F00:
Non-display screen settings (Monitor display mode, Mode switching), Set lock level settings for the Setting data lock function, and RUN/STOP switching in Engineering mode can be selected.

F01 to F10:
The parameter setting screen that is displayed in Parameter setting mode can be hidden.

F21 to F91:
Settings related to the specifications of this product can be selected. However, to display F21 and after, setting ModE (Mode selection [no display]) in F00 to 128 is required.



5.2 Restricting access to the Engineering mode

The relationships between Engineering mode, Set data unlock/lock, and RUN/STOP are shown below.

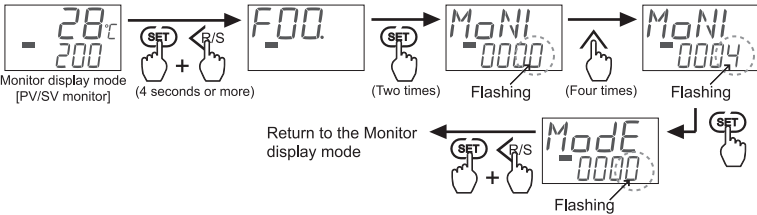
	◎: Can be displayed and changed	○: Can be displayed	●: Cannot be displayed or changed
Set data unlock/lock transfer	Engineering mode	RUN/STOP	
		RUN	STOP (STOP lamp lights)
Unlock	F00	◎	◎
	F01 to F10 *	◎	◎
	F21 to F91	○	◎ (Excluding F91)
Lock ( lamp lights)	F00	◎	◎
	F01 to F10 *	◎	◎
	F21 to F91	●	●

* Some setting items in Parameter setting mode are the same as the items in F01 to F10. When the set value of one of these items is changed, the set value of the corresponding item in the other mode also changes. However, with respect to parameters that can be changed in the locked state, this applies only to F□□ parameters that are not locked in the Set lock level setting.

5.3 Function Block 00 (F00)

Display	Name	Data range	Factory set value
	Function block 00	This is first parameter symbol of Function block 00.	
	Set lock level	0 to 10	0
		0 All parameters can be changed 1 Lock "Parameter Group" F01 through F10 2 Lock "Parameter Group" F02 through F10 3 Lock "Parameter Group" F03 through F10 4 Lock "Parameter Group" F04 through F10 5 Lock "Parameter Group" F05 through F10 6 Lock "Parameter Group" F06 through F10 7 Lock "Parameter Group" F07 through F10 8 Lock "Parameter Group" F08 through F10 9 Lock "Parameter Group" F09 and F10 10 Lock "Parameter Group" F10	
	Monitor selection (no display)	0: Display all 1: Current transformer 1 (CT1) input value monitor [no display] 2: Current transformer 2 (CT2) input value monitor [no display] 4: Manipulated output value (MV) monitor [no display]* 8: Remaining time monitor [no display] * MV monitors is not displayed with Heat/Cool control type.  Refer to setting example.	0
	Mode selection (no display)	0: Display Mode switching screen (Auto/Manual transfer, Set data unlock/lock transfer, Interlock release). 1: Auto (AUTO)/Manual (MAN) transfer [no display] 2: Set data unlock/lock transfer [no display] 4: Interlock release [no display] 8: Disable RUN/STOP key operation 128: Displays F21 and after	0
	RUN/STOP setting	0: RUN 1: STOP (STOP lamp lights)	0

Setting example: Hiding the parameter screen  of Manipulated output value (MV) monitor



 Set the value of the item that you wish to hide. If there are multiple items that you wish to hide, set the sum of the values of the items.

5.4 Function Block 01 (F01) to 10 (F10)

Display	Name	Data range	Factory set value
	Function block 01	This is first parameter symbol of Function block 01. [Parameters related to Set values (SV)]	
	Set value 1 (SV1)	Setting limiter low to Setting limiter high	0 (0.0)
	Set value 2 (SV2)		0 (0.0)
	Set value 3 (SV3)		0 (0.0)
	Set value 4 (SV4)		0 (0.0)
	SV selection	1 to 4 One of the 4 set values can be selected and used for control. [Effective when Timer function 1 or 2 is selected.]	1
	F01 block selection (no display)	0: Display 1: No display	1
	Function block 02	This is first parameter symbol of Function block 02. [Parameters related to Timer function]	
	Timer 1	00 minutes 01 seconds to 99 minutes 59 seconds or 00 hours 01 minutes to 99 hours 59 minutes	00:01
	Timer 2	[Factory set value of time unit of Timer: 0 (min..sec.)]	00:01
	Timer 3		00:01
	Timer 4		00:01
	Timer function	0 (Unused), 1 (Timer function 1) to 4 (Timer function 4)	0
	Repeat execution times	0 to 9999 (9999: Infinite times) [Effective when Timer function 3 or 4 is selected.]	0
	F02 block selection (no display)	0: Display 1: No display	1
	Function block 03	This is first parameter symbol of Function block 03. [Parameters related to Setting change rate limiter]	
	Setting change rate limiter (up)	1(0.1) to Input span (Unit: °C [°F])/unit time (0: Unused)	0 (0.0)
	Setting change rate limiter (down)	[Factory set value of unit time: 0 (minute)]	0 (0.0)
	F03 block selection (no display)	0: Display 1: No display	1
	Function block 04	This is first parameter symbol of Function block 04. [Parameters related to Event set values]	
	Event 1 set value (EV1)	<Displayed when event code A to T, V or W is selected.> Deviation action: -Input span to +Input span Input value or set value action: Same as input range	TC/RTD: 50 (50.0) V/I: 5.0
	Event 1 set value (EV1) [high]	<Displayed when event code U, X, Y or Z is selected.> -Input span to +Input span	TC/RTD: 50 (50.0) V/I: 5.0
	Event 1 set value (EV1') [low]		TC/RTD: -50 (-50.0) V/I: -5.0
	Event 2 set value (EV2)	The data range is the same as Event 1 set value (EV1).	TC/RTD: 50 (50.0) V/I: 5.0
	Event 2 set value (EV2) [high]	The data range is the same as Event 1 set value (EV1) [high].	TC/RTD: 50 (50.0) V/I: 5.0
	Event 2 set value (EV2') [low]	The data range is the same as Event 1 set value (EV1') [low].	TC/RTD: -50 (-50.0) V/I: -5.0
	Event 3 set value (EV3)	The data range is the same as Event 1 set value (EV1).	TC/RTD: 50 (50.0) V/I: 5.0
	Event 3 set value (EV3) [high]	The data range is the same as Event 1 set value (EV1) [high].	TC/RTD: 50 (50.0) V/I: 5.0
	Event 3 set value (EV3') [low]	The data range is the same as Event 1 set value (EV1') [low].	TC/RTD: -50 (-50.0) V/I: -5.0
	Event 4 set value (EV4)	The data range is the same as Event 1 set value (EV1).	TC/RTD: 50 (50.0) V/I: 5.0
	Event 4 set value (EV4) [high]	The data range is the same as Event 1 set value (EV1) [high].	TC/RTD: 50 (50.0) V/I: 5.0
	Event 4 set value (EV4') [low]	The data range is the same as Event 1 set value (EV1') [low].	TC/RTD: -50 (-50.0) V/I: -5.0
	F04 block selection (no display)	0: Display 1: No display	0
	Function block 05	This is first parameter symbol of Function block 05. [Parameters related to AT and ST]	
	Autotuning (AT)	0: PID control 1: AT	0
	Startup tuning (ST)	0: ST unused 1: Execute once 2: Execute always	0
	F05 block selection (no display)	0: Display 1: No display	0
	Function block 06	This is first parameter symbol of Function block 06. [Parameters related to PID values, ARW and Fine tuning]	
	Proportional band [heat-side]	TC/RTD inputs: 1(0.1) to Input span (Unit: °C [°F]) [Resolution of 0.1 °C (°F): Within 999.9 °C (°F)] Voltage (V)/Current (I) inputs: 0.1 to 100.0 % of Input span 0 (0.0): ON/OFF action	TC/RTD: 30 (30.0) V/I: 3.0
	Integral time	1 to 3600 seconds (0: PD action)	240
	Derivative time	1 to 3600 seconds (0: PI action)	

Display	Name	Data range	Factory set value
	Anti-reset windup (ARW)	1 to 100 % of Proportional band [heat-side] (0: Integral action is always OFF)	100
	Proportional band [cool-side]	1 to 1000 % of Proportional band [heat-side] (ON/OFF control of cool-side only is not possible)	100
	Overlap/Deadband	TC/RTD inputs: ~10 (~10.0) to +10 (+10.0) °C [°F] Voltage (V)/Current (I) inputs: ~10.0 to +10.0 % of Input span Minus (-) setting results in overlap.	0 (0.0)
	Fine tuning setting	~3 to +3 (0: Unused)	0
	F06 block selection (no display)	0: Display 1: No display	0
	Function block 07	This is first parameter symbol of Function block 07. [Parameters related to HBA set value, LBA time and the LBD]	
	Heater break alarm 1 (HBA1) set value	0.0 to 100.0 A (0.0: Unused [Current value can be monitored])	0.0
	Heater break alarm 2 (HBA2) set value	[Displayed when event code "1" is selected.]	0.0
	Control loop break alarm (LBA) time	0 to 7200 seconds (0: Unused) [Displayed when event code "2" is selected.]	480
	LBA deadband (LBD)	0 to Input span [Displayed when event code "2" is selected.]	0
	F07 block selection (no display)	0: Display 1: No display	0
	Function block 08	This is first parameter symbol of Function block 08. [Parameters related to Proportional cycle time and Output limiter]	
	Proportional cycle time [heat-side]	0 to 100 seconds (0: Setting below 1 second is possible for Time setting of proportional cycle time [heat-side] in the Engineering mode F51) [Displayed when OUT1 code M, V or D is selected.]	Relay contact output: 20 Voltage pulse output, Open collector output: 2
	Minimum ON/OFF time of proportioning cycle [heat-side]	0 to 1000 ms [Displayed when OUT1 code M, V or D is selected.]	0
	Output limiter high [Heat-side output limiter (high)]	PID control: Output limiter low to 105.0 % Heat/Cool PID control: 0.0 to 105.0 %	105.0
	Output limiter low [Cool-side output limiter (high)]	PID control *: ~5.0 % to Output limiter high * Output limiter high > Output limiter low Heat/Cool PID control: 0.0 to 105.0 %	PID control: ~5.0 Heat/Cool PID control: 105.0
	Proportional cycle time [cool-side]	0 to 100 seconds (0: Setting below 1 second is possible for Time setting of proportional cycle time [cool-side] in the Engineering mode F51) [Displayed when OUT2 code M, V or D is selected.]	Relay contact output: 20 Voltage pulse output, Open collector output: 2
	Minimum ON/OFF time of proportioning cycle [cool-side]	0 to 1000 ms [Displayed when OUT2 code M, V or D is selected.]	0
	F08 block selection (no display)	0: Display 1: No display	0
	Function block 09	This is first parameter symbol of Function block 09. [Parameters related to Input correction]	
	PV bias	TC/RTD inputs: ~1999 (~199.9) to +9999 (+999.9) °C [°F] Voltage (V)/Current (I) inputs: ~Input span to +Input span	0 (0.0)
	PV digital filter	0 to 100 seconds (0: Unused)	1
	F09 block selection (no display)	0: Display 1: No display	0
	Function block 10	This is first parameter symbol of Function block 10. [Parameters related to Manual manipulated output value (MV)]	
	Manual manipulated output value (MV)	PID control: Output limiter low to Output limiter high Heat/Cool PID control: ~Cool-side output limiter (high) to +Heat-side output limiter (high)	0.0
	F10 block selection (no display)	0: Display 1: No display	1

5.5 Function block 21(F21) to 91(F91)

Conditions for displaying F21 and after: Refer to "5.2 Restricting Access to Engineering Mode"

• 128 must be set in Mode selection (no display) [ModE]. Refer to "5.3 Function Block 00 (F00)"

• Settings must be unlocked. Refer to "3. Mode Switching"

Display	Name	Data range	Factory set value
	Function block 21	This is first parameter symbol of Function block 21. [Parameters related to Input type]	
	Input type	0 to 38 [Refer to table 1.]	Depends on model code
	Decimal point position	0 (No decimal place), 1 (One decimal place) to 3 (Three decimal places) TC/RTD inputs: 0 to 1 Voltage (V)/Current (I) inputs: 0 to 3	Depends on model code
	Burnout direction	0: Upscale 1: Downscale Valid only when the TC input is selected.	0
	Input scale high	TC/RTD inputs: Input scale low to Maximum value of the selected input range Voltage (V)/Current (I) inputs: ~1999 to +9999 (Varies with the setting of the Decimal point position) Input scale low < Input scale high	TC/RTD: Maximum value of the selected input range V/I: 100.0
	Input scale low	TC/RTD inputs: Minimum value of the selected input range to Input scale high Voltage (V)/Current (I) inputs: ~1999 to +9999 (Varies with the setting of the Decimal point position) Input scale low < Input scale high	TC/RTD: Minimum value of the selected input range V/I: 0.0

Display	Name	Data range	Factory set value
	Setting limiter high	Setting limiter low to Input scale high	Input scale high
	Setting limiter low	Input scale low to Setting limiter high	Input scale low
	PV flashing display at input error	0: Flashing 1: Non-flashing display	0
	Function block 23	This is first parameter symbol of Function block 23. [Parameters related to DI assignment]	
	DI assignment	0 to 7 [Refer to table 2.]	Depends on model code
	Function block 30	This is first parameter symbol of Function block 30. [Parameters related to Output action at STOP mode and STOP display]	
	Output action at STOP mode	0: Both event output and transmission output (AO) are off. 1: Event output remains unchanged, and transmission output (AO) is off. 2: Event output is off, and transmission output (AO) remains unchanged. 3: Both event output and transmission output (AO) remain unchanged.	0
	STOP display selection	0: STOP on PV display + STOP lamp (green) lights 1: STOP on SV display + STOP lamp (green) lights 2: STOP lamp (green) lights	1
	Function block 33	This is first parameter symbol of Function block 33. [Parameters related to Transmission output]	
	Transmission output type	0: Manipulated output value (MV1) 1: Measured value (PV) 2: Set value (SV)	1
	Transmission output scale high	When MV1 is selected: Transmission output scale low to +105.0 % When PV or SV is selected: Transmission output scale low to Input scale high	High-limit value of input span
	Transmission output scale low	When MV1 is selected: ~5.0 % to Transmission output scale high When PV or SV is selected: Input scale low to Transmission output scale high	Low-limit value of input span
	AO full scale adjustment value	~10.0 to +10.0 %	Adjustment value
	AO zero adjustment value	Do not change the factory set adjustment value for the AO zero adjustment value and or the AO full scale adjustment value as the accuracy will be changed.	Adjustment value
	Function block 41	This is first parameter symbol of Function block 41. [Parameters related to Event function]	
	Event 1 type	0 to 23 [Refer to table 3.]	Depends on model code
	Event 1 hold action	0: OFF 1: Hold action ON (When power turned on; when transferred from STOP to RUN) 2: Re-hold action ON (When power turned on; when transferred from STOP to RUN; SV changed)	Depends on model code
	Event 1 differential gap	0 to Input span	TC/RTD: 2 (2.0) V/I: 0.2
	Event 1 output action at input burnout	0: Event output is not forcibly turned ON when the Burnout function is activated. 1: ON at overscale; no action at underscale 2: ON at underscale; no action at overscale 3: ON at overscale or underscale 4: OFF at overscale or underscale	0
	Energized/De-energized of Event 1 output	0: Energized 1: De-energized	0
	Event 1 timer	0 to 600 seconds	0
	Event 1 interlock	0: Unused 1: Used	0

Parameters include in the Function block F42 (Event 2) to F44 (Event 4) are the same at those in Function block F41 (Event 1).

	Function block 45	This is first parameter symbol of Function block 45. [Parameters related to HBA function]	
	CT ratio (Number of turns)	1 to 1000	CTL-6P: 800 CTL-12P: 1000
	Number of HBA delay times	0 to 255 times	3
	Function block 51	This is first parameter symbol of Function block 51. [Parameters related to Control action]	
	Direct/Reverse action	0: Direct action 1: Reverse action	Depends on model code
	Cool action	0: Air cooling 1: Water cooling 2: Cooling gain linear	Depends on model code
	ON/OFF action differential gap (upper)	TC/RTD inputs: 0 (0.0) to 100 (100.0) °C [°F] Voltage (V)/Current (I) inputs: 0.0 to 10.0 % of Input span	TC/RTD: 1 (1.0) V/I: 0.1
	ON/OFF action differential gap (lower)		TC/RTD: 1 (1.0) V/I: 0.1
	Control output at burnout	0: Result of control computation 1: Low output limiter value (Output OFF)* * In case of Heat/Cool control type, both heating and cooling outputs are off.	0
	Bumpless mode setting	0: Without bumpless 1: With bumpless	1
	Derivative action	0: Measured value derivative 1: Deviation derivative	0
	Time setting of proportional cycle time [heat-side]	0: 0.1 second (fixed) 1: 0.25 second (fixed) 2: 0.5 second (fixed)	When Proportional cycle time [heat-side] is set to 0 second in the Parameter setting mode, this setting item becomes valid for the Proportional cycle time [heat-side].
	Time setting of proportional cycle time [cool-side]	0: 0.1 second (fixed) 1: 0.25 second (fixed) 2: 0.5 second (fixed)	When Proportional cycle time [cool-side] is set to 0 second in the Parameter setting mode, this setting item becomes valid for the Proportional cycle time [cool-side].

Display	Name	Data range	Factory set value
	Function block 52	This is first parameter symbol of Function block 52. [Parameters related to AT cycles, AT differential gap time and ST start condition]	
	AT cycles	0: 1.5 cycles 1: 2.5 cycles	0
	AT differential gap time	0 to 50 seconds	10
	ST start condition	0: Activate the ST function when the power is turned on; when transferred from STOP to RUN; or when the Set value (SV) is changed. 1: Activate the ST function when the power is turned on; or when transferred from STOP to RUN. 2: Activate the ST function when the Set value (SV) is changed.	0
	Function block 60	This is first parameter symbol of Function block 60. [Parameters related to Communication function]	
	Communication protocol	0: RKC communication 1: Modbus	Depends on model code
	Device Address	0 to 99 (Modbus: 1 to 99)	0 (Modbus: 1)
	Communication speed	0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps	3
	Data bit configuration	0 to 11 (Modbus: 0 to 5) [Refer to table 4.]	0
	Interval time	0 to 250 ms	10
	Communication response monitor	0: Normal response 1: Overrun error 2: Parity error 4: Framing error 8: Receive buffer overflow If two or more errors happen, the sum of errors will be displayed.	0
	Function block 70	This is first parameter symbol of Function block 70. [Parameters related to Setting change rate limiter unit time and Timer time unit]	
	Setting change rate limiter unit time	0: Minute 1: Hours	0
	Timer time unit	0: Min.: sec. 1: Hour: min.	0
	Function block 91	This is first parameter symbol of Function block 91. [Parameters related to Monitor]	
	ROM version monitor	Display the version of loaded software.	—
	Integrated operating time monitor	0 to 9999 hours	—
	Holding peak value ambient temperature monitor	~10 to +100 °C	—

Table 1: Input type (F21.)

Set value	Input type	Range code	Set value	Input type	Range code
0	K -199.9 to +400.0 °C	K43	20	J -328 to +2192 °F	JA1, JA2, JB9
1	K 0.0 to 800.0 °C	K09, K10	21	T -199.9 to +300.0 °F	TC8
2	K ~200 to +1372 °C	K01 to K06, K41	22	T 0.0 to 600.0 °F	TC7
3	J -199.9 to +300.0 °C	J07	23	T -328 to +752 °F	TC9
4	J -200 to +1200 °C	J01 to J06, J15	24	S 0 to 3216 °F	SA2
5	T -199.9 to +300.0 °C	T02, T03, T05	25	R 0 to 3216 °F	RA2
6	T 0.0 to +400.0 °C	T06	26	E 0 to 1832 °F	EA1, EA2
8	S 0 to 1769 °C	S02	27	B 0 to 3308 °F	BA1, BA2
9	R 0 to 1769 °C	R02	28	N 0 to 2372 °F	NA1, NA2
10	E 0 to 1000 °C	E01, E02	29	PL II 0 to 2534 °F	AA1, AA2
11	B 0 to 1820 °C	B01, B02	30	WSRe/WSRe 0 to 4208 °F	WA4
12	N 0 to 1300 °C	N01, N02	31	P1100 -199.9 to +900.0 °F	DA2 to DA9, DB2
13	PL II 0 to 1390 °C	AO1, AO2	33	Voltage input 0 to 1 V DC	301
14	WSRe/WSRe 0 to 2320 °C	W01, W02	34	Voltage input 0 to 5 V DC	401
15	P1100 -199.9 to +649.0 °C	D01 to D10	35	Voltage input 0 to 10 V DC	501
16	JP1100 -199.9 to +649.0 °C	P01 to P10	36	Voltage input 1 to 5 V DC	601
17	K -100.0 to +752.0 °F	KC8	37	Current input 0 to 20 mA DC	701
18	K -328 to +2501 °F	KA1, KA2, KC7	38	Current input 4 to 20 mA DC	801
19	J -199.9 to +550.0 °F	JC8			

Do not set to any number which is not described in the input type table above. This may cause malfunctioning.

The Input type can be changed.
[Inputs is selectable within each group (TC/RTD input group, Voltage/Current input group).]

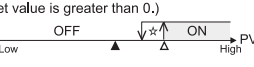
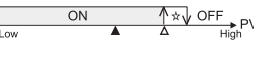
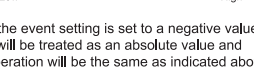
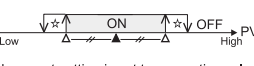
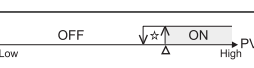
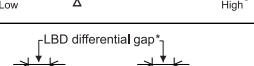
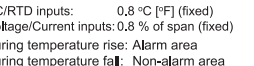
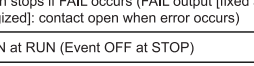
Table 2: DI assignment (F23.)

Set value	DI1	DI2	SV selection function (SV1 to SV4):
0	Unused (No DI assignment)		
1	SV selection function (SV1 to SV4) ¹		
2	SV selection function ² (SV1 to SV2)	RUN/STOP transfer ³	
3	SV selection function ² (SV1 to SV2)	AUTO/MAN transfer ⁴	
4	SV selection function ² (SV1 to SV2)	Interlock release ⁵	
5	RUN/STOP transfer ³	AUTO/MAN transfer ⁴	
6	RUN/STOP transfer ³	Interlock release ⁵	
7	AUTO/MAN transfer ⁴	Interlock release ⁵	

Mode select from key operation or communication	DI-switched *	Actual state	Indication lamp
SV selection function Example: In case of SV selecting function (SV1 to SV2) SV1 is selected	SV2 is selected (Contact closed)	Switched to SV2	SV1 lamp turns off SV2 lamp lights
RUN/STOP transfer	RUN	RUN (Contact closed) STOP (Contact open)	STOP lamp turns off
	STOP	RUN (Contact closed) STOP (Contact open)	STOP lamp lights
AUTO/MAN transfer	AUTO mode	AUTO (Contact closed) MAN (Contact open)	MAN lamp turns off
	MAN mode	AUTO (Contact closed) MAN (Contact open)	MAN lamp lights

* Selected status by DI is not back up by EEPROM.

Table 3: Event type (F41. to F44.)

Set value	Event type code		Action
0	N	None	
1	A	Deviation high (Using SV monitor value)	(Event set value is greater than 0.) 
	E	Deviation high with hold action * (Using SV monitor value)	
	Q	Deviation high with re-hold action * (Using SV monitor value)	
14		Deviation high (Using local SV)	(Event set value is less than 0.) 
		Deviation high with hold action * (Using local SV)	
		Deviation high with re-hold action * (Using local SV)	
2	B	Deviation low (Using SV monitor value)	(Event set value is greater than 0.) 
	F	Deviation low with hold action * (Using SV monitor value)	
	R	Deviation low with re-hold action * (Using SV monitor value)	
15		Deviation low (Using local SV)	(Event set value is less than 0.) 
		Deviation low with hold action * (Using local SV)	
		Deviation low with re-hold action * (Using local SV)	
3	C	Deviation high/low (Using SV monitor value) ◆	
	G	Deviation high/low with hold action * (Using SV monitor value) ◆	
	T	Deviation high/low with re-hold action * (Using SV monitor value) ◆	
16		Deviation high/low (Using local SV) ◆	◆: If the event setting is set to a negative value, it will be treated as an absolute value and operation will be the same as indicated above. 
		Deviation high/low with hold action * (Using local SV) ◆	
		Deviation high/low with re-hold action * (Using local SV) ◆	
5	X	Deviation high/low (Using SV monitor value) [High/Low individual setting]	
	Y	Deviation high/low with hold action (Using SV monitor value)* [High/Low individual setting]	
	Z	Deviation high/low with re-hold action (Using SV monitor value)* [High/Low individual setting]	
18		Deviation high/low (Using local SV) [High/Low individual setting]	
		Deviation high/low with hold action (Using local SV) * [High/Low individual setting]	
		Deviation high/low with re-hold action (Using local SV) * [High/Low individual setting]	
4	D	Band (Using SV monitor value) ◆	
6	U	Band (Using SV monitor value) [High/Low individual setting]	
17		Band (Using local SV) ◆	
19		Band (Using local SV) [High/Low individual setting]	◆: If the event setting is set to a negative value, it will be treated as an absolute value and operation will be the same as indicated above.
9	H	Process high	
	K	Process high with hold action *	
10	J	Process low	
	L	Process low with hold action *	
7	V	SV high (Using SV monitor value)	
20		SV high (Using local SV)	
8	W	SV low (Using SV monitor value)	
21		SV low (Using local SV)	
11	2	Control loop break alarm (LBA) **	 * TC/RTD inputs: 0.8 °C [°F] (fixed) Voltage/Current inputs: 0.8 % of span (fixed) A: During temperature rise: Alarm area During temperature fall: Non-alarm area B: During temperature rise: Non-alarm area During temperature fall: Alarm area
13	3	FAIL	Operation stops if FAIL occurs (FAIL output [fixed at de-energized]: contact open when error occurs)
12	4	Monitor during RUN	Event ON at RUN (Event OFF at STOP)
22	1	Heater break alarm (HBA)	Alarm is on in case of HBA status.
23	5	Output of the communication monitoring result	Event signal is turned on when communication is not properly made for 10 seconds.