No. CP-SP-1321E

Comprehensive User's Manual for the RX Series Combustion Safety Controller

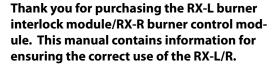
(RX-L Burner Interlock Module and RX-R Burner Control Module)

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It should be read by those who design and maintain equipment that uses the RX-L/R.

It also provides necessary information for installation, maintenance, and troubleshooting. Be sure to keep this manual nearby for handy reference.

Azbil Corporation

NOTICE

Be sure that the user receives this manual before the product is used.

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

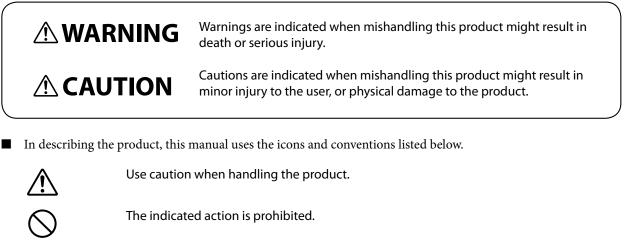
Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact the azbil Group.

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

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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.



Always follow the indicated instructions.

! Handling Precautions:

Use caution when handling the product.

Note: Indicates useful information that the user might benefit from knowing.

Indicates the number of a reference item or page.

(1), (2), (3): Indicates steps in a procedure or explanations that correspond with a part in a diagram.

>> Indicates the result of an operation, or the status after the operation.

Safety Precautions

0	The RX-R2 Series Combustion Safety Controller is for batch operation. Please use it with a system that is started/stopped once or more in a 24-hour period. In order to further improve safety for high-load combustion and important facilities during batch operation, use the RX-R4 series, which is able to continuously check flame sensors and flame detection circuits.
0	Use the unit within the operating ranges recommended in the specifications (for temperature, hu- midity, vibration, shock, installation direction, atmosphere, and so on). Failure to do so might cause fire or device failure.
0	Before installing, removing, or wiring the unit, turn OFF the power to the unit and any connected devices. Failure to do so might cause electric shock.
\bigcirc	Do not allow wire clippings, metal shavings, water, etc., to enter the case of this device. They might cause fire or device failure.
(Do not touch electrically charged parts such as the power terminals. Doing so might result in electric shock.
0	Before wiring the unit, always turn the power OFF. Failure to do so might cause device failure.
0	Wire the unit in compliance with established standards, using the specified power source and rec- ognized installation methods. Failure to do so might cause electric shock, fire or device failure.
\bigcirc	The total power consumption of all connected modules must not exceed 80 W. If it does, fire or de- vice failure may result.
\bigcirc	Do not supply power to the linked modules from multiple power sources. Also, do not short the power terminals of connected modules that are sharing a power source. Doing so might cause fire or device failure.
\bigcirc	Do not use unused terminals on the device as relay terminals. Doing so can cause electric shock, fire or device failure.
\bigcirc	Do not short-circuit the outputs. Doing so can cause device failure.
0	Firmly tighten the terminal screws. Insufficient tightening of terminal screws might cause fire.
0	If there is a risk of a power surge caused by lightning, use a surge protector to prevent possible fire or failure of the device. Failure to do so may cause a fire or device failure.
0	Be sure to check that the module has been correctly wired before turning on the power. Incorrect wiring of the module can damage it or lead to hazardous conditions.
	Do not attempt to disassemble, modify, or repair. This device contains high voltage parts. Disassembling it could result in electric shock, device failure, or fire.
\bigcirc	Always connect interlock contacts and limit device contacts directly to the interlock input on this unit. Do not connect via a relay or other intermediary device.
0	Be sure to do the pilot turndown test carefully. If the flame detector detects a pilot flame that is too small to ignite the main burner, the controller will not be able to recognize flame failure in the main burner. In this case fuel would continue to be supplied, causing a serious explosion hazard.

	A WARNING
\bigcirc	Do not begin operation until the unit has been adjusted and tested, and the combustion equip- ment manufacturer's tests have been completed.
0	If lockout occurs, make sure to do a prepurge before restarting. If unburned gas that has accumu- lated in the combustion chamber or flue is not properly ventilated, it may generate an explosion when the burner is ignited.
0	Mishandling this device may lead to electric shock, fire, or malfunction. Provide a display showing the potential dangers in the area of installation.
0	This device does not include a main power switch. Please attach an easy-to-operate power shut-of device to the control panel.
0	Install this unit in a lockable environment or in a panel that can be opened and closed only with a tool or key. Touching a terminal or other part by mistake can result in electric shock.
0	This unit has an IP20 protection rating. Install and use it in a panel that has an IP54 or equivalent rating.
0	To lock or unlock the DIN rail locking tab, use a tool such as a screwdriver.
	Do not disassemble this device. Doing so might cause device failure.
\bigcirc	Do not block ventilation holes. Doing so might cause fire or device failure.
0	Installation, wiring, maintenance, inspection, and adjustment must be carried out by a professional with technical training in combustion units and combustion safety equipment.
0	Make sure the load connected to each terminal does not exceed the ratings indicated in the specifications.
0	Installation and wiring must be done according to this operation manual or an operation manual provided by the combustion equipment manufacturer.
0	Wire the high voltage cable for the ignition transformer separately and keep it at least 30 cm away from this unit and other wires (we recommend 1 m).
\bigcirc	Do not combine AC power lines and signal lines such as the interlock contact wires in the same multicore cable. Always wire them separately.
0	Connect the power last. Otherwise, accidentally touching the wrong terminal can cause electric shock or damage.
0	After wiring is complete, make sure it has been done correctly. Incorrect wiring may cause device damage or malfunction.
0	When discarding the unit, dispose of it as industrial waste, following local regulations.
0	Use D-class grounding (max. resistance of 100 Ω) or better, in accordance with technical standards for electrical equipment, and always connect the ground directly to the burner itself.

The Role of This Manual

A total of 5 different manuals are available for the RX Series Combustion Safety Controller. Read them as necessary for your specific requirements. If a manual you require is not available, contact the azbil Group or a dealer. Alternatively, you can download the necessary manuals from http://www.compoclub.com.

Usor'sManual	A WARNING CAUTION
	CAUTRON.

RX Series Safety Controller: RX-L80, RX-L90 Burner Interlock Module Installation Manual No. CP-UM-5629E

This manual is supplied with the RX-L.

Personnel in charge of designing or manufacturing equipment that uses the RX-L should read this manual thoroughly. It describes safety precautions, installation, wiring, and primary specifications for use of the RX-L.

For detailed operating procedures, refer to the comprehensive user's manual, CP-SP-1321E.



RX Series Safety Controller: RX-R40/20 Burner Control Module Installation Manual No. CP-UM-5630E

This manual is supplied with the RX-R40/20. Personnel in charge of designing or manufacturing equipment that uses the RX-R40/20 should read this manual thoroughly. It describes safety precautions, installation, wiring, and primary specifications for use of the RX-R40/20. For detailed operating procedures, refer to the comprehensive user's manual, CP-SP-1321E.

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Comprehensive User's Manual for the RX Series Combustion Safety Controller (RX-L Burner Interlock Module and RX-R Burner Control Module) Manual No. CP-SP-1321E

This manual.

Personnel who are using the RX-L or RX-R for the first time or who are in charge of hardware design and/or maintenance of a control panel containing RX-L or RX-R should read this manual thoroughly.

This manual describes the hardware, surveys the RX-L or RX-R and other products used with it, explains installation, wiring, and troubleshooting, and gives hardware specifications.



RX Series Combustion Safety Controller Smart Loader Package SLP-RXE/RXM Installation and Usage Guide Manual No. CP-UM-5634E

This manual is supplied with the SLP-RX Smart Loader Package. The manual explains how to install the package on a personal computer, the authentication code settings, and the menu windows.



Network Instrumentation Module NX Communication Box NX-CB1 User's Manual for Installation Manual No. CP-UM-5558E

This manual is supplied with the NX-CB1.

Personnel in charge of the design and/or manufacture of a system using the NX-CB1 should read this manual thoroughly.

It describes safety precautions, installation, wiring, and primary specifications when using the NX-CB1.

Organization of the Manual

		This manual is organized as follows:
Chapter 1.	OVERVIEW	Overview of the RX-L and RX-R modules, structure of model numbers, part names, and functions.
Chapter 2.	INSTALLATION	RX-L and RX-R installation environment and installation procedures.
Chapter 3.	WIRING	RX-L and RX-R wiring procedures and precautions, and connection examples.
Chapter 4.	RX-L SETTINGS	Settings required to operate the RX-L are described with examples.
Chapter 5.	RX-R SETTINGS	Settings required to operate the RX-R are described with examples.
Chapter 6.	EXPLANATION (DF OPERATIONS Examples of RX-L and RX-R instrumentation and an explanation of operations using a sequence chart.
Chapter 7.	TRIAL OPERATIO	DN AND ADJUSTMENTS Pre-operation adjustments and checks.
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Chapter 13.	MAINTENANCE,	INSPECTION, AND DISPOSAL Procedures for performing RX-L and RX-R maintenance and inspections, and disposing of an RX-L or RX-R.
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Chapter 1. OVERVIEW

1 - 1 Overview: Features

Overview

The RX series combustion safety controller combines a burner interlock module (hereinafter RX-L) and burner control module (hereinafter RX-R) for various functions, such as interlock monitoring, automatic ignition, flame monitoring, etc. to safely and correctly operate a combustion burner.

An exclusive loader (hereinafter the SLP-RX) offers a preinstalled list of functions enabling various modes of operation and ignition.

In addition, burner controllers are used by combining advanced UV sensors (for continuous and batch operation) and flame rods as flame detection circuits.

Features

- Provides combustion safety according to equipment specifications
 - Safety features are tailored to equipment specifications, from single-burner to multi-burner equipment, via modular structure and a wide range of selectable functions.
 - Simply select from a variety of pre-installed safety functions to execute them, specially tailored to equipment specifications. This greatly reduces the time spent on safety circuit review and validation.
 - Safety functions can be selected and executed via SLP-RX without acquiring or creating special software.
- Conservation of space and wiring
 - Shutoff commands and other such safety signals are connected via interlinking side connectors between modules, eliminating the need for connection of safety signals via external wiring or relays, and ultimately conserving space and wiring.
- Maintenance support function
 - A device operation log (times operated/time/warning history) is automatically recorded without the need for any special settings. Whenever necessary, the log can be checked by connecting the SLP-RX.
 - Various monitor outputs tailored to equipment size are implemented, providing for active support for status monitoring or understanding the maintenance/ troubleshooting situation.

Product status confirmation 7-segment LED display
Indicators on front panel Open collector monitor output
Remote status monitoring RS-485 communication
Ethernet communication (RX-L90 only)

- Certificate
 - RX-L80A and RX-R4_C have received the following certification. Gas Appliance Directive (CE): 0063CN6671

Main RX-L functions

- Interlock input function
 - 16 inputs

Individual OFF delay settings (chattering non-detection)

Function input (collective startup, etc.)

Flame monitoring changeover for 760 °C or higher*

* Gas Appliance Directive (CE) does not apply

• Purge functions

Prepurge from 5 seconds to 60 minutes (32 selectable patterns) Postpurge setting for any time length Postpurge stop by temperature contacts Blower motor output Motor control

- Main unit displays Status display (7-segment LED) Status display (LED)
- Monitor output
 22 open collector outputs (freely assignable)
 RS-485 communication output (standard feature)

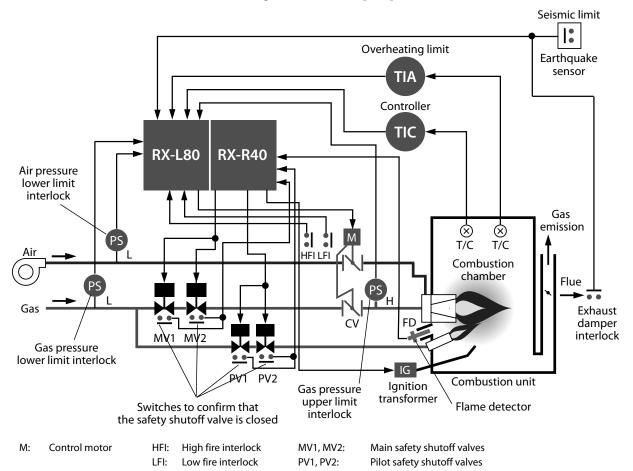
Main RX-R functions

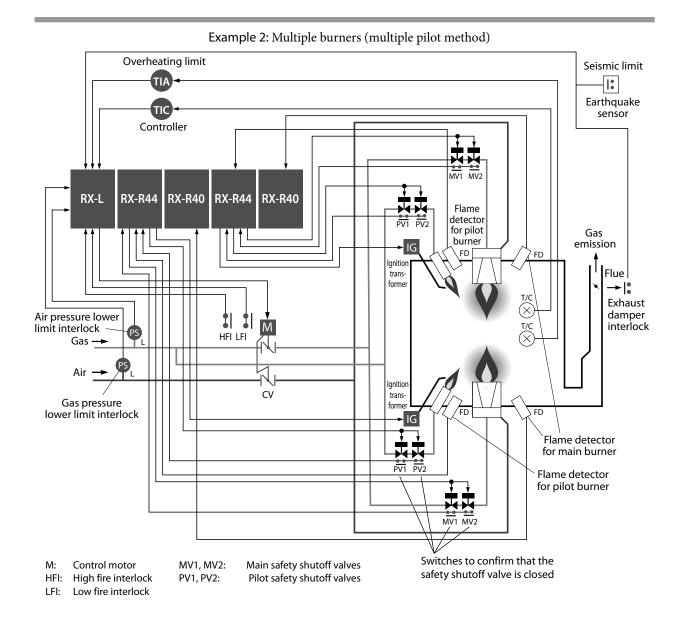
- Modes of operation
 - Continuous operation (RX-R40/44/46)
 - Batch operation (RX-R20/22)
- Ignition functions (for the 5 models below)
 - Models with selectable ignition methods (RX-R40/20) Interrupted pilot/overlapping-continuous pilot/direct ignition/flame relay function, etc. can be selected via SLP-RX for these models.
 - Direct ignition, external relay drive model (RX-R22) In order to control high-frequency loads via direct ignition sequence, this model was designed so that the load can be connected to the outside of the RX-R.
 - Independent supervision model (RX-R44) When Separately monitoring the flames of the pilot and main burner, the RX-R44 and RX-R40 are combined.
 - Independent supervision, external relay drive model (RX-R46) In order to control high-frequency loads via proportional time control, ON-OFF control, etc., this model was designed so that the load can be connected to the outside of the RX-R.
- Interlock input
 4-point Interlock input
 Individual OFF delay time settings
- Ignition time
 Pilot ignition time: 5/10 s (select via SLP-RX)
 Main ignition time: 5 s (fixed)
- Flame response 3 ± 1 or 2 s (model selection)
- Flame detectors Advanced UV sensors (AUD300C/500C, AUD100 Series), flame rods

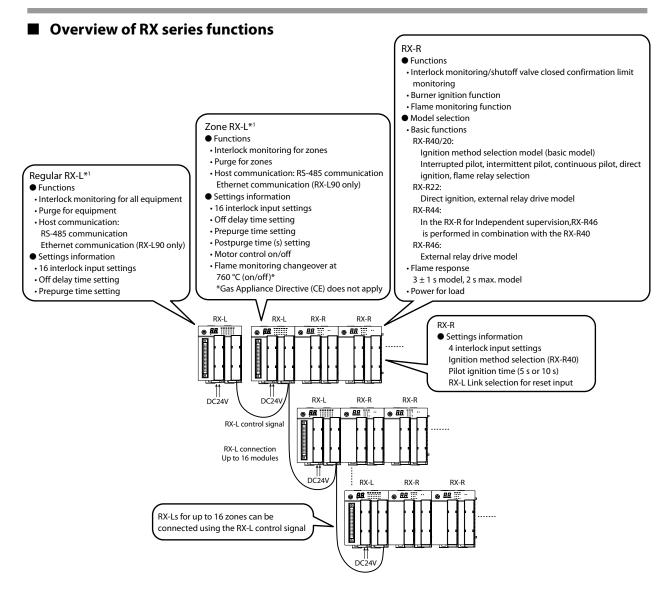
System configuration diagram

This device combines a gas pressure switch, safety shutoff valves, flame detectors, etc. with combustion equipment for the following system structure.

Example 1: Single burner (interrupted pilot method)







*1 For the RX-L burner interlock module, during use, set whether to use "Regular RX-L", "Zone RX-L" or "Single zone RX-L" in the "RX-L type (A-1)" model setting of the SLP-RXEJ Smart Loader Package.

For details on "Regular RX-L", "Zone RX-L" and "Single zone RX-L",

C→ ● RX-L type (A-1) (page 4-3).

Safety functions

This device is designed for safety, with important safety features for burner operation and flame monitoring.

- (1) Combustion monitoring and safety shutoff
 - If burner flame failure is detected, fuel is quickly shut off for safety.
 - Upon ignition failure or flame failure, and when combustion ends, each device is shut down by predetermined method.
- (2) Starting up/operating/stopping a combustion device

Each device is put into operation by predetermined timing and procedure.

(3) Secure ignition time

The ignition circuits ensure safety by shutting down the ignition operation once a specified amount of time passes when parts malfunction.

- (4) Safe startup
 - Before startup, signals from the flame detector and flame detection circuits are Separately checked for internal malfunction.
 - If any malfunctions are detected, the burner will not start up. Checks are performed for false flame detection, tube unit false discharge, ignition circuit malfunction, warning circuit malfunction, etc.
- (5) Dynamic self-check (RX-R40B/C only) Flame detection sensors and circuits are continuously being checked for malfunction during normal combustion. If a malfunction is detected, combustion is quickly halted, and lockout occurs.
- (6) Designed for safety even if a part malfunctions

Failure mode and effects analysis are performed for all parts, to ensure safety during a malfunction so the following do not occur.

- · Ignition processes out of order
- Dangerous error in ignition sequence

(Ignition timing specifications are not greatly exceeded)

Equipment design cautions

When designing equipment that uses a combustion safety control device, carefully consider the following safety guidelines.

- Technical guidelines for industrial furnace combustion equipment safety standards: The Ministry of Health, Labor and Welfare
- Industrial furnace safety rules: JIS B 8415
- Safety engineering directives for industrial gas combustion equipment: Japan Gas Association
- Safety engineering directives for boiler combustion equipment: Japan Gas Association

Important points for safety

- (1) The load must be directly connected to this device
- (2) Interlock must be directly connected to this device's interlock input (It should not be connected to this device via a relay)
- (3) Bypass circuits for manual operation, etc. should not be set for any load
- (4) The main safety shutoff valve and shutoff valve (pilot) must be shut off together.

Model Numbers 1 - 2

RX-L

Model No.	Host communication Certificate		
RX-L80A010010	RS-485 communication	CE	
RX-L90A010020	RS-485 communication/Ethernet communication	—	

"D" at the end of the model No. means that the inspection report is included. Example: RX-L80A01001D

RX-R

Models with selectable Combustion mode RX-R40/20

Model No.	Flame detector	Flame response time	Certificate
RX-R40C013_00	AUD300C/500C	$3 \pm 1 \text{ s}^{*1}$	CE
RX-R20C013_00	AUD100/110 (AUD15)	3 ± 1 s *1	CE
RX-R40B013_00	Flame rod	$3 \pm 1 \text{ s}^{*2}$	CE
RX-R20B013_00	Flame rod	3 ± 1 s *2	CE

_: Load supply voltage (1 = AC 100 V, 2 = AC 200 V, 4 = AC 110 V, 6 = AC 220 V)

*1 At a flame voltage of 3V

*2 At a flame voltage of 2V

Interrupted pilot/overlapping-continuous pilot/direct ignition, etc. can be selected with the SLP-RX.

The suffix "D" indicates that an inspection report is included.

Example: RX-R40C01310D

Independent supervision model RX-R44

Model No.	Flame detector	Flame response time	Certificate
RX-R44C013_00	AUD300C/500C	3 ± 1 s *1	CE
RX-R44B013_00	Flame rod	3 ± 1 s * ²	CE

Load supply voltage (1 = AC 100 V, 2 = AC 200 V, 4 = AC 110 V, 6 = AC 220 V)
 *1 At a flame voltage of 3V

*2 At a flame voltage of 2V

The suffix "D" indicates that an inspection report is included. Example: RX-R44C01310D

Independent supervison, external relay drive model RX-R46

Model No.	odel No. Flame detector Flame response time		Certificate
RX-R46C013_00	AUD300C/500C	3 ± 1 s *1	CE

_: Load supply voltage (1 = AC 100 V, 2 = AC 200 V, 4 = AC 110 V, 6 = AC 220 V)

*1 At a flame voltage of 3V

Interrupted pilot/overlapping-continuous pilot/direct ignition, etc. can be selected with the SLP-RX.

In order to control high-frequency loads via proportional time control, ON-OFF control, etc., this model was designed so that the load can be connected to the outside of the RX-R.

The suffix "D" indicates that an inspection report is included. Example: RX-R46C01310D

• Direct ignition, external relay drive model RX-R22

Model No.	Flame detector	Flame response time	Certificate
RX-R22C013_00	AUD100/110 (AUD15)	3 ± 1 s *1	CE

_: Load supply voltage (1 = AC 100 V, 2 = AC 200 V, 4 = AC 110 V, 6 = AC 220 V)

*1 At a flame voltage of 3V

The suffix "D" indicates that an inspection report is included. Example: RX-R22C01310D

Related devices

ltem	Name	Model No.	Remarks
Compatible flame	Ultraviolet Flame	AUD100/110+AUD15C	For batch operation
detector	Detector	AUD300C	For continuous operation
		AUD500C	For continuous operation (explosion-proof type)
	Flame rod	C7007A, C7008A	—
Loader	Smart loader package	SLP-RXMJ70	For maintenance (cable included)
		SLP-RXMJ71	For maintenance (cable not included)
		SLP-RXEJ70	For function selection (cable included)
		SLP-RXEJ71	For function selection (cable not included)
Optional parts	Flame simulator	FSP300C100	For AUD100/110, AUD300C/500C
		123514A	For flame rods
	Analog flame meter	FSP136A100	—

Certificate

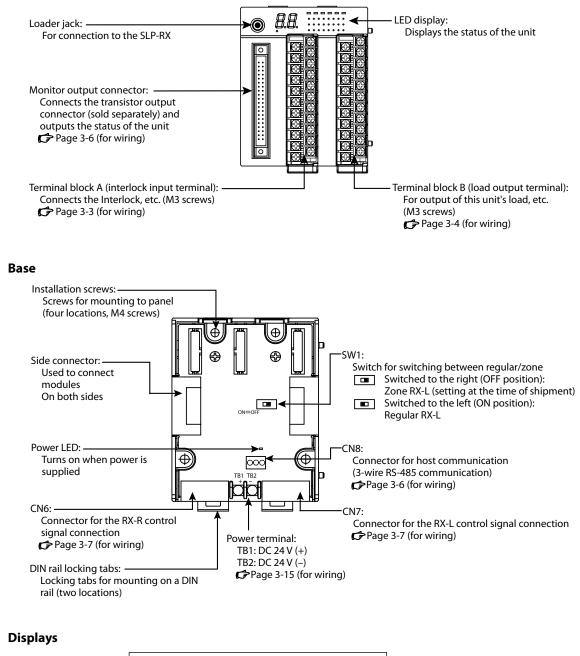
Gas Appliance Directive (CE): 0063CN6671(Model RX-L80A and RX-R4_C*) * Certificate is valid only for a combination of RX-R4_C and AUD300C

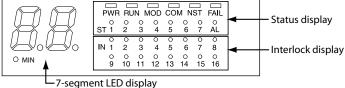
1 - 3 Names and Functions of Parts

RX-L

Main unit

The terminal area is displayed with its cover removed for explanatory purposes.





• 7-segment LED display

Prepurge time, remaining prepurge time count display, and error codes (during an error) are displayed.

• Prepurge time

Normal and prepurge times are displayed.

Note: • When the "MIN" LED is lit, displayed numeric values represent minutes.

- When the "MIN" LED is not lit, displayed numeric values represent seconds.
- When the prepurge function is set to "OFF", "--" is displayed here.

Example:

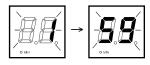
Prepurge time set to 5 minutes Prepurge time set to 30 seconds



• Remaining prepurge time display

Remaining time during prepurge is shown as a blinking amount. If less than 1 minute of time is remaining, seconds are displayed. Once prepurge is complete, the prepurge time setting display is again shown.

Example:



• Error code display

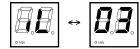
When an error occurs, the corresponding error code is displayed. The "Min" LED shuts off. Once the error is reset, prepurge time settings are again shown. There are two display options available: detailed and simple.

Detailed display

During interlock operation:

"iL" and the applicable Interlock number will be alternately displayed.

Example: Interlock IN3 operation



Errors unrelated to interlock operation:

The error code is displayed as "E" followed by 3 digits. "E"+ the first digit and the last 2 digits are displayed alternately.

Example: Error code E101



• Simple display

The error code is displayed as "E"+ 1 digit (the 3-digit code's first digit) while blinking.

Example: Error code E101



• Blinking display (RX-L90 only)

This function is used to specify the installation position of the module with the specified communication address (or IP address).

If you write 5A5AH in the 4912W data address, the 7-segment LED will blink. It will continue to blink until the power is turned off or a value other than 5A5AH is written in the above data address.



• Status display and Interlock displays

Displays the status of the unit.

F				10D	cor		ST	FAIL	
ST	о г 1	0 2	0 3	0 4	0 5	0 6	0 7	o AL	Status display
IN	0 1	0 2	0 3	0 4	0 5	0 6	0 7	0 8	Interlock display
	9 9	0 10	0 11	0 12	0 13	0 14	0 15	0 16	

• Name, display information

LED name	Display information
PWR	Turns on when DC power (V+, V–) is supplied.
RUN	Turns on when startup input is received.
MOD	Turns on during the test run mode and flashes when settings are being written. Note: Do not turn the power off while this light is flashing.
СОМ	Always OFF on this module (RX-L80). The module's own Ethernet packets are being received (RX-L80).
NST	Always OFF on this module (RX-L80). Always ON on this module (RX-L90).
FAIL	Always OFF on this unit
ST1 to ST7	Select from the display pattern on the next page.*
IN1 to IN16	Select from the display pattern on the next page.*
AL	Turns on when locked out as a result of an error. Turns off when the error is reset. Blinks when waiting for startup input to shut off after resetting.

* Configured on the SLP-RX.

Display patterns				
Signal	Display pattern name	Display information		
S-1 to S-16	Input displays 1 to 16	Outputs the input status. The numbers 1 to 16 correspond with inputs IN1 to IN16.*1		
S-AFSOFF	Air switch OFF check	Turns on when the system confirms that the air pressure switch is OFF.		
S-AFSOK	Air pressure switch op- eration check complete	Turns on when the operation check for the air pressure switch is complete.		
S-760	760 °C mode	Turns on during 760 °C mode.		
S-PURGING	Purge in progress	Turns on during the prepurge. Turns off when the prepurg finishes.		
S-PURGCMP	Purge complete	Turns on when the prepurge finishes. Turns off when the startup input turns off.		
S-POSTP	Postpurge in progress	Turns on during the postpurge. Turns off when the post- purge finishes.		
S-BLOWER	Blower output	Turns on when the blower output is on.		
S-HILO	High fire position/low fire position	Turns on during High fire position (turns off during damper modulation).		
S-CTL	Damper modulation	Turns on during damper modulation.		
S-RELAY	Relay output	Turns on when relay output is on.		
S-IL-F	Operations from the Regular RX-L module allowed	Indicates the permission status for operations from the Regular RX-L module. ^{*2} Turns off during interlock operations. Turns on when interlock is normal. Flashes in all other circumstances (such as when stopped).		
S-IL-B	Operations for the zone RX-L module allowed	When turned on, indicates that operations for the zone RX-L module are permitted.		
S-NON	Not used	Normally turned off.		

*1 Meaning of input status display

Display	Meaning	
Off	Indicates that "Not used" is set	
On	Indicates that a value other than "Not used" has been set and input has been shorted (input shorted \rightarrow also turns on during the OFF delay time when input is open)	
Flashing	Indicates that a value other than "Not used" has been set and input is open	

*2 Only valid when RX-L type (A-1) is set to Zone RX-L.

LED	Display information			
name	Signal	Display name		
ST1	S-AFSOK	Air pressure switch operation check complete		
ST2	S-PURGING	Purge in progress		
ST3	S-PURGCMP	Purge completed		
ST4	S-IL-B	Operations for the zone RX-L module allowed		
ST5	S-NON	Not used		
ST6	S-NON	Not used		
ST7	S-NON	Not used		
IN1	S-1	Input display 1		
IN2	S-2	Input display 2		
IN3	S-3	Input display 3		
IN4	S-4	Input display 4		
IN5	S-5	Input display 5		
IN6	S-6	Input display 6		
IN7	S-7	Input display 7		
IN8	S-8	Input display 8		
IN9	S-9	Input display 9		
IN10	S-10	Input display 10		
IN11	S-11	Input display 11		
IN12	S-12	Input display 12		
IN13	S-13	Input display 13		
IN14	S-14	Input display 14		
IN15	S-15	Input display 15		
IN16	S-16	Input display 16		

• Error display setting (CP • Error display setting (DSP-2) (page 4-28)

Select from simple or detailed for the warning display.

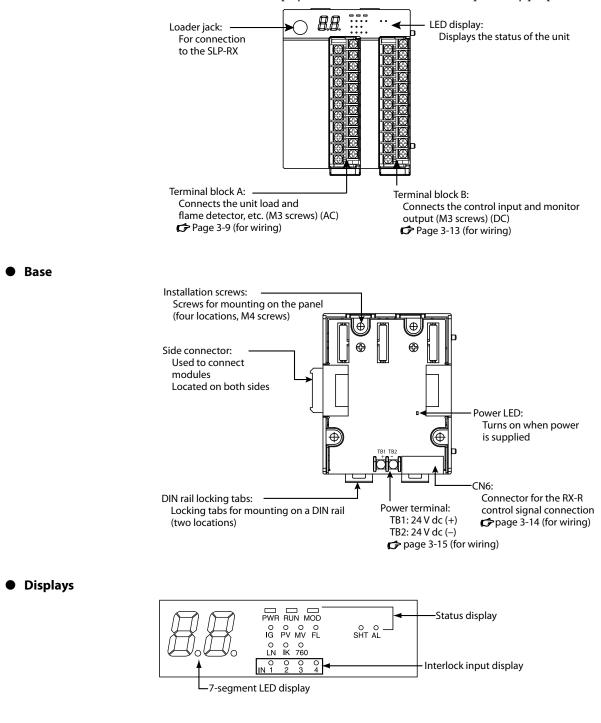
Setting: • Simple 2-digit warning display

• Detailed 4-digit warning display (default setting)

RX-R

Main unit

The terminal area is displayed with its cover removed for explanatory purposes.



• 7-segment LED display

When power is turned ON, the station address is displayed for several seconds, but normally the process display and error code display (during error) are shown.

• Station address display

Displays the currently set station address. Displayed for approximately 10 seconds after power is turned ON.

• Process display

Displays current process information.

Displayed text*	Process	Details	
	Stop/standby/post reset standby	In standby with the startup contact input OFF	
P1	Start check	Startup check for this unit and the flame detector	
P2	Pilot trial standby	Waiting for ignition of the pilot burner	
P3	Pilot trial	Ignition of the pilot burner	
P4	Pilot only	Checks that the pilot burner is actually lit	
P5	Main trial	Ignition of the main burner	
Р6	Steady combustion	Flame monitoring after the main burner has been lit	
oF	760 °C end standby	Standby occurs for a certain amount of time after 760 °C mode ends (R20C/R22C/R20B)	
Fr	Flame relay	Used in the flame relay function	
(Error code)	Lockout	Displays the corresponding error code	

* 7-segment LED display

• Combustion standby mode

"OP" is shown when combustion standby mode input is set and contacts are open.

Manual valve standby

"oo" is shown when manual valve input is set and contacts are closed.

• Error code display

When an error occurs, the corresponding error code is displayed. When the error is reset, the normal process display is again shown. A 2-digit or 4-digit setting can be selected for the LED warning display.

· 2-digit display

"E" + 1 digit of the error code alternates with the process code. The warning code display is fixed as "EA".

Example 1: error code E1, process P1 (= start check)



Example 2: warning code EA



• 4-digit display

• During interlock operation:

"iL", the applicable input function number, and the operation process number are displayed in the order: "iL" \rightarrow input function number \rightarrow process number.

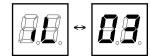
• Errors unrelated to interlock operation:

"E" + 3-digit error code and process number.

"E" + first digit → last 2 digits → process display are displayed in that order. For warnings, "EA" → last 2 digits are displayed in that order. Example 1: error code E101, process P1 (= start check)



Example 2: Interlock IN3 operation



• Status display

Displays the status of the unit.

PWR RUN MOD	
0 0 0 0 IG PV MV FL	O O SHT AL
0 0 0 LN IK 760	

• Name, display information

LED name	Explanation		
PWR	Turns on when DC power (V+, V-) is applied.		
RUN	Turns on when startup input is received and flashes during setup mode.		
MOD	Turns on during the test run mode and flashes when settings are being		
	written.		
	Note: Do not turn the power off while this light is flashing.		
	Also, do not end configuration mode while this light is flashing.		
AL	Turns on when locked out as a result of an error.		
	Blinks when the startup signal/pilot startup signal* remains on after		
	resetting		
	Turns off when the startup signal/pilot startup signal*) shuts off after		
	resetting		
IG	Lights up in tandem with IG output.		
PV	Lights up in tandem with PV output.		
MV	Lights up in tandem with MV output.		
FL	Lights up in tandem with the flame signal.		
SHT	Flashes when the shutter operates (when using units that support shutter		
	output).		
	Has shutter output = ON.		
	Models with no shutter output or no support for shutter output = OFF.		
LN	Turns on when the RX-R control signal connection is normal.		
IK	On when normal, flashing when interlock information is received from the		
	RX-L.		
760	Turns on during 760 °C mode.		

* When pilot start is allocated by input

• Interlock input display

Displays the input function's input status.

LED number corresponds to input function number.

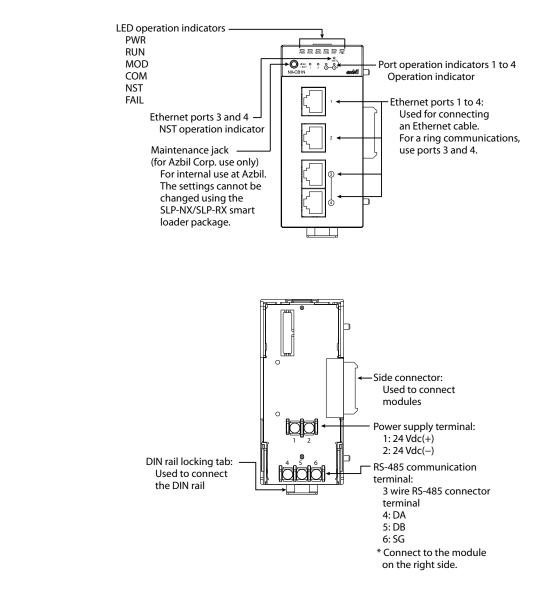
	0	0	0	0
IN	1	2	3	4

Display	Meaning	
Turned off	Indicates that "Disabled" has been set.	
Turned on	Indicates that "Used" has been set and input has been shorted.	
	(Input shorted \rightarrow also turns on during the OFF delay time when input is open).	
Flashing	Indicates that "Used" has been set and input is open.	

Communication box

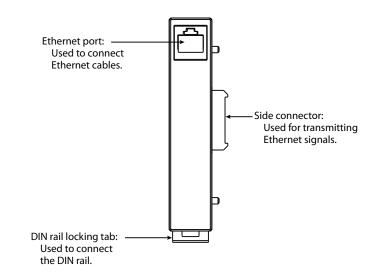
Body

Base



Communication adapter

• For left side



Safety signals and control signals

The safety signal and control signal types in the device inputs and outputs are shown below.

• RX-L

Category	Name	Туре	Description and precautions
Input	Interlock input (IN1 to IN16)	Safety input	Perform fault diagnosis for the input circuit. If there is a fault, lock- out occurs.
	Startup input	Safety input	Perform fault diagnosis for the input circuit. If there is a fault, lock- out occurs.
	Reset input	Safety input	Perform fault diagnosis for the input circuit. If there is a fault, lock- out occurs.
Output	Monitor output (M-1 to M-22)	Control output	Depending on the fault, the output may get stuck in ON or OFF. Also, fault diagnosis is not performed. This cannot be used in safety shutoff valves or for controlling dangerous sources of power.
	Relay output (H, G)	Safety output	Perform fault diagnosis for the output circuit.If there is a fault, lock- out occurs.
	Blower output	Control output	Depending on the fault, the output may get stuck in ON or OFF. Fault diagnosis is not performed. * Monitoring the air pressure with a limit switch is required.
	Control motor output	Control output	Depending on the fault, the output may get stuck in ON or OFF. Fault diagnosis is not performed. * Monitoring the position of the control motor with a limit switch is required.
Communication	RS-485 Ethernet (RX-L90 only)	Control signal	A fault may prevent communication or cause irregular data. Communication data cannot be used in the condition diagnosis related to safety.

• RX-R

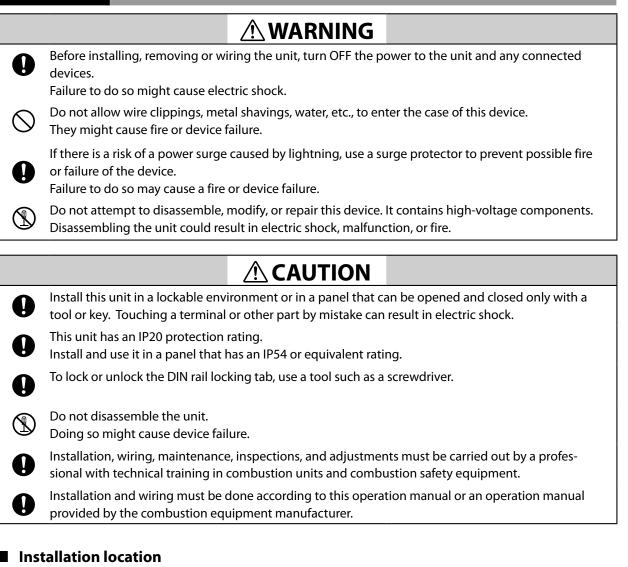
Category	Name	Туре	Description and precautions	
Input	Interlock input (IN1 to IN4)	Safety input	fety input Perform fault diagnosis for the input circuit.If there is a fault, lock out occurs.	
	Startup input	Safety input	Perform fault diagnosis for the input circuit.If there is a fault, lock- out occurs.	
	Reset input	Safety input	Perform fault diagnosis for the input circuit.If there is a fault, lock- out occurs.	
Output	Monitor output (M-1 to M-11)	Control output	Depending on the fault, the output may get stuck in ON or OFF. Also, fault diagnosis is not performed. This cannot be used in safety shutoff valves or for controlling dangerous sources of power. *1	
	IG (ignition transformer)	Safety output	Perform fault diagnosis for the output circuit.If there is a fault, lock- out occurs.	
	PV (pilot safety shutoff valve)	Safety output	Perform fault diagnosis for the output circuit.If there is a fault, lock- out occurs.	
	MV (main safety shutoff valve)	Safety output	Perform fault diagnosis for the output circuit.If there is a fault, lock- out occurs.	
	Flame voltage output	Control output	A fault may cause irregular output values.Fault diagnosis is not performed. This cannot be used in safety shutoff valves or for con- trolling dangerous sources of power.	

*1 When using the monitor settings shown below, use the specified connection method.

C→ ● RRX-R purge conditions (1-2) (page 5-4),

[•] Wiring of RX-R40/20 terminal block A (AC) "(5) Connection for the direct ignition, external relay model (RX-R22)" (page 3-12).

Chapter 2. INSTALLATION



Do not install in locations like the following:

- Places with a high or low temperature or high or low humidity outside the specification range
- Places with sulfide gas or other corrosive gases
- Places exposed to dust or oily smoke
- Places exposed to direct sunlight, wind or rain
- Places exposed to mechanical vibration or shocks outside the specification range
- Near high voltage lines, welding machines or other sources of electrical noise
- Places with strong magnetic fields
- Places with flammable liquid or gas

! Handling precautions

• The RX series has a commercial power supply for loads on the front terminal. Make sure the RX series attachment area has an electric shock cautionary display conforming to JIS regulations, as well as the following electric shock cautionary content.

[Breaker section]

• Be sure to shut off the main breaker during construction or inspection, as electric shock or short circuit may result in bodily harm.

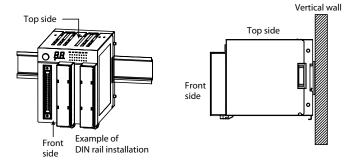
[RX series installation section]

Be sure to take the following precautions to prevent fire or electric shock:

- Do not perform unauthorized modification.
- Be sure to set device to the proper mode after testing.
- Make sure the door is securely closed and locked as needed.
- Do not connect/disconnect terminals while power is on.
- Do not connect/disconnect main device while power is on.
- Do not open/remove terminal cover while power is on.

Installation position

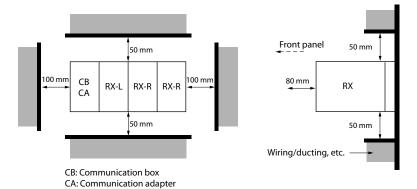
Install so that the device is positioned as shown.



Installation space

During installation, leave a clearance of at least 50 mm above and below, 100 mm on the right and left, and 80 mm from the front of the unit for air intake and device removal, wiring, and maintenance.

Install at least 100 mm away from other devices or another row of RX units. Do not install above heat sources such as electric devices.



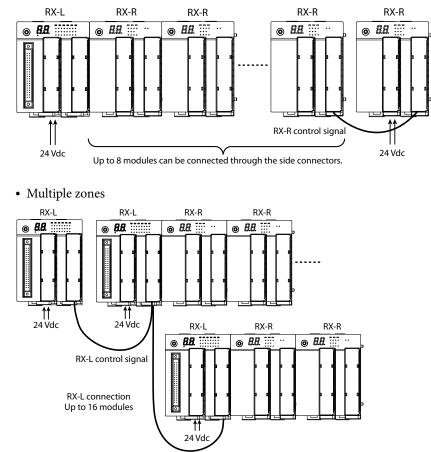
Module connection

The RX-L and RX-R can be connected to another RX-R with the base side connector. Connecting the modules connects the power and communication of each module, reducing the amount of wiring that is required.

Connect the modules before installing them on the DIN rail.

A module connection example is shown below.

• Multiple burners



To connect to the **RX-L90** via an Ethernet connection, you need a communication box or a communication adapter.

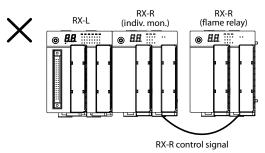
! Handling precautions

- Modules receive and supply power through the side connectors. Up to 8 connected RX-L and RX-R modules can receive and supply power in this way.
- Supply power to any one of the modules connected by side connector.
- Select a power supply that is sufficient for the total power consumption of all the modules connected by side connectors.
- Connect an RX-L to the left side of the RX-R. The RX-L cannot be connected to the right side of the RX-R.
- Install a breaker so that power has no effect on burner maintenance.
- The communication box or communication adapter can only be connected to the left side of the RX-L90.

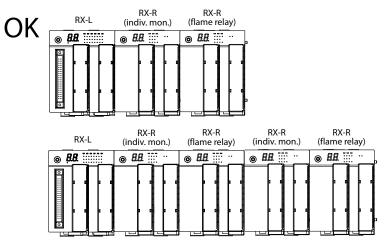
Important notes for Independent supervision

For Independent supervision, use an RX-R set for Independent supervision and an RX-R set for flame relay in a 1-to-1 configuration.

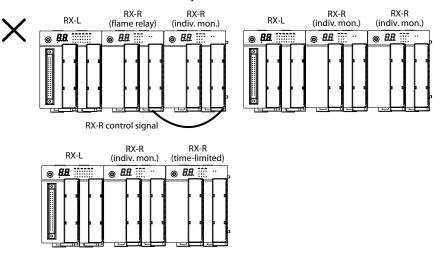
Make sure to connect the modules, or else the main flame will no longer be detectable.



Correct examples: The module for the pilot burner and module for the main burner are connected 1-to-1.



Incorrect examples: RX-R (Independent supervision) and RX-R (flame relay) are connected backwards, or the RX-R (Independent supervision) is connected to an RX-R with an operation mode other than flame relay.



Installation method

There are two methods of attachment for this device, described as follows.

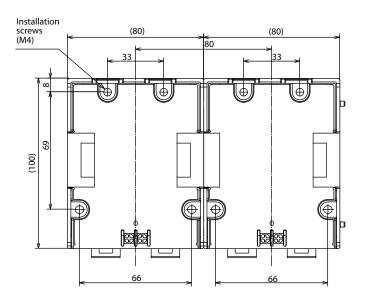
- Screw installation
- DIN rail installation

If you are using the **RX-L90** with a communication box or communication adapter, you need to mount it on a DIN rail.

• Screw installation

Secure the device by inserting 4 M4 screws in the provided screw holes.

Unit: mm



DIN rail mounting

After installing the DIN rail, pull out the DIN rail locking tabs sufficiently and attach the base to the rail. Then push the locking tabs upward until they click into place.

! Handling precautions

• Install the unit on a vertical surface with the DIN rail locking tabs at the bottom.

Terminal block installation and removal

Make sure the power source wired to the terminal block is turned OFF when working. Connecting/ disconnecting the terminal block with the power ON may result in electric shock if the polar zone is touched.

The following diagrams show the RX-L, but the RX-R is handled in the same way.

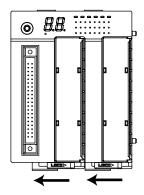
! Handling precautions

- Do not remove the terminal block except for necessary work, such as:
 - Wiring done before device installation
- Maintenance

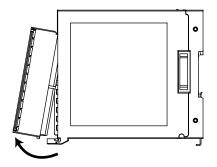
Make sure the power source wired to the terminal block is turned OFF when working.

Removal method

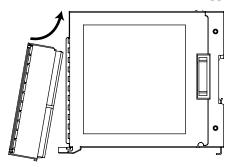
(1) Slide the lock lever of the terminal block to the left to unlock the terminal block.



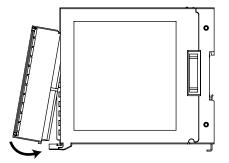
(2) Using the upper part of the terminal block as a fulcrum, remove the terminal block by pulling it out towards you from the bottom.



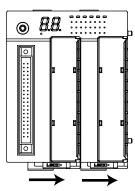
- Installation method
- (1) Tilt the terminal block and insert its upper side into the groove in the case.



(2) Install by pushing the bottom of the terminal block toward the case.



(3) Slide the lock lever of the terminal block to the right to lock the terminal block.



Attaching the main unit to the base

Make sure the power is turned OFF when attaching/removing the main body's base. Connecting/ disconnecting the main body's base with the power ON may result in electric shock if the polar zone is touched.

The following diagram shows the RX-L, but the RX-R is handled in the same way.

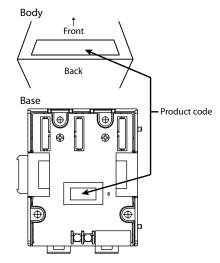
! Handling precautions

• The included base and body must be used as a pair.

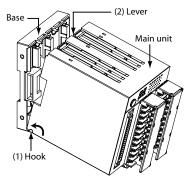
The following error occurs on the RX-L90 since information on the base is different to the information on the body.

Eb88 (Communication CPU) data error (1)

Make sure that the product codes on the body and base match.



- You cannot use the RX-L80 base with the RX-L90 body.
- Do not attach an RX-L base to an RX-R, or an RX-R base to an RX-L. Doing so may cause damage.
- First attach the hooks on the bottom of the main unit to the base. Failure to do so may damage the hooks.
- (1) Attach the hooks on the bottom of the main unit to the base.
- (2) Insert the upper side of the main unit until the levers make a click.



To remove, press the two levers on top while pulling the unit toward you.

Chapter 3. WIRING

0	Before installing, removing or wiring the unit, turn OFF the power to the unit and any connected devices. Failure to do so might cause electric shock.
0	Before removing, mounting, or wiring this module, make sure the power has been OFF for at least 1 minute. Residual voltage may cause electric shock.
\bigcirc	Do not allow wire clippings, metal shavings, water, etc. to enter the case of this device. They might cause fire or device failure.
0	Before wiring the unit, be sure to turn the power OFF. Failure to do so might cause device failure.
0	Wire the unit in compliance with established standards, using the specified power source and recog- nized installation methods. Failure to do so might cause electric shock, fire or device failure. The total power consumption of all connected modules must not exceed 80 W. If it does, fire or de-
0	vice failure may result. Do not supply power to the linked modules from multiple power sources. Also, do not short the power terminals of connected modules that are sharing a power source. Doing so might cause fire or device failure.
0	Do not use unused terminals on the device as relay terminals. Doing so can cause electric shock, fire or device failure.
0	Do not short-circuit the outputs. Doing so can cause device failure.
0	Firmly tighten the terminal screws. Insufficient tightening of terminal screws might cause fire.
0	Be sure to check that the module has been correctly wired before turning on the power. Incorrect wiring of the module can damage it or lead to hazardous conditions.
(Do not attempt to disassemble, modify, or repair. This device contains high-voltage parts. Disassembling it could result in electric shock, device failure, or fire.
0	Always connect interlock contacts and limit device contacts directly to the Interlock input on this unit. Do not connect via a relay or other intermediary device.
0	Do not open the terminal block cover while the power is ON. Doing so may result in electric shock if the polar zone is touched.
\bigcirc	After wiring, make sure the cover is securely closed. Failure to do so may result in electric shock if the polar zone is touched.
0	Do not use a terminal block if its cover is lost or damaged. In such a case, the terminal block should be immediately replaced with a new one.
	If flame voltage measurement is required during maintenance or troubleshooting, do not measure the main body's terminal block directly. Instead, perform measurement from an external terminal block that has been wired in advance. When taking measurements, establish connection from the flame voltage terminal to the external voltage terminal within the control panel. When wiring, dis- connect from the high-voltage terminal to avoid electric shock.

	Do not disassemble this device. Doing so might cause device failure.
0	Installation, wiring, maintenance, inspection, and adjustment must be carried out by a professional with technical training in combustion units and combustion safety equipment.
\bigcirc	Make sure the load connected to each terminal does not exceed the ratings indicated in the specifications.
0	Installation and wiring must be done according to this operation manual or an operation manual provided by the combustion equipment manufacturer.
0	Wire the high voltage cable for the ignition transformer separately and keep it at least 30 cm away from this unit and other wires (we recommend 1 m).
\bigcirc	Do not combine AC power lines and signal lines such as the interlock contact wires in the same mul- ticore cable. Always wire them separately.
0	Connect the power last. Otherwise, accidentally touching the wrong terminal can cause electric shock or damage.
0	After wiring is complete, make sure it has been done correctly. Incorrect wiring may cause device damage or malfunction.
0	Use D-class grounding (max. resistance of 100 Ω) or better, in accordance with technical standards for electrical equipment, and always connect the ground directly to the burner itself.

Wiring precautions

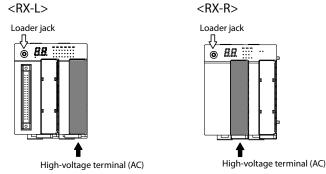
- Before wiring, verify the model No. and terminal Nos. written on the label on the side of the main unit.
- When wiring, use crimp terminal lugs that fit M3 screws.
- Take particular care that crimp terminal lugs, etc. do not make contact with adjacent terminals.
- Leave a distance of at least 30 cm between I/O lead wires and communications lead wires or power lead wires. Also, do not pass these lead wires through the same conduit or wiring duct.
- After wiring is complete, make sure it has been done correctly. Incorrect wiring may cause device damage or malfunction.
- The list below shows terminal blocks and connectors that use the same kind of hardware. Make sure to avoid wiring errors or wrong insertions.
 <RX-L>
 - Terminal block A (Interlock input terminal) and terminal block B (load output terminal): M3 screws
 - RX-R control signal connection and RX-L control signal connection: connectors CN6, CN7

<RX-R>

• Terminal block A and terminal block B: M3 screws

• The loader jack and terminal block are connected. High voltage is being applied to the terminal block, so be careful to avoid electric shock when inserting the loader cable.

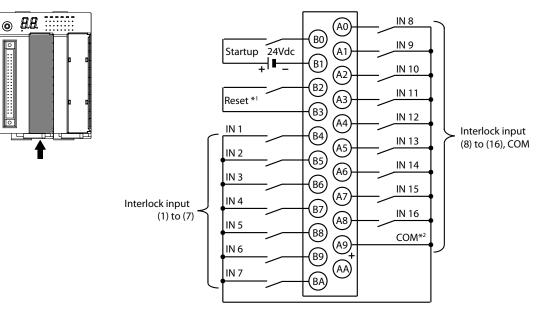
When using a personal computer loader, secure enough workspace so that hands or feet do not get caught on the loader cable.



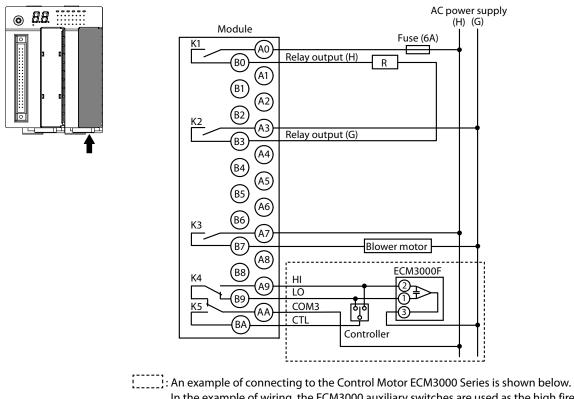
• Frame sensor terminals F and G are not insulated with frame voltage output terminals FV+ and FV-. If flame rods are used as flame sensors, terminal G will be grounded, so flame voltage output terminal FV- should also be grounded within the product. If the flame voltage output is to be converted by signal converter etc., please use an insulated signal converter.

■ RX-L wiring

Wiring for terminal block A (Interlock input terminal)



*1 Use the reset input by itself. It cannot be used together with another RX-L reset input.
*2 The COM terminal cannot be used together with another RX-L.

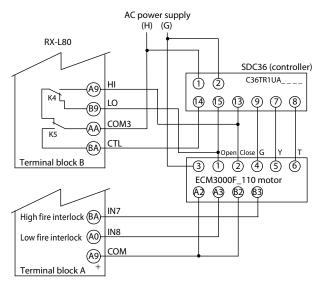


• Wiring for terminal block B (load output terminal)

In the example of wiring, the ECM3000 auxiliary switches are used as the high fire interlock and the low fire interlock, and terminal A on the RX-L80 is assigned to interlock input IN7 and IN8.

In the example, the ECM3000 auxiliary switches are used as the high fire interlock and the low fire interlock, and terminal A on the RX-L80 is assigned to Interlock inputs IN7 and IN8.

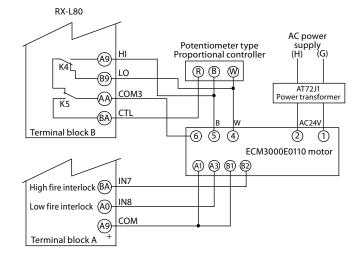
1. Wiring to relay contact input ECM3000F_110 (with auxiliary switches)



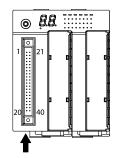
📖 Note

- To automatically tune the SDC36 position damper modulation after wiring the SDC36 controller, ECM3000F motor, and RX-L as outlined above, connect the SLP-RX_PC loader package to the RX-L, switch it to test mode, change the control motor output to "Proportional," and then run position damper modulation auto-tuning.
- AC power supply (H) (G) RX-L80 SDC36 (controller) C36TCXUA _ _ _ ᠿ HI (A9) K4L (13) (14) LO (B9) _ 4–20mA сома (AA) K5 CTL (BA) Terminal block B Q (4) (5) ECM3000G _120/_ 220 motor (A1) A3 B1 B2 3 IN7 High fire interlock (BA) IN8 Low fire interlock (A0) сом (A9) Terminal block A
- 2. Wiring to 4 to 20 mA input ECM3000G _120/_ 220 (with auxiliary switches)

3. Wiring to potentiometer input ECM3000E0110 (with auxiliary switches)

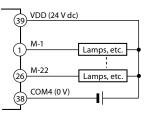


Monitor output connector wiring



Terminal*	Monitor output	Terminal	Monitor output
1 (B20)	Monitor output 1 (M-1)	21 (A20)	Monitor output 17 (M-17)
2 (B19)	Monitor output 2 (M-2)	22 (A19)	Monitor output 18 (M-18)
3 (B18)	Monitor output 3 (M-3)	23 (A18)	Monitor output 19 (M-19)
4 (B17)	Monitor output 4 (M-4)	24 (A17)	Monitor output 20 (M-20)
5 (B16)	Monitor output 5 (M-5)	25 (A16)	Monitor output 21 (M-21)
6 (B15)	Monitor output 6 (M-6)	26 (A15)	Monitor output 22 (M-22)
7 (B14)	Monitor output 7 (M-7)	27 (A14)	NC
8 (B13)	Monitor output 8 (M-8)	28 (A13)	NC
9 (B12)	Monitor output 9 (M-9)	29 (A12)	NC
10 (B11)	Monitor output 10 (M-10)	30 (A11)	NC
11 (B10)	Monitor output 11 (M-11)	31 (A10)	NC
12 (B9)	Monitor output 12 (M-12)	32 (A9)	NC
13 (B8)	Monitor output 13 (M-13)	33 (A8)	NC
14 (B7)	Monitor output 14(M-14)	34 (A7)	NC
15 (B6)	Monitor output 15(M-15)	35 (A6)	NC
16 (B5)	Monitor output 16(M-16)	36 (A5)	NC
17 (B4)	NC	37 (A4)	COM4 (0 V)
18 (B3)	NC	38 (A3)	COM4 (0 V)
19 (B2)	NC	39 (A2)	VDD (24 Vdc)
20 (B1)	NC	40 (A1)	VDD (24 Vdc)

 * The number in parentheses is a pin assignment for a transistor output connector (81446847-001/ Fujitsu Components connector (sold separately)).



• RS-485 communication connections

CN8

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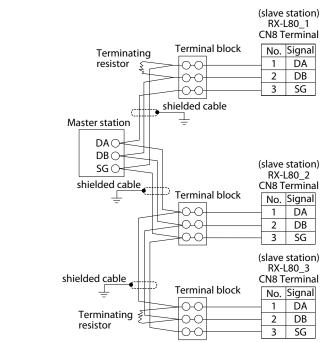
LA A

R

DA DB SG

 Λ

RS-485 communication wiring is the 3-wire type. Make sure to use DA, DB, and SG to connect to connector CN8.



! Handling precautions

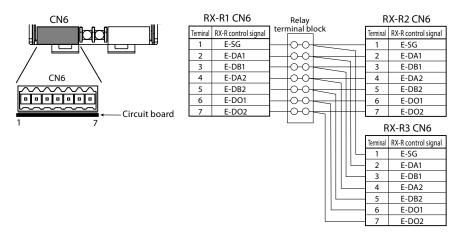
• Insert a 0.5 W or greater terminating resistor of 150 Ω between the DA signal and DB signal at each end of the communication path. Using external terminal blocks to receive the communications cable, and implementing a terminating resistor in the terminal blocks makes it easier to insert. (A resistor and cable will not both fit into the base's connector CN8.)

If a device does not allow terminating resistor to be placed in the same line, follow the settings of the device.

- The cable to the terminal block from the RX-L must be as short as possible. (Max, cable length: 1 m)
- Be sure to connect the SG terminals to each other. Failure to do so might cause unstable communications.

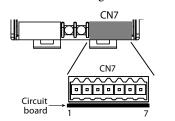
RX-R control signal connection

If RX-R control signal wires cannot connect to another RX-R with side connectors, connect to connector CN6.



RX-L control signal connection

If RX-L control signal wires are to connect to another RX-L, use connector CN7.



onn							
R	X-L1 CN7	Relay terminal block		RX-L2 CN7			
Terminal	RX-L control signal		(Terminal	RX-L control signal	
1	C-SG0		_	_	1	C-SG0	
2	C-DA1		_	$ \rightarrow $	2	C-DA1	
3	C-DB1		_	511	3	C-DB1	
4	C-DA2		_		4	C-DA2	
5	C-DB2		-		5	C-DB2	
6	C-DIO		5		6	C-DIO	
7	C-SG		i H		7	C-SG	
					F	RX-L3 CN7	
					Terminal	RX-L control signal	
					1	C-SG0	
					2	C-DA1	
					3	C-DB1	
				L	4	C-DA2	
			L		5	C-DB2	
					6	C-DIO	

C-SG

I/O isolation

Solid lines indicate isolation from the rest of the circuit.			
DC power (TB1, TB2)	Interlock input (IN 1 to IN 16, COM)		
Reset input	RX-L control signals (CN7, pins 6-7)		
RS485 host communication (CN8)	RX-R control signal connector (CN6)		
Loader jack (loader) communication			
Ethernet host communicatin(RX-90 only)	RX-L control signal connector (CN7, pins 1-5)		
Relay output R/S	AC power supply H, G		
Startup input	Monitor output connector		
Control motor output	Blower output		

RX-R wiring

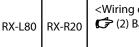
• Combining and wiring RX-L80 and RX-R40/20

- 1. The method of combining the RX-L80 and RX-R40/20 depends upon how the pilot burner and main burner operate.
- 2. Configuration according to operation method, and wiring of RX-R40/20 terminal block A
 - Interrupted pilot

```
- For continuous operation equipment (applicable to batch operation as well)
```

RX-L80	RX-R40	<wiring a="" block="" of="" rx-r40="" terminal=""></wiring>
--------	--------	---

- For batch operation equipment



<Wiring of RX-R20 terminal block A> (2) Basic connection (RX-R20)

· Intermittent pilot, continuous pilot

- For continuous operation equipment (applicable to batch operation as well)

RX-L80	RX-R44	RX-R40	(
			<
			(

<Wiring of RX-R44 terminal block A> (1) Basic connection (RX-R40/44) <Wiring of RX-R40 terminal block A> (3) Connection for main flame monitoring with

Independent supervision (RX-R40 (flame relay settings))

- For continuous operation equipment with external relay drive

(applicable to batch operation as well)

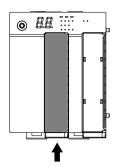
RX-L80	RX-R46	RX-R40	<wiring a="" block="" of="" rx-r46="" terminal=""> (4) Connection for Independent supervison, external relay model (RX-R46)</wiring>	
			<wiring a="" block="" of="" rx-r40="" terminal=""> (3) Connection for main flame monitoring with Independent supervision (RX-R40 (flame relay settings))</wiring>	

Direct ignition

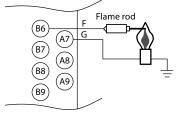
- For a batch operation equipment with direct ignition and external relay drive

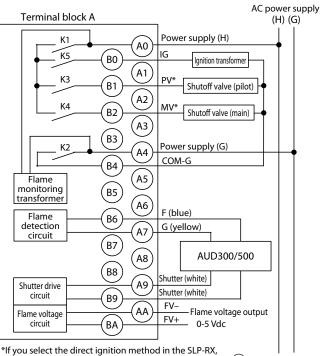
RX-L80	RX-R22	<wiring a="" block="" of="" rx-r22="" terminal=""> (5) Connection for the direct ignition, external relay model (RX-R22)</wiring>
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Wiring of RX-R40/20 terminal block A (AC) (1) Basic connection (RX-R40/44)



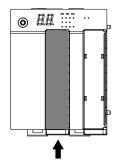




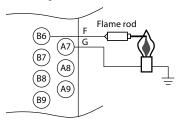


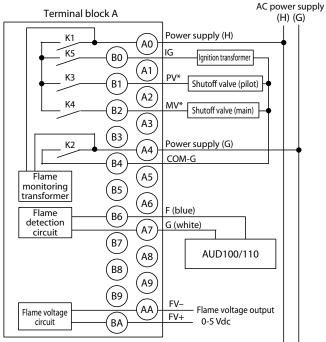
connect the main burner safety shutoff valve to terminal (B_1) .

(2) Basic connection (RX-R20)

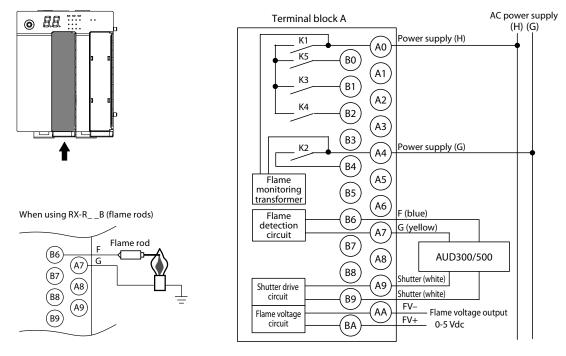


When using RX-R__B (flame rods)





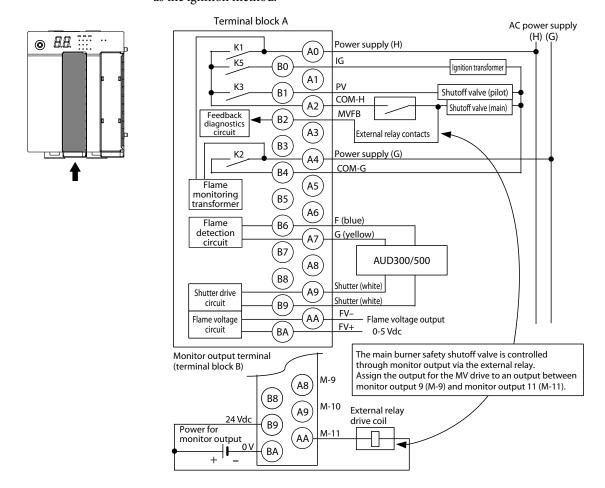
* If you select the direct ignition method in the SLP-RX, connect the main burner safety shutoff valve to terminal (B1).



(3) Connection for main flame monitoring with Independent supervision (RX-R40 (flame relay settings)) The configuration includes the Independent supervision model RX-R44.

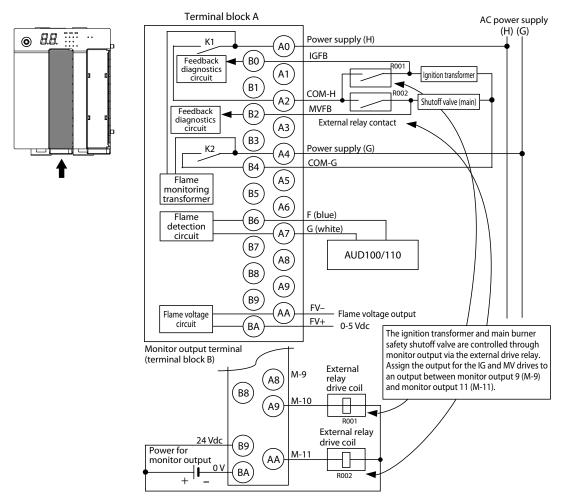
! Handling precautions

• If RX-R40 terminal block A is used with the above connection, do not connect to (DC) terminal block B's B2 to B6 (IN1 to IN4, COM).



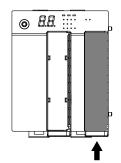
(4) Connection for Independent supervison, external relay model (RX-R46)

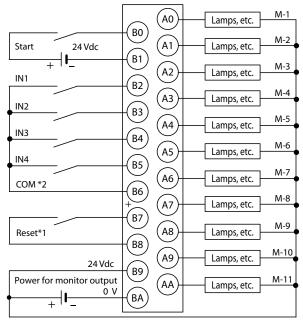
The configuration includes the selectable ignition model RX-R40. Select flame relay as the ignition method.



(5) Connection for the direct ignition, external relay model (RX-R22)

• Terminal block B connection (DC)



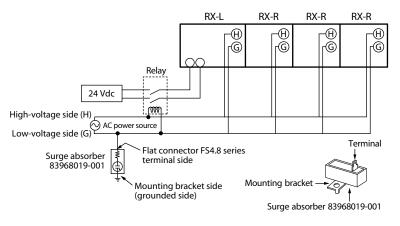


- *1 Use the reset input by itself. It cannot be used together with another RX-R40/20 reset input.
- *2 The COM terminal cannot be used together with another RX-R40/20.

• Wiring of AC power source, DC power source, external relay, surge suppressor

When using a surge suppressor as a countermeasure against lightning, perform the following steps.

Model No.: 83968019-001 (sold separately)

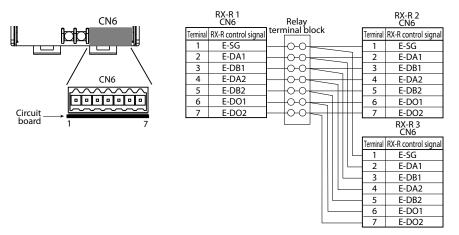


! Handling precautions

- Attach the FS4.8 series flat connector, which is a Tyco Electronics Amplifier 187 series receptacle or equivalent, to one terminal of an electrical wire and keep the wiring as short as possible.
- The mounting bracket of Surge suppressor 83968019-001 is clamped between the ground side and the inside to enable conduction. It is connected to ground by mounting it on a metal part that is connected to ground, such as a burner housing.
- Make sure 24 Vdc power supplied to the RX-R is linked to AC power H. Supplying only 24 Vdc power to the RX-R without AC power may cause a malfunction.

RX-R control signal connection

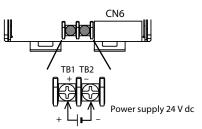
If RX-R control signal wires cannot be connected to another RX-R with side connectors, connect to connector CN6.



• I/O isolation

The solid line indicates isolation from the rest of the circuit.			
DC power supply (TB1, TB2)	Interlock input (IN 1 to IN 4/COM)		
Reset input (reset/COM)	Shutter output (S1/S2)		
RX-R control signal connector (CN6)	Flame voltage output (FV+/FV–)		
Relay output (IG/PV/MV/COM-H/COM-G) AC power supply (H, G)			
Flame detector (F, G)			
Startup input	Monitor output connector		

Power terminal connection (for RX-L, RX-R)



! Handling precautions

- Modules receive and supply power through the side connectors. Up to 8 connected RX-L and RX-R modules can receive and supply power in this way.
- Supply power to one of the modules connected by side connectors.
- Select a power supply that is sufficient for the total power consumption of all the modules connected by side connectors.

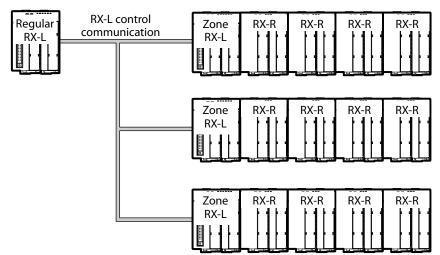
Multi-zone instrument applications

The following multi-zone configuration will be used for descriptive purposes.

Cautions

- This instrumentation example is supplied for reference only. Before use, do a risk assessment based on the actual combustion equipment.
- If there is a problem with an RX-R in a certain zone, and if the device is to be replaced, switch OFF the power of the zone containing the RX-R.

• System structure diagram



• System specifications

The following specifications will be used for this system.

- If an error occurs for one zone, which is then stopped, other zones will continue operating.
- The problem device in the zone in which the error occurred can be replaced.

• Parameter settings

In order to fulfill the required system specifications, all RX-L settings should be as follows. With these settings, if a zone has an RX-L error, the other zones can continue operating. However, if all RX-L zones experience an error, all RX-Ls will be stopped.

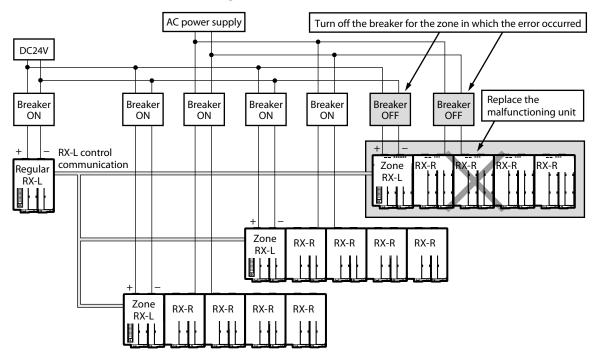
Туре	Item description	Code	Set value
Control	Number of locked out zone RX-Ls	B-8	3*
setting	Number of connected zone RX-Ls	B-14	3
	RX-L communication error remedy	B-18	Run

Set to the number of zone RX-Ls connected to regular RX-L.

External instruments

RX series devices cannot be hot swapped, so there should be a circuit breaker (or a power supply switch) for each zone.

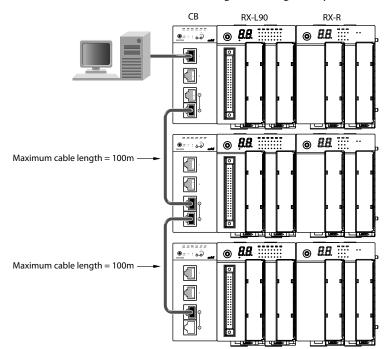
If a zone error occurs, the power to that zone can be turned off, and the abnormal device can be replaced.



Ethernet connections

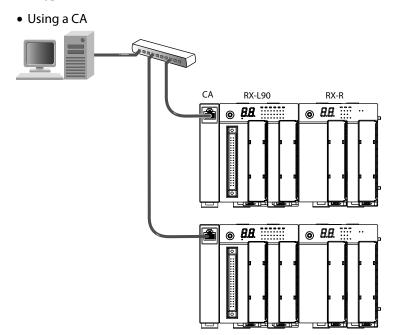
Daisy chain and star connections

Connect CBs (communication boxes) together using a daisy chain connection.



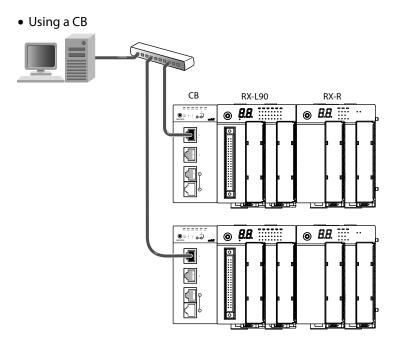
- For connections between CBs, use port 3 or port 4. Normally, port 4 connects to port 3 on the destination CB. You can also connect port 3 to port 3 or port 4 to port 4.
- When connecting to the host monitoring system, use port 1 or port 2. You can also use port 3 or port 4.
- You can connect up to a maximum of 100 communication boxes.
- The cable between each CB can be no longer than 100 m.
- For the Ethernet cable, use Cat 5e or higher (ANSI/TIA/EIA-568-B) 4-pair straight-wire UTP (Unshielded Twist Pair) cable.

Do not use an STP cable (shielded twisted pair cable).



You can also use a general-purpose (commercially available) switching hub and a star-type connection.

Install the CA (communication adapter) on the left side of the RX-L90.

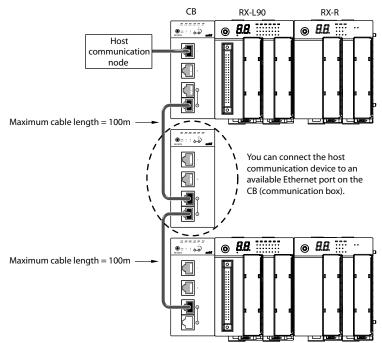


Install the CB (communication box) on the left side of the RX-L90. Use port 1 or port 2.

• Long-range connection

• Connections using a CB

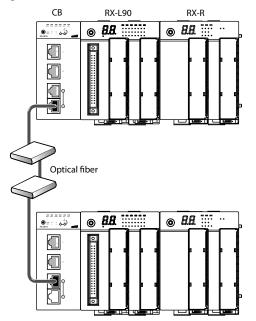
This refers to a connection that uses communication boxes as relays. (repeaters)



Connections using optical media converters

Use a commercially-available optical media converter to extend the distance of the connection.

The optical fiber section is not affected by noise. It can be connected in a grounded environment and between different buildings.



! Handling precautions

• Correct operations are not guaranteed when using a general-purpose (commercially available) optical media converter.

Before using a converter, first make sure that it works correctly to avoid problems.

For information on general-purpose (commercially available) optical media converters, contact the applicable manufacturer or retail outlet.

ltem	Required specifications
Bridge function	Not installed
	Do not use a media converter if the specifications on the converter state any of the following: • Built-in bridge function or With bridge function
	Built-in L2 switching function
	• Transfer method (switching method): store and forward
	Lists the buffer capacity
	 The TP port is compatible with 10BASE-T
	Lists the aging time
	Note: Specifications are listed differently by each manufac-
	turer.
	If they are unclear, contact the manufacturer.
TP port	100BASE-TX (IEEE802.3u) Full Duplex
(local port)	(Local port) Auto Negotiation support is required
"FX port 100BASE-FX	100BASE-FX (IEEE802.3u) compliant
(IEEE802.3u) compliant"	The optical fiber specifications should be decided consid-
(optical port, remote port)	ering the connection distance.
Environmental conditions	Depends on the installation environment

Required specifications for optical media converters

• Unacceptable wiring and example of special wiring

• Wiring when using an intranet

Devices can only be connected using an intranet if the conditions below have been met.

<Condition 1>

• The intranet is separated from other devices using the VLAN function.* The intranet is configured so that data sent from other devices on the intranet does not pass through modules, and data sent from these modules does not pass through devices other than these modules.

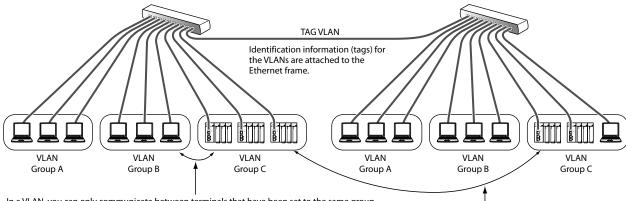
<Condition 2>

- Fixed IP addresses can be assigned
- Only IPv4 is supported. (IPv6 is not supported)
- Address classes and network addresses are optional.
- Automatic address retrieval through DHCP is not supported.

- <Specifications for the destination network>
 - Specifications for the destination network when using communication boxes 100BASE-TX/10BASE-T (1000BASE-T is not supported) Full Duplex/Half Duplex
- Specifications for the destination network when using communication adapters 100BASE-TX (1000BASE-T/10BASE-T is not supported)
- Full Duplex (Half Duplex is not supported)
- The Auto Negotiation function is required.
- * VLAN is an abbreviation for Virtual LAN. Divide the network into any virtual groups, regardless of the actual physical connection configuration.
- This can be achieved using a VLAN-compatible switching hub.

By creating a VLAN configuration, you can isolate networks and create networks that are not affected by external influences.

- Prepare separate routing devices for communication between networks that have been separated using a VLAN.
- Actual connection configuration

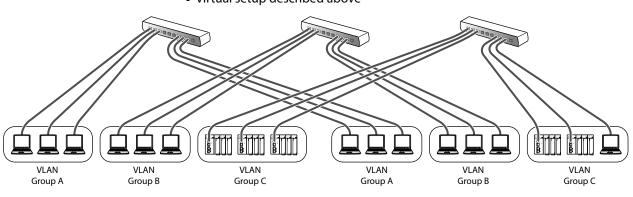


In a VLAN, you can only communicate between terminals that have been set to the same group. If terminals are connected to the same switching hub but they have been set to different VLAN groups, they cannot communicate directly with each other.

(VLAN-enabled switching hubs do not transfer communication frames to other groups.) To communicate between different VLAN groups, route a function between the VLAN groups, or insert a router between the VLAN groups.

Virtual setup described above

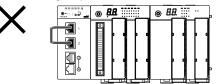
Identification information (tags) for the VLANs are attached to the Ethernet frame.



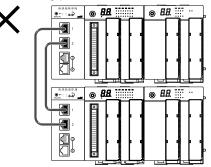
• Example of unacceptable wiring

The examples below are representative of wiring examples that are not permitted. (Not all unacceptable wiring examples are shown.)

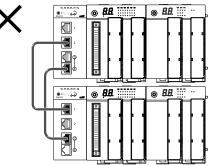
Connecting to ports 1 and 2 on the front



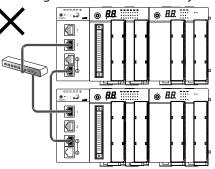
Connecting ports 1 and 2 of different communication boxes



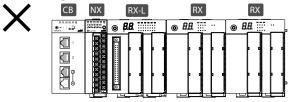
Connecting ports 1 and 2 when there is a daisy chain connection between ports 3 and 4



Connecting ports 1 and 2 with a general-purpose (commercially available) switching hub when there is a daisy chain connection between ports 3 and 4



Connecting with a mix of RX and NX



Precautions regarding the location of Ethernet cables

This section explains some precautions relating to the location of Ethernet cables.

• Minimum bend radius

The bend radius* of an Ethernet cable should be at least 50 mm or more. A smaller bend radius may result in disconnections and deterioration of cable characteristics.

The deterioration of cable characteristics causes communication errors.

- * The minimum bend radius indicates the bend radius at which a cable can be installed and at which the characteristics of the cable can be guaranteed for long-term use.
- Installing communication cables

When installing Ethernet cable, do not deform the cable with clamps and metal brackets.

If the cable is deformed, deterioration of cable characteristics or disconnection may result. Deterioration of cable characteristics causes communications errors.

• Distance from sources of electromagnetic interference Avoid sources of electromagnetic interference when routing Ethernet cables. Electromagnetic interference causes communication errors.

An example of sources of electromagnetic interference includes motors, transformers, copy machines, and machine tools, and power cables to these types of equipment. Keep Ethernet cables separated from power cables by the distances shown in the table below. These values are the specifications for these devices and are based on ANSI/TIA/EIA-569.

	Condition		
Condition	Less than 2kVA	2 to 5kVA	More than 5 kVA
Unshielded electrical devices or power lines that are close to a communica- tions line which is exposed or in a non- metallic path	300mm min.	600mm min.	1200mm min.
Unshielded electrical devices or power lines that are close to a communications line in a grounded metal conduit	150mm min.	300mm min.	600mm min.
Power lines contained in a grounded metal conduit that are close to a com- munications line in a grounded metal conduit		150mm min.	300mm min.

! Design precautions

• For Ethernet cable, use 4-pair straight-wire UTP cable of Cat 5e or higher (nonshielded twisted pair cable) as defined by ANSI/TIA/EIA-568-B. This module is not compatible with STP cables (shielded twisted pair cable).

Chapter 4. RX-L SETTINGS

4 - 1 Overview

An overview of setting items

	Item description	Code	Details	Reference pages
System	RX-L type	A-1	Selects from regular RX-L, zone RX-L, and single zone RX-L.	4-3
	Number of connected zone RX-Ls	B-14	Sets the number of zone RX-Ls connected to regular RX-Ls.	4-5
	Number of locked out zone RX-Ls	B-8	Sets the number of abnormal zone RX-Rs for overall stop of regular RX-Ls.	4-5
	RX-L address	B-19	Set the zone RX-L address.	4-7
	Number of connected RX-Rs	E-1	Sets the number of RX-R units to be connected to zone RX-L and single zone RX-L units.	4-7
	Number of locked out RX-Rs	E-2	Sets the number of RX-R units stopped abnormally for zone lockout.	4-7
	Air pressure switch check use	A-2	Select a air pressure switch operation check or not.	4-7
	Air pressure switch check result clear	A-5	Selects cancellation conditions for air pressure switch operation check results.	4-8
	760 °C mode use*	A-4	Selects a furnace temperature 760 °C monitoring mode.	4-8
	Startup type	A-3	Selects process start conditions.	4-9
Control	RX-L start method	B-1	Set the RX-L startup conditions.	4-10
	Prepurge use	B-2	Select prepurge, postpurge ON/OFF for RX-L.	4-10
	Blower Sync signal source	B-6	Select an input method for Blower Sync signals.	4-10
	Purge count start signal source	B-7	Sets the purge count start signal source.	4-11
	High fire position input	B-9	Specifies high and low fire position input numbers.	4-11
	Low fire position input	B-10		
	Process timeout handling	B-11	Sets remedy methods for cases when the process progress conditions are not met.	4-12
	Prepurge after RX-R restart	B-12	Sets prepurge condition for when all RX-Rs are stopped during combustion and then restarted.	4-12
	Low fire stop	B-13	Returns equipment to low fire position (ignition condi- tion) when combustion is OFF.	4-13
	Postpurge for residual flame	B-15	Sets the postpurge operation conditions for when there is a residual flame.	4-13
	RX-R prepurge use	B-16	Sets when RX-R input is made into a prepurge condition.	4-13
		B-17	Setting cannot be changed.	4-14
	RX-L communication error handling	B-18	Sets regular RX-L continuous operation ON/OFF for when there is no communication with zone RX-Ls.	4-14
	RX-R start by communication command (RX-L90 only)	F-5	Permits separate RX-R startup from host device via communication.	4-29
	Communication supervision (RS485) (RX-L90 only)	B-21	Sets the reception monitoring conditions for RS-485.	11-1
	Communication supervision (Ethernet) (RX-L90 only)	B-22	Sets the reception monitoring conditions for Ethernet communication.	11-1
	Communication supervision warning reset method (RX-L90 only)	B-23	Sets the reset conditions for host communication timeouts	11-1
Timer	Prepurge time	D-1	Sets the prepurge time.	4-17
	Ignition wait time (s)	D-2	Sets the standby time from when Ignition condition are met to when pilot ignition begins.	4-17
	Damper modulation control wait time (s)	D-3	During the main ignition process, reception of damper modulation input is on standby until this setting elapses.	4-17

* Gas Appliance Directive (CE) does not apply

	Item description	Code	Details	Reference pages
Timer	Postpurge time (s)	D-4	Sets the postpurge time (s).	4-18
	Lockout postpurge time (s)	D-5	Sets the postpurge time (s) after lockout.	4-18
	Process error judgment time (no combustion) (s)	D-6	Sets the error determination time for cases when no process progress conditions have been established (while there is no combustion).	4-18
	Process error judgment time (during combustion) (s)	D-7	Sets the error determination time for cases when no process progress conditions have been established (during combustion).	4-18
	Reignition standby time (s)	D-8	Determines whether or not to execute a prepurge when RX-Rs start up again after all are stopped during combustion.	4-19
	Communication supervision timeout (s) (RX-L90 only)	D-9	Sets the timeout period for reception monitoring.	11-1
RX-R_Group	RX-R_Group	E-3	Set groups to perform combined operation.	4-19
Input settings	Input function	C-1	Selects input functions IN1 to IN16.	4-20
	Off delay time	C-2	Selects OFF delay time for IN1 to IN16.	4-21
	Conditional interlock condition	C-3	Specifies conditional interlocks A to E.	4-21
	Conditional interlock condition standby time	C-4	Sets the standby time for interlock monitoring to start for conditional interlocks A to E.	4-21
Relay output	Relay output	B-3	Sets relay output operation.	4-21
	Blower output	B-4	Sets blower output operation.	4-24
	Damper output	B-5	Sets control motor output operation.	4-24
Monitor output	Flicker	MO-1	Selects the flicker display setting (ON/OFF alternate output) for interlock operated output.	4-24
	Monitor output	MO-2	Selects signals for assignment to monitor outputs 1 through 22 (M-1 to M-22).	4-24
	Monitor output logic	MO-3	Monitor outputs 1 to 22 (M-1 to M-22) monitor output operation	4-26
LED Display	LED settings	DSP-1	Selects signals to be assigned to the module's front display portion (ST1 to ST7, IN1 to IN16).	4-27
	Error display setting	DSP-2	Selects an error display method for display on the mod- ule front 7-segment LED.	4-28
Host com-	Station address	F-1	Sets a station address.	4-29
munication	Baud rate	F-2	Sets the transmission speed.	4-29
(RS485/ Ethernet)	Data format	F-3	Sets parity and stop bit length.	4-29
	Protocol	F-4	Sets communication protocol.	4-29
	RX-R start by communication command (RX-L80 only)	F-5	Permits separate RX-R startup from host device via communication.	4-29
	Minimum response time (ms) (RX-L90 only)	F-6	Sets the minimum response time.	4-29
	IP Address (RX-L90 only)	H-1	Sets the IP address. Changes in settings take effect after powering off and back on.	10-1
	Subnet mask (RX-L90 only)	H-2	Sets the subnet mask. Changes in settings take effect after powering off and back on.	10-1
	Default gateway (RX-L90 only)	H-3	Sets the default gateway. Changes in settings take effect after powering off and back on.	10-1
	MODBUS/TCP Port number (RX-L90 only)	H-4	Sets the MODBUS/TCP port number. Changes in settings take effect after powering off and back on.	10-1

4 - 2 Setting Details

System

This is an explanation of the items available for system.

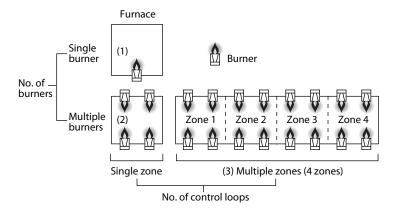
• RX-L type (A-1)

Select whether to use RX-L with regular RX-L, zone RX-L, or single zone RX-L.

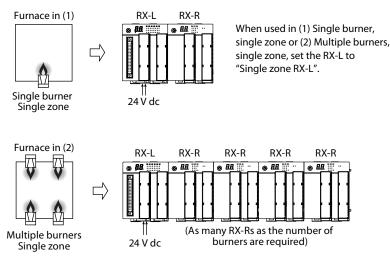
Setting	Description	
Regular RX-L	Operates as regular RX-L.	
Zone RX-L Operates as zone RX-L.		
Single zone RX-L	Operates as single zone RX-L.	

📖 Note

• When furnaces are categorized by number of burners and number of control loops, they can be divided into the following (1), (2) and (3).

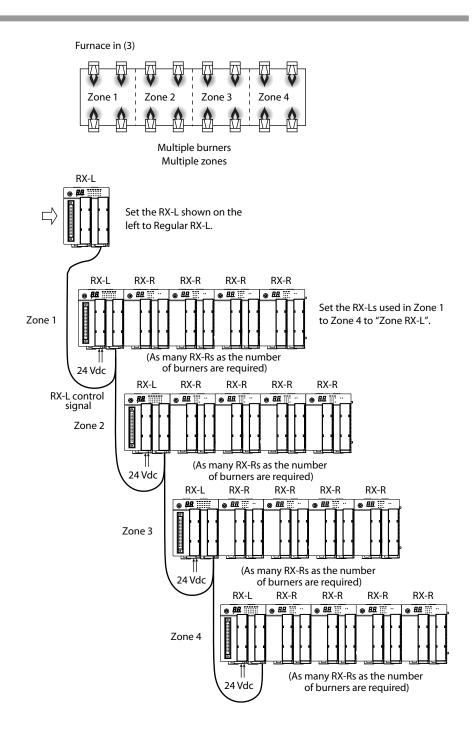


• When performing furnace instrumentation with RX-L and RX-R, the RX-L settings for (1), (2) and (3) above are different. The RX-L settings for (1), (2) and (3) are described below for burners using the interrupted pilot method.



Roles of single zone RX-L

- · Performs interlock monitoring/purging
- · Controls the RX-Rs
- Determines all stop or Separate stop for the RX-Rs (when using multiple burners)



Roles of each RX-L

Regular RX-L

- · Performs interlock monitoring and overall purging for all burners
- Notifies the zone RX-Ls of the interlock conditions
- Determines overall zone stop

Zone RX-L

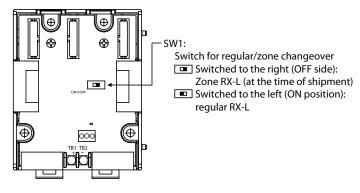
- Determines startup based on the interlock conditions from the regular RX-L.
- Performs interlock monitoring/zone purging by zone
- Controls the RX-Rs (burner controller)

! Handling precautions

- For regular RX-L and zone RX-L, in addition to selecting on the loader, setting the switch on the RX-L base section is also required.
- To enable the "RX-L type (A-1)" setting, and change the "SW1: RX-L type" switch on the RX-L base

If the settings are not correct, RX-L will lock out.

If "single zone RX-L" is selected, this setting is unnecessary.



Number of connected zone RX-Ls (B-14)

This setting is only valid when "RX-L type (A-1)" is set to "regular RX-L".

Setting	Description
Units 1 to 16	Set the number of zone RX-Ls connected to regular RX-Ls.

📖 Note

- If the setting is changed, the new setting is applied under the following conditions.
 - When "Communication error between RX-Ls (E915)" is cancelled
 - When "Error in number of connected RX-Ls (E004)" is cancelled
 - When the system is restarted.

• Number of locked out zone RX-Ls (B-8)

Setting	Description
Units 1 to 16	Set the number of zone RX-L errors for overall stop of regular RX-Ls.

📖 Note

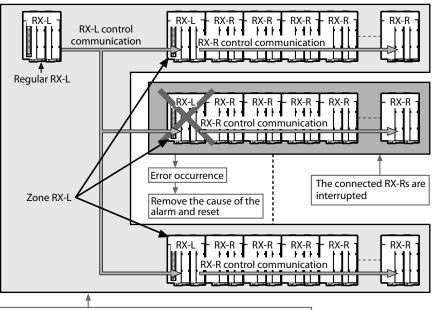
- Process after overall stop
 - After removing the cause of the zone RX-L error, reset the zone RX-L.
 - Reset regular RX-L.
 - After being reset, regular RX-L begins operation.

Example: Two RX-L units are completely stopped due to errors

- One zone RX-L unit is abnormal
- The zone RX-L that produced an error is locked out. (Connected RX-R is blocked as well.)

Regular RX-Ls, other zone RX-Ls, and connected RX-Rs will continue combustion control.

After removing the cause of the zone RX-L error, the zone RX-L can be reset and restarted.

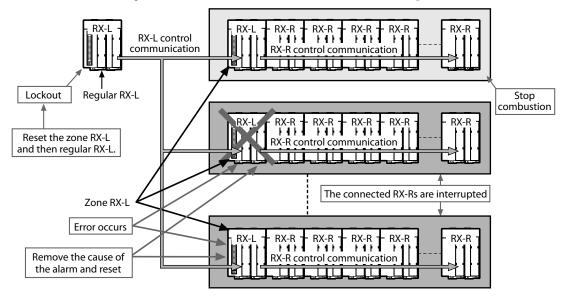


Continue combustion control in zones other than the problem zones

• Two or more RX-L units are abnormal

If an error occurs for two or more RX-L units, all RX-Ls are locked out, and all connected zone RX-Ls are stopped.

After removing the cause of the zone RX-L error, reset the zone RX-L. After that, regular RX-Ls can be reset and restarted via the normal process.



• RX-L address (B-19)

Set the station addresses of the regular RX-L, zone RX-L and single zone RX-L.

Setting	Description
0 to 15	Set the station addresses of the regular RX-L, zone RX-L and single zone RX-L.

📖 Note

• Only the "0" setting is available as the station address of the regular RX-L and single zone RX-L.

Number of connected RX-Rs (E-1)

Set the number of RX-R units to be connected to zone RX-L and single zone RX-L units.

Setting	Description
Units 0 to 32	Set the number of RX-R units to be connected to zone RX-L and single zone RX-L units.

📖 Note

- If the setting is changed, a new setting value is applied according to the following conditions.
 - When "RX-R communication error (E914)" is cancelled
 - When "Error in number of connected RX-Rs (E003)" is cancelled
 - Restart the system.

Number of locked out RX-Rs (E-2)

Set the number of zone lockout abnormal RX-Rs for zone RX-L and single zone RX-L.

Setting	Description
Units 0 to 32	Set the number of zone lockout * abnormal RX-Rs for zone RX-L and single zone RX-L.

Zone lockout means lockout by zone RX-L or single zone RX-L.

📖 Note

• Set to be related as follows.

"Number of locked out RX-Rs" \leq "RX-R units actually connected to zone RX-Ls" If "0" or a value higher than the number of units is set, lockout will not occur.

• Air pressure switch check use (A-2)

Select an air switch check use or not.

Setting	Description
Enable *	Air pressure switch operation check will be executed.
Disable	Air pressure switch operation check will not be executed.

• Operation when Enable is set.

After start-up, make sure the air pressure switch is OFF while the blower is off. (OFFstatus confirmation) Then make sure the air pressure switch is ON while the blower is on. (ON-status confirmation)

Go to the next process only if both OFF and ON status are confirmed as normal.

! Handling precautions

- If Enable is set, make sure to set "Air pressure switch" for the desired input in "Input function (C-1)".
- If "air pressure switch" is not set to an input while "Air switch check use (A-2)" is set to "Enable", the process will not be able to advance ahead of the Air switch ON check process.
- If "air pressure switch" is set to an input while "Air switch check use (A-2)" is set to "Disable", air pressure switch interlock monitoring will be performed (including startup check).

• Air pressure switch check result clear (A-5)

Select cancel conditions for air pressure switch operation check results.

Setting	Description
When RX-L start switch OFF	Check results are cancelled when startup input is OFF.
When blower sync OFF	Check results are cancelled when Blower Sync input is OFF.

! Handling precautions

- Select a system that does not stop the blower after it is ON during startup. Air pressure switch operation check results are maintained while "Blower Sync set in input function (C-1)" is ON (even if startup input is OFF).
- When selecting "When blower sync OFF", make sure to configure the following settings.
 - Set "Blower Sync assignment (B-6) to input". (RX-L80 only)
 - Set "Blower Sync" for the desired input in "input function (C-1)".
- If "When blower sync OFF" is set and Interlock input open (E101) is executed when air pressure switch is turned ON after the air pressure switch operation check has completed, the air pressure switch startup check results will be cancelled.

• 760 °C mode use (A-4)

Select a furnace temperature 760 °C monitoring mode.

Gas Appliance Directive (CE) does not apply.

Setting	Description
Disable	Furnace temp 760 °C monitoring is not performed.
First prepurge only	Furnace temp 760 °C monitoring is performed. The first prepurge after startup is definitely executed regardless of the burner temp. Second and later prepurges are executed according to furnace temperature conditions.
Every prepurge	Furnace temp 760 °C monitoring is performed. Preparge is definitely executed according to burner temp conditions.
Normally	Furnace temp 760 °C monitoring is performed. Prepurge is executed according to temperature conditions.

! Handling precautions

- If the setting is anything other than "Disable", make sure to set "760 °C (1)" and "760 °C (2)" for the desired input in "Input function (C-1)".
- If "760 °C mode use (A-4)" is set to something other than "Disable", and "760 °C (1)" and "760 °C (2)" are not each set to an input, you will not proceed to 760 °C mode.

However, if "760 °C mode use (A-4)" is set to "Disable", and "760 °C (1)" and "760 °C (2)" are each set to an input, lockout will be performed via "760 °C input error (E111)".

Startup type (A-3)

Select a process start condition.

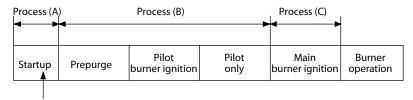
Setting	Description
Link (1)	Select to use the RX-L startup input to start interlock monitoring and then perform combined operations from prepurge to pilot burner ignition and main burner ignition.
Link (2)	Select to use the RX-L startup input to start interlock monitoring and then perform operations from prepurge to pilot burner igni- tion, and use another input * ¹ (or communication) for main burner ignition.
Separate	Select to use the RX-L startup input to start interlock monitoring, use the pilot start * ² to perform operations from prepurge to pilot burner ignition, and use the main burner ignition input * ³ for main burner ignition. Also, when advancing the sequence while cooperating with the host device, set to "Separate".

*1 Use "Group A/B main start" for RX-L input, and use "Main start" for RX-R input.

*2 Use "Group A/B pilot start" for RX-L input, and use "Pilot start" for RX-R input.

*3 Use "Group A/B main start" for RX-L input, and use "Main start" for RX-R input.

📖 Note



Interlock monitoring start

- In Link 1, when the RX-L startup input is turned ON, processes (A), (B) and (C) are performed.
- In Link 2, when the RX-L startup input is turned ON, processes (A) and (B) are performed. Process (C) is performed with the main start.
- In Separate, when the RX-L startup input is turned ON, the operation stops after process (A). Process (B) is performed with the pilot start, and process (C) is performed with the main start.

Control

This is an explanation of the items available for control.

• RX-L start method (B-1)

Set the RX-L startup conditions.

When the RX-L startup conditions are established, interlock monitoring will begin.

Setting	Description
Start switch input	Starts up device with startup input set to ON.
Communication	Starts up device with a startup request from host communication.
Start switch + comm	Starts up device with start switch input and a startup request from host communication.
Start switch or comm	Starts up device with start switch input, or a startup request from host communication.

Prepurge use (B-2)

Select prepurge, postpurge ON/OFF for RX-L.

Setting	Description
Disable *1	When RX-R receives a call for ignition * ² , RX-R starts up with disable, and burner ignition is performed. Postpurge is not performed.
Enable	When RX-R receives a call for ignition * ² , RX-R always starts up after prepurge is performed, and then burner ignition is performed. Postpurge is performed.
Determine by input *1	Input set to "zone purge ON/OFF" * ³ determines whether or not prepurge and postpurge are performed.

- *1 The regular RX-L cannot use this function.
- *2 Depending on the "Startup method (A-3)" setting of RX-L, the call for ignition to RX-R is as follows.
 - For Link 1: "RX-L startup input"
 - For Link 2: "RX-L startup input" up to pilot burner ignition; and for main burner ignition, "Group A/B main start" when using RX-L input, and "Main start" when using RX-R input.
 - For Separate: For pilot burner ignition, "Group A/B pilot start" when using RX-L input, and "pilot start" when using RX-R input. For main burner ignition, "Group A/B main start" when using RX-L
 - input, and "Main start" when using RX-R input.
- *3 C 4-3 Input Function (page 4-33).

Blower sync signal source (B-6)

Select an input method for Blower Sync signals.

Setting	Description
External input	Uses the setting for "Blower Sync".*
Communication	Inputs Blower Sync signal via host communication.
Internal	Operates blower output as Blower Sync.
* This function is used when performing blower control with the best device	

This function is used when performing blower control with the host device.

CP 4-3 Input Function (page 4-33).

! Handling precautions

- If "Blower sync signal source (B-6)" is set to Input, make sure to set "Blower Sync" to one of the inputs in "input function (C-1)".
- If "Blower Sync" is not set to an input while "Blower sync signal source (B-6)" is set to "input", the process will not be able to advance ahead of the blower ON wait process.

• Purge count start signal source (B-7)

Select an input method for purge count signals.

Setting	Description
External input	Uses the setting for "start purge count"* as the purge count signal.
Communication	Inputs start purge count via host communication.
Internal	When prepurge condition are established, purge count will start.

This function is used when performing blower control with the host device.
 4-3 Input Function (page 4-33).

! Handling precautions

- If "purge count start signal source (B-7)" is set to "input", make sure to set "start purge count" to one of the inputs in "input function (C-1)".
- If "start purge count" is not set to an input while "purge count start signal source (B-7)" is set to input, the process will not be able to advance ahead of the start prepurge count wait process.

• High fire position input (B-9), Low fire position input (B-10)

Use for burners with a drive unit (such as a control motor) for combustion amount control.

Specify the Interlock terminal numbers (IN1 to IN16) that connect the high fire position confirmation switch and low fire position confirmation switch of the burner. High fire position/low fire position contradiction check is performed (while both ON).

1	• • •
Setting	Description
Disable	High fire position input and Low fire position input are not monitored.
IN1 to IN16	Specify high and Low fire position input numbers

Low fire position ON is used as a condition of "Low fire stop (B-13)".

📖 Note

- When high and low fire position are both turned ON, they are locked out after a specified period of time*.
 - * "Process error judgment time (no combustion) (s) (D-6)"

• Process timeout handling (B-11)

Set remedy methods for cases when the process is not advancing.

Setting	Description
Wait	Continue to wait until conditions are established.
Alarm (after a specified time*)	A warning is displayed after a specified amount of time passes. However, if conditions are established, the warning message is can- celled, and the process continues.
Lockout (after a specified time*)	Lockout occurs after a specified amount of time passes.

* "Process error judgment time (no combustion) (s) (D-6)"

📖 Note

- The following process is the monitored target.
- Processes other than this go into standby operation regardless of settings.
- Air switch OFF check process
- · Air switch ON check process
- Prepurge conditions wait process

• Prepurge after RX-R restart (B-12)

Set prepurge condition for when all RX-Rs are stopped during combustion, and then restart.

This setting is only valid when the "prepurge use (B-2)" setting is set to "Enable".

Setting	Description
Every time	Every time and start up RX-R.
Cancel	When restarting within the specified time*, prepurge is cancelled, and RX-R restarts. If the specified time is exceeded, prepurge is performed.
Lockout	When restarting within the specified time*, prepurge is cancelled, and RX-R restarts. If the specified time is exceeded, lockout occurs.

"Prepurge determination time during reignition (D-8)"

! Handling precautions

• When setting "Cancel purge within time" and "Lockout", set "postpurge time (s) (D-4)" to something other than 0.0 seconds.

• Low fire stop (B-13)

Use when performing low fire stop for burners with a drive unit (such as a control motor) for combustion amount control.

Note that "low fire stop (B-13)" cannot be performed unless pilot start is used. When pilot start is turned OFF, the combustion amount control motor transitions to low fire, and after the input set with "low fire position input (B-10)" that confirms the Low fire position is turned ON, the RX-R is stopped.

Setting	Description
Disable	When pilot start *1 is turned OFF, RX-R is immediately stopped.
Enable	When pilot start *1 is turned OFF, and the combustion amount control motor transitions to the position of low fire (when Low fire position input is ON), the RX-R is stopped *2.

*1 "Group A/B pilot start" is used as the pilot start when using RX-L input, and "pilot start" is used when using RX-R input.

*2 If the Low fire position cannot be detected even after the "Process error judgment time (during combustion) (s) (D-7)" passes, lockout occurs.

• Postpurge for residual flame (B-15)

Set the postpurge operation conditions for when remaining flames occur.

Setting	Description
No setting	Performs postpurge within the specified time*1, unrelated to re- maining flames.
Continue purge	Postpurge continues while remaining flames occur.
Continue purge (with time limit)	Postpurge continues while remaining flames occur. However, once the specified time ^{*2} passes, the blower is stopped.
Lockout	Postpurge continues while remaining flames occur. However, once the specified time ^{*2} passes, the blower is stopped and lockout occurs.

*1 "Postpurge time (s) (D-4)"

 *2 "Process error judgment time (no combustion) (s) (D-6)" When this specified time is used, it relates to the following.
 "Process error judgment time (no combustion) (s) (D-6)" ≥ "postpurge time (s) (D-4)" and "lockout postpurge time (s) (D-5)"

• RX-R prepurge use (B-16)

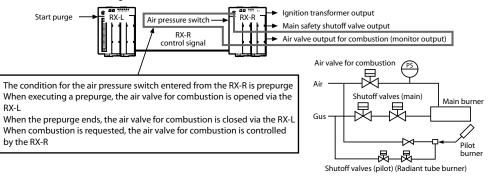
Set when RX-R inputs (IN1 to IN4) are made into prepurge condition.

By connecting an air solenoid valve to the RX-R for instrumentation to confirm air pressure answerback, this setting is used when air pressure answerback taken in by this RX-R is set as a zone RX-L prepurge condition.

Setting	Description
Disable	Air pressure answerback input into the RX-R is not set as a prepurge condition.
Enable	Air pressure answerback input into the RX-R is set as a prepurge condition.

📖 Note

- If using while combined with Independent supervision RX-R (RX-R44, RX-R46), this function cannot be used.
- Also, this function cannot be used if burners are operated selectively.
- RX-R model type and input settings are both needed.
- Instrumentation example
 - Use when operating as described below.
 - During combustion stoppage, it works together with the main safety shutoff valve to shut off air for combustion.
 - During a combustion request, it works together with the main safety shutoff valve to open air for combustion.



Unused (B-17)

Setting cannot be changed.

• RX-L communication error handling (B-18)

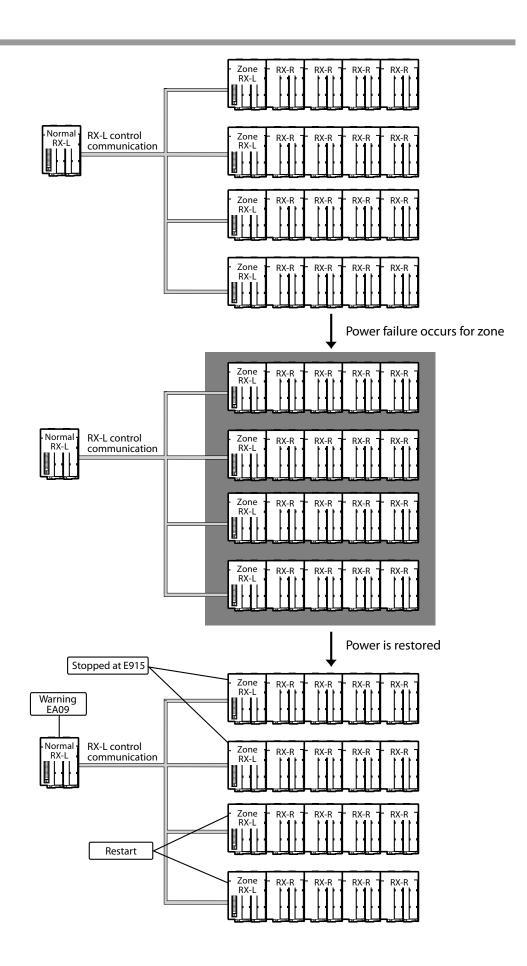
Set regular RX-L operation when communication is lost with zone RX-L.

Setting	Description
Lockout	When communication is lost with zone RX-L, lockout occurs.
Run	When communication is lost with zone RX-L, a warning message is displayed. Operation will continue. However, when communication is lost with all zone RX-L units, lockout occurs.

! Handling precautions

- When selecting "Run", make sure to set the regular RX-L and all zone RX-Ls to "Run".
- Precaution for short-time power failures when "Run" is selected (1)
 If a system is configured of multiple zone RX-Ls, a short-time power failure occurs for some zone RX-Ls, but then power is restored, a communication error will occur for the portion of zone RX-Ls which experienced a power failure, and the process is stopped. In some cases, a communication error will not occur for the remaining zone RX-Ls, and the system will restart. In this case, the regular RX-L process is set to "prepurge end process", so zone RX-L starts up after power is restored.

However, if regular RX-L experiences power failure at the same time, and then power is restored, startup will begin from regular RX-L.

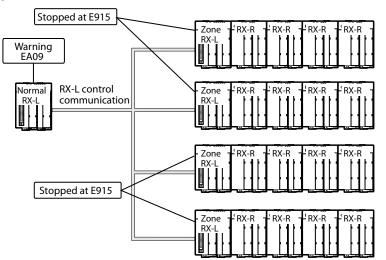


As for system design, make sure there are no startup issues when power is restored for the portion of zone RX-Ls that experienced power failure. (Consider prepurge time as needed for the zone side.)

If power is restored for the portion of zone RX-Ls that experienced power failure, and normal RX-Ls are to be restarted, make sure this setting is set to "Lockout".

(No. of zone number of connected zone RX-Ls) \times less than 1.5 seconds (However, if power is restored after a power failure exceeding the time above, an Communication error between RX-Ls (E915) will occur, and combustion will be halted.)

• If a system is configured of multiple Important Note (2) Zone RX-Ls when "Run" is selected, a short-time power failure occurs only for zone RX-Ls, and an Communication error between RX-Ls (E915) occurs for all zone RX-Ls, normal RX-Ls will not be set to Lockout, and a warning (EA09) is given on occasion.



Examples of how to fix this error are provided below.

- If startup occurs only for zone RX-Ls
 - 1: Use normal RX-L reset input to reset the system.
- If startup begins from normal RX-Ls
 - 1: Turn OFF the normal RX-L startup input.
 - 2: Use normal RX-L reset input to reset the system.

Power failure time is estimated as follows.

(No. of zone number of connected zone RX-Ls) \times less than 1.5 seconds (However, if power is restored after a power failure exceeding the time above, an Communication error between RX-Ls (E915) will occur, and combustion will be halted.)

Timer

This is an explanation of the items available for timer.

Prepurge time (D-1)

Set the prepurge time.

A prepurge time can be selected from the following 32 patterns.

No.	Setup	No.	Setup
1	5 s	17	6 min
2	10 s	18	7 min
3	15 s	19	8 min
4	20 s	20	9 min
5	25 s	21	10 min
6	30 s	22	15 min
7	35 s	23	20 min
8	40 s	24	25 min
9	45 s	25	30 min
10	50 s	26	35 min
11	55 s	27	40 min
12	1 min	28	45 min
13	2 min	29	50 min
14	3 min	30	55 min
15	4 min	31	60 min
16	5 min	32	Disable

• Ignition wait time (s) (D-2)

Setting	Description
	Set the standby time from when Ignition condition are estab- lished to when pilot ignition begins (or main ignition if a direct method is used).

• Damper modulation control wait time (s) (D-3)

Set when "damper modulation" is set in Input function (C-1).

Setting	Description
0.0 to 300.0 s	During the main ignition process, standby occurs for the receiv-
(0.1 second intervals)	ing of damper modulation input until the set time ends.

📖 Note

• Set the time until transitioning to "damper modulation," after the main burner has ignited, for burners with a drive unit (such as a control motor) for combustion amount control.

• Damper modulation" in 4-3 Input Function (page 4-43).

! Handling precautions

 When using a combustion amount control motor, be sure to use after assigning "damper modulation" as input in "Input function (C-1)."
 When "damper modulation input" is not used, the control motor does not transition to "damper modulation" after main ignition.

• Postpurge time (s) (D-4)

Setting	Description
0.0 to 1800.0 s (0.1 second intervals)	Set the postpurge time (s).

• Lockout postpurge time (s) (D-5)

Setting	Description
0.0 to 1800.0 s (0.1 second intervals)	Set the lockout postpurge time (s).

Process error judgment time (no combustion) (s) (D-6)

Setting	Description
	Set the error determination time for cases when no process progress conditions are established.

📖 Note

- This setting is used with the following items.
 - (1) "High fire position input (B-9)", "Low fire position input (B-10)" Lockout determination time during simultaneous ON detection
 - (2) "Process timeout handling (B-11)" Lockout determination time when process conditions are not established (including a warning for some settings).
 - (3) "Postpurge for residual flame (B-15)" Lockout determination time when remaining flames occur

Process error judgment time (during combustion) (s) (D-7)

Setting	Description
	Set the error determination time for cases when no process
(0.1 second intervals)	progress conditions are established.

📖 Note

- This setting is used with the following items.
 - (1) "Low fire stop (B-13)"
 - Lockout determination time when low fire position cannot be detected.
 - (2) "Input monitor standby time for interlock (after purge has ended)"
 - This setting is only valid when "RX-L type (A-1)" is set to "regular RX-L".

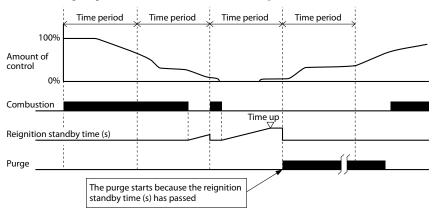
• Reignition standby time (s) (D-8)

Setting	Description
0.0 to 1800.0 s (0.1 second intervals)	Determine whether or not prepurge occurs when RX-Rs startup again after all are stopped during combustion.

📖 Note

• Operation example

The following setting enables you to light the burner without purging during direct time proportioning/regenerative burning, or when there is no longer a call for heat during reignition from the combustion stop status.



■ RX-R_Group

This is an explanation of the RX-R_Group.

• RX-R_Group (E-3)

Set a group when combining pilot ignition and main ignition for the RX-Rs connected to zone RX-Ls or single zone RX-Ls.

Setting	Description
Group A Group B	Set groups to perform combined operation.

Input settings

This is an explanation of the items available for input settings.

• Input function (C-1)

Select an input function.

Setting	Description
Air pressure switch	Input an air pressure switch.
Interlock	Input interlock for each type.
Prepurge condition	Becomes a prepurge count condition.
Interlock and prepurge condition	Conditions for interlock as well as for prepurge count.
Interlock (after prepurge)	Interlock monitoring is performed after prepurging has finished.
Blower Sync	Input a signal for the blower start/stop cycle. Used for air pressure switch startup confirmation.
Prepurge count start	Input a start signal for prepurge count.
Ignition condition	Checks the conditions before pilot and main ignition. Does not check the conditions during pilot and main ignition.
Damper modulation	After main ignition occurs, control monitor output changes to damper modulation.
Group A pilot start	Performs pilot ignition for RX-Rs belonging to Group A.
Group B pilot start	Performs pilot ignition for RX-Rs belonging to Group B.
Group A main start	Performs main ignition for RX-Rs belonging to Group A.
Group B main start	Performs main ignition for RX-Rs belonging to Group B.
760 °C (1), (2)*	Input the event ouput of temperature controller when performing 760 °C monitoring.
Prepurge-postpurge	Select whether or not zone purging is done.
Postpurge extension	Postpurge is extended while inside input.
Conditional interlock A through E	Performs interlock monitoring while conditions are established.
Blower Sync for pilot	Input a signal for the pilot blower's start/stop cycle.
air	Used for pilot air pressure switch startup confirmation.
Air pressure switch for pilot air	Input air pressure switch for pilot air.
Monitor	Only used for LED display and monitor output.
Disable	Select this when no input will be used.

Gas Appliance Directive (CE) does not apply

Detected minimum retention time: 0.2 seconds If a contact of 0.2 seconds or more is not retained in ON status (or OFF status), the ON status (or OFF status) will not be detected.

📖 Note

• For a detailed example,

*

4-3 Input Function (page 4-33).

• C Section "The input number display for the activated interlock is different (both RX-L and RX-R)" in Chapter 14. TROUBLESHOOTING (page 14-18). If the 7-segment display and the interlock input number display for communication data (1439W) are different, or if the 7-segment display and the interlock input number display for the first-out monitor output are different.

• Off delay time (C-2)

Set input OFF delay time. OFF delay time can be set for each Separate input.

Setting	Description
0 to 10 second (1-second inter	ay time for each Interlock.

📖 Note

• C 4-5 Timing Regulation (page 4-60)

• Conditional interlock condition (C-3)

Specify conditional interlock A to E.

Setting	Description
Disable	Select when nothing will be used.
IN1 to IN16	Performs interlock monitoring while input is short-circuiting.

! Handling precautions

• Do not set "Conditional interlock condition (C-3)" as an input function for itself. Bad example

When "IN1" is set as conditional interlock setting A, and "conditional interlock setting A" is set as an IN1 input function.

If these settings are made, interlock operation will not be detected, even when IN1 is opened.

• Conditional interlock setting standby time (C-4)

Set a standby time to last until interlock monitoring begins for conditional interlocks A through E.

Setting	Description
0.0 to 30.0 s (0.1 second intervals)	Set a standby time to last until interlock monitoring begins for conditional interlocks A through E.

Relay output

This is an explanation of the items available for relay output.

Relay output setting (B-3)

During burner ignition, use a relay output when opening the main valve located upstream from the safety shutoff valve equipped on each burner.

When using relay output, set it here.

Setting	Description
Disable	—
Enable	 For regular RX-L, links with the operation permission for zone RX-L, and turns ON. For zone RX-L and single zone RX-L, links with the operation permission for RX-R, and turns ON.

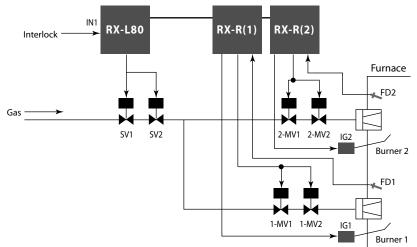
! Handling precautions

• If "relay output setting (B-3)" is set to "Enable", make sure to connect the specified load to the relay output.

If the output is open, or the minimum load requirement is not met, a "relay diagnosis circuit error" will be detected.

📖 Note

Example of using RX-L relay output (H, G) This section shows an instrumentation example where control of the gas pipe main valve is performed using RX-L relay output (H, G). To ensure observance of the ignition safety times (pilot ignition time, main ignition time) and flame response (extinguish response time), connect a combustion shutoff valve to the RX-Rs for each burner.



• Output timing of relay output (H, G) Relay output (H, G) turns ON in the following processes.

Model setting	Process where relay output (H, G) turns ON
Regular RX-L	Prepurge end process
Zone RX-L,	Ignition confirmation process, pilot ignition process, main ignition
single zone RX-L	process, Damper modulation process, reignition condition process,
	low fire stop process

• Timing chart

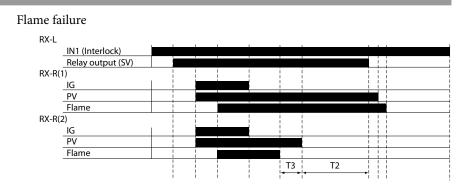
 No ignition

 RX-L

 IN1 (Interlock)
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T1: Pilot ignition time $(4.5\pm0.5 \text{ s}, 9\pm1 \text{ s})$

T2: Typ. $180 + 65 \times$ (No. of RX-R connections) ms Max. $180 + 1500 \times$ (No. of RX-R connections) ms

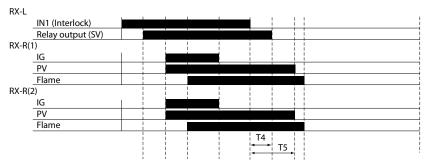


T2: Typ. $180 + 65 \times$ (No. of RX-R connections) ms Max. $180 + 1500 \times$ (No. of RX-R connections) ms

T3: Flame response (Flame response time)

(Max. 2 s, 3±0.5 s, select according to model number)

Interlock operation



T4: Relay output shutoff timing Max. 300 ms*

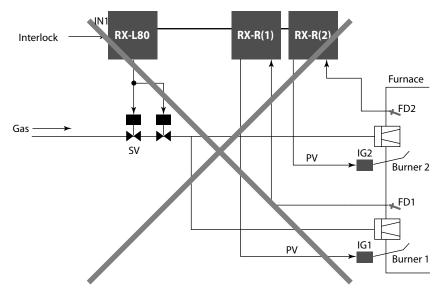
T5: Zone interlock shutoff timing Max. 500 ms*

* 🕼 4-5 Timing Regulation (page 4-60).

! Handling precautions

• O Prohibitions

The following kind of instrumentation using the RX-L and RX-R is prohibited. Fuel safety shutoff cannot be performed using only RX-L relay output (H-G).



• Blower output (B-4)

Specify here whether to control the blower with this RX-L or control it with the host device.

Set blower output operation.

Setting	Description
Disable	Set "Always OFF" to control the blower with the host device.
Enable	Set "Blower Running" to control the blower with this RX-L.

• Damper output (B-5)

When using a burner with a combustion amount control motor, set the use of the control motor here.

Set control motor output operation.

Setting	Description
Disable	—
Enable	Perform control motor operation.

Monitor output

This is an explanation of the items available for monitor output.

• Flicker (MO-1)

Select a flicker display for an interlocked input (ON/OFF alternate output).

Setting	Description
Disable	Output is turned ON during interlock operation.
Enable	Flicker alternately switches ON/OFF every 0.5 seconds during inter- lock operation.

Monitor output (MO-2)

Allows you to assign any of the following signals to monitor output 1 to 22 (M-1 to M-22)

M-22).		
Symbol	Setting output name	Description
MS-1 to MS-16	First Out Monitor 1 to 16	Outputs the input status. (1) to (16) correspond to inputs IN1 to IN16. During normal operation Monitor outputs the input status. During lockout Only the first abnormal input ^{*1} is turned ON. (If output logic is set to "reverse", it is turned OFF.) Flicker output can be done as well depending on the setting. ^{*2}
MS-AFSOFF	Air pressure switch OFF confirmed	Outputs air pressure switch OFF confirmation completion status.* ³
MS-AFSOK	Air pressure switch check complete	Outputs air pressure switch startup check completion status.* ³
MS-760	760 °C diagnosis* ⁹	Outputs 760 °C mode status.
MS-PURGING	Prepurging	Only outputs during prepurge.
MS-PURGCMP	Prepurge complete	Outputs prepurge completion status.
MS-AL-P	Alarm (lockout)	Monitor output turned ON during lockout. (When normal, monitor output turned OFF.)
MS-POSTP	Postpurging	Only outputs during postpurge.

Symbol	Setting output name	Description
MS-IL-OK	Interlock input normal	Regular RX-L: Outputs operation permission for zone RX-L. Zone RX-L, single zone RX-L: Outputs operation permission for zone RX-R.
MS-AFSOFF-P	Pilot air pressure switch OFF confirmed	Outputs air pressure switch OFF confirma- tion completion status set to pilot air pressure switch as an input function.
MS-AFSOK-P	Pilot air pressure switch check complete	Outputs air pressure switch startup check com- pletion status set to pilot air pressure switch as an input function.
MS-RELAY	Relay output	Outputs relay output status.*4
MS-BLOWER	Blower output	Outputs blower output status.*5
MS-HILO	High/Low fire position	Outputs high and Low fire position status.*6
MS-CTL	Damper modulation	Outputs damper modulation status.*7
MS-760DIAG1	760 °C diagnosis (1)*9	Diagnosis output for temperature controller. Connects to temperature controller 1 Dl.
MS-760DIAG2	760 °C diagnosis (2)*9	Diagnosis output for temperature controller. Connects to temperature controller 2 DI.
MS-1-T to MS-16-T	Input monitors (1) to (16)	Provide input status ^{*7} (1) to (16) correspond to IN1 to IN16 - Turn on monitor output when input is on - Turn off monitor output when input is off
MS-1-F to MS-16-F	Input monitor (OFF delay)	Provide input status ^{*8} (1) to (16) correspond to IN1 to IN16 - Turn on monitor output when input is on - Turn off monitor output when input is off
MS-START	RUN	Turn ON when device is starting up (Even when a startup condition, turn OFF while in setup mode)
MS-NON	(Not used)	Not used

- *1 For an input function following lockout.
 - "Air pressure switch" "Interlock" "Conditional interlock A through E" "Interlock and prepurge condition"
- *2 🕞 Flicker (MO-1) (page 4-24).
- *3 For input set to "air pressure switch".
- *4 Only valid when "relay output (B-3) = Enable".
- *5 Only valid when "blower output (B-4) = Enable".
- *6 Only valid when "Damper output (B-5) = Enable".
- *7 Outputs the input status regardless of the OFF delay time set for the input in "Off delay time (C-2)". When changed to "reverse action" in "monitor output logic (MO-3)", the output is reversed.
- *8 Outputs the status that reflects the OFF delay time set for the input in "Off delay time (C-2)". When changed to "reverse action" in "monitor output logic (MO-3)", the output is reversed.
- *9 Gas Appliance Directive (CE) does not apply.

• Monitor output logic (MO-3)

The output operation of monitor output logic 1 to 22 (M-1 to M-22) can be set Individually.

When output operation setting is set to "Reverse", output occurs with output status in reverse. The default setting is "Direct".

However, if the monitor output(MO-2) is set as follows, output operation is fixed at direct action.

760 °C diagnosis (1) (MS-760DIAG1)

760 °C diagnosis (2) (MS-760DIAG2)

Setting	Description
Direct	See the chart below.
Reverse	

			Output lo	gic settings
Symbol	Setting output name	Monitor signal status	Direct logic	Reverse logic
MS-1 to MS-16 First-out monitors	First-out monitors	Input OFF	Tr-ON *	Tr-OFF *
	(1) to (16)	Input ON	Tr-OFF	Tr-ON
MS-AFSOFF	Air pressure switch	Incomplete	Tr-OFF	Tr-ON
	OFF confirmed	Complete	Tr-ON	Tr-OFF
MS-AFSOK	Air pressure switch	Incomplete	Tr-OFF	Tr-ON
	check complete	Complete	Tr-ON	Tr-OFF
MS-760	760 °C mode	Outside of mode	Tr-OFF	Tr-ON
		During mode	Tr-ON	Tr-OFF
MS-PURGING	Prepurging	Not during prepurge	Tr-OFF	Tr-ON
		Prepurging	Tr-ON	Tr-OFF
MS-PURGCMP	Prepurge complete	Prepurge incomplete	Tr-OFF	Tr-ON
		Prepurge complete	Tr-ON	Tr-OFF
MS-AL-P	Alarm output	When normal	Tr-OFF	Tr-ON
		During lockout	Tr-ON	Tr-OFF
MS-POSTP	Postpurging	Not during postpurge	Tr-OFF	Tr-ON
		Postpurging	Tr-ON	Tr-OFF
MS-IL-OK	Interlock input normal	Interlock operation	Tr-OFF	Tr-ON
		Interlock input normal	Tr-ON	Tr-OFF
MS-AFSOFF-P	Pilot air pressure	Incomplete	Tr-OFF	Tr-ON
	switch OFF confirmed	Complete	Tr-ON	Tr-OFF
MS-AFSOK-P	Pilot air pressure	Incomplete	Tr-OFF	Tr-ON
	switch check complete	Complete	Tr-ON	Tr-OFF
MS-RELAY	Relay output	OFF	Tr-OFF	Tr-ON
		ON	Tr-ON	Tr-OFF
MS-BLOWER	Blower output	OFF	Tr-OFF	Tr-ON
		ON	Tr-ON	Tr-OFF
MS-HILO	High fire position/low	L	Tr-OFF	Tr-ON
	fire position	Н	Tr-ON	Tr-OFF
		When damper modula- tion is ON	Tr-OFF	Tr-ON
MS-CTL	Damper modulation	OFF	Tr-OFF	Tr-ON
		ON	Tr-ON	Tr-OFF
MS-760DIAG1,	760 °C diagnosis (1),	Diagnosis standby	Tr-OFF	Tr-OFF
MS-760DIAG2	760 °C diagnosis (2)	Diagnosis in progress	Tr-ON	Tr-ON

			Output logic settings	
Symbol	Setting output name	Monitor signal status	Direct logic	Reverse logic
MS-1-T to	Input monitors	Input OFF	Tr-OFF*	Tr-ON
MS-16-T	(1) to (16)	Input ON	Tr-ON*	Tr-OFF
MS-1-F to	Input monitor	Input OFF	Tr-OFF	Tr-ON
MS-16-F	(OFF delay) (1) to (16)	Input ON	Tr-ON	Tr-OFF
MS-START	RUN	When halted	Tr-OFF	Tr-ON
		When RUN	Tr-ON	Tr-OFF

* Tr-ON: Monitor output transistor ON,

Tr-OFF: Monitor output transistor OFF

Display settings

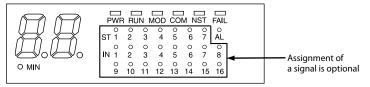
This is an explanation of the items available for display settings.

• LED settings (DSP-1)

Any of the following signals can be assigned to the module's front display portion $(ST1 \text{ to } ST7, IN1 \text{ to } IN16)^{*1}$.

Symbol	Setting output name	Description
S-1 to S-16	Input display (1) to (16)	Outputs the input status. (1) to (16) correspond to inputs IN1 to IN16. ^{*2} for display methods.
S-AFSOFF	Air pressure switch OFF confirmed	When air pressure switch OFF confirmation has completed, this will light up.
S-AFSOK	Air pressure switch check complete	When air pressure switch start up check has completed, this will light up.
S-760	760 °C mode	Will light up while 760 °C mode is in progress.
S-PURGING	Prepurging	Lights up during prepurging.Turns off when the prepurge finishes.
S-PURGCMP	Prepurge complete	Lights up when the prepurge finishes. Turns off when the startup input turns off.
S-IL-F	Permission from previous module	Zone RX-L: Lights up while operation is permitted from regular RX-L. ^{*3} Turns off during interlock operation. Lights up during normal interlock. Blinks during times other than described above (stopping, etc.)
S-IL-B	Permission for next module	Regular RX-L: When lit, indicates operation permission for zone RX-L. Zone RX-L, single zone RX-L: When lit, indicates operation permission for RX-R.
S-RELAY	Relay output	Lights up when relay output is ON. ^{*4}
S-BLOWER	Blower output	Lights up when blower output is ON. ^{*5}
S-HILO	High fire position/ low fire position	Lights up during High fire position (turns off during damper modulation). ^{*5}
S-CTL	Damper modulation	Lights up during damper modulation. ^{*6}
S-POSTP	Postpurging	Lights up during postpurging. Turns off when the postpurge finishes.
S-NON	(Not used)	Not used

*1 Display portion



*2 Input display content

Display	Meaning
Off	Indicates that "Not used" has been set.
Lit	Indicates that something other than "Not used" has been set, and input is ON. (Also lit during OFF delay time when input changes from ON to OFF.)
Blinking	Indicates that something other than "Not used" has been set, and input is open.

*3 Input display content

Only valid when "RX-L type (A-1)" is set to "Zone RX-L".

- *4 Only valid when "relay output (B-3)" = "Enable"
- *5 Only valid when "blower output (B-4)" = "Enable"
- *6 Only valid when "Damper output (B-5)" = "Enable"

• Error display setting (DSP-2)

Select an error display method for display on the module front 7-segment LED.

Setting	Description
Simple (2 chars.)	2-digit warning display
Detailed (4 chars.)	4-digit warning display

📖 Note

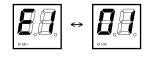
- Error code display
- The error code is displayed as "E" followed by 3 digits.
- When "simple display" is selected.
 - "E" + 1 digit (the 3-digit code's first digit) blinking display.

Example: Error code E101



When "detailed display" is selected.
"E" + 1 digit (the 3-digit code's first digit) and 2 digits (the 3-digit code's last 2 digits) are displayed alternately.

Example: Error code E101



Host communication (RS485) settings

This is an explanation of the items available for Host communication (RS485) settings.

Station address (F-1)

Setting	Description
1 to 32 (RX-L80 only)	Set a station address.
1 to 127 (RX-L90 only)	
0 (No communication)	

Baud rate (F-2)

Setting	Description
4800 bps (RX-L90 only)	Set the baud rate.
9600 bps	
19200 bps	
38400 bps	
57600 bps (RX-L90 only)	
115200 bps (RX-L90 only)	

Data format (F-3)

Setting	Description
Even parity, 1 stop bit	Data length 8-bits, even parity, 1 stop bit
Even parity, 2 stop bits	Data length 8-bits, even parity, 2 stop bits
Odd parity, 1 stop bit	Data length 8-bits, odd parity, 1 stop bit
Odd parity, 2 stop bits	Data length 8-bits, odd parity, 2 stop bits

In the RX-L90, the data length (7/8 bits), parity (even/odd/none), and stop bits (1 bit/2 bits) are set separately.

• Protocol (F-4)

CPL communication (Controller Peripheral Link: Azbil Corporation's host communication protocol) or MODBUS communication can be selected.

Setting	Description
CPL	This is Azbil Corporation's unique protocol.
MODBUS/ASCII	The ASCII mode for MODBUS communication.
(RX-L90 only)	The data length is 8 bits.
MODBUS/RTU	The RTU mode for MODBUS communication.
(RX-L90 only)	The data length is 7 bits.

• RX-R start by communication command (RS-485/Ethernet*) (F-5)

Setting	Description
Disable	Prevents RX-R startup from host device and loader communication.
Enable	Permits RX-R startup from host device and loader communication.
* BX-190 only	

RX-L90 only

Minimum response time (RS-485) (F-6)

Setting	Description
1 to 250ms	Sets the minimum response time.

! Handling precautions

- If you use the Azbil CMC10L as an RS-485 converter, set the "minimum response time" to 3 ms or longer.
 - The maximum baud rate supported by the CMC10L is 38400 bps.

Initial value

Each parameter's initial values are as follows.

	Setting items	Code	Initial value		
System	RX-L type	A-1	Single zone RX-L		
	Number of connected zone RX-Ls	B-14	1		
	Number of locked out zone RX-Ls	B-8	1		
	RX-L address		0		
	Number of connected RX-Rs	E-1	1		
	Number of locked out RX-Rs		1		
	Air pressure switch check use		ON		
	Air pressure switch check result clear	A-5	When RX-L start switch OFF		
	760 °C mode use	A-4	OFF		
	Startup type	A-3	Link (1)		
Control	RX-L start method	B-1	Start switch input		
setting	Prepurge use	B-2	Enable		
	Blower sync signal source	B-6	Internal		
	Purge count start signal source	B-7	Internal		
	High fire position input	B-9	IN 2		
	Low fire position input	B-10	IN 3		
	Process timeout handling	B-11	Only a warning is displayed after a specified		
			amount of time passes.		
	Prepurge after RX-R restart	B-12	Every time		
	Low fire stop		OFF		
	Postpurge for residual flame	B-15	No setting		
	RX-R prepurge use	B-16	OFF		
		B-17	-		
	RX-L communication error handling	B-18	Lockout		
	RX-R start by communication command*	F-5	None		
	Communication supervision (RS485)*		Not monitored		
	Communication supervision (Ethernet)*		Not monitored		
	Communication supervision warning reset method*		Auto recovery		
Timer	Prepurge time		5 min		
	Ignition wait time (s)		20.0 s		
	Damper modulation control wait time (s)		20.0 s		
	Postpurge time (s)		60.0 s		
	Lockout postpurge time (s)	D-5	60.0 s		
	Process error judgment time (no combustion) (s)	D-6	120.0 s		
	Process error judgment time (during combustion) (s)	D-7	20.0 s		
	Reignition standby time (s)	D-8	20.0 s		
	Communication supervision timeout (s)*	D-9	180.0 s		
Groups	RX-R1 to 32	E-3	Group A		
Input	IN1 input function	C-1	Air pressure switch		
settings	IN1 Off delay time	C-2	0 s		
	IN2 input function	C-1	Prepurge condition		
	IN2 Off delay time	C-2	0 s		
	Input function IN3	C-1	Ignition condition		
	IN3 Off delay time	C-2	0 s		
	Input function IN4	C-1	Damper modulation		
	IN4 Off delay time	C-2	0 s		

	Setting items	Code	Initial value	
Input	Input function IN5	C-1	Interlock	
settings	IN5 Off delay time	C-2	0 s	
	Input function IN6	C-1	Interlock	
	IN6 Off delay time	C-2	0 s	
	Input function IN7	C-1	Interlock	
	IN7 Off delay time	C-2	0 s	
	IN8 input function	C-1	Disable	
	IN8 Off delay time	C-2	0 s	
	IN9 input function	C-1	Disable	
	IN9 Off delay time	C-2	0 s	
	IN10 input function	C-1	Disable	
	IN10 Off delay time	C-2	0 s	
	IN11 input function	C-1	Disable	
	IN11 Off delay time	C-2	0 s	
	IN12 input function	C-1	Disable	
	IN12 Off delay time	C-2	0 s	
	IN13 input function IN13 Off delay time	C-1	Disable	
		C-2 C-1	0 s Disable	
	IN14 input function IN14 Off delay time	C-1 C-2	0 s	
	IN14 Off delay time IN15 input function	C-2	Disable	
	IN15 Off delay time	C-1 C-2	0 s	
	IN15 Off delay time IN16 input function	C-2	Disable	
	IN16 Off delay time	C-1 C-2	0 s	
Condition	Conditional interlock condition A to E	C-2 C-3	Disable	
settings	Conditional interlock wait time A to E	C-4	3.0 s	
Relay output	Relay output	B-3	Disable	
newy output	Blower output	B-4	Blower operation	
	Damper output	B-5	Control motor operation	
Monitor	Flicker	MO-1		
output	M-1	MO-2		
·	M-2		First Out Monitor 2	
	M-3		First Out Monitor 3	
	M-4		First Out Monitor 4	
	M-5		First Out Monitor 5	
	M-6		First Out Monitor 6	
	M-7		First Out Monitor 7	
	M-8		First Out Monitor 8	
	M-9		First Out Monitor 9	
	M-10		First Out Monitor0	
	M-11		First Out Monitor1	
	M-12		First Out Monitor2	
	M-13		First Out Monitor3	
	M-14		First Out Monitor4	
	M-15		First Out Monitor5	
	M-16		First Out Monitor6	
	M-17		Air switch check complete	
	M-18		Prepurging	
	M-19		Prepurge complete	
	M-20		Interlock input normal	
	M-21		Not used	
	M-22		Alarm (lockout)	
Monitor	M-1 output logic	MO-3	Direct	
output logic	M-2 output logic		Direct	
	M-3 output logic		Direct	

Setting items			Code	Initial value			
Monitor	M-4 output logic		MO-3	Direct			
output logic	M-5 output logic			Direct			
	M-6 output logic			Direct			
	M-7 output logic			Direct			
	M-8 output logic			Direct			
	M-9 output logic			Direct			
	M-10 output logic			Direct			
	M-11 output logic			Direct			
	M-12 output logic			Direct			
	M-13 output logic			Direct			
	M-14 output logic			Direct			
	M-15 output logic			Direct			
	M-16 output logic			Direct			
	M-17 output logic			Direct			
	M-18 output logic			Direct			
	M-19 output logic			Direct			
	M-20 output logic			Direct			
	M-21 output logic			Direct			
	M-22 output logic			Direct			
LED display	LED settings (IN)	IN1	DSP-1				
		IN2		IN 2			
		IN3		IN 3			
		IN4		IN 4			
		IN5		IN 5			
		IN6		IN 6			
	IN7			IN 7			
		IN8		IN 8			
		IN9		IN 9			
		IN10		IN 10			
		IN11		IN 11			
		IN12		IN 12			
		IN13		IN 13			
		IN14		IN 14			
		IN15		IN 15			
		IN16		IN 16			
	LED (ST)	ST1		Air switch check complete			
		ST2		Prepurging			
		ST3		Prepurge complete			
		ST4		Allow operation of the next module			
		ST5		Not used			
		ST6		Not used			
		ST7		Not used			
	Error display setting (2	7-segment LED)	DSP-2	4-digit warning display			
Host com- munication	Station address			1 (RX-L80) 127 (RX-L90)			
(RS485/	Baud rate			19200 bps			
(RS485/ Ethernet)	Data format			Even parity, 1 stop bit			
				CPL			
	Protocol RX-R start by communication command*1			Disable			
	Minimum response tir		F-5 F-6	3 s			
	IP Address ^{*2}						
	Subnet mask*2		H-1	192.168.255.254			
			H-2 H-3	255.255.255.0			
	Default gateway ^{*2} MODBUS/TCP Port number ^{*2}			Disable 502			

*1 RX-L80 only

*2 RX-L90 only

4 - 3 Input Function

The following explanation covers the content and methods of use for each function assigned to inputs (IN1 to IN16).

Setting items	Details	Type *1	Reference page		
Air pressure switch	Input an air pressure switch.	Interlock	4-34		
Interlock	Input interlock for each type.	Interlock	4-36		
Prepurge condition	Becomes a prepurge count condition.	Interlock	4-37		
Interlock and prepurge condition	Conditions for interlock as well as for prepurge count.	Interlock	4-38		
Interlock (after prepurge)	Interlock monitoring is performed after prepurging has finished.	Interlock	4-38		
Blower Sync	Input a signal for the blower start/stop cycle. Used for air pressure switch startup confirmation.	Control input	4-39		
Prepurge count start	Input a start signal for prepurge count.	Control input	4-40		
Ignition condition	Checks the conditions before pilot and main ignition. Does not check during pilot and main ignition.	Control input	4-41		
Damper modulation	ation After main ignition occurs, control monitor output changes to damper modulation.				
Group A pilot start	Performs pilot ignition for RX-Rs belonging to Group A.	Control input	4-44		
Group B pilot start	Performs pilot ignition for RX-Rs belonging to Group B.	Control input	4-44		
Group A main start	Performs main ignition for RX-Rs belonging to Group A.	Control input	4-44		
Group B main start	Performs main ignition for RX-Rs belonging to Group B.	Control input	4-44		
760 °C diagnosis (1), (2) *2 Input the event ouput of temperature controller when per- forming 760 °C monitoring.		Interlock	4-44		
Prepurge-postpurge	Select whether or not zone purging is done.	Control input	4-45		
Postpurge extension	Postpurge is extended while inside input.	Control input	4-46		
Conditional interlock A through E	Performs interlock monitoring while conditions are established.	Interlock	4-47		
Blower Sync for pilot air	Input a signal for the pilot blower's start/stop cycle. Used for pilot air pressure switch startup confirmation.	Interlock	4-48		
Air pressure switch for pilot air	Input air pressure switch for pilot air.	Interlock	4-50		
Monitor	Only used for LED display and monitor output.		_		
Disable	Select this when no input will be used.				

*1 Type

Control input

Control input is an input condition for process transition and control selection. Lockout not executed.

Interlock

Interlock monitoring input. Lockout occurs when input is turned OFF.

• All OFF delay settings other than "Disable" are applied.

*2 Gas Appliance Directive (CE) does not apply

Function explanation

The following explanation covers the content and methods of use for each function assigned to inputs (IN1 to IN16).

Additional items

• Monitor output of operation example: The time charts for MS-1, MS-2, MS-3, MS-4 and so on are described with the state at time of shipment (direct action).

Air pressure switch

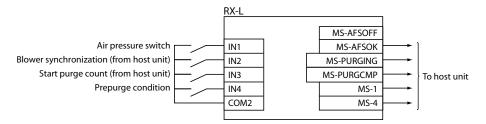
Overview

The input connected to air pressure switch is "set to air pressure switch". The following functions are available.

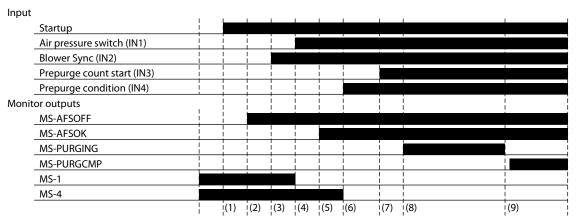
- Startup check Confirmation is made that input is open when blower is OFF, and input contacts are shorted when blower is ON.
- Prepurge condition
 Startup check's completion and being ON are prepurge start conditions.
 When turned OFF during prepurging, prepurge timing is stopped. When turned ON again, prepurge starts over from the beginning.
- Interlock conditions

When input is turned OFF by the following processes, lockout occurs. (Regular RX-L)

- · Prepurge end process
- (Zone RX-L)
- Ignition condition wait process, ignition standby process, ignition confirmation process, pilot ignition process, main ignition process, damper modulation process, reignition condition process, low fire stop process
- Wiring example



• Operation example (1) Basic



- (1) Startup is turned ON.
- (2) If air pressure switch (IN1) was OFF, monitor output MS-AFSOFF is turned ON.
- (3) Confirmation is made that monitor output MS-AFSOFF in ON, then blower output and Blower Sync (IN2) for the host device is turned ON.
- (4) Air pressure switch (IN1) is turned ON.
- (5) Monitor output MS-AFSOK is turned ON, and indicates that air pressure switch startup confirmation is complete.
- (6) Prepurge condition (IN4) is turned ON.
- (7) Start purge count (IN3) is turned ON, and prepurging begins.
- (8) Prepurge
- (9) Prepurge complete
- Operation example (2) Air pressure switch ON

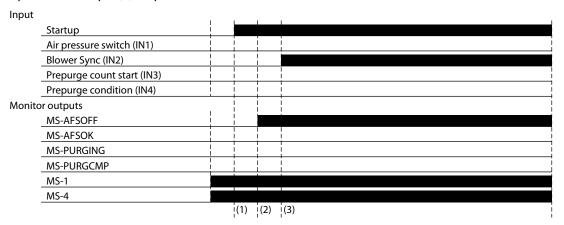
Input			
	Startup	1	
	Air pressure switch (IN1)		
	Blower Sync (IN2)	 	
	Prepurge count start (IN3)	 	
	Prepurge condition (IN4)	1	
Monito	r outputs		
	MS-AFSOFF	 	
	MS-AFSOK	i I	
	MS-PURGING	1	
	MS-PURGCMP	1	
	MS-1	1	
	MS-4		
		(1)	(2)

- (1) Air pressure switch (IN1) is ON before startup begins.
- (2) Even when startup is ON, MS-AFSOFF remains OFF.

📖 Note

- For error handling methods,
 - Process timeout handling (B-11) (page 4-12).

• Operation example (3) Air pressure switch OFF



- (1) Startup is turned ON.
- (2) Confirmation is made that MS-AFSOFF is ON, and Blower Sync (IN2) turns ON.
- (3) Since air pressure switch (IN1) will not turn ON, MS-AFSOK will not turn ON.

📖 Note

Additional items

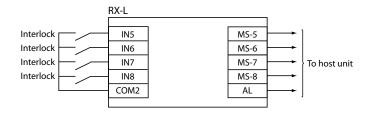
• "Air pressure switch" cannot be set to multiple inputs. When accidentally set to multiple inputs, the smallest number input is used as "air pressure switch".

Interlock

Overview

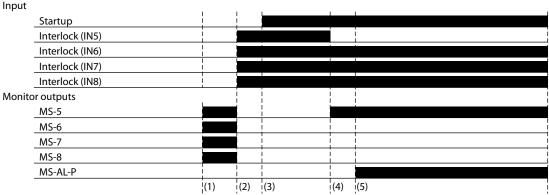
Monitoring is performed while startup is ON. When opened, lockout occurs. If "interlock" is set to multiple inputs, and one of those inputs is opened, lockout will occur.

• Wiring example



• Operation example Basic

Input



- (1) Startup is turned OFF.
- (2) All interlocks are turned ON.
- (3) Once it is confirmed that all interlocks are short-circuited (normal), startup is turned ON.
- (4) Interlock (IN5) is opened.
- (5) Lockout occurs.

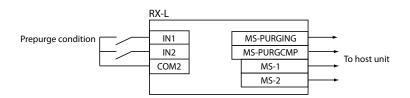
Prepurge condition

Overview

Conditions for prepurge count. Prepurge count is executed when input is ON. If "Prepurge condition" is set to multiple inputs, prepurge will only be performed when all of those inputs are ON.

If an input turns OFF during prepurge, the prepurge timing setting will be reset. Monitoring will no longer be performed once prepurge has completed.

• Wiring example



Operation example



Input					1		
	Prepurge condition (IN1)						
	Prepurge condition (IN2)	i					
Monito	r outputs			Ì		i i	
	MS-PURGING		!				
	MS-PURGCMP						
	MS-1			i		i I	
	MS-2				1	1	
		(1)	(2)	(3)	(4)	(5)	(6)
		•					

- (1) to (3) Prepurge condition are not established
- (4) Prepurge is performed according to the established prepurge condition
- (5) Prepurge complete
- (6) After prepurge is completed, the prepurge completion results will be maintained even if prepurge condition are turned OFF.

Interlock and prepurge condition

Overview

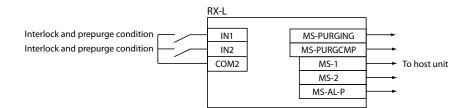
Conditions for prepurge count and interlock.

These are prepurge count conditions until just before prepurge is completed. After completion, they become interlock conditions.

If set to multiple inputs, conditions will only be established when all of those inputs are ON.

If an input turns OFF during prepurge, the prepurge time will be reset. (Lockout not executed.)

• Wiring example



Operation example

Input

			i	1		
Interlock and prepurge condition (IN1)	1					
Interlock and prepurge condition (IN2)	i .	i .				
or outputs		ł	ł	 	I I	I I
MS-PURGING		 				
MS-PURGCMP		1				
_MS-1			i	1	i I	
MS-2				 	I I	
MS-AL-P		1			1	
	(1)	(2)	(3)	(4)	(5)	(6)
	Interlock and prepurge condition (IN2) or outputs MS-PURGING MS-PURGCMP MS-1 MS-2	Interlock and prepurge condition (IN2) or outputs MS-PURGING MS-PURGCMP MS-1 MS-2 MS-AL-P	Interlock and prepurge condition (IN2) or outputs MS-PURGING MS-PURGCMP MS-1 MS-2 MS-AL-P	Interlock and prepurge condition (IN2) or outputs MS-PURGING MS-PURGCMP MS-1 MS-2 MS-AL-P	Interlock and prepurge condition (IN2) Interlock and prepurge condition (IN2) MS-PURGING MS-PURGCMP MS-1 MS-2 MS-AL-P	Interlock and prepurge condition (IN2) Interlock and prepurge condition (IN2) MS-PURGING MS-PURGCMP MS-1 MS-2 MS-AL-P

(1) to (3) Prepurge condition are not established

- (4) Prepurge is performed according to the established prepurge condition
- (5) Prepurge complete
- (6) Lockout occurs when interlock and prepurge condition (IN1) are OFF

Interlock (after prepurge)

Overview

Interlock monitoring is performed after prepurging has finished.

The start time for interlock monitoring once prepurge has completed will differ for regular RX-L and zone RX-L/single zone RX-L.

• Regular RX-L

When advancing to the prepurge completion process, interlock monitoring will be performed after the time set for "process error judgment time (during combustion) (s) (D-7)" has elapsed.

- Zone RX-L/single zone RX-L After 60 seconds have passed from the prepurge completion process, interlock monitoring will be performed.
- Monitoring is done according to the following processes. Pilot ignition operation, main ignition operation, damper modulation operation, reignition conditions operation, low fire stop operation.

Blower Sync

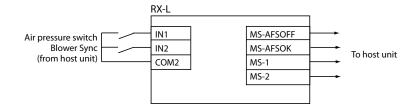
Overview

Use during instrumentation as described below.

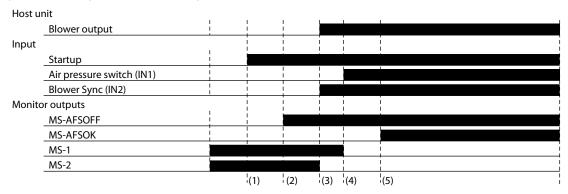
- Blower control performed via host device
- Air pressure switch startup check performed via RX-L.

Performs air pressure switch movement confirmation according to "Blower Sync" input.

• Wiring example

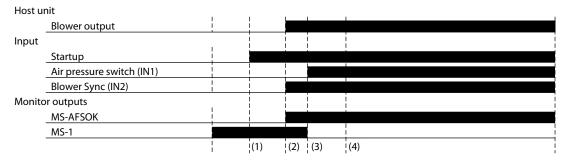


• Operation example (1) (Monitor output: uses MS-AFSOFF and MS-AFSOK)



- (1) Startup is turned ON.
- (2) If air pressure switch (IN1) was OFF, monitor output MS-AFSOFF is turned ON.
- (3) Confirmation is made that monitor output MS-AFSOFF in ON, then blower output and Blower Sync (IN2) for the host device is turned ON.
- (4) Air pressure switch (IN1) is turned ON.
- (5) Monitor output MS-AFSOK is turned ON, and indicates that air pressure switch startup confirmation is complete.

• Operation example (2) (Monitor output: Only MS-AFSOK is used)



- (1) Startup is turned ON.
- (2) Host device confirms that monitor output MS-1 is ON, and after about 3 seconds pass, blower output and Blower Sync (IN2) are turned ON.
- (3) Air pressure switch (IN1) is turned ON.
- (4) Monitor output MS-AFSOK is turned ON, and indicates that air pressure switch startup confirmation is complete.

Additional items

- Make sure to synchronize blower control output with "Blower Sync input".
- When directly performing blower control with this product, do not set "Blower Sync".
- "Blower Sync" cannot be set to multiple inputs.

When accidentally set to multiple inputs, the input number's small input is used as "Blower Sync".

Prepurge count start

Overview

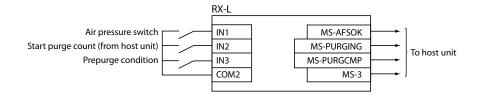
This function is used when controlling prepurge start with the host device. Once all of the following conditions are established, prepurge timing begins.

- Air switch check complete
- "Air pressure switch" input ON
- "Prepurge condition" are all ON
- "Start purge count" input ON

If "start purge count" input is turned OFF during prepurge time count, time count is stopped.

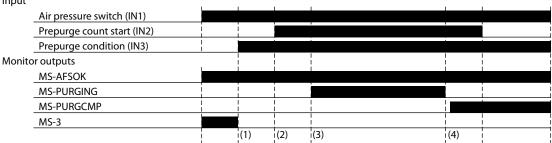
If the input is turned ON again, time count will restart.

• Wiring example



• Operation example (1) Basic

Input



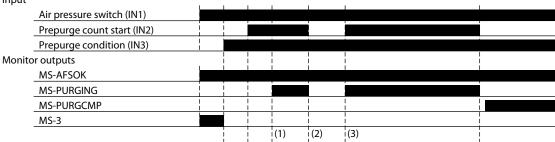
- (1) Host device confirms that air pressure switch startup confirmation (MS-AFSOK) is ON.
- (2) "Start purge count" is turned ON.
- (3) Prepurge is performed according to the specified time.
- (4) When prepurge is complete, prepurge complete (MS-PURGCMP) turns ON.

📖 Note

• After prepurge had completed, "Start purge count" input has no effect on operation in any status.

• Operation example (2) Cancel purge





- (1) Prepurging in progress
- (2) When "Start purge count" turns OFF, prepurge goes into standby mode.
- (3) When "Start purge count" turns ON again, prepurge restarts.

Additional items

• "Start purge count" cannot be set to multiple inputs. When accidentally set to multiple inputs, the input number's small input is used as "start purge count".

Ignition condition

Overview

Ignition condition (for pilot ignition and main ignition).

Checks the conditions before pilot and main ignition.

Does not check the conditions during pilot and main ignition.

If set to multiple inputs, conditions will only be established when all of those inputs are ON.

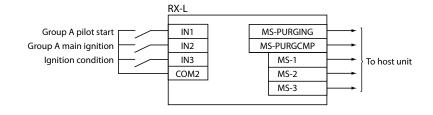
! Handling precautions

- Check ignition conditions for pilot ignition
 Only checks the ignition conditions wait process and ignition standby. Does not check the ignition conditions in processes after ignition standby.
 Check ignition conditions for main ignition
- Only checks ignition conditions when the main ignition order changes from OFF to ON in the pilot ignition process, main ignition process, and proportional combustion process.

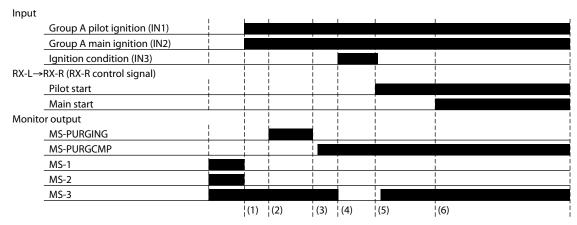
Does not check the ignition conditions if the main ignition order is already ON when transitioning to the pilot ignition process.

Status Change Chart 3 to 6 in Appendix 1 RX-L State Transition.

• Wiring example



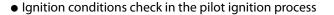
• Ignition conditions check when first starting

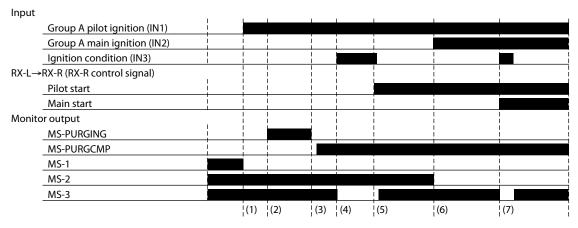


- (1) Pilot ignition request and main ignition request
- (2) Prepurge
- (3) Prepurge is complete, waiting for the ignition conditions to turn ON. (Ignition conditions wait process)
- (4) When the ignition conditions turn ON, waits for the ignition standby time (D-3). (Ignition standby)

In the ignition standby process, returns to the ignition conditions wait process when the ignition condition turns OFF.

- (5) Pilot start (does not check the ignition conditions)
- (6) Main start (does not check the ignition conditions)





- (1) Pilot ignition request
- (2) Prepurge
- (3) Prepurge is complete, waiting for the ignition conditions to turn ON. (Ignition conditions wait process)
- (4) When the ignition conditions turn ON, waits for the ignition standby time (D-3). (Ignition standby)

In the ignition standby process, returns to the ignition conditions wait process when the ignition condition turns OFF.

- (5) Pilot ignition
- (6) The main start remains in standby even if a main ignition request is received because the ignition condition is OFF.
- (7) The ignition condition turns ON and main starts.

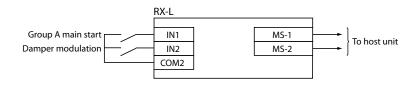
Damper modulation

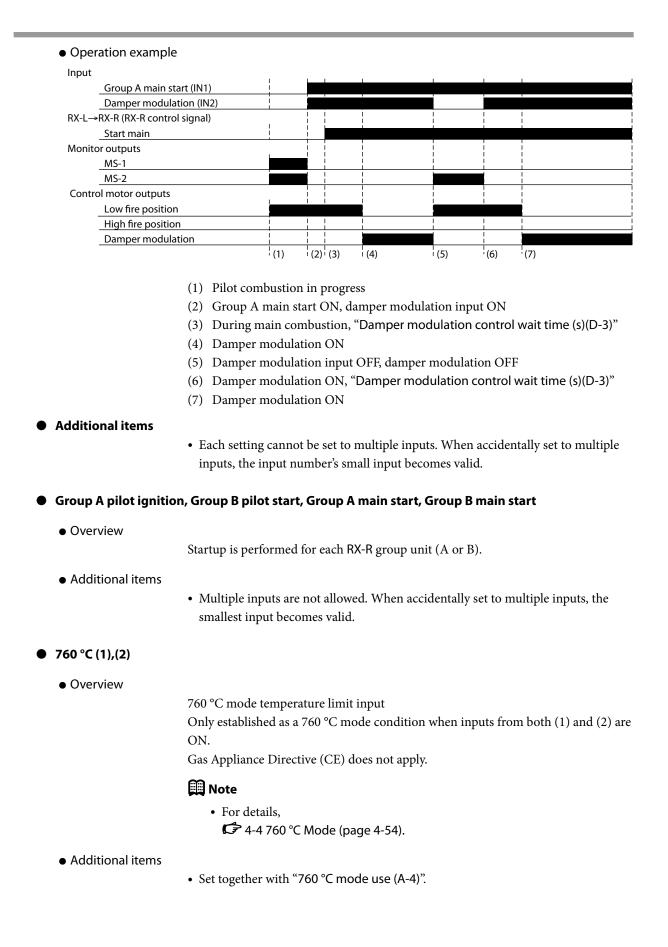
Overview

The damper modulation input controls the control motor damper modulation output.

After the specified time* has elapsed during the main ignition, the damper modulation input is accepted. If the damper modulation input is turned ON, the control motor damper modulation output is turned ON. Later, as soon as the damper modulation input is turned OFF, the control motor damper modulation output is also turned OFF.

- * "Damper modulation control wait time (s)(D-3)"
- Wiring example





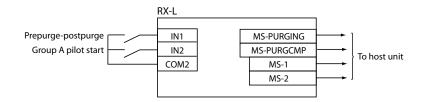
• Prepurge-postpurge

• Overview

This function can be used for zone RX-Ls and single zone RX-Ls. The regular RX-L cannot use this function. Determines whether or not zone purge is performed according to input status. Zone purge will be performed if inputs are OFF.

If inputs are ON, zone purge will not performed, and RX-R will be started up.

• Wiring example



• Operation example (1) Zone purge included

Input						
	Prepurge-postpurge					
	Group A pilot ignition (IN2)					
RX-L→	RX-R (RX-R control signal)		1	1	1	I I
	Start pilot	1		1	1	
	Start main	i I		1	1	
Monito	r outputs			1	i I	
	MS-PURGING	1	1			
	MS-PURGCMP	i I		 		
	MS-1	1			1	
	MS-2			 I I	1	
		1	¦(1)	(2)	(3)	(4)

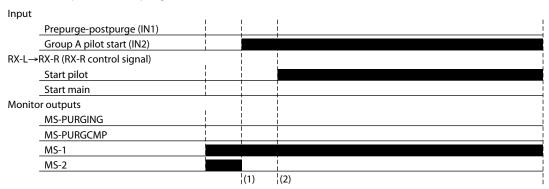
(1) Pilot ignition request

- (2) Prepurge
- (3) Prepurge complete
- (4) Combustion permission granted to RX-R

📖 Note

- If "zone purge ON/OFF" is turned ON during prepurging, prepurging will continue.
- If "zone purge ON/OFF" is turned ON during postpurging, postpurging will continue.

• Operation example (2) Zone purge not included



- (1) Pilot ignition request
- (2) Combustion permission granted to RX-R

Additional items

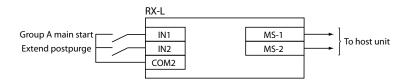
 "Zone purge ON/OFF" cannot be set to multiple inputs. When accidentally set to multiple inputs, the input number's small input is used as "zone purge ON/OFF".

Postpurge extension

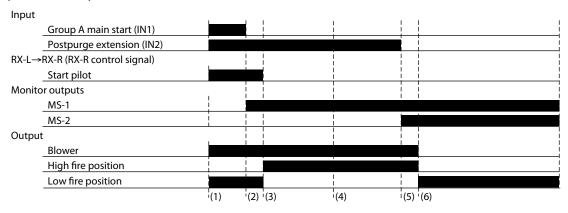
Overview

Postpurge is performed while postpurge extension input contacts are shorted.

• Wiring example



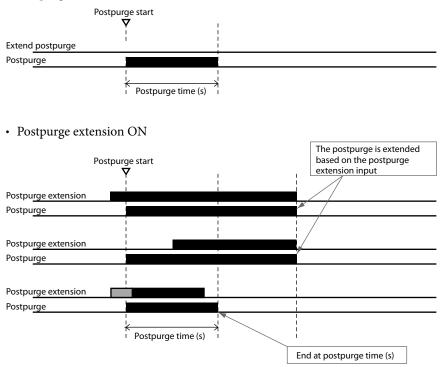
• Operation example



- (1) Pilot combustion in progress
- (2) Combustion OFF
- (3) Postpurge (for specified time)
- (4) Postpurge (extended)
- (5) Postpurge extension ends
- (6) Stop

📖 Note

- Relationship between postpurge time (s) and postpurge extension
 - Postpurge extension OFF



Conditional interlock A through E

Overview

Interlock monitoring only occurs when any input is turned ON. Interlock monitoring conditions must be set separately via "Conditional interlock condition (C-3)".

Up to 5 types of monitoring conditions can be set (A to E).

After that, assignment will be made to the interlock inputs selected from set monitoring conditions A through E.

Basic operation

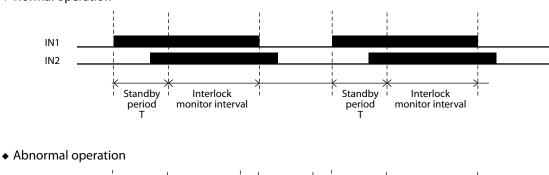
When using conditional interlock, the following items must be set.

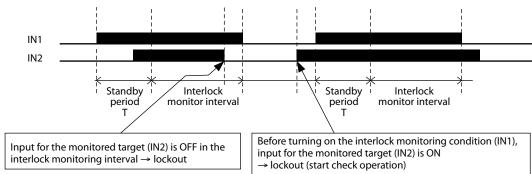
- (1) "Input functions (C-1)"
 - Set one item from conditional interlocks A to E.
- (2) "Conditional interlock condition (C-3)" Set conditional interlocks A to E via C-1.
- (3) "Conditional interlock setting standby time (C-4)" Set the standby time spanning from when conditions are set via C-3 until interlock monitoring begins for conditional interlocks A to E.

• Use example

Assignment is made to each input terminal as follows. IN1: "Conditional interlock condition (C-3)" IN2: "Conditional interlock A (C-1)" Standby time: "T(C-4)"

Normal operation

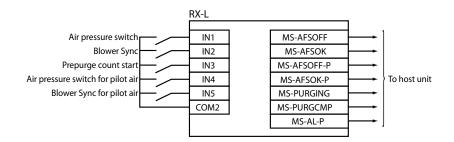




- Additional items
- Conditional interlocks A to E can be assigned to each of the multiple interlock inputs.
- Blower Sync for pilot air
 - Overview

Pilot air blower's "Blower Sync" input. Used for pilot air pressure switch startup confirmation.

• Wiring example



• Operation example Input Startup Air pressure switch (IN1) Blower Sync (IN2) Prepurge count start (IN3) Air pressure switch for pilot air (IN4) Blower Sync for pilot air (IN5) Regular RX-L→RX-R (RX-R control signal) Regular interlock Monitor outputs MS-AFSOFF MS-AFSOK MS-PURGING MS-PURGCMP MS-AFSOFF-P MS-AFSOK-P MS-AL-P (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14)

- (1) to (8) Main air pressure check and prepurge operation
- (9) to (11) Pilot air pressure check
- (12) Zone combustion permission
- (13) and (14) Error operation
- (1) Startup is turned ON.
- (2) If air pressure switch (IN1) was OFF, monitor output MS-AFSOFF is turned ON.
- (3) Confirmation is made that monitor output MS-AFSOFF in ON, then blower output and Blower Sync (IN2) for the host device is turned ON.
- (4) Air pressure switch (IN1) is turned ON.
- (5) Monitor output MS-AFSOK is turned ON, and indicates that air pressure switch startup confirmation is complete.
- (6) Start purge count (IN3) is turned ON, and prepurging begins.
- (7) Prepurge in progress
- (8) Prepurge complete
- (9) Confirmation is made that monitor output MS-AFSOFF-P is ON, then the host device turns ON pilot blower output and pilot air Blower Sync (IN5).
- (10) Pilot air pressure switch (IN4) is turned ON.
- (11) Monitor output MS-AFSOK-P is turned ON, and indicates that pilot air pressure switch startup confirmation is complete.
- (12) "Regular interlock" = ON for zone RX-L.
- (13) Pilot air pressure switch (IN4) is turned OFF.
- (14) "Regular interlock" = OFF for zone RX-L, all zones are stopped, and regular RX-L is locked out.

📖 Note

• Differing from this chart, pilot air confirmation can be performed first, then prepurge operation can be performed.

• Air pressure switch for pilot air

Overview

Pilot air pressure switch is input.

The following functions are available.

- Startup check Confirmation is made that input is open when blower is OFF, and input is ON when blower is ON.
- Pilot RX-R start from Startup check completion is a condition for pilot startup.
- Interlock conditions After the pilot starts up, and the "pilot air pressure switch" is turned OFF, lockout is performed.

📖 Note

- Pilot air pressure switch is not a prepurge condition.
- Wiring example

Blower Sync for pilot air (page 4-48).

• Operation example

Blower Sync for pilot air (page 4-48).

Availability of settings

In the "RX-L type (A-1)" model setting, set whether to use the RX-L specification with regular RX-L, zone RX-L, or single zone RX-L.

For each RX-L that is set, some items can be set and some items cannot be set. Items are determined applicable or not applicable as follows.

✔: Available, Blank: Not available

Class:6:	Nie we e	RX-L type (A-1)			
Classification	Name	Regular RX-L	Zone RX-L	Single zone RX-I	
System	RX-L type (A-1)	—	—	_	
	Number of connected zone RX-Ls (B-14)	v .			
	Number of locked out zone RX-Ls (B-8)	~			
	RX-L address (B-19)		~		
	RX-R connections (E-1)		~	~	
	Number of locked out RX-Rs (E-2)		~	~	
	Air pressure switch check use (A-2)	~	~	~	
	Air pressure switch check result clear (A-5)	~	~	~	
	760 °C mode use (A-4)		~	~	
	Startup type (A-3)	~	~	~	
Control	RX-L start method (B-1)	~	~	~	
setting	Prepurge use (B-2)	*1	~	<i>v</i>	
	Blower sync signal source (B-6)	~	~	<i>v</i>	
	Purge count start signal source (B-7)	~	~	<i>v</i>	
	High fire position input (B-9)	~	~	~	
	Low fire position input (B-10)	~	~	~	
	Process timeout handling (B-11)	~	~	~	
	Prepurge after RX-R restart (B-12)		~	 ✓ 	
	Low fire stop (B-13)		~	~	
	Postpurge for residual flame (B-15)		~	~	
	RX-R prepurge use (B-16)		~	~	
		_	_	_	
	RX-L communication error handling (B-18)	~	~		
	RX-R start by communication command (F-5)*2	~	~	 ✓ 	
	Communication supervision(RS485) (B-21)*2	~	~	~	
	Communication supervision (Ethernet) (B-22)*2	~	~	~	
	Communication supervision warning reset method (B-23)*2	~	~	~	
Timer	Prepurge time (D-1)	~	~	~	
	Ignition wait time (s) (D-2)		~	~	
	Damper modulation control wait time (s) (D-3)		×	×	
	Postpurge time (s) (D-4)		×	×	
	Lockout postpurge time (s) (D-5)		×	· ·	
	Process error judgment time (no combustion) (s) (D-6)	~	×	· ·	
	Process error judgment time (during combustion) (s) (D-7)	×	×	· ·	
	Reignition standby time (s) (D-8)		×	· ·	
	Communication supervision timeout (D-9)*2	~	×	· ·	
RX-R_Group	RX-R_Group (E-3)		~	· ·	
Input	Input function (C-1) IN1 to IN16	~	~	· ·	
settings	Input function (C-1) Blower Sync	· ·	~	· ·	
	Input function (C-1) start purge count	~	(multiple possible)	~	
	Input function (C-1) air pressure switch	<pre>(maniple possible)</pre>			

Classification	Nama	RX-L type (A-1)			
Classification	Name	Regular RX-L	Zone RX-L	Single zone RX-L	
Input settings	Input function (C-1) interlock	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible	
	Input function (C-1) conditional interlock A to E	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible	
	Input function (C-1) prepurge condition	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible	
	Input function (C-1) interlock and prepurge condition	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible	
	Input function (C-1) 760 °C (1), (2)		~	~	
	Input function (C-1) zone purge ON/OFF		~	~	
	Input function (C-1) Group A pilot start		~	~	
	Input function (C-1) Group B pilot start		~	~	
	Input function (C-1) Group A main start		~	 ✓ 	
	Input function (C-1) Group B main start		~	~	
	Input function (C-1) Ignition condition		✓ (multiple possible)	✓ (multiple possible	
	Input function (C-1) damper modulation		~	 ✓ 	
	Input function (C-1) postpurge extension		~	~	
	Input function (C-1) pilot air Blower Sync	~			
	Input function (C-1) pilot air pressure switch	~			
	Input function (C-1) monitor	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible)	
	Input function (C-1) interlock (after prepurge complete)	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible	
	Input function (C-1) not used	✓ (multiple possible)	✓ (multiple possible)	✓ (multiple possible	
	Off delay time (C-2) input (1) to input (16)	~	~	~	
Condition	Conditional interlock condition (C-3) A to E	~	~	~	
settings	Conditional interlock setting standby time (C-4)	~	~	~	
Relay output	Relay output setting (B-3)	~	~	~	
	Blower output setting (B-4)	~	~	~	
	Damper output (B-5)	~	~	~	
Monitor	Flicker (MO-1)	~	~	~	
output	Monitor output (MO-2) FirstOutMonitor1 to 16	~	~	~	
	Monitor output (MO-2) air pressure switch OFF confirmation	~	~	~	
	Monitor output (MO-2) Air switch check complete	~	~	~	
	Monitor output (MO-2) 760 °C mode		~	~	
	Monitor output (MO-2) purge in progress	~	~	~	
	Monitor output (MO-2) purge complete	~	~	~	
	Monitor output (MO-2) postpurge in progress		~	v	
	Monitor output (MO-2) blower output	~	~	v	
	Monitor output (MO-2) high fire position/low fire position	~	~	~	
	Monitor output (MO-2) damper modulation	 ✓ 	~	~	
	Monitor output (MO-2) relay output	~	~	~	
	Monitor output (MO-2) Alarm (lockout)	~	~	 ✓ 	
	Monitor output (MO-2) alarm output (reverse)	~	~	 ✓ 	
	Monitor output (MO-2) normal interlock	~	~	 ✓ 	
	Monitor output (MO-2) pilot air pressure switch OFF confirmation	~			
	Monitor output (MO-2) pilot air switch check complete	 ✓ 	I		

Classification Name		RX-L type (A-1)			
Classification	Name	Regular RX-L	Zone RX-L	Single zone RX-L	
Monitor	Monitor output (MO-2) 760 °C diagnosis (2)		~	~	
output	Monitor output (MO-2) not used	~	~	~	
	Monitor output (MO-2) input monitor (1) to (16)	~	~	~	
	Monitor output (MO-2) input monitor (OFF delay) (1) to (16)	~	~	~	
	Monitor output (MO-2) when RUN	~	~	~	
	Monitor output operation (MO-3)	~	~	~	
LED display	LED settings (DSP-1) input display (1) to (16)	~	~	~	
	LED settings (DSP-1) air pressure switch OFF confirmation	~	~	~	
	LED settings (DSP-1) Air switch check complete	~	~	~	
	LED settings (DSP-1) 760 °C mode		~	~	
	LED settings (DSP-1) purge in progress	~	~	~	
	LED settings (DSP-1) purge complete	~	~	~	
	LED settings (DSP-1) postpurge in progress		~	~	
	LED settings (DSP-1) blower output	~	~	~	
	LED settings (DSP-1) high fire position/low fire position	~	~	~	
	LED settings (DSP-1) damper modulation	~	~	~	
	LED settings (DSP-1) relay output	~	~	~	
	LED settings (DSP-1) Permission from previous module		~		
	LED settings (DSP-1) Permission for next module	~	~	~	
	LED settings (DSP-1) not used	~	~	~	
	Error display setting (DSP-2)	~	~	~	
Host com-	Station address (F-1)	~	~	~	
munication	Baud rate (F-2)	~	~	~	
(RS485/ Ethernet)	Data format (F-3)	~	~	~	
Ethemety	Protocol (F-4)	~	~	~	
	RX-R start by communication command (F-5)*3		~	~	
	Minimum response time (F-6)*2	~	~	~	
	IP Address (H-1)*2	~	~	~	
	Subnet mask (H-2)*2	~	~	~	
	Default gateway (H-3)*2	~	~	 ✓ 	
	MODBUS/TCP Port number (H-4)*2	~	~	 ✓ 	

*1 Available only when "Enable". *2 RX-L90 only *3 RX-L80 only

4 - 4 760 °C Mode

Overview

Two temperature controllers are used, and if they reach 760 °C or more, they will move into burner temp 760 °C mode.

The following operations are performed when in this mode.

- Prepurge cancel operation
- Flame monitoring cancel operation
- Gas Appliance Directive (CE) does not apply.

Item setting

(1) "760 °C mode use (A-4)"

Select a furnace temp 760 °C monitoring mode.

Setting	Description
Disable	Furnace temp 760 °C monitoring is not performed.
First prepurge only	Burner temp 760 °C monitoring is performed. After startup, prepurge is performed for the first time independent of burner temp. For the second time and beyond, prepurge is determined accord- ing to furnace temperature conditions.
Every time	Furnace temp 760 °C monitoring is performed. Prepurge will definitely occur independent of burner temp.
Normal	Furnace temp 760 °C monitoring is performed. Occurrence of prepurge is determined according to burner temp conditions.

- (2) "Input function (C-1)"
 - Set "760 °C (1)" to any input, then connect to temperature controller 1's output signal.
 - Set "760 °C (2)" to any input, then connect to temperature controller 2's output signal.
- (3) "Monitor output (MO-2)"
 - Set "760 °C diagnosis (1)" to any monitor, then connect to temperature controller 1's DI.
 - Set "760 °C diagnosis (2)" to any monitor, then connect to temperature controller 2's DI.

! Handling precautions

- When choosing a set temperature, fully consider the margin of error for temperature sensors and controllers, as well as temperature distribution within the furnace, and the 760 °C temperature point.
- Cannot be used together with temperature controllers specifically for control. Use temperature controllers for monitoring furnace temps of 760 °C or higher.

Basic operation

- 760 °C mode start condition When all inputs set to "760 °C contact input" are turned ON, 760 °C mode will start.
- 760 °C mode end condition If one or more inputs set to "760 °C contact input" are turned OFF, 760 °C mode will end.
- Operations while 760 °C mode is in progress If a startup request enters an inter-zonal RX-R, it will move into ignition operation, regardless of whether flames are ON or OFF.

Prepurge operation

Prepurge ON/OFF is determined based on "760 °C mode use (A-4)".

Setting item "760 °C mode use (A-4)" = "normal"

If in 760 °C mode, prepurge will not be performed. Prepurge cancel timing is determined as follows.

- If "Startup type (A-3)" = "Link (1)" or "Link (2)" If in burner temp 760 °C mode when the air pressure ON confirmation process turns all air pressure switches ON, prepurge will not be performed. Instead, you will be moved into the Ignition condition wait process, or ignition confirmation process.
- If "Startup type (A-3)" = "Separate"

If in burner temp 760 °C mode when the call for heat wait process gets a call for heat, the prepurge operation is cancelled, and you will be moved into the Ignition condition wait process, or ignition confirmation process.

Prepurge will be performed for the following processes, even while in 760 °C mode.

- Wait process for prepurge count start
- Wait process for prepurge condition
- Prepurge process

Setting item "760 °C mode use (A-4)" = "First prepurge only"

Prepurge will be performed during the initial process operation after startup, regardless of whether 760 °C mode is ON or OFF. For the second time and beyond, process operations are the same as with "760 °C mode use (A-4)" = "normal".

Setting item "760 °C mode use (A-4)" = "Every time"

Prepurge is always performed, regardless of whether 760 °C mode is ON or OFF.

760 °C contact input diagnosis

If a mismatch between the contact inputs continues for 10 minutes or longer, lockout will occur.

RX-R 760 °C mode operation

Even in 760 °C mode, operation is executed according to the process. During flame detection, the presence of a flame is always indicated. Accordingly, the combustion sequence will proceed regardless of the actual flame status. The actual flame status is detected even in 760 °C mode. Therefore, the LED display and external monitor output link to the actual flame status. If a false flame, UV error, ignition failure, or flame failure is detected in 760 °C mode, an alarm is activated. Normal flame monitoring will resume shortly after 760° C mode is canceled.

Thermal sensing devices that can be combined

SDC35/36 options: Select event output/DI/auxiliary output (electric current)/RSP input with options.

Example model numbers

C35TC0UA2300	C36TC0UA2300
C35TR0UA2300	C36TR0UA2300
C35TV0UA2300	C36TV0UA2300
C35TC0UA2400	C36TC0UA2400
C35TCCUA2400	C36TCCUA2400
C35TR0UA2400	C36TR0UA2400
C35TV0UA2400	C36TV0UA2400
C35TC0UA5300	C36TC0UA5300
C35TR0UA5300	C36TR0UA5300
C35TV0UA5300	C36TV0UA5300
Use a thermocouple	for the thermal sensor.

Connecting a temperature controller

To run in 760 °C mode, you will need two temperature controllers in addition to the RX.

This section explains how to connect a temperature controller to the RX-L, and the temperature controller settings.

• Connecting a temperature controller to the RX-L

Input to the RX-L

Set "760 °C contact input (1)" and "760°C contact input (2)" for two of the RX-L interlock input terminals and connect the OUT (event output) of the two temperature controllers.

• Output from the RX-L

Set "760 °C setting diagnosis (1)" and "760 °C setting diagnosis (2)" for two of the RX-L monitor output terminals and connect to the DI of the two temperature controllers.

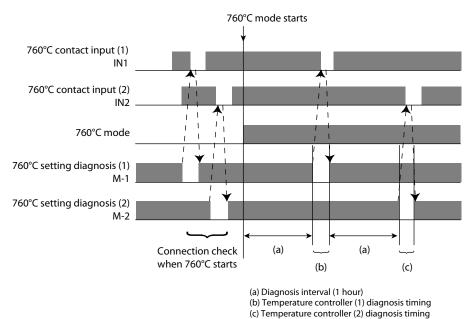
This is done for the following two reasons.

- To check for proper connection to the temperature controller when starting 760 $^{\circ}\mathrm{C}$ mode

• To periodically diagnose temperature controller output during 760 °C mode A temperature controller check is only performed when starting 760 °C mode for the first time after Start ON.

If the connection is not correct, a warning is displayed (EA10 760 °C device connection error) and the status does not change to 760 °C mode. During 760 °C mode, the RX-L outputs a monitor signal so that the temperature controller turns the output OFF once every hour.

If the temperature controller does not turn OFF in spite of some requests, the temperature controller output is considered to have failed and a lockout occurs.



Temperature controller (Azbil SDC35/36) settings

 Temperature of 	leviation	crossc	hecl	k
------------------------------------	-----------	--------	------	---

To reduce the risks associated with a temperature controller failure, use two temperature controllers to cross check each other's status (check the PV deviation with each other).

Use the SDC35/36 RSP function.

Assign a PV to each SDC35/36 auxiliary output, and input it as the RSP for the other SDC35/36. During 760 °C diagnosis, make sure that the variation is small. Configure the settings so that 760 °C mode is canceled if the variation is higher than the set amount.

The details that should be set for the minimum limits for the two temperature controllers in order to run 760 °C mode are shown below.

Control method

Set the control method (CTRL) to "On/Off Control". Set the differential (DIFF) and operation offset (OFFS) for the ON/OFF control to small values such as 1 and 0 respectively.

PV mutual check

Set the auxiliary output range (C52) to 4 to 20 mA and the auxiliary output type (C53) to PV.

Set the RSP range type (C10) to 4 to 20 mA.

Adjust the high and low limits for the auxiliary output scaling and RSP range according to the PV range type. For example, if the PV range type is "2: K 0 to 1200 °C", the high and low limits will be 1200 and 0.

Event output (EV1)

• Event output (EV1)

Set the operation type to "LSP/RSP" and Operation 3: "A or B or C or D". Set input assignment A to "DI1" and input assignments B, C, and D to "Always open".

In DI1, connect the "760 °C setting diagnosis (1) (or (2))" RX-L monitor output.

Internal contact 4

Set to operation 4: "A and B and C and D".

Set input assignment A to "DI1", input assignment B to "Internal event 3", input assignment C to "Internal event 4", and input assignment D to "Always close". Set internal event 3 to "6: Deviation high and low limits" (reverse action) and, for example, 10 °C.

Set internal event 4 to "2: PV low limits" (direct action) and, for example, 800 °C*.

You can set any temperature for entering 760 °C mode. However, consider the errors of temperature sensors and controllers, as well as temperature distribution in the furnace, and allow sufficient margin when setting the temperature for 760 °C. You can reduce the risk of accidentally (or unintentionally) entering 760 °C mode at a temperature lower than 760 °C if you set the low limit for the SP limit to 760 °C or higher.

• Internal contact 5

Set to operation 1: "(A and B) or (C and D)".

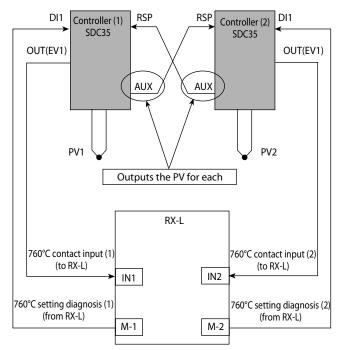
Set input assignment A to "DI1", reverse input assignment B to "Alarm", and set input assignments C and D to "Always open".

• "Event output 1" for the DO assignment

Set to operation 1: "(A and B) or (C and D)".

Set input assignment A to "MV1", input asignment B to "Internal contact 5", input assignment C to "Internal contact 4", and input assignment D to "Always close".

Based on the settings above, 760 °C contact input (1) and (2) will turn ON when the deviation between the two temperature controllers is less than 10 °C and the PV reaches 800 °C. 760 °C contact input (1) or (2) will turn OFF when 760 °C setting diagnosis (1) or (2) turns off at a period of one time per hour.



IN is the interlock input terminal and M is the monitor output terminal.

Numbers have been added to the figure for convenience, but this can happen in any order.

For details regarding settings,

Appendix 4 SDC35/36 Settings (page App-27).

4 - 5 Timing Regulation

Regular interlock shutoff timing

Definition

Time taken from the beginning of regular RX-L interlock operation until the RX-R safety shutoff valve turns OFF.

Regulation

No more than 700 ms (when OFF delay time is at 0 seconds)

• Target

Targeted "Input function (C-1)" is as follows.

- Air pressure switch
- Interlock
- Conditional interlock A through E
- Interlock and prepurge condition
- Interlock (after prepurge)

Zone interlock shutoff timing

Definition

Time taken from the beginning of zone RX-L interlock operation until the RX-R safety shutoff valve turns OFF.

Regulation

No more than 500 ms (when OFF delay time is at 0 seconds)

• Target

Targeted "Input function (C-1)" is as follows.

- Air pressure switch
- Interlock
- Conditional interlock A through E
- Interlock and prepurge condition
- Interlock (after prepurge has completed)

Relay output shutoff timing

Definition

Time taken from the start of interlock operation until relay output turns OFF.

Regulation

No more than 300 ms (when OFF delay time is at 0 seconds)

• Target

Targeted "Input function (C-1)" is as follows.

- Air pressure switch
- Interlock
- Conditional interlock A through E
- Interlock and prepurge condition
- Interlock (after prepurge)

Other timing

• Definition

Timing setting value, time accuracy

Regulation

Within $\pm~20~\%$

• Target

Targets are as follows.

- Timing setting value
- Error determination time

Chapter 5. RX-R SETTINGS

Overview 5 - 1

■ An overview of settings

	Settings	Code	Description	Reference pages
System	Combustion mode	1-1	Select a combustion mode.	5-2
	RX-R purge conditions	1-2	Toggle air pressure switch operation check ON/OFF.	5-4
	760 °C mode *3	1-5	Select whether or not 760 °C mode is used.	5-6
Control	RX-R start from	2-1	Select RX-R start from for RX-R.	5-7
	Reset condition	2-2	Select conditions for canceling lockout.	5-7
Timer	Restart wait time (s)	2-3	Set the standby time before ignition when restarting a locked out RX-R. The process will not move forward during standby, even if a startup signal enters.	5-7
	Start check delay time (s)	2-4	Set a delay time for beginning the start check.	5-7
	Air valve OFF delay (s)	2-5	Sets the OFF delay time for the air valve output for combustion.*1	5-8
	Air pressure switch Off test timeout (s)	2-6	Set the timeout time for the Air pressure switch's OFF confirma- tion failure during start check.* ²	5-8
	Pilot ignition time	1-3	Select a pilot ignition time.	5-10
Input set-	Input function	3-1	Select input functions IN1 to IN4.	5-10
tings	Off delay time	3-2	Select OFF delay time for IN1 to IN4.	5-14
Monitor output	Flicker	5-1	Select a flicker display for an interlocked output (ON/OFF alternate output).	5-15
	Monitor output	5-2	Select signals for assignment to monitor outputs 1 through 11 (M-1 to M-11).	5-15
	Monitor output logic	5-3	Set the monitor output operation (direct, reverse) for monitor outputs 1 to 11 (M-1 to M-11).	5-15
Display set- tings	Error display setting	6-1	Select a error display method for display on the module front 7-segment LED.	5-19
RX-R control	Address	4-1	Set the RX-R control communication station address.	5-19

*1 Valid with the following settings.

• "RX-R purge conditions (1-2)" = "ON" • "AV-DRV" is set to "Monitor output (M-9 to 11)" via "Monitor output (5-2)".

*2 Valid when "RX-R purge conditions (1-2)" = "ON".

*3 Gas Appliance Directive (CE) does not apply.

5 - 2 Setting Details

System

This is an explanation of the items available for system.

• Combustion mode (1-1)

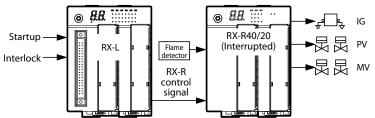
Select a combustion method according to model number and SLP-RX settings.

Setting		Description
Model No.	Combustion method	Description
RX-R40/20	Interrupted pilot	Corresponds to interrupted pilot ignition method.
	Intermittent pilot	Corresponds to intermittent pilot ignition method.
	Continuous pilot	Corresponds to continuous pilot ignition method.
	Direct ignition	Corresponds to ignition method for lighting the direct main burner.
	Flame relay	Used together with the Independent supervision model. Only performs flame monitoring.
RX-R44	Independent supervision	Corresponds to ignition methods of continuous/inter- mittent pilots which perform Independent supervi- sion. Used together with the flame relay model.
RX-R46	Independent su- pervision (external relay)	Corresponds to ignition methods of continuous pilots that perform Independent supervision, and drive ex- ternal relays via external monitor output. Used together with the flame relay model.
RX-R22	Direct ignition (ex- ternal relay)	Corresponds to direct ignition methods that drive ex- ternal relays via external monitor output.

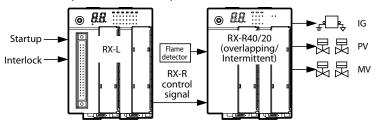
(RX-R40/44/46: For continuous operation, RX-R20/22: For batch operation)

• Device combination

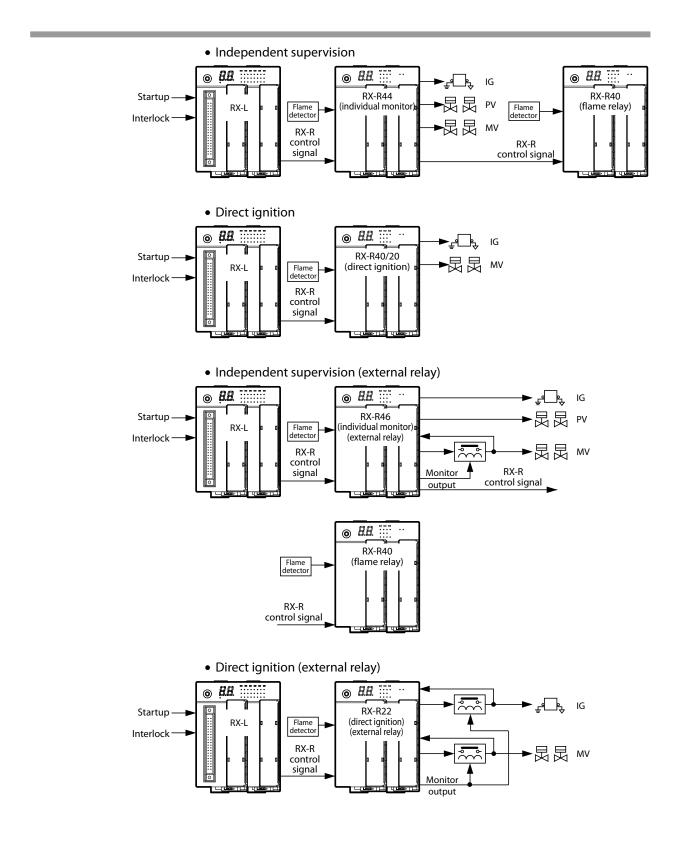
• Interrupted pilot



• Intermittent pilot, Continuous pilot*



* Independent supervision is generally needed for intermittent pilots and Continuous pilots.



RX-R purge conditions (1-2)

Select whether or not the combustion air valve drive is driven from the RX-R.

! Handling precautions

• "Input function (3-1)" air pressure switch and "monitor output (5-2)" Air valve drive [air valve drive output for combustion] settings are also needed. Related to RX-L's "RX-R prepurge use (B-16)" (page 4-13).

Setting	Description	
Disable	Select when there are no purge conditions.	
Linked call for heat	Links to startup requests for RX-R, and drives combustion air valve. Select when using with a direct burner.	
Linked MV	Links to RX-R MV, and drives combustion air valve. Select when using with a radiant tube burner or self pilot burner.	

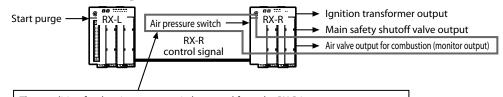
Note: During RX-R main ignition, the RX-L input function (C-1) ignition condition check is not applied.

📖 Note

- If using while combined with Independent supervision RX-R (RX-R44, RX-R46), this function cannot be used.
- Also, this function cannot be used if burners are operated selectively.
- RX-R model type and input settings are both needed.
- Instrumentation example

Use when operating as described below.

- During combustion stoppage, it works together with the main safety shutoff valve to shut off air for combustion.
- During a combustion request, it works together with the main safety shutoff valve to open air for combustion.



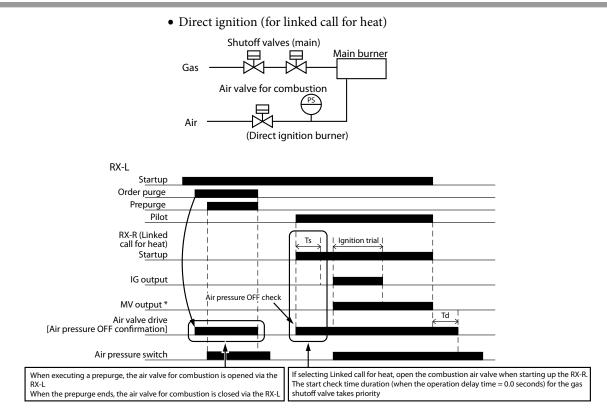
The condition for the air pressure switch entered from the RX-R is prepurge When executing a prepurge, the air valve for combustion is opened via the RX-L When the prepurge ends, the air valve for combustion is closed via the RX-L When combustion is requested, the air valve for combustion is controlled by the RX-R

• Combustion air valve drive timing

Combustion air valve drive timing for RX-R purge conditions "Linked call for heat" and "Linked MV" is as follows.

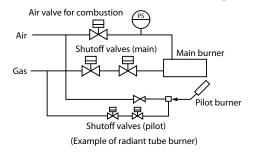
Ts: Start check time

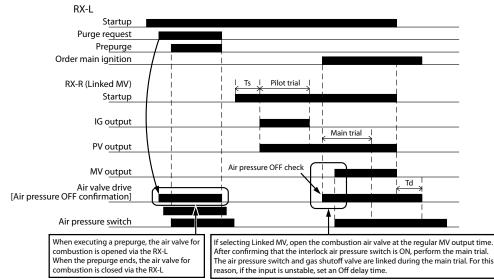
Td: Air valve output OFF delay time for combustion



- * Use by connecting to the B1 terminal for the RX-R40 or RX-R20 pilot safety shutoff valve.
 - Continuous pilot (for Linked MV)

Use with the radiant tube burner or self pilot.





• 760 °C mode (1-5)

Select whether or not the 760 °C mode is enabled for the RX-R40 series.

Gas Appliance Directive (CE) does not apply.

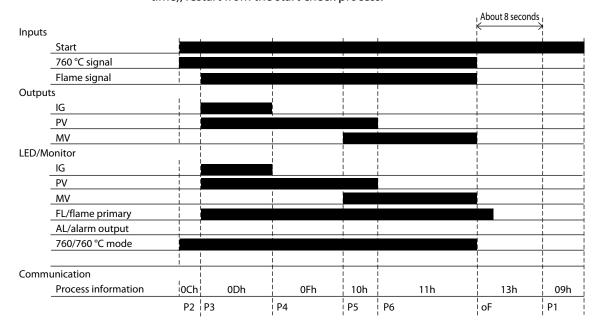
Setting	Description
Disabled	Disable 760 °C mode.
Enable	Enable 760 °C mode (can only be set for RX-R40 series).

Note: During RX-R ignition, the RX-L input function (C-1) ignition condition check is not applied.

! Handling precautions

• For RX-R20C, R22C, R20B

When about to perform batch style combustion, halt normal combustion immediately after 760 °C mode is canceled, wait for a specified period of time, then restart the combustion process from the start check process. Exit 760 °C mode (from pilot trial to normal combustion in progress) If the 760 °C signal is turned off once the pilot trial has begun, move on to the 760 °C post exit standby process (oF), stop all loads, and halt combustion. After about 8 seconds have passed (flame response time + false flame standby time), restart from the start check process.



Control

This is an explanation of the items available for control.

RX-R start from (2-1)

Setting	Description
Linked RX-L	Start up RX-R with a startup order from RX-L.
RX-L and RX-R Start SW	Start up RX-R via startup order from RX-L, along with RX-L and RX-R Start SW of the startup order which input RX-R startup.

Reset condition (2-2)

Setting	Description	
Linked RX-L	Links to RX-L reset input to reset RX-R.	
RX-L or RX-R Reset SW	RX-R is reset via RX-L reset input or RX-R reset input.	

Timer

This is an explanation of the items available for timer.

Restart wait time (s) (2-3)

Set the standby time until ignition takes place when restarting a locked out RX-R. The process will not move forward during standby, even if there is a startup signal.

Setting	Description
0.0 to 600.0 s (0.1 second intervals)	Set the standby time until startup is received during lockout.

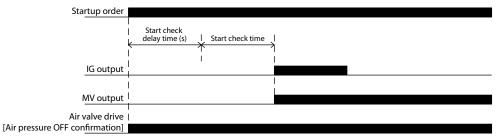
Start check delay time (s) (2-4)

Setting	Description
0.0 to 600.0 s (0.1 second intervals)	Set a delay time for beginning the start check.

Note: During RX-R ignition, the RX-L input function (C-1) ignition condition check is not applied.

📖 Note

• For direct ignition, when "Linked call for heat" is selected as an RX-R purge condition, air solenoid valve and gas shutoff valve timing is as follows.



* Use by connecting to the B1 terminal for the RX-R40 or RX-R20 pilot safety shutoff valve.

• Air valve OFF delay (s) (2-5)

Set air valve OFF delay (s).

(RX-R purge conditions: call for heat or Linked MV)

This setting is enabled when going from main combustion status to main extinguishing.

This setting is disabled during purge operation (via RX-L).

Setting	Description
0.0 to 600.0 s	Set air valve OFF delay (s).
(0.1 second intervals)	

📖 Note

• For direct ignition, when "linked call for heat" is selected as an RX-R purge condition, air valve for combustion and gas shutoff valve timing is as follows.



* Use by connecting to the B1 terminal for the RX-R40 or RX-R20 pilot safety shutoff valve.

• Air pressure switch Off test timeout (s) (2-6)

Set the timeout time for the air pressure switch OFF confirmation failure during start check/when moving on to the main trial (Linked MV only). (RX-R side purge conditions: call for heat or Linked MV)

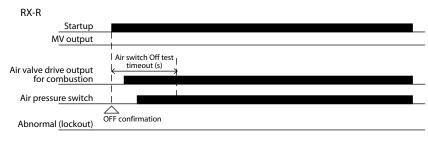
Setting	Description
0.0 to 600.0 s	Set the timeout time for the air pressure switch OFF confirma-
(0.1 second intervals)	tion failure during start check.

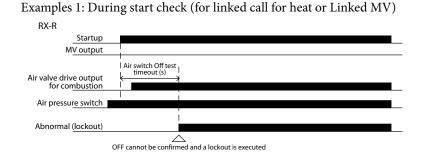
Note: The timeout timing, for air pressure switch OFF confirmation when the main startup signal is entered, will be canceled while the main startup signal is OFF.

📖 Note

- Operation during air pressure switch OFF confirmation
 - When normal

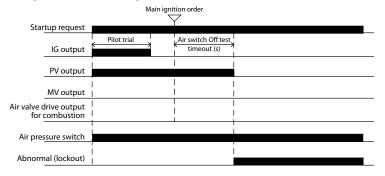
Examples: During start check





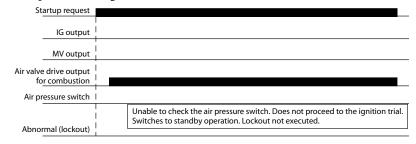
Examples 2: Continuous pilot (for Linked MV)

• Abnormal end

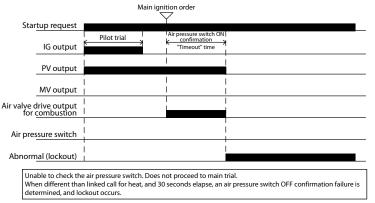


- Operation during air pressure switch ON confirmation
 - Normal end
 RX-R purge conditions (1-2) (page 5-4).
 - Abnormal end Operations differ for "Linked call for heat" and "Linked MV" RX-R purge conditions.

Example 1: Direct ignition/linked call for heat







Note: The timeout timing, for air pressure ON confirmation when the main ignition order is entered, will be canceled while the main false flame is generated.

• Pilot ignition time (1-3)

Setting	Description
4.5 ± 0.5 s	Select a pilot ignition time.
9 ± 1 s	

Input settings

This is an explanation of the items available for input settings.

• Input functions (3-1)

Select Interlock functions (IN1 to IN4).

Setting	Description	Type ^{*1}
Interlock	Any interlock can be input. If multiple settings were made, each input operates independently. If opened simultaneously, the one with the largest number is enabled. (If OFF delay was set, and they are opened simultaneously after OFF delay ends, the one with the largest number is enabled.) Open — interlock error, lockout performance Short-circuit — normal interlock	Interlock
Pilot safety valve confirmed closed	An answerback check can be performed for the shutoff valve (pilot). If multiple settings were made, it is only handled as a short-circuit when all inputs are short-circuited (RX-L and RX-R Start SW). When the shutoff valve (pilot) is ON Open — normal Short-circuit — abnormal: Lockout after 20 consecutive seconds When the shutoff valve (pilot) is OFF Open — abnormal: Lockout after 20 consecutive seconds Short-circuit — normal	Interlock
Main safety valve confirmed closed	An answerback check can be performed for the shutoff valve (main). If multiple settings were made, it is only handled as a short-circuit when all inputs are short-circuited (RX-L and RX-R Start SW). When the shutoff valve (main) is ON Open — normal Short-circuit — abnormal: Lockout after 20 consecutive seconds When the main valve is OFF Open — abnormal: Lockout after 20 consecutive seconds Short-circuit — normal	Interlock
Pilot start *2	A process transfer to pilot trial can be performed by an external signal.	Control input
Main start *2	A process transfer to main trial can be performed by an external signal.	Control input
Combustion standby mode	RX-R can be transferred to standby process without lockout. If during combustion, both pilot and main are extinguished. If input enters, the combustion sequence restarts from the standby process. OFF — transfer to standby process ON — restart from standby process	Control input

			De	escription			Type ^{*1}
Air pressure switch				-	or heat or Linked monitor can be ta		Interlock
	firmation can						
	Air pressure OFF confirmation process (linked call for heat, Linked MV).						
	Open — No Short-circu		al: Lockout af	ter 0 to 600 (c	hangeable) conse	ocutive seconds	
	Short-circuit — Abnormal: Lockout after 0 to 600 (changeable) consecutive seconds Process						
	Purge conditions	Input status	Before standby	Air pressure OFF confirmation	Start check	From K1 check to pilot ignition standby	
	Linked call	Open	Not running	Normal	Process standby	Not running	
	for heat	Short-circuit Not set	Not running Not running	Abnormal Abnormal	Normal	Normal	
	Linked MV	Open	Not running	Normal	Normal	Normal	
		Short-circuit	Not running	Abnormal	Not running	Not running	
	(Hyphen in	Not set	Not running	Abnormal			
	Once pilot tria		-				
	Open — Ab	normal: Lock it — Normal		ior neat)			
	Purge	Input status			Process		
	conditions	•			om main trial to nor		
	Linked call for heat	Open Short-circuit	Abnormal A Normal	Abnormal Normal	Abnorm Norma		
		Not set	_	_			
	Open — Normal Short-circuit — Abnormal: Once the main ignition order is entered, lockout will occur continuously for 0 to 600 seconds (can be set) Main trial standby process (Linked MV) Open — Abnormal: Lockout after 30 consecutive seconds Short-circuit — Normal						
	Open — Ab	onormal: Lock	Linked MV)	sly for 0 to 600) seconds (can be		
	Open — Ak Short-circu Once main tria Open — Ak	onormal: Lock it — Normal	Linked MV) cout after 30 c gins (Linked M	sly for 0 to 600) seconds (can be		
	Open — Ak Short-circu Once main tria Open — Ak	onormal: Lock it — Normal Il process beg onormal: Lock	Linked MV) cout after 30 c gins (Linked M	sly for 0 to 600 consecutive se) seconds (can be		
	Open — Ak Short-circu Once main tria Open — Ak Short-circu	onormal: Lock it — Normal Il process bec onormal: Lock it — Normal	Linked MV) cout after 30 c gins (Linked M	sly for 0 to 600 consecutive se IV) Before pilot on) seconds (can be	set) From main trial to normal	
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge	onormal: Lock it — Normal Il process bec onormal: Lock it — Normal	Linked MV) cout after 30 c gins (Linked M cout	sly for 0 to 600 consecutive se IV) Before pilot on) seconds econds Process Ily After pilot only	set) From main	
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions	onormal: Lock it — Normal Il process beg onormal: Lock it — Normal Input status Open Short-circuit	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive) seconds (can be econds Process ly After pilot only air valve drive	set) From main trial to normal combustion	
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions Linked call for heat	onormal: Lock it — Normal Il process beconormal: Lock it — Normal Input status Open Short-circuit Not set	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal Not running —	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive Normal Abnormal *) seconds (can be econds Process ly After pilot only air valve drive Abnormal	set) From main trial to normal combustion Abnormal	
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions Linked call for heat * When the Gas pressure s gas pressure is	onormal: Lock it — Normal Il process beconormal: Lock it — Normal Input status Open Short-circuit Not set e main ignition witch contact normal.	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal Not running 	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive Normal Abnormal *) seconds (can be econds Process ly After pilot only air valve drive Abnormal	set) From main trial to normal combustion Abnormal Normal 	Interlock
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions Linked call for heat * When the Gas pressure s gas pressure is Elapsed time of tings are perfor When the pilor	onormal: Lock it — Normal Il process beg onormal: Lock it — Normal Input status <u>Open</u> <u>Short-circuit</u> Not set e main ignition witch contact normal. Iuring openir urmed via inp t or main bur rmal: Lockout	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal Not running order has beer t is taken in, a ng (dead time ut function O ner is ON t if open after	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive Normal Abnormal *) seconds (can be econds ly After pilot only air valve drive Abnormal Normal on can be made c	set) From main trial to normal combustion Abnormal Normal	Interlock
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions Linked call for heat * When the Gas pressure is Elapsed time of tings are perfo When the pilo Open — abno Short-circuit —	onormal: Lock it — Normal l process beg onormal: Lock it — Normal Input status <u>Open</u> <u>Short-circuit</u> Not set e main ignition witch contact normal. during openir med via inp t or main bur rmal: Lockout tion sta	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal Not running order has beer t is taken in, a ng (dead time ut function O ner is ON t if open after	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive Normal Abnormal *) seconds (can be econds ly After pilot only air valve drive Abnormal Normal on can be made c but OFF delay tim	set) From main trial to normal combustion Abnormal Normal	Interlock
Gas pressure switch	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions Linked call for heat * When the Gas pressure is Elapsed time of tings are perfor When the pilor Open — abno	onormal: Lock it — Normal l process beconormal: Lock it — Normal Input status Open Short-circuit Not set e main ignition witch contact formal. during openir prmed via inp t or main bur rmal: Lockout tion sta – normal	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal Not running order has beer t is taken in, a ng (dead time ut function O ner is ON t if open after rt	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive Normal Abnormal * 	o seconds (can be econds Process ly After pilot only air valve drive Abnormal Normal On can be made c out OFF delay tim ds (changeable) f	set) From main trial to normal combustion Abnormal Normal	Interlock
	Open — Ak Short-circu Once main tria Open — Ak Short-circu Purge conditions Linked call for heat * When the Gas pressure is Elapsed time of tings are perfo When the pilo Open — abno Short-circuit — Example:	onormal: Lock it — Normal l process beconormal: Lock it — Normal Input status Open Short-circuit Not set e main ignition witch contact formal. during openir prmed via inp t or main bur rmal: Lockout tion sta – normal	Linked MV) cout after 30 c gins (Linked M cout Pilot trial Normal Not running order has beer t is taken in, a ng (dead time ut function O ner is ON t if open after rt	sly for 0 to 600 consecutive se IV) Before pilot on air valve drive Normal Abnormal * 	econds (can be econds Process ly After pilot only air valve drive Abnormal Normal On can be made c out OFF delay tim ds (changeable) f	set) From main trial to normal combustion Abnormal Normal	Interlock

Setting	Description	Type ^{*1}
Manual valve	Used together with manual limit switch. When input contacts are shorted, RX-R stands by via standby process. However, if there is a contradiction with manual limit switch status, lockout will occur. If manual limit switch is open or was not set OFF — normal ON — abnormal: lockout If manual limit switch was short-circuited OFF — abnormal: lockout ON — normal	Control input
Manual limit switch	Used together with manual valve. If there is a contradiction with manual limit switch status, lockout will occur. If manual valve is open or was not set Open — normal Short-circuit — abnormal: lockout If manual valve was shorted Open — abnormal: lockout Short-circuit — normal	Interlock
Disabled	Nothing will function, regardless of input ON/OFF. When the combustion method is flame relay, set all input functions to disabled.	-

Detected minimum retention time: 0.2 seconds

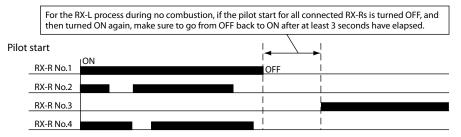
If a contact of 0.2 seconds or more is not retained in ON status (or OFF status), the ON status (or OFF status) will not be detected.

- *1 Type
 - Control input

Control input is an input condition for process transition and control selection. Lockout not executed.

- Interlock
- Interlock monitoring input. If OFF delay time is exceeded, and input is opened, lockout will occur.
- *2 Cannot be used with RX-L setting item "Damper modulation control wait time (s) (D-3)". When using "Pilot start" or "Main start", make sure to set damper modulation control wait time (s)(D-3) to 0.0 seconds.
 - For the RX-L process during no combustion, if the pilot start for all connected RX-Rs is turned OFF, and then turned ON again, make sure to go from OFF back to ON after at least 3 seconds have elapsed.

The process during no combustion includes all processes except for the ignition confirmation process, pilot ignition process, main ignition process, Damper modulation process, and re-ignition condition process.



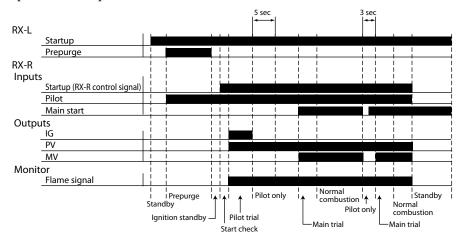
📖 Note

• If the 7-segment display and the interlock input number display for the first-out monitor output are different,

Chapter 14. TROUBLESHOOTING "■ The input number display for the activated interlock is different (both RX-L and RX-R)" (page 14-18).



Operations once pilot start and main start have been set are as follows.



Prepurge

Prepurging is not performed until pilot start is entered.

Pilot only process (if transitioning from pilot trial process)

The pilot only time after transitioning from the pilot trial process is 5 seconds. If main start is OFF once 5 seconds have elapsed, transition will not be made to the main trial.

■ Main flame control extinguishing

(RX-R40/20 combustion mode switching can only be done with continuous pilot and RX44/R46C)

By switching main start to OFF during normal combustion, the main shutoff valve can be closed.

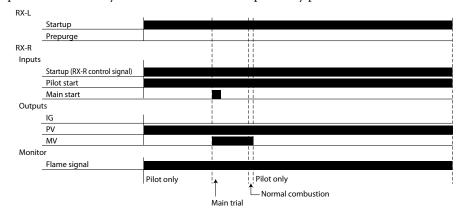
At that time, the process will change from normal combustion (P6) to pilot only (P4).

Pilot only process (if transitioning from normal combustion)

The pilot only time after transitioning from normal combustion is 3 seconds. Due to this, even if main start is turned ON before 3 seconds have passed, the process will not transition to main trial process until the pilot only time has elapsed.

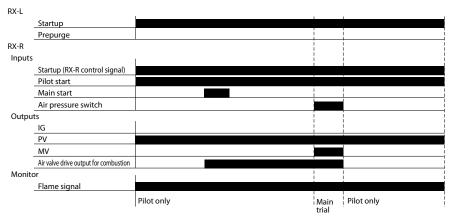
· Important things to note when turning main start OFF

Entering main start will take you to the main trial process (P5), but turning OFF main start during the main trial will not change the process. Once the main trial process has ended, you will be returned to the pilot only process.



If the RX-R side purge condition (1-2) is Linked MV, and air pressure switch is OFF after main start is entered, standby occurs until input is ON for the pilot only process (P4). At this time, the process will not change even if the main start is turned OFF. After the air pressure switch is ON and the main trial process has ended, you will be returned to the pilot only process.

If 30 seconds have passed and the Air pressure switch is still not ON, lockout will occur.



Off delay time (3-2)

Set Interlock Off delay time.

OFF delay time can be set for each individual input.

Setting	Description
0 to 10 seconds (1-second intervals)	Set OFF delay time for each interlock.

Monitor output

This is an explanation of the items available for monitor output.

• Flicker (5-1)

Select a flicker display for an interlocked input (ON/OFF alternate output).

Setting	Description
Flicker OFF	Output is turned ON during interlock operation.
Flicker ON	Flicker alternately switches ON/OFF every 0.5 seconds during interlock operation.

• Monitor output (5-2)

Allows you to assign any of the following signals to monitor output 1 to 11 (M-1 to M-11).

Setting output name	Description
First Out Monitor (1) to (4)	 Outputs the input status. (1) to (4) correspond to inputs IN1 to IN4. When "control system/other" is assigned Monitor output is turned ON during input ON. Monitor output is turned OFF during input OFF. The OFF delay time setting is enabled. When "interlock function" is assigned Normal end Monitor output is turned OFF when input function is short- circuited. During lockout Only the input function that opens first and is confirmed as abnormal turns ON (monitor output), after the OFF delay time has passed. When "not used" is assigned Monitor output turns OFF.
IG	Monitor output turns ON during IG load output.
PV	Monitor output turns ON during PV load output.
MV	Monitor output turns ON during MV load output.
Flame (primary)	Output ON with flame signal/output OFF with no flame signal
Flame (secondary)	Output ON with flame signal/output OFF with no flame signal Note: For other than RX-R 4x/6x models, output is always OFF.
Alarm (lockout)	Turns monitor output ON during lockout. (Turns monitor out- put OFF during normal end.)
Ignition failure (ER1)	ON during ignition failure error. Turns OFF when error is reset.
Flame failure (ER2)	ON during flame failure error. Turns OFF when error is reset.
False flame (ER3)	ON during false flame error. Turns OFF when error is reset.
Other errors (ER4)	Output is ON for all errors except for the following: ignition failure, main ignition failure, flame failure, main flame failure, false flame, main false flame, flame detection error, main flame detection error. Turns OFF when error is reset.
Warning	ON when warning occurs. Turns OFF when problem is solved.
760 °C mode *1	ON during 760 °C mode.
Shutter (primary)	When using a device compatible with shutter output, it links with shutter movement to turn ON/OFF. Note: Always OFF except the RX-R4x series
Shutter (secondary)	When using a device compatible with shutter output, it links with shutter movement to turn ON/OFF. Note: Always OFF except the RX-R44/R66

Setting output name	Description
RUN	•
KON	Turned ON when startup input is entered, once the standby process has begun.
Flame detection error (ER5)	Output is ON during flame detection error. Turns OFF when error is reset.
Main ignition failure (ER1M)	Output ON during main ignition failure error. Turns OFF when error is reset.
Main flame failure (ER2M)	Output ON during main flame failure error. Turns OFF when error is reset.
Main false flame (ER3M)	Output ON during main false flame error. Turns OFF when error is reset.
Main flame detection error (ER5M)	Output ON during main flame detection error. Turns OFF when error is reset.
Ignition failure/Main ig- nition failure (ER1C)	Output ON during ignition failure/main ignition failure error. Turns OFF once the error is reset. Distinguishing between pilot and main can be done by flame error identification.
Flame failure/ Main flame failure (ER2C)	Output ON during flame failure/main flame failure error. Turns OFF when error is reset. Distinguishing between pilot and main can be done by flame error identification.
False flame/Main false flame (ER3C)	Output ON during false flame/main false flame error. Turns OFF when error is reset. Distinguishing between pilot and main can be done by flame error identification.
Flame detection error/ Main flame detection error (ER5C)	Output ON during flame detection error/main flame detection error. Turns OFF once the error is reset. Distinguishing between pilot and main can be done by flame error identification.
Select error flame type (ERR-SEL)	Used while combined with ERxC. Turned ON when a main ignition failure, main flame failure, main false flame, or main flame detection error occurs. Turned OFF when errors other than those above occur, and during normal status.
Air valve drive* ²	Turns ON when aligned with process AV output request. (Can only be set from M-9 to M-11, operates when RX-R side purge conditions are linked call for heat and Linked MV)
Main valve drive ^{*2}	Turns ON when aligned with process MV output request. (Only M-9 to M11 can be set, only operates with RX-R22/R46 models)
llgnition drive* ²	Turns ON when aligned with process IG output request. (Only M-9 to M11 can be set, only operates with RX-R22 model)
Input monitor IN1 to IN4	Outputs the input status Turns monitor output ON during input function short-circuit. Turns monitor output OFF when input function opens. Status is output as is, with no effect on the OFF delay time setting.
Input monitor IN1 (OFF delay) to IN4 (OFF delay)	Outputs the input status Turns monitor output ON during input function short-circuit. Turns monitor output OFF when input function opens. The OFF delay time setting is enabled.
Not used Output always OFF	

*1 Gas Appliance Directive (CE) does not apply.
*2 This setting output name is only displayed when monitor output M-9, M-10, or M-11 is set.

• Monitor output logics (5-3)

Set the monitor output operation (direct, reverse) for monitor outputs 1 to 11 (M-1 to M-11).

Setting	Description
Direct	🕏 Output logic chart.
Reverse	

			Output one	ration catting	
Setting output name First Out Control		Monitor output status	Output operation setting		
			Direct action Tr-ON*1	Reverse action Tr-OFF ^{*1}	
First Out Control Monitor1 to 4 system/other		Input ON		Tr-OFF**	
	,	Input OFF	Tr-OFF Tr-OFF	-	
	Interlock system	Input short-circuit		Tr-ON	
		Input open	Tr-ON	Tr-OFF	
	Not used	Always	Tr-OFF	Tr-ON	
IG		Load output ON	Tr-ON	Tr-OFF	
2)/		Load output OFF	Tr-OFF	Tr-ON	
PV		Load output ON	Tr-ON	Tr-OFF	
		Load output OFF	Tr-OFF	Tr-ON	
MV		Load output ON	Tr-ON	Tr-OFF	
		Load output OFF	Tr-OFF	Tr-ON	
Flame (primary	y)	With flame	Tr-ON	Tr-OFF	
		Without flame	Tr-OFF	Tr-ON	
Flame (second	ary)	With flame	Tr-ON	Tr-OFF	
		Without flame	Tr-OFF	Tr-ON	
Alarm (lockout	t)	Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Ignition failure	e (ER1)	Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Flame failure (ER2)		Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
False flame (ER3)		Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Other error (ER4)		Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Warning		Warning	Tr-ON	Tr-OFF	
-		Normal	Tr-OFF	Tr-ON	
760 °C mode		In 760 °C mode	Tr-ON	Tr-OFF	
		Other than above	Tr-OFF	Tr-ON	
Shutter (prima	rv)	ON	Tr-ON	Tr-OFF	
	,,	OFF	Tr-OFF	Tr-ON	
Shutter/secon	dary (SHT-SEC)	ON	Tr-ON	Tr-OFF	
		OFF	Tr-OFF	Tr-ON	
RUN		RUN	Tr-ON	Tr-OFF	
Nort		When stopped	Tr-OFF	Tr-ON	
Flame detection	on error (FR5)	Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Main ignition failure (ER1M)		Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Main flame fai	Lure (FR2M)	Lockout	Tr-ON	Tr-OFF	
		Normal	Tr-OFF	Tr-ON	
Main false flam					
Main false flam		Lockout	Tr-ON Tr-OFF	Tr-OFF	
		Normal		Tr-ON	

Setting output name	Monitor output status	Output operation setting		
Setting output name		Direct action	Reverse action	
Main flame detection error	Lockout	Tr-ON	Tr-OFF	
(ER5M)	Normal	Tr-OFF	Tr-ON	
Ignition failure/Main ignition	Lockout	Tr-ON	Tr-OFF	
failure (ER1C)	Normal	Tr-OFF	Tr-ON	
Flame failure/ Main flame	Lockout	Tr-ON	Tr-OFF	
failure (ER2C)	Normal	Tr-OFF	Tr-ON	
False flame/Main false flame	Lockout	Tr-ON	Tr-OFF	
(ER3C)	Normal	Tr-OFF	Tr-ON	
Flame detection error/Main	Lockout	Tr-ON	Tr-OFF	
flame detection error (ER5C)	Normal	Tr-OFF	Tr-ON	
Select error flame type	Main type error	Tr-ON	Tr-OFF	
(ERR-SEL)	Errors other than above/normal status	Tr-OFF	Tr-ON	
Air valve drive*2	ON	Tr-ON	Tr-ON	
	OFF	Tr-OFF	Tr-OFF	
Main valve drive*2	ON	Tr-ON	Tr-ON	
	OFF	Tr-OFF	Tr-OFF	
Ignition drive*2	ON	Tr-ON	Tr-ON	
	OFF	Tr-OFF	Tr-OFF	
Input monitor IN1 to IN4	Input short-circuit	Tr-ON	Tr-OFF	
	Input open	Tr-OFF	Tr-ON	
Input monitor IN1 (OFF	Input short-circuit	Tr-ON	Tr-OFF	
delay) to IN4 (OFF delay)	Input open	Tr-OFF	Tr-ON	
Not used	_	Tr-OFF	Tr-OFF	

*1 Tr-ON: Monitor output transistor ON,

Tr-OFF: Monitor output transistor OFF

*2 This setting output name is only displayed when monitor output M-9, M-10, or M-11 is set.

Display settings

This is an explanation of the items available for display settings.

• Error display setting (6-1)

Select a warning display method for display on the module front 7-segment LED.

Setting	Description
Simple (2 chars.)	2-digit warning display
Detailed (4 chars.)	4-digit warning display

📖 Note

- Error code display
 - The error code is displayed as "E" followed by 3 digits.
 - When "simple display" is selected.
 - "E" + 1 digit (the 3-digit code's first digit) \Leftrightarrow "Process display" are displayed alternately.

Example: Error code E101

• When "detailed display" is selected.

"E" + 1 digit (the 3-digit code's first digit) \rightarrow 2 digits (the 3-digit code's last 2 digits) \rightarrow "Process display" are displayed in order. Example: Error code E101



RX-R control

This is an explanation of the items available for RX-R control.

Address (4-1)

Set the station address for performing RX-L and RX-R control communication.

Setting	Description
1 to 32	Set a station address.

Initial value

Each parameter's initial values are as follows. They differ according to model number.

• RX-R40

	Setting	Code	Initial value
System	Combustion mode	1-1	Interrupted pilot
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disable
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay (s)	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	$4.5 \pm 0.5 \text{ s}$
Input settings	Input function IN1	3-1	Interlock
	IN1 OFF delay	3-2	0 s
	Input function IN2	3-1	Interlock
	IN2 OFF delay	3-2	0 s
	Input function IN3	3-1	Interlock
	IN3 OFF delay	3-2	0 s
	Input function IN4	3-1	Interlock
	IN4 OFF delay	3-2	0 s
Monitor output	Flicker	5-1	OFF
•	M-1	5-2	First Out Monitor 1
	M-2	5-2	First Out Monitor 2
	M-3	5-2	First Out Monitor 3
	M-4	5-2	First Out Monitor 4
	M-5	5-2	Ignition transformer output
	M-6	5-2	Shutoff valve (pilot) output
	M-7	5-2	Shutoff valve (main) output
	M-8	5-2	Flame/primary
	M-9	5-2	Alarm (lockout)
	M-10	5-2	Not used
	M-11	5-2	Not used
	M-1 output logic	5-3	Direct
	M-2 output logic	5-3	Direct
	M-3 output logic	5-3	Direct
	M-4 output logic	5-3	Direct
	M-5 output logic	5-3	Direct
	M-6 output logic	5-3	Direct
	M-7 output logic	5-3	Direct
	M-8 output logic	5-3	Direct
	M-9 output logic	5-3	Direct
	M-10 output logic	5-3	Direct
	M-11 output logic	5-3	Direct
Display settings	Error display setting	6-1	Detailed (4 chars.)
RX-R control	Address	4-1	0*

* Initial value is "0", and normal operation will not occur as is. Make sure to connect to SLP-RX, and change the setting to anything between "1 and 32".

RX-R20 Code Initial value Setting System Combustion mode 1-1 Interrupted pilot **RX-R** purge conditions 1-2 Disable 760 °C mode 1-5 Disabled Control RX-R start from 2-1 Linked RX-L Reset condition 2-2 Linked RX-L Timer Restart wait time (s) 2-3 0.0 s 2-4 Start check delay time (s) 0.0 s Air valve OFF delay (s) 2-5 0.0 s Air switch Off test timeout (s) 2-6 20.0 s Pilot ignition time 1-3 4.5 ± 0.5 s Interlock Input settings Input function IN1 3-1 IN1 OFF delay 3-2 0 s Input function IN2 3-1 Interlock IN2 OFF delay 3-2 0 s Interlock Input function IN3 3-1 IN3 OFF delay 3-2 0 s Input function IN4 Interlock 3-1 IN4 OFF delay 3-2 0 s Monitor output Flicker 5-1 OFF First Out Monitor 1 M-1 5-2 M-2 First Out Monitor 2 5-2 M-3 5-2 First Out Monitor 3 M-4 5-2 First Out Monitor 4 M-5 5-2 Ignition transformer output 5-2 Shutoff valve (pilot) output M-6 5-2 Shutoff valve (main) output M-7 5-2 M-8 Flame/primary M-9 5-2 Alarm (lockout) M-10 5-2 Not used M-11 5-2 Not used M-1 output logic 5-3 Direct M-2 output logic 5-3 Direct M-3 output logic 5-3 Direct Direct M-4 output logic 5-3 M-5 output logic 5-3 Direct 5-3 Direct M-6 output logic 5-3 Direct M-6 output logic M-8 output logic 5-3 Direct Direct M-9 output logic 5-3 M-10 output logic 5-3 Direct M-11 output logic 5-3 Direct **Display settings** Error display setting 6-1 Detailed (4 chars.) **RX-R** control Address 4-1 0*

* Initial value is "0", and normal operation will not occur as is. Make sure to connect to SLP-RX, and change the setting to any value from "1 to 32".

	Setting	Code	Initial value
System	Combustion mode	1-1	Independent supervision
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disabled
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay (s)	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	4.5 ± 0.5 s
nput settings	Input function IN1	3-1	Interlock
	IN1 OFF delay	3-2	0 s
	Input function IN2	3-1	Interlock
	IN2 OFF delay	3-2	0 s
	Input function IN3	3-1	Interlock
	IN3 OFF delay	3-2	0 s
	Input function IN4	3-1	Interlock
	IN4 OFF delay	3-2	0 s
Monitor output	Flicker	5-1	OFF
	M-1	5-2	First Out Monitor 1
	M-2	5-2	First Out Monitor 2
	M-3	5-2	First Out Monitor 3
	M-4	5-2	First Out Monitor 4
	M-5	5-2	Ignition transformer output
	M-6	5-2	Shutoff valve (pilot) output
	M-7	5-2	Shutoff valve (main) output
	M-8	5-2	Flame/primary
	M-9	5-2	Alarm (lockout)
	M-10	5-2	Flame/secondary
	M-11	5-2	Not used
	M-1 output logic	5-3	Direct
	M-2 output logic	5-3	Direct
	M-3 output logic	5-3	Direct
	M-4 output logic	5-3	Direct
	M-5 output logic	5-3	Direct
	M-6 output logic	5-3	Direct
	M-7 output logic	5-3	Direct
	M-8 output logic	5-3	Direct
	M-9 output logic	5-3	Direct
	M-10 output logic	5-3	Direct
	M-11 output logic	5-3	Direct
Display settings	Error display setting	6-1	Detailed (4 chars.)
RX-R control	Address	4-1	0*

* Initial value is "0", and normal operation will not occur as is. Make sure to connect to SLP-RX, and change the setting to any value from "1 to 32".

• RX-R46

	Setting	Code	Initial value
System	Combustion mode	1-1	Independent supervision (external relay)
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disable
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay (s)	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	4.5 ± 0.5 s
Input settings	Input function IN1	3-1	Interlock
	IN1 OFF delay	3-2	0 s
	Input function IN2	3-1	Interlock
	IN2 OFF delay	3-2	0 s
	Input function IN3	3-1	Interlock
	IN3 OFF delay	3-2	0 s
	Input function IN4	3-1	Interlock
	IN4 OFF delay	3-2	0 s
Monitor output	Flicker	5-1	OFF
	M-1	5-2	First Out Monitor 1
	M-2	5-2	First Out Monitor 2
	M-3	5-2	First Out Monitor 3
	M-4	5-2	First Out Monitor 4
	M-5	5-2	Ignition transformer output
	M-6	5-2	Shutoff valve (pilot) output
	M-7	5-2	Shutoff valve (main) output
	M-8	5-2	Flame/primary
	M-9	5-2	Alarm (lockout)
	M-10	5-2	Flame/secondary
	M-11	5-2	MV drive output
	M-1 output logic	5-3	Direct
	M-2 output logic	5-3	Direct
	M-3 output logic	5-3	Direct
	M-4 output logic	5-3	Direct
	M-5 output logic	5-3	Direct
	M-6 output logic	5-3	Direct
	M-7 output logic	5-3	Direct
	M-8 output logic	5-3	Direct
	M-9 output logic	5-3	Direct
	M-10 output logic	5-3	Direct
	M-11 output logic	5-3	Direct
Display settings	Error display setting	6-1	Detailed (4 chars.)
RX-R control	Address	4-1	0*

* Initial value is "0", and normal operation will not occur as is. Make sure to connect to SLP-RX, and change the setting to any value from "1 to 32".

• RX-R22

	Setting	Code	Initial value
System	Combustion mode	1-1	Direct ignition (external relay)
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disabled
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay (s)	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	4.5 ± 0.5 s
Input settings	Input function IN1	3-1	Interlock
	IN1 OFF delay	3-2	0 s
	Input function IN2	3-1	Interlock
	IN2 OFF delay	3-2	0 s
	Input function IN3	3-1	Interlock
	IN3 OFF delay	3-2	0 s
	Input function IN4	3-1	Interlock
	IN4 OFF delay	3-2	0 s
Monitor output	Flicker	5-1	OFF
	M-1	5-2	First Out Monitor 1
	M-2	5-2	First Out Monitor 2
	M-3	5-2	First Out Monitor 3
	M-4	5-2	First Out Monitor 4
	M-5	5-2	Ignition transformer output
	M-6	5-2	Not used
	M-7	5-2	Shutoff valve (main) output
	M-8	5-2	Flame/primary
	M-9	5-2	Alarm (lockout)
	M-10	5-2	IG drive output
	M-11	5-2	MV drive output
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
	M-1 output logic	5-3	Direct
Display settings	Error display setting	6-1	Detailed (4 chars.)
RX-R control	Address	4-1	0 *

* Initial value is 0, and normal operation will not occur as is. Make sure to connect to SLP-RX, and change the setting to any value from 1 to 32.

5 - 3 Signal Name

The combustion control input signal for this controller is generated by contact inputs connected to it, and communication from RX-L. The input signal, and input of the device which generates it (RX-R input), is displayed as follows along with RX-L communication orders.

■ Signals and corresponding module inputs and communications commands

Signal name	RX-R input	RX-L communication order	Generated conditions
Startup signal	Startup input	Startup	AND/Linked RX-L
Pilot startup signal	Pilot start	Pilot startup order	AND *
Main startup signal	Main start	Main startup order	AND *
Reset signal	Reset input	Reset input (RESET)	OR/Linked RX-L

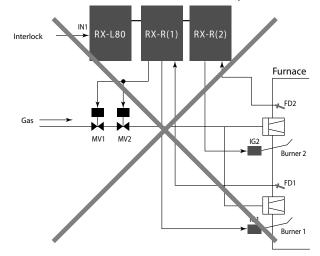
* If input function is set for both RX-L and RX-R. If only set for only one of them, the set one is prioritized.

5 - 4 Timing Regulation

Timing	Regulation	Settings/model number of impact	Remarks
Standby after an error is returned	After recovering from lockout 0.0 to 600.0 s	Restart wait time (s) (2-3)	When starting up after lockout occurs, standby will occur for the set amount of seconds.
Start check	Normal: 2.5 -0.5/ +1.5 s Error: Lockout occurs for up to 30 s (In the case of an answerback error)	Normal: None	When an error is detected during start check, the start check process will continue until error confirmation or the
	When RX-R purge conditions are something other than OFF: Normal: 2.5 -0.5/ +1.5 s Error: Lockout occurs for up to 600.0 s (air pressure OFF confirmation timeout time)	When RX-R purge conditions are something other than OFF: RX-R purge conditions (1-2) Air switch Off test timeout (s) (2-6)	error is solved. Also, if 5 seconds have not passed since extinguishing ended, the process will continue until 5 seconds pass after normal start check time has ended.
	When start check delay time (s) is set: 0.0 to 600.0 s standby added to normal time	When start check delay time (s) is set: Start check delay time (s) (2-4)	
Pilot ignition time	4.5 ± 0.5 s, 9 ± 1 s	Pilot ignition time (1-3)	The initial value (at the time of ship- ment) is 4.5±0.5 s. Select with the loader. However, note that RX-R22 is 4.5±0.5 s only.
Pilot only time	When transitioning from the pilot trial: 5±1s When transitioning from steady combustion: 3±1s	_	The pilot only process will continue until the main startup signal is entered. However, even when entered, you will not be taken to the next process until the pilot only time has elapsed.
Main ignition time	4.5 ± 0.5 s	_	_
Flame re- sponse* (response to flameout)	2 s MAX, 3 ± 1 s	Select according to model number	For RX-R C: Flame voltage At 3 V For RX-R B: Flame voltage At 2 V
Standby time after 760 °C mode	Flame failure response period + 5 s	_	
Other timing	5 s min., within ± 20 % Less than 5 s, within ± 1.0 s However, in case of 0.0 s, within 1 s.	Timing setting value Error determination time	

* **O** Prohibitions

• The following kind of instrumentation using the RX-L and RX-R is prohibited. In the following RX-L, RX-R configuration, if a flame failure occurs for burner 2 (RX-R (2)) during combustion with burner 1 (RX-R (1)) and burner 2 (RX-R (2)), MV1 and MV2 cannot shut off within the flame response time of RX-R (2).



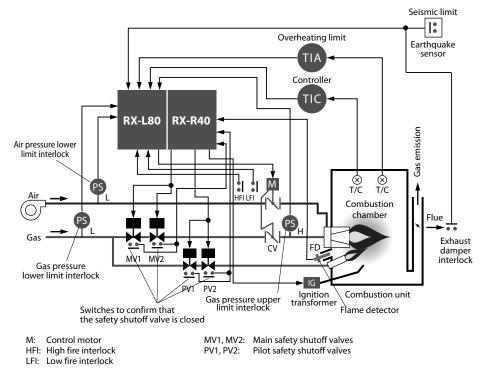
Chapter 6. OPERATION DESCRIPTION

The operations of representative instruments are described.

Instrumentation example	Page
Interrupted Pilot Method (Single Burner)	··· 6-2
Intermittent Pilot Method (Single Burner/Individual Flame Monitoring)	6-13
Intermittent Pilot Method (Multi-Zone)	6-18

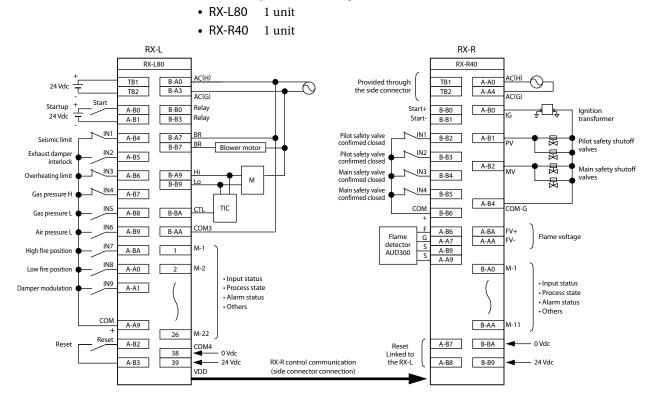
6 - 1 Interrupted Pilot Method (Single Burner)

Instrumentation example



Device configuration

It is made up of the following devices.



Note: Related to terminal number:

A-A0 to A-BA are the terminal numbers for RX-L80 or RX-R40 series terminal block A, B-A0 to B-BA are the terminal numbers for RX-L80 or RX-R40 series terminal block B, 1 to 40 are the RX-L80 monitor output connector's terminal numbers, TB1 and TB2 are the power's terminal numbers.

Parameter settings

• RX-L80

Monitor output and display settings are omitted since they may be freely changed by the user.

	Setting item	Code	Setting
System	RX-L type	A-1	Single zone RX-L
	Number of connected zone RX-Ls	B-14	1
	Number of locked out zone RX-Ls	B-8	1
	RX-L address	B-19	0
	Number of connected RX-Rs	E-1	1
	Number of locked out RX-Rs	E-2	1
	Air switch check use	A-2	ON
	Air switch check result clear	A-5	When RX-L start switch OFF
	760 °C mode use	A-4	OFF
	Startup type	A-3	Link (1)
Control	RX-L start method	B-1	Start switch input
setting	Prepurge use	B-2	Enable
	Blower sync signal source	B-6	Internal
	Purge count start signal source	B-7	Internal
	High fire position input	B-9	IN7
	Low fire position input	B-10	IN8
	Process timeout handling	B-11	Only a warning is displayed after a speci fied amount of time passes.
	Prepurge after RX-R restart	B-12	Every time
	Low fire stop	B-13	OFF
	Postpurge for residual flame	B-15	Normal
	RX-R prepurge use	B-16	OFF
		B-17	_
	RX-L communication error handling	B-18	Lockout
	Permit RX-R startup via host communication* ¹	F-5	None
	Set reception monitoring for host communication (RS-485)*1	B-21	Not monitored
	Set reception monitoring for host communication (Ethernet)*1	B-22	Not monitored
	Set reception monitoring reset for host communication*1	B-23	Auto recovery
Timer	Prepurge time	D-1	5 min
	Ignition wait time (s)	D-2	20.0 s
	Damper modulation control wait time (s)	D-3	20.0 s
	Postpurge time (s)	D-4	60.0 s
	Lockout postpurge time (s)	D-5	60.0 s
	Process error judgment time (no combustion) (s)	D-6	120.0 s
	Process error judgment time (during combustion) (s)	D-7	20.0 s
	Reignition standby time (s)	D-8	20.0 s
	Timeout time for host communication reception monitoring* ¹	D-9	180.0 s
Groups	RX-R1 to 32	E-3	Group A
	IN1 input function	C-1	Interlock
	IN1 Off delay time	C-2	0 s
	IN2 input function	C-1	Interlock
	IN2 Off delay time	C-2	0 s

	Setting item	Code	Setting
Input settings	IN3 input function	C-1	Interlock
	IN3 Off delay time	C-2	0 s
	IN4 input function	C-1	Interlock
	IN4 Off delay time	C-2	0 s
	IN5 input function	C-1	Interlock
	IN5 Off delay time	C-2	0 s
	IN6 input function	C-1	Air pressure switch
	IN6 Off delay time	C-2	0 s
	IN7 input function	C-1	Prepurge condition
	IN7 Off delay time	C-2	0 s
	IN8 input function	C-1	Ignition condition
	IN8 Off delay time	C-2	0 s
	IN9 input function	C-1	Damper modulation
	IN9 Off delay time	C-2	0 s
	IN10 input function	C-1	Disable
	IN10 Off delay time	C-2	0 s
	IN11 input function	C-1	Disable
	IN11 Off delay time	C-2	0 s
	IN12 input function	C-1	Disable
	IN12 Off delay time	C-2	0 s
	IN13 input function	C-1	Disable
	IN13 Off delay time	C-2	0 s
	IN14 input function	C-1	Disable
	IN14 Off delay time	C-2	0 s
	IN15 input function	C-1	Disable
	IN15 Off delay time	C-2	0 s
	IN16 input function	C-1	Disable
	IN16 Off delay time	C-2	0 s
Condition	Conditional interlock condition	C-3	Disable
settings	Conditional interlock condition standby time	C-4	3.0 s
Relay output	Relay output	B-3	Disable
	Blower output	B-4	Blower operation
	Damper output	B-5	Control motor operation
Host com-	Station address	F-1	1
munication	Baud rate	F-2	19200 bps
RS485	Data format*2	F-3	Even parity, 1 stop bit
	Data length for host communication (RS-485)*1	F-3	8 bits
	Parity for host communication (RS-485)*1	F-3	Even parity
	Stop bits for host communication (RS-485)*1	F-3	1 stop bit
	Protocol	F-4	CPL
	Permit RX-R startup via host communication	F-5	None
	Minimum response time for host communication (RS-485)*1	F-6	3 s
	IP address for host communication (Ethernet)*1	H-1	192.168.255.254
	Net mask for host communication (Ethernet)*1	H-2	255.255.255.0
	Default gateway for host communication (Ethernet)*1	H-3	Disable
	MODBUS/TCP port number for host communication (Ethernet)*1	H-4	502

*1 RX-L90 only

*2 RX-L80 only

• RX-R40

Monitor output and display settings are omitted as optional.

	Setting item	Code	Setting
System	Combustion mode	1-1	Interrupted pilot
	RX-R purge conditions	1-2	OFF
	760 °C mode	1-5	Disabled
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay time for combustion	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	$4.5 \pm 0.5 \text{ s}$
Input settings	IN1 input function	3-1	Pilot safety valve confirmed closed
	IN1 OFF delay	3-2	0 s
	IN2 input function	3-1	Pilot safety valve confirmed closed
	IN2 OFF delay	3-2	0 s
	IN3 input function	3-1	Main safety valve confirmed closed
	IN3 OFF delay	3-2	0 s
	IN4 input function	3-1	Main safety valve confirmed closed
	IN4 OFF delay	3-2	0 s
RX-R control signal	Address	4-1	1

Sequence chart

Shows the operation sequence for this method.

Normal operation

• RX-L80		Air	Blower	Air I Pur		Ignition	Start		1					
Input	Stop	OFF	startup	oressure Pur ON start	^{ge} i Prepurge up	standby	Start check	Pilot trial	Pilot only	I Main trial	Low fire	Damper modulation	Postpurge	I Stop
Power supply			i			-i				1			1	i and the second se
Startup input	1				1	1			1	1	1			
IN1-5									1		,			
IN6	-	-												
IN7	1	1							1	1				
IN8														
IN9	<u> </u>	1			1	1								[
Reset input		1								i				I
Relay output	1	1							1	1			I I	I
Blower output	1	1		I	I					I	I I		I	i
High fire position	1								1	i				i i
Low fire position		i –			1						i		1	
Motor control output	-			1						1				
Monitor output					1				1	1			1	
Purging	1	1												1
Purge complete	i	1		i						1			I	
Interlock input normal	1	1								1	1			[
Alarm output	1	1		i						1				
• RX-R40									 	 				
Input Startup (RX-R control signal)	i i	i.	i i	i	i i	i -				1]
IN1, IN2		1							1	I	·			
IN3, IN4						_								
Reset (RX-R control signal)		1											1	/
	<u> </u>	<u> </u>	H		-		i							I
Load output	1	1		-						1			1	
Ignition transformer Shutoff valve (pilot)		+			-	+				1			 	
Shutoff valve (pilot) Shutoff valve (main)	<u>i</u>	-												í
	i –	i –	H	i	1	<u> </u>	 						1	I
Shutter Monitor output	1	1	<u> </u>	1	1	1								
IN1, IN2	-				<u> </u>								 	i
			: :	÷										
IN3, IN4		1	1 1	1	1	1	1			1		1		
Ignition transformer	!	1			-					l I			I	
Shutoff valve (pilot)	-	-			-	+								
Shutoff valve (main)	<u> </u>	-	i i				÷							
Flame signal	i	<u>i</u>				<u> </u>			1	1	1			
Alarm output	1	1	<u>i i</u>		1	1	1	1	1	1	I I	I	1	<u> </u>

• Operation during start check error (false flame)

Even if RX-R detects flames during the standby process, error determination is not performed.

If an error (false flame) is detected during the start check, and 5 seconds have passed after false flame standby begins, lockout occurs.

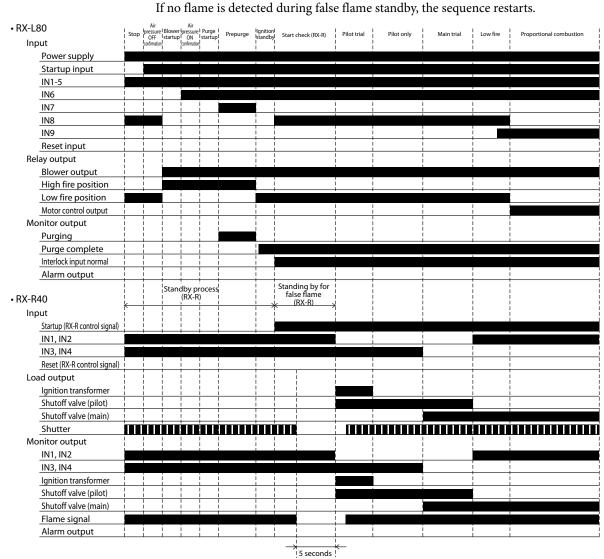
"E201" (when 4-digit display is selected) and "P1" will be displayed alternately on the RX-R's 7-segment LED.

📖 Note

• When a false flame is generated on the main side during independent supervision in start check, "E201" will be displayed on the 7-segment LED.

When a false flame is generated on the main side when transitioning to the main trial, "E203" will be displayed on the 7-segment LED.

							1 /	0	
• RX-L80	!	Air	Air Blower press	re. Purge	!	Ignition	!	k	Lockout
Input	I Stop	OFF	Blower pressu startup ON confirma	startup	I Prepurge I	lgnition standby	I Start check (RX-R)	Postpurge when there is an error	
Power supply									
Startup input									
IN1-5								1	
IN6	i	i			1				
IN7	i i	1					1		
IN8					1	-			
IN9						-			
Reset input		i			1			1	
Relay output	1				1	-		1	
Blower output	!				1		1	1	
High fire position					1		1		
Low fire position				i	 				
Motor control output				1	i i	1		1	
Monitor output				Ì	1	!	1	1	
Purging								 	
Purge complete				1	i	i 🗖			
Interlock input normal	i i			i	i i	1			
Alarm output	1				1	1			
·			Standby	proces	 6	i	False flame	16 als a 6 al	se flame standby
• RX-R40	i L	įį	(R)	(-R)	- 	Ι.	standby period	period e	exceeds 5 seconds,
Input				-	1	1		a lockou	it takes effect
Startup (RX-R control signal)				1	1	1			
IN1, IN2				•	1		1		1
IN3, IN4							<u>i</u>		
Reset (RX-R control signal)	1				1	-	1		
Load output				1	1	1		1	
Ignition transformer	1	i i				i i		1	
Shutoff valve (pilot)	1	İ		Ì	i i	Ì	1		
Shutoff valve (main)					1	1	1	i i	
Shutter						İ			
Monitor output									1
IN1, IN2			i i	i.	1	i.	1		
IN3, IN4					I.			1	
Ignition transformer		1		Ì	i	Ì			
Shutoff valve (pilot)				i	1	1	 	1 	
Shutoff valve (main)		Ţ			1	!			
Flame signal				1	1	1	 		
Alarm output	1	1		Ì	i	i			
			. 1				,		



False flame standby lasts for 5 seconds without going into ignition.

• Flame detection error

If a UV sensor error (self-discharge) is detected, the shutter continues to close. (R4_ C type only)

Moreover, an internal circuit malfunction may cause an error in normal flame detection.

When a flame detection error occurs on the main side during independent supervision, "E301" will be displayed on the 7-segment LED.

The following is a sequence performed during start check.

📖 Note

• If a UV error is detected on the main side via independent supervision, "E302" is displayed on the 7-segment LED.

RX-L80 Air Stop Stop Air Stop Stop Air Air Prepurge Ignition Start check (RX-R) When there is an error	
Power supply	
Startup input	
IN1-5	
<u>IN6</u>	
IN7	
IN8	
IN9 IN9	
Reset input	
Relay output	
Blower output	
High fire position	
Low fire position	
Motor control output	
Monitor output	
Purging	
Purge complete	
Interlock input normal	
Alarm output	
• RX-R40	
Input	
Startup (RX-R control signal)	
IN1, IN2	
IN3, IN4	
Reset (RX-R control signal)	
Load output Self-discharge 5 seconds	
Ignition transformer	
Shutoff valve (pilot)	
Shutoff valve (main)	
Shutter	
Monitor output !	
IN1, IN2	
IN3, IN4	
Ignition transformer	
Shutoff valve (pilot)	
Shutoff valve (main)	
Flame signal	
Alarm output	

• Operation during ignition failure

If no flame is detected once the pilot trial timing has exceeded, lockout will occur. "E401" (when 4-digit display is selected) and "P3" will be displayed alternately on the RX-R's 7-segment LED.

📖 Note

• If ignition failure is detected on the main side via independent supervision, "E402" is displayed on the 7-segment LED.

• RX-L80		. Air		Air						l,	Lockout
Input	Stop	oressure OFF confirmation	Blower startup	pressure ON confirmation	Purge startup	Prepurge	Ignition standby	Start check	Pilot trial	Postpurge when there is an error	
Power supply		contrimation		commation			i	i		men dicie is direnti	
Startup input											
IN1-5											
IN6	1	1	1		_						
IN7	1	i i		1							
IN8		1									
IN9	1	i					1				
Reset input	1						1				
Relay output	İ	Ì	i i				İ				
Blower output	1	!		1			1				
High fire position	1										
Low fire position		i						i			
Motor control output		1	1								
Monitor output	1						1				
Purging	1	i i	i i				i i				
Purge complete	İ	1	1	1							
Interlock input normal	1	!					1				
Alarm output	1						1				
	Ì	i	1				1				
• RX-R40	}						}				
Input	1	ļ					1				
Startup (RX-R control signal)			1				1				
IN1, IN2											
IN3, IN4											
Reset (RX-R control signal)			1								
Load output	Ì	1	i				1				
Ignition transformer	-						1				
Shutoff valve (pilot)	1						1				
Shutoff valve (main)							i	Í			
Shutter	1	1	1	1			1				
Monitor output	1						1			1	
IN1, IN2				I							
IN3, IN4											
Ignition transformer											
Shutoff valve (pilot)											
Shutoff valve (main)											
Flame signal	1										
Alarm output											

• Operation during flame failure

If flame failure is detected during normal combustion, lockout will occur. "E501" (when 4-digit display is selected) and "P6" will be displayed alternately on the RX-R's 7-segment LED.

📖 Note

• If flame failure is detected on the main side via independent supervision, "E601" is displayed on the 7-segment LED.

			10	r			/	500	,							
													Flame	failu	ıre	
• RX-L80		Air		Air			h ar	1.0	1			Low	Damper		Loc	kout
Input	Stop	OFF OFF confirmation	startup	Air pressure ON confirmation	startup	Prepurge	Istandby	Start	Pilot trial	I Pilot only	Main trial	fire	modulation		Postpurge when I there is an error I	
Power supply		conirmation		contrimation			1			1		1	1			
Startup input							1			1		1				
IN1-5										8						
IN6										1		1				
IN7																
IN8					Ì					1		1				
IN9					Ì		1			1						
Reset input							-			1		1	1			
Relay output																
Blower output																
High fire position										1		1				
Low fire position																
Motor control output					۲ ا											
Monitor output	1 1			Ī			1	1		1		i —	i —			
Purging										1		 	 	ł		
Purge complete																
Interlock input normal							1									
Alarm output					ĺ		1			1		1	1			
							-					1				
• RX-R40							i –					, 				
Inp <u>ut</u>							1			 		i I	i 		i	
Startup (RX-R control signal)																
IN1, IN2										1						
IN3, IN4							1					i 				
Reset (RX-R control signal)							1			 		l I	 			
Load output												 		$ \rightarrow $	Flame res	ponse
Ignition transformer	<u> </u>						i	<u>i</u>		i		i 		\mathbb{H}		
Shutoff valve (pilot)	Ļ				i		1			1			l		i i	
Shutoff valve (main)	<u> </u>						-			 					!	
Shutter					1		<u> </u>							Ľ		
Monitor output					į		i	i		i I			i 			
IN1, IN2										I I						
IN3, IN4												 	 	\square		
Ignition transformer							<u> </u>							Ļ		
Shutoff valve (pilot)							<u>i</u>	1						i		
Shutoff valve (main)	Ļ				j		-			!					i	
Flame signal							-									
Alarm output	<u>i i</u>						i –	i		i		l	1 	1		

• Operation during interlock (interlock operation during normal combustion)

If RX-L interlock contacts are disconnected or OFF, lockout will occur.

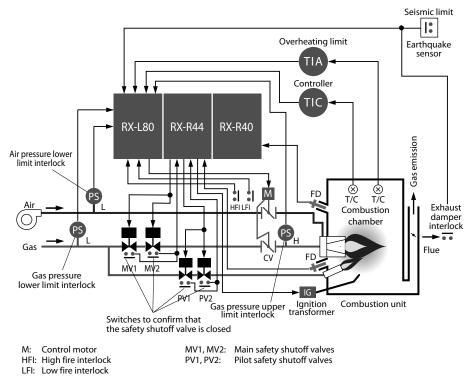
"iL" + the operated input number are displayed on the RX-L's 7-segment LED.

Interlock Runnig (open)

													Interiock Ru		
• RX-L80		Air ,		Air ,										Loc	kout
Input	Stop	pressure E OFF	Blower startup	oressure Pu ON stai	irge irtup	Prepurge	Ignition standby	Start check	Pilot trial	Pilot only	Main trial	Low fire	Damper modulation	Postpurge when I there is an error	
Power supply		confirmation	i	confirmation	i			, i		Ì			1	,	
Startup input			1		1								1		
IN1-5			,							ſ			1		
IN6										1					
IN7			1							1			1		
IN8			1		1		-			ł					
IN9			i		İ					1					
Reset input										 			1		
Relay output														1	
Blower output	1	1											I		
High fire position	i I		i							1			1		
Low fire position					1					1					
Motor control output															
Monitor output	i i	1	i		1		1 1	İ		i I					
Purging	i I		i							1			1		
Purge complete										1					
Interlock input normal			į												
Alarm output	<u> </u>	<u>i i</u>	i		i		i i	j		1			1		
			1							 			1		
• RX-R40		1					1 1			1 			1		
Inp <u>ut</u>		ii	j		j			į					1		
Startup (RX-R control signal)							-								
IN1, IN2				وز ک						 					
IN3, IN4															
Reset (RX-R control signal)										 					
Load output										1			1		
Ignition transformer	<u> </u>	<u>i i</u>													
Shutoff valve (pilot)	i	ii	j	i	i		-						i 		
Shutoff valve (main)	<u> </u>	<u> </u>								 					
Shutter	<u> </u>	<u> </u>													
Monitor output	i i	1	į		1		1			 			1		
IN1, IN2										 					
IN3, IN4													1		
Ignition transformer	i—	<u>i - i</u>													
Shutoff valve (pilot)	i	<u>i i</u>					1							-	
Shutoff valve (main)	<u> </u>	<u> </u>	i				-			 					
Flame signal	<u> </u>	<u> </u>	!												[
Alarm output	[1								

6 - 2 Intermittent Pilot Method (Single Burner/Individual Flame Monitoring)

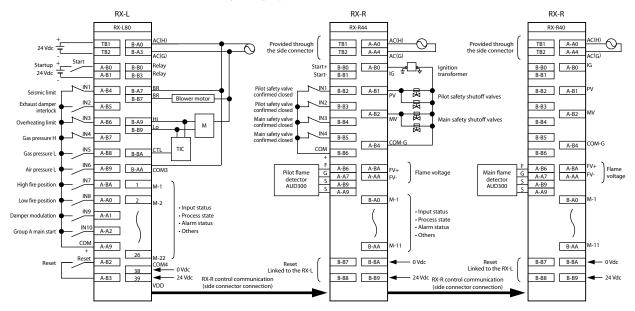
Instrumentation example



Device configuration

It is made up of the following devices.

- RX-L80 1 unit
- RX-R44 1 unit
- RX-R40 1 unit



Note: Related to terminal number:

A-A0 to A-BA are the terminal numbers for RX-L80 or RX-R40 series terminal block A, B-A0 to B-BA are the terminal numbers for RX-L80 or RX-R40 series terminal block B, 1 to 40 are the RX-L80 monitor output connector's terminal numbers, TB1 and TB2 are the power's terminal numbers.

Parameter settings

• RX-L80

Monitor output and display settings are omitted since they may be freely changed by the user.

	Setting item	Code	Setting
System	RX-L type	A-1	Single zone RX-L
	Number of connected zone RX-Ls	B-14	1
	Number of locked out zone RX-Ls	B-8	1
	RX-L address	B-19	0
	Number of connected RX-Rs	E-1	2
	Number of locked out RX-Rs	E-2	1
	Air switch check use	A-2	ON
	Air switch check result clear	A-5	When RX-L start switch OFF
	760 °C mode use	A-4	Disable
	Startup type	A-3	Link 2
Control	RX-L start method	B-1	Start switch input
setting	Prepurge use	B-2	Enable
	Blower sync signal source	B-6	Internal
	Purge count start signal source	B-7	Internal
	High fire position input	B-9	IN7
	Low fire position input	B-10	IN8
	Process timeout handling	B-11	Only a warning is displayed after a speci- fied amount of time passes.
	Prepurge after RX-R restart	B-12	Every time
	Low fire stop	B-13	OFF
	Postpurge for residual flame	B-15	Normal
	RX-R prepurge use	B-16	OFF
		B-17	-
	RX-L communication error handling	B-18	Lockout
	Permit RX-R startup via host communication*1	F-5	None
	Set reception monitoring for host communication (RS-485)*1	B-21	Not monitored
	Set reception monitoring for host communication (Ethernet)*1	B-22	Not monitored
	Set reception monitoring reset for host communication ^{*1}	B-23	Auto recovery
Timer	Prepurge time	D-1	5 min
	Ignition wait time (s)	D-2	20.0 s
	Damper modulation control wait time (s)	D-3	20.0 s
	Postpurge time (s)	D-4	60.0 s
	Lockout postpurge time (s)	D-5	60.0 s
	Process error judgment time (no combustion) (s)	D-6	120.0 s
	Process error judgment time (during combustion) (s)	D-7	20.0 s
	Reignition standby time (s)	D-8	20.0 s
	Timeout time for host communication reception monitoring* ¹	D-9	180.0 s
Groups	RX-R1 to 32	E-3	Group A
Input settings	IN1 input function	C-1	Interlock
. 5	IN1 Off delay time	C-2	0 s
	IN2 input function	C-1	Interlock
	IN2 Off delay time	C-2	0 s

	Setting item	Code	Setting
Input settings	IN3 input function	C-1	Interlock
	IN3 Off delay time	C-2	0 s
	IN4 input function	C-1	Interlock
	IN4 Off delay time	C-2	0 s
	IN5 input function	C-1	Interlock
	IN5 Off delay time	C-2	0 s
	IN6 input function	C-1	Air pressure switch
	IN6 Off delay time	C-2	0 s
	IN7 input function	C-1	Prepurge condition
	IN7 Off delay time	C-2	0 s
	IN8 input function	C-1	Ignition condition
	IN8 Off delay time	C-2	0 s
	IN9 input function	C-1	Damper modulation
	IN9 Off delay time	C-2	0 s
	IN10 input function	C-1	Group A main start
	IN10 Off delay time	C-2	0 s
	IN11 input function	C-1	Disable
	IN11 Off delay time	C-2	0 s
	IN12 input function	C-1	Disable
	IN12 Off delay time	C-2	0 s
	IN13 input function	C-1	Disable
	IN13 Off delay time	C-2	0 s
	IN14 input function	C-1	Disable
	IN14 Off delay time	C-2	0 s
	IN15 input function	C-1	Disable
	IN15 Off delay time	C-2	0 s
	IN16 input function	C-1	Disable
	IN16 Off delay time	C-2	0 s
Condition	Conditional interlock condition	C-3	Disable
settings	Conditional interlock condition standby time	C-4	3.0 s
Relay output	Relay output	B-3	Disable
	Blower output	B-4	Blower operation
	Damper output	B-5	Control motor operation
Host com-	Station address	F-1	1
munication	Baud rate	F-2	19200 bps
RS485	Data format* ²	F-3	Even parity, 1 stop bit
	Data length for host communication (RS-485)*1	F-3	8 bits
	Parity for host communication (RS-485)*1	F-3	Even parity
	Stop bits for host communication (RS-485)*1	F-3	1 stop bit
	Protocol	F-4	CPL
	Enable RX-R startup via host communication*1	F-5	Disable
	Minimum response time for host communication (RS-485)*1	F-6	3 s
	IP address for host communication (Ethernet)*1	H-1	192.168.255.254
	Net mask for host communication (Ethernet)*1	H-2	255.255.255.0
	Default gateway for host communication (Ethernet) ^{*1}		None
	MODBUS/TCP port number for host communication (Ethernet)*1	H-4	502

*1 RX-L90 only

*2 RX-L80 only

• RX-R44

Monitor output and display settings are omitted as optional.

	Setting item	Code	Setting
System	Combustion mode	1-1	Independent supervision (cannot be changed)
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disabled
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay time for combustion	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	4.5 ± 0.5 s
Input settings	IN1 input function	3-1	Pilot safety valve confirmed closed
	IN1 OFF delay	3-2	0 s
	IN2 input function	3-1	Pilot safety valve confirmed closed
	IN2 OFF delay	3-2	0 s
	IN3 input function	3-1	Main safety valve confirmed closed
	IN3 OFF delay	3-2	0 s
	IN4 input function	3-1	Main safety valve confirmed closed
	IN4 OFF delay	3-2	0 s
RX-R control signal	Address	4-1	1

• RX-R40

Monitor output and display settings are omitted as optional.

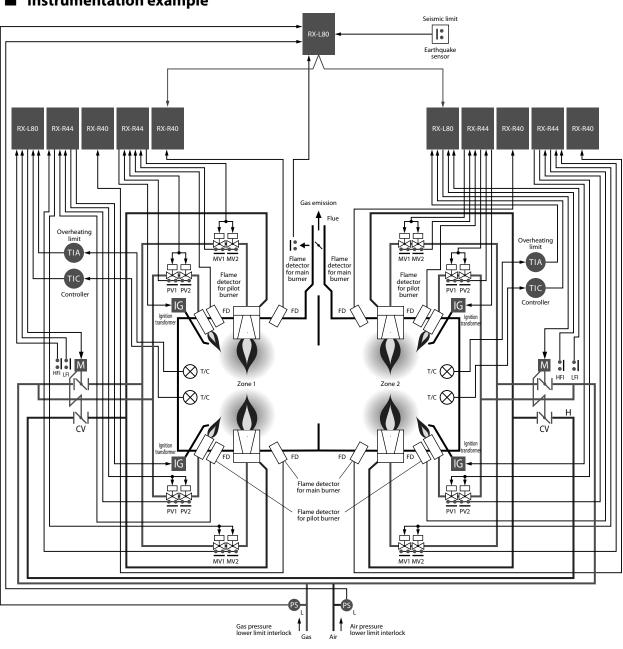
	Setting item	Code	Setting
System	Combustion mode	1-1	Flame relay
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disabled
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay time for combustion	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	4.5 ± 0.5 s
Input settings	IN1 input function	3-1	Disable
	IN1 OFF delay	3-2	0 s
	IN2 input function	3-1	Disable
	IN2 OFF delay	3-2	0 s
	IN3 input function	3-1	Disable
	IN3 OFF delay	3-2	0 s
	IN4 input function	3-1	Disable
	IN4 OFF delay	3-2	0 s
RX-R control signal	Address	4-1	2

Sequence chart

Shows the operation sequence for this method.

Normal operation • RX-L80 Pilot only Damper modulation Pilot trial Main trial Low fire Postpurge Stop Input Power supply Startup input IN1-5 IN6 IN7 IN8 IN9 IN10 Reset input Relay output Blower output High fire position Low fire position Motor control output Monitor output Purging Purge complete Interlock input normal Alarm output • RX-R44 Input Startup (RX-R control signal) IN1, IN2 IN3, IN4 Reset (RX-R control signal) Load output Ignition transformer Shutoff valve (pilot) Shutoff valve (main) Shutter Monitor output IN1, IN2 IN3, IN4 Ignition transformer Shutoff valve (pilot) Shutoff valve (main) Flame signal (pilot) Alarm output • RX-R40 Load output Shutter Monitor output Flame signal (main)

Intermittent Pilot Method (Multi-Zone) 6 - 3



Instrumentation example

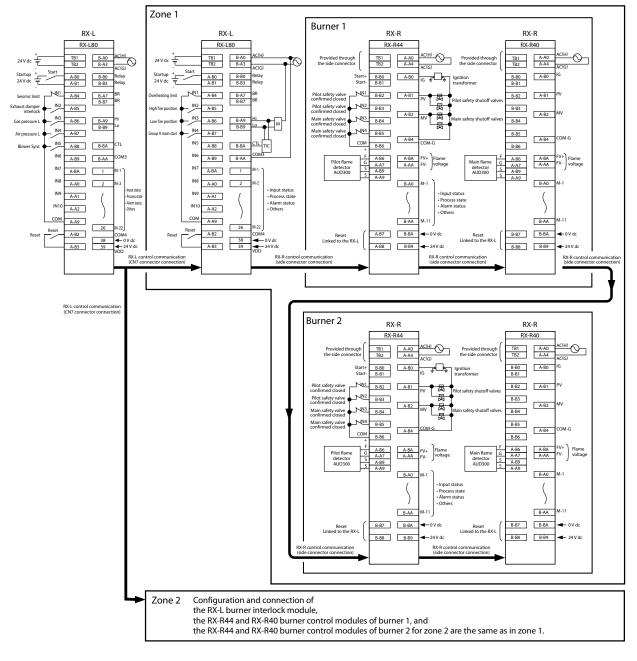
M: Control motor HFI: High fire interlock MV1, MV2: Main safety shutoff valves PV1, PV2: Pilot safety shutoff valves

LFI: Low fire interlock

Device composition

It is made up of the following devices.

- RX-L80 3 units
- RX-R44 4 units
- RX-R40 4 units



Note: Related to terminal number:

A-A0 to A-BA are the terminal numbers for RX-L80 or RX-R40 series terminal block A, B-A0 to B-BA are the terminal numbers for RX-L80 or RX-R40 series terminal block B, 1 to 40 are the RX-L80 monitor output connector's terminal numbers, TB1 and TB2 are the power terminal numbers.

Parameter settings

Note: The blower is shown on the parameter setting example when controlled by the central monitoring board.

• Regular RX-L80

Monitor output and display settings are omitted since they may be freely changed by the user.

	Setting item	Code	Setting			
System	RX-L type	A-1	Regular RX-L			
	Number of connected zone RX-Ls	B-14	2			
	Number of locked out zone RX-Ls	A-1 Regular RX-L B-14 2 B-14 2 B-14 2 B-19 0 E-1 1 E-2 1 A-2 Enable A-3 Link (1) B-1 Start switch input B-2 Always not performed B-1 Start switch input B-2 Always not performed B-6 Input B-7 Internal B-7 Internal B-9 Disable B-10 OFF B-11 Alarm B-12 Every time B-13 Disable B-14 Disable B-15 Normal B-16 Disable B-17 — B-18 Lockout F-5 None B-21 Not monitored B-21 Not monitored B-23 Auto recovery D-1 Disable D-2 20.0 s D-3 20.0 s<	1			
	RX-L address	B-19	0			
	Number of connected RX-Rs	E-1	1			
	Number of locked out RX-Rs	E-2	1			
	Air switch check use	A-2	Enable			
	Air pressure switch operation check conditions canceled	A-5	Regular RX-L 2 1 0 1 1 Enable When blower sync OFF Disable Link (1) Start switch input Always not performed Input Internal Disable OFF Alarm Every time Disable OFF Alarm Every time Disable Okout Normal Disable Mot monitored Not monitored Auto recovery Disable 20.0 s </td			
	760 °C mode use	A-4	Disable			
	Startup type	A-3	Imable Imable When blower sync OFF Disable Link (1) Start switch input Always not performed nput Internal Disable OFF Alarm Every time Disable Alarm Every time Disable Alormal Disable			
Control	RX-L start method	B-1	Start switch input			
setting	Prepurge use	B-2	Always not performed			
	Blower Sync signal assignment	B-6	Input			
	Purge count start signal source	B-7	Internal			
	High fire position input	B-9	Disable			
	Low fire position input	B-10	OFF			
	Process timeout handling	B-11	Alarm			
	Prepurge after RX-R restart	B-12	Every time			
	Low fire stop					
	Postpurge for residual flame	B-15	Normal			
Control R etting P Etting -R prepurge use	B-16	Disable				
		1	—			
	RX-L communication error handling	B-18	Lockout			
	Permit RX-R startup via host communication*1	F-5	None			
	Set reception monitoring for host communication (RS-485)*1	B-21	Not monitored			
	Set reception monitoring for host communication (Ethernet)* ¹	B-22	Not monitored			
	Set reception monitoring reset for host communication ^{*1}	B-23	Auto recovery			
Timer	Prepurge time	D-1	Disable			
	Ignition wait time (s)	D-2	20.0 s			
	Damper modulation control wait time (s)	D-3	20.0 s			
	Postpurge time (s)	D-4	60.0 s			
	Lockout postpurge time (s)	D-5	60.0 s			
	Process error judgment time (no combustion) (s)	D-6	120.0 s			
	Process error judgment time (during combustion) (s)	D-7	20.0 s			
	Reignition standby time (s)	D-8	20.0 s			
	Timeout time for host communication reception monitoring* ¹	D-9	180.0 s			
Groups	RX-R1 to 32	E-3	Group A			
Input settings		-	i			
. 5	IN1 Off delay time	1				

	Setting item	Code	Setting		
Input settings	IN2 input function	C-1	Interlock		
	IN2 Off delay time	C-2	0 s		
	IN3 input function	C-1	Interlock		
	IN3 Off delay time	C-2	0 s		
	IN4 input function	C-1	Air pressure switch		
	IN4 Off delay time	C-2	0 s		
	IN5 input function	C-1	Blower Sync		
	IN5 Off delay time	C-2	0 s		
	IN6 input function	C-1	Disable		
	IN6 Off delay time	C-2	0 s		
	IN7 input function	C-1	Disable		
	IN7 Off delay time	C-2	0 s		
	IN8 input function	1	S nterlock S ir pressure switch S lower Sync S lower Sync S lower Sync S losable S los		
	IN8 Off delay time		0 s		
	IN9 input function				
	IN9 Off delay time	1			
	IN10 input function				
	IN10 Off delay time				
	IN11 input function	C-1 Interlock C-2 0 s C-1 Interlock C-2 0 s C-1 Air pressure switch C-2 0 s C-1 Blower Sync C-2 0 s C-1 Disable C-2 0 s			
	IN11 Off delay time	1			
	IN12 input function				
	IN12 Off delay time				
	IN13 input function				
	IN13 Off delay time				
	IN14 input function				
	IN14 Input function				
	IN14 On delay time				
	•				
	IN15 Off delay time IN16 input function				
		1			
c !!!!	IN16 Off delay time				
	Conditional interlock condition				
-	Conditional interlock condition standby time				
Relay output	Relay output				
	Blower output				
	Damper output				
	Station address	1			
	Baud rate				
13405	Data format*2				
Condition ettings Relay output fost com- nunication tS485	Data length for host communication (RS-485)*1				
	Parity for host communication (RS-485)*1				
	Stop bits for host communication (RS-485)*1		-		
	Protocol				
	Permit RX-R startup via host communication*1	1			
	Minimum response time for host communication (RS-485)*1	F-6	3 s		
	IP address for host communication (Ethernet)*1	H-1	192.168.255.254		
	Net mask for host communication (Ethernet)*1	H-2	255.255.255.0		
	Default gateway for host communication (Ethernet)*1	H-3	None		
	MODBUS/TCP port number for host communication (Ethernet)*1	H-4	502		

*1 RX-L90 only

*2 RX-L80 only

• Zone 1 and 2 RX-L80

Monitor output and display settings are omitted as optional.

	Setting Item	Code	Setting			
System	RX-L type	A-1	Zone RX-L			
	Number of connected zone RX-Ls	B-14	1			
	Number of locked out zone RX-Ls	A-1 Zone RX- B-14 1 B-14 1 B-19 Zone 1 R E-1 4 E-2 1 A-2 OFF litions A-4 A-4 OFF A-3 Link (2) B-1 Start switt B-2 Disable B-6 Internal B-7 Internal B-7 Internal B-7 Internal B-10 OFF B-11 Alarm B-12 Every time B-13 Disable B-14 Disable B-15<	1			
	RX-L communication address	B-19	Zone 1 RX-L: 0, zone 2 RX-L: 1			
	Number of connected RX-Rs	E-1	4			
	Number of locked out RX-Rs	E-2	1			
	Air switch check use	A-2	OFF			
	Air pressure switch operation check conditions	A-5	When RX-L start switch OFF			
	canceled					
	760 °C mode use		DFF Vhen RX-L start switch OFF DFF ink (2) tart switch input Disable Internal DFF DFF DFF Uarm Very time Disable Io setting Disable Io able Disable Io setting Disable			
	Startup type	A-3	Zone RX-L Zone 1 RX-L: 0, zone 2 RX-L: 1 Zone 1 RX-L: 0, zone 2 RX-L: 1 When RX-L start switch OFF OFF DFF DFF Sable Internal Inter			
Control	RX-L start method	B-1	Start switch input			
setting	Prepurge use	B-2	Disable			
	Blower sync signal source	B-6	Internal			
	Purge count start signal source	B-7	Internal			
Control etting	High fire position input	B-9	OFF			
	Low fire position input	B-10	OFF			
	Process timeout handling	B-11	Alarm			
	Prepurge after RX-R restart	B-12	Every time			
	Low fire stop	B-13	Disable			
	Postpurge for residual flame	B-15	No setting			
	RX-R prepurge use	B-16	Disable			
		B-17	_			
	RX-L communication error handling	B-18	Lockout			
	Permit RX-R startup via host communication*1	F-5	None			
	Set reception monitoring for host communication (RS-485)*1	B-21	Not monitored			
	Set reception monitoring for host communication (Ethernet)*1	B-22	Not monitored			
	Set reception monitoring reset for host communication*1	B-23	Auto recovery			
Timer	Prepurge time	D-1	5 min			
	Ignition wait time (s)	D-2	20.0 s			
	Damper modulation control wait time (s)	D-3	20.0 s			
	Postpurge time (s)	D-4	60.0 s			
	Lockout postpurge time (s)	D-5	60.0 s			
	Process error judgment time (no combustion) (s)	D-6	120.0 s			
	Process error judgment time (during combustion) (s)	D-7	20.0 s			
	Reignition standby time (s)	D-8	20.0 s			
	Timeout time for host communication reception	D-9	180.0 s			
	monitoring*1					
Groups	RX-R1 to 32	E-3	Group A			
Input settings	IN1 input function	C-1	Interlock			
	IN1 Off delay time	C-2	0 s			
	IN2 input function	C-1	Prepurge condition			
	IN2 Off delay time	1				
	IN3 input function		Ignition condition			
	IN3 Off delay time					

	Setting Item	Code	Setting			
Input settings	IN4 input function	C-1	Group A main start			
	IN4 Off delay time	C-2	0 s			
	IN5 input function	C-1	Disable			
	IN5 Off delay time	C-2	0 s			
	IN6 input function	C-1	Disable			
	IN6 Off delay time	C-2	0 s			
	IN7 input function	C-1	Disable			
	IN7 Off delay time	C-2	0 s			
	IN8 input function	C-1	Disable			
	IN8 Off delay time	C-2	0 s			
	IN9 input function	C-1	Disable			
	IN9 Off delay time	C-2	0 s			
	IN10 input function	C-1	Disable			
	IN10 Off delay time	C-2) s Disable Dis			
	IN11 input function	C-1	Disable			
	IN11 Off delay time	C-2	0 s			
	IN12 input function	C-1	Disable			
	IN12 Off delay time	C-2	0 s			
	IN13 input function	C-1				
Condition Condition	IN13 Off delay time	C-2	0 s			
	IN14 input function	C-1				
	IN14 Off delay time	C-2	0 s			
	IN15 input function	C-1				
	IN15 Off delay time	C-2	0 s			
	IN16 input function	C-2				
	IN16 Off delay time	C-1 C-2				
	Conditional interlock condition	C-2 C-3				
		C-3				
-	Conditional interlock condition standby time					
Relay output	Relay output	B-3				
	Blower output	B-4				
	Damper output	B-5	•			
	Station address	F-1				
	Baud rate	F-2	-			
10-100	Data format*2	F-3				
	Data length for host communication (RS-485)*1	F-3				
	Parity for host communication (RS-485)*1	F-3	Even parity			
	Stop bits for host communication (RS-485)*1	F-3	1 stop bit			
	Protocol	F-4	CPL			
	Permit RX-R startup via host communication (RS-485)* ²	F-5	None			
	Minimum response time for host communication (RS-485)* ¹	F-6	3 s			
	IP address for host communication (Ethernet)*1	H-1	192.168.255.254			
	Net mask for host communication (Ethernet)*1	H-2	255.255.255.0			
	Default gateway for host communication (Ethernet)*1	H-3	None			
	MODBUS/TCP port number for host communication (Ethernet)* ¹	H-4	502			

*1 RX-L90 only *2 RX-L80 only

• Burner 1 and 2/RX-R44

Monitor output and display settings are omitted as optional.

	Setting Item	Code	Setting			
System	Combustion mode	1-1	Independent supervision			
	RX-R purge conditions	1-2	Disable			
	760 °C mode	1-5	Disable			
Control	RX-R start from	2-1	RX-L and RX-R Start SW			
	Reset condition	2-2	Linked RX-L			
Timer	Restart wait time (s)	2-3	Disable Disable X-L and RX-R Start SW inked RX-L 0.0 s 0.0 s 0.0 s 0.0 s 1.			
	Start check delay time (s)	2-4	0.0 s			
	Air solenoid valve OFF delay time	2-5	0.0 s			
	Air switch Off test timeout (s)	2-6	0.0 s			
	Pilot ignition time	1-3	$4.5 \pm 0.5 \text{ s}$			
Input settings	IN1 input function	3-1	Pilot safety shutoff valve close confirmation			
	IN1 OFF delay	3-2	0 s			
	IN2 input function	3-1	Pilot safety shutoff valve close confirmation			
	IN2 OFF delay	3-2	0 s			
	IN3 input function	3-1	Main safety shutoff valve close confirmation			
	IN3 OFF delay	3-2	0 s			
	IN4 input function	3-1	Main safety shutoff valve close confirmation			
	IN4 OFF delay	3-2	0 s			
RX-R control signal	Address	4-1	1, 3			

• Burner 1 and 2/RX-R40

Monitor output and display settings are omitted as optional.

	Setting Item	Code	Setting
System	Combustion mode	1-1	Flame relay
	RX-R purge conditions	1-2	Disable
	760 °C mode	1-5	Disabled
Control	RX-R start from	2-1	Linked RX-L
	Reset condition	2-2	Linked RX-L
Timer	Restart wait time (s)	2-3	0.0 s
	Start check delay time (s)	2-4	0.0 s
	Air valve OFF delay time for combustion	2-5	0.0 s
	Air switch Off test timeout (s)	2-6	20.0 s
	Pilot ignition time	1-3	$4.5 \pm 0.5 \text{ s}$
Input settings	IN1 input function	3-1	Disable
	IN1 OFF delay	3-2	0 s
	IN2 input function	3-1	Disable
	IN2 OFF delay	3-2	0 s
	IN3 input function	3-1	Disable
	IN3 OFF delay	3-2	0 s
	IN4 input function	3-1	Disable
	IN4 OFF delay	3-2	0 s
RX-R	Address	4-1	2, 4
control signal			

Sequence chart

Shows the operation sequence for this method.

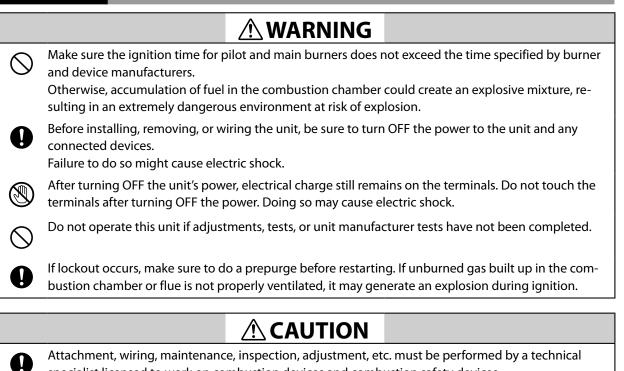
Normal operation

• RX-L80 (regular)		Air		Air												
Input	Stop	pressure OFF	Blower startup	pressure ON	Shared OK	Purge startup	Prepurge	Ignition standby	Start check	Pilot trial	Pilot only	Main trial	Steady combustion	Zone stop	Blower stop	Stop
Power supply		confirmation	¦	confirmation	1						1	1	1	1		
Startup input	-		1		1						1					
IN1-3											1	r.	1		1	
IN4	1	ļ	1										1			1
IN5	+	1			1				L		1	1		1	1	
Reset input					1			1	1		1	1	1			
	<u> </u>	<u> </u>	i –	<u> </u>	<u> </u>			1	i –					<u> </u>	i	<u> </u>
Monitor output Air switch OFF confirmed	1		1	!	!			1	1		l	1	1	1		1
ON confirmation for the air pressure switch	+				1			1			1	1				
Interlock input normal		-	<u> </u>	-							I	I				
Alarm output	<u> </u>	<u> </u>	<u> </u>	<u> </u>	-			i	i		i	i	1			<u> </u>
Alamoutput	+	-		<u> </u>	-			-	1		l	 	<u> </u>	1	1	1
• RX-L80 (zone)		-	!		!							1				
	i	i i	i .	į –	i –	i i		i i	i .		i i	i		i		i –
Input Power supply		i	į	i	i	i i		i	i		İ	1		i	i	i
Startup input					1						1					
IN1	-										1	1				
IN1 IN2					i				i		i					
	<u> </u>	<u> </u>	<u>i</u>	<u>i</u>	<u> </u>	<u> </u>			<u> </u>			1		<u> </u>	<u> </u>	<u> </u>
IN3		1		<u>i</u>	1			<u>i</u>			1			<u>.</u>	1	
IN4	+				-								1	-		
Reset input	+										 	 				
Relay output				 	1						1	 		1		1
High fire position	<u> </u>	i –							i		İ			i	i	i
Low fire position	+											1			1	
Monitor control output	<u> </u>										!	 			 	
Monitor output		1	!	ļ	!				ļ			1				
Purging	<u> </u>	<u>i</u>	<u>i</u>	<u>i</u>	<u>i</u>				<u> </u>			1		<u> </u>	i 1	i
Purge complete	<u> </u>	-	i 	i	i			1					1		i 	i
Interlock input normal	<u> </u>	1	-	!				1								
Alarm output	<u> </u>	<u> </u>	<u> </u>	<u> </u>								1				
			i i		i i							1				i i
• RX-R44 (burner 1)	1	i	i i	į.	i –			i i	į			1	1	i	i	İ
Input	1	1	1	ł	1				1		1	1	1	1	1	1
Startup (AND condition)		į.														
IN1, IN2																
IN3, IN4		1	1		1				I		I					
Reset (RX-R control signal)	<u> </u>	i i	i I	i i	i I			Ì	i i						i I	i i
Loa <u>d output</u>	<u> </u>	1	<u> </u>	<u> </u>	<u> </u>				<u> </u>			1			1	<u> </u>
Ignition transformer			ļ		ļ.			ļ	ļ			1				ļ
Shutoff valve (pilot)		i i	i .	Ì	i .			i	ļ		I	I				i
Shutoff valve (main)	1	i i	i i	i i	i i			i	i i		1		• •		1	i i
Shutter	1	1	1	ł	1									Í	1	1
Monitor output				1	1				[1		
IN1, IN2	j po s							1								
IN3, IN4																
Ignition transformer			1		1							1	1			1
Shutoff valve (pilot)	1	-		-							1	I				
Shutoff valve (main)	1	1						1	ļ		i					
Flame signal (pilot)	1	1		1	1				1				1		1	
Alarm output	1	i	İ	i	İ			1	İ		1	1	1	1		<u> </u>
· · · · · · · · · · · · · · · · · · ·	+	1	İ.	1	i –	H		1	İ.			<u> </u>				-
• RX-R40 (burner 1)	1	1		1	!			-	!		!	1				!
Load output	1	1	!	1	1						1					
Shutter	1	1							1					i i		
Monitor output	+	1	i	i	i			1	1						i	i
Flame signal (main)	1	ł		l I	ł			ł	ł	1				1	1	ł
		1	1	1				1	1	l	1				1	<u> </u>

📖 Note

- Burner 2 has the same timing as Burner 1.
- Zone 2 has the same timing as Zone 1.

Chapter 7. TRIAL OPERATION/ADJUSTMENT



Attachment, wiring, maintenance, inspection, adjustment, etc. must be performed by a technical specialist licensed to work on combustion devices and combustion safety devices.

The pilot turndown test must be performed by an experienced technical specialist with knowledge of combustion devices and combustion safety devices.

Adjustment summary

This chapter contains tests and adjustments for the following.

- · Interlock operation
- Flame voltage measurement
- · Pilot turndown
- Ignition spark response
- · Safety shutoff

! Handling precautions

- After the items above have been adjusted, make sure make sure again that each is still properly adjusted. All adjustments must be correct in the flame detector's final attachment position.
- Do not repeatedly turn the power switch ON/OFF. Doing so might cause the unit to malfunction. After turning the power OFF, wait at least 3 seconds before turning it ON again.
- Things to prepare

Commercial tester and FSP136A	Input impedance 100 k Ω or more
	Range 0 to 300 Vac
	Range 0 to 10 Vdc
 Jumper cables w/crocodile clip 	AWG14 (2 mm ²) or more, length approxi-
	mately 30 cm \times 2
Insulation resistance meter	500 Vdc megger

Preliminary checkup

- (1) Inspect all wiring connections.
- (2) Make sure the installation location is within the permissible ambient temperature range.
- (3) Make sure the flame detector is correctly mounted. Especially make sure the flame detector's blue lead wire (RX-R B6 terminal) and yellow lead wire (RX-R A7 terminal) are connected properly.
- (4) Make sure each fuel system's valves and cocks are closed, and that fuel will not enter the burner during ignition.
 - Also make sure the combustion chamber is well-ventilated.
- (5) After confirming (1) through (4) above, turn the power ON for trial operation adjustment.

Interlock operation test

- Disconnect contact signal wiring of the interlock device to be checked. Wrap the disconnected wiring in vinyl tape as needed to make sure it does not make contact with other terminals or electrically charged parts.
- (2) Start up the unit, and make sure the RX-L does not advance to lockout or any processes.
- (3) After all Interlock checks are completed, reconnect all wiring.

Measuring flame voltage (flame signals)

Start up the unit, and measure the voltage under various conditions during startup, such as steady operation.

- (1) Set the FSP136A range to 7.5 V.
- (2) Connect FSP136A + (plus) side to the unit's flame voltage terminal FV+ (RX-R BA terminal), and FSP136A (minus) side to FV– (RX-R AA terminal).
- (3) Make sure the flame voltage is stable.(Recommended flame voltage: steady 2 Vdc or more)
- (4) If the flame voltage fluctuates a great deal, check the flame detector's attached position, wiring status, etc.

! Handling precautions

- Use wire with indoor PVC insulation (IV wire, JIS C3307) of 0.75 mm² or more for the signal wire, and keep the wiring length to 10 m or less.
- Use a measuring instrument with an input impedance of 100 $k\Omega$ or more to connect to the unit.

Pilot turndown test

For this test, adjust gas pressure and air pressure to their worst-case conditions. When the flame detector detects the pilot flame in this situation, make sure the flame transfers well to the main burner. This is a very important test.

! Handling precautions

• If the fuel pressure limit (if used) is open, use a jumper cable to short it during this test.

Use the following steps to perform the pilot turndown test.

Preparations to make before the test

- (1) Turn OFF the power.
- (2) Close manual valves for the pilot and main burners, and then shut off the gas.
- (3) Open the pilot passage manual valve.

Check the gas pressure at which the flame detector cannot detect the pilot flame.

- (4) Turn ON the power and close the startup contacts.
 - >> Prepurge and ignition operation will begin, the shutoff valve (pilot) will open, and the ignition transformer will operate.
- (5) Slowly close the manual valve for the pilot burner. Gradually close it so that the pilot flame slowly gets smaller, until the flame detector can no longer detect the flame.
- (6) Once the flame is no longer detected, the fuel is shut off, and lockout occurs. Record the gas pressure just before lockout occurred.

Make sure the smallest pilot flame is able to ignite the main burner.

- (7) Slowly open the manual valve for the pilot burner, and set it at the pressure just before the pilot burner's flame was shut off.
- (8) Reset the unit, turn ON the startup contacts, and ignite the pilot burner.
- (9) Open the manual valve for the main burner and make sure the main burner smoothly ignites within 1 second.
- (10) Set the gas pressure to its minimum and maximum levels, and at both levels ignite the main burner 5 or 6 times to confirm that it ignites smoothly each time.

If the smallest pilot flame cannot ignite the main burner

- (11) Readjust the flame detector's attachment position and amount of light that enters, so that the flame detector cannot detect a pilot flame that cannot ignite the main burner.
 - The following 2 adjustment methods are available.
 - Distance the monitoring pipe's monitoring line of sight slightly from the pilot flame.
 - Put an orifice plate into the monitoring pipe, and reduce the amount of light that enters from the pilot flame.
- (12) Slowly open the pilot passage manual valve, and make the pilot flame larger than before.

• Make sure the adjusted pilot flame is able to ignite the main burner.

(13) Once again, make sure the smallest pilot flame is able to ignite the main burner.

! Handling precautions

• When using a multiple burners, make sure flames from the other burners are not being detected.

Action to take after testing

- (14) When the test is finished, return the manual valve for the main burner to its fully open position.
- (15) Make sure the flame voltage is at an appropriate level.
- (16) If the limit has a jumper attached, remove it.

Ignition spark response test

- (1) Close the manual valves for the pilot and main burners.
- (2) Start up the unit, measure the flame voltage during the pilot ignition trial, and check if pilot ignition affects the flame voltage.
- (3) If the pilot flame is detected, refer to the unit's operation manual while performing the following adjustments.
 - Adjust the flame detector or ignition spark rod positioning so that there is no effect.
 - If the flame sensor is an ultraviolet type device, attach a masking shield so that ultraviolet rays cannot enter the light path, and make adjustments so that the spark has no effect.

! Handling precautions

• If the flame detector is an ultraviolet type, make sure that external ultraviolet rays are not detected.

Examples of UV radiation (other than radiation from flame) that might be detected by a UV type flame detector are given below.

Source of	Red-hot furnace wall of at least 1371 °C (within 50 cm)
ultraviolet rays	Spark of an ignition transformer or welding arc
	Gas laser
	Heat lamp
	Sterilization lamp, ultraviolet lamp, fluorescent lamp
	Powerful flash (for ultraviolet light discharge)
Gamma rays and X-rays	X-ray diffraction device, gamma ray analysis indicator
	Electron microscope
	X-ray machine
	High-voltage vacuum switch
	High-voltage capacitor
	Radioisotope
	All other ultraviolet ray, gamma ray, and X-ray generation sources

Safety shutoff test

After all test operation adjustments are finished, test the safety shutoff mechanism.

• Pilot ignition failure (ignition failure)

- (1) Close the manual valves for the pilot and main burners.
- (2) Turn ON the startup contacts.>> Operation begins.
- (3) The shutoff valve (pilot) will be opened during pilot ignition, but make sure lockout occurs because of ignition failure, and that the main safety shutoff valve does not open.

• Steady combustion flame failure

- (1) Open the manual valves for the pilot and main burners.
- (2) Turn ON the startup contacts and start operation.
- (3) When the sequence is progressing normally, and steady combustion begins (main safety shutoff valve open), close the manual valves for the pilot and main burners to extinguish the burner flame.

At this time, make sure flame failure is detected, safety shutoff is performed, and lockout occurs.

• Interlock operation confirmation

Operate each interlock and confirm that lockout occurs.

Chapter 8. CPL COMMUNICATIONS FUNCTION

8 - 1 Overview of Communication

Communication with a PC, PLC or other host devices is available using a user-configured program that uses RS-485 communication.

The communication protocol is CPL (<u>Controller Peripheral Link</u>: Azbil Corporation's host communication protocol).

This chapter describes CPL communications.

Features

The features of the unit's communication function are as follows:

- Up to 32 units can be connected to a single master station acting as a host device.
- If the communication specifications of the host device conform to the RS-232C interface, the CMC10L communication converter (sold separately) is required. The CMC10L allows conversion between RS-232C and RS-485.
- Almost all of the unit parameters can be communicated.
 Chapter 12. LIST OF COMMUNICATION DATA.

Setup

The following settings are required for CPL communications.

• RX-L80

ltem	Setting	Initial value
Station address (F-1)	1 to 32	1
Baud rate (F-2)	9600 bps 19200 bps 38400 bps	19200 bps
Data format (F-3)	Even parity, 1 stop bit (data length 8-bits, even parity, 1 stop bit) Even parity, 2 stop bits (data length 8-bits, even parity, 2 stop bits) Odd parity, 1 stop bit (data length 8-bits, odd parity, 1 stop bit) Odd parity, 2 stop bits (data length 8-bits, odd parity, 2 stop bits)	Even parity, 1 stop bit
Protocol (F-4)	CPL	CPL
Minimum response time	10 ms	_

• RX-L90

ltem	Setting	Initial value
Station address (F-1)	0 (No communication), 1 to 27	127
Baud rate (F-2)	4800 bps 9600 bps 19200 bps 38400 bps 57600 bps 115200 bps	19200 bps
Data format (data length) (F-3)	0: 7 bits 1: 8 bits	1
Data format (parity) (F-3)	0: Even parity 1: Odd parity 2: No parity	0
Data format (stop bit) (F-3)	0: 1 bit 1: 2 bits	0
Protocol	CPL MODBUS/ASCII MODBUS/RTU	CPL
Minimum response time	1 to 250 ms	3

! Handling precautions

- The supported maximum transmission speed in Protocol (F-4) CMC10L is 38400 bps.
- If you use the Azbil CMC10L as an RS-485 converter, set the "minimum response time" to 3 ms or longer.

Communication procedures

- The communication procedure is as follows:
- (1) The command message is sent from the host device (master station) to one unit (slave station).
- (2) The slave station receives the command 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

• Multiple protocols such as CPL, MODBUS/ASCII, and MODBUS/RTU protocols cannot be used together on the same RS-485 line.

8 - 2 Message Structure

Message Structure

The following shows the message structure.

Messages are broadly classified into 2 layers: the data link layer and the application layer.

• Data link layer

This layer contains the basic information required for communication.

For example, the destination of the communication message and the check information of the message.

Application layer

(4) Device code

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	I			58H				 03H		[0DH	0AH
STX				X				ETX			CR	LF
(1)	(2)		(3)	(4)		(5	5)	 (6)	(7	7)	(8	3)
Data link layer				Application layer Data link layer		layer						
[1	l fram	e	 				
(1) STX	(1) STX (Start of message) (5) Command message = command											
• •	(2) Station address Response message = response											
(3) Sub-address (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 all the message components in the data link layer of the command message are correct. If even one of these is incorrect, no response messages are sent, and the device waits for a 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	0 to 7FH are expressed as hexadecimal char-	2	Identification of device to communicate
address	acter codes.		with Sub-address
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 hexa-	2	Checksum of message
	decimal character codes.		
Delimiter	CR (0DH), LF (0AH)	2	End of message

Description of data items

• STX (02H)

When STX is received, the unit judges this to be the start of the send message. It follows that if a delimiter has not been received previously, the unit judges that a message start STX has been received. The purpose of this is to enable recovery of the unit's response at the next message from the master station in the event that noise, for example, causes a message error.

• Station address

Of the messages received, the unit creates response messages only when station addresses are the same. Station addresses in the messages are expressed as 2 hexadecimal characters.

The unit returns the same station address as that of the received message. However, when the station address is set to "00" (30H 30H), the unit does not respond even if the station addresses match.

• Sub-address

Two hexadecimal characters can be used, from "00" (30H 30H) to "FF" (46H 46H). The unit returns the same sub-address as that of the received message.

• Device code

"X" (58H) or "x" (78H) can be used. This code is determined for each device series, and other codes cannot be selected. The unit returns the same device code as that of the received message. These can be used to identify the messages, for example by using "X" (58H) as the initial value and "x" (78H) in resend 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 2 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 2's complement of the low-order 1 byte of the addition result.
 - (3) Convert the obtained 2's complement to a 2-byte ASCII code.

The following is a sample checksum calculation for a sample message:

[Message example]

- STX: 02H
- '0': 30H (1st byte of the station address)
- '1': 31H (2nd byte of the station address)
- '0': 30H (1st byte of the sub-address)
- '0': 30H (2nd byte of the sub-address)
- 'X': 58H (device code)
- 'R': 52H (1st byte of the command)
- 'D': 44H (2nd byte of the command)
- (omitted)
- ETX: 03H

- Add the character codes in the message from STX through ETX in single byte units. The addition calculation in single byte units is as follows:
 02H + 30H + 31H + 30H + 30H + 58H + 52H + 44H +... + 03H The result of this calculation is 376H.
- (2) The low-order 1 byte of the addition result 376H is 76H. The 2's complement of 76H is 8AH.
- (3) Convert the obtained 8AH to a 2-byte ASCII code. The result is:
 '8': 38H
 'A': 41H

The 2 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 unit enters a state which allows the processing of the received message.

Application layer

The table below sho	ws the configuration	n of the application layer.

ltem	Description				
Command	RS (decimal format continuous address data read)				
	WS (decimal format continuous address data write)				
	RD (hexadecimal format continuous address data read)				
	WD (hexadecimal format continuous address data write)				
	RU (hexadecimal format random address data read)				
	WU (hexadecimal format random address data write)				
Data	RS, WS command: , (comma)				
delimiter	Other commands: None				
Word address	RS, WS command: Numeric Value in decimal notation and "W", such as "501W." Other commands: Numeric value in hexadecimal notation, such as "01F5."				
Read	RS, WS command: Numeric value in decimal notation, such as "1."				
number	Other commands: Numeric value in hexadecimal notation, such as "0001."				
Write	RS, WS command: Numeric value in decimal notation, such as "100."				
conditions	Other commands: Numeric value in hexadecimal notation, such as "0064."				

The number of data records accessible by a single command message and response message cycle is as follows:

Command	No. of data records
RD	32 (28)
WD	16 (28)
RS	16 (16)
WS	16 (16)
RU	28 (28)
WU	16 (16)

Values enclosed in () are for the RX-L90.

! Handling precautions

- Four characters are used for numeric representation of the RD, WD, RU, or WU command.
- If the numeric representation has fewer than 4 characters, add "0" to the front of it so that there are 4 characters.

8 - 3 Description of Command

Fixed length continuous data read command (RD command)

Data in continuous data addresses is read in a hexadecimal format.

• Command message

Specifies the start data address and the number of data records. The structure of the application layer in the command message is as follows:

R D		
(1)	(2)	(3)

(1) Command
 (2) Start data address
 (3) No. of data records

Response message

The structure of the application layer in the response message is as follows:

•	Normal	end	(reading	of single	data item)
---	--------	-----	----------	-----------	------------

0 0	
(1)	(2)

• Normal end (reading of multiple data items)

0 0		$\Box 7l$		
(1)	(2)	(3)	(4)	

• Abnormal end

X X The abnormal end code is entered at XX.

For details of the codes, refer to:

(1) 6 6 6 6 6 7 7 7 8 -5 List of End Codes (page 8-14).

(1) End code

(2) Data (1st item)

(3) Data (2nd and following items)

(4) Data (final item)

📖 Note

- For details on hexadecimal number notation, refer to:
 - S-4 Numeric Representation in the Application Layer

Hexadecimal (page 8-12)

Fixed length continuous data write command (WD command)

Writing is performed in a hexadecimal format to data in continuous data addresses.

Command message

Specifies the start data address and at least one data record. The structure of the application layer in the command message is as follows:

۰.

• Writing of single data item

WD		
(1)	(2)	(3)

• Writing of multiple data items

ſ	WD					7	\square				
ſ	(1)	(2))	(3)		(4))		(!	5)	

(1) Command

(2) Start data address

(3) Data (1st item)

(4) Data (2nd and following items)

(5) Data (final item)

Response message

The structure of the application layer in the response message is as follows:

• Norn	nal end
0 0	
(1)	

• Abnormal end

The abnormal end code is entered at XX. X X

For details of the codes, refer to: (1)

🕼 8-5 List of End Codes (page 8-14).

(1) End code

📖 Note

• For details on hexadecimal number notation, refer to:

P 8-4 Numeric Representation in the Application Layer

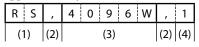
Hexadecimal (page 8-12)

Continuous data read command (RS command)

Data in continuous data addresses is read in a decimal format.

Command message

Specifies the start data address and the number of data records. The structure of the application layer in the command message is as follows:



(1) Command (2) Data delimiter (3) Start data address ("W" is required) (4) No. of data records

Response message

The structure of the application layer in the response message is as follows:

• Normal end (reading of single data item)

0	0	,	
(*	1)	(2)	(3)

Normal end (reading of multiple data items)

0 0	,		,	\Box		,	
(1)	(2)	(3)	(2)	(4)	(2)	(5)

Abnormal end

The abnormal end code is entered at XX. ХХ

For details of the codes, refer to: (1)

🕼 8-5 List of End Codes (page 8-14).

- (1) End code
- (2) Data delimiter
- (3) Data (1st item)

(4) Data (2nd and following items)

(5) Data (final item)

- For details on decimal number notation, refer to:
 - 🕫 8-4 Numeric Representation in the Application Layer Decimal (page 8-13)

Continuous data write command (WS command)

Writing is performed in a decimal format to data in continuous data addresses.

• Command message

Specifies the start address and at least one data record. The structure of the application layer in the command message is as follows:

W	S	,	4	0	9	6	W	,	1	,	6	5
('	1)	(2)			(3)			(2)	(4)	(2)	(5	5)
(1) (Com	mai	nd									

- (2) Data delimiter
- (3) Start data address ("W" is required)
- (4) Data (1st item)
- (5) Data (2nd item)

Response message

The structure of the application layer in the response message is as follows:

,	• N	orn	nal	end
ĺ	0	0		

• •	
(1)	

• Abnormal end

ĺ	x x	The abnormal end code is entered at XX. For details of the codes, refer to: 🕼 8-5 List of End Codes (page 8-14).
	(1)	For details of the codes, refer to:
	(1)	🕼 8-5 List of End Codes (page 8-14).

(1) End code

- For details on decimal number notation, refer to:
 - 🕫 8-4 Numeric Representation in the Application Layer
 - Decimal (page 8-13)

Fixed length random data read command (RU command)

Data in random (non-continuous) data addresses is read in a hexadecimal format.

• Command message

Specifies at least one data record. The structure of the application layer in the command message is as follows:

R U	0 0		$\Box \Box l$			
(1)	(2)	(3)	(4)	(5)	

(1) Command

- (2) Sub-command, fixed to 00
- (3) Data address (1st item)
- (4) Data address (2nd and following items)

(5) Data address (final item)

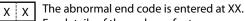
• Response message

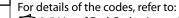
The structure of the application layer in the response message is as follows:

Normal end or Warning

ХХ		\Box			The end code is entered at XX.
(1)	(2)	(3))	(4)	

• Abnormal end





(1) S-5 List of End Codes (page 8-14).

- (1) End code
- (2) Data (1st item)

(3) Data (2nd and following items)

(4) Data (final item)

- For details on hexadecimal number notation, refer to:
 - ☑ 8-4 Numeric Representation in the Application Layer■ Hexadecimal (page 8-12)
- The RX-L90 cannot read a combination of addresses in the 1000 to 2536W (decimal) range and other address ranges. (End code 10)

Fixed length random data write command (WU command)

Writing is performed in a hexadecimal format to data in random (non-continuous) data addresses.

• Command message

Groups data addresses and data, and specifies at least one group.

The structure of the application layer in the command message is as follows:

ΨU	0 0			$\Box \overline{D}$		
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) Command

(2) Sub-command, fixed to 00

(3) Data address (1st group)

(4) Write data (1st group)

(5) Data address, write data (2nd and following groups)

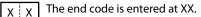
(6) Data address (final group)

(7) Write data (final group)

Response message

The structure of the application layer in the response message is as follows:

• Normal end or Warning





Abnormal end

X X The abnormal end code is entered at XX.

For details of the codes, refer to:

(1) **6** 8-5 List of End Codes (page 8-14).

(1) End code

📖 Note

• For details on hexadecimal number notation, refer to:

☑ 8-4 Numeric Representation in the Application Layer
 ■ Hexadecimal (page 8-12)

• The RX-L90 cannot read a combination of addresses in the 1000 to 2536W (decimal) range and other address ranges. (End code 10)

8 - 4 Numeric Representation in the Application Layer

The numeric values in the application layer include the data address, number of data records and data values, and use hexadecimal or decimal notation depending on the command. This notation method is shared by both the command message and the response message.

Hexadecimal

The hexadecimal specifications are shown in the table below.

If the message does not match the specifications, the unit does not process the command message and instead returns an error response.

ltem	Specification	Example of specification mismatch
Supported commands	RD, WD, RU, WU	RS command (hexadecimal is not allowed) WS command (hexadecimal is not allowed)
Available characters	0 (30H) to 9 (39H) A (41H) to F (46H)	1 2 3 a (a is not allowed) - 1 2 3 (- is not allowed) 1 2 3 (Space is not allowed)
Number of characters	4	1 2 3 (3 characters) 0 1 2 3 4 (5 characters)
Expressible nu- meric values	8000H to 7FFFH (data with symbols) 0000H to FFFFH (data without symbols)	
Examples of normal charac- ter strings	0 0 0 0 1 2 A B 0 1 2 3 F F F F	

Decimal

The decimal specifications are shown in the table below.

In the data address, a capital letter W (57H) is added immediately after the decimal. If the message does not match the specifications, the unit does not process the command message and instead returns an error response.

ltem	Specification	Example of specification mismatch
Supported commands	RS WS	RD command (decimal is not allowed) WD command (decimal is not allowed)
Available characters	0(30H) to 9(39H) –(2DH)	1 2 3 A (a is not allowed) + 1 2 3 (+ is not allowed) 1 2 3 (Space is not allowed)
Delimiter characters	,(2CH) Delimiter characters are used between numerals.	
Number of characters	1 to 5 (positive numbers) 2 to 6 (negative numbers) 1 (numeric value 0)	0 characters (nothing between delimiter characters) 1 2 3 4 5 6 (6-character positive number)
Expressible numeric values	-32768 to +32767 (data with symbols) 0 to 65535 (data without symbols)	
Positive number notation	Starts with 1 (31H) to 9 (39H)	0 1 (Not allowed to start with 0)
Negative number notation	Starts with –(2DH), the 2nd character is 1 (31H) to 9 (39H)	- 0 1 (0 is not allowed for the 2nd character)
Numeric value 0 notation	0	 0 (- is not allowed) 0 0 (Anything other than 1 character is not allowed)
Examples of normal character strings	1 3 2 7 6 7 - 1 2 - 3 2 7 6 8	

8 - 5 List of End Codes

The result of the application layer process for the command message can be understood from the end code of the response message.

Results other than "normal" are in 2 levels. An "error" occurs when nothing is processed, and a "warning" occurs when there is a possibility that some kind of processing was performed.

End codes for the read command

End code	Details	Module processing	Applicable*2	Applicable*3
00 (Normal)	Normal end	Returns a read value	~	~
99 (Error)	Undefined command	Returns only the end code	~	~
10 (Error)	Parameter error*1	Returns only the end code	_	~
40 (Error)	No. of data records error	Returns only the end code	~	~
41 (Error)	Data address error	Returns only the end code	~	~
21 (Warning)	Data address error	Returns a 0 for the corresponding data address	_	~
22 (Warning)	Data range error	Returns the read value of the corresponding data address as 8000 or 7FFF in hexadecimal format, or -32768 or +32767 in decimal format.	_	v
23 (Error)	Not allowed depending on the instrument conditions	Returns only the end code	~	—
23 (Warning)	g) Not allowed depending on the instrument conditions Returns a 0 for the corresponding data address		—	~

*1 The parameter errors are the following errors.

• Violation of the numeric representation

Violation of the command message format

*2 When the target address is 1000 to 2536W in the RX-L80 or RX-L90.

*3 When the target address is not 1000 to 2536W in the RX-L90.

End codes for the write command

End code	Details	Module processing	Applicable*2	Applicable*3
00 (Normal)	Normal end	Writes all data	~	~
99 (Error)	Undefined command	Does not write any data	v	v
10 (Error)	Parameter error*1	Does not write any data	_	~
40 (Error)	No. of data records error	Does not write any data	 ✓ 	v
41 (Error)	Data address error	Does not write any data		_
42 (Warning)	Write data error	Does not write from the corresponding data address onwards	~	~
21 (Warning)	Data address error	Does not write the corresponding data address	_	~
22 (Warning)	Write data invalid	Does not write any data	 ✓ 	_
	Data range error	Does not write the corresponding data address	_	v
23 (Warning)	Cannot write	Does not write any data	 ✓ 	_
	Not allowed depending on the instrument conditions	Does not write the corresponding data address	—	~

*1 The parameter errors are the following errors.

• Violation of the numeric representation

Violation of the command message format

Addition of excess data to the end of the frame

*2 When the target address is 1000 to 2536W in the RX-L80 or RX-L90.

*3 When the target address is not 1000 to 2536W in the RX-L90.

8 - 6 Reception and Transmission Timing

Timing specifications for instruction and response message

The cautions below are required with regard to the timing to transmit an command message from the master station and a response message from the slave station.

Response monitor time

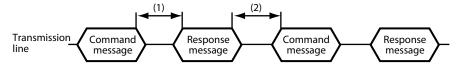
The maximum response time from the end of the command message transmission by the master station until when the master station receives a response message from the slave station is 2 seconds ((1) in the figure below).

So, the response monitor time should be set to 2 seconds.

Generally, when a response "timeout" occurs, the command message is resent.

Transmission start time

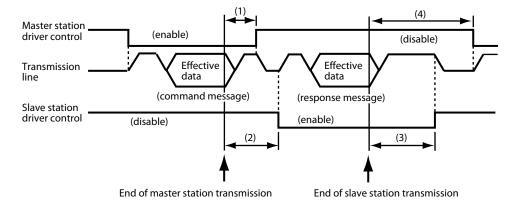
A wait time of 10 ms is required before the master station starts to transmit the next command message (to the same slave station or a different slave station) after the end of receiving response message ((2) in the figure below).



(1) End of master station transmission – Transmission start time for slave station = Max. 2000 ms
 (2) End of slave station transmission – Transmission start time for 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 s

- (2) End of slave station reception Driver enable time = 10 ms (RX-L80)
 - End of slave station reception Driver enable time = Minimum response time (RX-L90)
- (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 9. MODBUS COMMUNICATIONS FUNCTION

9 - 1 Outline of Communication

This function is only applicable to the RX-L90.

Communication with a PC, PLC or other host devices is available using a user-configured program that uses RS-485 communication.

CPL communication (<u>Controller Peripheral Link</u>: Azbil Corporation's host communication protocol) or MODBUS communication can be selected as the communication protocol. This chapter describes MODBUS communications.

Features

The features of the module's communication function are as follows:

- Up to 31 modules can be connected to a single master station that is the host device.
- If the host device uses RS-232C communication, you will need a CMC10L communication converter (sold separately).

The CMC10L allows conversion between RS-232C and RS-485.

Almost all of the unit parameters can be communicated. For details on the communication parameters, refer to:
 Chapter 12. LIST OF COMMUNICATION DATA.

! Handling precautions

• In MODBUS communications, the data address for the module that is set in the host device may be reduced by 1 in a communication message during transmission.

Example: If the data address is set to "1001" in the host device, it will be "1000" in a communication message during transmission.

The module performs the sending and receiving processes for the data address that is specified in the communication message. Confirm the specifications of the host device before using the module.

Setup

The following settings are required to perform MODBUS communication.

ltem name	Setting details	Initial value
Communications type	0: CPL 1: MODBUS/ASCII 2: MODBUS/RTU	0
Station address	0: Does not communicate 1 to 127	127
Baud rate	0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4: 57600 bps 5: 115200 bps	2
Data format (data length)	0: 7 bits 1: 8 bits	1
Data format (parity)	0: Even parity 1: Odd parity 2: No parity	0
Data format (stop bit)	0: 1 bit 1: 2 bits	0
Minimum response time	1 to 250 ms	3

• When the communications type is set to MODBUS/RTU, the operation is fixed to 8-bit data regardless of the data format (data length) setting.

! Handling precautions

• If you use the Azbil CMC10L as an RS-232C/RS-485 converter, set the minimum response time to 3 ms or longer. The maximum baud rate supported by the CMC10L is 38400 bps.

Communication procedure

The communication procedure is as follows:

- (1) The command message is sent from the host device (master station) to one unit (slave station).
- (2) The slave station receives the command 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

• Multiple protocols such as CPL, MODBUS/ASCII, and MODBUS/RTU protocols cannot be used together on the same RS-485 line.

9 - 2 Message Structure

Message structure

The following section shows the message structure.

MODBUS/ASCII

Messages other than the start code and end code all use hexadecimal ASCII codes. MODBUS/ASCII messages are comprised of parts (1) to (5) as shown below. The command (details sent from the master station) and the response (details returned from the slave station) are stored in part (3). One box below represents one character.

3AH						0DH 0AH	
:						CR LF	
(1)	(2)		(3)			(5)	
	1 frame						

- (1) Start code (1 byte)
- (2) Station address (2 bytes)
- (3) Send message, response message
- (4) Check code (LRC) (2 bytes)
- (5) End code (2 bytes)
- Start code

The start code is a colon (3AH).

When the start code is received, the module judges this to be the start of the send message. It follows that if an end code has not been received previously, the module judges that a message start STX has been received. The purpose of this is to enable recovery of the module's response in the next message from the master station in the event that noise, for example, causes a message error.

Station address

For the messages received, the module creates response messages only when station addresses are the same. Station addresses in the messages are expressed as 2 hexadecimal characters.

However, when the station address is set to "00" (30H 30H), the module does not respond even if the station addresses match. The module returns the same station address as that of the received message.

• Check code (LRC)

This value is for checking whether an abnormality (e.g. noise) causes the message content to change during communications. The check code is expressed as 2 hexadecimal characters. The procedure for calculating the check code is as follows.

- (1) Add from the start of the station address to immediately before the check code. Be sure that the added value is not the ASCII character value of the send message, but rather the one-byte binary data that is converted from the 2 ASCII characters.
- (2) Take the 2's complement of the addition result.
- (3) Convert the low-order byte of the addition result to the 2 characters that express the hexadecimal.
- End code (CR/LF)

This indicates the end of the message. Immediately after LF is received, the device enters a state that allows processing of the received message.

📖 Note

- The following is an example of the check code (LRC) calculation. [Message example]
 - : : 3AH (start of message)
 - '0' : 30H(1st byte of the station address)
 - 'A' : 41H(2nd byte of the station address)
 - '0' : 30H (1st byte of the read command)
 - '3' : 33H (2nd byte of the read command)
 - '0' : 30H (1st byte of the start data address)
 - '3' : 33H(2nd byte of the start data address)
 - 'E' : 45H(3rd byte of the start data address)
 - '9' : 39H(4th byte of the start data address)
 - '0' : 30H (1st byte of the no. of data records)
 - '0' : 30H (2nd byte of the no. of data records)
 - '0' : 30H (3rd byte of the no. of data records)
 - '2' : 32H (4th byte of the no. of data records)
- (1) Add from the 1st byte of the station address to immediately before the check code. The calculation is as follows:
 0AH + 03H + 03H + E9H + 00H + 02H The result of this calculation is the FBH.
- (2) The low-order byte of the calculated FBH is the FBH. It does not change. The 2's complement of the FBH is 05H.
- (3) Convert the obtained 05H to a 2-byte ASCII code.
 - '0' : 30H
 - '5' : 35H
 - The 2 bytes, '0' (30H) and '5' (35H), are the check code.

MODBUS/RTU

All messages use binary data. MODBUS/RTU messages are comprised of parts (1) to (3) as shown below.

The command (details sent from the master station) and the response (details returned from the slave station) are stored in part (2). All messages use binary data. (One box below represents 1 byte.)

[
(1)	(1) (2)					(3	3)				
	1 frame										

(1) Station address (1 byte)

(2) Send message, response message

(3) Check code (2 bytes)

• Station address

For the messages received, the module creates response messages only when station addresses are the same. Station addresses in the messages are 1 byte. However, when the station address is set to "0", the unit does not respond even if the station addresses match. The unit returns the same station address as that of the received message.

• Check code (CRC)

This value is for checking whether an abnormality (e.g. noise) has caused the message content to change during communications. The check code is 2 bytes. The procedure for calculating the check code (CRC) is as follows. The part from the start of the station address in the message to immediately before the check code is the part that is calculated. The binary data of the message is used unchanged in the calculation. The check code is 16-bit data, and can be calculated with the C language function get_crc16() as shown below. In the message, the low-order byte is first, and the high-order byte is last. This order is the reverse of other 16-bit data.

[Explanation]	Calculate the CRC 16 bits
[Argument 1]	Character string length (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;
```

• Determining end of one frame

}

The message end (end of one frame) is determined to be when the time in which a character has not been received exceeds the time specified for the baud rate. If the next character is not received before the timeout times shown below, it is determined to be the end of one frame. However, note that there is a variation of ± 1 ms in the timeouts shown in the table below.

Set baud rate (bps)	Timeout time baud rate (bps)
4800	9 ms min.
9600	5 ms min.
19200	3 ms min.
38400	2 ms min.
57600	2 ms min.
115200	2 ms min.

Command types

The command (send message) types supported by this module are as follows:

Command turns	Det	ails	Conformance class	
Command type	ASCII	RTU	Conformance class	
Multiple data item read	"03" (2 bytes)	03H (1 byte)	class 0	
Multiple data item write	"10" (2 bytes)	10H (1 byte)	class 0	
1 data item write	"06" (2 bytes)	06H (1 byte)	class 1*1	

*1 This module does not support class 1 commands other than one data item write.

Exception codes

When a response message error occurs, the following exception codes are added after the function code.

Error tupos	Exception	on code	Details	
Error types	ASCII	RTU		
Invalid function codes	"01" (2 bytes)	01H (1 byte)	Function code not supported	
Invalid data address	"02" (2 bytes)	02H (1 byte)	Including data addresses that cannot be read or written	
Invalid data	"03" (2 bytes)	03H (1 byte)	Errors other than the above	
Busy	"06" (2 bytes)	06H (1 byte)	Cannot process data. Please send again.	

No. of data records

The number of data records that can be read or written in a one frame message is as follows:

Command type	No. of dat	a records
(Function code)	ASCII	RTU
Multiple data item read (03H)	1 to 16 items	1 to 32 items
Multiple data item write (10H)	1 to 16 items	1 to 32 items
1 data record write (06H)	1 record	1 record

- For details regarding MODBUS communication specifications, refer to
 - Generation Modbus Protocol Reference Guide (PI-MBUS-300 Rev.J)" MODICON, Inc.
 - 🇭 "OPEN MODBUS TCP SPECIFICATION (Release 1.0)" Schneider Electric.

9 - 3 Description of Commands

Multiple data item read command (03H)

Data in continuous data addresses is read in a hexadecimal format.

Command message

Specifies the start data address and the number of data records. The structure of the command message is as follows:

MODBUS/ASCII

3AH	30H	41H	30H	33H	30H	33H	45H	39H	30H	30H	30H	32H	30H	35H	0DH	0AH
:	0	А	0	3	0	3	Е	9	0	0	0	2	0	5	CR	LF
(1)	(2	2)	(3	3)		(4)			(5)				(6	5)	(7	7)

(1) Start code

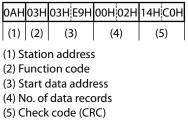
(2) Station address

(3) Function code

(4) Start data address

(5) No. of data records(6) Check code (LRC)(7) End code

MODBUS/RTU



Response message

The structure of the response message is as follows:

MODBUS/ASCII

• Normal example

				a nip															
	3AH	30H	41H	30H	33H	30H	34H	30H	33H	30H	31H	30H	30H	30H	33H	45H	38H	0DH	0AH
	:	0	А	0	3	0	4	0	3	0	1	0	0	0	3	Е	8	CR	LF
	(1)	(2	2)	(3	3)	(4	4)		(5	5)			(6	5)		(7	7)	(8	3)
	(1) S [.]	tart o	code				(5) Read data 1												
(2) Station address							(6) Read data 2												
(3) Function code							(7) Check code (LRC)												

(8) End code

(4) No. of data records \times 2

• Error example

3AH	30H	41H	38H	34H	30H	31H	37H	31H	0DH	0AH
	0	Α	8	4	0	1	7	1	CR	LF
(1)	(2	2)	(3	3)	(4	1)	(5	5)	(6	5)

(1) Start code

(2) Station address

- (3) Function code (When an error occurs, 1 is set for the MSB of the send message function code. In this example, a response of 84 is given for the undefined 04.)
- (4) Exception codes 🌈 (page 9-6)

(5) Check code (LRC)

(6) End code

MODBUS/RTU

• No	orma	al ex	amp	ole					_
0AH	03H	04H	03H	01H	00H	03H	51H	76H	
(1)	(2)	(3)	(4	4)	(!	5)	(6	5)	
(1) S ⁻ (2) F (3) N (4) R (5) R (6) C	uncti o. of ead o ead o	ion c data data data	ode reco 1 2	ords	× 2 (i	num	ber o	f byt	:es)
● Er	ror e	exam	ple		_				
0AH	84H	01H	F3H	02H					
(1)	(2)	(3)	(4	4)					

(1) Station address

(2) Function code (When an error occurs, 1 is set for the MSB of the send message function code. In this example, a response of 84 is given for the undefined 04.)

(3) Exception codes (page 9-6)

(4) Check code (CRC)

Multiple data item write command (10H)

Writing is performed in a hexadecimal format to data in continuous data addresses.

• Command message

Specifies the start data address and at least one data record. The structure of the command message is as follows:

Example: The 01A0H and 0E53H values are written in 2 continuous data addresses from 05DDH.

						1010	טטכ	03/7	1301																
3AH	30H 31F	I 31⊦	130H	30H	35H	44H	44H	30H	30H	30H	32H	30H	34H	30H	31H	41H	30H	30H	45H	35H	33H	30H	35H	0DH	0AH
:	0 1	1	0	0	5	D	D	0	0	0	2	0	4	0	1	Α	0	0	Е	5	3	0	5	CR	LF
(1)	(2)	((3)		(-	4)			(5	5)		(6	5)		(7)			(8	8)		(9	9)	(1	0)
						(2) (3) (4) (5)	Stat Fune Writ No.	t cod ion a ction e star of wr US/F	ddre code rt da ite d	e ta ac						(7) W (8) W (9) C	/rite /rite hecl	f writ data data codd code	1 2 e (LR		cords	5 × 2			
						01	H 10	H 05	H DD	H OC)H 02	H 04	H 01	H A0	H OE	H 53	H 45	5H B9	Н						
						(1) (2	2)	(3)		(4)	(5	5)	(6)		(7)		(8)							
						(2) (3)	Fun Writ	ion a ction e sta of wr	cod rt da	e ta ao				(6) (7)	Writ Writ	te da te da	ta 1 ta 2	lata r CRC)	ecor	ds ×	2				

MODBUS/ASCII

• Response message

The structure of the response message is as follows:

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	В	CR	LF
(1)	(2	2)	(3	3)) (4)					(5	5)		(6	5)	(7	7)
(1) S	tart o	ode							(5) N	o. of	writ	e dat	a rec	ords		
(2) S	tatio	n ad	dress	ress					(6) C	heck	cod	e (LR	C)			
(3) Function code							(7) End code									

(4) Write start data address 1

MODBUS/RTU

01H	10H	05H	DDH	00H	02H	D1H	3EH	
(1)	(2)	(3	3)	(4	1)	(5	5)	
• •		n address						
• •		on code						
(3) W	/rite	start data address						
(4) N	o. of	writ	e dat	ta reo	ords			
(5) C	heck	cod	e (CF	RC)				

📖 Note

• The response message when an error occurs is the same as when an error occurs for the multiple data item read command.

One data item write command (06H)

Data is written to an data address in hexadecimal notation.

Send message

Specifies the data address and the number of data records. The structure of the command message is as follows:

Example: The 01A0H value is written in the 05DDH data address. MODBUS/ASCII

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	Α	0	7	6	CR	LF
(1)	(2	2)	(3	3)		(4	4)			(!	5)		(6	5)	(7	')
(2) S (3) F) Start code(5) Write data() Station address(6) Check code (LRC)() Function code(7) End code() Data address(7) End code															
MO	DBU	S/RT	U					_								
01H	1H 06H 05H DDH 01H A0H 18H D4H															
(1)	(2)	(3	3)	(4	4)	(!	5)									
(1) S [.] (2) F	tatio uncti			5												

(3) Data address

(4) Write data

(5) Check code (CRC)

Response message The normal response message is the same as the send message. Note • The response message when an error occurs is the same as when an error occurs for the multiple data item read command.

9 - 4 Numeric Representation

The numeric values include the data address and number of data records and data values. All use the hexadecimal notation. The numeric representation varies depending on whether the communications type is MODBUS/ASCII or MODBUS/RTU. This notation method is the same for both the command message and the response message.

■ ASCII hexadecimals

The hexadecimal specifications for ASCII are shown in the table below. If the message does not match the specifications, the module does not process the command message and instead returns an error response.

Item	Specification	Example of specification mismatch
Available characters	0 (30H) to 9 (39H) A (41H) to F (46H)	1 2 3 a (a is not allowed) - 1 2 3 (- is not allowed) 1 2 3 (Space is not allowed)
Number of characters	4 or 2	1 2 3 (3 characters) 0 1 2 3 4 (5 characters)
Expressible numeric values (4 characters)	8000H to 7FFFH (data with symbols) 0000H to FFFFH (data without symbols)	
Expressible numeric values (2 characters)	00H to FFH (data without symbols)	
Examples of normal character strings	0 0 0 0 1 2 A B 0 1 2 3 F F F F 0 1 1 0	

RTU hexadecimals

The hexadecimal specifications for RTU are shown in the table below. If the message does not match the specifications, the module does not process the command message and instead returns an error response.

ltem	Specification	Example of specification mismatch
Available characters	00H to FFH (all)	
Number of characters	2 or 1	00H 01H 02H (3 characters)
Expressible numeric values (2 characters)	8000H to 7FFFH (data with symbols) 0000H to FFFFH (data without symbols)	
Expressible numeric values (1 characters)	00H to FFH (data without symbols)	
Examples of normal character strings	00H 00H 12H ABH 01H 23H FFH FFH 10H 04H	

! Handling precautions

• Assign numeric values with the most significant byte 1st (big endian) for MODBUS communications.

9 - 5 Specifications Shared with CPL Communications Function

■ RS-485 driver control timing specifications

8-6 Reception and Transmission Timing (page 8-15).

Chapter 10. MODBUS TCP COMMUNICATION FUNCTION

10-1 Outline of Communication

This function is only applicable to the RX-L90.

The module can communicate with the host device using MODBUS/TCP protocol, which is compliant with Ethernet TCP/IP.

Features

The features of the module's communication function are as follows:

- To use Ethernet communication, mount an Ethernet interface communication adapter (1 port) or communication box (4 ports) on the left of a connected unit, and connect an Ethernet cable.
- The host device can perform communication via Ethernet when the module's IP address is specified.
- Almost all of the module parameters can be communicated. For details on the communication parameters, refer to:

Chapter 12. LIST OF COMMUNICATION DATA.

! Handling precautions

• In MODBUS communication, the data address for the module that is set in the host device may be reduced by 1 in a communication message during transmission.

Example: If the data address is set to "1001" in the host device, it will be "1000" in a communication message during transmission.

This module bases sending and receiving on the data address that is specified in the communication message. Be sure to understand the specifications of the host device before using the module.

Setup

To activate MODBUS/TCP communication with the module, the following settings are required.

ltem name	Initial value
IP address	192.168.255.254
Net mask	255.255.255.0
Default gateway	None

• The port number used by MODBUS/TCP is 502. However, it can be changed if necessary.

Number of connections

2

Use a maximum of 2 MODBUS/TCP connections for each RX-L90. If the host device is connected using one connection for each RX-L90, you can communicate with one RX-L90 from 2 host devices. When using RS-485 communication, Ethernet communication is limited to one session.

Communication procedure

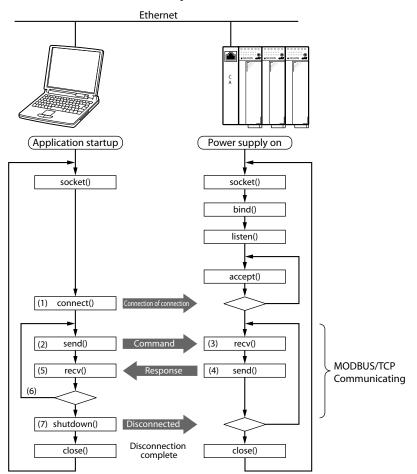
With MODBUS/TCP, the TCP/IP socket interface is used for communications. The TCP/IP socket interface is used in different ways depending on the host device, but this section will explain the usage method for an ordinary computer.

- (1) A TCP/IP socket connection is established from the host device (master station) to one unit (slave station).
- (2) The master station sends an command message to a slave station.
- (3) The slave station receives the command message, and performs read or write processing according to the content of the message.
- (4) The slave station sends a message corresponding to the processing content as a response message.
- (5) The master station receives the response message.
- (6) To continue MODBUS/TCP communication, go back to (2).
- (7) To end MODBUS/TCP communication, the master station performs a TCP/IP socket connection cutoff request on the slave station.

! Handling precautions

• This device can support up to 2 TCP connections (one when using RS-485 communication) for MODBUS/TCP.

General TCP/IP socket communication procedure



10-2 Message Structure

Message structure

A TCP/IP frame is used. The MODBUS/TCP message is expressed in the TCP data section.

• MODBUSTCP

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

Data details

• Transaction Identifier

A request and its response have the same value.

The host station can use the transaction identifier to confirm that the data is a response to the request.

- Protocol Identifier For MODBUS protocol, specify 0000H.
- Length

Expresses the data length from Unit Identifier to Data as the number of bytes.

- Unit Identifier Specify FFH or 00H.
- Function Specify a function code.
- Data The communication data.

• Frame detection method

A TCP frame is equivalent to a MODBUS/TCP frame.

Used port

The TCP port number used by MODBUS/TCP is No. 502. (Can be changed.)

• Function codes

Supports Function Codes 3(03H), 16(10H) and 6(06H).

Exception codes

When a response message error occurs, the following exception codes are added after the function code.

Error types	Exception code	Details
Invalid function codes	"01" (2 bytes)	Function code not supported
Invalid data address	"02" (2 bytes)	Including data addresses that cannot be read or written
Invalid data	"03" (2 bytes)	Errors other than the above
Busy	"06" (2 bytes)	Cannot process data. Please send again.

■ No. of data records

The number of data records that can be read or written in a one frame message is as follows:

Command type	No. of data records		
(Function code)	RAM	EEPROM	
Multiple data item read (03H)	1 to 64 items	1 to 64 items	
Multiple data item write (10H)	1 to 32 items	1 to 32 items	
1 data record write (06H)	1 item	1 item	

📖 Note

- For details regarding MODBUS communication specifications, refer to
 - Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev.J)" MODICON, Inc.
 - 🇭 "OPEN MODBUS TCP SPECIFICATION (Release 1.0)" Schneider Electric.

10-3 Description of Commands

Application section

The following data descriptions are single-byte hexadecimal descriptions (left side is the upper nibble).

Х	1	Х	
(1)			

Multiple data item read command (03H)

• One data item

• Requ	lest	
0 3		
(1)	(2)	(3)

(1) Function code (Read Holding Registers)

(2) Start data address

(3) Number of data items (=1)

• During normal response

0 3		
(1)	(2)	(3)

(1) Function code (Read Holding Registers)
 (2) Start data address
 (3) Read data

• During abnormal response

8 3	
(1)	(2)

(1) Error code (Read Holding Registers)

(2) Exception code (=01H/02H/03H/06H)

Multiple data items

 Request

0 3					
(1)	(2)		(3	3)	

(1) Function code (Read Holding Registers)

(2) Start data address

(3) Number of data items

• During normal response

0 3			$\Box 7$	
(1)	(2)	(3)	Τ'	(3)

(1) Function code (Read Holding Registers)

(2) Number of bytes

(3) Read data (data from the number of read data items is continuous)

. .

• During abnormal response

8 3	
(1)	(2)



(1) Error code (Read Holding Registers)

(2) Exception codes (=01/02/03/06)

Multiple data item write command (10H)

• One data item

• Request													
1	0		1				1 	1					
(1	1)		(2)			(3	3)	(4	4)	(!	5)	

(1) Function code (Write Multiple Registers)

(2) Start data address

(3) Number of data items (=1)

(4) Number of bytes (= number of data items \times 2)

(5) Write data

• During normal response

1 0		
(1)	(2)	(3)

(1) Function code (Write Multiple Registers)

(2) Start data address

(3) Number of data items (=1)

• During abnormal response

9 0	
(1)	(2)

(1) Error code (Write Multiple Registers)(2) Exception code (=01H/02H/03H/06H)

• Multiple data items

• R	equ	uest					
1	0						

(1)	(2)	(3)	(4)	(5)			
(1) Function code (Write Multiple Registers)							

(5)

(1) Function code (Write Multiple Registers)

(2) Start data address(3) Number of data items

(4) Number of bytes (= number of data items \times 2)

(5) Write data

• During normal response

1 0		
(1)	(2)	(3)

(1) Function code (Write Multiple Registers)

(2) Start data address

(3) Number of data items

• During abnormal response

9 0	
(1)	(2)

(1) Error code (Write Multiple Registers)

(2) Exception code (=01H/02H/03H/06H)

One data item write command (06H)

• Requ	uest	
0 6		
(1)	(2)	(3)

(1) Function code (Write Single Register) (2) Write address

(3) Write data

• During normal response

0 6		
(1)	(2)	(3)

(1) Function code (Write Single Register) (2) Write address

(3) Write data (echo back)

• During abnormal response

8 6	
(1)	(2)

(1) Error code (Write Single Register)(2) Exception code (=01H/02H/03H/06H)

Chapter 11. RECEPTION MONITORING

This function is only applicable to the RX-L90.

Cancels operation orders from the host (such as start) and stops devices when a communication line is disconnected or communication with the host device is interrupted, due to noise for example.

You can perform reception monitoring for RS-485 and Ethernet communications separately.

Settings

• Communication supervision setting

Set the conditions for starting reception monitoring. You can set the reception monitoring conditions for RS-485 and Ethernet separately.

Setting	Details
No supervision (initial value)	Reception is not monitored.
Supervise after writing data	Reception is monitored after writing data to the following addresses for operation commands. 1500 to 1535W*
Supervise always	Reception is monitored from the time that the power is turned on.

RX-L startup, blower sync, purge/count start, damper modulation start, startup of each RX-R

• Communication supervision timeout setting

These are the access timeout settings for communication from the host device. The setting range is 10 to 65535 seconds. The initial value is 180 seconds.

! Handling precautions

- Packet data delays may occur due to the network characteristics (WAN) and increases in traffic on the network. In addition, packet data may be destroyed or may not be received properly due to external noise.
- If a reception monitoring timeout (EA04) is detected, the device is stopped. Take these factors into consideration when specifying settings for reception monitoring timeouts.

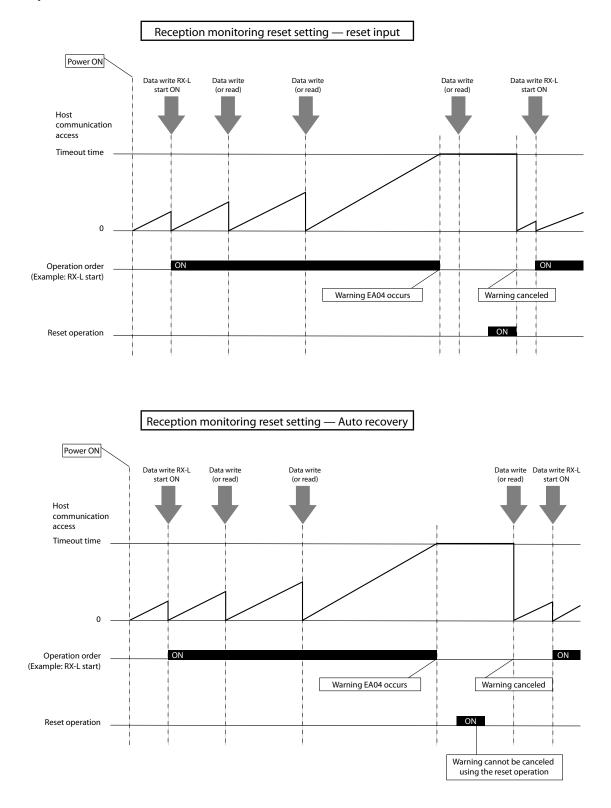
Communication supervision warning reset method setting

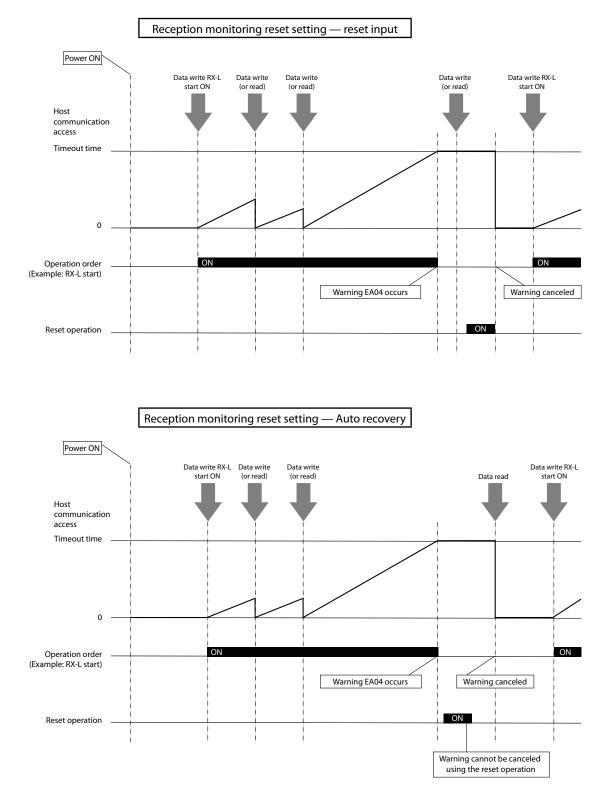
Set the reset conditions for warnings resulting from reception monitoring timeouts.

Setting	Details
Reset input	Warnings are canceled as a result of reset inputs.
Auto recovery (initial value)	Automatically recovers as a result of normal communica- tion access. Normal communication access is read or write access to addresses 1000 to 2536W.

Action

Always monitored



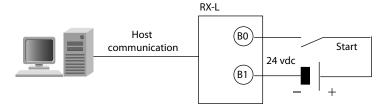


• Monitor after writing data

Settings Example of start method (B-1) combinations

• Start method (B-1) = "Start input ON"

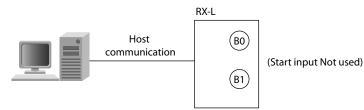
Start input only, it is possible to start/stop the device.



If there is a reception monitoring timeout during reception monitoring, the start state continues. However, if there is a reception monitoring timeout during reception monitoring, the following signals will turn OFF. Blower sync, purge/count start, damper modulation start, startup of each RX-R

• Start method (B-1) = "Communication command ON"

Only through host communication, it is possible to start/stop the device.



• Reception monitoring setting = "Not monitored"

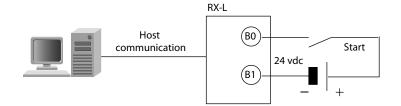
If host communication is interrupted, you will not be able to start/stop devices. You can restart after host communication returns to normal.

• Reception monitoring setting = "Monitor after writing" or "Always monitor" If host communication is interrupted, devices stop after the reception monitoring timeout.

You can restart after host communication returns to normal.

• Start method (B-1) = "Start input ON and communication command ON"

With start input ON and communication command ON, devices start.

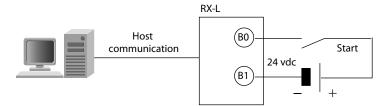


- Reception monitoring setting = "Not monitored" The start state continues even if host communication is interrupted, but devices cannot be stopped with host communication. However, they can be stopped if start input is OFF.
- Reception monitoring setting = "Monitor after writing" or "Always monitor" If host communication is interrupted, devices stop after the reception monitoring timeout.

You can restart after host communication returns to normal.

• Start method (B-1)= "Start input ON or communication command ON"

With start input ON or communication command ON, devices start.



- Reception monitoring setting = "Not monitored" If turned ON with a communication command, the start state continues even if host communication is interrupted, but devices cannot be stopped with host communication. You can stop after host communication returns to normal.
- Reception monitoring setting = "Monitor after writing" or "Always monitor" When turned ON with a communication command (start input OFF), if host communication is interrupted, devices stop after the reception monitoring timeout. You can restart after host communication returns to normal. To start devices while host communication is interrupted, turn the start input ON.

Chapter 12. LIST OF COMMUNICATION DATA

Host communication symbols

R: Read only

RW: Read/write

System data

System data is communication data with the addresses listed below.
(A normal response will be returned when performing a read operation, but the read value details will not be available)
0 to 10W, 1211 to 1212W, 1440W, 1840W, 1959 to 1960W, 1970W, 2000 to 2055W, 2201 to 2209W, 2331 to 2347W, 2400 to 2427W, 2453 to 2466W, 2473 to 2480W

The following addresses apply to the **RX-L90**. 256 to 286W, 848 to 851W, 864 to 875W, 2481 to 2536W, 4913W, 4915 to 4916W, 10240 to 10246W, 10544 to 10545W, 10560W, 10760 to 10805W, 20224 to 20304W

Unused addresses

Unused addresses are addresses other than valid communication data addresses and the above listed system data.

If you access an unused address, an error response (41H: data address error) is returned.

-MEMO-

		Ac	ldress	Host	
Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
RX-L status information	Operation information	1000	3E8H	R	• Operation number (page 12-19)
RX-L status information	Start/reset input	1001	3E9H	R	• Start/reset input (page 12-19)
RX-L status information	Input (IN1 to IN16)	1002	3EAH	R	●Input (IN1 to IN16) (page 12-19)
RX-R status information	RX-R operation, error information address 1	1003	3EBH	R	• RX-R operation, error information (page 12-20)
RX-R status information	RX-R input information address 1	1004	3ECH	R	• RX-R input information (page 12-21)
RX-R status information	RX-R operation, error information address 2	1005	3EDH	R	• RX-R operation, error information (page 12-20)
RX-R status information	RX-R input information address 2	1006	3EEH	R	• RX-R input information (page 12-21)
RX-R status information	RX-R operation, error information address 3	1007	3EFH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 3	1008	3F0H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 4	1009	3F1H	R	● RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 4	1010	3F2H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 5	1011	3F3H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 5	1012	3F4H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 6	1013	3F5H	R	 RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 6	1014	3F6H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 7	1015	3F7H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 7	1016	3F8H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 8	1017	3F9H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 8	1018	3FAH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 9	1019	3FBH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 9	1020	3FCH	R	● RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 10	1021	3FDH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 10	1022	3FEH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 11	1023	3FFH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 11	1024	400H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 12	1025	401H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 12	1026	402H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 13	1027	403H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 13	1028	404H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 14	1029	405H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 14	1030	406H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 15	1031	407H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 15	1032	408H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 16	1033	409H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 16	1034	40AH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 17	1035	40BH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 17	1036	40CH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 18	1037	40DH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 18	1038	40EH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 19	1039	40FH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 19	1040	410H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 20	1041	411H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 20	1042	412H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 21	1043	413H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 21	1044	414H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 22	1045	415H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 22	1046	416H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 23	1047	417H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 23	1048	418H	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 24	1049	419H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 24	1050	41AH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 25	1050	41BH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 25	1051	41CH	R	RX-R input information (page 12-20)
X-R status information	RX-R operation, error information address 26	1052	41DH	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 26	1055	41EH	R	• RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 27	1054	41FH	R	• RX-R operation, error information (page 12-21)
X-R status information	RX-R input information address 27	1055	420H	R	RX-R input information (page 12-21)
X-R status information	RX-R operation, error information address 28	1050	421H	R	• RX-R operation, error information (page 12-20)
X-R status information	RX-R input information address 28	1057	421H	R	• RX-R input information (page 12-20)

Class:6				Host	Data la farmatica
Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
RX-R status information	RX-R operation, error information address 29	1059	423H	R	•RX-R operation, error information (page 12-20)
RX-R status information	RX-R input information address 29	1060	424H	R	●RX-R input information (page 12-21)
RX-R status information	RX-R operation, error information address 30	1061	425H	R	●RX-R operation, error information (page 12-20)
RX-R status information	RX-R input information address 30	1062	426H	R	•RX-R input information (page 12-21)
RX-R status information	RX-R operation, error information address 31	1063	427H	R	•RX-R operation, error information (page 12-20)
RX-R status information	RX-R input information address 31	1064	428H	R	●RX-R input information (page 12-21)
RX-R status information	RX-R operation, error information address 32	1065	429H	R	•RX-R operation, error information (page 12-20)
RX-R status information	RX-R input information address 32	1066	42AH	R	•RX-R input information (page 12-21)
RX-L system information	System	1200	4B0H	R	Regular RX-L=51, Zone RX-L=102, Single Zone RX-L=153, Uncertain=0
RX-L system information	Major version, minor version	1201	4B1H	R	Firmware/version values (page 12-21)
RX-L system information	Sub-version	1202	4B2H	R	
RX-L system information	ROM checksum 1	1203	4B3H	R	0x0000 to 0xFFFF
RX-L system information	ROM checksum 2	1204	4B4H	R	0x0000 to 0xFFFF
RX-L system information	Product serial number	1205	4B5H	R	0 to 65535
RX-L system information	Product date code	1206	4B6H	R	0 to 65535
RX-L system information	Clock (seconds, minutes)	1207	4B7H	R	●Clock (page 12-21)
RX-L system information	Clock (hour)	1208	4B8H	R	
RX-L system information	Clock (day, month)	1209	4B9H	R	
RX-L system information	Clock (year)	1210	4BAH	R	
RX-L operating information	Operating mode	1213	4BDH	R	Normal mode=60, trial mode=90
RX-L operating information	Operation number	1214	4BEH	R	Operation number (page 12-19)
RX-L operating information	Operation number code	1215	4BFH	R	Operation number code (page 12-22)
RX-L operating information	Error code	1216	4C0H	R	Error codes and warning codes for the error details on Page
RX-L operating information	Warning code	1217	4C1H	R	11-2
RX-L operating information	Information from the previous interlock	1218	4C2H	R	Interlock input normal=90,
RX-L operating information	Interlock judgment	1219	4C3H	R	interlock running=60, uncertain=0
RX-L operating information	No. of connected RX-L modules	1220	4C4H	R	0 to 16
RX-L operating information	No. of connected RX-R modules	1221	4C5H	R	0 to 32
RX-L operating information	Start/reset input	1222	4C6H	R	● Start/reset input (page 12-19)
RX-L operating information	Interlock	1223	4C7H	R	●Input (IN1 to IN16) (page 12-19)
RX-L operating information	Monitor output 1	1224	4C8H	R	 Monitor output (page 12-23)
RX-L operating information	Monitor output 2	1225	4C9H	R	
RX-L operating information	Relay output	1226	4CAH	R	● Relay output (page 12-23)
RX-L operating information	Internal temperature	1227	4CBH	R	 Internal temperature (page 12-23)
RX-L operating information	760 °C mode	1229	4CDH	R	In 760 °C mode=90, not in 760 °C mode=60
RX-L operating information	· ·	1230	4CEH	R	Pulse input information (page 12-23)
Zone RX-L information	Zone RX-L operation status address 0	1231	4CFH	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1232	4D0H	R	
Zone RX-L information	Zone RX-L operation status address 1	1233	4D1H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1234	4D2H	R	
Zone RX-L information	Zone RX-L operation status address 2	1235	4D3H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1236	4D4H	R	
Zone RX-L information	Zone RX-L operation status address 3	1237	4D5H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1238	4D6H	R	
Zone RX-L information	Zone RX-L operation status address 4	1239	4D7H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1240	4D8H	R	
Zone RX-L information	Zone RX-L operation status address 5	1241	4D9H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1242	4DAH	R	
Zone RX-L information	Zone RX-L operation status address 6	1243	4DBH	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1244	4DCH	R	
Zone RX-L information	Zone RX-L operation status address 7	1245	4DDH	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1246	4DEH	R	
Zone RX-L information	Zone RX-L operation status address 8	1247	4DFH	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1248	4E0H	R	
Zone RX-L information	Zone RX-L operation status address 9	1249	4E1H	R	Normal = 421, Lockout = 32513
Zono DV L information	(Reserved)	1250	4E2H	R	
Zone RX-L information					
Zone RX-L information	Zone RX-L operation status address 10	1251	4E3H	R	Normal = 421, Lockout = 32513

		Ac	ldress	Host	
Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
one RX-L information	Zone RX-L operation status address 11	1253	4E5H	R	Normal = 421, Lockout = 32513
Ione RX-L information	(Reserved)	1254	4E6H	R	
Zone RX-L information	Zone RX-L operation status address 12	1255	4E7H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1256	4E8H	R	
Zone RX-L information	Zone RX-L operation status address 13	1257	4E9H	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1258	4EAH	R	
Zone RX-L information	Zone RX-L operation status address 14	1259	4EBH	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1260	4ECH	R	
Zone RX-L information	Zone RX-L operation status address 15	1261	4EDH	R	Normal = 421, Lockout = 32513
Zone RX-L information	(Reserved)	1262	4EEH	R	
Zone RX-L information	Zone RX-L connection status address 0	1263	4EFH	R	Not connected=0, connected=90, after connection,
Zone RX-L information	Zone RX-L connection status address 1	1264	4F0H	R	communication error=60
Zone RX-L information	Zone RX-L connection status address 2	1265	4F1H	R	
Zone RX-L information	Zone RX-L connection status address 3	1266	4F2H	R	
Zone RX-L information	Zone RX-L connection status address 4	1267	4F3H	R	
Zone RX-L information	Zone RX-L connection status address 5	1268	4F4H	R	
Zone RX-L information	Zone RX-L connection status address 6	1269	4F5H	R	
Zone RX-L information	Zone RX-L connection status address 7	1270	4F6H	R	
Zone RX-L information	Zone RX-L connection status address 8	1271	4F7H	R	
Zone RX-L information	Zone RX-L connection status address 9	1272	4F8H	R	
Zone RX-L information	Zone RX-L connection status address 10	1273	4F9H	R	
Zone RX-L information	Zone RX-L connection status address 11	1274	4FAH	R	
Zone RX-L information	Zone RX-L connection status address 12	1275	4FBH	R	
Zone RX-L information	Zone RX-L connection status address 13	1276	4FCH	R	
Zone RX-L information	Zone RX-L connection status address 14	1277	4FDH	R	
Zone RX-L information	Zone RX-L connection status address 15	1278	4FEH	R	
RX-R information	RX-R operation, error information address 1	1279	4FFH	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 1	1280	500H	R	● RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 1	1281	501H	R	
RX-R detailed information	RX-R settings information address 1	1282	502H	R	
RX-R detailed information	RX-R operation, error information address 2	1283	503H	R	●RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 2	1284	504H	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 2	1285	505H	R	
RX-R detailed information	RX-R settings information address 2	1286	506H	R	
RX-R detailed information	RX-R operation, error information address 3	1287	507H	R	●RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 3	1288	508H	R	● RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 3	1289	509H	R	
RX-R detailed information	RX-R settings information address 3	1290	50AH	R	
RX-R detailed information	RX-R operation, error information address 4	1291	50BH	R	●RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 4	1292	50CH	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 4	1293	50DH	R	
RX-R detailed information	RX-R settings information address 4	1294	50EH	R	
RX-R detailed information	RX-R operation, error information address 5	1295	50FH	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 5	1296	510H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 5	1297	511H	R	
RX-R detailed information	RX-R settings information address 5	1298	512H	R	
RX-R detailed information	RX-R operation, error information address 6	1299	513H	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 6	1300	514H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 6	1301	515H	R	
RX-R detailed information	RX-R settings information address 6	1302	516H	R	
X-R detailed information	RX-R operation, error information address 7	1303	517H	R	● RX-R operation, error information (page 12-20)
X-R detailed information	RX-R input information 1 address 7	1303	518H	R	• RX-R detailed information (page 12-24)
X-R detailed information	RX-R input information 2, flame level address 7	1305	519H	R	· · · · · · · · · · · · · · · · · · ·
RX-R detailed information	RX-R settings information address 7	1305	51AH	R	
RX-R detailed information	RX-R operation, error information address 8	1307	51BH	R	• RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 8	1307	51CH	R	• RX-R detailed information (page 12-20)
RX-R detailed information	RX-R input information 2, flame level address 8	1309	51DH	R	ense in detailed miorination (page 12-24)
RX-R detailed information	RX-R settings information address 8	1309	51DH	R	
as in actaned initiation	Intersectings mornation address o	1310	JILA	R	

	1	Ac	ldress	Host	
Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
RX-R detailed information	RX-R input information 1 address 9	1312	520H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 9	1313	521H	R	
RX-R detailed information	RX-R settings information address 9	1314	522H	R	
RX-R detailed information	RX-R operation, error information address 10	1315	523H	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 10	1316	524H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 10	1317	525H	R	
RX-R detailed information	RX-R settings information address 10	1318	526H	R	
RX-R detailed information	RX-R operation, error information address 11	1319	527H	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 11	1320	528H	R	● RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 11	1321	529H	R	
RX-R detailed information	RX-R settings information address 11	1322	52AH	R	
RX-R detailed information	RX-R operation, error information address 12	1323	52BH	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 12	1324	52CH	R	RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 12	1325	52DH	R	
RX-R detailed information	RX-R settings information address 12	1326	52EH	R	
RX-R detailed information	RX-R operation, error information address 13	1327	52FH	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 13	1328	530H	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 13	1329	531H	R	
RX-R detailed information	RX-R settings information address 13	1330	532H	R	
RX-R detailed information	RX-R operation, error information address 14	1331	533H	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 14	1332	534H	R	RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 14	1333	535H	R	
RX-R detailed information	RX-R settings information address 14	1334	536H	R	
RX-R detailed information	RX-R operation, error information address 15	1335	537H	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 15	1336	538H	R	● RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 15	1337	539H	R	
RX-R detailed information	RX-R settings information address 15	1338	53AH	R	
RX-R detailed information	RX-R operation, error information address 16	1339	53BH	R	• RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 16	1340	53CH	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 16	1341	53DH	R	
RX-R detailed information	RX-R settings information address 16	1342	53EH	R	
RX-R detailed information	RX-R operation, error information address 17	1343	53FH	R	●RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 17	1344	540H	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 17	1345	541H	R	
RX-R detailed information	RX-R settings information address 17	1346	542H	R	
RX-R detailed information	RX-R operation, error information address 18	1347	543H	R	●RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 18	1348	544H	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 18	1349	545H	R	
RX-R detailed information	RX-R settings information address 18	1350	546H	R	
RX-R detailed information	RX-R operation, error information address 19	1351	547H	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 19	1352	548H	R	•RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 19	1353	549H	R	
RX-R detailed information	RX-R settings information address 19	1354	54AH	R	
RX-R detailed information	RX-R operation, error information address 20	1355	54BH	R	RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 20	1356	54CH	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 20	1357	54DH	R	
RX-R detailed information	RX-R settings information address 20	1358	54EH	R	
RX-R detailed information	RX-R operation, error information address 21	1359	54FH	R	• RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 21	1360	550H	R	•RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 21	1361	551H	R	
RX-R detailed information	RX-R settings information address 21	1362	552H	R	
RX-R detailed information	RX-R operation, error information address 22	1363	553H	R	RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 22	1364	554H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 22	1365	555H	R	
RX-R detailed information	RX-R settings information address 22	1366	556H	R	
RX-R detailed information	RX-R operation, error information address 23	1367	557H	R	RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 23	1368	558H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 23	1369	559H	R	
RX-R detailed information	RX-R settings information address 23	1370	55AH	R	

Address Host					
Classification	ltem		Hexadecimal	Communi-	Data Information
DV D datailed information	BY Departing error information address 24		55BH	cation R	• DV D exercision error information (page 12-20)
RX-R detailed information RX-R detailed information	RX-R operation, error information address 24 RX-R input information 1 address 24	1371 1372	55CH	R	 RX-R operation, error information (page 12-20) RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 24	1372	55DH	R	• KA-K detailed information (page 12-24)
RX-R detailed information	RX-R settings information address 24	1374	55EH	R	
RX-R detailed information	RX-R operation, error information address 25	1375	55EH	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 25	1376	560H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 25	1377	561H	R	• Intractalica information (page 12 2 1)
RX-R detailed information	RX-R settings information address 25	1378	562H	R	
RX-R detailed information	RX-R operation, error information address 26	1379	563H	R	● RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 26	1380	564H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 26	1381	565H	R	
RX-R detailed information	RX-R settings information address 26	1382	566H	R	
RX-R detailed information	RX-R operation, error information address 27	1383	567H	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 27	1384	568H	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 27	1385	569H	R	
RX-R detailed information	RX-R settings information address 27	1386	56AH	R	
RX-R detailed information	RX-R operation, error information address 28	1387	56BH	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 28	1388	56CH	R	•RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 28	1389	56DH	R	
RX-R detailed information	RX-R settings information address 28	1390	56EH	R	
RX-R detailed information	RX-R operation, error information address 29	1391	56FH	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 29	1392	570H	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 29	1393	571H	R	
RX-R detailed information	RX-R settings information address 29	1394	572H	R	
RX-R detailed information	RX-R operation, error information address 30	1395	573H	R	•RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 30	1396	574H	R	●RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 30	1397	575H	R	
RX-R detailed information	RX-R settings information address 30	1398	576H	R	
RX-R detailed information	RX-R operation, error information address 31	1399	577H	R	●RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 31	1400	578H	R	•RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 31	1401	579H	R	
RX-R detailed information	RX-R settings information address 31	1402	57AH	R	
RX-R detailed information	RX-R operation, error information address 32	1403	57BH	R	• RX-R operation, error information (page 12-20)
RX-R detailed information	RX-R input information 1 address 32	1404	57CH	R	• RX-R detailed information (page 12-24)
RX-R detailed information	RX-R input information 2, flame level address 32	1405	57DH	R	
RX-R detailed information	RX-R settings information address 32	1406	57EH	R	
RX-R information	RX-R connection status address 1	1407	57FH	R	Not connected=0, connected=90, after connection, communication error=60
RX-R information	RX-R connection status address 2	1408	580H	R	
RX-R information RX-R information	RX-R connection status address 3 RX-R connection status address 4	1409	581H	R	
		1410	582H	R R	
RX-R information RX-R information	RX-R connection status address 5 RX-R connection status address 6	1411	583H 584H	R	
RX-R information	RX-R connection status address 7	1412	585H	R	
RX-R information	RX-R connection status address 8	1415	586H	R	
RX-R information	RX-R connection status address 9	1415	587H	R	
RX-R information	RX-R connection status address 10	1416	588H	R	
RX-R information	RX-R connection status address 11	1417	589H	R	
RX-R information	RX-R connection status address 12	1418	58AH	R	
RX-R information	RX-R connection status address 13	1419	5878H	R	
RX-R information	RX-R connection status address 14	1420	58CH	R	
RX-R information	RX-R connection status address 15	1421	58DH	R	
RX-R information	RX-R connection status address 16	1422	58EH	R	
RX-R information	RX-R connection status address 17	1423	58FH	R	
RX-R information	RX-R connection status address 18	1424	590H	R	
RX-R information	RX-R connection status address 19	1425	591H	R	
RX-R information	RX-R connection status address 20	1426	592H	R	
RX-R information	RX-R connection status address 21	1427	593H	R	
RX-R information	RX-R connection status address 22	1428	594H	R	
RX-R information	RX-R connection status address 23	1429	595H	R	

Classification	ltem	Ad	ddress	Host Communi-	Data Information
Classification	item	Decimal	Hexadecimal	cation	Data information
RX-R information	RX-R connection status address 24	1430	596H	R	Not connected=0, connected=90, after connection,
RX-R information	RX-R connection status address 25	1431	597H	R	communication error=60
RX-R information	RX-R connection status address 26	1432	598H	R	
RX-R information	RX-R connection status address 27	1433	599H	R	
RX-R information	RX-R connection status address 28	1434	59AH	R	
RX-R information	RX-R connection status address 29	1435	59BH	R	
RX-R information	RX-R connection status address 30	1436	59CH	R	
RX-R information	RX-R connection status address 31	1437	59DH	R	
RX-R information	RX-R connection status address 32	1438	59EH	R	
RX-L operating information	Running interlock number	1439	59FH	R	(None Running=0), 1 to 16
RX-L operating information	Pilot air control operation information	1441	5A1H	R	 Operation number (page 12-19)
RX-L operating information	Pilot air control operation information (internal)	1442	5A2H	R	Pilot air control operation number (internal) (page 12-24)
RX-L operating information	Interlock (no OFF delay operation)	1443	5A3H	R	●Input (IN1 to IN16) (page 12-19)
RX-L operating information	Prepurge elapsed time information (prepurge operation)	1444	5A4H	R	Range 0 to 65535, unit: 0.1 s
RX-L operating information	Operation timer elapsed time information (general timer)	1445	5A5H	R	
RX-L operating information	Reboot standby elapsed time information (reboot standby operation)	1446	5A6H	R	
RX-L operating information	Number of retries information	1447	5A7H	R	Range 0 to 4, unit: times
RX-L operating information	First purge information	1448	5A8H	R	First prepurge=0x5A5A, Second prepurge and after=0x3C3C
RX-L operating information	Air pressure OFF confirmation flag information	1449	5A9H	R	SET=0x5A5A, RESET=0x3C3C
RX-L control information	Startup	1500	5DCH	RW	No start request=0, start request=383
RX-L control information	Blower Sync	1501	5DDH	RW	OFF=0, ON=639
RX-L control information	Purge/count start	1502	5DEH	RW	Stop=0, start=895
RX-L control information	Damper modulation start	1503	5DFH	RW	OFF=0, ON=1151
RX-L control information	RX-R start request address 1	1504	5E0H	RW	Pilot start (0x013C), main start (0x015A) Stop (0x0)
RX-L control information	RX-R start request address 2	1505	5E1H	RW	Pilot start (0x023C), main start (0x025A) Stop (0x0)
RX-L control information	RX-R start request address 3	1506	5E2H	RW	Pilot start (0x033C), main start (0x035A) Stop (0x0)
RX-L control information	RX-R start request address 4	1507	5E3H	RW	Pilot start (0x043C), main start (0x045A) Stop (0x0)
RX-L control information	RX-R start request address 5	1508	5E4H	RW	Pilot start (0x053C), main start (0x055A) Stop (0x0)
RX-L control information	RX-R start request address 6	1509	5E5H	RW	Pilot start (0x063C), main start (0x065A) Stop (0x0)
RX-L control information	RX-R start request address 7	1510	5E6H	RW	Pilot start (0x073C), main start (0x075A) Stop (0x0)
RX-L control information	RX-R start request address 8	1511	5E7H	RW	Pilot start (0x083C), main start (0x085A) Stop (0x0)
RX-L control information	RX-R start request address 9	1512	5E8H	RW	Pilot start (0x093C), main start (0x095A) Stop (0x0)
RX-L control information	RX-R start request address 10	1513	5E9H	RW	Pilot start (0x0A3C), main start (0x0A5A) Stop (0x0)
RX-L control information	RX-R start request address 11	1514	5EAH	RW	Pilot start (0x0B3C), main start (0x0B5A) Stop (0x0)
RX-L control information	RX-R start request address 12	1515	5EBH	RW	Pilot start (0x0C3C), main start (0x0C5A) Stop (0x0)
RX-L control information	RX-R start request address 13	1516	5ECH	RW	Pilot start (0x0D3C), main start (0x0D5A) Stop (0x0)

		Ac	Address Host		
Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
RX-L control information	RX-R start request address 14	1517	5EDH	RW	Pilot start (0x0E3C), main start (0x0E5A) Stop (0x0)
RX-L control information	RX-R start request address 15	1518	5EEH	RW	Pilot start (0x0F3C), main start (0x0F5A) Stop (0x0)
RX-L control information	RX-R start request address 16	1519	5EFH	RW	Pilot start (0x103C), main start (0x105A) Stop (0x0)
RX-L control information	RX-R start request address 17	1520	5F0H	RW	Pilot start (0x113C), main start (0x115A) Stop (0x0)
RX-L control information	RX-R start request address 18	1521	5F1H	RW	Pilot start (0x123C), main start (0x125A) Stop (0x0)
RX-L control information	RX-R start request address 19	1522	5F2H	RW	Pilot start (0x133C), main start (0x135A) Stop (0x0)
RX-L control information	RX-R start request address 20	1523	5F3H	RW	Pilot start (0x143C), main start (0x145A) Stop (0x0)
RX-L control information	RX-R start request address 21	1524	5F4H	RW	Pilot start (0x153C), main start (0x155A) Stop (0x0)
RX-L control information	RX-R start request address 22	1525	5F5H	RW	Pilot start (0x163C), main start (0x165A) Stop (0x0)
RX-L control information	RX-R start request address 23	1526	5F6H	RW	Pilot start (0x173C), main start (0x175A) Stop (0x0)
RX-L control information	RX-R start request address 24	1527	5F7H	RW	Pilot start (0x183C), main start (0x185A) Stop (0x0)
RX-L control information	RX-R start request address 25	1528	5F8H	RW	Pilot start (0x193C), main start (0x195A) Stop (0x0)
RX-L control information	RX-R start request address 26	1529	5F9H	RW	Pilot start (0x1A3C), main start (0x1A5A) Stop (0x0)
RX-L control information	RX-R start request address 27	1530	5FAH	RW	Pilot start (0x1B3C), main start (0x1B5A) Stop (0x0)
RX-L control information	RX-R start request address 28	1531	5FBH	RW	Pilot start (0x1C3C), main start (0x1C5A) Stop (0x0)
RX-L control information	RX-R start request address 29	1532	5FCH	RW	Pilot start (0x1D3C), main start (0x1D5A) Stop (0x0)
RX-L control information	RX-R start request address 30	1533	5FDH	RW	Pilot start (0x1E3C), main start (0x1E5A) Stop (0x0)
RX-L control information	RX-R start request address 31	1534	5FEH	RW	Pilot start (0x1F3C), main start (0x1F5A) Stop (0x0)
RX-L control information	RX-R start request address 32	1535	5FFH	RW	Pilot start (0x203C), main start (0x205A) Stop (0x0)
RX-L System	RX-L type (A-1)	1600	640H	R	• (Host word) Other (page 12-25)
RX-L System	RX-L type (A-1)	1601	641H	R	(Slave word)
RX-L System	Air switch check use (A-2)	1602	642H	R	●(Host word) Other (page 12-25)
RX-L System	Air switch check use (A-2)	1603	643H	R	(Slave word)
RX-L System	Startup type (A-3)	1604	644H	R	●(Host word) Other (page 12-25)
RX-L System	Startup type (A-3)	1605	645H	R	(Slave word)
RX-L System	760 °C mode use (A-4)	1606	646H	R	●(Host word) Other (page 12-25)
RX-L System	760 °C mode use (A-4)	1607	647H	R	(Slave word)
RX-L System	Air switch check result clear (A-5)	1608	648H	R	●(Host word) Other (page 12-25)
RX-L System	Air switch check result clear (A-5)	1609	649H	R	(Slave word)
RX-L operation settings	RX-L start method (B-1)	1610	64AH	R	●(Host word) Other (page 12-25)
RX-L operation settings	RX-L start method (B-1)	1611	64BH	R	(Slave word)

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Classification	ltem	Ac	ldress	Host Communi-	Data Information
classification		Decimal	Hexadecimal	cation	
RX-L operation settings	Prepurge use (B-2)	1612	64CH	R	●(Host word) Other (page 12-25)
RX-L operation settings	Prepurge use (B-2)	1613	64DH	R	(Slave word)
RX-L operation settings	Prepurge time (D-1)	1614	64EH	R	●(Host word) Other (page 12-25)
RX-L operation settings	Prepurge time (D-1)	1615	64FH	R	(Slave word)
RX-L operation settings	Ignition wait period (D-2)	1616	650H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Ignition wait period (D-2)	1617	651H	R	(Slave word)
RX-L operation settings	Damper modulation control wait time (s) (D-3)	1618	652H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Damper modulation control wait time (s) (D-3)	1619	653H	R	(Slave word)
RX-L operation settings	Postpurge time (s) (D-4)	1620	654H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Postpurge time (s) (D-4)	1621	655H	R	(Slave word)
RX-L operation settings	Relay output (B-3)	1622	656H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Relay output (B-3)	1623	657H	R	(Slave word)
RX-L operation settings	Blower output (B-4)	1624	658H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Blower output (B-4)	1625	659H	R	(Slave word)
RX-L operation settings	Damper output (B-5)	1626	65AH	R	● (Host word) Other (page 12-25)
RX-L operation settings	Damper output (B-5)	1627	65BH	R	(Slave word)
RX-L operation settings	Blower sync signal source (B-6)	1628	65CH	R	●(Host word) Other (page 12-25)
RX-L operation settings	Blower sync signal source (B-6)	1629	65DH	R	(Slave word)
RX-L operation settings	Purge count start signal source (B-7)	1630	65EH	R	●(Host word) Other (page 12-25)
RX-L operation settings	Purge count start signal source (B-7)	1631	65FH	R	(Slave word)
RX-L operation settings	Number of locked out zone RX-Ls (B-8)	1632	660H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Number of locked out zone RX-Ls (B-8)	1633	661H	R	(Slave word)
RX-L operation settings	Number of locked out RX-Rs (E-2)	1634	662H	R	• (Host word) Other (page 12-25)
RX-L operation settings	Number of locked out RX-Rs (E-2)	1635	663H	R	(Slave word)
RX-L operation settings	High fire position input (B-9)	1636	664H	R	• (Host word) Other (page 12-25)
RX-L operation settings	High fire position input (B-9)	1637	665H	R	(Slave word)
RX-L operation settings	Low fire position input (B-10)	1638	666H	R	• (Host word) Other (page 12-25)
RX-L operation settings	Low fire position input (B-10)	1639	667H	R	(Slave word)
RX-L operation settings	Prepurge check method	1640	668H	R	• (Host word) Other (page 12-25)
RX-L operation settings	Prepurge check method	1641	669H	R	(Slave word)
RX-L operation settings	Process error judgment time (no combustion) (s) (D-6)	1642	66AH	R	• (Host word) Other (page 12-25)
RX-L operation settings	Process error judgment time (no combustion) (s) (D-6)	1643	66BH	R	(Slave word)
RX-L operation settings	Process error judgment time (combustion) (s) (D-7)	1644	66CH	R	●(Host word) Other (page 12-25)
RX-L operation settings	Process error judgment time (combustion) (s) (D-7)	1645	66DH	R	(Slave word)
RX-L operation settings	Prepurge after RX-R restart (B-12)	1646	66EH	R	●(Host word) Other (page 12-25)
RX-L operation settings	Prepurge after RX-R restart (B-12)	1647	66FH	R	(Slave word)
RX-L operation settings	Reignition standby time (s) (D-8)	1648	670H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Reignition standby time (s) (D-8)	1649	671H	R	(Slave word)
RX-L operation settings	Low fire stop (B-13)	1650	672H	R	● (Host word) Other (page 12-25)
RX-L operation settings	Low fire stop (B-13)	1651	673H	R	(Slave word)
RX-L operation settings	Lockout postpurge time (s) (D-5)	1652	674H	R	● (Host word) Other (page 12-25)
RX-L operation settings	Lockout postpurge time (s) (D-5)	1653	675H	R	(Slave word)
RX-L operation settings	Postpurge operation with residual flame (B-15)	1654	676H	R	●(Host word) Other (page 12-25)
RX-L operation settings	Postpurge operation with residual flame (B-15)	1655	677H	R	(Slave word)
RX-L operation settings	RX-R prepurge use (B-16)	1656	678H	R	●(Host word) Other (page 12-25)
RX-L operation settings	RX-R prepurge use (B-16)	1657	679H	R	(Slave word)
RX-L operation settings		1658	67AH	R	●(Host word) Other (page 12-25)
RX-L operation settings		1659	67BH	R	(Slave word)
RX-L operation settings	RX-L communication error remedy (B-18)	1660	67CH	R	●(Host word) Other (page 12-25)
RX-L operation settings	RX-L communication error remedy (B-18)	1661	67DH	R	(Slave word)
RX-L Monitor settings	LED setting (DSP-1) ST1	1662	67EH	R	● LED setting (DSP-1) (page 12-30)
RX-L Monitor settings	LED setting (DSP-1) ST2	1663	67FH	R	
		1664	680H	R	
RX-L Monitor settings	LED setting (DSP-1) ST3				
RX-L Monitor settings RX-L Monitor settings	LED setting (DSP-1) ST3 LED setting (DSP-1) ST4	1665	681H	R	

		Ac	ldress	Host	
Classification	Item	Decimal	Hexadecimal	Communi- cation	Data Information
RX-L Monitor settings	LED setting (DSP-1) ST6	1667	683H	R	●LED setting (DSP-1) (page 12-30)
RX-L Monitor settings	LED setting (DSP-1) ST7	1668	684H	R	
RX-L Monitor settings	LED setting (DSP-1) IN1	1669	685H	R	-
RX-L Monitor settings	LED setting (DSP-1) IN2	1670	686H	R	-
RX-L Monitor settings	LED setting (DSP-1) IN3	1671	687H	R	-
RX-L Monitor settings	LED setting (DSP-1) IN4	1672	688H	R	-
RX-L Monitor settings	LED setting (DSP-1) IN5	1673	689H	R	
RX-L Monitor settings	LED setting (DSP-1) IN6	1674	68AH	R	-
RX-L Monitor settings	LED setting (DSP-1) IN7	1675	68BH	R	-
RX-L Monitor settings	LED setting (DSP-1) IN8	1676	68CH	R	•
RX-L Monitor settings	LED setting (DSP-1) IN9	1677	68DH	R	
RX-L Monitor settings	LED setting (DSP-1) IN10	1678	68EH	R	-
RX-L Monitor settings	LED setting (DSP-1) IN11	1679	68FH	R	-
RX-L Monitor settings	LED setting (DSP-1) IN12	1680	690H	R	-
X-L Monitor settings	LED setting (DSP-1) IN13	1681	691H	R	
X-L Monitor settings	LED setting (DSP-1) IN13	1682	692H	R	1
X-L Monitor settings	LED setting (DSP-1) IN14 LED setting (DSP-1) IN15	1683	693H	R	1
X-L Monitor settings	LED setting (DSP-1) IN15 LED setting (DSP-1) IN16	1684	694H	R	1
X-L user settings	Error display setting (DSP-2)	1685	695H	R	• Other (page 12-25)
X-L user settings	Monitor output (MO-2) M-1	1686	696H	R	Monitor output (MO-2) (page 12-31)
RX-L user settings	Monitor output (MO-2) M-2	1687	697H	R	• Monitor output (MO-2) (page 12-31)
RX-L user settings	Monitor output (MO-2) M-3	1688	698H	R	
RX-L user settings	Monitor output (MO-2) M-3	1689	699H	R	
X-L user settings	Monitor output (MO-2) M-4 Monitor output (MO-2) M-5	1690	69AH	R	
	Monitor output (MO-2) M-6	1690	69BH	R	
RX-L user settings RX-L user settings	Monitor output (MO-2) M-7	1692	69CH	R	
X-L user settings	Monitor output (MO-2) M-8	1692	69DH	R	
X-L user settings	Monitor output (MO-2) M-9	1693	69EH	R	
Ū.				R	-
RX-L user settings	Monitor output (MO-2) M-10	1695	69FH	R	
RX-L user settings	Monitor output (MO-2) M-11	1696	6A0H	R	-
RX-L user settings	Monitor output (MO-2) M-12	1697	6A1H	R	-
RX-L user settings	Monitor output (MO-2) M-13	1698	6A2H		-
RX-L user settings	Monitor output (MO-2) M-14	1699	6A3H	R R	-
RX-L user settings	Monitor output (MO-2) M-15	1700	6A4H		-
RX-L user settings	Monitor output (MO-2) M-16	1701	6A5H	R	-
RX-L user settings	Monitor output (MO-2) M-17	1702	6A6H	R	-
RX-L user settings	Monitor output (MO-2) M-18	1703	6A7H	R	-
RX-L user settings	Monitor output (MO-2) M-19	1704	6A8H	R	
RX-L user settings	Monitor output (MO-2) M-20	1705	6A9H	R	
RX-L user settings	Monitor output (MO-2) M-21	1706	6AAH	R	
X-L user settings	Monitor output (MO-2) M-22	1707	6ABH	R	
RX-L Monitor settings	Input monitor flicker setting (MO-1)	1708	6ACH	R	Other (page 12-25)
RX-L Monitor settings		1709	6ADH	R	
RX-L Monitor settings	Monitor setting, monitor output logic (MO-3) M-1	1841	731H	R	• Monitor output logic (MO-3) (page 12-33)
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-2	1842	732H	R	4
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-3	1843	733H	R	1
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-4	1844	734H	R	4
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-5	1845	735H	R	1
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-6	1846	736H	R	4
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-7	1847	737H	R	4
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-8	1848	738H	R	4
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-9	1849	739H	R	4
X-L monitor settings	Monitor setting, monitor output logic (MO-3) M-10	1850	73AH	R	4
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-11	1851	73BH	R	4
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-12	1852	73CH	R	
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-13	1853	73DH	R	
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-14	1854	73EH	R	
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-15	1855	73FH	R	
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-16	1856	740H	R	1

	T	Address Host			
Classification	ltem	Decimal	ldress Hexadecimal	Host Communi-	Data Information
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-17	1857	741H	cation R	 Monitor output logic (MO-3) (page 12-33)
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-17 Monitor setting, monitor output logic (MO-3) M-18	1858	741H 742H	R	• Monitor output logic (MO-3) (page 12-33)
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-19	1859	743H	R	-
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-20	1860	744H	R	-
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-21	1861	745H	R	
RX-L monitor settings	Monitor setting, monitor output logic (MO-3) M-22	1862	746H	R	-
Operation status	Compatibility mode information (1)	2479	9AFH	R	• Compatibility mode information (1) (page 12-34)
RX-L user settings	Input function (C-1) IN1	1711	6AFH	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN1	1712	6B0H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN1	1713	6B1H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN1	1714	6B2H	R	(Slave word)
RX-L user settings	Input function (C-1) IN2	1715	6B3H	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN2	1716	6B4H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN2	1717	6B5H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN2	1718	6B6H	R	(Slave word)
RX-L user settings	Input function (C-1) IN3	1719	6B7H	R	• (Host word) Input function (C-1) (page 12-34)
XX-L user settings	Input function (C-1) IN3	1720	6B8H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN3	1720	6B9H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN3	1721	6BAH	R	(Slave word)
RX-L user settings	Input function (C-1) IN4	1723	6BBH	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN4	1723	6BCH	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN4	1724	6BDH	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN4	1725	6BEH	R	(Slave word)
X-L user settings	Input function (C-1) IN5	1720	6BFH	R	• (Host word) Input function (C-1) (page 12-34)
X-L user settings	Input function (C-1) IN5	1727	6C0H	R	(Slave word)
X-L user settings	OFF delay (C-2) IN5	1720	6C1H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN5	1729	6C2H	R	(Slave word)
RX-L user settings	Input function (C-1) IN6	1730	6C3H	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN6	1732	6C4H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN6	1732	6C5H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN6	1734	6C6H	R	(Slave word)
RX-L user settings	Input function (C-1) IN7	1734	6C7H	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN7	1735	6C8H	R	(Slave word)
RX-L user settings		1730	6C9H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
0	OFF delay (C-2) IN7		6CAH	R	(Slave word)
RX-L user settings RX-L user settings	OFF delay (C-2) IN7	1738	6CAH 6CBH		,
3	Input function (C-1) IN8	1739 1740	6ССН	R R	• (Host word) Input function (C-1) (page 12-34) (Slave word)
RX-L user settings	Input function (C-1) IN8				• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN8	1741	6CDH	R	
RX-L user settings	OFF delay (C-2) IN8	1742	6CEH	R	(Slave word)
RX-L user settings	Input function (C-1) IN9	1743	6CFH	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN9	1744	6D0H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN9	1745	6D1H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
X-L user settings	OFF delay (C-2) IN9	1746	6D2H	R	(Slave word)
X-L user settings	Input function (C-1) IN10	1747	6D3H	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN10	1748	6D4H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN10	1749	6D5H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN10	1750	6D6H	R	(Slave word)
X-L user settings	Input function (C-1) IN11	1751	6D7H	R	• (Host word) Input function (C-1) (page 12-34)
X-L user settings	Input function (C-1) IN11	1752	6D8H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN11	1753	6D9H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
X-L user settings	OFF delay (C-2) IN11	1754	6DAH	R	(Slave word)
X-L user settings	Input function (C-1) IN12	1755	6DBH	R	• (Host word) Input function (C-1) (page 12-34)
X-L user settings	Input function (C-1) IN12	1756	6DCH	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN12	1757	6DDH	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN12	1758	6DEH	R	(Slave word)
RX-L user settings	Input function (C-1) IN13	1759	6DFH	R	• (Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN13	1760	6E0H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN13	1761	6E1H	R	• (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN13	1762	6E2H	R	(Slave word)

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Classification	Item	Decimal	Hexadecimal	Communi- cation	Data Information
RX-L user settings	Input function (C-1) IN14	1763	6E3H	R	●(Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN14	1764	6E4H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN14	1765	6E5H	R	●(Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN14	1766	6E6H	R	(Slave word)
RX-L user settings	Input function (C-1) IN15	1767	6E7H	R	•(Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN15	1768	6E8H	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN15	1769	6E9H	R	● (Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN15	1770	6EAH	R	(Slave word)
RX-L user settings	Input function (C-1) IN16	1771	6EBH	R	●(Host word) Input function (C-1) (page 12-34)
RX-L user settings	Input function (C-1) IN16	1772	6ECH	R	(Slave word)
RX-L user settings	OFF delay (C-2) IN16	1773	6EDH	R	●(Host word) OFF delay settings (C-2) (page 12-35)
RX-L user settings	OFF delay (C-2) IN16	1774	6EEH	R	(Slave word)
RX-L user settings	Conditional interlock condition (C-3) A	1775	6EFH	R	●(Host word) Conditional interlock condition (C-3) (page 12-36)
RX-L user settings	Conditional interlock condition (C-3) A	1776	6F0H	R	(Slave word)
RX-L user settings	Conditional interlock settings standby time (C-4) A	1777	6F1H	R	• (Host word) Conditional interlock standby time (C-4) (page 12-36)
RX-L user settings	Conditional interlock settings standby time (C-4) A	1778	6F2H	R	(Slave word)
RX-L user settings	Conditional interlock condition (C-3) B	1779	6F3H	R	 (Host word) Conditional interlock condition (C-3) (page 12-36)
RX-L user settings	Conditional interlock condition (C-3) B	1780	6F4H	R	(Slave word)
RX-L user settings	Conditional interlock settings standby time (C-4) B	1781	6F5H	R	 (Host word) Conditional interlock standby time (C-4) (page 12-36)
RX-L user settings	Conditional interlock settings standby time (C-4) B	1782	6F6H	R	(Slave word)
RX-L user settings	Conditional interlock condition(C-3) C	1783	6F7H	R	 (Host word) Conditional interlock condition (C-3) (page 12-36)
RX-L user settings	Conditional interlock condition(C-3) C	1784	6F8H	R	(Slave word)
RX-L user settings	Conditional interlock settings standby time (C-4) C	1785	6F9H	R	 (Host word) Conditional interlock standby time (C-4) (page 12-36)
RX-L user settings	Conditional interlock settings standby time (C-4) C	1786	6FAH	R	(Slave word)
RX-L user settings	Conditional interlock condition (C-3) D	1787	6FBH	R	 (Host word) Conditional interlock condition (C-3) (page 12-36)
RX-L user settings	Conditional interlock condition (C-3) D	1788	6FCH	R	(Slave word)
RX-L user settings	Conditional interlock settings standby time (C-4) D	1789	6FDH	R	 (Host word) Conditional interlock standby time (C-4) (page 12-36)
RX-L user settings	Conditional interlock settings standby time (C-4) D	1790	6FEH	R	(Slave word)
RX-L user settings	Conditional interlock condition(C-3) E	1791	6FFH	R	• (Host word) Conditional interlock condition (C-3) (page 12-36)
RX-L user settings	Conditional interlock condition(C-3) E	1792	700H	R	(Slave word)
RX-L user settings	Conditional interlock settings standby time (C-4) E	1793	701H	R	• (Host word) Conditional interlock standby time (C-4) (page 12-36)
RX-L user settings	Conditional interlock settings standby time (C-4) E	1794	702H	R	(Slave word)
RX-L module settings	Number of connected zone RX-Ls (B-14)	1795	703H	R	• (Host word) Other (page 12-25)
RX-L module settings	Number of connected zone RX-Ls (B-14)	1796	704H	R	(Slave word)
RX-L module settings	Number of connected RX-Rs (E-1)	1797	705H	R	• (Host word) Other (page 12-25)
RX-L module settings	Number of connected RX-Rs (E-1)	1798	706H	R	(Slave word)
RX-L module settings	RX-R_group (E-3) address 1	1799	707H	R	• RX-R_group (E-3) (page 12-37)
RX-L module settings	RX-R_group (E-3) address 2	1800	708H	R	
RX-L module settings	RX-R_group (E-3) address 3	1801	709H	R	
RX-L module settings	RX-R_group (E-3) address 4	1802	70AH	R	
RX-L module settings	RX-R_group (E-3) address 5	1803	70BH	R	
RX-L module settings	RX-R_group (E-3) address 6	1804	70CH	R	
RX-L module settings	RX-R_group (E-3) address 7	1805	70DH	R	
RX-L module settings	RX-R_group (E-3) address 8	1806	70EH	R	
RX-L module settings	RX-R_group (E-3) address 9	1807	70FH	R	
RX-L module settings	RX-R_group (E-3) address 10	1808	710H	R	
RX-L module settings	RX-R_group (E-3) address 11	1809	711H	R	
	RX-R_group (E-3) address 12	1810	712H	R	
RX-L module settings					1
	RX-R_group (E-3) address 13	1811	713H	R	
RX-L module settings RX-L module settings	RX-R_group (E-3) address 13 RX-R_group (E-3) address 14	1811 1812	713H 714H	R R	

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Classification	ltem	Ad	dress	Host Communi-	Data Information
classification		Decimal	Hexadecimal	cation	
RX-L module settings	RX-R_group (E-3) address 16	1814	716H	R	●RX-R_group (E-3) (page 12-37)
RX-L module settings	RX-R_group (E-3) address 17	1815	717H	R	
RX-L module settings	RX-R_group (E-3) address 18	1816	718H	R	
RX-L module settings	RX-R_group (E-3) address 19	1817	719H	R	
RX-L module settings	RX-R_group (E-3) address 20	1818	71AH	R	
RX-L module settings	RX-R_group (E-3) address 21	1819	71BH	R	
RX-L module settings	RX-R_group (E-3) address 22	1820	71CH	R	
RX-L module settings	RX-R_group (E-3) address 23	1821	71DH	R	
RX-L module settings	RX-R_group (E-3) address 24	1822	71EH	R	
RX-L module settings	RX-R_group (E-3) address 25	1823	71FH	R	
RX-L module settings	RX-R_group (E-3) address 26	1824	720H	R	
RX-L module settings RX-L module settings	RX-R_group (E-3) address 27 RX-R_group (E-3) address 28	1825 1826	721H 722H	R R	
RX-L module settings	RX-R_group (E-3) address 28 RX-R_group (E-3) address 29	1827	722H 723H	R	
RX-L module settings	RX-R_group (E-3) address 30	1828	723H 724H	R	
RX-L module settings	RX-R_group (E-3) address 30	1829	724H	R	
RX-L module settings	RX-R_group (E-3) address 32	1830	726H	R	
RX-L communication	Baud rate (F-2)	1831	727H	R	Other (page 12-25)
settings					RX-L80 only
RX-L communication settings	Data format (F-3)	1832	728H	R	
RX-L communication settings	Station address (F-1)	1833	729H	R	
RX-L communication settings	Protocol (F-4)	1834	72AH	R	
RX-L communication settings	RX-L address (B-19)	1835	72BH	R	• (Host word) Other (page 12-25)
RX-L communication settings	RX-L address (B-19)	1836	72CH	R	• (Slave word) Other (page 12-25)
RX-L communication settings	Permit RX-R startup via host communication (F-5)	1837	72DH	R	● Other (page 12-25)
RX-L communication settings	Text	1838	72EH	R	0 to 65535
RX-L communication settings	Text	1839	72FH	R	
RX-L communication setting	Set reception monitoring (RS-485) (RX-L90 only)	1863	747H	R	0xBB40: Monitored after writing data 0xBB80: Always monitored 0xBB00: Not monitored
RX-L communication setting	Set reception monitoring (Ethernet) (RX-L90 only)	1864	748H	R	0xBC40: Monitored after writing data 0xBC80: Always monitored 0xBC00: Not monitored
RX-L communication setting	Set reception monitoring reset (RX-L90 only)	1865	749H	R	0xBD5A: Reset input 0xBD3C: Auto recovery
RX-L communication setting	Set reception monitoring timeout (RX-L90 only)	1866	74AH	R	0x00BE0000 (0 seconds) to 0x00BEFFFF (65535 seconds) Host word
RX-L communication setting	Set reception monitoring timeout (RX-L90 only)	1867	74BH	R	0x00BE0000 (0 seconds) to 0x00BEFFFF (65535 seconds) Slave word
RX-L operating history	Number of power ONs accumulated value	1900	76CH	R	Host word 0 to 999999 times
RX-L operating history	Number of power ONs accumulated value	1901	76DH	R	Slave word 0 to 999999 times
RX-L operating history	Number of starts accumulated value	1902	76EH	R	Host word 0 to 999999 times
RX-L operating history	Number of starts accumulated value	1903	76FH	R	Slave word 0 to 999999 times
RX-L operating history	Number of resets accumulated value	1904	770H	R	Host word 0 to 999999 times
RX-L operating history	Number of resets accumulated value	1905	771H	R	Slave word 0 to 999999 times
RX-L operating history	Number of operation starts accumulated value	1906	772H	R	Host word 0 to 999999 times
RX-L operating history	Number of operation starts accumulated value	1907	773H	R	Slave word 0 to 999999 times
RX-L operating history	Number of relay ONs accumulated value	1908	774H	R	Host word 0 to 999999 times
RX-L operating history	Number of relay ONs accumulated value	1909	775H	R	Slave word 0 to 999999 times
RX-L operating history	Number of blower ONs accumulated value	1910	776H	R	Host word 0 to 999999 times
RX-L operating history	Number of blower ONs accumulated value	1911	777H	R	Slave word 0 to 999999 times
RX-L operating history	Number of high combustion position ONs accumulated value	1912	778H	R	Host word 0 to 999999 times
RX-L operating history	Number of high combustion position ONs accumulated value	1913	779H	R	Slave word 0 to 999999 times
RX-L operating history	Number of damper modulation ONs accumulated value	1914	77AH	R	Host word 0 to 999999 times
RX-L operating history	Number of damper modulation ONs accumulated value	1915	77BH	R	Slave word 0 to 999999 times

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Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
RX-L operating history	Checksum error accumulated errors	1940	794H	R	0 to 9999 times
RX-L operating history	Data read error accumulated errors	1941	795H	R	
X-L operating history	Irregular settings procedure accumulated errors	1942	796H	R	
X-L operating history	Operation timeout error (air pressure OFF confirmation operation) accumulated errors	1943	797H	R	
X-L operating history	Operation timeout error (air pressure ON confirmation operation) accumulated errors	1944	798H	R	
X-L operating history	Interlock running accumulated errors	1945	799H	R	
X-L operating history	Reset input error accumulated errors	1946	79AH	R	
RX-L operating history	Zone alarm accumulated errors	1947	79BH	R	
X-L operating history	Zone stop caused by RX-R error accumulated errors	1948	79CH	R	
X-L operating history	Trial operation timeout accumulated errors	1949	79DH	R	
X-L operating history	System error 1 accumulated errors	1950	79EH	R	
RX-L operating history	RX-R communication error accumulated errors	1951	79FH	R	
X-L operating history	Communication error between RX-L modules	1952	7A0H	R	
	accumulated errors				
RX-L operating history	Data write error accumulated errors	1953	7A1H	R	
X-L operating history	Relay answer back error 2 accumulated errors	1954	7A2H	R	
X-L operating history	Relay answer back error 1 accumulated errors	1955	7A3H	R	
RX-L operating history	Regular RX-L signal inconsistency accumulated errors	1956	7A4H	R	
X-L operating history	System error 2 accumulated errors	1957	7A5H	R	
X-L operating history	Settings error accumulated errors	1958	5A6H	R	
RX-L operating history	Not used	1959	7A7H	R	
X-L operating history	Not used	1960	7A8H	R	
X-L operating history	Control motor input inconsistency accumulated	1961	7A9H	R	
RX-L operating history	Operation timeout error (Prepurge condition standby operation) accumulated errors	1962	7AAH	R	
RX-L operating history	Operation timeout error (Ignition condition standby operation) accumulated errors	1963	7ABH	R	
RX-L operating history	Low fire stop error accumulated errors	1964	7ACH	R	
X-L operating history	760 °C contact input inconsistency accumulated errors	1965	7ADH	R	
RX-L operating history	Ember error accumulated errors	1966	7AEH	R	
X-L operating history	System error 3 accumulated errors	1967	7AFH	R	
X-L operating history	System error 4 accumulated errors	1968	7B0H	R	
X-L operating history	Operation failure 3 accumulated errors	1969	7B1H	R	
X-L operating history	Not used	1909	782H	R	
XX-L operating history	System error 5 accumulated errors	1970	782H	R	
1 3 ,				R	
X-L operating history	Operation failure 1 accumulated errors Number of connected RX-Rs error accumulated errors	1972	7B4H		
X-L operating history	RX-L connectable units error accumulated errors	1973	7B5H	R	
X-L operating history		1974	7B6H	R	
X-L operating history	760 °C unit error accumulated errors	1975	7B7H	R	
X-L operating history	Restart timeout accumulated errors	1976	7B8H	R	
X-L operating history	System error 6 accumulated errors	1977	7B9H	R	
RX-L operating history	Operation failure 2 accumulated errors	1978	7BAH	R	
X-L operating history	Number of relay life warnings accumulated value	1979	7BBH	R	
X-L operating history	Increased internal temperature warning accumulated value	1980	7BCH	R	
RX-L operating history	Operation timeout warning (Air pressure OFF confirmation operation) accumulated value	1981	7BDH	R	
RX-L operating history	Operation timeout warning (Air pressure ON confirmation operation) accumulated value	1982	7BEH	R	
RX-L operating history	Operation timeout warning (Prepurge condition standby operation) accumulated value	1983	7BFH	R	
RX-L operating history	RX-L communication error warning accumulated	1984	7C0H	R	

		Δ	dress	Host	
Classification	ltem	Decimal	Hexadecimal	Communi- cation	Data Information
RX-L operating history	Host communication timeout accumulated value	1985	7C1H	R	0 to 9999 times
RX-L operating history	760 °C unit connection failure accumulated value	1985	7C2H	R	
RX-L operating history	Base EEPROM read write error Total number*	1987	7C2H	R	0 to 9999 times
RX-L operating history	Base EEPROM error Total number*	1988	7C3H	R	* RX-L90 only
RX-L operating history	RS-485 setting error Total number*	1989	7C4H	R	
RX-L operating history	Module EEPROM not initialized Total number*	1990	7C6H	R	-
RX-L operating history	MAC address error Total number*	1991	7C7H	R	-
RX-L operating history	RAM read write error Total number*	1992	7C8H	R	-
RX-L operating history	EEPROM read write error Total number*	1993	7C9H	R	-
RX-L operating history	RAM error (parameter area) Total number*	1994	7CAH	R	-
RX-L operating history	EEPROM error (parameter area) Total number*	1995	7CBH	R	
RX-L operating history	ROM error Total number*	1996	7CCH	R	
Trial operation mode	Status	2200	898H	R	Normal mode=60, trial mode=90
Trial operation mode	Dummy monitor output request	2210	8A2H	R	Dummy output allowed for RX-L only=1075, dummy output allowed for RX-R only=1126, output allowed for both RX-L and RX-R=1177, dummy monitor output not allowed=(any other value)
Trial operation mode	RX-L dummy monitor 1	2211	8A3H	RW	●RX-L dummy monitor output data (page 12-38)
Trial operation mode	RX-L dummy monitor 2	2212	8A4H	RW	
Trial operation mode	RX-R dummy monitor address 1	2213	8A5H	RW	
Trial operation mode	RX-R dummy monitor address 2	2214	8A6H	RW	
Trial operation mode	RX-R dummy monitor address 3	2215	8A7H	RW	
Trial operation mode	RX-R dummy monitor address 4	2216	8A8H	RW	_
Trial operation mode	RX-R dummy monitor address 5	2217	8A9H	RW	
Trial operation mode	RX-R dummy monitor address 6	2218	8AAH	RW	-
Trial operation mode	RX-R dummy monitor address 7	2219	8ABH	RW	-
Trial operation mode	RX-R dummy monitor address 8	2220	8ACH	RW	-
Trial operation mode	RX-R dummy monitor address 9	2221	8ADH	RW	-
Trial operation mode	RX-R dummy monitor address 10	2222	8AEH	RW	-
Trial operation mode	RX-R dummy monitor address 11	2223	8AFH	RW	-
Trial operation mode	RX-R dummy monitor address 12	2224	8B0H	RW	-
Trial operation mode	RX-R dummy monitor address 13	2225	8B1H	RW	-
Trial operation mode	RX-R dummy monitor address 14	2226	8B2H	RW	-
Trial operation mode	RX-R dummy monitor address 15	2227	8B3H	RW	-
Trial operation mode	RX-R dummy monitor address 16	2228	8B4H	RW	-
Trial operation mode	RX-R dummy monitor address 17	2229	8B5H	RW	-
Trial operation mode	RX-R dummy monitor address 18	2230	8B6H	RW	-
Trial operation mode	RX-R dummy monitor address 19	2231	8B7H	RW	-
Trial operation mode	RX-R dummy monitor address 20	2232	8B8H	RW	-
Trial operation mode Trial operation mode	RX-R dummy monitor address 21	2233	8B9H	RW	4
	RX-R dummy monitor address 22	2234	8BAH	RW	4
Trial operation mode Trial operation mode	RX-R dummy monitor address 23 RX-R dummy monitor address 24	2235 2236	8BBH 8BCH	RW RW	1
Trial operation mode	RX-R dummy monitor address 24 RX-R dummy monitor address 25	2236	8BCH 8BDH	RW	4
Trial operation mode	RX-R dummy monitor address 25 RX-R dummy monitor address 26	2237	8BDH 8BEH	RW	4
Trial operation mode	RX-R dummy monitor address 27	2230	8BFH	RW	4
Trial operation mode	RX-R dummy monitor address 27	2239	8C0H	RW	1
Trial operation mode	RX-R dummy monitor address 29	2240	8C1H	RW	4
Trial operation mode	RX-R dummy monitor address 29 RX-R dummy monitor address 30	2241	8C2H	RW	1
Trial operation mode	RX-R dummy monitor address 30	2242	8C3H	RW	1
Trial operation mode	RX-R dummy monitor address 31	2243	8C4H	RW	1
Time setting data	Seconds, minutes	2300	8FCH	RW	Clock settings
Time setting data	Hour, week	2300	8FDH	RW	• Clock (page 12-21)
Time setting data	Day, month	2302	8FEH	RW	
Time setting data	Year	2302	8FFH	RW	
Clock set	Clock set	2303	900H	RW	Clock set=5AH
Time setting	Clock set NG	2329	919H	R	Clock data valid≠5AH,
					Clock data invalid=5AH

Classification	ltere	A	ddress	Host	Data lafarmatian
Classification	Item	Decimal	Hexadecimal	Communi- cation	Data Information
Settings mode	Status	2330	91AH	R	Settings mode=5AH, Not settings mode≠5AH A 5AH occurs when there is a product failure (date and time function) or invalid date and time data is written. If you turn the power off and back on and the date and time function is normal, the error clears.
Internal diagnostics	Inter-module communication 1	2428	97CH	R	 Communication error counter (page 12-39)
Internal diagnostics	Inter-module communication 2	2429	97DH	R	
Internal diagnostics	Inter-module communication 3	2430	97EH	R	-
Internal diagnostics	Inter-module communication 4	2431	97FH	R	
Internal diagnostics	Inter-module communication 5	2432	980H	R	
Internal diagnostics	Inter- RX-L communication 1	2433	981H	R	
Internal diagnostics	Inter- RX-L communication 2	2434	982H	R	
Internal diagnostics	Inter- RX-L communication 3	2435	983H	R	
Internal diagnostics	Inter- RX-L communication 4	2436	984H	R	
Internal diagnostics	Inter- RX-L communication 5	2437	985H	R	
Internal diagnostics	Inter-CPU communication 1	2438	986H	R	
Internal diagnostics	Inter-CPU communication 2	2439	987H	R	
Internal diagnostics	Inter-CPU communication 3	2440	988H	R	
Internal diagnostics	Inter-CPU communication 4	2441	989H	R	
Internal diagnostics	Inter-CPU communication 5	2442	98AH	R	
Internal diagnostics	Host communication 1	2443	98BH	R	
Internal diagnostics	Host communication 2	2444	98CH	R	
Internal diagnostics	Host communication 3	2445	98DH	R	
Internal diagnostics	Host communication 4	2446	98EH	R	
Internal diagnostics	Host communication 5	2447	98FH	R	
Internal diagnostics	Personal computer/loader communication 1	2448	990H	R	
Internal diagnostics	Personal computer/loader communication 2	2449	991H	R	
Internal diagnostics	Personal computer/loader communication 3	2450	992H	R]
Internal diagnostics	Personal computer/loader communication 4	2451	993H	R	
Internal diagnostics	Personal computer/loader communication 5	2452	994H	R	
Operation failure 1	Representative flag	2467	9A3H	R	•Operation failure 1 error information (page 12-39)
Error information	Operation comparison Inconsistent data 1	2468	9A4H	R]
	Operation comparison Inconsistent data 2	2469	9A5H	R	
	Timer comparison Inconsistent data	2470	9A6H	R	
	Status value comparison Inconsistent data 1	2471	9A7H	R	
	Status value comparison Inconsistent data 2	2472	9A8H	R	

	The following comm	unicati	on data l	ist app	blies to the RX-L90.
Classification	ltem	Ac	dress	Host Communi-	Data Information
Classification		Decimal	Hexadecimal	cation	Data mornation
Ethernet communication setting	MAC address 1	800	320H	R	0 to 255 Changes in settings take effect after powering off and back
Ethernet communication setting	MAC address 2	801	321H	R	on.
Ethernet communication setting	MAC address 3	802	322H	R	
Ethernet communication setting	MAC address 4	803	323H	R	
Ethernet communication setting	MAC address 5	804	324H	R	
Ethernet communication setting	MAC address 6	805	325H	R	
Ethernet communication setting	IPv4 address 1	817	331H	RW	
Ethernet communication setting	IPv4 address 2	818	332H	RW	
Ethernet communication setting	IPv4 address 3	819	333H	RW	
Ethernet communication setting	IPv4 address 4	820	334H	RW	
Ethernet communication setting	IPv4 address net mask 1	821	335H	RW	
Ethernet communication setting	IPv4 address net mask 2	822	336H	RW	
Ethernet communication setting	IPv4 address net mask 3	823	337H	RW	
Ethernet communication setting	IPv4 address net mask 4	824	338H	RW	
Ethernet communication setting	IPv4 default gateway 1	825	339H	RW	
Ethernet communication setting	IPv4 default gateway 2	826	33AH	RW	
Ethernet communication setting	IPv4 default gateway 3	827	33BH	RW	
Ethernet communication setting	IPv4 default gateway 4	828	33CH	RW	
Ethernet communication setting	MODBUS/TCP port No.	830	33EH	RW	0 to 65535 Changes in settings take effect after powering off and back on.
Utility	Blink	4912	1330H	RW	0x5A5A (Request blink) Not 0x5A5A (Stop blink)
Diagnosis	Error flag	4914	1332H	RW	Bit 0: Base EEPROM read write error Bit 1: Base EEPROM data error Bit 2: RS485 setting error Bit 3: EEPROM not initialized Bit 4: MAC address error Bit 5: RAM read write error Bit 6: EEPROM read write error Bit 7: RAM checksum error Bit 8: EEPROM checksum error Bit 9: ROM checksum error Bit 9: ROM checksum error Bit 10 to bit 15: Private
RS-485 setting	Communications type	26624	6800H	RW	0: CPL 1: MODBUS/ASCII 2: MODBUS/RTU
RS-485 setting	Station address	26625	6801H	RW	0 to 127
RS-485 setting	Baud rate	26626	6802H	RW	0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4: 57600 bps 5: 115200 bps
RS-485 setting	Data format (data length)	26627	6803H	RW	0: 7 bits 1: 8 bits
RS-485 setting	Data format (parity)	26628	6804H	RW	0: Even parity 1: Odd parity 2: No parity
RS-485 setting	Data format (stop bit)	26629	6805H	RW	0: 1 stop bit 1: 2 stop bits
RS-485 setting	Minimum response time	26630	6806H	RW	1 to 250 (unit: milliseconds)

The following communication data list applies to the RX-L90.

Data information

• Operation number

• Regular RX-L

Process number	Process name
1	Stop process
4	Air switch OFF check process
5	Blower ON wait process
6	Air switch ON check process
8	Prepurge count start wait process
9	Prepurge conditions wait process
10	Prepurge process
12	Prepurge end process
26	Lockout process

• Zone RX-L (single zone RX-L)

Process number	Process name	Process number	Process name
1	Stop process	15	Ignition check process
2	Standby process	16	Pilot ignition process
4	Air switch OFF check process	17	Main ignition process
5	Blower ON wait process	18	Damper modulation process
6	Air switch ON check process	19	Re-ignition conditions process
7	Wait for call for heat process	20	Low fire stop process
8	Prepurge count start wait process	22	Postpurge process
9	Prepurge conditions wait process	23	Lockout postpurge process
10	Prepurge process	24	Ignition retry standby process
13	Ignition conditions wait process	25	RX-R restart time-limited standby process
14	Ignition standby process	26	Lockout process

• Start/reset input

2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

(1):	Reset input	OFF=0, ON=1
(2):	Start input	OFF=0, ON=1
(3) to (16):	Not used	_

• Input (IN1 to IN16)

.	-			-													
2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20		
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)		
(1):	Inp	out (I	N1)		OFF:	=0, O	N=1			(9)):	Inpu	t (IN	9)	O	FF=0,	ON=1
(2):	Inp	out (I	N2)		OFF:	=0, O	N=1			(1	0):	Input	t (IN	10)	O	FF=0,	ON=1
(3):	Inp	out (I	N3)		OFF:	=0, O	N=1			(1	1):	Inpu	t (IN	11)	O	FF=0,	ON=1
(4):	Inp	out (I	N4)		OFF:	=0, O	N=1			(1)	2):	Inpu	t (IN	12)	O	FF=0	, ON=1
(5):	Inp	out (I	N5)		OFF:	=0, O	N=1			(1)	3):	Inpu	t (IN	13)	O	FF=0	, ON=1
(6):	Inp	out (I	N6)		OFF:	=0, O	N=1			(1-	4):	Inpu	t (IN	14)	O	FF=0	, ON=1
(7):	Inp	out (I	N7)		OFF:	=0, O	N=1			(1	5):	Inpu	t (IN	15)	O	FF=0	, ON=1
(8):	Inp	out (I	N8)		OFF	=0, O	N=1			(1	6):	Inpu	t (IN	16)	Ol	FF=0	, ON=1

• RX-R operation, error information

	2 ¹⁴ 2 ¹³	1 1		2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	2 ⁵	-	2 ³	2 ²	2 ¹	2 ⁰		
16)	(15) (14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)		
• Op	eration i	nform	natio	n (1 t	o 7)*											
x0:	Initializ	ation							C)xb:	K2 cl	heck				
)x1:	Stop								C)xc:	Ignit	ion tı	ial s	andby	,	
)x2:	Standby	7							C)xd:	Pilot	trial				
)x3:	Startup	judgr	nent						C)xe:	Post	igniti	on			
)x4:	Lockou	t							C)xf:	Pilot	only				
)x5:	Flame 1	elay							C)x10:	Mair	n trial				
)x6:	Error re	eturn	stand	lby					C)x11:	Stead	ly coi	nbus	tion		
)x7:	False fla	ame st	andt	у					C)x12:	Pilot	ignit	ion s	tandby	Y	
)x8:	Air pre	ssure (OFF (confi	rmat	ion s	tandl	зу	C)x13:	Mair	ı trial	stan	dby		
)x9:	Start ch	leck							C)x14:	760 °	°C en	d sta	ndby		
)xa:	K1 chee	:k							C)x15:	Post	reset	stan	dby		
Whe	n process	ing da	ta, m	ask bi	ts (8)	to (1	6) and	d extr	act l	bits (1) to (7)					
Err	or inforn	natior) (Q tr	ר 14) [.]	×											
• Liii)x0:	No erro		1 () (((די כ				0v	16.	K1 re	alav ar	iswer	bac	c error	1	
)x1:	Checks		ror								•			c error		
)x2:	Data re										•			c error		
)x3:	Irregula			proce	dure						•			k erroi		
)x4:	Alarm										•			ck erro		
)x5:	Reset ir		-	8						Oper	•					
)x6:	Trial op			neou	t					Syste						
)x7:	Data w				-					Oper			re 1			
)x8:	System									Inter						
)x9:	, RX-R c			tion	error								•	l inco	nsistency	r
)xa:	False fl									Syste			0		1	
)xb:	No igni	tion								, Air p			F er	or		
	Flame f									Pilot						
)xc:		ame fa	ailure	;				0x2	25:	Main	UV e	error				
)xc:)xd:	Main fl		nond	ent si	ıperv	visior	1)	0x2	26:	Aları	n rela	y err	or			
	Main fl (during	Indep	pena			ror		0x2	27:	Oper	ation	time	out e	rror		
		-	-	mati	on er					(air p	oressu	re OI	FF co	nfirm	ation ope	<i></i> 、
)xd:	(during	osed c	onfir			rror				_						eration)
)xd:)xe:)xf:	(during Pilot cle	osed c losed c	onfir confi	rmati	ion e			0x2	28:	Syste	m err	or 4			1	eration)
)xd:)xe:)xf:)x11:	(during Pilot clo Main cl	osed c losed c y answ	onfir confi ver ba	rmati ack e	ion e rror 2	2				Syste Oper			re 2		I	eration)
)xd:)xe:)xf:)x11:)x12:	(during Pilot clo Main cl K1 rela	osed c losed c y answ y answ	onfir confir ver ba ver ba	rmati ack e ack e	ion e rror 2 rror 2	2 2		0x2	29:	Oper	ation	failu		manu	-	nput inco
)xd:)xe:)xf:)x11:)x12:)x13:	(during Pilot clo Main cl K1 rela K2 rela	osed c losed c y answ y answ y answ y answ	confir confir ver ba ver ba ver ba	rmati ack e ack e ack e	ion er rror 2 rror 2 rror 2	2 2 2		0x2 0x2	29: 2a:	Oper	ation bustio	failu: on sh	utoff	manu	-	

* When processing data, mask bits (1) to (8) and (15) to (16) and extract bits (9) to (14).

RX-R	R input information															
2 ¹⁵	214	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	2 ⁸	2 ⁷	26	25	24	2 ³	2 ²	2 ¹	20	
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1	
(1):		Sta	art				OFF=0, ON=1									
(2):		Re	eset				OFF=0, ON=1									
(3):		Fla	ame (pilot)		No=(), Yes	=1							
(4):		Fla	ame (mair	1)			No=0, Yes=1								
(5):		IN	[1						OFF:	=0, O	N=1					
(6):		IN	2						OFF=0, ON=1							
(7):		IN	[3						OFF=0, ON=1							
(8):		IN	[4						OFF	=0, O	N=1					
(9):		Sta	art						OFF:	=0, O	N=1					
(10):		Pi	lot st	art				OFF=0, ON=1								
(11):		М	ain st	tart			OFF=0, ON=1									
(12) t	o (16	5): Us	ed in	ı inte	rnal j	5										

• Firmware/version values

2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	2 ⁵	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

• Major version, minor version

(1) to (8):	Major version	0 to 255
(9) to (16):	Minor version	0 to 255

• Sub-version, not used

(1) to (8):	Sub version	0 to 255
(9) to (16):	Not used	_

• Clock

2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

_

• Clock (seconds, minutes)

(9) to (16): Not used

(1) to (8):	Seconds	00 to 59 (BCD format)
(9) to (16):	Minutes	00 to 59 (BCD format)
• Clock (he	our)	
(1) to (8):	Hour	00 to 23 (BCD format)
(9) to (16):	Not used	_
• Clock (da	ay, month)	
• Clock (da (1) to (8):	ay, month) Day	01 to 31 (BCD format)
	Day	01 to 31 (BCD format) 01 to 12 (BCD format)
(1) to (8):	Day	
(1) to (8):	Day Month	

• Operation number code

Interlock	ltem	Operation number code (hexadecimal)	Operation number code (decimal)		
Regular RX-L	Initialization	007FH	0		
	Lockout	017EH	26		
	Waiting for stop	027DH	26		
	Stop operation	037CH	1		
	Start check	047BH	1		
	Start check synchronization	057AH	1		
	Air pressure OFF confirmation operation	0679H	4		
	Blower ON wait operation	0778H	5		
	Air pressure ON confirmation operation	0877H	6		
	Prepurge/count start wait operation	0976H	8		
	Waiting for prepurge condition	0A75H	9		
	Prepurge operation	0B74H	10		
	Prepurge end operation 1	0C73H	12		
	Prepurge end operation 2	0D72H	12		
Zone	Initialization	0E71H	0		
20116	Postpurge confirmation when there is an error	0F70H	0		
	Postpurge when there is an error		23		
		106FH	-		
	Lockout judgment	116EH	26		
	Lockout	126DH	26		
	Waiting for stop	136CH	26		
	Postpurge confirmation	146BH	-		
	Postpurge	156AH	22		
	Postpurge (start OFF)	1669H	22		
	Time-limited standby	1768H	25		
	Stop	1867H	1		
	Retry standby operation	1966H	24		
	Retry standby operation (cancel)	1A65H	24		
	Standby operation	1B64H	2		
	Start check	1C63H	-		
	Start check synchronization	1D62H	_		
	Air pressure OFF confirmation operation	1E61H	4		
	Blower ON wait operation	1F60H	5		
	Air pressure ON confirmation operation	205FH	6		
	Waiting for call for heat	215EH	7		
	Individual retry reset	225DH	7		
	Call for heat wait synchronization	235CH	_		
	Prepurge/count start wait operation	245BH	8		
	Prepurge condition wait operation	255AH	9		
	Prepurge operation	2659H	10		
	Prepurge end branch judgment	2758H	10		
	Ignition condition wait operation	2857H	13		
	Ignition standby period operation	2956H	14		
	Ignition confirmation	2A55H	15		
	Ignition confirmation (when OFF)	2A54H	15		
	Pilot ignition operation	2C53H	16		
	Main ignition operation	2C52H	17		
	Damper modulation	2E51H	18		
	Reignition conditions operation	2F50H	19		
	Stop judgment	304FH	-		
	Stop judgment (start OFF)	314FH	-		
	Low fire stop operation	324DH	20		

Monitor output

2 ¹⁵	214	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	28	27	26	2 ⁵	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

	Мо	onitor output 1	Мо	onitor output 2
	ltem	Value	ltem	Value
1	M-1	Try-ON=1, Try-OFF=1*	M-17	Try-ON=1, Try-OFF=1
2	M-2	Try-ON=1, Try-OFF=1	M-18	Try-ON=1, Try-OFF=1
3	M-3	Try-ON=1, Try-OFF=1	M-19	Try-ON=1, Try-OFF=1
4	M-4	Try-ON=1, Try-OFF=1	M-20	Try-ON=1, Try-OFF=1
5	M-5	Try-ON=1, Try-OFF=1	M-21	Try-ON=1, Try-OFF=1
6	M-6	Try-ON=1, Try-OFF=1	M-22	Try-ON=1, Try-OFF=1
7	M-7	Try-ON=1, Try-OFF=1	Not used	_
8	M-8	Try-ON=1, Try-OFF=1	Not used	_
9	M-9	Try-ON=1, Try-OFF=1	Not used	—
10	M-10	Try-ON=1, Try-OFF=1	Not used	—
11	M-11	Try-ON=1, Try-OFF=1	Not used	_
12	M-12	Try-ON=1, Try-OFF=1	Not used	—
13	M-13	Try-ON=1, Try-OFF=1	Not used	
14	M-14	Try-ON=1, Try-OFF=1	Not used	
15	M-15	Try-ON=1, Try-OFF=1	Not used	
16	M-16	Try-ON=1, Try-OFF=1	Not used	

* Try-ON=output transistor ON, Try-OFF=output transistor OFF

Relay output

2 ¹⁵	214	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	2 ⁰		
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)		
(1):		Re	Relay								OFF=0, ON=1						
(2):		Bl	Blower								OFF=0, ON=1						
(3):		H	igh fi	re po	sitio	n/low	fire	posit	ion	Lo=0, Hi=1							
(4):		D	Damper modulation								OFF=0, ON=1						
(5) to	o (16)	: N	Not used								_						

Internal temperature

The internal temperature is obtained using the following conversion equation: Internal temperature [°C] = {(communication data) – 400} \div 10 The range for communication data is 0 to 1650. Converted to temperature, this is _40.0 °C to \pm 10

The range for communication data is 0 to 1650. Converted to temperature, this is -40.0 °C to +125.0 °C.

Pulse input information

2 ¹⁵	214	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	2 ⁸	27	26	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

(1): DO information from regular RX-L modules

(2): Answer back for DO information for zone RX-L modules

(3): Relay answer back

(4): Relay answer back

- (5) Answer back for DO information 1 for RX-L modules
- (6): Answer back for DO information 2 for RX-L modules

(7) to (16): Not used

No pulse=0, with pulse=1 No pulse=0, with pulse=1 No pulse=0, with pulse=1 No pulse=0, with pulse=1 No pulse=0, with pulse=1 No pulse=0, with pulse=1

• RX-R detailed information

	215	2 ¹⁴	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	2 ⁸	2 ⁷	2 ⁶	25	24	2 ³	2 ²	2 ¹	2 ⁰
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

Input information 1

(1):	Start	OFF=0, ON=1
(2):	Reset	OFF=0, ON=1
(3):	Flame (pilot)	No=0, Yes=1
(4):	Flame (main)	No=0, Yes=1
(5):	IN1	OFF=0, ON=1
(6):	IN2	OFF=0, ON=1
(7):	IN3	OFF=0, ON=1
(8):	IN4	OFF=0, ON=1
(9) to (12):	Start	OFF=1, ON=2
(13) to (16):	Pilot start	OFF=3, ON=4

• Input information 2, flame level

(1) to (4): Main start OFF=9, ON=10

(5) to (8): For internal processing

(9) to (16): Flame level

The flame level is obtained using the following conversion formula: Flame level [V] = (communication data)/10The range of communication data is 0 to 50. If converted into voltage, it is 0.0 to 5.0 V.

• Pilot air control operation number (internal)

ltem	Value (hexadecimal)
Initial status	007FH
Control stop	017EH
Pilot air air pressure OFF confirmation	027DH
Pilot Blower Sync ON confirmation	037CH
Pilot air air pressure ON confirmation	047BH
Pilot air normal	057AH
Control stop*	0679H
Pilot air air pressure OFF confirmation*	0778H
Pilot Blower Sync ON confirmation*	0877H
Pilot air air pressure ON confirmation*	0976H
Pilot air normal*	0A75H
Standby during a stop or lockout*	0B74H

* When Air switch check result clear (A-5) = When blower sync OFF

• Other

Setting Item	Setting Value	Value (hexadecimal)
Input monitor flicker setting (MO-1)	Yes	165AH
Input monitor flicker setting (MO-1)	No	163CH
Monitor output logic (MO-3)	Reverse	173CH
Monitor output logic (MO-3)	Direct	175AH
Error display setting (DSP-2)	Simple (2 chars.)	303CH
Error display setting (DSP-2)	Detailed (4 chars.)	305AH
Baud rate (F-2)	9600	5100H
Baud rate (F-2)	19200	5140H
Baud rate (F-2)	38400	5180H
Data format (F-3)	Even parity stop 1	5200H
Data format (F-3)	Even parity stop 2	5233H
Data format (F-3)	Odd parity stop 1	5266H
Data format (F-3)	Odd parity stop 2	5299H
Station address (F-1)	Minimum	5300H
Station address (F-1)	Maximum	53FFH
Protocol (F-4)	CPL	543CH
Allow RX-R start using host communication (RS-485) (F-5)	No	555AH
Allow RX-R start using host communication (RS-485) (F-5)	Yes	553CH
RX-L type (A-1)	Regular RX-L	0056FF00H
RX-L type (A-1)	Zone RX-L	0056BF40H
RX-L type (A-1)	Single zone RX-L	00567F80H
Prepurge use (B-2)	Disable	0058FF00H
Prepurge use (B-2)	Enable	0058BF40H
Prepurge use (B-2)	Determine by input	00587F80H
Air switch check use (A-2)	Enable	00595A12H
Air switch check use (A-2)	Disable	00593CEFH
Start method (A-3)	Link 1	005AFF00H
Start method (A-3)	Link 2	005ABF40H
Start method (A-3)	Separate	005A7F80H
Prepurge time (D-1)	5 s	005B0032H
Prepurge time (D-1)	10 s	005B0064H
Prepurge time (D-1)	15 s	005B0096H
Prepurge time (D-1)	20 s	005B00C8H
Prepurge time (D-1)	25 s	005B00FAH
Prepurge time (D-1)	30 s	005B012CH
Prepurge time (D-1)	35 s	005B015EH
Prepurge time (D-1)	40 s	005B0190H
Prepurge time (D-1)	45 s	005B01C2H
Prepurge time (D-1)	50 s	005B01F4H
Prepurge time (D-1)	55 s	005B0226H
Prepurge time (D-1)	1 min	005B0258H
Prepurge time (D-1)	2 min	005B04B0H
Prepurge time (D-1)	3 min	005B0708H
Prepurge time (D-1)	4 min	005B0960H
Prepurge time (D-1)	5 min	005B0BB8H
Prepurge time (D-1)	6 min	005B0E10H
Prepurge time (D-1)	7 min	005B1068H
Prepurge time (D-1)	8 min	005B12C0H

Setting Item	Setting Value	Value (hexadecima		
Prepurge time (D-1)	9 min	005B1518H		
Prepurge time (D-1)	10 min	005B1770H		
Prepurge time (D-1)	15 min	005B2328H		
Prepurge time (D-1)	20 min	005B2EE0H		
Prepurge time (D-1)	25 min	005B3A98H		
Prepurge time (D-1)	30 min	005B4650H		
Prepurge time (D-1)	35 min	005B5208H		
Prepurge time (D-1)	40 min	005B5DC0H		
Prepurge time (D-1)	45 min	005B6978H		
Prepurge time (D-1)	50 min	005B7530H		
Prepurge time (D-1)	55 min	005B80E8H		
Prepurge time (D-1)	60 min	005B8CA0H		
Prepurge time (D-1)	0 s	005B0000H		
Ignition wait time (s) (D-2)	Minimum	005E0000H		
Ignition wait time (s) (D-2)	Maximum	005E0BB8H		
Damper modulation control wait time (s) (D-3)	Minimum	005F0000H		
Damper modulation control wait time (s) (D-3)	Maximum	005F0BB8H		
Postpurge time (s) (D-4)	Minimum	00600000H		
Postpurge time (s) (D-4)	Maximum	00604650H		
Number of connected zone RX-Ls (B-14)	1	00610001H		
Number of connected zone RX-Ls (B-14)	2	00610002H		
Number of connected zone RX-Ls (B-14)	3	00610003H		
Number of connected zone RX-Ls (B-14)	4	00610004H		
Number of connected zone RX-Ls (B-14)	5	00610005H		
Number of connected zone RX-Ls (B-14)	6	00610006H		
Number of connected zone RX-Ls (B-14)	7	00610007H		
Number of connected zone RX-Ls (B-14)	8	00610008H		
Number of connected zone RX-Ls (B-14)	9	00610009H		
Number of connected zone RX-Ls (B-14)	10	0061000AH		
Number of connected zone RX-Ls (B-14)	11	0061000BH		
Number of connected zone RX-Ls (B-14)	12	0061000CH		
Number of connected zone RX-Ls (B-14)	13	0061000DH		
Number of connected zone RX-Ls (B-14)	14	0061000EH		
Number of connected zone RX-Ls (B-14)	15	0061000EH		
Number of connected zone RX-Ls (B-14)	16	00610010H		
Number of connected RX-Rs (E-1)	Minimum	00620000H		
Number of connected RX-Rs (E-1)	Maximum	00620020H		
Relay output (B-3)	Enable	00635A12H		
Relay output (B-3)	Disable	00633CEFH		
Blower output (B-4)	Enable	00645A12H		
Blower output (B-4)				
Damper output (B-5)	Disable Enable	00643CEFH		
· · ·		00655A12H		
Damper output (B-5)	Disable Stort quitch input	00653CEFH		
RX-L start method (B-1)	Start switch input	0066FF00H		
RX-L start method (B-1)	Communication	0066CC33H		
RX-L start method (B-1)	Start switch + comm	00669966H		
RX-L start method (B-1)	Start switch or comm	00666699H		
Number of locked out zone RX-Ls (B-8) Number of locked out zone RX-Ls (B-8)	2	00670001H 00670002H		

Setting Item	Setting Value	Value (hexadecimal)
Number of locked out zone RX-Ls (B-8)	3	00670003H
Number of locked out zone RX-Ls (B-8)	4	00670004H
Number of locked out zone RX-Ls (B-8)	5	00670005H
Number of locked out zone RX-Ls (B-8)	6	00670006H
Number of locked out zone RX-Ls (B-8)	7	00670007H
Number of locked out zone RX-Ls (B-8)	8	00670008H
Number of locked out zone RX-Ls (B-8)	9	00670009H
Number of locked out zone RX-Ls (B-8)	10	0067000AH
Number of locked out zone RX-Ls (B-8)	11	0067000BH
Number of locked out zone RX-Ls (B-8)	12	0067000CH
Number of locked out zone RX-Ls (B-8)	13	0067000DH
Number of locked out zone RX-Ls (B-8)	14	0067000EH
Number of locked out zone RX-Ls (B-8)	15	0067000FH
Number of locked out zone RX-Ls (B-8)	16	00670010H
Number of locked out zone RX-Rs (E-2)	0	00680000H
Number of locked out zone RX-Rs (E-2)	1	00680001H
Number of locked out zone RX-Rs (E-2)	2	00680002H
Number of locked out zone RX-Rs (E-2)	3	00680003H
Number of locked out zone RX-Rs (E-2)	4	00680004H
Number of locked out zone RX-Rs (E-2)	5	00680005H
Number of locked out zone RX-Rs (E-2)	6	00680006H
Number of locked out zone RX-Rs (E-2)	7	00680007H
Number of locked out zone RX-Rs (E-2)	8	00680008H
Number of locked out zone RX-Rs (E-2)	9	00680009H
Number of locked out zone RX-Rs (E-2)	10	0068000AH
Number of locked out zone RX-Rs (E-2)	11	0068000BH
Number of locked out zone RX-Rs (E-2)	12	0068000CH
Number of locked out zone RX-Rs (E-2)	13	0068000DH
Number of locked out zone RX-Rs (E-2)	14	0068000EH
Number of locked out zone RX-Rs (E-2)	15	0068000FH
Number of locked out zone RX-Rs (E-2)	16	00680010H
Number of locked out zone RX-Rs (E-2)	17	00680011H
Number of locked out zone RX-Rs (E-2)	18	00680012H
Number of locked out zone RX-Rs (E-2)	19	00680013H
Number of locked out zone RX-Rs (E-2)	20	00680014H
Number of locked out zone RX-Rs (E-2)	21	00680015H
Number of locked out zone RX-Rs (E-2)	22	00680016H
Number of locked out zone RX-Rs (E-2)	23	00680017H
Number of locked out zone RX-Rs (E-2)	24	00680018H
Number of locked out zone RX-Rs (E-2)	25	00680019H
Number of locked out zone RX-Rs (E-2)	26	0068001AH
Number of locked out zone RX-Rs (E-2)	27	0068001BH
Number of locked out zone RX-Rs (E-2)	28	0068001CH
Number of locked out zone RX-Rs (E-2)	29	0068001DH
Number of locked out zone RX-Rs (E-2)	30	0068001EH
Number of locked out zone RX-Rs (E-2)	31	0068001FH
Number of locked out zone RX-Rs (E-2)	32	00680020H
Blower sync signal source (B-6)	Communication	0069FF00H
Blower sync signal source (B-6)	External input	0069BF40H

Setting Item	Setting Value	Value (hexadecima
Blower sync signal source(B-6)	Internal	00697F80H
Purge count start signal source (B-7)	Communication	006AFF00H
Purge count start signal source (B-7)	External input	006ABF40H
Purge count start signal source (B-7)	Internal	006A7F80H
760 °C mode use (A-4)	Disable	006BFF00H
760 °C mode use (A-4)	First	006BCC33H
760 °C mode use (A-4)	Every prepurge	006B9966H
760 °C mode use (A-4)	Normally	006B6699H
Air switch check result clear (A-5)	When RX-L start switch OFF	006C3C3CH
Air switch check result clear (A-5)	When blower Sync OFF	006C5A5AH
Operation timeout error handling (B-11)	Wait	006DFF00H
Operation timeout error handling (B-11)	Alarm (after a specified time)	006DBF40H
Operation timeout error handling (B-11)	Lockout (after a specified time)	006D7F80H
High fire position input (B-9)	Disable	006EFF00H
High fire position input (B-9)	IN1	006EF10EH
High fire position input (B-9)	IN2	006EE31CH
High fire position input (B-9)	IN3	006ED52AH
High fire position input (B-9)	IN4	006EC639H
High fire position input (B-9)	IN5	006EB847H
High fire position input (B-9)	IN6	006EAA55H
High fire position input (B-9)	IN7	006E9C63H
High fire position input (B-9)	IN8	006E8E71H
High fire position input (B-9)	IN9	006E7F80H
High fire position input (B-9)	IN10	006E718EH
High fire position input (B-9)	IN11	006E639CH
High fire position input (B-9)	IN12	006E55AAH
High fire position input (B-9)	IN13	006E47B8H
High fire position input (B-9)	IN14	006E39C6H
High fire position input (B-9)	IN15	006E2BD4H
High fire position input (B-9)	IN16	006E1CE3H
Low fire position input (B-10)	Disable	006FFF00H
Low fire position input (B-10)	IN1	006FF10EH
Low fire position input (B-10)	IN2	006FE31CH
Low fire position input (B-10)	IN3	006FD52AH
Low fire position input (B-10)	IN4	006FC639H
Low fire position input (B-10)	IN5	006FB847H
Low fire position input (B-10)	IN6	
Low fire position input (B-10)		006FAA55H 006F9C63H
· · ·	IN7	
Low fire position input (B-10) Low fire position input (B-10)	IN8	006F8E71H
	IN9	006F7F80H
Low fire position input (B-10)	IN10	006F718EH
Low fire position input (B-10)	IN11	006F639CH
Low fire position input (B-10)	IN12	006F55AAH
Low fire position input (B-10)	IN13	006F47B8H
Low fire position input (B-10)	IN14	006F39C6H
Low fire position input (B-10)	IN15	006F2BD4H
Low fire position input (B-10)	IN16	006F1CE3H
Operation error judgment time (no combustion) (D-6)	Minimum	00700000H

Setting Item	Setting Value	Value (hexadecimal)
Operation error judgment time (combustion) (D-7)	Minimum	00710000H
Operation error judgment time (combustion) (D-7)	Maximum	00714650H
Prepurge condition for RX-R restart (B-12)	Every time	0072FF00H
Prepurge condition for RX-R restart (B-12)	Cancel	0072BF40H
Prepurge condition for RX-R restart (B-12)	Lockout	00727F80H
Reignition standby time (s) (D-8)	Minimum	00730000H
Reignition standby time (s) (D-8)	Maximum	00734650H
Low fire stop (B-13)	Yes	00745A12H
Low fire stop (B-13)	No	00743CEFH
Alarm postpurge time (D-5)	Minimum	00750000H
Alarm postpurge time (D-5)	Maximum	00754650H
Postpurge operation with residual flame (B-15)	Not specified	0076FF00H
Postpurge operation with residual flame (B-15)	Continue purge	0076CC33H
Postpurge operation with residual flame (B-15)	Continue purge (with limits)	00769966H
Postpurge operation with residual flame (B-15)	Lockout	00766699H
RX-R prepurge use (B-16)	Enable	00775A12H
RX-R prepurge use (B-16)	Disable	00773CEFH
RX-L communication error handling (B-18)	Lockout	00A33C3CH
RX-L communication error handling (B-18)	Run	00A35A5AH
RX-L address (B-19)	Minimum	00A40000H
RX-L address (B-19)	Maximum	00A4000FH

• LED setting (DSP-1)

• Data format

Data size: 2 bytes High-order bytes: 🗭 Settings INDEX Low-order bytes: 🗭 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)	Settings INDEX	Value (hexadecimal)		
IN1	19H	IN13	25H		
IN2	1AH	IN14	26H		
IN3	1BH	IN15	27H		
IN4	1CH	IN16	28H		
IN5	IN5 1DH		29H		
IN6	1EH	ST2	2AH		
IN7	IN7 1FH		2BH		
IN8	IN8 20H		2CH		
IN9	IN9 21H		2DH		
IN10	IN10 22H		2EH		
IN11	IN11 23H		2FH		
IN12	24H		_		

• Contents to setup

Contents to setup	Value (hexadecimal)	Contents to setup	Value (hexadecimal)
Input 1	00H	Air pressure switch OFF confirmation	88H
Input 2	08H	Air pressure switch start check complete	90H
Input 3	11H	760 °C mode	99H
Input 4	1AH	Purging	A2H
Input 5	22H	Purge complete	AAH
Input 6	2AH	Allow operation through the previous module	B2H
Input 7	33H	Allow operation of the next module	BBH
Input 8	3CH	Relay output	C4H
Input 9	44H	Blower output	ССН
Input 10	4CH	High fire position/low fire position	D4H
Input 11	55H	Damper modulation	DDH
Input 12	5EH	Postpurging	E6H
Input 13	66H	Not used	EEH
Input 14	6EH		
Input 15	77H		
Input 16	80H		

• Monitor output (MO-2)

• Data format

Data size: 2 bytes High-order bytes: Settings INDEX Low-order bytes: Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)	Settings INDEX	Value (hexadecimal)
Monitor (M-1)	00H	Monitor (M-12)	OBH
Monitor (M-2)	01H	Monitor (M-13)	0CH
Monitor (M-3)	02H	Monitor (M-14)	0DH
Monitor (M-4)	03H	Monitor (M-15)	0EH
Monitor (M-5)	04H	Monitor (M-16)	0FH
Monitor (M-6)	05H	Monitor (M-17)	10H
Monitor (M-7)	06H	Monitor (M-18)	11H
Monitor (M-8)	07H	Monitor (M-19)	12H
Monitor (M-9)	08H	Monitor (M-20)	13H
Monitor (M-10)	09H	Monitor (M-21)	14H
Monitor (M-11)	0AH	Monitor (M-22)	15H

• Contents to setup

Contents to setup	Value (hexadecimal)	Contents to setup	Value (hexadecimal)
First-out monitor (1)	00H	Air pressure switch OFF confirmation	75H
First-out monitor (2)	07H	Air pressure switch start check complete	7CH
First-out monitor (3)	0FH	760 °C mode	83H
First-out monitor (4)	16H	Purging	8AH
First-out monitor (5)	1DH	Purge complete	92H
First-out monitor (6)	24H	Alarm output (positive)	99H
First-out monitor (7)	2CH	Alarm output (negative)	A0H
First-out monitor (8)	33H	Postpurging	A8H
First-out monitor (9)	3AH	Interlock input normal	AFH
First-out monitor (10)	42H	Pilot air air pressure switch OFF confirmation	B6H
First-out monitor (11)	49H	Pilot air air pressure switch start check complete	BDH
First-out monitor (12)	50H	Relay output	C5H
First-out monitor (13)	57H	Blower output	ССН
First-out monitor (14)	5FH	High fire position/low fire position	D3H
First-out monitor (15)	66H	Damper modulation	DBH
First-out monitor (16)	6DH	Furnace temperature 760 °C diagnostics 1	E2H
		Furnace temperature 760 °C diagnostics 2	E9H
		Not used	FOH
Input monitor (1)	01H	Input monitor (OFF delay) (1)	02H
Input monitor (2)	08H	Input monitor (OFF delay) (2)	09H
Input monitor (3)	10H	Input monitor (OFF delay) (3)	11H
Input monitor (4)	17H	Input monitor (OFF delay) (4)	18H
Input monitor (5)	1EH	Input monitor (OFF delay) (5)	1FH
Input monitor (6)	25H	Input monitor (OFF delay) (6)	26H
Input monitor (7)	2DH	Input monitor (OFF delay) (7)	2EH
Input monitor (8)	34H	Input monitor (OFF delay) (8)	35H
Input monitor (9)	3BH	Input monitor (OFF delay) (9)	3CH
Input monitor (10)	43H	Input monitor (OFF delay) (10)	44H
Input monitor (11)	4AH	Input monitor (OFF delay) (11)	4BH
Input monitor (12)	51H	Input monitor (OFF delay) (12)	52H
Input monitor (13)	58H	Input monitor (OFF delay) (13)	59H
Input monitor (14)	60H	Input monitor (OFF delay) (14)	61H
Input monitor (15)	67H	Input monitor (OFF delay) (15)	68H
Input monitor (16)	6EH	Input monitor (OFF delay) (16)	6FH
		Running	F2H

Example: When the monitor is set to first-out monitor (2), the value is 0107H.

• Monitor output logic (MO-3)

• Data format

Data size: 2 bytes High-order bytes: 🖙 Settings INDEX Low-order bytes: 🖙 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)	Settings INDEX	Value (hexadecimal)
Monitor (M-1)	A5H	Monitor (M-12)	BOH
Monitor (M-2)	A6H	Monitor (M-13)	B1H
Monitor (M-3)	A7H	Monitor (M-14)	B2H
Monitor (M-4)	A8H	Monitor (M-15)	B3H
Monitor (M-5)	A9H	Monitor (M-16)	B4H
Monitor (M-6)	AAH	Monitor (M-17)	B5H
Monitor (M-7)	ABH	Monitor (M-18)	B6H
Monitor (M-8)	ACH	Monitor (M-19)	B7H
Monitor (M-9)	ADH	Monitor (M-20)	B8H
Monitor (M-10)	AEH	Monitor (M-21)	B9H
Monitor (M-11)	AFH	Monitor (M-22)	BAH

• Contents to setup

Settings INDEX	Value (hexadecimal)
Direct action	01H
Reverse action	02H

• Compatibility mode information (1)

2 ¹⁵	214	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

	Compatibility mo	de information (1)
		Value
	ltem	value
1	Compatibility mode	0 = Checking
	check status	1 = Check complete
2	Undefined	0
3	Undefined	0
4	Undefined	0
5	Undefined	0
6	Undefined	0
7	Undefined	0
8	Undefined	0
9	Undefined	0
10	Undefined	0
11	Undefined	0
12	Undefined	0
13	Undefined	0
14	Undefined	0
15	Undefined	0
16	Undefined	0

• Input function (C-1)

• Data format

Data size: 4 bytes High-order bytes: 🗭 Settings INDEX Low-order bytes: 🎜 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)	Settings INDEX	Value (hexadecimal)		
Input 1	0079H	Input 9	0081H		
Input 2	007AH	Input 10	0082H		
Input 3	007BH	Input 11	0083H		
Input 4	007CH	Input 12	0084H		
Input 5	007DH	Input 13	0085H		
Input 6	007EH	Input 14	0086H		
Input 7 007FH		Input 15	0087H		
Input 8	0080H	Input 16	0088H		

• Contents to setup

Contents to setup	Value (hexadecimal)	Contents to setup	Value (hexadecimal)
	, , ,		
Air pressure switch	FF00H	Postpurge extension	649BH
	F609H	Condition A	5BA4H
Interlock	ED12H	Condition B	52ADH
Prepurge condition	E41BH	Condition C	49B6H
Interlock and prepurge condition	DB24H	Condition D	40BFH
Blower Sync	C837H	Condition E	37C8H
Purge/count start	BF40H	Synchronizes blower for pilot air	2ED1H
Ignition condition	B649H	Air pressure switch for pilot air	24DBH
Damper modulation	AD52H	Monitor	1BE4H
Group A pilot start	A45BH	Not connected	12EDH
Group A main start	9B64H	Interlock (after prepurge finishes)	D12EH
Group B pilot start	926DH		_
Group B main start	8976H	_	_
760 °C contact 1	7F80H	_	_
760 °C contact 2	7689H	_	_
Zone purge selection	6D92H		_

• OFF delay settings (C-2)

• Data format

Data size: 4 bytes High-order bytes: 🖙 Settings INDEX Low-order bytes: 🖙 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)	Settings INDEX	Value (hexadecimal)
Input 1	0089H	Input 9	0091H
Input 2	008AH	Input 10	0092H
Input 3	008BH	Input 11	0093H
Input 4	008CH	Input 12	0094H
Input 5	008DH	Input 13	0095H
Input 6	008EH	Input 14	0096H
Input 7 008FH		Input 15	0097H
Input 8	0090H	Input 16	0098H

• Contents to setup

ltem	Value (hexadecimal)	ltem	Value (hexadecimal)		
0 s	0000H	6 s	003CH		
1 s	000AH	7 s	0046H		
2 s	0014H	8 s	0050H		
3 s	001EH	9 s	005AH		
4 s	0028H	10 s	0064H		
5 s	0032H		_		

• Conditional interlock condition (C-3)

• Data format

Data size: 4 bytes High-order bytes: 🖙 Settings INDEX Low-order bytes: 🖙 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)
Condition A	0099H
Condition B	009AH
Condition C	009BH
Condition D	009CH
Condition E	009DH

• Contents to setup

Contents to setup	Value (hexadecimal)	Contents to setup	Value (hexadecimal)	
Not specified	FF00H	IN9	7F80H	
IN1	F10EH	IN10	718EH	
IN2	E31CH	IN11	639CH	
IN3	D52AH	IN12	55AAH	
IN4	C639H	IN13	47B8H	
IN5	B847H	IN14	39C6H	
IN6	AA55H	IN15	2BD4H	
IN7	9C63H	IN16	1CE3H	
IN8	8E71H	_	_	

• Conditional interlock standby time (C-4)

Data format

Data size: 4 bytes High-order bytes: 🖙 Settings INDEX Low-order bytes: 🖨 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)
Condition A	009EH
Condition B	009FH
Condition C	00A0H
Condition D	00A1H
Condition E	00A2H

Contents to setup

Contents to setup	Value (hexadecimal)
Minimum time	0000H
Maximum time	012CH

• RX-R_group (E-3)

• Data format

Data size: 2 bytes High-order bytes: 🖙 Settings INDEX Low-order bytes: 🖙 Contents to setup

• Settings INDEX

Settings INDEX	Value (hexadecimal)	Settings INDEX	Value (hexadecimal)
RX-R1	31H	RX-R17	41H
RX-R2	32H	RX-R18	42H
RX-R3	33H	RX-R19	43H
RX-R4	34H	RX-R20	44H
RX-R5	35H	RX-R21	45H
RX-R6	36H	RX-R22	46H
RX-R7	37H	RX-R23	47H
RX-R8	38H	RX-R24	48H
RX-R9	39H	RX-R25	49H
RX-R10	3AH	RX-R26	4AH
RX-R11	3BH	RX-R27	4BH
RX-R12	3CH	RX-R28	4CH
RX-R13	3DH	RX-R29	4DH
RX-R14	3EH	RX-R30	4EH
RX-R15	3FH	RX-R31	4FH
RX-R16	40H	RX-R32	50H

• Contents to setup

Contents to setup	Value (hexadecimal)
Group A	3CH
Group B	5AH

• RX-L dummy monitor output data

2 ¹⁵	214	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

	R	K-L dummy monitor 1	R	X-L dummy monitor 2
	ltem	Value	ltem	Value
1	M-1	Try-ON=1, Try-OFF=1*	M-17	Try-ON=1, Try-OFF=1
2	M-2	Try-ON=1, Try-OFF=1	M-18	Try-ON=1, Try-OFF=1
3	M-3	Try-ON=1, Try-OFF=1	M-19	Try-ON=1, Try-OFF=1
4	M-4	Try-ON=1, Try-OFF=1	M-20	Try-ON=1, Try-OFF=1
5	M-5	Try-ON=1, Try-OFF=1	M-21	Try-ON=1, Try-OFF=1
6	M-6	Try-ON=1, Try-OFF=1	M-22	Try-ON=1, Try-OFF=1
7	M-7	Try-ON=1, Try-OFF=1	Not used	_
8	M-8	Try-ON=1, Try-OFF=1	Not used	_
9	M-9	Try-ON=1, Try-OFF=1	Not used	
10	M-10	Try-ON=1, Try-OFF=1	Not used	_
11	M-11	Try-ON=1, Try-OFF=1	Not used	_
12	M-12	Try-ON=1, Try-OFF=1	Not used	_
13	M-13	Try-ON=1, Try-OFF=1	Not used	_
14	M-14	Try-ON=1, Try-OFF=1	Not used	_
15	M-15	Try-ON=1, Try-OFF=1	Not used	_
16	M-16	Try-ON=1, Try-OFF=1	Not used	_

*Try-ON=output transistor ON, Try-OFF=output transistor OFF

• RX-R dummy monitor output data

2 ¹⁵	214	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	2 ⁰
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

	RX-F	R dummy monitor 1
	ltem	Value
1	M-1	Try-ON=1, Try-OFF=1*
2	M-2	Try-ON=1, Try-OFF=1
3	M-3	Try-ON=1, Try-OFF=1
4	M-4	Try-ON=1, Try-OFF=1
5	M-5	Try-ON=1, Try-OFF=1
6	M-6	Try-ON=1, Try-OFF=1
7	M-7	Try-ON=1, Try-OFF=1
8	M-8	Try-ON=1, Try-OFF=1
9	M-9	Try-ON=1, Try-OFF=1
10	M-10	Try-ON=1, Try-OFF=1
11	M-11	Try-ON=1, Try-OFF=1
12	Not used	—
13	Not used	_
14	Not used	—
15	Not used	_
16	Not used	—

* Try-ON=output transistor ON, Try-OFF=output transistor OFF

• Communication error counter

2 ¹⁵	2 ¹⁴	2 ¹³	212	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	1
● In	ter-m	nodu	le co	mmu	nicat	tion 1	l								
(1) to	(8):	U	ndefi	ned					_	-					
(9) to	(16)	: N	umbe	er of S	ST er	rors			0	to 25	5 (U	nit: ti	mes)		
• In	ter-m	nodu	le coi	mmu	nicat	tion 2	2								
(1) to	(8):	N	umbe	er of c	comn	nand	erroi	s	0	to 25	5 (U	nit: ti	mes)		
(9) to	(16)	: N	umbe	er of c	lata l	ength	n erro	ors	0	to 25	5 (U	nit: ti	mes)		
						-									
● In	ter-m	nodu	le co	mmu	nicat	tion 3	3								
(1) to	(8):	N	umbe	er of (CRC	error	s		0	to 25	5 (U	nit: ti	mes)		
(9) to	(16)	: N	umbe	er of c	lelim	iter e	rrors	;	0	to 25	55 (U	nit: ti	mes)		
• In	ter-m	nodu	le coi	mmu	nicat	tion 4	1								
(1) to	(8):	N	umbe	er of s	erial	error	ſS		0	to 25	5 (U	nit: ti	mes)		
(9) to	(16)	: N	umbe	er of l	ouffe	r ovei	flow	error	rs 0	to 25	5 (U	nit: ti	mes)		
● In	ter-m	nodu	le co	mmu	nicat	tion 5	5								
(1) to	(8):	N	umbe	er of t	imec	outs			0	to 25	55 (U	nit: ti	mes)		
(9) to	(16)	: N	umbe	er of f	orma	at erre	ors		0	to 25	5 (U	nit: ti	mes)		

📖 Note

• The data structure for communication between RX-L modules, communication between CPUs, host communication, and PC loader communication is the same as above.

• Operation failure 1 error information

• Representative flag

2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	26	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

(1): Settings comparison status

(2): Status value comparison status(3): Timer comparison status

- (4): Operations comparison status
- (5) to (16): Not used

No errors=0, with errors=1 No errors=0, with errors=1 No errors=0, with errors=1 No errors=0, with errors=1

• Operation comparison inconsistent data 1, 2

Operation information when the operation comparison has inconsistencies

Operation comparison inconsistent data 1, operation information on this CPU

C Operation number code (page 12-22)

Operation comparison inconsistent data 2, operation information on another CPU

C Operation number code (page 12-22)

● Ti	mer o	comp	arisc	on inc	onsi	stent	data	I							
2 ¹⁵	214	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
(1):		Pr	epur	ge tin	ner				N	lo err	ors=0	0, wit	h err	ors=	1
(2):		G	enera	l ope	ratio	n tim	er		Ν	o err	ors=0), wit	h err	ors=	1
(3):		Pr	epur	ge cai	ncel j	udgn	nent	timer	N	lo err	ors=0	0, wit	h err	ors=	1
(4) to	o (16)	: N	ot use	ed					_	-					

• Status value comparison inconsistent data 1

2 ¹⁵	214	2 ¹³	2 ¹²	214	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	20
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)

(1):	Operation startup flag slave byte	Consi
(2):	Operation startup flag host byte	Consi
(3):	Number of retries slave byte	Consi
(4):	Number of retries host byte	Consi
(5):	First prepurge flag slave byte	Consi
(6):	First prepurge flag host byte	Consi
(7):	Air pressure switch OFF confirmation complete flag slave byte	Consi
(8):	Air pressure switch OFF confirmation complete flag host byte	Consi
(9):	760 °C mode first byte	Consi
(10):	760 °C mode second byte	Consi
(11):	760 °C mode third byte	Consi
(12):	760 °C mode fourth byte	Consi
(13):	Test mode first byte	Consi
(14):	Test mode second byte	Consi
(15):	Test mode third byte	Consi
(16):	Test mode fourth byte	Consi

sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1 sistent=0, inconsistent=1

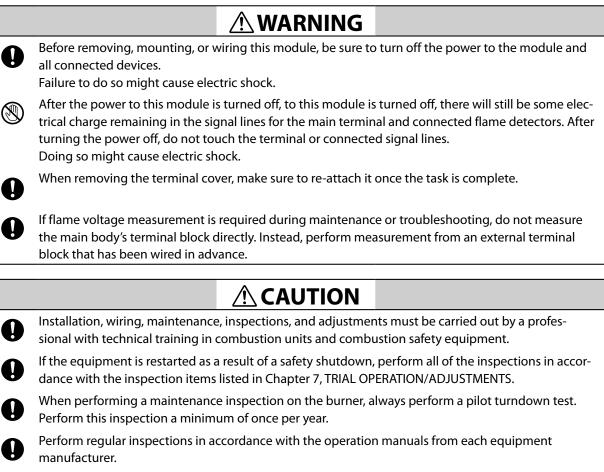
• Status value comparison inconsistent data 2

2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	2 ¹⁴	2 ¹⁰	2 ⁹	2 ⁸	27	2 ⁶	25	24	2 ³	2 ²	2 ¹	2 ⁰
(16)	(15)	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
(1):		Tr	rial op	perati	on m	node	first l	oyte	C	Consis	stent=	=0, in	consi	istent	=1
(2):		Tr	ial op	perati	on m	node	secor	nd by	te C	consis	stent=	=0, in	consi	istent	=1
(3):		Tr	ial op	perati	on m	node	third	byte	C	consis	stent=	=0, in	consi	istent	=1
(4):		Tr	ial op	perati	on m	ode	fourt	h byt	e C	Consis	stent=	=0, in	consi	istent	=1
(5):		Se	tting	s mo	de fir	st by	te		C	Consis	stent=	=0, in	consi	istent	=1
(6):		Se	tting	s mo	de se	cond	byte		C	onsis	stent=	=0, in	consi	istent	=1
(7):		Se	tting	s mo	de th	ird by	yte		C	onsis	stent=	=0, in	consi	istent	=1
(8):		Se	tting	s mo	de fo	urth l	byte		C	consis	stent=	=0, in	consi	istent	=1
(9) to	o (16)	: N	ot use	ed			-		_	_					

Chapter 13. MAINTENANCE/INSPECTION AND DISPOSAL

13-1

Maintenance and Inspection



When cleaning the burner, also clean the flame detector.

Maintenance inspection cycle

Plan the maintenance inspection cycle based on:

- Equipment type
- Conditions at the installation location (such as dust, ambient temperature, and so on)
- Damage and impact when the equipment stops

Inspection Details	Inspection Cycle
Safety shutdown test (Chapter 7, TRIAL OPERATION/ADJUSTMENTS)	1 time/month minimum
Cleaning of the AUD300/500 monitoring window and monitoring pipe	1 time/month minimum
Flame voltage measurement	1 time/month minimum
Pilot turndown test	1 time/year minimum

! Handling precautions

- If a burner shutdown operation results in critical damage to equipment, increase the number of inspections.
- If the equipment manufacturer provided specific maintenance and inspection instructions, follow those instructions.
- For the flame voltage output, use a minimum of 0.75 mm² wire with indoor PVC insulation (IV wire, JIS C3307) with a maximum length of 10 m. In addition, make sure that the input impedance for measurement equipment is 100 k Ω or more.

For use when checking site conditions and usage conditions in the event that there is a problem, or when performing equipment inspection checks.

×.

			Date: YYYY/MM/DD			
* Fill in the ap	propriate boxes w	ith a check mark.	Person in charge:			
End user / device manufacturer		Device name / li	ne name and number	e and number		
Product model number	Date code / dat (YYYY/MM/DD)	e of manufacture	Date of delivery (YYYY/M	M)		
 Wiring / attachment 1. Current / instruments / power rise and fall pressure (1) – (2) V Power failure, partial power faidrop, surge YES NO 2. Wiring material, radius, distance Electrical current wires Signal wires Grounding wires 3. Installation Indoors Instrument Outdoors Under a roof? YES NO 4. Dirt on UV light-receiving content of the second sec	ilure, voltage e, manufacturer t panel room	During igniti During igniti 2. Main combu Main ignition Minimum Maximum Steady	voltage stion in progress ion transformer operation ion transformer stop istion in progress n in progress ed / frequency of operation	μΑ/V μΑ/V μΑ/V μΑ/V		
Environment 1. Ambient temperature 2. Ambient humidity 3. Condensation 4. Corrosive atmosphere 5. Other		 Pilot burner Type Manufacture Burning cap Fuel type / cap Pilot burner Main burner 	er acity kW (kcal/h) er acity kW (kcal/h) omposition			

13-2 Disposal

When disposing of this unit, dispose of it appropriately as industrial waste in accordance with local laws and regulations.

Chapter 14. TROUBLESHOOTING

Make sure to disconnect the main power supply when performing a repair task.



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If flame voltage measurement is required during maintenance or troubleshooting, do not measure the main body's terminal block directly. Instead, perform measurement from an external terminal block that has been wired in advance.

This task should be performed by a specialist/licensed technician.

14-1 RX-L Troubleshooting

Error code	pages
E003	
E004	
E011	14-6
E101	14-5
E102	14-6
E103	14-7
E104	14-7
E105	14-7
E106	14-7
E107	14-7
E108	14-6
E111	14-6
E112	14-7
E113	14-7
E202	
E801 1	
E812 1	
E813	
E814	
E815	
E901	
E902	
E903	
E904	
E905	
E906	
E907	
E908	
E909	
E910	
E911	
E914	
E915	
E917	
E917	
E921	
EA01	
EA02	
EA03	
EA04	14-8
EA061	4-11
EA071	4-12
EA101	4-12
Eb33 1	4-15
Eb83 1	4-13
Eb84 1	4-14
Eb85 1	4-14
Eb86 1	4-14
Eb87 1	4-13
Eb88 1	
Eb94 1	
Eb97 1	
Eb99 1	4-15

The RX-L diagnoses errors resulting from external causes such as interlock operation, as well as errors resulting from internal causes such as product circuit failures and communication errors.

If it determines that an error has occurred, it activates a lockout.

The lockout state is maintained until the error conditions are removed and a reset operation is performed.

The definition of a lockout is explained below for each RX-L type.

- Regular RX-L: All zone RX-Ls are notified of the lockout. The RX-Ls that receive this notification then stop all connected RX-Rs.
- Zone RX-L: Stop all connected RX-Rs

Error details

• Explanation of items in the tables		
Error code (display):	This is the error code that is displayed in the 7-segment LED display on the front of the unit.	
Error code (communication):	Indicates the error codes and sub codes in the communication data in host communication (in decimal notation).	
Monitoring conditions:	Stipulates the conditions for performing an error judgment.	
Target model:	Shows the devices for which the error judgment is being performed.	
Corrective action:	Shows the status of the device after the error has been determined.	
Cancellation procedure:	This section shows the procedure for canceling errors.	

• RX-R communication error (E914)

ltem	Details
Error code	E914 (display)
Judgment details	A communication error occurs in an RX-R with which a connection has already been established.
Monitoring conditions	After a connection has been established
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Communication error between RX-Ls (E915)

ltem	Details
Error code	E915 (display)
Warning code	EA09 (display), 9 (communication data)
Judgment details	A communication error occurs in an RX-L with which communication has already been established
Monitoring conditions	After a connection has been established
Target model	Regular RX-L, zone RX-L
Corrective action	(Regular RX-L) A lockout is implemented or an error is displayed and operations continue (select in the settings) (Zone RX-L) Lockout
Cancellation procedure	(Regular RX-L) Reset input operation (Zone RX-L) Automatic recovery when communication returns to normal

• Regular RX-L alarm (E813)

ltem	Details
Error code	E813 (display)
Judgment details	An error is detected in a regular RX-L and a lockout is implemented
Monitoring conditions	Always
Target model	Zone RX-L
Corrective action	Stop (AL display turns off, monitor alarm output turns OFF)
Cancellation procedure	Automatic recovery when the regular RX-L error is canceled

• Zone alarm (E814)

ltem	Details
Error code	E814 (display)
Judgment details	The number of locked out zone RX-Ls exceeds the number set in Number of failed RX-Ls for system stop (B-8)
Monitoring conditions	When startup is on
Target model	Regular RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Zone stop caused by RX-R error (E815)

ltem	Details
Error code	E815 (display)
Judgment details	The number of RX-Rs locked out as a result of an error exceeds the number set in Number of failed RX-Rs for zone/lockout (E-1)
Monitoring conditions	When startup is on
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Error in number of connected RX-Rs (E003)

ltem	Details
Error code	E003 (display)
Judgment details	The number of RX-R units returning a normal communication response and the number of units set in Number of connected RX-Rs (E-1) do not match
Monitoring conditions	When the power is turned on
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

ltem	Details
Error code	E004 (display)
Judgment details	The number of zone RX-L units returning a normal communication response and the number of units set in RX-L connectable units (B-14) do not match
Monitoring conditions	When the power is turned on
Target model	Regular RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Error in number of connected RX-Ls (E004)

• Interlock input open (E101)

ltem	Details
Error code	E101 (display), iL01 to iL16 (the numerical value is the Interlock input number)
Judgment details	The interlock runs (is open) for longer than the OFF delay time
Monitoring conditions*	See below
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

*Monitoring conditions

Input Function (C-1)	Model	Monitoring conditions
Interlock, conditional interlock A to E ^{*1}	All models	When startup is on
Air pressure switch	Regular RX-L	Prepurge end process
	Zone RX-L, single zone RX-L	Ignition condition wait operation, ignition standby operation, ignition confirmation operation, pilot ignition operation, main ignition operation, damper modulation operation, reignition conditions operation, low fire stop operation
Interlock and prepurge condition	Regular RX-L	Prepurge end process
	Zone RX-L, single zone RX-L	Ignition condition wait operation, ignition standby operation, ignition confirmation operation, pilot ignition operation, main ignition operation, damper modulation operation, reignition conditions operation, low fire stop operation, reboot standby operation, retry standby operation, ^{*3} postpurge operation ^{*3}
Air pressure switch for pilot air	Regular RX-L	When the air control operation for the pilot is pilot air normal
Interlock	Regular RX-L	Prepurge end process
(after prepurge finishes)*2	Zone RX-L, single zone RX-L	Pilot ignition operation, main ignition operation, damper modulation operation, reignition conditions operation, low fire stop operation

*1 Monitor after the Conditional interlock condition standby time (C-4) has passed

*2 (Regular RX-L) Monitor after the process error judgment time (during combustion) (s) (D-7) has passed (Zone RX-L and single zone RX-L) Start monitoring 60 seconds after the transition to the ignition confirmation operation

*3 Monitor only when startup is on

ltem	Details
Error code	E011 (display)
Judgment details	The inputs set in High fire position input (B-9) and Low fire position input (B-10) are both on, but the time set in Operation error judgment time (no combustion) (D-6) has passed
Monitoring conditions	When startup is on
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Damper high/low limit inconsistency (E011)

• Reset input error (E108)

ltem	Details
Error code	E108 (display)
Judgment details	 When 10 minutes pass under either of the following conditions 1. The input values assigned to 760 °C (1) and 760 °C (2) input 2 in Input function (C-1) do not match 2. There are input values assigned to 760 °C (1) and 760 °C (2) in Input function (C-1), even though 760 °C mode use (A-4) = Disable
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• 760 °C input error (E111)

ltem	Details
Error code	E111 (display)
Judgment details	 When 10 minutes pass under either of the following conditions 1. The input values assigned to 760 °C (1) and 760 °C (2) in Input function (C-1) do not match 2. There are input values assigned to 760 °C (1) and 760 °C (2) in Input function (C-1), even though 760 °C mode use (A-4) = Disable
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Trial operation timeout (E102)

ltem	Details
Error code	E102 (display)
Judgment details	The set trial operation mode continuation time has been exceeded but the trial opera- tion mode does not end
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

Item	Details	
Error code	Air switch OFF check timeout	E103 (display)
	Air switch ON check timeout	E104 (display)
	Prepurge conditions wait timeout error	E105 (display)
	Ignition conditions wait timeout error	E106 (display) (excluding Regular RX-L)
Warning code	Air switch OFF check timeout	EA01 (display)
	Air switch ON check timeout	EA02 (display)
	Prepurge conditions wait timeout alarm	EA03 (display)
Judgment details	Process error judgment time (no combustion) (s) (D-6) has passed but the system does not move to the next operation.	
	This applies to the following processes:	
	Air switch OFF check timeout, air switch ON timeout error, ignition conditions wait time	
Monitoring conditions	Each operation	
Target model	All models	
Corrective action	Lockout (when Process timeout handling (B-11) = lockout (after a specified time)) Only display alarm (when Process timeout handling (B-11) = alarm after a specified time)) However, the Ignition condition wait operation switches to a lockout when there are no conditions	
Cancellation procedure	Reset input operation	

• Operation timeout error (E103, E104, E105, E106, EA01, EA02, EA03)

• Low fire stop error (E107)

ltem	Details
Error code	E107 (display)
Judgment details	The time since the combustion request was turned off has exceeded the Operation error judgment time (combustion) (D-7), but the input set in Low fire position input (B-10) does not turn on
Monitoring conditions	Low fire stop
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• RX-R restart timeout error (E113)

ltem	Details
Error code	E113 (display)
Judgment details	Combustion is turned off for all RX-Rs and a combustion request is not received within the specified time
Monitoring conditions	Reboot standby operation, postpurge operation
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• 760 °C device error (E112)

ltem	Details
Error code	E112 (display)
Judgment details	760 °C unit diagnostics error
Monitoring conditions	During 760 °C mode
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

Residual flame error (E202)	
ltem	Details
Error code	E202 (display)
Judgment details	Residual flame is detected after combustion has stopped
Monitoring conditions	Postpurge process
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Settings error (E921)

ltem	Details
Error code	E921 (display)
Judgment details	There are inconsistencies in the Prepurge time (D-1) and the prepurge use (B-2) settings, as shown below: Prepurge time (D-1) = 0 seconds and prepurge use (B-2) = always perform a prepurge, with postpurge OR Prepurge time (D-1) = 0 seconds and prepurge use (B-2) = decide based on input
Monitoring conditions	When not in the settings mode
Target model	Zone RX-L, single zone RX-L
Corrective action	Lockout
Cancellation procedure	Correct the settings and run the reset input

• Host communication timeout (EA04)

ltem	Details
Error code	EA04 (display)
Judgment details	There is no communication access via host communication (or loader communication) for more than 30 minutes while the RX-R is running.
Monitoring conditions	Always
Target model	Zone RX-L, single zone RX-L
Corrective action	An error is displayed and operations continue Stop the RX-R that is being operated through host communication (or loader communication)
Cancellation procedure	Normal communication access cannot be performed using host communication (or loader communication)

For information on RX-L90 errors, Chapter 11. RECEPTION MONITORING.

• ROM checksum error (E901)

ltem	Details
Error code	E901 (display)
Judgment details	The program ROM checksums do not match
Monitoring conditions	Regular
Target model	All models
Corrective action	Lockout
Cancellation procedure	A special reset through the SLP-RX

• EEPROM read error (E902)

ltem	Details
Error code	E902 (display)
Judgment details	A data error is detected during an EEPROM data read
Monitoring conditions	Always (when reading data from EEPROM)
Target model	All models
Corrective action	Lockout
Cancellation procedure	1. Reset all of the settings in the SLP-RX. 2. Perform a special reset through the SLP-RX.

• Data write error (E903)

ltem	Details
Error code	E903 (display)
Judgment details	EEPROM data is not being written correctly
Monitoring conditions	Always (when writing data from EEPROM)
Target model	All models
Corrective action	Lockout
Cancellation procedure	1. Reset all of the settings in the SLP-RX. 2. Run the reset input

• Process operation error (3) (E904)

ltem	Details
Error code	E904 (display)
Judgment details	An error is detected in the internal data that is required to execute an operation
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (1) (E905)

ltem	Details
Error code	E905 (display)
Judgment details	An error is detected in internal processing
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Regular RX-L signal inconsistency (E906)

ltem	Details
Error code	E906 (display)
Judgment details	There is an error in data from a regular RX-L in the RX-L control signal and it continues for 60 consecutive seconds
Monitoring conditions	Always
Target model	Zone RX-L
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (2) (E907)

•	
Item	Details
Error code	E907 (display)
Judgment details	RX-L control signal and RX-R control signal output has resulted in an error
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (3) (E908)

ltem	Details
Error code	E908 (display)
Judgment details	Continues for at least five seconds in self diagnosis of the input circuit and an error is detected
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (4) (E909)

ltem	Details
Error code	E909 (display)
Judgment details	An error is detected in the internal clock information
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (5) (E910)

ltem	Details
Error code	E910 (display)
Judgment details	An error is detected in the internal clock information
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Process operation error (1) (E911)

ltem	Details
Error code	E911 (display)
Judgment details	 An error is detected in internal data During settings mode, the following errors occur and the settings are not written correctly Power is switched off The SLP-RX cable is removed, etc.
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation However, if an error occurs as a result of an error during settings mode, use the following procedure to cancel the error: 1. Reset all of the settings in the SLP-RX. 2. Run the reset input

• Relay answerback error (2) (E812)

ltem	Details
Error code	E812 (display)
Judgment details	An error is detected in the relay answer back signal
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Relay answerback error (1) (E801)

ltem	Details
Error code	E801 (display)
Judgment details	An error is detected in the relay answer back signal
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Relay life alarm (EA06)

ltem	Details
Warning code	EA06 (display)
Judgment details	The relay has been turned on more than 100,000 times
Monitoring conditions	Always
Target model	All models
Corrective action	Continue operation with the error display only
Cancellation procedure	—

• RX internal temperature alarm (EA07)

ltem	Details
Warning code	EA07 (display)
Judgment details	The internal temperature has been over 80 °C for more than 60 consecutive seconds
Monitoring conditions	Always
Target model	All models
Corrective action	Continue operation with the error display only
Cancellation procedure	When the internal temperature is lower than 73 °C for more than 60 consecutive seconds

• Configuration error (E917)

ltem	Details
Error code	E917 (display)
Judgment details	The power is turned off while in settings mode and settings mode is not completed properly
Monitoring conditions	When not in the settings mode
Target model	All models
Corrective action	Lockout
Cancellation procedure	1. Reset all of the settings in the SLP-RX. 2. Perform a special reset through the SLP-RX.

• System error (6) (E916)

ltem	Details
Error code	E916 (display)
Judgment details	An error is detected in the internal clock device
Monitoring conditions	When the power is turned on and when setting the clock
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Process operation error (2) (E920)

ltem	Details
Error code	E920 (display)
Judgment details	An error is detected in internal data
Monitoring conditions	Always
Target model	All models
Corrective action	Lockout
Cancellation procedure	Reset input operation

• 760 °C device connection problem (EA10)

ltem	Details
Warning code	EA10 (display)
Judgment details	There is a problem with the connection to the temperature detector
Monitoring conditions	When starting 760 °C mode
Target model	Zone RX-L, single zone RX-L
Corrective action	Continue operation with the error display only However, do not enter 760 °C mode
Cancellation procedure	Startup OFF

The following warnings apply to the RX-L90.

ltem	Details
Error code	Eb87 (displayed)
Judgment details	Base EEPROM read write error
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, replace it.
Cancellation procedure	Power reset

• (Communication CPU) Data read write error (1) (Eb87)

• (Communication CPU) data error (Eb88)

ltem	Details
Error code	Eb88 (displayed)
Judgment details	Base EEPROM data invalid
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, re- place it.
Cancellation procedure	Power reset

! Handling precautions

• The included base and body must be used as a pair. If you combine the wrong body and base, the IP address/MAC address for a different module is stored in the base and an Eb88 occurs.

If this happens, you can clear the warning by performing a special reset. When you return to the correct base, an Eb88 occurs again and you can clear it with a special reset. However, when you perform the special reset, the IP address for the body is rewritten. Therefore, read the setting again and check/reset the IP address.

• (Communication CPU) Configuration error (Eb83)

ltem	Details
Error code	Eb83 (displayed)
Judgment details	EEPROM read error
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, re- place it.
Cancellation procedure	Power reset

• (Communication CPU) MAC address error (Eb84)

ltem	Details
Error code	Eb84 (displayed)
Judgment details	MAC address error
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, re- place it.
Cancellation procedure	Power reset

• (Communication CPU) Data read write error (2) (Eb85)

ltem	Details
Error code	Eb85 (displayed)
Judgment details	RAM read write error
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, replace it.
Cancellation procedure	Power reset

• (Communication CPU) Data read write error (3) (Eb86)

ltem	Details
Error code	Eb86 (displayed)
Judgment details	EEPROM read write error
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, replace it.
Cancellation procedure	Power reset

• (Communication CPU) Data error (2) (Eb94)

ltem	Details
Error code	Eb94 (displayed)
Judgment details	RAM checksum error
Monitoring conditions	Always
Target model	All models
Corrective action	If the module does not return to normal after the power is turned off and back on, re- place it.
Cancellation procedure	Power reset

• (Communication CPU) Data error (3) (Eb97)

ltem	Details	
Error code	Eb97 (displayed)	
Judgment details	EEPROM checksum error	
Monitoring conditions	Always	
Target model	All models	
Corrective action	If the module does not return to normal after the power is turned off and back on, re- place it.	
Cancellation procedure	Power reset	

• (Communication CPU) Checksum error (Eb99)

ltem	Details	
Error code	Eb99 (displayed)	
Judgment details	ROM fault	
Monitoring conditions	Always	
Target model	All models	
Corrective action	If the module does not return to normal after the power is turned off and back on, replace it.	
Cancellation procedure	Power reset	

• (Communication CPU) RS-485 setting error (Eb33)

ltem	Details	
Error code	Eb33 (displayed)	
Judgment details	RS-485 setting error	
Monitoring conditions	Always	
Target model	All models	
Corrective action	Reconfigure the RS-485 settings and turn the power off and back on.	
Cancellation procedure	Power reset	

Error cancellation procedure

This section gives the procedure for canceling errors. Check whether the cause of the error has been removed.

Turn the reset input ↔ COM5 on and then off. Turn it on for at least three seconds. This cancels the error. The 7 segment LED display returns from the error code display to the normal display.

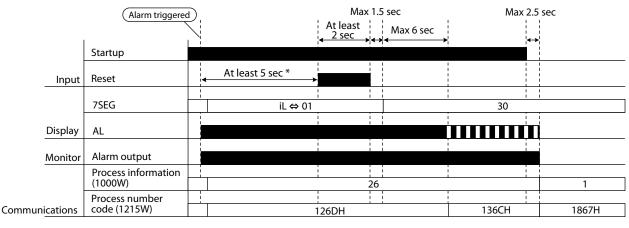
However, to reboot you need to follow the procedure below.

Note: If the reset input ↔ COM5 was already on when the error occurred, the reset input will not be recognized.

Reset operation timing chart



Indicates ON



Legend

Indicates blinking

* If abnormal postpurge time (D-5) is 0 sec

Abnormal postpurge time (s) (D-5) is something other than 0 sec under the following conditions. At least 5 seconds have passed since the alarm output (monitor) turned ON. Also, at least 1 second has passed since abnormal postpurge was completed (blower output is OFF).

- Reset operation steps
 - (1) Short circuit reset input, then open once 2 or more seconds have passed
 - (2) When opening startup input, and monitor output's "alarm output" is turned OFF, startup input can be received (short circuited)

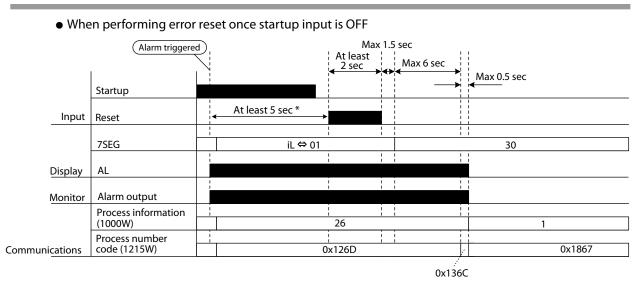
Communication data details

Process information (1000W)

Process number	Process name
1	Stop process
26	Lockout process

Process number code (1215W)

Zone RX-L process number code (hexadecime	al) Name
126DH	Lockout
136CH	Stop wait
1867H	Stop



* If abnormal postpurge time (s) (D-5) is 0 sec

Abnormal postpurge time (s) (D-5) is something other than 0 sec under the following conditions. At least 5 seconds have passed since the alarm output (monitor) turned ON. Also, at least 1 second has passed since abnormal postpurge was completed (blower output is OFF).

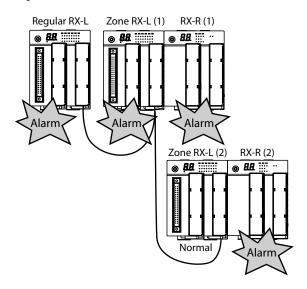
Canceling errors in particular modules

The figures below show the procedure for canceling errors between modules.

A reset operation performed for a regular RX-L is only effective for regular RX-Ls. Zone RX-Ls will not be reset.

A reset operation performed for zone RX-L (1) will be effective for zone RX-L (1) and RX-R (1). (A zone RX-L reset operation is effective for the zone RX-L and connected RX-Rs.)

A reset operation performed for zone RX-L (2) will be effective for RX-R (2).



! Handling precautions

- To reset an RX-R when you perform a zone RX-L reset, set the RX-R reset condition to Linked RX-L.
- To cancel zone RX-R errors through a zone RX-L reset operation, turn on reset input ↔ COM5 for at least six seconds. (This is the time that is required to cancel errors in a maximum of 32 zone RX-R units)
- If you try to cancel an RX-R error using the RX-L reset operation when there is an RX-R communication error (E914) in the zone RX-L or zone RX-R, the error might not be canceled in a single reset operation. In this case, perform multiple reset operations.

The input number display for the activated interlock is different (both RX-L and RX-R)

This module has three ways to display the input number for the activated (open) interlock (RX-L is IN1 to IN16, RX-R is IN1to IN4).

- 7-segment display
- Monitor output (first-out monitors)
- Communication data (RS-485 and loader) RX-L only

If multiple interlocks are activated (open) at approximately the same time*, the interlock input number displayed in the 7-segment display and the interlock input number displayed in the monitor output (and RS-485 communication data) might be different. (The input numbers in the monitor output and communication data are not different.)

* Another interlock is activated within 300 ms of activating the first interlock.

This operation is not an interlock identification error. It shows that the interlocks were activated at approximately the same time (within 300 ms). To recover, remove the cause of the operation.

Note that you cannot identify which of the different interlock input numbers displayed in the 7-segment display and the monitor display (and RS-485 communication data) were activated first.

14-2 RX-R Troubleshooting

Error Code/Warning Code pag	ges
E101	20
E102	20
E103	20
E108	21
E109	21
E110	21
E114	21
E115	21
E201	22
E203	22
E301	22
E302	22
E401	22
E402	22
E501	22
E601	23
E802	23
E803	23
E804	23
E805	23
E806	
E807	
E808	
E809	
E810	
E811	
E816	
E901	
E902	
E903	
E904	24
E905	
E908	24
E910	25
E911	25
E914	25
E916	25
E917	25
E918	26
E919	26
E920	26
EA06	26
EA07	
EA20	27
EA30	27
EA40	27
EA5014-2	27

The RX-R diagnosis errors resulting from external causes such as interlock operation, no ignition, and flame failure, as well as errors resulting from internal causes such as product circuit failures and communication errors.

If it determines that an error has occurred, it activates a lockout.

The lockout state is maintained until the error conditions are removed and the error is reset through a reset operation. The state is maintained even if the power supply is cut. In a lockout, all loads are turned off.

The purpose of warnings is to communicate important information from the unit.

Warnings do not trigger a lockout and do not affect operations.

Warnings recover automatically through a reset operation or when the cause of the warning is canceled (providing that it is possible to cancel the cause).

Error details

Error code (display):	This is the error code that is displayed in the 7 seg- ment LED display on the front of the unit. In the simple display, only the top two digits are displayed.
Monitoring conditions:	Stipulates the conditions for performing an error judgment.
Corrective action:	Shows the status of the device after the error has been determined.
Cancellation procedure:	This section shows the procedure for canceling errors.

Interlock input open (E101)

ltem	Details
Error code	iL01 to iL04 (display; the numerical value is the Interlock input number), E1 (simple display)
Judgment details	The interlock runs (is open) for longer than the OFF delay time
Monitoring conditions	When startup is on
Corrective action	Lockout
Cancellation procedure	Reset input operation (🗲 Error cancellation procedure (page 14-28))

• Trial operation timeout (E102)

ltem	Details
Error code	E102 (display)
Judgment details	The set trial operation mode continuation time has been exceeded but the trial opera- tion mode does not end
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Operation timeout error (Air switch OFF check timeout) (E103)

Item	Details
Error code	E103 (display)
Judgment details	During the start check, the combustion air valve OFF confirmation is performed but the ON status continues for 0.0 to 600.0 seconds
Monitoring conditions	Start check (when RX-R purge conditions (1-2) = linked call for heat, Linked MV) Transitioning to main trial (when RX-R purge conditions (1-2) = Linked MV)
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Reset input error (E108)

ltem	Details
Error code	E108 (display)
Judgment details	The reset input continues for more than 60 seconds and is ON
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Pilot safety valve closed check error (E109)

ltem	Details
Error code	E109 (display)
Judgment details	Inconsistency between the shutoff valve (pilot) output and the shutoff valve (pilot) closed confirmation input for 20 seconds or longer
Monitoring conditions	While running (only when the shutoff valve (pilot) closed confirmation input is assigned in the input function)
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Main safety valve closed check error (E110)

ltem	Details
Error code	E110 (display)
Judgment details	Inconsistency between the Shutoff valve (main) output and the Shutoff valve (main) closed confirmation input for 20 seconds or longer
Monitoring conditions	While running (only when the Shutoff valve (main) closed confirmation input is assigned in the input function)
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Air switch OFF error (E114)

ltem	Details
Error code	E114 (display)
Judgment details	RX-R side purge condition: Linked call for heat If air pressure switch is not entered once the pilot trial starts RX-R side purge condition: Linked MV If air pressure switch is not entered 30 seconds or more after transitioning to the main trial If air pressure switch is not entered once the main trial starts
Monitoring conditions	When running and the purge is set on the RX-R side
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Manual valve input inconsistency (E115)

ltem	Details
Error code	E115 (display)
Judgment details	Inconsistency between the input functions manual valve and manual limit switch
Monitoring conditions	Running
Corrective action	Lockout
Cancellation procedure	Reset input operation

• False flame (E201)

ltem	Details
Error code	E201 (display)
Judgment details	During the start check it is detected that the flame has continued for at least five seconds
Monitoring conditions	Start check
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Main burner false flame (E203)

ltem	Details
Error code	E203 (display)
Judgment details	When the main startup signal is turned ON, and the main flame is detected continuously for up to 5 seconds
Monitoring conditions	Transition to main trial/combustion mode: Independent supervision only
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Flame detection error (E301)/Main flame detection error (E302)

ltem	Details
Error code	E301/E302 (display)
Judgment details	An error is detected in the flame sensor or flame detection circuit
Monitoring conditions	When running /only the UV model with shutter (model: RX-R4_C)
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Ignition failure (E401)/Main burner ignition failure (E402)

ltem	Details
Error code	E401/E402 (display)
Judgment details	In the pilot trial, the ignition safety time passes and a flame signal could not be detected
Monitoring conditions	Pilot trial (E401), main trial (E402, combustion mode: Independent supervision only)
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Flame failure (E501)

ltem	Details
Error code	E501 (display)
Judgment details	During combustion, the primary flame signal was not detected during the flame re- sponse time
Monitoring conditions	Pilot only - steady combustion
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Main flame failure (E601)

ltem	Details
Error code	E601 (display)
Judgment details	During combustion, the secondary flame signal was not detected during the flame re- sponse time
Monitoring conditions	Pilot only - steady combustion/combustion mode: Independent supervision only
Corrective action	Lockout
Cancellation procedure	Reset input operation

Relay answerback error (2) (K1 to K5) (E802, E803, E804, E805, E806)

ltem	Details
Error code	E802 to E806 (display)
Judgment details	Relay ON is detected for 30 seconds or more even though the relay ON signal has not been sent
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Relay answerback error (1) (K1 to K5) (E807, E808, E809, E810, E811)

ltem	Details
Error code	E807 to E811 (display)
Judgment details	Relay ON is not detected for 30 seconds or more even though the relay ON signal has been sent (during the K5 relay only pilot trial timing, there was not a single answerback)
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Alarm relay timeout (E816)

ltem	Details
Error code	E816 (display)
Judgment details	Completion of the alarm relay set/reset cannot be confirmed and 30 seconds have passed
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• ROM checksum error (E901)

ltem	Details
Error code	E901 (display)
Judgment details	The program ROM checksums do not match
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	A special reset through the SLP-RX

• EEPROM read error (E902)

ltem	Details
Error code	E902 (display)
Judgment details	A data error is detected during an EEPROM data read
Monitoring conditions	Always (when reading data from EEPROM)
Corrective action	Lockout
Cancellation procedure	1. Reset all of the settings in the SLP-RX.
	2. Perform a special reset through the SLP-RX.

• Data write error (E903)

ltem	Details
Error code	E903 (display)
Judgment details	EEPROM data is not being written correctly
Monitoring conditions	Always (when writing data from EEPROM)
Corrective action	Lockout
Cancellation procedure	1. Reset all of the settings in the SLP-RX. 2. Run the reset input

• Process operation error (3) (E904)

ltem	Details
Error code	E904 (display)
Judgment details	An error is detected in the internal data that is required to execute an operation
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (1) (E905)

ltem	Details
Error code	E905 (display)
Judgment details	An error is detected in internal processing
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error 3 (E908)

ltem	Details
Error code	E908 (display)
Judgment details	Continues for at least five seconds in self diagnosis of the input circuit and an error is detected
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (5) (E910)

ltem	Details
Error code	E910 (display)
Judgment details	An error is detected in the internal clock information
Monitoring conditions	Running
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Process operation error (1) (E911)

ltem	Details
Error code	E911 (display)
Judgment details	 An error is detected in internal data During settings mode, the following errors occur and the settings are not written correctly Power is switched off The SLP-RX cable is removed, etc.
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation However, if an error occurs as a result of an error during settings mode, use the following procedure to cancel the error: 1. Reset all of the settings in the SLP-RX. 2. Run the reset input

• RX-R communication error (E914)

ltem	Details
Error code	E914 (display)
Judgment details	Established communication fails in communication between RX-R modules
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (6) (E916)

ltem	Details
Error code	E916 (display)
Judgment details	An error is detected in the internal clock device
Monitoring conditions	When the power is turned on and when setting the clock
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Configuration error (E917)

ltem	Details
Error code	E917 (display)
Judgment details	The power was turned off while in settings mode and settings were not completed properly
Monitoring conditions	When not in the settings mode
Corrective action	Lockout
Cancellation procedure	1. Reset all of the settings in the SLP-RX. 2. Perform a special reset through the SLP-RX.

• Zone interlock signal inconsistency (E918)

ltem	Details
Error code	E918 (display)
Judgment details	A safety signal error is detected and continues for 60 seconds
Monitoring conditions	Running
Corrective action	Lockout
Cancellation procedure	Reset input operation

• System error (4) (E919)

ltem	Details
Error code	E919 (display)
Judgment details	An error is detected in communication data
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

• Process operation error (2) (E920)

ltem	Details
Error code	E920 (display)
Judgment details	An error is detected in internal data
Monitoring conditions	Always
Corrective action	Lockout
Cancellation procedure	Reset input operation

Warning information details

• Explanation of items in the tables		
Warning code (display):	This is the warning code that is displayed in the 7 segment LED display on the front of the unit. In the simple display, only the top two digits are displayed.	
Monitoring conditions:	Stipulates the conditions for performing a warning judgment.	
Corrective action:	Shows the status of the device after the warning has been determined.	
Cancellation procedure:	Shows the conditions for canceling the warning.	

• Relay life alarm (EA06)

ltem	Details
Warning code	EA06 (display)
Judgment details	Each relay has run over 100,000 times (subsequently occurs when relay actions reach 50,000)
Monitoring conditions	Always
Corrective action	Continue operation
Cancellation procedure	Reset input operation

ltem	Details
Warning code	EA07 (display)
Judgment details	The thermistor temperature for the internal flame has exceeded 80 °C and 60 seconds have passed
Monitoring conditions	Always
Corrective action	Continue operation
Cancellation procedure	Automatically recovers as a result of a reset input operation or when the thermistor temperature drops to 73 $^\circ C$ for 60 seconds

• RX internal temperature alarm (EA07)

• 760 °C mode false flame (EA20)

ltem	Details
Warning code	EA20 (display)
Judgment details	When stopped or waiting during 760 °C mode, and a false flame is detected continu- ously for 5 seconds Or when transitioning to the main trial, the main flame is detected continuously for up to 5 seconds (however, detection can only be made when air pressure cannot be confirmed as ON during Linked MV setting)
Monitoring conditions	Stopped/standby
Corrective action	Continue operation
Cancellation procedure	Reset input operation, cancel 760 °C mode

• 760 °C mode flame detection error (EA30)

ltem	Details
Warning code	EA30 (display)
Judgment details	When a flame detection error/main flame detection error occurs during 760 °C mode
Monitoring conditions	Running
Corrective action	Continue operation
Cancellation procedure	Reset input operation, cancel 760 °C mode

• 760 °C mode ignition failure (EA40)

ltem	Details
Warning code	EA40 (display)
Judgment details	When an ignition failure/main ignition failure occurs during 760 °C mode
Monitoring conditions	Running
Corrective action	Continue operation
Cancellation procedure	Reset input operation, cancel 760 °C mode

• 760 °C mode flame failure (EA50)

ltem	Details
Warning code	EA50 (display)
Judgment details	When a flame failure/main flame failure occurs during 760 °C mode
Monitoring conditions	Running
Corrective action	Continue operation
Cancellation procedure	Reset input operation, cancel 760 °C mode

Error cancellation procedure

There are two methods for canceling an error in an RX-R module.

• Order a reset from an RX-L

If you have a module connection with an RX-L or you are connected through an RX-R control signal, you can cancel the RX-R lockout in conjunction with a lockout cancellation on the RX-L side.

G ■ Error cancellation procedure (page 14-16).

Reset input (RESET) short circuit

Check whether the cause of the error has been removed.

Turn the reset input (RESET) \Leftrightarrow reset input (COM) on and then off. To ensure proper operation, leave it on for at least 2 seconds.

This cancels the error. The 7-segment LED display returns from the error code display to the normal display.

When startup signal/pilot startup signal* are continuously ON, output will be continuously ON for ALLED blinking, alarm (lockout), and individual alarm output (ER1 to ER5, ER1T to 3T, ER5T, ER1C to ER3C, ER5C).

When startup signal or pilot startup signal* is turned OFF, LED and monitor output will both be turned OFF.

* When pilot startup input was being set

However, to reboot you need to follow the procedure below.

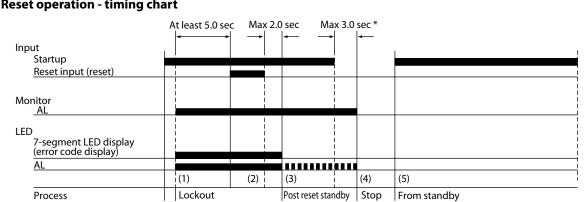
- If the reset input (RESET) ↔ reset input (COM) was already on when the error occurred, the reset input will not be recognized.
- If multiple errors have occurred, one reset operation might not cancel the errors. In this case, perform multiple reset operations and confirm that all of the errors have been canceled.

Note: If RX-L Ver1.0.2 or earlier was connected to RX-R Ver2.0.2 or later, reset input short-circuit time may be longer.When reset is performed from RX-L, but the error is not fixed, RX-R reset input short-circuit time will increase from 2 or more secs to 3 or more secs. When in this situation, canceling lockout will take you back to normal status.

Reboot method

From the RX-L, turn the start input signal off and then on, or turn the start input $(+) \Leftrightarrow$ start input (-) off and then on. To ensure proper operation, leave it off for at least two seconds.

Note: If the startup input was off, the step described above is not necessary.



Reset operation - timing chart

* When reset is performed via RX-L, the time will fluctuate according to how many RX-R units are connected. The chart represents when only 1 RX-R is connected.

(1) Lockout status

- (2) Reset input OFF (let short-circuit for 2 or more seconds)
- (3) Wait for restart 7-segment display returns to normal, and LED begins to blink. Monitor output = continuous.
- (4) Startup OFF (let it remain OFF for 2 or more seconds)
- (5) Restart

Additional info: Post reset operation for firmware versions 1.0.0 to 1.2.0 Depending on RX-L/RX-R settings, post reset operation with the startup signal remaining entered will differ for the stated versions.

Related settings: RX-L No. of zone lockout abnormal RX-Rs (E-2)

RX-R Input function (3-1)

Reset performed with startup signal entered

- When the number of locked out RX-R units is the same or more than the number of zone lockout abnormal RX-R units (E-2)
 - → All zones on standby until RX-L startup input is OFF
- When the number of locked out RX-R units is less than the number of zone lockout abnormal RX-R units (E-2)

When no combusting RX-Rs are in the zone └→ Zone prepurge is performed after reset

- When combusting RX-R (s) are in the zone

When the locked out RX-R input function (3-1) is set to input pilot ignition

When transitioning to start check after standby or reset

When the locked out RX-R input function (3-1) is not set to input pilot ignition

Standby

• Error sequence chart

• Ignition failure/main ignition failure

In a pilot trial, if a flame signal is not detected within the pilot flame time, it is treated as an ignition failure and a lockout is implemented.

If a flame signal is not detected within the main ignition time during the main trial, lockout is performed as the main ignition failure.

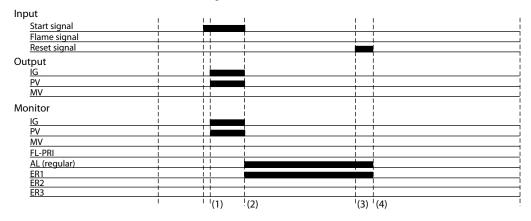
During the lockout, AL and ER1 are output and the safety shutoff valve is closed.

At this time, the start signal is automatically turned off.

To cancel the lockout, send an external reset input.

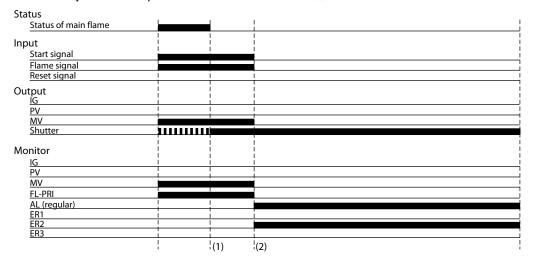
If the reset input is received when each start signal is OFF and the general Interlock input is normal, the AL is canceled.

To restart, turn the start signal off and then on.



- (1) Pilot trial operation
- (2) Lockout operation
- (3) Run a reset, start OFF (turn off for at least two seconds)
- (4) Stop operation
- Flame failure/main flame failure

If a flame signal is not detected during pilot only - steady combustion, the safety shutoff valve is closed within the flame response time (1), an AL and ER2 are output, and the system transitions to a lockout. (2)

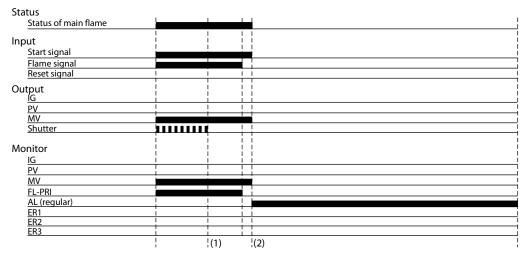


• Flame detection error/main flame detection error

If current continues to flow to the sensor as a result of a UV sensor self-discharge, the shutter remains closed.

If this status remains for 5 seconds, lockout will occur as a flame detection error even if a flame was actually detected.

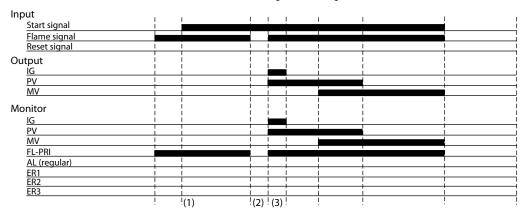
In addition, the flame signal is lost but it is not classed as a flame failure error.



• False flame/main false flame

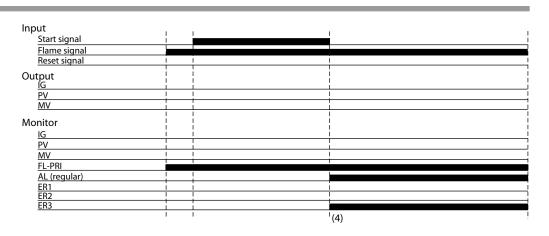
In a standby operation, a flame is detected but an error judgment is not made. If a flame is detected during a start check, the system goes into standby without entering the ignition operation. (1)

If a flame is not detected during the false flame standby (2), the sequence restarts. (3) (Main flame also included for Independent supervision)



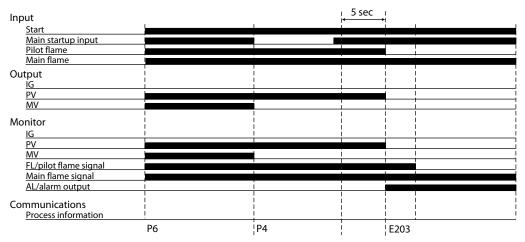
If the false flame standby period exceeds five seconds, the system transitions to a lockout. (4)

If AL is set, ER3 is output.



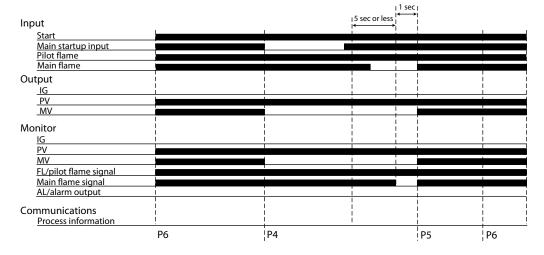
Even when the main false flame continues during the pilot only process, error detection will not occur.

If a false flame is determined between the pilot only process and transition to main trial process, and the main flame signal is detected continuously for 5 seconds, lock-out will occur.



If the main flame is extinguished before lockout occurs, the main trial is performed when waiting 1 second after the extinguishing was detected.

If the main flame is detected again during the post extinguish wait, it will be determined as a main false flame again.



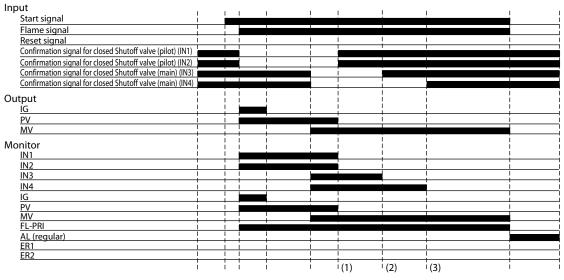
• Safety shutoff valve inconsistency (inconsistency in the closed state)

If there are inconsistencies in the status of the safety shutoff valve load output and the safety shutoff valve closed confirmation switch, a lockout is implemented. However, the system does not transition to a lockout in standby mode (1), even if inconsistencies are detected. If a fixed period inconsistency check is performed during a start check (2) and the closed confirmation switch is open, the system transitions to a lockout. (3)

Input			
Start signal	1		
Flame signal	1		
Reset signal	İ		
Confirmation signal for closed Shutoff valve (pilot) (IN1)	1	1	
Confirmation signal for closed Shutoff valve (pilot) (IN2)			
Confirmation signal for closed Shutoff valve (main) (IN3)			
Confirmation signal for closed Shutoff valve (main) (IN4)			
Output	1	1	
IG	i		
PV	1	1	
MV	1	1	
Monitor	1		
IN1		1	
IN2	Ì		
IN3			
IN4	!	1	
IG			
PV		1	
MV			,,
<u>FL-PRI</u> AL (regular)			
AL (regular) ER1	I	1	
ER2		1	1
	(1)	(2)	(3)

• Safety shutoff valve inconsistency (inconsistency in the open state)

If there are inconsistencies in the status of the safety shutoff valve load output and the safety shutoff valve closed confirmation switch, a lockout is implemented. During the safety shutoff valve load output (pilot only, steady combustion), if the closed confirmation switch for the safety shutoff valve results in a fixed period abnormal close, the safety shutoff valve is closed and a lockout is implemented. In this case, the lockout is implemented even if a flame signal is detected (due to a circuit error).



- (1) When normal
- (2) If the main safety shutoff valve is open, a lockout is not implemented even if there
- is an inconsistency in one of the confirmation signals, due to the AND condition (3) If the main safety shutoff valve is open, a lockout is implemented if there are in-
- consistencies in both of the confirmation signals

14-3 RX-L90 Troubleshooting

If communication is not possible with the touch panel, etc., due to module replacement

If a module that communicates with devices, such as touch panels, using the MODBUS/TCP protocol is replaced with another, the replacement module may be unable to communicate with the devices. In this case, either temporarily turn off the power to devices, such as touch panels, or wait for automatic recovery.

• Major host devices and estimated time required for automatic recovery

- ARF100/200 series: about 5 minutes
- Azbil system products (Harmonas, Industrial-DEO, PREXION, EneSCOPE etc.) :

about 10 minutes

• Digital Electronics Corporation GP series graphic operator interfaces:

about 20 minutes

Mitsubishi Electric Corporation GOT series graphic operator interfaces:
 about 20 minutes

• Reason for loss of communication

Host devices using MODBUS/TCP automatically read MAC addresses from modules and regularly update them in order to identify each module.

After module replacement, the MAC address of the module that was replaced may remain in the host devices, and it may attempt to communicate using the old address.

When receiving command messages from host devices, the new module judges that the MAC address in the messages is not its MAC address, even though the IP address is the same, and discards the received messages. Thus communication cannot be established.

For normal communication to resume, time is required to rewrite the MAC address in the host devices. The amount of time varies depending on the host device.

If the module can no longer communicate with a device using the MODBUS TCP protocol

This device can communicate with host devices using MODBUS/TCP protocol. However, communication may not be possible in the following cases. In such cases, turn off the power of the host device and this device, or wait for 3 minutes for automatic recovery.

Cases where communication fails

- The host device is subject to repeated short interruptions
- Network devices between the host device and the module (such as a hub) experience repeated short power outages or disconnections.

• Reason for loss of communication

Since the module retains data from its communication partners for a certain time, if the host devices experience repeated short interruptions, the module sometimes perceives different devices before and after the interruption.

As a result, the module may mistakenly conclude that the number of host communications exceeds the limit (2) and refuse to accept further communications.

Chapter 15. SPECIFICATIONS

15-1 RX-L Specifications

Environmental specifications

• Operating conditions

Ambient temperature:	(RX-L80) –20 to +55 °C (RX-L90) 0 to +50 °C
Ambient humidity:	10 to 90 % RH (without condensation)
Vibration:	0 to 3.2 m/s ² (10 to 150 Hz for 2 h each in x, y, and z directions)
Shock:	0 to 9.8 m/s ²
Corrosive gas:	None

• Transportation and storage conditions

···· j - ··· ··· ···	
Ambient temperature:	-20 to +70 °C
Ambient humidity:	5 to 95 % RH (without condensation)
Vibration:	0 to 9.8 m/s ² (10 to 150 Hz for 2 h each in x, y, and z directions)
Shock:	0 to 300 m/s ² (0 to 200 m/s ² in a direction perpendicular to the base)
Package drop test:	Drop height 60 cm (free fall on 1 corner, 3 edges, 6 planes)

Electrical specifications

aciv	7115	
	Rated voltage:	24 Vdc
	Allowable supply voltage:	21.6 to 26.4 Vdc
	Load supply voltage:	AC 100 V, AC 110 V, AC 200 V, or AC 220 V
	Allowable supply voltage:	-15 to +10 % of rated voltage (AC power)
	Power consumption:	9 W max.
	Dielectric strength:	 DC terminal 500 Vac, 1 min Excitation sections Between the 24 Vdc power terminal and the input function terminal Between the 24 Vdc power terminal and the moni- tor output connector Between the 24 Vdc power terminal and the RX-R/ RX-L control signal terminal
		 AC terminal 1500 Vac, 1 min or 1800 Vac, 1 s Excitation sections Between power terminals H and G/relay outputs H and G, and the DC terminal/connector Between the blower output terminal and the DC terminal/connector Between the control motor output terminal and the DC terminal/connector
	Insulation resistance:	 50 MΩ min. with a 500 Vdc megger Between power supply terminals H and G/relay outputs H and G, and the DC terminal/connector Between the blower output terminal and the DC terminal/connector Between the control motor output terminal and the DC terminal/connector

Operating life:	7 years of continuous use or 10 years of use (8 hours per day) at 25 °C 100000 relay contact operations (at the rated load)	
Data retention:	The clock IC can be powered by the supercapacitor during power-off. The supercapacitor works for over 24 hours. One hour or more is required for charging the superca- pacitor during power-on.	
Input specifications	Startup input:Contact input (24 Vdc, 10 mA*)Reset input:Contact input (24 Vdc, 20 mA*)Interlock input:Contact input (24 Vdc, 20 mA*)* Use devices with an ON resistance of 250 Ω or less Output specifications	
Output specifications	Relay output: 400 VA (with relay contact welding detection) Note: Cannot be used for dry output. For relay output, be sure to con- nect an AC power load (10 VA min.)	
	Blower output (no voltage output):	
	350 VA	
	Control motor output :	
	100 VA (no voltage output)	
	Monitor outputs (transistor outputs):	
	22 (0.1 A max./point, 1 A max./	
	module max., 30 Vdc max.)	

Communication specifications

Host communication

Maximum number of connections:

2

When using RS-485 communication, Ethernet communication is limited to one session.

- Ethernet communication (RX-L90 only) Protocol: MODBUS/TCP
- RS-485 communication Communication protocol:

(RX-L80) CPL
(RX-L90) CPL, MODBUS/RTU, MODBUS/ASCIISignal level:Conforms to RS-485Communication/synchronization method:
Half-duplex, start/stop synchronizationMax. line length:500 mTerminating resistor:External (150 Ω 1/2 W min.)Baud rate:(RX-L80) Select from 9600, 19200, or 38400 bps
(RX-L90) Select from 4800, 9600, 19200, 38400,
57600, or 115200 bps

• RX-R control signal

Communication protocol:	RX-R control protocol
Maximum cable length:	50 m

• RX-L control signal

Communication protocol:	RX-L control protocol
Maximum cable length:	500 m

General specifications

Dimensions:	80 (W) × 134 (D) × 105 mm (H)
Mass:	Approx. 550 g
Unit color:	Black
Structure:	Two-piece construction with a separable base and main unit
Installation method:	DIN rail or panel mounting with screws (M4)
Installation orientation:	Vertical
Certificate:	Gas Appliance Directive (CE) 0063CN6671 Gas Appliance Directive (CE) does not apply to the 760 °C mode use. For applications that require the cer-

■ Wiring cable specifications

Reset: Interlock contact input: Signal line type/length: The max. cable length is 10 m.

The max. cable length is 200 m.

Signal	Cable type	Max. cable length
RX-R control signal	0.2 to 1.5 mm ² (AWG28-14)* ¹	50 m
RX-L control signal		500 m
Reset signal	0.3 to 0.75 mm ² (AWG22-18)* ²	10 m
Start signal		200 m
IN1 to IN16 signals		
Monitor output (M-1 to M-22)	Solder: 0.25 mm ² (AWG 23) or less Solderless terminal: 0.08-0.2 mm ² (AWG 28-24)	100 m
RS-485 communication	0.2 to 1.5 mm ² (AWG28-14)* ³	500 m
Ethernet (RX-L90 only)	UPT cable (4P) Cat 5e or higher (straight) (both ends ANSI/TIA/EIA-568-B)	100 m
Blower output	JIS C 3306, 0.75 mm ² min.	—
Motor output	(0.18 dia. and 30 strands)	

tificate to be applied, do not use 760 °C mode use.

*1 Recommended: JCS4364 cable for light electrical instruments (twisted shielded cable for instruments), 8 cores (4 pairs)

*2 Wire diameter 2.0 mm max. Recommended solderless terminals: V1.25-3 (RAV1.25-3), made by JST Mfg. Co., Ltd.

*3 Recommended: JCS4364 cable for light electrical instruments (twisted shielded cable for instruments), 4 cores (2 pairs)

Selection of functions

• Interlock input function

	16 inputs	
	Individual OFF delay setting (without chattering detection)	
	Switching to flame monitoring above 760 °C	
	Function input (batch operation, etc.)	
• Purge function		
	Prepurge time setting from 5 s to 60 min (choice of 32 patterns)	
	Postpurge time setting (30 min max.)	
	Blower output	
	Motor control	
Unit display		
	Status display (7 segments)	
	Status display (LED)	
Monitor output		
	22 open collector outputs (assignable)	
	RS-485 communication	
	Ethernet communication (RX-L90 only)	
 Trial operation mode (when using SLP-RXE) 		
•		

Purge time setting for trial operation Forced ON for monitor output Forced open output/forced closed output for the control motor

15-2 RX-R Specifications

Environmental specifications

• Operating conditions

Ambient temperature:	–20 to +55 °C
Ambient humidity:	10 to 90 % RH (without condensation)
Vibration:	0 to 3.2 m/s ² (10 to 150 Hz for 2 h each in x, y, and z directions)
Shock:	0 to 9.8 m/s ²
Corrosive gas:	None

• Transportation and storage conditions

Ambient temperature:	-20 to +70 °C
Ambient humidity:	5 to 95 % RH (without condensation)
Vibration:	0 to 9.8 m/s ² (10 to 150 Hz for 2 h each in x, y, and z directions)
Shock:	0 to 300 m/s ²
Package drop test:	Drop height 60 cm (free fall on 1 corner, 3 edges, 6 planes)

• Electrical specifications

••	
Rated voltage:	24 Vdc
Allowable supply voltage:	21.6 to 26.4 Vdc
Load supply voltage:	100, 110, 200 or 220 Vac (depending on the model)
Allowable supply voltage:	-15 to +10 % of rated voltage (AC power)
Power consumption:	8 W max.
Dielectric strength:	 DC terminal 500 Vac for 1 min or 600 Vac for 1 s Between the 24 Vdc power terminal and the input function terminal Between the 24 Vdc power terminal and the monitor output connector Between the 24 Vdc power terminal and the RX-R control signal terminal
	 AC terminal 1500 Vac for 1 min or 1800 Vac for 1 s Between Relay output/power supply terminals H and G, and the DC terminal/connector
Insulation resistance:	 50 MΩ min. with a 500 Vdc megger Between Relay output/power supply terminals H and G, and the DC terminal/connector
Operating life:	7 years of continuous use or 100000 times of relay contact operations at 25 $^{\rm o}{\rm C}$
Startup input:	Contact input (24 Vdc, 10 mA*)
Reset input:	Contact input (24 Vdc, 20 mA*)
Interlock:	Contact input (24 Vdc, 20 mA*) * Use devices with an ON resistance of 250 Ω or less
Contact capacity:	Ignition transformer 300 VA Pilot valve 200 VA Main valve 200 VA
Monitor outputs (transistor	outputs):

11 (0.1 A max./point, 0.8 A max./module, 30 Vdc max.)

Communication specifications

Communication protocol:	RX-R control protocol
Maximum cable length:	50 m

General specifications

Dimensions:	80 (W) × 134 (D) × 105 mm (H)
Mass:	Approx. 600 g
Unit color:	Black
Structure:	Two-piece construction with a separable base and main unit
Installation method:	DIN rail or panel mounting with screws (M4)
Installation orientation:	Vertical
Certificate*:	Gas Appliance Directive (CE) 0063CN6671 * Certificate is valid only for a combination of RX-R4_C and AUD300C.
	Gas Appliance Directive (CE) does not apply to the 760 °C mode use. For applications that require the cer-

Wiring cable specifications

Reset: Interlock contact input: Signal line type/length: The max. cable length is 10 m.

The max. cable length is 200 m.

Signal	Cable type	Max. cable length
RX-R control signal	0.2 to 1.5 mm ² (AWG28-14)*	50 m
Reset signal	0.3 to 1.25 mm ² (AWG22-16)	10 m
Start signal		200 m
IN1 to IN4 signals		
Monitor output (M-1 to M-11)		100 m

tificate to be applied, do not use 760 °C mode use.

* Recommended JCS4364 cable for light electrical instruments (twisted shielded cable for instruments), 8 cores (4 pairs)

Flame voltage

Flame voltage range	
With flame:	1.5 to 4.0 Vdc
Without flame:	0.0 to 0.6 Vdc
Recommended flame	voltage:

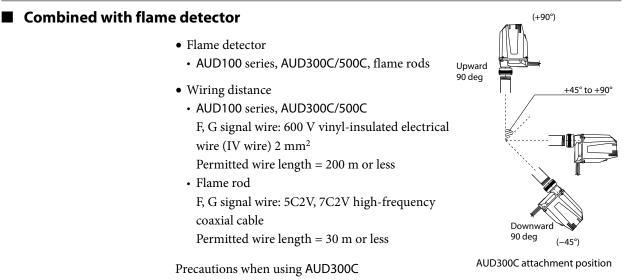
Stable 2.0 Vdc or more

Flame voltage output:

0 to 5 Vdc

Operation method

Continuous operation, batch operation



When AUD300C attachment position stops between +45 and +90 degrees (with AUD300C shutter open), use at a permitted temperature range of -20 to +70 °C, and make sure the RX-R4_C power voltage is between DC22.8 and DC26.4 volts.

Sequence timing

Pilot ignition time	Pilot only time	Main ignition time
4.5 \pm 0.5 s or 9 \pm 1 s Select in the SLP-RX	5 ±1 s	4.5 ±0.5 s

■ Flame response (Flame response time)*

 3 ± 1 s, 2 s or less (select according to model number)

* For RX-R_ C: At a flame voltage of 3 V For RX-R_ B: At a flame voltage of 2 V

15-3 Optional Accessories (sold separately)

Name	Azbil Corporation model no./Part no.	Description
Transistor output connector	81446847-001	FCN361J040-AU soldered jack (1) and FCN-360C040-B cover (1) made by Fujitsu Components
RX-R/RX-L control signal connector	81447402-001	BL3.5/7SNSW (2) (Part no: 161019) made by Weidmuller
Smart Loader Package	SLP-RXMJ70	For maintenance (with cables)
	SLP-RXMJ71	For maintenance (without cables)
	SLP-RXEJ70	For function selection (with cables)
	SLP-RXEJ71	For function selection (without cables)
Surge absorber	83968019-001	-
Communication box (non-ring type)	NX-CB1NN0400	4-port Ethernet adapter
Communication box (ring type)	NX-CB1NR0400	4-port Ethernet adapter
Communication adapter	NX-CL1000000	Ethernet adapter

■ Communication box (Sold separately, Model No.: NX-CB1____)

Ports:	4
• Transmission path type:	 Ethernet ports 1, 2 IEEE802.3/IEEE802.3u 10BASE-T/100BASE-TX (With auto-negotiation, Auto MDI/MDI-X functions) Ethernet ports 3, 4 IEEE802.3u 100BASE-TX (With full duplex, auto MDI/MDI-X functions. The auto-negotiation function on a connected device should be enabled, except when the device is con- nected between communication boxes.)
• Connector:	RJ-45
• Cable:	UTP cable (4P) Cat 5e or higher (Straight) (Both ends ANSI/TIA/EIA-568-B)

■ Communication adapters (sold separately, model no.: NX-CL1____)

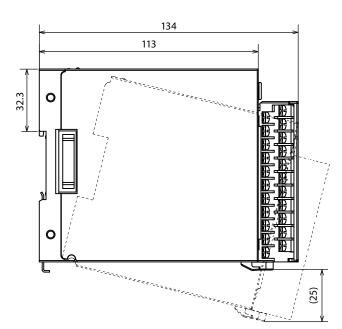
Ports:	1
• Transmission path type:	IEEE802.3u 100BASE-TX (With full duplex, auto MDI/MDI-X functions. The auto-negotiation function on a connected device should be enabled.)
• Connector:	RJ-45
• Cable:	UTP cable (4P) Cat 5e or higher (Straight) (Both ends ANSI/TIA/EIA-568-B)

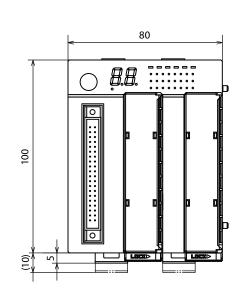
Communication cap (Sold separately model no. 80700224-010 (for male), 80700225-010 (for female))

Used to protect the side connectors (male and female).		
RX-L:	Both sides are female.	
RX-R:	The right connector is female and the left connector is male when the module is viewed from the front.	
Quantity:	10	

15-4 External Dimensions

RX-L

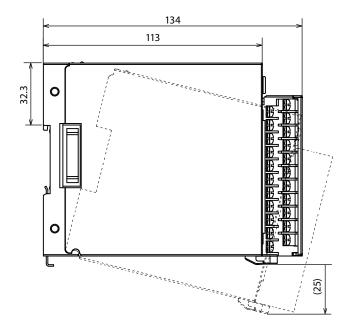


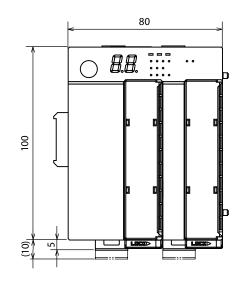


RX-R

Unit: mm

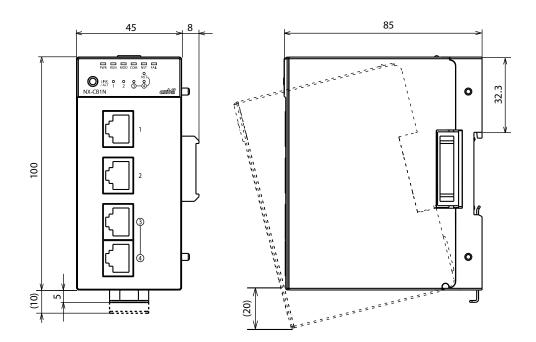
Unit: mm



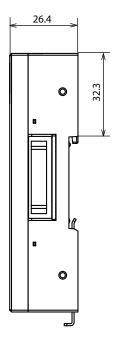


Communication box

Unit: mm



Communication adapter



Unit: mm

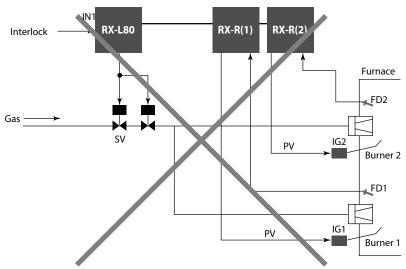
Chapter 16. PROHIBITED INSTRUMENTATION EXAMPLES

16-1 Examples of Prohibited Instrumentation Using RX-L and RX-R

The following kind of instrumentation using the RX-L and RX-R is prohibited.

Prohibited instrumentation example 1

Fuel safety shutoff cannot be performed using only RX-L relay output (H-G).

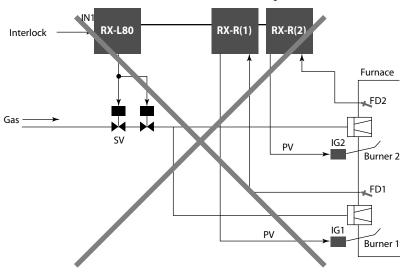


📖 Note

• 🕼 🖬 Relay output "Note" (page 4-22).

Prohibited instrumentation example 2

In the following RX-L, RX-R configuration, if a flame failure occurs for burner 2 (RX-R (2)) during combustion with burner 1 (RX-R (1)) and burner 2 (RX-R (2)), MV1 and MV2 cannot shut off within the flame response time of RX-R (2).



📖 Note

• 🕼 5-4 Timing Regulation "Prohibitions" (page 5-26).

Appendix

Appendix 1 RX-L State Transition

Explanation of state transition diagrams 1 and 2

The following explanation is provided to help you understand the state transitions shown in figures 1 and 2.

Please read this first before reviewing the state transition diagrams.

Events

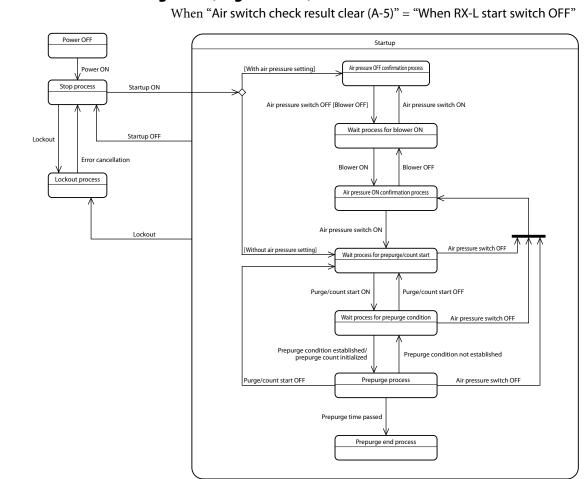
Name	Description
Startup ON [Air pressure OFF confir- mation flag = SET]	When the RX-R start from have been established in "RX-L start method (B-1)" and the air pressure OFF confirmation flag = SET
Startup ON [Air pressure OFF confir- mation flag = RESET]	When the RX-R start from have been established in "RX-L start method (B-1)" and the air pressure OFF confirmation flag = RESET
Startup ON [Without air pressure setting]	The RX-R start from have been established in "RX-L start method (B-1)", and "Air switch check use (A-2)" = "No", and no inputs are assigned to "Air pressure switch in Input function (C-1)", and "Air pressure switch operation check cancel condition (A-5)" = "When RX-L start switch OFF", and
Startup ON [With air pressure setting]	 "Blower sync signal source (B-6)" = "Run internally" The RX-R start from have been established in "RX-L start method (B-1)", and "Air switch check use (A-2)" = Yes, or inputs are assigned to "Air pressure switch in Input function (C-1)," or "Air pressure switch operation check cancel condition (A-5)" ≠ "When RX-L start switch OFF", or "Blower sync signal source (B-6)" ≠ "Run internally"
Startup OFF Lockout	When the RX-R start from have not been set in "RX-L start method (B-1)" Treatment = When an error occurs that results in a lockout
Air pressure switch OFF, Air pressure switch ON Purge count start OFF,	Chapter 14. TROUBLESHOOTING (for information on the treatment of each error) When inputs assigned to "Air pressure switch in Input function (C-1)" are OFF or ON When inputs assigned to "Start purge count in Input function (C-1)" are OFF or ON
Purge count start ON Prepurge condition established	When all of the following are set: All inputs assigned in "Prepurge condition in Input function (C-1)" are ON All inputs assigned in "Interlock and prepurge condition in Input function (C-1)" are ON The inputs specified in "High fire position input (B-9)" and "Low fire position input (B-10)" are not ON
Prepurge condition not established	When the above conditions are not established
Prepurge time passed	Normal: When the time set in "Prepurge time (D-1)" has passed Trial operation: When the prepurge time for trial operation set in SLP-RX has passed
Error cancellation	When an error is canceled using the reset method defined for each error Chapter 14. TROUBLESHOOTING (for information on how to reset each error)
Blower ON, blower OFF, [Blower OFF]	When the Blower Sync signal set in "Blower sync signal source (B-6)" is ON or OFF
Power ON	When voltage is supplied to the 24 Vdc input. The air pressure OFF confirmation flag is reset

• Actions

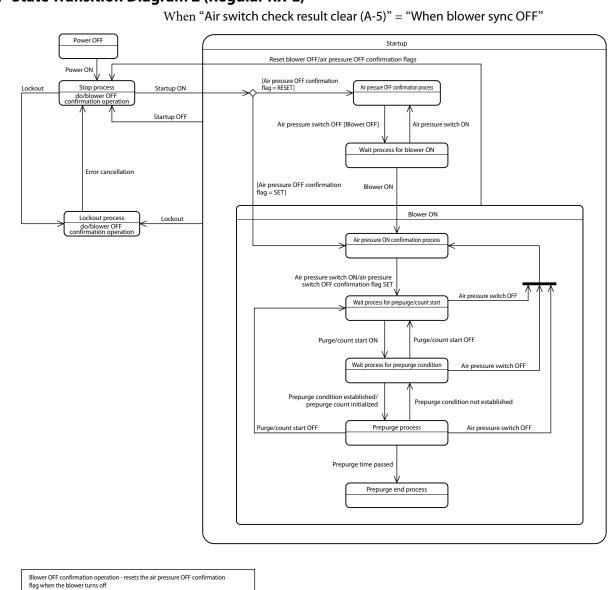
Name	Description
Air pressure OFF confirmation flag SET	Sets the flag that indicates that the air pressure OFF confirmation is complete
Air pressure OFF confirmation flag RESET	Resets the flag that indicates that the air pressure OFF confirmation is complete
Prepurge count initialization	Clear the prepurge timing counter to 0
Blower OFF confirmation operation	Resets the air pressure OFF confirmation flag when the blower turns OFF

📖 Note

• If "Air pressure switch operation check cancel condition (A-5)" = "When blower sync OFF", after setting the air pressure OFF confirmation flag, the air pressure OFF confirmation flag is reset when the status changes to interlock input open (E101) as a result of the air pressure switch being opened.



State Transition Diagram 1 (Regular RX-L)



State Transition Diagram 2 (Regular RX-L)

Explanation of state transition diagrams 3 to 6

The following explanation is provided to help you understand the state transition shown in figures 3 to 6.

Please read this first before reviewing state transition diagrams 3 to 6.

• Event/Transition Destination

Name	Description
Start switch input ON, Start switch input OFF	For RX-L start method (B-1), the RX-L start condition is met or not met.
Call for heat, no call for heat	RX-R startup conditions established or RX-R startup conditions not established
[Regular Interlock input normal]	1. When RX-L type = Zone RX-L. the regular interlock input normal. 2. When RX-L type = Single zone RX-L, the condition is always met.
Regular interlock operation or preparation	1. When RX-L type = Zone RX-L, the regular interlock input is open or ready. 2. When RX-L type = Single zone RX-L, this event does not occur.
Lockout	Treatment = When an error occurs that results in a "lockout" Chapter 14. TROUBLESHOOTING.
All air pressure switches OFF	All inputs assigned to "Air flow switch" or "Prepurge condition" for "Input function (C-1)" are turned OFF.
Air pressure switch OFF	At least one of the inputs assigned to "Air flow switch" or "Prepurge condition" for "Input function (C-1)" is turned OFF.
All air pressure switches ON	All inputs assigned to "Air flow switch" or "Prepurge condition" for "Input function (C-1)" are turned ON.
Air pressure switch ON	At least one of the inputs assigned to "Air flow switch" or "Prepurge condition" for "Input function (C-1)" is turned ON.
Purge count start ON, Purge count start OFF	When inputs assigned to "Prepurge count start" in "Input function (C-1)" are ON or OFF
Prepurge condition established	 When all of the following are set: All inputs assigned in "Interlock and prepurge condition" in "Input function (C-1)" are ON When "RX-R prepurge use (B-16)" = "Enable" and purge conditions are established on the RX-R side The inputs specified in "High fire position input (B-9)" and "Low fire position input (B-10)" are not ON
Prepurge condition not established	When the above conditions are not established
Prepurge time passed	Normal: When the time set in "Prepurge time (D-1)" has passed Trial operation: When the prepurge time for trial operation set in SLP-RX has passed
Ignition condition established, ignition position	
Ignition condition not established	When the above conditions are not established
Ignition standby period passed	When the time set in "Damper modulation control wait time (s) (D-3)" has passed
No ignition	When a no ignition error occurs on an RX-R
Normal ignition	When ignition is normal on all RX-R modules that have the pilot running
There are RX-Rs waiting for ignition [With ignition condition]	Startup conditions from have been established but there is at least one RX-R module that does not have an ignited status and all inputs assigned in "Ignition condition" in "Input function (C-1)" are not ON
With/without main ignition request	When a main ignition request has or has not been established
With/without damper modulation request	When inputs assigned to "Damper modulation" in "Input function (C-1)" are ON or OFF
Postpurge complete	When the time set in "Postpurge time (s) (D-4)" has passed, and inputs assigned in "Postpurge extension" in "Input function (C-1)" are OFF, and postpurge OFF condition is set in "Postpurge for residual flame (B-15)"
Error cancellation	When an error is canceled using the reset method defined for each error Chapter 14. TROUBLESHOOTING (for information on the treatment of each error)
[With air pressure setting]	 When any of the following apply: "Air switch check use (A-2)" = "Enable". An input is set for "Air flow switch" for "Input function (C-1)". "Air switch check result clear (A-5)" = "When blower sync OFF" "Blower sync signal source (B-6)" ≠ "Internal"
[Without air pressure setting]	When none of the above apply
Blower ON,	When the blower status set in "Blower sync signal source (B-6)" is ON or OFF
Blower OFF, [Blower OFF]	

Name	Description
Power ON	When voltage is supplied to the 24 Vdc input. The air pressure OFF confirmation flag is reset
[No purge]	 Setting conditions When any of the following apply: (1) Prepurge use (B-2) = Disable, and Prepurge time (D-1) = Disable (2) Prepurge use (B-2) = Determine by input, and the input assigned to prepurge-post-purge for input function (C-1) is ON. 760 °C mode conditions When any of the following purge cancel conditions that occur in 760 °C mode apply, even if the above setting conditions do not apply (1) F760 °C mode use (A-4) = First prepurge only and the system is in the second or later prepurge and 760 °C mode (2) 760 °C mode use (A-4) = Normal and the system is in 760 °C mode
[With purge]	When 1. Setting conditions and 2. 760 °C mode conditions above do not apply
Ignition position	When the input set in "High fire position input (B-9)" is ON
[Damper modulation control wait time passed]	When the time set in "Damper modulation control wait time (s) (D-3)" has passed since the main ignition operation started
Retry standby period passed	When 20 seconds have passed
Limit time exceeded	When the time set in "Reignition standby time (s) (D-8)" has passed
[Within limit time]	When the time set in "Reignition standby time (s) (D-8)" has not passed
End postpurge when there is an error	When the time set in "Lockout postpurge time (s) (D-5)" has passed
[With Ignition condition]	 When any of the following apply: When inputs are set in "Ignition condition" in "Input function (C-1)" When "Ignition wait time (s) (D-2)" ≠ 0 seconds
[No Ignition condition]	When the above conditions do not apply
[No Low fire stop], [With Low fire stop]	Disable or Enable is set for Low fire stop (B-13).
[With reboot time confirmation]	Prepurge after RX-R restart (B-12) ≠ Every time
[No reboot time confirmation]	Prepurge after RX-R restart (B-12) ≠ Every time
Stop conditions	When Air switch check result clear (A-5) = When RX-L start switch OFF Startup OFF or regular interlock operation or preparation When Air switch check result clear (A-5) = When blower sync OFF Startup OFF or regular interlock operation or preparation or blower OFF
No call for heat [Low fire stop operation]	When the call for heat is turned off by the pilot ignition operation, main ignition opera- tion, Damper modulation operation, or reignition conditions operation
With main ignition request [With "Ignition condition" and "Ignition condition" not established]	When the main ignition request is established but all inputs assigned in "Ignition condi- tion" in "Input function (C-1)" are not ON
Postpurge complete	The postpurge complete and stop flags have been reset (when the stop operation has pre-
[Stop flag = RESET]	viously been performed)
Postpurge complete	The postpurge complete and stop flags have been set (when the stop operation has previ-
[Stop flag = SET]	ously been performed)
Retry standby period passed	When the retry standby period has passed and the stop flag is set (when the stop opera-
[Stop flag = SET or no call for heat]	tion has previously been performed) or there is no call for heat
Retry standby period passed [Stop flag = RESET and there is a tem- perature request]	When the retry standby period has passed and the stop flag is reset (when the stop opera- tion has previously been performed) and there is a call for heat

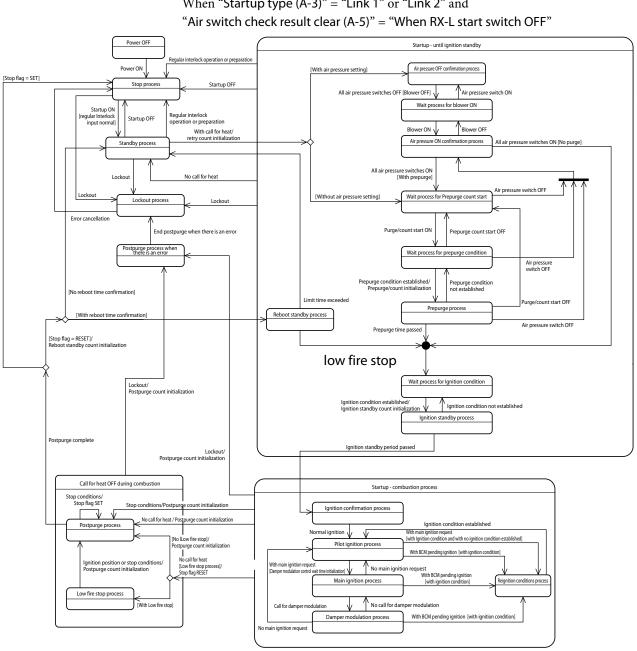
• Actions

• Actions	
Name	Description
Air pressure OFF confirmation flag SET	Sets the flag that indicates that the air pressure OFF confirmation is complete
Air pressure OFF confirmation flag RESET	Resets the flag that indicates that the air pressure OFF confirmation is complete
Prepurge count initialization	Clear the prepurge timing counter to 0
Ignition wait time (s) count initialization	Clear the Ignition wait time (s) counter to 0
Postpurge count initialization	Clear the postpurge time counter to 0
Standby count initialization	Clear the retry standby time counter to 0
Reboot standby count initialization	Clear the restart standby time counter to 0
Damper modulation control wait time initialization	Clear the wait time counter for the damper modulation control transition to 0
Retry count initialization	Clear the number of retries to 0
Retry count	Count the number of retries as one
Stop flag RESET	Reset the stop flag (the flag that indicates that a stop operation ^{*1} has previously been performed)
Stop flag SET	Set the stop flag (the flag that indicates that a stop operation ^{*1} has previously been performed)

*1. What is a stop operation

• When Air switch check result clear (A-5) = When RX-L start switch OFF, startup is OFF, or regular interlock operation or preparation

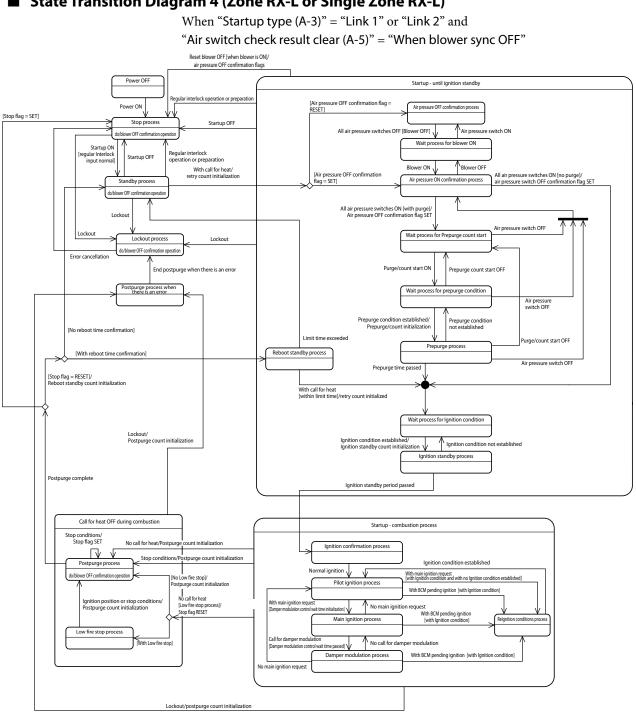
• When Air switch check result clear (A-5) = When blower sync OFF, startup input is OFF, or regular interlock operation or preparation, or blower OFF



State Transition Diagram 3 (Zone RX-L or Single Zone RX-L)

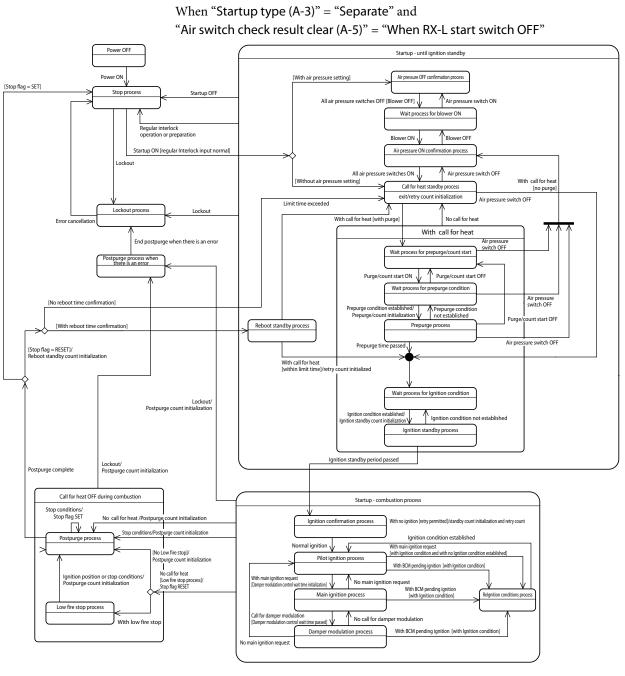
When "Startup type (A-3)" = "Link 1" or "Link 2" and

reignition Stop conditions - Startup OFF or regular interlock operation or preparation Low fire stop process - pilot ignition process, main ignition process, Damper modulation process, reignition conditions process



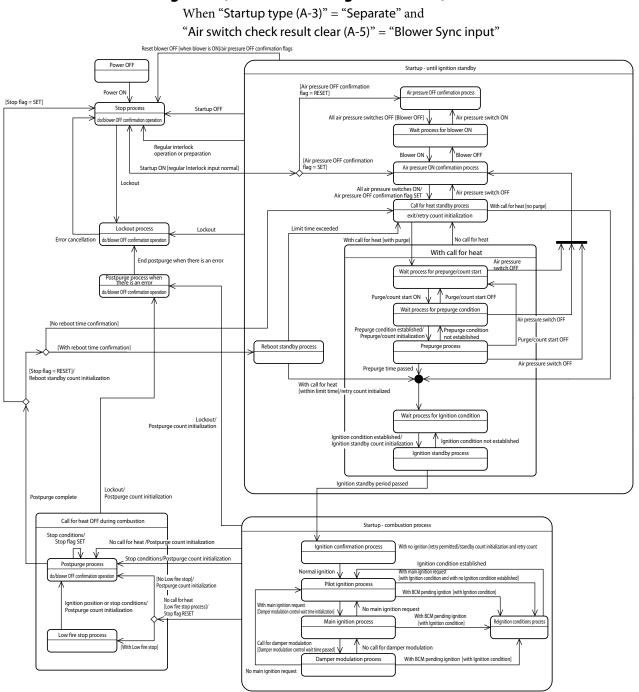
State Transition Diagram 4 (Zone RX-L or Single Zone RX-L)

Stop conditions - Startup OFF or regular interlock operation or preparation or blower OFF (Reset air pressure OFF confirmation flag when blower is OFF) Blower OFF confirmation operation - reset the air pressure OFF confirmation flag when the blowe turns off Low fire stop process - pilot ignition process, main ignition process, damper modulation process, relgnition conditions process



State Transition Diagram 5 (Zone RX-L or Single Zone RX-L)

Stop conditions - Startup OFF or regular interlock operation or preparation Low fire stop process - pilot ignition process, main ignition process, damper modulation process, relgnition conditions process



State Transition Diagram 6 (Zone RX-L or Single Zone RX-L)

Stop conditions - Startup OFF or regular interlock operation or preparation or blower OFF (Reset air pressure OFF confirmation flag when blower is OFF) Blower OFF confirmation operation - reset the air pressure OFF confirmation flag when the blower turns off Low fire stop process - pilot ignition process, main ignition process, damper modulation process reginition conditions process

Appendix 2 RX-R Operations and State Transition

Combustion operation

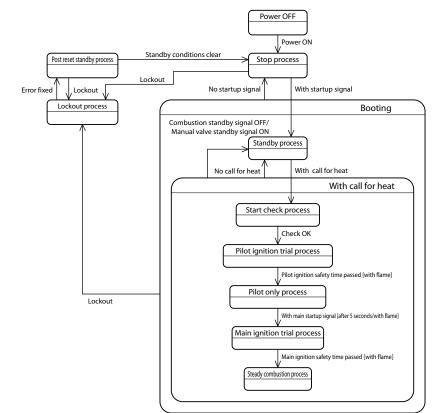
The RX-R operations are as follows:

Name	Description	Remarks
Stop	A startup signal has not been received	
Standby	A startup signal has been received Input functions are checked	Operations continue until a call for heat*1 is received
Start check	When the the call for heat * ¹ is received, false flame, post- error recovery standby, and so on, are checked	
Pilot ignition trial	The pilot burner is ignited	
Pilot only	Only the pilot burner flame has been detected In the direct ignition/time proportioning model, operations do not proceed beyond this sequence	Operations continue until the main startup signal is received
Main igni- tion trial	The main burner is ignited	
Steady combustion	The main burner flame has been detected	Interrupted pilot: Pilot extinguish Continuous pilot/ Intermittent pilot/ Independent supervision/ Independent supervision (external relay): pilot combustion
760 °C end standby	If combustion was continuing after 760 °C mode ends, stop the entire load and stand by for a specified time.	R20C/R22C/R20B only
Lockout	An error has occurred and all loads have been stopped	
Flame relay	Combustion mode: Moves to this operation during flame relay Does not drive the load	

*1 The RX-R call for heat is generated when the conditions listed below are met. A call for heat is not generated if there is an exception in any of these conditions.

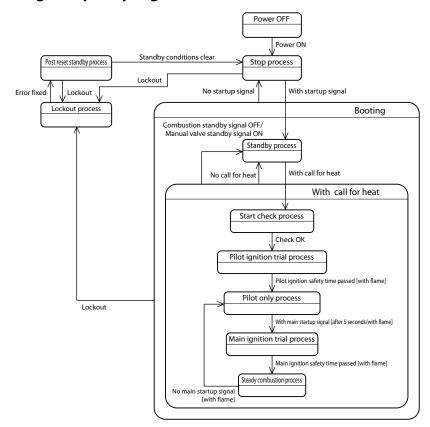
Startup signal	Yes
Combustion standby signal	Yes o
Manual value standby signal	No o
Pilot startup signal or main startup signal	Yes
Communication link with RX-L	Yes
Interlock signal from RX-L	Norn

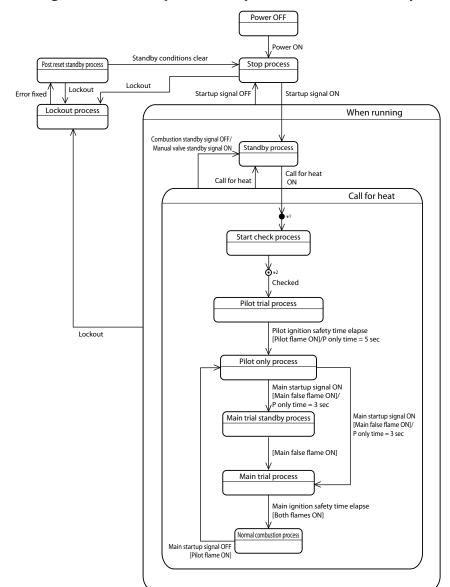
Yes Yes or combustion standby mode is not set No or the manual valve is not set tup signal Yes Yes Normal



State Transition Diagram 1 (Interrupted/intermittent pilot)

State Transition Diagram 2 (Continuous pilot/Independent supervision/Independent supervision (high frequency/regenerative burner))

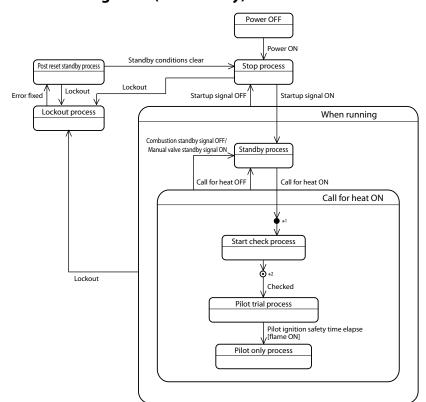




Status Change Chart 3 (Independent supervision (external relay))

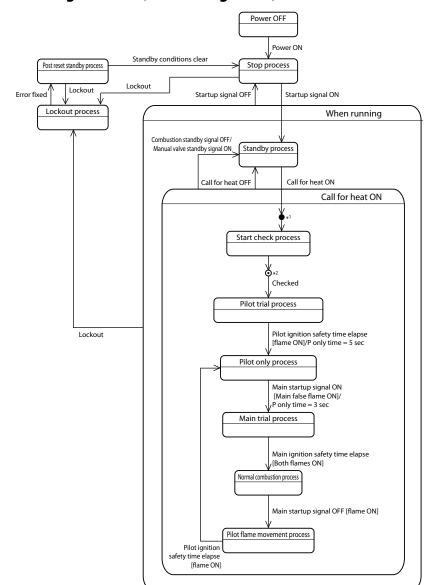
For details on the *1 and *2 start check processes,

refer to 🕞 🖬 Status Change Chart 7 (start check process details) (Appendix-Page 17).



State Transition Diagram 4 (Flame relay)

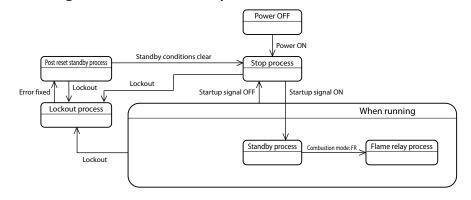
For details on the *1 and *2 start check processes, refer to 🎓 🖬 Status Change Chart 7 (start check process details) (Appendix-Page 17).



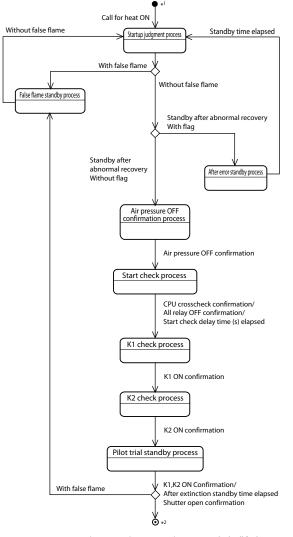
Status Change Chart 5 (Alternating Pilots)

For details on the *1 and *2 start check processes, refer to 🞓 🖬 Status Change Chart 7 (start check process details) (Appendix-Page 17).

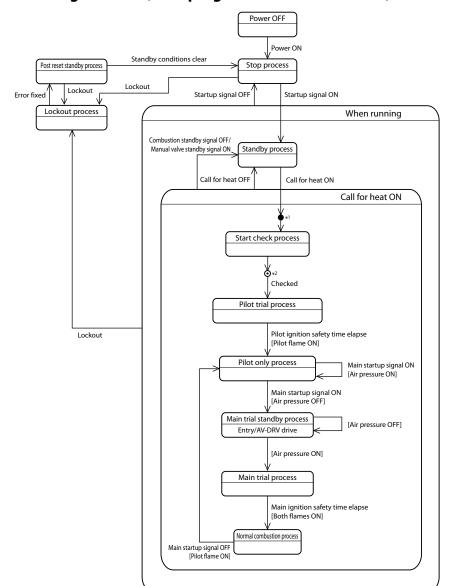
Status Change Chart 6 (Flame relay)



Status Change Chart 7 (Flame relay)



CAUTION: When RX-R side purge conditions are *Linked call for heat*, check if *with air pressure input* at start check process.



Status Change Chart 8 (RX-R purge condition: Linked MV)

For details on the *1 and *2 start check processes, refer to 🎓 ■ Status Change Chart 7 (start check process details) (Appendix-Page 17).

Appendix 3 RX-L80, RX-R40/20/44/46/22 Parameter Settings Sheet

RX-L80 Parameter Settings Sheet

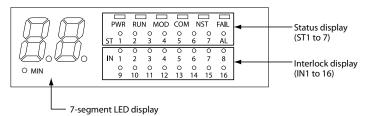
	Setting item	Code	Initial value	Setting
System	RX-L type	A-1	Single zone RX-L	
	Number of connected zone RX-Ls	B-14	1	
	Number of locked out zone RX-Ls	B-8	1	
	RX-L address	B-19	0	
	Number of connected RX-Rs	E-1	1	
	Number of locked out RX-Rs	E-2	1	
	Air switch check use	A-2	ON	
	Air switch check result clear	A-5	When RX-L start switch OFF	
	760 °C mode use	A-4	OFF	
	Startup type	A-3	Link 1	
Control	RX-L start method	B-1	Start switch input	
	Prepurge use	B-2	Enable	
	Blower cycle signal assignment	B-6	Run internally	
	Purge count start signal source	B-7	Run internally	
	High fire position input	B-9	IN 2	
	Low fire position input	B-10	IN 3	
	Process timeout handling	B-11	Only a warning is displayed	
			after a specified amount of	
			time passes.	
	Prepurge after RX-R restart	B-12	Always perform a prepurge	
	Low fire stop	B-13	OFF	
	Postpurge for residual flame	B-15	Not specified	
	RX-R prepurge use	B-16	OFF	
		B-17		
	RX-L communication error handling	B-18	Lockout	
	Permit RX-R startup via host communication*1	F-5	None	
	Set reception monitoring for host communication	B-21	Not monitored	
	(RS-485)*1 Set reception monitoring for host communication	B-22	Not monitored	
	(Ethernet)*1	0.00		
	Set reception monitoring reset for host communication*1	B-23	Auto recovery	
limer	Prepurge time	D-1	5min.	
	Ignition wait time (s)	D-2	20.0s	
	Damper modulation control wait time (s)	D-3	20.0s	
	Postpurge time (s)	D-4	60.0s	
	Lockout postpurge time (s)	D-5	60.0s	
	Process error judgment time (no combustion) (s)	D-6	120.0s	
	Process error judgment time (during combustion) (s)	D-7	20.0s	
	Reignition wait time (s)	D-8	20.0s	
	Timeout time for host communication reception	D-9	180.0s	
	monitoring*1			
Group settings	RX-R1	E-3	Group A	
	RX-R2	E-3	Group A	
	RX-R3	E-3	Group A	
	RX-R4	E-3	Group A	
	RX-R5	E-3	Group A	
	RX-R6	E-3	Group A	
	RX-R7	E-3	Group A	
	RX-R8	E-3	Group A	
	RX-R9	E-3	Group A	
	RX-R10	E-3	Group A	
	RX-R11	E-3	Group A	
	RX-R12	E-3	Group A	

	Setting item	Code	Initial value	Setting
Group settings	RX-R13	E-3	Group A	
	RX-R14	E-3	Group A	
	RX-R15	E-3	Group A	
	RX-R16	E-3	Group A	
	RX-R17	E-3	Group A	
	RX-R18	E-3	Group A	
	RX-R19	E-3	Group A	
	RX-R20	E-3	Group A	
	RX-R21	E-3	Group A	
	RX-R22	E-3	Group A	
	RX-R23	E-3	Group A	
	RX-R24	E-3	Group A	
	RX-R25	E-3	Group A	
	RX-R26	E-3	Group A	
	RX-R27	E-3		
		E-3	Group A	
	RX-R28		Group A	
	RX-R29	E-3	Group A	
	RX-R30	E-3	Group A	
	RX-R31	E-3	Group A	
	RX-R32	E-3	Group A	
nput settings	IN1 input function	C-1	Air pressure switch	
	IN1 interlock OFF delay	C-2	0 s	
	IN2 input function	C-1	Prepurge condition	
	IN2 interlock OFF delay	C-2	0 s	
	IN3 input function	C-1	Ignition condition	
	IN3 interlock OFF delay	C-2	0 s	
	IN4 input function	C-1	Damper modulation	
	IN4 interlock OFF delay	C-2	0 s	
	IN5 input function	C-1	Interlock	
	IN5 interlock OFF delay	C-2	0 s	
	IN6 input function	C-1	Interlock	
	IN6 interlock OFF delay	C-2	0 s	
	IN7 input function	C-1	Interlock	
	IN7 interlock OFF delay	C-2	0 s	
	IN8 input function	C-1	Disable	
	•	C-1	0 s	
	IN8 interlock OFF delay			
	IN9 input function	C-1	Disable	
	IN9 interlock OFF delay	C-2	0 s	
	IN10 input function	C-1	Disable	
	IN10 interlock OFF delay	C-2	0 s	
	IN11 input function	C-1	Disable	
	IN11 interlock OFF delay	C-2	0 s	
	IN12 input function	C-1	Disable	
	IN12 interlock OFF delay	C-2	0 s	
	IN13 input function	C-1	Disable	
	IN13 interlock OFF delay	C-2	0 s	
	IN14 input function	C-1	Disable	
	IN14 interlock OFF delay	C-2	0 s	
	IN15 input function	C-1	Disable	
	IN15 interlock OFF delay	C-2	0 s	
	IN16 input function	C-1	Disable	
	IN16 interlock OFF delay	C-2	0 s	
Condition	Conditional interlock setting A	C-3	Disable	
settings	Conditional interlock setting A	C-3	3.0s	

	Setting item	Code	Initial value	Setting
Condition	Conditional interlock setting B	C-3	Disable	
settings	Conditional interlock setting standby time B	C-4	3.0s	
	Conditional interlock setting C	C-3	Disable	
	Conditional interlock setting standby time C	C-4	3.0s	
	Conditional interlock setting D	C-3	Disable	
	Conditional interlock setting standby time D	C-4	3.0s	
	Conditional interlock setting E	C-3	Disable	
	Conditional interlock setting standby time E	C-4	3.0s	
Relay output	Relay output	B-3	Disable	
	Blower output	B-4	Blower running	
	Damper output	B-5	Control motor running	
Monitor	Flicker	MO-1	Flicker OFF	
output	M-1	MO-2	First Out Monitor 1	
	M-2		First Out Monitor 2	
	M-3		First Out Monitor 3	
	M-4		First Out Monitor 4	
	M-5		First Out Monitor 5	
	M-6		First Out Monitor 6	
	M-7		First Out Monitor 7	
	M-8		First Out Monitor 8	
	M-9		First Out Monitor 9	
	M-10		First Out Monitor 10	
	M-11		First Out Monitor 11	
	M-12		First Out Monitor 12	
	M-13		First Out Monitor 13	
	M-14		First Out Monitor 14	
	M-15		First Out Monitor 15	
	M-16		First Out Monitor 16	
	M-17		Air switch check complete	
	M-18		Purging	
	M-19		Purge complete	
	M-20		Interlock input normal	
	M-21		Not used	
	M-22		Alarm (lockout)	
Monitor	M-1 output logic	MO-3	Direct	
output logic	M-2 output logic		Direct	
	M-3 output logic		Direct	
	M-4 output logic		Direct	
	M-5 output logic		Direct	
	M-6 output logic		Direct	
	M-7 output logic		Direct	
	M-8 output logic		Direct	
	M-9 output logic		Direct	
	M-10 output logic		Direct	
	M-11 output logic		Direct	
	M-12 output logic		Direct	
	M-13 output logic		Direct	
	M-14 output logic		Direct	
	M-15 output logic		Direct	
	M-16 output logic		Direct	
	M-17 output logic		Direct	
	M-18 output logic		Direct	
	M-19 output logic		Direct	
	M-20 output logic		Direct	

	Setting it	em	Code	Initial value	Setting
Monitor	M-21 output logic		MO-3	Direct	
output logic	M-22 output logic			Direct	
LED display *3	LED settings (IN)	IN1	DSP-1	IN1	
		IN2		IN2	
		IN3		IN3	
		IN4		IN4	
		IN5		IN5	
		IN6	1	IN6	
		IN7	7	IN7	
		IN8	1	IN8	
		IN9		IN9	
		IN10		IN10	
		IN11		IN11	
	IN12	IN12	7	IN12	
		IN13		IN13	
		IN14		IN14	
	IN15	IN15		IN15	
		IN16		IN16	
	LED (ST)	ST1	7	Air switch check complete	
		ST2		Purging	
		ST3		Purge complete	
		ST4		Allow operation of the next	
				module	
		ST5		Not used	
		ST6		Not used	
		ST7		Not used	
	Error display setting (7-segment LED)	DSP-2	4-digit warning display	
Host com-	Host communication ((RS-485) device address	F-1	1 (RX-L80)	
munication				127 (RX-L90)	
RS485	Baud rate		F-2	19200bps	
	Data format ^{*2}		F-3	Even parity stop 1	
		ommunication (RS-485)* ¹	F-3	8 bits	
	Parity for host commu		F-3	Even parity	
	Stop bits for host com	munication (RS-485)* ¹	F-3	1 stop bit	
	Protocol		F-4	CPL	
	Permit RX-R startup via host communication* ²		F-5	Disable	
	Minimum response tir (RS-485)*1	ne for host communication	F-6	3s	
	IP address for host cor	nmunication (Ethernet)* ¹	H-1	192.168.255.254	
	Net mask for host com	nmunication (Ethernet)* ¹	H-2	255.255.255.0	
	Default gateway for he	ost communication (Ethernet)*1	H-3	None	
		mber for host communication	H-4	502	

*1 RX-L90 only *2 RX-L80 only *3 RX-L burner interlock module display



	Setting item	Code	Initial value	Setting
System	Combustion mode switch	1-1	Interrupted pilot	
,	RX-R purge conditions	1-2	Disable	
	760 ℃ mode	1-5	Disable	
Control	Startup settings	2-1	Linked RX-L	
	Reset condition	2-2	Linked RX-L	
Timer	Restart wait time (s)	2-3	0.0s	
	Start check delay time (s)	2-4	0.0s	
	Air valve OFF delay (s)	2-5	0.0s	
	Air switch Off test timeout (s)	2-6	20.0s	
	Pilot ignition time	1-3	4.5±0.5s	
Input settings	IN1 input function	3-1	Interlock	
1 5	IN1 OFF delay	3-2	0 s	
	IN2 input function	3-1	Interlock	
	IN2 OFF delay	3-2	0 s	
	IN3 input function	3-1	Interlock	
	IN3 OFF delay	3-2	0 s	
	IN4 input function	3-1	Interlock	
	IN4 OFF delay	3-2	0 s	
Monitor	Flicker	5-1	OFF	
output	M-1	5-2	First Out Monitor 1	
	M-2	5-2	First Out Monitor 2	
	M-3	5-2	First Out Monitor 3	
	M-4	5-2	First Out Monitor 4	
	M-5	5-2	Ignition transformer output	
	M-6	5-2	Pilot safety shutoff valve	
			output	
	M-7	5-2	Main safety shutoff valve	
			output	
	M-8	5-2	Flame/primary	
	M-9	5-2	Alarm output	
	M-10	5-2	Not used	
	M-11	5-2	Not used	
	M-1 output logic	5-3	Direct	
	M-2 output logic	5-3	Direct	
	M-3 output logic	5-3	Direct	
	M-4 output logic	5-3	Direct	
	M-5 output logic	5-3	Direct	
	M-6 output logic	5-3	Direct	
	M-7 output logic	5-3	Direct	
	M-8 output logic	5-3	Direct	
	M-9 output logic	5-3	Direct	
	M-10 output logic	5-3	Direct	
	M-11 output logic	5-3	Direct	
Display settings	Error display setting	6-1	Detailed (4 chars.)	
RX-R control	Address	4-1	0 *	

	Setting item	Code	Initial value	Setting
System	Combustion mode switch	1-1	Interrupted pilot	
	RX-R purge conditions	1-2	Disable	
	760 °C mode	1-5	Disable	
Control	Startup settings	2-1	Linked RX-L	
	Reset condition	2-2	Linked RX-L	
Timer	Restart wait time (s)	2-3	0.0s	
	Start check delay time (s)	2-4	0.0s	
	Air valve OFF delay (s)	2-5	0.0s	
	Air switch Off test timeout (s)	2-6	20.0s	
	Pilot ignition time	1-3	4.5±0.5s	
Input settings	IN1 input function	3-1	Interlock	
	IN1 OFF delay	3-2	0 s	
	IN2 input function	3-1	Interlock	
	IN2 OFF delay	3-2	0 s	
	IN3 input function	3-1	Interlock	
	IN3 OFF delay	3-2	0 s	
	IN4 input function	3-1	Interlock	
	IN4 OFF delay	3-2	0 s	
Monitor	Flicker	5-1	OFF	
output	M-1	5-2	First Out Monitor 1	
	M-2	5-2	First Out Monitor 2	
	M-3	5-2	First Out Monitor 3	
	M-4	5-2	First Out Monitor 4	
	M-5	5-2	Ignition transformer output	
	M-6	5-2	Pilot safety shutoff valve	
			output	
	M-7	5-2	Main safety shutoff valve	
			output	
	M-8	5-2	Flame/primary	
	M-9	5-2	Alarm output	
	M-10	5-2	Not used	
	M-11	5-2	Not used	
	M-1 output logic	5-3	Direct	
	M-2 output logic	5-3	Direct	
	M-3 output logic	5-3	Direct	
	M-4 output logic	5-3	Direct	
	M-5 output logic	5-3	Direct	
	M-6 output logic	5-3	Direct	
	M-7 output logic	5-3	Direct	
	M-8 output logic	5-3	Direct	
	M-9 output logic	5-3	Direct	
	M-10 output logic	5-3	Direct	
	M-11 output logic	5-3	Direct	
Display settings	Error display setting	6-1	Detailed (4 chars.)	
RX-R control	Address	4-1	0 *	

RX-R20 Parameter Settings Sheet

	Setting item	Code	Initial value	Setting
System	Combustion mode switch	1-1	Independent supervision	
,	RX-R purge conditions	1-2	Disable	
	760 °C mode	1-5	Disable	
Control	Startup settings	2-1	Linked RX-L	
	Reset condition	2-2	Linked RX-L	
Timer	Restart wait time (s)	2-3	0.0s	
	Start check delay time (s)	2-4	0.0s	
	Air valve OFF delay (s)	2-5	0.0s	
	Air switch Off test timeout (s)	2-6	20.0s	
	Pilot ignition time	1-3	4.5±0.5s	
Input settings	IN1 input function	3-1	Interlock	
provide gr	IN1 OFF delay	3-2	0 s	
	IN2 input function	3-1	Interlock	
	IN2 OFF delay	3-2	0 s	
	IN3 input function	3-1	Interlock	
	IN3 OFF delay	3-2	0 s	
	IN4 input function	3-1	Interlock	
	IN4 OFF delay	3-2	0 s	
Monitor	Flicker	5-1	OFF	
output	M-1	5-2	First Out Monitor 1	
•	M-2	5-2	First Out Monitor 2	
	M-3	5-2	First Out Monitor 3	
	M-4	5-2	First Out Monitor 4	
	M-5	5-2	Ignition transformer output	
	M-6	5-2	Pilot safety shutoff valve	
			output	
	M-7	5-2	Main safety shutoff valve	
			output	
	M-8	5-2	Flame/primary	
	M-9	5-2	Alarm output	
	M-10	5-2	Flame/secondary	
	M-11	5-2	Not used	
	M-1 output logic	5-3	Direct	
	M-2 output logic	5-3	Direct	
	M-3 output logic	5-3	Direct	
	M-4 output logic	5-3	Direct	
	M-5 output logic	5-3	Direct	
	M-6 output logic	5-3	Direct	
	M-7 output logic	5-3	Direct	
	M-8 output logic	5-3	Direct	
	M-9 output logic	5-3	Direct	
	M-10 output logic	5-3	Direct	
	M-11 output logic	5-3	Direct	
Display settings	Error display setting	6-1	Detailed (4 chars.)	
RX-R control	Address	4-1	0*	

	Setting item	Code	Initial value	Setting
System	Combustion mode switch	1-1	Independent supervision (external relay)	
	RX-R purge conditions	1-2	Disable	
	760 °C mode	1-5	Disable	
Control	Startup settings	2-1	Linked RX-L	
	Reset condition	2-2	Linked RX-L	
Timer	Restart wait time (s)	2-3	0.0s	
	Start check delay time (s)	2-4	0.0s	
	Air valve OFF delay (s)	2-5	0.0s	
	Air switch Off test timeout (s)	2-6	20.0s	
	Pilot ignition time	1-3	4.5±0.5s	
Input settings	IN1 input function	3-1	Interlock	
provide state	IN1 OFF delay	3-2	0 s	
	IN2 input function	3-1	Interlock	
	IN2 OFF delay	3-2	0 s	
	IN3 input function	3-1	Interlock	
	IN3 OFF delay	3-2	0 s	
	IN4 input function	3-1	Interlock	
	IN4 OFF delay	3-2	0 s	
Monitor	Flicker	5-1	OFF	
output	M-1	5-2	First Out Monitor 1	
o alp al	M-2	5-2	First Out Monitor 2	
	M-3	5-2	First Out Monitor 3	
	M-4	5-2	First Out Monitor 4	
	M-5	5-2	Ignition transformer output	
	M-6	5-2	Pilot safety shutoff valve	
		5-2	output	
	M-7	5-2	Main safety shutoff valve	
			output	
	M-8	5-2	Flame/primary	
	M-9	5-2	Alarm output	
	M-10	5-2	Flame/secondary	
	M-11	5-2	MV drive output	
	M-1 output logic	5-3	Direct	
	M-2 output logic	5-3	Direct	
	M-3 output logic	5-3	Direct	
	M-4 output logic	5-3	Direct	
	M-5 output logic	5-3	Direct	
	M-6 output logic	5-3	Direct	
	M-7 output logic	5-3	Direct	
	M-8 output logic	5-3	Direct	
	M-9 output logic	5-3	Direct	
	M-10 output logic	5-3	Direct	
	M-11 output logic	5-3	1	
Dicplay	· · · · · · · · · · · · · · · · · · ·	1	Direct Detailed (4 chars.)	
Display settings	Error display setting	6-1	Detalled (4 chars.)	
RX-R control	Address	4-1	0 *	

RX-R46 Parameter Settings Sheet

	Setting item	Code	Initial value	Setting
System	Combustion mode switch	1-1	Direct ignition (external relay)	
	RX-R purge conditions	1-2	Disable	
	760 °C mode	1-2	Disable	
Control	Startup settings	2-1	Linked RX-L	
Control	Reset condition	2-1	Linked RX-L	
Timer	Restart wait time (s)	2-2	0.0s	
Inner	Start check delay time (s)	2-3	0.0s	
	Air valve OFF delay (s)	2-4	0.0s	
	Air switch Off test timeout (s)			
		2-6	20.0s	
	Pilot ignition time	1-3	4.5±0.5s	
Input settings	IN1 input function	3-1	Interlock	
	IN1 OFF delay	3-2	0 s	
	IN2 input function	3-1	Interlock	
	IN2 OFF delay	3-2	0 s	
	IN3 input function	3-1	Interlock	
	IN3 OFF delay	3-2	0 s	
	IN4 input function	3-1	Interlock	
	IN4 OFF delay	3-2	0 s	
Monitor	Flicker	5-1	OFF	
output	M-1	5-2	First Out Monitor 1	
	M-2	5-2	First Out Monitor 2	
	M-3	5-2	First Out Monitor 3	
	M-4	5-2	First Out Monitor 4	
	M-5	5-2	Ignition transformer output	
	M-6	5-2	Pilot safety shutoff valve output	
	M-7	5-2	Main safety shutoff valve output	
	M-8	5-2	Flame/primary	
	M-9	5-2	Alarm output	
	M-10	5-2	IG drive output	
	M-11	5-2	MV drive output	
	M-1 output logic	5-3	Direct	
	M-2 output logic	5-3	Direct	
	M-3 output logic	5-3	Direct	
	M-4 output logic	5-3	Direct	
	M-5 output logic	5-3	Direct	
	M-6 output logic	5-3	Direct	
	M-7 output logic	5-3	Direct	
	M-8 output logic	5-3	Direct	
	M-9 output logic	5-3	Direct	
	M-9 output logic	5-3	1	
	· · · ·		Direct	
Display	M-11 output logic Error display setting	<u>5-3</u> 6-1	Direct Detailed (4 chars.)	
settings				
RX-R control	Address	4-1	0 *	

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Appendix 4 SDC35/36 Settings

■ [SP bank] *5P*

Display	ltem	Setting
SP-1	SP for LSP groups 1 to 8	800

■ [Event configuration bank] EUCF

Display	ltem	Setting		
E2.C1	Internal event Config. 1	1: PV high limit		
E3.C1		6: Deviation high and low limits		
E4.C1		2: PV low limit		
	Internal event Config. 2			
E2.C2	Direct/Reverse	1: Reverse		
	Standby	0: No standby		
	EVENT state at READY	0: Continuation		
E3.C2	Direct/Reverse	1: Reverse		
	Standby	0: No standby		
	EVENT state at READY	0: Continuation		
E4.C2	Direct/Reverse	0: Direct		
	Standby	0: No standby		
	EVENT state at READY	0: Continuation		
	Internal event Config. 3			
E2.C3	Alarm OR	0: No standby		
	Special OFF	0: As normal		
	Delay time unit	0:0.1 s		
E3.C3	Alarm OR	0: No standby		
	Special OFF	0: As normal		
	Delay time unit	0:0.1 s		
E4.C3	Alarm OR	0: No standby		
	Special OFF	0: As normal		
	Delay time unit	0:0.1 s		

Event bank]

Display	ltem	Setting
E2	Internal event Main setting	1000
E3		10
E4		800
E2.Sb	Internal event Sub setting	—
E3.Sb		10
E4.Sb		—
E2.Hy	Hysteresis	5
E3.Hy		1
E4.Hy		1
E2.on	ON delay	0
E3.on		0
E4.on		0
E2.oF	OFF delay	0
E3.oF		0
E4.oF		0

■ [Parameter bank] *PR-R*

Display	ltem	Setting	
CtrL	Control method	0: ON/OFF control	
diFF	ON/OFF control differential	1	
oFFS	ON/OFF control operation offset	0	

List of setup settings and displays

Display	ltem	Setting	
C07	SP low limit	765	
C08	SP high limit	1200	
C10	RSP range type	0: 4 to 20 mA	
C11	RSP range low limit	0	
C12	RSP range high limit	1200	
C52	Auxiliary output range	1: 4 to 20 mA	
C53	Auxiliary output type	3: PV	
C54	Auxiliary output scaling low limit	0	
C55	Auxiliary output scaling high limit	1200	

■ [Setup bank] SEUP

■ [DI assignment bank] EUCF

Display	ltem	Setting
di1.1	Operation type	9: LSP/RSP (SDC35/36 only)
di2.1		0: No function
di3.1		7: RUN/READY mode selection
di4.1		0: No function
di5.1		0: No function
di1.2	Input bit operation	1: Operation 1: (A and B) or (C and D)
di2.2		0: Do not use (default input external contact 2)
di3.2		1: Operation 1: (A and B) or (C and D)
di4.2		4: Operation 4: (A and B and C and D)
di5.2		1: Operation 1: (A and B) or (C and D)
di1.3	Input assignment A	2: DI1
di2.3		_
di3.3		0: Always open (OFF, 0)
di4.3		2: DI1
di5.3		2: DI1
di1.4	Input assignment B	1: Always close (ON, 1)
di2.4		—
di3.4		0: Always open (OFF, 0)
di4.4		12: Internal event 3 (Setting = 6: deviation high low limit)
di5.4		28: Alarm
di1.5	Input assignment C	0: Always open (OFF, 0)
di2.5		—
di3.5		0: Always open (OFF, 0)
di4.5		13: Internal event 4 (Setting = 2: PV low limit)
di5.5		0: Always open (OFF, 0)
di1.6	Input assignment D	0: Always open (OFF, 0)
di2.6		—
di3.6		0: Always open (OFF, 0)
di4.6		1: Always close (ON, 1)
di5.6		0: Always open (OFF, 0)
di1.7	Reverse A	1: Reverse
	Reverse B	0: Direct
	Reverse C	0: Direct
	Reverse D	0: Direct

Display	Item	Setting		
di2.7	Reverse A	_		
	Reverse B	—		
	Reverse C	—		
	Reverse D	—		
di3.7	Reverse A	0: Direct		
	Reverse B	0: Direct		
	Reverse C	0: Direct		
	Reverse D	0: Direct		
di4.7	Reverse A	1: Reverse		
	Reverse B	1: Reverse		
	Reverse C	1: Reverse		
	Reverse D	0: Direct		
di5.7	Reverse A	0: Direct		
	Reverse B	1: Reverse		
	Reverse C	0: Direct		
	Reverse D	0: Direct		
di1.8	Reverse	0: Direct		
di2.8		0: Direct		
di3.8		0: Direct		
di4.8		0: Direct		
di5.8		0: Direct		
di1.9	Internal event Number specification			
di2.9				
di3.9		_		
di4.9				
di5.9		—		

■ [User function bank] UF

Display	ltem	Setting	
UF-1	User function definition 1	605: SP value	
UF-2	User function definition 2	806: Event main setting 2	
UF-3	User function definition 3	811: Event main setting 3	
UF-4	User function definition 4	812: Event sub setting 3	
UF-5	User function definition 5	816: Event main setting 4	
UF-6	User function definition 6	1211: RSP bias	

■ [DO assignment bank] 💋

Display	ltem	Setting
Ev1.1	Operation type Event output 1	3: Operation 1: (A and B) or (C and D)
Ev1.2	Output assignment A Event output 1	14: MV1
Ev1.3	Output assignment B Event output 1	30: Internal contact 5 (Setting = 0: No function)
Ev1.4	Output assignment C Event output 1	29: Internal contact 4 (Setting = 0: No function)
Ev1.5	Output assignment D Event output 1 1: Always close (ON, 1)	
Ev1.6	Reverse A	1: Reverse
	Reverse B	0: Direct
	Reverse C	0: Direct
	Reverse D	0: Direct
Ev1.7 Reverse 0: Direct		0: Direct
Ev1.8	Latch	0: None

The following settings are recommended settings.

■ [Lock bank] LoC

Display	ltem	Setting	
LoC	LoC Key lock	3: The UF, lock, and manual MV can be set	

Appendix 5 Explanation of General Terminology

A list of general Ethernet terminology is provided below as a reference.

OSI (Open Systems Interconnection) Layer

There are seven layers in the hierarchical structure conversion system used for creating OSI (Open Systems Interconnection model) protocol. This is based on the ISO (International Standards Organization) network configuration design plan for data communications.

Layer 7	Application layer	Rule for between applications (HTTP, etc MODBUS and CPL are also in this layer)
Layer 6	Presentation layer	Method for expressing data (SMTP, etc.)
Layer 5	Session layer	Procedures for sessions (NetBIOS, etc.)
Layer 4	Transport layer	Method for communicating between applications (TCP, UDP, etc.)
Layer 3	Network layer	Method for communicating between two nodes (IP, ICMP, etc.)
Layer 2	Data link layer	Method for transferring data between multiple nodes con- nected to a network medium. (Ethernet MAC)
Layer 1	Physical layer	Method for converting signals passing through or above a net- work medium (In Ethernet communications, this refers to PHY and cables)

Ethernet

Developed by Xerox, this is a Baseband LAN standardized as IEEE802.3. (Ethernet is a registered trademark of Xerox)

Strictly speaking, there are some specification differences between Ethernet and the IEEE802.3 standard. However, these are generally not differentiated between. In this document, the IEEE802.3 standard is generally referred to as Ethernet. The Ethernet bandwidths currently in use are 10 Mbps (Ethernet), 100 Mbps (Fast Ethernet), 1 Gbps (Gigabit Ethernet), and 10 Gbps (10GbE). In addition, 40 Gbps and 100 Gbps are currently being formulated as wide-band standards. This devices only supports 100 Mbps 100BASE-TX.

100BASE-TX

IEEE802.3u: This is the most widespread of the Fast Ethernet (100 Mbps) standards.

It is a point-to-point connection using two Cat 5 UTP cables (unshielded twistedpair cables).

Data is encoded in 4B/5B and communication is conducted using the MLT-3 modulation method.

Other Fast Ethernet

100BASE-T2: Use two CAT 5 UTP cables

100BASE-T4: Use four CAT 3 UTP cables

100BASE-FX: Connect using optical fiber cable

UTP (Unshielded Twist Pair) Cable

UTP cable is unshielded twisted-pair cable.

It is classified according to the "performance" and "modular plug" connection methods.

The details of each are explained below.

• Performance

Performance is standardized as ANSI/TIA/EIA-568 and classified as shown below.

Cat 3: Prescribed up to the 16 MHz frequency bandwidth (10BASE-T)

- Cat 5: Prescribed up to the 100 MHz frequency bandwidth (100BASE-TX/10BASE-T)
- Cat 5e: Adds the regulation on interference from remote communication lines to Cat 5 (1000BASE-T/100BASE-TX/10BASE-T)
- Cat 6: Prescribed up to the 250 MHz frequency bandwidth

Cat 6a: Prescribed up to the 500 MHz frequency bandwidth, with UTP and ScTP (bundle shield)

Cat 6e: Cable manufacturer-specific standards.

The electrical characteristics, including the modular plug, and the processing method are strictly regulated in ANSI/TIA/EIA-568. The cables used have modular plugs, and are sold in retail stores. However, some cables do not meet the standards for modular plug characteristics/processing methods. If cables do not meet the standards, communication may be unstable.

Modular plugs

These are classified according to straight wires and cross wires. Straight wires connect with the same pins as the opposing modular plug. Always align pins with the corresponding twisted pair as shown below.

Pair 1: Pin 4–Pin 5 Pair 2: Pin 1–Pin 2 Pair 3: Pin 3–Pin 6 Pair 4: Pin 7–Pin 8

Only use four pairs of straight wires for the Network Instrumentation Modules. The cable length is more than 0.5 meters and less than 100 meters.

Different restrictions apply to the cable length depending on the configuration. Chapter 3. WIRING

The locations for cross wires are different for each transmission standard (1000BASE-T/1000BASE-TX/100BASE-TX) and there is no compatibility.

STP (Shielded Twist Pair) Cable

Twisted-pair cable with a shield. This device does not support STP cables.

Bandwidth

Communication capacity in a certain amount of time. This is normally expressed by how many bits of data can be sent in OSI Layer 2 in one second. Example: 100 Mbps

Node

A terminal that has communication functions. Each Network Instrumentation Modules is a node on the network.Communication boxes, communication adapters, and terminal adapters are not nodes.

Port	
	An interface component for exchanging data with external components. Originally, this also included software. However, in this case it refers to a compo- nent that is contacted electrically. Communication adapters convert the functions of these ports.
■ Hub	
	The line concentrator relayed in an OSI Layer 1 used in a star-type LAN. A hub has multiple ports and data that is input in one port is transferred to all other ports. All connected nodes share bandwidth. The functions are different to those of a switching hub. Although they may be both referred to as a hub, they need to be clearly distinguished. A hub is referred to as a dumb hub if there is a need to distinguish it from a switching hub.
Switching Hub	
	The line concentrator relayed in an OSI Layer 2 used in a star-type LAN. A switching hub has multiple ports. It analyzes entered data frame destination ad- dresses and uses bandwidth efficiently by only transmitting to the relevant ports. All connected ports can use all bandwidths. In addition, you can typically connect devices with different bandwidths to each port. It also has switches that relay in OSI Layer 3 and Layer 4.
Router	
	This is a device that relays to other networks in OSI Layer 3 (and part of Layer 4). It has a route analysis function that determines which route to use for transferring entered data, and management functions, such as a filtering function for determin- ing protocols and IP.
Topology	
	Topology is a network's connection configuration. A typical topology is shown below.
Star topology	Star topology is appropriate for 10BASE-T, 100BASE-TX, and 1000BASE-T(GbE).
	Hub/switching hub
	Node Node Node Node Node Node Node Node
	In this configuration, connections are made in a broadcasting state using line con- centrators and relay devices (such as switching hubs). Line concentrators and relay devices can be connected in a cascade. Nodes are connected to line concentrators and relay devices using a point-to-point connection. (Other nodes are not con- nected in between).

Line concentrators and relay devices have dumb hubs and switching hubs. The network topology of a dumb hub is logically the same as a bus topology because all connected nodes share bandwidth in the hub.

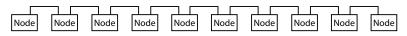
In switching hubs, bandwidth is guaranteed in each port, improving the efficient use of a network.

It is unlikely that the entire network will go down as a result of a single node going down. However, if there is a line concentrator or relay device error, communication will fail in all nodes.

A tree topology is similar to this topology. Tree topology is typified by USB. It uses a hub with master nodes that connect to slave nodes.

Daisy chain topology

Daisy chain topology is appropriate for SCSI and IEEE1394 (i.LINK/FireWire). This topology is rarely used in typical Ethernet communications.



In this configuration, all nodes have two sets of ports, and they are strung together in series using point-to-point connections. Data is transferred by relaying it using intermediate nodes. This configuration is advantageous because wiring for connections is easy. However, if an intermediate node fails, the network becomes divided. Signals flow between multiple nodes, with the exception of the nodes located at either end. The bandwidth usage efficiency is inferior to star topology connected through a switching hub, but it is better than a bus topology.

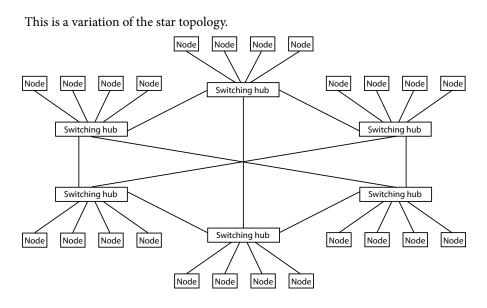
Ring topology

Node	Node	Node	Node	Node
Node	Node	Node	Node	Node

This configuration improves the fault tolerance performance of daisy chain topology. (A single point of failure does not inhibit communications between healthy nodes.)

In this configuration, all nodes have two sets of ports. They are strung together in series using point-to-point connections that form one closed ring. Data is transferred via intermediate nodes.

Mesh topology



It is a redundant connection method that connects through multiple paths (mesh states) when establishing connections between multiple switching hubs. Note that the switching hubs must support a spanning tree protocol. (If this protocol is not supported, the network becomes congested.)

This configuration can support a failure in an intermediate switching hub. However, it cannot support a failure in a switching hub that has nodes connected.

Full Duplex

This is a two-way communication method that has two communication path systems and allows receiving and sending to be performed simultaneously. Most switching hubs support full duplex.

Half Duplex

This is a two-way communication method that only has one communication path system and splits its time switching between sending and receiving. Half duplex is used in a bus topology such as 10BASE-5, and a star topology when using dumb hubs.

Auto Negotiation

There are different bandwidth standards for Ethernet connected using UTP cables. There are also differences between full duplex and half duplex. If there are these differences between communication partners connected to each other using a point-to-point connection, communications will not be possible. The auto negotiation exchanges information with connection partners as soon as a cable is connected and automatically adjusts the bandwidth to the most appropriate one.

AutoMDI/MDI-X

	The AutoMDI/MDI-X function determines whether the destination port type is MDI or MDI-X and automatically switches MDI wires and MDI-X wires.
	This makes it possible to connect using straight wires, regardless of the port type on the partner side.
	In 100BASE-TX, communications are performed using 2 sets of twisted-pair cable, with 1 set for sending and 1 set for receiving.
	This wiring assignment has MDI and MDI-X.
	\square MDI Wiring and \blacksquare MDI-X Wiring below.
	When connecting MDI-wired devices and MDI-X-wired devices, you should use standard straight cables because these devices send/receive data to/from a different
	type of devices.
	On the other hand, to connect an MDI device to another or an MDI-X device to another, use a crossover cable so that data sending and receiving can be crossed.
MDI Wiring	
	Node-side wiring
	Send: Use pins 1-2 Receive: Use pins 3-6
MDI-X Wiri	-
	Switching hub-side wiring
	Send: Use pins 3-6 Receive: Use pins 1-2
Address	
	Ethernet communications use MAC addresses and IP addresses to identify the des- tination devices that are communicating.
MAC addr	ress
	This is an address that identifies devices in OSI Layer 2. In Ethernet communica- tions, MAC addresses have 48 bits. The first 24 bits are a code assigned by the ven-
	dor. The last 24 bits are assigned so that they do not duplicate the vendor code.
IP address	-
	This is an address that identifies devices in OSI Layer 3. These addresses are as- signed by the user. IP addresses are IPv4 or IPv6. Unless otherwise specified, IPv4 is used.
	IPv4 is a 32 bit address. It is divided into a network address section and a host ad- dress section.
	It is divided into four lots of 8 bits. Each lot is converted into decimal, with a dot "." entered in between. Example: 192.168.0.1
	Basically, you can only communicate with devices with the same network address. To communicate with devices with a different network address, you need a device relaying data in OSI Layer 3 (such as a router or L3 switch).

Network addresses do not allow overlapping. For this reason, they are managed on an international level by organizations such as ICANN. You cannot assign a network address yourself. (Global address) However, these restraints do not apply to assigning addresses to be used in private LANs without connecting to the internet. Such addresses are called private addresses.

Network addresses are divided into classes according to the number of hosts that can be connected. (Host means more or less the same thing as node). The classes are Class A, B, C, and D (and E).

(2) Private address

This is an IP address that can be used freely but cannot connect directly to the internet. Private addresses are assigned to each class.

(3) Class A

Network address = 8 bits Host address = 24 bits Network address range: 0.xx.xx.xx-127.xx.xx (xx is the host address) Private address range: 10.xx.xx.xx (xx is the host address)

(4) Class B

Network address = 16 bits Host address = 16 bits Network address range: 128.0.xx.xx-191.255.xx.xx (xx is the host address) Private address range: 172.16.xx.xx-172.32.xx.xx (xx is the host address)

(5) Class C

Network address = 24 bits Host address = 8 bits Network address range: 192.0.0.xx-223.255.255.xx (xx is the host address) Private address range: 192.168.0.xx-192.168.255.xx (xx is the host address)

- (6) Class D (Multicast address: simultaneous data transfer to multiple nodes) Network address = 32 bits Host address = 0 bits Network address range: 224.0.0.00-239.255.255.255
- (7) Class E (reserved)
 Network address = 32 bits Host address = 0 bits
 Network address range: 224.0.000-255.255.255.255
- (8) Subnet mask

Specifies how many host bits in a 32-bit IPv4 address are considered to be the network address. This is normally used when one network address is split into multiple network addresses.

(9) Default gateway

If a specific gateway address has not been set for accessing addresses in a different network, data is sent to the default gateway address. A device relaying data in OSI Layer 3 (such as a router or L3 switch) is normally set.

Unicast Transmission

This is the transmission method used in point-to-point communications in IP communications. Data is sent to specific nodes.

It uses the Class A, Class B, and Class C unicast addresses.

When sending to the same network address, data is sent directly to partner nodes. To communicate with a different network address, you need a device relaying data in OSI Layer 3 (such as a router or L3 switch).

Multicast Transmission

This method transmits to multiple nodes on a network at the same time. It sends to Class D addresses. The receiving node must determine whether it is data that it needs.

The addresses are broadly divided into the following three types:

Link local address: 244.0.0.244.0.0.255

An address that uses network protocol. For example, RIP and OSPF. It normally cannot go beyond devices that are relaying data in OSI Layer 3 (such as a router or L3 switch).

Global scope address: 224.0.1.0-238.255.255.255

Must be assigned from ICANN.

Limited scope address: 239.0.0.0-239.255.255.255

Can be assigned freely.

Broadcast Transmission

Data transmission to all nodes on a network. Data is transmitted to the following two types of addresses:

• Limited broadcast addresses All IP address bits are set to 1. It is sent to all nodes on the same network address (same network segment).

It is not sent beyond OSI level 3 devices (router, L3 switch, etc.).

Directed broadcast addresses

Leave the network address as it is and set all bits in the host address section to 1. They will be sent to all nodes of the network address. This type of address is normally used when reporting to different network addresses. They are transferred by devices relaying data in OSI Layer 3 (such as a router or L3 switch).

VLAN

Virtual LAN. A virtual LAN divides a network into arbitrary groups, regardless of the actual physical connection configuration. This can be achieved using a VLANcompatible switching hub. By creating a VLAN configuration, you can isolate networks and create networks that are not affected by external influences. Separate routing devices are separately required for communications between networks that are separated using a VLAN.

SNMP

Simple Network Management Protocol. This is one type of protocol for managing devices connected to a network.

	Routing	
		Relaying communications in OSI Layer 3. This is performed by a router or an L3 switch.
	RIP	
		Routing Information Protocol. This is the protocol that determines the routing path. It is the same as OSPF and BGP.
	NAT	
		Network Address Translator. This technology converts IP addresses during rout- ing. It is used for accessing an external global address device from a private ad- dress. There must be the same number of global addresses as the number of private addresses.
	IP Masquerade (=NA	PT)
	•	This technology is the same as a NAT for accessing an external global address de- vice from a private address. However, multiple private addresses are assigned to one global address.
	IPv4 Address	
		This address identifies devices in OSI Layer 3. The address architecture is 32 bit.
	IPv6 Address	
		This address identifies devices in OSI Layer 3. IPv4 32-bit addresses are extended
		to 128 bits in IPv6. This is not supported in this device.
	Congestion	
		An excess number of packets (traffic) flowing through the network exceeds the pro- cessing ability of the network causing congestion.
		Congestion in Ethernet communications is often caused by broadcast storms.
	Broadcast Storm	
_		When Ethernet wiring is configured like a loop, frames to broadcast addresses or multicast addresses continues to loop around and will spend all of the network bandwidth.
		To resolve a broadcast storm, correct the network configuration.
	Spanning Tree Proto	col (STP)
	-	If a network connected in OSI Layer 2 has simple path redundancy, it becomes con- gested as a result of a broadcast storm. STP is the protocol used to avoid this. It is standardized as IEEE802.1d. There is also RSTP (Rapid Spanning Tree Protocol) which speeds up operations.

Revision History (CP-UM-1321E)

Printed	Edn.	Revised pages	Description
Apr. 2011	1		
June 2012			Fully revised due to function enhancement.
July 2013	3		Overall revision. 3rd ed = 13th Jp ed.

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products. 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

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

In the case of products that Azbil Corporation has repaired for a fee, the repaired part only shall be warranted for three (3) months from the time of delivery to the location designated by the customer.

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:

- (1) Regulations and standards or laws that your Equipment is to comply with.
- (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
- (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

Azbil Corporation's products other than those explicitly specified as applicable (e.g. azbil Limit Switch For Nuclear Energy) shall not be used in a nuclear energy controlled area (radiation controlled area).

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. In addition.

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

- (2) For use of specific purposes, such as:
 - * Nuclear energy/radiation related facilities
 - [For use outside nuclear energy controlled areas] [For use of Azbil Corporation's Limit Switch For Nuclear Energy]
 - * 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

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification. Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used.

Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc. as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals.

System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts.

For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

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.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice. For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts. For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service.

- Accordingly, a separate fee will be charged in any of the following cases:
 - Installation, adjustment, guidance, and attendance at a test run
 Maintenance, inspection, adjustment, and repair
 - (2) Maintenance, inspection, adjustment, and rep(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.

AAS-511A-014-02



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Specifications are subject to change without notice. (09)