

RS-485/Analog Output Signal Converter for ACTIVAL+™ Modbus™ Protocol / Standalone Model

General

Model RYY792C3001 is a signal converter that receives the analog data of Model FVY513_J/FVY514_J/FVY515_J via RS-485 communication and outputs the data via analog signal.

2 channels for 4 to 20 mA DC output are provided per 1 converter.

Master/slave communication is selectable by the switch, and up to 5 converters, 10 analog output points in other words, are configured.

Features

- Plug-in design for easy maintenance.
- Anti-drop mechanism of the mounting screw to enhance workability.



Specifications

(1/2)

Item	Specification
Power supply	85 V AC to 264 V AC, 50 Hz/60 Hz
Power consumption	5 VA
Isolation	Isolated among communication, primary output, secondary output, and power supply
Insulation resistance	100 MΩ or higher (at 500 V DC) (Among communication, primary output, secondary output, and power supply)
Withstand voltage	2000 V AC for 1 min. (Among communication, primary/secondary output, and power supply)
	500 V AC for 1 min. (Between primary and secondary outputs)
Rated operating conditions	Temperature: -5 °C to 55 °C Humidity: 5 %RH to 90 %RH (Non-condensing) Vibration: 4.9 m/s ² , 5 Hz to 100 Hz
Transport/storage conditions	Temperature: -10 °C to 60 °C Humidity: 5 %RH to 90 %RH (Non-condensing) Vibration: 9.8 m/s ² , 0 Hz to 60 Hz
Output channels	2 channels
Output signal	Primary output: 4 mA DC to 20 mA DC Secondary output: 4 mA DC to 20 mA DC
Maximum output current	20.2 mA (at 350 Ω)
Maximum output load	Primary output: 350 Ω Secondary output: 350 Ω

(2/2)

Item	Specification
Communication system	RS-485, half-duplex
Number of units connectable	Max. 5 units connectable to the master converter (1 Model FVY513_J/FVY514_J/FVY515_J and 4 slave converters)
Communication distance	Max. 100 m
Communication line	3-wire (Terminator not connectable)
Analog output data setting	With the rotary switch for each channel
Master/slave switchover	With the switch (‘MASTER/SLAVE’ LED indicates the setting)
Materials	Main unit housing: ABS resin Socket terminals: PBT resin
Running status indication	By LED flashing patterns
Conversion accuracy	Within ± 0.1 % F.S. (at 25 °C ± 5 °C)
Temperature characteristic	Within ± 0.2 % of span at 10 °C change
Dimensions	Refer to Fig. 2.
Accessory	Dedicated socket (Refer to Fig. 2.)
Auxiliary part (optional)	Dedicated socket Part No. RYY-CS3700-11P

LED: Light-Emitting Diode

ABS: Acrylonitrile Butadiene Styrene

PBT: Polybutylene Terephthalate



Safety Instructions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual nearby for quick reference.




Usage Restrictions


This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in a clean room or a place where reliability or control accuracy is particularly required, please contact our sales representative. Azbil Corporation will not bear any responsibility for the results produced by the operators.


Warnings and Cautions


	WARNING	Alerts users that improper handling may cause death or serious injury.
	CAUTION	Alerts users that improper handling may cause minor injury or material loss.


Signs











	Alerts users possible hazardous conditions caused by erroneous operation or erroneous use. The symbol inside \triangle indicates the specific type of danger. (For example, the sign on the left warns of the risk of electric shock.)
	Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside \odot graphically indicates the prohibited action. (For example, the sign on the left notifies that disassembly is prohibited.)
	Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside \bullet graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

 **WARNING**

 Before wiring and maintenance, be sure to turn off the power to the product. Failure to do so might cause electric shock or device failure.

 Be sure to ground the product with ground resistance of less than 100 Ω . Improper grounding might cause electric shock or malfunction.

 **CAUTION**

-  Install the product in a location that satisfies the operating conditions (temperature, humidity, power, vibration, shock, mounting direction, atmospheric condition, etc.) as listed in the specifications and use the product within the rated operating ranges.
Failure to do so might cause fire or device failure.
-  Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
-  All wiring must comply with applicable codes and ordinances.
-  Be sure to provide a circuit breaker for the power to the product as the product does not have a power switch.
-  Take anti-lightening measures based on regional and building characteristics.
Lightening might cause fire or critical damage to the products without the anti-lightening measures.
-  To connect the wires to the screw terminals, use crimp terminal lugs with insulation.
Failure to do so might cause fire due to short circuit or device failure.
-  Firmly tighten the terminal screws.
Insufficient tightening of the terminal screws might cause fire or overheating.
-  Do not allow wire clippings, chips, and other refuses to enter into the product.
Doing so might cause fire or product damage.
-  Do not disassemble the product.
Doing so might cause electric shock or device failure.
-  Dispose of the product as industrial waste in accordance with your local regulations.
Do not reuse all or part of this product.

System Configuration

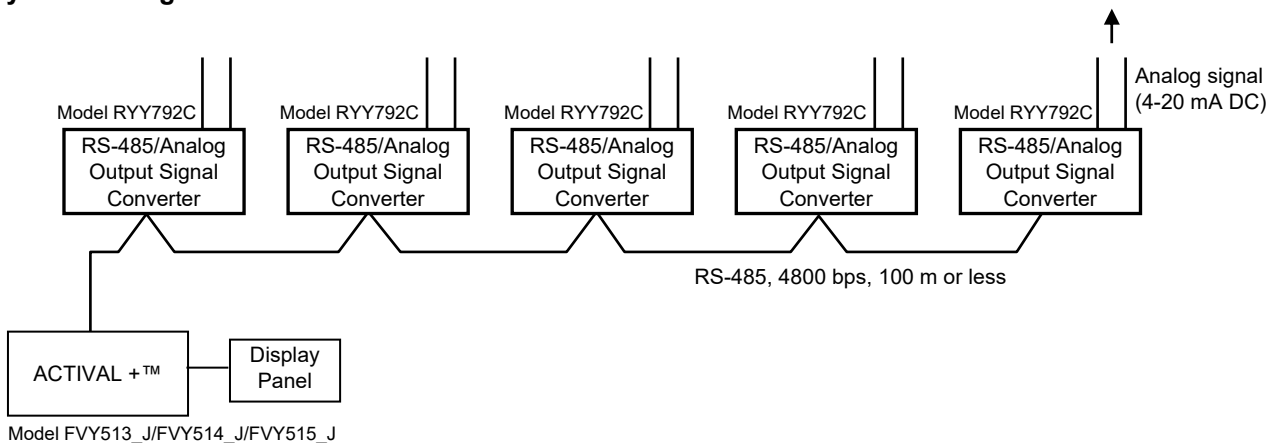


Figure 1. System configuration example

Dimensions (Main unit with socket)

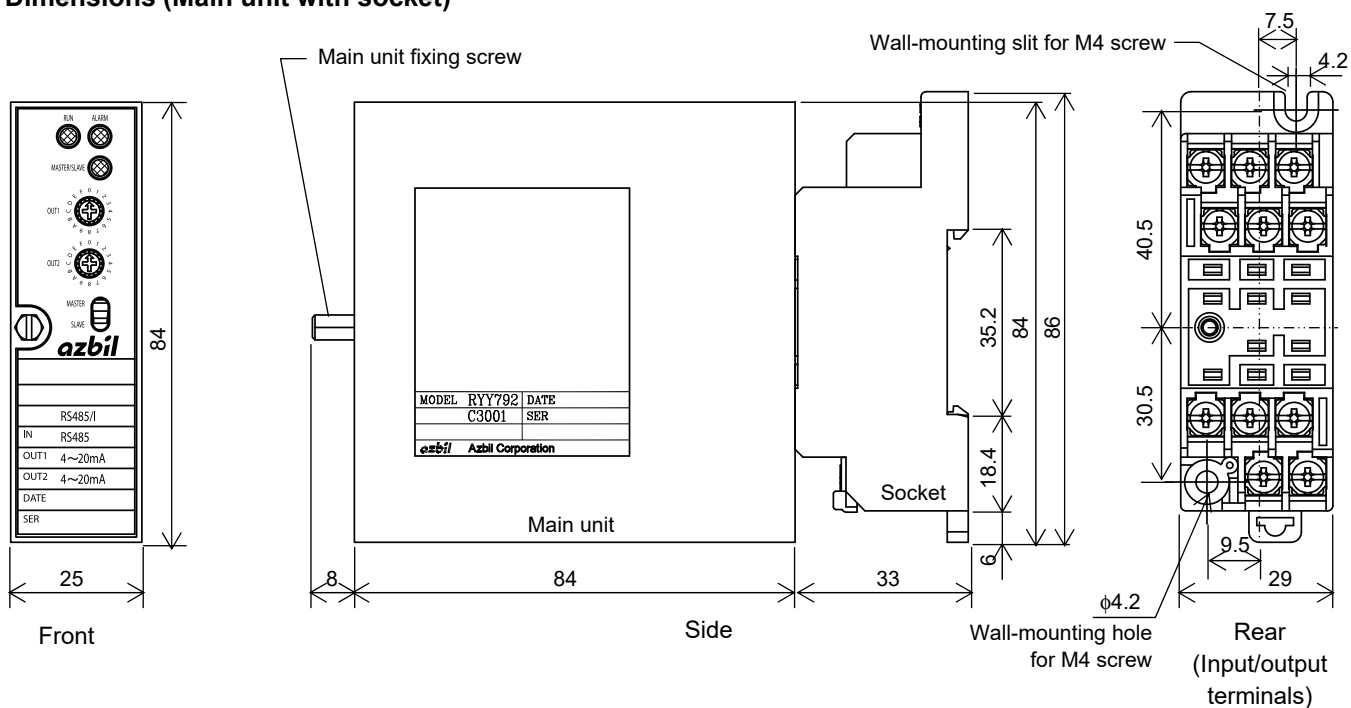


Figure 2. Dimensions (mm): Main unit with socket

Installation

This product is a panel-mount type converter. Install this product according to the following instructions.

Precautions for installation

- Install the product indoors.
- Do not place any flammable objects close to or under the product.
- Do not use the product in an atmosphere containing excessive humidity, acid gases, or corrosive substances.
- Use the product under the environmental and operating conditions specified in this document.
- Use the product at 2000 m altitude or lower.
- Do not block the vent holes of the product.
- Connect this product to a device suitable for the output impedance of this product.
- This product does not have a power switch. Provide a power circuit breaker for the power source of this product. Note that the power circuit breaker must be installed in a location close to this product and where you can operate the product without being disturbed.
- Use the dedicated socket.

Installation procedure

- 1) Mount the socket on a panel with a DIN rail or with the screws. To mount the socket with the screws, refer to Fig. 2. When you mount the socket, be careful with the orientation so that the socket is not mounted upside down. M4 × 15 screws are necessary to fix the socket.
- 2) Connect the wires to the terminals according to the **Wiring** section.
Then, assemble the main unit with the socket by carefully inserting the main unit in the front of the socket. Do not forcefully press the main unit, diagonally insert the main unit, or insert the main unit upside down when you insert. Improper insertion might damage the pins of the main unit or the socket.
After insertion, finger-tighten the main unit fixing screw.

Wiring

Wire specifications

Select the appropriate size, length, and type of wires corresponding to the following requirements.

- Communication line: JCS* 4364 instrument cable or equivalent
(Model JKPEV-S 2P×0.9SQ (manufactured by Sumiden Hitach Cable Ltd.) is recommended.)

*JCS: Japanese Electric Wire and Cable Makers' Association

- Output line: 3 Ω or lower wiring resistance per line
- Power line: 3 Ω or lower wiring resistance per line

Wiring precautions

Check and follow your local indoor wiring rule or other regulations of your local government to perform wiring.

Wiring diagram

Fig. 3 is the wiring diagram of the terminals 1 to 11.
Refer to Figs. 2 and 3 to connect the wires.

Notes:

- * If a wire runs near a noise source, use shielded wire.
- * Do not connect a terminator.
- * Do not connect between the terminals 9 (DA) and 10 (DB).

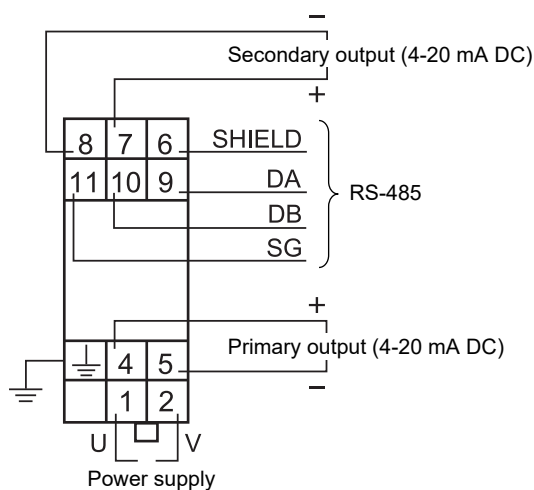


Figure 3. Wiring diagram

Wiring example

The following example shows the wiring of 3 converters (Model RYY792C3001) and 1 Model FVY513_J/FVY514_J/FVY515_J.

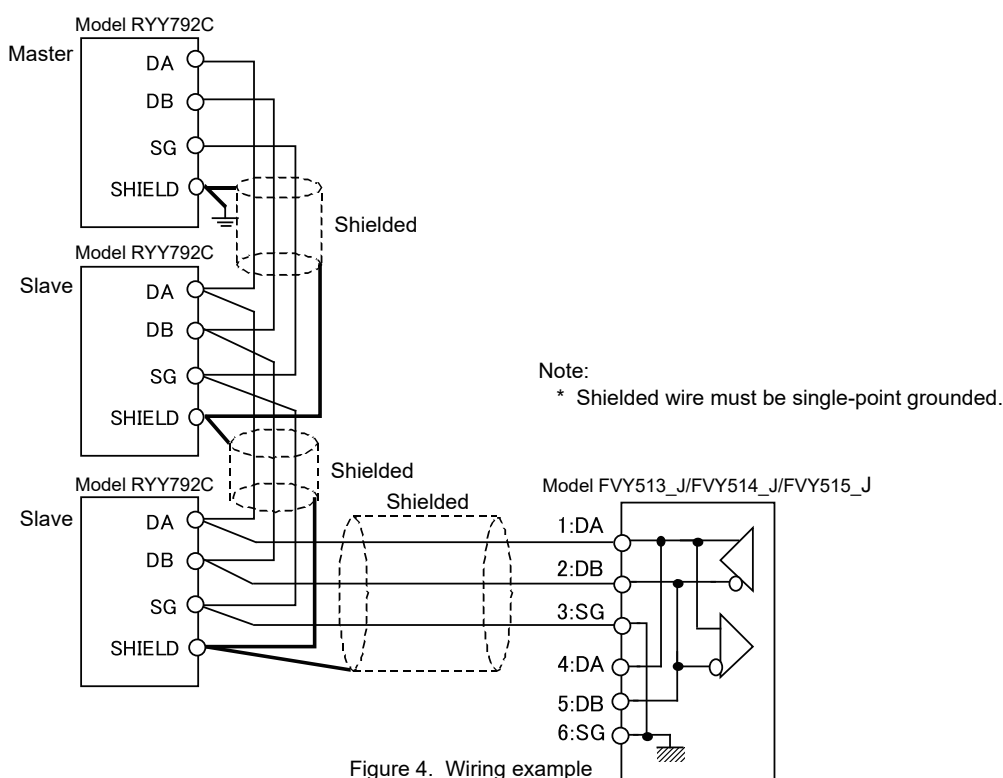


Figure 4. Wiring example

Setting

Master/slave switchover

Refer to Fig. 5 and change the MASTER/SLAVE switch to set the master/slave mode. (Upper: master, lower: slave)

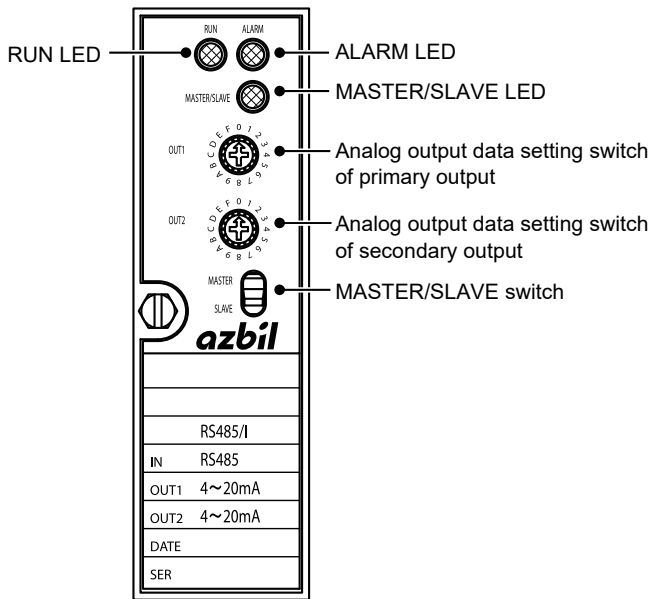


Figure 5. LED and switches on the front

Analog data setting

Refer to Fig. 5 and turn the analog output data setting switch (rotary switch) using a screwdriver to set the analog output data.

Set the analog output data for both of the primary output and the secondary output. The following table describes each switch indication and its corresponding analog data to output.

Table 1. Analog data switch indications and the analog data

Switch indication	Analog output data	Measuring range
1	Control setting value	0 to 100 %
2	Actual valve position	0 to 100 %
3	Actual flow	See *1 below.
4	Set flow	See *1 below.
5	Valve inlet pressure	0.000 to 1.100 MPa* ^{1,2} 0.000 to 1.800 MPa* ^{1,3} 0.000 to 2.200 MPa* ^{1,4}
6	Valve outlet pressure	0.000 to 1.100 MPa* ^{1,2} 0.000 to 1.800 MPa* ^{1,3} 0.000 to 2.200 MPa* ^{1,4}
7	Supply water temperature	-10 to 100 °C
8	Return water temperature	-10 to 100 °C
9	Energy	See *1 below.
A	12 mA output	—
0, B to F	0 output	—

Notes:

*1 Measuring range differs depending on the setting of Model FVY513_J/FVY514_J/FVY515_J.

*2 Measuring range for the converter with Model FVY5130J/FVY5140J/FVY5150J

*3 Measuring range for the converter with Model FVY5137J/FVY5147J/FVY5157J

*4 Measuring range for the converter with Model FVY513EJ/FVY514EJ

LED Indications

'RUN', 'ALARM', and 'MASTER/SLAVE' LED provided on the front of the main unit indicate the running status. See Fig. 5 for the LED locations. The following table shows the LED indications and the corresponding running status.

Table 2. LED indications and the running status

Running status	LED indications		
	RUN (green)	ALARM (red)	MASTER/SLAVE (orange/green)
Normal	ON	OFF	Master: ON in orange / Slave: ON in green
Power outage	ON	ON	ON in orange *1
Memory error	OFF	ON	ON in orange or green*2
Model FVY513_/FVY514_/FVY515_ failure	Flashing (0.5s period)	Flashing (0.5s period)	Master: ON in orange / Slave: ON in green
Communication error	Flashing (0.5s period)	Flashing (1s period)	Master: ON in orange / Slave: ON in green
Double masters	Flashing (0.5s period)	Flashing (2s period)	Master: ON in orange / Slave: ON in green
Communication disconnected	Flashing (0.5s period)	ON	Master: ON in orange / Slave: ON in green

Notes:

*1 LED lights up in orange regardless of master/slave mode.

*2 LED stays ON in orange or green depending on the mode (master or slave) when the converter (Model RYY792C3001) abnormally stopped.

Inspection and Handling Precautions

IMPORTANT:

- This product is precision equipment. Do not drop or throw.
- This product contains electronic parts. Do not spray with or soak in water. Do not leave the product in a location with dew condensation.
- Housing of this product is made of plastic. Note that it may get deformed if being exposed to high heat.
- This product is highly-reliable precision equipment with high performance. Do not disassemble or remodel the product.

Inspection

Inspect that all the settings are correct every 2 years.



- This product (Model RYY792C3001) complies with the following Electromagnetic Compatibility (EMC) and the Low Voltage Directive (LVD).

EMC (2014/30/EU)

EN61326-1 Class A Table 2 (For use in an industrial electromagnetic environment)

LVD (2014/35/EU)

EN61010-1/IEC61010-1

Overvoltage category II

Pollution degree 2

- This product is panel-mount type. Install the product inside a panel cabinet.
- Dielectric strength: Basic insulation between the communication and output, the output and chassis ground.

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