(Not for use in Japan)

No. CP-SP-1218E

Single Loop Controller

Model C45/46

User's Manual

for
Installation and Configuration

Thank you for purchasing your Azbil Corporation product.

This manual contains information for ensuring the safe and correct use of the product.

Those designing or maintaining equipment that uses this product should first read and understand this manual. This manual contains information not only for installation, but also for maintenance, troubleshooting, etc. Be sure to keep it nearby for handy reference.

Azbil Corporation

NOTICE

Please make sure that this manual is available to the user of the product.

Unauthorized duplication of this user's manual in part or in whole is forbidden. The information and specifications in this manual are subject to change without notice.

Considerable effort has been made to ensure that this manual is complete and accurate, but if you should find an omission or error, please contact us.

In no event is Azbil Corporation liable to anyone for any indirect, special, or consequential damages as a result of using this product.

Safety Requirements

To reduce the risk of an electric shock that could cause personal injury, follow all safety notices in this document.

This symbol warns the user of a potential shock hazard

The use of this product in a manner not specified by the manufacturer will impair its built-in safety features.

Do not replace any component or part not explicitly specified as replaceable by your supplier.

All wiring should follow local regulations and be carried out by certified and experienced personnel.

Be sure to mount a switch for shutoff of the main power to this unit within reach of the operator.

For AC models, connect a slow-action fuse (type T) having a rated current of 1.0 A and rated voltage of 250 V to the power wiring on the non-grounded side. (IEC 127)

For DC models, connect a Class II power supply unit to the AC power source.

■ EQUIPMENT RATINGS

● AC power

Supply voltage:	100 to 240 V AC (operating power supply voltage: 85 to 264 V AC)
Frequency:	50/60 Hz
Power consumption:	30 VA max. (C45), 40 VA max. (C46)

● DC power

Supply voltage:	24 V DC (operating power supply voltage: 21.6 to 26.4 V DC)
Power consumption:	12 W max. (C45), 15 W max. (C46)

■ Environmental conditions

Do not use this device near corrosive gases, or flammable fluids or gases.

Operating temperature:	0 to 50 °C
Operating humidity:	10 to 90 % RH (without condensation)
Vibration:	2 m/s^2 (10 to 60 Hz)
Overvoltage:	Category II (IEC 60364-4-443, IEC 60664-1)
Pollution degree:	2
Installation location:	Indoors
Altitude:	2000 m max.
Temporary overvoltage:	Supply voltage + 250 V

■ EQUIPMENT INSTALLATION

Be sure to mount this product in a panel so that operators do not touch the rear terminal block. With the exception of supply power and relay contact output, the I/O common mode voltage to ground must be 30 Vrms max., 42.4 V peak max., 60 V DC max.

■ STANDARDS COMPLIENCE

EN 61010-1, EN 61326-1 (for use in industrial locations)
During EMC testing, the reading or output may fluctuate by ±10 % FS.

Conventions Used in This Manual

■ The safety precautions explained in the following section aim to prevent injury to the operator and others, and to prevent property damage.

⚠WARNING	**Warnings are indicated when mishandling this product might result in death or serious injury.**
⚠CAUTION	**Cautions are indicated when mishandling this product might result in minor injury to the user, or physical damage to the product.**

■ In describing the product, this manual uses the icons and conventions listed below.

⚠	Use caution when handling the product.
⃠	The indicated action is prohibited.
❗	Always follow the indicated instructions.

Handling Precautions:

Handling Precautions indicate items that the user should pay attention to when handling this device.

Note:	Indicates information that might benefit the user.
☞ :	This indicates the item or page that the user is requested to refer to.
(1), (2), (3):	Numbers within parentheses indicate steps in a sequence or parts of an explanation.
[para] key, [<] key:	Indicates keys on the panel.
"man" LED:	Indicates various indicators on this unit.
>>:	Indicates the result of an operation, details displayed on the personal computer or other devices, or the state of the device after operation.

Numeric value and character display on LED

7-segment LED

Numeric values: The 7-segment LED expresses numeric values as follows:

0		1		2		3		4		–1	
5		6		7		8		9			

Alphabetical characters: The 7-segment LED expresses alphabetical characters shown below. There are some alphabetical characters, which are not displayed on the LED.

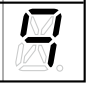
A a		B b		C c		D d		E e	
F f		G g		H h		I i		J j	
K k		L l		M m		N n		O o	
P p		Q q		R r		S s		T t	
U u		V v		Y y		Z z		–	

Handling Precautions

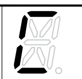
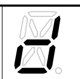
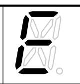
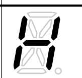
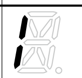
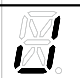
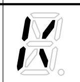
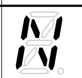
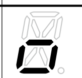
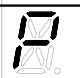
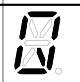
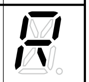
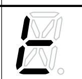
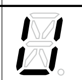
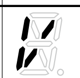
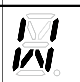
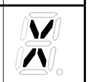
- As shown above, numeric value "2" and alphabetic character "Z" are shown in the same manner.
  Accordingly, numeric value "5" and alphabetic character "S", as well as numeric value "9" and alphabetic character "Q" are also shown in the same manner.

● 11-segment LED

Numeric values: The 11-segment LED expresses numeric values as follows:

0		1		2		3		4	
5		6		7		8		9	

Alphabetical characters: The 11-segment LED expresses alphabetical characters shown below. There are some alphabetical characters, which are not displayed on the LED.

A a		B b		C c		D d		E e		F f	
G g		H h		I i		J j		K k		L l	
M m		N n		O o		P p		Q q		R r	
S s		T t		U u		V v		W w		X x	
Y y		Z z									

Handling Precautions

- As shown above, numeric value "5" and alphabetic character "S" are shown in the same manner.

Safety Precautions

⚠ WARNING

	Do not use this device in an environment with conductive pollution, or with dry non-conductive pollution which can become conductive due to condensation, etc. Otherwise, problems such as tracking phenomena may damage parts, resulting in fire.
	When wiring the power for this device, be sure to mount a shutoff switch for the main power to this unit within reach of the operator. In addition, when wiring the power for AC power models, install a time-lag (T) fuse (rated current 1.0 A, rated voltage 250 V) as specified by IEC 127. Otherwise, tracking phenomena or parts failure due to other factors may cause fire.
	Before removing, mounting, or wiring this device, be sure to turn off the SDC45/46 and all connected devices. Failure to do so might cause electric shock.
	Incorrect wiring of this device can damage this device and lead to other hazards. Check that this device has been correctly wired before turning the power ON.
	Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.
	Do not disassemble this device. Doing so might cause electric shock or device failure.

⚠ CAUTION

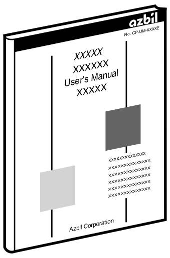
	Use this device within the operating ranges recommended in the specifications (temperature, humidity, voltage, vibration, shock, mounting direction, atmosphere, etc.). Failure to do so might cause fire or device failure.
	Do not block ventilation holes. Doing so might cause fire or device failure.
	Wire this device properly using the specified types of wire and following recognized installation methods. Failure to do so might cause electric shock, fire or device failure.
	Do not allow wire clippings, chips or water to enter the controller case. They might cause fire or device failure.
	Firmly tighten the terminal screws to the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
	Do not use unused terminals on this device as relay terminals. Doing so might cause electric shock, fire or device failure.
	We recommend attaching the terminal cover (sold separately) after wiring this device. Failure to do so might cause electric shock.
	Use the relays within the recommended service life. Failure to do so might cause fire or device failure.
	If there is a risk of a power surge caused by lightning, use a surge absorber (surge protector) to prevent fire or device failure.

⚠ CAUTION

⃠	**Do not operate the keys with a mechanical pencil or other sharp-tipped object.** **Doing so might cause device failure.**
❗	**This device does not operate for 2 to 60seconds (depending on the settings) after the power has been turned ON. Since, in the same way, relay output from this device does not operate, take sufficient care if relay output is used.**
❗	**The frame ground (FG) terminal on this device has a ground terminal function. To limit the effects of external electrical noise, be sure to ground this device. Failure to do so might cause malfunction.**
❗	**Dispose of the battery appropriately, following local regulations.**
❗	**Be sure that the settings are correct for the sensor type.** **If the settings are incorrect, the normal PV will not be measured correctly. In that case a dangerous situation, such as a constant 100% control output, could occur.**

The Role of This Manual

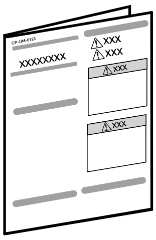
A total of 5 different manuals are available for the C45/46. Read them as necessary for your specific requirements. If a manual you require is not available, contact the azbil Group or its dealer.



Single Loop Controller Model C45/46 User's Manual for Installation and Configuration

Manual No. CP-SP-1218E

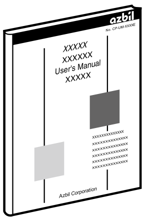
This manual.
Personnel in charge of design, manufacture, operation, and/or maintenance of a system using C45/46 must thoroughly read this manual. This manual also describes the installation, wiring, connections for communication, all functions and settings of the C45/46, operating procedures, troubleshooting, and detailed specifications.



Single Loop Controller Model C45/46 Installation Instructions

Manual No. CP-UM-5445JE

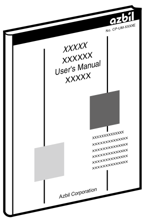
This manual is supplied with the C45/46. Personnel in charge of design and/or manufacture of a system using the C45/46 must thoroughly read this manual. This manual describes the safety precautions, installation, wiring, primary specifications, and transitions of key operations and displays. For further information about operation, refer to another manual, Installation and Configuration.



Single Loop Controller Model C45/46 User's Manual for Displays and Settings

Manual No. CP-SP-1265E

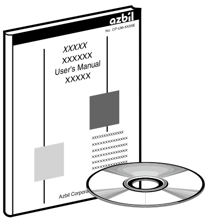
The manual is a reference document necessary to set or change data. The manual lists up the displays, setup items, setting ranges, and initial values.



Single Loop Controller Model C45V/46V User's Manual for Computational Functions

Manual No. CP-SP-1275E

It describes the computation functions of the C45V/46V. Please read it together with the Installation and Configuration manual (CP-SP-1218E) and the Displays and Settings manual (CP-SP-1265E).



User's Manual for Smart Loader Package Model SLP-C45 for Single Loop Controller Model C45

Manual No. CP-UM-5458E

This manual is supplied with the SLP-C45 Smart Loader Package. The manual describes the software used to make various settings for the C45/46 using a personal computer. Personnel in charge of design or setting of a system using C45/46 must thoroughly read this manual. The manual describes installation of the software into a personal computer, operation of the personal computer, various functions, and setup procedures.

Organization of This User's Manual

This manual is organized as follows:

Flowchart of key operations and displays

This section summarizes the flowchart of key operations and displays of model C45/46 in the diagram so as to describe them.

Chapter 1. OVERVIEW

This chapter describes the application, features, model selection, part names, and functions of model C45/46. Names of parts and functions introduced here are used for explanation in the following chapters, so please make sure to understand them.

Chapter 2. INSTALLATION

This chapter describes the environmental conditions and installation procedures when installing model C45/46.

Chapter 3. WIRING

This chapter describes the wiring procedures, wiring precautions, and connection examples.

Chapter 4. FUNCTIONS NECESSARY FOR CONTROL

This chapter describes the functions absolutely necessary to operate the control of model C45/46.

Chapter 5. OPERATION

This chapter describes how to set the functions, which are normally used for model C45/46.

Chapter 6. FUNCTIONS OFTEN USED FOR OPERATIONS OTHER THAN CONTROL

This chapter describes how to set the functions, which are used for operations other than the control actions of model C45/46.

Chapter 7. FUNCTIONS USED AS REQUIRED

This chapter describes how to set the functions necessary for convenient operations of model C45/46.

Chapter 8. LIST OF SETTINGS

Refer to: "Single Loop Controller Model C45/46 User's Manual for Displays and Settings (CP-SP-1265E)".

Chapter 9. CPL COMMUNICATIONS FUNCTION

This chapter describes how to communicate model C45/46 with a host unit, such as a personal computer or PLC through Azbil Corporation's standard CPL communication using RS-485.

Chapter 10. Modbus COMMUNICATIONS FUNCTIONS

This chapter describes how to communicate model C45/46 with a host unit, such as a personal computer or Modbus communication using RS-485.

Chapter 11. LIST OF COMMUNICATION DATA

This chapter shows the list of communication data inside the memory of model C45/46.

Chapter 12. TROUBLESHOOTING

This chapter describes the troubleshooting of model C45/46.

Chapter 13. MAINTENANCE, INSPECTION, AND DISPOSAL

This chapter describes how to carry out the maintenance and inspection of model C45/46 and how to dispose of model C45/46.

Chapter 14. SPECIFICATIONS

This chapter describes the general specifications, performance specifications, external dimensions, and optional parts of model C45/46.

Appendices

These appendixes describe the function block diagrams, standard bit codes, standard numerical bit codes, and using characters and terms used in descriptions of this manual.

Contents

Flowcharts for Major Settings

Chapter 4. FUNCTIONS NECESSARY FOR CONTROL

Chapter 6. FUNCTIONS OFTEN USED FOR OPERATIONS OTHER THAN CONTROL

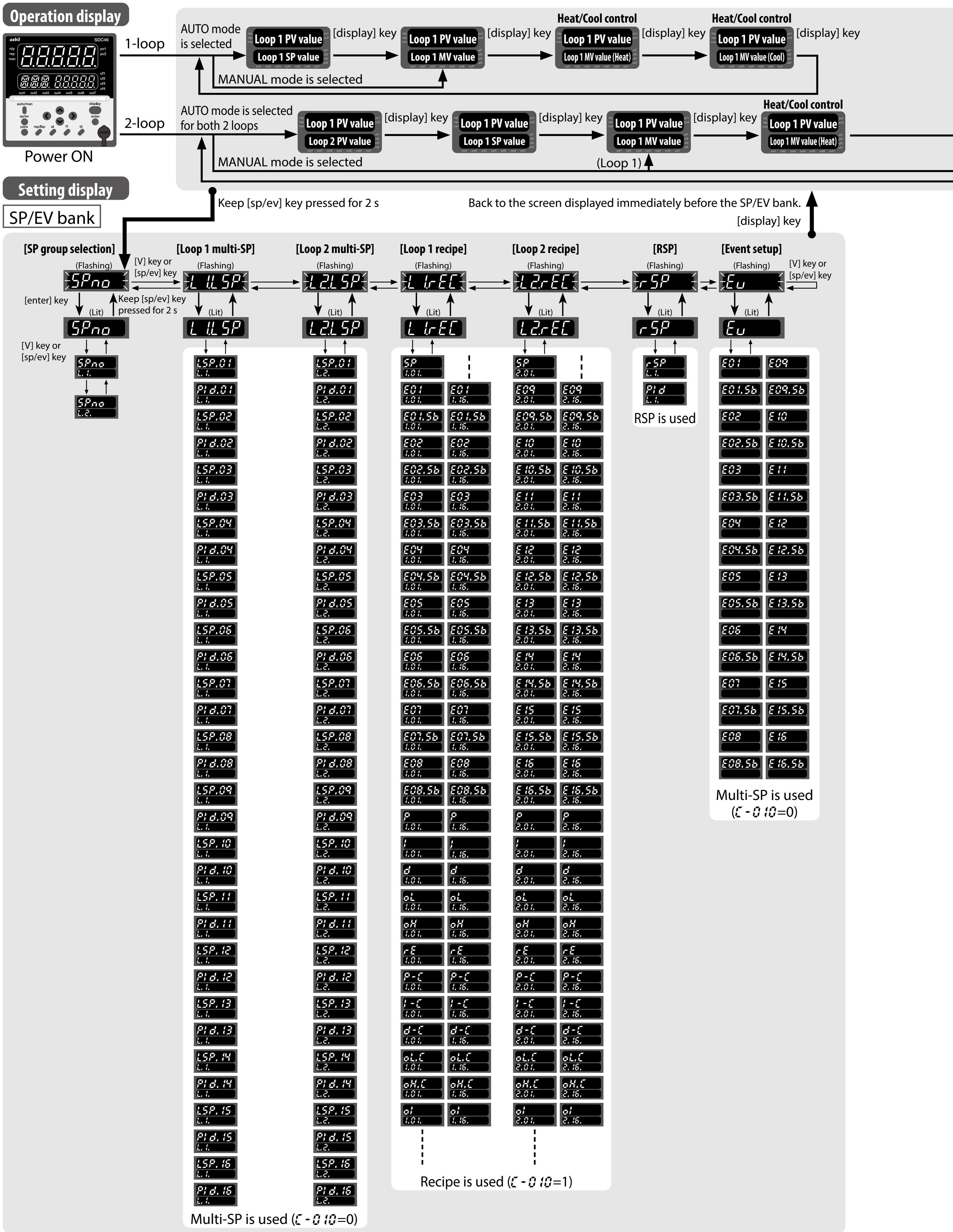
Chapter 7. FUNCTIONS USED AS REQUIRED

Chapter 8. LIST OF SETTINGS

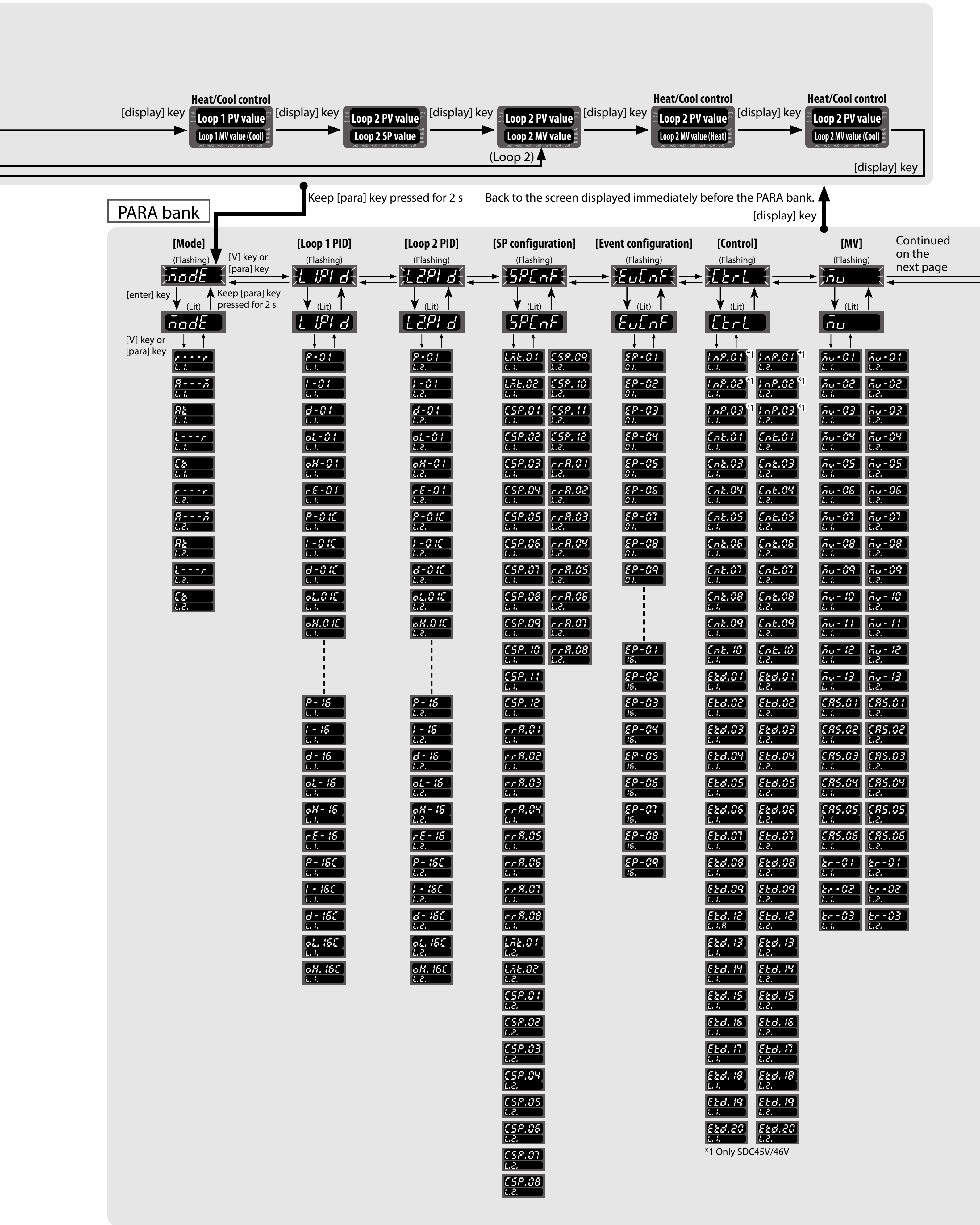
Refer to: "Single Loop Controller Model C45/46 User's Manual for Displays and Settings (CP-SP-1265E)".

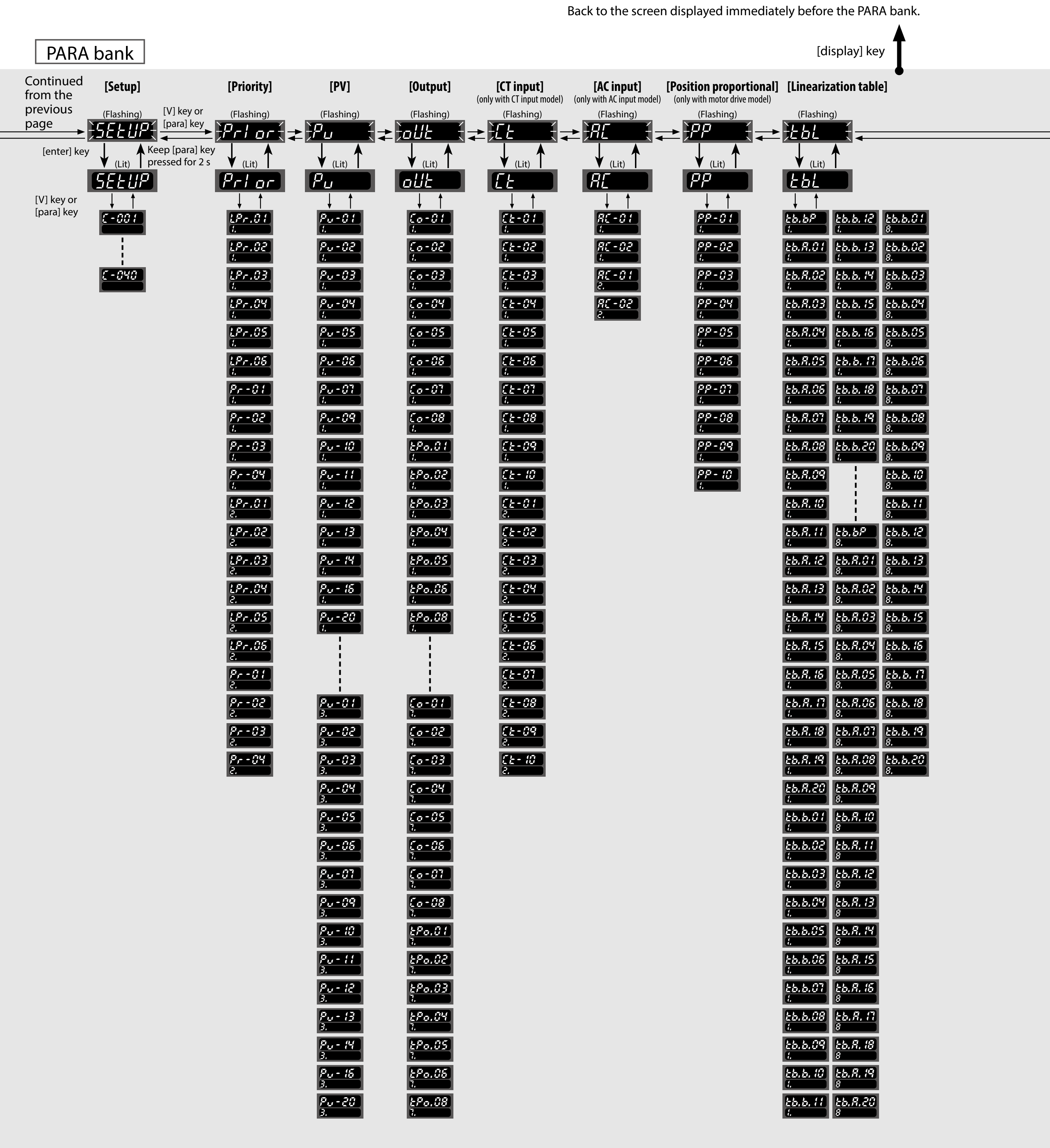
Chapter 9. CPL COMMUNICATIONS FUNCTION

Flowchart of key operations and displays

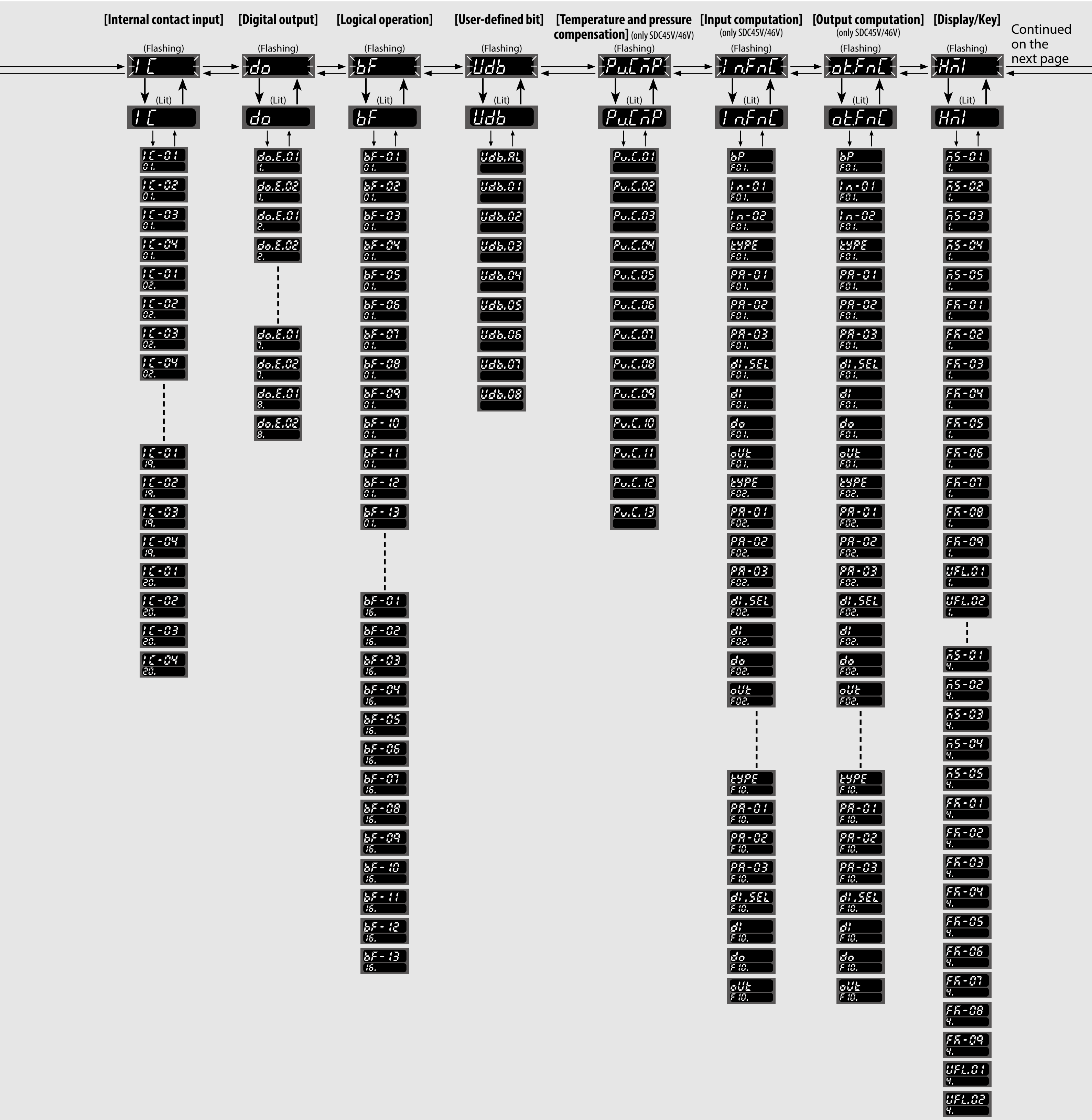


Note: Bank names are enclosed in brackets, [ ]





Back to the screen displayed immediately before the PARA bank.
[display] key
PARA bank
Continued from the previous page
[Setup]
[Priority]
[PV]
[Output]
[CT input]
(only with CT input model)
[AC input]
(only with AC input model)
[Position proportional]
(only with motor drive model)
[Linearization table]
(Flashing)
(Lit)
[V] key or [para] key
[enter] key
Keep [para] key pressed for 2 s
SEtUP
PrI or
Pu
oUt
Ct
AC
PP
tbL

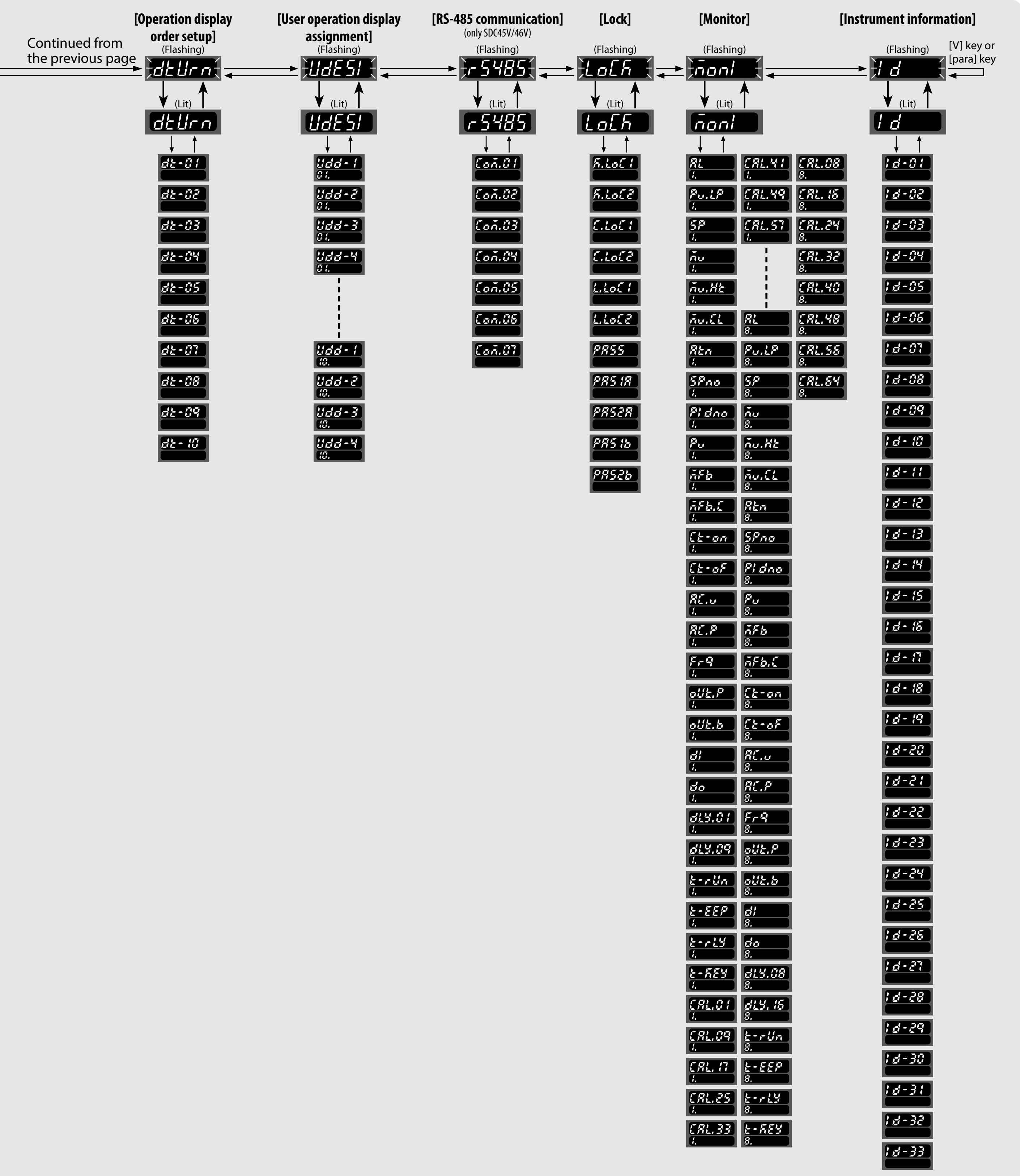

[Internal contact input]
[Digital output]
[Logical operation]
[User-defined bit]
[Temperature and pressure compensation] (only SDC45V/46V)
[Input computation] (only SDC45V/46V)
[Output computation] (only SDC45V/46V)
[Display/Key]
(Flashing)
(Lit)
Continued on the next page

Note: Bank names are enclosed in brackets, [ ]

■ Movement within bank

- Forward movement
  [sp/ev] key or [V] key (SP/EV bank)
  [para] key or [V] key (PARA bank)
- Backward movement
  [Λ] key

PARA bank



Chapter 1. OVERVIEW

1 - 1 Overview and Features

■ Overview

Model C45/46 (hereafter referred to as "this unit" or "the SDC") is a digital indicating controller designed to control temperature, pressure, flow rate, pH, liquid level, and other process variables. Up to two full multirange input points can be connected. Therefore, this unit is applicable to various control modes, such as single-loop PID control. The following features are provided to achieve complicated process controls. Thus, this unit can be used for a wide variety of applications.

■ Features

- A variety of models

  The best model for the application can be chosen from the following 3 models: standard model (SDC45A/46A), computation function model (SDC45V/46V), and high-accuracy model (SDC45R/46R). *1

- High speed and high accuracy

  This unit combines a high-speed sampling cycle with a 5-digit display and high accuracy.

- Multi-loop input

  Up to two full multi-range input points can be mounted. According to this function, the control modes, such as single-loop PID control (remote SP input), 2-loop PID control, cascade control, and backup control can be made with only one unit. The control mode can be changed by data settings.

- Improvement of visibility and operability

  High-intensity LEDs are used for the display part. This ensures excellent visibility. Additionally, a model that uses orange LEDs for all display parts is available. This also ensures good visibility. *2
  As for operation keys, various kinds of mode keys, and [∧], [∨], [<], and [>] keys are arranged. This ensures easy setting and mode change. A mechanical key mechanism is utilized for the main unit, ensuring convenient operation with click-feeling.

- Achievement of advanced control

  The control action incorporates a new algorithm "Ra-PID (Rationa LOOP PID)" and "Just-FiTTER." Three types of auto tunings are prepared by assuming a variety of cases. This ensures easy obtaining of optimal control results. Additionally, input and output linearization approximation tables are provided as standard functions. This ensures optimal control results, which cannot be obtained with normal PID only. Also, use of two output points makes it possible to perform the heat/cool control.

- Various forms of input and output

  Up to seven output points can be connected to the SDC46A, and the SDC45A can take up to five. Output types can be selected from among relay contact, voltage pulse, current, continuous voltage, and transmitter power supply (24 V DC). Multiple types of output allow various final control elements to be connected through this one unit. Control output assignments can be changed freely by means of settings.
  Additionally, the DI and DO points of the SDC46A/46V can be extended to up to 14 DI points and 8 DO points using optional functions. By exchanging the I/O with the PLC, auto operation of the equipment, mode change, various alarms, and statuses can be controlled, contributing to safe operation of the equipment.

- Personal computer loader supported

  A personal computer loader provides a monitoring function. Data setting, as well as device monitor and trend functions are provided. This unit can also be used as a simple data logger.

*1 The sampling cycle of the SDC45A/46A can be selected from 25, 50, 100, and 300 ms. On the SDC45R/46R/45V/46V the sampling cycle is fixed at 100 ms.

*2 There are no SDC45R/46R models with orange LED display.

1 - 2 Model Selection Table

■ C45A/V (with 14-digit model No.)

Basic model No.	Input model	Power supply	Output 1, 2	Output 3, 4	Output 5	Output 6, 7	Option	Addition 1	Addition 2	Specifications
C45A										Standard model
C45V										Computation function model
	1									1 input (1 full multiple) *1
	2									2 inputs (2 full multiple)
	3									3 inputs (1 full multiple, 2 linear) *2
		A								100 to 240 V AC
		D								24 V DC
			1							1 form 1a1b relay
			2							2 form 1a relays
				C0						Current output (OUT 3)
				D0						Continuous voltage output (OUT 3)
				V0						Voltage pulse output (OUT 3)
				RR						2 form 1a relays
				CC						2 current outputs
				VV						2 voltage pulse outputs
				CV						Current (OUT 3) + voltage pulse (OUT4)
				SS						Motor drive triac + MFB input *7
					0					None
					R					Form 1a relay
					C					Current output
					D					Continuous voltage output
					P					Transmitter power supply
						0				None
							0			2 digital inputs (DI-F1/2) *3
							1			10 digital inputs *4
							2			2 digital inputs + 8 digital outputs *3
							3			2 digital inputs + 8 digital outputs + RS-485 communication *3
							4			2 CT inputs *5
							5			2 CT inputs + 8 digital inputs *5
							6			2 CT inputs + 8 digital outputs *5
							7			2 CT inputs + 8 digital outputs + RS-485 communication *5
								0		None *6
								D		Inspection certificate
								Y		Complying with the traceability certification
									0	None
									1	LEDs: all orange
									A	UL-marked product
									B	UL-marked product, orange LEDs only

*1 Not available for SDC45V.

*2 SDC45V only.

*3 There are no digital inputs if "SS" is selected for Output 3, 4.

*4 There are 8 digital inputs if "SS" is selected for Output 3, 4.

*5 Cannot be selected if "SS" is selected for Output 3, 4.

*6 Tropicalization and anti-sulfidation treatments can be ordered. However, there are some restrictions on the specifications. For details, please contact the azbil Group.

*7 AC Power supply model only.

■ C46A/V (with 14-digit model No.)

Basic model No.	Input model	Power supply	Output 1, 2	Output 3, 4	Output 5	Output 6, 7	Option	Addition 1	Addition 2	Specifications
C45A										Standard model
C45V										Computation function model
	1									1 input (1 full multiple) *1
	2									2 inputs (2 full multiple)
	3									3 inputs (1 full multiple, 2 linear) *2
		A								100 to 240 V AC
		D								24 V DC
			1							1 form 1a1b relay
			2							2 form 1a relays
				C0						Current output (OUT 3)
				D0						Continuous voltage output (OUT 3)
				V0						Voltage pulse output (OUT 3)
				RR						2 form 1a relays
				CC						2 current outputs
				VV						2 voltage pulse outputs
				CV						Current (OUT 3) + voltage pulse (OUT4)
				SS						Motor drive triac + MFB input *9
				R1						Motor drive relay + MFB input *9
					0					None *4
					R					Form 1a relay *4
					C					Current output *4
					D					Continuous voltage output *4
					P					Transmitter power supply *4
						0				None
						1				Current output (OUT 6)
						2				Transmitter power supply (OUT 7)
						3				2 current outputs *3
						4				Current (OUT 6) + transmitter power supply (OUT 7)
							0			2 digital inputs (DI-F1/2) *5
							1			14 digital inputs *6
							2			14 digital inputs + 8 digital outputs *6
							3			14 digital inputs + 8 digital outputs + RS-485 communication *6
							4			2 CT inputs *7
							5			2 CT inputs + 12 digital inputs *7
							6			2 CT inputs + 12 digital inputs + 8 digital outputs *7
							7			2 CT inputs + 12 digital inputs + 8 digital outputs + RS-485 communication *7
								0		None *8
								D		Inspection certificate
								Y		Complying with the traceability certification
									0	None
									1	LEDs: all orange
									A	UL-marked product
									B	UL-marked product, orange LEDs only

*1 Not available for SDC46V.

*2 SDC46V only.

*3 Not available if "CC" is selected for Output 3, 4 and "C" is selected for Output 5.

*4 Selection must be "0" if "R1" is selected for Output 3, 4.

*5 There are no digital inputs if "SS" or "R1" is selected for Output 3, 4.

*6 There are 12 digital inputs if "SS" or "R1" is selected for Output 3, 4.

*7 Not available if "SS" or "R1" is selected for Output 3, 4.

*8 Tropicalization and anti-sulfidation treatments can be ordered. However, there are some restrictions on the specifications. For details, please contact the azbil Group.

*9 AC Power supply model only.

■ C45A (with 7-digit model No.)

Displays have all-orange LEDs.

Basic model No.	Set No.	Option 1	Option 2	Specifications
C45A				Standard model: 2 alarm outputs (OUT 1/2)
	0			None
		0		Regular type 1: 2 relay outputs (OUT 3/4) + 1 current output (OUT 5) + 2 digital inputs (DI-F1/2)
		1		Regular type 2: 1 current output (OUT 3) + 1 voltage pulse output (OUT 4) + 1 relay output (OUT 5) + 2 digital inputs (DI-F1/2)
		2		Position proportion type 1: 2 triac outputs (OUT 3/4) + 1 relay output (OUT 5)
		3		Regular type 3: 2 current outputs (OUT 3/4) + transmitter power supply (24 V DC) (OUT 5) + 2 digital inputs (DI-F1/2)
		4		Position proportion type 2: 2 triac outputs (OUT 3/4) + transmitter power supply (24 V DC) (OUT 5)
			0	None
			1	Communications (RS-485) + PV input 2 + 8 digital outputs
			2	PV input 2 + 8 digital outputs
			3	8 digital outputs
			4	PV input 2

■ C46A (with 7-digit model No.)

Basic model No.	Set No.	Option 1	Option 2	Specifications
C46A				Standard model: 2 alarm outputs (OUT 1/2) + 1 current output (OUT 6)
	0			None
		0		Regular type 1: 2 relay outputs (OUT 3/4) + 1 current output (OUT 5) + 2 digital inputs (DI-F1/2)
		1		Regular type 2: 1 current output (OUT 3) + 1 voltage pulse output (OUT 4) + 1 relay output (OUT 5) + 2 digital inputs (DI-F1/2)
		2		Position proportion type 1: 2 triac outputs (OUT 3/4) + 1 relay output (OUT 5)
		3		Regular type 3: 2 relay outputs (OUT 3/4) + 1 current output (OUT 5) + transmitter power supply (24 V DC) (OUT 7) + 2 digital inputs (DI-F1/2)
		4		Position proportion type 2: 2 triac outputs (OUT 3/4) +1 relay output (OUT 5) + transmitter supply (24 V DC) (OUT 7)
			0	None
			1	Communications (RS-485) + PV input 2 + 12 digital inputs + 8 digital outputs
			2	PV input 2 + 12 digital inputs + 8 digital outputs
			3	12 digital inputs + 8 digital outputs
			4	PV input 2

■ C45R

Basic model No.	Input model	Power supply	Output 1, 2	Output 3, 4	Output 5	Output 6, 7	Option	Addition 1	Addition 2	Specifications
C45R										High accuracy model
	1									2 inputs (1 RTD, 1 linear)
	2									2 inputs (2 RTDs)
		A								100 to 240 V AC
		D								24 V DC
			1							1 form 1a1b relay
			2							2 form 1a relays
				CC						2 current outputs
				VV						2 voltage pulse outputs
					R					Form 1a relay
						0				None
							0			2 AC inputs
							1			2 AC inputs + 8 digital inputs
							8			2 AC inputs + RS-485 communication
								D		Inspection certificate
								Y		Complying with the traceability certification
									0	None
									A	UL-marked product

■ C46R

Basic model No.	Input model	Power supply	Output 1, 2	Output 3, 4	Output 5	Output 6, 7	Option	Addition 1	Addition 2	Specifications
C46R										High accuracy model
	1									2 inputs (1 RTD, 1 linear)
	2									2 inputs (2 RTDs)
		A								100 to 240 V AC
		D								24 V DC
			1							1 form 1a1b relay
			2							2 form 1a relays
				CC						2 current outputs
				VV						2 voltage pulse outputs
					R					Form 1a relay
						0				None
						3				2 current outputs
							0			2 AC inputs
							1			2 AC inputs + 12 digital inputs
							8			2 AC inputs + RS-485 communication
								D		Inspection certificate
								Y		Complying with the traceability certification
									0	None
									A	UL-marked product

■ Accessories and optional parts

● Accessories

Name	Model No.
Mounting bracket	81405411-004
Gasket	81421863-001 (for SDC45A)
	81421864-001 (for SDC46A)

● Optional parts

Item	Parts No. or model No.
Mounting bracket (2 units)	81405411-003
Terminal cover *1	81441420-001
Current transformer	QN212A *2 (φ12)
	QN206A *2 (φ6)
Transformer for detecting heater power supply voltage	81406725-003 *2
Hard cover	81441421-001 (for SDC45)
	81441422-001 (for SDC46)

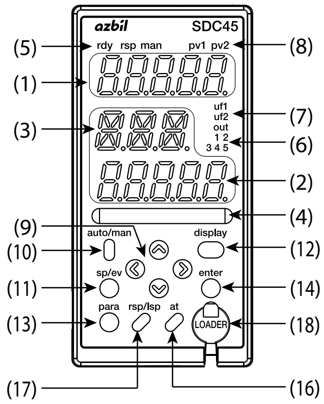
* 1. Cover for SDC45, 2 for SDC46.

* 2. Not UL-certified.

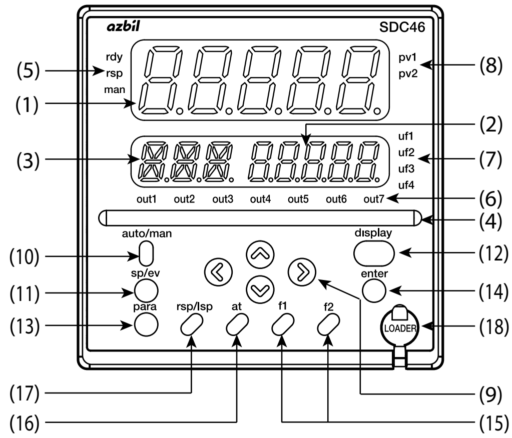
1 - 3 Names and Functions of Parts

■ Front panel

● C45



● C46



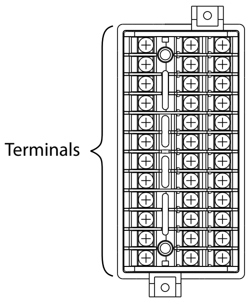
● **Description**

(1) Upper display: Displays PV (present temperature etc.) or setup items.
(2) Lower display: Displays SP (set temperature, etc.) and other parameters.
(3) Auxiliary display: Displays group No., loop* No., and channel No. of setup item.
* The control loop is formed by the PV input, PID control, and control output.
(4) Multi-status indicator: Indicates MV or DI/DO status.
(5) Mode indicators:
rdy: Lights up in READY mode.
rsp: Lights up in RSP (remote setting input) mode.
man: Lights up in MANUAL mode.
(6) Output indicators:
out1-7: Light up when the output is ON (SDC45: out1-5). Always lit when the output is current or continuous voltage.
(7) User function indicators:
uf1-4: Light under user-assigned conditions (SDC45: uf1, uf2).
(8) Loop number indicators:
pv1, pv2: Light up to indicate which loop has the displayed PV value.
(9) [∧], [∨], [<], [>] keys: Used to increment/decrement numeric values and shift between digits or settable items.
(10) [auto/man] key: Used to change AUTO/MANUAL mode.
(11) [sp/ev] key: Used to set the SP/EV bank.
(12) [display] key: Used to change the display contents in the operation display mode.
(13) [para] key: Used to set the PARA bank.
(14) [enter] key: Used in initiating setup and to confirm changed values.
(15) [f1], [f2] key: Used for user-assigned functions. (SDC46 only).
(16) [at] key: Used to execute/cancel auto-tuning, or for user-assigned functions.
(17) [rsp/lsp] key: Used to change between remote and local set point, or for user-assigned functions.
(18) Loader jack: Jack for connection of PC loader cable (with cap).

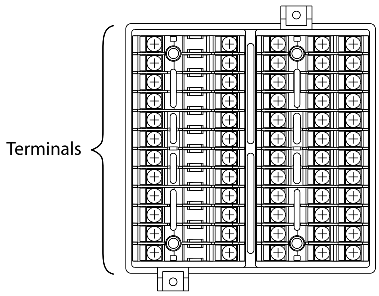
■ Rear panel

The rear panel of this unit contains terminals used to connect the power supply, inputs, and/or outputs.
For connections, always use crimp terminals suitable for M3 screws.
Terminal screws: M3
Tightening torque of terminal screws: 0.4 to 0.6 N·m or less

● **C45**

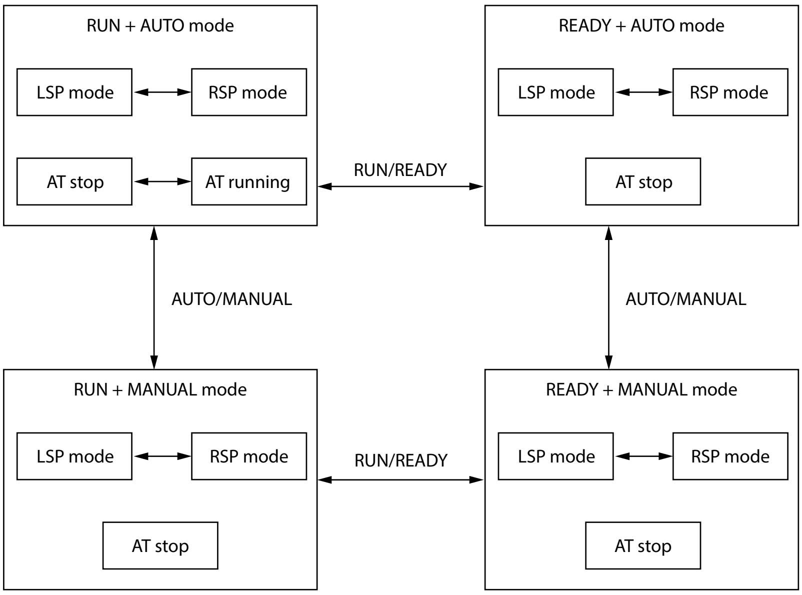


● **C46**



1 - 4 Operation Modes

The following shows the transition of operation modes:



RUN:	Control status
READY:	Control stop status
AUTO:	Automatic operation (This unit automatically determines the MV values.)
MANUAL:	Manual operation (The MV values are operated manually.)
LSP:	Local SP (The control is performed using the SP stored in the measuring instrument.)
RSP:	Remote SP (The analog input from the external device is used as SP.)
AT:	Auto tuning (The PID constants are set automatically using the limit cycle.)

When performing the 2-loop control with a 2-input model, the operation mode can be changed independently in each loop.

Chapter 2. INSTALLATION

⚠ CAUTION

Use this device within the operating ranges recommended in the specifications (temperature, humidity, voltage, vibration, shock, mounting direction, atmosphere, etc.).
Failure to do so might cause fire or faulty operation.

Do not block ventilation holes.
Doing so might cause fire or faulty operation.

■ Location

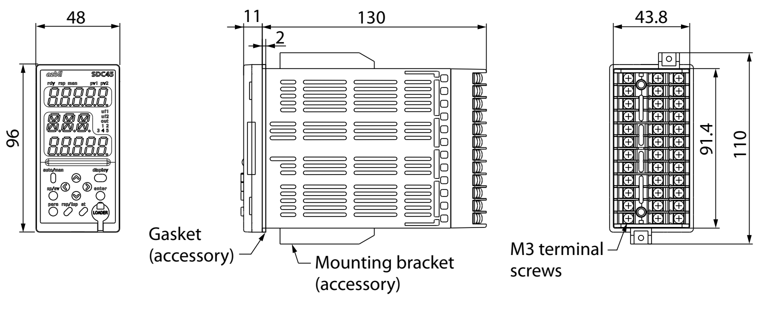
Install the controller in a location that meets the following criteria:

- Voltage to ground of 30 Vr.m.s. max., 42.4 V peak max., and 60 V DC max.
- No high/low temperature/humidity.
- Free from silicone gas and other corrosive gases such as sulfide gas.
- Not dusty or sooty.
- Protected from direct sunlight, wind, and rain.
- Little mechanical vibration or shock.
- Not close to high voltage line, welding machine or other electrical noise generating source.
- At least 15 meters away from the high voltage ignition device for a boiler.
- No strong magnetic fields.
- No flammable liquid or gas.
- Indoors

■ External dimensions

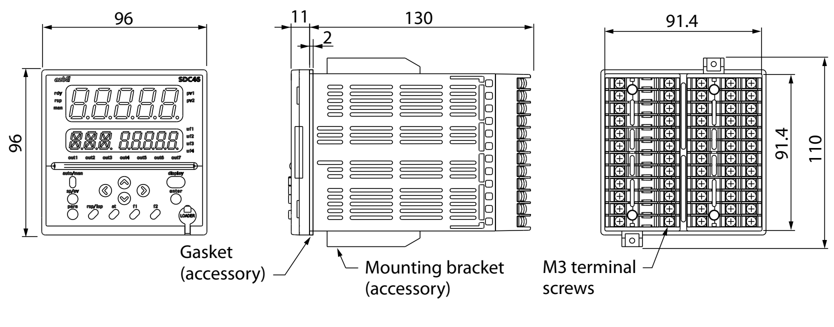
● C45

Unit: mm



● C46

Unit: mm

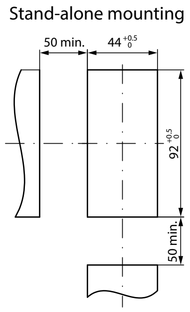


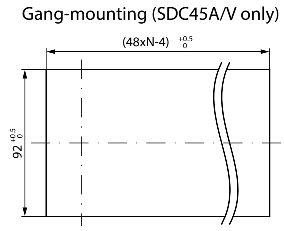
■ Panel cutout dimensions

Make the mounting holes according to the panel hole marking dimensions.

● C45

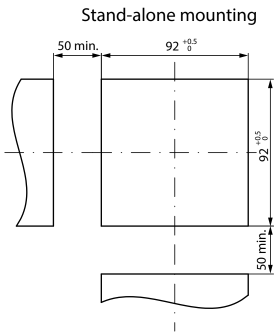
Unit: mm

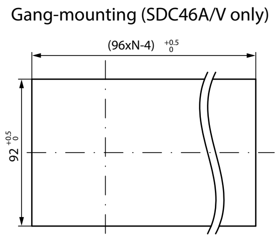




● C46

Unit: mm





[!] Handling Precautions

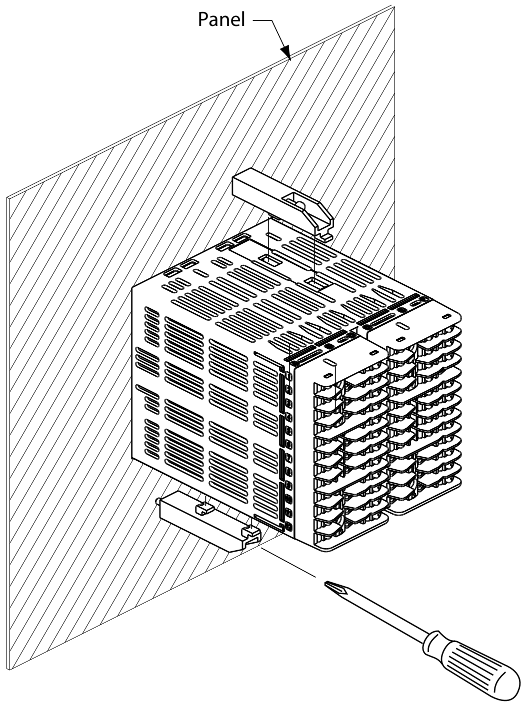
- When used as a waterproof unit, be sure to install a gasket.
- Mount the SDC45R/46R with the stand-alone mounting method only.
- When three or more units are gang-mounted horizontally, the maximum allowable ambient temperature is 40 °C.
- Provide a space of at least 50 mm or more above and below the controller.

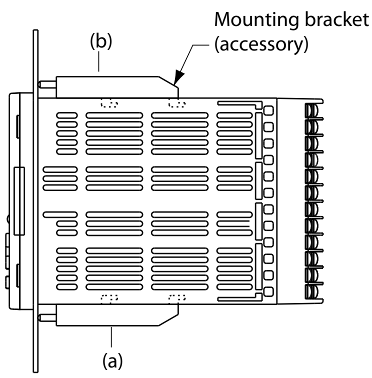
■ Mounting procedure

● Ordinal mounting

Tools: Phillips-head screwdriver

(1) Insert this unit from the front of the panel.
(2) Fix the top and bottom of this unit firmly with the mounting brackets (accessory). When mounting this unit, mount the lower mounting bracket (a) first.





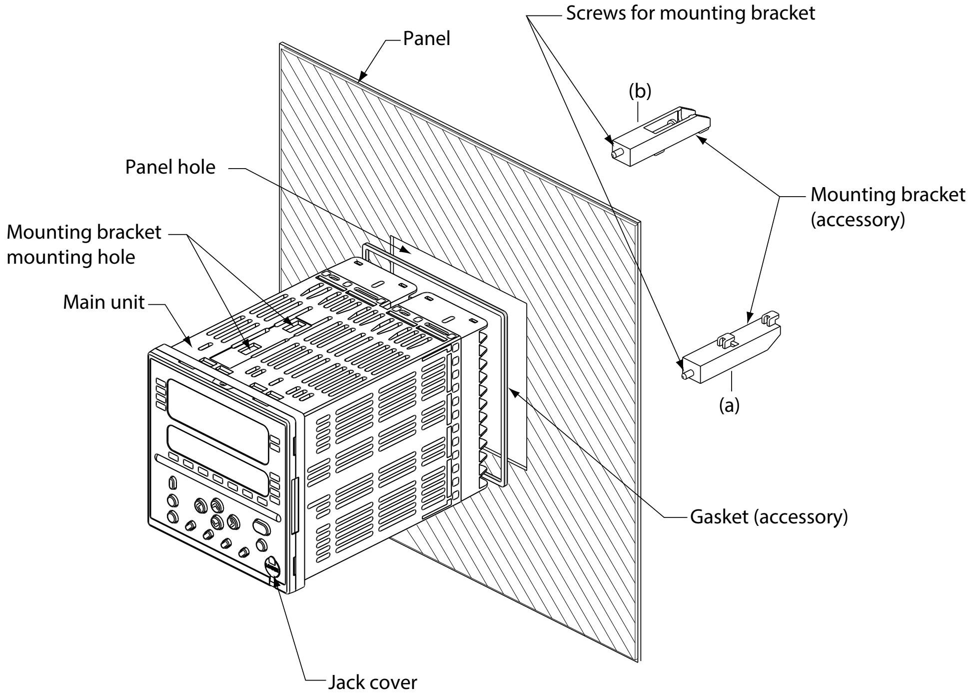
(3) To fasten this controller onto the panel, tighten the mounting bracket screws, and turn one more turn when there is no play between the bracket and panel.

! Handling Precautions

- Excessive tightening of the screws may deform the controller case.
- The mounting must be horizontal with the back not tilted more than 10° up or down.
- The mounting panel should be rigid and no more than 7 mm thick (5 mm max. when a gasket is used).

● **Waterproof mounting**

Tools: Phillips-head screwdriver



(1) Mount the gasket on the flange part of this unit.
(2) Make sure that the jack cover is inserted to the front panel of this unit firmly.
(3) From the front of the panel, insert this unit with the gasket mounted.
(4) Fix the top and bottom of the main unit firmly from the rear of the panel with the mounting brackets (accessory).
    When mounting this unit, mount the lower mounting bracket (a) first.
(5) To fasten this controller onto the panel, tighten a mounting bracket screws, and turn one more turn when there is no play between the bracket and panel.

! Handling Precautions

- Excessive tightening of the screws may deform the controller case.
- If gang-mounted, dustproof and waterproof protection may not be maintained.
- When used as a waterproof unit, be sure to install a gasket.

Chapter 3. WIRING

3 - 1 Wiring Precautions

⚠ WARNING
Do not use this device in an environment with conductive pollution, or with dry non-conductive pollution which can become conductive due to condensation, etc. Otherwise, problems such as tracking phenomena may damage parts, resulting in fire.
When wiring the power for this device, be sure to mount a shutoff switch for the main power to this unit within reach of the operator. In addition, when wiring the power for AC power models, install a time-lag (T) fuse (rated current 1.0 A, rated voltage 250 V) as specified by IEC 127. Otherwise, tracking phenomena or parts failure due to other factors may cause fire.
Before removing, mounting, or wiring this device, be sure to turn off the SDC45/46 and all connected devices. Failure to do so might cause electric shock.
Incorrect wiring of this device can damage this device and lead to other hazards. Check that this device has been correctly wired before turning the power ON.
Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.
Do not disassemble this device. Doing so might cause electric shock or device failure.

⚠ CAUTION
Wire this device properly using the specified types of wire and following recognized installation methods. Failure to do so might cause electric shock, fire or device failure.
Do not allow wire clippings, chips or water to enter the controller case. They might cause fire or device failure.
Firmly tighten the terminal screws to the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
Do not use unused terminals on this device as relay terminals. Doing so might cause electric shock, fire or device failure.
We recommend attaching the terminal cover (sold separately) after wiring this device. Failure to do so might cause electric shock.
Use the relays within the recommended service life. Failure to do so might cause fire or device failure.
If there is a risk of a power surge caused by lightning, use a surge absorber (surge protector) to prevent fire or device failure.
The frame ground (FG) terminal on this device has a ground terminal function. To limit the effects of external electrical noise, be sure to ground this device. Failure to do so might cause malfunction.

■ Wiring precautions

- Be sure to provide a switch within operator reach for shutting off the main power supply to the controller in the main supply wiring. Also, the main supply wiring also requires a time-lagged (T) fuse rated at 1.0 A, 250 V. Install the switch or fuse on the high potential (non-ground) side of the circuit. (IEC127)
- Symbols in the terminal wiring label on the controller side:

Symbols	Meaning
∼	AC power supply
⎓	DC power supply
⚠ (lightning)	Caution, danger of electric shock
⚠	Caution
⏚	Functional ground terminal (not a protective ground terminal)

- Before wiring the SDC45/46, verify the controller's model No. and terminal Nos. written on the label on the side. Inspect all wiring once wiring work has been completed.
- Use M3 crimp-type terminal lugs for wiring to terminals.
  The tightening torque of the terminal screw is 0.4 to 0.6 N·m.
- Leave a distance of at least 50 cm between I/O lead wires or communications lead wires and power lead wires. Also, do not pass these lead wires through the same conduit or wiring duct.
- Be careful not to allow any crimp-type terminal lugs to touch adjacent terminals.
- To connect 2 (max.) crimp terminals to the same terminal screw, bend the crimp terminals beforehand.
- Make sure that devices and equipment connected to this device have reinforced insulation or double insulation suitable for the maximum operating voltage of this device’s power supply, inputs, and outputs.
- The controller requires 2 to 60 seconds according to the settings to start up once the power is turned ON. A warm-up time of at least 30 minutes is recommended to allow the controller to attain the specified accuracy.
- If current transformer input is used for phase angle control, inaccurate values will be indicated.

3 - 2 Recommended Cables

- Contact the thermocouple wires to the terminals in case of a thermocouple input.

  When a thermocouple is connected to terminals, or wiring distance is long, connect the wire via a shielded compensating lead wire.

- For input/output other than thermocouples, use a JCS 4364 instrument cable or equivalent (generally called twisted shielded cable for instrumentation use).

  Recommended twisted shielded cables are:

Fujikura Ltd.	2 conductors	IPEV-S-0.9 mm^2 × 1P
	3 conductors	ITEV-S-0.9 mm^2 × 1T
Hitachi Cable, Ltd.	2 conductors	KPEV-S-0.9 mm^2 × 1P
	3 conductors	KTEV-S-0.9 mm^2 × 1T

- A shielded multiconductor microphone cord (MVVS) may be used, if electromagnetic induction noise is comparatively low.

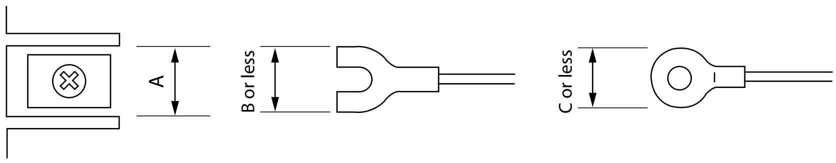
- Use a power cable with the following specifications: nominal cross-sectional area of 0.75 to 2.00 mm^2, rated voltage of 300 V or more, and rated temperature of 60 °C or more.
  If commercially available cables are used, CVV or VTC or equivalent is recommended.
  Use cables whose cross-sectional area is suitable for the crimp terminal lugs used.

3 - 3 Terminal Connections

⚠ CAUTION

!	**Firmly tighten the terminal screws to the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.**
⃠	**Do not use unused terminals on this device as relay terminals. Doing so might cause electric shock, fire or device failure.**
⚠	**We recommend attaching the terminal cover (sold separately) after wiring this device. Failure to do so might cause electric shock.**

For wiring of SDC45/46, use an appropriate crimp type terminal lug suitable for the M3 screw.



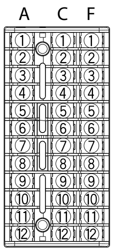
Applicable screw size	Terminal dimensions (mm)			Recommended crimp terminal JIS indication	Applicable electrical wire size	JST Mfg. Co. Model No. (Reference)
	A	B	C			
M3	6.1	5.8	5.8	RAV1.25-3	0.3 to 1.3 mm^2 AWG22 to 16	V1.25-3 V1.25 B3A

! Handling Precautions

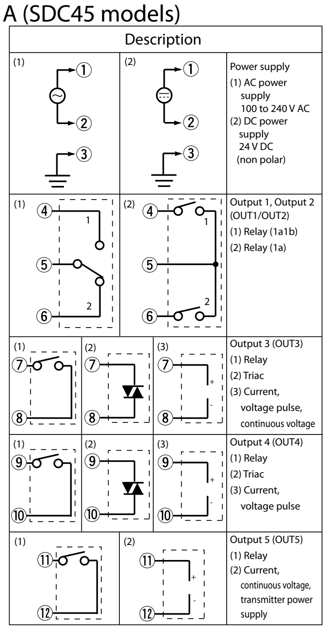
- When installing this unit in a place where the vibration or impact is large, always use an appropriate round crimp type terminal lug to avoid loose terminal connections.
- Pay special attention so that no crimp type terminal lugs are in touch with adjacent terminals.
- The tightening torque of the terminal screw must be 0.4 to 0.6 N·m or less.

3 - 4 Terminal Wiring Diagram

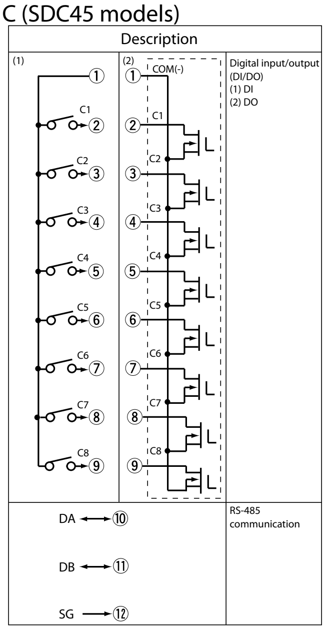
■ C45 terminals



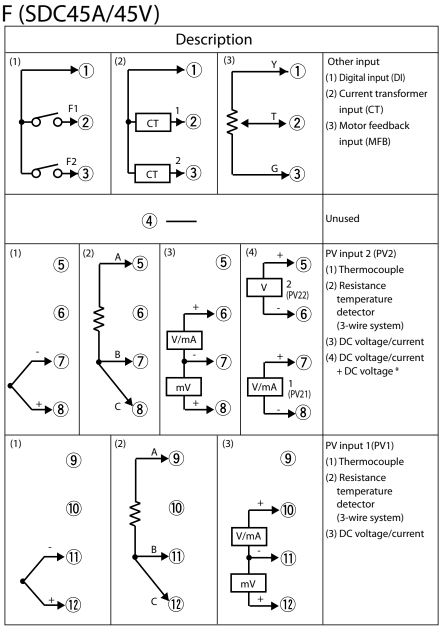
A (SDC45 models)



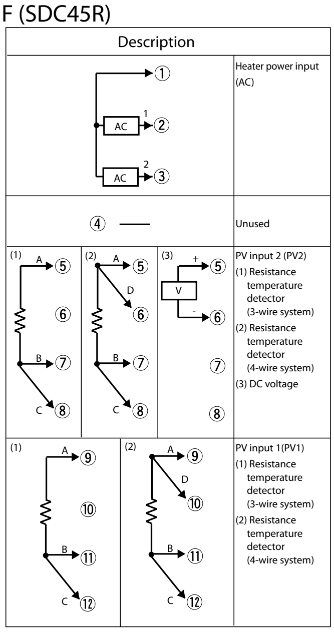
C (SDC45 models)



F (SDC45A/45V)

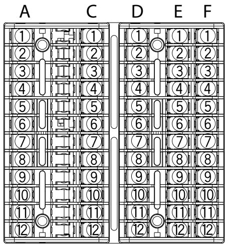


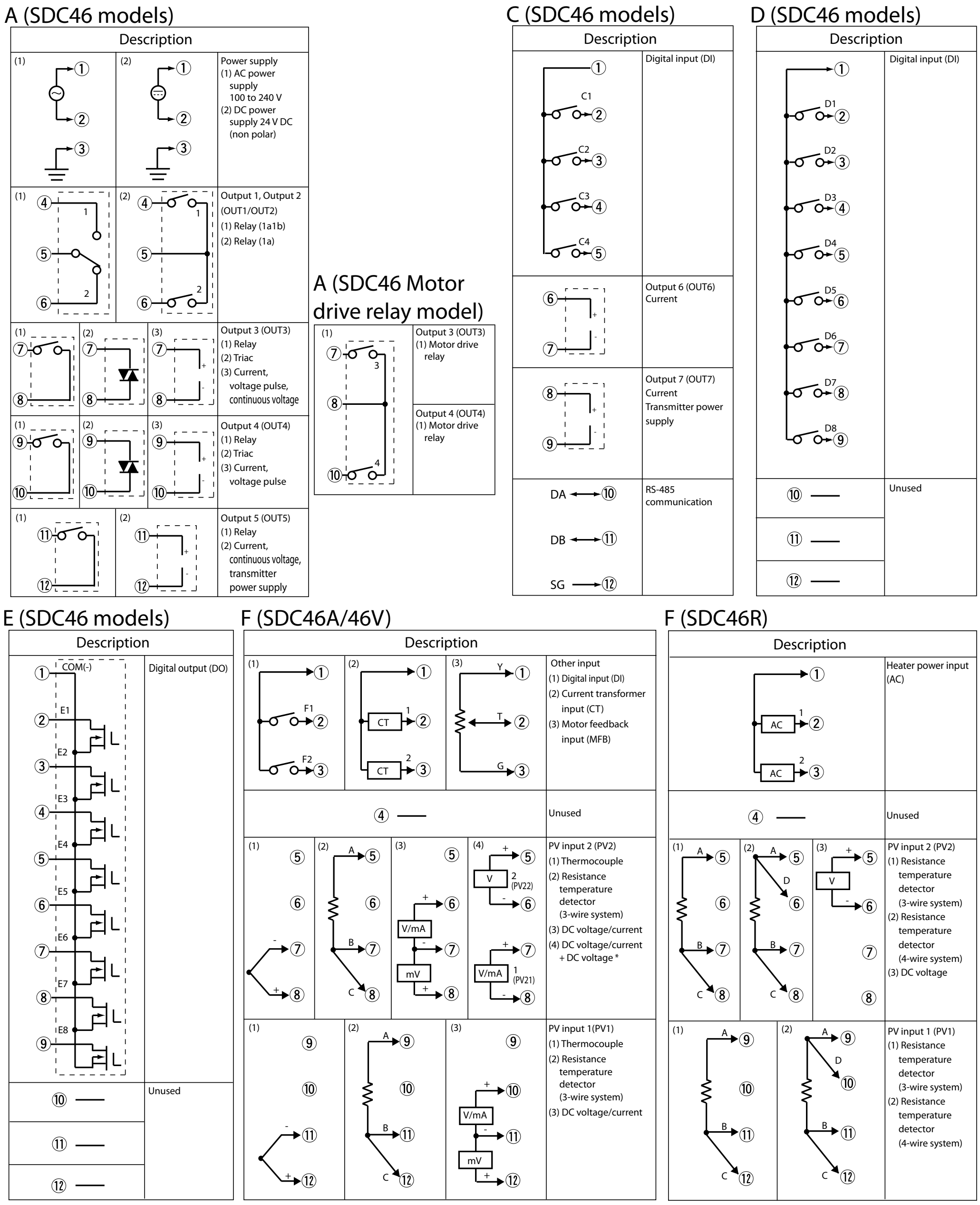
F (SDC45R)



* SDC45V models all have 3 inputs.

■ C46 terminals





* SDC46V models all have 3 inputs.

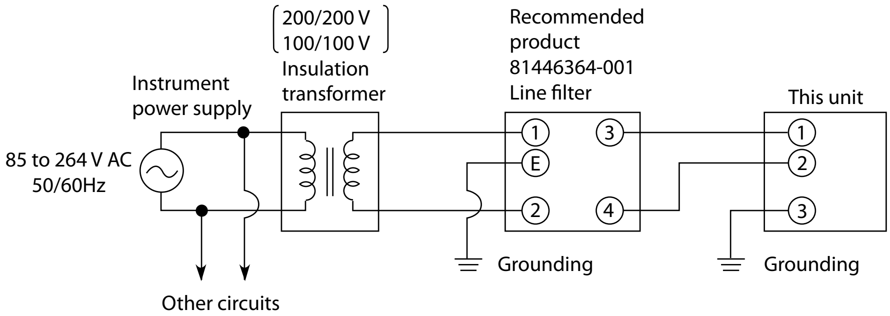
3 - 5 Power Supply Connections and Grounding

■ Power supply connections

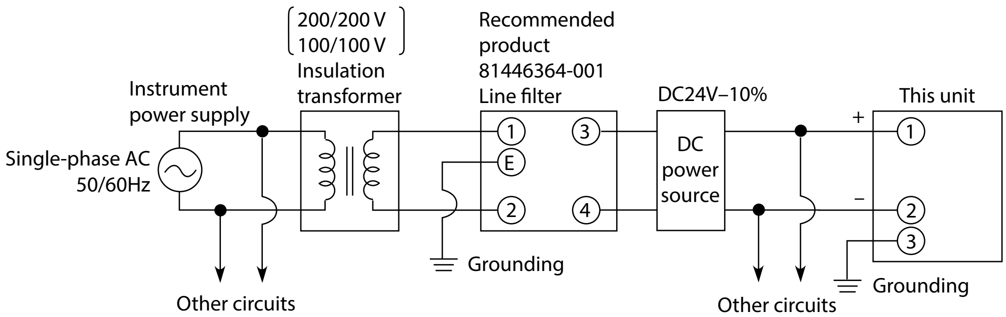
⚠ WARNING

Before wiring, removing or mounting this device, be sure to turn the power OFF. Failure to do so might cause electric shock or device failure.

- **AC power supply model**



- **DC power supply model**



■ Noise-reduction

Obtain the SDC45/46 power source from a single-phase instrumentation power source not subject to excess noise for AC model.

If the power source generates noise, add an insulation transformer, and use a line filter.

Line filter Azbil Corporation Model No. 81446364-001

Use a CR filter for fast-rising noise.

CR filter Azbil Corporation Model No. 81446365-001

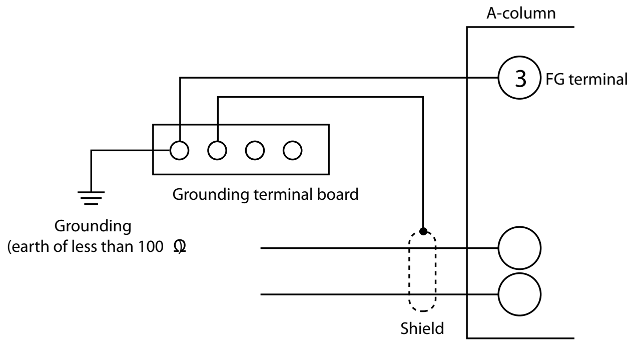
Handling Precautions

- After introducing noise-reduction measures, do not bundle cables from the primary and secondary coils of the isolation transformer together. Do not put them in the same conduit or duct.

■ Grounding

Connect the instrument by one-point grounding to FG terminal (terminal A-(3)). Do not perform any jumper wiring. Mounting a grounding terminal board separately, and connect shielded cables, etc. to the ground, if grounding work is difficult.

Grounding resistance: Less than 100 Ω
Grounding conductor: Annealed copper wire more than 2 mm² (AWG14)
Grounding conductor length: 20 m max.



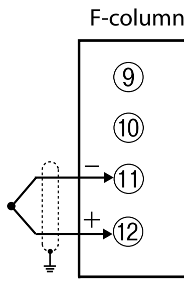
3-6 PV Input (PV) Connections

Handling Precautions

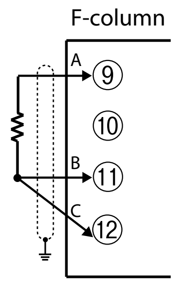
- Do not apply a voltage exceeding the allowable input voltage described in the specifications to each input. Doing so might cause the unit to malfunction.
- Make the connections properly while carefully checking the input polarities.
- Always use shielded wires for input wiring.
- When using a thermocouple for the input, take appropriate measures so that the terminal is not exposed to the wind. Failure to do so might cause an error to occur.
- Input ratings are shown below.
  DC voltage input (mV-range): -100 to +100 mV
  DC voltage input (V-range): -1 to +10 V
  DC current input: 0 to 20 mA

PV input 1 (PV1) connection

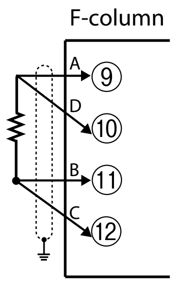
- **Thermocouple sensor**



- **RTD sensor**

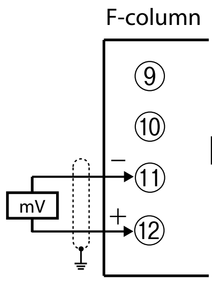


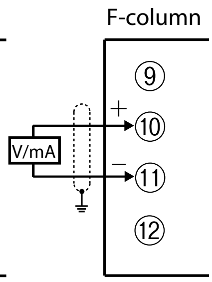
(3-wire system)



(4-wire system)

- **Linear voltage/linear current sensor**

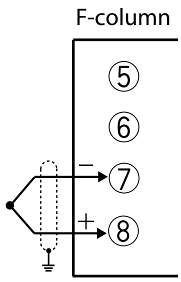




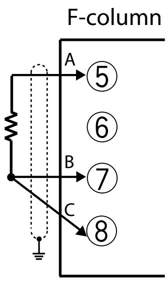
- When the range type is 43 to 46 (0 to 10 mV, -10 to +10 mV, 0 to 100 mV, -100 to +100 mV), terminal Nos. (11) and (12) are used.
- When the range type is 41 (4 to 20mA), 42 (0 to 20mA) and 47 to 51 (0 to 1 V, -1 to +1 V, 1 to 5 V, 0 to 5 V, 0 to 10 V), terminal Nos. (10) and (11) are used.

■ PV input 2 (PV2) connection

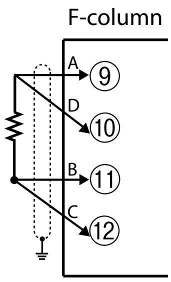
- **Thermocouple sensor**



- **RTD sensor**

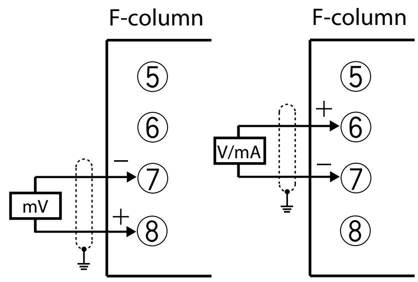


(3-wire system)



(4-wire system)

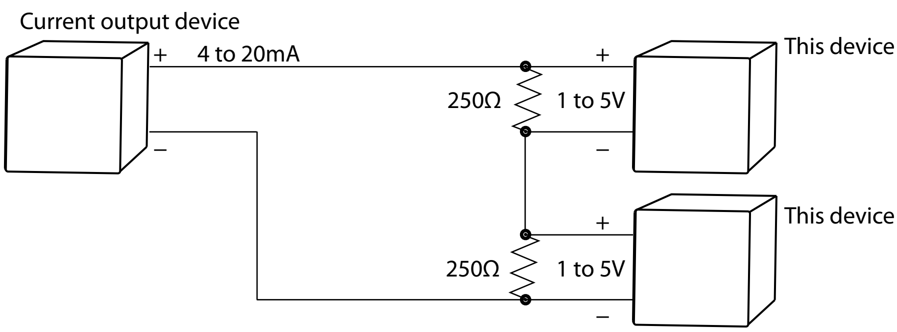
- **Linear voltage/linear current sensor**



- When the range type is 43 to 46 (0 to 10 mV, -10 to +10 mV, 0 to 100 mV, -100 to +100 mV), terminal Nos. (7) and (8) are used.
- When the range type is 41 (4 to 20mA), 42 (0 to 20mA) and 47 to 51 (0 to 1 V, -1 to +1 V, 1 to 5 V, 0 to 5 V, 0 to 10 V), terminal Nos. (6) and (7) are used.

■ Current input connection

The current input circuit of this device is shut off when the instrument power is turned off.
If multiple current input circuits are connected in series, and if the instrument power supplies can be turned off individually, connect the separately-sold resistor (81401325) and set the range type to voltage.



Note

- For details about SDC45V/46V 3-input models and SDC45R/46R models, refer to:
☞ ■ C45 terminals (P. 3-5) and ■ C46 terminals (P. 3-6).

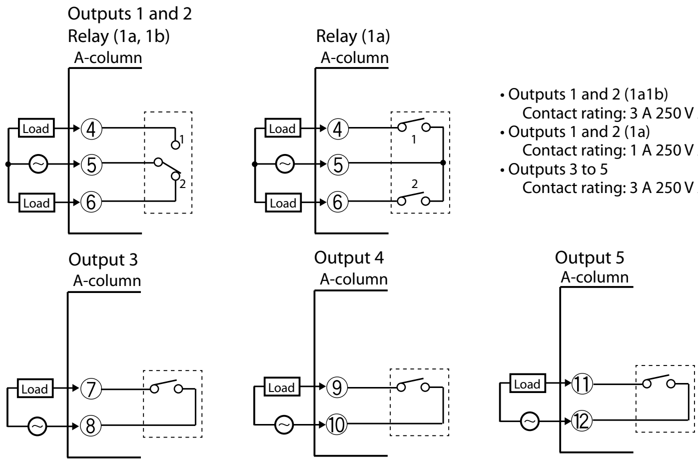
3 - 7 Output (OUT) Connections

The terminal assignment may vary depending on the model No. Make the connections properly while carefully checking the model No. and terminal No.

For details about terminal No. assignment, refer to:

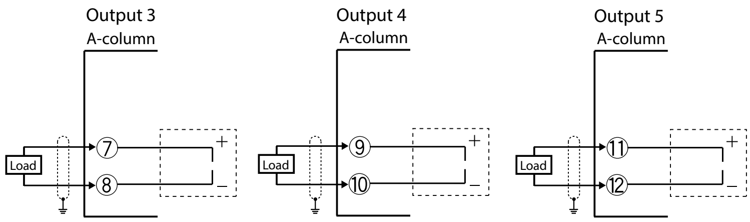
3 - 4 Terminal Wiring Diagram (P. 3-5).

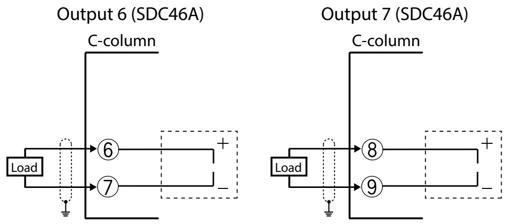
■ Relay output



- Outputs 1 and 2 (1a1b)
  Contact rating: 3 A 250 V AC/30 V DC
- Outputs 1 and 2 (1a)
  Contact rating: 1 A 250 V AC/30 V DC
- Outputs 3 to 5
  Contact rating: 3 A 250 V AC/30 V DC

■ Current output, continuous voltage output, voltage pulse output, and power supply for transmitter





- Current output
  4 to 20 mA DC/0 to 20 mA DC,
  600 Ω max.
- Continuous voltage output
  0 to 5 V DC/1 to 5 V DC/0 to 10 V DC,
  1k Ω min.
- Voltage pulse output
  12 V DC/30 mA max.

Handling Precautions

- When opening or closing a micro current, use a bleeder resistance corresponding to the minimum open/close capacity of the relay to adjust it to a sufficient current level.
- Do not connect or disconnect a load with the power to this unit turned ON. Doing so might cause this unit or load to be faulty.
- Always use shielded wires to connect the current output or continuous voltage output.

■ Connection with solid state relay (SSR)

To drive the SSR, a model having voltage pulse outputs must be used.
A constant current type SSR must be used. The following describes how to connect the SSR.
The two conditions listed below must be satisfied.

- Input current (maximum): When the load current of the voltage pulse output is satisfied, parallel connection can be made.
- Operating voltage range (input): Check that the voltage between the terminals of the voltage pulse output is within the specified range.

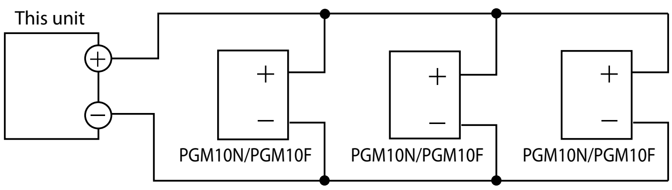
● Azbil Corporation's PGM10N/PGM10F series

This example shows the calculation for the connection of this unit and the PGM10N015.
Note: For connection with other model number, check the specifications of each model.

- Input current: Since the input current is 10 mA or less, up to three units (10 mA × 3 = 30 mA ≤ 30 mA [maximum load current]) can be connected in parallel.
- Operating voltage range (input): The rated voltage is 3.5 to 30 V DC. Therefore, the output voltage is within the range.

Output voltage = 12 V DC $^{+15\%}_{-10\%}$

Connection diagram



Number of connectable units

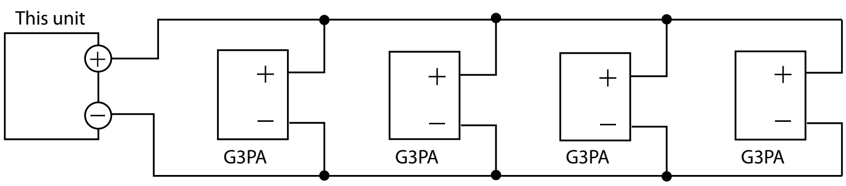
SSR	Connection	Number of connected units per output
PGM10N	Parallel connection	Up to 3 units
PGM10F	Parallel connection	Up to 2 units

● Omron's G3PA, G3PB, G3NA

- Input current: Since the input current is 7 mA or less, up to four units (7 mA × 4 = 28 mA ≤ 30 mA [maximum allowable current]) can be connected in parallel.
- Operating voltage range (input): The operating voltage is 4 to 30 (32) V DC or 9.6 to 30 V DC. Therefore, the output voltage is within the range.

Output voltage = 12 V DC $^{+15\%}_{-10\%}$

Connection diagram

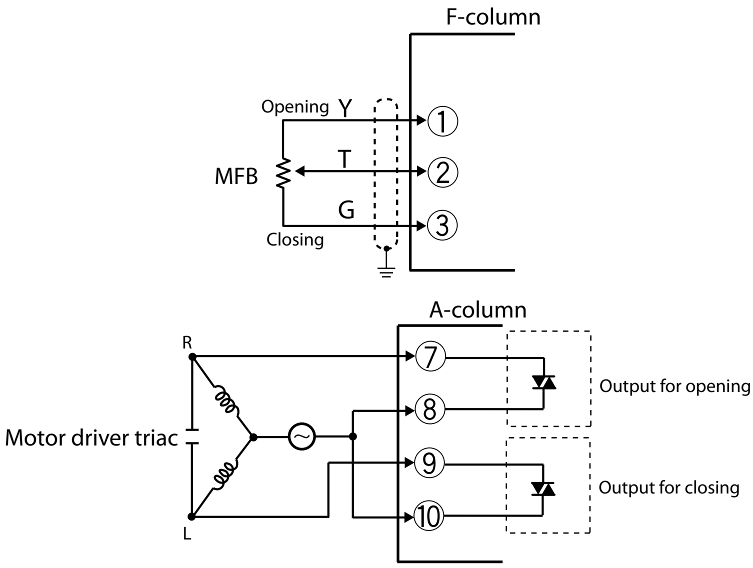


Number of connectable units

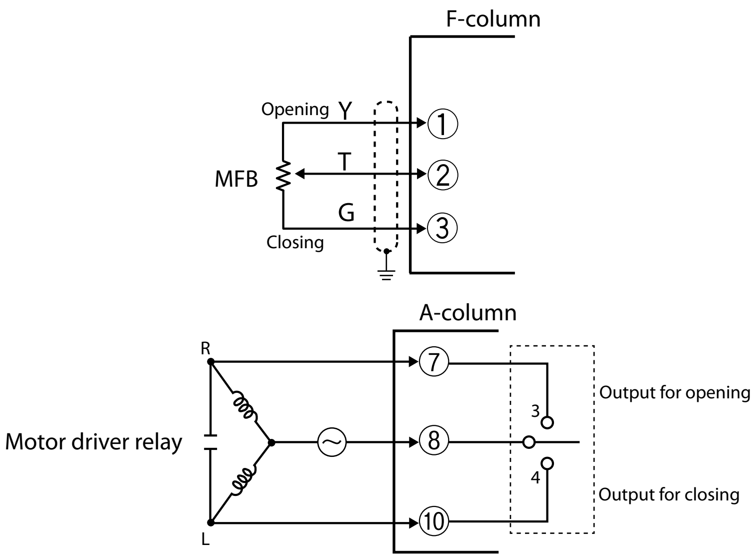
SSR	Connection	Number of connected units per output
Omron G3PA	Parallel connection	Up to 4 units
Omron G3PB	Parallel connection	Up to 4 units
Omron G3NA	Parallel connection	Up to 4 units

■ Connection if a motor driver is used

● Connections for motor driver triac output



● Connections for motor driver relay output



Note

- If the direction of motor rotation is reversed, reverse the wiring of R and L, and reverse the wiring of G and Y.
- Only 100 V AC supply voltage can be used for the ECM3000 with a direct connection (only for triac output).

! Handling Precautions

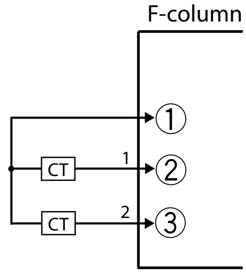
- If the supply voltage of the ECM3000 connected to the motor driver triac output is NOT 100 V AC, use an external auxiliary relay.
  If an external auxiliary relay is used, consider the minimum specified load current for the motor driver triac, and connect a bleeder resistor if necessary.
- If the power supply connected to the motor driver relay output is for a 100/200 V AC motor, pay attention to not only contact rating but also inrush current, and use an external auxiliary relay if necessary.
- Do not put wires for the triac or for relay output terminals (7), (8), (9) and 10 in the same duct with wires for MFB input terminals (1), (2), and (3). Also, they should not be combined in a 6-core cable. Doing so may cause this unit to malfunction due to motor startup noise, etc.
- Avoid using PID constants that cause repeated excessive ON-OFF action. Excessive ON-OFF will shorten the life of the motor and relay.
  In such cases, setting PP-04 (long life) to 1 (life-oriented) in the position proportional bank (PP) may reduce the number of operations of the triac/relay with almost no effect on control results.
- If PP-02 (selection of control methods) is set to 2 (estimated position control) or 3 (estimated position control + position adjustment at power-on), wiring for MFB terminals (1), (2), and (3) is not necessary (for control without feedback).
- If PP-02 (selection of control methods) is set to 0 (MFB control + estimated position control) or to 1 (MFB control + close upon line break), be sure to execute auto-tuning in PP-05 after completion of wiring. For details, refer to:
  ☞ ■ Auto-tuning (PP-05) (P. 4-22).
- If PP-02 (selection of control methods) is set to 2 (estimated position control) or to 3 (estimated position control + position adjustment at power-on), be sure to correctly input the value in PP-08 (full opening time).
- If motor drive relay output 3 (terminals 7 and 8 in column A) and output 4 (terminals 8 and 10 in column A) are turned on simultaneously, output 3 is disconnected, and current flows only to output 4. Current does not flow to outputs 3 and 4 at the same time.
- Use motor drive relay output 4 (terminals 8 and 10 in column A) for closing.
  If output 4 is used for opening, and if the relay fails, the motor may remain in the open position.

3 - 8 Connections for Current Transformer Input/Heater Power Supply Voltage Input

■ Connections for current transformer input

Input ratings are shown below.

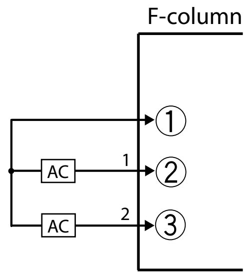
- AC 0 to 69 mA



■ Connections for heater power supply voltage input

Input ratings are shown below.

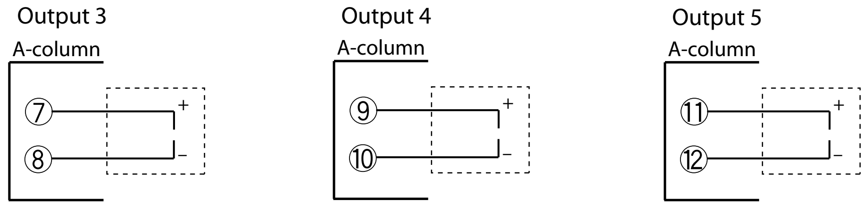
- AC 0 to 13.2 V

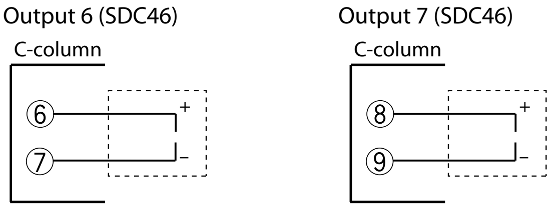


3 - 9 Connection with Transmitter

When this unit is used for the power supply of the transmitter (4 to 20 mAdc output), use a model, the output of which has the power supply for the transmitter

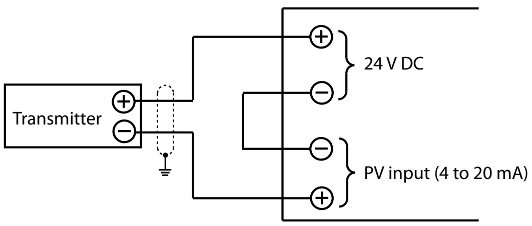
● Terminal numbers for transmitter power supply



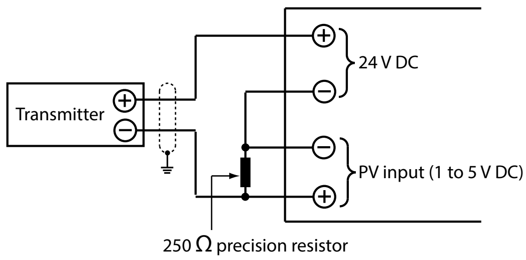


- Transmitter power supply function
  24 V DC, 30 mA max.

● Current input

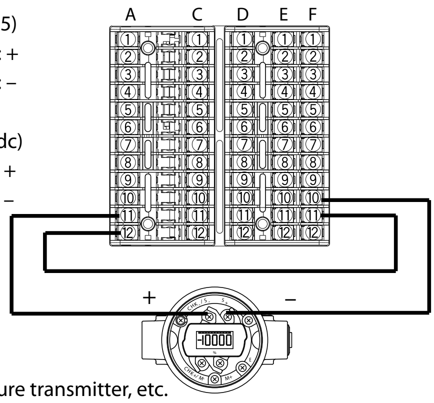


● Voltage input



● Example of wiring between the output 5 power supply and PV1 on the SDC46A1A2C0P0000

- 24 V DC (output 5)
  A-column No.11: +
  A-column No.12: –
- PV1 (4 to 20 mAdc)
  F-column No.10: +
  F-column No.11: –



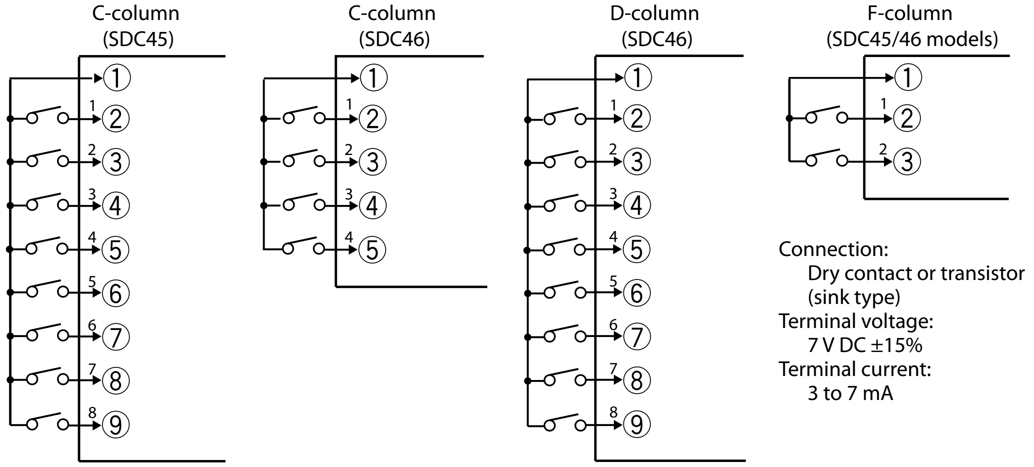
Pressure transmitter, etc.

! Handling Precautions

- The power supply for the transmitter always outputs the voltage at the same time when the power to this unit is turned ON. Therefore, carefully check the connections before turning ON the power to this unit.
  Additionally, do not connect or disconnect the transmitter with the power to this unit turned ON. Doing so might cause the transmitter to malfunction.
- Always use shielded wires for wiring.
- If a transmitter is connected to the power supply for the transmitter of this unit using the PV input as current input, be sure to set the PV input range to current input (4 to 20 mAdc) before doing an operational check.
  If the PV range is not configured properly, 24 V DC will not be supplied to the circuits, and the transmitter will not operate.

3 - 10 Digital Input (DI) Connections

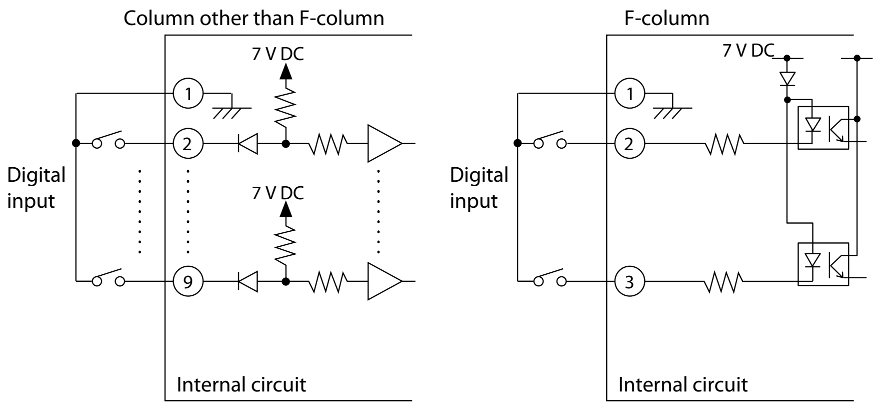
The terminal assignment may vary depending on the model No. Make the connections properly while carefully checking the model No. and terminal No.
For details about terminal No. assignment, refer to:
3 - 4 Terminal Wiring Diagram (P. 3-5).



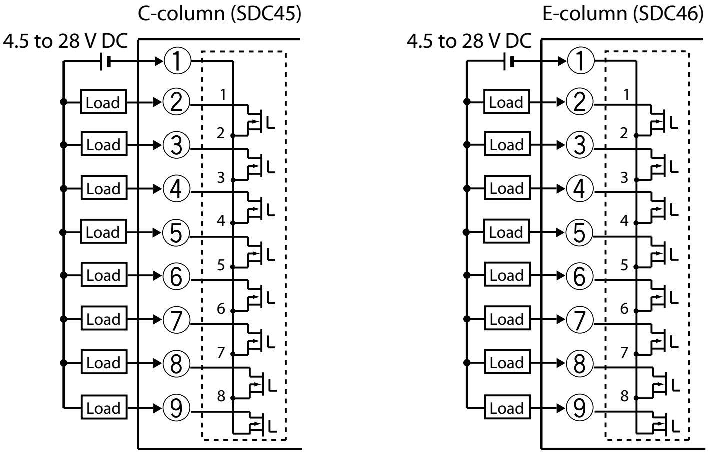
Handling Precautions

- The digital input of this unit is a type of built-in power supply. Always use dry contacts for external contacts.
- For dry contacts, always use a gold contact or other contact that can turn ON or OFF the micro current. When using other relay contacts, the relay contact may not be turned ON or OFF. Always use a contact having a sufficient allowance of the minimum open/close capacity to the short-circuit terminal current and open-terminal voltage of this unit.
- If a semiconductor (open collector, etc.) is used for dry contact, use an appropriate semiconductor that the voltage across the contact at both ends when the contact is turned ON satisfies the allowable ON drop voltage. Additionally, use an appropriate semiconductor that the leak current when the contact is turned OFF satisfies the allowable OFF leak current.

Internal circuit diagram of this unit to be connected to external switch input



3 - 11 Digital Output (DO) Connections

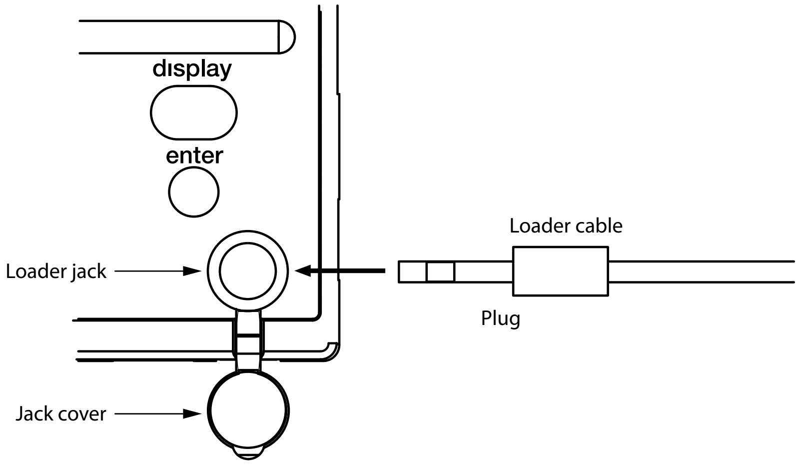


4.5 to 28 V DC, 70 mA max./point, 500 mA max./unit

Handling Precautions

- Do not make the positive (+) terminal of the external power supply short-circuited with terminals (2) to (9) of C-column (SDC45) or E-column (SDC46). If the positive (+) terminal is short-circuited with above terminals, this might cause the digital output to malfunction. (A short-circuit protection circuit is not incorporated.)
- When connecting a semiconductor load, such as program controller (sequencer), always select an appropriate module having the same current direction.
  Additionally, do not use any semiconductor load, which is not operated by the leak current when the digital output of this unit is turned OFF.

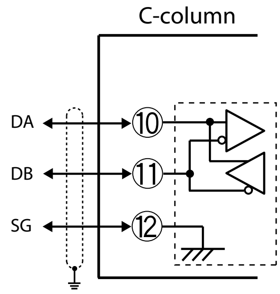
3 - 12 Loader Cable Connection



Handling Precautions

- Be sure to insert the plug into the loader jack properly.
- When plugging in or unplugging the loader cable, hold the plastic insulator. Do not pull on the cable.
- When no loader cable is connected, be sure to close the jack cover.
- For waterproof mounting, the jack cover must be closed.
- When the loader cable is connected, do not apply force to the cable or plug (side to side or up and down). Doing so may damage the cable or jack, or affect the functions or performance of the unit.

3 - 13 RS-485 Communication Connections

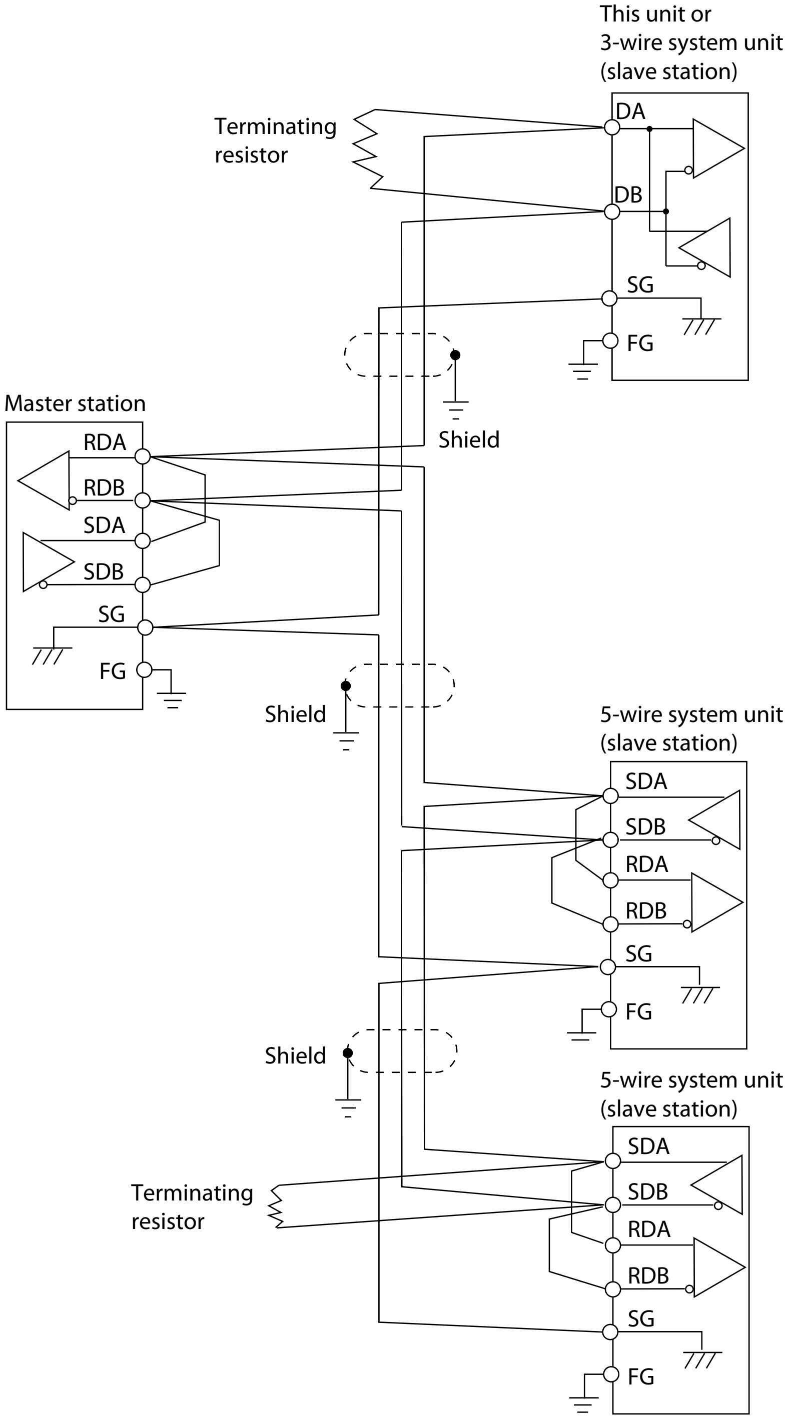


Transmission line: RS-485
Transmission distance: 500 m max.
Connectable units: 32 max.

Handling Precautions

- Be sure to connect the SG terminals each other. Failure to do so might cause unstable communications.
- Attach 0.5 W or greater terminating resistor of 150 Ω ± 5 % at each end of the communications lines.
- If units for which the connection of a terminating resistor is prohibited (Azbil Corporation SDC15/25/26/35/36 or DMC10) are on the same transmission line, do not connect a terminating resistor to the SDC45/46 or to the communications line.
- Ground the shield FGs at one end in one location, not at both ends.

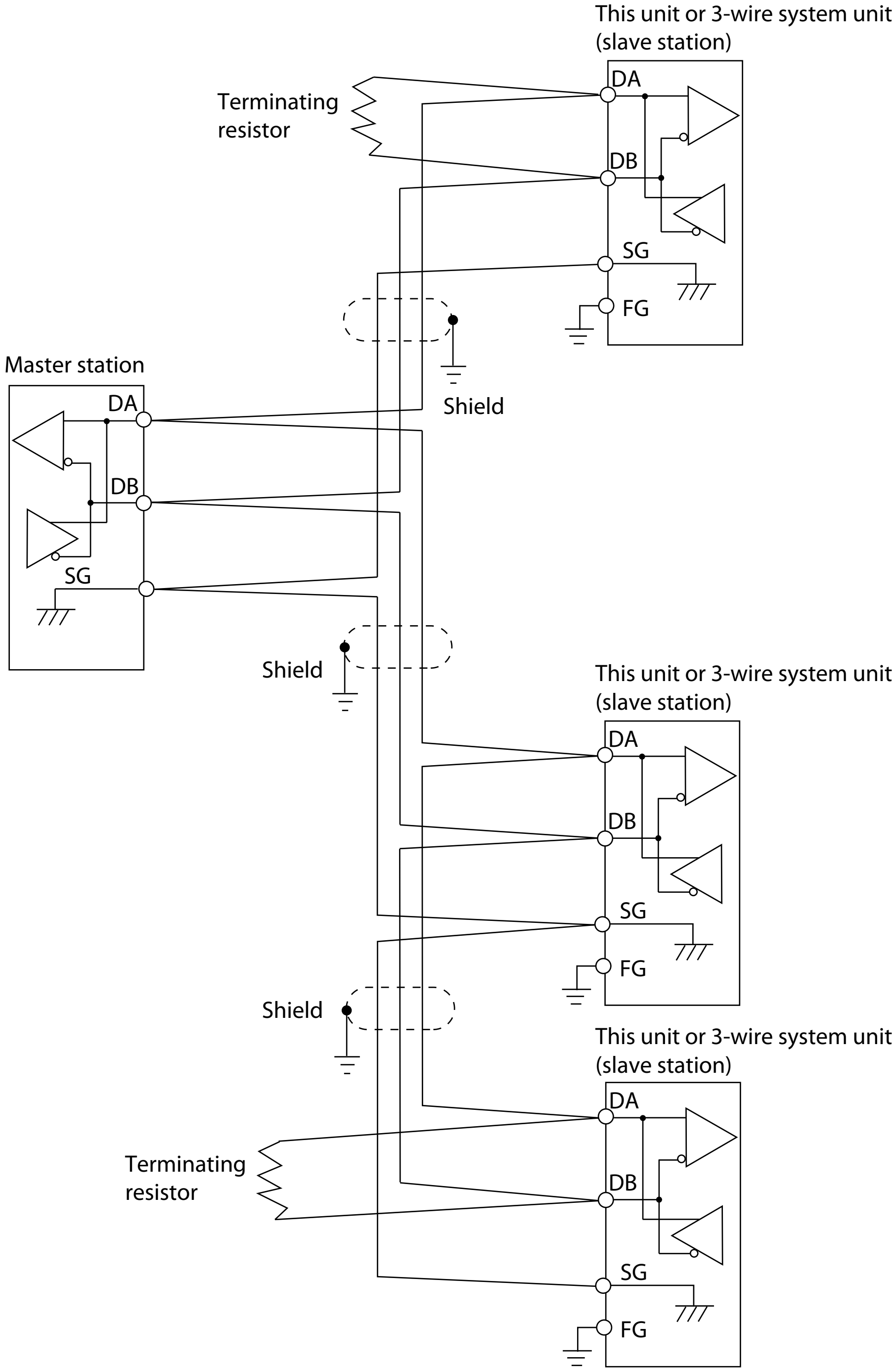
- **Multiple 5-wire system units together**



Handling Precautions

- If units for which the connection of a terminating resistor is prohibited (Azbil Corporation SDC15/25/26/35/36 or DMC10) are on the same transmission line, do not connect a terminating resistor to the SDC45/46 or to the communications line.

● **3-wire system**



! Handling Precautions

- If units for which the connection of a terminating resistor is prohibited (Azbil Corporation SDC15/25/26/35/36 or DMC10) are on the same transmission line, do not connect a terminating resistor to the SDC45/46 or to the communications line.

3 - 14 Noise Generation Sources and Noise Suppression

Generally, it is thought that the following may be noise generation sources:

1. Relay and contacts
2. Solenoid coils and solenoid valves
3. Power line (higher than 90 V AC, in particular)
4. Inductive load
5. Motor commutator
6. Phase angle control SCR
7. Radio communication equipment
8. Welding machine
9. High-voltage ignition devices

The following shows effective measures for noise suppression:

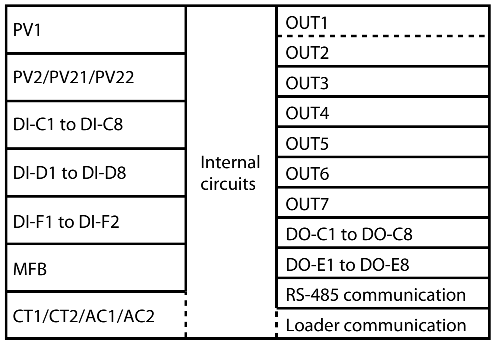
1. A CR filter is effective for quick-rising noises such as impulse noise.
   Recommended CR filter: Azbil Corporation Model No. 81446365-001
2. A varistor is effective for noises with high crest values.
   Recommended varistor
   Azbil Corporation Model No. : 81446366-001 (for 100 V)
   81446367-001 (for 200 V)

Handling Precautions

- Take great care when using a varistor since the varistor becomes short-circuited if it is faulty.

3 - 15 I/O Isolation

The following figure shows the mutual isolation between the input and output. In the following figure, sections bounded by a solid line are isolated from the rest of the circuit. Sections bounded by a dotted line are not isolated from the rest of the circuit.



The power circuit is isolated from all inputs/outputs, communications and internal circuits.

Handling Precautions

- The loader jack is not isolated from the internal circuits. Always put the cap on the loader jack when the loader is not used.
- For motor driver relays, OUT3 and OUT4 are not isolated.

Flowcharts for Major Settings

Chapters 4 to 7 describe the data settings of this unit.
To properly operate this unit, be sure to set each setting data correctly so that it meets the operation of this unit.

When operating this unit for the first time, configure the settings in the order shown below.

1. Setting of PARA bank
2. Setting of SP/EV bank

For details about data setting order in each setup, see the setting flowcharts on the following pages:
The functions of this unit vary depending on the ROM version. Before configuring the unit, check the ROM version and the settable functions.
For details, refer to:
Appendix 4 History of ROM Versions (P. App.-19)

1. Setting of PARA bank

● Key operations when setting or changing PARA bank

(1) Press the [display] key to return to the operation display.
(2) To select a bank, keep the [para] key pressed for 2 s.
(3) To display a bank to be set, press the [para] key, [∧] key, or [∨] key.
(4) When a desired bank is displayed, press the [enter] key.
(5) To display an item to be set, press the [para] key, [∧] key, [∨] key, [<] key, or [>] key.
(6) When a desired item is displayed, press the [enter] key.
(7) Change the set value with the [∧] key, [∨] key, [<] key, or [>] key.
(8) To set the set value you have changed, press the [enter] key.
(9) To set other items in the same bank, repeat the operation from step (5).
To set desired set data in other bank, continue the operation from step (2).
(10) To exit the setting, press the [display] key.

● Setting and operation flow

Start of key operation
[display] key → Keep the [para] key pressed for 2s. → Select a bank with [para] key, [∧] key, or [∨] key.

↓

Initial setup
Setup bank (SEtUP)

C-001	Loop type	☞ Page 4-1
C-010	Recipe enabled.	☞ Pages 6-17, 6-19
C-011	SP system group	☞ Pages 7-41
C-012	Sampling cycle time	

← **Computer backup function is used.**
Setup bank (SEtUP) C-002 Computer backup type ☞ Page 7-5

↓

PV1 input setup
PV bank (PV)
(Auxiliary display 1.)

Pv-01	Range type	☞ Page 4-3
Pv-02	Decimal point position	
Pv-04 to Pv-20	Linear scaling high/low limit, filter, ratio, bias, etc.	☞ Page 4-6

↓

PV2 input setup
PV bank (Pv)
(Auxiliary display 2.)

Pv-01	Range type	☞ Page 4-3
Pv-02	Decimal point position	
Pv-04 to Pv-20	Linear scaling high/low limit, Filter, ratio, bias, etc.	☞ Page 4-6

← **Approximation by linearization table is used.**
Linearization table bank (tbL)

tb.dP	Linearization decimal point	☞ Page 7-11
tb.A.01 to tb.b.20	Breakpoint	

← **RSP multi-ratio is used.**

SP configuration bank (SPCnF)	rrA.01 to rrA.08	RSP ratio 1 to 8	☞ Page 7-8
Internal contact input bank (IC)	IC01 to IC04	Operation type, input type, etc.	

↓

Control setup
Control bank (CtrL)

Cnt.01	Loop PV/SP /Decimal point position	
Cnt.03	Control action	☞ Page 4-14
Cnt.04	Control algorithm	
Cnt.05 to Cnt.06	Control range high/low limit	☞ Page 4-6

← **Output at READY is changed.**
MV bank (ñv) ñv-01 to ñv-03 Output at READY

← **Output at PV alarm is used.**
MV bank (ñv) ñv-04 to ñv-05 Output at PV alarm

← **Fixed output value is used.**

MV bank (ñv)	ñv-06 to ñv-13	Fixed output value	☞ Page 7-14
Internal contact input bank (IC)	IC01 to IC04	Operation type, input type, etc.	

↓

SP configuration setup
SP configuration bank (SPCnF) LñT.01 to LñT.02 SP high/low limit

↓

Continued on next page.

Continued from the previous page.

SP ramp is used.
SP configuration bank (SPCnF) — CSP.01 to CSP.04 — LSP ramp-up, ramp-down, etc. ☞ Page 7-46

Event configuration setup
Event configuration bank (EvCnF) — EP-01 to EP-09 — Operation type, Loop/Channel definition, Polarity, Standby, Hysteresis, Delay, etc. ☞ Page 6-5

Output setup
Output bank (oUt) — Co-01 to Co-07 — Continuous output (current output, continuous voltage output)
tPo.01 to tPo.06 — ON/OFF output, Time proportional output ☞ Page 4-16

Approximation by linearization table is used.
Linearization table bank (TBL) — tb.dP — Linearization decimal point
tb.A.01 to tb.b.20 — Breakpoint ☞ Page 7-11

Digital output setup
Digital output bank (do) — do.C.01 to do.C.02 — Output type, Latch
do.E.01 to do.E.02 — Output type, Latch

Digital input is used.
Priority bank (Prior) — LPr.01 to LPr.06 — SP group selection, RUN/READY, AUTO/MANUAL, LSP/RSP, etc. ☞ Page 6-2
Pr-01 to Pr-02 — Release all latches, OUT broken line table use group
Internal contact input bank (IC) — IC01 to IC04 — Operation type, Input type, etc. ☞ Page 6-11

PID constant setup
Loop 1 PID bank (L1.PId) — P-XX, I-XX, d-XX — Proportional band, Integration time, Derivative time ☞ Page 5-8
Loop 2 PID bank (L2.PId) — oL-XX, oH-XX, rE-XX — MV high/low limit, Manual reset
P.XXC, I.XXC, d.XXC — Proportional band (cool), Integration time (cool), Derivative time (cool)
(XX shows the PID group No.) — oL.XXC, oH.XXC — MV high/low limit (cool)

Zone PID is used.
Priority bank (Prior) — LPr.02 — PID group selection ☞ Page 6-2
Control bank (Ctrl) — Ctd.12 to Ctd.20 — Zone PID ☞ Page 7-17

Event setup (For multi-SP)
Event setup bank (Ev) — E01 to E16.Sb — Event 1 to 16, Main setting, Sub setting ☞ Page 6-5

Display or key is changed.
Display/key bank (HMI) — MS-01 to MS-05 — MS display
FK-01 to FK-09 — [rsp/lsp] key, [at] key, [f1] key, [f2] key
UFL.01 to UFL.02 — "uf1 to uf4" lamp ☞ Page 7-20

RS-485 communication is used.
RS-485 communication bank (r485) — CoM.02 to CoM.07 — to Station address, Transmission speed, etc. ☞ Page 9-1

Lock function is used.
Lock bank (LoCK) — K.LoC1 to K.LoC2 — Key lock
C.LoC1 to C.LoC2 — RS-485 communication lock
L.LoC1 to L.LoC2 — Loader communication lock

Completion of key operation
[display] key

2. Setting of SP/EV bank

● Key operations when setting or changing SP/EV bank

(1) Press the [display] key to return to the operation display.
(2) To select a bank, keep the [sp/ev] key pressed for 2 s.
(3) To display a bank to be set, press the [sp/ev] key, [∧] key, or [∨] key.
(4) When a desired bank is displayed, press the [enter] key.
(5) To display an item to be set, press the [sp/ev] key, [∧] key, [∨] key, [<] key, or [>] key.
(6) When a desired item is displayed, press the [enter] key.
(7) Change the set value with the [∧] key, [∨] key, [<] key, or [>] key.
(8) To set the set value you have changed, press the [enter] key.
(9) To set other items in the same bank, repeat the operation from step (5).
To set desired set data in other bank, continue the operation from step (2).
(10) To exit the setting, press the [display] key.

● Setting and operation flow

Start of key operation
[display] key → Keep the [sp/ev] key pressed for 2s. → Select a bank with [sp/ev] key, [V] key, or [∧] key.

↓

SP group selection
SP group selection bank — SPno — SP group
☞ Page 5-8

↓

Multi-SP setup (For multi-SP)
Multi-SP setup (For multi-SP) — LSP.01 ~ LSP.16 — LSP of SP groups 1 to 16
(Auxiliary display L.1.) — PId.01 to PId.16 — PID group definition of SP groups 1 to 16
☞ Page 6-17

↓

Multi-SP setup (2-loop and multi-SP are used.)
Loop 2 multi-SP bank — LSP.01 ~ LSP.16 — LSP of SP groups 1 to 16
(Auxiliary display L.2.) — PId.01 to PId.16 — PID group definition of SP groups 1 to 16
☞ Page 6-17

↓

Completion of key operation
[display] key

Recipe setup (Recipe is used.)
Loop 1 recipe bank(L1.rEC)
(Auxiliary display 1.XX)
(XX shows the SP group No.)

SP	LSP
E01 ~ E08.Sb	Event 1 to 8, main setting and sub setting
P, I, d	Proportional band, Integration time, Derivative time
oL, oH, rE	MV high/low limit, Manual reset
P-C, I-C, d-C	Proportional band (cool), Integration time (cool), Derivative time (cool)
oL.C, oH.C	MV high/low limit (cool)
oI	Initial output of PID control

☞ Pages 5-1, 5-6

↓

Recipe setup (2-loop and recipe are used.)
Loop 2 recipe bank(L2.rEC)
(Auxiliary display 2.XX)
(XX shows SP group No.)

SP	LSP
E09 ~ E16.Sb	Event 9 to 16, main setting and sub setting
P, I, d	Proportional band, Integration time, Derivative time
oL, oH, rE	MV high/low limit, Manual reset
P-C, I-C, d-C	Proportional band (cool), Integration time (cool), Derivative time (cool)
oL.C, oH.C	MV high/low limit (cool)
oI	Initial output of PID control

☞ Pages 5-1, 5-6

↓

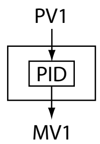
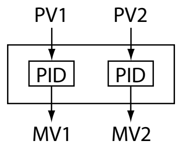
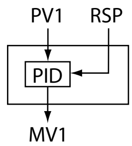
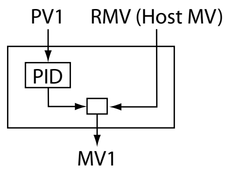
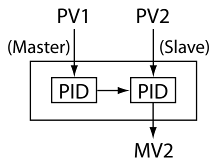
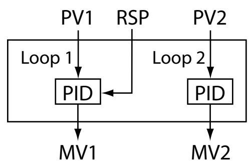
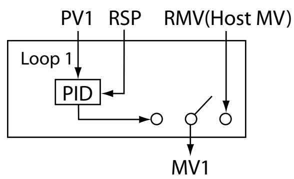
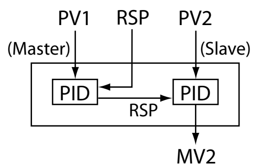
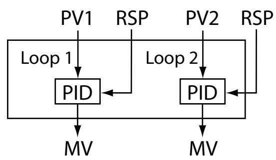
Completion of key operation
[display] key

Chapter 4. FUNCTIONS NECESSARY FOR CONTROL

4 - 1 How to Set the Loop Type

■ Bank and settings

Bank	Item display	Item name	Settings
SEtUP (Setup bank)	C-001	Loop type	See below

Loop type		Input model 1	Input model 2	Input model 3
0: 1 loop		○	○	○
1: 2 loops (Independent)		×	○	○
2: 1 loop (RSP)		△	●	●
3: 1 loop (Computer backup)		×	○	○
4: 1 loop (Internal cascade)		×	○	○
5: 2 loops with an RSP on one side		×	△	●
6: 1 loop (Computer backup with an RSP)		×	△	●
7: 1 loop (Internal cascade with an RSP)		×	△	●
8: 2 loops (RSP)		×	see Note	●

○ : Settable

● : Settable
Models with RS-485:
Select digital RSP or PV input type
Models without RS-485:
Use PV input type

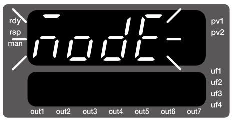
△ : Models with RS-485: Settable
Use digital RSP
Models without RS-485: Unsettable

× : Unsettable

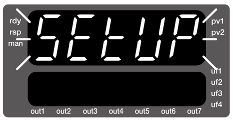
Note: SDC45A/46A (standard model) and SDC45R/46R (high-accuracy model): △
SDC45C/46C (computation function model): ●

■ Setting procedures

(1) Keep the [para] key pressed for 2 s in the operation display status.
>> modE is flashing on the upper display.

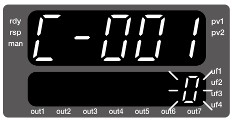


(2) Press the [∨] key or [para] key several times until SEtUP is shown on the upper display.
>> SEtUP is flashing on the upper display.



(3) Press the [enter] key.
>> C-001 is shown on the upper display.

(4) Press the [enter] key.
>> The value on the lower display starts flashing.



(5) Set a desired value with the [∨] key or [∧] key.
(6) Press the [enter] key to set the value.
(7) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

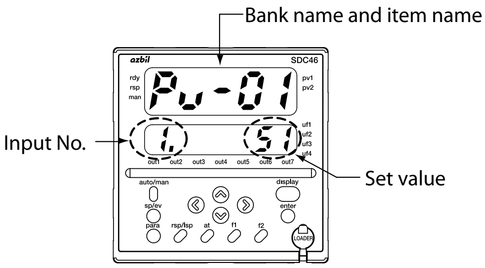
4-2 How to Set the Input Type

The input of this unit is a full-multi input method. The setting data is set properly according to the type of the signal to be connected.

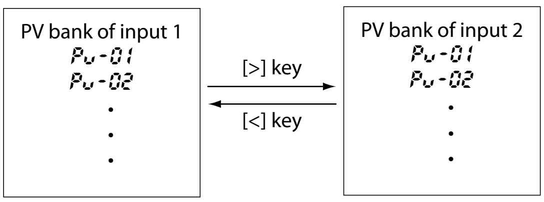
■ Bank and settings

Bank	Item display	Item name	Settings
Pv (PV bank)	Pv-01	Range type	☞ ■ Input types (P. 4-4)

■ Description of display



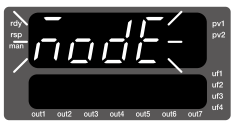
The input No. can be changed with the [<] key or [>] key. (For 2-input model)



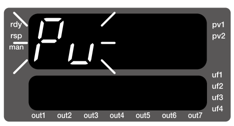
■ Setting procedures

● **PV input bank (Pv)**

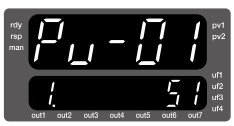
(1) Keep the [para] key pressed for 2s in the operation display status.
>> modE is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until Pv is shown on the upper display.
>> Pv is flashing on the upper display.



(3) Press the [enter] key.
>> Pv-01 is shown on the upper display. At this time, check that 1. is shown on the auxiliary display.
(To set input 2, change the value with the [>] key or [<] key.)



(4) Press the [enter] key.
>> The value on the lower display starts flashing.

(5) Set a desired value with the [∨] key or [∧] key.
(6) Press the [enter] key to set the value.
(7) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

■ Input types

As shown below, input type is determined by the model No. and input No.

Model No.		Input No.			
Model No.	Input model	PV1	PV2	PV3	PV4
SDC45A/46A	1 Input	Multi range	None	None	None
	2 inputs	Multi range	Multi range	None	None
SDC45V/46V	2 inputs	Multi range	Multi range	None	None
	3 inputs	Multi range	None	Linear only 1	Linear only 2
SDC45R/46R	2 inputs (2 RTDs)	RTD use only	RTD use only	None	None
	2 inputs (1 RTD + 1 linear)	RTD use only	Linear only 3	None	None

■ Input types: Multi-range

Pu-01 set value	Sensor type	Range	
		(Celsius)	(Fahrenheit)
1	Thermocouple K	-270.0 to +1372.0 °C	-454 to +2502 °F
2	Thermocouple E	-270.0 to +1000.0 °C	-454 to +1832 °F
3	Thermocouple J	-200.0 to +1200.0 °C	-328 to +2192 °F
4	Thermocouple T	-270.0 to +400.0 °C	-454 to +752 °F
5	Thermocouple B	0.0 to 1800.0 °C	32 to 3272 °F
6	Thermocouple R	-50.0 to +1768.0 °C	-58 to +3214 °F
7	Thermocouple S	-50.0 to +1768.0 °C	-58 to +3214 °F
8	Thermocouple WRe5-26	0.0 to 2300.0 °C	32 to 4172 °F
9	Thermocouple PR40-20	0.0 to 1900.0 °C	32 to 3452 °F
10	Thermocouple Ni-Ni•Mo	0.0 to 1300.0 °C	32 to 2372 °F
11	Thermocouple N	-200.0 to +1300.0 °C	-328 to +2372 °F
12	Thermocouple PL II	0.0 to 1390.0 °C	32 to 2534 °F
13	Thermocouple DIN U	-200.0 to +600.0 °C	-328 to +1112 °F
14	Thermocouple DIN L	-200.0 to +900.0 °C	-328 to +1652 °F
15	Thermocouple Gold-iron/chromel	-273.0 to +27.0 °C	-459 to +80 °F
21	RTD Pt100	-200.0 to +850.0 °C	-328.0 to +1562.0 °F
22	RTD Pt100	-200.00 to +300.00 °C	-328.00 to +572.00 °F
31	RTD JPt100	-200.0 to +640.0 °C	-328.0 to +1184.0 °F
32	RTD JPt100	-200.00 to +300.00 °C	-328.00 to +572.00 °F
41	Current	4 to 20mA	
42	Current	0 to 20mA	
43	Voltage	0 to 10mV	
44	Voltage	-10 to +10mV	
45	Voltage	0 to 100mV	
46	Voltage	-100 to +100mV	
47	Voltage	0 to +1V	
48	Voltage	-1 to +1V	
49	Voltage	1 to +5V	
50	Voltage	0 to +5V	
51	Voltage	0 to +10V	

The low limit for B thermocouple indication is 20 °C.

■ Input types: Linear only 1

PV-01 set value	Sensor type	Range		
41	Current	4	to	20mA
42		0	to	20mA
49	Voltage	1	to	5V
50		0	to	5V
51		0	to	10V

■ Input types: Linear only 2

PV-01 set value	Sensor type	Range		
49	Voltage	1	to	5V
50		0	to	5V
51		0	to	10V

■ Input types: Linear only 3

PV-01 set value	Sensor type	Range		
47	Voltage	0	to	1V
49		1	to	5V
50		0	to	5V

■ Input types: RTD use only

PV-01 set value	Sensor type	Range					
		(Celsius)			(Fahrenheit)		
23	RTD Pt100	0.00	to	100.00°C	32.00	to	212.00 °F
	(3-wire system)	0.000	to	32.000°C	32.000	to	89.600 °F
24	RTD Pt100	0.00	to	100.00°C	32.00	to	212.00 °F
	(4-wire system)	0.000	to	32.000°C	32.000	to	89.600 °F
33	RTD JPt100	0.00	to	100.00°C	32.00	to	212.00 °F
	(3-wire system)	0.000	to	32.000°C	32.000	to	89.600 °F
34	RTD JPt100	0.00	to	100.00°C	32.00	to	212.00 °F
	(4-wire system)	0.000	to	32.000°C	32.000	to	89.600 °F

Note

- The input indication accuracy may vary depending on the type of sensor.
  For details, refer to:
  ☞ Chapter 14. SPECIFICATIONS ● Analog input (PV) (P. 14-1).

Handling Precautions

- If any value not available on the PV-01 setting list is set, the input value will be fixed at 0.0.

4 - 3 How to Set Range-Related Items

Each range is set corresponding to the input type set in section 4-2 How to Set an Input Type (on page 4-3).

■ Bank and settings

Bank	Item display	Item name	Settings
CtrL (Control bank)	Cnt.05	Range low limit for control	Low limit of range used for PID control *1
	Cnt.06	Range high limit for control	High limit of range used for PID control *1
Pv (PV bank)	Pv-04	Range low limit	Under-range is detected by the PV below this value.
	Pv-05	Range high limit	Over-range is detected by the PV exceeding this value.
	Pv-09	Linear scaling low limit	Value when the low limit of the linear signal is input. *2
	Pv-10	Linear scaling high limit	Value when the high limit of the linear signal is input. *2

*1 This item must be set.

*2 This item must be set when the linear input is selected.

■ Control range setup (Cnt.05, Cnt.06)

The high and low limits of the control range (Cnt.05, Cnt.06) are used for the loop PV (used in calculation of the PID). Set the high and low limits of the control range as needed for the application.

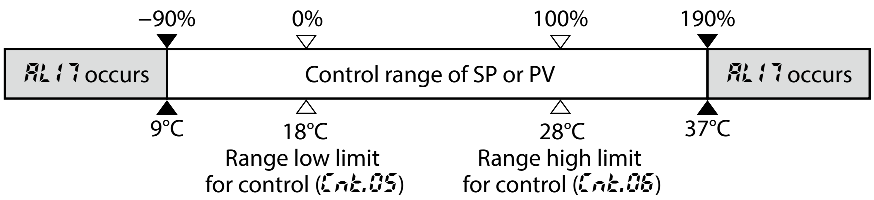
The control range is independent of the PV input range. Therefore, after setting the control range, no readjustment is necessary even in cases such as the following:

- Thermocouple input type is changed (e.g., K → R)
- RTD input type is changed (e.g., -200.0 to +850.0 → -200.0 to +300)
- Linear range scaling is changed (e.g., 0.0 to 5.0 kPa → 0.00 to 0.75 kPa)
- PV alarm setting is changed

[!] Handling Precautions

- The range for control affects the results of the auto tuning. Therefore, this range must be set.
- Execute PID tuning after setting the control range. If the control range is changed, tune the PID again.
- Specify the control range, taking the SP and PV into consideration. If the SP or PV is less than -90 % or more than190 % of the control range, AL17 is triggered.

  Ex.: AL17 is triggered if the SP or PV is under 9 °C or above 37 °C when the control range is set to 18–28 °C.

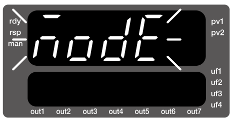


● Setting procedures

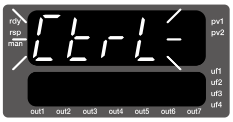
Example: K thermocouple range (0.0 to 800.0 °C) used for loop 1 PV

Bank	Item display	Item name	Settings
CtrL (Control bank)	Cnt.05	Range low limit for control	0.0
	Cnt.06	Range high limit for control	800.0

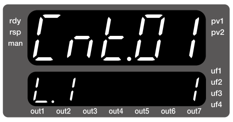
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> modE is flashing on the upper display.



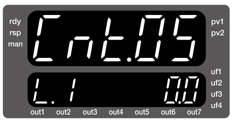
(2) Press the [∨] key or [para] key several times until CtrL is shown on the upper display.
>> CtrL is flashing on the upper display.



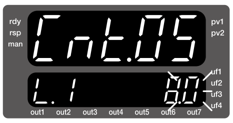
(3) Press the [enter] key. At this time, check that L.1. is shown on the auxiliary display.
>> Cnt.01 is shown on the upper display.
(To set input 2, change the value with the [>] key or [<] key.)



(4) Press the the [∨] key key several times until Cnt.05 is shown on the upper display.
>> Cnt.05 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set at 0.0 with the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) In the same manner, return with the the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for Cnt.06.
(9) When all settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

■ How to set the linear scaling (Pv-09, Pv-10)

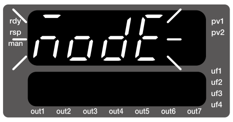
The high and low limits of the linear range (Pv-09, Pv-10) need to be set when the DC voltage or DC current is selected for the input type. Input high and low limit values corresponding to the output range (engineering range) of the connected unit.

● Setting procedures

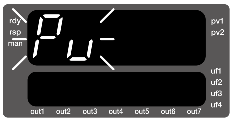
Example: Setting when the pressure transmitter is connected

Specifications of transmitter		Setting of this unit		
Output signal	Output range	Item display	Item name	Settings
4 mA DC	0.0 kPa	Pv-09	Linear scaling low limit	0.0
20 mA DC	10.0 kPa	Pv-10	Linear scaling high limit	10.0

(1) Keep the [para] key pressed for 2 s in the operation display status.
>> modE is flashing on the upper display.

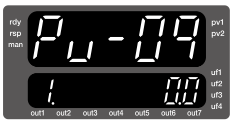


(2) Press the [∨] key or [para] key several times until Pv is shown on the upper display.
>> Pv is flashing on the upper display.

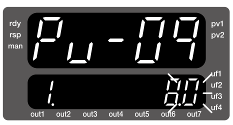


(3) Press the [enter] key.
>> Pv-01 is shown on the upper display. At this time, check that 1. is shown on the auxiliary display.
(To set input 2, change the value with the [>] key or [<] key.)

(4) Press the [∨] key several times until Pv-09 is shown on the upper display.
>> Pv-09 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set at 0.0 with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for Pv-10.

(9) When the setting has been completed, press the [display] key.
>> The operation is returned to the operation display status.

■ How to change the PV alarm setting (Pv-04, Pv-05)

The PV alarm setting differs for each input type.

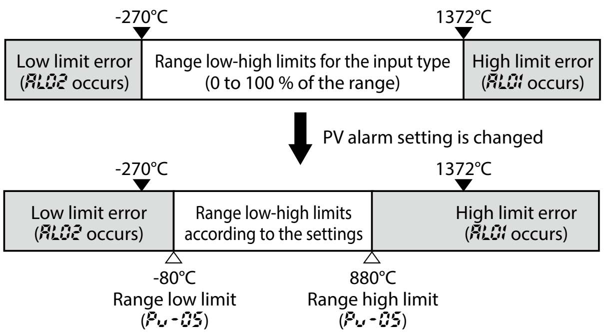
Input type	Low limit error	High limit error
Thermocouple, RTD	0 % of the range	100 % of the range
DC voltage, DC current	-10 % of the range	110 % of the range

By setting the PV input range narrowly, the point at which the PV alarm is activated can be changed. If no change of the PV alarm setting is needed, it is not necessary to set the high and low limits for the range (Pv-04, Pv-05). Use the factory settings (-19999U, 32000U).

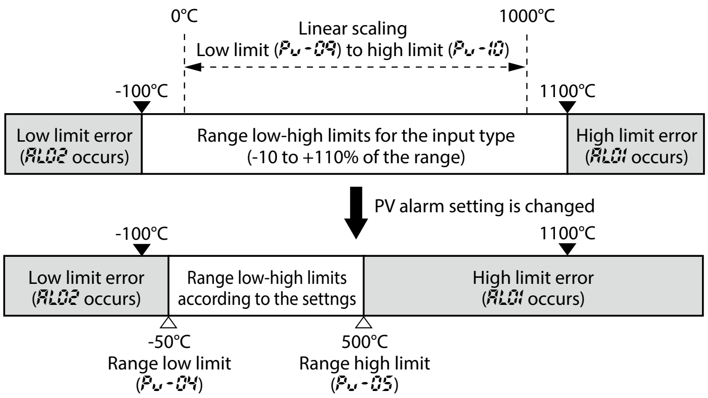
! Handling Precautions

- The PV low limit error threshold for type B thermocouples depends on the ROM version:
  - ROM version 4.07 or later: -180 °C equivalent
  - ROM version 4.06 or earlier: -0 °C equivalent (0 % of the range)
  - "-180 °C equivalent" and "-0 °C equivalent" are the electromotive force values obtained by extending straight the thermoelectromotive force characteristics line between around 60 °C to around 20 °C.

● Example: changing the PV alarm setting for PV1 (K thermocouple, -270 to +1372 °C)



● Example: changing the PV alarm setting for PV1 (DC voltage, scaling 0 to 1000)

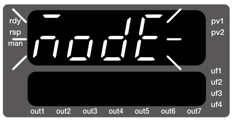


● Setting procedures

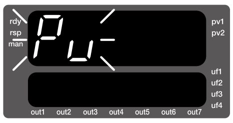
Example: changing the PV alarm setting for PV1 (K thermocouple, -270 to +1372 °C) to -80 °C (or less) and +880 °C (or more).

Bank	Item display	Item name	Settings
Pv (PV bank)	Pv-04	Range low limit	-80.0
	Pv-05	Range high limit	+880.0

(1) Keep the [para] key pressed for 2 s in the operation display status.
>> mode is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until Pv is shown on the upper display.
>> Pv is flashing on the upper display.



(3) Press the [enter] key.
>> Pv-01 is shown on the upper display. At this time, check that 1. is shown on the auxiliary display.
(To set input 2, change the value with the [>] key or [<] key.)

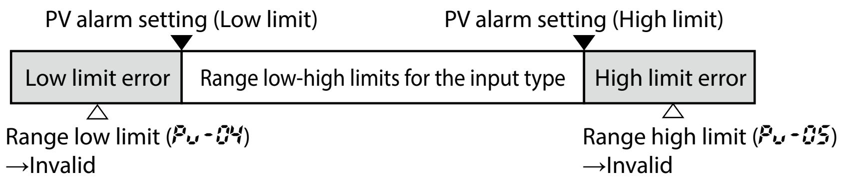
(4) Press the [∨] key several times until Pv-04 is shown on the upper display.
>> Pv-04 is shown on the upper display.

(5) Press the [enter] key.
>> The value on the lower display starts flashing.

(6) Set to -80.0 with the the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for Pv-05.
(9) When the setting has been completed, press the [display] key.
>> The operation is returned to the operation display status.

Handling Precautions

- If the low and high limits of the range (PV-04, PV-05) are set outside of the low-high limit range for the input type, the PV alarm setting will remain unchanged.



4 - 4 How to Set the Decimal Point Position

Apart from the decimal point position for the input range, which is set in the PV bank, the decimal point position for the display can be set.

■ Bank and settings

Bank	Item display	Item name	Settings
CtrL (Control bank)	Cnt.01	Loop PV/SP decimal point position	0: No decimal point, 1: 1 digit after the decimal point, 2: 2 digits after the decimal point 3: 3 digits after the decimal point 4: 4 digits after the decimal point

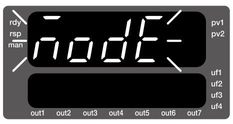
Settings for the decimal point position are reflected in the following screens/items.

Display, Bank	Item name	Note
Operation display Monitor bank Communications profile (instrument status)	Loop PV and SP	
Control bank	Control range low and high limits	Even if the decimal point position is changed, the. settings are unchanged (within the allowable setting range). Example: changing 100 to 100.0 (from no decimal point to 1 digit after the decimal point)
	Zone 1 to 7	
	Hysteresis for zones	
MV bank	SP scaling low and high limits	
Multi-SP bank	LSP 1 to 16	
Recipe bank	LSP 1 to 16	
RSP bank	RSP	
Communications profile (operation processing)	LSP	
SP configuration bank	SP low and high limits	

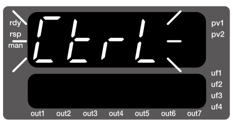
■ Setting procedures

● **Control (basic) bank (CtrL)**

(1) Keep the [para] key pressed for 2 s in the operation display status.
>> ModE is flashing on the upper display.

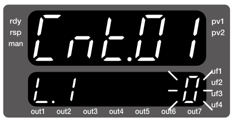


(2) Press the [v] key or [para] key several times until CtrL is shown on the upper display.
>> CtrL is flashing on the upper display.



(3) Press the [enter] key.
>> Cnt.01 is shown on the upper display.

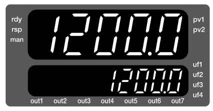
(4) Press the [enter] key.
>> The value on the lower display starts flashing.



(5) Set a desired value with the [∨] key or [∧] key.
(6) Press the [enter] key to set the value.
(7) Press the [display] key.
>> The operation is returned to the operation display status.

Note

- Depending on the operation, the decimal point can be displayed or deleted.
  Example: changing from 1 digit after the decimal point to no decimal point

Operation status	Cnt.01 set	Display example
1 digit after the decimal point is displayed during trial run adjustment	1: 1 digit after the decimal point	
No decimal point is displayed after the start of regular operation.	0: No decimal point	

Handling Precautions

- In the case of a thermocouple or RTD, the maximum number of digits after the decimal point is determined separately for each range number. Set the decimal point position within the appropriate range for the range No.
  For details about ranges for each input type, refer to:
  ☞ 4 - 2 How to Set the Input Type, ■ Input types (P. 4-4).
  If decimal point setting exceeds the range, the PV display will have the specified number of digits after the decimal point, but the digits after the position determined by the range No. will all be "0."

  Ex.: Based on the range No., 1 digit after the decimal point is shown for the K thermocouple (-270 to +1372 °C) in the PV display. If the decimal point position for the loop PV/SP is set for 2 digits after the decimal point, the PV display of temperatures around 500 °C will be as follows.

  PV display: 499.90
  PV display: 500.00
  PV display: 500.10
  PV display: 500.20

  This digit is always "0".

4-5 How to Set the Loop Control Action

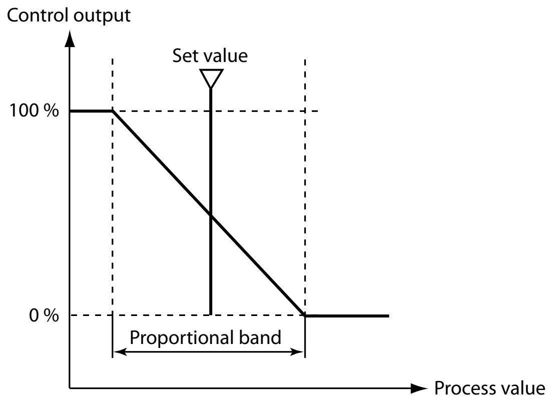
■ Bank and settings

Bank	Item display	Item name	Settings
CtrL (Control bank)	Cnt.03	Control action	0: Reverse action (heat), 1: Direct action (cool), 2: Heat/Cool

The basic operation of the PID control is set.

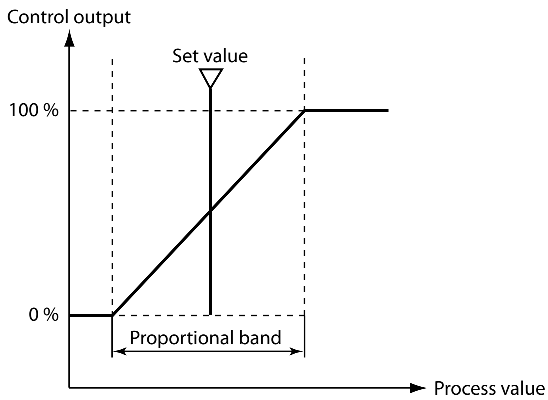
Heat action: Reverse action.

Control output decreases as the process value increases. Generally, this action is used for heating control.

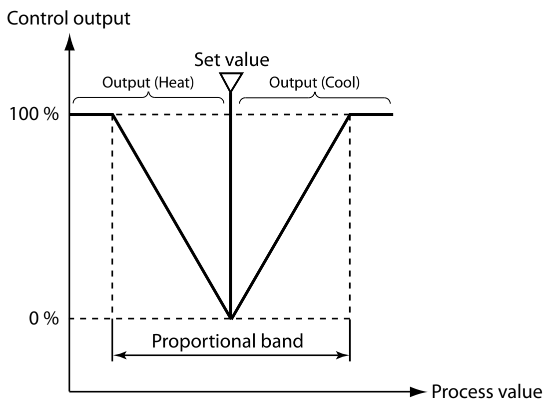


Cool action: Direct action.

Control output increases as the process value increases. Generally, this action is used for cooling control.

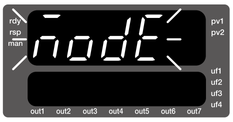


Heat/Cool action

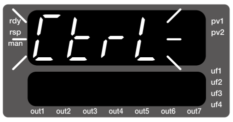


■ Setting procedures

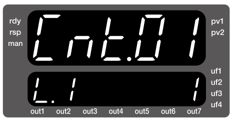
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> mode is flashing on the upper display.



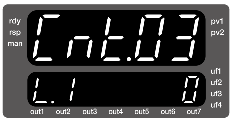
(2) Press the [∨] key or [para] key several times until CtrL is shown on the upper display.
>> CtrL is flashing on the upper display.



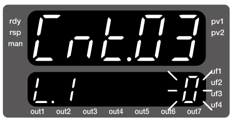
(3) Press the [enter] key.
>> Cnt.01 is shown on the upper display.



(4) Press the [∨] key several times until Cnt.03 is shown on the upper display.
>> Cnt.03 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set a desired value with the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) Press the [display] key.
>> The operation is returned to the operation display status.

4 - 6 How to Set Outputs (continuous output and time proportional output)

Up to seven output points can be mounted on the SDC46 while up to five points can be mounted on the SDC45. Setup items of each setting may vary depending on the type of output and operation method.

■ Output types, applications, and settings

Output No.	Output type (Set by model No.)	Application	Bank	Item display
1 to 2	Relay	Time proportional output (MV) Alarm output (EV)	oUt	tPo.01 to tPo.08
3 to 7	Relay Voltage pulse	Time proportional output (MV) Alarm output (EV)		
	Current Continuous voltage	Continuous output (MV) Transmission output (PV, SP, etc.)		Co-01 to Co-08
	Power supply for transmitter	24 V DC power supply	None	-

■ Bank and settings

● For current output or continuous voltage output

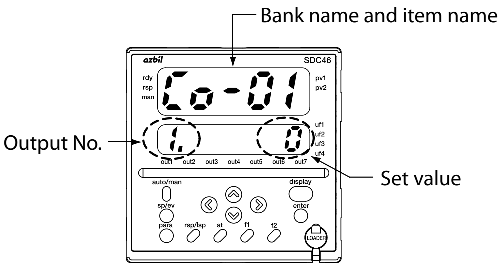
Bank	Item display	Item name	Settings
oUt (Continuous output bank)	Co-01	Output range	Current output, 0: 4 to 20 mA, 1: 0 to 20 mA Continuous voltage output, 0: 1 to 5 V, 1: 0 to 5 V, 2: 0 to 10 V
	Co-02	Output type	0: Fixed at 0%, 1: MV, 2: Heat MV (for heat/cool control), 3: Cool MV (for heat/cool control), 4: PV (Loop), 5: SP, 6: Deviation (PV-SP), 7: PV (input channel) For others, see the list of standard numeric values (on page App.-15).
	Co-03	Loop/channel definition	0: Invalid, 1: Loop 1/Channel 1, 2: Loop 2/Channel 2
	Co-04	Output decimal position	0: No decimal point, 1: One digit below the decimal point, 2: Two digits below the decimal point, 3: Three digits below the decimal point, 4: Four digits below the decimal point
	Co-05	Low limit of output scaling	-19999 to +32000 U (Value assigned to the low limit of the output)
	Co-06	High limit of output scaling	-19999 to +32000 U (Value assigned to the high limit of the output)
	Co-07	Linearization table group definition	0: Not used., 1: 1 group, 2: 2 groups, 3: 3 groups, 4: 4 groups, 5: 5 groups, 6: 6 groups, 7: 7 groups, 8: 8 groups
	Co-08	Supply voltage correction	0: Disabled, 1: Correction by AC1 input, 2: Correction by AC2 input

● For relay output or voltage pulse output

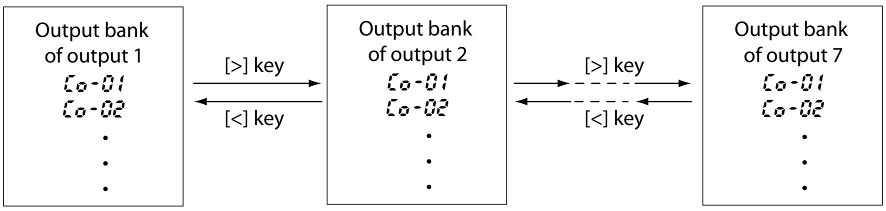
Bank	Item display	Item name	Settings
oUt (ON/OFF output bank)	tPo.01	Output type	0: OFF, 1: MV of loop 1, 2: Heat MV of loop 1 (for heat/cool control) *, 3: Cool MV of loop 1 (for heat/cool control) *, 4: MV of loop 2 5: Heat MV of loop 2 (for heat/cool control) *, 6: Cool MV of loop 2 (for heat/cool control) * 13: Position proportional output 1 output for closing 14: Position proportional output 1 output for opening For others, see the list of standard bit Nos. (on page App.-14).
	tPo.02	Latch	0: Not latched., 1: Latched when turned ON., 2: Latched when turned OFF. (Except for OFF when power is turned ON.)
	tPo.03	Time proportional operation type	0: Priority on controllability, 1: Priority on device life
	tPo.04	Min. ON/OFF time	0 to 300 ms
	tPo.05	Time proportional cycle	Relay output, 5.0 to 120.0 s Voltage pulse output, 0.1 to 120.0 s
	tPo.06	Linearization table group definition	0: Not used., 1: group 1, 2: group 2, 3: group 3, 4: group 4, 5: group 5, 6: group 6, 7: group 7, 8: group 8
	tPo.08	Supply voltage correction	0: Disabled, 1: Correction by AC1 input, 2: Correction by AC2 input

* For heating and cooling control

Description of display

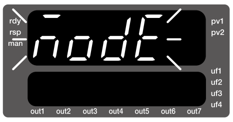


The output No. can be changed with the [<] key or [>] key.

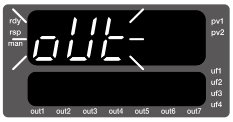


■ Setting procedures

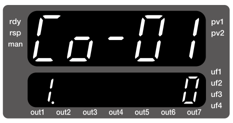
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> mode is flashing on the upper display.



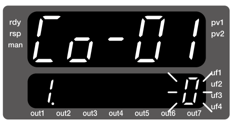
(2) Press the [∨] key or [para] key several times until oUt is shown on the upper display.
>> oUt is flashing on the upper display.



(3) Press the [enter] key.
>> Co-01 is shown on the upper display.



(4) Press the [enter] key.
>> The value on the lower display starts flashing.

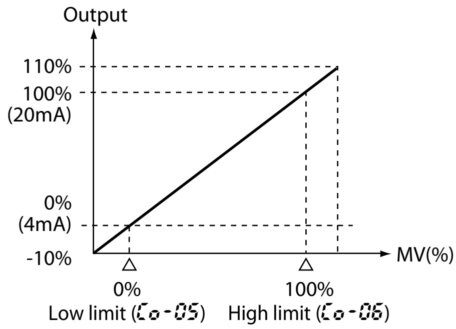


(5) Set a desired value with the [∨] key or [∧] key.
(6) Press the [enter] key to set the value.
(7) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (3) to (6) to configure the settings for Co-02 to Co-07 and tPo.01 to tPo.06.
(8) When all settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

■ Continuous output setup

Set the output range (Co-01) for the desired current or continuous voltage range.
Specify the output type (Co-02) and loop/channel definition (Co-03) for the output.
In the output decimal point position (Co-04), the decimal point position is set for the low limit of the output scaling (Co-05) and the high limit of the output scaling (Co-06).

With the low limit (Co-05) and high limit (Co-06) settings, output scaling can be applied to the data assigned in the output type.
If the high limit is set smaller than the low limit, reverse scaling is possible.
The figure below shows an example of scaled output applied to the MV for the power supply output (4 to 20 mA).

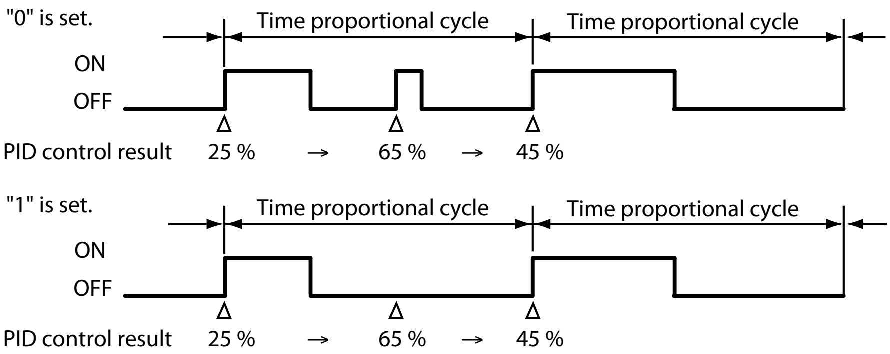


However, when the output range is 0 to 20 mA, 0 to 5 V, or 0 to 10 V, the output becomes 0 to 110 %.

In the linearization table group definition (Co-07), a scaling calculation can be set up for broken-line approximation values.
Also, by setting the linearization table group for OUT use (Pr-02) in the Priority bank (Prior), the linearization table groups used for broken line approximation can be specified from the internal contact input.

■ Time proportional output setup

When the output type (tPo.01) is set to 1 to 6, the time proportional value is output according to the settings of the time proportional cycle (tPo.05).
According to the time proportional operation type (tPo.03), the time proportional output becomes as follows.
When "0: Priority on controllability" is set, the output may be turned ON twice or more within the time proportional cycle. On the contrary, when "1: Priority on device life" is set, the output is turned ON zero time to once within the time proportional cycle.



The min. ON/OFF time (tPo.04) is valid. However, even though "0" is set, the min. ON/OFF time becomes 1 ms. In the relay output, even though a value less than "50" is set, the min. ON/OFF time on the operation is 50 ms.
The linearization table group definition (tPo.06), can be set so that the time proportional output corresponding to the linearization approximation value is made.
Additionally, by setting the linearization table use group (Prior) for OUT of the priority bank (Pr-02), you can change to the internal contact input definition. The latch (tPo.02) becomes invalid.

■ ON/OFF output setup

When the output type (tPo.01) is set at "0", the output becomes the OFF output.
When any of the standard bit Nos. 1024 to 2047 is set in the output type (tPo.01), the ON/OFF status of this standard bit is output.
The latch (tPo.02) and the min. ON/OFF time (tPo.04) are valid.
Additionally, even though a value less than "50" is set in the relay output, the min. ON/OFF time on the operation is 50 ms.
The time proportional operation type (tPo.03), time proportional cycle (tPo.05), and linearization table group definition (tPo.06) are invalid.

4 - 7 How to Set Motor Driver Output

Motor driver functions are available if "SS" or "R1" is selected for output 3 and 4 in the model selection table, or if "2" or "4" is selected for option 1 (for models with 7-digit model Nos.).
For details about model selection, refer to:
☞ 1 - 2 Model Selection Table (P. 1-3).

■ Motors that can be used for motor driver triac output

Azbil Corporation's ECM3000 motor.
Model No.: ECM3000F1_ _ _ (100 V AC, relay contact input)

■ Bank and settings

Bank	Item display	Item name	Settings
PP (Position proportional bank)	PP-01	Output type	0: Position proportional control OFF, 1: Loop 1 MV, 2: Loop 1 heating MV, 3: Loop 1 cooling MV, 4: Loop 2 MV, 5: Loop 2 heating MV, 6: Loop 2 cooling MV, 2048 to 3071: see list of standard numerical codes (Appendix 2)
	PP-02	Selection of control method	0: MFB control + estimated position control, 1: MFB control + close upon line break 2: Estimated position control 3: Estimated position control + position adjustment at power-on
	PP-03	Dead zone	0.5. to 25.0 %
	PP-04	Long life	0: Control-oriented, 1: Life-oriented
	PP-05	Auto-tuning	0: Stop, 1: Start by method 1, 2: Start by method 2
	PP-06	Fully closed FB value	0 to 8000
	PP-07	Ful opening FB value	0 to 8000
	PP-08	Full opening time	5.0 to 240.0 s
	PP-09	Loop designation	1: Loop 1, 2: Loop 2
	PP-10	Linearization table group designation	0: Disabled, 1: 1 group, 2: 2 groups, 3: 3 groups, 4: 4 groups, 5: 5 groups, 6: 6 groups, 7: 7 groups, 8: 8 groups

Bank	Item display	Auxiliary display	Item name	Settings
oUt (ON/OFF output bank)	tPo.01	3.	Output type	14: Position proportional output 1 output for opening
	tPo.01	4.	Output type	13: Position proportional output 1 output for closing

Handling Precautions

- Functions in the position proportional bank can be displayed and set if "SS" or "R1" was selected for output 3 - 4 in the model selection table, or if "2" or "4" was selected for option 1 (for models with 7-digit model Nos.).

■ Selection of output type (PP-01)

Selects the type of MV output to use as motor driver output.
To drive the motor in accordance with the manipulated variable (MV) output from the controller, set “Output type” to a value from 1 to 6. The setting to select depends on the instrumentation of the controller. For example, if a motor opening (%) that is the same as the MV (%) of loop 1 is needed, set “1” (Loop 1 MV).
If “2720: MV for position proportioning 1 ,” “2464: MFB1 (Motor opening feedback value 1)(including estimation),” or “2480: MFB1 (Motor opening feedback value 1) (measurement value)” is set, the motor will not operate in accordance with the MV output from the controller.

■ Selection of control methods (PP-02)

● 0: MFB control + close upon line break

When the motor feedback (MFB) input is normal, the MFB function controls the motor position using actual measurements of the motor position. To use this function, set PP-05 to 1 and execute auto-tuning.

- If the motor feedback (MFB) input is abnormal, the MFB function controls the motor position on the basis of the estimated position of the motor (MFB value). This is called estimated position control.
  For example, if the MFB input fluctuates rapidly when the rotation of the motor enters a deteriorated position on the feedback potentiometer, the MFB function regards this sudden change as an abnormality and estimates the correct position of the motor. This estimated MFB is also used to control the motor position if the MFB line break alarm is activated.
- With estimated position control, some error is inevitable between the actual degree of motor opening and the estimated MFB. This error is corrected in the following ways:
  - If the (MV) output is 0.0 % or less, output for closing is always ON to fully close the motor.
  - If the (MV) output is 100.0 % or more, output for opening is always ON to fully open the motor.

  However, the following cases are excluded:
  - When the MV is limited to within 0.1-99.9 % by the output limiter.
  - When the MV is neither 0.0 % or less nor 100.0 % or more due to the control status.
- The following problems are likely to cause estimated position control:
  - Incorrect motor opening adjustment
  - Deterioration or insufficient resolution of the feedback potentiometer
  - Faulty MFB wiring

● 1: MFB control + close upon line break

If there is a break in the MFB line, the motor moves to the closed position and control action stops.

● 2: Estimated position control

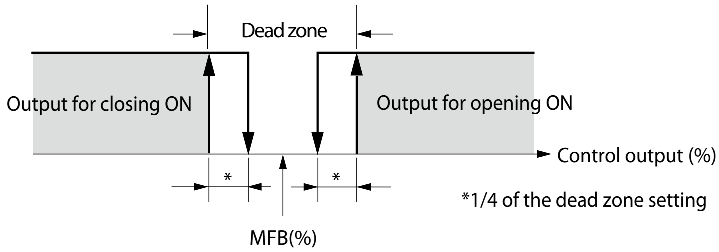
- The motor is always controlled by estimated position control on the basis of the estimated MFB, with or without connected MFB wiring.
- When using this setting, be sure to correctly input a full opening time (PP-08).
- The MFB line break alarm does not operate.
- The difference between the actual motor opening and the estimated MFB is corrected when the motor is forced to move to the closed position or to the open position by an MV of 0.0 or 100 %, respectively.

● 3: Estimated position control + position adjustment at power-on

When the power is turned on, the output for closing is ON only for the amount of time set for full opening time (PP-08), in order to align 0 % of the estimated MFB and the actual degree of motor opening. After the alignment, this control method operates the same way as #2, estimated position control.
When using this setting, be sure to correctly input a full opening time (PP-08).

■ Dead zone (PP-03)

If PP-04 (long life) is set to 1 (life-oriented), this function can be neither displayed nor set. This function sets the dead zone between motor opening and motor closing when position proportional control is used. As a guideline for configuration, when a constant manual output is generated during dead zone adjustment, the point at which hunting stops is the minimum value for the dead zone. If the zone is set too narrow, the motor will be activated constantly, shortening its lifetime enormously. The factory setting is 10.0 %. This is a rough guide, but the desired control results and motor service life should be considered.



■ Long life (PP-04)

If 1 (life-oriented) is set, settings for Etd.05 (MV up change limit), Etd.06 (MV down change limit), and PP-03 (dead zone) will be invalid, and the optimum life-oriented value will be automatically calculated for the potentiometer.

■ Auto-tuning (PP-05)

[!] Handling Precautions

- If PP-02 (selection of control method) is set to 0 (MFB control + estimated position control) or 1 (MFB control + close upon line break), be sure to execute auto-tuning.

- If PP-02 (selection of control method) is set to 2 (estimated position control) or 3 (estimated position control + position adjustment at power-on), auto-tuning can be neither displayed nor set.
- Auto-tuning for position proportional control automatically sets PP-06 (fully closed FB value), PP-07 (fully open FB value), and PP-08 (full opening time).
- How to use auto-tuning
  (1) Set PP-02 (selection of control methods) to 0 (MFB control + estimated position control) or to 1 (MFB control + close upon line break).
  (2) Set PP-05 (auto-tuning) to a value other than 0, and press the [enter] key. If a value other than 0 has already been set, press the [enter] key twice.

Motor	[PP-05] (auto-tuning) setting
ECM3000 MY3000	Set to "1" (Start by method 1) and execute auto-tuning.
M904F M931	Set to "2" (Start by method 2) and execute auto-tuning.
Other than the above	Set to "1" (Start by method 1) and execute auto-tuning. If auto-tuning is still not successful, manually configure PP-06 (fully closed FB value), PP-07 (fully open FB value), and PP-08 (full opening time).

(3) Auto-tuning begins.

• "CA.CL" is shown on the upper display and the output for closing turns ON.

• The motor moves to the closed position and the auxiliary display shows the MFB value. When the value stabilizes, full closing operation is complete and the value is written to PP-06 (fully closed FB value).

• The upper display says "CA.oP" and the output for opening turns on.

• The motor turns to the open side and the auxiliary display shows the MFB value. When the value stabilizes, full opening operation is complete and the value is written to PP-07 (fully open FB value).
Additionally, the time between the fully closed and fully open positions is written to PP-08 (full opening time). However, if the time is longer than the maximum of 240.0 s, PP-08 is 240.0 s.

• When auto tuning is complete, the basic display is again shown.

(4) To cancel tuning, press the [display] key.
Once auto-tuning starts, no key operation is possible except for cancellation of auto tuning with the [display] key.
In the following cases in which an error occurs, AL22 is displayed and the tuning values before auto-tuning began are restored. AL22 is displayed until auto-tuning is successfully completed or until the power is reset.

• The difference between the fully open and fully closed values is less than 300.

• The time between fully closed and fully open is less than 5 s.

• MFB line break alarm (AL21) occurs continuously or frequently.

• The MFB value takes more than 5 min to stabilize.

• The MFB or open/close output is miswired. (However, not all miswiring can be detected.)

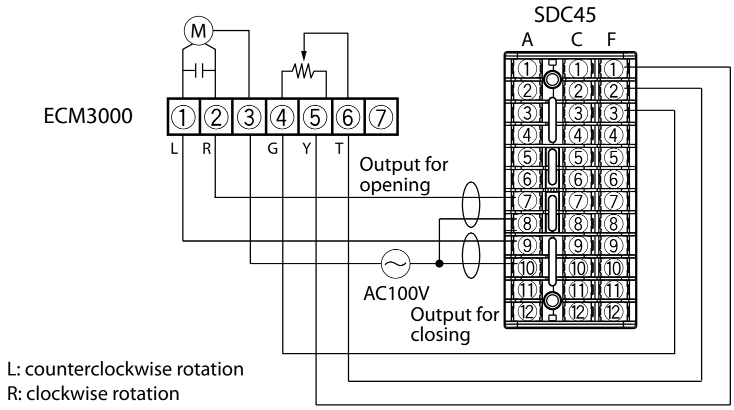
• With CPL communications, auto-tuning can be started or canceled by writing to the auto-tuning address (decimal 9444). Write "1" to start auto-tuning and "0" to cancel it.

Handling Precautions

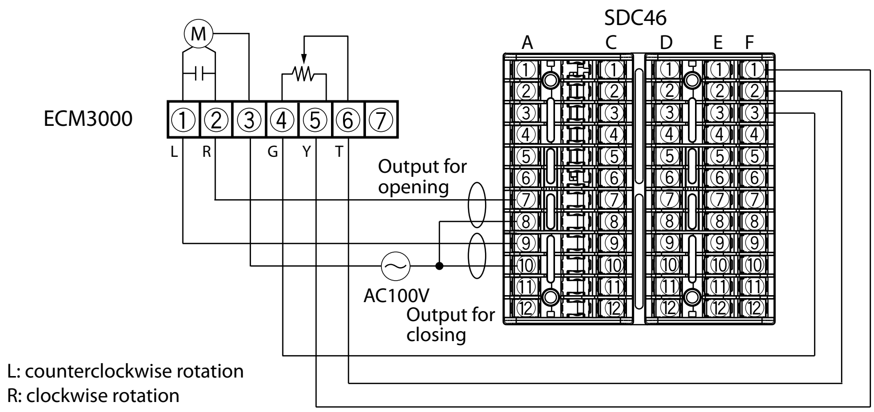
- If the power of the main unit is turned off during auto-tuning for position proportional control, auto-tuning will be canceled when the power is turned on again.
- If the mode is switched between AUTO and MANUAL, RUN and READY, or LSP and RSP during auto-tuning for position proportional control, auto-tuning will continue.
- During auto-tuning, check that the valve fully opens and fully closes properly.
- After auto-tuning is complete, check that the valve can be fully opened and closed properly.

● Wiring of motor

• SDC45 models



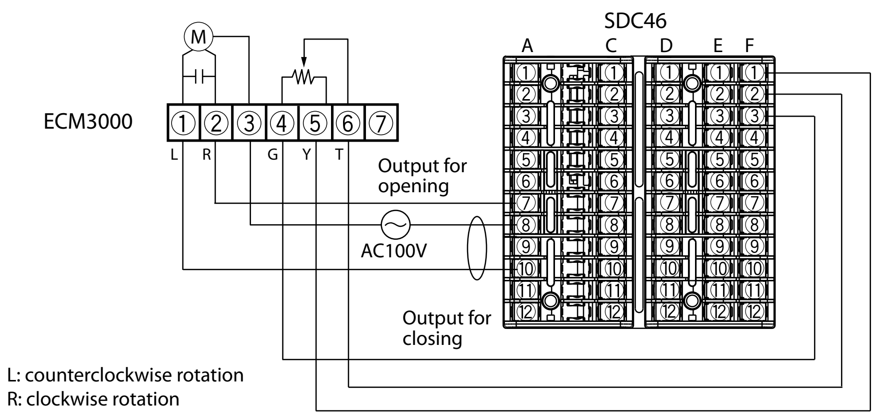
• SDC46 models (model No. output 3, 4: SS)
or SDC46 models with 7-digit model No. (option 1: 2 or 4)



Note

- Only 100 V AC supply voltage can be used for the ECM3000 with a direct connection (only for triac output). (only for SDC45 and SDC46 with model number “SS” [Outputs 3 and 4])

• SDC46 models (model No. output 3, 4: R1)



Note

- If the direction of motor rotation is reversed, reverse the wiring of R and L, and reverse the wiring of G and Y.

Handling Precautions

- Use motor drive relay output 4 (terminals 8 and 10 in column A) for closing. If output 4 is used for opening, and if the relay fails, the motor may remain in the open position.

■ Fully closed FB value (PP-06) and fully open FB value (PP-07)

- If PP-02 (selection of control method) is set to 2 (estimated position control) or 3 (estimated position control + position adjustment at power-on), auto-tuning can be neither displayed nor set.
- These values can be automatically set by auto-tuning for position proportional control. Manual setting is also possible.

Note

- For details about auto-tuning, refer to:
  ☞ ■ Auto-tuning (PP-05) (P. 4-22).

■ Full opening time (PP-08)

- If PP-02 (selection of control methods) is set to 0 (MFB control + estimated position control) or 1 (MFB control + close upon line break), PP-08 can be automatically set by auto-tuning for position proportional control. Manual setting is also possible.

Note

- For details about auto-tuning, refer to:
  ☞ ■ Auto-tuning (PP-05) (P. 4-22).

- If PP-02 (selection of control methods) is set to 2 (estimated position control) or 3 (estimated position control + position adjustment at power-on), input the actually measured opening time of the motor as the full opening time.

■ Loop assignment (PP-09)

A loop assignment is needed if PP-01 (output type) is set between 2048 and 3071. For the specified loop, the degree of opening is added to the operation display. If the specified loop is in MANUAL or READY mode, there is no position adjustment at power-on.

Chapter 5. OPERATION

5 - 1 Operation Displays

The operation display changes each time the [display] key is pressed.
Since switching the display does not affect control, any display can be chosen while control is in progress.

Operation display types

Operation display types are the following 14 types.

Screen No.	Upper display	Lower display	Auxiliary display	Display condition
1	Loop 1 PV	Loop 1 SP	*1	
2	Loop 1 PV	Loop 1 MV	*2	
3	Loop 1 PV	Loop 1 Heating MV	Ht.	When heat/cool control is selected
4	Loop 1 PV	Loop 1 Cool MV	CL.	When heat/cool control is selected
5	Loop 2 PV	Loop 2 SP	*1	
6	Loop 2 PV	Loop 2 MV	MV.	
7	Loop 2 PV	Loop 2 Heating MV	Ht.	When heat/cool control is selected
8	Loop 2 PV	Loop 2 Cool MV	CL.	When heat/cool control is selected
9	Loop 1 PV	Loop 2 PV	PV.	
10	Loop 1 PV	MFB1	Fb. (blinks when estimation is in progress)	Motor driver output models only
11	Loop 2 PV	MFB1	Fb. (blinks when estimation is in progress)	Motor driver output models only
12	Loop 1 PV	Progress of auto-tuning	At.	During auto-tuning only
13	Loop 2 PV	Progress of auto-tuning	At.	During auto-tuning only
14	Loop 1 PV	Loop 2 MV	SMV.	When the loop type is internal cascade

*1 For LSP mode, "SP.X" (where X is the group No. in hexadecimal), and for RSP modes imply "rSP".

*2 "MV" for all cases except computer backup. For computer backup, the display depends on the mode, as shown below.

- "LMV." for backup mode.
- "rMV." for through-output mode.

■Operation display at power-on

The operation display pattern at power-on depends on the loop type set in C-001 in the setup bank, as shown below.

C-001 setting	Loop type	Display pattern at power-on
0	1 loop	Pattern 1
1	2 loops (independent)	Pattern 3
2	1 loop (RSP)	Pattern 1
3	1 loop (computer backup)	Pattern 1
4	1 loop (internal cascade)	Pattern 2
5	2 loops (with RSP for 1 loop)	Pattern 3
6	1 loop (computer backup with RSP)	Pattern 1
7	1 loop (internal cascade with RSP)	Pattern 2
8	2 loops (with RSP)	Pattern 3

The patterns 1 to 3 are as follows.

Pattern	Operation mode	Screen No.
Pattern 1	AUTO	1
	MANUAL	2
Pattern 2	AUTO	9
	MANUAL	14
Pattern 3	Loop 1 = AUTO, Loop 2 = AUTO	9
	Loop 1 = MANUAL, Loop 2 = AUTO	2
	Loop 1 = AUTO, Loop 2 = AMANUAL	6
	Loop 1 = MANUAL, Loop 2 = MANUAL	2

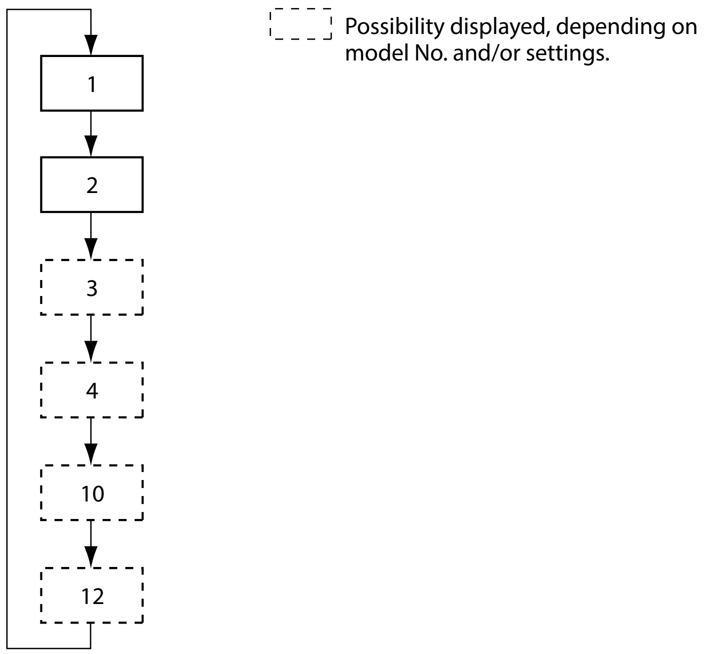
Switching order of the operation display

The order in which the operation display is changed depends on the loop type set in C-001 in the setup bank, as shown below.

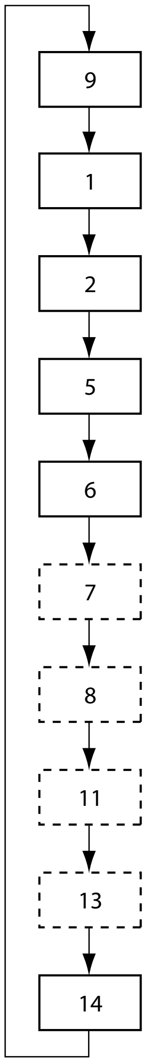
C-001 setting	Loop type	Switching order of screen No.
0	1 loop	Type 1
1	2 loops (independent)	Type 3
2	1 loop (RSP)	Type 1
3	1 loop (computer backup)	Type 1
4	1 loop (internal cascade)	Type 2
5	2 loops (with RSP for 1 loop)	Type 3
6	1 loop (computer backup with RSP)	Type 1
7	1 loop (internal cascade with RSP)	Type 2
8	2 loops (with RSP)	Type 3

The order in which the displays (listed by screen No.) are switched in each of types 1 to 3 is shown below.

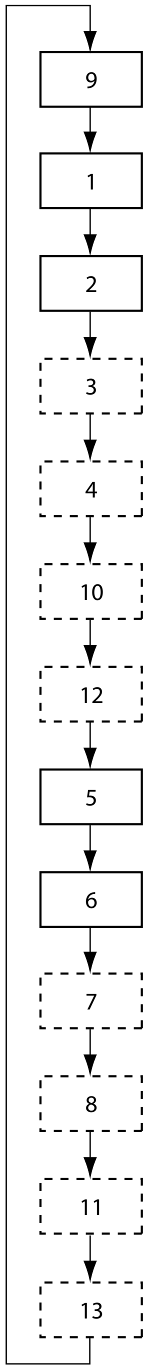
Switching order of type 1



Switching order of type 2



Switching order of type 3



Handling Precautions

- If C-005 (Operation display customization) in the SEtUP bank is set to "1" (Customize), operation displays are displayed in the order specified by the operation display switching order bank.
  ☞ 7 - 13 Display Switching Function (P. 7-27)

Display status of mode indicator lamps

When two loops are operated independently, two PID controls are executed in the internal cascade control. Therefore, according to the displayed PV input No., each mode indication LED is lit, flashing, or off with the patterns shown in the tables below.

Meaning of display ○ : Lit.

△ : Flashing

× : Off

• "rdy" LED

Mode	Display			
	PV1	PV2	PV1, PV2	Other
Loop 1: RUN Loop 2: RUN	×	×	×	×
Loop 1: READY Loop 2: RUN	○	△	△	△
Loop 1: RUN Loop 2: READY	△	○	△	△
Loop 1: READY Loop 2: READY	○	○	○	○

• "man" LED

Mode	Display			
	PV1	PV2	PV1, PV2	Other
Loop 1: AUTO Loop 2: AUTO	×	×	×	×
Loop 1: MANUAL Loop 2: AUTO	○	△	△	△
Loop 1: AUTO Loop 2: MANUAL	△	○	△	△
Loop 1: MANUAL Loop 2: MANUAL	○	○	○	○

• "rsp" LED

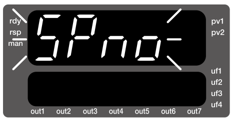
Mode	Display			
	PV1	PV2	PV1, PV2	Other
Loop 1: LSP Loop 2: LSP	×	×	×	×
Loop 1: LSP Loop 2: RSP	△	○	△	△

5 - 2   How to Change the SP

Setting procedures

The following describes an example that the LSP1 is changed when using the multi-SP:

(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



(2) Press the [∨] key or [sp/ev] key several times until L1.LSP is shown on the upper display.
>> L1.LSP is flashing on the upper display.

(3) Press the [enter] key.
>> LSP.01 is shown on the upper display. At this time, check that the auxiliary display shows L.1. This shows that the loop 1 is currently active.

(4) Press the [enter] key.
>> The value on the lower display starts flashing.

(5) Set a desired value with the [∨] key or [∧] key.
(6) Press the [enter] key to set the value.
(7) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

Note

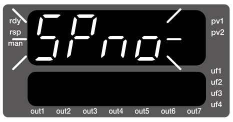
- When changing LSP1 of loop 2, select L2.LSP in step (2).
- When using the recipe, change the LSP1 from the loop 2 recipe bank (bank display: L1.rEC, L2.rEC) of the SP/EV bank.
- The LSP value can be changed directly from the operation display (depending on the settings).
For details, refer to:
☞ 6 - 1 SP Group/LSP Value Change from the Operation Display (P. 6-1).

5 - 3 How to Change the SP Group

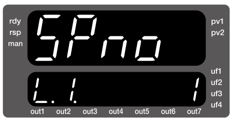
When multi-SP group and multiple recipe groups are set, the SP group used for control can be changed.
The multi-SP/recipe is set using the setup bank.
For details, refer to:
☞ 6 - 6 How to Use the Multi-SP (P. 6-18) and
6 - 7 How to Use Recipes (P. 6-20).

■ Setting procedures

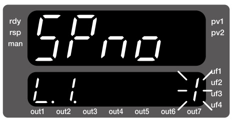
(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



(2) Press the [enter] key.
>> Check that the auxiliary display shows L.1.. This shows that the loop 1 is currently active. If you want to change it to loop 2, change the value with the [∨] key, [∧] key, [>] key or [<] key.



(3) Press the [enter] key.
>> The value on the lower display starts flashing.



(4) Set a desired value with the [∨] key or [∧] key.
(5) Press the [enter] key to set the value.
(6) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

[!] Handling Precautions

- When LPr.01 (SP group selection) is set to "1" (Internal contact input priority), the group cannot be changed using the keys.
  For details, refer to:
  ☞ 6 - 2 How to Set the Priority (P. 6-2).

5 - 4 How to Change the PID (auto tuning)

■Starting procedures

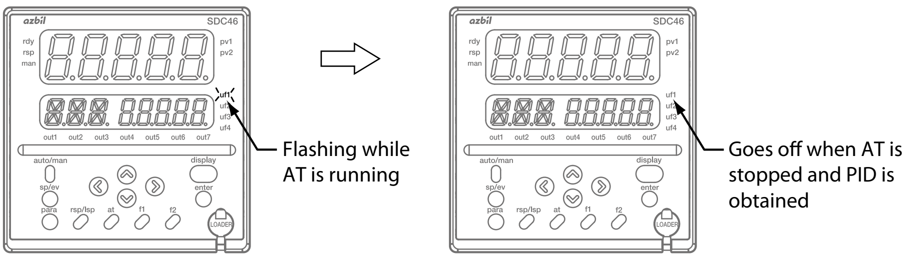
(1) Check that the PV inputs and final control elements (heater power supply, etc.) are connected correctly and that the unit is ready for control.
(2) Press the [display] key to display the loop, in which the AT (auto tuning) is executed. (PV1 or PV2: For 2-input model)
(3) Check that the displayed loop is in the RUN and AUTO modes.
(4) Keep the [at] key pressed for 2s. (The function key registration is set in the initial settings.)
>> The display status of At.on on the lower display changes from flashing to lit. The AT is then started.

■Stopping procedures

Normally, the AT completes automatically. To stop the AT while it is running, keep the [at] key again pressed for 2s.
>> The display status of At.oF on the lower display is then changed from flashing to lit. The AT is then stopped.
Additionally, the AT is also stopped when the operation mode is changed to the READY mode or MANUAL mode.

■Display while AT is running

The "uf1" LED is flashing while the AT of the loop 1 is running.
(The user function indicator lamp setting is set at the initial value.)
When the AT has been completed and the PID has been obtained, the "uf1" LED is turned off.
The new PID value is written into the PID group currently being used.
Since no display is given while the AT of the loop 2 is running, set the user function indicator lamp when necessary.



! Handling Precautions

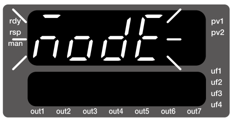
- Before starting the AT, check the PV inputs or final control elements are connected correctly. Make the control operation ready to start.
- To start the AT, it is preconditioned that the PV input error does not occur in the RUN mode and AUTO mode.
- For 2-input models, the AT cannot be started when both the PV1 and PV2 are displayed.
  With the [display] key, change the display to a loop you want to run the AT.
- If the READY mode or MANUAL mode is changed, or PV input error or power failure occurs while the AT is running, the AT is completed without changing of the PID constants.

5 - 5 How to Change the PID (manual)

Setting procedures

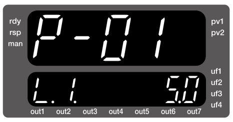
The following describes an example that the PID is changed when using the multi-SP:

(1) Keep the [para] key pressed for 2s in the operation display status.
>> mode is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until L1.PId is shown on the upper display.
>> L1.PId is flashing on the upper display.

(3) Press the [enter] key.
>> P-01 is shown on the upper display. This shows the proportional band of the 1st group. To change the PID group, change it with the [<] key or [>] key.



(4) Select an item you want to set with the [∨] key or [∧] key.
>> The selected item is shown on the upper display.
(5) Press the [enter] key.
>> The value on the lower display starts flashing.
(6) Set a desired value with the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

Note

- To change the PID group of the loop 2, select L2.PId in step (2).
- When using the recipe, change the PID from the recipe bank (L1.rEC, L2.rEC) of the loop 2 of the SP/EV bank.

5 - 6 How to Change the Event Action Point

The event action point setting procedures may vary depending on the setting of the recipe enabled setup of the setup bank (item display: C-010), that is, multi-SP and recipe.

- If multi-SP use is set.

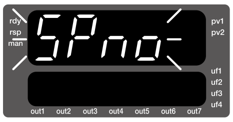
  The event action point is set using the event setup bank.
  The event action point setting consists of one set of main setting and sub setting for each event No.

- If recipe use is set.

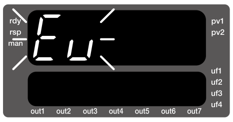
  The action points of events 1 to 8 are set using the loop 1 recipe bank while the action points of events 9 to 16 are set using the loop 2 recipe bank.
  The event action point setting consists of main settings and sub settings equivalent to the number of SP groups for each event No.

■Setting procedures (for multi-SP)

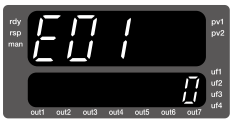
(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



(2) Press the [∨] key or [sp/ev] key several times until Ev is shown on the upper display.
>> Ev is flashing on the upper display.



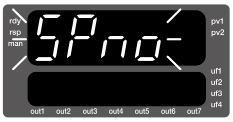
(3) Press the [enter] key.
>> The main setting of the action point 1 group is shown on the upper display.



(4) Select an item you want to set with the [∨] key or [∧] key.
>> The selected item is shown on the upper display.
(5) Press the [enter] key.
>> The value on the lower display starts flashing.
(6) Set a desired value with the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

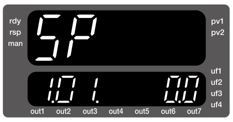
Setting procedures (for recipe)

(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.

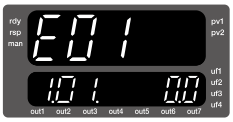


(2) Press the [∨] key or [sp/ev] key several times until L1.rEC is shown on the upper display. (L2.rEC for loop 2 recipe)
>> L1.rEC is flashing on the upper display.

(3) Press the [enter] key.
>> The SP of the recipe group 1 of the loop 1 is shown on the upper display.



(4) Select an item you want to set with the [∨] key.
>> The main setting of the event 1 group is shown.



(5) Every time the [∨] key is pressed, the display changes until the sub setting of the event 8 group is shown.
>> The selected item is shown on the upper display.
(6) Press the [enter] key.
>> The value on the lower display starts flashing.
(7) Set a desired value with the [∨] key or [∧] key.
(8) Press the [enter] key to set the value.
(9) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

! Handling Precautions

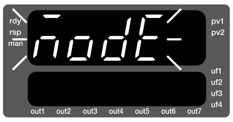
- If the operation type of the event is not set, "- - - - -" is shown on the lower display and the setting cannot be configured.

5 - 7 How to Start and Stop the Control Operation (RUN/READY)

■Setting procedures

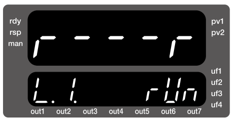
(1) Keep the [para] key pressed for 2s in the operation display status.

>> mode is flashing on the upper display.



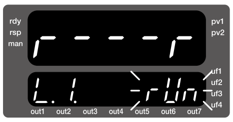
(2) Press the [enter] key.

>> r - - - r is shown on the upper display. At this time, check that the auxiliary display shows L.1. This shows that the loop 1 is currently active. If you want to change it to loop 2, change the value with the [∨] key, [∧] key, [>] key or [<] key.)



(3) Press the [enter] key.

>> The value on the lower display starts flashing.



(4) Set a desired mode with the [∨] key or [∧] key.

rUn: RUN mode

rdY: READY mode

(5) Press the [enter] key to set the value.

(6) Press the [display] key.

>> The operation is then returned to the operation display status.

! Handling Precautions

- For proper PID control, set to READY mode when the power to an actuator such as a heater is turned off.

5 - 8 How to Manually Output the MV (AUTO/MANUAL)

This function is intended to change the MV using the key operation regardless of the operation status of the instrument.

■ Setting procedures

(1) In the operation display status, press the [display] key to display a loop you want to put it in the manual mode. (This operation is valid only for 2-loop models.)

(2) In the operation display status, keep the [auto/man] key pressed for 2s.
>> The display status of MAn on the lower display changes from flashing to lit (operation mode changes to the manual operation mode) and the numeric value starts flashing. (The "man" LED is lit.)

(3) Change the output value to a desired level with the [∨] key, [∧] key, [<] key, or [>] key.
>> The MV changes in synchronization with the key operation. (It is not necessary to press the [enter] key.)

(4) To return to the auto mode, keep the [auto/man] key again pressed for 2s.
>> The display status of AUto on the lower display changes from flashing to lit and the operation mode changes to the auto mode. (The "man" LED is off.)

! Handling Precautions

- For 2-input models, when PV1 and PV2 are displayed at the same time, the mode cannot be changed. With the [display] key, change the display to a loop you want to run.

Note

- Bumpless (MV before change continues) or preset value can be selected for the MV when changing the manual mode.
  For details about settings, refer to:
  Single Loop Controller Model C45/46 User’s Manual for Displays and Settings (Document No. CP-SP-1265E).

5 - 9 How to Change to the Remote SP (RSP/LSP)

When the loop with the RSP or internal cascade is selected in the 2-input model, a set value to be used can be selected from the remote or local.

■How to change to the remote SP (RSP)

(1) In the operation display status, keep the [rsp/lsp] key pressed for 2s.
(The function key registration is set at the initial setting.)
When using the internal cascade control, perform the operation with PV2 displayed.
>> The display status of rSP on the upper display changes from flashing to lit and the mode changes to the remote SP mode. (The "rsp" LED is lit.)

■How to change to the local SP (LSP)

(1) In the operation display status, keep the [rsp/lsp] key pressed for 2s.
When using the internal cascade control, perform the operation with PV2 displayed.
>> The display status of LSP on the upper display changes from flashing to lit and the mode is changed to the local SP mode. (The "rsp" LED is turned off.)

Handling Precautions

- For 2-input models, when PV1 and PV2 are displayed at the same time, the mode cannot be changed. With the [display] key, change the display to a loop you want to run.

Note

- When changing the remote SP to the local SP, the remote SP immediately before changing is written to the local SP, enabling the continuous control. (RSP tracking function)
  For details about setting, refer to:
  ☞ 7 - 5 RSP Tracking (P. 7-10) and Single Loop Controller Model C45/46 User's Manual for Displaysand Settings (Document No. CP-SP-1265E)

Chapter 6. FUNCTIONS OFTEN USED FOR OPERATIONS OTHER THAN CONTROL

6 - 1 SP Group/LSP Value Change from the Operation Display

The SP group or LSP value can be changed using the [enter] key when the operation display shows the PV or SP.

Bank and settings

● Setting 0: LSP can not be changed

Bank	Item display	Item name	Settings
SEtUP (Setup bank)	C-009	SP change method from the operation	0: Disabled 1: LSP value change enabled 2: SP group change enabled

Settings cannot be changed with the [enter] key.

● Setting 1: LSP can be changed

To change the LSP value, press the [enter] key when the operation display shows the PV or SP.*
To finalize the change of LSP value, press the [enter] key again.
To cancel the change, press the [display] key. Other keys are invalid.
If a change has not been finalized and if there is no key operation for 3 minutes, the change will be cancelled and the setting (blinking) will be replaced by the previous one (lit steadily).

*: The setting cannot be changed in RSP mode. During the SP ramp, the LSP and the displayed SP value differ, but while the setting is being changed using the keys, the most recent SP setting is displayed.

● Setting 2: SP group (recipe) can be changed

To change the SP group, press the [enter] key when the operation display shows the PV or SP.*
The number of SP groups that can be changed depends on the number of SP groups that are set up in the set-up bank.
To finalize a change of SP group, press the [enter] key again.
To cancel a change of SP group, press the [display] key. All other keys are invalid.
If a change has not been finalized and if there is no key operation for 3 minutes, the change will be cancelled and the setting (blinking) will be replaced by the previous one (lit steadily).

*: SP group change is impossible in the following cases:

- In RSP mode
- SP group selection is set to "internal contact input has priority."
- There is only one SP group.

6 - 2 How to Set the Priority

In the functions, one of set value, internal contact input (digital input), and other conditions can be used as conditions for operation change. What condition is used is set by the priority.

■Setting bank

Priority bank (Pr1or)

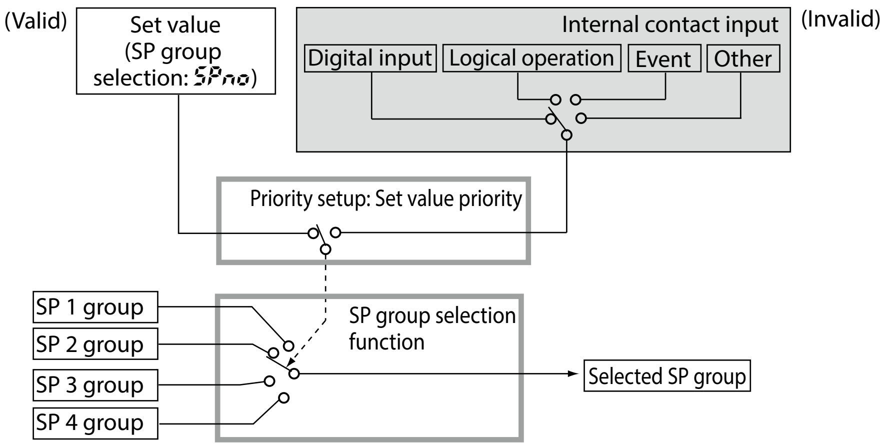
■Example: Selection of SP group

The following describes an example that the SP group selection function is used for four SP groups.
Set value (SP group selection) or internal contact input (digital input) is used for conditions for SP group selection is determined by the priority.

● SP group of control loop 1 is selected by the set value (SP group selection).

Configure the settings as shown below in the priority bank (Pr1or) setup.
When the priority setup is set at "Set value priority," the SP group selection function operates according to the set value of the SP group selection.

Display item	Auxiliary display	Item name	Setting
LPr.01	1.	(Loop 1) SP group selection	0: Set value priority

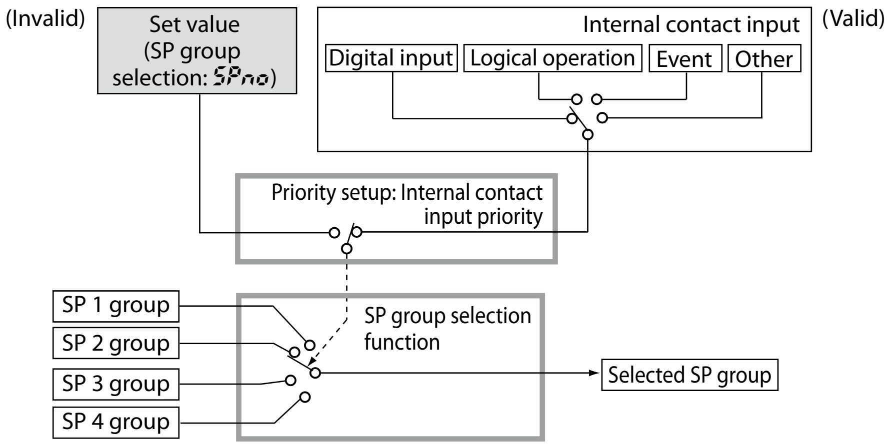


The SP group selection with the digital input is set for the internal contact input as shown in the Figure above. However, since the priority setup is set at "Set value priority," the SP group selection does not operate even though the digital input is operated.

● SP group of control loop 1 is selected by the internal contact input (digital input).

Configure the settings as shown below in the priority bank (PrIor) setup.

Display item	Auxiliary display	Item name	Setting
LPr.01	1.	SP group selection	1: Internal contact input priority

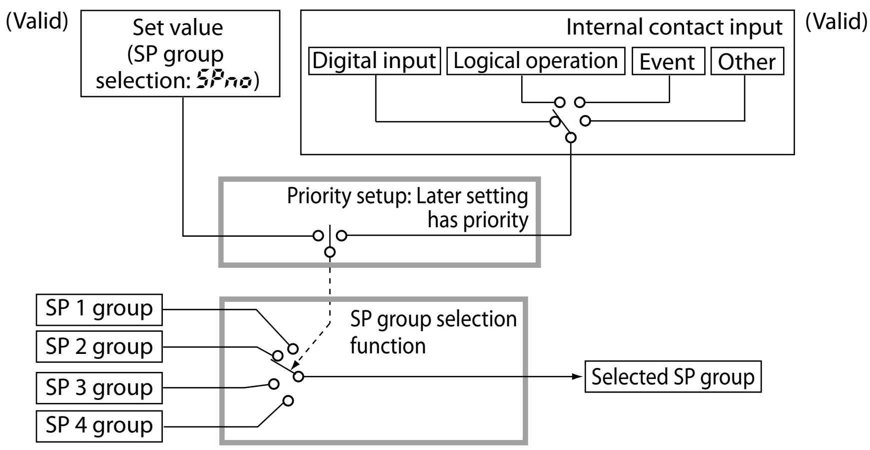


Since the priority setup is set at "Internal contact input priority," the SP group selection operates by the internal contact input.
When the SP group selection with the digital input is set for the internal contact input as shown in the Figure above, the SP group selection function operates by the digital input.
Since the priority setup is set at "Internal contact input priority," the SP group selection does not operate even though the set value of the SP group selection is changed.
If the SP group selection is not set for the internal contact input when the priority setup is set at "Internal contact input priority," this status is the same as that the input is OFF. One SP group is always selected.

● SP group of control loop 1 is selected by "Later setting has priority."

Configure the settings as shown below in the priority bank (PrIor) setup.

Display item	Auxiliary display	Item name	Setting
LPr.01	1.	SP group selection	2: Later setting has priority



Because the priority setting is set to “Later setting has priority,” the SP group specified by “SPno: SP group selection ” or the SP group specified by internal contact input, whichever is specified later, is valid. For “SPno: SP group selection,” the selected SP group is set when the [enter] key is pressed. For internal contact input, the SP is selected when the status of the contacts changes.

■Functions whose priority can be set for each control loop

Display item	Item name	Setting
LPr.01	SP group selection	0: Setting priority 1: Internal contact input priority 2: Later setting has priority
LPr.02	PID group selection	0: Setting priority 1: Internal contact input priority 2: Zone PID function priority
LPr.03	RUN/READY mode selection	0: Setting priority 1: Internal contact input priority 2: Later setting has priority
LPr.04	AUTO/MANUAL mode selection	0: Setting priority 1: Internal contact input priority 2: Later setting has priority
LPr.05	LSP/RSP mode selection	0: Setting priority 1: Internal contact input priority 2: Later setting has priority
LPr.06	Backup/through output selection	0: Setting priority 1: Internal contact input priority 2: Later setting has priority

■Functions whose priority can be set regardless of control loop

Display item	Item name	Setting
Pr.01	Release all latches	0: Setting priority 1: Internal contact input priority
Pr.02	Linearization table group for OUT	0: Setting priority 1: Internal contact input priority
Pr.03	Switching the operation display	0: [display] key 1: Set value + [display] key 2: Internal contact input + [display] key
Pr.04	Linearization table group for position proportional control	0: Setting priority 1: Internal contact input priority

6-3 How to Use Events

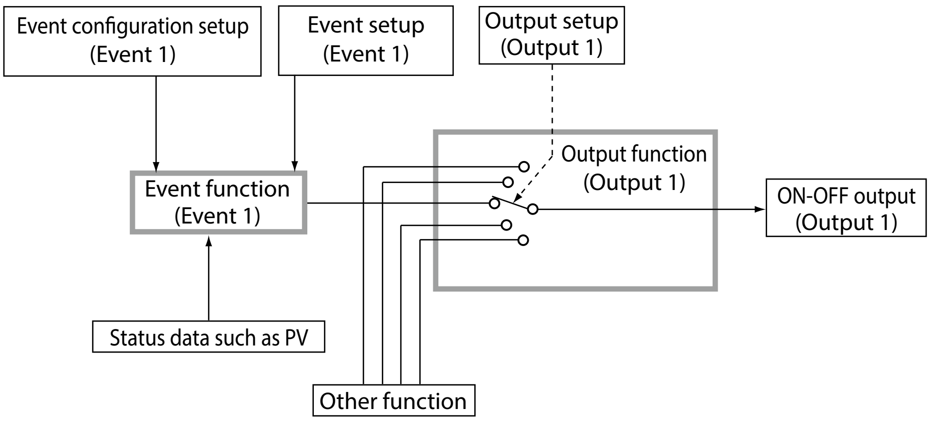
The ON/OFF status of the event is determined according to the conditions for each operation type.
The ON/OFF of the event can be output to the ON/OFF output terminal or digital output terminal.
Additionally, the ON/OFF status of the event can be used as input of the internal contact input function.

■Setting banks

Event configuration bank (EvCnF)
Event setup bank (Ev)
Output bank (oUt)

■Example: PV high limit alarm (on if an error occurs.)

The following describes an example that the relay of the output 1 is turned ON if the PV of loop 1 exceeds 800 °C. In this example, the event function and output function are used.



(1) Set the event configuration of event 1.
Configure the settings as shown below in the event configuration bank (EvCnF) setup.

Display item	Auxiliary display	Item name	Settings
EP-01	01.	Operation type	1: PV high limit
EP-02	01.	Loop/Channel definition	1
EP-03	01.	Polarity	0: Direct
EP-04	01.	Standby	0: No standby
EP-05	01.	Operation at READY	0: Continue
EP-06	01.	Decimal point position	0: No decimal point
EP-07	01.	Hysteresis	5
EP-08	01.	ON delay	0.0 (Unit: s)
EP-09	01.	OFF delay	0.0 (Unit: s)

(2) Set the event action point of event 1.
Configure the settings as shown below in the event setup bank (Ev) setup.

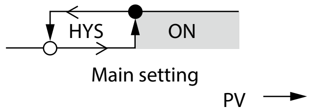
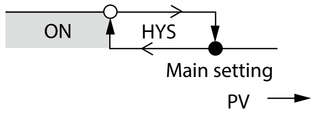
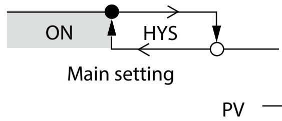
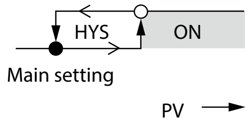
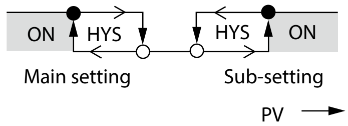
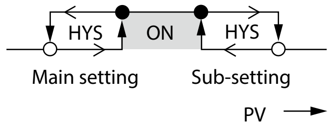
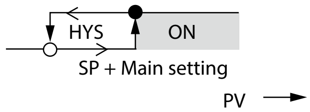
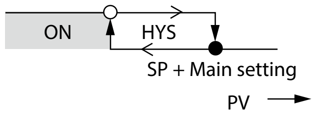
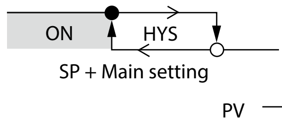
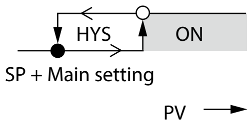
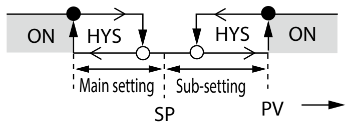
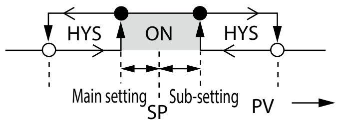
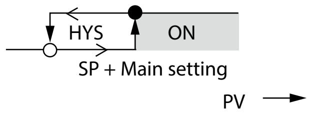
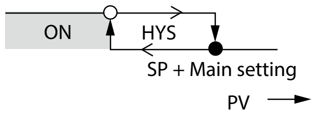
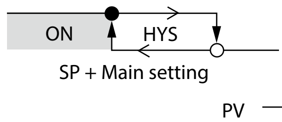
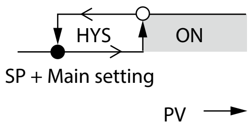
Display item	Auxiliary display	Item name	Settings
E01	No display	Event 1 main setting	800
E01.Sb	No display	Event 1 sub-setting	(setting is disabled.)

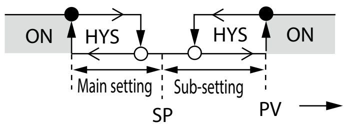
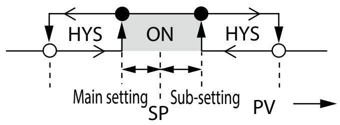
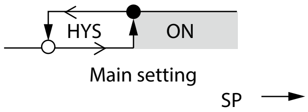
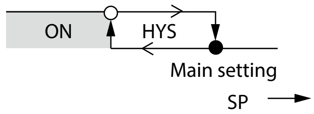
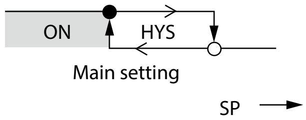
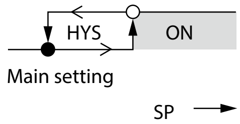
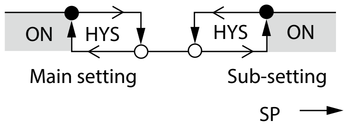
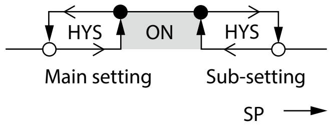
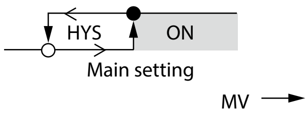
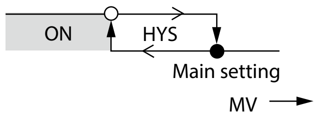
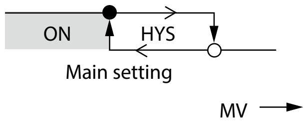
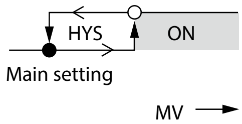
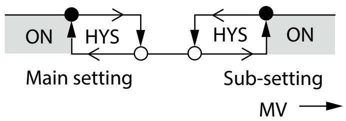
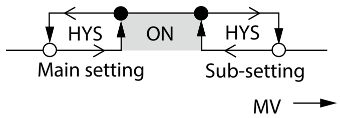
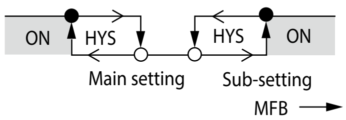
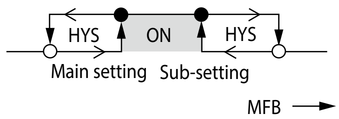
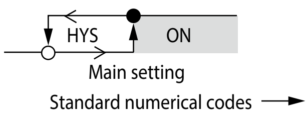
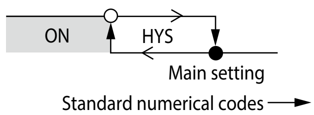
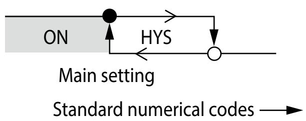
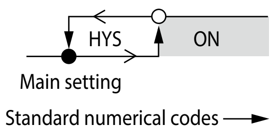
(3) Configure the settings so that the ON/OFF status of event 1 is output from output 1.
Configure the settings as shown below in the output bank (oUt) setup.

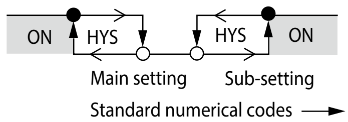
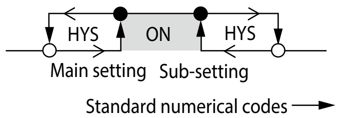
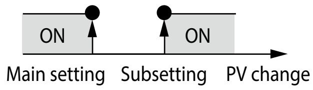
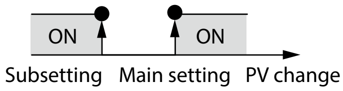
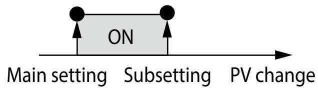
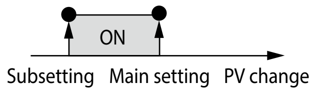
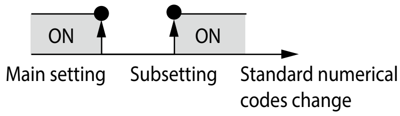
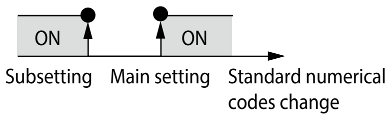
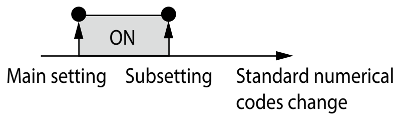
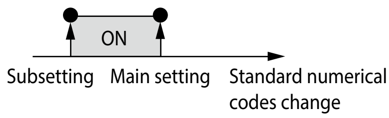
Display item	Auxiliary display	Item name	Settings
tPo.01	01.	Output type	1088: Event 1
tPo.02	01.	Latch	0: No latch
tPo.03	01.	Time proportional operation type	(setting is disabled.)
tPo.04	01.	Min. ON/OFF time	250 (ms)
tPo.05	01.	Time proportioning cycle time	(setting is disabled.)
tPo.06	01.	Linearization table group definition	(setting is disabled.)

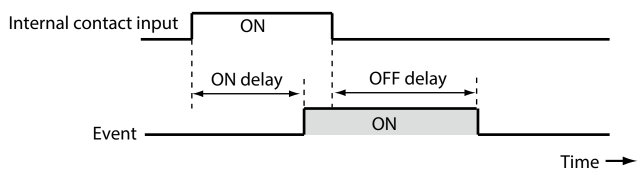
■ Event operation type, polarity, hysteresis, main setting, and sub-setting

According to the operation type, polarity, main setting, sub-setting, hysteresis, and other settings, the operation of the event becomes as follows:

Operation type	Set value of operation type	Direct action ●shows that the ON/OFF is changed at this value. ○shows that the ON/OFF is changed at a point that "1U" is added to this value.	Reverse action ●shows that the ON/OFF is changed at this value. ○shows that the ON/OFF is changed at a point that "1U" is added to this value.
No event	0	Always OFF	Always OFF
PV high limit	1		
PV low limit	2		
PV high/low limit	3		
Deviation high limit	4		
Deviation low limit	5		
Deviation high/ low limit	6		
Deviation high limit (Final SP reference)	7	 Same as the direct action of the deviation high limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.	 Same as the reverse action of the deviation high limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.
Deviation low limit (Final SP reference)	8	 Same as the direct action of the deviation low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.	 Same as the reverse action of the deviation low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.

Operation type	Set value of operation type	Direct action ●shows that the ON/OFF is changed at this value. ○shows that the ON/OFF is changed at a point that "1U" is added to this value.	Reverse action ●shows that the ON/OFF is changed at this value. ○shows that the ON/OFF is changed at a point that "1U" is added to this value.
Deviation high/ low limit (Final SP reference)	9	 Same as the direct action of the deviation high/low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.	 Same as the reverse action of the deviation high/low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.
SP high limit	10		
SP low limit	11		
SP high/low limit	12		
MV high limit	13		
MV low limit	14		
MV high/low limit	15		
MFB high/low limit	16		
Upper limit for standard numerical codes	26		
Lower limit for standard numerical codes	27		

Operation type	Set value of operation type	Direct action ●shows that the ON/OFF is changed at this value. ○shows that the ON/OFF is changed at a point that "1U" is added to this value.	Reverse action ●shows that the ON/OFF is changed at this value. ○shows that the ON/OFF is changed at a point that "1U" is added to this value.
Upper/lower limit for standard numerical codes	28		
PV change rate	29	Operates according to the magnitude of the PV change. Value change = Current value - Previous value  or  Always ON if event main setting = event subsetting.	Operates according to the magnitude of the PV change. Value change = Current value - Previous value  or  Always OFF if event main setting = event subsetting
Standard numerical codes change rate	30	Operates according to the magnitude of the Standard numerical codes. Value change = Current value - Previous value  or  Always ON if event main setting = event subsetting. Standby function is not available. The event status in READY mode is always "0: Continued."	Operates according to the magnitude of the Standardnumerical codes. Value change = Current value - Previous value  or  Always OFF if event main setting = event subsetting. Standby function is not available. The event status in READY mode is always "0: Continued."
Alarm (status)	61	ON if alarm occurs (alarm code AL01 to 99). OFF in other cases.	OFF if alarm occurs (alarm code AL01 to 99). ON in other cases.
READY (status)	62	ON in the READY mode. OFF in the RUN mode.	OFF in the READY mode. ON in the RUN mode.
MANUAL (status)	63	ON in the MANUAL mode. OFF in the AUTO mode.	OFF in the MANUAL mode. ON in the AUTO mode.
RSP (status)	64	ON in the RSP mode. OFF in the LSP mode.	OFF in the RSP mode. ON in the LSP mode.
During AT (Status)	65	ON when AT is executed. OFF when AT is stopped.	OFF when AT is executed. ON when AT is stopped.
During SP ramp	66	ON during SP ramp. OFF when SP ramp is not performed or is completed.	OFF during SP ramp. ON when SP ramp is not performed or is completed.

<table>
<tr><th>Operation type</th><th>Set value of operation type</th><th>Direct action</th><th>Reverse action</th></tr>
<tr><td>Control action (status)</td><td>67</td><td>ON during direct action (cooling).
OFF during reverse action (heating).</td><td>OFF during direct action (cooling).
ON during reverse action (heating).</td></tr>
<tr><td>Through output (status)</td><td>68</td><td>ON in the through output mode of the computer backup.
OFF in the backup mode.</td><td>OFF in the through output mode of the computer backup.
ON in the backup mode.</td></tr>
<tr><td>Timer (status)</td><td>70</td><td colspan="2">The direct and reverse action settings are disabled for the timer event.
To use the timer event, it is necessary to set the operation type of the internal contact input to "Timer Stop/Start".
Additionally, multiple timer events can be controlled from individual internal contact input by setting an event No. in the loop/channel definition of the internal contact input.
● Setting items
• ON delay time: A period of time necessary for the event change from OFF to ON after the internal contact input has been changed from OFF to ON.
• OFF delay time: A period of time necessary for the event change from ON to OFF after the internal contact input has been changed from ON to OFF.
● Operation specifications
• The event is turned ON when the internal contact input ON continues for ON delay time or longer.
• The event is turned OFF when the internal contact input OFF continues for OFF delay time.
• In other cases, the current status is continued.


● CAUTION
The default settings of the ON delay and OFF delay before shipment are 0.0s.
The default setting of the loop/channel definition of the internal contact input is "0". In this case, all timer events can be stopped or started through one internal contact input.
Additionally, when a value exceeding "1" is set for the loop/channel definition, one specified timer event can be stopped or started through one internal contact input.</td></tr>
</table>

Loop/Channel definition

Setting differs depending on the operation type.

Loop/Channel definition	Operation type No.	Operation at READY*1	Standby*2
Loop 1 or 2 for the operation type	1 to 15	○	○
	62 to 68	○	×
Loop 1 or 2 for use of standby or operation at READY	16	○	○
	61, 70	○	×
Standard numerical code (2304 to 2720)	26 to 28	×	×

*1 ○: Choice of continuation/forced OFF is available. ×: Always continues

*2 ○: Choice of standby/no standby is available. ×: No standby

Event standby and operation at READY

"Standby" is a function that does not turn ON the event even though the event currently used satisfies the ON conditions when this unit is turned ON or when READY mode is changed to RUN mode.

The event is turned ON when the ON conditions are satisfied again once the OFF conditions have been satisfied. (The OFF conditions do not include the hysteresis range.)

"Standby + Standby at SP change" means that the standby is set again when the SP is changed (SP value and SP group number) in addition to the standby functions. However, when the same SP value is written or when the SP value is not changed even though the SP group number is changed, the unit does not enter standby mode.

	READY		READY→RUN change	
Standby setup \ EVENT state at READY setup	0: Continued	1: Forced OFF	0: Continued	1: Forced OFF
0: None	Usual operation	OFF	Usual operation	Usual operation
1: Standby	OFF	OFF	OFF (standby state)	OFF (standby state)
2: Standby + Standby at SP change	OFF	OFF	OFF (standby state)	OFF (standby state)

Event decimal point

The decimal point position of the main setting and sub-setting of the event setup bank (action point) and the hysteresis setting of the event configuration bank can be changed.

ON delay and OFF delay

ON delay is a function that delays the timing, at which the event status is changed from OFF to ON. OFF delay is a function that delays the timing, at which the event status is changed from ON to OFF. However, the operation with the operation type set at timer event is performed as described on the previous page.

6 - 4 How to Use Internal Contact Input (digital input)

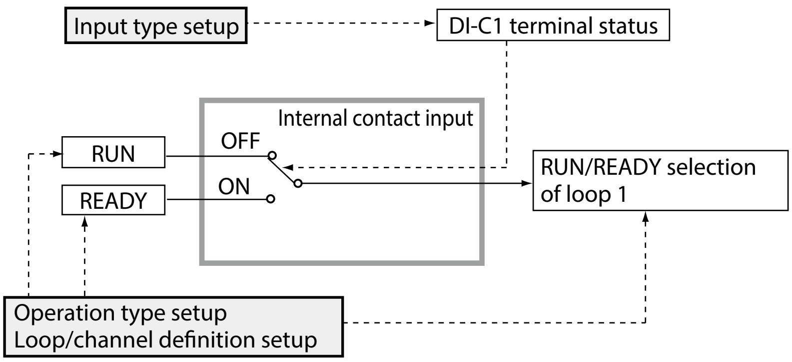
The internal contact input (digital input) can take in the ON/OFF data, which is specified in the input type, as internal contact input inside the instrument.
The change-over operation specified in the operation type can be performed with the ON/OFF data in the specified input type.

■Setting banks

Priority bank (PrIor)
Internal contact input bank (IC)

■Example 1: RUN/READY change-over by internal contact input

The following describes an example that the RUN/READY of the loop 1 is changed to READY when the DI-C1 terminal status is ON and it is changed to RUN when the DI-C1 terminal status is OFF.



(1) Set the priority to the internal contact input priority.
Configure the settings as shown below in the priority bank (PrIor) setup.

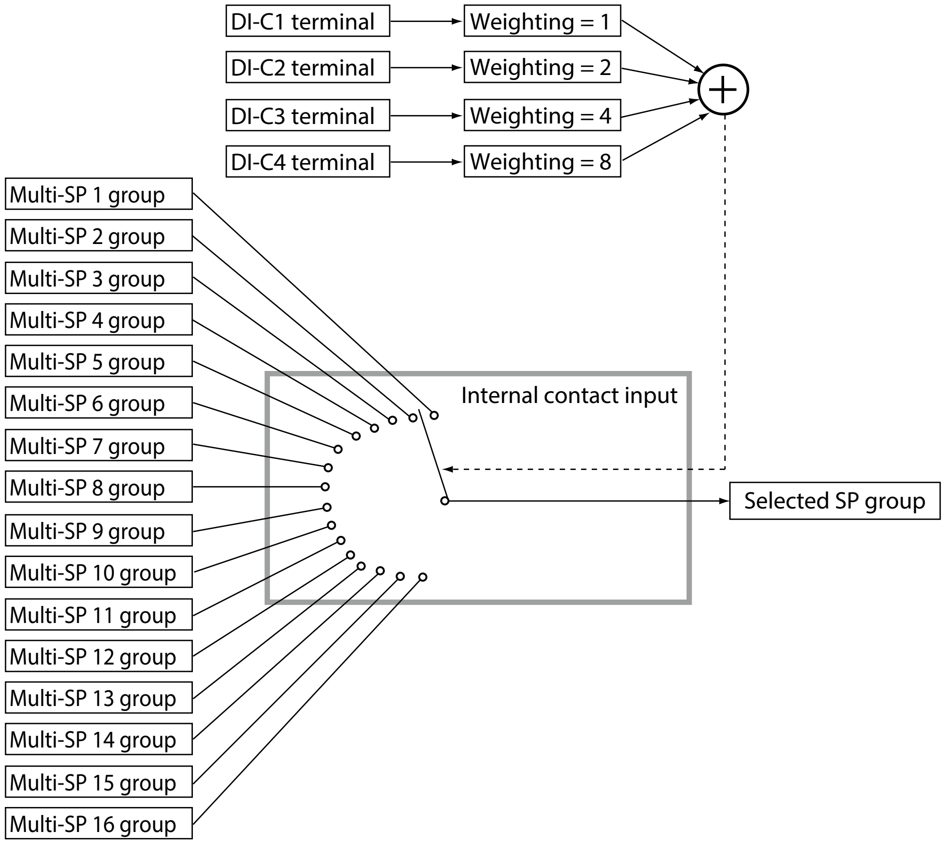
Display item	Auxiliary display	Item name	Setting
LPr.03	1.	RUN/READY mode selection	1: Internal contact input priority

(2) Set RUN/READY to the internal contact 1.
Configure the settings as shown below in the internal contact input bank (IC) setup.

Display item	Auxiliary display	Item name	Settings
IC-01	01.	Operation type	21: RUN/READY
IC-02	01.	Input type	1152: DI-C1 terminal status
IC-03	01.	Loop/channel definition	1: Loop 1
IC-04	01.	Weighting	(setting is invalid.)

■Example 2: SP group selection by internal contact input

The following describes an example that the selection of multi-SP1 group to multi-SP 16 group in the loop 1 is made enabled using the DI-C1 to DI-C4 terminals.



DI-C1	OFF	ON	OFF	ON	• • • •	OFF	ON	OFF	ON
DI-C2	OFF	OFF	ON	ON	• • • •	OFF	OFF	ON	ON
DI-C3	OFF	OFF	OFF	OFF	• • • •	ON	ON	ON	ON
DI-C2	OFF	OFF	OFF	OFF	• • • •	ON	ON	ON	ON
Sum of the weighting values	0	1	2	3	• • • •	12	13	14	15
Selected SP group	SP1	SP2	SP3	SP4	• • • •	SP13	SP14	SP15	SP16

(1) Set the priority to the internal contact input priority.
Configure the settings as shown below in the priority bank (Prior) setup.

Display item	Auxiliary display	Item name	Settings
LPr.01	No display	SP group selection	1: Internal contact input priority

(2) Set the SP system group.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Settings
C-011	1.	SP system group	16

(3) Set the SP group selection for four groups of internal contact inputs.
In the internal contact input bank (IC), set four groups of internal contact inputs as described below.

Display item	Auxiliary display	Item name	Settings
IC-01	01.	Operation type	1: SP group selection
IC-02	01.	Input type	1152: DI-C1 terminal status
IC-03	01.	Loop/channel definition	1
IC-04	01.	Weighting	1
IC-01	02.	Operation type	1: SP group selection
IC-02	02.	Input type	1153: DI-C2 terminal status
IC-03	02.	Loop/channel definition	1
IC-04	02.	Weighting	2
IC-01	03.	Operation type	1: SP group selection
IC-02	03.	Input type	1154: DI-C3 terminal status
IC-03	03.	Loop/channel definition	1
IC-04	03.	Weighting	4
IC-01	04.	Operation type	1: SP group selection
IC-02	04.	Input type	1155: DI-C4 terminal status
IC-03	04.	Loop/channel definition	1
IC-04	04.	Weighting	8

■Operation type (IC-01)

Select operations, which are to be changed over by internal contact input, from the following table, "Operation Type Settings" and then set them properly.

Set value and meaning of operation type	Set value and meaning of loop/channel definition
0: No function	0 to 127: Invalid
1: SP group selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
2: PID group selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
3: Fixed value output selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
4: Multi-ratio selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
5: Linearization use group selection (For output)	0: Invalid, 1 to 7: Output No., 8 to 127: Invalid
6: Linearization use group selection (For position proportional control)	0 to 127: Invalid
21: RUN/READY mode selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
22: AUTO/MANUAL mode selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
23: LSP/RSP mode selection	0: All loops, 1: Loop 1, 2: Loop 2 (slave side of internal cascade function), 3 to 127: Invalid
24: AT start/stop selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
25: Backup/through output selection	0: All loops, 1: Invalid, 2: Loop 2, 3 to 127: Invalid
41: Control operation polarity selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
42: SP RAMP enabled/disabled	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
43: Operation display switching	0 to 127: Invalid
46: Timer stop/start selection	0: All timer events, 1 to 16: Event No. of timer event, 17 to 127: Invalid
47: Release all latches	0 to 127: Invalid

■Input type (IC-02)

Use to specify the ON/OFF data that the data internal contact input uses as input. This ON/OFF data shows various kinds of instrument statuses and it is called "standard bit".

For details about standard bit numeric values, refer to:

■ Standard bit codes (P. App.-16).

■Loop/channel definition (IC-03)

Use to specify a loop or channel is specified that becomes a target operated by the internal contact input. The meaning of the loop/channel definition may vary depending on the operation type.

For details, refer to:

Operation Type Settings (P. 6-14).

■Weighting (IC-04)

Use to select a group or number in a specific operation type, such as SP group selection, PID group selection, fixed value output selection, multi-ratio selection, selection of Linearization table use group (for OUT) or operation display switching. When the input is OFF, the value becomes "0". When the input is ON, the value becomes the set value.

When the operation type and loop/channel definition use the same internal contact input, a selection is determined by the sum of weighting values as shown in the table below.

Sum of weights Operation type	0	1 or more
SP group selection	1 group	Group with "1" added to the sum of weighting values is selected.
PID group selection	1 group	Group with "1" added to the sum of weighting values is selected.
Fixed value output selection	Fixed value output is not used. (This value becomes the MV of the PID control.)	Fixed value output with a number equivalent to the sum of weighting values.
Multi-ratio selection	Multi-ratio is not used. (Ratio = 1.000)	Multi-ratio with a number equivalent to the sum of weighting values.
Linearization use group selection	Approximation by linearization table is not used.	Linearization group with the sum of weighting values
Operation display switching	Operation display cannot be switched.	Screen No. of the sum of the weighting values. Operation display does not change if a nonexistent screen No. is specified.

6 - 5 How to Use Digital Output

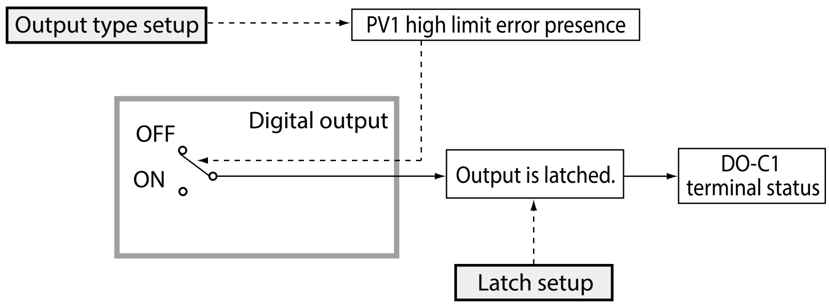
The digital output (DO) can output the ON/OFF data specified by the output type.
Additionally, the ON or OFF status of the digital output can be latched.

■Setting banks

PV bank (Pu)
Digital output bank (do)

■Example: DO turns ON if PV1 high limit error occurs

The following describes an example that the high limit error is given if the PV1 exceeds 1000.0 °C or more, the PV1 high limit error alarm is output from the terminal DO-C1, and this ON status is latched.



(1) Set the high limit error of the PV1 input.
Configure the settings as shown below in the PV bank (Pu) setup.
Set the high limit of the PV1 using Pu-05.

Display item	Auxiliary display	Item name	Settings
Pu-01	1.	Range type	1: K thermocouple
Pu-02	1.	Decimal point position	1: One digit after the decimal point
Pu-03	1.	Temperature unit	0: Centigrade (°C)
Pu-04	1.	Range low limit	0.0
Pu-05	1.	Range high limit	1000.0
Pu-06	1.	Cold junction compensation	0: Compensated inside instrument.
Pu-09	1.	Linear scaling low limit	(setting is disabled.)
Pu-10	1.	Linear scaling high limit	(setting is disabled.)
Pu-11	1.	PV square root extraction dropout	(setting is disabled.)
Pu-12	1.	Filter	0.00
Pu-13	1.	Bias	0.0
Pu-14	1.	Ratio	1.000
Pu-15	1.	Thermocouple/mV-input burnout	0: Upscale at burnout
Pu-20	1.	Linearization table group definition	0: Not used.

(2) Set the operation of the DO-C1 terminal.
Configure the settings as shown below using the C-column terminal in the digital output bank (do).

Display item	Auxiliary display	Item name	Settings
do.C.01	1.	Output type	1824: PV input high limit error (PV1)
do.C.02	1.	Latch	1: Latched at ON.

■ Output type (do.C.01)

Use to specify the ON/OFF data to be output from the digital output. This ON/OFF data shows various kinds of instrument statuses and it is called "standard bit".
The standard bit Nos. are set as output type.

Note

- For details about standard bit Nos., refer to:

☞ ■ Standard bit codes (P. App.-16).

■ Latch (do.C.02)

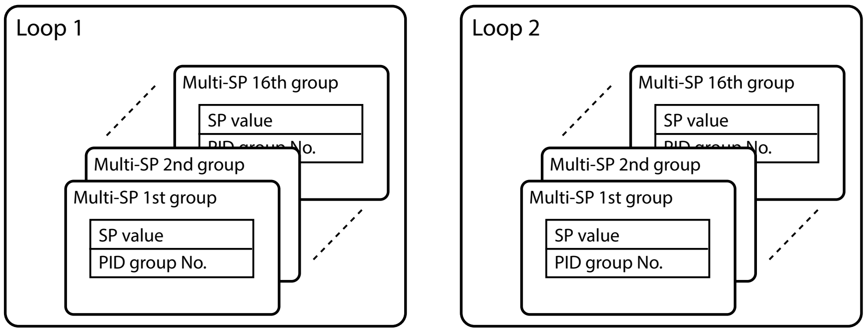
Use to specify the latch operation of the digital output from the following selections:
0: Not latched.
1: Latched at ON.
2: Latched at OFF. (Except for OFF when the power is turned ON.)

To release the latch, the following methods are provided.

- Set the setup item "Release all latches" in the setup bank (C-003) to " 1 " (release latch).
- Change the latch setting (do.C.02) in the digital output bank to " 0 " (not latched).
- Turn OFF the power to this unit, and then turn it ON again.

6-6 How to Use the Multi-SP

The multi-SP can be set by combining LSP value and PID group definition on an SP group basis.
Up to 16 SP groups per loop are provided. You can select one group from these groups and use it for control.



■Setting banks

Setup bank (SEtUP)
Loop 1 multi-SP bank (L1.LSP)
Loop 2 multi-SP bank (L2.LSP)
Loop 1 PID bank (L1.PId)
Loop 2 PID bank (L2.PId)
Priority bank (Prior)
SP group selection bank (SPno)

■Features

PID constant group separated from the SP group is provided. When selecting an SP group, the constants of the PID group corresponding to the PID group definition set in the SP group are used for the control. When using PID constants common to multiple SP groups, you can configure the settings so that the same PID group can be specified.
Additionally, even though the selection of the SP group is changed, the action point set value of the event does not change.

■Example: Multi-SP is used with two LSP groups.

The following describes an example that two LSP groups and PID constants of two groups are used with two SP groups in the loop 1:

(1) Set the SP to two groups using the multi-SP.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Settings
C-010	No display	Recipe enabled	0: Multi-SP
C-011	No display	SP system group	2

(2) Set data for the SP group.
Configure the settings as shown below in the loop 1 multi-SP bank (L1.LSP) setup.

Display item	Auxiliary display	Item name	Settings
LSP.01	L.1.	(SP 1 group) LSP	100.0
PId.01	L.1.	(SP 1 group) PID group definition (For LSP)	1
LSP.02	L.1.	(SP 2 group) LSP	200.0
PId.02	L.1.	(SP 2 group) PID group definition (For LSP)	2

(3) Set data for the PID group.
Configure the settings as shown below in the loop 1 PID bank (L1.PId) setup.

Display item	Auxiliary display	Item name	Settings
P-01	L.1.	(Loop 1 PID 1 group) Proportional band	5.0
I-01	L.1.	(Loop 1 PID 1 group) Integration time	120
d-01	L.1.	(Loop 1 PID 1 group) Derivative time	30
oL-01	L.1.	(Loop 1 PID 1 group) MV low limit	0.0
oH-01	L.1.	(Loop 1 PID 1 group) MV high limit	100.0
(Omission)			
P-02	L.1.	(Loop 1 PID 2 group) Proportional band	5.0
I-02	L.1.	(Loop 1 PID 2 group) Integration time	100
d-02	L.1.	(Loop 1 PID 2 group) Derivative time	25
oL-02	L.1.	(Loop 1 PID 2 group) MV low limit	0.0
oH-02	L.1.	(Loop 1 PID 2 group) MV high limit	100.0
(Others omitted.)			

(4) Set the priority of the SP group selection.
Configure the settings as shown below in the priority bank (Prior) setup.

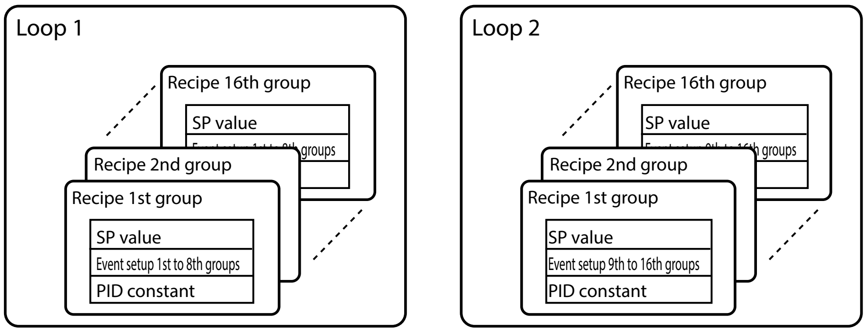
Display item	Auxiliary display	Item name	Settings
LPr.01	L.1.	(Loop 1) SP group selection	0: Set value priority

(5) Select an SP group.
Select an SP group in the SP group selection bank (SPno).
To select the SP 2 group, configure the setting as described in the table below.

Display item	Auxiliary display	Item name	Settings
SPno	L.1.	(Loop 1) SP group selection	2: Select the SP 2 group.

6 - 7   How to Use Recipes

The recipe can be set by combining LSP value and event action point set value on an SP group basis. Up to 16 SP groups per loop are provided. You can select one group from these groups and use it for control.



■Setting banks

Setup bank (SEtUP)
Event configuration bank (EvCnF)
Loop 1 recipe bank (L1.rEC)
Loop 2 recipe bank (L2.rEC)
Priority bank (PrLor)
SP group selection bank (SPno)

■Features

When selecting an SP group, the operation is performed using the event action point set values and PID constants set in this SP group. Even though the event action point set values or PID constants of a certain SP group are changed, this does not affect other SP groups.
In the SP group of the loop 1, there are action point set values of event 1 to event 8.
In the SP group of the loop 2, there are action point set values of event 9 to event 16.

■Example: Recipe of the LSP 2 group is used.

The following describes an example that two LSP groups, the event action point set values of two groups, and PID constants of two groups are used with two SP groups in the loop 1.
Event 1 is set to the PV high/low limit event of the loop 1, and event 2 to event 8 are set to "no event."

(1) Set the SP to two groups using the recipe.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Settings
C-010	No display	Recipe enabled	1: Recipe
C-011	No display	SP system group	2

(2) Set the event 1 to the PV high/low limit event.
Configure the settings as shown below in the event configuration bank (EvCnF) setup.

Display item	Auxiliary display	Item name	Settings
EP-01	01.	(Event 1) Operation type	3: PV high/low limit
EP-02	01.	(Event 1) Loop/Channel definition	1
EP-03	01.	(Event 1) Polarity	0: Direct
EP-04	01.	(Event 1) Standby	0: No standby
EP-05	01.	(Event 1) Operation at READY	0: Continue
EP-06	01.	(Event 1) Decimal point position	1: One digit below the decimal point
EP-07	01.	(Event 1) Hysteresis	5.0
EP-08	01.	(Event 1) ON delay	0.0
EP-09	01.	(Event 1) OFF delay	0.0
EP-01	02.	(Event 2) Operation type	0: No event
(Omission)			
EP-01	03.	(Event 3) Operation type	0: No event
(Omission)			
EP-01	04.	(Event 4) Operation type	0: No event
(Omission)			
EP-01	05.	(Event 5) Operation type	0: No event
(Omission)			
EP-01	06.	(Event 6) Operation type	0: No event
(Omission)			
EP-01	07.	(Event 7) Operation type	0: No event
(Omission)			
EP-01	08.	(Event 8) Operation type	0: No event
(Followings are omitted.)			

(3) Set data for the SP group.
Configure the settings as shown below in the loop 1 recipe bank (L1.rEC) setup.

Display item	Auxiliary display	Item name	Settings
SP	1.01.	(Loop 1 SP 1 group) LSP	100.0
E01	1.01.	(Loop 1 SP 1 group) Event 1 main setting	120.0
E01.Sb	1.01.	(Loop 1 SP 1 group) Event 1 sub-setting	80.0
E02	1.01.	(Loop 1 SP 1 group) Event 2 main setting	(setting is disabled.)
E02.Sb	1.01.	(Loop 1 SP 1 group) Event 2 sub-setting	(setting is disabled.)
E03	1.01.	(Loop 1 SP 1 group) Event 3 main setting	(setting is disabled.)
E03.Sb	1.01.	(Loop 1 SP 1 group) Event 3 sub-setting	(setting is disabled.)
E04	1.01.	(Loop 1 SP 1 group) Event 4 main setting	(setting is disabled.)
E04.Sb	1.01.	(Loop 1 SP 1 group) Event 4 sub-setting	(setting is disabled.)
E05	1.01.	(Loop 1 SP 1 group) Event 5 main setting	(setting is disabled.)
E05.Sb	1.01.	(Loop 1 SP 1 group) Event 5 sub-setting	(setting is disabled.)
E06	1.01.	(Loop 1 SP 1 group) Event 6 main setting	(setting is disabled.)
E06.Sb	1.01.	(Loop 1 SP 1 group) Event 6 sub-setting	(setting is disabled.)

Display item	Auxiliary display	Item name	Settings
E07	1.01.	(Loop 1 SP 1 group) Event 7 main setting	(setting is disabled.)
E07.Sb	1.01.	(Loop 1 SP 1 group) Event 7 sub-setting	(setting is disabled.)
E08	1.01.	(Loop 1 SP 1 group) Event 8 main setting	(setting is disabled.)
E08.Sb	1.01.	(Loop 1 SP 1 group) Event 8 sub-setting	(setting is disabled.)
P	1.01.	(Loop 1 SP 1 group) Proportional band	5.0
I	1.01.	(Loop 1 SP 1 group) Integration time	120
d	1.01.	(Loop 1 SP 1 group) Derivative time	30
oL	1.01.	(Loop 1 SP 1 group) MV low limit	0.0
oH	1.01.	(Loop 1 SP 1 group) MV high limit	100.0
rE	1.01.	(Loop 1 SP 1 group) Manual reset	50.0
P-C	1.01.	(Loop 1 SP 1 group) Proportional band (cool)	5.0
I-C	1.01.	(Loop 1 SP 1 group) Integration time (cool)	120
d-C	1.01.	(Loop 1 SP 1 group) Derivative time (cool)	30
oL.C	1.01.	(Loop 1 SP 1 group) MV low limit (cool)	0.0
oH.C	1.01.	(Loop 1 SP 1 group) MV high limit (cool)	100.0
oI	1.01.	(Loop 1 SP 1 group) Initial output of PID control	0.0
SP	1.02.	(Loop 1 SP 2 group) LSP	200.0
E01	1.02.	(Loop 1 SP 2 group) Event 1 main setting	220.0
E01.Sb	1.02.	(Loop 1 SP 2 group) Event 1 sub-setting	180.0
(Omission)			
P	1.02.	(Loop 1 SP 2 group) Proportional band	5.0
I	1.02.	(Loop 1 SP 2 group) Integration time	120
d	1.02.	(Loop 1 SP 2 group) Derivative time	30
oL	1.02.	(Loop 1 SP 2 group) MV low limit	0.0
oH	1.02.	(Loop 1 SP 2 group) MV high limit	100.0
rE	1.02.	(Loop 1 SP 2 group) Manual reset	50.0
P-C	1.02.	(Loop 1 SP 2 group) Proportional band (cool)	5.0
I-C	1.02.	(Loop 1 SP 2 group) Integration time (cool)	100
d-C	1.02.	(Loop 1 SP 2 group) Derivative time (cool)	25
oL.C	1.02.	(Loop 1 SP 2 group) MV low limit (cool)	0.0
oH.C	1.02.	(Loop 1 SP 2 group) MV high limit (cool)	100.0
oI	1.02.	(Loop 1 SP 2 group) Initial output of PID control	0.0

(4) Set the priority of the SP group selection.
Configure the settings as shown below in the priority bank (PrIor) setup.

Display item	Auxiliary display	Item name	Setting
LPr.01	L.1.	(Loop 1) SP group selection	0: Set value priority

(5) Select an SP group.
Select an SP group in the SP group selection bank (SPno).
To select the SP 2 group, configure the setting as described in the table below.

Display item	Auxiliary display	Item name	Setting
SPno	L.1.	(Loop 1) SP group selection	2: Select the SP 2 group

When the SP group selection is changed, the SP value, event action point set value, and PID constant used for the control changes according to the SP group setup.

6-8 Current Transformer (CT) Input

On CT input models, current to the heater can be measured by CT input.
Channels 1 and 2 (CH1, CH2) are available for CT input.
There are 3 types of current measurement, as follows. Select the appropriate detection mode.
(1) Measured current output ON when SDC output is ON/OFF
(2) Measured current output OFF when SDC output is ON/OFF
(3) Measured current output unrelated to SDC output ON/OFF
Use (1) for detection of heater line break or overcurrent.
Use (2) for detection of heater short circuit (actuator short circuit).
Use (3) for constant current measurement. The measured value is conveniently shown as output ON current.

- Methods (1) and (2) of current detection can be used if CT operation (Ct-01) is set to any value from 1 to 5.
- If CT operation is set to 0, current detection method (3) is available.

■Bank and settings

The auxiliary display shows CT input No. (1: CT input 1. 2: CT input 2)

Bank	Item display	Item name	Settings
Ct (CT input bank)	Ct-01	CT operation	0: Current measurement 1: OUT1 heater line break detection 2: OUT2 heater line break detection 3: OUT3 heater line break detection 4: OUT4 heater line break detection 5: OUT5 heater line break detection
	Ct-02	Waiting time for CT measurement	30 to 300ms
	Ct-03	The number of CT turns	100 to 4000
	Ct-04	The number of CT power line passes	1 to 6
	Ct-05	Amount of current indicating disconnected heater	0.0 to 350.0A
	Ct-06	Amount of current indicating overcurrent	0.0 to 350.0A
	Ct-07	Amount of current indicating short circuit	0.0 to 350.0A
	Ct-08	Hysteresis	0.0 to 350.0A
	Ct-09	Delay time	0.0 to 3200.0s
	Ct-10	Condition for restoring the status before measurement	1024 to 2047 (standard bit codes)

■CT operation (Ct-01)

CT inputs 1 and 2 can be independently set.

- Models with 2 CT inputs (selected by option field in the model No.) can display and set this function.
- If set to 0 (current measurement), whenever the SDC output is ON the value for measured current will be updated, and whenever the SDC output is OFF the value for measured current will be fixed at 0.0 amps.

■Waiting time for CT measurement (Ct-02)

If the CT operation is set to detect a heater line break, the time from the change in output ON/OFF until the start of current measurement can be set.

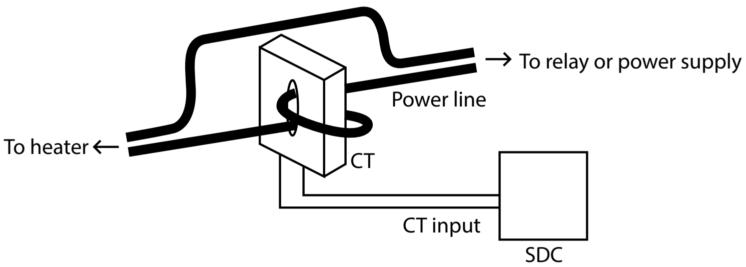
- Models with 2 CT inputs (selected by option field in the model No.) can display and set this function if the CT operation is set to detect a heater line break.
- Following a change in output ON/OFF, and after the waiting time for CT measurement, current measurement starts. It ends 100 ms later.

■The number of CT turns/ power line passes (Ct-03, Ct-04)

These functions can be set independently for the CTs connected to CT inputs 1 and 2.

- Models with 2 CT inputs (selected by option field in the model No.) can display and set these functions.
- Be sure to enter a setting for the number of turns of the CT connected to the SDC.
- For the number of power line passes, count the number of times the power line passes through the CT hole.

  For example, if the power line goes through the hole twice, as shown below, set "2."



■Amount of current that indicates a disconnected heater (Ct-05)

If the current measured by the CT is below the set value when the SDC output is ON, a heater line break will be detected.
When set to "0.0," detection is disabled.

■Amount of current that indicates overcurrent (Ct-06)

If the current measured by the CT is above the set value when the SDC output is ON, an overcurrent will be detected.
When set to "0.0," detection is disabled.

■Amount of current indicating short circuit (Ct-07)

If the current measured by the CT is above the set value when the SDC output is OFF, a short circuit will be detected.
When set to "0.0," detection is disabled.

■Hysteresis (Ct-08)

Applies to the detection of heater line break, overcurrent, and short circuit of the actuator.

■ Delay time (Ct-09)

Applies to the detection of heater line break, overcurrent, and short circuit of the actuator.

■ Condition for restoring the status before measurement (Ct-10)

A standard bit code can be set as the condition for restoring the status before measurement of current. For example, if the control output is OFF after detection of a line break, use this function to cancel continuing detection of the line break.

! Handling Precautions

- The ON/OFF status of heater line break/overcurrent/short circuit detection is reflected in the standard bit codes.
  ☞ Standard bit codes of Chapter 11. LIST OF COMMUNICATION DATA (P. 11-97).
- To detect a line break or the like using an event function, set the event operation type (EP-01) to standard numerical codes and specify the desired standard numerical code No. and the loop/channel definition (EP-02).
  ☞ 6 - 3 How to Use Events (P. 6-5).
- If ON/OFF signals for detecting a line break or overcurrent are generated from the relay output or digital output (DO), set the desired CT operation for the output type assignment in the output bank or digital output bank.

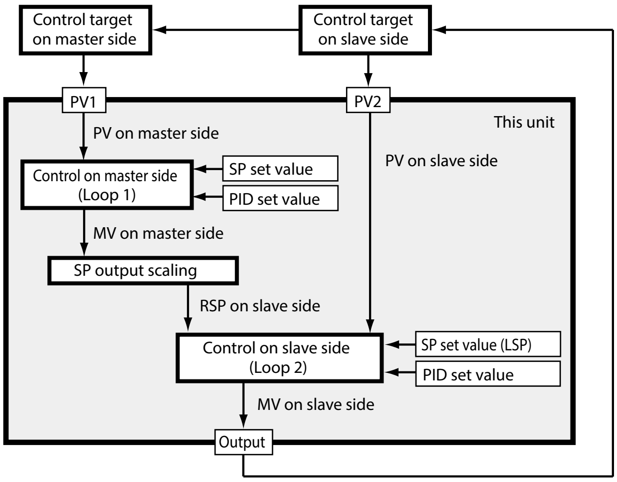
Chapter 7. FUNCTIONS USED AS REQUIRED

7 - 1 Internal Cascade Function

If the SDC is a 2- or 3-input model, it can control both the master and slave sides of the cascade control.

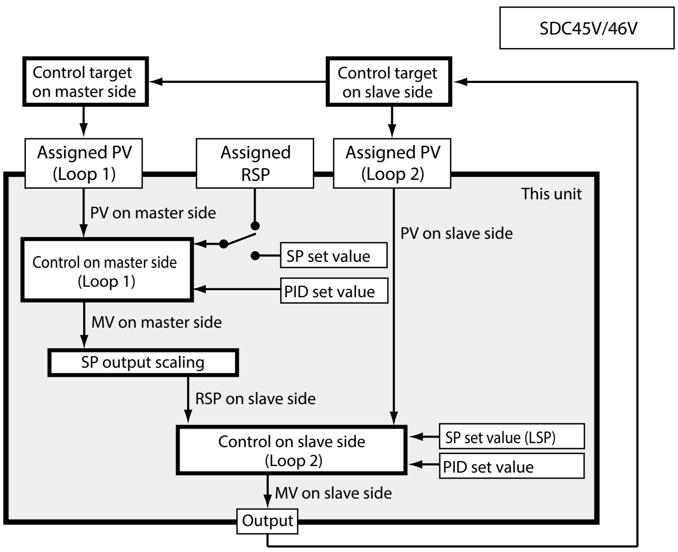
● 2-input models

The control on the master side operates as loop 1 control. The PV1 becomes PV on the master side.
The control on the slave side operates as loop 2 control. The PV2 becomes PV on the slave side.
The MV on the master side is converted into the RSP on the slave side through the SP output scaling.



● 3-input models

Control of the master is done as loop 1 control, and PV1 is for the master PV. RSP input can be selected for the SP settings. PV and RSP inputs use the data assigned in the loop control bank.
Control of the slave is done as loop 2 control, and PV2 is for the slave PV. PV input uses the data assigned in the loop control bank. The master MV is converted to the slave RSP by means of SP output scaling.



[!] Handling Precautions

- 1-input models cannot use the internal cascade function.

Setting banks

Setup bank (SEtUP)
MV bank (mv)
Output bank (oUt)

Example: The MV on the slave side is output from output 3 by internal cascade control.

The following describes an example that the MV on the master side is converted into RSP ranging from 0 °C to 200 °C in order to control the slave side, and the MV on the slave side is output from output 3:

(1) Configure the settings so that the internal cascade function can be used.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Setting
C-001	No display	Loop type	4: 1 loop (internal cascade)

(2) Configure the settings so that the MV on the master side is converted into the RSP on the slave side.
Configure the settings as shown below in the MV bank (mv) setup.

Display item	Auxiliary display	Item name	Settings
CAS.01	L.1.	(Loop 1) Scaling method	0: Fixed
CAS.02	L.1.	(Loop 1) Scaling low limit	0.0
CAS.03	L.1.	(Loop 1) Scaling high limit	200.0
CAS.04	L.1.	(Loop 1) Tracking mode	(Setting is invalid.)
CAS.05	L.1.	(Loop 1) SP output filter	0.00 (unit: s)

The RSP conversion calculation formula may vary depending on the scaling method (CAS.01).

- Fixed (CAS.01 = 0)

  RSP = (MVm ÷ 100) × (SH − SL) + SL

- SP reference (CAS.01 = 1)

  RSP = (MVm ÷ 100) × (SH − SL) + SL + SPm

- PV reference (CAS.01 = 2)

  RSP = (MVm ÷ 100) × (SH − SL) + SL + PVm

The following shows the meanings of variables used in the calculation formulas:

SL: Scaling low limit
SH: Scaling high limit
MVm: MV on master side
SPm: SP on master side
PVm: PV on master side

! Handling Precautions

- The decimal point position for "CAS.02: (Loop 1) Scaling low limit" and "CAS.03: (Loop 1) Scaling high limit" is determined by the position for the master loop (loop 1), and is not determined by the position for the slave loop (loop 2). If necessary, change the decimal point position for the master loop (loop 1) to the position forthe slave loop (loop 2).
  ☞ 4-4 How to set the Decimal Point Position (for details)

(3) The MV on the slave side is output from the output 3.
The setup items may vary depending on whether the output 3 is the continuous output or the ON/OFF output.
When the output 3 is the continuous output, configure the settings as shown below in the output bank (oUt) setup.

In this example, an MV of 0 to 100 % on the slave side is output as 4 to 20 mA.

Display item	Auxiliary display	Item name	Settings
Co-01	3.	(Output 3) Output range	0: 4 to 20mA
Co-02	3.	(Output 3) Output type	1: MV
Co-03	3.	(Output 3) Loop/channel definition	2
Co-04	3.	(Output 3) Decimal point position	1: One digit after the decimal point
Co-05	3.	(Output 3) Low limit of output scaling	0.0
Co-06	3.	(Output 3) High limit of output scaling	100.0
Co-07	3.	(Output 3) Linearization table group definition	0: Not used.

When the output 3 is the ON/OFF output, configure the settings as shown below in the output bank (oUt) setup.
In this example, the setting with the controllability priority is made assuming that the time proportional cycle time is 10 s.

Display item	Auxiliary display	Item name	Settings
tPo.01	3.	(Output 3) Output type	4: MV of loop 2
tPo.02	3.	(Output 3) Latch	(Setting is disabled.)
tPo.03	3.	(Output 3) Time proportional operation type	0: Priority on controllability
tPo.04	3.	(Output 3) Min. ON/OFF time	250 (unit: ms)
tPo.05	3.	(Output 3) Time proportional cycle	10.0 (unit: s)
tPo.06	3.	(Output 3) Linearization table group definition	0: Not used.

7 - 2 Computer Backup

If the SDC is a 2- or 3- input model, a computer backup function is available. There are two backup modes, as shown below.

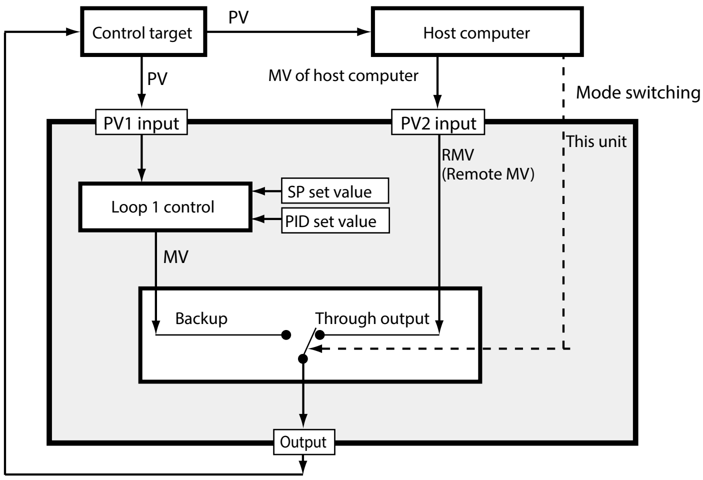
● 2-input models

- Through output mode

  The connected computer does the main control calculation. The SDC receives the MV from the computer through its PV2 input, and then outputs it as the MV from the SDC.

- Backup mode

  The SDC does the main control calculation, rather than the connected computer. The PV1 input is used as the PV of the loop 1.



● 3-input models

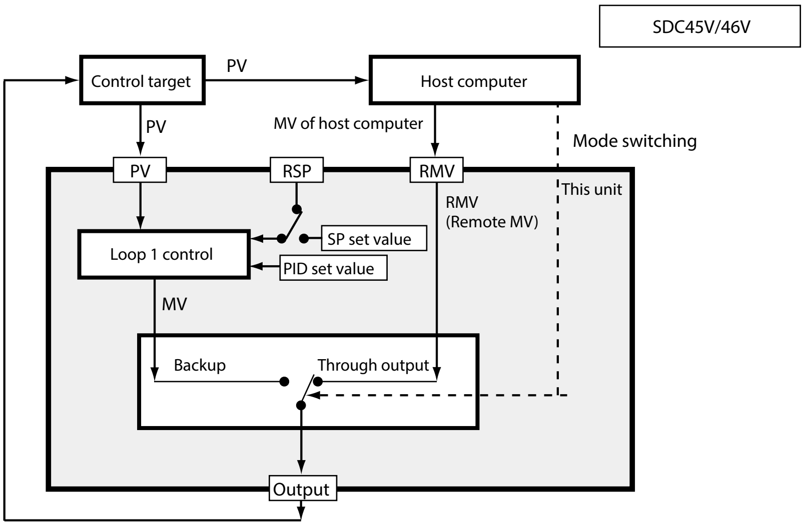
For PV, RSP, and RMV, the settings specified in the control bank are used.
On 3-input models, the computer backup function with use of the RSP is available.

- Through output mode

  The connected computer does the main control calculation. The SDC receives the MV from the computer through its RMV input, and then outputs it as the MV from the SDC.

- Backup mode

  The SDC performs the control calculation instead of the host computer. For the SP, the RSP input can be selected.



! Handling Precautions

- The computer backup function is not available on 1-input models.

■ Setting banks

Setup bank (SEtUP)
Priority bank (PrIor)
Internal contact input bank (IC)
Output bank (oUt)

■ Example

The following describes an example that the terminal status of the DI-F1 (F1 of digital input) is used to change to the computer backup and the MV is output to the output 3:

(1) Configure the settings so that the computer backup function can be used.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Settings
C-001	No display	Loop type	3: 1 loop (computer backup)
C-002	No display	Computer backup type	0: Computer backup method 1

The operation when the through output is changed to the backup may vary depending on the type of computer backup as described below.

Method 1: The LSP becomes the same value as the PV. A change in MV is small.
Method 2: The LSP does not change. A change in MV is large.
Method 3: The LSP does not change. A change in MV is small.

(2) Using the priority setup, configure the settings so that the mode of the computer backup is changed by the internal contact input.
Configure the settings as shown below in the priority bank (PrIor) setup.

Display item	Auxiliary display	Item name	Setting
LPr.06	1.	(Loop 1) Backup/through output	1: Internal contact input priority

(3) Configure the settings as shown below in the internal contact input bank (IC) so that the mode of the computer backup is changed by the terminal status of DI-F1 (F1 of digital input).

Display item	Auxiliary display	Item name	Settings
IC-01	01.	(Internal contact 1 group) Operation type	25: Backup/through output selection
IC-02	01.	(Internal contact 1 group) Input type	1176: DI-F1
IC-03	01.	(Internal contact 1 group) Loop/channel definition	1
IC-04	01.	(Internal contact 1 group) Weighting	(Setting is invalid.)

(4) The MV of loop 1 is output from the output 3. The setup items may vary depending on whether the output 3 is the continuous output or the ON/OFF output.
When the output 3 is the continuous output, configure the settings as shown below in the output bank (oUt) setup. In this example, an MV of 0 to 100 % on the slave side is output as 4 to 20 mA.

Display item	Auxiliary display	Item name	Settings
Co-01	3.	(Output 3) Output range	0: 4 to 20 mA
Co-02	3.	(Output 3) Output type	1: MV
Co-03	3.	(Output 3) Loop/channel definition	1
Co-04	3.	(Output 3) Decimal point position	1: One digit after the decimal point
Co-05	3.	(Output 3) Low limit of output scaling	0.0
Co-06	3.	(Output 3) High limit of output scaling	100.0
Co-07	3.	(Output 3) Linearization table group definition	0: Not used.

When the output 3 is the ON/OFF output, configure the settings as shown below in the output bank (oUt) setup. In this example, the setting with the controllability priority is made assuming that the time proportional cycle time is 10 s.

Display item	Auxiliary display	Item name	Settings
tPo.01	3.	(Output 3) Output type	1: MV of loop 1
tPo.02	3.	(Output 3) Latch	(setting is disabled.)
tPo.03	3.	(Output 3) Time proportional operation type	0: Priority on controllability
tPo.04	3.	(Output 3) Min. ON/OFF time	250 (unit: ms)
tPo.05	3.	(Output 3) Time proportional cycle	10.0 (unit: s)
tPo.06	3.	(Output 3) Linearization table group definition	0: Not used.

7 - 3 MV Tracking

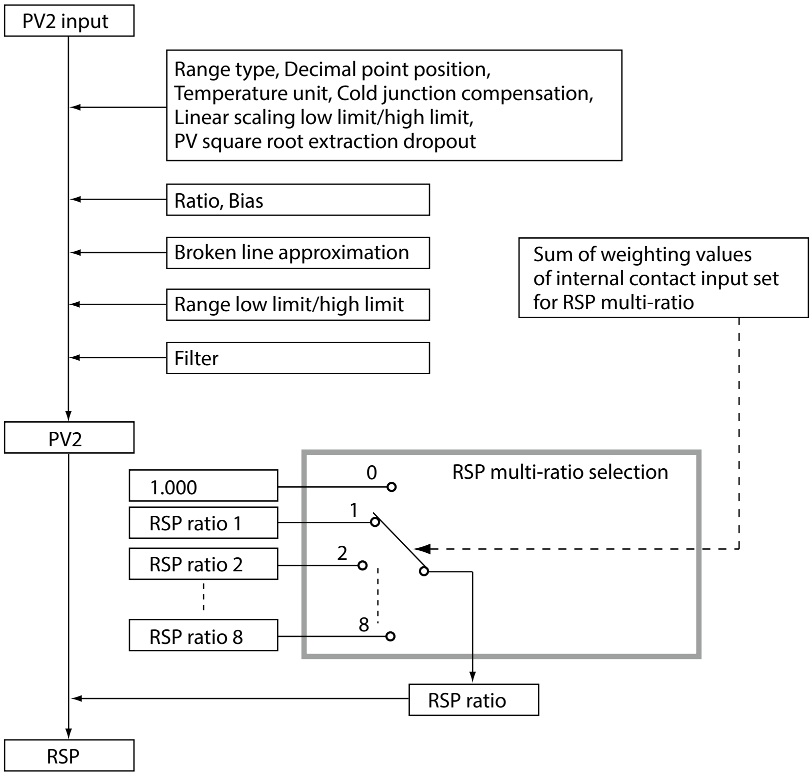
In RUN mode, in AUTO, when MV tracking changeover is ON, there is through-output of the MV tracking signal (-10 to +110 % max.) Also in RUN AUTO mode, when MV tracking changeover turns from ON to OFF, initialization is bumpless.

■Bank and setting

Bank	Item display	Item name	Settings
ñU (Control bank)	tr-01	MV tracking changeover	0: OFF 1: Contact output of input computation F7 (SDC45V/46V models only) 2: Contact output of output computation F7 (SDC45V/46V models only) 1024 to 2047 (standard bit codes)
	tr-02	Reverse MV tracking signal	0: Direct 1: Reverse
	tr-03	MV tracking signal	0: 0 % fixed 1: Input calculation F7 output (always 0 % for models other than SDC45V/46V) 2: Output calculation F7 output (always 0 % for models other than SDC45V/46V) 2048 to 3071 (standard numerical codes)

7 - 4   RSP Multi-Ratio

When this unit is a 2-input model and the 1-loop control with RSP is performed, the RSP multi-ratio function can be used.
The RSP multi-ratio function uses a ratio selected from multiple RSP ratio settings by the internal contact input. The RSP is calculated using the following calculation formula:
RSP = PV2 × RA
The RA is a value of the selected RSP ratio.
However, when the sum of weighting values of the internal contact input is "0" or when the multi-ratio selection setting does not exist in the internal contact input, the RA becomes "1.000" (RA = 1.000).
Additionally, since the number of RSP ratio settings is "8", RSP ratio 8 is selected if the sum of weighting values of the internal contact input is "9" or more.



Handling Precautions

- The RSP multi-ratio function can be used only when this unit is a 2-input model. The 1-input model cannot use the RSP multi-ratio function.

■ Setting banks

SP configuration bank (SPCnF)
Internal contact input bank (IC)

■Example

The following describes an example that the ratio selection is used from "0.100" to "0.700" in steps of "0.100" using three digital inputs, C-column 1 to C-column 3:

(1) Set the multi-ratio.
Configure the settings as shown below in the SP configuration bank (SPCnF) setup. (In this example, the RSP ratio 8 is not used.)

Display item	Auxiliary display	Item name	Settings
rrA.01	L.1.	(Loop 1) RSP ratio 1	0.100
rrA.02	L.1.	(Loop 1) RSP ratio 2	0.200
rrA.03	L.1.	(Loop 1) RSP ratio 3	0.300
rrA.04	L.1.	(Loop 1) RSP ratio 4	0.400
rrA.05	L.1.	(Loop 1) RSP ratio 5	0.500
rrA.06	L.1.	(Loop 1) RSP ratio 6	0.600
rrA.07	L.1.	(Loop 1) RSP ratio 7	0.700
rrA.08	L.1.	(Loop 1) RSP ratio 8	1.000

(2) In the internal contact input setup bank (IC), configure the settings so that the multi-ratio selection uses the digital inputs C-column 1 to C-column 3.

Display item	Auxiliary display	Item name	Settings
IC-01	01.	(Internal contact 1 group) Operation type	4: Multi-ratio selection
IC-02	01.	(Internal contact 1 group) Input type	1152: DI-C1
IC-03	01.	(Internal contact 1 group) Loop/channel definition	1
IC-04	01.	(Internal contact 1 group) Weighting	1
IC-01	02.	(Internal contact 2 group) Operation type	4: Multi-ratio selection
IC-02	02.	(Internal contact 2 group) Input type	1153: DI-C2
IC-03	02.	(Internal contact 2 group) Loop/channel definition	1
IC-04	02.	(Internal contact 2 group) Weighting	2
IC-01	03.	(Internal contact 3 group) Operation type	4: Multi-ratio selection
IC-02	03.	(Internal contact 3 group) Input type	1154: DI-C3
IC-03	03.	(Internal contact 3 group) Loop/channel definition	1
IC-04	03.	(Internal contact 3 group) Weighting	4

7 - 5 RSP Tracking

When the mode changes from RSP to LSP, the RSP is written to the LSP. If there are multiple SP system groups, the RSP is written to the LSP whose number was selected when the mode was changed.
If the loop type is internal cascade, the internal RSP is written as a slave LSP.
However, RSP tracking is not done in the following cases:

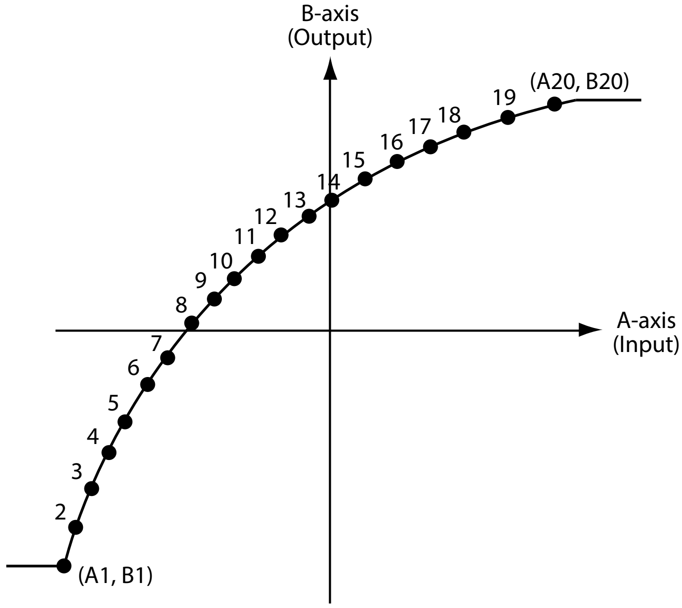
- In READY mode.
- In MANUAL mode.
- In the case of fixed value output.

■Setting banks

SP configuration bank (SPCnF)

7 - 6 Approximation by Linearization Table

This unit can use an approximation by linearization table for the PV input or continuous output.
There are eight groups of linearizations. One linearization group has 20-point settings.
Settings A1 to A20 are input values for the approximation by linearization table while settings B1 to B20 are output values for the approximation by linearization table. They are shown as a graph in the figure below.
When the input is A1 or less, the output becomes B1.
When the input is A20 or more, the output becomes B20.



■ Approximation by linearization table of output

To use the approximation by linearization table for the continuous output, configure the settings in the linearization table use group for OUT of the priority bank (Pr - 02) so that the linearization group is selected by the set value or the internal contact input.

■ Setting banks

PV bank (Pv)
Linearization table bank (tbL)

■ Example

The following describes an example that the approximation by linearization table of the linearization table 1 group is used for the PV1 input:
An input ranging from "0.0" to "100.0" is converted into other characteristic of "0.0" to "100.0".

(1) Specify a group of the linearization table using the PV input.
Configure the settings as shown below in the PV bank (Pv) setup.

Display item	Auxiliary display	Item name	Setting
Pv-20	1.	(PV1 input) Linearization table group definition	1: 1 group

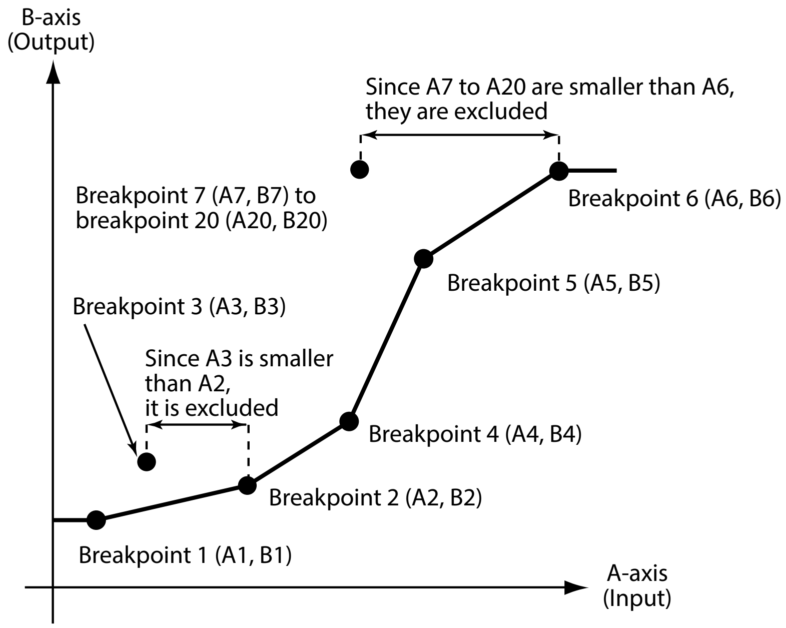
(2) Set the linearization table.
Configure the settings as shown below in the linearization table bank (tbL) setup.

Display item	Auxiliary display	Item name	Settings
tb.dP	1.	(Linearization table 1 group) Breakpoint decimal point	1: One digit below the decimal position
tb.A.01	1.	(Linearization table 1 group) Breakpoint A1	0.0
tb.A.02	1.	(Linearization table 1 group) Breakpoint A2	17.4
tb.A.03	1.	(Linearization table 1 group) Breakpoint A3	25.0
(Omission)			
tb.A.18	1.	(Linearization table 1 group) Breakpoint A18	75.0
tb.A.19	1.	(Linearization table 1 group) Breakpoint A19	82.6
tb.A.20	1.	(Linearization table 1 group) Breakpoint A20	100.0
tb.b.01	1.	(Linearization table 1 group) Breakpoint B1	0.0
tb.b.02	1.	(Linearization table 1 group) Breakpoint B2	10.0
tb.b.03	1.	(Linearization table 1 group) Breakpoint B3	15.0
(Omission)			
tb.b.18	1.	(Linearization table 1 group) Breakpoint B18	85.0
tb.b.19	1.	(Linearization table 1 group) Breakpoint B19	90.0
tb.b.20	1.	(Linearization table 1 group) Breakpoint B20	100.0

The decimal point position used to set breakpoints A1 to 20 and breakpoints B1 to 20 is specified using the breakpoint decimal point position (tb.dP).

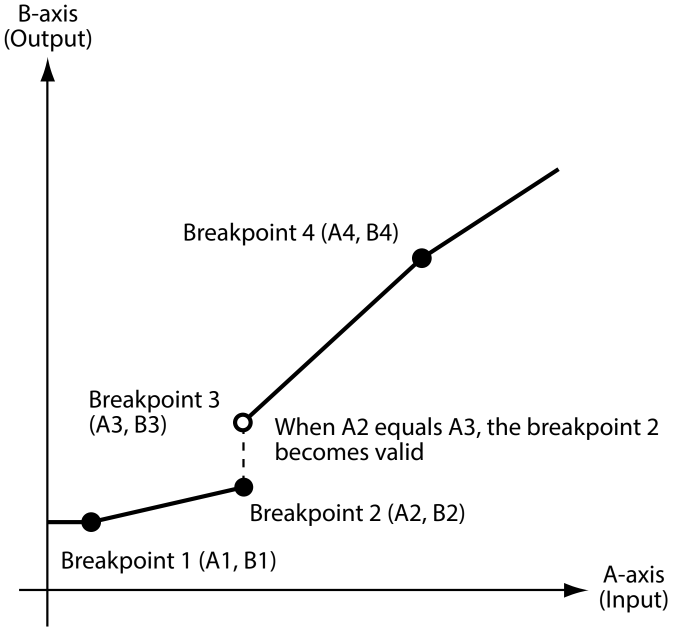
■ Magnitude correlation of breakpoint A setting is not the numerical order.

Linearization is written except for deviation points.
It is possible not to use the breakpoint located halfway. (breakpoint 3 shown in the figure below.)
It is possible not to use the excess breakpoints. (breakpoints 7 to 20 shown in the figure below.)



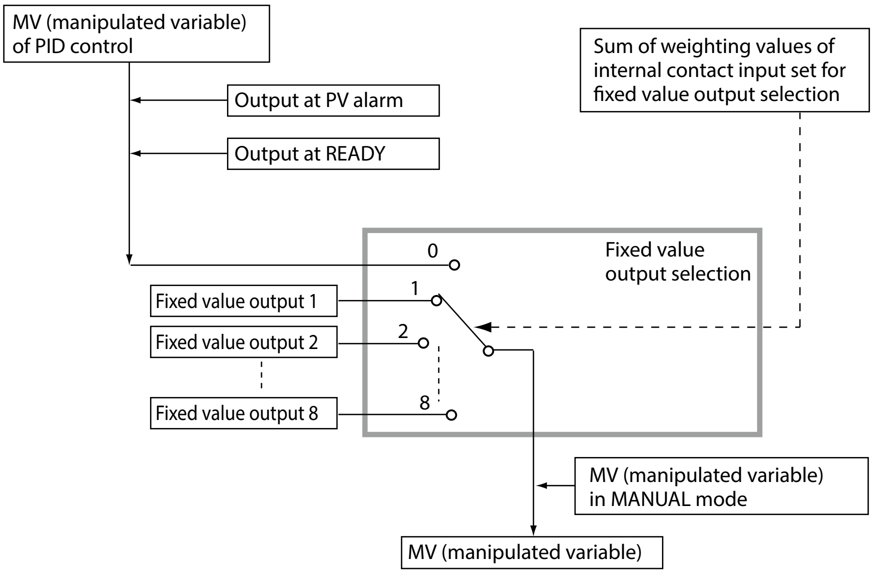
A options of the adjacent breakpoints are the same.

A breakpoint having a smaller No. becomes valid. Additionally, the two points are not connected by a linearization.



7 - 7 Fixed Value Output

This unit can use a fixed value selected by the internal contact input instead of the MV (manipulated variable) of the PID control. Eight fixed value outputs are set for each loop.
However, when the sum of weighting values of the internal contact inputs is "0" or when the fixed value group selection setting is not provided on the internal contact input, the fixed value output cannot be used.
Additionally, since the number of fixed value output settings is "8", the fixed value output 8 is selected if the sum of weighting values of the internal contact inputs is "9" or more.
The priority of the fixed value output is higher than the MV of the PID control, Output at PV alarm, Output at READY, Output at READY (heat), Output at READY (cool), and through output of computer backup, but it is lower than the MV in the MANUAL mode.



■Setting banks

MV bank (mv)
Internal contact input bank (IC)

■Example

The following describes an example that the fixed value output selection is used from "10.0 %" to "70.0 %" in steps of "10.0" using three digital inputs, C-column 1 to C-column 3:

(1) Set the fixed value output.
Configure the settings as shown below in the MV bank (mv) setup (in this example, the fixed value output 8 is not used).

Display item	Auxiliary display	Item name	Settings
mv-06	L.1.	(Loop 1) Fixed value output 1	10.0
mv-07	L.1.	(Loop 1) Fixed value output 2	20.0
mv-08	L.1.	(Loop 1) Fixed value output 3	30.0
mv-09	L.1.	(Loop 1) Fixed value output 4	40.0
mv-10	L.1.	(Loop 1) Fixed value output 5	50.0
mv-11	L.1.	(Loop 1) Fixed value output 6	60.0
mv-12	L.1.	(Loop 1) Fixed value output 7	70.0
mv-13	L.1.	(Loop 1) Fixed value output 8	0.0

(2) In the internal contact input bank (IC), configure the settings so that the fixed values are selected using the digital inputs, C-column 1 to C-column 3.

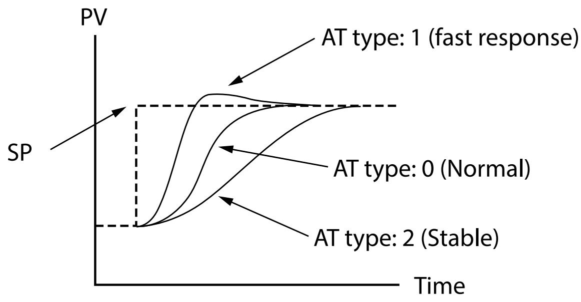
Display item	Auxiliary display	Item name	Settings
IC-01	01.	(Internal contact 1 group) Operation type	3: Fixed value output selection
IC-02	01.	(Internal contact 1 group) Input type	1152: DI-C1
IC-03	01.	(Internal contact 1 group) Loop/channel definition	1
IC-04	01.	(Internal contact 1 group) Weighting	1
IC-01	02.	(Internal contact 2 group) Operation type	3: Fixed value output selection
IC-02	02.	(Internal contact 2 group) Input type	1153: DI-C2
IC-03	02.	(Internal contact 2 group) Loop/channel definition	1
IC-04	02.	(Internal contact 2 group) Weighting	2
IC-01	03.	(Internal contact 3 group) Operation type	3: Fixed value output selection
IC-02	03.	(Internal contact 3 group) Input type	1154: DI-C3
IC-03	03.	(Internal contact 3 group) Loop/channel definition	1
IC-04	03.	(Internal contact 3 group) Weighting	4

7 - 8 How to Change Auto-Tuning (AT) Types

When using AT, select the proper AT type in order to achieve successful AT that fits the control characteristics of the target application. The AT type can be selected from the following 3 types:

0: Normal (regular control characteristics)
1: Fast response (reaction to disturbance)
2: Stable (minimal up/down PV fluctuation)

The figure below illustrates the differences in control results using the PID constants generated by each AT type.



Differences in SPs

■Setting banks

Control bank (CtrL)

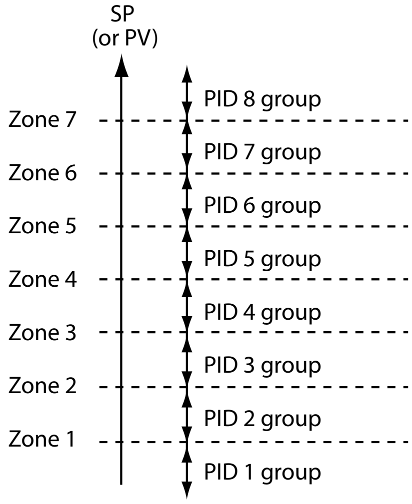
■Example

The AT type for loop 1 is changed to "fast response."

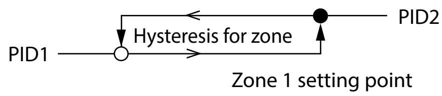
Display item	Auxiliary display	Item name	Settings
Cnt-07	1.	AT type	1: Fast response

7 - 9 Zone PID

This unit can perform the PID control using the zone PID function. The zone PID is a function that selects a PID constant group from group 1 to 8 according to the SP value or PV value.



The following shows the operation at the change-over point between zones. The change-over between the PID1 and PID2 is described as an example:



● means that the PID group is changed by this value.
○ means that the PID group is changed at a point where 1U elapses from this value.

Handling Precautions

- The zone PID function can be used only when the recipe enabled (C-010) setup is "0" (multi-SP). When the setting is "1" (recipe), this function cannot be used.
  Additionally, 16 PID constant groups are provided for each loop. However, when using the zone PID, only groups 1 to 8 can be used.

■ Setting banks

Setup bank (SEtUP)
Priority bank (PrIor)
Control bank (CtrL)

■ Example

The following describes an example that the zone PID function is used with PV from 100 °C in steps of 100 °C in the loop 1:

(1) Set the multi-SP.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Setting
C-010	No display	Recipe enabled	0: Multi-SP

(2) Set the priority of the PID group selection.
Configure the settings as shown below in the priority bank (PrIor) setup.

Display item	Auxiliary display	Item name	Setting
LPr.02	1.	(Loop 1) PID group selection	0: Zone PID function priority

(3) Set a zone.
Configure the settings as shown below in the control bank (Ctrl) setup.
Set the zones 1 to 7 so that they become larger sequentially.
The hysteresis for the zone is used when the zone is moved to that having a number, which is 1 smaller than the current number. Set a value, which is sufficiently smaller than the width of each zone.

Display item	Auxiliary display	Item name	Settings
Etd.12	L.1.	(Loop 1) Zone operation selection	1: Selection with PV value.
Etd.13	L.1.	(Loop 1) Zone 1	100.0
Etd.14	L.1.	(Loop 1) Zone 2	200.0
Etd.15	L.1.	(Loop 1) Zone 3	300.0
Etd.16	L.1.	(Loop 1) Zone 4	400.0
Etd.17	L.1.	(Loop 1) Zone 5	500.0
Etd.18	L.1.	(Loop 1) Zone 6	600.0
Etd.19	L.1.	(Loop 1) Zone 7	700.0
Etd.20	L.1.	(Loop 1) Hysteresis for zone	5.0

7 - 10 Cold Junction Compensation

If the PV range is set for thermocouples, the cold junction compensation method can be selected.

■Bank and setting

Bank	Item display	Item name	Settings
PV (PV bank)	PV-06	Cold junction compensation	0: Internal 1: External 2: By sensor or another channel

● 2: Compensation by a sensor on another channel

- When this setting is used for PV1 input, PV2 input is for the reference junction temperature.
- When this setting is used for PV2 input, PV1 input is for the reference junction temperature.
- If the input of another channel is used for items other than RTDs (none, thermocouple, linear, and unused), a cold junction compensation failure (AL71/72) will occur. In this case, cold junction compensation cannot be executed.
- If the input of the other channel is outside the -20 to +80 °C range, a cold junction compensation failure (AL71/72) will occur.

  Cold junction compensation will be executed, but temperatures less than -20.0 °C or more than +80.0 °C will be treated as -20.0 °C and +80.0 °C respectively.

7 - 11 Function Keys

This unit can set the mode change-over for keys shown in the Table below. Up to eight parameters and parameter groups can be assigned to the keys. This function is called "function key (F key) function".

Key	Applicable model No.		Initial value of F key basic registration setting (FA-01)	Setting range of F key basic registration setting (FA-01)
	SDC45	SDC46		
rsp/lsp	○	○	5: RSP/LSP selection	0: No registration, 1: Item setting, 2: RUN/READY selection, 3: Undefined., 4: AT start/stop selection, 5: RSP/LSP selection, 6: Backup/through output selection, 7 to 14: User defined bits 1 to 8 selection
at	○	○	4: AT start/stop selection	
f1	×	○	0: No registration	
f2	×	○	0: No registration	

■Setting banks

Priority bank (Prior)
Display/key bank (HAI)

■Auxiliary display

The table below shows the relationships between the function keys and FA-01 to FA-09 on the auxiliary display.

Function key	Auxiliary display	Model No.
rsp/lsp	1.	SDC45, SDC46
at	2.	SDC45, SDC46
f1	3.	SDC46
f2	4.	SDC46

■Settings

To assign parameters to the keys, specify a communication data address (for RAM) for the parameters to be assigned for "FA-02" to "FA-09" (F key assignment items 1 to 8). Because the communication data address is hexadecimal, alphabetic characters A to F are used in addition to numeric values. To assign parameter groups to the keys, specify the following bank numbers according to the type of the parameters.

Bank No. (hex)	Description
0001	Loop 1 PID parameters of the selected PID group
0002	Loop 2 PID parameters of the selected PID group
0003	Loop 1 RSP multi-ratio parameters
0004	Loop 2 RSP multi-ratio parameters
0010 to 001f	Loop 1 RSP multi-ratio parametersParameters for groups PID 1 to PID 16
0020 to 002f	Loop 2 RSP multi-ratio parametersParameters for groups PID 1 to PID 16
0050 to 0057	Parameters for linearization tables 1–8 (A–B pairs, no decimal point position)

! Handling Precautions

- Settings for F key assignment items are communications data addresses (for RAM). However, when the settings are changed using the F key, both the RAM and EEPROM data are changed accordingly.

Loop 1/Loop 2 PID parameters of the selected PID group

Bank No. (hex)	Upper display	Auxiliary display	Description
Loop 1: 0001	P-01 to P-16	(Loop 1)	Proportional band
Loop 2: 0002	I-01 to I-16	L.1.	Integral time
	d-01 to d-16	(Loop 2)	Derivative time
	oL-01 to oL-16	L.2.	MV low limit
	oH-01 to oH-16		MV high limit
	rE-01 to rE-16		Manual reset
	P-01C to P-16C		Proportional band for cooling
	I-01C to I-16C		Integral time for cooling
	d-01C to d-16C		Derivative time for cooling
	oL.01C to oL.16C		MV low limit for cooling
	oH.01C to oH.16C		MV high limit for cooling

Note: Parameters for cooling are displayed only when heating and cooling control is in progress.

Loop 1/Loop 2 RSP multi-ratio parameters

Bank No. (hex)	Upper display	Auxiliary display	Description
Loop 2: 0003	rrA.01	(Loop 1)	RSP ratio 1
Loop 2: 0004	rrA.02	L.1.	RSP ratio 2
	rrA.03	(Loop 2)	RSP ratio 3
	rrA.04	L.2.	RSP ratio 4
	rrA.05		RSP ratio 5
	rrA.06		RSP ratio 6
	rrA.07		RSP ratio 7
	rrA.08		RSP ratio 8

Loop 1/Loop 2 Parameters of the selected PID group

When multi-SP is used

Bank No. (hex)	Upper display	Auxiliary display	Description
Loop 1: 0010 to 001f	P-01 to P-16	(Loop 1)	Proportional band
(PID 1 to PID 16)	I-01 to I-16	L.1.	Integral time
Loop 2: 0020 to 002f	d-01 to d-16	(Loop 2)	Derivative time
(PID 1 to PID 16)	oL-01 to oL-16	L.2.	MV low limit
	oH-01 to oH-16		MV high limit
	rE-01 to rE-16		Manual reset
	P-01C to P-16C		Proportional band for cooling
	I-01C to I-16C		Integral time for cooling
	d-01C to d-16C		Derivative time for cooling
	oL.01C to oL.16C		MV low limit for cooling
	oH.01C to oH.16C		MV high limit for cooling

When Recipe enabled is used

Bank No. (hex)	Upper display	Auxiliary display	Description
Loop 1: 0010 to 001f (PID 1 to PID 16) Loop 2: 0020 to 002f (PID 1 to PID 16)	P	(Loop 1) 1.01. to 1.16. (Loop 2) 2.01. to 2.16.	Proportional band
	I		Integral time
	d		Derivative time
	oL		MV low limit
	oH		MV high limit
	rE		Manual reset
	P-C		Proportional band for cooling
	I-C		Integral time for cooling
	d-C		Derivative time for cooling
	oL.C		MV low limit for cooling
	oH.C		MV high limit for cooling

Note: Parameters for cooling are displayed only when heating and cooling control is in progress.

■Parameters for linearization tables 1–8 (A–B pairs, no decimal point position)

Bank No. (hex)	Upper display	Auxiliary display	Description
Loop 1: 0010 to 001f (PID 1 to PID 16) Loop 2: 0020 to 002f (PID 1 to PID 16)	tb.A.01	1. to 8.	RSP ratio 1
	tb.b.01	1. to 8.	RSP ratio 2
	tb.A.02	1. to 8.	RSP ratio 3
	tb.b.02	1. to 8.	RSP ratio 4
	:	:	:
	tb.A.19	1. to 8.	RSP ratio 5
	tb.b.19	1. to 8.	RSP ratio 6
	rrA.20	1. to 8.	RSP ratio 7
	rrA.20	1. to 8.	RSP ratio 8

■Example 1

In the following example, RUN/READY mode changeover is assigned to the [rsp/lsp] key.

(1) Set the priority of the RUN/READY selection.
Configure the settings in the priority bank (PrIor) as shown below.

Display item	Auxiliary display	Item name	Settings
LPr.03	1.	(Loop 1) RUN/READY selection	0: Set value priority
LPr.03	2.	(Loop 2) RUN/READY selection	0: Set value priority

When the loop type is 1-loop, "Loop 2 RUN/READY selection" cannot be set.

(2) Assign RUN/READY changeover to the [rsp/lsp] key.
Configure the setting in the display/key bank (MMI) as shown below.

Display item	Auxiliary display	Item name	Settings
FK-01	1.	([rsp/lsp] key) F key basic registration	2: RUN/READY selection
FK-02	1.	([rsp/lsp] key) F key assignment item 1	(setting is invalid.)
FK-03	1.	([rsp/lsp] key) F key assignment item 2	(setting is invalid.)
FK-04	1.	([rsp/lsp] key) F key assignment item 3	(setting is invalid.)
FK-05	1.	([rsp/lsp] key) F key assignment item 4	(setting is invalid.)
FK-06	1.	([rsp/lsp] key) F key assignment item 5	(setting is invalid.)
FK-07	1.	([rsp/lsp] key) F key assignment item 6	(setting is invalid.)
FK-08	1.	([rsp/lsp] key) F key assignment item 7	(setting is invalid.)
FK-09	1.	([rsp/lsp] key) F key assignment item 8	(setting is invalid.)

(3) Check that the function key assignment was successful.
First, press the [display] key to view the operation display screen.
Next, press the [rsp/lsp] key and check that "rUn" or "rdY" on the lower display starts flashing.
Subsequently, as the [rsp/lsp] key is kept pressed, "rUn" or "rdY" on the lower display stops flashing and remains lit, and the RUN/READY mode has been changed.

■Example 2

In this example the loop 1 SP low limit and loop 1 SP high limit are assigned to the [at] key.

(1) Assign the desired items to the [at] key.
Configure the settings as shown below in the display/key bank (MMI) setup.

Display item	Auxiliary display	Item name	Settings
FK-01	2.	([at] key) F key basic registration	1: Item setting
FK-02	2.	([at] key) F key assignment item 1	010A0 (SP low limit of loop 1)
FK-03	2.	([at] key) F key assignment item 2	010A1 (SP high limit of loop 1)
FK-04	2.	([at] key) F key assignment item 3	00000 (invalid)
FK-05	2.	([at] key) F key assignment item 4	00000 (invalid)
FK-06	2.	([at] key) F key assignment item 5	00000 (invalid)
FK-07	2.	([at] key) F key assignment item 6	00000 (invalid)
FK-08	2.	([at] key) F key assignment item 7	00000 (invalid)
FK-09	2.	([at] key) F key assignment item 8	00000 (invalid)

(2) Check that the function key assignment was successful.
First, press the [display] key to view the operation display screen.
Next, check that the display changes to the loop 1 SP low limit setting when the [at] key is pressed for 2 s or more.
Check that the display changes to the loop 1 SP high limit setting when the [at] key is pressed again.

■Example 3

In the following example three settings pertaining to the PID group used by loop 1 are assigned to the [at] key, namely the proportional band, the integral time, and the derivative time.

(1) Assign the setup items to the [at] key.
Configure the settings in the display/key bank (KEY) as shown below.

Display item	Auxiliary display	Item name	Settings
FK-01	2.	([at] key) F key basic registration	1: Item setting
FK-02	2.	([at] key) F key assignment item 1	03A00 (loop 1 PID group proportional band)
FK-03	2.	([at] key) F key assignment item 2	03A01 (loop 1 PID group integral time)
FK-04	2.	([at] key) F key assignment item 3	03A02 (loop 1 PID group derivative time)
FK-05	2.	([at] key) F key assignment item 4	00000 (invalid)
FK-06	2.	([at] key) F key assignment item 5	00000 (invalid)
FK-07	2.	([at] key) F key assignment item 6	00000 (invalid)
FK-08	2.	([at] key) F key assignment item 7	00000 (invalid)
FK-09	2.	([at] key) F key assignment item 8	00000 (invalid)

(2) Check that the function key assignment was successful.
First, press the [display] key to view the operation display screen.
Next, check that the display changes to the loop 1 PID group proportional band setting when the [at] key is pressed for 2 s or more.
Check that the loop 1 PID group integral time setting is displayed when the [at] key is pressed again.
Check that the display changes to the loop 1 PID group derivative time setting when the [at] key is pressed again.

Note

- The tables below show the values to set for F key assignments 1 to 8 (FK-02 to FK-09) if PID group settings are assigned to the F key.

PID group settings for loop 1

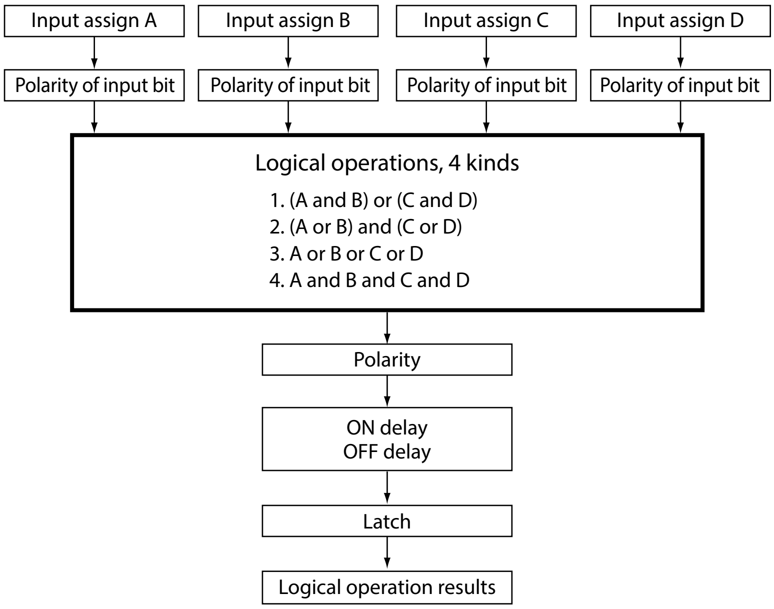
Proportional band	03A00
Integral time	03A01
Derivative time	03A02
Manual reset	03A03
MV low limit	03A04
MV high limit	03A05
Proportional band for cooling	03A06
Integral time for cooling	03A07
Derivative time for cooling	03A08
(Reserved for future use)	–
MV low limit for cooling	03A0A
MV high limit for cooling	03A0B

PID group settings for loop 2

Proportional band	03A0C
Integral time	03A0D
Derivative time	03A0E
Manual reset	03A0F
MV low limit	03A10
MV high limit	03A11
Proportional band for cooling	03A12
Integral time for cooling	03A13
Derivative time for cooling	03A14
(Reserved for future use)	–
MV low limit for cooling	03A16
MV high limit for cooling	03A17

7 - 12 Logical Operations

This unit can perform the logical operation (Boolean operation consisting of "0" and "1") corresponding to various instrument statuses and can use the logical operation results as ON/OFF outputs or internal contact inputs.
16 groups of logical operations are provided. One operation group consists of four inputs and one output.
Four kinds of logical operations are provided. Furthermore, the input or output logic can be inverted.



■ Processing sequence for logical operations

Certain logical operation results can be used as inputs of the logical operation in the same group or different group. The operating process of the logical operation is performed at intervals of sampling cycles in the group No. order.
Therefore, the logical operation results of a smaller group No. can be used in the same sampling cycle. The logical operation results of the same group No. or a lager group No. are used in the next sampling cycle.

■ Setting banks

Logical operation bank (bF)
Output bank (oUt)

■Example

The following describes an example that output 1 is turned ON when any of the event 1, event 2, and alarm indication is turned ON using the logical operation 1 group:

(1) Set the logical operation.
Configure the settings as shown below in the logical operation bank (bF) setup in the status that the auxiliary display shows 01. (group 1).

Display item	Auxiliary display	Item name	Settings
bF-01	01.	(Logical operation group 1) Operation type	3: Operation 3 (A or B or C or D)
bF-02	01.	(Logical operation group 1) Input assign A	1088: Event 1
bF-03	01.	(Logical operation group 1) Input assign B	1089: Event 2
bF-04	01.	(Logical operation group 1) Input assign C	1792: Representative of all alarms
bF-05	01.	(Logical operation group 1) Input assign D	1024:OFF
bF-06	01.	(Logical operation group 1) Input bit polarity A	0: Direct
bF-07	01.	(Logical operation group 1) Input bit polarity B	0: Direct
bF-08	01.	(Logical operation group 1) Input bit polarity C	0: Direct
bF-09	01.	(Logical operation group 1) Input bit polarity D	0: Direct
bF-10	01.	(Logical operation group 1) ON delay time	0.0 (unit: s)
bF-11	01.	(Logical operation group 1) OFF delay time	0.0 (unit: s)
bF-12	01.	(Logical operation group 1) Reverse	0: Direct
bF-13	01.	(Logical operation group 1) Latch	0: Not latched.

(2) Set the results of the logical operation 1 for the output 1.
Configure the settings as shown below in the output bank (oUt) setup.

Display item	Auxiliary display	Item name	Settings
tPo.01	1.	(Output 1) Output type	1440: Results of logical operation 1
tPo.02	1.	(Output 1) Latch	0: Not latched.
tPo.03	1.	(Output 1) Time proportional operation type	(setting is disabled.)
tPo.04	1.	(Output 1) Min. ON/OFF time	250 (unit: ms)
tPo.05	1.	(Output 1) Time proportional cycle	(setting is disabled.)
tPo.06	1.	(Output 1) Linearization table group definition	(setting is disabled.)

7 - 13 Display Switching Function

This function switches the current display to a different one without using the [display] key. It is useful for the following applications:

- Regularly switching the current display to another display specified by the user (e.g., PV/SP display).
- Switching the current display to any display via communications or internal contact input (digital input).

Setting banks

Priority bank (Prior)
Setup bank (SEtUP)
Internal contact input bank (IC)

Example 1: Regular switching to a certain operation display

This function can be used for the following applications:

- Showing the desired operation display after power-on
- After the display is changed with the [display] key, automatically switching back to a display specified by the user.

In the following example the upper and lower displays are switched to the PV and SP of loop 1 respectively 60 s after the displays are changed with the [display] key.

(1) Set the priority for operation display switching.
Set the priority bank (Prior) as follows.

Display item	Auxiliary display	Item name	Settings
Pr-03	1.	Operation display switching	1: Settings + the [display] key

(2) Set the screen No.
Set the setup bank (SEtUP) as follows.

Display item	Auxiliary display	Item name	Settings
C-014	No display	Operation display Display assignment	1: PV of loop 1, SP of loop 1

(3) Set the return time.
Set the setup bank (SEtUP) as shown below.

Display item	Auxiliary display	Item name	Settings
C-015	No display	Operation display return time	60s

■Example 2: Switching the operation display via communications

In the next example the upper and lower displays are switched to the PV and SP of loop 1 or the PV and MV of loop 1 respectively through communications.

(1) Set the priority of operation display switching.
Set the priority bank (PrIor) as follows.

Display item	Auxiliary display	Item name	Settings
Pr-03	1.	Operation display switching	1: Settings + the [display] key

(2) Set the return time.
Configure the settings in the setup bank (SEtUP) as shown below. In this case, the current display is automatically switched to the display specified by communications 10 s after the display is changed with the [display] key.

Display item	Auxiliary display	Item name	Settings
Pr-015	No display	Operation display return time	10s

(3) Change the screen No. via communications.
In the setup bank (SEtUP), set C-014 (data address) to 1 (PV and SP of loop 1) or 2 (PV and MV of loop 1).

[!] Handling Precautions

- Two types of data addresses are used for operation display and display assignment: RAM and EEPROM. Generally RAM addresses should be used.
For details about differences between RAM and EEPROM addresses, refer to:
☞ 9-4 Definition of Data Addresses (P. 9-12).

Example 3: Switching the operation display with the internal contact input

In the next example the upper and lower displays are switched to loop 1 PV and loop 2 PV respectively when the digital input (DI-C1) is ON.
For details about how to use internal contact input, refer to:
☞ 6-4 How to Use Internal Contact Input (digital input) (P. 6-12).

(1) Set the priority for operation display switching.
Set the priority bank (Prior) as follows.

Display item	Auxiliary display	Item name	Settings
Pr-03	1.	Operation display switching	2: internal contact input + the [display] key

(2) Set operation display switching for internal contact 1.
Set the internal contact input bank (IC) as follows.

Display item	Auxiliary display	Item name	Settings
IC-01	01	Operation type	43: Operation display switching
IC-02	01	Input type	1152: terminal status of DI-C1
IC-03	01	Loop/channel definition	(Setting is invalid)
IC-04	01	Sum of the weighting values	9: PV of loop 1, PV of loop 2

(3) Set the return time.
Configure the settings in the setup bank (SEtUP) as shown below. In this case, the current display is automatically switched to the display specified by the internal contact input 30 s after the display is changed with the [display] key.

Display item	Auxiliary display	Item name	Settings
C-015	(None)	Operation display Return time	30s

Operation display return time (C-015)

Even when the operation display switching function is in use, the display can be changed with the [display] key. If there is no key operation during the operation display return time (C-015), the display will return to the specified screen.

Handling Precautions

- If the operation display return time (C-015) is set to 0 s, the operation display cannot be switched with the [display] key.
  If the operation display return time (C-015) is set too short, the display may be switched suddenly in the middle of key operation to change the manual MV, LSP, or SP group (recipe), so be sure to specify an appropriate return time.

Note

- In SP/EV or PARA bank setup screens, if there is no key operation for 3 minutes, the display will automatically return to the operation display. Afterwards, if the operation display switching function is in use, after the operation display return time (C-015) passes, the operation display will be switched to the specified one.

Screen No.

The following screen Nos. can be specified for use by the operation display switching function. They are used for both selection of the operation display (C-014) and for the sum of the weighting values of the internal contact input.

Screen No.	Upper display	Lower display	Auxiliary display	Effective condition
0	(No switching function)			
1	Loop 1 PV	Loop 1 SP	*1	
2	Loop 1 PV	Loop 1 MV	*2	
3	Loop 1 PV	Loop 1 Heating MV	Ht.	Loop 1 is heat/cool control
4	Loop 1 PV	Loop 1 Cool MV	CL.	Loop 1 is heat/cool control
5	Loop 2 PV	Loop 2 SP	*1	When loop 2 is used
6	Loop 2 PV	Loop 2 MV	MV.	When loop 2 is used
7	Loop 2 PV	Loop 2 Heating MV	Ht.	Loop 2 is heat/cool control
8	Loop 2 PV	Loop 2 Cool MV	CL.	Loop 2 is heat/cool control
9	Loop 1 PV	Loop 2 PV	PV.	When loop 2 is used
10	(No switching function)			

*1 In LSP mode: "SP._" (where _ is the group No. in hexadecimal. Group 16 is indicated as "G".) In RSP mode: "RSP."

*2 "MV" for all cases except computer backup. For computer backup, the display depends on the mode, as shown below.

- "LMV." for backup mode.
- "RMV." for through-output mode.

Handling Precautions

- The display will not be switched if a screen No. that is not available for display (because of the model or settings), or any nonexistent screen No. is specified.

7 - 14   Customizing Operation Displays

Up to 10 types of customized operation displays (user-defined displays) can be defined and saved. The saved displays and standard displays can be switched in a desired order.

■ Setting banks

Setup bank (SEtUP)
Operation display switching order bank (dtUrn)
User-defined operation display creation bank (UdESI)

■ Example: Adding a display that shows MV1 and MV2 simultaneously

(1) Prepare for operation display customization.
In the SEtUP bank, change the setting as follows

Display item	Auxiliary display	Item name	Settings
C-005	No display	Operation display customization	1: Customize

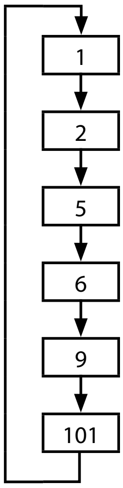
(2) Create a user-defined operation display.
In the UdESI (user-defined operation display creation) bank, change the settings as follows. In the example below, Loop 1 MV and Loop 2 MV are displayed with lit LEDs in the upper and lower displays as userdefined operation display 1.

Display item	Auxiliary display	Item name	Settings
Udd-1	1	Upper display: Lit	0: Lit
Udd-2	1	Upper display: Displayed data	2416: Loop 1 MV
Udd-3	1	Lower display: Lit	0: Lit
Udd-4	1	Lower display: Displayed data	2417: Loop 2 MV

(3) Set the switching order for operation displays.
In the dtUrn (operation display switching order) bank, change the settings as follows. In the example below, five types of standard operation display are selected as displays 1–5, and a user-defined operation display is selected for the sixth.

Display item	Auxiliary display	Item name	Settings
dt-01	No display	1st operation display	1: Loop 1 PV / Loop 1 SP
dt-02	No display	2nd operation display	2: Loop 1 PV / Loop 1 MV
dt-03	No display	3rd operation display	5: Loop 2 PV / Loop 2 SP
dt-04	No display	4th operation display	6: Loop 2 PV / Loop 1 MV
dt-05	No display	5th operation display	9: Loop 1 PV / Loop 2 PV
dt-06	No display	6th operation display	101: User-defined operation display 1

Every time the [display] key is pressed, the operation display will change as follows.



If user-defined operation displays are set in the dtUrn (operation display switching order) bank, the auxiliary display indicates the following:

Auxiliary display	Lighting status
U01	User-defined operation display 1
U02	User-defined operation display 2
U03	User-defined operation display 3
U04	User-defined operation display 4
U05	User-defined operation display 5
U06	User-defined operation display 6
U07	User-defined operation display 7
U08	User-defined operation display 8
U09	User-defined operation display 9
U10	User-defined operation display 10

Handling Precautions

- If C-005: Operation display customization of the SEtUP bank is set to" 1" (Customize), be sure to set the dtUrn (operation display switching order) bank. If it is necessary to display standard operation displays in addition to the created user-defined operation displays, they should also be set.
  Otherwise, the necessary standard operation displays will not be displayed.
- If no operation displays are set, or if the display conditions are not satisfied, the following is displayed:

Displays	Displayed item
Upper display	- - - - -
Lower display	- - - - -
Auxiliary display	ERR

7 - 15 Digital RSP

Models with optional RS-485 communications can use a digital RSP. Its value can be changed through communications. As with an analog RSP, it is possible to switch between LSP and RSP modes.

■ Setting banks

SP configuration bank (SPCnF)

■ Example

In the following example the loop type is set to 1 in order to use a digital RSP.

(1) Set the loop type.
Configure the settings in the setup bank (SEtUP) as shown below.

Display item	Auxiliary display	Item name	Settings
C-001	No display	Loop type	2: 1 loop (RSP)

(2) Set the digital RDP to be enabled.
In the SP configuration bank (SPCnF), set as follows.

Display item	Auxiliary display	Item name	Settings
CSP.11	L.1.	Digital RSP selection	1: Enabled

(3) Write the desired value to the digital RSP data address via communications.
Write the desired value to the digital RSP (CSP.12) data address in the SP configuration bank (SPCnF).

Handling Precautions

- Either RAM or EEPROM data addresses can be used for the digital RSP, but if the SDC is constantly writing the RSP or if the RSP is changed 30 times or more per day, use RAM.
  For details about the difference between RAM address and EEPROM address, refer to:
  ☞ 9 - 4 Definition of Data Addresses (P. 9-12).

Note

- If the optional communications function is added to a 1-input model, "2: 1-loop (RSP)" can be selected as the loop type.
- When the loop type for a 2-input model is set to “2: 1 loop (RSP),” set “CSP.11: Digital RSP selection” to “1: Enabled.”

7 - 16 User Function Indicators

With user function indicators, users can set the conditions under which the LED is ON/OFF.
The SDC46 has 4 (uf1 to 4) indicators, while the SDC45 has 2 (uf1 to 2).
The default settings are shown below.

Indicators	Conditions for lighting	Lighting status
Uf1	1600: Loop 1 AT pause / AT status	2: Blinking (while ON)
Uf2	1547: When communicating	0: Blinks (when ON)
Uf3	1024: OFF	
Uf4	1024: OFF	

Note

- For location of the indicators, refer to:
  ☞ 1 - 3 Names and Functions of Parts (P. 1-8).

■Setting banks

Display/Key bank (HMI)

■Example

In the following example uf3 is set to blink during a loop 1 SP ramp.

(1) In the SP configuration bank (SPCnF), set the operation conditions for the SP ramp.
In this case we set the SP to change 10 units per minute.

Display item	Auxiliary display	Item name	Settings
CSP.01	1	SP ramp unit	1: No decimal point/min
CSP.02	1	Slope of SP up-ramp for LSP	10
CSP.03	1	Slope of SP down-ramp for LSP	10

(2) A bit that turns on during an SP ramp is available for both up and down ramps.
Set the bits to turn on for either direction by using a logical operation.
(Bank: bF)

Display item	Auxiliary display	Item name	Settings
bF-01	1	Type of operation	3: Operation 3 (A or B or C or D)
bF-02	1	Input assignment A	1648: Loop 1 SP ramp (up-ramp)
bF-03	1	Input assignment B	1648: Loop 1 SP ramp (down-ramp)
bF-04	1	Input assignment C	1024: OFF
bF-05	1	Input assignment D	1024: OFF

(3) Set the conditions for lighting uf3.

Display item	Auxiliary display	Item name	Settings
UFL.01	3	Conditions for lighting	1440: Results of logical operation 1
UFL.02	3	Lighting status	2: Blinking (while ON)

(4) Check that it operates properly.
When a new value is set for the SP, the SP should change according to the ramp setting. As it changes, uf3 should blink.

7 - 17 Multi-Status (MS) Indicator

The MS indicator uses LEDs to show the status of the MV or DI/DO.
It can show three pairs of conditions and lighting statuses, which are set in order of priority.

■Setting banks

Display/Key bank (HMI)

■Example: display of the MV output using the LED bar.

In this example the MV output is displayed on the LED bar.
In the display/key (MS display) bank (HMI), configure the settings as follows.

Display item	Auxiliary display	Item name	Settings
MS-01	1.	Conditions for lighting	1025: ON
MS-02	1.	Lighting status	15: MV graph (loop 1)
MS-03	1.	Decimal point position	1: 1 digit after the decimal point
MS-04	1.	Scaling low limit	0.0
MS-05	1.	Scaling high limit	100.0

■Conditions for lighting

Conditions for lighting (MS-01) are satisfied only if the specified lighting status is ON. If MS-01 is set to 1024 (OFF), the lighting conditions are never satisfied, and if it is set to 1025 (ON), they are always satisfied.

■Priority for the MS indicator

3 priorities can be set and shown on the indicator.
1. to 3. on the auxiliary display represent the 1st, 2nd, and 3rd priority settings respectively in the display/key (MS display) bank.

- If the conditions for 1st priority are satisfied, the 1st priority lighting status goes into effect.
- If the conditions for 1st priority are not satisfied, but the conditions for 2nd priority are, the 2nd priority lighting status goes into effect.
- If the conditions for 1st and 2nd priority are not satisfied, but the conditions for 3rd priority are, the 3rd priority lighting status goes into effect.
- If none of the conditions is satisfied, the MS indicator turns off.

Lighting status and display type

Specify MS indicator action in detail by setting the lighting status (mS-02). This determines the display type as well.

mS-02 Setting	Description	Notes	Display type
0	Lit		Lit blinking
1	Slow blinking		
2	2 blinks	Repeated 2 blinks and light off	
3	Rapid blinking		
4	Left to right	Moving light from left to right	
5	Right to left	Moving light from right to left	
6	Left-right round trip	Moving light to both ends	
7	Deviation OK (loop 1)	Whole indicator lit when deviation is within range.	Lit within the specified deviation
8	Deviation OK (loop 2)	Whole indicator off when deviation is out of range	
11	Deviation graph (loop 1)	Shows deviation with a bar display whose center is 0 %	Bar display (0-centered one side scaling)
12	Deviation graph (loop 2)		
15	MV graph (loop1)	MV or MFB shown with bar display	Bar display (fixed scaling)
16	MV graph (loop1)		
19	MV graph for heating (loop 1)		
20	MV graph for heating (loop 2)		
23	MV graph for cooling (loop 1)		
24	MV graph for cooling (loop 2)		
27	MFB1 graph		
29	DI/DO monitor (cols. C + F)	DI or DO monitor for cols. C and D	DI/DO monitor
30	DI/DO monitor (col. D)	DI or DO monitor for col. D	
31	DI/DO monitor (col. E)	DI or DO monitor for col. E	
32	Event status monitor	Monitors events 1 to 12	
2048 to 3071	Standard numerical codes	Shows standard numerical code using bar display	Bar display (low/high limit scaling)

Display type

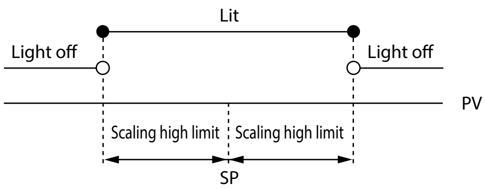
Lit blinking

Lights up, blinks, or lights with horizontal movement.

Lit within the specified deviation

When the deviation is within the specified range, the whole MS indicator is lit. Otherwise it is off.

- Set the deviation range for the scaling high limit (mS-05).
- Set the number of digits after the decimal point (mS-03) for the scaling high limit (mS-05).
- If the scaling high limit (mS-05) is set to 0 U, the whole MS indicator is lit only when PV = SP.



Light on/off when deviation is OK

● Bar display (0-centered one side scaling)

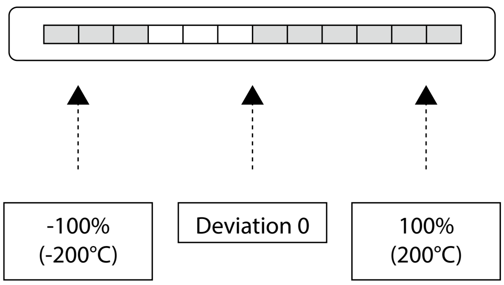
This shows scaled data (percentage) with a bar display.
The center of the MS indicator is 0 %. The left and right halves represent -100 to 0 % and 0 to 100 % respectively.

- For the scaling high limit (MS-05), set the value in the target data that is equivalent to 100 %.

- Set the number of digits after the decimal point (MS-03) for the scaling high limit (MS-05).

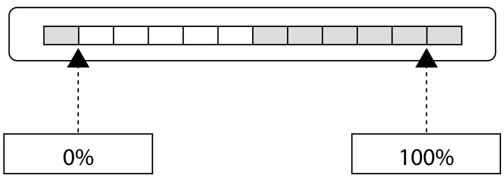
Range of target data	MS indicator (□: Light ON, ■: Light OFF)
X ≦ 100.0%	□□□□□□■■■■■■
−100.0% < X ≦ −80.0%	■□□□□□■■■■■■
−80.0% < X ≦ −60.0%	■■□□□□■■■■■■
−60.0% < X ≦ −40.0%	■■■□□□■■■■■■
−40.0% < X ≦ −20.0%	■■■■□□■■■■■■
−20.0% < X ≦ 0.0%	■■■■■□■■■■■■
0.0% < X ≦ 20.0%	■■■■■■□■■■■■
20.0% < X ≦ 40.0%	■■■■■■□□■■■■
40.0% < X ≦ 60.0%	■■■■■■□□□■■■
60.0% < X ≦ 80.0%	■■■■■■□□□□■■
80.0% < X ≦ 100.0%	■■■■■■□□□□□■
100.0% < X	■■■■■■□□□□□□

- For example, to show a deviation of ±200 °C on the MS indicator, set the scaling high limit (MS-05) to 200 (digits after the decimal point: 0). If the deviation is -100 °C (-50 %), the bar display will be as shown below.



● Bar display (fixed scaling)

The left end of the MS indicator is 0 %, and the whole bar shows 0 to 100 %.



Range of target data	MS indicator (□: Light ON, ■: Light OFF)
X ≦ 0.0%	■■■■■■■■■■■■
0.0% < X ≦ 10.0%	■□■■■■■■■■■■
10.0% < X ≦ 20.0%	■□□■■■■■■■■■
20.0% < X ≦ 30.0%	■□□□■■■■■■■■
30.0% < X ≦ 40.0%	■□□□□■■■■■■■
40.0% < X ≦ 50.0%	■□□□□□■■■■■■
50.0% < X ≦ 60.0%	■□□□□□□■■■■■
60.0% < X ≦ 70.0%	■□□□□□□□■■■■
70.0% < X ≦ 80.0%	■□□□□□□□□■■■
80.0% < X ≦ 90.0%	■□□□□□□□□□■■
90.0% < X ≦ 100.0%	■□□□□□□□□□□■
100.0% < X	■□□□□□□□□□□□

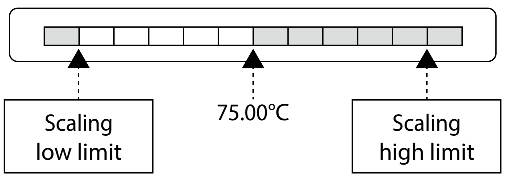
● Bar display (low/high limit scaling)

The left end of the MS indicator is 0 % and the bar shows scaled percentage data (0 to 100 %).

- For the scaling low and high limits (MS-04 and MS-05), set the target data values that are equivalent to 0 and 100 % respectively. The low limit setting must be less than the high limit setting.
- Set the number of digits after the decimal point (MS-03) for the scaling low limit and high limits (MS-04 and MS-05).

Range of target data	MS indicator (□: Light ON, ■: Light OFF)
X ≦ 0.0%	■■■■■■■■■■■■
0.0% < X ≦ 10.0%	■□■■■■■■■■■■
10.0% < X ≦ 20.0%	■□□■■■■■■■■■
20.0% < X ≦ 30.0%	■□□□■■■■■■■■
30.0% < X ≦ 40.0%	■□□□□■■■■■■■
40.0% < X ≦ 50.0%	■□□□□□■■■■■■
50.0% < X ≦ 60.0%	■□□□□□□■■■■■
60.0% < X ≦ 70.0%	■□□□□□□□■■■■
70.0% < X ≦ 80.0%	■□□□□□□□□■■■
80.0% < X ≦ 90.0%	■□□□□□□□□□■■
90.0% < X ≦ 100.0%	■□□□□□□□□□□■
100.0% < X	■□□□□□□□□□□□

- For example, if the scaling is set for a PV of 0.00 to 150.00 °C (with 2 digits after the decimal point), a PV of 75.00 °C is shown as below.



● DI/DO monitor

This is used to show whether DI, DO, and events are ON or OFF. The LED assignments are shown below.

DI/DO monitor (columns C and F)

LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8	LED 9	LED 10	LED 11	LED 12
DI-C1	DI-C2	DI-C3	DI-C4	DI-C5	DI-C6	DI-C7	DI-C8	DI-F1	DI-F2	OFF	OFF
DO-C1	DO-C2	DO-C3	DO-C4	DO-C5	DO-C6	DO-C7	DO-C8	DI-F1	DI-F2	OFF	OFF

Note: In col. C, DI or DO is implemented depending on the model number.

DI/DO monitor (column D)

LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8	LED 9	LED 10	LED 11	LED 12
DI-D1	DI-D2	DI-D3	DI-D4	DI-D5	DI-D6	DI-D7	DI-D8	OFF	OFF	OFF	OFF

DI/DO monitor (column E)

LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8	LED 9	LED 10	LED 11	LED 12
DI-E1	DI-E2	DI-E3	DI-E4	DI-E5	DI-E6	DI-E7	DI-E8	OFF	OFF	OFF	OFF

Event No.

LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8	LED 9	LED 10	LED 11	LED 12
EV 1	EV 2	EV 3	EV 4	EV 5	EV 6	EV 7	EV 8	EV 9	EV 10	EV 11	EV 12

Note: The status of events 13 and following is not shown.

7 - 18 Key Lock, Communications Lock, and Loader Lock

To protect settings and prevent inadvertent changes, access can be restricted by key lock, RS-485 communications lock, and loader communications lock.

■Setting banks

Lock bank (LoCK)

Key lock levels and restricted items related to setting changes (❍: accessible, ×: inaccessible)

Target parameter	K.LoC1 (key lock and setting change) settings			
	0	1	2	3
Settings assigned to rsp/lsp, at, F1, and F2 keys Manual MV on the operation display Lock bank parameters SP group (recipe group)/LSP value on the operation display	❍	❍	❍	❍
Multi-SP bank parameters RSP bank parameters Recipe bank parameters	❍	❍	❍	×
Event setup bank parameters Mode bank parameters	❍	❍	×	×
Setting changes in banks other than the above	❍	×	×	×

Key lock levels and restricted items related to display (❍: accessible, ×: inaccessible)

Target parameter	K.LoC2 (key lock and display) settings		
	0	1	2
Settings assigned to rsp/lsp, at, F1, and F2 keys Operation display (PV, SP, MV, etc.) Multi-SP bank parameters RSP bank parameters Recipe bank parameters Lock bank parameters	❍	❍	❍
Event setup bank parameters Mode bank parameters Instrument information bank parameters	❍	❍	×
Display of banks other than the above	❍	×	×

Lock levels and restricted items related to communications and loaders

Display item	Auxiliary display	Item name	Settings
C.LoC1		RS-485 lock on reading	0: Unlock, 1: Lock
C.LoC2		RS-485 lock on writing	0: Unlock, 1: Lock
C.LoC1		Loader lock on reading	0: Unlock, 1: Lock
C.LoC2		Loader lock on writing	0: Unlock, 1: Lock

Handling Precautions

- Even with a lock on RS-485 or loader communications, reading/writing the following parameters is possible.

Bank	Item
Setup	Release all latches
SP group selection	SP group selection
Mode	RUN/READY AUTO/MANUAL AT stop/start LSP/RSP Backup/through output
Communications profile (instrument status)	READY/RUN AUTO/MANUAL AT cancel/execution LSP/RSP PAV SP MV
Communications profile (operation)	SP group selection LSP Manual MV READY/RUN AUTO/MANUAL AT stop/start LSP/RSP
PV	Decimal point position
RSP	RSP
Control	Decimal point position for loop PV/SP
Output (continuous output)	Decimal point position for output
Monitor	All items
User-defined bit	All items
Standard bit	All items
Standard numerical code	All items

7 - 19 Password

A password can be set to prevent settings of the key lock, RS-485 communication lock, and loader communication lock from being changed.

■Setting banks

Lock bank (LoCK)

Item display	Auxiliary display	Item name	Settings
PASS	(None)	Password display	0 to 15 5: Show passwords 1 and 2
PAS1A	(None)	Password1A (Input of password 1)	0000 to FFFF (hexadecimal value)
PAS2A	(None)	Password2A (Input of password 2)	0000 to FFFF (hexadecimal value)
PAS1b	(None)	Password1B (Lock/unlock password 1)	0000 to FFFF (hexadecimal value)
PAS2b	(None)	Password2B (Lock/unlock password 2)	0000 to FFFF (hexadecimal value)

■Password display

Passwords 1 and 2 can be displayed and set (input, locked/unlocked) only when password display (PASS) is set to 5.
After changing the settings (input, locking/unlocking) for passwords 1 and 2, set password display (PASS) to 0.

■Input of passwords

(1) Specify 2 hexadecimal values for the 2 passwords.
(2) For password 1, set password 1A (PAS1A).
(3) For password 2, set password 2A (PAS2A).

■Locking

(1) Input some value other than password 1 as the password 1B (PAS1b) setting.
(2) Input some value other than password 2 as the password 2B (PAS2b) setting.
(3) The key lock, RS-485 lock, and loader lock settings are now protected from accidental or unauthorized change. Also, password 1A (PAS1A) and password 2A (PAS2A) are now displayed as "[-----]" and are protected from change.

Unlocking

(1) Input password 1 as the password1B (PAS1b) setting.
(2) Input password 2 as the password2B (PAS2b) setting.
(3) The key lock, RS-485 communications lock, and loader communications lock settings can now be changed.
Also, the hexadecimal values for passwords 1A (PAS1A) and 2A (PAS2A) can be displayed and changed.

Handling Precautions

- Make sure that passwords 1 and 2 are not forgotten
- Unlocking is possible only if passwords 1 and 2 are both correctly matched. If only one password is correct, the lock will remain in force. If password input is unsuccessful, it is not possible to determine whether either password 1 or 2 was correct or incorrect.
- If the passwords cannot be entered correctly, contact the azbil Group or a dealer. Passwords can be reset to the default settings at the factory.
If this is done, all customer settings on the device will be lost.

7 - 20 Sampling Cycle

The sampling cycle of the SDC45A/46A consists of updating the analog input and calculating the control constants.
The frequency of the sampling cycle can be changed as needed, according to the characteristics of the control target, to achieve better control.
The default setting is 100 ms (setting 2).

■Setting banks

Setup bank (SEtUP)

■Example

The SDC setting below is used for a rapid-response ceramic heater.
The sampling cycle is 25 ms.

Display item	Auxiliary display	Item name	Settings
C-012	(None)	Sampling cycle	0: 25ms

7 - 21   Startup Delay after Power-On

The time from power-on until the beginning of operation can be extended to as much as 60 s.
Operation begins after the startup time (2 to 5 s depending on the model) and the time set for delay elapse.
The startup time for the model cannot be reduced.
The default setting is 0 s.

■Setting banks

Setup bank (SEtUP)

■Example

When set as below, the SDC begins to operate 30 s or more after power-on.

Display item	Auxiliary display	Item name	Settings
C-013	(None)	Startup delay after power-on	30

7 - 22 Brightness Adjustment

The brightness of the upper, lower, and auxiliary displays can be changed to one of 3 levels.
The default setting is 0 (Standard).

■Setting banks

Setup bank (SEtUP)

■Example

With the setting below, the display brightness becomes 1 step darker than the regular setting.

Display item	Auxiliary display	Item name	Settings
C-040	(None)	Display brightness	1: Somewhat dark

7 - 23   SP Bias

A bias can be added to the SP.

Setting banks

SP configuration bank (SPCnF)

Example

With the settings shown below, the LSP and RSP of loop 1 are assigned a bias of 10.0 and 20.0 respectively.

(1) Set the LSP bias.
In the SP configuration bank (SPCnF), set as follows.

Display item	Auxiliary display	Item name	Settings
CSP.07	L. 1.	LSP bias	10.0

(2) Set the RSP bias.
In the SP configuration bank (SPCnF), set as follows.

Display item	Auxiliary display	Item name	Settings
CSP.08	L. 1.	RSP bias	20.0

7 - 24 Heater Power Supply Voltage Compensation (C45R/46R only)

On models with AC input, compensation for heater supply voltage fluctuation is available using AC input.
The heater voltage compensation function improves control by correcting the output (MV) in proportion to the fluctuation of the supply voltage of a heater used as the actuator in temperature control.
AC 1 and 2 are available for AC input.

■ Connections for heater supply voltage input

Refer to:
■ Connections for heater power supply voltage input (P. 3-15).

■ Setting banks

Set AC input in the AC input bank.
The auxiliary display shows the AC input No. (1: AC1, 2: AC2).

Bank	Item display	Item name	Settings
AC (AC input bank)	AC-01	Reference voltage	4.00 to 11.00V
	AC-02	Filter	0.00 to 120.00s

Set up heater supply voltage compensation in the output bank (continuous or ON/OFF).
If output is current or continuous voltage, set Co-08. For time proportional output, set tPo.08. The auxiliary display shows the output No. (1 to 7).

Bank	Item display	Item name	Settings
oUt (Output bank)	Co-08	Supply voltage compensation selection	0: Disabled 1: Correction using AC 1 input 2: Correction using AC 2 input
	tPo.08	Supply voltage compensation selection	0: Disabled 1: Correction using AC 1 input 2: Correction using AC 2 input

■ Reference voltage (AC-01)

Set the amount of the AC voltage output from the transformer for the heater.
For example, if the voltage is decreased from 200 V to 10 V, set 10.00.
The SDC will determine the amount of compensation depending on the ratio of the actual AC input voltage to the reference voltage.

■ Filter (AC-02)

The AC input voltage can be filtered with a primary delay filter.
If the heater supply voltage is affected by small rapid fluctuations, with a negative effect on the compensation of the output (MV), this filter can reduce the effect.

■ Power supply voltage compensation selection (Co-08, tPo.-08)

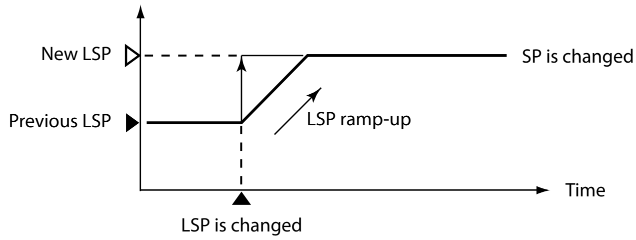
Correction by AC1 or AC2 input is available for continuous output (current or continuous voltage) or time proportional output.

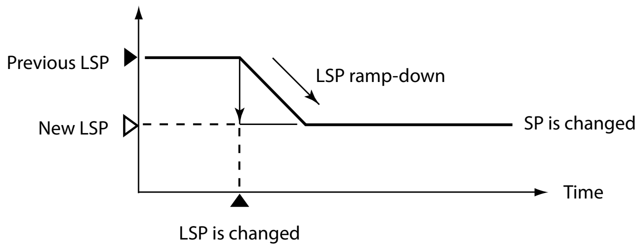
! Handling Precautions

- If the AC input voltage is less than 80 % of the reference voltage setting, the output (MV) will not be compensated.
  If the AC input voltage is 120 % or more of the reference voltage setting, the compensated output (MV) will be 120 %.
- The purpose of AC input is not to measure the supply voltage, but to improve temperature control by the heater.

7 - 25   How to Change the LSP with Constant Ramp

When changing the set value of the LSP or the SP group selection, it is possible to change the SP with a constant SP ramp.



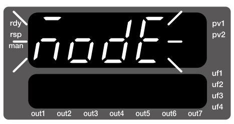


Bank and settings

Bank	Item display	Item name	Settings
SPCnF (SP configuration bank)	CSP.01	SP ramp unit	0: No decimal point/s, 1: No decimal point/min, 2: No decimal point/h, 3: 0.1/s, 4: 0.1/min, 5: 0.1/h, 6: 0.01/s, 7: 0.01/min, 8: 0.01/h, 9: 0.001/s, 10: 0.001/min, 11: 0.001/h
	CSP.02	SP ramp-up for LSP	0 U (No ramp) 1 to 32000 U (decimal point position may vary depending on the SP ramp unit)
	CSP.03	SP ramp-down for LSP	0 U (No ramp) 1 to 32000 U (decimal point position may vary depending on the SP ramp unit)
	CSP.09	PV start for LSP	0: Enabled, 1: Disabled

Setting procedures

(1) Keep the [para] key pressed for 2s in the operation display status.
>> mode is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until SPCnF is shown on the upper display.
>> SPCnF is flashing on the upper display.

(3) Press the [enter] key.
>> Lnt.01 is shown on the upper display. At this time, check that the auxiliary display shows L. 1. This shows that the loop 1 is currently active.

(4) Press the [∨] key several times until CSP.01 is shown on the upper display.
>> CSP.01 is shown on the upper display.

(5) Press the [enter] key.
>> The value on the lower display starts flashing.

(6) Set a desired value with the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for CSP.02 to CSP.03.
(9) When settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

■Conditions for ramp start

- LSP value is changed.
- SP group (multi-SP group/recipe group) is changed.
- Mode is changed from RSP to LSP.

■Conditions for ramp start with PV used as start point

If any of the following arises, the ramp is started with PV used as start point instead of the previous SP:

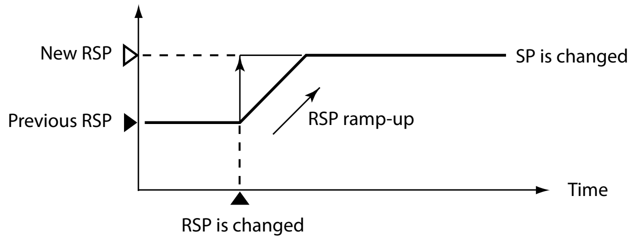
- The power is turned ON.
- The MANUAL mode is changed to the AUTO mode.
- The READY mode is changed to the RUN mode.
- The through output is changed to the backup mode.
- The fixed value output is released.
- The "Loop type" item of the setup bank is changed.

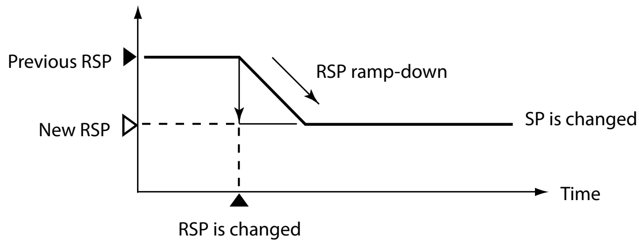
Handling Precautions

- In any one of the following situations, SDC ramp operation will not begin. Also, if a ramp is in progress and one of these situations occurs, the ramp operation will be halted.
  - In MANUAL mode
  - In READY mode
  - In through-output mode
  - When ramp operations are prohibited by internal contact input
  - While fixed-value output is being generated
- Under the following circumstances ramp operation cannot be initiated by the PV.
  - If a PV input error occurs
  - If PV start (CSP.09) is set to 1 (PV start disabled)

7 - 26 How to Change the RSP with Constant Ramp

When changing the set value of the RSP, it is possible to change the SP with a constant SP ramp.



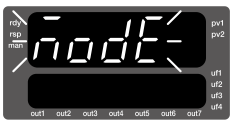


Bank and settings

Bank	Item display	Item name	Settings
SPCnF (SP configuration bank)	CSP.01	SP ramp unit	0: No decimal point/s, 1: No decimal point/min, 2: No decimal point/h, 3: 0.1/s, 4: 0.1/min, 5: 0.1/h, 6: 0.01/s, 7: 0.01/min, 8: 0.01/h, 9: 0.001/s, 10: 0.001/min, 11: 0.001/h
	CSP.05	SP ramp-up for RSP	0 U (No ramp) 1 to 32000 U (decimal point position may vary depending on the SP ramp unit)
	CSP.06	SP ramp-down for RSP	0 U (No ramp) 1 to 32000 U (decimal point position may vary depending on the SP ramp unit)
	CSP.10	PV start for RSP	0: Enabled, 1: Disabled

Setting procedures

(1) Keep the [para] key pressed for 2s in the operation display status.
>> mode is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until SPCnF is shown on the upper display.
>> SPCnF is flashing on the upper display.

(3) Press the [enter] key.
>> Lnt.01 is shown on the upper display. At this time, check that the auxiliary display shows L.1. This shows that the loop 1 is currently active.

(4) Press the [∨] key several times until CSP.01 is shown on the upper display.
>> CSP.01 is shown on the upper display.

(5) Press the [enter] key.
>> The value on the lower display starts flashing.

(6) Set a desired value with the [∨] key or [∧] key.
(7) Press the [enter] key to set the value.
(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for CSP.05 to CSP.06.
(9) When settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

■ Conditions for ramp start

- RSP value is changed.
- Mode is changed from LSP to RSP.

■ Conditions for ramp start with PV used as start point

If any of the following arises, the ramp is started with PV used as start point instead of the previous SP:

- The power is turned ON.
- The MANUAL mode is changed to the AUTO mode.
- The READY mode is changed to the RUN mode.
- The through output is changed to the backup mode.
- The fixed value output is released.
- The "Loop type" item of the setup bank is changed.

! Handling Precautions

- In any one of the following situations, SDC ramp operation will not begin. Also, if a ramp is in progress and one of these situations occurs, the ramp operation will be halted.
  - In MANUAL mode
  - In READY mode
  - In through-output mode
  - When ramp operations are prohibited by internal contact input
  - While fixed-value output is being generated
- Under the following circumstances ramp operation cannot be initiated by the PV.
  - If a PV input error occurs
  - If PV start (CSP.10) is set to 1 (PV start disabled)

7 - 27 Setting the MV Change Limit

The amount of MV change (%) per second can be limited by setting the MV change limit.

Bank and settings

Bank	Item display	Item name	Settings
CtrL (Control bank)	Ctd.05	MV up change limit	MV change limit per second when the MV is increasing 0.00 %/s setting: no change limit 0.00 to 320.00 %/s
	Ctd.06	MV down change limit	MV change limit per second when the MV is decreasing 0.00 %/s setting: no change limit 0.00 to 320.00 %/s

Handling Precautions

- If a change limit is not needed for the MV, set to 0.00.
- Azbil Corporation's SDC40A series uses a different time unit (amount of change per 0.1 seconds) for the same parameters. Accordingly, if the SDC40A is replaced with the SDC45/46, change the setting as follows.

  Example: Setting for SDC40A: 0.2 (0.2 % / 0.1 s)
  ↓
  Setting for SDC45/46: 2.00 (2 %/s)

7 - 28 Zener barrier adjustment

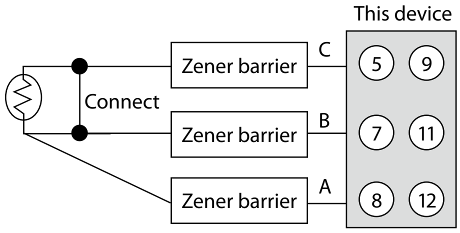
When using zener barriers where the PV range of a resistance temperature detector (RTD) is set, be sure to adjust the difference in resistance between the zener barriers. Zener barrier adjustment is also necessary when zener barriers are not used, if the wiring for an RTD is long and its wiring resistance affects device operation. The adjustment function is not available for input types other than RTD.

■Bank and settings

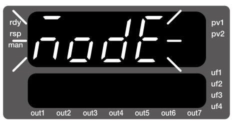
Bank	Item display	Item name	Settings
Pu (PV bank)	Pu-07	Zener barrier adjustment	Difference in resistance

■Adjustment method

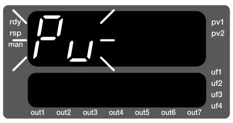
(1) Turn off power to the device. Mount and wire the RTD and zener barriers. Connect zener barriers A and B using the RTD terminals.



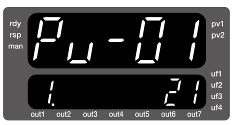
(2) Turn on the device. With operation status displayed, press the [para] key for 2 seconds.
>> modE blinks on the upper display.



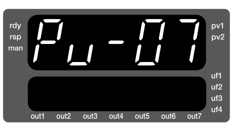
(3) Press the [v] key or [para] key several times until Pu is displayed on the upper display.
>> Pu blinks on the upper display.



(4) Press the [enter] key.
>> Pu-01 is displayed on the upper display. At this time, check that 1. (meaning PV1) is shown on the auxiliary display.
(To set PV2, change the value with the [>] key or [<] key.).



(5) Press the [v] key or [para] key several times until Pu-07 is displayed on the upper display.
>> Pu-07 is displayed on the upper display.



(6) Press the [enter] key.
>> The difference in resistance blinks on the lower display.
(7) Press the [enter] key to save the difference in resistance between lines A and C as the amount of adjustment.
(8) When you finish changing the settings, press the [display] key.
>> The device displays the operation status.
(9) Turn off the device and disconnect zener barriers A and B using the RTD terminals.

! Handling Precautions

- Zener barriers can be used only with PV range 21, 22, 31, or 32.
- The allowable wiring resistance is 85 Ω or less, including the resistance of the zener barriers.
- A difference in zener barrier resistance of more than 20 Ω cannot be corrected.
- After the zener barrier adjustment is set, the same correction will be made even if the PV range type is changed or if no zener barriers are used. In these cases, be sure to redo the zener barrier adjustment.
- Use zener barriers recommended by Azbil Corporation.
  Recommended zener barriers (for RTD)
  8907/22-02/120 (made by Azbil Corporation)
  NZB3-1R75 (made by Nakamura Electric Mfg. Co., Ltd.)

7 - 29 Heating/Cooling Control

If the control operation is set to “2” (Heating/cooling), heating and cooling are controlled.

■Bank and settings

Bank	Item display	Auxiliary display	Item name	Settings
CtrL Control (basic) bank	Cnt.03	L.1.	Control operation (Loop 1)	0: Reverse (heating) 1: Direct (cooling) 2: Heating/cooling Set to “2” (Heating/cooling).
	Cnt.08	L.1.	Heating/cooling control deadband (Loop 1)	-100.0 to +100.0 %
	Cnt.09	L.1.	PID initial MV (Loop 1)	-10.0 to +110.0 % Normal setting is 50.0 %.
	Same as above	L.2.	Loop 2 has the same items as Loop 1 above.	
CtrL Control (advanced) bank	Etd.02	L.1.	Decimal point position for integral time/ derivative time (Loop 1) *3	0: No decimal point 1: 1 digit after the decimal point 2: 2 digits after the decimal point
	Etd.07	L.1.	Heating/cooling selection (Loop 1)	0: Normal 1: Energy-saving
	Same as above	L.2.	Loop 2 has the same items as Loop 1 above.	
mv MV (basic) bank	mv.01	L.1.	MV in READY mode (Loop 1)	-10.0 to +110.0 % The setting for this item does not affect heating/cooling control.
	mv.02	L.1.	MV in READY mode (heating) (Loop 1)	-10.0 to +110.0 %
	mv.03	L.1.	MV in READY mode (cooling) (Loop 1)	-10.0 to +110.0 %
	Same as above	L.2.	Loop 2 has the same items as Loop 1 above.	
L1.PId Loop 1 PID bank	P-01	L.1.	Proportional band (PID 1 group) (Loop 1) *1 *4	0.1 to 3200.0 %
	I-01	L.1.	Integral time (PID 1 group) (Loop 1) *1 *3	0 to 32000 s
	d-01	L.1.	Derivative time (PID 1 group) (Loop 1) *1 *3	0 to 32000 s
	oL-01	L.1.	MV low limit (PID 1 group) (Loop 1) *1	-10.0 to +110.0 %
	oH-01	L.1.	MV high limit (PID 1 group) (Loop 1) *1	-10.0 to +110.0 %
	rE-01	L.1.	Manual reset (PID 1 group) (Loop 1) *2	-10.0 to +110.0 %
	P-01C	L.1.	Proportional band for cooling (PID 1 group) (Loop 1) *4	0.1 to 3200.0 %
	I-01C	L.1.	Integral time for cooling (PID 1 group) (Loop 1) *3	0 to 32000 s
	d-01C	L.1.	Derivative time for cooling (PID 1 group) (Loop 1) *3	0 to 32000 s
	oL.01C	L.1.	MV low limit for cooling (PID 1 group) (Loop 1)	-10.0 to +110.0 %
	oH.01C	L.1.	MV high limit for cooling (PID 1 group) (Loop 1)	-10.0 to +110.0 %
	P-02 to oH.16C	L.1.	PID groups 2–16 (Loop 1) are the same way.	
L2.PId Loop 2 PID bank	P-01 to oH.16C	L.2.	Like Loop 1, Loop 2 has PID groups 1–16.	

*1 The proportional band, integral time, derivative time, MV low limit, and MV high limit parameters are used for heating. To differentiate them from the parameters for cooling, "for heating" is added to the parameter names in the following sections.

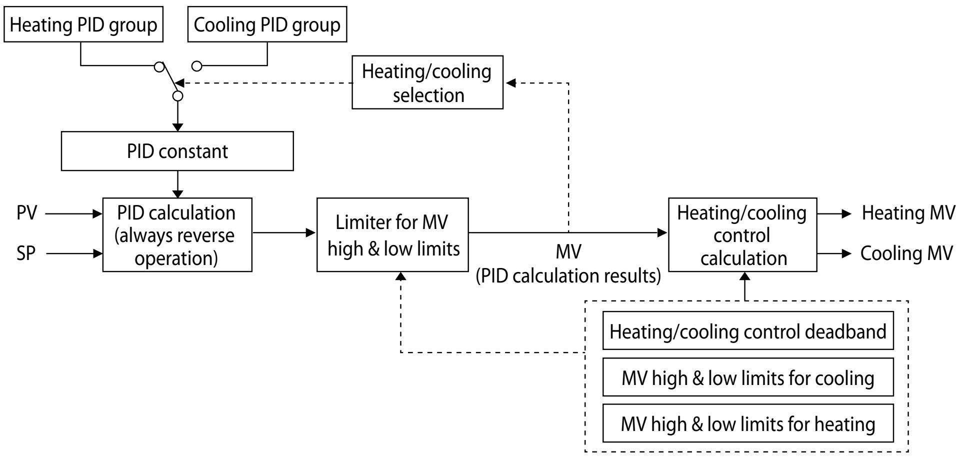
*2 The "Manual reset" parameter is used for both heating and cooling. It is enabled when integral time for heating or cooling is set to 0.

*3 The decimal point position and high limit for the integral time for heating, derivative time for heating, integral time for cooling, and derivative time for cooling will change depending on the setting for "Decimal point position for integral time/derivative time."

*4 When replacing a heat/cool output model of the C40A controller with this device, the settings of the proportional band and the proportional band for cooling should be about 1/2 the values set for the C40A. This is because the C40A uses the amount of change (width) of the PV by the heating MV and the cooling MV as the proportional band, while this device uses the change of the PV by the heating MV only as the proportional band.

Calculations for heating and cooling control

Heating/cooling control calculations are as follows.



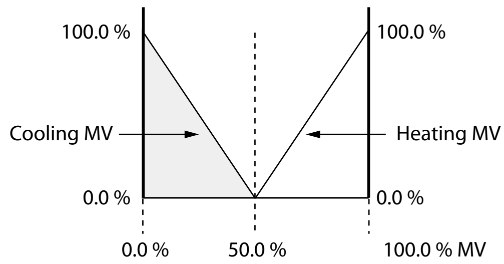
If MV ≥ 50 %, PID groups for heating will be enabled.
If MV < 50 %, PID groups for cooling will be enabled.

Handling Precautions

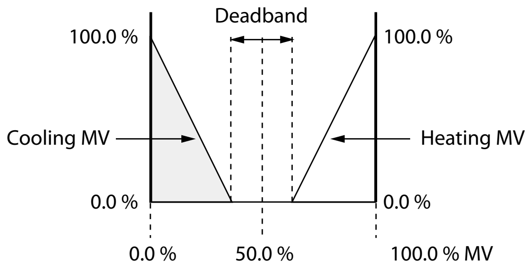
- If Etd.07 (Heating/cooling selection) is set to "1" (Energy-saving), switching between heating and cooling will be restricted, resulting in better energy efficiency. Note that if Cnt.08 (Heating/cooling control deadband) is less than 0.0 %, energy efficiency will not be improved.

Heating/cooling control deadband

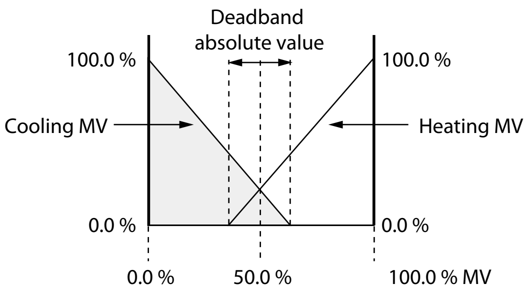
The heating MV and cooling MV are output in accordance with the MV obtained by PID control calculation. The heating MV and cooling MV shown in the figures below are output in accordance with the setting for "Heating/cooling control deadband."



When deadband = 0.0 %



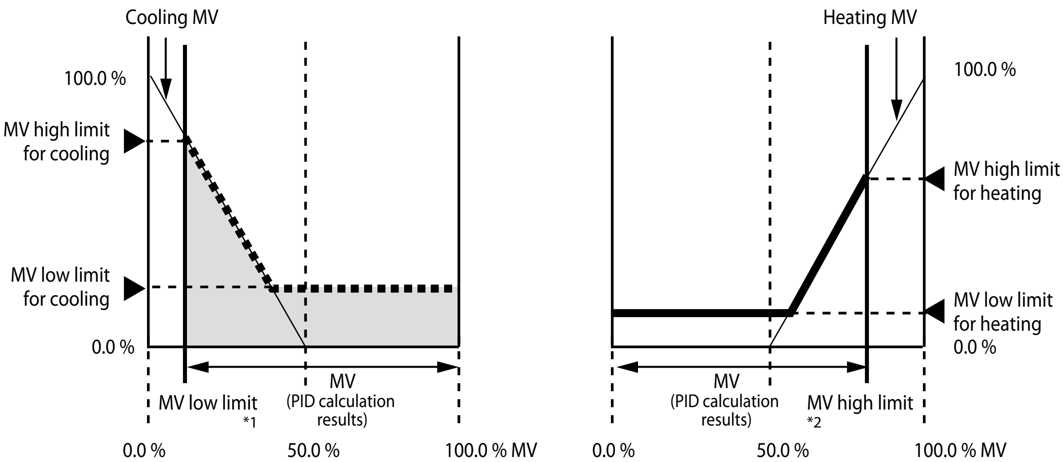
When deadband > 0.0 %



When deadband < 0.0 %

High and low limits for heating MV and cooling MV

The "MV high limit for cooling" and "MV low limit for cooling" parameters are high and low limits for cooling output. The "MV high limit for heating" and "MV low limit for heating" parameters are high and low limits for heating output. (The following figures are when the heating/cooling control deadband = 0.0 %.)



*1 The MV (resulting from PID calculation) will not be below the MV low limit.

*2 The MV (resulting from PID calculation) will not exceed the MV high limit.

! Handling Precautions

- When "Heating/cooling control deadband" is less than 0 %, specify "MV high limit for cooling" and "MV high limit for heating" so that the MV low limit is less than 50 % and the MV high limit is 50 % or above. The limits are calculated using the following formulas:

  - MV low limit = (100 - MV high limit for cooling) × (100 - Heating/cooling control deadband) ÷ 200

    MV high limit = (MV high limit for heating - 100) × (100 - Heating/cooling control deadband) ÷ 200 + 100

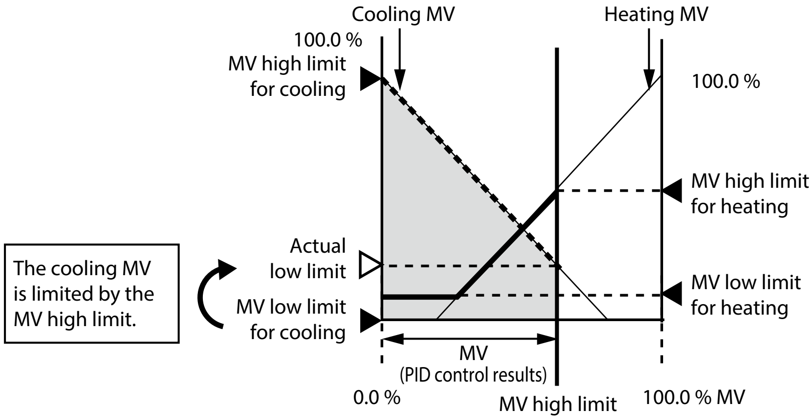
    (If the result of calculation is less than 0.0 % or more than 100.0 %, it is handled as 0.0 % and 100.0 %.)

    Ex. 1: When deadband = -25 %, MV high limit for cooling = 80 %, MV high limit for heating = 80 %
    MV low limit = (100 - 80) × (100 - (-25)) ÷ 200 = 12.5 % ← OK
    MV high limit = (80 - 100) × (100 - (-25)) ÷ 200 + 100 = 87.5 % ← OK

    Ex. 2: When deadband = -75 %, MV high limit for cooling = 80 %, MV high limit for heating = 40 %
    MV low limit = (100 - 80) × (100 - (-75)) ÷ 200 = 17.5% ← OK
    MV high limit = (40 - 100) × (100 - (-75)) ÷ 200 + 100 = 47.5 % ← Not allowed

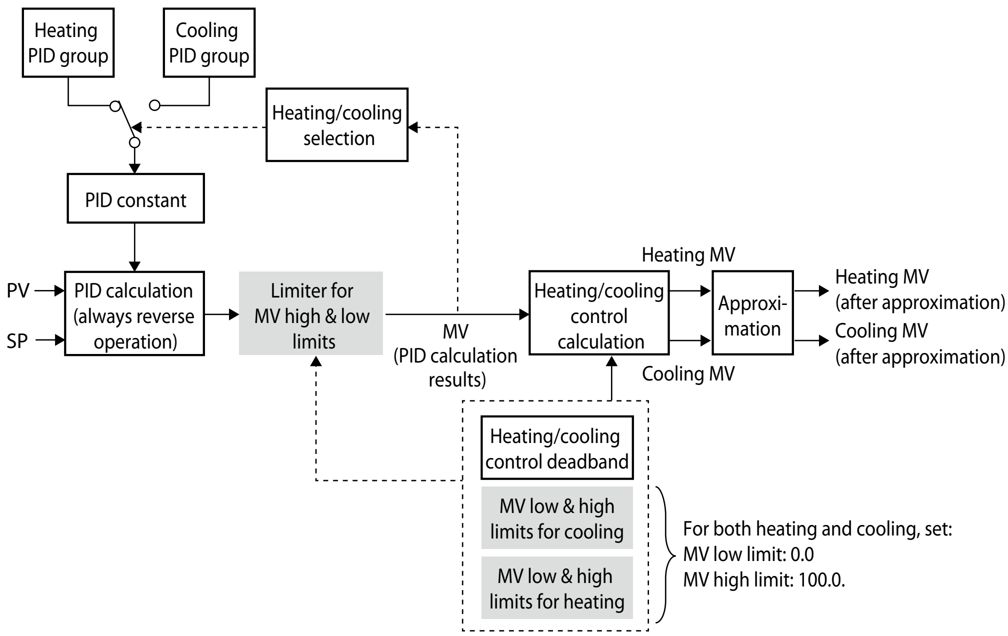
- Note that when the MV low limit and MV high limit are restricted, the actual MV low limits for heating and cooling may be above the specified low limits for heating and cooling. To prevent this from happening, be sure to set "MV high limit for cooling" and "MV high limit for heating" as instructed above.

Example: When the cooling MV does not reach the MV low limit for cooling



Note

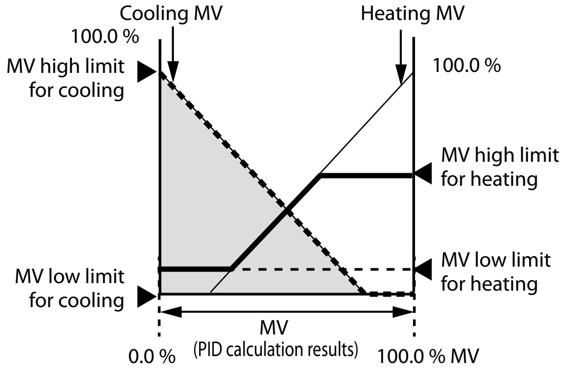
- To prevent the cooling MV from being limited by the MV high limit, the approximation function can be used as shown below.



Example: Use breakpoint groups 1 and 2 in the linearization table to set high and low limits for the continuously output heating MV and cooling MV that are controlled by the PID 1 group

Bank	Item display	Auxiliary display	Item name	Settings
L1.PId Loop 1 PID bank	oL-01	L.1.	MV low limit (PID 1 group)	0.0 %
	oH-01	L.1.	MV high limit (PID 1 group)	100.0 %
	oL.01C	L.1.	MV low limit for cooling (PID 1 group)	0.0 %
	oH.01C	L.1.	MV high limit for cooling (PID 1 group)	100.0 %
oUt Output (continuous output) bank	Co-02	3.	Output type (Output 3)	2: Heating MV (for heating/cooling control)
	Co-07	3.	Linearization table breakpoint group definition (Output 3)	1: Group 1
	Co-02	4.	Output type (Output 4)	3: Cooling MV (for heating/cooling control)
	Co-07	4.	Linearization table table breakpoint group definition (Output 4)	1: Group 2
tbL Linearization table bank	tb.dP	1.	Breakpoint decimal point position (linearization table 1)	1: 1 digit after the decimal point
	tb.A.01	1.	Breakpoint A1 (linearization table 1)	MV low limit for heating
	tb.A.02	1.	Breakpoint A2 (linearization table 1)	MV high limit for heating
	tb.A.03–tb.A.20	1.	Breakpoints A3–A20 (linearization table 1)	0.0
	tb.b.01	1.	Breakpoint B1 (linearization table 1)	MV low limit for heating
	tb.b.02	1.	Breakpoint B2 (linearization table 1)	MV high limit for heating
	tb.b.03–tb.b.20	1.	Breakpoints B3–B20 (linearization table 1)	0.0
	tb.dP	2.	Breakpoint decimal point position (linearization table 2)	1: 1 digit after the decimal point
	tb.A.01	2.	Breakpoint A1 (linearization table 2)	MV low limit for cooling
	tb.A.02	2.	Breakpoint A2 (linearization table 2)	MV high limit for cooling
	tb.A.03–tb.A.20	2.	Breakpoints A3–A20 (linearization table 2)	0.0
	tb.b.01	2.	Breakpoint B1 (linearization table 2)	MV low limit for cooling
	tb.b.02	2.	Breakpoint B2 (linearization table 2)	MV high limit for cooling
	tb.b.03–tb.b.20	2.	Breakpoints B3–B20 (linearization table 2)	0.0

Operation will be as shown below.



Handling Precautions

- If this method is used, please note the following:
    - The values output for the MV in Ready mode (for heating/cooling), etc., are all after approximation.
      ☞ ■ Control process block diagram (heat/cool control) (P. App.-7)
      ☞ ■ Continuous output process block diagram (P. App.-10)
      ☞ ■ ON/OFF output process block diagram (P. App.-11) (for details)
- The AT results when approximation is used is different from the results when AT is executed without using approximation. This is because the MV high and low limits are different.

Chapter 8. LIST OF SETTINGS

Refer to: "Single Loop Controller Model C45/46 User's Manual for Displays and Settings (CP-SP-1265E)".

Chapter 9. CPL COMMUNICATIONS FUNCTION

9 - 1 Outline of Communication

If the optional model is provided with the RS-485 communication function, communication with a PC, PLC or other host devices are available using a user-configured program.
The communication protocol of this unit can be selected from the Controller Peripheral Link (CPL) communication (Azbil Corporation's host communication protocol) and the Modbus communication.
This chapter describes the CPL communications.

■ Features

The features of the SDC45/46's communication function are as follows:

- Up to 31 units can be connected to a single master station as a host device.
- When the communication specifications of the host device conform to the RS-232C interface, the communication converter CMC10L (sold separately) is required. The CMC10L allows the conversion between RS-232C and RS-485.
- Almost all of the device parameters can be communicated.
  For details on communication parameters, refer to:
  Chapter 11. LIST OF COMMUNICATION DATA.
- Random access commands are available.
  Two or more number of parameters at separated addresses can be read or written by a single command.

■ Setup

The following setups are required for performing the CPL communications.
The items on the table below can be displayed and set up only when the optional model number is provided with the RS-485 communication function.

Item name (RS-485 communication bank)	Item display	Contents of setup	Initial value
CPL/Modbus	Com.01	0: CPL 1: Modbus ASCII format 2: Modbus RTU format	0
Station address	Com.02	0: Does not communicate 1 to 127	0
Transmission speed	Com.03	0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps	2
Data format (Data length)	Com.04	0: 7 bits 1: 8 bits	1
Data format (Parity)	Com.05	0: Even parity 1: Odd parity 2: No parity	0
Data format (Stop bit)	Com.06	0: 1 stop bit 1: 2 stop bits	0
Response time-out	Com.07	1 to 250ms	3

Handling Precautions

- Setups can be performed through key operation on this unit or the SLP-C45 Smart Loader Package. However, they cannot be performed via RS-485 communications.
- If you use the Azbil Corporation CMC10L as an RS-232C/RS-485 converter, set the response time-out (Com.07) to 3 ms or longer.

Communication procedures

The communication procedure is as follows:

(1) The instruction message is sent from the host device (master station) to one unit (slave station) to communicate with.

(2) The slave station receives the instruction message, and performs read or write processing according to the content of the message.

(3) The slave station sends a message corresponding to the processing content as a response message.

(4) The master station receives the response message.

Handling Precautions

- It is not allowed to use two or more number of protocols together on a single RS-485 transmission line (such as CPL, Modbus ASCII format, and Modbus RTU format).

9 - 2 Message Structure

Message structure

The following shows the message structure.
Messages are broadly classified into two layers: the data link layer and the application layer.

- Data link layer
  This layer contains the basic information required for the communication such as the destination of the communication message and the check information of the message.

- Application layer
  Data is read and written in this layer. The content of the layer varies according to the purpose of the message.

Messages comprise parts (1) to (8) as shown in the figure below.
The command (details sent from the master station) and the response (details returned from the slave station) are stored in the application layer.

02H			58H		03H		0DH 0AH
STX			X		ETX		CR LF
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Data link layer				Application layer	Data link layer		
1 frame							

(1) STX (start of message)
(2) Station address
(3) Sub-address
(4) Device code
(5) Send message = command, response message = response
(6) ETX (end of command/response)
(7) Checksum
(8) Delimiter (end of message)

Data link layer

● Outline

The data link layer is of a fixed length. The position of each data item and the number of its characters are already decided. Note, however, that the data positions of the data link layer from ETX onwards shift according to the number of characters in the application layer.

● Response start conditions

- The device sends the response message only when message structure in the data link layer is all correct. If even one of these is incorrect, no response messages are sent, and the device waits for new message.

● List of data link layer data definitions

The following list shows the definitions for data in the data link layer:

Data name	Character code	Number of characters	Meaning of data
STX	02H	1	Start of message
Station address	0 to 7FH are expressed as hexadecimal character codes.	2	Identification of device to communicate with
Sub-address	"00" (30H, 30H)	2	No function
Device code	"X" (58H) or "x" (78H)	1	Device type
ETX	03H	1	End position of the application layer
Checksum	00H to FFH are expressed as two-digit hexadecimal character codes.	2	Checksum of message
Delimiter	CR(0DH), LF(0AH)	2	End of message

● Description of data items

- STX(02H)
  When it receives an STX, the SDC regards it as the start of a transmitted message, even if no delimiter for the previous STX has been received. In this way, if electrical noise (etc.) causes an error in a message, the SDC can respond properly when the next message from the master station is received.

- Station address
  The SDC creates a response message only when the station address on the received message is that of the SDC. The station address consists of two hexadecimal characters.
  The SDC returns the same station address as that of the received message. However, if the station address is set to "0" (30H 30H), the SDC makes no response even if the station addresses match.

- Sub-address
  Two hexadecimal characters between "00" (30H 30H) and "FF" (46H 46H) can be used. The SDC returns the same sub-address as that of the received message.

- Device code
  "X" (58H) or "x" (78H) can be used. Because the device code is fixed for each device series, other codes cannot be used. The SDC returns the same device code as that of the received message. As an example of use, "X" (58H) can be used as the default code, while "x" (78H) is used for resent messages.

- ETX
  ETX indicates the end of the application layer.

- Checksum
  This value is for checking whether or not some abnormality (e.g. noise) causes the message content to change during communications.
  The checksum is expressed as two hexadecimal characters.

- How to calculate a checksum
  (1) Add the character codes in the message from STX through ETX in single byte units.
  (2) Take two's complement of the low-order one byte of the addition result.
  (3) Convert the obtained two's complement to a two-byte ASCII code.

The following is a sample checksum calculation for a sample message:

STX:	02H
'0':	30H (first byte of the station address)
'1':	31H (second byte of the station address)
'0':	30H (first byte of the sub-address)
'0':	30H (second byte of the sub-address)
'X':	58H (device code)
'R':	52H (first byte of the command)
'D':	44H (second byte of the command)
(omitted)	
ETX:	03H

(1) Add the character codes in the message from STX through ETX in single byte units.
The addition operation in single byte units is as follows:
02H + 30H + 31H + 30H + 30H + 58H + 52H + 53H + • • • + 03H.
Assume that the result is 376H.

(2) The low-order one byte of the addition result 376H is 76H. The two's complement of 76H is 8AH.

(3) Convert the obtained 8AH to a two-byte ASCII code.
The result is:
'8' : 38H
'A' : 41H,
and the two bytes, '8'(38H) and 'A'(41H), are the checksum.

- Delimiter (CR/LF)
This indicates the end of the message. Immediately after LF is received, the device enters a state allowed to process the received message.

■Application layer

The table below shows the configuration of the application layer.

Item	Description
Command	"RS" (decimal format continuous address data read command)
	"WS" (decimal format continuous address data write command)
	"RD" (hex format continuous address data read command)
	"WD" (hex format continuous address data write command)
	"RU" (hex format random address data read command)
	"WU" (hex format random address data write command)
Data delimiter	RS, WS command: "," (comma) Other commands: none
Word address	RS, WS command: Base 10 numbers + W (501W, etc.) Other commands: Numeric value in hex notation, such as "01F5".
Read count	RS, WS command: Base 10 numbers (1, etc.) Other commands: Numeric value in hex notation, such as "0001".
Numerical value to be written	RS, WS command: Base 10 numbers (100, etc.) Other commands: Numeric value in hex notation, such as "0064".

The number of addresses accessible by a single command and response message.

Type	Number of addresses	Type	Number of addresses
RS	1 to 16	WD	1 to 16
WS	1 to 16	RU	1 to 16
RD	1 to 16	WU	1 to 16

9 - 3 Description of Commands

■ Fixed length continuous data read command (RD command)

Reads data from contiguous data addresses in hexadecimal format.

● Command message

Specify the starting data address and the number of words. The format for the application layer of command messages is shown below.

R	D								
(1)		(2)				(3)			

(1) Fixed length continuous data read command
(2) Starting data address
(3) Number of read data

● Response message

The format for the application layer of response messages is shown below.

• Normal termination (reading of single data item)

0	0				
(1)		(2)			

• Normal termination (reading of multiple data items)

0	0													
(1)		(2)				(3)				(4)				

• Abnormal termination

X	X
(1)	

The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9 - 6 List of Termination Codes (P. 9-15).

(1) Termination code
(2) Data
(3) Data 2 to data (n-1)
(4) Data n

Note

For details on hexadecimal number format, refer to:
☞ 9 - 5 Numeric Representation in the Application Layer ■ Hexadecimal numbers (P. 9-13).

■Fixed length continuous data write command (WD command)

Writes data to continuous data addresses in hexadecimal format.

● Command message

Specify the starting data address and 1 word or more. The format for the application layer of command messages is shown below.

• Writing of single data item

W D		
(1)	(2)	(3)

• Writing of multiple data items

W D				
(1)	(2)	(3)	(4)	(5)

(1) Fixed length continuous data write command
(2) Starting data address
(3) Data 1
(4) Data 2 to data (n-1)
(5) Data n

● Response message

The format for the application layer of response messages is shown below.

• Normal termination

0 0
(1)

• Abnormal termination

X X
(1)

The abnormal termination code is entered at XX.
For details of codes, refer to:
9-6 List of Termination Codes (P. 9-15)

(1) Termination code

Note

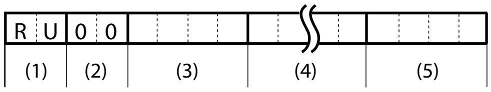
For details on hexadecimal number format, refer to:
9-5 Numeric Representation in the Application Layer ■ Hexadecimal numbers (P. 9-13).

■Fixed length random data read command (RU command)

Reads data from "random" (non-continuous) data addresses in hexadecimal format.

● Command message

Specify 1 or more data addresses. The format for the application layer of command messages is shown below.

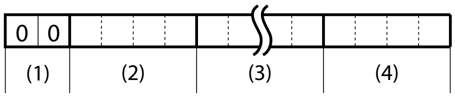


(1) Fixed length random data read command
(2) Sub-command: fixed to "00".
(3) Data address 1
(4) Data address 2 to data address (n-1)
(5) Data address n

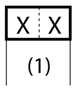
● Response message

The format for the application layer of response messages is shown below.

• Normal termination



• Abnormal termination



The abnormal termination code is entered at XX.
For details of codes, refer to:
9 - 6 List of Termination Codes (P. 9-15).

(1) Termination code
(2) Data 1
(3) Data 2 to data (n-1)
(4) Data n

Note

For details on hexadecimal number format, refer to:
9 - 5 Numeric Representation in the Application Layer ■ Hexadecimal numbers (P. 9-13).

■ Fixed length random data write command (WU command)

Writes data to "random" (non-continuous) data addresses in hexadecimal format.

● Command message

Make a set of data address and data, and specify 1 group or more. The format for the application layer of command messages is shown below.

W U	0 0					
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) Fixed length random data write command
(2) Sub-command: fixed to "00".
(3) Data address 1
(4) Write data 1
(5) Data address, write data 2 to write data (n-1)
(6) Data address n
(7) Write data n

● Response message

The format for the application layer of response messages is shown below.

• Normal termination

0 0
(1)

• Abnormal termination

X X
(1)

The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6 List of Termination Codes (P. 9-15).

(1) Termination code

Note

For details on hexadecimal number format, refer to:
☞ 9-5 Numeric Representation in the Application Layer ■ Hexadecimal numbers (P. 9-13).

■Continuous data read command (RS command)

Reads data is read from continuous data addresses in decimal format.

● Command message

Specify the starting data address and number of words. The format for the application layer of command messages is shown below.

R	S	,	4	0	9	6	W	,	1
(1)		(2)	(3)					(2)	(4)

Application layer

(1) Command
(2) Data delimiter
(3) Starting data address
(4) Number of words

● Response message

The format for the application layer of response messages is shown below.

• Normal termination (reading of single data item)

0	0	,	
(1)		(2)	(3)

• Normal termination (reading of multiple data items)

0	0	,		,		,	
(1)		(2)	(3)	(2)	(4)	(2)	(5)

• Abnormal termination

X	X
(1)	

The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6 List of Termination Codes (P. 9-15)

(1) Termination code
(2) Data delimiter
(3) Data
(4) Data 2 to data (n-1)
(5) Data n

Note

For details on decimal number format, refer to:
☞ 9-5 Numeric Representation in the Application Layer ■ Decimal numbers (P. 9-14).

■ Continuous data write command (WS command)

Writes data to continuous data addresses in decimal format.

● Command message

Specify the starting data address and 1 word or more. The format for the application layer of command messages is shown below.

W	S	,	4	0	9	6	W	,	1	,	6	5
(1)		(2)	(3)					(2)	(4)	(2)	(5)	

(1) Command
(2) Data delimiter
(3) Starting data address
(4) Data 1
(5) Data 2

● Response message

The format for the application layer of response messages is shown below.

• Normal termination

0	0
(1)	

• Abnormal termination

X	X
(1)	

The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6 List of Termination Codes (P. 9-15)

(1) Termination code

Note

For details on decimal number format, refer to:
☞ 9-5 Numeric Representation in the Application Layer ■ Decimal numbers (P. 9-14).

9-4 Definition of Data Addresses

● RAM and EEPROM areas of data addresses

Data addresses are categorized as follows:

Data address Hexadecimal notation	Data address Decimal notation	Name	Remarks
1000 to 4FFF	4096 to 20479	RAM access data address	Reading and writing of these addresses are both performed on RAM. Since writing is not performed to EEPROM, the value returns to that stored in EEPROM after restarted.
5000 to 8FFF	20480 to 36863	EEPROM access data address	Writing is performed to both RAM and EEPROM; reading is performed only on RAM. Since writing is also performed to EEPROM, the value does not change even after restarted.

Handling Precautions

- EEPROM's erase/write cycles are limited.
  Accordingly, it is recommended that very frequently written parameters be written to RAM, which does not have a limitation on cycles.
  Note that with regard to the data written to RAM area, that data is saved to EEPROM area when the power is turned ON again.

● Write data range

If the write value exceeds the range determined by parameters, writing is not performed and an abnormal termination code is returned.

● Write conditions

An abnormal termination code is also returned when the writing is not possible due to the conditions.

9 - 5 Numeric Representation in the Application Layer

Numeric values in the application layer include data addresses, the number of words, and data values. Hexadecimal or decimal numbers are used depending on the command. Command and response messages both use the same format.

Hexadecimal numbers

Specifications for hexadecimal numbers are shown below.
If values do not meet the specifications, the SDC will send an abnormal termination code and abort command message processing.

Item	Specification	Illegal formats
Command name	RD WD RU WU	RS command (no hexadecimal numbers) WS command (no hexadecimal numbers)
Usable characters	0(30H) to 9(39H) A(41H) to F(46H)	1 2 3 a ("a" cannot be used) - 1 2 3 ("-" cannot be used) ␣ 1 2 3 (space cannot be used)
Number of characters	4	1 2 3 (3 characters) 0 1 2 3 4 (5 characters)
Usable values	8000H to 7FFFH (signed data) 0000H to FFFFH (unsigned data)	
Typical character strings	0 0 0 0 1 2 A B 0 1 2 3 F F F F	

Decimal numbers

Specifications for decimal numbers are shown below.
For data addresses, and "W" (57H) to the end of the decimal numeral.
If values do not meet the specifications, the SDC will send an abnormal termination code and abort command message processing.

Item	Specification	Illegal formats
Command	RS WS	RD command (no decimal numbers) WD command (no decimal numbers)
Usable characters	0(30H) to 9(39H) -(2DH)	1 2 3 A ("A" cannot be used) + 1 2 3 ("+" cannot be used) ␣ 1 2 3 (space cannot be used)
Delimiter	,(2CH) The delimiter is put between values	
Number of digits	Positive numbers: 1 to 5 digits Negative numbers: 2 to 6 digits Zero: 1 digit	Nothing (between delimiters) 1 2 3 4 5 6 (6 positive numbers)
Usable values	-32768 to +32767 (signed data) 0 to 65535 (unsigned data)	
Format for positive numbers	First digit must be from 1(31H) to 9(39H)	0 1 (0 cannot be the first digit)
Format for negative numbers	First character must be "-" (2DH) followed by 1(31H) to 9(39H)	- 0 1 (0 cannot be the second character)
Format for 0	0	- 0 ("-" cannot be used) 0 0 (1 digit only)
Typical character strings	1 3 2 7 6 7 - 1 2 - 3 2 7 6 8	

9-6 List of Termination Codes

The outcome of processing the application layer of the command message is indicated in the termination code of the response message. In addition to the normal termination code, there are abnormal termination codes (no processing was done) and warning termination codes (processing may have been done).

■Termination codes for read commands

Termination code	Description	Processing by SDC
00 (normal)	Normal termination	Read-out value was returned
99 (abnormal)	Undefined command	Only termination code was returned (without data)
10 (abnormal)	Parameter error*	Only termination code was returned (without data)
40 (abnormal)	Word count error	Only termination code was returned (without data)
21 (warning)	Data address error	Data from this address was returned as "0"
22 (warning)	Data range error	Data read from this address was returned as 8000 or 7FFF (hex), or as -32768 or +32767 (decimal)
23 (warning)	Impossible due to device conditions	Data from this address was returned as "0"

* The following are parameter errors

- Incorrect numerical representation
- Incorrect command message format

■Termination codes for write commands

Termination code	Description	Processing by SDC
00 (normal)	Normal termination	All data was written
99 (abnormal)	Undefined command	No data was written
10 (abnormal)	Parameter error*	No data was written
40 (abnormal)	Word count error	No data was written
21 (warning)	Data address error	There was at least one data address where nothing was written
22 (warning)	Data range error	There was at least one data address where nothing was written
23 (warning)	Impossible due to device conditions	There was at least one data address where nothing was written

* The following are parameter errors

- Incorrect numerical representation
- Incorrect command message format

9 - 7 Reception and Transmission Timing

■Timing specifications for instruction and response message

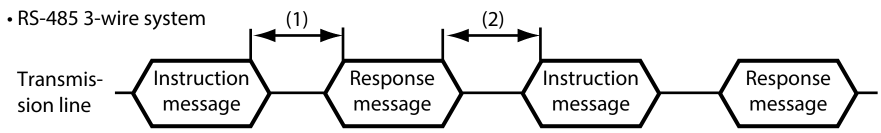
The cautions below are required with regard to the timing to transmit a instruction message from the master station and a response message from the slave station.

● Response monitor time

The maximum response time from the end of the instruction message transmission by the master station until when the master station receives a response message from the slave station is two seconds ((1) in the figure below). So, the response monitor time should be set to two seconds.
Generally, when a response time-out occurs, the instruction message is resent.

● Transmission start time

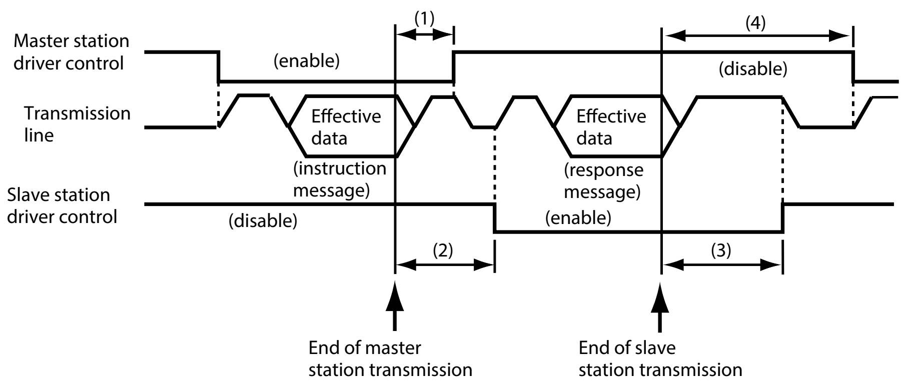
A wait time of 10 ms is required before the master station starts to transmit the next instruction message (to the same slave station or a different slave station) after the end of receiving response message ((2) in the figure below).



(1) End of master station transmission -
Transmission start time of slave station = Max. 2000 ms
(2) End of slave station transmission -
Transmission start time of master station = Min. 10 ms

■RS-485 driver control timing specifications

When the transmission/reception on the RS-485 3-wire system is directly controlled by the master station, care should be paid to the following timing:



(1) End of master station transmission - Driver disable time = Max. 500 μs
(2) End of slave station reception - Driver enable time = Response time-out RS-485 communication bank (item display: Con.07) or more
(3) End of slave station transmission - Driver disable time = Max. 10 ms
(4) End of master station reception - Driver enable time = Min. 10 ms

Chapter 10. Modbus COMMUNICATIONS FUNCTIONS

10 - 1 Outline of Communication

If the optional model is provided with the RS-485 communications function, communication with a PC, PLC or other host devices are available using a user-configured program.
The communication protocol can be selected from the Controller Peripheral Link (CPL) communication (Azbil Corporation's host communication protocol) and the Modbus communication. This chapter describes the Modbus communications.

■ Features

The features of the SDC45/46's communication function are as follows:

- Up to 31 units can be connected to a single master station as a host device.
- When the communication specifications of the host device conform to the RS-232C interface, the communication converter CMC10L (sold separately) is required. The CMC10L allows the conversion between RS-232C and RS-485.
- Almost all of the device parameters can be communicated.
  For details on communication parameters, refer to;
  ☞ Chapter 11. LIST OF COMMUNICATION DATA.

■ Setup

The following setups are required for performing the Modbus communication:

Item (RS-485 Communication bank)	Display	Contents	Initial value
CPL/Modbus	Con.01	0: CPL 1: Modbus ASCII format 2: Modbus RTU format	0
Station address	Con.02	0: Does not communicate 1 to 127	0
Transmission speed	Con.03	0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps	2
Data format (data length)	Con.04	0: 7 bits 1: 8 bits	1
Data format (parity)	Con.05	0: Even parity 1: Odd parity 2: No parity	0
Data format (stop bit)	Con.06	0: 1 stop bit 1: 2 stop bits	0
Response time-out	Con.07	1 to 250ms	3

- If the optional model number is provided with the RS-485 communications function, display and setup are available.
- If the communications type is set to Modbus RTU format, data format (data length) cannot be displayed nor set up, and the action is fixed to 8-bit data.

Handling Precautions

- Setups can be performed through key operation on this unit or the SLP-C45 Smart Loader Package. However, they cannot be performed via RS-485 communications.
- If you use the Azbil Corporatin CMC10L as an RS-232C/RS-485 converter, set the response time-out (Con.07) to 3ms or longer.

Communication procedures

The communication procedure is as follows:

(1) The instruction message is sent from the host device (master station) to one unit (slave station) to communicate with.
(2) The slave station receives the instruction message, and performs read or write processing according to the content of the message.
(3) The slave station sends a message corresponding to the processing content as a response message.
(4) The master station receives the response message.

Handling Precautions

It is not allowed to use two or more number of protocols together on a single RS-485 transmission line such as CPL, Modbus ASCII format, and Modbus RTU format.

10 - 2 Message Structure

Message structure

This section describes the message structure.

Modbus ASCII

All messages other than delimiters are written in hexadecimal ASCII codes.
A message of Modbus ASCII consists of (1) to (6) below.
The part of (3) stores commands, which are transmission contents from the master station and responses, which are transmission contents from the slave station.
All messages use ASCII codes. (Each slot below corresponds to one character.)

3AH						---------					0DH	0AH
:						---------					CR	LF
(1)	(2)		(3)						(4)		(5)	
1 frame												

(1) Start code (1 byte)
(2) Station address (2 bytes)
(3) Send message, response message
(4) Check code (2-byte LRC)
(5) End code (2 bytes)

- Start code
  The start code is a colon (3AH). Whenever it receives the start code, the SDC judges that it is the start of a sent message, even if no end code for the previous start code has been received. In this way, even if electrical noise (etc.) causes an error in a message, the SDC can respond properly when the next message from the master station is received.

- Station address
  The SDC creates a response message only when the station address on the received message is the same as that of the SDC. The station address consists of two hexadecimal characters.
  However, if the station address is set to “0” (30H 30H), the SDC makes no response even if the station addresses match. The SDC returns the same station address as that of the received message.

- Check code (LRC)
  This code, consisting of two hexadecimal characters, is used to check whether or not some problem (such as electrical noise) has corrupted the message during transmission. The method used to create the check code is described below.
  (1) Data from the beginning of the station address up to just before the check code is added. Note that the values added are not those of the pairs of ASCII numerals in the sent message that express the hex values, but rather the one-byte binary data converted from the two ASCII characters.
  (2) Take two's complement of the addition result is taken.
  (3) The low-order byte of the addition result is converted to two hexadecimal characters.

- End code (CR/LF)
  This indicates the end of the message. As soon as LF is received, processing of the received message can begin.

Note

- A sample check code (LRC) calculation is shown below.

[Sample message]

:	: 3AH (start of the message)
'0'	: 30H (first byte of the station address)
'A'	: 41H (second byte of the station address)
'0'	: 30H (first byte of the read command)
'3'	: 33H (second byte of the read command)
'0'	: 30H (first byte of the start data address)
'3'	: 33H (second byte of the start data address)
'E'	: 45H (third byte of the start data address)
'9'	: 39H (fourth byte of the start data address)
'0'	: 30H (first byte of the number of read data)
'0'	: 30H (second byte of the number of read data)
'0'	: 30H (third byte of the number of read data)
'2'	: 32H (fourth byte of the number of read data)

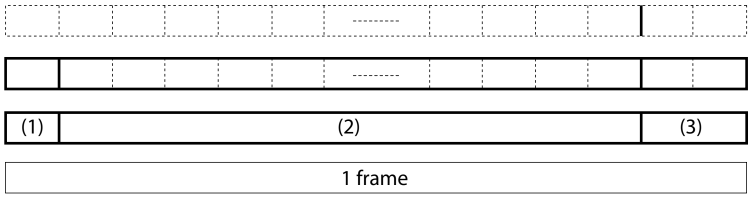
(1) Add the data from the top up to just before the checksum.
The add operation is as follows:
0AH + 03H + 03H + E9H + 00H + 02H
The result is FBH.
(2) The low-order byte of the addition result FBH is FBH as is. The two's complement of FBH is 05H.
(3) Convert the obtained 05H to a two-byte ASCII code.
The result is:

'0'	: 30H
'5'	: 35H,

and the two bytes, '0' (30H) and '5' (35H), are the check code.

● Modbus RTU

All messages are written in binary data.
A Modbus RTU message consists of (1) to (3) below.
The part of (2) stores commands, which are transmission contents from the master station and responses, which are transmission contents from the slave station.
All messages use binary data. (Each slot below corresponds to one character.)



(1) Station address (1 byte)
(2) Send message, response message
(3) Checksum (2 bytes)

- Station address
  The SDC creates a response message only when the station address of the received message is the same as that of the SDC. The station address in a message is expressed as 1 byte. However, when the station address is set to "0," the SDC makes no response even if the station addresses match.The SDC returns the same station address as that of the received message.
- Check code (CRC)
  This code is used for checking whether or not some abnormality (e.g., electrical noise) causes the message to change during transmission. The check code is expressed as 2 bytes.

The CRC check code creation method is shown below.
The section of the message from the station address until just before the check code is used in the calculation. For the calculation, the binary data in the message is used. The check code is 16 bit data and can be calculated by using the C-language function "get_crc16()" shown below. In the message, the low-order byte comes first, and then the high-order byte. The opposite order is used in other 16 bit data.

```
[Description]       16-bit CRC is calculated.
[Argument 1]        Length of character string (number of bytes)
[Argument 2]        Pointer for start of character string
[Function value]    Calculation result

unsigned short get_crc16(signed int len, const unsigned char *p)
{
    unsigned short crc16;
    unsigned short next;
    unsigned short carry;
    signed int i;
    crc16 = 0xffff;

    while (len > 0)
    {
        next = (unsigned short)*p;
        crc16 ^= next;
        for (i = 0; i < 8; i++)
        {
            carry = crc16 & 0x0001;
            crc16 >>= 1;
            if (carry != 0)
            {
                crc16 ^= 0xa001;
            }
        }
        p++;
        len--;
    }

    return crc16;
}
```

- 1-frame end judgment
  A message end (1-frame end) is determined when a time period specified for each transmission speed has passed during which no character is received. It is considered that 1 frame has ended when the next character is not received before the time-out time shown below passes.
  However, the time-out time has a fluctuation of ±1ms from the values in the table below.

Set transmission speed (bps)	Time-out time
4800	9ms or more
9600	5ms or more
19200	3ms or more
38400	2ms or more

Command type

The following types of command (send message) are compatible with the SDC.

Command type	Description		Conformance class
	ASCII	RTU (binary)	
Multiple word read-out	"03" (2-byte)	03H (1-byte)	class 0
Multiple word write	"10" (2-byte)	10H (1-byte)	class 0
Single word write	"06" (2-byte)	06H (1-byte)	class 1 *

* The SDC is not compliant with class 1 commands other than single word write.

Exception codes

If the response message is abnormal, it will have one of the exception codes below after the function code.

Type of Error	Exception Code		Description
	ASCII	RTU (binary)	
Function code error	"01" (2-byte)	01H (1-byte)	Function code not supported by SDC
Data address error	"02" (2-byte)	02H (1-byte)	Cannot read/write at data address
Data error	"03" (2-byte)	03H (1-byte)	Error other than the above

Number of words

In a 1-frame message, the amount of data read or written is shown below.

Command type (function code)	Amount of data	
	ASCII	RTU (binary)
Multiple data read-out(03)	1 to 16	1 to 16
Multiple data write(10)	1 to 16	1 to 16
Single word write(06)	1	1

Note

- For the details of Modbus specifications, refer to;
  ☞ Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev.J) by MODICON, Inc.
  ☞ OPEN Modbus/TCP SPECIFICATION (Release 1.0) by Schneider Electric

10 - 3 Description of Commands

Multiple data read-out command (03H)

Data of contiguous data addresses is read out in hexadecimal.

● Command message

Specify the start data address and number of data. The command message structure is shown below.

Modbus ASCII

3AH	30H	41H	30H	33H	30H	33H	45H	39H	30H	30H	30H	32H	30H	35H	0DH	0AH
:	0	A	0	3	0	3	E	9	0	0	0	2	0	5	CR	LF
(1)	(2)		(3)		(4)				(5)				(6)		(7)	

(1) Start code
(2) Station address
(3) Function code
(4) Starting data address
(5) Number of words
(6) Check code (LRC)
(7) End code

Modbus RTU

0AH	03H	03H	E9H	00H	02H	14H	C0H
(1)	(2)	(3)		(4)		(5)	

(1) Station address
(2) Function code
(3) Starting data address
(4) Number of read-out words
(5) Check code (CRC)

● Response Message

The structure of a response message is shown below.

Modbus ASCII

• Example in case of normal reception

3AH	30H	41H	30H	33H	30H	34H	30H	33H	30H	31H	30H	30H	30H	33H	45H	38H	D0H	0AH
:	0	A	0	3	0	4	0	3	0	1	0	0	0	3	E	8	CR	LF
(1)	(2)		(3)		(4)		(5)				(6)				(7)		(8)	

(1) Start code
(2) Station address
(3) Function code
(4) Number of read data X 2
(5) Read data 1
(6) Read data 2
(7) Check code (LRC)
(8) End code

• Example in case of error

(1)	(2)		(3)		(4)		(5)		(6)	
3AH	30H	41H	38H	34H	30H	31H	37H	31H	0DH	0AH
:	0	A	8	4	0	1	7	1	CR	LF

(1) Start code
(2) Station address
(3) Function code (If an abnormality occurs, set the MSB of the function code in the sent message to 1. In this case, since undefined "04" is sent as a command with a sent message, "84" is sent back.)
(4) Abnormal termination code (☞ refer to P. 10-6)
(5) Check code (LRC)
(6) End code

Modbus RTU

• Example in case of normal reception

(1)	(2)	(3)	(4)		(5)		(6)	
0AH	03H	04H	03H	01H	00H	03H	51H	76H

(1) Station address
(2) Function code
(3) Number of read data X 2 (bytes)
(4) Read data 1
(5) Read data 2
(6) Check code (CRC)

• Example in case of error

(1)	(2)	(3)	(4)	
0AH	84H	01H	F3H	02H

(1) Station address
(2) Error flag (since undefined "04H" is sent as a command with a send message, the most significant bit is turned ON and sent back as "84H".)
(3) Abnormal termination code (☞ refer to P. 10-6)
(4) Check code (CRC)

Multiple data write command (10H)

Data is written to data with contiguous data addresses in hexadecimal.

Command message

Specify the start data address and 1 word or more. The structure of the application layer of a command message is shown below.

(Example) Example: 01A0H and 0E53H are written to 2 contiguous data addresses starting at 05DDH.

Modbus ASCII

3AH	30H	31H	31H	30H	30H	35H	44H	44H	30H	30H	30H	32H	30H	34H
:	0	1	1	0	0	5	D	D	0	0	0	2	0	4
(1)	(2)		(3)		(4)				(5)				(6)	

30H	31H	41H	30H	30H	45H	35H	33H	30H	35H	0DH	0AH
0	1	A	0	0	E	5	3	0	5	CR	LF
(7)				(8)				(9)		(10)	

(1) Start of message
(2) Station address
(3) Write command 10H
(4) Starting write data address
(5) Number of write data
(6) Number of write data X 2
(7) Write data 1
(8) Write data 2
(9) Check code (LRC)
(10) End code

Modbus RTU

01H	10H	05H	DDH	00H	02H	04H	01H	A0H	0EH	53H	45H	B9H
(1)	(2)	(3)		(4)		(5)	(6)		(7)		(8)	

(1) Station address
(2) Write command 10H
(3) Starting write data address
(4) Number of write data
(5) Number of write data x 2
(6) Write data 1
(7) Write data 2
(8) Check code (CRC)

● Response Message

The structure of the application layer of a response message is shown below.

Modbus ASCII

3AH	30H	31H	31H	30H	30H	35H	44H	44H	30H	30H	30H	32H	30H	42H	0DH	0AH
:	0	1	1	0	0	5	D	D	0	0	0	2	0	B	CR	LF
(1)	(2)		(3)		(4)				(5)				(6)		(7)	

(1) Start code
(2) Station address
(3) Function code
(4) Starting write data address 1
(5) Number of write data
(6) Check code (LRC)
(7) End code

Modbus RTU

01H	10H	05H	DDH	00H	02H	D1H	3EH
(1)	(2)	(3)		(4)		(5)	

(1) Station address
(2) Function code
(3) Starting write data address
(4) Number of write data
(5) Check code (CRC)

Note

- The response message at the time of abnormal termination is the same as that for abnormal termination of the multiple-data read command.

Single data write command (06H)

One data address of data is written in hexadecimal.

Command message

Specify the data address and data. The command message structure is shown below.

(Example) The value of 01A0H is written to data address 05DDH.

Modbus ASCII

3AH	30H	31H	30H	36H	30H	35H	44H	44H	30H	31H	41H	30H	37H	36H	0DH	0AH
:	0	1	0	6	0	5	D	D	0	1	A	0	7	6	CR	LF
(1)	(2)		(3)		(4)				(5)				(6)		(7)	

(1) Start of message
(2) Station address
(3) Function code
(4) Data address
(5) Write data
(6) Check code (LRC)
(7) End code

Modbus RTU

01H	06H	05H	DDH	01H	A0H	18H	D4H
(1)	(2)	(3)		(4)		(5)	

(1) Station address
(2) Function code
(3) Data address
(4) Write data
(5) Check code (CRC)

Response Message

Normally the response message is the same as the command.

Note

- If an error has occurred, the response message is the same as when the multiple data read command results in an error.

10 - 4 Numeric Representation

Numerical values include data addresses, numbers specifying the number of data words, and data values, all of which are hexadecimal numbers.
Numeric representation varies depending on whether the communications type is Modbus ASCII or Modbus RTU. This applies to both command and response messages.

■ASCII hexadecimal numbers

Specifications for ASCII hexadecimal numbers are shown in the table below.
If values do not meet these specifications, the SDC will send an abnormal termination code, aborting command message processing.

Item	Specification	Illegal formats
Usable characters	0(30H) to 9(39H) A(41H) to F(46H)	1 2 3 a ("a" cannot be used) - 1 2 3 ("-" cannot be used) 1 2 3 (space cannot be used)
Number of characters	4 or 2	1 2 3 (3 characters) 0 1 2 3 4 (5 characters)
Usable values (4 characters)	8000H to 7FFFH (signed data) 0000H to FFFFH (unsigned data)	
Usable values (2 characters)	00H to 7FFFH (signed data)	
Typical character strings	0 0 0 0 1 2 A B 0 1 2 3 F F F F	

■RTU hexadecimal numbers

Specifications for RTU hexadecimal numbers are shown in the table below.
If values do not meet these specifications, the SDC will send an abnormal termination code, aborting command message processing.

Item	Specification	Illegal formats
Usable characters	00H to FFH (all)	
Number of characters	2 or 1	00H 01H 02H (3 characters)
Usable values (2 characters)	8000H to 7FFFH (signed data) 0000H to FFFFH (unsigned data)	
Usable values	00H to FFH (signed data)	
Typical character strings	00H 00H 12H ABH 01H 23H FFH FFH	

10 - 5　CPL Communication Function and Common Specifications

■ Definition of Data Address

Refer to;

☞ 9 - 4 Definition of Data Addresses (P. 9-12)

■ RS-485 Driver Control Timing Specifications

Refer to;

☞ 9 - 7 Reception and Transmission Timing (P. 9-16).

Chapter 11. LIST OF COMMUNICATION DATA

The following shows the meanings of the symbols stated in the "RAM/EEPROM Read/Write" columns:

No symbol :	Possible.
□ :	Possible according to the conditions.
△ :	Possible, but data is invalid.
× :	Impossible.

Handling Precautions

- When reading the EEPROM address, data in the RAM is read in the same manner as reading of the RAM address.

Decimal point information

-:	No decimal point
1 to 3:	Decimal point position (original value of data is multiplied by 10, 100, or 1000)
LP1 and 2:	Determined by the settings for the loop 1 or loop 2 in the control bank ("loop PV/SV decimal point position").
PV1 and 2:	Determined by the settings for PV1 or PV2 in the PV bank ("decimal point position").
RMP1 and 2:	Determined by the settings for loop 1 or loop 2 in the SP configuration bank ("SP ramp unit").
PID1 and 2:	Determined by the settings for loop 1 or loop 2 in the control bank ("integral time/derivative time decimal point position").
OUT1 to 7:	Determined by the settings for outputs 1 through 7 in the output bank ("output decimal point position").
EV1 to 7:	Determined by the settings for event Nos. 1 through 16 in the event configuration bank ("decimal point position").
Linearizations 1 to 8:	Determined by the settings for Linearizations 1 through 8 in the Linearization table bank ("breakpoint decimal point position").
MS1 to 3:	Determined by the settings for priorities 1 through 3 in the display/key bank ("MS display decimal point position").
FL:	Determined by the decimal point position setting (for setting the flow rate) in the temperature and pressure compensation bank.
FL-T:	Determined by the decimal point position setting in the PV bank for temperature compensation input.
FL-P:	Determined by the decimal point position setting in the PV bank for pressure compensation input.
I-F:	Determined by the decimal point position setting in the input computation bank.
I-F01 to I-F10:	Determined by the settings for the computation type of computation units F01 to F10 in the input computation bank.
O-F:	Determined by the decimal point position set in the output computation bank.
O-F01 to O-F10:	Determined by the settings for the computation types of computation units F01 to F10 in the output computation bank.

SP group selection

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
SP group selection	Loop 1	SP group selection	4096	1000	20480	5000					–	
	Loop 2	SP group selection	4100	1004	20484	5004					–	

Loop 1 Multi-SP

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 Multi-SP	SP1	LSP	4112	1010	20496	5010					LP1	
		PID group definition	4113	1011	20497	5011					–	
	SP2	LSP	4114	1012	20498	5012					LP1	
		PID group definition	4115	1013	20499	5013					–	
	SP3	LSP	4116	1014	20500	5014					LP1	
		PID group definition	4117	1015	20501	5015					–	
	SP4	LSP	4118	1016	20502	5016					LP1	
		PID group definition	4119	1017	20503	5017					–	
	SP5	LSP	4120	1018	20504	5018					LP1	
		PID group definition	4121	1019	20505	5019					–	
	SP6	LSP	4122	101A	20506	501A					LP1	
		PID group definition	4123	101B	20507	501B					–	
	SP7	LSP	4124	101C	20508	501C					LP1	
		PID group definition	4125	101D	20509	501D					–	
	SP8	LSP	4126	101E	20510	501E					LP1	
		PID group definition	4127	101F	20511	501F					–	
	SP9	LSP	4128	1020	20512	5020					LP1	
		PID group definition	4129	1021	20513	5021					–	
	SP10	LSP	4130	1022	20514	5022					LP1	
		PID group definition	4131	1023	20515	5023					–	
	SP11	LSP	4132	1024	20516	5024					LP1	
		PID group definition	4133	1025	20517	5025					–	
	SP12	LSP	4134	1026	20518	5026					LP1	
		PID group definition	4135	1027	20519	5027					–	
	SP13	LSP	4136	1028	20520	5028					LP1	
		PID group definition	4137	1029	20521	5029					–	
	SP14	LSP	4138	102A	20522	502A					LP1	
		PID group definition	4139	102B	20523	502B					–	
	SP15	LSP	4140	102C	20524	502C					LP1	
		PID group definition	4141	102D	20525	502D					–	
	SP16	LSP	4142	102E	20526	502E					LP1	
		PID group definition	4143	102F	20527	502F					–	

Loop 2 Multi-SP

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 Multi-SP	SP1	LSP	4144	1030	20528	5030					LP2	
		PID group definition	4145	1031	20529	5031					–	
	SP2	LSP	4146	1032	20530	5032					LP2	
		PID group definition	4147	1033	20531	5033					–	
	SP3	LSP	4148	1034	20532	5034					LP2	
		PID group definition	4149	1035	20533	5035					–	
	SP4	LSP	4150	1036	20534	5036					LP2	
		PID group definition	4151	1037	20535	5037					–	
	SP5	LSP	4152	1038	20536	5038					LP2	
		PID group definition	4153	1039	20537	5039					–	
	SP6	LSP	4154	103A	20538	503A					LP2	
		PID group definition	4155	103B	20539	503B					–	
	SP7	LSP	4156	103C	20540	503C					LP2	
		PID group definition	4157	103D	20541	503D					–	
	SP8	LSP	4158	103E	20542	503E					LP2	
		PID group definition	4159	103F	20543	503F					–	
	SP9	LSP	4160	1040	20544	5040					LP2	
		PID group definition	4161	1041	20545	5041					–	
	SP10	LSP	4162	1042	20546	5042					LP2	
		PID group definition	4163	1043	20547	5043					–	
	SP11	LSP	4164	1044	20548	5044					LP2	
		PID group definition	4165	1045	20549	5045					–	
	SP12	LSP	4166	1046	20550	5046					LP2	
		PID group definition	4167	1047	20551	5047					–	
	SP13	LSP	4168	1048	20552	5048					LP2	
		PID group definition	4169	1049	20553	5049					–	
	SP14	LSP	4170	104A	20554	504A					LP2	
		PID group definition	4171	104B	20555	504B					–	
	SP15	LSP	4172	104C	20556	504C					LP2	
		PID group definition	4173	104D	20557	504D					–	
	SP16	LSP	4174	104E	20558	504E					LP2	
		PID group definition	4175	104F	20559	504F					–	

RSP

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
RSP	Loop 1	RSP	4240	1090	20624	5090		×		×	LP1	
		PID group definition	4241	1091	20625	5091					–	
	Loop 2	RSP	4244	1094	20628	5094		×		×	LP2	Added to version 1.05.
		PID group definition	4245	1095	20629	5095					–	

SP configuration

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
SP configuration	Loop 1	SP low limit	4256	10A0	20640	50A0					LP1	
		SP high limit	4257	10A1	20641	50A1					LP1	
	Loop 2	SP low limit	4260	10A4	20644	50A4					LP2	
		SP high limit	4261	10A5	20645	50A5					LP2	
	Loop 1	SP ramp unit	4272	10B0	20656	50B0					–	
		SP ramp-up for LSP	4273	10B1	20657	50B1					RMP1	
		SP ramp-down for LSP	4274	10B2	20658	50B2					RMP1	
		RSP tracking	4275	10B3	20659	50B3					–	
		SP ramp-up for RSP	4276	10B4	20660	50B4					RMP1	Add to version 3.00.
		SP ramp-down for RSP	4277	10B5	20661	50B5					RMP1	
		LSP bias	4278	10B6	20662	50B6					LP1	
		RSP bias	4279	10B7	20663	50B7					LP1	
		PV start for LSP	4280	10B8	20664	50B8					–	
		PV start for RSP	4281	10B9	20665	50B9					–	
		Digital RSP selection	4282	10BA	20666	50BA					–	
		Digital RSP	4283	10BB	20667	50BB					LP1	
	Loop 2	SP ramp unit	4288	10C0	20672	50C0					–	
		SP ramp-up for LSP	4289	10C1	20673	50C1					RMP2	
		SP ramp-down for LSP	4290	10C2	20674	50C2					RMP2	
		RSP tracking	4291	10C3	20675	50C3					–	
		SP ramp-up for RSP	4292	10C4	20676	50C4					RMP1	Add to version 3.00.
		SP ramp-down for RSP	4293	10C5	20677	50C5					RMP1	
		LSP bias	4294	10C6	20678	50C6					LP1	
		RSP bias	4295	10C7	20679	50C7					LP1	
		PV start for LSP	4296	10C8	20680	50C8					–	
		PV start for RSP	4297	10C9	20681	50C9					–	
		Digital RSP selection	4298	10CA	20682	50CA					–	
		Digital RSP	4299	10CB	20683	50CB					LP1	

Event setup

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Event setup	EV1	Event main setting	4336	10F0	20720	50F0					EV1	
		Event sub-setting	4337	10F1	20721	50F1					EV1	
	EV2	Event main setting	4338	10F2	20722	50F2					EV2	
		Event sub-setting	4339	10F3	20723	50F3					EV2	
	EV3	Event main setting	4340	10F4	20724	50F4					EV3	
		Event sub-setting	4341	10F5	20725	50F5					EV3	
	EV4	Event main setting	4342	10F6	20726	50F6					EV4	
		Event sub-setting	4343	10F7	20727	50F7					EV4	
	EV5	Event main setting	4344	10F8	20728	50F8					EV5	
		Event sub-setting	4345	10F9	20729	50F9					EV5	
	EV6	Event main setting	4346	10FA	20730	50FA					EV6	
		Event sub-setting	4347	10FB	20731	50FB					EV6	
	EV7	Event main setting	4348	10FC	20732	50FC					EV7	
		Event sub-setting	4349	10FD	20733	50FD					EV7	
	EV8	Event main setting	4350	10FE	20734	50FE					EV8	
		Event sub-setting	4351	10FF	20735	50FF					EV8	
	EV9	Event main setting	4352	1100	20736	5100					EV9	
		Event sub-setting	4353	1101	20737	5101					EV9	
	EV10	Event main setting	4354	1102	20738	5102					EV10	
		Event sub-setting	4355	1103	20739	5103					EV10	
	EV11	Event main setting	4356	1104	20740	5104					EV11	
		Event sub-setting	4357	1105	20741	5105					EV11	
	EV12	Event main setting	4358	1106	20742	5106					EV12	
		Event sub-setting	4359	1107	20743	5107					EV12	
	EV13	Event main setting	4360	1108	20744	5108					EV13	
		Event sub-setting	4361	1109	20745	5109					EV13	
	EV14	Event main setting	4362	110A	20746	510A					EV14	
		Event sub-setting	4363	110B	20747	510B					EV14	
	EV15	Event main setting	4364	110C	20748	510C					EV15	
		Event sub-setting	4365	110D	20749	510D					EV15	
	EV16	Event main setting	4366	110E	20750	510E					EV16	
		Event sub-setting	4367	110F	20751	510F					EV16	

Event configuration

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Event configuration	EV1	Operation type	4400	1130	20784	5130					–	
		Loop/channel definition	4401	1131	20785	5131					–	
		Direct/reverse	4402	1132	20786	5132					–	
		Standby	4403	1133	20787	5133					–	
		EVENT state at READY	4404	1134	20788	5134					–	
		Decimal point position	4405	1135	20789	5135					–	
		Hysteresis	4406	1136	20790	5136					EV1	
		ON delay	4407	1137	20791	5137					1	
		OFF delay	4408	1138	20792	5138					1	
	EV2	Operation type	4416	1140	20800	5140					–	
		Loop/channel definition	4417	1141	20801	5141					–	
		Direct/reverse	4418	1142	20802	5142					–	
		Standby	4419	1143	20803	5143					–	
		EVENT state at READY	4420	1144	20804	5144					–	
		Decimal point position	4421	1145	20805	5145					–	
		Hysteresis	4422	1146	20806	5146					EV2	
		ON delay	4423	1147	20807	5147					1	
		OFF delay	4424	1148	20808	5148					1	
	EV3	Operation type	4432	1150	20816	5150					–	
		Loop/channel definition	4433	1151	20817	5151					–	
		Direct/reverse	4434	1152	20818	5152					–	
		Standby	4435	1153	20819	5153					–	
		EVENT state at READY	4436	1154	20820	5154					–	
		Decimal point position	4437	1155	20821	5155					–	
		Hysteresis	4438	1156	20822	5156					EV3	
		ON delay	4439	1157	20823	5157					1	
		OFF delay	4440	1158	20824	5158					1	
	EV4	Operation type	4448	1160	20832	5160					–	
		Loop/channel definition	4449	1161	20833	5161					–	
		Direct/reverse	4450	1162	20834	5162					–	
		Standby	4451	1163	20835	5163					–	
		EVENT state at READY	4452	1164	20836	5164					–	
		Decimal point position	4453	1165	20837	5165					–	
		Hysteresis	4454	1166	20838	5166					EV4	
		ON delay	4455	1167	20839	5167					1	
		OFF delay	4456	1168	20840	5168					1	

Event configuration

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Event configuration	EV5	Operation type	4464	1170	20848	5170					–	
		Loop/channel definition	4465	1171	20849	5171					–	
		Direct/reverse	4466	1172	20850	5172					–	
		Standby	4467	1173	20851	5173					–	
		EVENT state at READY	4468	1174	20852	5174					–	
		Decimal point position	4469	1175	20853	5175					–	
		Hysteresis	4470	1176	20854	5176					EV5	
		ON delay	4471	1177	20855	5177					1	
		OFF delay	4472	1178	20856	5178					1	
	EV6	Operation type	4480	1180	20864	5180					–	
		Loop/channel definition	4481	1181	20865	5181					–	
		Direct/reverse	4482	1182	20866	5182					–	
		Standby	4483	1183	20867	5183					–	
		EVENT state at READY	4484	1184	20868	5184					–	
		Decimal point position	4485	1185	20869	5185					–	
		Hysteresis	4486	1186	20870	5186					EV6	
		ON delay	4487	1187	20871	5187					1	
		OFF delay	4488	1188	20872	5188					1	
	EV7	Operation type	4496	1190	20880	5190					–	
		Loop/channel definition	4497	1191	20881	5191					–	
		Direct/reverse	4498	1192	20882	5192					–	
		Standby	4499	1193	20883	5193					–	
		EVENT state at READY	4500	1194	20884	5194					–	
		Decimal point position	4501	1195	20885	5195					–	
		Hysteresis	4502	1196	20886	5196					EV7	
		ON delay	4503	1197	20887	5197					1	
		OFF delay	4504	1198	20888	5198					1	
	EV8	Operation type	4512	11A0	20896	51A0					–	
		Loop/channel definition	4513	11A1	20897	51A1					–	
		Direct/reverse	4514	11A2	20898	51A2					–	
		Standby	4515	11A3	20899	51A3					–	
		EVENT state at READY	4516	11A4	20900	51A4					–	
		Decimal point position	4517	11A5	20901	51A5					–	
		Hysteresis	4518	11A6	20902	51A6					EV8	
		ON delay	4519	11A7	20903	51A7					1	
		OFF delay	4520	11A8	20904	51A8					1	

Event configuration

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Event configuration	EV9	Operation type	4528	11B0	20912	51B0					–	
		Loop/channel definition	4529	11B1	20913	51B1					–	
		Direct/reverse	4530	11B2	20914	51B2					–	
		Standby	4531	11B3	20915	51B3					–	
		EVENT state at READY	4532	11B4	20916	51B4					–	
		Decimal point position	4533	11B5	20917	51B5					–	
		Hysteresis	4534	11B6	20918	51B6					EV9	
		ON delay	4535	11B7	20919	51B7					1	
		OFF delay	4536	11B8	20920	51B8					1	
	EV10	Operation type	4544	11C0	20928	51C0					–	
		Loop/channel definition	4545	11C1	20929	51C1					–	
		Direct/reverse	4546	11C2	20930	51C2					–	
		Standby	4547	11C3	20931	51C3					–	
		EVENT state at READY	4548	11C4	20932	51C4					–	
		Decimal point position	4549	11C5	20933	51C5					–	
		Hysteresis	4550	11C6	20934	51C6					EV10	
		ON delay	4551	11C7	20935	51C7					1	
		OFF delay	4552	11C8	20936	51C8					1	
	EV11	Operation type	4560	11D0	20944	51D0					–	
		Loop/channel definition	4561	11D1	20945	51D1					–	
		Direct/reverse	4562	11D2	20946	51D2					–	
		Standby	4563	11D3	20947	51D3					–	
		EVENT state at READY	4564	11D4	20948	51D4					–	
		Decimal point position	4565	11D5	20949	51D5					–	
		Hysteresis	4566	11D6	20950	51D6					EV11	
		ON delay	4567	11D7	20951	51D7					1	
		OFF delay	4568	11D8	20952	51D8					1	
	EV12	Operation type	4576	11E0	20960	51E0					–	
		Loop/channel definition	4577	11E1	20961	51E1					–	
		Direct/reverse	4578	11E2	20962	51E2					–	
		Standby	4579	11E3	20963	51E3					–	
		EVENT state at READY	4580	11E4	20964	51E4					–	
		Decimal point position	4581	11E5	20965	51E5					–	
		Hysteresis	4582	11E6	20966	51E6					EV12	
		ON delay	4583	11E7	20967	51E7					1	
		OFF delay	4584	11E8	20968	51E8					1	

Event configuration

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Event configuration	EV13	Operation type	4592	11F0	20976	51F0					–	
		Loop/channel definition	4593	11F1	20977	51F1					–	
		Direct/reverse	4594	11F2	20978	51F2					–	
		Standby	4595	11F3	20979	51F3					–	
		EVENT state at READY	4596	11F4	20980	51F4					–	
		Decimal point position	4597	11F5	20981	51F5					–	
		Hysteresis	4598	11F6	20982	51F6					EV13	
		ON delay	4599	11F7	20983	51F7					1	
		OFF delay	4600	11F8	20984	51F8					1	
	EV14	Operation type	4608	1200	20992	5200					–	
		Loop/channel definition	4609	1201	20993	5201					–	
		Direct/reverse	4610	1202	20994	5202					–	
		Standby	4611	1203	20995	5203					–	
		EVENT state at READY	4612	1204	20996	5204					–	
		Decimal point position	4613	1205	20997	5205					–	
		Hysteresis	4614	1206	20998	5206					EV14	
		ON delay	4615	1207	20999	5207					1	
		OFF delay	4616	1208	21000	5208					1	
	EV15	Operation type	4624	1210	21008	5210					–	
		Loop/channel definition	4625	1211	21009	5211					–	
		Direct/reverse	4626	1212	21010	5212					–	
		Standby	4627	1213	21011	5213					–	
		EVENT state at READY	4628	1214	21012	5214					–	
		Decimal point position	4629	1215	21013	5215					–	
		Hysteresis	4630	1216	21014	5216					EV15	
		ON delay	4631	1217	21015	5217					1	
		OFF delay	4632	1218	21016	5218					1	
	EV16	Operation type	4640	1220	21024	5220					–	
		Loop/channel definition	4641	1221	21025	5221					–	
		Direct/reverse	4642	1222	21026	5222					–	
		Standby	4643	1223	21027	5223					–	
		EVENT state at READY	4644	1224	21028	5224					–	
		Decimal point position	4645	1225	21029	5225					–	
		Hysteresis	4646	1226	21030	5226					EV16	
		ON delay	4647	1227	21031	5227					1	
		OFF delay	4648	1228	21032	5228					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP1	LSP	4912	1330	21296	5330					LP1	
		Event 1 main setting	4913	1331	21297	5331					EV1	
		Event 1 sub-setting	4914	1332	21298	5332					EV1	
		Event 2 main setting	4915	1333	21299	5333					EV2	
		Event 2 sub-setting	4916	1334	21300	5334					EV2	
		Event 3 main setting	4917	1335	21301	5335					EV3	
		Event 3 sub-setting	4918	1336	21302	5336					EV3	
		Event 4 main setting	4919	1337	21303	5337					EV4	
		Event 4 sub-setting	4920	1338	21304	5338					EV4	
		Event 5 main setting	4921	1339	21305	5339					EV5	
		Event 5 sub-setting	4922	133A	21306	533A					EV5	
		Event 6 main setting	4923	133B	21307	533B					EV6	
		Event 6 sub-setting	4924	133C	21308	533C					EV6	
		Event 7 main setting	4925	133D	21309	533D					EV7	
		Event 7 sub-setting	4926	133E	21310	533E					EV7	
		Event 8 main setting	4927	133F	21311	533F					EV8	
		Event 8 sub-setting	4928	1340	21312	5340					EV8	
		Proportional band	4929	1341	21313	5341					1	
		Integral time	4930	1342	21314	5342					PID1	
		Derivative time	4931	1343	21315	5343					PID1	
		Output low limit	4932	1344	21316	5344					1	
		Output high limit	4933	1345	21317	5345					1	
		Manual reset	4934	1346	21318	5346					1	
		Proportional band for cool side	4935	1347	21319	5347					1	
		Integration time for cool side	4936	1348	21320	5348					PID1	
		Derivative time for cool side	4937	1349	21321	5349					PID1	
		Output low limit for cool side	4938	134A	21322	534A					1	
		Output high limit for cool side	4939	134B	21323	534B					1	
		Initial output of PID control	4940	134C	21324	534C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP2	LSP	4944	1350	21328	5350					LP1	
		Event 1 main setting	4945	1351	21329	5351					EV1	
		Event 1 sub-setting	4946	1352	21330	5352					EV1	
		Event 2 main setting	4947	1353	21331	5353					EV2	
		Event 2 sub-setting	4948	1354	21332	5354					EV2	
		Event 3 main setting	4949	1355	21333	5355					EV3	
		Event 3 sub-setting	4950	1356	21334	5356					EV3	
		Event 4 main setting	4951	1357	21335	5357					EV4	
		Event 4 sub-setting	4952	1358	21336	5358					EV4	
		Event 5 main setting	4953	1359	21337	5359					EV5	
		Event 5 sub-setting	4954	135A	21338	535A					EV5	
		Event 6 main setting	4955	135B	21339	535B					EV6	
		Event 6 sub-setting	4956	135C	21340	535C					EV6	
		Event 7 main setting	4957	135D	21341	535D					EV7	
		Event 7 sub-setting	4958	135E	21342	535E					EV7	
		Event 8 main setting	4959	135F	21343	535F					EV8	
		Event 8 sub-setting	4960	1360	21344	5360					EV8	
		Proportional band	4961	1361	21345	5361					1	
		Integral time	4962	1362	21346	5362					PID1	
		Derivative time	4963	1363	21347	5363					PID1	
		Output low limit	4964	1364	21348	5364					1	
		Output high limit	4965	1365	21349	5365					1	
		Manual reset	4966	1366	21350	5366					1	
		Proportional band for cool side	4967	1367	21351	5367					1	
		Integration time for cool side	4968	1368	21352	5368					PID1	
		Derivative time for cool side	4969	1369	21353	5369					PID1	
		Output low limit for cool side	4970	136A	21354	536A					1	
		Output high limit for cool side	4971	136B	21355	536B					1	
		Initial output of PID control	4972	136C	21356	536C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP3	LSP	4976	1370	21360	5370					LP1	
		Event 1 main setting	4977	1371	21361	5371					EV1	
		Event 1 sub-setting	4978	1372	21362	5372					EV1	
		Event 2 main setting	4979	1373	21363	5373					EV2	
		Event 2 sub-setting	4980	1374	21364	5374					EV2	
		Event 3 main setting	4981	1375	21365	5375					EV3	
		Event 3 sub-setting	4982	1376	21366	5376					EV3	
		Event 4 main setting	4983	1377	21367	5377					EV4	
		Event 4 sub-setting	4984	1378	21368	5378					EV4	
		Event 5 main setting	4985	1379	21369	5379					EV5	
		Event 5 sub-setting	4986	137A	21370	537A					EV5	
		Event 6 main setting	4987	137B	21371	537B					EV6	
		Event 6 sub-setting	4988	137C	21372	537C					EV6	
		Event 7 main setting	4989	137D	21373	537D					EV7	
		Event 7 sub-setting	4990	137E	21374	537E					EV7	
		Event 8 main setting	4991	137F	21375	537F					EV8	
		Event 8 sub-setting	4992	1380	21376	5380					EV8	
		Proportional band	4993	1381	21377	5381					1	
		Integral time	4994	1382	21378	5382					PID1	
		Derivative time	4995	1383	21379	5383					PID1	
		Output low limit	4996	1384	21380	5384					1	
		Output high limit	4997	1385	21381	5385					1	
		Manual reset	4998	1386	21382	5386					1	
		Proportional band for cool side	4999	1387	21383	5387					1	
		Integration time for cool side	5000	1388	21384	5388					PID1	
		Derivative time for cool side	5001	1389	21385	5389					PID1	
		Output low limit for cool side	5002	138A	21386	538A					1	
		Output high limit for cool side	5003	138B	21387	538B					1	
		Initial output of PID control	5004	138C	21388	538C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP4	LSP	5008	1390	21392	5390					LP1	
		Event 1 main setting	5009	1391	21393	5391					EV1	
		Event 1 sub-setting	5010	1392	21394	5392					EV1	
		Event 2 main setting	5011	1393	21395	5393					EV2	
		Event 2 sub-setting	5012	1394	21396	5394					EV2	
		Event 3 main setting	5013	1395	21397	5395					EV3	
		Event 3 sub-setting	5014	1396	21398	5396					EV3	
		Event 4 main setting	5015	1397	21399	5397					EV4	
		Event 4 sub-setting	5016	1398	21400	5398					EV4	
		Event 5 main setting	5017	1399	21401	5399					EV5	
		Event 5 sub-setting	5018	139A	21402	539A					EV5	
		Event 6 main setting	5019	139B	21403	539B					EV6	
		Event 6 sub-setting	5020	139C	21404	539C					EV6	
		Event 7 main setting	5021	139D	21405	539D					EV7	
		Event 7 sub-setting	5022	139E	21406	539E					EV7	
		Event 8 main setting	5023	139F	21407	539F					EV8	
		Event 8 sub-setting	5024	13A0	21408	53A0					EV8	
		Proportional band	5025	13A1	21409	53A1					1	
		Integral time	5026	13A2	21410	53A2					PID1	
		Derivative time	5027	13A3	21411	53A3					PID1	
		Output low limit	5028	13A4	21412	53A4					1	
		Output high limit	5029	13A5	21413	53A5					1	
		Manual reset	5030	13A6	21414	53A6					1	
		Proportional band for cool side	5031	13A7	21415	53A7					1	
		Integration time for cool side	5032	13A8	21416	53A8					PID1	
		Derivative time for cool side	5033	13A9	21417	53A9					PID1	
		Output low limit for cool side	5034	13AA	21418	53AA					1	
		Output high limit for cool side	5035	13AB	21419	53AB					1	
		Initial output of PID control	5036	13AC	21420	53AC					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP5	LSP	5040	13B0	21424	53B0					LP1	
		Event 1 main setting	5041	13B1	21425	53B1					EV1	
		Event 1 sub-setting	5042	13B2	21426	53B2					EV1	
		Event 2 main setting	5043	13B3	21427	53B3					EV2	
		Event 2 sub-setting	5044	13B4	21428	53B4					EV2	
		Event 3 main setting	5045	13B5	21429	53B5					EV3	
		Event 3 sub-setting	5046	13B6	21430	53B6					EV3	
		Event 4 main setting	5047	13B7	21431	53B7					EV4	
		Event 4 sub-setting	5048	13B8	21432	53B8					EV4	
		Event 5 main setting	5049	13B9	21433	53B9					EV5	
		Event 5 sub-setting	5050	13BA	21434	53BA					EV5	
		Event 6 main setting	5051	13BB	21435	53BB					EV6	
		Event 6 sub-setting	5052	13BC	21436	53BC					EV6	
		Event 7 main setting	5053	13BD	21437	53BD					EV7	
		Event 7 sub-setting	5054	13BE	21438	53BE					EV7	
		Event 8 main setting	5055	13BF	21439	53BF					EV8	
		Event 8 sub-setting	5056	13C0	21440	53C0					EV8	
		Proportional band	5057	13C1	21441	53C1					1	
		Integral time	5058	13C2	21442	53C2					PID1	
		Derivative time	5059	13C3	21443	53C3					PID1	
		Output low limit	5060	13C4	21444	53C4					1	
		Output high limit	5061	13C5	21445	53C5					1	
		Manual reset	5062	13C6	21446	53C6					1	
		Proportional band for cool side	5063	13C7	21447	53C7					1	
		Integration time for cool side	5064	13C8	21448	53C8					PID1	
		Derivative time for cool side	5065	13C9	21449	53C9					PID1	
		Output low limit for cool side	5066	13CA	21450	53CA					1	
		Output high limit for cool side	5067	13CB	21451	53CB					1	
		Initial output of PID control	5068	13CC	21452	53CC					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP6	LSP	5072	13D0	21456	53D0					LP1	
		Event 1 main setting	5073	13D1	21457	53D1					EV1	
		Event 1 sub-setting	5074	13D2	21458	53D2					EV1	
		Event 2 main setting	5075	13D3	21459	53D3					EV2	
		Event 2 sub-setting	5076	13D4	21460	53D4					EV2	
		Event 3 main setting	5077	13D5	21461	53D5					EV3	
		Event 3 sub-setting	5078	13D6	21462	53D6					EV3	
		Event 4 main setting	5079	13D7	21463	53D7					EV4	
		Event 4 sub-setting	5080	13D8	21464	53D8					EV4	
		Event 5 main setting	5081	13D9	21465	53D9					EV5	
		Event 5 sub-setting	5082	13DA	21466	53DA					EV5	
		Event 6 main setting	5083	13DB	21467	53DB					EV6	
		Event 6 sub-setting	5084	13DC	21468	53DC					EV6	
		Event 7 main setting	5085	13DD	21469	53DD					EV7	
		Event 7 sub-setting	5086	13DE	21470	53DE					EV7	
		Event 8 main setting	5087	13DF	21471	53DF					EV8	
		Event 8 sub-setting	5088	13E0	21472	53E0					EV8	
		Proportional band	5089	13E1	21473	53E1					1	
		Integral time	5090	13E2	21474	53E2					PID1	
		Derivative time	5091	13E3	21475	53E3					PID1	
		Output low limit	5092	13E4	21476	53E4					1	
		Output high limit	5093	13E5	21477	53E5					1	
		Manual reset	5094	13E6	21478	53E6					1	
		Proportional band for cool side	5095	13E7	21479	53E7					1	
		Integration time for cool side	5096	13E8	21480	53E8					PID1	
		Derivative time for cool side	5097	13E9	21481	53E9					PID1	
		Output low limit for cool side	5098	13EA	21482	53EA					1	
		Output high limit for cool side	5099	13EB	21483	53EB					1	
		Initial output of PID control	5100	13EC	21484	53EC					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP7	LSP	5104	13F0	21488	53F0					LP1	
		Event 1 main setting	5105	13F1	21489	53F1					EV1	
		Event 1 sub-setting	5106	13F2	21490	53F2					EV1	
		Event 2 main setting	5107	13F3	21491	53F3					EV2	
		Event 2 sub-setting	5108	13F4	21492	53F4					EV2	
		Event 3 main setting	5109	13F5	21493	53F5					EV3	
		Event 3 sub-setting	5110	13F6	21494	53F6					EV3	
		Event 4 main setting	5111	13F7	21495	53F7					EV4	
		Event 4 sub-setting	5112	13F8	21496	53F8					EV4	
		Event 5 main setting	5113	13F9	21497	53F9					EV5	
		Event 5 sub-setting	5114	13FA	21498	53FA					EV5	
		Event 6 main setting	5115	13FB	21499	53FB					EV6	
		Event 6 sub-setting	5116	13FC	21500	53FC					EV6	
		Event 7 main setting	5117	13FD	21501	53FD					EV7	
		Event 7 sub-setting	5118	13FE	21502	53FE					EV7	
		Event 8 main setting	5119	13FF	21503	53FF					EV8	
		Event 8 sub-setting	5120	1400	21504	5400					EV8	
		Proportional band	5121	1401	21505	5401					1	
		Integral time	5122	1402	21506	5402					PID1	
		Derivative time	5123	1403	21507	5403					PID1	
		Output low limit	5124	1404	21508	5404					1	
		Output high limit	5125	1405	21509	5405					1	
		Manual reset	5126	1406	21510	5406					1	
		Proportional band for cool side	5127	1407	21511	5407					1	
		Integration time for cool side	5128	1408	21512	5408					PID1	
		Derivative time for cool side	5129	1409	21513	5409					PID1	
		Output low limit for cool side	5130	140A	21514	540A					1	
		Output high limit for cool side	5131	140B	21515	540B					1	
		Initial output of PID control	5132	140C	21516	540C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP8	LSP	5136	1410	21520	5410					LP1	
		Event 1 main setting	5137	1411	21521	5411					EV1	
		Event 1 sub-setting	5138	1412	21522	5412					EV1	
		Event 2 main setting	5139	1413	21523	5413					EV2	
		Event 2 sub-setting	5140	1414	21524	5414					EV2	
		Event 3 main setting	5141	1415	21525	5415					EV3	
		Event 3 sub-setting	5142	1416	21526	5416					EV3	
		Event 4 main setting	5143	1417	21527	5417					EV4	
		Event 4 sub-setting	5144	1418	21528	5418					EV4	
		Event 5 main setting	5145	1419	21529	5419					EV5	
		Event 5 sub-setting	5146	141A	21530	541A					EV5	
		Event 6 main setting	5147	141B	21531	541B					EV6	
		Event 6 sub-setting	5148	141C	21532	541C					EV6	
		Event 7 main setting	5149	141D	21533	541D					EV7	
		Event 7 sub-setting	5150	141E	21534	541E					EV7	
		Event 8 main setting	5151	141F	21535	541F					EV8	
		Event 8 sub-setting	5152	1420	21536	5420					EV8	
		Proportional band	5153	1421	21537	5421					1	
		Integral time	5154	1422	21538	5422					PID1	
		Derivative time	5155	1423	21539	5423					PID1	
		Output low limit	5156	1424	21540	5424					1	
		Output high limit	5157	1425	21541	5425					1	
		Manual reset	5158	1426	21542	5426					1	
		Proportional band for cool side	5159	1427	21543	5427					1	
		Integration time for cool side	5160	1428	21544	5428					PID1	
		Derivative time for cool side	5161	1429	21545	5429					PID1	
		Output low limit for cool side	5162	142A	21546	542A					1	
		Output high limit for cool side	5163	142B	21547	542B					1	
		Initial output of PID control	5164	142C	21548	542C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP9	LSP	5168	1430	21552	5430					LP1	
		Event 1 main setting	5169	1431	21553	5431					EV1	
		Event 1 sub-setting	5170	1432	21554	5432					EV1	
		Event 2 main setting	5171	1433	21555	5433					EV2	
		Event 2 sub-setting	5172	1434	21556	5434					EV2	
		Event 3 main setting	5173	1435	21557	5435					EV3	
		Event 3 sub-setting	5174	1436	21558	5436					EV3	
		Event 4 main setting	5175	1437	21559	5437					EV4	
		Event 4 sub-setting	5176	1438	21560	5438					EV4	
		Event 5 main setting	5177	1439	21561	5439					EV5	
		Event 5 sub-setting	5178	143A	21562	543A					EV5	
		Event 6 main setting	5179	143B	21563	543B					EV6	
		Event 6 sub-setting	5180	143C	21564	543C					EV6	
		Event 7 main setting	5181	143D	21565	543D					EV7	
		Event 7 sub-setting	5182	143E	21566	543E					EV7	
		Event 8 main setting	5183	143F	21567	543F					EV8	
		Event 8 sub-setting	5184	1440	21568	5440					EV8	
		Proportional band	5185	1441	21569	5441					1	
		Integral time	5186	1442	21570	5442					PID1	
		Derivative time	5187	1443	21571	5443					PID1	
		Output low limit	5188	1444	21572	5444					1	
		Output high limit	5189	1445	21573	5445					1	
		Manual reset	5190	1446	21574	5446					1	
		Proportional band for cool side	5191	1447	21575	5447					1	
		Integration time for cool side	5192	1448	21576	5448					PID1	
		Derivative time for cool side	5193	1449	21577	5449					PID1	
		Output low limit for cool side	5194	144A	21578	544A					1	
		Output high limit for cool side	5195	144B	21579	544B					1	
		Initial output of PID control	5196	144C	21580	544C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP10	LSP	5200	1450	21584	5450					LP1	
		Event 1 main setting	5201	1451	21585	5451					EV1	
		Event 1 sub-setting	5202	1452	21586	5452					EV1	
		Event 2 main setting	5203	1453	21587	5453					EV2	
		Event 2 sub-setting	5204	1454	21588	5454					EV2	
		Event 3 main setting	5205	1455	21589	5455					EV3	
		Event 3 sub-setting	5206	1456	21590	5456					EV3	
		Event 4 main setting	5207	1457	21591	5457					EV4	
		Event 4 sub-setting	5208	1458	21592	5458					EV4	
		Event 5 main setting	5209	1459	21593	5459					EV5	
		Event 5 sub-setting	5210	145A	21594	545A					EV5	
		Event 6 main setting	5211	145B	21595	545B					EV6	
		Event 6 sub-setting	5212	145C	21596	545C					EV6	
		Event 7 main setting	5213	145D	21597	545D					EV7	
		Event 7 sub-setting	5214	145E	21598	545E					EV7	
		Event 8 main setting	5215	145F	21599	545F					EV8	
		Event 8 sub-setting	5216	1460	21600	5460					EV8	
		Proportional band	5217	1461	21601	5461					1	
		Integral time	5218	1462	21602	5462					PID1	
		Derivative time	5219	1463	21603	5463					PID1	
		Output low limit	5220	1464	21604	5464					1	
		Output high limit	5221	1465	21605	5465					1	
		Manual reset	5222	1466	21606	5466					1	
		Proportional band for cool side	5223	1467	21607	5467					1	
		Integration time for cool side	5224	1468	21608	5468					PID1	
		Derivative time for cool side	5225	1469	21609	5469					PID1	
		Output low limit for cool side	5226	146A	21610	546A					1	
		Output high limit for cool side	5227	146B	21611	546B					1	
		Initial output of PID control	5228	146C	21612	546C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP11	LSP	5232	1470	21616	5470					LP1	
		Event 1 main setting	5233	1471	21617	5471					EV1	
		Event 1 sub-setting	5234	1472	21618	5472					EV1	
		Event 2 main setting	5235	1473	21619	5473					EV2	
		Event 2 sub-setting	5236	1474	21620	5474					EV2	
		Event 3 main setting	5237	1475	21621	5475					EV3	
		Event 3 sub-setting	5238	1476	21622	5476					EV3	
		Event 4 main setting	5239	1477	21623	5477					EV4	
		Event 4 sub-setting	5240	1478	21624	5478					EV4	
		Event 5 main setting	5241	1479	21625	5479					EV5	
		Event 5 sub-setting	5242	147A	21626	547A					EV5	
		Event 6 main setting	5243	147B	21627	547B					EV6	
		Event 6 sub-setting	5244	147C	21628	547C					EV6	
		Event 7 main setting	5245	147D	21629	547D					EV7	
		Event 7 sub-setting	5246	147E	21630	547E					EV7	
		Event 8 main setting	5247	147F	21631	547F					EV8	
		Event 8 sub-setting	5248	1480	21632	5480					EV8	
		Proportional band	5249	1481	21633	5481					1	
		Integral time	5250	1482	21634	5482					PID1	
		Derivative time	5251	1483	21635	5483					PID1	
		Output low limit	5252	1484	21636	5484					1	
		Output high limit	5253	1485	21637	5485					1	
		Manual reset	5254	1486	21638	5486					1	
		Proportional band for cool side	5255	1487	21639	5487					1	
		Integration time for cool side	5256	1488	21640	5488					PID1	
		Derivative time for cool side	5257	1489	21641	5489					PID1	
		Output low limit for cool side	5258	148A	21642	548A					1	
		Output high limit for cool side	5259	148B	21643	548B					1	
		Initial output of PID control	5260	148C	21644	548C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP12	LSP	5264	1490	21648	5490					LP1	
		Event 1 main setting	5265	1491	21649	5491					EV1	
		Event 1 sub-setting	5266	1492	21650	5492					EV1	
		Event 2 main setting	5267	1493	21651	5493					EV2	
		Event 2 sub-setting	5268	1494	21652	5494					EV2	
		Event 3 main setting	5269	1495	21653	5495					EV3	
		Event 3 sub-setting	5270	1496	21654	5496					EV3	
		Event 4 main setting	5271	1497	21655	5497					EV4	
		Event 4 sub-setting	5272	1498	21656	5498					EV4	
		Event 5 main setting	5273	1499	21657	5499					EV5	
		Event 5 sub-setting	5274	149A	21658	549A					EV5	
		Event 6 main setting	5275	149B	21659	549B					EV6	
		Event 6 sub-setting	5276	149C	21660	549C					EV6	
		Event 7 main setting	5277	149D	21661	549D					EV7	
		Event 7 sub-setting	5278	149E	21662	549E					EV7	
		Event 8 main setting	5279	149F	21663	549F					EV8	
		Event 8 sub-setting	5280	14A0	21664	54A0					EV8	
		Proportional band	5281	14A1	21665	54A1					1	
		Integral time	5282	14A2	21666	54A2					PID1	
		Derivative time	5283	14A3	21667	54A3					PID1	
		Output low limit	5284	14A4	21668	54A4					1	
		Output high limit	5285	14A5	21669	54A5					1	
		Manual reset	5286	14A6	21670	54A6					1	
		Proportional band for cool side	5287	14A7	21671	54A7					1	
		Integration time for cool side	5288	14A8	21672	54A8					PID1	
		Derivative time for cool side	5289	14A9	21673	54A9					PID1	
		Output low limit for cool side	5290	14AA	21674	54AA					1	
		Output high limit for cool side	5291	14AB	21675	54AB					1	
		Initial output of PID control	5292	14AC	21676	54AC					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP13	LSP	5296	14B0	21680	54B0					LP1	
		Event 1 main setting	5297	14B1	21681	54B1					EV1	
		Event 1 sub-setting	5298	14B2	21682	54B2					EV1	
		Event 2 main setting	5299	14B3	21683	54B3					EV2	
		Event 2 sub-setting	5300	14B4	21684	54B4					EV2	
		Event 3 main setting	5301	14B5	21685	54B5					EV3	
		Event 3 sub-setting	5302	14B6	21686	54B6					EV3	
		Event 4 main setting	5303	14B7	21687	54B7					EV4	
		Event 4 sub-setting	5304	14B8	21688	54B8					EV4	
		Event 5 main setting	5305	14B9	21689	54B9					EV5	
		Event 5 sub-setting	5306	14BA	21690	54BA					EV5	
		Event 6 main setting	5307	14BB	21691	54BB					EV6	
		Event 6 sub-setting	5308	14BC	21692	54BC					EV6	
		Event 7 main setting	5309	14BD	21693	54BD					EV7	
		Event 7 sub-setting	5310	14BE	21694	54BE					EV7	
		Event 8 main setting	5311	14BF	21695	54BF					EV8	
		Event 8 sub-setting	5312	14C0	21696	54C0					EV8	
		Proportional band	5313	14C1	21697	54C1					1	
		Integral time	5314	14C2	21698	54C2					PID1	
		Derivative time	5315	14C3	21699	54C3					PID1	
		Output low limit	5316	14C4	21700	54C4					1	
		Output high limit	5317	14C5	21701	54C5					1	
		Manual reset	5318	14C6	21702	54C6					1	
		Proportional band for cool side	5319	14C7	21703	54C7					1	
		Integration time for cool side	5320	14C8	21704	54C8					PID1	
		Derivative time for cool side	5321	14C9	21705	54C9					PID1	
		Output low limit for cool side	5322	14CA	21706	54CA					1	
		Output high limit for cool side	5323	14CB	21707	54CB					1	
		Initial output of PID control	5324	14CC	21708	54CC					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP14	LSP	5328	14D0	21712	54D0					LP1	
		Event 1 main setting	5329	14D1	21713	54D1					EV1	
		Event 1 sub-setting	5330	14D2	21714	54D2					EV1	
		Event 2 main setting	5331	14D3	21715	54D3					EV2	
		Event 2 sub-setting	5332	14D4	21716	54D4					EV2	
		Event 3 main setting	5333	14D5	21717	54D5					EV3	
		Event 3 sub-setting	5334	14D6	21718	54D6					EV3	
		Event 4 main setting	5335	14D7	21719	54D7					EV4	
		Event 4 sub-setting	5336	14D8	21720	54D8					EV4	
		Event 5 main setting	5337	14D9	21721	54D9					EV5	
		Event 5 sub-setting	5338	14DA	21722	54DA					EV5	
		Event 6 main setting	5339	14DB	21723	54DB					EV6	
		Event 6 sub-setting	5340	14DC	21724	54DC					EV6	
		Event 7 main setting	5341	14DD	21725	54DD					EV7	
		Event 7 sub-setting	5342	14DE	21726	54DE					EV7	
		Event 8 main setting	5343	14DF	21727	54DF					EV8	
		Event 8 sub-setting	5344	14E0	21728	54E0					EV8	
		Proportional band	5345	14E1	21729	54E1					1	
		Integral time	5346	14E2	21730	54E2					PID1	
		Derivative time	5347	14E3	21731	54E3					PID1	
		Output low limit	5348	14E4	21732	54E4					1	
		Output high limit	5349	14E5	21733	54E5					1	
		Manual reset	5350	14E6	21734	54E6					1	
		Proportional band for cool side	5351	14E7	21735	54E7					1	
		Integration time for cool side	5352	14E8	21736	54E8					PID1	
		Derivative time for cool side	5353	14E9	21737	54E9					PID1	
		Output low limit for cool side	5354	14EA	21738	54EA					1	
		Output high limit for cool side	5355	14EB	21739	54EB					1	
		Initial output of PID control	5356	14EC	21740	54EC					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP15	LSP	5360	14F0	21744	54F0					LP1	
		Event 1 main setting	5361	14F1	21745	54F1					EV1	
		Event 1 sub-setting	5362	14F2	21746	54F2					EV1	
		Event 2 main setting	5363	14F3	21747	54F3					EV2	
		Event 2 sub-setting	5364	14F4	21748	54F4					EV2	
		Event 3 main setting	5365	14F5	21749	54F5					EV3	
		Event 3 sub-setting	5366	14F6	21750	54F6					EV3	
		Event 4 main setting	5367	14F7	21751	54F7					EV4	
		Event 4 sub-setting	5368	14F8	21752	54F8					EV4	
		Event 5 main setting	5369	14F9	21753	54F9					EV5	
		Event 5 sub-setting	5370	14FA	21754	54FA					EV5	
		Event 6 main setting	5371	14FB	21755	54FB					EV6	
		Event 6 sub-setting	5372	14FC	21756	54FC					EV6	
		Event 7 main setting	5373	14FD	21757	54FD					EV7	
		Event 7 sub-setting	5374	14FE	21758	54FE					EV7	
		Event 8 main setting	5375	14FF	21759	54FF					EV8	
		Event 8 sub-setting	5376	1500	21760	5500					EV8	
		Proportional band	5377	1501	21761	5501					1	
		Integral time	5378	1502	21762	5502					PID1	
		Derivative time	5379	1503	21763	5503					PID1	
		Output low limit	5380	1504	21764	5504					1	
		Output high limit	5381	1505	21765	5505					1	
		Manual reset	5382	1506	21766	5506					1	
		Proportional band for cool side	5383	1507	21767	5507					1	
		Integration time for cool side	5384	1508	21768	5508					PID1	
		Derivative time for cool side	5385	1509	21769	5509					PID1	
		Output low limit for cool side	5386	150A	21770	550A					1	
		Output high limit for cool side	5387	150B	21771	550B					1	
		Initial output of PID control	5388	150C	21772	550C					1	

Loop 1 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 recipe	SP16	LSP	5392	1510	21776	5510					LP1	
		Event 1 main setting	5393	1511	21777	5511					EV1	
		Event 1 sub-setting	5394	1512	21778	5512					EV1	
		Event 2 main setting	5395	1513	21779	5513					EV2	
		Event 2 sub-setting	5396	1514	21780	5514					EV2	
		Event 3 main setting	5397	1515	21781	5515					EV3	
		Event 3 sub-setting	5398	1516	21782	5516					EV3	
		Event 4 main setting	5399	1517	21783	5517					EV4	
		Event 4 sub-setting	5400	1518	21784	5518					EV4	
		Event 5 main setting	5401	1519	21785	5519					EV5	
		Event 5 sub-setting	5402	151A	21786	551A					EV5	
		Event 6 main setting	5403	151B	21787	551B					EV6	
		Event 6 sub-setting	5404	151C	21788	551C					EV6	
		Event 7 main setting	5405	151D	21789	551D					EV7	
		Event 7 sub-setting	5406	151E	21790	551E					EV7	
		Event 8 main setting	5407	151F	21791	551F					EV8	
		Event 8 sub-setting	5408	1520	21792	5520					EV8	
		Proportional band	5409	1521	21793	5521					1	
		Integral time	5410	1522	21794	5522					PID1	
		Derivative time	5411	1523	21795	5523					PID1	
		Output low limit	5412	1524	21796	5524					1	
		Output high limit	5413	1525	21797	5525					1	
		Manual reset	5414	1526	21798	5526					1	
		Proportional band for cool side	5415	1527	21799	5527					1	
		Integration time for cool side	5416	1528	21800	5528					PID1	
		Derivative time for cool side	5417	1529	21801	5529					PID1	
		Output low limit for cool side	5418	152A	21802	552A					1	
		Output high limit for cool side	5419	152B	21803	552B					1	
		Initial output of PID control	5420	152C	21804	552C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP1	LSP	5424	1530	21808	5530					LP2	
		Event 9 main setting	5425	1531	21809	5531					EV9	
		Event 9 sub-setting	5426	1532	21810	5532					EV9	
		Event 10 main setting	5427	1533	21811	5533					EV10	
		Event 10 sub-setting	5428	1534	21812	5534					EV10	
		Event 11 main setting	5429	1535	21813	5535					EV11	
		Event 11 sub-setting	5430	1536	21814	5536					EV11	
		Event 12 main setting	5431	1537	21815	5537					EV12	
		Event 12 sub-setting	5432	1538	21816	5538					EV12	
		Event 13 main setting	5433	1539	21817	5539					EV13	
		Event 13 sub-setting	5434	153A	21818	553A					EV13	
		Event 14 main setting	5435	153B	21819	553B					EV14	
		Event 14 sub-setting	5436	153C	21820	553C					EV14	
		Event 15 main setting	5437	153D	21821	553D					EV15	
		Event 15 sub-setting	5438	153E	21822	553E					EV15	
		Event 16 main setting	5439	153F	21823	553F					EV16	
		Event 16 sub-setting	5440	1540	21824	5540					EV16	
		Proportional band	5441	1541	21825	5541					1	
		Integral time	5442	1542	21826	5542					PID2	
		Derivative time	5443	1543	21827	5543					PID2	
		Output low limit	5444	1544	21828	5544					1	
		Output high limit	5445	1545	21829	5545					1	
		Manual reset	5446	1546	21830	5546					1	
		Proportional band for cool side	5447	1547	21831	5547					1	
		Integration time for cool side	5448	1548	21832	5548					PID2	
		Derivative time for cool side	5449	1549	21833	5549					PID2	
		Output low limit for cool side	5450	154A	21834	554A					1	
		Output high limit for cool side	5451	154B	21835	554B					1	
		Initial output of PID control	5452	154C	21836	554C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP2	LSP	5456	1550	21840	5550					LP2	
		Event 9 main setting	5457	1551	21841	5551					EV9	
		Event 9 sub-setting	5458	1552	21842	5552					EV9	
		Event 10 main setting	5459	1553	21843	5553					EV10	
		Event 10 sub-setting	5460	1554	21844	5554					EV10	
		Event 11 main setting	5461	1555	21845	5555					EV11	
		Event 11 sub-setting	5462	1556	21846	5556					EV11	
		Event 12 main setting	5463	1557	21847	5557					EV12	
		Event 12 sub-setting	5464	1558	21848	5558					EV12	
		Event 13 main setting	5465	1559	21849	5559					EV13	
		Event 13 sub-setting	5466	155A	21850	555A					EV13	
		Event 14 main setting	5467	155B	21851	555B					EV14	
		Event 14 sub-setting	5468	155C	21852	555C					EV14	
		Event 15 main setting	5469	155D	21853	555D					EV15	
		Event 15 sub-setting	5470	155E	21854	555E					EV15	
		Event 16 main setting	5471	155F	21855	555F					EV16	
		Event 16 sub-setting	5472	1560	21856	5560					EV16	
		Proportional band	5473	1561	21857	5561					1	
		Integral time	5474	1562	21858	5562					PID2	
		Derivative time	5475	1563	21859	5563					PID2	
		Output low limit	5476	1564	21860	5564					1	
		Output high limit	5477	1565	21861	5565					1	
		Manual reset	5478	1566	21862	5566					1	
		Proportional band for cool side	5479	1567	21863	5567					1	
		Integration time for cool side	5480	1568	21864	5568					PID2	
		Derivative time for cool side	5481	1569	21865	5569					PID2	
		Output low limit for cool side	5482	156A	21866	556A					1	
		Output high limit for cool side	5483	156B	21867	556B					1	
		Initial output of PID control	5484	156C	21868	556C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP3	LSP	5488	1570	21872	5570					LP2	
		Event 9 main setting	5489	1571	21873	5571					EV9	
		Event 9 sub-setting	5490	1572	21874	5572					EV9	
		Event 10 main setting	5491	1573	21875	5573					EV10	
		Event 10 sub-setting	5492	1574	21876	5574					EV10	
		Event 11 main setting	5493	1575	21877	5575					EV11	
		Event 11 sub-setting	5494	1576	21878	5576					EV11	
		Event 12 main setting	5495	1577	21879	5577					EV12	
		Event 12 sub-setting	5496	1578	21880	5578					EV12	
		Event 13 main setting	5497	1579	21881	5579					EV13	
		Event 13 sub-setting	5498	157A	21882	557A					EV13	
		Event 14 main setting	5499	157B	21883	557B					EV14	
		Event 14 sub-setting	5500	157C	21884	557C					EV14	
		Event 15 main setting	5501	157D	21885	557D					EV15	
		Event 15 sub-setting	5502	157E	21886	557E					EV15	
		Event 16 main setting	5503	157F	21887	557F					EV16	
		Event 16 sub-setting	5504	1580	21888	5580					EV16	
		Proportional band	5505	1581	21889	5581					1	
		Integral time	5506	1582	21890	5582					PID2	
		Derivative time	5507	1583	21891	5583					PID2	
		Output low limit	5508	1584	21892	5584					1	
		Output high limit	5509	1585	21893	5585					1	
		Manual reset	5510	1586	21894	5586					1	
		Proportional band for cool side	5511	1587	21895	5587					1	
		Integration time for cool side	5512	1588	21896	5588					PID2	
		Derivative time for cool side	5513	1589	21897	5589					PID2	
		Output low limit for cool side	5514	158A	21898	558A					1	
		Output high limit for cool side	5515	158B	21899	558B					1	
		Initial output of PID control	5516	158C	21900	558C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP4	LSP	5520	1590	21904	5590					LP2	
		Event 9 main setting	5521	1591	21905	5591					EV9	
		Event 9 sub-setting	5522	1592	21906	5592					EV9	
		Event 10 main setting	5523	1593	21907	5593					EV10	
		Event 10 sub-setting	5524	1594	21908	5594					EV10	
		Event 11 main setting	5525	1595	21909	5595					EV11	
		Event 11 sub-setting	5526	1596	21910	5596					EV11	
		Event 12 main setting	5527	1597	21911	5597					EV12	
		Event 12 sub-setting	5528	1598	21912	5598					EV12	
		Event 13 main setting	5529	1599	21913	5599					EV13	
		Event 13 sub-setting	5530	159A	21914	559A					EV13	
		Event 14 main setting	5531	159B	21915	559B					EV14	
		Event 14 sub-setting	5532	159C	21916	559C					EV14	
		Event 15 main setting	5533	159D	21917	559D					EV15	
		Event 15 sub-setting	5534	159E	21918	559E					EV15	
		Event 16 main setting	5535	159F	21919	559F					EV16	
		Event 16 sub-setting	5536	15A0	21920	55A0					EV16	
		Proportional band	5537	15A1	21921	55A1					1	
		Integral time	5538	15A2	21922	55A2					PID2	
		Derivative time	5539	15A3	21923	55A3					PID2	
		Output low limit	5540	15A4	21924	55A4					1	
		Output high limit	5541	15A5	21925	55A5					1	
		Manual reset	5542	15A6	21926	55A6					1	
		Proportional band for cool side	5543	15A7	21927	55A7					1	
		Integration time for cool side	5544	15A8	21928	55A8					PID2	
		Derivative time for cool side	5545	15A9	21929	55A9					PID2	
		Output low limit for cool side	5546	15AA	21930	55AA					1	
		Output high limit for cool side	5547	15AB	21931	55AB					1	
		Initial output of PID control	5548	15AC	21932	55AC					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP5	LSP	5552	15B0	21936	55B0					LP2	
		Event 9 main setting	5553	15B1	21937	55B1					EV9	
		Event 9 sub-setting	5554	15B2	21938	55B2					EV9	
		Event 10 main setting	5555	15B3	21939	55B3					EV10	
		Event 10 sub-setting	5556	15B4	21940	55B4					EV10	
		Event 11 main setting	5557	15B5	21941	55B5					EV11	
		Event 11 sub-setting	5558	15B6	21942	55B6					EV11	
		Event 12 main setting	5559	15B7	21943	55B7					EV12	
		Event 12 sub-setting	5560	15B8	21944	55B8					EV12	
		Event 13 main setting	5561	15B9	21945	55B9					EV13	
		Event 13 sub-setting	5562	15BA	21946	55BA					EV13	
		Event 14 main setting	5563	15BB	21947	55BB					EV14	
		Event 14 sub-setting	5564	15BC	21948	55BC					EV14	
		Event 15 main setting	5565	15BD	21949	55BD					EV15	
		Event 15 sub-setting	5566	15BE	21950	55BE					EV15	
		Event 16 main setting	5567	15BF	21951	55BF					EV16	
		Event 16 sub-setting	5568	15C0	21952	55C0					EV16	
		Proportional band	5569	15C1	21953	55C1					1	
		Integral time	5570	15C2	21954	55C2					PID2	
		Derivative time	5571	15C3	21955	55C3					PID2	
		Output low limit	5572	15C4	21956	55C4					1	
		Output high limit	5573	15C5	21957	55C5					1	
		Manual reset	5574	15C6	21958	55C6					1	
		Proportional band for cool side	5575	15C7	21959	55C7					1	
		Integration time for cool side	5576	15C8	21960	55C8					PID2	
		Derivative time for cool side	5577	15C9	21961	55C9					PID2	
		Output low limit for cool side	5578	15CA	21962	55CA					1	
		Output high limit for cool side	5579	15CB	21963	55CB					1	
		Initial output of PID control	5580	15CC	21964	55CC					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP6	LSP	5584	15D0	21968	55D0					LP2	
		Event 9 main setting	5585	15D1	21969	55D1					EV9	
		Event 9 sub-setting	5586	15D2	21970	55D2					EV9	
		Event 10 main setting	5587	15D3	21971	55D3					EV10	
		Event 10 sub-setting	5588	15D4	21972	55D4					EV10	
		Event 11 main setting	5589	15D5	21973	55D5					EV11	
		Event 11 sub-setting	5590	15D6	21974	55D6					EV11	
		Event 12 main setting	5591	15D7	21975	55D7					EV12	
		Event 12 sub-setting	5592	15D8	21976	55D8					EV12	
		Event 13 main setting	5593	15D9	21977	55D9					EV13	
		Event 13 sub-setting	5594	15DA	21978	55DA					EV13	
		Event 14 main setting	5595	15DB	21979	55DB					EV14	
		Event 14 sub-setting	5596	15DC	21980	55DC					EV14	
		Event 15 main setting	5597	15DD	21981	55DD					EV15	
		Event 15 sub-setting	5598	15DE	21982	55DE					EV15	
		Event 16 main setting	5599	15DF	21983	55DF					EV16	
		Event 16 sub-setting	5600	15E0	21984	55E0					EV16	
		Proportional band	5601	15E1	21985	55E1					1	
		Integral time	5602	15E2	21986	55E2					PID2	
		Derivative time	5603	15E3	21987	55E3					PID2	
		Output low limit	5604	15E4	21988	55E4					1	
		Output high limit	5605	15E5	21989	55E5					1	
		Manual reset	5606	15E6	21990	55E6					1	
		Proportional band for cool side	5607	15E7	21991	55E7					1	
		Integration time for cool side	5608	15E8	21992	55E8					PID2	
		Derivative time for cool side	5609	15E9	21993	55E9					PID2	
		Output low limit for cool side	5610	15EA	21994	55EA					1	
		Output high limit for cool side	5611	15EB	21995	55EB					1	
		Initial output of PID control	5612	15EC	21996	55EC					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP7	LSP	5616	15F0	22000	55F0					LP2	
		Event 9 main setting	5617	15F1	22001	55F1					EV9	
		Event 9 sub-setting	5618	15F2	22002	55F2					EV9	
		Event 10 main setting	5619	15F3	22003	55F3					EV10	
		Event 10 sub-setting	5620	15F4	22004	55F4					EV10	
		Event 11 main setting	5621	15F5	22005	55F5					EV11	
		Event 11 sub-setting	5622	15F6	22006	55F6					EV11	
		Event 12 main setting	5623	15F7	22007	55F7					EV12	
		Event 12 sub-setting	5624	15F8	22008	55F8					EV12	
		Event 13 main setting	5625	15F9	22009	55F9					EV13	
		Event 13 sub-setting	5626	15FA	22010	55FA					EV13	
		Event 14 main setting	5627	15FB	22011	55FB					EV14	
		Event 14 sub-setting	5628	15FC	22012	55FC					EV14	
		Event 15 main setting	5629	15FD	22013	55FD					EV15	
		Event 15 sub-setting	5630	15FE	22014	55FE					EV15	
		Event 16 main setting	5631	15FF	22015	55FF					EV16	
		Event 16 sub-setting	5632	1600	22016	5600					EV16	
		Proportional band	5633	1601	22017	5601					1	
		Integral time	5634	1602	22018	5602					PID2	
		Derivative time	5635	1603	22019	5603					PID2	
		Output low limit	5636	1604	22020	5604					1	
		Output high limit	5637	1605	22021	5605					1	
		Manual reset	5638	1606	22022	5606					1	
		Proportional band for cool side	5639	1607	22023	5607					1	
		Integration time for cool side	5640	1608	22024	5608					PID2	
		Derivative time for cool side	5641	1609	22025	5609					PID2	
		Output low limit for cool side	5642	160A	22026	560A					1	
		Output high limit for cool side	5643	160B	22027	560B					1	
		Initial output of PID control	5644	160C	22028	560C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP8	LSP	5648	1610	22032	5610					LP2	
		Event 9 main setting	5649	1611	22033	5611					EV9	
		Event 9 sub-setting	5650	1612	22034	5612					EV9	
		Event 10 main setting	5651	1613	22035	5613					EV10	
		Event 10 sub-setting	5652	1614	22036	5614					EV10	
		Event 11 main setting	5653	1615	22037	5615					EV11	
		Event 11 sub-setting	5654	1616	22038	5616					EV11	
		Event 12 main setting	5655	1617	22039	5617					EV12	
		Event 12 sub-setting	5656	1618	22040	5618					EV12	
		Event 13 main setting	5657	1619	22041	5619					EV13	
		Event 13 sub-setting	5658	161A	22042	561A					EV13	
		Event 14 main setting	5659	161B	22043	561B					EV14	
		Event 14 sub-setting	5660	161C	22044	561C					EV14	
		Event 15 main setting	5661	161D	22045	561D					EV15	
		Event 15 sub-setting	5662	161E	22046	561E					EV15	
		Event 16 main setting	5663	161F	22047	561F					EV16	
		Event 16 sub-setting	5664	1620	22048	5620					EV16	
		Proportional band	5665	1621	22049	5621					1	
		Integral time	5666	1622	22050	5622					PID2	
		Derivative time	5667	1623	22051	5623					PID2	
		Output low limit	5668	1624	22052	5624					1	
		Output high limit	5669	1625	22053	5625					1	
		Manual reset	5670	1626	22054	5626					1	
		Proportional band for cool side	5671	1627	22055	5627					1	
		Integration time for cool side	5672	1628	22056	5628					PID2	
		Derivative time for cool side	5673	1629	22057	5629					PID2	
		Output low limit for cool side	5674	162A	22058	562A					1	
		Output high limit for cool side	5675	162B	22059	562B					1	
		Initial output of PID control	5676	162C	22060	562C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP9	LSP	5680	1630	22064	5630					LP2	
		Event 9 main setting	5681	1631	22065	5631					EV9	
		Event 9 sub-setting	5682	1632	22066	5632					EV9	
		Event 10 main setting	5683	1633	22067	5633					EV10	
		Event 10 sub-setting	5684	1634	22068	5634					EV10	
		Event 11 main setting	5685	1635	22069	5635					EV11	
		Event 11 sub-setting	5686	1636	22070	5636					EV11	
		Event 12 main setting	5687	1637	22071	5637					EV12	
		Event 12 sub-setting	5688	1638	22072	5638					EV12	
		Event 13 main setting	5689	1639	22073	5639					EV13	
		Event 13 sub-setting	5690	163A	22074	563A					EV13	
		Event 14 main setting	5691	163B	22075	563B					EV14	
		Event 14 sub-setting	5692	163C	22076	563C					EV14	
		Event 15 main setting	5693	163D	22077	563D					EV15	
		Event 15 sub-setting	5694	163E	22078	563E					EV15	
		Event 16 main setting	5695	163F	22079	563F					EV16	
		Event 16 sub-setting	5696	1640	22080	5640					EV16	
		Proportional band	5697	1641	22081	5641					1	
		Integral time	5698	1642	22082	5642					PID2	
		Derivative time	5699	1643	22083	5643					PID2	
		Output low limit	5700	1644	22084	5644					1	
		Output high limit	5701	1645	22085	5645					1	
		Manual reset	5702	1646	22086	5646					1	
		Proportional band for cool side	5703	1647	22087	5647					1	
		Integration time for cool side	5704	1648	22088	5648					PID2	
		Derivative time for cool side	5705	1649	22089	5649					PID2	
		Output low limit for cool side	5706	164A	22090	564A					1	
		Output high limit for cool side	5707	164B	22091	564B					1	
		Initial output of PID control	5708	164C	22092	564C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP10	LSP	5712	1650	22096	5650					LP2	
		Event 9 main setting	5713	1651	22097	5651					EV9	
		Event 9 sub-setting	5714	1652	22098	5652					EV9	
		Event 10 main setting	5715	1653	22099	5653					EV10	
		Event 10 sub-setting	5716	1654	22100	5654					EV10	
		Event 11 main setting	5717	1655	22101	5655					EV11	
		Event 11 sub-setting	5718	1656	22102	5656					EV11	
		Event 12 main setting	5719	1657	22103	5657					EV12	
		Event 12 sub-setting	5720	1658	22104	5658					EV12	
		Event 13 main setting	5721	1659	22105	5659					EV13	
		Event 13 sub-setting	5722	165A	22106	565A					EV13	
		Event 14 main setting	5723	165B	22107	565B					EV14	
		Event 14 sub-setting	5724	165C	22108	565C					EV14	
		Event 15 main setting	5725	165D	22109	565D					EV15	
		Event 15 sub-setting	5726	165E	22110	565E					EV15	
		Event 16 main setting	5727	165F	22111	565F					EV16	
		Event 16 sub-setting	5728	1660	22112	5660					EV16	
		Proportional band	5729	1661	22113	5661					1	
		Integral time	5730	1662	22114	5662					PID2	
		Derivative time	5731	1663	22115	5663					PID2	
		Output low limit	5732	1664	22116	5664					1	
		Output high limit	5733	1665	22117	5665					1	
		Manual reset	5734	1666	22118	5666					1	
		Proportional band for cool side	5735	1667	22119	5667					1	
		Integration time for cool side	5736	1668	22120	5668					PID2	
		Derivative time for cool side	5737	1669	22121	5669					PID2	
		Output low limit for cool side	5738	166A	22122	566A					1	
		Output high limit for cool side	5739	166B	22123	566B					1	
		Initial output of PID control	5740	166C	22124	566C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP11	LSP	5744	1670	22128	5670					LP2	
		Event 9 main setting	5745	1671	22129	5671					EV9	
		Event 9 sub-setting	5746	1672	22130	5672					EV9	
		Event 10 main setting	5747	1673	22131	5673					EV10	
		Event 10 sub-setting	5748	1674	22132	5674					EV10	
		Event 11 main setting	5749	1675	22133	5675					EV11	
		Event 11 sub-setting	5750	1676	22134	5676					EV11	
		Event 12 main setting	5751	1677	22135	5677					EV12	
		Event 12 sub-setting	5752	1678	22136	5678					EV12	
		Event 13 main setting	5753	1679	22137	5679					EV13	
		Event 13 sub-setting	5754	167A	22138	567A					EV13	
		Event 14 main setting	5755	167B	22139	567B					EV14	
		Event 14 sub-setting	5756	167C	22140	567C					EV14	
		Event 15 main setting	5757	167D	22141	567D					EV15	
		Event 15 sub-setting	5758	167E	22142	567E					EV15	
		Event 16 main setting	5759	167F	22143	567F					EV16	
		Event 16 sub-setting	5760	1680	22144	5680					EV16	
		Proportional band	5761	1681	22145	5681					1	
		Integral time	5762	1682	22146	5682					PID2	
		Derivative time	5763	1683	22147	5683					PID2	
		Output low limit	5764	1684	22148	5684					1	
		Output high limit	5765	1685	22149	5685					1	
		Manual reset	5766	1686	22150	5686					1	
		Proportional band for cool side	5767	1687	22151	5687					1	
		Integration time for cool side	5768	1688	22152	5688					PID2	
		Derivative time for cool side	5769	1689	22153	5689					PID2	
		Output low limit for cool side	5770	168A	22154	568A					1	
		Output high limit for cool side	5771	168B	22155	568B					1	
		Initial output of PID control	5772	168C	22156	568C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP12	LSP	5776	1690	22160	5690					LP2	
		Event 9 main setting	5777	1691	22161	5691					EV9	
		Event 9 sub-setting	5778	1692	22162	5692					EV9	
		Event 10 main setting	5779	1693	22163	5693					EV10	
		Event 10 sub-setting	5780	1694	22164	5694					EV10	
		Event 11 main setting	5781	1695	22165	5695					EV11	
		Event 11 sub-setting	5782	1696	22166	5696					EV11	
		Event 12 main setting	5783	1697	22167	5697					EV12	
		Event 12 sub-setting	5784	1698	22168	5698					EV12	
		Event 13 main setting	5785	1699	22169	5699					EV13	
		Event 13 sub-setting	5786	169A	22170	569A					EV13	
		Event 14 main setting	5787	169B	22171	569B					EV14	
		Event 14 sub-setting	5788	169C	22172	569C					EV14	
		Event 15 main setting	5789	169D	22173	569D					EV15	
		Event 15 sub-setting	5790	169E	22174	569E					EV15	
		Event 16 main setting	5791	169F	22175	569F					EV16	
		Event 16 sub-setting	5792	16A0	22176	56A0					EV16	
		Proportional band	5793	16A1	22177	56A1					1	
		Integral time	5794	16A2	22178	56A2					PID2	
		Derivative time	5795	16A3	22179	56A3					PID2	
		Output low limit	5796	16A4	22180	56A4					1	
		Output high limit	5797	16A5	22181	56A5					1	
		Manual reset	5798	16A6	22182	56A6					1	
		Proportional band for cool side	5799	16A7	22183	56A7					1	
		Integration time for cool side	5800	16A8	22184	56A8					PID2	
		Derivative time for cool side	5801	16A9	22185	56A9					PID2	
		Output low limit for cool side	5802	16AA	22186	56AA					1	
		Output high limit for cool side	5803	16AB	22187	56AB					1	
		Initial output of PID control	5804	16AC	22188	56AC					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP13	LSP	5808	16B0	22192	56B0					LP2	
		Event 9 main setting	5809	16B1	22193	56B1					EV9	
		Event 9 sub-setting	5810	16B2	22194	56B2					EV9	
		Event 10 main setting	5811	16B3	22195	56B3					EV10	
		Event 10 sub-setting	5812	16B4	22196	56B4					EV10	
		Event 11 main setting	5813	16B5	22197	56B5					EV11	
		Event 11 sub-setting	5814	16B6	22198	56B6					EV11	
		Event 12 main setting	5815	16B7	22199	56B7					EV12	
		Event 12 sub-setting	5816	16B8	22200	56B8					EV12	
		Event 13 main setting	5817	16B9	22201	56B9					EV13	
		Event 13 sub-setting	5818	16BA	22202	56BA					EV13	
		Event 14 main setting	5819	16BB	22203	56BB					EV14	
		Event 14 sub-setting	5820	16BC	22204	56BC					EV14	
		Event 15 main setting	5821	16BD	22205	56BD					EV15	
		Event 15 sub-setting	5822	16BE	22206	56BE					EV15	
		Event 16 main setting	5823	16BF	22207	56BF					EV16	
		Event 16 sub-setting	5824	16C0	22208	56C0					EV16	
		Proportional band	5825	16C1	22209	56C1					1	
		Integral time	5826	16C2	22210	56C2					PID2	
		Derivative time	5827	16C3	22211	56C3					PID2	
		Output low limit	5828	16C4	22212	56C4					1	
		Output high limit	5829	16C5	22213	56C5					1	
		Manual reset	5830	16C6	22214	56C6					1	
		Proportional band for cool side	5831	16C7	22215	56C7					1	
		Integration time for cool side	5832	16C8	22216	56C8					PID2	
		Derivative time for cool side	5833	16C9	22217	56C9					PID2	
		Output low limit for cool side	5834	16CA	22218	56CA					1	
		Output high limit for cool side	5835	16CB	22219	56CB					1	
		Initial output of PID control	5836	16CC	22220	56CC					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP14	LSP	5840	16D0	22224	56D0					LP2	
		Event 9 main setting	5841	16D1	22225	56D1					EV9	
		Event 9 sub-setting	5842	16D2	22226	56D2					EV9	
		Event 10 main setting	5843	16D3	22227	56D3					EV10	
		Event 10 sub-setting	5844	16D4	22228	56D4					EV10	
		Event 11 main setting	5845	16D5	22229	56D5					EV11	
		Event 11 sub-setting	5846	16D6	22230	56D6					EV11	
		Event 12 main setting	5847	16D7	22231	56D7					EV12	
		Event 12 sub-setting	5848	16D8	22232	56D8					EV12	
		Event 13 main setting	5849	16D9	22233	56D9					EV13	
		Event 13 sub-setting	5850	16DA	22234	56DA					EV13	
		Event 14 main setting	5851	16DB	22235	56DB					EV14	
		Event 14 sub-setting	5852	16DC	22236	56DC					EV14	
		Event 15 main setting	5853	16DD	22237	56DD					EV15	
		Event 15 sub-setting	5854	16DE	22238	56DE					EV15	
		Event 16 main setting	5855	16DF	22239	56DF					EV16	
		Event 16 sub-setting	5856	16E0	22240	56E0					EV16	
		Proportional band	5857	16E1	22241	56E1					1	
		Integral time	5858	16E2	22242	56E2					PID2	
		Derivative time	5859	16E3	22243	56E3					PID2	
		Output low limit	5860	16E4	22244	56E4					1	
		Output high limit	5861	16E5	22245	56E5					1	
		Manual reset	5862	16E6	22246	56E6					1	
		Proportional band for cool side	5863	16E7	22247	56E7					1	
		Integration time for cool side	5864	16E8	22248	56E8					PID2	
		Derivative time for cool side	5865	16E9	22249	56E9					PID2	
		Output low limit for cool side	5866	16EA	22250	56EA					1	
		Output high limit for cool side	5867	16EB	22251	56EB					1	
		Initial output of PID control	5868	16EC	22252	56EC					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP15	LSP	5872	16F0	22256	56F0					LP2	
		Event 9 main setting	5873	16F1	22257	56F1					EV9	
		Event 9 sub-setting	5874	16F2	22258	56F2					EV9	
		Event 10 main setting	5875	16F3	22259	56F3					EV10	
		Event 10 sub-setting	5876	16F4	22260	56F4					EV10	
		Event 11 main setting	5877	16F5	22261	56F5					EV11	
		Event 11 sub-setting	5878	16F6	22262	56F6					EV11	
		Event 12 main setting	5879	16F7	22263	56F7					EV12	
		Event 12 sub-setting	5880	16F8	22264	56F8					EV12	
		Event 13 main setting	5881	16F9	22265	56F9					EV13	
		Event 13 sub-setting	5882	16FA	22266	56FA					EV13	
		Event 14 main setting	5883	16FB	22267	56FB					EV14	
		Event 14 sub-setting	5884	16FC	22268	56FC					EV14	
		Event 15 main setting	5885	16FD	22269	56FD					EV15	
		Event 15 sub-setting	5886	16FE	22270	56FE					EV15	
		Event 16 main setting	5887	16FF	22271	56FF					EV16	
		Event 16 sub-setting	5888	1700	22272	5700					EV16	
		Proportional band	5889	1701	22273	5701					1	
		Integral time	5890	1702	22274	5702					PID2	
		Derivative time	5891	1703	22275	5703					PID2	
		Output low limit	5892	1704	22276	5704					1	
		Output high limit	5893	1705	22277	5705					1	
		Manual reset	5894	1706	22278	5706					1	
		Proportional band for cool side	5895	1707	22279	5707					1	
		Integration time for cool side	5896	1708	22280	5708					PID2	
		Derivative time for cool side	5897	1709	22281	5709					PID2	
		Output low limit for cool side	5898	170A	22282	570A					1	
		Output high limit for cool side	5899	170B	22283	570B					1	
		Initial output of PID control	5900	170C	22284	570C					1	

Loop 2 recipe

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 recipe	SP16	LSP	5904	1710	22288	5710					LP2	
		Event 9 main setting	5905	1711	22289	5711					EV9	
		Event 9 sub-setting	5906	1712	22290	5712					EV9	
		Event 10 main setting	5907	1713	22291	5713					EV10	
		Event 10 sub-setting	5908	1714	22292	5714					EV10	
		Event 11 main setting	5909	1715	22293	5715					EV11	
		Event 11 sub-setting	5910	1716	22294	5716					EV11	
		Event 12 main setting	5911	1717	22295	5717					EV12	
		Event 12 sub-setting	5912	1718	22296	5718					EV12	
		Event 13 main setting	5913	1719	22297	5719					EV13	
		Event 13 sub-setting	5914	171A	22298	571A					EV13	
		Event 14 main setting	5915	171B	22299	571B					EV14	
		Event 14 sub-setting	5916	171C	22300	571C					EV14	
		Event 15 main setting	5917	171D	22301	571D					EV15	
		Event 15 sub-setting	5918	171E	22302	571E					EV15	
		Event 16 main setting	5919	171F	22303	571F					EV16	
		Event 16 sub-setting	5920	1720	22304	5720					EV16	
		Proportional band	5921	1721	22305	5721					1	
		Integral time	5922	1722	22306	5722					PID2	
		Derivative time	5923	1723	22307	5723					PID2	
		Output low limit	5924	1724	22308	5724					1	
		Output high limit	5925	1725	22309	5725					1	
		Manual reset	5926	1726	22310	5726					1	
		Proportional band for cool side	5927	1727	22311	5727					1	
		Integration time for cool side	5928	1728	22312	5728					PID2	
		Derivative time for cool side	5929	1729	22313	5729					PID2	
		Output low limit for cool side	5930	172A	22314	572A					1	
		Output high limit for cool side	5931	172B	22315	572B					1	
		Initial output of PID control	5932	172C	22316	572C					1	

Mode

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Mode	Loop 1	RUN/READY	6960	1B30	23344	5B30		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	6961	1B31	23345	5B31		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	6962	1B32	23346	5B32		□		□	–	0:AT stop 1:AT start
		LSP/RSP	6963	1B33	23347	5B33		□		□	–	0:LSP 1:RSP
		Backup/through output	6964	1B34	23348	5B34		□		□	–	0:Backup 1:Through output
	Loop 2	RUN/READY	6976	1B40	23360	5B40		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	6977	1B41	23361	5B41		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	6978	1B42	23362	5B42		□		□	–	0:AT stop 1:AT start
		LSP/RSP	6979	1B43	23363	5B43		□		□	–	0:LSP 1:RSP
		Backup/through output	6980	1B44	23364	5B44		□		□	–	0:Backup 1:Through output

Loop 1 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 PID	PID1	Proportional band	7024	1B70	23408	5B70					1	
		Integral time	7025	1B71	23409	5B71					PID1	
		Derivative time	7026	1B72	23410	5B72					PID1	
		Output low limit	7027	1B73	23411	5B73					1	
		Output high limit	7028	1B74	23412	5B74					1	
		Manual reset	7029	1B75	23413	5B75					1	
		Proportional band for cool side	7030	1B76	23414	5B76					1	
		Integration time for cool side	7031	1B77	23415	5B77					PID1	
		Derivative time for cool side	7032	1B78	23416	5B78					PID1	
		Output low limit for cool side	7033	1B79	23417	5B79					1	
		Output high limit for cool side	7034	1B7A	23418	5B7A					1	
	PID2	Proportional band	7040	1B80	23424	5B80					1	
		Integral time	7041	1B81	23425	5B81					PID1	
		Derivative time	7042	1B82	23426	5B82					PID1	
		Output low limit	7043	1B83	23427	5B83					1	
		Output high limit	7044	1B84	23428	5B84					1	
		Manual reset	7045	1B85	23429	5B85					1	
		Proportional band for cool side	7046	1B86	23430	5B86					1	
		Integration time for cool side	7047	1B87	23431	5B87					PID1	
		Derivative time for cool side	7048	1B88	23432	5B88					PID1	
		Output low limit for cool side	7049	1B89	23433	5B89					1	
		Output high limit for cool side	7050	1B8A	23434	5B8A					1	
	PID3	Proportional band	7056	1B90	23440	5B90					1	
		Integral time	7057	1B91	23441	5B91					PID1	
		Derivative time	7058	1B92	23442	5B92					PID1	
		Output low limit	7059	1B93	23443	5B93					1	
		Output high limit	7060	1B94	23444	5B94					1	
		Manual reset	7061	1B95	23445	5B95					1	
		Proportional band for cool side	7062	1B96	23446	5B96					1	
		Integration time for cool side	7063	1B97	23447	5B97					PID1	
		Derivative time for cool side	7064	1B98	23448	5B98					PID1	
		Output low limit for cool side	7065	1B99	23449	5B99					1	
		Output high limit for cool side	7066	1B9A	23450	5B9A					1	
	PID4	Proportional band	7072	1BA0	23456	5BA0					1	
		Integral time	7073	1BA1	23457	5BA1					PID1	
		Derivative time	7074	1BA2	23458	5BA2					PID1	
		Output low limit	7075	1BA3	23459	5BA3					1	
		Output high limit	7076	1BA4	23460	5BA4					1	
		Manual reset	7077	1BA5	23461	5BA5					1	
		Proportional band for cool side	7078	1BA6	23462	5BA6					1	
		Integration time for cool side	7079	1BA7	23463	5BA7					PID1	
		Derivative time for cool side	7080	1BA8	23464	5BA8					PID1	
		Output low limit for cool side	7081	1BA9	23465	5BA9					1	
		Output high limit for cool side	7082	1BAA	23466	5BAA					1	

Loop 1 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 PID	PID5	Proportional band	7088	1BB0	23472	5BB0					1	
		Integral time	7089	1BB1	23473	5BB1					PID1	
		Derivative time	7090	1BB2	23474	5BB2					PID1	
		Output low limit	7091	1BB3	23475	5BB3					1	
		Output high limit	7092	1BB4	23476	5BB4					1	
		Manual reset	7093	1BB5	23477	5BB5					1	
		Proportional band for cool side	7094	1BB6	23478	5BB6					1	
		Integration time for cool side	7095	1BB7	23479	5BB7					PID1	
		Derivative time for cool side	7096	1BB8	23480	5BB8					PID1	
		Output low limit for cool side	7097	1BB9	23481	5BB9					1	
		Output high limit for cool side	7098	1BBA	23482	5BBA					1	
	PID6	Proportional band	7104	1BC0	23488	5BC0					1	
		Integral time	7105	1BC1	23489	5BC1					PID1	
		Derivative time	7106	1BC2	23490	5BC2					PID1	
		Output low limit	7107	1BC3	23491	5BC3					1	
		Output high limit	7108	1BC4	23492	5BC4					1	
		Manual reset	7109	1BC5	23493	5BC5					1	
		Proportional band for cool side	7110	1BC6	23494	5BC6					1	
		Integration time for cool side	7111	1BC7	23495	5BC7					PID1	
		Derivative time for cool side	7112	1BC8	23496	5BC8					PID1	
		Output low limit for cool side	7113	1BC9	23497	5BC9					1	
		Output high limit for cool side	7114	1BCA	23498	5BCA					1	
	PID7	Proportional band	7120	1BD0	23504	5BD0					1	
		Integral time	7121	1BD1	23505	5BD1					PID1	
		Derivative time	7122	1BD2	23506	5BD2					PID1	
		Output low limit	7123	1BD3	23507	5BD3					1	
		Output high limit	7124	1BD4	23508	5BD4					1	
		Manual reset	7125	1BD5	23509	5BD5					1	
		Proportional band for cool side	7126	1BD6	23510	5BD6					1	
		Integration time for cool side	7127	1BD7	23511	5BD7					PID1	
		Derivative time for cool side	7128	1BD8	23512	5BD8					PID1	
		Output low limit for cool side	7129	1BD9	23513	5BD9					1	
		Output high limit for cool side	7130	1BDA	23514	5BDA					1	
	PID8	Proportional band	7136	1BE0	23520	5BE0					1	
		Integral time	7137	1BE1	23521	5BE1					PID1	
		Derivative time	7138	1BE2	23522	5BE2					PID1	
		Output low limit	7139	1BE3	23523	5BE3					1	
		Output high limit	7140	1BE4	23524	5BE4					1	
		Manual reset	7141	1BE5	23525	5BE5					1	
		Proportional band for cool side	7142	1BE6	23526	5BE6					1	
		Integration time for cool side	7143	1BE7	23527	5BE7					PID1	
		Derivative time for cool side	7144	1BE8	23528	5BE8					PID1	
		Output low limit for cool side	7145	1BE9	23529	5BE9					1	
		Output high limit for cool side	7146	1BEA	23530	5BEA					1	

Loop 1 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 PID	PID9	Proportional band	7152	1BF0	23536	5BF0					1	
		Integral time	7153	1BF1	23537	5BF1					PID1	
		Derivative time	7154	1BF2	23538	5BF2					PID1	
		Output low limit	7155	1BF3	23539	5BF3					1	
		Output high limit	7156	1BF4	23540	5BF4					1	
		Manual reset	7157	1BF5	23541	5BF5					1	
		Proportional band for cool side	7158	1BF6	23542	5BF6					1	
		Integration time for cool side	7159	1BF7	23543	5BF7					PID1	
		Derivative time for cool side	7160	1BF8	23544	5BF8					PID1	
		Output low limit for cool side	7161	1BF9	23545	5BF9					1	
		Output high limit for cool side	7162	1BFA	23546	5BFA					1	
	PID10	Proportional band	7168	1C00	23552	5C00					1	
		Integral time	7169	1C01	23553	5C01					PID1	
		Derivative time	7170	1C02	23554	5C02					PID1	
		Output low limit	7171	1C03	23555	5C03					1	
		Output high limit	7172	1C04	23556	5C04					1	
		Manual reset	7173	1C05	23557	5C05					1	
		Proportional band for cool side	7174	1C06	23558	5C06					1	
		Integration time for cool side	7175	1C07	23559	5C07					PID1	
		Derivative time for cool side	7176	1C08	23560	5C08					PID1	
		Output low limit for cool side	7177	1C09	23561	5C09					1	
		Output high limit for cool side	7178	1C0A	23562	5C0A					1	
	PID11	Proportional band	7184	1C10	23568	5C10					1	
		Integral time	7185	1C11	23569	5C11					PID1	
		Derivative time	7186	1C12	23570	5C12					PID1	
		Output low limit	7187	1C13	23571	5C13					1	
		Output high limit	7188	1C14	23572	5C14					1	
		Manual reset	7189	1C15	23573	5C15					1	
		Proportional band for cool side	7190	1C16	23574	5C16					1	
		Integration time for cool side	7191	1C17	23575	5C17					PID1	
		Derivative time for cool side	7192	1C18	23576	5C18					PID1	
		Output low limit for cool side	7193	1C19	23577	5C19					1	
		Output high limit for cool side	7194	1C1A	23578	5C1A					1	
	PID12	Proportional band	7200	1C20	23584	5C20					1	
		Integral time	7201	1C21	23585	5C21					PID1	
		Derivative time	7202	1C22	23586	5C22					PID1	
		Output low limit	7203	1C23	23587	5C23					1	
		Output high limit	7204	1C24	23588	5C24					1	
		Manual reset	7205	1C25	23589	5C25					1	
		Proportional band for cool side	7206	1C26	23590	5C26					1	
		Integration time for cool side	7207	1C27	23591	5C27					PID1	
		Derivative time for cool side	7208	1C28	23592	5C28					PID1	
		Output low limit for cool side	7209	1C29	23593	5C29					1	
		Output high limit for cool side	7210	1C2A	23594	5C2A					1	

Loop 1 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 1 PID	PID13	Proportional band	7216	1C30	23600	5C30					1	
		Integral time	7217	1C31	23601	5C31					PID1	
		Derivative time	7218	1C32	23602	5C32					PID1	
		Output low limit	7219	1C33	23603	5C33					1	
		Output high limit	7220	1C34	23604	5C34					1	
		Manual reset	7221	1C35	23605	5C35					1	
		Proportional band for cool side	7222	1C36	23606	5C36					1	
		Integration time for cool side	7223	1C37	23607	5C37					PID1	
		Derivative time for cool side	7224	1C38	23608	5C38					PID1	
		Output low limit for cool side	7225	1C39	23609	5C39					1	
		Output high limit for cool side	7226	1C3A	23610	5C3A					1	
	PID14	Proportional band	7232	1C40	23616	5C40					1	
		Integral time	7233	1C41	23617	5C41					PID1	
		Derivative time	7234	1C42	23618	5C42					PID1	
		Output low limit	7235	1C43	23619	5C43					1	
		Output high limit	7236	1C44	23620	5C44					1	
		Manual reset	7237	1C45	23621	5C45					1	
		Proportional band for cool side	7238	1C46	23622	5C46					1	
		Integration time for cool side	7239	1C47	23623	5C47					PID1	
		Derivative time for cool side	7240	1C48	23624	5C48					PID1	
		Output low limit for cool side	7241	1C49	23625	5C49					1	
		Output high limit for cool side	7242	1C4A	23626	5C4A					1	
	PID15	Proportional band	7248	1C50	23632	5C50					1	
		Integral time	7249	1C51	23633	5C51					PID1	
		Derivative time	7250	1C52	23634	5C52					PID1	
		Output low limit	7251	1C53	23635	5C53					1	
		Output high limit	7252	1C54	23636	5C54					1	
		Manual reset	7253	1C55	23637	5C55					1	
		Proportional band for cool side	7254	1C56	23638	5C56					1	
		Integration time for cool side	7255	1C57	23639	5C57					PID1	
		Derivative time for cool side	7256	1C58	23640	5C58					PID1	
		Output low limit for cool side	7257	1C59	23641	5C59					1	
		Output high limit for cool side	7258	1C5A	23642	5C5A					1	
	PID16	Proportional band	7264	1C60	23648	5C60					1	
		Integral time	7265	1C61	23649	5C61					PID1	
		Derivative time	7266	1C62	23650	5C62					PID1	
		Output low limit	7267	1C63	23651	5C63					1	
		Output high limit	7268	1C64	23652	5C64					1	
		Manual reset	7269	1C65	23653	5C65					1	
		Proportional band for cool side	7270	1C66	23654	5C66					1	
		Integration time for cool side	7271	1C67	23655	5C67					PID1	
		Derivative time for cool side	7272	1C68	23656	5C68					PID1	
		Output low limit for cool side	7273	1C69	23657	5C69					1	
		Output high limit for cool side	7274	1C6A	23658	5C6A					1	

Loop 2 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 PID	PID1	Proportional band	7280	1C70	23664	5C70					1	
		Integral time	7281	1C71	23665	5C71					PID2	
		Derivative time	7282	1C72	23666	5C72					PID2	
		Output low limit	7283	1C73	23667	5C73					1	
		Output high limit	7284	1C74	23668	5C74					1	
		Manual reset	7285	1C75	23669	5C75					1	
		Proportional band for cool side	7286	1C76	23670	5C76					1	
		Integration time for cool side	7287	1C77	23671	5C77					PID2	
		Derivative time for cool side	7288	1C78	23672	5C78					PID2	
		Output low limit for cool side	7289	1C79	23673	5C79					1	
		Output high limit for cool side	7290	1C7A	23674	5C7A					1	
	PID2	Proportional band	7296	1C80	23680	5C80					1	
		Integral time	7297	1C81	23681	5C81					PID2	
		Derivative time	7298	1C82	23682	5C82					PID2	
		Output low limit	7299	1C83	23683	5C83					1	
		Output high limit	7300	1C84	23684	5C84					1	
		Manual reset	7301	1C85	23685	5C85					1	
		Proportional band for cool side	7302	1C86	23686	5C86					1	
		Integration time for cool side	7303	1C87	23687	5C87					PID2	
		Derivative time for cool side	7304	1C88	23688	5C88					PID2	
		Output low limit for cool side	7305	1C89	23689	5C89					1	
		Output high limit for cool side	7306	1C8A	23690	5C8A					1	
	PID3	Proportional band	7312	1C90	23696	5C90					1	
		Integral time	7313	1C91	23697	5C91					PID2	
		Derivative time	7314	1C92	23698	5C92					PID2	
		Output low limit	7315	1C93	23699	5C93					1	
		Output high limit	7316	1C94	23700	5C94					1	
		Manual reset	7317	1C95	23701	5C95					1	
		Proportional band for cool side	7318	1C96	23702	5C96					1	
		Integration time for cool side	7319	1C97	23703	5C97					PID2	
		Derivative time for cool side	7320	1C98	23704	5C98					PID2	
		Output low limit for cool side	7321	1C99	23705	5C99					1	
		Output high limit for cool side	7322	1C9A	23706	5C9A					1	
	PID4	Proportional band	7328	1CA0	23712	5CA0					1	
		Integral time	7329	1CA1	23713	5CA1					PID2	
		Derivative time	7330	1CA2	23714	5CA2					PID2	
		Output low limit	7331	1CA3	23715	5CA3					1	
		Output high limit	7332	1CA4	23716	5CA4					1	
		Manual reset	7333	1CA5	23717	5CA5					1	
		Proportional band for cool side	7334	1CA6	23718	5CA6					1	
		Integration time for cool side	7335	1CA7	23719	5CA7					PID2	
		Derivative time for cool side	7336	1CA8	23720	5CA8					PID2	
		Output low limit for cool side	7337	1CA9	23721	5CA9					1	
		Output high limit for cool side	7338	1CAA	23722	5CAA					1	

Loop 2 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 PID	PID5	Proportional band	7344	1CB0	23728	5CB0					1	
		Integral time	7345	1CB1	23729	5CB1					PID2	
		Derivative time	7346	1CB2	23730	5CB2					PID2	
		Output low limit	7347	1CB3	23731	5CB3					1	
		Output high limit	7348	1CB4	23732	5CB4					1	
		Manual reset	7349	1CB5	23733	5CB5					1	
		Proportional band for cool side	7350	1CB6	23734	5CB6					1	
		Integration time for cool side	7351	1CB7	23735	5CB7					PID2	
		Derivative time for cool side	7352	1CB8	23736	5CB8					PID2	
		Output low limit for cool side	7353	1CB9	23737	5CB9					1	
		Output high limit for cool side	7354	1CBA	23738	5CBA					1	
	PID6	Proportional band	7360	1CC0	23744	5CC0					1	
		Integral time	7361	1CC1	23745	5CC1					PID2	
		Derivative time	7362	1CC2	23746	5CC2					PID2	
		Output low limit	7363	1CC3	23747	5CC3					1	
		Output high limit	7364	1CC4	23748	5CC4					1	
		Manual reset	7365	1CC5	23749	5CC5					1	
		Proportional band for cool side	7366	1CC6	23750	5CC6					1	
		Integration time for cool side	7367	1CC7	23751	5CC7					PID2	
		Derivative time for cool side	7368	1CC8	23752	5CC8					PID2	
		Output low limit for cool side	7369	1CC9	23753	5CC9					1	
		Output high limit for cool side	7370	1CCA	23754	5CCA					1	
	PID7	Proportional band	7376	1CD0	23760	5CD0					1	
		Integral time	7377	1CD1	23761	5CD1					PID2	
		Derivative time	7378	1CD2	23762	5CD2					PID2	
		Output low limit	7379	1CD3	23763	5CD3					1	
		Output high limit	7380	1CD4	23764	5CD4					1	
		Manual reset	7381	1CD5	23765	5CD5					1	
		Proportional band for cool side	7382	1CD6	23766	5CD6					1	
		Integration time for cool side	7383	1CD7	23767	5CD7					PID2	
		Derivative time for cool side	7384	1CD8	23768	5CD8					PID2	
		Output low limit for cool side	7385	1CD9	23769	5CD9					1	
		Output high limit for cool side	7386	1CDA	23770	5CDA					1	
	PID8	Proportional band	7392	1CE0	23776	5CE0					1	
		Integral time	7393	1CE1	23777	5CE1					PID2	
		Derivative time	7394	1CE2	23778	5CE2					PID2	
		Output low limit	7395	1CE3	23779	5CE3					1	
		Output high limit	7396	1CE4	23780	5CE4					1	
		Manual reset	7397	1CE5	23781	5CE5					1	
		Proportional band for cool side	7398	1CE6	23782	5CE6					1	
		Integration time for cool side	7399	1CE7	23783	5CE7					PID2	
		Derivative time for cool side	7400	1CE8	23784	5CE8					PID2	
		Output low limit for cool side	7401	1CE9	23785	5CE9					1	
		Output high limit for cool side	7402	1CEA	23786	5CEA					1	

Loop 2 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 PID	PID9	Proportional band	7408	1CF0	23792	5CF0					1	
		Integral time	7409	1CF1	23793	5CF1					PID2	
		Derivative time	7410	1CF2	23794	5CF2					PID2	
		Output low limit	7411	1CF3	23795	5CF3					1	
		Output high limit	7412	1CF4	23796	5CF4					1	
		Manual reset	7413	1CF5	23797	5CF5					1	
		Proportional band for cool side	7414	1CF6	23798	5CF6					1	
		Integration time for cool side	7415	1CF7	23799	5CF7					PID2	
		Derivative time for cool side	7416	1CF8	23800	5CF8					PID2	
		Output low limit for cool side	7417	1CF9	23801	5CF9					1	
		Output high limit for cool side	7418	1CFA	23802	5CFA					1	
	PID10	Proportional band	7424	1D00	23808	5D00					1	
		Integral time	7425	1D01	23809	5D01					PID2	
		Derivative time	7426	1D02	23810	5D02					PID2	
		Output low limit	7427	1D03	23811	5D03					1	
		Output high limit	7428	1D04	23812	5D04					1	
		Manual reset	7429	1D05	23813	5D05					1	
		Proportional band for cool side	7430	1D06	23814	5D06					1	
		Integration time for cool side	7431	1D07	23815	5D07					PID2	
		Derivative time for cool side	7432	1D08	23816	5D08					PID2	
		Output low limit for cool side	7433	1D09	23817	5D09					1	
		Output high limit for cool side	7434	1D0A	23818	5D0A					1	
	PID11	Proportional band	7440	1D10	23824	5D10					1	
		Integral time	7441	1D11	23825	5D11					PID2	
		Derivative time	7442	1D12	23826	5D12					PID2	
		Output low limit	7443	1D13	23827	5D13					1	
		Output high limit	7444	1D14	23828	5D14					1	
		Manual reset	7445	1D15	23829	5D15					1	
		Proportional band for cool side	7446	1D16	23830	5D16					1	
		Integration time for cool side	7447	1D17	23831	5D17					PID2	
		Derivative time for cool side	7448	1D18	23832	5D18					PID2	
		Output low limit for cool side	7449	1D19	23833	5D19					1	
		Output high limit for cool side	7450	1D1A	23834	5D1A					1	
	PID12	Proportional band	7456	1D20	23840	5D20					1	
		Integral time	7457	1D21	23841	5D21					PID2	
		Derivative time	7458	1D22	23842	5D22					PID2	
		Output low limit	7459	1D23	23843	5D23					1	
		Output high limit	7460	1D24	23844	5D24					1	
		Manual reset	7461	1D25	23845	5D25					1	
		Proportional band for cool side	7462	1D26	23846	5D26					1	
		Integration time for cool side	7463	1D27	23847	5D27					PID2	
		Derivative time for cool side	7464	1D28	23848	5D28					PID2	
		Output low limit for cool side	7465	1D29	23849	5D29					1	
		Output high limit for cool side	7466	1D2A	23850	5D2A					1	

Loop 2 PID

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Loop 2 PID	PID13	Proportional band	7472	1D30	23856	5D30					1	
		Integral time	7473	1D31	23857	5D31					PID2	
		Derivative time	7474	1D32	23858	5D32					PID2	
		Output low limit	7475	1D33	23859	5D33					1	
		Output high limit	7476	1D34	23860	5D34					1	
		Manual reset	7477	1D35	23861	5D35					1	
		Proportional band for cool side	7478	1D36	23862	5D36					1	
		Integration time for cool side	7479	1D37	23863	5D37					PID2	
		Derivative time for cool side	7480	1D38	23864	5D38					PID2	
		Output low limit for cool side	7481	1D39	23865	5D39					1	
		Output high limit for cool side	7482	1D3A	23866	5D3A					1	
	PID14	Proportional band	7488	1D40	23872	5D40					1	
		Integral time	7489	1D41	23873	5D41					PID2	
		Derivative time	7490	1D42	23874	5D42					PID2	
		Output low limit	7491	1D43	23875	5D43					1	
		Output high limit	7492	1D44	23876	5D44					1	
		Manual reset	7493	1D45	23877	5D45					1	
		Proportional band for cool side	7494	1D46	23878	5D46					1	
		Integration time for cool side	7495	1D47	23879	5D47					PID2	
		Derivative time for cool side	7496	1D48	23880	5D48					PID2	
		Output low limit for cool side	7497	1D49	23881	5D49					1	
		Output high limit for cool side	7498	1D4A	23882	5D4A					1	
	PID15	Proportional band	7504	1D50	23888	5D50					1	
		Integral time	7505	1D51	23889	5D51					PID2	
		Derivative time	7506	1D52	23890	5D52					PID2	
		Output low limit	7507	1D53	23891	5D53					1	
		Output high limit	7508	1D54	23892	5D54					1	
		Manual reset	7509	1D55	23893	5D55					1	
		Proportional band for cool side	7510	1D56	23894	5D56					1	
		Integration time for cool side	7511	1D57	23895	5D57					PID2	
		Derivative time for cool side	7512	1D58	23896	5D58					PID2	
		Output low limit for cool side	7513	1D59	23897	5D59					1	
		Output high limit for cool side	7514	1D5A	23898	5D5A					1	
	PID16	Proportional band	7520	1D60	23904	5D60					1	
		Integral time	7521	1D61	23905	5D61					PID2	
		Derivative time	7522	1D62	23906	5D62					PID2	
		Output low limit	7523	1D63	23907	5D63					1	
		Output high limit	7524	1D64	23908	5D64					1	
		Manual reset	7525	1D65	23909	5D65					1	
		Proportional band for cool side	7526	1D66	23910	5D66					1	
		Integration time for cool side	7527	1D67	23911	5D67					PID2	
		Derivative time for cool side	7528	1D68	23912	5D68					PID2	
		Output low limit for cool side	7529	1D69	23913	5D69					1	
		Output high limit for cool side	7530	1D6A	23914	5D6A					1	

Control

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Control	Loop 1	Loop PV/SP decimal point position	8048	1F70	24432	5F70					–	
		(Reserved for future extension.)	8049	1F71	24433	5F71	×	×	×	×	–	
		Control action	8050	1F72	24434	5F72					–	
		Control algorithm	8051	1F73	24435	5F73					–	
		Control range low limit	8052	1F74	24436	5F74					LP1	
		Control range high limit	8053	1F75	24437	5F75					LP1	
		AT type	8054	1F76	24438	5F76					–	
		Heat/cool control dead zone	8055	1F77	24439	5F77					1	
		Initial output of PID control	8056	1F78	24440	5F78					1	
		Abnormal PV definition	8057	1F79	24441	5F79					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
	Loop 2	Loop PV/SP decimal point position	8064	1F80	24448	5F80					–	
		(Reserved for future use.)	8065	1F81	24449	5F81	×	×	×	×	–	
		Control action	8066	1F82	24450	5F82					–	
		Control algorithm	8067	1F83	24451	5F83					–	
		Control range low limit	8068	1F84	24452	5F84					LP2	
		Control range high limit	8069	1F85	24453	5F85					LP2	
		AT type	8070	1F86	24454	5F86					–	
		Heat/cool control dead zone	8071	1F87	24455	5F87					1	
		Initial output of PID control	8072	1F88	24456	5F88					1	
		Abnormal PV definition	8073	1F89	24457	5F89					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
	Loop 1	PID control initialization	8112	1FB0	24496	5FB0					–	
		Integration time/derivative time decimal point position	8113	1FB1	24497	5FB1					–	
		Output operation at changing Auto/Manual	8114	1FB2	24498	5FB2					–	
		Preset MANUAL value	8115	1FB3	24499	5FB3					1	
		MV increase change limit	8116	1FB4	24500	5FB4					2	
		MV decrease change limit	8117	1FB5	24501	5FB5					2	
		Heat/cool selection	8118	1FB6	24502	5FB6					–	
		MV low limit at AT	8119	1FB7	24503	5FB7					1	
		MV high limit at AT	8120	1FB8	24504	5FB8					1	
		(Reserved for future use.)	8121	1FB9	24505	5FB9	×	×	×	×	–	
		(Reserved for future use.)	8122	1FBA	24506	5FBA	×	×	×	×	–	
		Zone action selection	8123	1FBB	24507	5FBB					–	
		Zone 1	8124	1FBC	24508	5FBC					LP1	
		Zone 2	8125	1FBD	24509	5FBD					LP1	
		Zone 3	8126	1FBE	24510	5FBE					LP1	
		Zone 4	8127	1FBF	24511	5FBF					LP1	
		Zone 5	8128	1FC0	24512	5FC0					LP1	
		Zone 6	8129	1FC1	24513	5FC1					LP1	
		Zone 7	8130	1FC2	24514	5FC2					LP1	
		Zone hysteresis	8131	1FC3	24515	5FC3					LP1	
		(Reserved for future use.)	8132	1FC4	24516	5FC4	×	×	×	×	–	

Control

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Control	Loop 2	PID control initialization	8144	1FD0	24528	5FD0					–	
		Integration time/derivative time decimal point position	8145	1FD1	24529	5FD1					–	
		Output operation at changing Auto/Manual	8146	1FD2	24530	5FD2					–	
		Preset MANUAL value	8147	1FD3	24531	5FD3					1	
		MV increase change limit	8148	1FD4	24532	5FD4					2	
		MV decrease change limit	8149	1FD5	24533	5FD5					2	
		Heat/cool selection	8150	1FD6	24534	5FD6					–	
		MV low limit at AT	8151	1FD7	24535	5FD7					1	
		MV high limit at AT	8152	1FD8	24536	5FD8					1	
		(Reserved for future use.)	8153	1FD9	24537	5FD9	×	×	×	×	–	
		(Reserved for future use.)	8154	1FDA	24538	5FDA	×	×	×	×	–	
		Zone action selection	8155	1FDB	24539	5FDB					–	
		Zone 1	8156	1FDC	24540	5FDC					LP2	
		Zone 2	8157	1FDD	24541	5FDD					LP2	
		Zone 3	8158	1FDE	24542	5FDE					LP2	
		Zone 4	8159	1FDF	24543	5FDF					LP2	
		Zone 5	8160	1FE0	24544	5FE0					LP2	
		Zone 6	8161	1FE1	24545	5FE1					LP2	
		Zone 7	8162	1FE2	24546	5FE2					LP2	
		Zone hysteresis	8163	1FE3	24547	5FE3					LP2	
		(Reserved for future use.)	8164	1FE4	24548	5FE4	×	×	×	×	–	
	Loop 1	PV assignment	10704	29D0	27088	69D0					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		RSP assignment	10705	29D1	27089	69D1					–	
		RMV assignment	10706	29D2	27090	69D2					–	
	Loop 2	PV assignment	10720	29E0	27104	69E0					–	
		RSP assignment	10721	29E1	27105	69E1					–	
		RMV assignment	10722	29E2	27106	69E2					–	

MV

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
MV	Loop 1	Output at READY	8368	20B0	24752	60B0					1	
		Output at READY (Heat)	8369	20B1	24753	60B1					1	
		Output at READY (Cool)	8370	20B2	24754	60B2					1	
		Output operation at PV alarm	8371	20B3	24755	60B3					–	
		Output at PV alarm	8372	20B4	24756	60B4					1	
		Fixed value output 1	8373	20B5	24757	60B5					1	
		Fixed value output 2	8374	20B6	24758	60B6					1	
		Fixed value output 3	8375	20B7	24759	60B7					1	
		Fixed value output 4	8376	20B8	24760	60B8					1	
		Fixed value output 5	8377	20B9	24761	60B9					1	
		Fixed value output 6	8378	20BA	24762	60BA					1	
		Fixed value output 7	8379	20BB	24763	60BB					1	
		Fixed value output 8	8380	20BC	24764	60BC					1	
	Loop 2	Output at READY	8384	20C0	24768	60C0					1	
		Output at READY (Heat)	8385	20C1	24769	60C1					1	
		Output at READY (Cool)	8386	20C2	24770	60C2					1	
		Output operation at PV alarm	8387	20C3	24771	60C3					–	
		Output at PV alarm	8388	20C4	24772	60C4					1	
		Fixed value output 1	8389	20C5	24773	60C5					1	
		Fixed value output 2	8390	20C6	24774	60C6					1	
		Fixed value output 3	8391	20C7	24775	60C7					1	
		Fixed value output 4	8392	20C8	24776	60C8					1	
		Fixed value output 5	8393	20C9	24777	60C9					1	
		Fixed value output 6	8394	20CA	24778	60CA					1	
		Fixed value output 7	8395	20CB	24779	60CB					1	
		Fixed value output 8	8396	20CC	24780	60CC					1	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 1	Breakpoint decimal point position	8432	20F0	24816	60F0					–	
		Breakpoint A1	8433	20F1	24817	60F1					Linearization 1	
		Breakpoint A2	8434	20F2	24818	60F2					Linearization 1	
		Breakpoint A3	8435	20F3	24819	60F3					Linearization 1	
		Breakpoint A4	8436	20F4	24820	60F4					Linearization 1	
		Breakpoint A5	8437	20F5	24821	60F5					Linearization 1	
		Breakpoint A6	8438	20F6	24822	60F6					Linearization 1	
		Breakpoint A7	8439	20F7	24823	60F7					Linearization 1	
		Breakpoint A8	8440	20F8	24824	60F8					Linearization 1	
		Breakpoint A9	8441	20F9	24825	60F9					Linearization 1	
		Breakpoint A10	8442	20FA	24826	60FA					Linearization 1	
		Breakpoint A11	8443	20FB	24827	60FB					Linearization 1	
		Breakpoint A12	8444	20FC	24828	60FC					Linearization 1	
		Breakpoint A13	8445	20FD	24829	60FD					Linearization 1	
		Breakpoint A14	8446	20FE	24830	60FE					Linearization 1	
		Breakpoint A15	8447	20FF	24831	60FF					Linearization 1	
		Breakpoint A16	8448	2100	24832	6100					Linearization 1	
		Breakpoint A17	8449	2101	24833	6101					Linearization 1	
		Breakpoint A18	8450	2102	24834	6102					Linearization 1	
		Breakpoint A19	8451	2103	24835	6103					Linearization 1	
		Breakpoint A20	8452	2104	24836	6104					Linearization 1	
		Breakpoint B1	8453	2105	24837	6105					Linearization 1	
		Breakpoint B2	8454	2106	24838	6106					Linearization 1	
		Breakpoint B3	8455	2107	24839	6107					Linearization 1	
		Breakpoint B4	8456	2108	24840	6108					Linearization 1	
		Breakpoint B5	8457	2109	24841	6109					Linearization 1	
		Breakpoint B6	8458	210A	24842	610A					Linearization 1	
		Breakpoint B7	8459	210B	24843	610B					Linearization 1	
		Breakpoint B8	8460	210C	24844	610C					Linearization 1	
		Breakpoint B9	8461	210D	24845	610D					Linearization 1	
		Breakpoint B10	8462	210E	24846	610E					Linearization 1	
		Breakpoint B11	8463	210F	24847	610F					Linearization 1	
		Breakpoint B12	8464	2110	24848	6110					Linearization 1	
		Breakpoint B13	8465	2111	24849	6111					Linearization 1	
		Breakpoint B14	8466	2112	24850	6112					Linearization 1	
		Breakpoint B15	8467	2113	24851	6113					Linearization 1	
		Breakpoint B16	8468	2114	24852	6114					Linearization 1	
		Breakpoint B17	8469	2115	24853	6115					Linearization 1	
		Breakpoint B18	8470	2116	24854	6116					Linearization 1	
		Breakpoint B19	8471	2117	24855	6117					Linearization 1	
		Breakpoint B20	8472	2118	24856	6118					Linearization 1	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 2	Breakpoint decimal point position	8480	2120	24864	6120					–	
		Breakpoint A1	8481	2121	24865	6121					Linearization 2	
		Breakpoint A2	8482	2122	24866	6122					Linearization 2	
		Breakpoint A3	8483	2123	24867	6123					Linearization 2	
		Breakpoint A4	8484	2124	24868	6124					Linearization 2	
		Breakpoint A5	8485	2125	24869	6125					Linearization 2	
		Breakpoint A6	8486	2126	24870	6126					Linearization 2	
		Breakpoint A7	8487	2127	24871	6127					Linearization 2	
		Breakpoint A8	8488	2128	24872	6128					Linearization 2	
		Breakpoint A9	8489	2129	24873	6129					Linearization 2	
		Breakpoint A10	8490	212A	24874	612A					Linearization 2	
		Breakpoint A11	8491	212B	24875	612B					Linearization 2	
		Breakpoint A12	8492	212C	24876	612C					Linearization 2	
		Breakpoint A13	8493	212D	24877	612D					Linearization 2	
		Breakpoint A14	8494	212E	24878	612E					Linearization 2	
		Breakpoint A15	8495	212F	24879	612F					Linearization 2	
		Breakpoint A16	8496	2130	24880	6130					Linearization 2	
		Breakpoint A17	8497	2131	24881	6131					Linearization 2	
		Breakpoint A18	8498	2132	24882	6132					Linearization 2	
		Breakpoint A19	8499	2133	24883	6133					Linearization 2	
		Breakpoint A20	8500	2134	24884	6134					Linearization 2	
		Breakpoint B1	8501	2135	24885	6135					Linearization 2	
		Breakpoint B2	8502	2136	24886	6136					Linearization 2	
		Breakpoint B3	8503	2137	24887	6137					Linearization 2	
		Breakpoint B4	8504	2138	24888	6138					Linearization 2	
		Breakpoint B5	8505	2139	24889	6139					Linearization 2	
		Breakpoint B6	8506	213A	24890	613A					Linearization 2	
		Breakpoint B7	8507	213B	24891	613B					Linearization 2	
		Breakpoint B8	8508	213C	24892	613C					Linearization 2	
		Breakpoint B9	8509	213D	24893	613D					Linearization 2	
		Breakpoint B10	8510	213E	24894	613E					Linearization 2	
		Breakpoint B11	8511	213F	24895	613F					Linearization 2	
		Breakpoint B12	8512	2140	24896	6140					Linearization 2	
		Breakpoint B13	8513	2141	24897	6141					Linearization 2	
		Breakpoint B14	8514	2142	24898	6142					Linearization 2	
		Breakpoint B15	8515	2143	24899	6143					Linearization 2	
		Breakpoint B16	8516	2144	24900	6144					Linearization 2	
		Breakpoint B17	8517	2145	24901	6145					Linearization 2	
		Breakpoint B18	8518	2146	24902	6146					Linearization 2	
		Breakpoint B19	8519	2147	24903	6147					Linearization 2	
		Breakpoint B20	8520	2148	24904	6148					Linearization 2	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 3	Breakpoint decimal point position	8528	2150	24912	6150					–	
		Breakpoint A1	8529	2151	24913	6151					Linearization 3	
		Breakpoint A2	8530	2152	24914	6152					Linearization 3	
		Breakpoint A3	8531	2153	24915	6153					Linearization 3	
		Breakpoint A4	8532	2154	24916	6154					Linearization 3	
		Breakpoint A5	8533	2155	24917	6155					Linearization 3	
		Breakpoint A6	8534	2156	24918	6156					Linearization 3	
		Breakpoint A7	8535	2157	24919	6157					Linearization 3	
		Breakpoint A8	8536	2158	24920	6158					Linearization 3	
		Breakpoint A9	8537	2159	24921	6159					Linearization 3	
		Breakpoint A10	8538	215A	24922	615A					Linearization 3	
		Breakpoint A11	8539	215B	24923	615B					Linearization 3	
		Breakpoint A12	8540	215C	24924	615C					Linearization 3	
		Breakpoint A13	8541	215D	24925	615D					Linearization 3	
		Breakpoint A14	8542	215E	24926	615E					Linearization 3	
		Breakpoint A15	8543	215F	24927	615F					Linearization 3	
		Breakpoint A16	8544	2160	24928	6160					Linearization 3	
		Breakpoint A17	8545	2161	24929	6161					Linearization 3	
		Breakpoint A18	8546	2162	24930	6162					Linearization 3	
		Breakpoint A19	8547	2163	24931	6163					Linearization 3	
		Breakpoint A20	8548	2164	24932	6164					Linearization 3	
		Breakpoint B1	8549	2165	24933	6165					Linearization 3	
		Breakpoint B2	8550	2166	24934	6166					Linearization 3	
		Breakpoint B3	8551	2167	24935	6167					Linearization 3	
		Breakpoint B4	8552	2168	24936	6168					Linearization 3	
		Breakpoint B5	8553	2169	24937	6169					Linearization 3	
		Breakpoint B6	8554	216A	24938	616A					Linearization 3	
		Breakpoint B7	8555	216B	24939	616B					Linearization 3	
		Breakpoint B8	8556	216C	24940	616C					Linearization 3	
		Breakpoint B9	8557	216D	24941	616D					Linearization 3	
		Breakpoint B10	8558	216E	24942	616E					Linearization 3	
		Breakpoint B11	8559	216F	24943	616F					Linearization 3	
		Breakpoint B12	8560	2170	24944	6170					Linearization 3	
		Breakpoint B13	8561	2171	24945	6171					Linearization 3	
		Breakpoint B14	8562	2172	24946	6172					Linearization 3	
		Breakpoint B15	8563	2173	24947	6173					Linearization 3	
		Breakpoint B16	8564	2174	24948	6174					Linearization 3	
		Breakpoint B17	8565	2175	24949	6175					Linearization 3	
		Breakpoint B18	8566	2176	24950	6176					Linearization 3	
		Breakpoint B19	8567	2177	24951	6177					Linearization 3	
		Breakpoint B20	8568	2178	24952	6178					Linearization 3	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 4	Breakpoint decimal point position	8576	2180	24960	6180					–	
		Breakpoint A1	8577	2181	24961	6181					Linearization 4	
		Breakpoint A2	8578	2182	24962	6182					Linearization 4	
		Breakpoint A3	8579	2183	24963	6183					Linearization 4	
		Breakpoint A4	8580	2184	24964	6184					Linearization 4	
		Breakpoint A5	8581	2185	24965	6185					Linearization 4	
		Breakpoint A6	8582	2186	24966	6186					Linearization 4	
		Breakpoint A7	8583	2187	24967	6187					Linearization 4	
		Breakpoint A8	8584	2188	24968	6188					Linearization 4	
		Breakpoint A9	8585	2189	24969	6189					Linearization 4	
		Breakpoint A10	8586	218A	24970	618A					Linearization 4	
		Breakpoint A11	8587	218B	24971	618B					Linearization 4	
		Breakpoint A12	8588	218C	24972	618C					Linearization 4	
		Breakpoint A13	8589	218D	24973	618D					Linearization 4	
		Breakpoint A14	8590	218E	24974	618E					Linearization 4	
		Breakpoint A15	8591	218F	24975	618F					Linearization 4	
		Breakpoint A16	8592	2190	24976	6190					Linearization 4	
		Breakpoint A17	8593	2191	24977	6191					Linearization 4	
		Breakpoint A18	8594	2192	24978	6192					Linearization 4	
		Breakpoint A19	8595	2193	24979	6193					Linearization 4	
		Breakpoint A20	8596	2194	24980	6194					Linearization 4	
		Breakpoint B1	8597	2195	24981	6195					Linearization 4	
		Breakpoint B2	8598	2196	24982	6196					Linearization 4	
		Breakpoint B3	8599	2197	24983	6197					Linearization 4	
		Breakpoint B4	8600	2198	24984	6198					Linearization 4	
		Breakpoint B5	8601	2199	24985	6199					Linearization 4	
		Breakpoint B6	8602	219A	24986	619A					Linearization 4	
		Breakpoint B7	8603	219B	24987	619B					Linearization 4	
		Breakpoint B8	8604	219C	24988	619C					Linearization 4	
		Breakpoint B9	8605	219D	24989	619D					Linearization 4	
		Breakpoint B10	8606	219E	24990	619E					Linearization 4	
		Breakpoint B11	8607	219F	24991	619F					Linearization 4	
		Breakpoint B12	8608	21A0	24992	61A0					Linearization 4	
		Breakpoint B13	8609	21A1	24993	61A1					Linearization 4	
		Breakpoint B14	8610	21A2	24994	61A2					Linearization 4	
		Breakpoint B15	8611	21A3	24995	61A3					Linearization 4	
		Breakpoint B16	8612	21A4	24996	61A4					Linearization 4	
		Breakpoint B17	8613	21A5	24997	61A5					Linearization 4	
		Breakpoint B18	8614	21A6	24998	61A6					Linearization 4	
		Breakpoint B19	8615	21A7	24999	61A7					Linearization 4	
		Breakpoint B20	8616	21A8	25000	61A8					Linearization 4	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 5	Breakpoint decimal point position	8624	21B0	25008	61B0					–	
		Breakpoint A1	8625	21B1	25009	61B1					Linearization 5	
		Breakpoint A2	8626	21B2	25010	61B2					Linearization 5	
		Breakpoint A3	8627	21B3	25011	61B3					Linearization 5	
		Breakpoint A4	8628	21B4	25012	61B4					Linearization 5	
		Breakpoint A5	8629	21B5	25013	61B5					Linearization 5	
		Breakpoint A6	8630	21B6	25014	61B6					Linearization 5	
		Breakpoint A7	8631	21B7	25015	61B7					Linearization 5	
		Breakpoint A8	8632	21B8	25016	61B8					Linearization 5	
		Breakpoint A9	8633	21B9	25017	61B9					Linearization 5	
		Breakpoint A10	8634	21BA	25018	61BA					Linearization 5	
		Breakpoint A11	8635	21BB	25019	61BB					Linearization 5	
		Breakpoint A12	8636	21BC	25020	61BC					Linearization 5	
		Breakpoint A13	8637	21BD	25021	61BD					Linearization 5	
		Breakpoint A14	8638	21BE	25022	61BE					Linearization 5	
		Breakpoint A15	8639	21BF	25023	61BF					Linearization 5	
		Breakpoint A16	8640	21C0	25024	61C0					Linearization 5	
		Breakpoint A17	8641	21C1	25025	61C1					Linearization 5	
		Breakpoint A18	8642	21C2	25026	61C2					Linearization 5	
		Breakpoint A19	8643	21C3	25027	61C3					Linearization 5	
		Breakpoint A20	8644	21C4	25028	61C4					Linearization 5	
		Breakpoint B1	8645	21C5	25029	61C5					Linearization 5	
		Breakpoint B2	8646	21C6	25030	61C6					Linearization 5	
		Breakpoint B3	8647	21C7	25031	61C7					Linearization 5	
		Breakpoint B4	8648	21C8	25032	61C8					Linearization 5	
		Breakpoint B5	8649	21C9	25033	61C9					Linearization 5	
		Breakpoint B6	8650	21CA	25034	61CA					Linearization 5	
		Breakpoint B7	8651	21CB	25035	61CB					Linearization 5	
		Breakpoint B8	8652	21CC	25036	61CC					Linearization 5	
		Breakpoint B9	8653	21CD	25037	61CD					Linearization 5	
		Breakpoint B10	8654	21CE	25038	61CE					Linearization 5	
		Breakpoint B11	8655	21CF	25039	61CF					Linearization 5	
		Breakpoint B12	8656	21D0	25040	61D0					Linearization 5	
		Breakpoint B13	8657	21D1	25041	61D1					Linearization 5	
		Breakpoint B14	8658	21D2	25042	61D2					Linearization 5	
		Breakpoint B15	8659	21D3	25043	61D3					Linearization 5	
		Breakpoint B16	8660	21D4	25044	61D4					Linearization 5	
		Breakpoint B17	8661	21D5	25045	61D5					Linearization 5	
		Breakpoint B18	8662	21D6	25046	61D6					Linearization 5	
		Breakpoint B19	8663	21D7	25047	61D7					Linearization 5	
		Breakpoint B20	8664	21D8	25048	61D8					Linearization 5	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 6	Breakpoint decimal point position	8672	21E0	25056	61E0					–	
		Breakpoint A1	8673	21E1	25057	61E1					Linearization 6	
		Breakpoint A2	8674	21E2	25058	61E2					Linearization 6	
		Breakpoint A3	8675	21E3	25059	61E3					Linearization 6	
		Breakpoint A4	8676	21E4	25060	61E4					Linearization 6	
		Breakpoint A5	8677	21E5	25061	61E5					Linearization 6	
		Breakpoint A6	8678	21E6	25062	61E6					Linearization 6	
		Breakpoint A7	8679	21E7	25063	61E7					Linearization 6	
		Breakpoint A8	8680	21E8	25064	61E8					Linearization 6	
		Breakpoint A9	8681	21E9	25065	61E9					Linearization 6	
		Breakpoint A10	8682	21EA	25066	61EA					Linearization 6	
		Breakpoint A11	8683	21EB	25067	61EB					Linearization 6	
		Breakpoint A12	8684	21EC	25068	61EC					Linearization 6	
		Breakpoint A13	8685	21ED	25069	61ED					Linearization 6	
		Breakpoint A14	8686	21EE	25070	61EE					Linearization 6	
		Breakpoint A15	8687	21EF	25071	61EF					Linearization 6	
		Breakpoint A16	8688	21F0	25072	61F0					Linearization 6	
		Breakpoint A17	8689	21F1	25073	61F1					Linearization 6	
		Breakpoint A18	8690	21F2	25074	61F2					Linearization 6	
		Breakpoint A19	8691	21F3	25075	61F3					Linearization 6	
		Breakpoint A20	8692	21F4	25076	61F4					Linearization 6	
		Breakpoint B1	8693	21F5	25077	61F5					Linearization 6	
		Breakpoint B2	8694	21F6	25078	61F6					Linearization 6	
		Breakpoint B3	8695	21F7	25079	61F7					Linearization 6	
		Breakpoint B4	8696	21F8	25080	61F8					Linearization 6	
		Breakpoint B5	8697	21F9	25081	61F9					Linearization 6	
		Breakpoint B6	8698	21FA	25082	61FA					Linearization 6	
		Breakpoint B7	8699	21FB	25083	61FB					Linearization 6	
		Breakpoint B8	8700	21FC	25084	61FC					Linearization 6	
		Breakpoint B9	8701	21FD	25085	61FD					Linearization 6	
		Breakpoint B10	8702	21FE	25086	61FE					Linearization 6	
		Breakpoint B11	8703	21FF	25087	61FF					Linearization 6	
		Breakpoint B12	8704	2200	25088	6200					Linearization 6	
		Breakpoint B13	8705	2201	25089	6201					Linearization 6	
		Breakpoint B14	8706	2202	25090	6202					Linearization 6	
		Breakpoint B15	8707	2203	25091	6203					Linearization 6	
		Breakpoint B16	8708	2204	25092	6204					Linearization 6	
		Breakpoint B17	8709	2205	25093	6205					Linearization 6	
		Breakpoint B18	8710	2206	25094	6206					Linearization 6	
		Breakpoint B19	8711	2207	25095	6207					Linearization 6	
		Breakpoint B20	8712	2208	25096	6208					Linearization 6	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 7	Breakpoint decimal point position	8720	2210	25104	6210					–	
		Breakpoint A1	8721	2211	25105	6211					Linearization 7	
		Breakpoint A2	8722	2212	25106	6212					Linearization 7	
		Breakpoint A3	8723	2213	25107	6213					Linearization 7	
		Breakpoint A4	8724	2214	25108	6214					Linearization 7	
		Breakpoint A5	8725	2215	25109	6215					Linearization 7	
		Breakpoint A6	8726	2216	25110	6216					Linearization 7	
		Breakpoint A7	8727	2217	25111	6217					Linearization 7	
		Breakpoint A8	8728	2218	25112	6218					Linearization 7	
		Breakpoint A9	8729	2219	25113	6219					Linearization 7	
		Breakpoint A10	8730	221A	25114	621A					Linearization 7	
		Breakpoint A11	8731	221B	25115	621B					Linearization 7	
		Breakpoint A12	8732	221C	25116	621C					Linearization 7	
		Breakpoint A13	8733	221D	25117	621D					Linearization 7	
		Breakpoint A14	8734	221E	25118	621E					Linearization 7	
		Breakpoint A15	8735	221F	25119	621F					Linearization 7	
		Breakpoint A16	8736	2220	25120	6220					Linearization 7	
		Breakpoint A17	8737	2221	25121	6221					Linearization 7	
		Breakpoint A18	8738	2222	25122	6222					Linearization 7	
		Breakpoint A19	8739	2223	25123	6223					Linearization 7	
		Breakpoint A20	8740	2224	25124	6224					Linearization 7	
		Breakpoint B1	8741	2225	25125	6225					Linearization 7	
		Breakpoint B2	8742	2226	25126	6226					Linearization 7	
		Breakpoint B3	8743	2227	25127	6227					Linearization 7	
		Breakpoint B4	8744	2228	25128	6228					Linearization 7	
		Breakpoint B5	8745	2229	25129	6229					Linearization 7	
		Breakpoint B6	8746	222A	25130	622A					Linearization 7	
		Breakpoint B7	8747	222B	25131	622B					Linearization 7	
		Breakpoint B8	8748	222C	25132	622C					Linearization 7	
		Breakpoint B9	8749	222D	25133	622D					Linearization 7	
		Breakpoint B10	8750	222E	25134	622E					Linearization 7	
		Breakpoint B11	8751	222F	25135	622F					Linearization 7	
		Breakpoint B12	8752	2230	25136	6230					Linearization 7	
		Breakpoint B13	8753	2231	25137	6231					Linearization 7	
		Breakpoint B14	8754	2232	25138	6232					Linearization 7	
		Breakpoint B15	8755	2233	25139	6233					Linearization 7	
		Breakpoint B16	8756	2234	25140	6234					Linearization 7	
		Breakpoint B17	8757	2235	25141	6235					Linearization 7	
		Breakpoint B18	8758	2236	25142	6236					Linearization 7	
		Breakpoint B19	8759	2237	25143	6237					Linearization 7	
		Breakpoint B20	8760	2238	25144	6238					Linearization 7	

Linearization table

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Linearization table	Linearization 8	Breakpoint decimal point position	8768	2240	25152	6240					–	
		Breakpoint A1	8769	2241	25153	6241					Linearization 8	
		Breakpoint A2	8770	2242	25154	6242					Linearization 8	
		Breakpoint A3	8771	2243	25155	6243					Linearization 8	
		Breakpoint A4	8772	2244	25156	6244					Linearization 8	
		Breakpoint A5	8773	2245	25157	6245					Linearization 8	
		Breakpoint A6	8774	2246	25158	6246					Linearization 8	
		Breakpoint A7	8775	2247	25159	6247					Linearization 8	
		Breakpoint A8	8776	2248	25160	6248					Linearization 8	
		Breakpoint A9	8777	2249	25161	6249					Linearization 8	
		Breakpoint A10	8778	224A	25162	624A					Linearization 8	
		Breakpoint A11	8779	224B	25163	624B					Linearization 8	
		Breakpoint A12	8780	224C	25164	624C					Linearization 8	
		Breakpoint A13	8781	224D	25165	624D					Linearization 8	
		Breakpoint A14	8782	224E	25166	624E					Linearization 8	
		Breakpoint A15	8783	224F	25167	624F					Linearization 8	
		Breakpoint A16	8784	2250	25168	6250					Linearization 8	
		Breakpoint A17	8785	2251	25169	6251					Linearization 8	
		Breakpoint A18	8786	2252	25170	6252					Linearization 8	
		Breakpoint A19	8787	2253	25171	6253					Linearization 8	
		Breakpoint A20	8788	2254	25172	6254					Linearization 8	
		Breakpoint B1	8789	2255	25173	6255					Linearization 8	
		Breakpoint B2	8790	2256	25174	6256					Linearization 8	
		Breakpoint B3	8791	2257	25175	6257					Linearization 8	
		Breakpoint B4	8792	2258	25176	6258					Linearization 8	
		Breakpoint B5	8793	2259	25177	6259					Linearization 8	
		Breakpoint B6	8794	225A	25178	625A					Linearization 8	
		Breakpoint B7	8795	225B	25179	625B					Linearization 8	
		Breakpoint B8	8796	225C	25180	625C					Linearization 8	
		Breakpoint B9	8797	225D	25181	625D					Linearization 8	
		Breakpoint B10	8798	225E	25182	625E					Linearization 8	
		Breakpoint B11	8799	225F	25183	625F					Linearization 8	
		Breakpoint B12	8800	2260	25184	6260					Linearization 8	
		Breakpoint B13	8801	2261	25185	6261					Linearization 8	
		Breakpoint B14	8802	2262	25186	6262					Linearization 8	
		Breakpoint B15	8803	2263	25187	6263					Linearization 8	
		Breakpoint B16	8804	2264	25188	6264					Linearization 8	
		Breakpoint B17	8805	2265	25189	6265					Linearization 8	
		Breakpoint B18	8806	2266	25190	6266					Linearization 8	
		Breakpoint B19	8807	2267	25191	6267					Linearization 8	
		Breakpoint B20	8808	2268	25192	6268					Linearization 8	

Setup

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Setup		SP change from operation display	8816	2270	25200	6270					–	Added to version 2.00.
		Use of recipe	8817	2271	25201	6271					–	
		SP system group	8818	2272	25202	6272					–	
		Sampling cycle	8819	2273	25203	6273					–	
		Start delay at power ON	8820	2274	25204	6274					–	
		Operation display screen designation	8821	2275	25205	6275					–	Added to version 2.00.
		Operation display return time	8822	2276	25206	6276					–	
		Power frequency	8823	2277	25207	6277					–	
		Start-up method	8824	2278	25208	6278					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Maximum power failure time for hot start	8825	2279	25209	6279					–	
		Detection of power failure	8826	227A	25210	627A					–	Added to version 2.00.
		Year	8844	228C	25228	628C					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Date	8845	228D	25229	628D					–	
		Time	8846	228E	25230	628E					–	
		Loop type	8880	22B0	25264	62B0					–	
		PC backup type	8881	22B1	25265	62B1					–	
		Release all latches	8882	22B2	25266	62B2					–	
		Operation display customization	8884	22B4	25268	62B4					–	Added to version 4.00.
		PID calculation correction	8885	22B5	25269	62B5					–	Added to version 4.06.
		Display brightness	8896	22C0	25280	62C0					–	

Priority

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Priority	Loop 1	SP group selection	8912	22D0	25296	62D0					–	
		PID group selection	8913	22D1	25297	62D1					–	
		RUN/READY mode selection	8914	22D2	25298	62D2					–	
		AUTO/MANUAL mode selection	8915	22D3	25299	62D3					–	
		LSP/RSP mode selection	8916	22D4	25300	62D4					–	
		Backup/through output selection	8917	22D5	25301	62D5					–	
	Loop 2	SP group selection	8928	22E0	25312	62E0					–	
		PID group selection	8929	22E1	25313	62E1					–	
		RUN/READY mode selection	8930	22E2	25314	62E2					–	
		AUTO/MANUAL mode selection	8931	22E3	25315	62E3					–	
		LSP/RSP mode selection	8932	22E4	25316	62E4					–	
		Backup/through output selection	8933	22E5	25317	62E5					–	Invalid setting
		Release all latches	8976	2310	25360	6310					–	
		OUT Linearization table use group	8977	2311	25361	6311					–	
		Switching the operation display	8978	2312	25362	6312					–	Added to version 2.00.
		Linearization table group for position proportional control	8979	2313	25363	6313					–	

PV

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
PV	PV1	Range type	9024	2340	25408	6340					–	
		Decimal point position	9025	2341	25409	6341					–	
		Temperature unit	9026	2342	25410	6342					–	
		Range low limit	9027	2343	25411	6343					PV1	
		Range high limit	9028	2344	25412	6344					PV1	
		Cold junction compensation	9029	2345	25413	6345					–	
		Zener barrier adjustment	9030	2346	25414	6346					2	
		(Reserved for future use.)	9031	2347	25415	6347	×	×	×	×	–	
		Linear scaling low limit	9032	2348	25416	6348					PV1	
		Linear scaling high limit	9033	2349	25417	6349					PV1	
		Square root extraction dropout	9034	234A	25418	634A					1	
		Filter	9035	234B	25419	634B					2	
		Bias	9036	234C	25420	634C					PV1	
		Ratio	9037	234D	25421	634D					3	
		(Reserved for future use.)	9038	234E	25422	634E	×	×	×	×	–	
		Thermocouple·mV input burnout	9039	234F	25423	634F					–	
		(Reserved for future use.)	9040	2350	25424	6350	×	×	×	×	–	
		(Reserved for future use.)	9041	2351	25425	6351	×	×	×	×	–	
		(Reserved for future use.)	9042	2352	25426	6352	×	×	×	×	–	
		Linearization table group definition	9043	2353	25427	6353					–	
	PV2	Range type	9056	2360	25440	6360					–	
		Decimal point position	9057	2361	25441	6361					–	
		Temperature unit	9058	2362	25442	6362					–	
		Range low limit	9059	2363	25443	6363					PV2	
		Range high limit	9060	2364	25444	6364					PV2	
		Cold junction compensation	9061	2365	25445	6365					–	
		Zener barrier adjustment	9062	2366	25446	6366					2	
		(Reserved for future use.)	9063	2367	25447	6367	×	×	×	×	–	
		Linear scaling low limit	9064	2368	25448	6368					PV2	
		Linear scaling high limit	9065	2369	25449	6369					PV2	
		Square root extraction dropout	9066	236A	25450	636A					1	
		Filter	9067	236B	25451	636B					2	
		Bias	9068	236C	25452	636C					PV2	
		Ratio	9069	236D	25453	636D					3	
		(Reserved for future use.)	9070	236E	25454	636E	×	×	×	×	–	
		Thermocouple·mV input burnout	9071	236F	25455	636F					–	
		(Reserved for future use.)	9072	2370	25456	6370	×	×	×	×	–	
		(Reserved for future use.)	9073	2371	25457	6371	×	×	×	×	–	
		(Reserved for future use.)	9074	2372	25458	6372	×	×	×	×	–	
		Linearization table group definition	9075	2373	25459	6373					–	

PV

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
PV	PV22	Range type	9088	2380	25472	6380					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Decimal point position	9089	2381	25473	6381					–	
		Temperature unit	9090	2382	25474	6382					–	
		Range low limit	9091	2383	25475	6383					PV22	
		Range high limit	9092	2384	25476	6384					PV22	
		Cold junction compensation	9093	2385	25477	6385					–	
		Zener barrier adjustment	9094	2386	25478	6386					2	
		(Reserved for future use.)	9095	2387	25479	6387	×	×	×	×	–	
		Linear scaling low limit	9096	2388	25480	6388					PV22	
		Linear scaling high limit	9097	2389	25481	6389					PV22	
		Square root extraction dropout	9098	238A	25482	638A					1	
		Filter	9099	238B	25483	638B					2	
		Bias	9100	238C	25484	638C					PV22	
		Ratio	9101	238D	25485	638D					3	
		(Reserved for future use.)	9102	238E	25486	638E	×	×	×	×	–	
		Thermocouple·mV input burnout	9103	238F	25487	638F					–	
		(Reserved for future use.)	9104	2390	25488	6390	×	×	×	×	–	
		(Reserved for future use.)	9105	2391	25489	6391	×	×	×	×	–	
		(Reserved for future use.)	9106	2392	25490	6392	×	×	×	×	–	
		Linearization table group definition	9107	2393	25491	6393					–	

Output (continuous output)

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Output (continuous output)	OUT3	Output range	9248	2420	25632	6420					–	
		Output type	9249	2421	25633	6421					–	
		Loop/channel definition	9250	2422	25634	6422					–	
		Output decimal point position	9251	2423	25635	6423					–	
		Output scaling low limit	9252	2424	25636	6424					OUT3	
		Output scaling high limit	9253	2425	25637	6425					OUT3	
		Linearization table group definition	9254	2426	25638	6426					–	
		Supply voltage compensation	9255	2427	25639	6427					–	Added to version 3.00.
	OUT4	Output range	9264	2430	25648	6430					–	
		Output type	9265	2431	25649	6431					–	
		Loop/channel definition	9266	2432	25650	6432					–	
		Output decimal point position	9267	2433	25651	6433					–	
		Output scaling low limit	9268	2434	25652	6434					OUT4	
		Output scaling high limit	9269	2435	25653	6435					OUT4	
		Linearization table group definition	9270	2436	25654	6436					–	
		Supply voltage compensation	9271	2437	25655	6437					–	Added to version 3.00.
	OUT5	Output range	9280	2440	25664	6440					–	
		Output type	9281	2441	25665	6441					–	
		Loop/channel definition	9282	2442	25666	6442					–	
		Output decimal point position	9283	2443	25667	6443					–	
		Output scaling low limit	9284	2444	25668	6444					OUT5	
		Output scaling high limit	9285	2445	25669	6445					OUT5	
		Linearization table group definition	9286	2446	25670	6446					–	
		Supply voltage compensation	9287	2447	25671	6447					–	Added to version 3.00.
	OUT6	Output range	9296	2450	25680	6450					–	
		Output type	9297	2451	25681	6451					–	
		Loop/channel definition	9298	2452	25682	6452					–	
		Output decimal point position	9299	2453	25683	6453					–	
		Output scaling low limit	9300	2454	25684	6454					OUT6	
		Output scaling high limit	9301	2455	25685	6455					OUT6	
		Linearization table group definition	9302	2456	25686	6456					–	
		Supply voltage compensation	9303	2457	25687	6457					–	Added to version 3.00.
	OUT7	Output range	9312	2460	25696	6460					–	
		Output type	9313	2461	25697	6461					–	
		Loop/channel definition	9314	2462	25698	6462					–	
		Output decimal point position	9315	2463	25699	6463					–	
		Output scaling low limit	9316	2464	25700	6464					OUT7	
		Output scaling high limit	9317	2465	25701	6465					OUT7	
		Linearization table group definition	9318	2466	25702	6466					–	
		Supply voltage compensation	9319	2467	25703	6467					–	Added to version 3.00.

Output (ON/OFF output)

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Output (ON/OFF output)	OUT1	Output type	9328	2470	25712	6470					–	
		Latch	9329	2471	25713	6471					–	
		Time proportional cycle mode	9330	2472	25714	6472					–	
		Minimum ON/OFF time	9331	2473	25715	6473					–	
		Time proportional cycle	9332	2474	25716	6474					1	
		Linearization table group definition	9333	2475	25717	6475					–	
		(Reserved for future use.)	9334	2476	25718	6476	×	×	×	×	–	
		Supply voltage compensation	9335	2477	25719	6477					–	Added to version 3.00.
	OUT2	Output type	9344	2480	25728	6480					–	
		Latch	9345	2481	25729	6481					–	
		Time proportional cycle mode	9346	2482	25730	6482					–	
		Minimum ON/OFF time	9347	2483	25731	6483					–	
		Time proportional cycle	9348	2484	25732	6484					1	
		Linearization table group definition	9349	2485	25733	6485					–	
		(Reserved for future use.)	9350	2486	25734	6486	×	×	×	×	–	
		Supply voltage compensation	9351	2487	25735	6487					–	Added to version 3.00.
	OUT3	Output type	9360	2490	25744	6490					–	
		Latch	9361	2491	25745	6491					–	
		Time proportional cycle mode	9362	2492	25746	6492					–	
		Minimum ON/OFF time	9363	2493	25747	6493					–	
		Time proportional cycle	9364	2494	25748	6494					1	
		Linearization table group definition	9365	2495	25749	6495					–	
		(Reserved for future use.)	9366	2496	25750	6496	×	×	×	×	–	
		Supply voltage compensation	9367	2497	25751	6497					–	Added to version 3.00.
	OUT4	Output type	9376	24A0	25760	64A0					–	
		Latch	9377	24A1	25761	64A1					–	
		Time proportional cycle mode	9378	24A2	25762	64A2					–	
		Minimum ON/OFF time	9379	24A3	25763	64A3					–	
		Time proportional cycle	9380	24A4	25764	64A4					1	
		Linearization table group definition	9381	24A5	25765	64A5					–	
		(Reserved for future use.)	9382	24A6	25766	64A6	×	×	×	×	–	
		Supply voltage compensation	9383	24A7	25767	64A7					–	Added to version 3.00.
	OUT5	Output type	9392	24B0	25776	64B0					–	
		Latch	9393	24B1	25777	64B1					–	
		Time proportional cycle mode	9394	24B2	25778	64B2					–	
		Minimum ON/OFF time	9395	24B3	25779	64B3					–	
		Time proportional cycle	9396	24B4	25780	64B4					1	
		Linearization table group definition	9397	24B5	25781	64B5					–	
		(Reserved for future use.)	9398	24B6	25782	64B6	×	×	×	×	–	
		Supply voltage compensation	9399	24B7	25783	64B7					–	Added to version 3.00.

Position proportional

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Position proportional		Output type	9440	24E0	25824	64E0					–	Added to version 2.00.
		Control method selection	9441	24E1	25825	64E1					–	
		Dead zone	9442	24E2	25826	64E2					1	
		Long life	9443	24E3	25827	64E3					–	
		Auto tuning	9444	24E4	25828	64E4					–	
		Fully closed FB value	9445	24E5	25829	64E5					–	
		Fully opened FB value	9446	24E6	25830	64E6					–	
		Full opening time	9447	24E7	25831	64E7					1	
		Loop assignment	9448	24E8	25832	64E8					–	
		Linearization table group definition	9449	24E9	25833	64E9					–	

International contact input

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Internal contact input	Contact 1	Operation type	9472	2500	25856	6500					–	
		Input type	9473	2501	25857	6501					–	
		Loop/channel definition	9474	2502	25858	6502					–	
		Weight	9475	2503	25859	6503					–	
	Contact 2	Operation type	9480	2508	25864	6508					–	
		Input type	9481	2509	25865	6509					–	
		Loop/channel definition	9482	250A	25866	650A					–	
		Weight	9483	250B	25867	650B					–	
	Contact 3	Operation type	9488	2510	25872	6510					–	
		Input type	9489	2511	25873	6511					–	
		Loop/channel definition	9490	2512	25874	6512					–	
		Weight	9491	2513	25875	6513					–	
	Contact 4	Operation type	9496	2518	25880	6518					–	
		Input type	9497	2519	25881	6519					–	
		Loop/channel definition	9498	251A	25882	651A					–	
		Weight	9499	251B	25883	651B					–	
	Contact 5	Operation type	9504	2520	25888	6520					–	
		Input type	9505	2521	25889	6521					–	
		Loop/channel definition	9506	2522	25890	6522					–	
		Weight	9507	2523	25891	6523					–	
	Contact 6	Operation type	9512	2528	25896	6528					–	
		Input type	9513	2529	25897	6529					–	
		Loop/channel definition	9514	252A	25898	652A					–	
		Weight	9515	252B	25899	652B					–	
	Contact 7	Operation type	9520	2530	25904	6530					–	
		Input type	9521	2531	25905	6531					–	
		Loop/channel definition	9522	2532	25906	6532					–	
		Weight	9523	2533	25907	6533					–	
	Contact 8	Operation type	9528	2538	25912	6538					–	
		Input type	9529	2539	25913	6539					–	
		Loop/channel definition	9530	253A	25914	653A					–	
		Weight	9531	253B	25915	653B					–	
	Contact 9	Operation type	9536	2540	25920	6540					–	
		Input type	9537	2541	25921	6541					–	
		Loop/channel definition	9538	2542	25922	6542					–	
		Weight	9539	2543	25923	6543					–	
	Contact 10	Operation type	9544	2548	25928	6548					–	
		Input type	9545	2549	25929	6549					–	
		Loop/channel definition	9546	254A	25930	654A					–	
		Weight	9547	254B	25931	654B					–	
	Contact 11	Operation type	9552	2550	25936	6550					–	
		Input type	9553	2551	25937	6551					–	
		Loop/channel definition	9554	2552	25938	6552					–	
		Weight	9555	2553	25939	6553					–	
	Contact 12	Operation type	9560	2558	25944	6558					–	
		Input type	9561	2559	25945	6559					–	
		Loop/channel definition	9562	255A	25946	655A					–	
		Weight	9563	255B	25947	655B					–	

International contact input

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Internal contact input	Contact 13	Operation type	9568	2560	25952	6560					–	
		Input type	9569	2561	25953	6561					–	
		Loop/channel definition	9570	2562	25954	6562					–	
		Weight	9571	2563	25955	6563					–	
	Contact 14	Operation type	9576	2568	25960	6568					–	
		Input type	9577	2569	25961	6569					–	
		Loop/channel definition	9578	256A	25962	656A					–	
		Weight	9579	256B	25963	656B					–	
	Contact 15	Operation type	9584	2570	25968	6570					–	
		Input type	9585	2571	25969	6571					–	
		Loop/channel definition	9586	2572	25970	6572					–	
		Weight	9587	2573	25971	6573					–	
	Contact 16	Operation type	9592	2578	25976	6578					–	
		Input type	9593	2579	25977	6579					–	
		Loop/channel definition	9594	257A	25978	657A					–	
		Weight	9595	257B	25979	657B					–	
	Contact 17	Operation type	9600	2580	25984	6580					–	
		Input type	9601	2581	25985	6581					–	
		Loop/channel definition	9602	2582	25986	6582					–	
		Weight	9603	2583	25987	6583					–	
	Contact 18	Operation type	9608	2588	25992	6588					–	
		Input type	9609	2589	25993	6589					–	
		Loop/channel definition	9610	258A	25994	658A					–	
		Weight	9611	258B	25995	658B					–	
	Contact 19	Operation type	9616	2590	26000	6590					–	
		Input type	9617	2591	26001	6591					–	
		Loop/channel definition	9618	2592	26002	6592					–	
		Weight	9619	2593	26003	6593					–	
	Contact 20	Operation type	9624	2598	26008	6598					–	
		Input type	9625	2599	26009	6599					–	
		Loop/channel definition	9626	259A	26010	659A					–	
		Weight	9627	259B	26011	659B					–	

Digital output

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Digital output	DO-C1	Output type	9632	25A0	26016	65A0					–	
		Latch	9633	25A1	26017	65A1					–	
	DO-C2	Output type	9640	25A8	26024	65A8					–	
		Latch	9641	25A9	26025	65A9					–	
	DO-C3	Output type	9648	25B0	26032	65B0					–	
		Latch	9649	25B1	26033	65B1					–	
	DO-C4	Output type	9656	25B8	26040	65B8					–	
		Latch	9657	25B9	26041	65B9					–	
	DO-C5	Output type	9664	25C0	26048	65C0					–	
		Latch	9665	25C1	26049	65C1					–	
	DO-C6	Output type	9672	25C8	26056	65C8					–	
		Latch	9673	25C9	26057	65C9					–	
	DO-C7	Output type	9680	25D0	26064	65D0					–	
		Latch	9681	25D1	26065	65D1					–	
	DO-C8	Output type	9688	25D8	26072	65D8					–	
		Latch	9689	25D9	26073	65D9					–	
	DO-E1	Output type	9760	2620	26144	6620					–	
		Latch	9761	2621	26145	6621					–	
	DO-E2	Output type	9768	2628	26152	6628					–	
		Latch	9769	2629	26153	6629					–	
	DO-E3	Output type	9776	2630	26160	6630					–	
		Latch	9777	2631	26161	6631					–	
	DO-E4	Output type	9784	2638	26168	6638					–	
		Latch	9785	2639	26169	6639					–	
	DO-E5	Output type	9792	2640	26176	6640					–	
		Latch	9793	2641	26177	6641					–	
	DO-E6	Output type	9800	2648	26184	6648					–	
		Latch	9801	2649	26185	6649					–	
	DO-E7	Output type	9808	2650	26192	6650					–	
		Latch	9809	2651	26193	6651					–	
	DO-E8	Output type	9816	2658	26200	6658					–	
		Latch	9817	2659	26201	6659					–	

Logical operation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Logical operation	Operation 1	Operation type	9824	2660	26208	6660					–	
		Input assignment A	9825	2661	26209	6661					–	
		Input assignment B	9826	2662	26210	6662					–	
		Input assignment C	9827	2663	26211	6663					–	
		Input assignment D	9828	2664	26212	6664					–	
		Input bit polarity A	9829	2665	26213	6665					–	
		Input bit polarity B	9830	2666	26214	6666					–	
		Input bit polarity C	9831	2667	26215	6667					–	
		Input bit polarity D	9832	2668	26216	6668					–	
		ON delay time	9833	2669	26217	6669					1	
		OFF delay time	9834	266A	26218	666A					1	
		Polarity	9835	266B	26219	666B					–	
		Latch	9836	266C	26220	666C					–	
	Operation 2	Operation type	9840	2670	26224	6670					–	
		Input assignment A	9841	2671	26225	6671					–	
		Input assignment B	9842	2672	26226	6672					–	
		Input assignment C	9843	2673	26227	6673					–	
		Input assignment D	9844	2674	26228	6674					–	
		Input bit polarity A	9845	2675	26229	6675					–	
		Input bit polarity B	9846	2676	26230	6676					–	
		Input bit polarity C	9847	2677	26231	6677					–	
		Input bit polarity D	9848	2678	26232	6678					–	
		ON delay time	9849	2679	26233	6679					1	
		OFF delay time	9850	267A	26234	667A					1	
		Polarity	9851	267B	26235	667B					–	
		Latch	9852	267C	26236	667C					–	
	Operation 3	Operation type	9856	2680	26240	6680					–	
		Input assignment A	9857	2681	26241	6681					–	
		Input assignment B	9858	2682	26242	6682					–	
		Input assignment C	9859	2683	26243	6683					–	
		Input assignment D	9860	2684	26244	6684					–	
		Input bit polarity A	9861	2685	26245	6685					–	
		Input bit polarity B	9862	2686	26246	6686					–	
		Input bit polarity C	9863	2687	26247	6687					–	
		Input bit polarity D	9864	2688	26248	6688					–	
		ON delay time	9865	2689	26249	6689					1	
		OFF delay time	9866	268A	26250	668A					1	
		Polarity	9867	268B	26251	668B					–	
		Latch	9868	268C	26252	668C					–	
	Operation 4	Operation type	9872	2690	26256	6690					–	
		Input assignment A	9873	2691	26257	6691					–	
		Input assignment B	9874	2692	26258	6692					–	
		Input assignment C	9875	2693	26259	6693					–	
		Input assignment D	9876	2694	26260	6694					–	
		Input bit polarity A	9877	2695	26261	6695					–	
		Input bit polarity B	9878	2696	26262	6696					–	
		Input bit polarity C	9879	2697	26263	6697					–	
		Input bit polarity D	9880	2698	26264	6698					–	
		ON delay time	9881	2699	26265	6699					1	
		OFF delay time	9882	269A	26266	669A					1	
		Polarity	9883	269B	26267	669B					–	
		Latch	9884	269C	26268	669C					–	

Logical operation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Logical operation	Operation 5	Operation type	9888	26A0	26272	66A0					–	
		Input assignment A	9889	26A1	26273	66A1					–	
		Input assignment B	9890	26A2	26274	66A2					–	
		Input assignment C	9891	26A3	26275	66A3					–	
		Input assignment D	9892	26A4	26276	66A4					–	
		Input bit polarity A	9893	26A5	26277	66A5					–	
		Input bit polarity B	9894	26A6	26278	66A6					–	
		Input bit polarity C	9895	26A7	26279	66A7					–	
		Input bit polarity D	9896	26A8	26280	66A8					–	
		ON delay time	9897	26A9	26281	66A9					1	
		OFF delay time	9898	26AA	26282	66AA					1	
		Polarity	9899	26AB	26283	66AB					–	
		Latch	9900	26AC	26284	66AC					–	
	Operation 6	Operation type	9904	26B0	26288	66B0					–	
		Input assignment A	9905	26B1	26289	66B1					–	
		Input assignment B	9906	26B2	26290	66B2					–	
		Input assignment C	9907	26B3	26291	66B3					–	
		Input assignment D	9908	26B4	26292	66B4					–	
		Input bit polarity A	9909	26B5	26293	66B5					–	
		Input bit polarity B	9910	26B6	26294	66B6					–	
		Input bit polarity C	9911	26B7	26295	66B7					–	
		Input bit polarity D	9912	26B8	26296	66B8					–	
		ON delay time	9913	26B9	26297	66B9					1	
		OFF delay time	9914	26BA	26298	66BA					1	
		Polarity	9915	26BB	26299	66BB					–	
		Latch	9916	26BC	26300	66BC					–	
	Operation 7	Operation type	9920	26C0	26304	66C0					–	
		Input assignment A	9921	26C1	26305	66C1					–	
		Input assignment B	9922	26C2	26306	66C2					–	
		Input assignment C	9923	26C3	26307	66C3					–	
		Input assignment D	9924	26C4	26308	66C4					–	
		Input bit polarity A	9925	26C5	26309	66C5					–	
		Input bit polarity B	9926	26C6	26310	66C6					–	
		Input bit polarity C	9927	26C7	26311	66C7					–	
		Input bit polarity D	9928	26C8	26312	66C8					–	
		ON delay time	9929	26C9	26313	66C9					1	
		OFF delay time	9930	26CA	26314	66CA					1	
		Polarity	9931	26CB	26315	66CB					–	
		Latch	9932	26CC	26316	66CC					–	
	Operation 8	Operation type	9936	26D0	26320	66D0					–	
		Input assignment A	9937	26D1	26321	66D1					–	
		Input assignment B	9938	26D2	26322	66D2					–	
		Input assignment C	9939	26D3	26323	66D3					–	
		Input assignment D	9940	26D4	26324	66D4					–	
		Input bit polarity A	9941	26D5	26325	66D5					–	
		Input bit polarity B	9942	26D6	26326	66D6					–	
		Input bit polarity C	9943	26D7	26327	66D7					–	
		Input bit polarity D	9944	26D8	26328	66D8					–	
		ON delay time	9945	26D9	26329	66D9					1	
		OFF delay time	9946	26DA	26330	66DA					1	
		Polarity	9947	26DB	26331	66DB					–	
		Latch	9948	26DC	26332	66DC					–	

Logical operation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Logical operation	Operation 9	Operation type	9952	26E0	26336	66E0					–	
		Input assignment A	9953	26E1	26337	66E1					–	
		Input assignment B	9954	26E2	26338	66E2					–	
		Input assignment C	9955	26E3	26339	66E3					–	
		Input assignment D	9956	26E4	26340	66E4					–	
		Input bit polarity A	9957	26E5	26341	66E5					–	
		Input bit polarity B	9958	26E6	26342	66E6					–	
		Input bit polarity C	9959	26E7	26343	66E7					–	
		Input bit polarity D	9960	26E8	26344	66E8					–	
		ON delay time	9961	26E9	26345	66E9					1	
		OFF delay time	9962	26EA	26346	66EA					1	
		Polarity	9963	26EB	26347	66EB					–	
		Latch	9964	26EC	26348	66EC					–	
	Operation 10	Operation type	9968	26F0	26352	66F0					–	
		Input assignment A	9969	26F1	26353	66F1					–	
		Input assignment B	9970	26F2	26354	66F2					–	
		Input assignment C	9971	26F3	26355	66F3					–	
		Input assignment D	9972	26F4	26356	66F4					–	
		Input bit polarity A	9973	26F5	26357	66F5					–	
		Input bit polarity B	9974	26F6	26358	66F6					–	
		Input bit polarity C	9975	26F7	26359	66F7					–	
		Input bit polarity D	9976	26F8	26360	66F8					–	
		ON delay time	9977	26F9	26361	66F9					1	
		OFF delay time	9978	26FA	26362	66FA					1	
		Polarity	9979	26FB	26363	66FB					–	
		Latch	9980	26FC	26364	66FC					–	
	Operation 11	Operation type	9984	2700	26368	6700					–	
		Input assignment A	9985	2701	26369	6701					–	
		Input assignment B	9986	2702	26370	6702					–	
		Input assignment C	9987	2703	26371	6703					–	
		Input assignment D	9988	2704	26372	6704					–	
		Input bit polarity A	9989	2705	26373	6705					–	
		Input bit polarity B	9990	2706	26374	6706					–	
		Input bit polarity C	9991	2707	26375	6707					–	
		Input bit polarity D	9992	2708	26376	6708					–	
		ON delay time	9993	2709	26377	6709					1	
		OFF delay time	9994	270A	26378	670A					1	
		Polarity	9995	270B	26379	670B					–	
		Latch	9996	270C	26380	670C					–	
	Operation 12	Operation type	10000	2710	26384	6710					–	
		Input assignment A	10001	2711	26385	6711					–	
		Input assignment B	10002	2712	26386	6712					–	
		Input assignment C	10003	2713	26387	6713					–	
		Input assignment D	10004	2714	26388	6714					–	
		Input bit polarity A	10005	2715	26389	6715					–	
		Input bit polarity B	10006	2716	26390	6716					–	
		Input bit polarity C	10007	2717	26391	6717					–	
		Input bit polarity D	10008	2718	26392	6718					–	
		ON delay time	10009	2719	26393	6719					1	
		OFF delay time	10010	271A	26394	671A					1	
		Polarity	10011	271B	26395	671B					–	
		Latch	10012	271C	26396	671C					–	

Logical operation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Logical operation	Operation 13	Operation type	10016	2720	26400	6720					–	
		Input assignment A	10017	2721	26401	6721					–	
		Input assignment B	10018	2722	26402	6722					–	
		Input assignment C	10019	2723	26403	6723					–	
		Input assignment D	10020	2724	26404	6724					–	
		Input bit polarity A	10021	2725	26405	6725					–	
		Input bit polarity B	10022	2726	26406	6726					–	
		Input bit polarity C	10023	2727	26407	6727					–	
		Input bit polarity D	10024	2728	26408	6728					–	
		ON delay time	10025	2729	26409	6729					1	
		OFF delay time	10026	272A	26410	672A					1	
		Polarity	10027	272B	26411	672B					–	
		Latch	10028	272C	26412	672C					–	
	Operation 14	Operation type	10032	2730	26416	6730					–	
		Input assignment A	10033	2731	26417	6731					–	
		Input assignment B	10034	2732	26418	6732					–	
		Input assignment C	10035	2733	26419	6733					–	
		Input assignment D	10036	2734	26420	6734					–	
		Input bit polarity A	10037	2735	26421	6735					–	
		Input bit polarity B	10038	2736	26422	6736					–	
		Input bit polarity C	10039	2737	26423	6737					–	
		Input bit polarity D	10040	2738	26424	6738					–	
		ON delay time	10041	2739	26425	6739					1	
		OFF delay time	10042	273A	26426	673A					1	
		Polarity	10043	273B	26427	673B					–	
		Latch	10044	273C	26428	673C					–	
	Operation 15	Operation type	10048	2740	26432	6740					–	
		Input assignment A	10049	2741	26433	6741					–	
		Input assignment B	10050	2742	26434	6742					–	
		Input assignment C	10051	2743	26435	6743					–	
		Input assignment D	10052	2744	26436	6744					–	
		Input bit polarity A	10053	2745	26437	6745					–	
		Input bit polarity B	10054	2746	26438	6746					–	
		Input bit polarity C	10055	2747	26439	6747					–	
		Input bit polarity D	10056	2748	26440	6748					–	
		ON delay time	10057	2749	26441	6749					1	
		OFF delay time	10058	274A	26442	674A					1	
		Polarity	10059	274B	26443	674B					–	
		Latch	10060	274C	26444	674C					–	
	Operation 16	Operation type	10064	2750	26448	6750					–	
		Input assignment A	10065	2751	26449	6751					–	
		Input assignment B	10066	2752	26450	6752					–	
		Input assignment C	10067	2753	26451	6753					–	
		Input assignment D	10068	2754	26452	6754					–	
		Input bit polarity A	10069	2755	26453	6755					–	
		Input bit polarity B	10070	2756	26454	6756					–	
		Input bit polarity C	10071	2757	26455	6757					–	
		Input bit polarity D	10072	2758	26456	6758					–	
		ON delay time	10073	2759	26457	6759					1	
		OFF delay time	10074	275A	26458	675A					1	
		Polarity	10075	275B	26459	675B					–	
		Latch	10076	275C	26460	675C					–	

User-defined bit

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
User-defined bit		User-defined bits 1-8	10080	2760	26464	6760					–	
		User-defined bits 1	10081	2761	26465	6761					–	
		User-defined bits 2	10082	2762	26466	6762					–	
		User-defined bits 3	10083	2763	26467	6763					–	
		User-defined bits 4	10084	2764	26468	6764					–	
		User-defined bits 5	10085	2765	26469	6765					–	
		User-defined bits 6	10086	2766	26470	6766					–	
		User-defined bits 7	10087	2767	26471	6767					–	
		User-defined bits 8	10088	2768	26472	6768					–	

Display/key

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Display/key	Top priority	MS display, condition	10112	2780	26496	6780					–	
		MS display, status	10113	2781	26497	6781					–	
		MS display, decimal point position	10114	2782	26498	6782					–	
		MS display, scaling low limit	10115	2783	26499	6783					MS1	
		MS display, scaling high limit	10116	2784	26500	6784					MS1	
	Second priority	MS display, condition	10128	2790	26512	6790					–	
		MS display, status	10129	2791	26513	6791					–	
		MS display, decimal point position	10130	2792	26514	6792					–	
		MS display, scaling low limit	10131	2793	26515	6793					MS2	
		MS display, scaling high limit	10132	2794	26516	6794					MS2	
	Third priority	MS display, condition	10144	27A0	26528	67A0					–	
		MS display, status	10145	27A1	26529	67A1					–	
		MS display, decimal point position	10146	27A2	26530	67A2					–	
		MS display, scaling low limit	10147	27A3	26531	67A3					MS3	
		MS display, scaling high limit	10148	27A4	26532	67A4					MS3	
	UF1 LED	UF LED, condition	10224	27F0	26608	67F0					–	
		UF LED, status	10225	27F1	26609	67F1					–	
	UF2 LED	UF LED, condition	10228	27F4	26612	67F4					–	
		UF LED, status	10229	27F5	26613	67F5					–	
	UF3 LED	UF LED, condition	10232	27F8	26616	67F8					–	
		UF LED, status	10233	27F9	26617	67F9					–	
	UF4 LED	UF LED, condition	10236	27FC	26620	67FC					–	
		UF LED, status	10237	27FD	26621	67FD					–	

Display/key

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Display/key	rsp/lsp key	F key basic registration	10160	27B0	26544	67B0					–	
		F key assignment item 1	10161	27B1	26545	67B1					–	
		F key assignment item 2	10162	27B2	26546	67B2					–	
		F key assignment item 3	10163	27B3	26547	67B3					–	
		F key assignment item 4	10164	27B4	26548	67B4					–	
		F key assignment item 5	10165	27B5	26549	67B5					–	
		F key assignment item 6	10166	27B6	26550	67B6					–	
		F key assignment item 7	10167	27B7	26551	67B7					–	
		F key assignment item 8	10168	27B8	26552	67B8					–	
	at key	F key basic registration	10176	27C0	26560	67C0					–	
		F key assignment item 1	10177	27C1	26561	67C1					–	
		F key assignment item 2	10178	27C2	26562	67C2					–	
		F key assignment item 3	10179	27C3	26563	67C3					–	
		F key assignment item 4	10180	27C4	26564	67C4					–	
		F key assignment item 5	10181	27C5	26565	67C5					–	
		F key assignment item 6	10182	27C6	26566	67C6					–	
		F key assignment item 7	10183	27C7	26567	67C7					–	
		F key assignment item 8	10184	27C8	26568	67C8					–	
	f1 key	F key basic registration	10192	27D0	26576	67D0					–	
		F key assignment item 1	10193	27D1	26577	67D1					–	
		F key assignment item 2	10194	27D2	26578	67D2					–	
		F key assignment item 3	10195	27D3	26579	67D3					–	
		F key assignment item 4	10196	27D4	26580	67D4					–	
		F key assignment item 5	10197	27D5	26581	67D5					–	
		F key assignment item 6	10198	27D6	26582	67D6					–	
		F key assignment item 7	10199	27D7	26583	67D7					–	
		F key assignment item 8	10200	27D8	26584	67D8					–	
	f2 key	F key basic registration	10208	27E0	26592	67E0					–	
		F key assignment item 1	10209	27E1	26593	67E1					–	
		F key assignment item 2	10210	27E2	26594	67E2					–	
		F key assignment item 3	10211	27E3	26595	67E3					–	
		F key assignment item 4	10212	27E4	26596	67E4					–	
		F key assignment item 5	10213	27E5	26597	67E5					–	
		F key assignment item 6	10214	27E6	26598	67E6					–	
		F key assignment item 7	10215	27E7	26599	67E7					–	
		F key assignment item 8	10216	27E8	26600	67E8					–	

RS-485 communications

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
RS-485 communications		Communication types	10240	2800	26624	6800		×		×	–	Added to version 3.00.
		Machine address	10241	2801	26625	6801		×		×	–	
		Transmission speed	10242	2802	26626	6802		×		×	–	
		Data format (Data length)	10243	2803	26627	6803		×		×	–	
		Data format (Parity)	10244	2804	26628	6804		×		×	–	
		Data format (Stop bit)	10245	2805	26629	6805		×		×	–	
		Response time-out	10246	2806	26630	6806		×		×	–	

Lock

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Lock		Key lock (Setting change)	10256	2810	26640	6810		×		×	–	
		Key lock (Display)	10257	2811	26641	6811		×		×	–	
		RS-485 communication lock (Read)	10258	2812	26642	6812		×		×	–	
		RS-485 communication lock (Write)	10259	2813	26643	6813		×		×	–	
		Loader communication lock (Read)	10260	2814	26644	6814		×		×	–	
		Loader communication lock (Write)	10261	2815	26645	6815		×		×	–	

Monitor

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Monitor		Alarm information 1	10288	2830	26672	6830		×		×	–	For details, refer to alarm information 1–4 in the Monitor Bank in C45/46 Single Loop Controller User's Manual for Displays and Settings (Document No. CP-SP-1265E).
		Alarm information 2	10289	2831	26673	6831		×		×	–	
		Alarm information 3	10290	2832	26674	6832		×		×	–	
		Alarm information 4	10291	2833	26675	6833		×		×	–	
	Loop 1	PV	10304	2840	26688	6840		×		×	LP1	
		SP	10305	2841	26689	6841		×		×	LP1	
		MV	10306	2842	26690	6842		×		×	1	
		Heat MV	10307	2843	26691	6843		×		×	1	
		Cool MV	10308	2844	26692	6844		×		×	1	
		AT progress	10309	2845	26693	6845		×		×	–	
		SP group selection	10310	2846	26694	6846		×		×	–	
		PID group selection	10311	2847	26695	6847		×		×	–	Added to version 3.00.
	Loop 2	PV	10320	2850	26704	6850		×		×	LP2	
		SP	10321	2851	26705	6851		×		×	LP2	
		MV	10322	2852	26706	6852		×		×	1	
		Heat MV	10323	2853	26707	6853		×		×	1	
		Cool MV	10324	2854	26708	6854		×		×	1	
		AT progress	10325	2855	26709	6855		×		×	–	
		SP group selection	10326	2856	26710	6856		×		×	–	
		PID group selection	10327	2857	26711	6857		×		×	–	Added to version 3.00.
	PV1	PV1	10368	2880	26752	6880		×		×	PV1	
	PV2/PV21	PV2/PV21	10369	2881	26753	6881		×		×	PV2	
	PV22	PV22	10370	2882	26754	6882		×		×	PV22	Added to version 2.00.
	MFB1	MFB1 amount of opening (estimated)	10384	2890	26768	6890		×		×	1	Added to version 2.00.
		MFB count value	10385	2891	26769	6891		×		×	–	Added to version 4.05.
		Flow rate (with temperature-pressure compensation)	10394	289A	26778	689A		×		×	FL	Added to version 2.00. Cannot be read or written on the SDC45A/46A/ 45R/46R
		Flow rate input (PV raw input %)	10395	289B	26779	689B		×		×	1	
		Temperature compensation input	10396	289C	26780	689C		×		×	FL-T	
		Pressure compensation input	10397	289D	26781	689D		×		×	FL-P	
	CT1	Current when output ON	10400	28A0	26784	68A0		×		×	1	Added to version 2.00.
		Current when output OFF	10401	28A1	26785	68A1		×		×	1	
	CT2	Current when output ON	10402	28A2	26786	68A2		×		×	1	
		Current when output OFF	10403	28A3	26787	68A3		×		×	1	
	AC1	AC measurement voltage	10416	28B0	26800	68B0		×		×	2	Added to version 3.00.
		AC percent	10417	28B1	26801	68B1		×		×	1	
	AC2	AC measurement voltage	10420	28B4	26804	68B4		×		×	2	
		AC percent	10421	28B5	26805	68B5		×		×	1	
		Power frequency	10432	28C0	26816	68C0		×		×	–	

Monitor

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Monitor	OUT1	Output percent data	10448	28D0	26832	68D0		×		×	1	
	OUT2	Output percent data	10449	28D1	26833	68D1		×		×	1	
	OUT3	Output percent data	10450	28D2	26834	68D2		×		×	1	
	OUT4	Output percent data	10451	28D3	26835	68D3		×		×	1	
	OUT5	Output percent data	10452	28D4	26836	68D4		×		×	1	
	OUT6	Output percent data	10453	28D5	26837	68D5		×		×	1	
	OUT7	Output percent data	10454	28D6	26838	68D6		×		×	1	
	OUT1	Output ON/OFF data	10464	28E0	26848	68E0		×		×	–	
	OUT2	Output ON/OFF data	10465	28E1	26849	68E1		×		×	–	
	OUT3	Output ON/OFF data	10466	28E2	26850	68E2		×		×	–	
	OUT4	Output ON/OFF data	10467	28E3	26851	68E3		×		×	–	
	OUT5	Output ON/OFF data	10468	28E4	26852	68E4		×		×	–	
	OUT6	Output ON/OFF data	10469	28E5	26853	68E5		×		×	–	
	OUT7	Output ON/OFF data	10470	28E6	26854	68E6		×		×	–	
		DI-C1 to DI-C4	10480	28F0	26864	68F0		×		×	–	For details, see digital output information 1-6 in "Basic Monitor Bank" of another manual, List of Displays and Settings (on pages 2-29 and 2-31).
		DI-C5 to DI-C8	10481	28F1	26865	68F1		×		×	–	
		DI-D1 to DI-D4	10482	28F2	26866	68F2		×		×	–	
		DI-D5 to DI-D8	10483	28F3	26867	68F3		×		×	–	
		(Reserved for future use.)	10484	28F4	26868	68F4		×		×	–	
		(Reserved for future use.)	10485	28F5	26869	68F5		×		×	–	
		DI-F1 to DI-F2	10486	28F6	26870	68F6		×		×	–	
		DO-C1 to DO-C4	10496	2900	26880	6900		×		×	–	
		DO-C5 to DO-C8	10497	2901	26881	6901		×		×	–	
		(Reserved for future use.)	10498	2902	26882	6902		×		×	–	
		(Reserved for future use.)	10499	2903	26883	6903		×		×	–	
		DO-E1 to DO-E4	10500	2904	26884	6904		×		×	–	
		DO-E5 to DO-E8	10501	2905	26885	6905		×		×	–	
	EV1	Delay remaining time	10512	2910	26896	6910		×		×	1	
	EV2	Delay remaining time	10513	2911	26897	6911		×		×	1	
	EV3	Delay remaining time	10514	2912	26898	6912		×		×	1	
	EV4	Delay remaining time	10515	2913	26899	6913		×		×	1	
	EV5	Delay remaining time	10516	2914	26900	6914		×		×	1	
	EV3	Delay remaining time	10517	2915	26901	6915		×		×	1	
	EV7	Delay remaining time	10518	2916	26902	6916		×		×	1	
	EV8	Delay remaining time	10519	2917	26903	6917		×		×	1	
	EV9	Delay remaining time	10520	2918	26904	6918		×		×	1	
	EV10	Delay remaining time	10521	2919	26905	6919		×		×	1	
	EV11	Delay remaining time	10522	291A	26906	691A		×		×	1	
	EV12	Delay remaining time	10523	291B	26907	691B		×		×	1	
	EV13	Delay remaining time	10524	291C	26908	691C		×		×	1	
	EV14	Delay remaining time	10525	291D	26909	691D		×		×	1	
	EV15	Delay remaining time	10526	291E	26910	691E		×		×	1	
	EV16	Delay remaining time	10527	291F	26911	691F		×		×	1	
		Number of days continuously energized	10544	2930	26928	6930		×		×	–	Number of days (1: One day)
		Number of EEPROM writing cycles	10560	2940	26944	6940		×		×	–	1/100

Instrument information

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Instrument information		Firmware information (1) (ROM ID)	10768	2A10	27152	6A10		×		×	–	Added to version 2.00.
		Firmware information (2) (ROM version 1)	10769	2A11	27153	6A11		×		×	2	
		Firmware information (3) (ROM version 2)	10770	2A12	27154	6A12		×		×	2	
		Firmware information (4) (Version for SLP)	10771	2A13	27155	6A13		×		×	–	
		Firmware information (5) (Version for EST)	10772	2A14	27156	6A14		×		×	–	
		Date code (year)	10773	2A15	27157	6A15		×		×	–	
		Date code (month and day)	10774	2A16	27158	6A16		×		×	2	
		Production number	10775	2A17	27159	6A17		×		×	–	

SP configuration

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
SP configuration	Loop 1	RSP ratio 1	10864	2A70	27248	6A70					3	Added to version 1.05.
		RSP ratio 2	10865	2A71	27249	6A71					3	
		RSP ratio 3	10866	2A72	27250	6A72					3	
		RSP ratio 4	10867	2A73	27251	6A73					3	
		RSP ratio 5	10868	2A74	27252	6A74					3	
		RSP ratio 6	10869	2A75	27253	6A75					3	
		RSP ratio 7	10870	2A76	27254	6A76					3	
		RSP ratio 8	10871	2A77	27255	6A77					3	
	Loop 2	RSP ratio 1	10880	2A80	27264	6A80					3	
		RSP ratio 2	10881	2A81	27265	6A81					3	
		RSP ratio 3	10882	2A82	27266	6A82					3	
		RSP ratio 4	10883	2A83	27267	6A83					3	
		RSP ratio 5	10884	2A84	27268	6A84					3	
		RSP ratio 6	10885	2A85	27269	6A85					3	
		RSP ratio 7	10886	2A86	27270	6A86					3	
		RSP ratio 8	10887	2A87	27271	6A87					3	

Temperature-pressure compensation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Temperature-pressure compensation		Compensation method	10928	2AB0	27312	6AB0					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Temperature unit for temperature compensation	10929	2AB1	27313	6AB1					–	
		Design temperature for temperature compensation	10930	2AB2	27314	6AB2					1	
		Pressure unit for pressure compensation	10931	2AB3	27315	6AB3					–	
		Design pressure for pressure compensation	10932	2AB4	27316	6AB4					1	
		Decimal point position (for flow rate settings)	10933	2AB5	27317	6AB5					–	
		Flow rate scaling lower limit	10934	2AB6	27318	6AB6					FL	
		Flow rate scaling upper limit	10935	2AB7	27319	6AB7					FL	
		Square root extraction dropout	10936	2AB8	27320	6AB8					1	
		Filter	10937	2AB9	27321	6AB9					2	
		Bias	10938	2ABA	27322	6ABA					FL	
		Ratio	10939	2ABB	27323	6ABB					3	
		Linearization table group definition	10940	2ABC	27324	6ABC					–	

MV

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
MV	Loop 1	Scaling system	10960	2AD0	27344	6AD0					–	
		Scaling low limit	10961	2AD1	27345	6AD1					LP1	
		Scaling high limit	10962	2AD2	27346	6AD2					LP1	
		SP tracking mode	10963	2AD3	27347	6AD3					–	Add to version 1.05.
		SP output filter	10964	2AD4	27348	6AD4					2	
		SP tracking signal	10965	2AD5	27349	6AD5					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		MV tracking mode	10992	2AF0	27376	6AF0					–	Add to version 2.00.
		SP tracking	10993	2AF1	27377	6AF1					–	
		SP tracking signal	10994	2AF2	27378	6AF2					–	
	Loop 2	Scaling system	10968	2AD8	27352	6AD8					–	
		Scaling low limit	10969	2AD9	27353	6AD9					LP2	
		Scaling high limit	10970	2ADA	27354	6ADA					LP2	
		SP tracking mode	10971	2ADB	27355	6ADB					–	Add to version 1.05.
		SP output filter	10972	2ADC	27356	6ADC					2	
		SP tracking signal	10973	2ADD	27357	6ADD					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		MV tracking mode	11000	2AF8	27384	6AF8					–	Add to version 2.00.
		SP tracking	11001	2AF9	27385	6AF9					–	
		SP tracking signal	11002	2AFA	27386	6AFA					–	

AC input

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
AC input	AC1	Reference voltage	11136	2B80	27520	6B80					2	Add to version 3.00.
		Filter	11137	2B81	27521	6B81					2	
	AC2	Reference voltage	11140	2B84	27524	6B84					2	
		Filter	11141	2B85	27525	6B85					2	

CT input

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
CT input	CT1	CT type	11152	2B90	27536	6B90					–	Added to version 2.00.
		CT measurement wait time	11153	2B91	27537	6B91					–	
		Number of CT turns	11154	2B92	27538	6B92					–	
		Number of CT power wire loops	11155	2B93	27539	6B93					–	
		Heater burnout detection current value	11156	2B94	27540	6B94					1	
		Over-current detection current value	11157	2B95	27541	6B95					1	
		Short-circuit detection current value	11158	2B96	27542	6B96					1	
		Hysteresis	11159	2B97	27543	6B97					1	
		Delay time	11160	2B98	27544	6B98					1	
		Condition for restoring the status before measurement	11161	2B99	27545	6B99					–	
	CT2	CT type	11168	2BA0	27552	6BA0					–	
		CT measurement wait time	11169	2BA1	27553	6BA1					–	
		Number of CT turns	11170	2BA2	27554	6BA2					–	
		Number of CT power wire loops	11171	2BA3	27555	6BA3					–	
		Heater burnout detection current value	11172	2BA4	27556	6BA4					1	
		Over-current detection current value	11173	2BA5	27557	6BA5					1	
		Short-circuit detection current value	11174	2BA6	27558	6BA6					1	
		Hysteresis	11175	2BA7	27559	6BA7					1	
		Delay time	11176	2BA8	27560	6BA8					1	
		Condition for restoring the status before measurement	11177	2BA9	27561	6BA9					–	

Input computation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Input computation	F01	Decimal point position	11216	2BD0	27600	6BD0					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Input 1	11217	2BD1	27601	6BD1					–	
		Input 2	11218	2BD2	27602	6BD2					–	
		Computation types	11219	2BD3	27603	6BD3					–	
		Setting 1	11220	2BD4	27604	6BD4					I-F01	
		Setting 2	11221	2BD5	27605	6BD5					I-F01	
		Setting 3	11222	2BD6	27606	6BD6					I-F01	
		Contact input	11223	2BD7	27607	6BD7					–	
		Contact input monitor	11224	2BD8	27608	6BD8		×		×	–	
		Contact output monitor	11225	2BD9	27609	6BD9		×		×	–	
		Computation unit output monitor	11226	2BDA	27610	6BDA		×		×	I-F	
	F02	Computation types	11235	2BE3	27619	6BE3					–	
		Setting 1	11236	2BE4	27620	6BE4					I-F02	
		Setting 2	11237	2BE5	27621	6BE5					I-F02	
		Setting 3	11238	2BE6	27622	6BE6					I-F02	
		Contact input	11239	2BE7	27623	6BE7					–	
		Contact input monitor	11240	2BE8	27624	6BE8		×		×	–	
		Contact output monitor	11241	2BE9	27625	6BE9		×		×	–	
		Computation unit output monitor	11242	2BEA	27626	6BEA		×		×	I-F	
	F03	Computation types	11251	2BF3	27635	6BF3					–	
		Setting 1	11252	2BF4	27636	6BF4					I-F03	
		Setting 2	11253	2BF5	27637	6BF5					I-F03	
		Setting 3	11254	2BF6	27638	6BF6					I-F03	
		Contact input	11255	2BF7	27639	6BF7					–	
		Contact input monitor	11256	2BF8	27640	6BF8		×		×	–	
		Contact output monitor	11257	2BF9	27641	6BF9		×		×	–	
		Computation unit output monitor	11258	2BFA	27642	6BFA		×		×	I-F	
	F04	Computation types	11267	2C03	27651	6C03					–	
		Setting 1	11268	2C04	27652	6C04					I-F04	
		Setting 2	11269	2C05	27653	6C05					I-F04	
		Setting 3	11270	2C06	27654	6C06					I-F04	
		Contact input	11271	2C07	27655	6C07					–	
		Contact input monitor	11272	2C08	27656	6C08		×		×	–	
		Contact output monitor	11273	2C09	27657	6C09		×		×	–	
		Computation unit output monitor	11274	2C0A	27658	6C0A		×		×	I-F	
	F05	Computation types	11283	2C13	27667	6C13					–	
		Setting 1	11284	2C14	27668	6C14					I-F05	
		Setting 2	11285	2C15	27669	6C15					I-F05	
		Setting 3	11286	2C16	27670	6C16					I-F05	
		Contact input	11287	2C17	27671	6C17					–	
		Contact input monitor	11288	2C18	27672	6C18		×		×	–	
		Contact output monitor	11289	2C19	27673	6C19		×		×	–	
		Computation unit output monitor	11290	2C1A	27674	6C1A		×		×	I-F	

Input computation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Input computation	F06	Computation types	11299	2C23	27683	6C23					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Setting 1	11300	2C24	27684	6C24					I-F06	
		Setting 2	11301	2C25	27685	6C25					I-F06	
		Setting 3	11302	2C26	27686	6C26					I-F06	
		Contact input	11303	2C27	27687	6C27					–	
		Contact input monitor	11304	2C28	27688	6C28		×		×	–	
		Contact output monitor	11305	2C29	27689	6C29		×		×	–	
		Computation unit output monitor	11306	2C2A	27690	6C2A		×		×	I-F	
	F07	Computation types	11315	2C33	27699	6C33					–	
		Setting 1	11316	2C34	27700	6C34					I-F07	
		Setting 2	11317	2C35	27701	6C35					I-F07	
		Setting 3	11318	2C36	27702	6C36					I-F07	
		Contact input	11319	2C37	27703	6C37					–	
		Contact input monitor	11320	2C38	27704	6C38		×		×	–	
		Contact output monitor	11321	2C39	27705	6C39		×		×	–	
		Computation unit output monitor	11322	2C3A	27706	6C3A		×		×	I-F	
	F08	Computation types	11331	2C43	27715	6C43					–	
		Setting 1	11332	2C44	27716	6C44					I-F08	
		Setting 2	11333	2C45	27717	6C45					I-F08	
		Setting 3	11334	2C46	27718	6C46					I-F08	
		Contact input	11335	2C47	27719	6C47					–	
		Contact input monitor	11336	2C48	27720	6C48		×		×	–	
		Contact output monitor	11337	2C49	27721	6C49		×		×	–	
		Computation unit output monitor	11338	2C4A	27722	6C4A		×		×	I-F	
	F09	Computation types	11347	2C53	27731	6C53					–	
		Setting 1	11348	2C54	27732	6C54					I-F09	
		Setting 2	11349	2C55	27733	6C55					I-F09	
		Setting 3	11350	2C56	27734	6C56					I-F09	
		Contact input	11351	2C57	27735	6C57					–	
		Contact input monitor	11352	2C58	27736	6C58		×		×	–	
		Contact output monitor	11353	2C59	27737	6C59		×		×	–	
		Computation unit output monitor	11354	2C5A	27738	6C5A		×		×	I-F	
	F10	Computation types	11363	2C63	27747	6C63					–	
		Setting 1	11364	2C64	27748	6C64					I-F10	
		Setting 2	11365	2C65	27749	6C65					I-F10	
		Setting 3	11366	2C66	27750	6C66					I-F10	
		Contact input	11367	2C67	27751	6C67					–	
		Contact input monitor	11368	2C68	27752	6C68		×		×	–	
		Contact output monitor	11369	2C69	27753	6C69		×		×	–	
		Computation unit output monitor	11370	2C6A	27754	6C6A		×		×	I-F	

Output computation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Output computation	F01	Decimal point position	11376	2C70	27760	6C70					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Input 1	11377	2C71	27761	6C71					–	
		Input 2	11378	2C72	27762	6C72					–	
		Computation types	11379	2C73	27763	6C73					–	
		Setting 1	11380	2C74	27764	6C74					O-F01	
		Setting 2	11381	2C75	27765	6C75					O-F01	
		Setting 3	11382	2C76	27766	6C76					O-F01	
		Contact input	11383	2C77	27767	6C77					–	
		Contact input monitor	11384	2C78	27768	6C78		×		×	–	
		Contact output monitor	11385	2C79	27769	6C79		×		×	–	
		Computation unit output monitor	11386	2C7A	27770	6C7A		×		×	O-F	
	F02	Computation types	11395	2C83	27779	6C83					–	
		Setting 1	11396	2C84	27780	6C84					O-F02	
		Setting 2	11397	2C85	27781	6C85					O-F02	
		Setting 3	11398	2C86	27782	6C86					O-F02	
		Contact input	11399	2C87	27783	6C87					–	
		Contact input monitor	11400	2C88	27784	6C88		×		×	–	
		Contact output monitor	11401	2C89	27785	6C89		×		×	–	
		Computation unit output monitor	11402	2C8A	27786	6C8A		×		×	O-F	
	F03	Computation types	11411	2C93	27795	6C93					–	
		Setting 1	11412	2C94	27796	6C94					O-F03	
		Setting 2	11413	2C95	27797	6C95					O-F03	
		Setting 3	11414	2C96	27798	6C96					O-F03	
		Contact input	11415	2C97	27799	6C97					–	
		Contact input monitor	11416	2C98	27800	6C98		×		×	–	
		Contact output monitor	11417	2C99	27801	6C99		×		×	–	
		Computation unit output monitor	11418	2C9A	27802	6C9A		×		×	O-F	
	F04	Computation types	11427	2CA3	27811	6CA3					–	
		Setting 1	11428	2CA4	27812	6CA4					O-F04	
		Setting 2	11429	2CA5	27813	6CA5					O-F04	
		Setting 3	11430	2CA6	27814	6CA6					O-F04	
		Contact input	11431	2CA7	27815	6CA7					–	
		Contact input monitor	11432	2CA8	27816	6CA8		×		×	–	
		Contact output monitor	11433	2CA9	27817	6CA9		×		×	–	
		Computation unit output monitor	11434	2CAA	27818	6CAA		×		×	O-F	
	F05	Computation types	11443	2CB3	27827	6CB3					–	
		Setting 1	11444	2CB4	27828	6CB4					O-F05	
		Setting 2	11445	2CB5	27829	6CB5					O-F05	
		Setting 3	11446	2CB6	27830	6CB6					O-F05	
		Contact input	11447	2CB7	27831	6CB7					–	
		Contact input monitor	11448	2CB8	27832	6CB8		×		×	–	
		Contact output monitor	11449	2CB9	27833	6CB9		×		×	–	
		Computation unit output monitor	11450	2CBA	27834	6CBA		×		×	O-F	

Output computation

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Output computation	F06	Computation types	11459	2CC3	27843	6CC3					–	Added to version 2.00. Cannot be read or written on the SDC45A/46A/45R/46R
		Setting 1	11460	2CC4	27844	6CC4					O-F06	
		Setting 2	11461	2CC5	27845	6CC5					O-F06	
		Setting 3	11462	2CC6	27846	6CC6					O-F06	
		Contact input	11463	2CC7	27847	6CC7					–	
		Contact input monitor	11464	2CC8	27848	6CC8		×		×	–	
		Contact output monitor	11465	2CC9	27849	6CC9		×		×	–	
		Computation unit output monitor	11466	2CCA	27850	6CCA		×		×	O-F	
	F07	Computation types	11459	2CC3	27843	6CC3					–	
		Setting 1	11460	2CC4	27844	6CC4					O-F07	
		Setting 2	11461	2CC5	27845	6CC5					O-F07	
		Setting 3	11462	2CC6	27846	6CC6					O-F07	
		Contact input	11463	2CC7	27847	6CC7					–	
		Contact input monitor	11464	2CC8	27848	6CC8		×		×	–	
		Contact output monitor	11465	2CC9	27849	6CC9		×		×	–	
		Computation unit output monitor	11466	2CCA	27850	6CCA		×		×	O-F	
	F08	Computation types	11491	2CE3	27875	6CE3					–	
		Setting 1	11492	2CE4	27876	6CE4					O-F08	
		Setting 2	11493	2CE5	27877	6CE5					O-F08	
		Setting 3	11494	2CE6	27878	6CE6					O-F08	
		Contact input	11495	2CE7	27879	6CE7					–	
		Contact input monitor	11496	2CE8	27880	6CE8		×		×	–	
		Contact output monitor	11497	2CE9	27881	6CE9		×		×	–	
		Computation unit output monitor	11498	2CEA	27882	6CEA		×		×	O-F	
	F09	Computation types	11507	2CF3	27891	6CF3					–	
		Setting 1	11508	2CF4	27892	6CF4					O-F09	
		Setting 2	11509	2CF5	27893	6CF5					O-F09	
		Setting 3	11510	2CF6	27894	6CF6					O-F09	
		Contact input	11511	2CF7	27895	6CF7					–	
		Contact input monitor	11512	2CF8	27896	6CF8		×		×	–	
		Contact output monitor	11513	2CF9	27897	6CF9		×		×	–	
		Computation unit output monitor	11514	2CFA	27898	6CFA		×		×	O-F	
	F10	Computation types	11523	2D03	27907	6D03					–	
		Setting 1	11524	2D04	27908	6D04					O-F10	
		Setting 2	11525	2D05	27909	6D05					O-F10	
		Setting 3	11526	2D06	27910	6D06					O-F10	
		Contact input	11527	2D07	27911	6D07					–	
		Contact input monitor	11528	2D08	27912	6D08		×		×	–	
		Contact output monitor	11529	2D09	27913	6D09		×		×	–	
		Computation unit output monitor	11530	2D0A	27914	6D0A		×		×	O-F	

Operation display order setup

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Operation display order setup		Operation display order 1	11536	2D10	27920	6D10					–	Added to version 4.00.
		Operation display order 2	11537	2D11	27921	6D11					–	
		Operation display order 3	11538	2D12	27922	6D12					–	
		Operation display order 4	11539	2D13	27923	6D13					–	
		Operation display order 5	11540	2D14	27924	6D14					–	
		Operation display order 6	11541	2D15	27925	6D15					–	
		Operation display order 7	11542	2D16	27926	6D16					–	
		Operation display order 8	11543	2D17	27927	6D17					–	
		Operation display order 9	11544	2D18	27928	6D18					–	
		Operation display order 10	11545	2D19	27929	6D19					–	
		Operation display order 11	11546	2D1A	27930	6D1A					–	
		Operation display order 12	11547	2D1B	27931	6D1B					–	
		Operation display order 13	11548	2D1C	27932	6D1C					–	
		Operation display order 14	11549	2D1D	27933	6D1D					–	
		Operation display order 15	11550	2D1E	27934	6D1E					–	
		Operation display order 16	11551	2D1F	27935	6D1F					–	
		Operation display order 17	11552	2D20	27936	6D20					–	
		Operation display order 18	11553	2D21	27937	6D21					–	
		Operation display order 19	11554	2D22	27938	6D22					–	
		Operation display order 20	11555	2D23	27939	6D23					–	
		Operation display order 21	11556	2D24	27940	6D24					–	
		Operation display order 22	11557	2D25	27941	6D25					–	
		Operation display order 23	11558	2D26	27942	6D26					–	
		Operation display order 24	11559	2D27	27943	6D27					–	
		Operation display order 25	11560	2D28	27944	6D28					–	
		Operation display order 26	11561	2D29	27945	6D29					–	
		Operation display order 27	11562	2D2A	27946	6D2A					–	
		Operation display order 28	11563	2D2B	27947	6D2B					–	
		Operation display order 26	11564	2D2C	27948	6D2C					–	
		Operation display order 30	11565	2D2D	27949	6D2D					–	

User operation display assignment

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
User operation display assignment	Display 1	1st display lit state	11584	2D40	27968	6D40					–	Added to version 4.00.
		1st display display data	11585	2D41	27969	6D41					–	
		2nd display lit state	11586	2D42	27970	6D42					–	
		2nd display display data	11587	2D43	27971	6D43					–	
	Display 2	1st display lit state	11592	2D48	27976	6D48					–	
		1st display display data	11593	2D49	27977	6D49					–	
		2nd display lit state	11594	2D4A	27978	6D4A					–	
		2nd display display data	11595	2D4B	27979	6D4B					–	
	Display 3	1st display lit state	11600	2D50	27984	6D50					–	
		1st display display data	11601	2D51	27985	6D51					–	
		2nd display lit state	11602	2D52	27986	6D52					–	
		2nd display display data	11603	2D53	27987	6D53					–	
	Display 4	1st display lit state	11608	2D58	27992	6D58					–	
		1st display display data	11609	2D59	27993	6D59					–	
		2nd display lit state	11610	2D5A	27994	6D5A					–	
		2nd display display data	11611	2D5B	27995	6D5B					–	
	Display 5	1st display lit state	11616	2D60	28000	6D60					–	
		1st display display data	11617	2D61	28001	6D61					–	
		2nd display lit state	11618	2D62	28002	6D62					–	
		2nd display display data	11619	2D63	28003	6D63					–	
	Display 6	1st display lit state	11624	2D68	28008	6D68					–	
		1st display display data	11625	2D69	28009	6D69					–	
		2nd display lit state	11626	2D6A	28010	6D6A					–	
		2nd display display data	11627	2D6B	28011	6D6B					–	
	Display 7	1st display lit state	11632	2D70	28016	6D70					–	
		1st display display data	11633	2D71	28017	6D71					–	
		2nd display lit state	11634	2D72	28018	6D72					–	
		2nd display display data	11635	2D73	28019	6D73					–	
	Display 8	1st display lit state	11640	2D78	28024	6D78						
		1st display display data	11641	2D79	28025	6D79						
		2nd display lit state	11642	2D7A	28026	6D7A						
		2nd display display data	11643	2D7B	28027	6D7B						
	Display 9	1st display lit state	11648	2D80	28032	6D80						
		1st display display data	11649	2D81	28033	6D81						
		2nd display lit state	11650	2D82	28034	6D82						
		2nd display display data	11651	2D83	28035	6D83						
	Display 10	1st display lit state	11656	2D88	28040	6D88						
		1st display display data	11657	2D89	28041	6D89						
		2nd display lit state	11658	2D8A	28042	6D8A					–	
		2nd display display data	11659	2D8B	28043	6D8B					–	

Standard bit

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Standard bit		OFF(0)	17664	4500	34048	8500		×		×	–	
		ON(1)	17665	4501	34049	8501		×		×	–	
		Event 1	17728	4540	34112	8540		×		×	–	
		Event 2	17729	4541	34113	8541		×		×	–	
		Event 3	17730	4542	34114	8542		×		×	–	
		Event 4	17731	4543	34115	8543		×		×	–	
		Event 5	17732	4544	34116	8544		×		×	–	
		Event 6	17733	4545	34117	8545		×		×	–	
		Event 7	17734	4546	34118	8546		×		×	–	
		Event 8	17735	4547	34119	8547		×		×	–	
		Event 9	17736	4548	34120	8548		×		×	–	
		Event 10	17737	4549	34121	8549		×		×	–	
		Event 11	17738	454A	34122	854A		×		×	–	
		Event 12	17739	454B	34123	854B		×		×	–	
		Event 13	17740	454C	34124	854C		×		×	–	
		Event 14	17741	454D	34125	854D		×		×	–	
		Event 15	17742	454E	34126	854E		×		×	–	
		Event 16	17743	454F	34127	854F		×		×	–	
		CT1 Heater burnout detection	17760	4560	34144	8560		×		×	–	Added to version 2.00.
		CT2 Heater burnout detection	17761	4561	34145	8561		×		×	–	
		CT1 Over-current detection	17764	4564	34148	8564		×		×	–	
		CT2 Over-current detection	17765	4565	34149	8565		×		×	–	
		CT1 Short-circuit detection	17768	4568	34152	8568		×		×	–	
		CT2 Short-circuit detection	17769	4569	34153	8569		×		×	–	
		DI-C1 terminal status	17792	4580	34176	8580		×		×	–	
		DI-C2 terminal status	17793	4581	34177	8581		×		×	–	
		DI-C3 terminal status	17794	4582	34178	8582		×		×	–	
		DI-C4 terminal status	17795	4583	34179	8583		×		×	–	
		DI-C5 terminal status	17796	4584	34180	8584		×		×	–	
		DI-C6 terminal status	17797	4585	34181	8585		×		×	–	
		DI-C7 terminal status	17798	4586	34182	8586		×		×	–	
		DI-C8 terminal status	17799	4587	34183	8587		×		×	–	
		DI-D1 terminal status	17800	4588	34184	8588		×		×	–	
		DI-D2 terminal status	17801	4589	34185	8589		×		×	–	
		DI-D3 terminal status	17802	458A	34186	858A		×		×	–	
		DI-D4 terminal status	17803	458B	34187	858B		×		×	–	
		DI-D5 terminal status	17804	458C	34188	858C		×		×	–	
		DI-D6 terminal status	17805	458D	34189	858D		×		×	–	
		DI-D7 terminal status	17806	458E	34190	858E		×		×	–	
		DI-D8 terminal status	17807	458F	34191	858F		×		×	–	
		DI-F1 terminal status	17816	4598	34200	8598		×		×	–	
		DI-F2 terminal status	17817	4599	34201	8599		×		×	–	

Standard bit

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Standard bit		DO-C1 terminal status	17856	45C0	34240	85C0		×		×	–	
		DO-C2 terminal status	17857	45C1	34241	85C1		×		×	–	
		DO-C3 terminal status	17858	45C2	34242	85C2		×		×	–	
		DO-C4 terminal status	17859	45C3	34243	85C3		×		×	–	
		DO-C5 terminal status	17860	45C4	34244	85C4		×		×	–	
		DO-C6 terminal status	17861	45C5	34245	85C5		×		×	–	
		DO-C7 terminal status	17862	45C6	34246	85C6		×		×	–	
		DO-C8 terminal status	17863	45C7	34247	85C7		×		×	–	
		DO-E1 terminal status	17872	45D0	34256	85D0		×		×	–	
		DO-E2 terminal status	17873	45D1	34257	85D1		×		×	–	
		DO-E3 terminal status	17874	45D2	34258	85D2		×		×	–	
		DO-E4 terminal status	17875	45D3	34259	85D3		×		×	–	
		DO-E5 terminal status	17876	45D4	34260	85D4		×		×	–	
		DO-E6 terminal status	17877	45D5	34261	85D5		×		×	–	
		DO-E7 terminal status	17878	45D6	34262	85D6		×		×	–	
		DO-E8 terminal status	17879	45D7	34263	85D7		×		×	–	
		OUT1 (ON/OFF status)	17920	4600	34304	8600		×		×	–	
		OUT2 (ON/OFF status)	17921	4601	34305	8601		×		×	–	
		OUT3 (ON/OFF status)	17922	4602	34306	8602		×		×	–	
		OUT4 (ON/OFF status)	17923	4603	34307	8603		×		×	–	
		OUT5 (ON/OFF status)	17924	4604	34308	8604		×		×	–	
		OUT6 (ON/OFF status)	17925	4605	34309	8605		×		×	–	
		OUT7 (ON/OFF status)	17926	4606	34310	8606		×		×	–	
		Input computation contact input (F01)	17984	4640	34368	8640		×		×	–	Added to version 4.00.
		Input computation contact input (F02)	17985	4641	34369	8641		×		×	–	
		Input computation contact input (F03)	17986	4642	34370	8642		×		×	–	
		Input computation contact input (F04)	17987	4643	34371	8643		×		×	–	
		Input computation contact input (F05)	17988	4644	34372	8644		×		×	–	
		Input computation contact input (F06)	17989	4645	34373	8645		×		×	–	
		Input computation contact input (F07)	17990	4646	34374	8646		×		×	–	
		Input computation contact input (F08)	17991	4647	34375	8647		×		×	–	
		Input computation contact input (F09)	17992	4648	34376	8648		×		×	–	
		Input computation contact input (F10)	17993	4649	34377	8649		×		×	–	
		Input computation contact output (F01)	18000	4650	34384	8650		×		×	–	
		Input computation contact output (F02)	18001	4651	34385	8651		×		×	–	
		Input computation contact output (F03)	18002	4652	34386	8652		×		×	–	
		Input computation contact output (F04)	18003	4653	34387	8653		×		×	–	
		Input computation contact output (F05)	18004	4654	34388	8654		×		×	–	
		Input computation contact output (F06)	18005	4655	34389	8655		×		×	–	
		Input computation contact output (F07)	18006	4656	34390	8656		×		×	–	
		Input computation contact output (F08)	18007	4657	34391	8657		×		×	–	
		Input computation contact output (F09)	18008	4658	34392	8658		×		×	–	
		Input computation contact output (F10)	18009	4659	34393	8659		×		×	–	

Standard bit

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Standard bit		Output computation contact input (F01)	18016	4660	34400	8660		×		×	–	Added to version 4.00.
		Output computation contact input (F02)	18017	4661	34401	8661		×		×	–	
		Output computation contact input (F03)	18018	4662	34402	8662		×		×	–	
		Output computation contact input (F04)	18019	4663	34403	8663		×		×	–	
		Output computation contact input (F05)	18020	4664	34404	8664		×		×	–	
		Output computation contact input (F06)	18021	4665	34405	8665		×		×	–	
		Output computation contact input (F07)	18022	4666	34406	8666		×		×	–	
		Output computation contact input (F08)	18023	4667	34407	8667		×		×	–	
		Output computation contact input (F09)	18024	4668	34408	8668		×		×	–	
		Output computation contact input (F10)	18025	4669	34409	8669		×		×	–	
		Output computation contact output (F01)	18032	4670	34416	8670		×		×	–	
		Output computation contact output (F02)	18033	4671	34417	8671		×		×	–	
		Output computation contact output (F03)	18034	4672	34418	8672		×		×	–	
		Output computation contact output (F04)	18035	4673	34419	8673		×		×	–	
		Output computation contact output (F05)	18036	4674	34420	8674		×		×	–	
		Output computation contact output (F06)	18037	4675	34421	8675		×		×	–	
		Output computation contact output (F07)	18038	4676	34422	8676		×		×	–	
		Output computation contact output (F08)	18039	4677	34423	8677		×		×	–	
		Output computation contact output (F09)	18040	4678	34424	8678		×		×	–	
		Output computation contact output (F10)	18041	4679	34425	8679		×		×	–	
		User-defined bit 1	18048	4680	34432	8680		×		×	–	
		User-defined bit 2	18049	4681	34433	8681		×		×	–	
		User-defined bit 3	18050	4682	34434	8682		×		×	–	
		User-defined bit 4	18051	4683	34435	8683		×		×	–	
		User-defined bit 5	18052	4684	34436	8684		×		×	–	
		User-defined bit 6	18053	4685	34437	8685		×		×	–	
		User-defined bit 7	18054	4686	34438	8686		×		×	–	
		User-defined bit 8	18055	4687	34439	8687		×		×	–	
		Results of logical operation 1	18080	46A0	34464	86A0		×		×	–	
		Results of logical operation 2	18081	46A1	34465	86A1		×		×	–	
		Results of logical operation 3	18082	46A2	34466	86A2		×		×	–	
		Results of logical operation 4	18083	46A3	34467	86A3		×		×	–	
		Results of logical operation 5	18084	46A4	34468	86A4		×		×	–	
		Results of logical operation 6	18085	46A5	34469	86A5		×		×	–	
		Results of logical operation 7	18086	46A6	34470	86A6		×		×	–	
		Results of logical operation 8	18087	46A7	34471	86A7		×		×	–	
		Results of logical operation 9	18088	46A8	34472	86A8		×		×	–	
		Results of logical operation 10	18089	46A9	34473	86A9		×		×	–	
		Results of logical operation 11	18090	46AA	34474	86AA		×		×	–	
		Results of logical operation 12	18091	46AB	34475	86AB		×		×	–	
		Results of logical operation 13	18092	46AC	34476	86AC		×		×	–	
		Results of logical operation 14	18093	46AD	34477	86AD		×		×	–	
		Results of logical operation 15	18094	46AE	34478	86AE		×		×	–	
		Results of logical operation 16	18095	46AF	34479	86AF		×		×	–	

Standard bit

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Standard bit		Key status (auto/man)	18144	46E0	34528	86E0		×		×	–	
		Key status (sp/ev)	18145	46E1	34529	86E1		×		×	–	
		Key status (para)	18146	46E2	34530	86E2		×		×	–	
		Key status (rsp/lsp)	18147	46E3	34531	86E3		×		×	–	
		Key status (at)	18148	46E4	34532	86E4		×		×	–	
		Key status (f1)	18149	46E5	34533	86E5		×		×	–	
		Key status (f2)	18150	46E6	34534	86E6		×		×	–	
		Key status (up)	18151	46E7	34535	86E7		×		×	–	
		Key status (left)	18152	46E8	34536	86E8		×		×	–	
		Key status (right)	18153	46E9	34537	86E9		×		×	–	
		Key status (down)	18154	46EA	34538	86EA		×		×	–	
		Key status (display)	18155	46EB	34539	86EB		×		×	–	
		Key status (enter)	18156	46EC	34540	86EC		×		×	–	
		Communications status (normal receipt on a byte basis)	18185	4709	34569	8709		×		×	–	
		(Reserved for future use.)	18186	470A	34570	870A	×	×	×	×	–	
		Communications status (normal receipt on a byte basis)	18187	470B	34571	870B		×		×	–	
		Communications status (an error received)	18188	470C	34572	870C		×		×	–	
		Power failure detection	18189	470D	34573	870D		×		×	–	Added to version 2.00.
		Loop 1 PID hot start detection	18190	470E	34574	870E		×		×	–	
		Loop 2 PID hot start detection	18191	470F	34575	870F		×		×	–	
		RUN/READY status of loop 1	18208	4720	34592	8720		×		×	–	0:RUN
		RUN/READY status of loop 2	18209	4721	34593	8721		×		×	–	1:READY
		AUTO/MANUAL status of loop 1	18224	4730	34608	8730		×		×	–	0:AUTO
		AUTO/MANUAL status of loop 2	18225	4731	34609	8731		×		×		1:MANUAL
		AT stop/start status of loop 1	18240	4740	34624	8740		×		×	–	0:AT stop
		AT stop/start status of loop 2	18241	4741	34625	8741		×		×	–	1:AT start
		LSP/RSP status of loop 1	18256	4750	34640	8750		×		×	–	0:LSP
		LSP/RSP status of loop 2	18257	4751	34641	8751		×		×	–	1:RSP
		During SP ramp of loop 1 (up)	18288	4770	34672	8770		×		×	–	
		During SP ramp of loop 2 (up)	18289	4771	34673	8771		×		×	–	
		During SP ramp of loop 1 (down)	18304	4780	34688	8780						
		During SP ramp of loop 2 (down)	18305	4781	34689	8781						
		Backup/through output status of loop 1	18336	47A0	34720	87A0		×		×	–	0:Backup 1:Through output status
		(Reserved for future use.)	18337	47A1	34721	87A1	×	×	×	×	–	
		All typical alarms	18432	4800	34816	8800		×		×	–	OR of all the alarms to be displayed
		PV input high limit alarm (PV1)	18464	4820	34848	8820		×		×	–	
		PV input high limit alarm (PV2/PV21)	18465	4821	34849	8821		×		×	–	
		PV input high limit alarm (PV22)	18466	4822	34850	8822		×		×	–	Added to version 2.00.
		PV input low limit alarm (PV1)	18480	4830	34864	8830		×		×	–	
		PV input low limit alarm (PV2/PV21)	18481	4831	34865	8831		×		×	–	
		PV input low limit alarm (PV22)	18482	4832	34866	8832		×		×	–	Added to version 2.00.
		CJ input alarm (PV1)	18496	4840	34880	8840		×		×	–	
		CJ input alarm (PV2)	18497	4841	34881	8841		×		×	–	
		MFB1 (motor feedback 1) input error	18520	4858	34904	8858		×		×	–	Added to version 2.00.
		MFB1 estimation in progress	18528	4860	34912	8860		×		×	–	
		MFB1 adjustment error	18536	4868	34920	8868		×		×	–	

Standard value

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Standard value		CT1 input alarm	18592	48A0	34976	88A0		×		×	–	Added to version 2.00.
		CT2 input alarm	18593	48A1	34977	88A1		×		×	–	
		Parameter failure	18608	48B0	34992	88B0		×		×	–	
		Adjustment data failure (CPU board)	18609	48B1	34993	88B1		×		×	–	
		Adjustment data failure (PV board)	18610	48B2	34994	88B2		×		×	–	
		(Reserved for future use.)	18611	48B3	34995	88B3	×	×	×	×	–	
		ROM failure (CPU board)	18612	48B4	34996	88B4		×		×	–	
		ROM failure (PV board)	18613	48B5	34997	88B5		×		×	–	
		(Reserved for future use.)	18614	48B6	34998	88B6	×	×	×	×	–	
		Battery voltage alarm	18615	48B7	34999	88B7		×		×	–	Added to version 2.00.
		RTC alarm	18616	48B8	35000	88B8		×		×	–	
		PV1	18944	4A00	35328	8A00		×		×	PV1	
		PV2/PV21	18945	4A01	35329	8A01		×		×	PV2	
		PV22	18946	4A02	35330	8A02		×		×	PV22	Added to version 2.00.
		PV of loop 1 (used for PID operation)	18960	4A10	35344	8A10		×		×	LP1	
		PV of loop 2 (used for PID operation)	18961	4A11	35345	8A11		×		×	LP2	
		SP of loop 1 (in use)	18976	4A20	35360	8A20		×		×	LP1	
		SP of loop 2 (in use)	18977	4A21	35361	8A21		×		×	LP2	
		SP of loop 1 (finally attained value)	18992	4A30	35376	8A30		×		×	LP1	
		SP of loop 2 (finally attained value)	18993	4A31	35377	8A31		×		×	LP2	
		SP output of loop 1	19024	4A50	35408	8A50		×		×	LP1	
		(Reserved for future use.)	19025	4A51	35409	8A51	△	×	△	×	LP2	
		MV of loop 1	19056	4A70	35440	8A70		×		×	1	
		MV of loop 2	19057	4A71	35441	8A71		×		×	1	
		MV of loop 1 (Heat)	19072	4A80	35456	8A80		×		×	1	
		MV of loop 2 (Heat)	19073	4A81	35457	8A81		×		×	1	
		MV of loop 1 (Cool)	19088	4A90	35472	8A90		×		×	1	
		MV of loop 2 (Cool)	19089	4A91	35473	8A91		×		×	1	
		MFB1 amount of opening (estimated)	19104	4AA0	35488	8AA0		×		×	–	Added to version 2.00.
		MFB1 amount of opening (measured)	19120	4AB0	35504	8AB0		×		×	–	
		CT1 current when output ON	19136	4AC0	35520	8AC0		×		×	–	
		CT2 current when output ON	19137	4AC1	35521	8AC1		×		×	–	
		CT1 current when output OFF	19152	4AD0	35536	8AD0		×		×	–	
		CT2 current when output OFF	19153	4AD1	35537	8AD1		×		×	–	
		Deviation of loop 1 (PV-SP)	19168	4AE0	35552	8AE0		×		×	LP1	
		Deviation of loop 2 (PV-SP)	19169	4AE1	35553	8AE1		×		×	LP2	
		AC1 measurement voltage	19184	4AF0	35568	8AF0		×		×	2	Added to version 2.00.
		AC2 measurement voltage	19185	4AF1	35569	8AF1		×		×	2	
		AC1 percent	19200	4B00	35584	8B00		×		×	1	
		AC2 percent	19201	4B01	35585	8B01		×		×	1	
		Flow rate (with temperature-pressure compensation)	19232	4B20	35616	8B20		×		×	FL	Added to version 2.00.

Standard value

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Standard value		Input computation result (F01)	19239	4B27	35623	8B27		×		×	I-F	Added to version 4.00.
		Input computation result (F02)	19240	4B28	35624	8B28		×		×	I-F	
		Input computation result (F03)	19241	4B29	35625	8B29		×		×	I-F	
		Input computation result (F04)	19242	4B2A	35626	8B2A		×		×	I-F	
		Input computation result (F05)	19243	4B2B	35627	8B2B		×		×	I-F	
		Input computation result (F06)	19244	4B2C	35628	8B2C		×		×	I-F	
		Input computation result (F07)	19245	4B2D	35629	8B2D		×		×	I-F	
		Input computation result (F08)	19246	4B2E	35630	8B2E		×		×	I-F	
		Input computation result (F09)	19247	4B2F	35631	8B2F		×		×	I-F	
		Input computation result (F10)	19248	4B30	35632	8B30		×		×	I-F	Added to version 2.00.
		Output computation result (F01)	19255	4B37	35639	8B37		×		×	O-F	Added to version 4.00.
		Output computation result (F02)	19256	4B38	35640	8B38		×		×	O-F	
		Output computation result (F03)	19257	4B39	35641	8B39		×		×	O-F	
		Output computation result (F04)	19258	4B3A	35642	8B3A		×		×	O-F	
		Output computation result (F05)	19259	4B3B	35643	8B3B		×		×	O-F	
		Output computation result (F06)	19260	4B3C	35644	8B3C		×		×	O-F	
		Output computation result (F07)	19261	4B3D	35645	8B3D		×		×	O-F	
		Output computation result (F08)	19262	4B3E	35646	8B3E		×		×	O-F	
		Output computation result (F09)	19263	4B3F	35647	8B3F		×		×	O-F	
		Output computation result (F10)	19264	4B40	35648	8B40		×		×	O-F	Added to version 2.00.
		Event 1 delay remaining time	19296	4B60	35680	8B60		×		×	1	
		Event 2 delay remaining time	19297	4B61	35681	8B61		×		×	1	
		Event 3 delay remaining time	19298	4B62	35682	8B62		×		×	1	
		Event 4 delay remaining time	19299	4B63	35683	8B63		×		×	1	
		Event 5 delay remaining time	19300	4B64	35684	8B64		×		×	1	
		Event 6 delay remaining time	19301	4B65	35685	8B65		×		×	1	
		Event 7 delay remaining time	19302	4B66	35686	8B66		×		×	1	
		Event 8 delay remaining time	19303	4B67	35687	8B67		×		×	1	
		Event 9 delay remaining time	19304	4B68	35688	8B68		×		×	1	
		Event 10 delay remaining time	19305	4B69	35689	8B69		×		×	1	
		Event 11 delay remaining time	19306	4B6A	35690	8B6A		×		×	1	
		Event 12 delay remaining time	19307	4B6B	35691	8B6B		×		×	1	
		Event 13 delay remaining time	19308	4B6C	35692	8B6C		×		×	1	
		Event 14 delay remaining time	19309	4B6D	35693	8B6D		×		×	1	
		Event 15 delay remaining time	19310	4B6E	35694	8B6E		×		×	1	
		Event 16 delay remaining time	19311	4B6F	35695	8B6F		×		×	1	
		MV used for position proportional control	19360	4BA0	35744	8BA0		×		×	1	Added to version 2.00.

Communications profile (instrument status)

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Communications profile (Instrument status)	Loop 1	RUN/READY	14352	3810	30736	7810		×		×	–	0:RUN 1:READY
		AUTO/MANUAL	14353	3811	30737	7811		×		×	–	0:AUTO 1:MANUAL
		AT stop/start	14354	3812	30738	7812		×		×	–	0:AT stop 1:AT start
		LSP/RSP	14355	3813	30739	7813		×		×	–	0:LSP 1:RSP
		PV	14356	3814	30740	7814		×		×	LP1	
		SP	14357	3815	30741	7815		×		×	LP1	
		MV	14358	3816	30742	7816		×		×	1	
		(Reserved for future use.)	14359	3817	30743	7817	△	×	△	×	–	
	Loop 2	RUN/READY	14360	3818	30744	7818		×		×	–	0:RUN 1:READY
		AUTO/MANUAL	14361	3819	30745	7819		×		×	–	0:AUTO 1:MANUAL
		AT stop/start	14362	381A	30746	781A		×		×	–	0:AT stop 1:AT start
		LSP/RSP	14363	381B	30747	781B		×		×	–	0:LSP 1:RSP
		PV	14364	381C	30748	781C		×		×	LP2	
		SP	14365	381D	30749	781D		×		×	LP2	
		MV	14366	381E	30750	781E		×		×	1	
		(Reserved for future use.)	14367	381F	30751	781F	△	×	△	×	–	

Communications profile (operation)

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Communications profile (operation)	Loop 1	SP group selection	14592	3900	30976	7900					–	If internal contact input is given high prriority, writing is invalid.
		LSP	14593	3901	30977	7901					LP1	
		Manual MV	14594	3902	30978	7902		□		□	1	
		RUN/READY	14595	3903	30979	7903		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	14596	3904	30980	7904		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	14597	3905	30981	7905		□		□	–	0:AT stop 1:AT start
		LSP/RSP	14598	3906	30982	7906		□		□	–	0:LSP 1:RSP
		(Reserved for future use.)	14599	3907	30983	7907	△	△	△	△	–	
	Loop 2	SP group selection	14600	3908	30984	7908					–	If internal contact input is given high prriority, writing is invalid.
		LSP	14601	3909	30985	7909					LP2	
		Manual MV	14602	390A	30986	790A		□		□	1	
		RUN/READY	14603	390B	30987	790B		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	14604	390C	30988	790C		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	14605	390D	30989	790D		□		□	–	0:AT stop 1:AT start
		LSP/RSP	14606	390E	30990	790E		□		□	–	0:LSP 1:RSP
		(Reserved for future use.)	14607	390F	30991	790F	△	△	△	△	–	

Communications profile (PID group in use)

Bank name	No.	Item name	RAM address		EEPROM address		RAM		EEPROM		Decimal point information	Remarks
			Decimal	Hexadecimal	Decimal	Hexadecimal	Read	Write	Read	Write		
Communications profile (PID group in use)	Loop 1	Proportional band	14848	3A00	31232	7A00					1	Set value for the PID group in use
		Integral time	14849	3A01	31233	7A01					PID1	
		Derivative time	14850	3A02	31234	7A02					PID1	
		Manual reset	14851	3A03	31235	7A03					1	
		Output low limit	14852	3A04	31236	7A04					1	
		Output high limit	14853	3A05	31237	7A05					1	
		Proportional band for cool side	14854	3A06	31238	7A06					1	
		Integration time for cool side	14855	3A07	31239	7A07					PID1	
		Derivative time for cool side	14856	3A08	31240	7A08					PID1	
		(Reserved for future use.)	14857	3A09	31241	7A09	△	△	△	△	1	
		Output low limit for cool side	14858	3A0A	31242	7A0A					1	
		Output high limit for cool side	14859	3A0B	31243	7A0B					1	
	Loop 2	Proportional band	14860	3A0C	31244	7A0C					1	Set value for the PID group in use
		Integral time	14861	3A0D	31245	7A0D					PID2	
		Derivative time	14862	3A0E	31246	7A0E					PID2	
		Manual reset	14863	3A0F	31247	7A0F					1	
		Output low limit	14864	3A10	31248	7A10					1	
		Output high limit	14865	3A11	31249	7A11					1	
		Proportional band for cool side	14866	3A12	31250	7A12					1	
		Integration time for cool side	14867	3A13	31251	7A13					PID2	
		Derivative time for cool side	14868	3A14	31252	7A14					PID2	
		(Reserved for future use.)	14869	3A15	31253	7A15	△	△	△	△	1	
		Output low limit for cool side	14870	3A16	31254	7A16					1	
		Output high limit for cool side	14871	3A17	31255	7A17					1	

Chapter 12. TROUBLESHOOTING

Alarm code displays and corrective actions

Alarm codes and countermeasures in case of abnormal operation of this controller.

Alarm code	Failure name	Cause	Corrective action
AL01	PV1 input failure (over-range)	Sensor burnout, incorrect wiring, incorrect PV1 range type setting.	Check the wiring or reset PV1 range type (Pv-01). Reset PV1 range high/low limits (Pv-04: Range low limit, Pv-05: Range high limit.)
AL02	PV1 input failure (under-range)		
AL03	PV2/PV21 input failure (over-range)	Sensor burnout, incorrect wiring, incorrect PV2/PV21 range type setting.	Check the wiring or reset PV2/PV21 range type (Pv-01). Reset PV2/PV21 range high/low limits (Pv-04: Range low limit, Pv-05: Range high limit.)
AL04	PV2/PV21 input failure (under-range)		
AL05	PV22 input high limit failure (SDC45V/46V only)	Sensor burnout, incorrect wiring, incorrect PV22 range type setting.	Check the wiring or reset PV22 range type (Pv-01). Reset PV22 range high/low limits (Pv-04: Range low limit, Pv-05: Range high limit.)
AL06	PV22 input low limit failure (SDC45V/46V only)		
AL17	Control range error	Incorrect control range	Reset the control range high and low limits. (Cnt.05: range low limit for control, Cnt.06: range high limit for control)
AL21	MFB input error	Line break, incorrect wiring	Check the wiring
AL22	Motor adjustment error	Line break, incorrect wiring Motor power supply cut-off	Check the wiring,Check the power to the motor, Readjustment
AL25	CT1 input error	CT over range	Check the CT input
AL26	CT2 input error	Incorrect setting of CT input	Reset the CT input
AL71	Abnormal PV1 CJ compensation	Abnormal terminal temperature	Check the ambient temperature. *
AL72	Abnormal PV2 CJ compensation		
AL81	Battery voltage drop (SDC45V/46V only)	Weak battery	Replace the battery.
AL82	Built-in clock error (SDC45V/46V only)	Weak battery, Hardware failure	Reset the clock after battery replacement
AL83	Board configuration problem	Hardware failure	Replace the unit.
AL96	Main board error		
AL97	Parameter failure	Power was turned OFF while setting data.	Restart the system. Reset data (AL97: setting data, AL98: tuning data) or replace the unit.
AL98	Adjustment data problem	Data is corrupted due to noise, etc.	
AL99	ROM failure	ROM (memory) is faulty.	Restart the system. Replace the unit.

* A terminal temperature error occurs when the range type is other than resistance temperature detector and the terminal temperature is outside the -20 to +80 °C range. If a sensor on another channel is used for compensation, refer to 7 - 10 Cold Junction Compensation.

Chapter 13. MAINTENANCE, INSPECTION, AND DISPOSAL

13 - 1 Maintenance and Inspection

Cleaning:	If the module is dirty, wipe it with a soft, dry cloth. Do not use a detergent or an organic solvent like thinner or benzene.
Part replacement:	Do not replace any parts of this unit.
Fuse replacement:	When replacing the fuse connected to the electric wiring, always use the specified standard fuse. Standard IEC127 Shut-down speed Slow-action type (T) Rated voltage 250V Rated current 1.0A

EU

13 - 2 Disposal

■C45A/46A/45R/46R

When discarding the SDC45A/46A/45R/46R, dispose of it appropriately as industrial waste in accordance with local regulations.

■C45V/46V

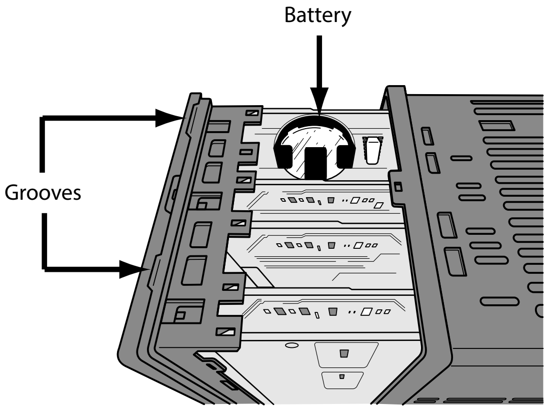
⚠ CAUTION
When discarding this device, shut off the power and wait 10 minutes or longer before removing the battery. Failure to do so might cause an electric shock or burn.
When the battery is removed, some settings and internal operation status data will be lost.
Dispose of the battery appropriately, following local regulations.

When discarding the SDC45V/46V, remove the battery following the procedure given below, and then dispose of it appropriately, following local regulations.

● Battery removal procedure

(1) Remove the case.
Insert the flat head of a screwdriver into the grooves (on the top, bottom, right and left sides) between the front panel and the case, and then gradually pull the case off while gently prying with the screwdriver.

(2) Remove the battery from the battery holder.
Pull the battery upward.



Handling Precautions

- The SDC45/46 has a memory backup battery. The replacement battery listed below is available.
Model No.: 81446345-001

Chapter 14. SPECIFICATIONS

● Analog input (PV)

Input type	Thermocouple:	K, E, J, T, B, R, S, N(JIS C 1602-1995) WRe5-26(ASTM E988-96(Reapproved 2002)) PR40-20, Ni-Ni•Mo, PL II, Gold-iron/Chromel (ASTM E1751-00), DIN U, DIN L(DIN 43710-1985)
	Resistance temperature detector (RTD):	Pt100(JIS C 1604-1997) JPt100(JIS C 1604-1989)
	DC voltage (mV-range):	0 to 10 mV, -10 to +10 mV, 0 to 100 mV, -100 to +100 mV
	DC voltage (V-range):	0 to 1 V, -1 to +1 V, 1 to 5 V, 0 to 5 V, 0 to 10 V
	DC current:	4 to 20 mA, 0 to 20 mA
Sampling cycle:		25 ms, 50 ms, 100 ms, 300 ms (model C45A/46A) 100 ms (model C45V/46V/45R/46R)

● Thermocouple input

Indication accuracy (under standard conditions):

Sensor type	Input indication accuracy	
K	±0.1 % rdg. ± 1 digit	400 °C or higher
	±0.5 °C	-100 to less than +400 °C
	±1.0 °C	-200 to less than -100 °C
	±20.0 °C	Less than -200 °C
J	±0.1 % rdg. ± 1 digit	400 °C or higher
	±0.5 °C	-100 to less than +400 °C
	±1.0 °C	Less than -100 °C
E	±0.1 % rdg. ± 1 digit	400 °C or higher
	±0.5 °C	-100 to less than +400 °C
	±1.0 °C	-200 to less than -100 °C
	±15.0 °C	Less than -200 °C
T	±0.5 °C	-100 °C or higher
	±1.0 °C	-200 to less than -100 °C
	±10.0 °C	Less than -200 °C
B	±2 °C	800 °C or higher
	±4 °C	260 to less than 800 °C
	±70 °C	Less than 260 °C
R	±0.1 % rdg. ± 1 digit	1000 °C or higher
	±2.0 °C	0 to less than 1000 °C
	±4.0 °C	Less than 0 °C
S	±0.1 % rdg. ± 1 digit	1000 °C or higher
	±2.0 °C	0 to less than 1000 °C
	±4.0 °C	Less than 0 °C
N	±1.4 °C	0 °C or higher
	±4.0 °C	Less than 0 °C
WRe5-26	±0.1 % rdg. ± 1 digit	1400 °C or higher
	±1.5 °C	Less than 1400 °C
PR40-20	±8 °C	800 °C or higher
	±20 °C	300 to less than 800 °C
	±40 °C	Less than 300 °C
Ni-Ni•Mo	±1.4 °C	
PL II	±1.4 °C	
DIN U	±0.7 °C	0 °C or higher
	±1.0 °C	Less than 0 °C
DIN L	±1.0 °C	0 °C or higher
	±1.5 °C	Less than 0 °C
Gold-iron/Chromel	±1.5 °C	

Internal cold junction compensation accuracy:
±0.5 °C (under standard conditions)
±1.0 °C Ambient temperature, 0 to 50 °C (under other standard conditions)

Cold junction compensation method: Internal/external (0 °C only) compensation selectable

Allowable input voltage: -1.0 V to +3.5 V

⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.

Input bias current: 0.2 μA (flowed out from the positive (+) terminal.)
When the thermocouple/mV input burnout setup is set at "upscale at burnout":
0.05 μA (flowed out from the positive (+) terminal or flowed into the positive (+) terminal)
When the thermocouple/mV input burnout setup is set at "unknown at burnout."

Input impedance: 1 MΩ min.

Burnout indication: Upscale or unknown can be selected in the thermocouple/mV input burnout setup.

Allowable parallel connection resistance:
1 MΩ min., Burnout detection is provided.

● RTD input (C45A/C46A/45V/46V)

Indication accuracy (under standard conditions):

Sensor type	Range	Input indication accuracy
Pt100	-200.0 to +850.0 °C	±0.3 °C
	-200.00 to +300.00 °C	±0.15 °C
JPt100	-200.0 to +640.0 °C	±0.3 °C
	-200.00 to +300.00 °C	±0.15 °C

Measuring current: 1 mA ± 0.02 mA Flowed out from the terminals A and C to the terminal B.

Allowable wiring resistance: 85 Ω max. including the Zener barrier resistance per RTD.

Effect of wiring resistance: 0.02 °C/Ω max., wiring resistance is 85 Ω max.

Burnout indication: Burnout of terminal A, upscale
Burnout of terminal B or C, or two or more wires, downscale

● RTD input (C45R/C46R)

Indication accuracy (under standard conditions):

Sensor type	Wire system	Range	Input indication accuracy
Pt100	3-wire system 4-wire system	0.00 to 100.00 °C	±0.05 °C
JPt100	3-wire system 4-wire system	0.00 to 100.00 °C	±0.05 °C

Measuring current: 1.042 mA ± 1% Flowed out from the terminals A and C to the terminal B. (3-system wire)
Flowed out from the terminals A to the terminal B. (4-system wire)

Allowable wiring resistance: 2 Ω max. per RTD.

Effect of wiring resistance: 0.01 °C/Ω max., 3-wire system, wiring resistance is 2 Ω max.
0.001 °C/Ω max., 4-wire system, wiring resistance is 2 Ω max.

Burnout indication:	Burnout of terminal A,	upscale (3-wire system), downscale (4-wire system)
	Burnout of terminal B,	downscale
	Burnout of terminal C,	downscale (3-wire system), upscale (4-wire system)
	Burnout of terminal D,	upscale

● **DC voltage (mV-range) input**

Indication accuracy (under standard conditions): ±0.1 %FS ±1 digit

Allowable input voltage: -10 V to +2.5 V

⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.

Input bias current: 0.2 μA (flowed out from the positive (+) terminal.)
When the thermocouple/mV input burnout setup is set at "upscale at burnout"
0.05 μA (flowed out from the positive (+) terminal or flowed into the positive (+) terminal)
When the thermocouple/mV input burnout setup is set at "unknown at burnout"

Input impedance: 1 MΩ min.

Burnout indication: Upscale or unknown can be selected in the thermocouple/mV input burnout setup.

● **DC voltage (V-range) input**

Indication accuracy (under standard conditions): ±0.1 %FS ±1 digit

Allowable input voltage: -10 V to +25 V

⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.

Input bias current: 1 μA max. (flowed out from the positive (+) terminal or flowed into the positive (+) terminal)
Each of 0 to 1 V and -1 to +1 V ranges
5 μA max. (flowed into the positive (+) terminal.)
Each of 1 to 5 V and 0 to 5 V ranges
10 μA max. (Flowed into the positive (+) terminal.)
0 to 10 V range

Input impedance: 1 MΩ min.

Burnout indication: Equivalent to 0 V-input

● **DC current input**

Indication accuracy (under standard conditions): ±0.1 %FS ±1 digit

Allowable input voltage: -1 V to +4 V

⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.

Input impedance: 110 Ω max.

Burnout indication: Downscale 4 to 20 mA range
Equivalent to 0 mA-input 0 to 20 mA range

Note: The current input circuit of this device is shut off when the instrument power is turned off. If multiple current input circuits are connected in series, and if the instrument power supplies can be turned off individually, connect the separately sold resistor (81401325) and set the range type to voltage.
Chapter 3. Wiring (for details.)

● Motor feedback input (MFB)

Allowable potentiometer value: 100 to 2,500 Ω
Indication accuracy: ±0.2 %FS (under standard conditions)
Sampling frequency: 100ms

● Current transformer input

Compatible current transformer: QN212A* (φ 12, 800T), QN206A* (φ 6, 800T)
* Not UL-certified.
Input range: 0 to 50 Aac
Current measurement range: 0.0 to 55.0 Aac
(accuracy may be out of specifications for less than 0.4 Aac.)
Indication accuracy: ±3 %FS ±1 digit (50/60 Hz, when measuring the sine wave)
Indication resolution: 0.1 Aac
Input impedance: 10 Ω (typ)

● Heater power supply voltage input

Input frequency: 50 Hz/60 Hz
Input range: 0 to 12 V AC
Voltage measurement range: 0 to 13.2 V AC
(Accuracy may be out of specifications for less than 0.5 V AC)
Indication accuracy: ±0.5 %FS ±1 digit (50/60 Hz, when measuring the sine wave)
Indication resolution: 0.01 V AC
Input impedance: 126 kΩ (typ)
Transformer for detecting heater power supply voltage: 81406725-003 * Not UL-certified.

● Digital input (DI)

Types of connectable outputs: Dry contact or transistor (sink type)
Open terminal voltage: 7 V DC ±15 %
Terminal current (during short-circuit): 3 to 7 mA
Allowable ON contact resistance: 500 Ω max.
Allowable OFF contact resistance: 100 kΩ min.
Allowable ON residual voltage: 1.5 V max.
Allowable OFF-state leakage current: 0.1 mA max.
ON/OFF minimum detectable pulse width: 25 ms min.

● Control output (Control output (OUT) / auxiliary output (AUX) / event output (EV))

● Relay output (outputs 1 and 2)

Contact configuration:	1a1b or 1a, selected by the model No.
Contact rating:	3 A 250 V AC/30 V DC 1a1b, resistance load
	1 A 250 V AC/30 V DC 1a, resistance load
Contact voltage:	250 V AC max./30 V DC max.
Life:	Min. 100,000 operations, rated load
Min. switching specifications:	100 mA /5 V DC 1a1b
	10 mA/5 V DC 1a

● Relay output (output 3, 4 and 5)

Contact configuration:	1a
Contact rating:	3 A 250 V AC/30 V DC resistance load
Contact voltage:	250 V AC max./125 V DC max.
Life:	Min. 100,000 operations, rated load
Min. switching specifications:	100 mA/5 V DC

● Current output

Output current:	4 to 20 mAdc (2.4 to 21.6 mAdc)
	0 to 20 mAdc (0.0 to 22.0 mAdc)
Load resistance:	600 Ω max.
Output accuracy:	±0.1 %FS (standard conditions)
Output resolution:	1/15,000
Open terminal voltage:	23 V DC max.

● Continuous voltage output

Output voltage:	0 to 5 V DC (0.0 to 5.5 V DC)
	1 to 5 V DC (0.6 to 5.4 V DC)
	0 to 10 V DC (0.0 to 11.0 V DC)
Load resistance:	1 kΩ min.
Load limit current:	21 mA (standard value under standard conditions)
Output accuracy:	±0.1 %FS (standard conditions)
Output resolution:	1/20,000 (for 0 to 10 V)

● Voltage pulse output

Output voltage:	12 V DC +15 %/-10 %
Load current:	30 mA max.
Load limit current:	52 mA (standard value under standard conditions)
OFF leak current:	0.1 mA max.
Output response time:	500 μs max., 10 % ↔ 90 % of output voltage

● Motor drive output (triac output)(outputs 3 and 4)

Contact configuration:	1a (output 3) + 1a (output 4)
Compatible motors:	ECM3000F1_ _ _ (100 V AC, relay contact input)
Rated load voltage:	75 to 220 V AC (except with motor load)
Minimum load current:	20 mA
Maximum load current:	0.25 A

● Motor drive output (relay output)(outputs 3 and 4)

Contact configuration:	Swapping of outputs 3 and 4 (With function of simultaneously turning off outputs 3 and 4)
Contact rating:	2A at 250 V AC max./(cosφ = 0.4) 2.5 A at 24 V DC (L/R=0.7 ms)
Contact voltage:	250 V AC max./125 V DC max.
Life:	Min. 100,000 operations (under rated conditions)
Min. switching specifications:	40 mA/24 V DC

● Transmitter power supply function

Output voltage:	24 V DC ±10 %
Load current:	30 mA max.
Load limit current:	45 mA (standard value under standard conditions)
Ripple voltage:	100 mV max. (standard conditions)

● Digital output (DO)

Output type:	Transistor (sink type)
Load voltage:	4.5 to 28 V DC
Load current:	70 mA max./point 500 mA max./unit
ON-state residual voltage:	0.5 V max.
OFF-state leakage current:	0.1 mA max.

● RS-485 communications

Transmission line:	RS-485, 3-wire method 3-wire system multi-drop
Transmission speed:	4800, 9600, 19200, 38400 bps
Transmission distance:	500 m max.
Connectable units:	32 max. (including master station)
Communication system:	Half-duplex, start/stop synchronization
Terminating resistor:	150 Ω 1/2W, at both ends of the line
Bit length:	8 bits/7 bits
Stop bit length:	1 or 2 bits
Parity bit:	Even parity, odd parity, or non-parity
Communication protocol:	CPL, Modbus conforming

● Internal clock

Accuracy:	±270 sec./month (ambient temperature 25 °C)

Environmental conditions

Standard conditions

Ambient temperature:	23 ± 2 °C (C45A/46A/45V/46V) 23 ± 0.1 °C (C45R/46R)
Ambient humidity:	60 ±5 %RH
Rated power supply voltage:	105 V AC ± 1 % (100 to 240 V AC power model) 24 V DC ± 5 % (100 to 240 V AC power model, C45A/46A/45V/46V) 24 V DC ± 2 % (100 to 240 V AC power model, C45R/46R)
Power frequency:	50 ±1 Hz or 60 ±1 Hz (100 to 240 V AC power model)
Vibration resistance:	0 m/s^2
Shock resistance:	0 m/s^2
Mounting angle:	Reference plane ±3 °
Warm-up time:	30 min or longer

Operating conditions

Ambient temperature:	0 to 50 °C (C45A/46A/45V/46V) 20 to 25 °C (C45R/46R)
Ambient humidity:	10 to 90 %RH (without condensation)
Rated power supply voltage:	85 to 264 V AC (100 to 240 V AC power model) 21.6 to 26.4 V DC (24 V DC power model)
Power frequency:	50 ± 2 Hz or 60 ± 2 Hz (100 to 240 V AC power model)
Vibration resistance:	0 to 2 m/s^2 10 to 60 Hz for 2 h each in X, Y, and Z directions
Shock resistance:	0 to 10 m/s^2
Mounting angle:	Reference plane ±10 °
Altitude:	2000 m max.

Transportation conditions

Ambient temperature:	-20 to +70 °C
Ambient humidity:	10 to 95 %RH without condensation
Vibration resistance:	0 to 5 m/s^2 10 to 60 Hz (for 2 h each in X, Y, and Z directions)
Shock resistance:	0 to 500 m/s^2

Memory backup

Backup system:	Serial EEPROM, battery and double layer capacitor for SRAM (C45V/C46V)
Number of rewrite operations:	Max. 1,000,000 for EEPROM; no limitation for SRAM
Backup life:	EEPROM 10 years SRAM 30 min (by double layer capacitor (while changing battery, at an ambient temperature of 35 °C or less, after capacitor is charged for 1 h or more) 3 years (by battery (at 10 to 35 °C ambient temperature, without connection to power)

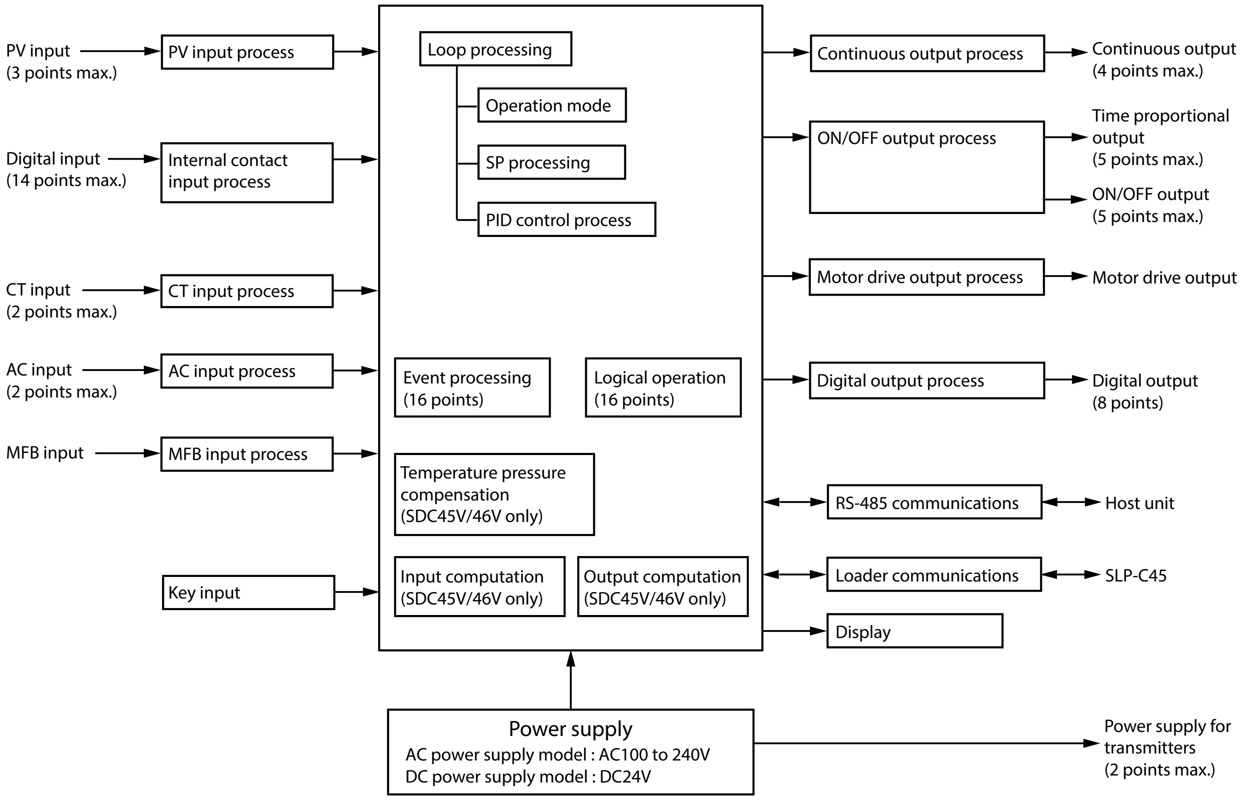
● Other specifications

Rated power voltage:	100 to 240 V AC (100 to 240 V AC power model)
Power consumption:	30 VA max. (C45 100 to 240 V AC power model) 40 VA max. (C46 100 to 240 V AC power model) 12 W max. (C45 24 V DC power model) 15 W max. (C46 24 V DC power model)
Power ON inrush current:	35 A max./10 ms max. (100 to 240 V AC power model) 20 A max./10 ms max. (24 V DC power model)
Allowable transient power loss:	20 ms min.
Insulation resistance:	20 MΩ min. the resistance between power terminals A1 and A2, and FG terminal A3 is measured with a 500 V DC-megger.
Dielectric strength:	1500 V AC for 1 min (dielectric strength between the power terminals A1, A2 or FG terminal A3 and each input/output terminal, and the dielectric strength between power terminals A1-A2 and FG terminal A3.)
Mass:	Approx. 400 g (C45A) (including dedicated mounting bracket) Approx. 700 g (C46A) (including dedicated mounting bracket)
Terminal screw tightening torque:	0.4 to 0.6N•m
Protection:	IP65 (under operating conditions)
Standards compliance:	EN61010-1, EN61326-1 (for use in industrial locations) During EMC testing, the reading or output may fluctuate by ±10 %FS.
Overvoltage category:	Category II (IEC60364-4-443, IEC60664-1)
Allowable pollution degree:	Pollution degree 2
Mask/case material:	PPO, Modified PPE
Mask/case color:	Black

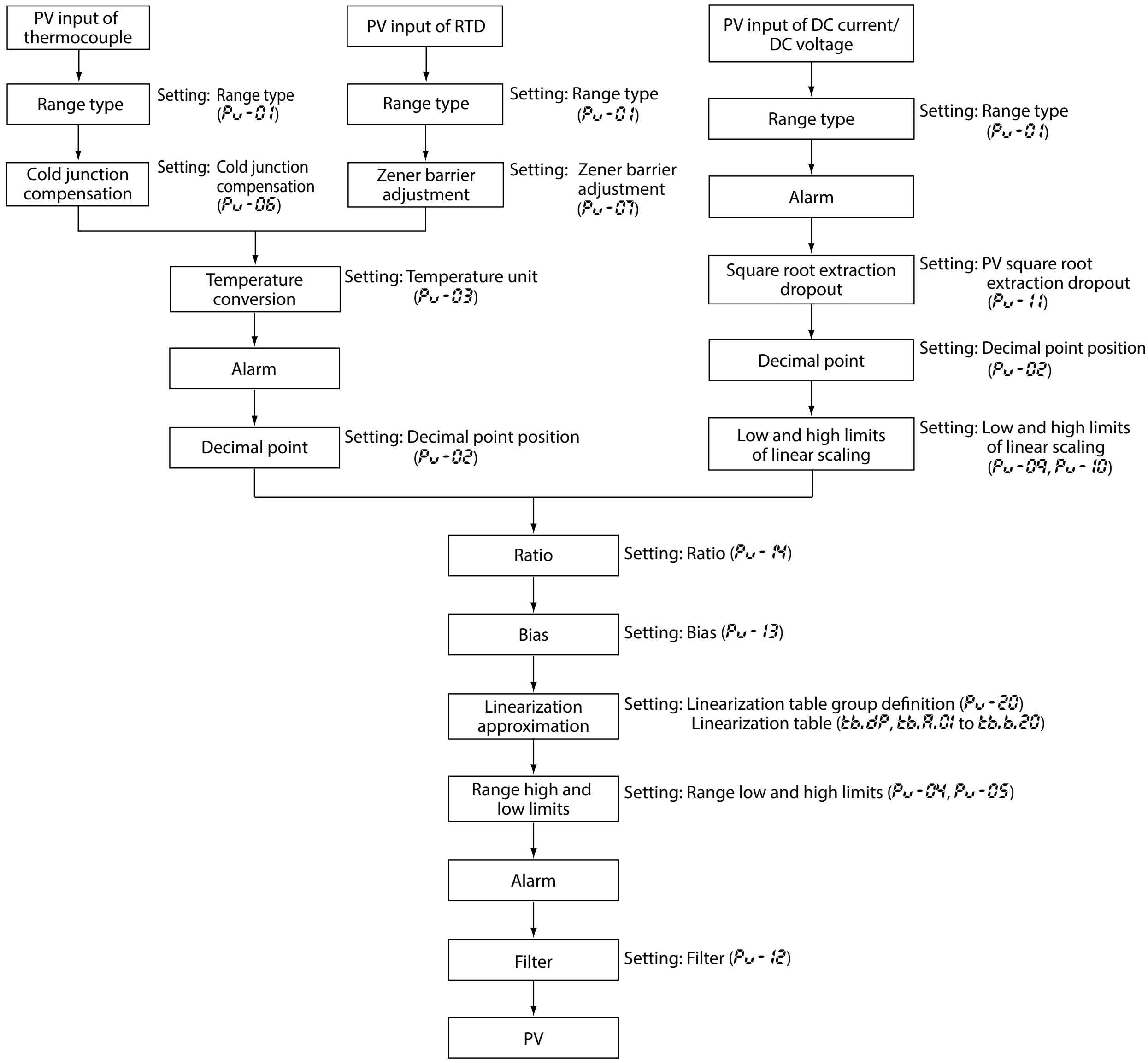
Appendices

Appendix 1 Function Block Diagrams

■ Basic function block diagram

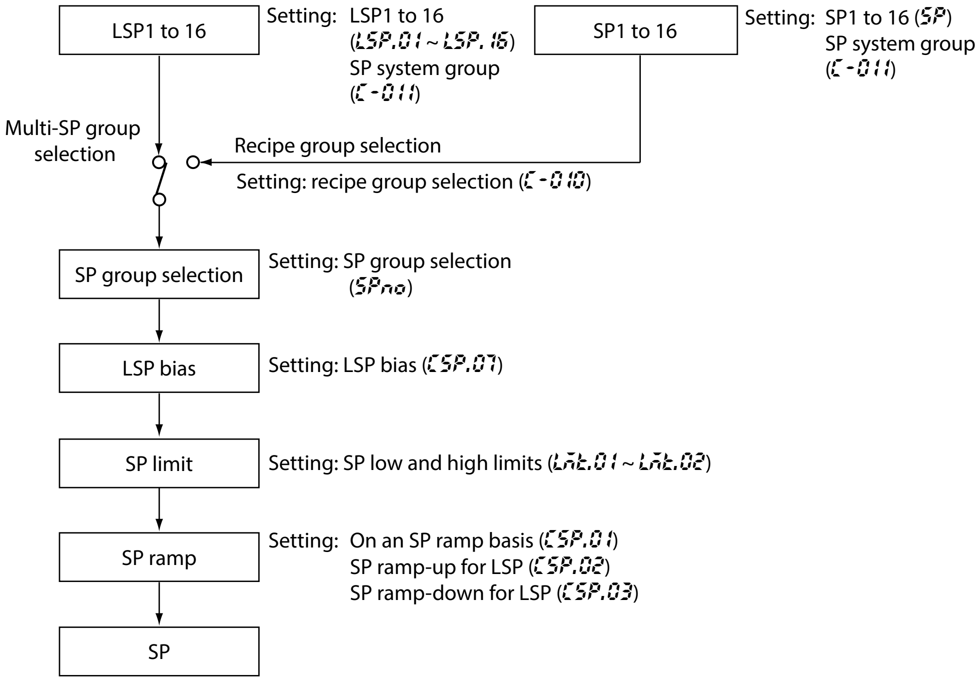


■ PV input process block diagram



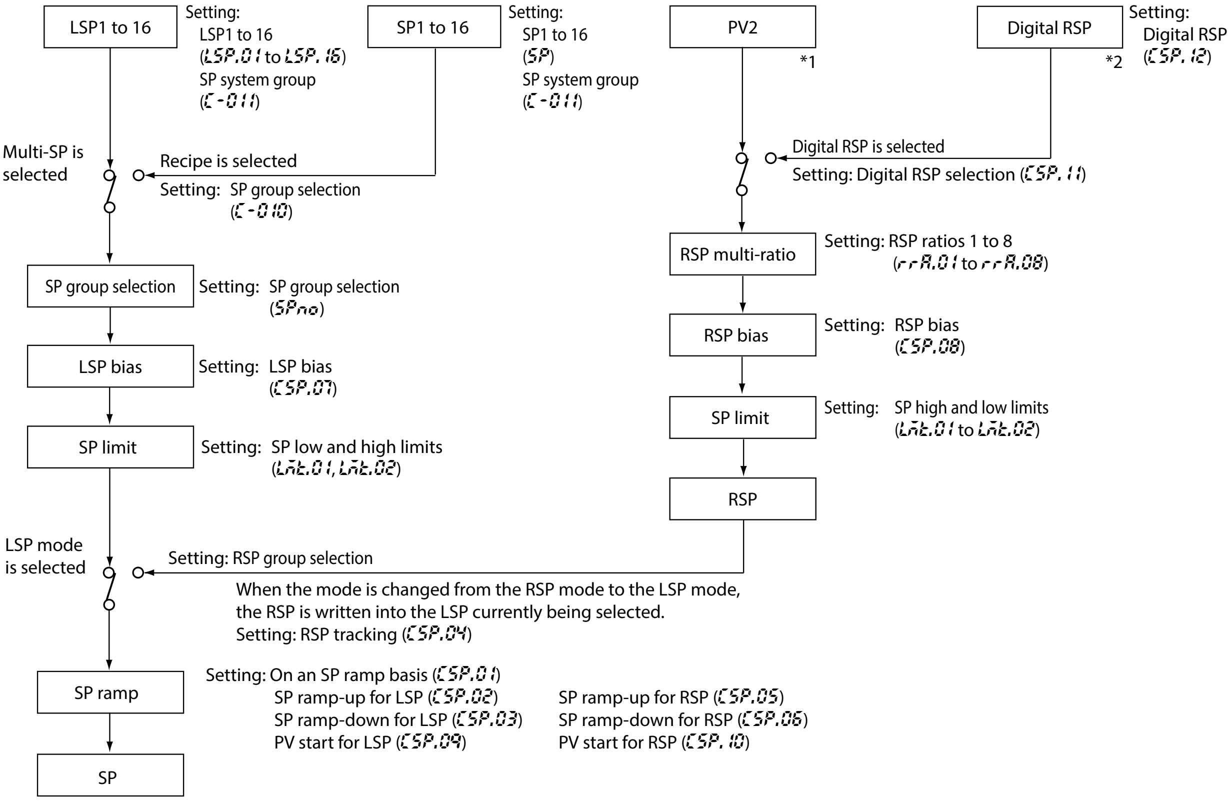
■ SP process block diagram

SP process without an RSP.



■ SP process block diagram (with RSP)

SP process with an RSP:



*1 In the case of SDC45V/46V, PV2 is selected in the RSP assignment (InP.02) by standard numerical code.

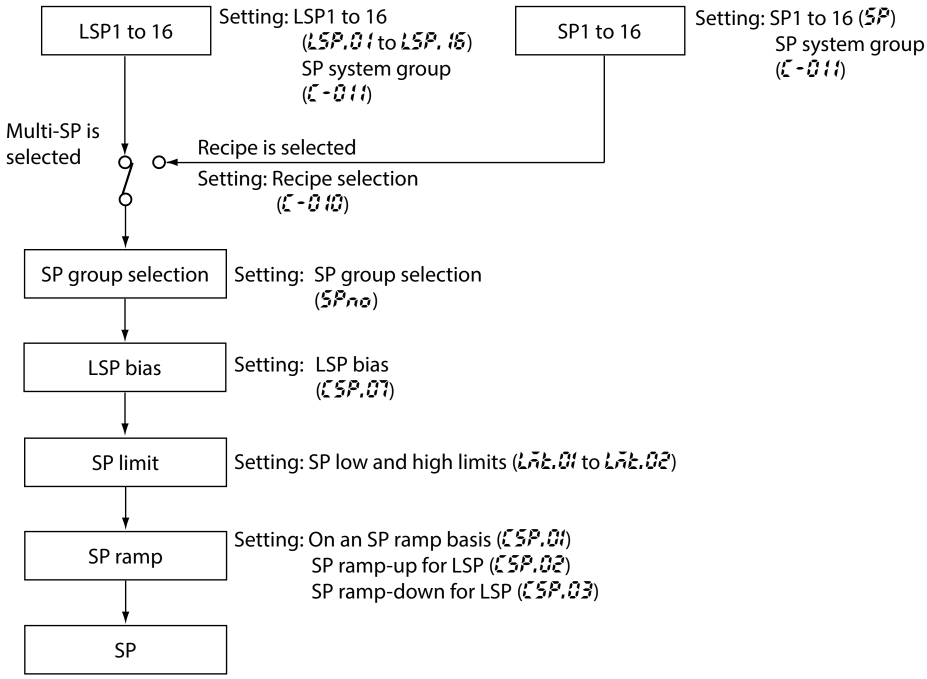
*2 RS-485 models only

■ SP process block diagram (internal cascade)

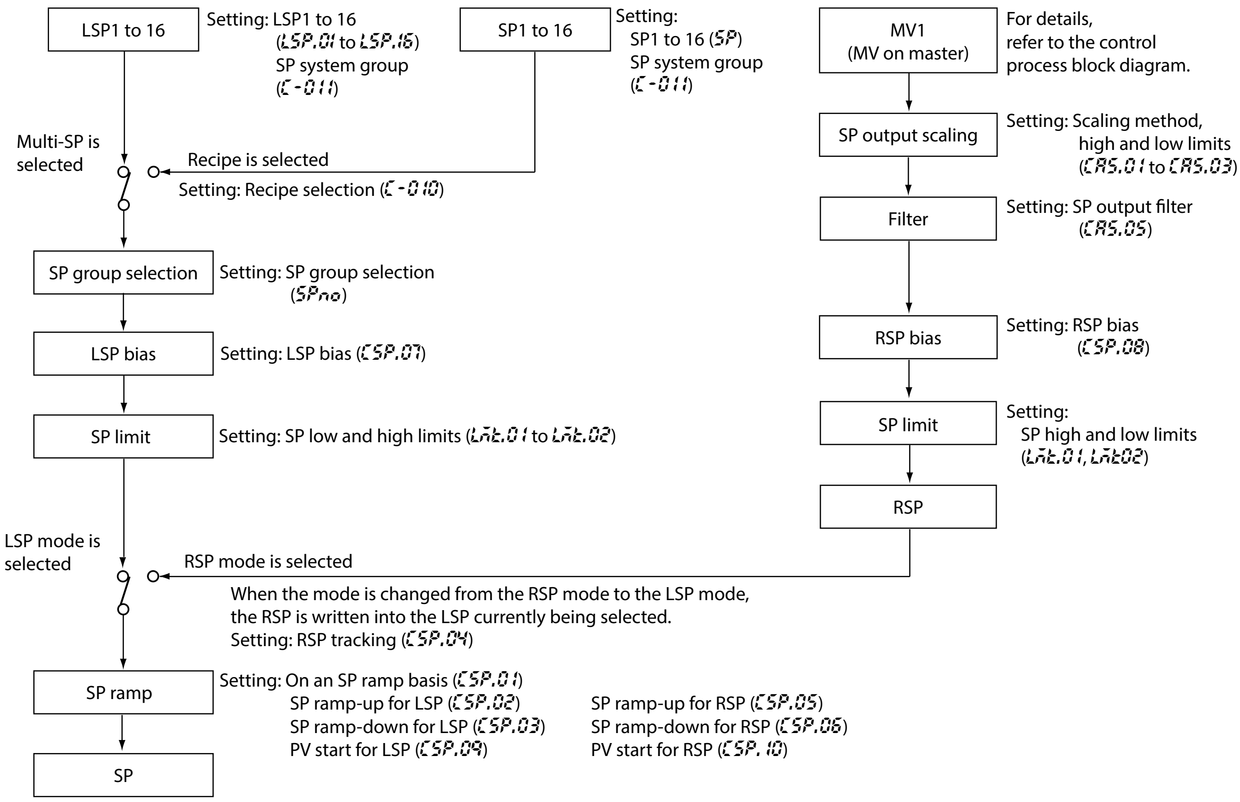
The following describes a SP process with the internal cascade:

The master and slave use different SP processes. The master uses the loop 1 setting while the slave uses the loop 2 setting. The MV on the master is converted through the SP output scaling and it is used for the RSP on the slave.

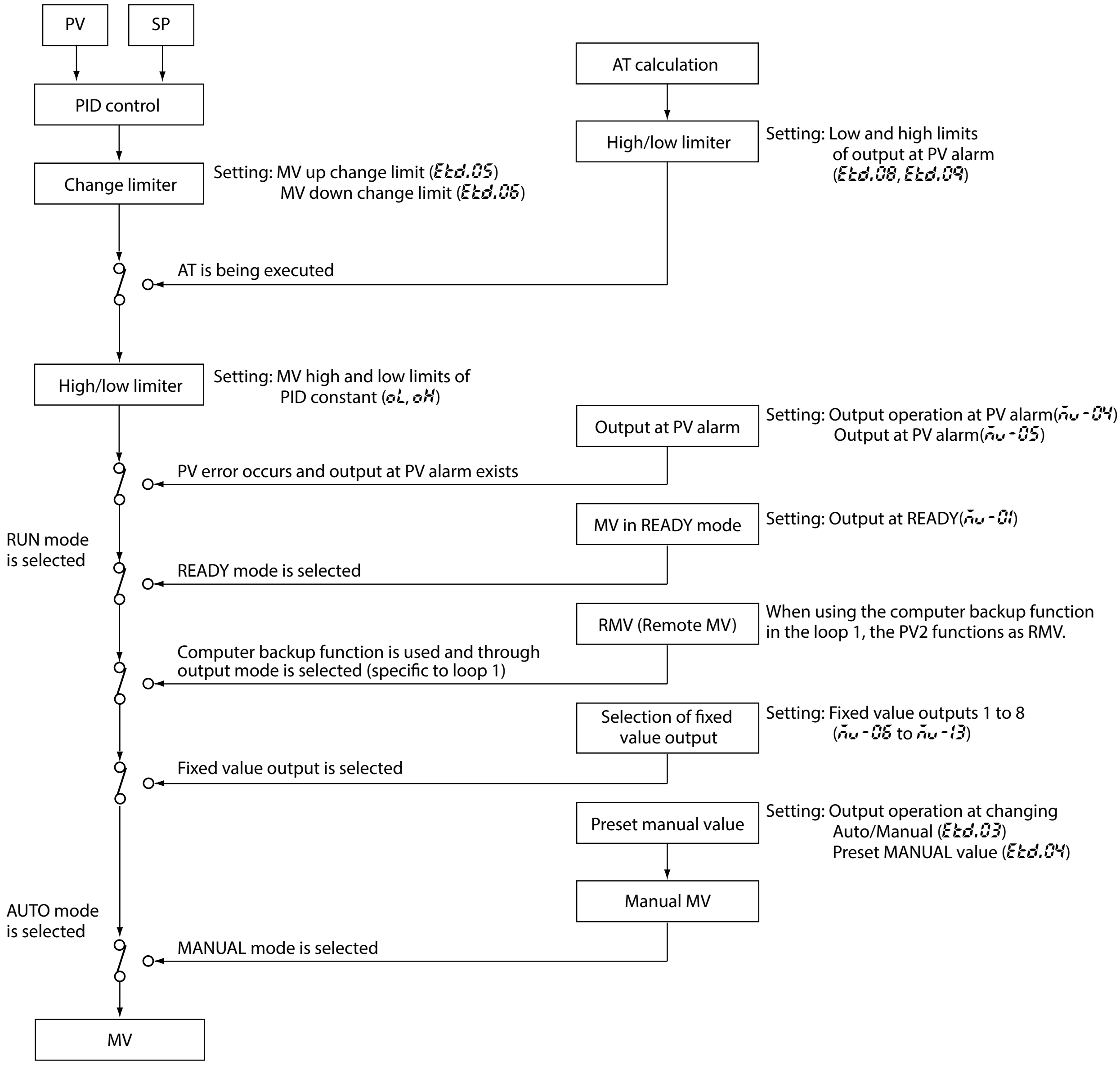
● Master (loop 1)



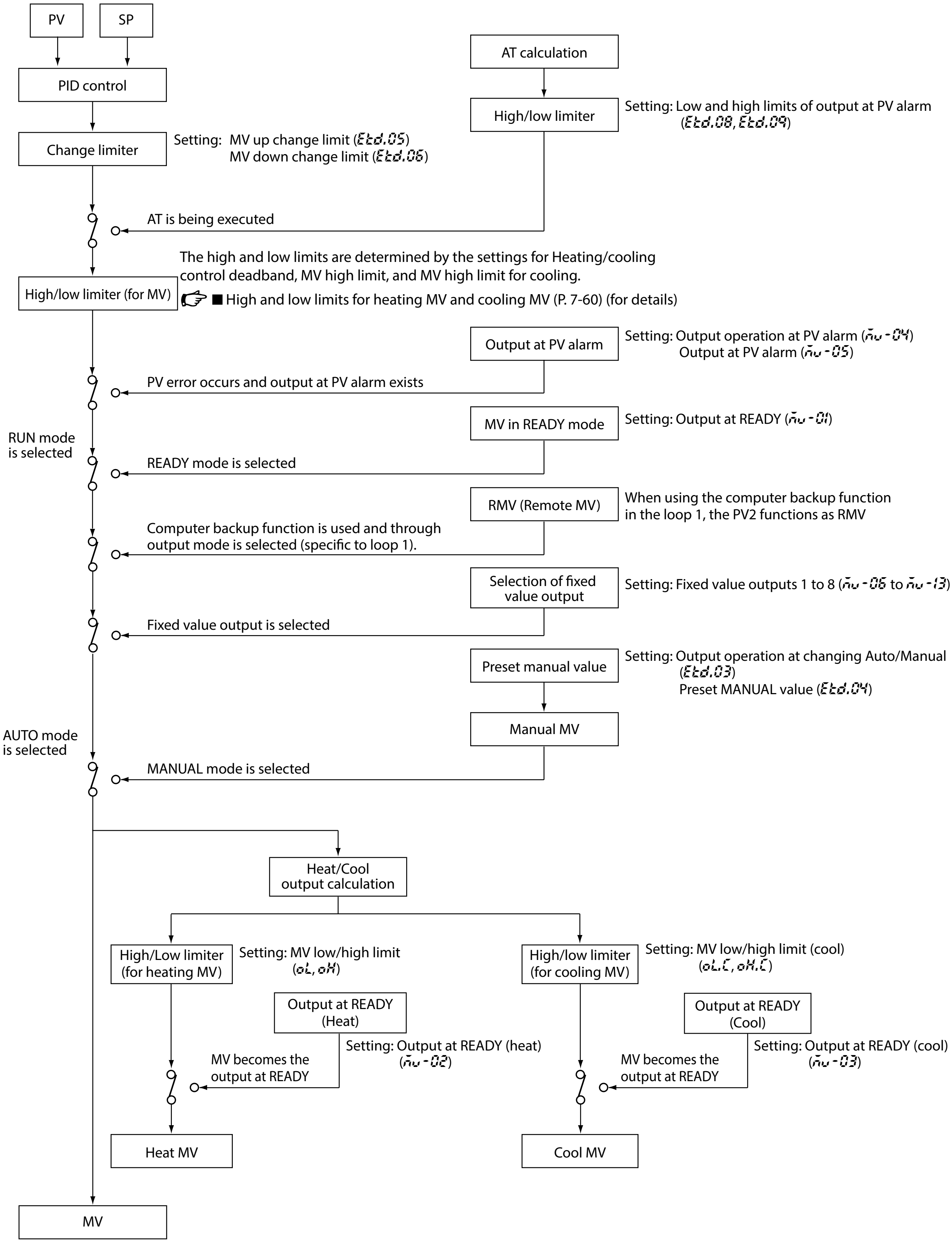
● Slave (loop 2)



■ Control process block diagram (direct or reverse action)

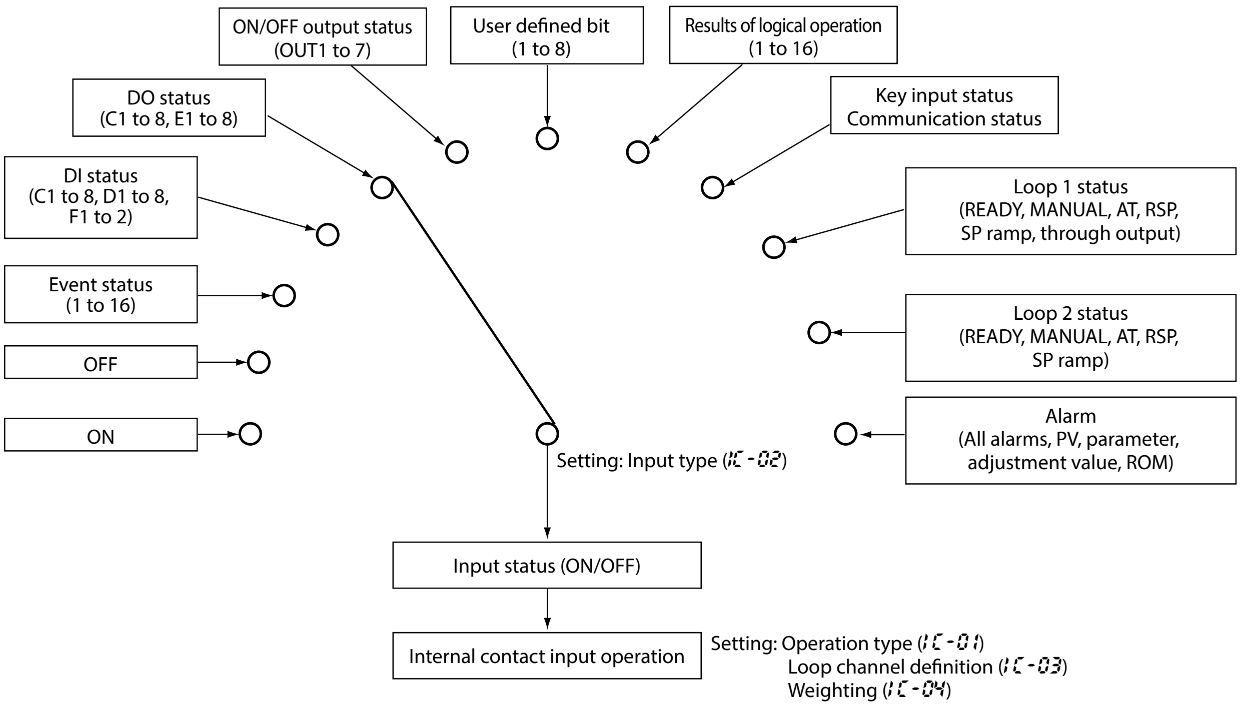


■ Control process block diagram (heat/cool control)



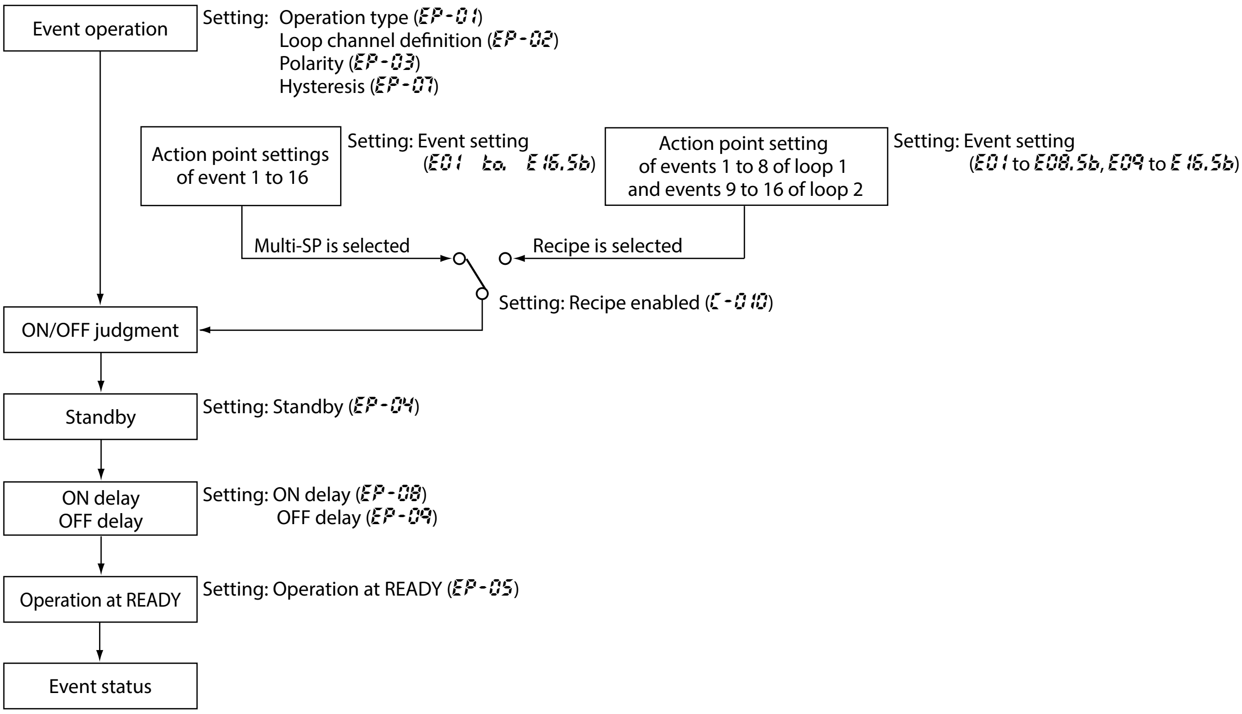
■ Internal contact input process block diagram

There are 20 groups of internal contact input processes. All groups use the same process. Settings are provided for each group.



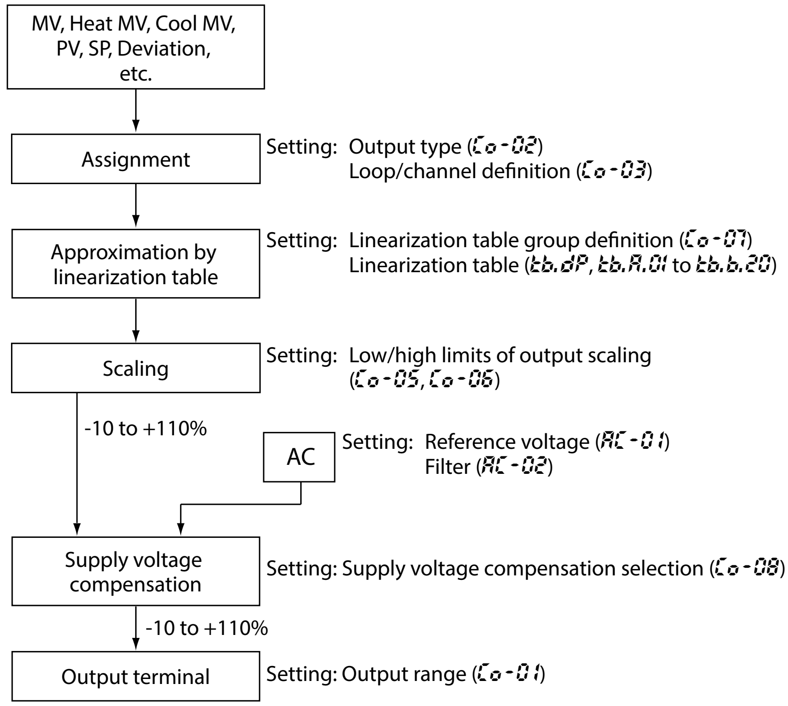
■ Event process block diagram

There are 16 groups of event processes. All groups use the same process. Settings are provided for each group.



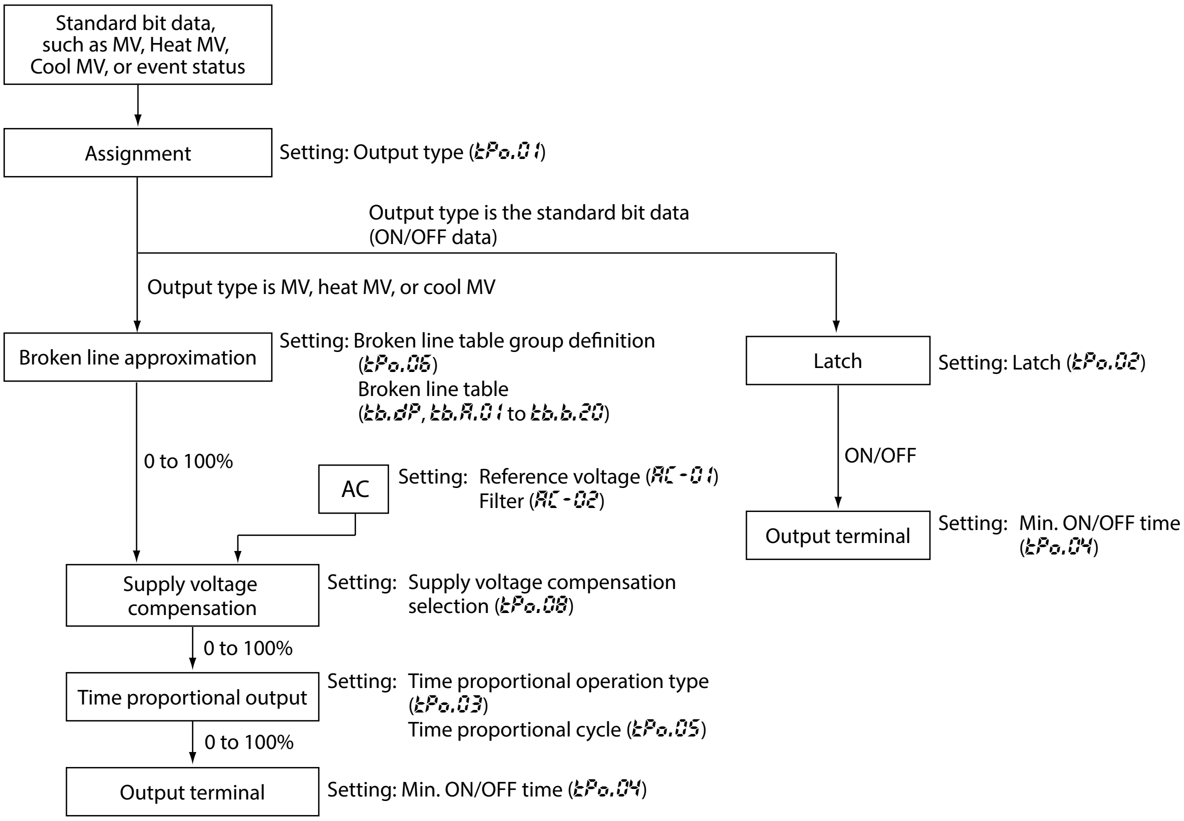
■ Continuous output process block diagram

The following shows the current output and continuous voltage output processes:



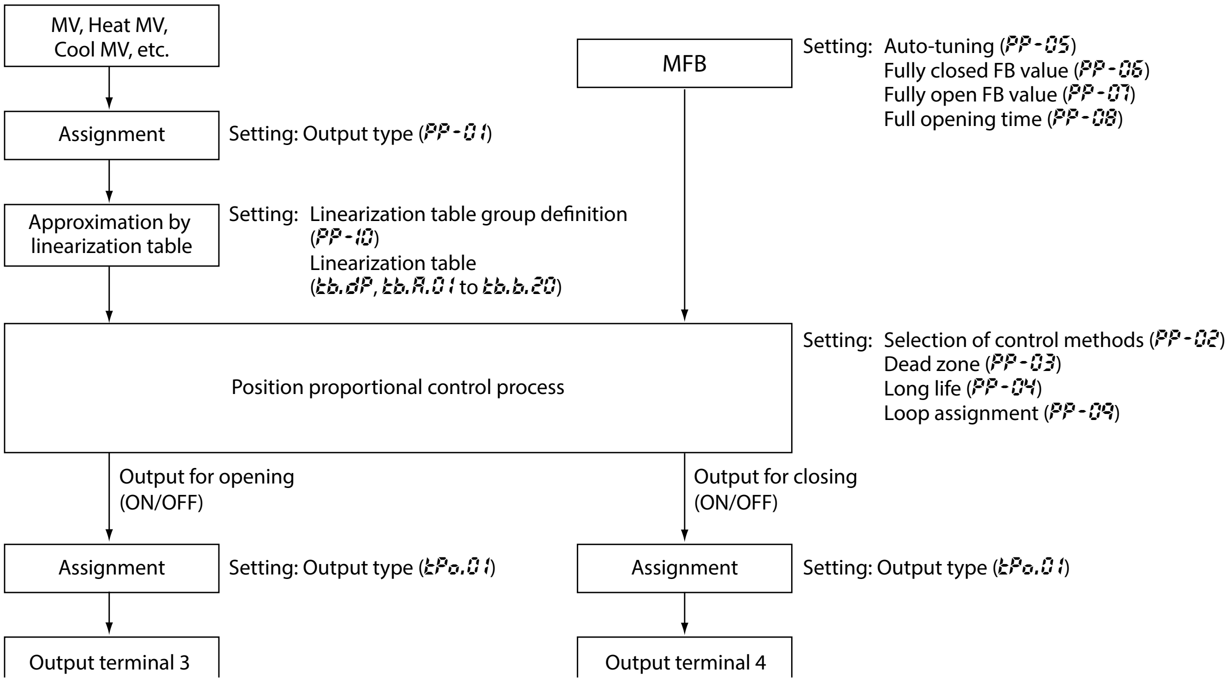
■ ON/OFF output process block diagram

The following shows the relay output and voltage pulse output processes:



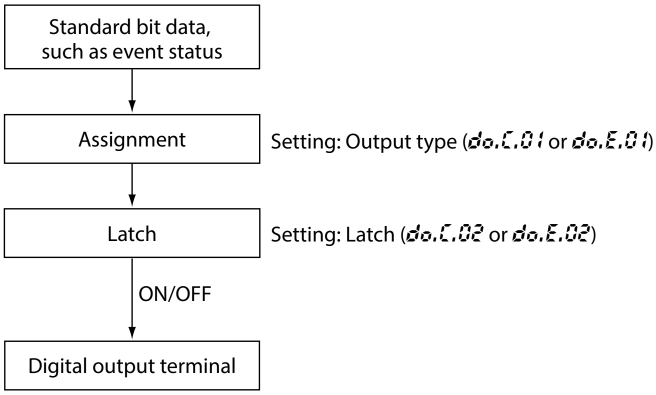
■ Motor drive output process diagram

Processes for motor drive triac output and motor drive relay output:



■ Digital output process block diagram

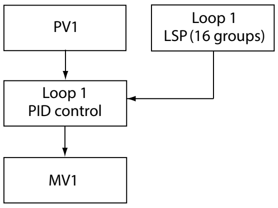
The following shows the process of the digital output (DO) terminals:



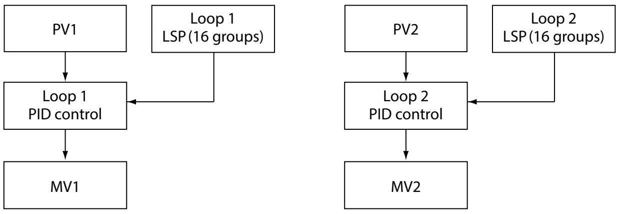
Appendix 2 Loop Process Block Diagram

There are five kinds of loops. For 1-input model, only "1-loop" is possible.
For 1-input model (with communication function, 2-input model, 3-input model, configure the setting using the loop type (item display: C-001) in the setup bank.
For the SDC45V/46V, select [Loop input allocation (InP.01)] in the control bank (CtrL), and assign [1: PV1] and [2: PV2] to [Loop 1] and [Loop 2] respectively.
The following shows the process block diagram of each loop:

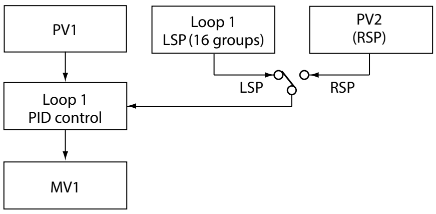
- **1-loop**



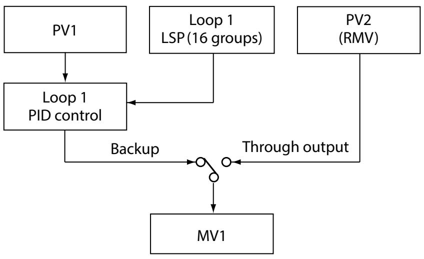
- **2-loop (independent)**



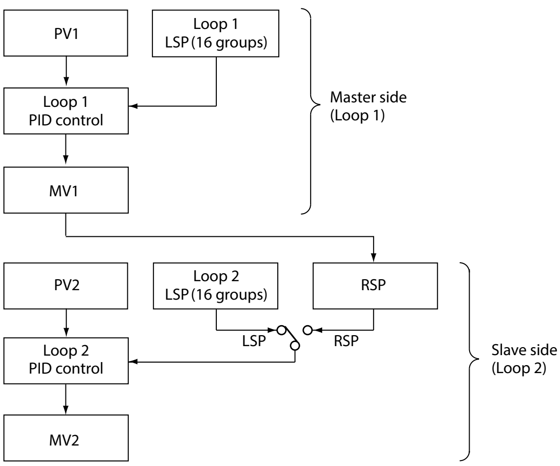
- **1-loop (RSP)**



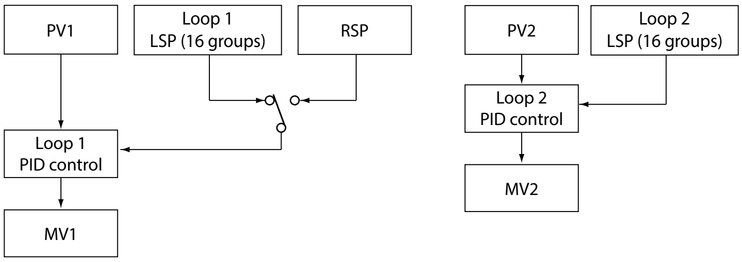
- **1-loop (computer backup)**



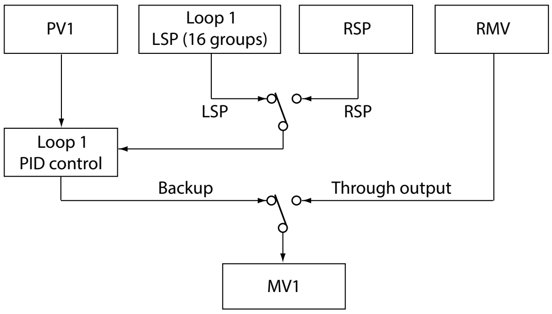
- **1-loop (internal cascade)**



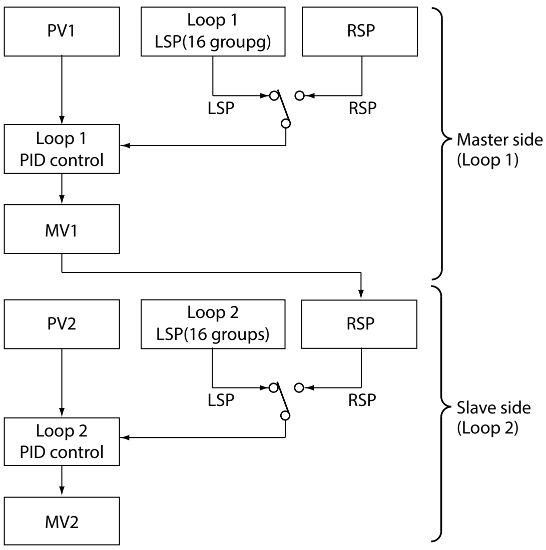
● 2-loop with an RSP on one side



● 1-loop (computer backup with RSP)



● 1-loop (internal cascade with RSP)



Appendix 3 Standard Bit Codes and Standard Numerical Codes

■ Standard bit codes

The range of the standard bit codes is 1024 to 2047.
Codes not stated in the list are undefined. Therefore, do not use such codes
The standard bit codes are set values common to the following items:

- Output type (tPo.01) of output bank (ON/OFF output)
- Input type (IC-02) of internal contact input bank
- Output type (do.C.01, do.E.01) of digital output (C/E-column terminal)
- Input assignment A/B/C/D (bF-02 to bF-05) of logical operation
- Lighting conditions (MS-01) for display and key bank (MS display)
- Lighting conditions (UFL-01) for display and key bank (UFLED setting)
- Tracking selection (CAS-04) of MV bank
- MV tracking selection (tr-01) of MV bank
- Condition for restoring the status before measurement (Ct-10) in the CT bank
- Contact input (dI.SEL) of the input calculation bank and the output calculation bank

Standard bit code	Meaning of standard bit
1024	OFF (0)
1025	ON (1)
1088	Event 1
1089	Event 2
1090	Event 3
1091	Event 4
1092	Event 5
1093	Event 6
1094	Event 7
1095	Event 8
1096	Event 9
1097	Event 10
1098	Event 11
1099	Event 12
1100	Event 13
1101	Event 14
1102	Event 15
1103	Event 16
1120	CT1 Heater burnout detection
1121	CT2 Heater burnout detection
1124	CT1 Over-current detection
1125	CT2 Over-current detection
1128	CT1 Short-circuit detection
1129	CT2 Short-circuit detection
1152	Terminal status of DI-C1
1153	Terminal status of DI-C2
1154	Terminal status of DI-C3
1155	Terminal status of DI-C4
1156	Terminal status of DI-C5
1157	Terminal status of DI-C6
1158	Terminal status of DI-C7
1159	Terminal status of DI-C8
1160	Terminal status of DI-D1
1161	Terminal status of DI-D2

Standard bit code	Meaning of standard bit
1162	Terminal status of DI-D3
1163	Terminal status of DI-D4
1164	Terminal status of DI-D5
1165	Terminal status of DI-D6
1166	Terminal status of DI-D7
1167	Terminal status of DI-D8
1176	Terminal status of DI-F1
1177	Terminal status of DI-F2
1216	Terminal status of DO-C1
1217	Terminal status of DO-C2
1218	Terminal status of DO-C3
1219	Terminal status of DO-C4
1220	Terminal status of DO-C5
1221	Terminal status of DO-C6
1222	Terminal status of DO-C7
1223	Terminal status of DO-C8
1232	Terminal status of DO-E1
1233	Terminal status of DO-E2
1234	Terminal status of DO-E3
1235	Terminal status of DO-E4
1236	Terminal status of DO-E5
1237	Terminal status of DO-E6
1238	Terminal status of DO-E7
1239	Terminal status of DO-E8
1280	OUT1 (ON/OFF status)
1281	OUT2 (ON/OFF status)
1282	OUT3 (ON/OFF status)
1283	OUT4 (ON/OFF status)
1284	OUT5 (ON/OFF status)
1285	OUT6 (ON/OFF status)
1286	OUT7 (ON/OFF status)
1408	User defined bit 1
1409	User defined bit 2
1410	User defined bit 3

Standard bit code	Meaning of standard bit
1411	User defined bit 4
1412	User defined bit 5
1413	User defined bit 6
1414	User defined bit 7
1415	User defined bit 8
1440	Results of logical operation 1
1441	Results of logical operation 2
1442	Results of logical operation 3
1443	Results of logical operation 4
1444	Results of logical operation 5
1445	Results of logical operation 6
1446	Results of logical operation 7
1447	Results of logical operation 8
1448	Results of logical operation 9
1449	Results of logical operation 10
1450	Results of logical operation 11
1451	Results of logical operation 12
1452	Results of logical operation 13
1453	Results of logical operation 14
1454	Results of logical operation 15
1455	Results of logical operation 16
1504	Key status (auto/man)
1505	Key status (sp/ev)
1506	Key status (para)
1507	Key status (rsp/lsp)
1508	Key status (at)
1509	Key status (f1)
1510	Key status (f2)
1511	Key status (up)
1512	Key status (left)
1513	Key status (right)
1514	Key status (down)
1515	Key status (display)
1516	Key status (enter)
1545	Communication status (Normal receipt on a byte basis)
1547	Communication status (Normal transmission on a byte basis)
1548	Communication status (An error received)
1549	Power failure detection
1568	RUN/READY status of loop 1
1569	RUN/READY status of loop 2
1584	AUTO/MANUAL status of loop 1
1585	AUTO/MANUAL status of loop 2
1600	AT stop /AT status of loop 1
1601	AT stop /AT status of loop 2
1616	LSP/RSP status of loop 1
1617	LSP/RSP status of loop 2
1648	During SP ramp of loop 1 (ramp-up)
1649	During SP ramp of loop 2 (ramp-up)
1664	During SP ramp of loop 1 (ramp-down)
1665	During SP ramp of loop 2 (ramp-down)

Standard bit code	Meaning of standard bit
1696	Backup/through output status of loop 1
1792	All typical alarms (logical OR of all alarms to be displayed)
1824	PV input high limit alarm (PV1)
1825	PV input high limit alarm (PV2/PV21)
1826	PV input high limit alarm (PV22)
1840	PV input low limit alarm (PV1)
1841	PV input low limit alarm (PV2/PV21)
1842	PV input low limit alarm (PV22)
1856	CJ input alarm (PV1)
1857	CJ input alarm (PV2)
1880	MFB1 input error
1888	MFB1 estimation in progress
1896	MFB1 adjustment error
1952	CT1 input alarm
1953	CT2 input alarm
1968	Parameter failure
1969	Adjustment value failure (CPU board)
1970	Adjustment value failure (PV board)
1972	ROM failure (CPU board)
1973	ROM failure (PV board)

Only SDC45V/46V

Standard bit code	Meaning of standard bit
1344	Input computation contact input (F01)
1345	Input computation contact input (F02)
1346	Input computation contact input (F03)
1347	Input computation contact input (F04)
1348	Input computation contact input (F05)
1349	Input computation contact input (F06)
1350	Input computation contact input (F07)
1351	Input computation contact input (F08)
1352	Input computation contact input (F09)
1353	Input computation contact input (F10)
1360	Input computation contact output (F01)
1361	Input computation contact output (F02)
1362	Input computation contact output (F03)
1363	Input computation contact output (F04)
1364	Input computation contact output (F05)
1365	Input computation contact output (F06)
1366	Input computation contact output (F07)
1367	Input computation contact output (F08)
1368	Input computation contact output (F09)
1369	Input computation contact output (F10)
1376	Output computation contact input (F01)
1377	Output computation contact input (F02)
1378	Output computation contact input (F03)
1379	Output computation contact input (F04)
1380	Output computation contact input (F05)
1381	Output computation contact input (F06)
1382	Output computation contact input (F07)
1383	Output computation contact input (F08)
1384	Output computation contact input (F09)
1385	Output computation contact input (F10)
1392	Output computation contact output (F01)
1393	Output computation contact output (F02)
1394	Output computation contact output (F03)
1395	Output computation contact output (F04)
1396	Output computation contact output (F05)
1397	Output computation contact output (F06)
1398	Output computation contact output (F07)
1399	Output computation contact output (F08)
1400	Output computation contact output (F09)
1401	Output computation contact output (F10)
1550	Hot start detection for loop 1 PID
1551	Hot start detection for loop 2 PID
1975	Battery voltage alarm
1976	RTC alarm

■ Standard numerical codes

The range of the standard numerical codes is 2048 to 3071.
Codes not stated in the list are undefined. Therefore, do not use such codes.
The standard numerical codes are set values common to the following items:

- Output type (Co-02) of output bank (continuous output)
- Lighting status (MS-02) of display and key bank (MS display)
- PV, RSP, RMV assignment (InP.01–InP.03) in the control bank
- SP tracking signal (CAS.06) in the MV bank
- MV tracking signal (tr-03) in the MV bank
- Inputs 1 and 2 (In-01–In-02) in the input calculation bank and the output calculation bank
- Displayed data (Udd-2, Udd-4) in the user-defined operation display creation bank

Standard numerical code	Meaning of standard bit
2304	PV1
2305	PV2/PV21
2320	PV of loop 1 (used for PID control)
2321	PV of loop 2 (used for PID control)
2336	SP of loop 1 (in use)
2337	SP of loop 2 (in use)
2352	SP of loop 1 (finally attained value)
2353	SP of loop 2 (finally attained value)
2384	SP output of loop 1
2416	MV of loop 1
2417	MV of loop 2
2432	Heat MV of loop 1
2433	Heat MV of loop 2
2448	Cool MV of loop 1
2449	Cool MV of loop 2
2464	MFB1 (Motor opening feedback value 1) (including estimation)
2480	MFB1 (Motor opening feedback value 1) (measurement value)
2496	CT1 current when output ON
2497	CT2 current when output ON
2512	CT1 current when output OFF
2513	CT2 current when output OFF
2528	Deviation of loop 1 (PV-SP)
2529	Deviation of loop 2 (PV-SP)
2544	AC1 value measurement voltage
2545	AC2 value measurement voltage
2560	AC1 value percent data
2561	AC2 value percent data
2656	Event 1 delay remaining time
2657	Event 2 delay remaining time
2658	Event 3 delay remaining time
2659	Event 4 delay remaining time
2660	Event 5 delay remaining time
2661	Event 6 delay remaining time
2662	Event 7 delay remaining time
2663	Event 8 delay remaining time

Standard numerical code	Meaning of standard bit
2664	Event 9 delay remaining time
2665	Event 10 delay remaining time
2666	Event 11 delay remaining time
2667	Event 12 delay remaining time
2668	Event 13 delay remaining time
2669	Event 14 delay remaining time
2670	Event 15 delay remaining time
2671	Event 16 delay remaining time
2720	MV for position proportioning 1

Only SDC45V/46V

Standard bit code	Meaning of standard bit
2306	PV22
2592	Flow rate (with temperature pressure compensation)
2599	Input computation result (F01)
2600	Input computation result (F02)
2601	Input computation result (F03)
2602	Input computation result (F04)
2603	Input computation result (F05)
2604	Input computation result (F06)
2605	Input computation result (F07)
2606	Input computation result (F08)
2607	Input computation result (F09)
2608	Input computation result (F10)
2615	Output computation result (F01)
2616	Output computation result (F02)
2617	Output computation result (F03)
2618	Output computation result (F04)
2619	Output computation result (F05)
2620	Output computation result (F06)
2621	Output computation result (F07)
2622	Output computation result (F08)
2623	Output computation result (F09)
2624	Output computation result (F10)

Appendix 4 History of ROM Versions

This chapter describes added functions and specification changes in ROM versions.
The ROM version can be checked in Id-02 (“F/W information 2 (ROM version 1)”) in the instrument information bank (Id).

■ Ver. 1.05 to 1.99 (available in June, 2007)

● Added functions

Descriptions
Compatible with internal cascade control
RSP multi-ratio function added.
SP tracking function added
Function added that restores the operation display when [display] is pressed while [<] is held down.

● Specification changes

Descriptions
The displayed label for the scaling method in the MV bank was changed from SCL.01 to CAS.01.
The displayed labels for the scaling low/high limits in the MV bank were changed from SCL.02/SCL.03 to CAS.02/ CAS.03.
The displayed label for SP group selection in the monitor bank was changed from SPS to SPno.
The displayed label for the SP group selection bank was changed from SPS to SPno.
The displayed label for the SP group selection in the SP group selection bank was changed from SPS to SPno.

■ Ver. 2.00 to 2.99 (available in December, 2007)

● Added functions

Descriptions
Compatible with SDC45V/46V (computation function model).
Compatible with DC power models.
Compatible with position proportional control by MFB input.
Compatible with CT input.
RS and WS commands added for CPL communications.
For cold junction compensation, a function added that compensates for the terminal temperature using a sensor on another channel.
A function was added that allows change of SP group/LSP value from the operation display.
Display switching function added.
MV tracking function added.
Power failure detection function added
The following event operation types were added. 16: Upper/lower limits for MFB (motor feedback) 26: Upper limit for standard numerical codes 27: Lower limit for standard numerical codes 28: Upper/lower limits for standard numerical codes
The following alarm codes were added.
AL05/06: PV22 input error Al21: MFB input error AL22: Motor adjustment error AL25/26: CT input error AL81: Low battery voltage AL82: Internal clock error AL96: Main board error
Instrument information bank (Id) added.

● **Specification changes**

Descriptions
The selected group has display priority in the multi-SP, PID, and recipe banks.
The zone PID (ETD.12 to ETD.20) in the control bank can be set only when the PID group selection (LPR.02) is set to 2 (Zone PID function priority).
The default setting for SP scaling in the MV bank was changed from 1000.0 to 100.0.
The settable loop types in the setup bank now depend on the model No.
In the internal contact input bank, if configuration of an item (IC-02 to IC04) is unnecessary due to the operation type, the item is now displayed as "---."
The default setting for input type (groups 17 to 20) in the internal contact input bank was changed to 1024 (OFF).

■ Ver. 3.00 and later (available in September, 2008)

● **Added functions**

Descriptions
Compatible with SDC45R/46R (high accuracy model).
Compatible with AC input.
Power supply voltage correction function.
RSP ramp function added.
A function that prevents PV start depending on the setting was added to the LSP ramp function.
LSP bias and RSP bias functions added.
Assignment of the proportional band, integral time, and derivative time of the PID group in use to a function key.
Ability to check the PID group currently used from the console or by communications.
Compatible with Modbus communications protocol.

● **Specification changes**

Descriptions
Function keys 1 to 8 (FK-02 to FK-09) in the display/key bank can be assigned only if the function key registration setting (FK-01) is 1.

■ Ver. 4.00 (available in April 2009)

● Added functions

Descriptions
Operation display customization
"8: 2 loops (RSP)" was added for "Loop type" in the setup bank.
The following event operation types were added: 29: PV change rate event 30: Standard numerical code change rate event
The following internal contact input operation types were added: 31: RUN/READY selection (RUN when ON conditions are met) 32: AUTO/MANUAL selection (AUTO when ON conditions are met) 33: RSP/LSP selection (LSP when ON conditions are met) 35: Through/Backup output selection (backup output when ON conditions are met)
Assignment of parameter groups to function keys was added.
"Later setting has priority" was added as a setting for priority. Both the value specified by using keys or communications and the value specified by using internal contact input are enabled in the selection of SP group, mode, etc., and whichever is specified later is valid.
"- - - -" is displayed for items that need not to be specified in the SP configuration bank, recipe bank, PID bank, control bank, MV bank, priority bank, display/key bank, RS-485 communication bank, or monitor bank.
The following alarm code was added: AL17: Control range error
Standard bit codes 1344–1353, 1360–1369, 1376–1385, 1392–1401 were added.
Standard numerical codes 2599–2607, 2615–2623 were added.

● Specification changes

Descriptions
Setting using the F keys: Items can be selected using the [∧] [∨] keys.
The default setting for "Output type" in the digital output bank changed to 1024 (OFF).
Data displayed for "RSP" in the RSP bank was changed as follows. Before: During the RSP ramp, the current ramped RSP is displayed. After: During the RSP ramp, the final RSP is displayed.
The specifications for the RSP multi-ratio function in computer backup with RSP were changed as follows. Before: Enabled for both RSP and RMV (Remote MV) After: Enabled for RSP

■ Ver. 4.05 (available in December 2011)

● Added functions

Descriptions
Auto-tuning of M904F and M931 motors is supported.
"MFB1 count" was added to the monitor bank.

Appendix 5 Abbreviations and Terms

Abbreviations are used in descriptions, tables, and illustrations of this manual. The following describes major abbreviations.

AT:	Auto Tuning. The PID is automatically adjusted at an optimal numeric value.
DI:	Digital input
DISP:	Display. Pressing the [display] key will change the contents of the display.
DO:	Digital output (control output of relay and voltage pulse, and event output)
OL:	Output Low. Output low limit, a minimum limit level of the output, is set.
OH:	Output High. Output high limit, a maximum limit level of the output, is set.
PARA:	Parameter. A variable to determine the operating conditions for this unit. A desired numeric value is set.
PID :	PID has the following meanings. P (Proportioning). Proportional operation. I (Integral). Integral operation or reset operation. D (Derivative). Derivative operation or rate operation.
PV:	Process Variable. Measured values of the thermocouple, RTD, and linear input.
SP:	Set value of Set Point. For example, set point to control the temperature.
LSP:	Local Set Point. A set value stored in the controller.
RSP:	Remote Set Point. A set value given from the outside by the analog signal.
MV:	Manipulated Variable. An output of the instrument to be controlled. This output shows the PID control results.
LMV:	Local Manipulated Variable. When the loop type is set at computer backup, MV of the PID control result of this unit is called "LMV". "LMV" is distinguished from "RMV", an MV given from the outside.
RMV:	Remote Manipulated Variable. MV given from the outside by the analog signal.
Setup:	Setup is a setting operation corresponding to how to use a unit that incorporates operating conditions, such as control action.
Hysteresis:	An operation gap during event operation. A difference between the value at which the event OFF is changed to ON and the value at which the event ON is changed to OFF. Hysteresis is shown as "HYSR" in the Figs. in this manual.
EV:	Event. EV shows a set value of the event function. The event function is the ON/OFF signal function, which is output in the control status. EV with numeric values added, like EV1 or EV2 shows an event function. A numeric value shows relevant event No.

U:	An abbreviation of "Unit". This shows the minimum unit of the setting. When the number of digits below the decimal point of the set value is "0", "1", "2", "3", and "4", 1U=1, 1U=0.1, 1U=0.01, 1U=0.001, and 1U=0.0001, respectively.
Cascade control:	Control method that two PID controllers are connected in series. This control method is effective if a large response delay exists between the operation part and measurement point.
Heat/cool output:	Control output, which is output when the heat output is related with the cool output within one controller.
AUTO:	Auto operation status that the PID control result is used as MV.
MANUAL:	Manual operation status that a value manually set by the operator is used as MV.
READY:	Standby status, in which the control calculation is stopped.
RUN:	Status, in which the control calculation is executed.

Revision History of CP-SP-1218E

Date	Rev.	Revised pages	Description
Nov. 2007	**1**		
Oct. 2009	**2**		Overall revision
Jan. 2010	**3**	iii, iv 3-1, 3-2, 3-3, 3-11, 3-16, 3-18, 3-19, 3-21 4-9	Description deleted. Explanation added. Explanation added. Graph corrected.
Jan. 2011	**4**	i iii, 3-1 v 1-1 2-1 12-1 14-7	EQUIPMENT INSTALLATION changed. Wiring explanation changed. Manual No. revised. ■Futures changed. ■Location changed and condition added. Alarm code AL17 added. Number of rewrite operations changed. Delete Number of EEPROM writing cycles.
May 2011	**5**	iii 3-9, 3-15	Wiring description deleted. Description deleted.
Nov. 2011	**6**	14-5	Output current of item was changed.
Apr. 2012	**7**		Company name changed.
June 2018	**8**		Overall revision. 8th ed = 17th Jp ed.
May 2019	**9**	v, 3-1	Warnings added.
Dec. 2019	**10**	1-7	Added note to table “Optional parts”.
Nov. 2020	**11**	5-1 7-30 12-1	■Operation display types changed. Changed the table of “■Screen No.” (*2 → n̄v.) Added note to table “■Alarm code displays and corrective actions”.
Dec. 2021	**12**	7-30 7-48 7-58, 7-59	■Screen No.: Note was added. Handling precaution: Description was changed. ■Bank and settings: Note was added.

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You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

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1.2 Warranty scope

In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

(1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
(2) Failure caused for other reasons than Azbil Corporation's product;
(3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
(4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
(5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
(6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

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(3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use
Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with safety design such as fool-proof design,*1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance,*3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

*1. A design that is safe even if the user makes an error.
*2. A design that is safe even if the device fails.
*3. Avoidance of device failure by using highly reliable components, etc.
*4. The use of redundancy.

3. Precautions and restrictions on application

3.1 Restrictions on application

Please follow the table below for use in nuclear power or radiation-related equipment.

	Nuclear power quality*5 required	Nuclear power quality*5 not required
Within a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Cannot be used (except for limit switches for nuclear power*7)
Outside a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Can be used

*5. Nuclear power quality: compliance with JEAG 4121 required
*6. Radiation controlled area: an area governed by the requirements of article 3 of "Rules on the Prevention of Harm from Ionizing Radiation," article 2 2 4 of "Regulations on Installation and Operation of Nuclear Reactors for Practical Power Generation," article 4 of "Determining the Quantity, etc., of Radiation-Emitting Isotopes,"etc.
*7. Limit switch for nuclear power: a limit switch designed, manufactured and sold according to IEEE 382 and JEAG 4121.

Any Azbil Corporation's products shall not be used for/with medical equipment.

The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.

3.2 Precautions on application

you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below. Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

(1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
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      [When used outside a radiation controlled area and where nuclear power quality is not required]
      [When the limit switch for nuclear power is used]
    * Machinery or equipment for space/sea bottom
    * Transportation equipment
      [Railway, aircraft, vessels, vehicle equipment, etc.]
    * Antidisaster/crime-prevention equipment
    * Burning appliances
    * Electrothermal equipment
    * Amusement facilities
    * Facilities/applications associated directly with billing
(3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
(4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
(5) Machinery or equipment that may affect human lives, human bodies or properties
(6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

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5. Recommendation for renewal

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Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason. For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

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(1) Installation, adjustment, guidance, and attendance at a test run
(2) Maintenance, inspection, adjustment, and repair
(3) Technical guidance and technical education
(4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

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