Burner Interlock Module
RX-L80/90

Overview

The RX series consists of new combustion safety controllers that combine a burner interlock module and a burner control module in order to provide a wide variety of combustion furnaces with interlock monitoring, automatic ignition, flame monitoring, and other features that ensure safe and correct operation.
Various operation and ignition methods are available by selecteding pre-installed functions using a PC loader.

Features of the RX series

■ Combustion safety that suits the equipment's specifications

- Modular structure and a wealth of selectable functions ensure safety functions that are suitable for the equipment specifications.
- Simply select from safety functions that are already created. This reduces the time required to review and verify the safety circuits.
- Functions can be selected using the dedicated PC loader. It is not necessary to study or create special software.

■ Minimizes wiring, saves space

- Shutoff signals and other such safety signals are transmitted by connectors between modules.
- Both the number of wires and the amount of space required can be reduced without the need to relay the safety signals through external wiring.

■ Maintenance support functions

- Device operation history (operation count, operating hours, warning history, etc.) is automatically recorded without the need to configure any special settings.
- Operation history can be checked at any time by connecting the PC loader.
- Various types of monitor output tailored to the equipment size are implemented to support status investigation and cause identification work during maintenance/troubleshooting.
  Status check on the product: 7-segment/LED display
  Lamp check on the front panel: Open collector monitor output
  Remote monitoring of status: RS-485 communication (standard feature)
  Ethernet communication (for RX-L90 only)

Major Functions of the Burner Interlock Module (RX-L)

- Interlock input function
  Number of inputs: 16
  Individual OFF-delay settings (period when chattering is ignored)
  Function input (collective startup, etc.)
  Flame monitoring changeover at 760 °C or higher
- Purge function
  Prepurge: 5 s to 60 min (selectable from 32 patterns)
  Postpurge time can be freely set
  Postpurge stop by a temperature contact
  Blower output
  Motor control
- Displays on the product
  Status (7-segment LED)
  Status (LED indicator)
- Monitor output
  Open collector output, 22 points (freely allocable)
  RS-485 communication output (standard feature)
  Ethernet communication output (RX-L90 only)

■ Equipment design precautions

When designing equipment that uses a combustion safety device, give due consideration to the following safety guidelines.

- Safety Engineering Directives for Industrial Heating Furnace Combustion Equipment (by the Ministry of Health, Labour and Welfare [of Japan])
- General Safety Code for Industrial Combustion Furnaces: JIS B 8415
- Safety Guidelines for Industrial Gas Combustion Equipment (by the Japan Gas Association)
- Safety Guidelines for Gas Boiler Combustion Equipment (by the Japan Gas Association)

■ Important points for ensuring safety

1. Connect loads directly to this device.
2. Connect interlocks directly to the interlock input of this device. (They should not be connected to this device via a relay)
3. Do not set up a bypass circuit for manual operation, etc., for any load.
4. Ensure that both main and pilot valves have a redundant shutoff feature.

Specifications

Environmental specifications	Ambient temperature		**RX-L80**: -20 to +55 °C **RX-L90**: 0 to 50 °C
	Storage temperature		-20 to +70 °C
	Ambient humidity		10 to 90 % RH (without condensation)
	Vibration		0 to 3.2 m/s^2 (10 to 150 Hz for two hours each in the X, Y, and Z directions)
	Impact		0 to 9.8 m/s^2
Electrical specifications	Rated supply power		24 V DC
	Allowable supply power		21.6 to 26.4 V DC
	Load Power	Rated voltage	100 V AC, 110 V AC, 200 V AC, 220 V AC
		Allowable voltage	-15 % to +10 % of rated voltage
	Power consumption		**RX-L80**: 9 W max. **RX-L90**: 9.5 W max.
	Withstand voltage		• DC terminals 500 V AC for 1 min between: 24 V DC power terminal and the input function terminal 24 V DC power terminal and the monitor output connector 24 V DC power terminal and the RX-R/RX-L control signal terminal • AC terminals 1500 V AC for 1 min or 1800 V AC for 1 s between: (1) H-G power terminals and H-G relay output and (2) DC terminals and connectors (1) blower output terminal and (2) DC terminals and connectors (1) control motor output terminal and (2) DC terminals and connectors
	Insulation resistance		50 MΩ or more with a 500 V DC megger between: (1) H-G power terminals and H-G relay output and (2) DC terminals and connectors (1) blower output terminal and (2) DC terminals and connectors (1) control motor output terminal and (2) DC terminals and connectors
	Product life		Seven years when used continuously, 10 years when used eight hours per day (25 °C). Relay contact life is 100,000 cylcles (at rated load)
	Startup input		Contact input (24 V DC, 10 mA)*1
	Reset input		Contact input (24 V DC, 20 mA)*1
	Interlock input		Contact input (24 V DC, 20 mA)*1
	Relay output (with voltage output)		400 VA (with relay welding detection)*2
	Blower output (non-voltage output)		350 VA
	Control motor output (non-voltage output)		100 VA
	Monitoring outputs (transistor outputs)		22 (0.1 A max./output, 1 A max./module, 30 V DC max.)
Communication specifications	RS-485 Communication	Protocol	**RX-L80**: CPL **RX-L90**: CPL, Modbus/RTU, Modbus/ASCII
		Signal level	Conforms to RS-485
		Communication/ synchronization method	Half-duplex/asynchronous
		Maximum wiring length	500 m
		Terminating resistor	External (150 Ω, 1/2 W or more)
		Transmission speed	38400 bps max.
	RX-R Control signal	Communication protocol	Control protocol for RX-R
		Maximum line length	50 m
	RX-L Control signal	Protocol	Control protocol for RX-L
		Maximum wiring length	500 m
	Ethernet communication protocol (RX-L90 only)		Modbus/TCP
General specifications	Dimensions		80 (W) × 134 (D) × 105 mm (H)
	Weight		Approximately 550 g
	Color (main unit)		Black
	Structure		Two-piece: base can be separated from main unit
	Certification		Gas Appliance Directive (CE): 0063CN6671 (certified model: RX-L80A)
Wiring cable specifications	Reset		Wiring length: 10 m max.
	Interlock contact input		Wiring length: 200 m max.
	Signal cable type/length		See Table 1.

*1. Can be used for equipment that has a contact resistance of 250 Ω or less.

*2. Cannot be used as a dry output. If relay is used, be sure to connect an AC load (10 VA or more).

(Table 1)

Signal	Cable type	Maximum length
RX-R control signal	0.2 to 1.5 mm^2 (#28-14 AWG)*1	50 m
RX-L control signal		500 m
Reset signal	0.3 to 0.75 mm^2 (#22-18 AWG)*2	10 m
Start signal		200 m
IN1 to IN16 signals		
M-1 to M-22 Monitor output	Soldered: 0.25 mm^2 or less (#23 AWG or less) Crimped: 0.08 to 0.2 mm^2 (#28-24 AWG)	100 m
RS-485 communication	0.2 to 1.5 mm2 (#28-14 AWG)*3	500 m
Blower output	JIS C 3306, 0.75 mm^2 or more (0.18 dia., 30 strands)	-
Control motor output		

*1. Recommended: JCS4364 cables for light electrical instruments (twisted shielded cables for instruments), eight cores (four pairs)

*2. Wire diameter of 2 mm max., recommended crimp terminal: V1.25-3 (RAV1.25-3), made by JST Mfg. Co., Ltd.

*3. Recommended: JCS4364 cables for light electrical instruments (twisted shielded cables for instruments), four cores (two pairs)

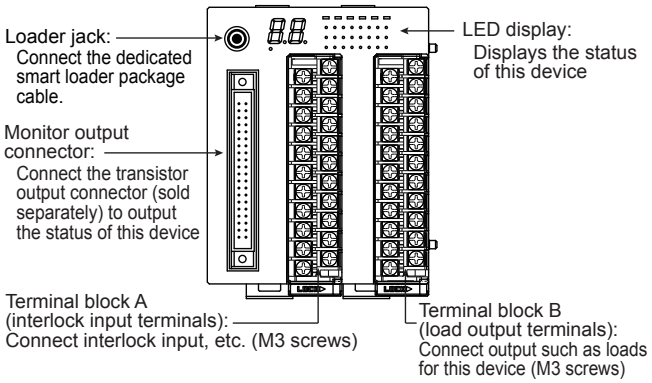
List of settings

Item		Setting No.	Description
Model settings	Regular/zone selection	A-1	Selects regular RX-Ls, zone RX-Ls, or a single RX-L.
	Number of connected RX-Ls	B-14	Sets the number of zone RX-Ls connected to regular RX-Ls.
	Number of abnormal RX-Ls required for an overall stop to occur	B-8	Sets the number of abnormal zone RX-Ls among regular RX-Ls required for an overall stop to occur.
	RX-L communication address	B-19	Sets the communication address of a zone RX-L.
	Number of connected RX-Rs	E-1	Sets the number of RX-Rs connected to the zone ILM.
	Number of abnormal RX-Rs for a zone lockout to occur	E-2	Sets the number of abnormally stopped RX-Rs required for a zone lockout to occur.
	Selection of air pressure switch startup check	A-2	Selects whether to perform an air pressure switch startup check.
	Air pressure switch operation check condition cancellation	A-5	Sets the cancellation conditions for results of the air pressure switch startup check
	Furnace temperature 760 °C monitoring	A-4	Selects ON or OFF for furnace temperature 760 °C monitoring
	Startup method	A-3	Sets the start conditions for processes.
Control settings	Selection of startup	B-1	Sets startup conditions.
	Selection of prepurge	B-2	Sets ON or OFF for prepurge (for zone).
	Blower sync signal assignment	B-6	Selects “Input port” or “Communication” for the blower sync signal.
	Purge count signal assignment	B-7	Selects “Input port” or “Communication” for the purge count signal.
	High fire position input	B-9	Specifies high and low fire position input numbers.
	Low fire position input	B-10	
	Process timeout handling	B-11	Determines what is done when the process progress conditions are not met.
	Prepurge conditions when restarting RX-R	B-12	Sets the prepurge conditions for restarting all RX-Rs that have stopped during combustion.
	Low fire shutdown	B-13	Returns to the low fire position (ignition conditions) when turning combustion OFF.
	Postpurge operation in the case of residual flame	B-15	Sets the conditions for postpurge if there is a residual flame.
	Prepurge conditions for RX-R	B-16	Sets whether to use RX-R input as a condition for prepurge.
	RX-L communication error handling	B-18	Sets whether shared RX-L continues to operate in cases where communication with a zone RX-L is lost.
Timing settings	Prepurge time	D-1	Sets the prepurge time.
	Ignition standby time	D-2	Sets the length of the standby period that starts when ignition conditions are met and ends when pilot burner ignition begins.
	Proportional control standby time	D-3	During the main ignition process, proportional control input is not accepted until this set time elapses.
	Postpurge time	D-4	Sets the postpurge time.
	Postpurge time for errors	D-5	Sets the postpurge time that is used in the event of an error.
	Process error determination time (not during combustion)	D-6	Sets the amount of time that can pass without the satisfaction of process progress conditions before an error is judged to have occurred (not during combustion).
	Process error determination time (during combustion)	D-7	Sets the amount of time that can pass without the satisfaction of process progress conditions before an error is judged to have occurred (during combustion).
	Re-ignition standby time	D-8	The wait time before performing a prepurge and restarting RX-Rs after all RX-Rs have stopped during combustion.
Group settings	RX-R Group	E-3	Sets groups to perform combined operations.
Input settings	Input function	C-1	Sets the input functions for IN1 to IN16.
	Interlock OFF delay	C-2	Sets the OFF delay time for IN1 to IN16.
	Conditional interlock setting	C-3	Specifies conditions for conditional interlocks A to E.
	Conditional interlock setting standby time	C-4	Sets the standby time that elapses before interlock monitoring begins for conditional interlocks A to E.
Relay output settings	Relay output operation	B-3	Sets the relay output operation.
	Blower output operation	B-4	Sets the blower output operation.
	Control motor output operation	B-5	Sets the control motor output operation.
Monitor output settings	Blink operation	MO-1	Selects whether to use blinking display (alternate ON/OFF output) for interlock operated output.
	Monitor output assignment	MO-2	Selects signals to be assigned to monitor outputs 1 to 22 (M-1 to M-22).
	Monitor output operation	MO-3	Sets the monitor output operation (direct or reverse) for monitor outputs 1 to 22 (M-1 to M-22).
Display settings	LED settings	DSP-1	Selects signals to be assigned to the LED display on the front of the module (ST1 to ST7, IN1 to 16).
	Alarm display setting	DSP-2	Sets the method of displaying alarms on the 7-segment LED on the front of the module.
Host communication settings	Host communication (RS-485) address	F-1	Sets the communication address.
	Host communication (RS-485) baud rate	F-2	Sets the baud rate (communication speed).
	Host communication (RS-485) format	F-3	Sets the parity and number of stop bits.
	Host communication (RS-485) protocol	F-4	Sets the communication protocol.
	Permission for RX-R startup by host communication (RS-485)	F-5	Selects whether an individual RX-R can be started by communication from the host device.

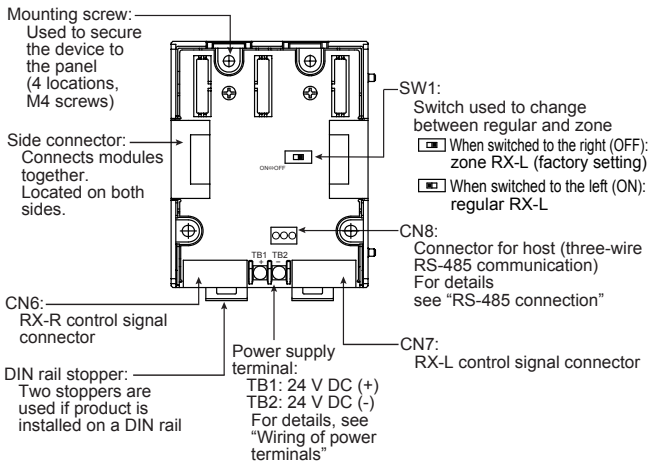
Part Names

■ Main unit

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



■ Base

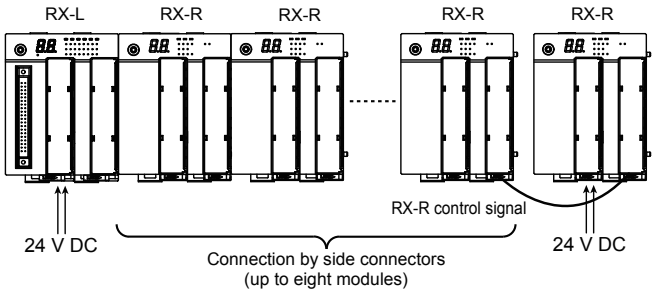


Installation

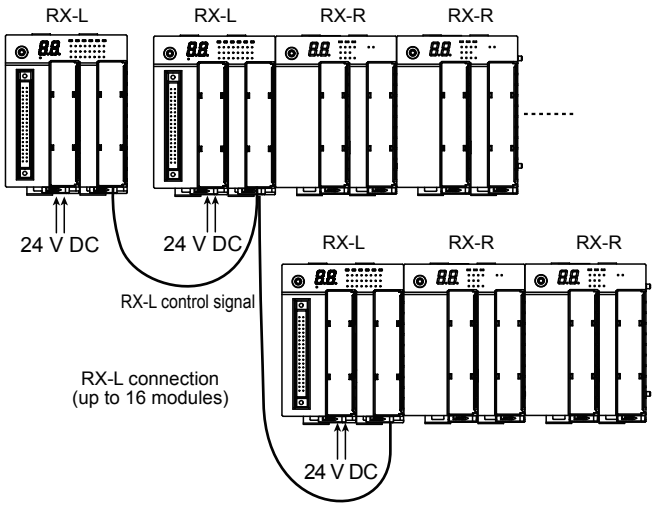
■ Module connection

This device can be connected to an RX-R using the side connector on the base.
When modules are connected, their power and communication link are also connected, reducing the amount of wiring required.
Connect the modules before installing them on the DIN rail.
Connection examples are shown below.

● Multiburner



● Multizone



Model No.

■ RX-L burner interlock module

Model No.	Host communication	Certification
RX-L80A010010	RS-485 communication	CE
RX-L90A010020	RS-485 communication, Ethernet communication	−

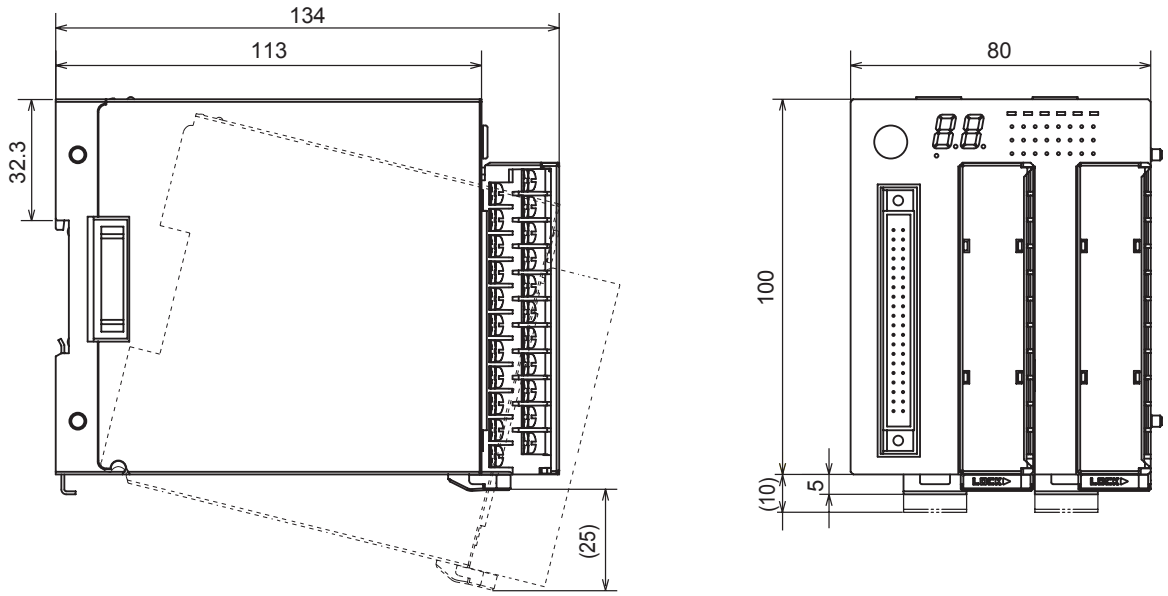
Note: The suffix "D" indicates that an inspection record is included.
Example: RX-L80A01001D

Optional accessories (sold separately)

Name	Azbil model No./part No.	Supply power
Transistor output connector	**81446847-001**	FCN361J040-AU solder-type jack (1) and FCN-360C040-B cover (1) manufactured by Fujitsu Components
RX-R/RX-L control signal connector	**81447402-001**	BL3.5/7SNSW control signal connector (2) (Part no.: 161019), made by Weidmueller
Smart loader package	**SLP-RXMJ70**	For maintenance (with cable)
	SLP-RXMJ71	For maintenance (without cable)
	SLP-RXEJ70	For selecting functions (with cable)
	SLP-RXEJ71	For selecting functions (without cable)
Surge absorber	**83968019-001**	

External dimensions

(Unit: mm)

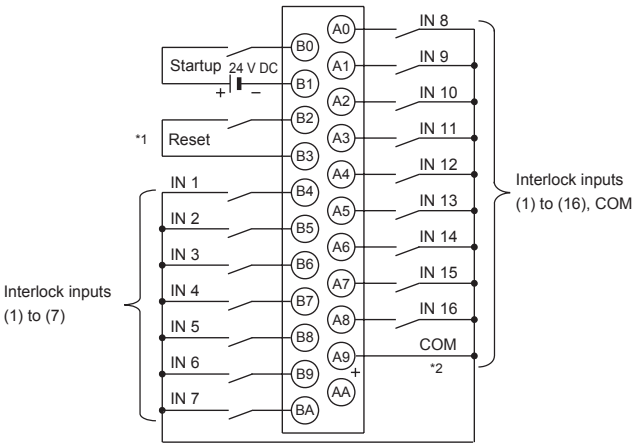


Wiring

■ Cautions for wiring

- The contacts of the interlock and limit function must be directly connected to the interlock input of this device. Do not connect the contacts using relays.
- Before wiring, verify the model No. and terminal No. on the label attached to the side of the module.
- Use a crimp terminal suitable for M3 screws to connect each terminal.
- Exercise care not to allow crimp terminals to touch adjacent terminals.
- Route the signal wires, power wires, etc., of this device at least 30 cm away from other input and power wires. Also, do not pass these wires through the same conduit or wiring duct.
- When wiring is completed, check that the wires are correctly connected. Incorrect wiring may cause damage or malfunction.
- The same terminal blocks and connectors are used for the following. Exercise care to ensure wiring is carried out correctly.
  - Terminal block A (interlock input terminals, M3 screws) and Terminal block B (load output terminals, M3 screws)
  - Connectors for RX-R control signals (CN6 connectors) and connectors for RX-L control signals (CN7 connectors)

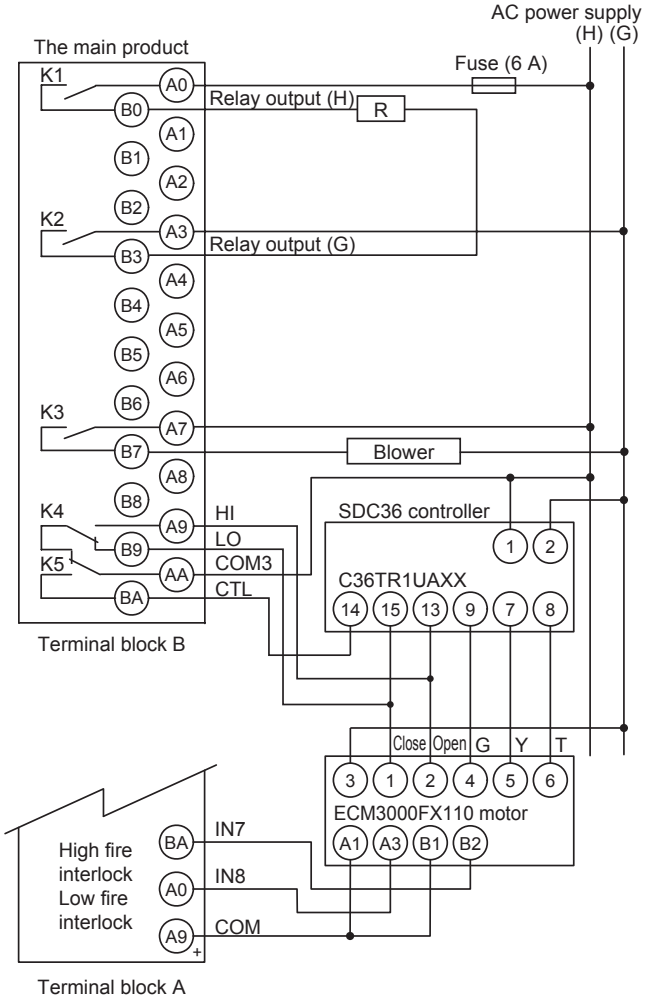
■ Wiring of Terminal block A (interlock input terminals)



*1. Use the reset input independently. It cannot be connected to the reset input of other RX-L or RX-R modules.

*2. The COM terminal cannot be shared with other RX-R or RX-L modules.

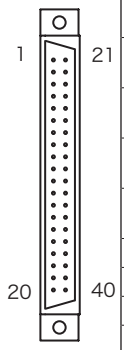
■ Wiring of Terminal block B (load output terminals)



Note

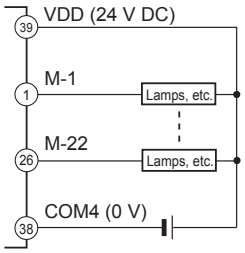
- In this example of wiring between Terminal block B and a motor, the ECM3000FX110 relay contact input (which has four auxiliary switches) is used, and the auxiliary switches are assigned to interlock inputs IN7 and IN8 of the RX-L80's Terminal block A as high fire and low fire interlocks.

■ Wiring of monitor output connectors

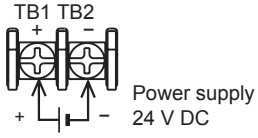


Terminal *	Monitor output	Terminal	Monitor output
1 (B20)	Monitor output 1 (M-1)	21 (A20)	Monitor output 17 (M-17)
2 (B19)	Monitor output 2 (M-2)	22 (A19)	Monitor output 18 (M-18)
3 (B18)	Monitor output 3 (M-3)	23 (A18)	Monitor output 19 (M-19)
4 (B17)	Monitor output 4 (M-4)	24 (A17)	Monitor output 20 (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 V DC)
20 (B1)	NC	40 (A1)	VDD (24 V DC)

* The number in parentheses is the pin assignment for the transistor output connector (81446847-001, made by Fujitsu Components and sold separately).

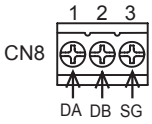


■ Wiring of power terminals



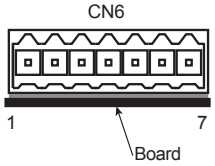
■ S-485 connection

The RS-485 communication cable consists of three wires. Always use DA, DB, and SG to connect to the CN8 connector.



■ Connection of RX-R control signals

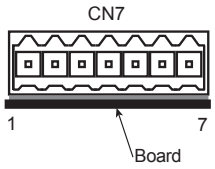
If RX-Rs cannot be connected together using a side connector, connect the RX-R control signal line to the CN6 connector.



Terminal	RX-R control signal
1	E-SG
2	E-DA1
3	E-DB1
4	E-DA2
5	E-DB2
6	E-DO1
7	E-DO2

■ Connection of RX-L control signals

When connecting RX-Ls together, connect the RX-L control signal line to the CN7 connector.



Terminal	RX-L control signal
1	C-SG0
2	C-DA1
3	C-DB1
4	C-DA2
5	C-DB2
6	C-DIO
7	C-SG

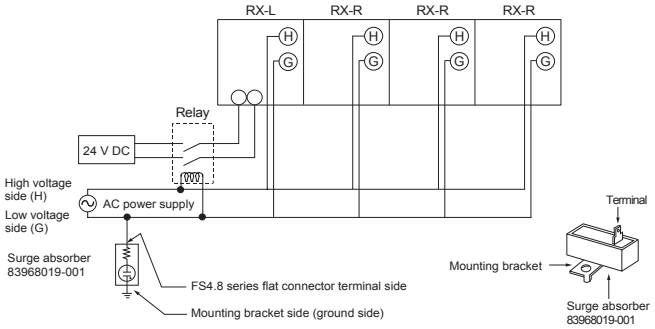
■ I/O isolation

The solid line indicates isolation from the rest of the circuits.

DC power supply (TB1, TB2) Reset input	Interlock input (IN 1 to IN 16, COM) RX-L control signal (pins CN7-6 and 7)
Host communication (RS-485 communication) connector (CN8) Loader jack (loader) communication	RX-R control signal connector (CN6) RX-L control signal connector (pins CN7-1 to 5)
Relay output H, G	AC power supply H, G
Startup input	Monitor output connector
Control motor output	Blower output

■ Wiring of an AC power, DC power, external relay, and surge absorber

When using a surge absorber as a countermeasure against lightning, use the connection shown below.
Model No.: 83968019-001 (sold separately)



! Handling precautions

- Install an FS4.8 series flat connector (Tyco Electronics AMP's 187 series receptacle or equivalent) on one end of the wire and use a wire that is as short as possible.
- The mounting bracket of the surge absorber, 83968019-001, is crimped internally and on the grounding side to ensure conductivity. It is grounded when installed on a metallic surface of the housing or other grounded part of the burner.
- Make sure the 24 V DC power is supplied to the RX-R/RX-L together with AC power H, G. If the 24 V DC power is supplied to the RX-R/RX-L and the AC power is not supplied, a malfunction may occur.

Please read “Terms and Conditions” from the following URL before ordering and use.

http://www.azbil.com/products/factory/order.html

Specifications are subject to change without notice.

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