Multi-point Digital Controller

MA900/MA901

Initial Setting Manual

RKC INSTRUMENT INC.

IMR01H03-E4

- 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.

Thank you for purchasing this RKC instrument. 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.

SYMBOLS

WARNING : This mark indicates precautions that must be taken if there is danger of electric shock, fire, etc., which could result in loss of life or injury.

CAUTION : This mark indicates that if these precautions and operating procedures are not taken, damage to the instrument may result.

 : This mark indicates that all precautions should be taken for safe usage.

 : This mark indicates important information on installation, handling and operating procedures.

 : This mark indicates supplemental information on installation, handling and operating procedures.

 : This mark indicates where additional information may be located.

⚠ WARNING

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument and equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction can occur and warranty is void under these conditions.

CAUTION

- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take adequate measures.
- This instrument is protected from electric shock by reinforced insulation. Provide reinforced insulation between the wire for the input signal and the wires for instrument power supply, source of power and loads.
- Be sure to provide an appropriate surge control circuit respectively for the following:
  - If input/output or signal lines within the building are longer than 30 meters.
  - If input/output or signal lines leave the building, regardless the length.
- This instrument is designed for installation in an enclosed instrumentation panel. All high-voltage connections such as power supply terminals must be enclosed in the instrumentation panel to avoid electric shock by operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- All wiring must be in accordance with local codes and regulations.
- All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action.
  The power must be turned off before repairing work for input break and output failure including replacement of sensor, contactor or SSR, and all wiring must be completed before power is turned on again.
- To prevent instrument damage or failure, protect the power line and the input/output lines from high currents with a protection device such as fuse, circuit breaker, etc.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.
- For proper operation of this instrument, provide adequate ventilation for heat dispensation.
- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration will occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to instrument display, do not rub with an abrasive material or push front panel with a hard object.
- Do not connect modular connectors to telephone line.

NOTICE

- This manual is written for RKC service engineers or qualified technicians. This manual is also prepared especially for readers who already have a fundamental knowledge of electricity, control, computer and communication.
- The figures, diagrams and numeric values used in this manual are only for purpose of illustration.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
- No portion of this document may be reprinted, modified, copied, transmitted, digitized, stored, processed or retrieved through any mechanical, electronic, optical or other means without prior written approval from RKC.

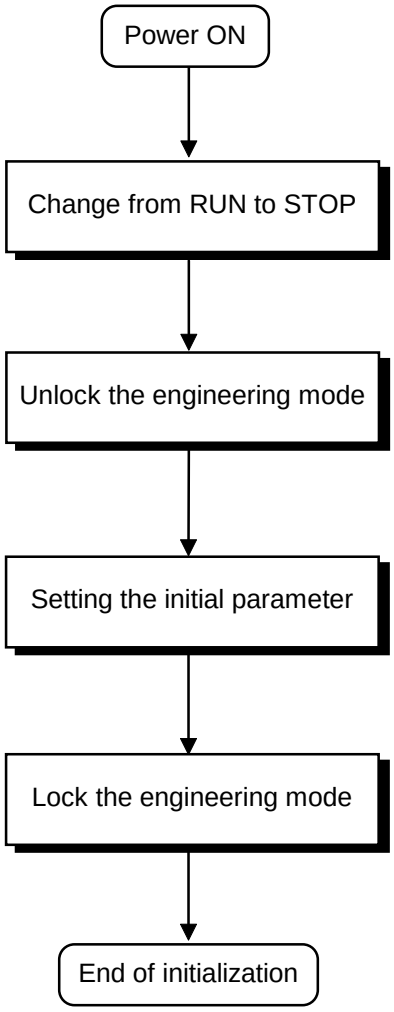
CONTENTS

MEMO

1. PROCEDURE FOR INITIALIZATION

Initialization is to set parameters relating to instrument specifications (input type, input range, alarm type, etc.). Engineering mode that can do this setting.

■ Initialization flowchart



☞ See 1.1 Transfer to Engineering Mode.

☞ See 1.1 Transfer to Engineering Mode.

☞ See 1.2 Procedure for Parameter Setting.
☞ See 2. DETAILS OF PARAMETER SETTING.

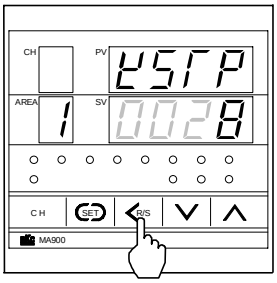
☞ See 1.3 End of Engineering Mode.

1.1 Transfer to Engineering Mode

MA900 is used in the below figures for explanation, but the same setting procedures also apply to MA901.

The parameter of engineering mode can be changed only in the control STOP state.

1. Press the <R/S key with states of the PV/SV monitor mode for 1 second, to change the STOP from RUN.



STOP display

If set to the STOP state (dSTP) by the contact input, no parameters in Engineering mode can be changed. They can be changed in case of the following.

- The instrument changed the STOP state (KSTP) by the key operation.
- The instrument changed the STOP state by both the key operation and contact input operation.

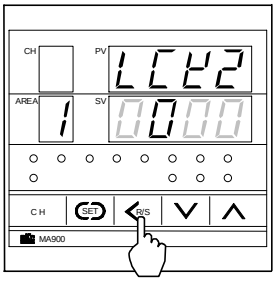
For the RUN/STOP transfer, see the **Instruction Manual (IMR01H01-E□)**

2. Press the <R/S key while pressing the SET key with the PV/SV monitor mode change the instrument to setup setting mode.

For the setup setting mode, see **Instruction Manual (IMR01H01-E□)**.

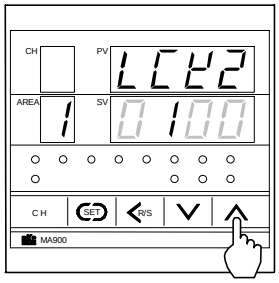
3. Press the SET key several times to change to the lock level 2 display (*LCK2*).

4. Press the <R/S key to light brightly the hundreds digit on the SV display.



Lock level 2 display

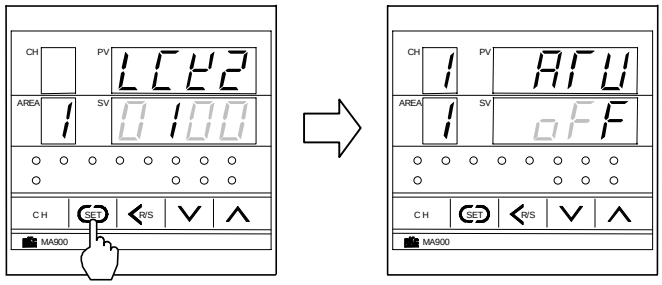
5. Press the UP key to change *0* to *1* in the hundreds digit.



Lock level 2 display

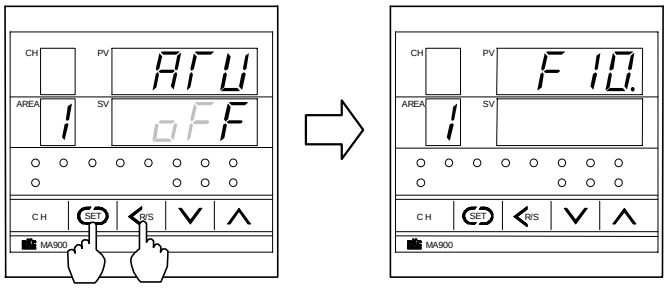
Set value
0000: Lock
0100: Unlock

6. Press the SET key to unlock the engineering mode. The display changes to the first parameter in setup setting mode.



Lock level 2 display　　Autotuning display

7. Press the <R/S key for 2 seconds while pressing the SET key to change the engineering mode. The display changes to the function block *F10*.



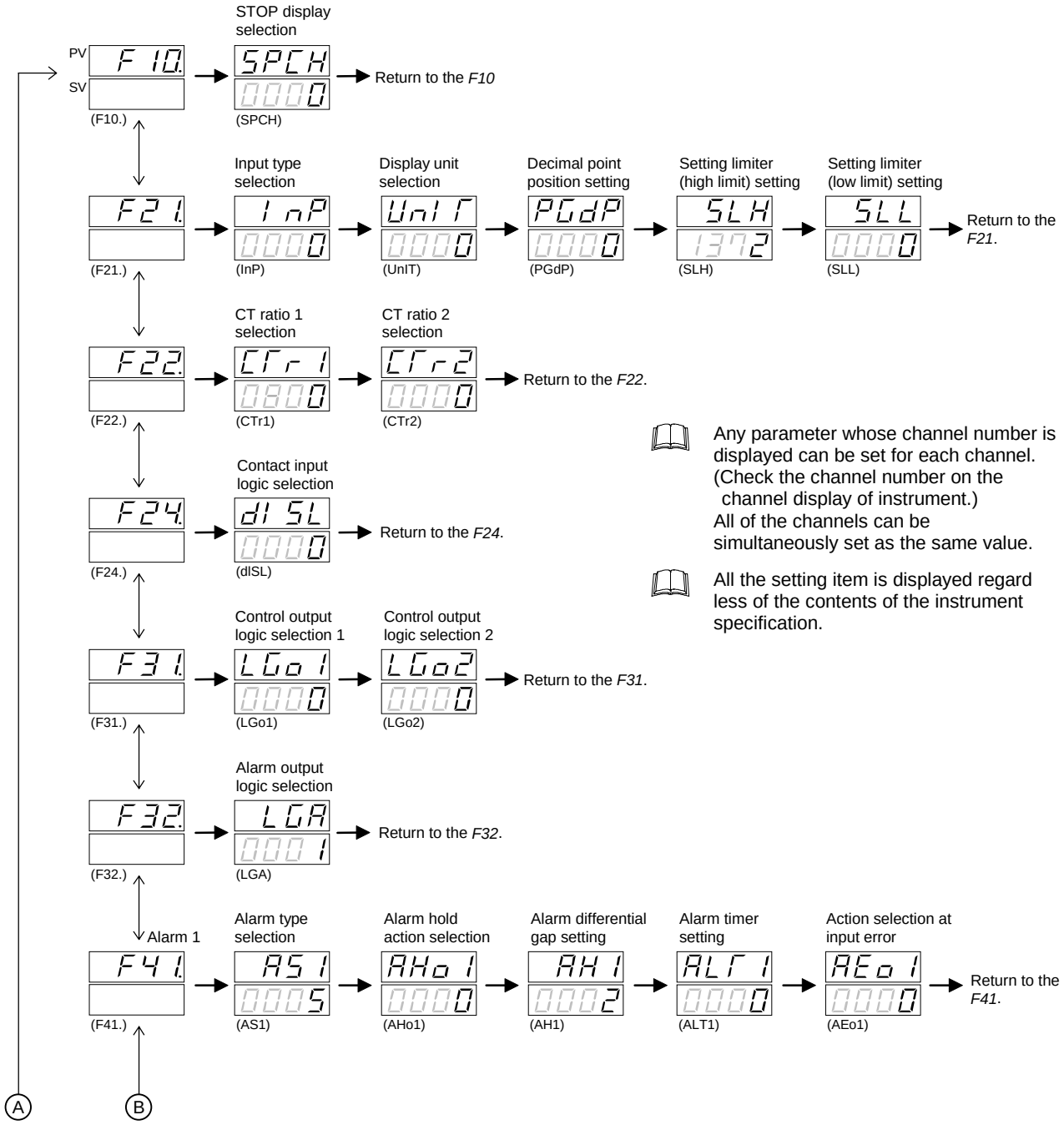
Autotuning display　　Function block F10 display
Engineering mode

1.2 Procedure for Parameter Setting

■ Flowchart of displaying parameter items

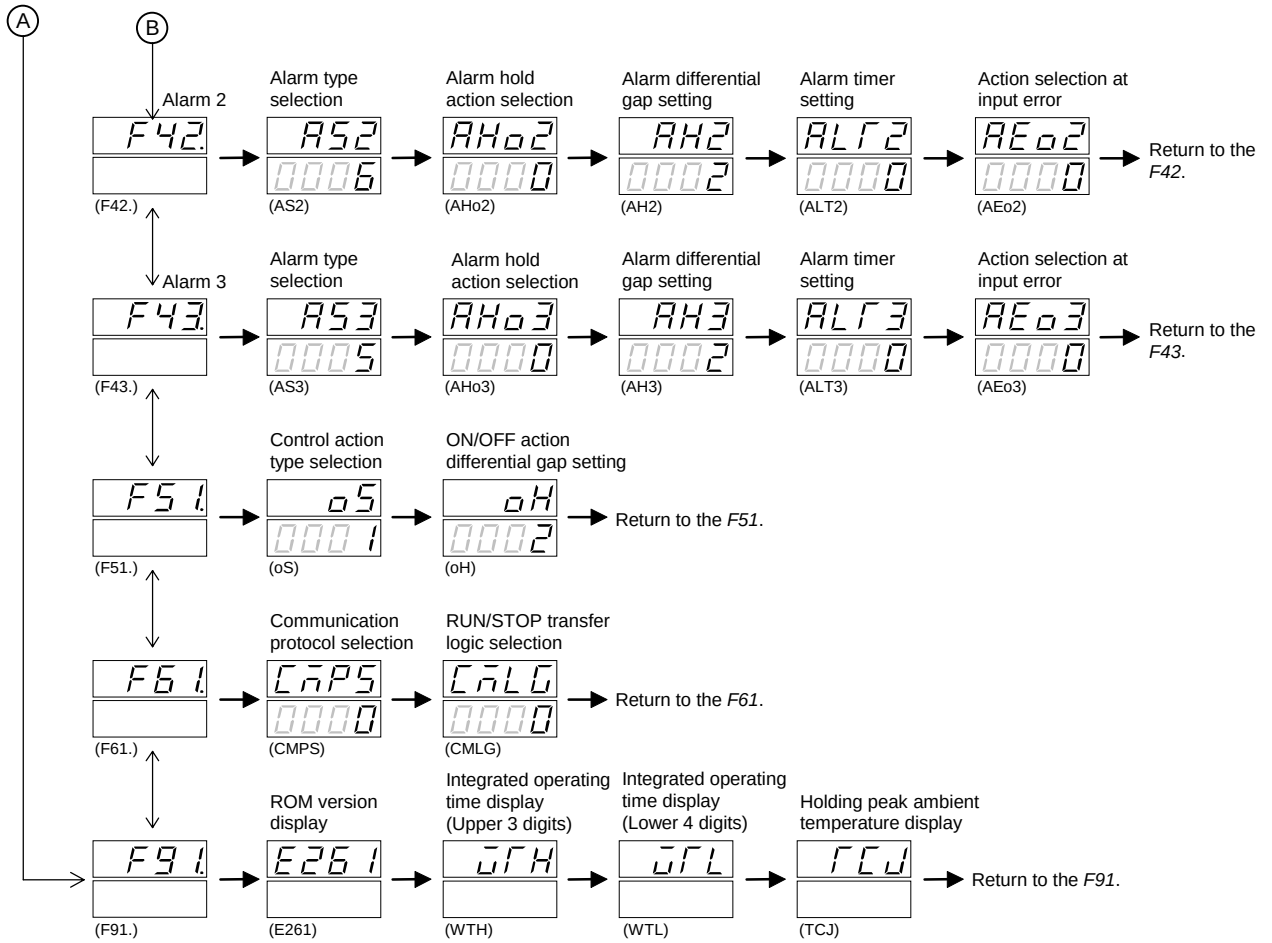
Display flowcharts in engineering mode are shown in the following.

[→ : Press the SET key ↕: Press the UP or DOWN key]



Any parameter whose channel number is displayed can be set for each channel. (Check the channel number on the channel display of instrument.)
All of the channels can be simultaneously set as the same value.

All the setting item is displayed regard less of the contents of the instrument specification.


A
B
Alarm 2
Alarm type selection
Alarm hold action selection
Alarm differential gap setting
Alarm timer setting
Action selection at input error
F42.
(F42.)
AS2
0006
(AS2)
AHo2
0000
(AHo2)
AH2
0002
(AH2)
ALT2
0000
(ALT2)
AEo2
0000
(AEo2)
Return to the F42.
Alarm 3
Alarm type selection
Alarm hold action selection
Alarm differential gap setting
Alarm timer setting
Action selection at input error
F43.
(F43.)
AS3
0005
(AS3)
AHo3
0000
(AHo3)
AH3
0002
(AH3)
ALT3
0000
(ALT3)
AEo3
0000
(AEo3)
Return to the F43.
Control action type selection
ON/OFF action differential gap setting
F51.
(F51.)
oS
0001
(oS)
oH
0002
(oH)
Return to the F51.
Communication protocol selection
RUN/STOP transfer logic selection
F61.
(F61.)
CMPS
0000
(CMPS)
CMLG
0000
(CMLG)
Return to the F61.
ROM version display
Integrated operating time display (Upper 3 digits)
Integrated operating time display (Lower 4 digits)
Holding peak ambient temperature display
F91.
(F91.)
E261
(E261)
WTH
(WTH)
WTL
(WTL)
TCJ
(TCJ)
Return to the F91.

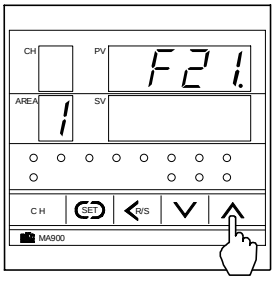
■ Example of changing the setting

As setting procedure example, show procedure at setting with each channel (Usual setting) and channel common (Batch setting).

MA900 is used in the below figures for explanation, but the same setting procedures also apply to MA901.

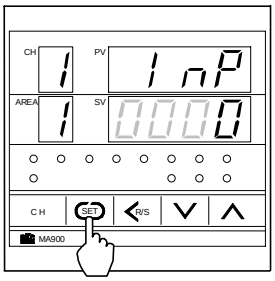
Example 1:
The following procedure is for changing the CH1 input type from “K” to “J.” (Usual setting)

1. Press the UP key to change the display to *F21*.



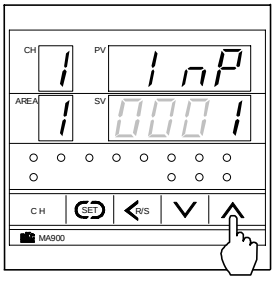
Function block display

2. Press the SET key to change to input type selection (*InP*).



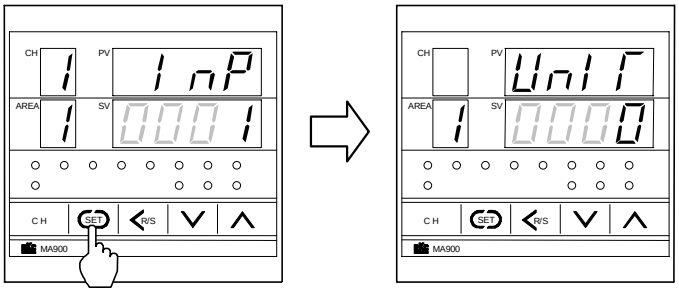
Input type selection

3. Press the UP key to enter *1* in the least significant digit of the set value (SV) display.



Input type selection

4. Press the SET key to register the value thus set. The display changes to the next parameter.

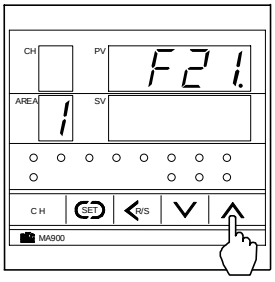


Input type selection　　Display unit selection

Example 2:

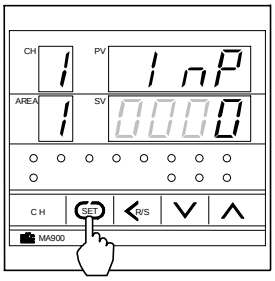
The following procedure is for changing all channels of the input type from “K” to “J.” (Batch setting)

1. Press the UP key to change the display to *F21*.



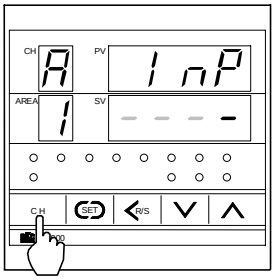
Function block display

2. Press the SET key to change to input type selection (*InP*).



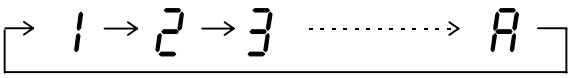
Input type selection

3. Press the CH key several times. Display the character *A* on the CH display and "----" on the SV display. The character *A* indicates that the batch setting.

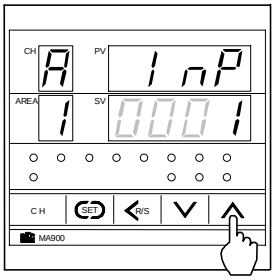


Input type selection

Every time the CH key is pressed, the channel number changes as follows.

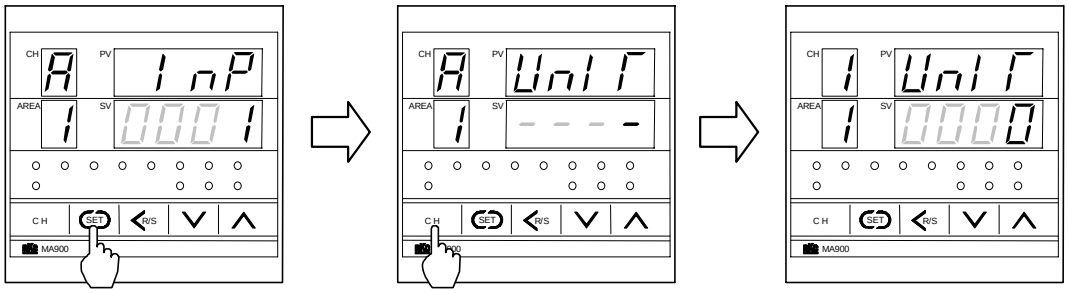


4. Press the UP key several times to enter *1* in the least significant digit of the set value (SV) display.



Input type selection

5. Press the SET key to register the value thus set. The display changes to the next parameter. Press the CH key to return to the usual setting from the batch setting.



Input type selection | Display unit selection (Batch setting) | Display unit selection (Usual setting)

If the selected parameter corresponds to the setting item in common to all channels, the simultaneous setting state returns to the normal setting state.

1.3 End of Engineering Mode

MA900 is used in the above figures for explanation, but the same setting procedures also apply to MA901.

1. Transfer to function block symbol display (*F□□*) after each parameter is set.

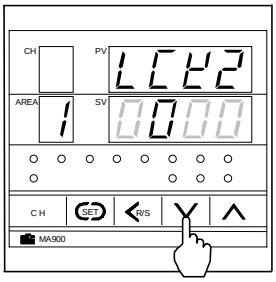
2. Press the <R/S key for 2 seconds while pressing the SET key to change to the PV/SV monitor mode from the engineering mode.

3. Press the <R/S key while pressing the SET key with the PV/SV monitor mode change the instrument to setup setting mode.

4. Press the SET key several times to change to the lock level 2 display (*LCK2*).

5. Press the <R/S key to light brightly the hundreds digit on the SV display.

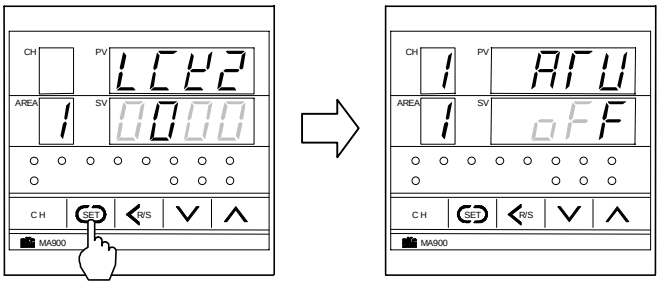
6. Press the DOWN key to change *1* to *0* in the hundreds digit.



Lock level 2 display

Set value
0000: **Lock**
0100: Unlock

7. Press the SET key to lock the engineering mode. The display changes to the first parameter in setup setting mode.



Lock level 2 display Autotuning display

8. Press the <R/S key while pressing the SET key to change to the PV/SV monitor mode from the setup setting mode. Thus, the initialization ends.

2. DETAILS OF PARAMETER SETTING

■ Parameter list

Function block		Parameter		Page
F 1 0. (F10.)	Display function	STOP display selection	SPCH (SPCH)	P. 17
F 2 1. (F21.)	Input specification	Input type selection	InP (InP)	P. 18
		Display unit selection	UnIT (UnIT)	
		Decimal point position selection	PGdP (PGdP)	P. 19
		Setting limiter (high limit) setting	SLH (SLH)	
		Setting limiter (low limit) setting	SLL (SLL)	
F 2 2. (F22.)	Current transformer (CT) input specification	CT ratio 1 selection	CTr1 (CTr1)	P. 20
		CT ratio 2 selection	CTr2 (CTr2)	
F 2 4. (F24.)	Contact input specification	Contact input logic selection	dISL (dISL)	P. 22
F 3 1. (F31.)	Output function	Control output logic selection 1	LGo1 (LGo1)	P. 24 (MA900)
		Control output logic selection 2	LGo2 (LGo2)	P. 25 (MA901)
F 3 2. (F32.)	Alarm output function	Alarm output logic selection	LGA (LGA)	P. 26
F 4 1. (F41.)	Alarm 1 function	Alarm 1 type selection	AS1 (AS1)	P. 27
		Alarm 1 hold action selection	AHo1 (AHo1)	
		Alarm 1 differential gap setting	AH1 (AH1)	P.28
		Alarm 1 timer setting	ALT1 (ALT1)	
		Alarm 1 action selection at input error	AEo1 (AEo1)	P. 29

Continued on the next page.

Continued from the previous page.

Function block		Parameter			Page
F42. (F42.)	Alarm 2 function	Alarm 2 type selection	AS2	(AS2)	P. 27
		Alarm 2 hold action selection	AHo2	(AHo2)	
		Alarm 2 differential gap setting	AH2	(AH2)	P. 28
		Alarm 2 timer setting	ALT2	(ALT2)	
		Alarm 2 action selection at input error	AEo2	(AEo2)	P. 29
F43. (F43.)	Alarm 3 function	Alarm 3 type selection	AS3	(AS3)	P. 27
		Alarm 3 hold action selection	AHo3	(AHo3)	
		Alarm 3 differential gap setting	AH3	(AH3)	P. 28
		Alarm 3 timer setting	ALT3	(ALT3)	
		Alarm 3 action selection at input error	AEo3	(AEo3)	P. 29
F51. (F51.)	Control action	Control action type selection	oS1	(oS1)	P. 29
		ON/OFF action differential gap setting	oH	(oH)	
F61. (F61.)	Communication function	Communication protocol selection	CMPS	(CMPS)	P. 30
		RUN/STOP transfer logic selection	CMLG	(CMLG)	
F91. (F91.)	Displayed for maintenance information	ROM version display	E261	(E261)	P. 31
		Integrated operating time (Upper 3 digits) display	WTH	(WTH)	
		Integrated operating time (Lower 4 digits) display	WTL	(WTL)	
		Holding peak ambient temperature display	TCJ	(TCJ)	

2.1 Attention Items in Setting

If any of the following parameter is changed, the relevant set value is initialized or is automatically converted.

- Before changing the set values, always record all of them (SV setting & CT monitor mode, setup setting mode, parameter setting mode and engineering mode).
- After changing the set values, always check all of them (SV setting & CT monitor mode, setup setting mode, parameter setting mode and engineering mode).

■ When changed parameter of input type selection or engineering unit setting

When change a input type and unit, all the set value of a list shown below is initialized. Set it in value to use once again.

Mode	Description	Default value		
		TC input	RTD input	Voltage input
Engineering mode	Decimal point position	0 [1]	1 [2]	
	Setting limiter [high limit]	Maximum settable value		100.0 %
	Setting limiter [low limit]			0.0 %
	Alarm 1 hold action	0 (Without alarm hold action)		
	Alarm 1 differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
	Alarm 1 action at input error	0 (Without action at input error)		
	Alarm 2 hold action	0 (Without alarm hold action)		
	Alarm 2 differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
	Alarm 2 action at input error	0 (Without action at input error)		
	Alarm 3 hold action	0 (Without alarm hold action)		
	Alarm 3 differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
	Alarm 3 action at input error	0 (Without action at input error)		
	ON/OFF action differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
Setup setting mode	Heater break alarm 1	OFF		
	Heater break alarm 2 [3]	OFF		
	PV bias	0 °C [°F]	0.0 °C [°F]	0.0 %
	Digital filter	OFF		

[1] 0: No digit below decimal point

[2] 1: 1 digit below decimal point

[3] In case of MA901, this item is not provided.

Continued on the next page.

Continued from the previous page.

Mode	Description	Default value		
		TC input	RTD input	Voltage input
Parameter setting mode	Control loop break alarm	8.0 minutes		
	Control loop break alarm deadband	0 °C [°F]	0.0 °C [°F]	0.0 %
	Alarm 1	50 °C [°F]	50.0 °C [°F]	5.0 % of span
	Alarm 2			
	Alarm 3			
	Heat-side proportional band	30 °C [°F]	30.0 °C [°F]	3.0 % of span
	Integral time	240 seconds		
	Derivative time	60 seconds		
	Anti-reset windup	100 %		
	Cool-side proportional band *	100 % of heat-side proportional band		
	Overlap/deadband *	0 °C [°F]	0.0 °C [°F]	0.0 %
	Setting changing rate limiter	OFF		
SV setting & CT monitor mode	Set value (SV)	0 °C [°F]	0.0 °C [°F]	0.0 %

* In case of MA901, these items are not provided.

■ When changed parameter of decimal point position setting

When change a decimal point position, it is converted into about set value of a list shown below automatically. However, the set value may change as a result of changing the position of the decimal point. Therefore in that case, re-set it to the value to be used.

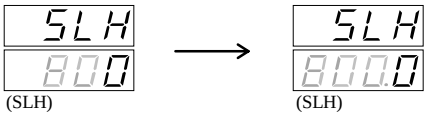
Mode	Description
Engineering mode	Setting limiter [high limit]
	Setting limiter [low limit]
	Alarm 1 differential gap
	Alarm 2 differential gap
	Alarm 3 differential gap
	ON/OFF action differential gap
Setup setting mode	PV bias
Parameter setting mode	Control loop break alarm deadband
	Alarm 1
	Alarm 2
	Alarm 3
	Heat-side proportional band
	Overlap/deadband *
	Setting changing rate limiter
SV setting & CT monitor mode	Set value (SV)

* In case of MA901, this item is not provided.

Example and caution of automatic conversion

- Decimal point location moves in accordance with it when increases decimal point location.

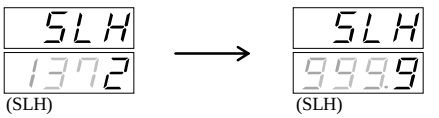
  Example: When the position of the decimal point changed from *0* to *1* with SLH set to 800 °C.



(Changed from *800* to *800.0*)

- If the setting range is not between −1999 and +9999 regardless of the position of the decimal point, it is limited by the range from −1999 to +9999.

  Example: Suppose set SLH is 1372 °C, if change decimal point position from *0* to *1*.



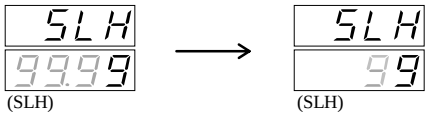
SLH becomes *999.9* as it exceeds the setting range.

Continued on the next page.

Continued from the previous page.

- If the number of digits below the decimal point is changed in the decreasing direction, the decreased number of digits is omitted.

  Example: Suppose set SLH is *99.99*, if change decimal point position from *0* to *2*.

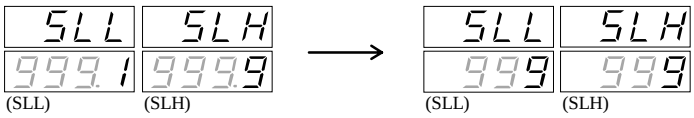


The figures below the decimal point are omitted, and as a result SLH becomes *99*.

In the above example, it the position of the decimal point is returned to 2 from 0, SLH becomes 99.00.

- Set SLL and SLH so that SLL may not be equal to SLH when the position of the decimal point is changed. Otherwise malfunction may result.

  Example: When the position of the decimal point is changed to 0 at SLL=*999.1* and SLH=*999.9*



■ When changed parameter of setting limiter [high limit/low limit]

When change setting limiter [high limit/low limit], all the set value of a list shown below is initialized. Set it in value to use once again. However no change is made if the set value is within the range changed.

Mode	Description
Engineering mode	Alarm 1 differential gap
	Alarm 2 differential gap
	Alarm 3 differential gap
	ON/OFF action differential gap
Setup setting mode	PV bias
Parameter setting mode	Control loop break alarm deadband
	Alarm 1
	Alarm 2
	Alarm 3
	Heat-side proportional band
	Overlap/deadband *
	Setting change rate limiter
SV setting & CT monitor mode	Set value (SV)

* In case of MA901, this item is not provided.

Example: For temperature input, voltage/current inputs
If the setting is made so that the span becomes narrower, there may be a case where the related set value becomes smaller or *0*.

■ When changed parameter of alarm type selection

When change alarm 1 type and alarm 2 type, all the set value of a list shown below is initialized. Set it in value to use once again.

Mode	Description	Default value		
		TC input	RTD input	Voltage input
Engineering mode	Alarm 1 hold action	0 (Without alarm hold action)		
	Alarm 1 differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
	Alarm 1 action at input error	0 (Without action at input error)		
	Alarm 2 hold action	0 (Without alarm hold action)		
	Alarm 2 differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
	Alarm 2 action at input error	0 (Without action at input error)		
	Alarm 3 hold action	0 (Without alarm hold action)		
	Alarm 3 differential gap	2 °C [°F]	2.0 °C [°F]	0.2 % of span
	Alarm 3 action at input error	0 (Without action at input error)		
Setup setting mode	Heater break alarm 1	OFF		
	Heater break alarm 2 *	OFF		
Parameter setting mode	Control loop break alarm	8.0 minutes		
	Control loop break alarm deadband	0 °C [°F]	0.0 °C [°F]	0.0 %
	Alarm 1	50 °C [°F]	50.0 °C [°F]	5.0 % of span
	Alarm 2			
	Alarm 3			

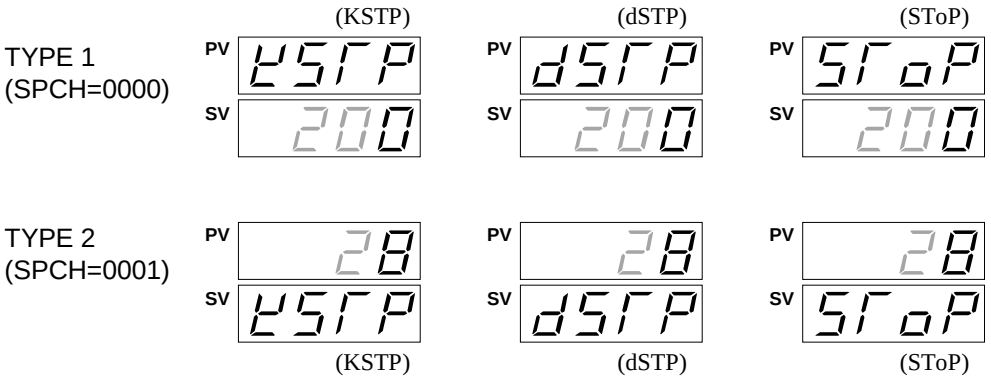
* In case of MA901, this item is not provided.

2.2 F10 Display function

(1) STOP display selection (SPCH)

Details of setting		Factory set value
0000	STOP is displayed on the PV display unit. (TYPE 1)	0000
0001	STOP is displayed on the SV display unit. (TYPE 2)	

Displays in the STOP mode become as follows.



2.3 F21 Input Specification

The setting items (InP, UnIT, PGdP, SLH and SLL) in the function block F21 are set for each channel. In addition, they can be set simultaneously for all channels.

(1) Input type selection (InP)

Details of setting			Factory set value
0000	K	Thermocouple * (TC)	Factory set value varies depending on the input type.
0001	J		
0002	R		
0003	S		
0004	B		
0005	E		
0006	N		
0007	T		
0008	W5Re/W26Re		
0009	PL II		
0010	U		
0011	L		
0012	Pt100	RTD *	
0013	JPt100		
0014	0 to 5 V DC	Voltage *	
0015	1 to 5 V DC		
0016	0 to 10 V DC		

* Input type cannot be changed because the hardware is different.

☞ See **2.1 Attention Items in Setting (P. 12)**.

(2) Display unit selection (UnIT)

Details of setting		Factory set value
0000	°C	0000
0001	°F	

📖 The invalidity in case of the voltage inputs.

☞ See **2.1 Attention Items in Setting (P. 12)**.

(3) Decimal point position setting (PGdP)

Details of setting		Factory set value
0000	No digit below decimal point (□□□□)	Note 1
0001	1 digit below decimal point (□□□.□)	
0002	2 digits below decimal point (□□.□□) *	
0003	3 digits below decimal point (□.□□□) *	

* When input type is thermocouple and RTD, no setting can be changed.

Note 1 Factory set value varies depending on the instrument specification.

☞ See. **2.1 Attention Items in Setting (P. 12)**.

(4) Setting limiter [high limit] (SLH)
Setting limiter [low limit] (SLL)

Details of setting			Factory set value
Thermocouple	K	−199 to +1372 °C (−326 to +2502 °F)	Factory set value varies depending on the instrument specification.
		−199.9 to +999.9 °C (−199.9 to +999.9 °F)	
	J	−199 to +1200 °C (−326 to +2192 °F)	
		−199.9 to +999.9 °C (−199.9 to +999.9 °F)	
	R	0 to 1769 °C (0 to 3216 °F)	
	S	0 to 1769 °C (0 to 3216 °F)	
	B	0 to 1820 °C (0 to 3308 °F)	
	E	0 to 1000 °C (0 to 1832 °F)	
	N	0 to 1300 °C (0 to 2372 °F)	
		0 to 999.9 °C (0 to 999.9 °F)	
	T	−199 to +400 °C (−326 to +752 °F)	
		−199.9 to +400.0 °C (−199.9 to +752.0 °F)	
	W5Re/W26Re	0 to 2320 °C (0 to 4208 °F)	
	PL II	0 to 1390 °C (0 to 2534 °F)	
	U	−199 to +600 °C (−326 to +1112 °F)	
		−199.9 to +600.0 °C (−199.9 to +999.9 °F)	
	L	0 to 900 °C (0 to 1652 °F)	
RTD	Pt100 (JIS/IEC [1])	−199.9 to +649.0 °C (−199.9 to +999.9 °F)	
	JPt100 (JIS)		
Voltage [2]	0 to 5 V DC	−1999 to +9999 (programmable scale)	SLH: 100.0 SLL: 0.0
	1 to 5 V DC		
	0 to 10 V DC		

[1] **IEC** (**International Electrotechnical Commission**) is equivalent to **JIS, DIN** and **ANSI**.

[2] In case of voltage/current inputs, SLH can be set below SLL.

☞ Set the setting limiter referring to the **4. INPUT RANGE TABLES (P. 55)**.

☞ See. **2.1 Attention Items in Setting (P. 12)**.

2.4 F22 Current Transformer (CT) Input Specification

If the heater break alarm is selected as the alarm 2, the number of turns * of the current transformer (CT) used is set for each channel. In addition, it can be set simultaneously for all channels.

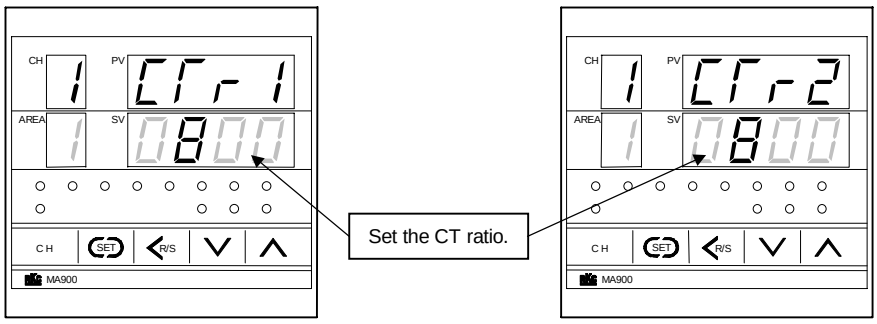
* The number of turns = CT ratio

The heater break alarm for three-phase heater can not be specified with MA901.

When the MA901 instrument specification corresponds to contact input or communication function, the heater break alarm can't be added. Therefore, do not use this parameter.

■ CT ratio 1 selection (CTr1) [Heater break alarm for single-phase heater or heater break alarm for three-phase heater (Z-168)]
CT ratio 2 selection (CTr2) [Heater break alarm for three-phase heater (Z-168)]

The setting the CT ratio from CT1 to CT4 can be made when the CT ratio 1 (CTr1) of MA900 is selected.
The setting the CT ratio from CT1 to CT8 can be made when the CT ratio 1 (CTr1) of MA901 is selected.
The setting the CT ratio from CT5 to CT8 can be made when the CT ratio 2 (CTr2) is selected.



CT ratio 1 selection (CTr1) CT ratio 2 selection (CTr2)

Setting method

When the CTL-6-P-N current transformer is used, set the CT ratio to 800.
When the CTL-12-S56-10L-N current transformer is used, set the CT ratio to 1000.

Details of setting	Factory set value
0 to 9999	CTL-6-P-N: 800 CTL-12-S56-10L-N: 1000

MA900 (Heater break alarm for single-phase heater)

CH display	PV display	Details of setting
1	CTr1	Set the CT ratio of CT1.
2		Set the CT ratio of CT2.
3		Set the CT ratio of CT3.
4		Set the CT ratio of CT4.

Continued on the next page.

Continued from the previous page.

MA900 (Heater break alarm for three-phase heater)

CH display	PV display	Details of setting
1	CTr1	Set the CT ratio of CT1.
2		Set the CT ratio of CT2.
3		Set the CT ratio of CT3.
4		Set the CT ratio of CT4.
1	CTr2	Set the CT ratio of CT5.
2		Set the CT ratio of CT6.
3		Set the CT ratio of CT7.
4		Set the CT ratio of CT8.

The CT ratio 2 selection (CTr2) is displayed when the instrument specification is three-phase heater.

MA901 (Heater break alarm for single-phase heater)

CH display	PV display	Details of setting
1	CTr1	Set the CT ratio of CT1.
2		Set the CT ratio of CT2.
3		Set the CT ratio of CT3.
4		Set the CT ratio of CT4.
5		Set the CT ratio of CT5.
6		Set the CT ratio of CT6.
7		Set the CT ratio of CT7.
8		Set the CT ratio of CT8.

2.5 F24 Contact Input Specification

Setting is common to all channels.

When the MA901 instrument specification corresponds to heater break alarm, the contact input can't be added. Therefore, do not use this parameter.

■ Contact input logic selection (diSL)

The contact input logic selection sets the set value about the following contents.

- STOP selection

  Selected whether to stop when the contact is opened or when the contact is closed.

- Memory area selection

  Memory area selection 1 to 8: These contents are selected when any of the memory areas from 1 to 8 is selected by the contact input.

  Memory area selection 1 to 7: For example, when a digital switch starting from "0" is used, select the memory area number when the memory area number must match the digital switch number.

  If the selection of the memory areas from 1 to 7 is chosen, no memory area 8 can be selected by the contact input. In this case, select the memory area by the front key.

- Used/unused of DI SET terminal (No. 43)

  The method of establishment is set when the memory area is selected.

  When the DI SET terminal (No. 43) is used:

  Select the area 0.5 seconds after the DI SET terminal is closed.

  When the DI SET terminal (No. 43) is not used:

  Select the memory area 2 seconds after the area is selected.

Details of setting	STOP selection	Memory area selection	Used/unused of DI SET terminal (No. 43)	Factory set value
0000	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 8	Used	0000
0001	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 8	Unused	
0002	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 7	Used	

Continued on the next page.

Continued from the previous page.

Details of setting	STOP selection	Memory area selection	Used/unused of DI SET terminal (No. 43)	Factory set value
0003	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 7	Unused	0000
0004	When contact input (RUN/STOP transfer) opens, stop.	There is no memory area transfer function.	Unused	
0005	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 8	Used	
0006	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 8	Unused	
0007	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 7	Used	
0008	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 7	Unused	
0009	When contact input (RUN/STOP transfer) is closed, stop.	There is no memory area transfer function.	Unused	

2.6 F31 Output Function

■ MA900

(1) Control output logic selection 1 (LGo1)

This data is *0000* fixation. This data must not set the set value besides *0000*.

Channel display	Output number	Details of setting	Factory set value
1	OUT1	0000: Heat-side control output of CH1	0000
2	OUT2	0000: Heat-side control output of CH2	
3	OUT3	0000: Heat-side control output of CH3	
4	OUT4	0000: Heat-side control output of CH4	

(2) Control output logic selection 2 (LGo2)

Select the output logic of the output 2 (OUT5 to OUT8).
The channel number displayed on the CH display unit corresponds to the relevant output number.
The setting is made for each channel number. In addition, OUT5 to OUT8 can be simultaneously set.

Conduct setting so as to meet the instrument specification.
An incorrect setting may cause a malfunction.

Channel display	Output number	Details of setting	Factory set value
1	OUT5	0000: No output 0001: Cool-side control output of CH1 [1] 0002: No output 0003: No output 0004: Alarm 3 of CH1 [2] 0005: Alarm 3 of CH2 [2] 0006: Alarm 3 of CH3 [2] 0007: Alarm 3 of CH4 [2] 0008 to 0011: No output	Factory set value varies depending on the instrument specification.
2	OUT6	0000: No output 0001: Cool-side control output of CH2 [1] 0002 to 0007: Same as OUT5 0008 to 0011: No output	
3	OUT7	0000: No output 0001: Cool-side control output of CH3 [1] 0002 to 0007: Same as OUT5 0008 to 0011: No output	

[1] Setting becomes effective at the time of heat/cool control.
[2] Not output when alarm 3 corresponds to the FAIL alarm.

Continued on the next page.

Continued from the previous page.

MA900

Channel display	Output number	Details of setting	Factory set value
4	OUT8	0000: No output 0001: Cool-side control output of CH4 * 0002 to 0007: Same as OUT5 0008 to 0011: No output	Factory set value varies depending on the instrument specification.

* Setting becomes effective at the time of heat/cool control.

■ MA901

(1) Control output logic selection 1 (LGo1)

This data is *0000* fixation. This data must not set the set value besides *0000*.

Channel display	Output number	Details of setting	Factory set value
1	OUT1	0000: Heat-side control output of CH1	0000
2	OUT2	0000: Heat-side control output of CH2	
3	OUT3	0000: Heat-side control output of CH3	
4	OUT4	0000: Heat-side control output of CH4	

(2) Control output logic selection 2 (LGo2)

This data is *0000* fixation. This data must not set the set value besides *0000*.

Channel display	Output number	Details of setting	Factory set value
1	OUT5	0000: Heat-side control output of CH5	0000
2	OUT6	0000: Heat-side control output of CH6	
3	OUT7	0000: Heat-side control output of CH7	
4	OUT8	0000: Heat-side control output of CH8	

2.7 F32 Alarm Output Function

■ Alarm output logic selection (LGA)

Select the alarm output logic of alarm 1 (Normal equipment), alarm 2 (Option) and alarm 3 (Option). The channel number displayed on the CH display unit corresponds to the relevant alarm. The setting is made for each channel number. In addition, output logic of alarm 1 to alarm 3 can be simultaneously set.

Conduct setting so as to meet the instrument specification.
An incorrect setting may cause a malfunction.

Channel display	Alarm	Details of setting	Factory set value
1	ALM1 [Alarm 1]	0000: FAIL alarm 0001: Logical *OR* of alarm 1 in all channels (Energized) 0002: Logical *OR* of alarm 2 in all channels (Energized) 0003: Logical *OR* of alarm 3 in all channels (Energized) 0004: Logical *OR* of alarm 1 and alarm 2 in all channels (Energized) 0005: Logical *OR* of alarm 1 and alarm 3 in all channels (Energized) 0006: Logical *OR* of alarm 2 and alarm 3 in all channels (Energized) 0007: Logical *OR* of alarm 1, alarm 2 and alarm 3 in all channels (Energized) 0008: Logical *OR* of alarm 1 in all channels (De-energized) 0009: Logical *OR* of alarm 2 in all channels (De-energized) 0010: Logical *OR* of alarm 3 in all channels (De-energized) 0011: Logical *OR* of alarm 1 and alarm 2 in all channels (De-energized) 0012: Logical *OR* of alarm 1 and alarm 3 in all channels (De-energized) 0013: Logical *OR* of alarm 2 and alarm 3 in all channels (De-energized) 0014: Logical *OR* of alarm 1, alarm 2 and alarm 3 in all channels (De-energized)	0001
2	ALM2 [Alarm 2]	0000 to 0014: Same as ALM1	0002
3	ALM3 [Alarm 3]	0000 to 0014: Same as ALM1	0003

Alarm output is only relay contact output.

2.8 F41 Alarm 1 Function
F42 Alarm 2 Function
F43 Alarm 3 Function

(1) Alarm type selection (AS1, AS2, AS3)

Details of setting		Factory set value
0000	Alarm not provided [1]	Factory set value varies depending on the instrument specification.
0001	SV high alarm	
0002	SV low alarm	
0003	Process high alarm	
0004	Process low alarm	
0005	Deviation high alarm	
0006	Deviation low alarm	
0007	Deviation high/low alarm	
0008	Band alarm	
0009	Control loop break alarm [2]	
0010	Heater break alarm [3, 4]	

[1] When instrument specification is failure alarm, set *0000*.

[2] When control action type is heat/cool control, do not select.

[3] When control output is current output, do not select.

[4] When the contact input or the communication function is selected as instrument specifications of MA901, the heater break alarm can't be added.

☞ See **2.1 Attention Items in Setting (P. 12)**.

(2) Alarm hold action selection (AHo1, AHo2, AHo3)

Details of setting		Factory set value
0000	Without alarm hold action	Without alarm hold action: 0000 With alarm hold action: 0002
0001	Effective when the power is turned on, or operation is changed from STOP to RUN.	
0002	Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	

📖 The alarm hold action function can not be added to the FAIL alarm, SV alarm, control loop break alarm and heater break alarm.

(3) Alarm differential gap setting (AH1, AH2, AH3)

Set the alarm differential gap for each channel. In addition, they can be set simultaneously for all channels.

Details of setting		Factory set value
Thermocouple	0 (0.0) to span	Note 1
RTD		
Voltage		

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage inputs: 0.2 % of span

(4) Alarm timer setting (ALT1, ALT2, ALT3)

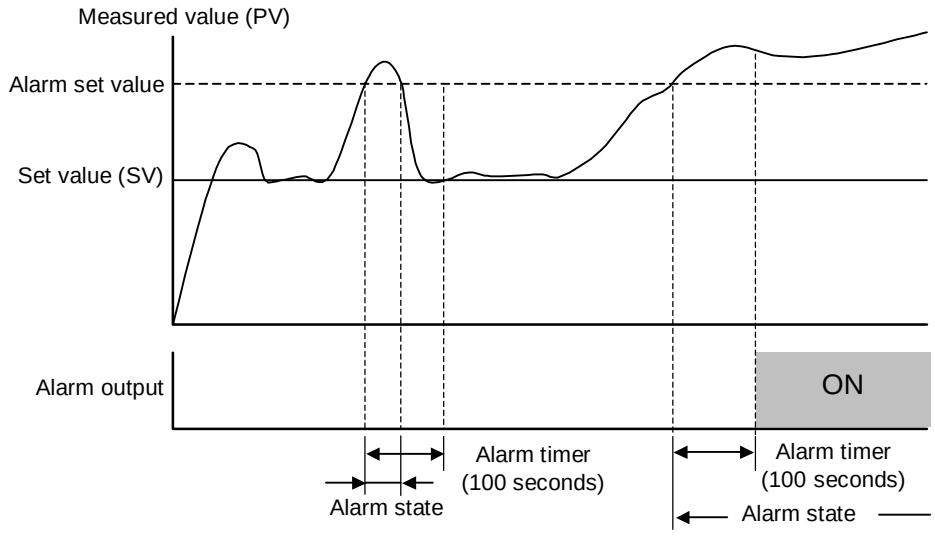
Set the time until an alarm is actually output after being set to the alarm state.

Details of setting	Factory set value
0 to 6000 seconds	0

Setting is common to all channels.

The alarm timer function:
The alarm timer function regards the period until the alarm timer is set after measured value (PV) or deviation exceeds the alarm set value as a non-alarm state and outputs an alarm after the alarm timer setting time elapses.
The alarm timer starts being activated if the alarm is turned on. In addition, if the alarm state is released while the alarm timer is being activated, no alarm is output.

Example: When set the alarm timer for 100 seconds



When instrument specification is FAIL alarm, the alarm timer function does not operate.

(5) Action selection at input error (AEo1, AEo2, AEo3)

Set the alarm action in input abnormality by input break (when the input is over-scaled or underscaled).

Details of setting		Factory set value
0000	Normal processing: The alarm action set by alarm type selection (AS1/AS2) is taken even if the input is abnormal.	0000
0001	Forcibly turned on when abnormal: The alarm is forcibly turned on regardless of the alarm action set by alarm type selection (AS1/AS2) when the input is abnormal.	

📖 For a voltage input of 0 to 5 V DC or 0 to 10 V DC, as over-scale or underscale does not occur when the input breaks, no alarm is turned on.

2.9 F51 Control Action

The setting items (oS and oH) in the function block F51 are set for each channel. In addition, they can be set simultaneously for all channels.

(1) Control action type selection (oS1)

📖 Match the setting with the instrument specification. Otherwise malfunction may result.

📖 The MA901 does not perform heat/cool control.

Details of setting		Factory set value
0000	D type: PID control with autotuning (Direct action) [1]	Note 1
0001	F type: PID control with autotuning (Reverse action) [1]	
0002	W type: Heat/cool PID control with autotuning (Water cooling) [2]	
0003	A type: Heat/cool PID control with autotuning (Air cooling) [2]	

[1] When instrument specification corresponds to heat/cool control, this set value can't be set.

[2] When instrument specification corresponds to heat control, this set value can't be set.

Note 1 Factory set value varies depending on the instrument specification.

(2) ON/OFF action differential gap setting (oH)

Details of setting		Factory set value
Thermocouple	0 (0.0) to span	Note 1
RTD		
Voltage		

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage inputs: 0.2 % of span

2.10 F61 Communication Function

(1) Communication protocol selection (CMPS)

If the protocol is selected, always turn the power on again or select RUN from STOP.

When the MA901 instrument specification corresponds to heater break alarm, the communication function can't be added. Therefore, do not use this parameter.

Details of setting		Factory set value
0000	RKC communication protocol (Multi-point mode)	Note 1
0001	Modbus communication protocol	
0002	RKC communication protocol (Single mode)	

Note 1 Factory set value varies depending on the instrument specification.

(2) RUN/STOP transfer logic selection

Select the logic of RUN/STOP transfer in the communication mode.

Details of setting		Factory set value
0000	Set in 0: STOP mode Set in 1: RUN mode	0000
0001	Set in 0: RUN mode Set in 1: STOP mode	

2.11 F91 Displayed for Maintenance Information

Only displayed for the F91 function block.

(1) ROM version displayed (E261)

Display the version of loading software.

(2) Integrated operating time display (WTH) [upper 3 digits]

Display the integrated operating time (upper 3 digits) of instrument.

Details of display : 0 to 100 (Resolution of display: 10,000 hours)

Up to 1,000,000 from 0 including the upper and lower digits can be displayed.

(3) Integrated operating time display (WTL) [lower 4 digits]

Display the integrated operating time (lower 4 digits) of instrument.
However, as the integral time is increments by 1 when the power is turned on or off.
If the total integrated operating time exceeds 9,999 hours, these digits move to the integrated operating time display (upper 3 digits).

Details of display : 0 to 9999 (Resolution of display: 1 hours)

(4) Holding peak value ambient temperature display (TCJ)

The maximum ambient temperature on the rear terminal board of the instrument is stored and displayed on the set value (SV) display.

Details of display : −10 to +100 °C [°F] (Resolution of display: 1°C [°F])

3. INITIALIZE COMMUNICATION DATA

3.1 RKC Communication Protocol

■ Reference to communication identifier list

(1) (2) (3) (4) (5) (6) (7)

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
STOP display selection	**DX**	1	0: It makes display "STOP" in PV display. 1: It makes display "STOP" in SV display.	0	R/W	–
Input type selection	**XI**	6	0 to 16 (See **P. 18**)	Note 1	R/W	×

(1) Name: A name of identifier is written.
(2) Identifier: The code to identify the data is written.
(3) No. of digits: The number of maximum digits is written.
(4) Data range: The range of reading or writing data is written.
(5) Factory set value: The factory set value of data is written.
(6) Attribute: The data accessing direction is written.
RO: Read only (Data direction: Controller → Host computer)
R/W: Read and Write (Data direction: Controller ↔ Host computer)
(7) CH: ×: Identifier with channel
–: Identifier without channel

■ Data sending during polling

Each time the host computer sends ACK (acknowledgement), the controller sends data corresponding to the respective identifier in the order specified in a list of communication identifiers.

Communication is not possible when an identifier is specified that the controller can not recognize.

To be send in this order.

Name	Iden-tifier	No. of digits	Data range
STOP display selection	**DX**	1	0: It makes display "STOP" PV display. 1: It makes display "STOP" SV display.
Input type selection	**XI**	6	0 to 16 (See **P. 18**)

■ Communication identifier list

☞ For details on the structure of communication data, see **Communication Instruction Manual (IMR01H02-E□)**.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
STOP display selection	**DX**	1	0: It makes display "STOP" in PV display. 1: It makes display "STOP" in SV display.	0	R/W	–
Input type selection	**XI**	6	0 to 16 (See **P. 18**)	Note 1	R/W	×
Display unit selection	**PU**	1	0: °C 1: °F	0	R/W	×
Decimal point position setting	**XU**	1	0: No digit below decimal point 1: 1 digit below decimal point 2: 2 digits below decimal point 3: 3 digits below decimal point	Note 2	R/W	×
Setting limiter [high limit] setting	**XV**	6	Within input range. See **4. INPUT RANGE TABLES** (**P. 55**)	Note 3	R/W	×
Setting limiter [low limit] setting	**XW**					
CT ratio 1 [1] selection	**XR**	6	0 to 9999 (See **P. 20**)	Note 4	R/W	×
CT ratio 2 [1, 2] selection	**XS**					

[1] When selecting CT ratio 1 or 2, as a channel number specified after the identifier, specify the channel number corresponding to the CT ratio selection.

☞ For the CT ratio selection channel number, see the **2.4 F22 Current Transformer (CT) Input Specification (P. 20)**.

[2] Do not use CT ratio 2 for the MA901.

Note 1 Factory set value varies depending on the input type.

Note 2 Factory set value varies depending on the instrument specification. However, factory set value of a case of voltage input is *1*.

Note 3 Factory set value varies depending on the instrument specification. However, factory set value of a case of voltage input is 100.0 (high limit) and 0.0 (low limit).

Note 4 CTL-6-P-N: 800
CTL-12-S56-10L-N: 1000

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Contact input logic selection *	**XK**	1	0 to 9 See **contact input logic tables**	0	R/W	×

* This is the identifier effective when the contact input is provided.

Contact input logic tables

Set value	STOP selection	Memory area selection	Used/Unused of DI SET terminal (No.43)
0	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 8	Used
1	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 8	Unused
2	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 7	Used
3	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 7	Unused
4	When contact input (RUN/STOP transfer) opens, stop.	There is no memory area transfer function.	Unused
5	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 8	Used
6	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 8	Unused
7	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 7	Used
8	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 7	Unused
9	When contact input (RUN/STOP transfer) is closed, stop.	There is no memory area transfer function.	Unused

☞ For details of the selection item, see the **2.5 F24 Contact Input Specification (P. 22)**.

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Control output logic selection 1	**E0**	6	**OUT1** 0: Heat-side control output of CH1 * **OUT2** 0: Heat-side control output of CH2 * **OUT3** 0: Heat-side control output of CH3 * **OUT4** 0: Heat-side control output of CH3 *	0	R/W	×

* This data is *0* fixation. This data must not set the set value besides *0*.

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Control output logic selection 2	**E1**	6	• **MA900 (OUT5 to OUT8)** **OUT5** 0: No output 1: Cool-side control output of CH1 [1] 2: No output 3: No output 4: Alarm 3 of CH1 [2] 5: Alarm 3 of CH2 [2] 6: Alarm 3 of CH3 [2] 7: Alarm 3 of CH4 [2] 8 to 11: No output **OUT6** 0: No output 1: Cool-side control output of CH2 [1] 2 to 11: Same as **OUT5** **OUT7** 0: No output 1: Cool-side control output of CH3 [1] 2 to 11: Same as **OUT5** **OUT8** 0: No output 1: Cool-side control output of CH4 [1] 2 to 11: Same as **OUT5** • **MA901 (OUT5 to OUT8)** **OUT5** 0: Heat-side control output of CH5 [3] **OUT6** 0: Heat-side control output of CH6 [3] **OUT7** 0: Heat-side control output of CH7 [3] **OUT8** 0: Heat-side control output of CH8 [3]	Factory set value varies depending on the instrument specification.	R/W	×

[1] Setting becomes effective at the time of heat/cool control.
[2] Not output when alarm 3 corresponds to the FAIL alarm.
[3] This data is *0* fixation. This data must not set the set value besides *0*.

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Alarm output logic selection *	**EA**	6	0: FAIL alarm 1: Logical *OR* of alarm 1 in all channels (Energized) 2: Logical *OR* of alarm 2 in all channels (Energized) 3: Logical *OR* of alarm 3 in all channels (Energized) 4: Logical *OR* of alarm 1 and alarm 2 in all channels (Energized) 5: Logical *OR* of alarm 1 and alarm 3 in all channels (Energized) 6: Logical *OR* of alarm 2 and alarm 3 in all channels (Energized) 7: Logical *OR* of alarm 1, alarm 2 and alarm 3 in all channels (Energized) 8: Logical *OR* of alarm 1 in all channels (De-energized) 9: Logical *OR* of alarm 2 in all channels (De-energized) 10: Logical *OR* of alarm 3 in all channels (De-energized) 11: Logical *OR* of alarm 1 and alarm 2 in all channels (De-energized) 12: Logical *OR* of alarm 1 and and 3 of all channels (De-energized) 13: Logical *OR* of alarm 2 and alarm 3 in all channels (De-energized) 14: Logical *OR* of alarm 1, alarm 2 and alarm 3 in all channels (De-energized)	Alarm 1: 1 Alarm 2: 2 Alarm 3: 3	R/W	–

* The logic of alarm output can be set for each alarm (alarm 1 to alarm 3). When selecting the logic, as a channel number specified after the identifier, specify any of the following numbers.
Alarm 1: 01 Alarm 2: 02 Alarm 3: 03

☞ For the data structure, see the **Communication Instruction Manual (IMR01H02-E□)**.

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Alarm 1 type selection [1]	**XA**	6	0: No alarm 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 [2]	Factory set value varies depending on the instrument specification.	R/W	–
Alarm 1 hold action selection [3]	**WA**	1	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	Without alarm hold action: 0 With alarm hold action: 2	R/W	–
Alarm 1 differential gap setting	**HA**	6	0 (0.0) to span	Note 1	R/W	×
Alarm 1 timer setting	**TD**	6	0 to 6000 seconds (See **P. 28**)	0	R/W	–
Alarm 1 action selection at input error	**OA**	1	0: Normal processing 1: Forcibly turned on when abnormal (See **P. 29**)	0	R/W	–

[1] When using the FAIL alarm, always set the alarm type to "0:No alarm."

[2] Control loop break alarm can not be specified in case of heat/cool control.

[3] The alarm hold action can not be added to the FAIL alarm, SV high alarm, SV low alarm, control loop break alarm and heater break alarm.

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Alarm 2 type selection [1]	**XB**	6	0: No alarm 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: No alarm 10: Heater break alarm [2, 3]	Factory set value varies depending on the instrument specification.	R/W	–
Alarm 2 hold action selection [4]	**WB**	1	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	Without alarm hold action: 0 With alarm hold action: 2	R/W	–
Alarm 2 differential gap setting	**HB**	6	0 (0.0) to span	Note 1	R/W	×
Alarm 2 timer setting	**TG**	6	0 to 6000 seconds (See **P. 28**)	0	R/W	–
Alarm 2 action selection at input error	**OB**	1	0: Normal processing 1: Forcibly turned on when abnormal (See **P. 29**)	0	R/W	–

[1] When using the FAIL alarm, always set the alarm type to "0:No alarm."

[2] When the control output is current output, no setting can be changed.

[3] When the contact input or the communication function is selected as instrument specifications of MA901, the heater break alarm cannot be added.

[4] The alarm hold action can not be added to the FAIL alarm, SV high alarm, SV low alarm, control loop break alarm and heater break alarm.

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
Alarm 3 type selection [1]	**XC**	6	0: No alarm 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.	R/W	–
Alarm 3 hold action selection [2]	**WC**	1	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	Without alarm hold action: 0 With alarm hold action: 2	R/W	–
Alarm 3 differential gap setting	**HC**	6	0 (0.0) to span	Note 1	R/W	×
Alarm 3 timer setting	**TH**	6	0 to 6000 seconds (See **P. 28**)	0	R/W	–
Alarm 3 action selection at input error	**OC**	1	0: Normal processing 1: Forcibly turned on when abnormal (See **P. 29**)	0	R/W	–

[1] When using the FAIL alarm, always set the alarm type to "0:No alarm."

[2] The alarm hold action can not be added to the FAIL alarm, SV high alarm, SV low alarm, control loop break alarm and heater break alarm.

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	No. of digits	Data range	Factory set value	Attri-bute	CH
ON/OFF action differential gap setting	**IV**	6	0 (0.0) to span However, 9999 digits of less	Note 1	R/W	×
Control action type selection	**XE**	1	0: PID control (Direct action) [1] 1: PID control (Reverse action) [1] 2: Heat/cool action (Water cooling) [2] 3: Heat/cool action (Air cooling) [2]	Factory set value varies depending on the instrument specification.	R/W	×
ROM version display	**VR**	10	Display the version of loading software.	—	RO	–
Integrated operating time display [upper 3 digits]	**UT**	6	0000 to 0100 (See **P. 31**)	—	RO	–
Integrated operating time display [lower 4 digits]	**UU**	6	0000 to 9999 (See **P. 31**)	—	RO	–
Holding peak ambient temperature display	**HP**	6	−10 to +100	—	RO	–
Communication protocol selection	**IS**	1	0: RKC communication protocol (Multi-point mode) 1: Modbus communication protocol 2: RKC communication protocol (Single mode)	Factory set value varies depending on the instrument specification.	R/W	–
RUN/STOP transfer logic selection	**RS**	1	0: 0 (STOP) 1 (RUN) 1: 0 (RUN) 1 (STOP)	0	R/W	–

[1] When the instrument specification is heat/cool control, no setting can be changed.

[2] When the instrument specification is only heat control, no setting can be changed.
The MA901 does not perform heat/cool control.

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

3.2 Modbus Communication Protocol

3.2.1 Communication data list

The communication data list summarizes names, descriptions, factory set values and attributes.

📖 Attribute (RO: Read only, R/W: Read and Write)

📖 The communication data whose name is marked with ★ indicates that corresponding to the memory area.

Name	Data range	Factory set value	Attribute
Setting change rate limiter ★	0 (0.0) to span/minute (0: Setting change rate limiter OFF)	0	R/W
Setting limiter [high limit] setting	Within input range. See **4. INPUT RANGE TABLES (P. 55)**	Note 1	R/W
Setting limiter [low limit] setting			
Digital filter	0 to 100 seconds (0: No digital filter function)	0	R/W
Input type selection	0 to 16 (See **P. 18**)	Note 2	R/W
Display unit selection	0: °C 1: °F	0	R/W
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	Note 3	R/W
CT ratio 1 selection	0 to 9999 (See **P. 20**)	Note 4	R/W
CT ratio 2 selection *			
ON/OFF action differential gap setting	0 (0.0) to span However, 9999 digits of less	Note 5	R/W

* Do not use CT ratio 2 for the MA901.

Note 1 Factory set value varies depending on the instrument specification. However, factory set value of a case of voltage input is 100.0 (high limit) and 0.0 (low limit).

Note 2 Factory set value varies depending on the input type.

Note 3 Factory set value varies depending on the instrument specification. However, factory set value of a case of voltage input is *1*.

Note 4 CTL-6-P-N: 800
CTL-12-S56-10L-N: 1000

Note 5 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Data range	Factory set value	Attribute
Control action type selection	0: PID control (Direct action) [1] 1: PID control (Reverse action) [1] 2: Heat/cool control (Water cooling) [2] 3: Heat/cool control (Air cooling) [2]	Note 1	R/W
Alarm 1 type selection [3]	0: No alarm 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 [4]	Factory set value varies depending on the instrument specification.	R/W
Alarm 1 hold action selection [5]	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	Without alarm hold action: 0 With alarm hold action: 2	R/W
Alarm 1 timer setting	0 to 6000 seconds (See **P. 28**)	0	R/W
Alarm 1 action selection at input error	0: Normal processing 1: Forcibly turned on when abnormal (See **P. 29**)	0	R/W
Alarm 1 differential gap setting	0 (0.0) to span	Note 2	R/W

[1] When the instrument specification is heat/cool control, no setting can be changed.
[2] When the instrument specification is only heat control, no setting can be changed. The MA901 does not perform heat/cool control.
[3] When using the FAIL alarm, always set the alarm type to "0: No alarm."
[4] Control loop break alarm can not be specified in case of heat/cool control.
[5] The alarm hold action can not be added to the FAIL alarm, SV high alarm, SV low alarm, control loop break alarm and heater break alarm.

Note 1 Factory set value varies depending on the instrument specification.
Note 2 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Data range	Factory set value	Attribute
Alarm 2 type selection [1]	0: No alarm 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: No alarm 10: Heater break alarm [2, 3]	Factory set value varies depending on the instrument specification.	R/W
Alarm 2 hold action selection [4]	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	Without alarm hold action: 0 With alarm hold action: 2	R/W
Alarm 2 timer setting	0 to 6000 seconds (See **P. 28**)	0	R/W
Alarm 2 action selection at input error	0: Normal processing 1: Forcibly turned on when abnormal (See **P. 29**)	0	R/W
Alarm 2 differential gap setting	0 (0.0) to span	Note 1	R/W

[1] When using the FAIL alarm, always set the alarm type to "0: No alarm."

[2] When the control output is current output, no setting can be changed.

[3] When the contact input or the communication function is selected as instrument specifications of MA901, the heater break alarm cannot be added.

[4] The alarm hold action can not be added to the FAIL alarm, SV high alarm, SV low alarm, control loop break alarm and heater break alarm.

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Data range	Factory set value	Attribute
Alarm 3 type selection [1]	0: No alarm 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.	R/W
Alarm 3 hold action selection [2]	0: Without alarm hold action 1: Effective when the power is turned on, or operation is changed from STOP to RUN. 2: Valid when: • the power is turned on, • operation is changed from STOP to RUN, • the SV is changed, or • the memory area (control area) is changed.	Without alarm hold action: 0 With alarm hold action: 2	R/W
Alarm 3 timer setting	0 to 6000 seconds (See **P. 28**)	0	R/W
Alarm 3 action selection at input error	0: Normal processing 1: Forcibly turned on when abnormal (See **P. 29**)	0	R/W
Alarm 3 differential gap setting	0 (0.0) to span	Note 1	R/W
Control output logic selection 1	**OUT1** 0: Heat-side control output of CH1 [3] **OUT2** 0: Heat-side control output of CH2 [3] **OUT3** 0: Heat-side control output of CH3 [3] **OUT4** 0: Heat-side control output of CH4 [3]	0	

[1] When using the FAIL alarm, always set the alarm type to "0: No alarm."

[2] The alarm hold action can not be added to the FAIL alarm, SV high alarm, SV low alarm, control loop break alarm and heater break alarm.

[3] This data is *0* fixation. This data must not set the set value besides *0*.

Note 1 TC and RTD inputs: 2 °C [°F] or 2.0 °C [°F]
Voltage input: 0.2 % of span

Continued on the next page.

Continued from the previous page.

Name	Data range	Factory set value	Attribute
Control output logic selection 2	• **MA900 (OUT5 to OUT8)** **OUT5** 0: No output 1: Cool-side control output of CH1 [1] 2: No output 3: No output 4: Alarm 3 of CH1 [2] 5: Alarm 3 of CH2 [2] 6: Alarm 3 of CH3 [2] 7: Alarm 3 of CH4 [2] 8 to 11: No output **OUT6** 0: No output 1: Cool-side control output of CH2 [1] 2 to 11: Same as **OUT5** **OUT7** 0: No output 1: Cool-side control output of CH3 [1] 2 to 11: Same as **OUT5** **OUT8** 0: No output 1: Cool-side control output of CH4 [1] 2 to 11: Same as **OUT5** • **MA901 (OUT5 to OUT8)** **OUT5** 0: Heat-side control output of CH5 [3] **OUT6** 0: Heat-side control output of CH6 [3] **OUT7** 0: Heat-side control output of CH7 [3] **OUT8** 0: Heat-side control output of CH8 [3]	Factory set value varies depending on the instrument specification.	R/W

[1] Setting becomes effective at the time of heat/cool control.

[2] Not output when alarm 3 corresponds to the FAIL alarm.

[3] This data is *0* fixation. This data must not set the set value besides *0*.

Continued on the next page.

Continued from the previous page.

Name	Data range	Factory set value	Attribute
Alarm output logic selection *	0: FAIL alarm 1: Logical *OR* of alarm 1 in all channels (Energized) 2: Logical *OR* of alarm 2 in all channels (Energized) 3: Logical *OR* of alarm 3 in all channels (Energized) 4: Logical *OR* of alarm 1 and alarm 2 in all channels (Energized) 5: Logical *OR* of alarm 1 and alarm 3 in all channels (Energized) 6: Logical *OR* of alarm 2 and alarm 3 in all channels (Energized) 7: Logical *OR* of alarm 1, alarm 2 and alarm 3 in all channels (Energized) 8: Logical *OR* of alarm 1 in all channels (De-energized) 9: Logical *OR* of alarm 2 in all channels (De-energized) 10: Logical *OR* of alarm 3 in all channels (De-energized) 11: Logical *OR* of alarm 1 and alarm 2 in all channels (De-energized) 12: Logical *OR* of alarm 1 and 3 of all channels (De-energized) 13: Logical *OR* of alarm 2 and alarm 3 in all channels (De-energized) 14: Logical *OR* of alarm 1, alarm 2 and alarm 3 in all channels (De-energized)	Alarm 1: 1 Alarm 2: 2 Alarm 3: 3	R/W
STOP display selection	0: It makes display “STOP” in PV display. 1: It makes display “STOP” in SV display.	0	R/W

* The logic of alarm output can be set for each alarm (alarm 1 to alarm 3).

Continued on the next page.

Continued from the previous page.

Name	Data range	Factory set value	Attribute
Contact input logic selection	0 to 9 See **contact input logic tables**	0	R/W
Communication protocol selection	0: RKC communication protocol (Multi-point mode) 1: Modbus communication protocol 2: RKC communication protocol (Single mode)	Factory set value varies depending on the instrument specification.	R/W
RUN/STOP transfer logic selection	0: 0 (STOP) 1 (RUN) 1: 0 (RUN) 1 (STOP)	0	R/W

Contact input logic tables

Set value	STOP selection	Memory area selection	Used/Unused of DI SET terminal (No.43)
0	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 8	Used
1	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 8	Unused
2	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 7	Used
3	When contact input (RUN/STOP transfer) opens, stop.	Memory area transfer 1 to 7	Unused
4	When contact input (RUN/STOP transfer) opens, stop.	There is no memory area transfer function.	Unused
5	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 8	Used
6	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 8	Unused
7	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 7	Used
8	When contact input (RUN/STOP transfer) is closed, stop.	Memory area transfer 1 to 7	Unused
9	When contact input (RUN/STOP transfer) is closed, stop.	There is no memory area transfer function.	Unused

☞ For details of the selection item, see the **2.5 F24 Contact Input Specification (P. 22)**.

3.2.2 Data map

■ Reference to data map

This data map summarizes the data addresses, channels and names that can be used with Modbus protocol. For details on each data range, see **3.2.1 Communication Data List (P. 42)**.

(1) (2) (3)

Address	CH	Name
03E8H (1000)	CH1	Setting change rate limiter
03E9H (1001)	CH2	
03EAH (1002)	CH3	
03EBH (1003)	CH4	
03ECH (1004) ⋮ 044BH (1099)	—	Unused
044CH (1100)	CH1	Setting limiter [high limit] setting
044DH (1101)	CH2	
044EH (1102)	CH3	
044FH (1103)	CH4	

(1) Address: Data addresses are written in hexadecimal numbers.
Characters in ( ) are decimal numbers.

(2) CH: The input channel number, output number (OUT1 to OUT8, ALM1 to ALM3) or CT ratio 1 and 2 selection channel number is written.

(3) Name: Data names

■ MA900 data map list

(Read/Write data)

Address	CH	Name
03E8H (1000)	CH1	Setting change rate limiter [1]
03E9H (1001)	CH2	
03EAH (1002)	CH3	
03EBH (1003)	CH4	
03ECH (1004) ⋮ 044BH (1099)	—	Unused
044CH (1100)	CH1	Setting limiter [high limit] setting
044DH (1101)	CH2	
044EH (1102)	CH3	
044FH (1103)	CH4	
0450H (1104) ⋮ 045FH (1119)	—	Unused
0460H (1120)	CH1	Setting limiter [low limit] setting
0461H (1121)	CH2	
0462H (1122)	CH3	
0463H (1123)	CH4	
0464H (1124) ⋮ 0473H (1139)	—	Unused
0474H (1140)	CH1	Digital filter [1]
0475H (1141)	CH2	
0476H (1142)	CH3	
0477H (1143)	CH4	
0478H (1144) ⋮ 0487H (1159)	—	Unused
0488H (1160)	CH1	Input type selection
0489H (1161)	CH2	
048AH (1162)	CH3	
048BH (1163)	CH4	
048CH (1164) ⋮ 049BH (1179)	—	Unused
049CH (1180)	CH1	Display unit selection
049DH (1181)	CH2	
049EH (1182)	CH3	
049FH (1183)	CH4	

Address	CH	Name
04A0H (1184) ⋮ 04AFH (1199)	—	Unused
04B0H (1200)	CH1	Decimal point position setting
04B1H (1201)	CH2	
04B2H (1202)	CH3	
04B3H (1203)	CH4	
04B4H (1204) ⋮ 04C3H (1219)	—	Unused
04C4H (1220)	CH1 [2]	CT ratio 1 selection
04C5H (1221)	CH2 [2]	
04C6H (1222)	CH3 [2]	
04C7H (1223)	CH4 [2]	
04C8H (1224)	CH1 [3]	CT ratio 2 selection (Heater break alarm for three-phase heater)
04C9H (1225)	CH2 [3]	
04CAH (1226)	CH3 [3]	
04CBH (1227)	CH4 [3]	
04CCH (1228) ⋮ 04D7H (1239)	—	Unused
04D8H (1240)	CH1	ON/OFF action differential gap setting
04D9H (1241)	CH2	
04DAH (1242)	CH3	
04DBH (1243)	CH4	
04DCH (1244) ⋮ 04EBH (1259)	—	Unused
04ECH (1260)	CH1	Control action type selection
04EDH (1261)	CH2	
04EEH (1262)	CH3	
04EFH (1263)	CH4	

[1] The limiter for the setting change rate limiter or digital filter described in the **Communication Instruction Manual (IMR01H02-E□)** can also be set.

[2] Channel number of the CT ratio 1 selection

[3] Channel number of the CT ratio 2 selection

Continued on the next page.

Continued from the previous page.

Address	CH	Name
04F0H (1264) ⋮ 04FFH (1279)	—	Unused
0500H (1280)	—	Alarm 1 type selection
0501H (1281)	—	Alarm 1 hold action selection
0502H (1282)	—	Alarm 1 timer setting
0503H (1283)	—	Alarm 1 action selection at input error
0504H (1284)	CH1	Alarm 1 differential gap setting
0505H (1285)	CH2	
0506H (1286)	CH3	
0507H (1287)	CH4	
0508H (1288) ⋮ 0513H (1299)	—	Unused
0514H (1300)	—	Alarm 2 type selection
0515H (1301)	—	Alarm 2 hold action selection
0516H (1302)	—	Alarm 2 timer setting
0517H (1303)	—	Alarm 2 action selection at input error
0518H (1304)	CH1	Alarm 2 differential gap setting
0519H (1305)	CH2	
051AH (1306)	CH3	
051BH (1307)	CH4	
051CH (1308) ⋮ 0527H (1319)	—	Unused
0528H (1320)	—	Alarm 3 type selection
0529H (1321)	—	Alarm 3 hold action selection
052AH (1322)	—	Alarm 3 timer setting
052BH (1323)	—	Alarm 3 action selection at input error
052CH (1324)	CH1	Alarm 3 differential gap setting
052DH (1325)	CH2	
052EH (1326)	CH3	
052FH (1327)	CH4	

Address	CH	Name
0530H (1328) ⋮ 053BH (1339)		Unused
053CH (1340)	OUT1	Control output logic selection 1
053DH (1341)	OUT2	
053EH (1342)	OUT3	
053FH (1343)	OUT4	
0540H (1344)	OUT5	Control output logic selection 2
0541H (1345)	OUT6	
0542H (1346)	OUT7	
0543H (1347)	OUT8	
0544H (1348)	ALM1	Alarm output logic selection
0545H (1349)	ALM2	
0546H (1350)	ALM3	
0547H (1351) ⋮ 054FH (1359)	—	Unused
0550H (1360)	—	STOP display selection
0551H (1361)	—	Unused
0552H (1362)	—	Contact input logic selection
0553H (1363)	—	Communication protocol selection
0554H (1364)	—	RUN/STOP transfer logic selection

■ MA901 data map list

(Read/Write data)

Address	CH	Name
03E8H (1000)	CH1	Setting change rate limiter *
03E9H (1001)	CH2	
03EAH (1002)	CH3	
03EBH (1003)	CH4	
03ECH (1004)	CH5	
03EDH (1005)	CH6	
03EEH (1006)	CH7	
03EFH (1007)	CH8	
03F0H (1008) ⋮ 044BH (1099)	—	Unused
044CH (1100)	CH1	Setting limiter [high limit] setting
044DH (1101)	CH2	
044EH (1102)	CH3	
044FH (1103)	CH4	
0450H (1104)	CH5	
0451H (1105)	CH6	
0452H (1106)	CH7	
0453H (1107)	CH8	
0454H (1108) ⋮ 045FH (1119)	—	Unused
0460H (1120)	CH1	Setting limiter [low limit] setting
0461H (1121)	CH2	
0462H (1122)	CH3	
0463H (1123)	CH4	
0464H (1124)	CH5	
0465H (1125)	CH6	
0466H (1126)	CH7	
0467H (1127)	CH8	
0468H (1128) ⋮ 0473H (1139)	—	Unused
0474H (1140)	CH1	Digital filter *
0475H (1141)	CH2	
0476H (1142)	CH3	
0477H (1143)	CH4	
0478H (1144)	CH5	
0479H (1145)	CH6	
047AH (1146)	CH7	
047BH (1147)	CH8	

Address	CH	Name
047CH (1148) ⋮ 0487H (1159)	—	Unused
0488H (1160)	CH1	Input type selection
0489H (1161)	CH2	
048AH (1162)	CH3	
048BH (1163)	CH4	
048CH (1164)	CH5	
048DH (1165)	CH6	
048EH (1166)	CH7	
048FH (1167)	CH8	
0490H (1168) ⋮ 049BH (1179)	—	Unused
049CH (1180)	CH1	Display unit selection
049DH (1181)	CH2	
049EH (1182)	CH3	
049FH (1183)	CH4	
04A0H (1184)	CH5	
04A1H (1185)	CH6	
04A2H (1186)	CH7	
04A3H (1187)	CH8	
04A4H (1188) ⋮ 04AFH (1199)	—	Unused
04B0H (1200)	CH1	Decimal point position setting
04B1H (1201)	CH2	
04B2H (1202)	CH3	
04B3H (1203)	CH4	
04B4H (1204)	CH5	
04B5H (1205)	CH6	
04B6H (1206)	CH7	
04B7H (1207)	CH8	

* The limiter for the setting change rate limiter or digital filter described in the **Communication instruction manual (IMR01H02-E□)** can also be set.

Continued on the next page.

Continued from the previous page.

Address	CH	Name
04B8H (1208) ⋮ 04C3H (1219)	—	Unused
04C4H (1220)	CH1 *	CT ratio 1 selection
04C5H (1221)	CH2 *	
04C6H (1222)	CH3 *	
04C7H (1223)	CH4 *	
04C8H (1224)	CH5 *	
04C9H (1225)	CH6 *	
04CAH (1226)	CH7 *	
04CBH (1227)	CH8 *	
04CCH (1228) ⋮ 04D7H (1239)	—	Unused
04D8H (1240)	CH1	ON/OFF action differential gap setting
04D9H (1241)	CH2	
04DAH (1242)	CH3	
04DBH (1243)	CH4	
04DCH (1244)	CH5	
04DDH (1245)	CH6	
04DEH (1246)	CH7	
04DFH (1247)	CH8	
04E0H (1248) ⋮ 04EBH (1259)	—	Unused
04ECH (1260)	CH1	Control action type selection
04EDH (1261)	CH2	
04EEH (1262)	CH3	
04EFH (1263)	CH4	
04F0H (1264)	CH5	
04F1H (1265)	CH6	
04F2H (1266)	CH7	
04F3H (1267)	CH8	
04F4H (1268) ⋮ 04FFH (1279)	—	Unused
0500H (1280)	—	Alarm 1 type selection
0501H (1281)	—	Alarm 1 hold action selection
0502H (1282)	—	Alarm 1 timer setting
0503H (1283)	—	Alarm 1 action selection at input error
0504H (1284)	CH1	Alarm 1 differential gap setting
0505H (1285)	CH2	
0506H (1286)	CH3	
0507H (1287)	CH4	
0508H (1288)	CH5	
0509H (1289)	CH6	
050AH (1290)	CH7	
050BH (1291)	CH8	
050CH (1292) ⋮ 0513H (1299)	—	Unused
0514H (1300)	—	Alarm 2 type selection
0515H (1301)	—	Alarm 2 hold action selection
0516H (1302)	—	Alarm 2 timer setting
0517H (1303)	—	Alarm 2 action selection at input error
0518H (1304)	CH1	Alarm 2 differential gap setting
0519H (1305)	CH2	
051AH (1306)	CH3	
051BH (1307)	CH4	
051CH (1308)	CH5	
051DH (1309)	CH6	
051EH (1310)	CH7	
051FH (1311)	CH8	
0520H (1312) ⋮ 0527H (1319)	—	Unused
0528H (1320)	—	Alarm 3 type selection
0529H (1321)	—	Alarm 3 hold action selection
052AH (1322)	—	Alarm 3 timer setting
052BH (1323)	—	Alarm 3 action selection at input error

* Channel number of the CT ratio 1 selection

Continued on the next page.

Continued from the previous page.

Address	CH	Name
052CH (1324)	CH1	Alarm 3 differential gap setting
052DH (1325)	CH2	
052EH (1326)	CH3	
052FH (1327)	CH4	
0530H (1328)	CH5	
0531H (1329)	CH6	
0532H (1330)	CH7	
0533H (1331)	CH8	
0534H (1332) ⋮ 053BH (1339)		Unused
053CH (1340)	OUT1	Control output logic selection 1
053DH (1341)	OUT2	
053EH (1342)	OUT3	
053FH (1343)	OUT4	
0540H (1344)	OUT5	Control output logic selection 2
0541H (1345)	OUT6	
0542H (1346)	OUT7	
0543H (1347)	OUT8	
0544H (1348)	ALM1	Alarm output logic selection
0545H (1349)	ALM2	
0546H (1350)	ALM3	
0547H (1351) ⋮ 054FH (1359)	—	Unused
0550H (1360)	—	STOP display selection
0551H (1361)	—	Unused
0552H (1362)	—	Contact input logic selection
0553H (1363)	—	Communication protocol selection
0554H (1364)	—	RUN/STOP transfer logic selection

4. INPUT RANGE TABLES

Input Range Table 1

Input type		Input range	Code	
			Input	Range
Thermocouple	K	0 to 200 °C	K	01
		0 to 400 °C	K	02
		0 to 600 °C	K	03
		0 to 800 °C	K	04
		0 to 1000 °C	K	05
		0 to 1200 °C	K	06
		0 to 1372 °C	K	07
		−199.9 to +300.0 °C *	K	08
		0.0 to 400.0 °C	K	09
		0.0 to 800.0 °C	K	10
		0 to 100 °C	K	13
		0 to 300 °C	K	14
		0 to 450 °C	K	17
		0 to 500 °C	K	20
		0.0 to 200.0 °C	K	29
		0.0 to 600.0 °C	K	37
		−199.9 to +800.0 °C *	K	38
		0 to 800 °F	K	A1
		0 to 1600 °F	K	A2
		0 to 2502 °F	K	A3
		0.0 to 800.0 °F	K	A4
		20 to 70 °F	K	A9
		−199.9 to +999.9 °F *	K	B2
	J	0 to 200 °C	J	01
		0 to 400 °C	J	02
		0 to 600 °C	J	03
		0 to 800 °C	J	04
		0 to 1000 °C	J	05
		0 to 1200 °C	J	06
		−199.9 to +300.0 °C *	J	07
		0.0 to 400.0 °C	J	08
		0.0 to 800.0 °C	J	09
		0 to 450 °C	J	10
		0.0 to 200.0 °C	J	22
		0.0 to 600.0 °C	J	23
		−199.9 to +600.0 °C *	J	30

* Accuracy is not guaranteed between −199.9 to −100.0 °C (−199.9 to −148.0 °F)

Continued on the next page.

Continued from the previous page.

Input type		Input range	Code	
			Input	Range
Thermocouple	J	0 to 800 °F	J	A1
		0 to 1600 °F	J	A2
		0 to 2192 °F	J	A3
		0 to 400 °F	J	A6
		−199.9 to +999.9 °F [1]	J	A9
		0.0 to 800.0 °F	J	B6
	R	0 to 1600 °C [2]	R	01
		0 to 1769 °C [2]	R	02
		0 to 1350 °C [2]	R	04
		0 to 3200 °F [2]	R	A1
		0 to 3216 °F [2]	R	A2
	S	0 to 1600 °C [2]	S	01
		0 to 1769 °C [2]	S	02
		0 to 3200 °F [2]	S	A1
		0 to 3216 °F [2]	S	A2
	B	400 to 1800 °C	B	01
		0 to 1820 °C [2]	B	02
		800 to 3200 °F	B	A1
		0 to 3308 °F [2]	B	A2
	E	0 to 800 °C	E	01
		0 to 1000 °C	E	02
		0 to 1600 °F	E	A1
		0 to 1832 °F	E	A2
	N	0 to 1200 °C	N	01
		0 to 1300 °C	N	02
		0.0 to 800.0 °C	N	06
		0 to 2300 °F	N	A1
		0 to 2372 °F	N	A2
		0.0 to 999.9 °F	N	A5
	T	−199.9 to +400.0 °C [1]	T	01
		−199.9 to +100.0 °C [1]	T	02
		−100.0 to +200.0 °C	T	03
		0.0 to 350.0 °C	T	04
		−199.9 to +752.0 °F [1]	T	A1
		−100.0 to +200.0 °F	T	A2
		−100.0 to +400.0 °F	T	A3
		0.0 to 450.0 °F	T	A4
		0.0 to 752.0 °F	T	A5

[1] Accuracy is not guaranteed between −199.9 to −100.0 °C (−199.9 to −148.0 °F)

[2] Accuracy is not guaranteed between 0 to 399 °C (0 to 751 °F)

Continued on the next page.

Continued from the previous page.

Input type		Input range	Code	
			Input	Range
Thermocouple	W5Re/W26Re	0 to 2000 °C	W	01
		0 to 2320 °C	W	02
		0 to 4000 °F	W	A1
	PL II	0 to 1300 °C	A	01
		0 to 1390 °C	A	02
		0 to 1200 °C	A	03
		0 to 2400 °F	A	A1
		0 to 2534 °F	A	A2
	U	−199.9 to +600.0 °C *	U	01
		−199.9 to +100.0 °C *	U	02
		0.0 to 400.0 °C	U	03
		−199.9 to +999.9 °F *	U	A1
		−100.0 to +200.0 °F	U	A2
		0.0 to 999.9 °F	U	A3
	L	0 to 400 °C	L	01
		0 to 800 °C	L	02
		0 to 800 °F	L	A1
		0 to 1600 °F	L	A2
RTD	Pt100	−199.9 to +649.0 °C	D	01
		−199.9 to +200.0 °C	D	02
		−100.0 to +50.0 °C	D	03
		−100.0 to +100.0 °C	D	04
		−100.0 to +200.0 °C	D	05
		0.0 to 50.0 °C	D	06
		0.0 to 100.0 °C	D	07
		0.0 to 200.0 °C	D	08
		0.0 to 300.0 °C	D	09
		0.0 to 500.0 °C	D	10
		−199.9 to +999.9 °F	D	A1
		−199.9 to +400.0 °F	D	A2
		−199.9 to +200.0 °F	D	A3
		−100.0 to +100.0 °F	D	A4
		−100.0 to +300.0 °F	D	A5
		0.0 to 100.0 °F	D	A6
		0.0 to 200.0 °F	D	A7
		0.0 to 400.0 °F	D	A8
		0.0 to 500.0 °F	D	A9

* Accuracy is not guaranteed between −199.9 to −100.0 °C (−199.9 to −148.0 °F)

Continued on the next page.

Continued from the previous page.

Input type		Input range	Code	
			Input	Range
RTD	JPt100	−199.9 to +649.0 °C	P	01
		−199.9 to +200.0 °C	P	02
		−100.0 to +50.0 °C	P	03
		−100.0 to +100.0 °C	P	04
		−100.0 to +200.0 °C	P	05
		0.0 to 50.0 °C	P	06
		0.0 to 100.0 °C	P	07
		0.0 to 200.0 °C	P	08
		0.0 to 300.0 °C	P	09
		0.0 to 500.0 °C	P	10

Input Range Table 2

Input type		Input range	Code	
			Input	Range
Voltage	0 to 5 V DC	0.0 to 100.0 %	4	01
	0 to 10 V DC		5	01
	1 to 5 V DC		6	01

The first edition: JUL. 2001
The fourth edition: JUL. 2002 [IMQ00]

RKC INSTRUMENT INC.

HEADQUARTERS: 16-6, KUGAHARA 5-CHOME, OHTA-KU TOKYO 146-8515 JAPAN
PHONE: 03-3751-9799 (+81 3 3751 9799)
E-mail: info@rkcinst.co.jp
FAX: 03-3751-8585 (+81 3 3751 8585)

IMR01H03-E4 **JUL. 2002**