

PROFIBUS Communication Converter

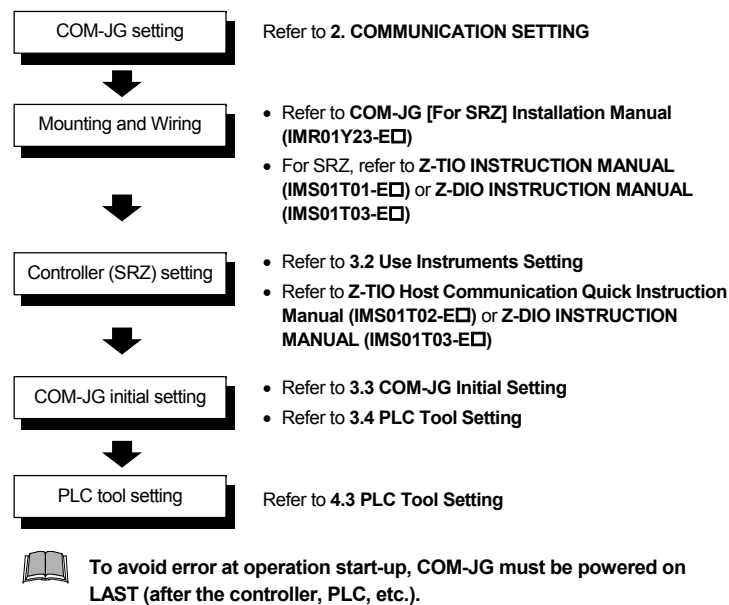
COM-JG [For SRZ] Quick Instruction Manual

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This manual describes the basic operation method of the COM-JG.

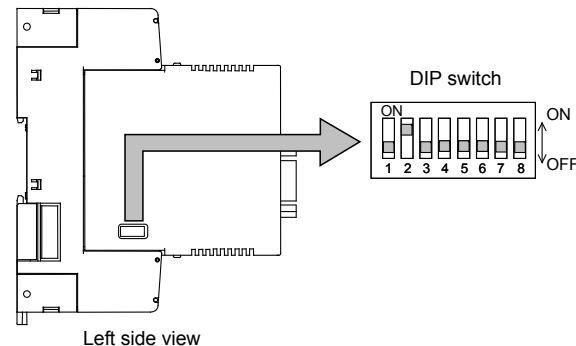
For detailed handling procedures and various function settings, refer to separate **COM-JG [For SRZ] Instruction Manual (IMR01Y35-E2)**. The manual can be downloaded from the official RKC website: http://www.rkcinst.com/english/manual_load.htm.

1. HANDLING PROCEDURES



2.2 DIP Switch Setting

Configure settings for controller communication speed, controller address auto obtain, and controller communication enable/disable using the DIP switches.



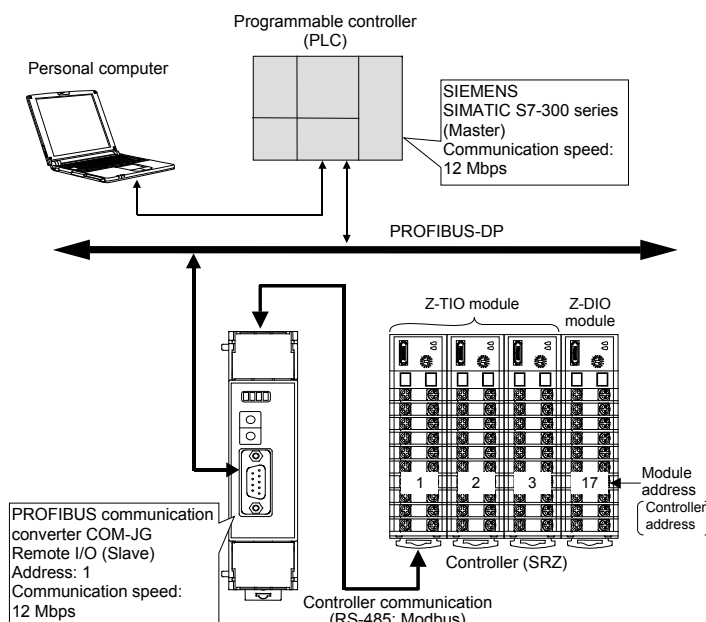
1	2	Controller communication speed	
OFF	OFF	38400 bps	
ON	OFF	9600 bps	
OFF	ON	19200 bps	
ON	ON	38400 bps	
← Factory set value: 19200 bps			
4	Controller address auto obtain		
OFF	Auto obtain off (No controller address search when power is turned on)		
ON	Auto obtain on (Controller address search and update when power is turned on)		
← Factory set value: Auto obtain off			
7	Controller communication enabled/disabled		
OFF	Controller communication enabled		
ON	Controller communication disabled (When COM-JG initial settings are configured using PLC tool)		
← Factory set value: Controller communication enabled			
3	5	6	8
OFF	OFF	OFF	OFF
Fixed			

For the "Controller address auto obtain" and the "Controller communication enabled/disabled," refer to 3.3 COM-JG Initial Setting.

3. USAGE EXAMPLE

In this usage example, described the following system configuration.

3.1 System Configuration



Use instruments

- PROFIBUS communication converter: COM-JG 1
 - Module type controller SRZ: Z-TIO module 3 (4-channel type: 2, 2-channel type: 1) Z-DIO module ... 1
 - SIMATIC S7-300 series (SIEMENS AG)
 - Power supply module: PS-300 (PS307 2A)
 - CPU module: S7-300 (CPU315-2DP)
 - DI module: DI-300 (SM321D16)
 - PROFIBUS special cable
 - COM-JG and controller connection cable
 - Personal computer
 - Software of the following must be installed in a personal computer.
 - Programming Software STEP7 (SIEMENS AG)
- For the personal computer to be connected to the PLC, refer to Instruction Manual of PLC and STEP7.

3.2 Use Instruments Setting

Set the COM-JG and controller as the following.

COM-JG setting

- PROFIBUS address: 1
- Controller communication speed: 19200 bps (Factory set value)

For setting method, refer to 2. COMMUNICATION SETTING.

Controller (SRZ) setting

- Module address: Z-TIO module: 4-channel type: 1, 2 2-channel type: 3 Z-DIO module: 17

- Communication protocol: Modbus-RTU
- Communication speed: 19200 bps (Factory set value)
- Data bit configuration: Data 8-bit, Without parity bit, Stop 1-bit

The controller address of a Z-TIO module will be the value (decimal) set in the address setting switch plus "1." The controller address of a Z-DIO module will be the value (decimal) set in the address setting switch plus "17."

For setting method, refer to Z-TIO Host Communication Quick Instruction Manual (IMS01T02-E2) and Z-DIO INSTRUCTION MANUAL (IMS01T03-E2).

3.3 COM-JG Initial Setting

To perform communication between a PLC and controller (SRZ), the following items must be set to COM-JG.

[COM-JG initial setting items]

- Controller address: It can be obtained automatically by switching DIP switch of COM-JG
 - Number of continuous accesses
 - Continuous accesses enable selection
 - Static data read/write range
 - Transmission wait time of controller communication: This setting is not necessary
- These settings are configured using the PLC tool.

Before configuring COM-JG initial settings using the PLC tool, be sure to set DIP switch No. 7 to ON (controller communication disabled). After you have completed the COM-JG initial settings, be sure to return DIP switch No. 7 to OFF (controller communication enabled).

In this example, five communication items are set for the following module configuration.

[Module configuration]

	1st module	2nd module	3rd module	4th module
Module type	Z-TIO	Z-TIO	Z-TIO	Z-DIO
Module address	1	2	3	17
Number of channels	4	4	2	8

[Communication item]

Communication item	Attribute*	Data type	Corresponding module
Measured value (PV)	RO	Channel-based data	Z-TIO
Set value (SV)	R/W	Channel-based data	
RUN/STOP transfer	R/W	Module-based data	
Digital input (DI) state	RO	Module-based data	Z-DIO
RUN/STOP transfer	R/W	Module-based data	

* RO: Read only, R/W: Read/Write

Controller address

This item is set to make the COM-JG recognize the address of each module of SRZ. This procedure assumes that the SRZ communication settings have been completed.

- Set DIP switch No. 4 on the left side of the COM-JG to ON (auto obtain ON). Set the controller communication speed with DIP switch Nos. 1 and 2.
- Connect the power wiring and the wiring between the COM-JG and the SRZ.
- When the power is turned on, controller address auto obtain starts. While auto obtain is in progress, the RUN lamp of the COM-JG blinks. The obtained addresses are stored in "Controller address" in the COM-JG initial setting items. "Controller address" has 31 address spaces, Nos. 1 to 31 [equal to the maximum number of controller connections], and the obtained addresses are stored in order from No. 1 beginning from the lowest-value address.
- When controller address auto obtain is finished, the RUN lamp of the COM-JG stops blinking and lights steadily.
- Turn off the power and return DIP switch No. 4 on the left side of the COM-JG to OFF (auto obtain OFF).

A certain amount of time is required to complete auto obtain (up to about 90 seconds).

[Controller address]

COM-JG initial setting item	Set value	No. 1 to No. 4 correspond to the 1st to the 4th module. No modules are connected for No. 5 to No. 31, and thus when addresses are automatically obtained, these are set to "0: No connected controller." Data range: 1 to 99 (0: No connected controller)
No. 1 Controller address	1	
No. 2 Controller address	2	
No. 3 Controller address	3	
No. 4 Controller address	17	

Number of continuous accesses

Each module in the SRZ has multiple channels, and thus in the case of a 4-channel type Z-TIO module, four data areas (data parameters) must be retained for each communication item. However, the number of continuous accesses setting can be configured to allow communication with just one data area (data parameter) per communication item regardless of the number of channel. Number of continuous accesses is set every controller address (module).

As a basic rule, the "Number of continuous accesses" is set to the number of channels used for each module. However, when only module-based data is set in the static data request (for example "Digital input (DI) state" of the Z-DIO module), set the "Number of continuous accesses" to "1."

[Number of continuous accesses]

COM-JG initial setting item	Set value	No. 1 to No. 4 correspond to the 1st to the 4th module. No. 4 (Z-DIO) has 8 channels, however, the data specified for the Z-DIO module is all module-based data, and thus "1" is set. Data range: 1 to 85
No. 1 Number of continuous accesses	4	
No. 2 Number of continuous accesses	4	
No. 3 Number of continuous accesses	2	
No. 4 Number of continuous accesses	1	

Continuous accesses enable selection

When communicate both channel-based data and module-based data in one controller (module), the number of continuous accesses setting must be disabled for module-based data.

Read and write of a static data request are set as shown below for each Group on the PLC tool.

Communication item	Data type	Corresponding module	Attribute
Group 1 Measured value (PV)	Channel-based data	Z-TIO	Read*
Group 2 Set value (SV)	Channel-based data		
Group 3 RUN/STOP transfer	Module-based data		
Group 4 Digital input (DI) state	Module-based data	Z-DIO	Write*
Group 5 RUN/STOP transfer	Module-based data		
Group 6 Set value (SV)	Channel-based data		
Group 7 RUN/STOP transfer	Module-based data		
Group 8 RUN/STOP transfer	Module-based data	Z-DIO	

* Always set the order of read item and write item.

Select enable/disable of continuous access for each communication item set by each Group. Eight items (8 bits) is one byte, and thus the maximum of 40 items (Groups 1 to 40) is set using 5 bytes. Disable (0) the module-based items.

Group 1 to 8

Group No.	8 (Bit 7)	7 (Bit 6)	6 (Bit 5)	5 (Bit 4)	4 (Bit 3)	3 (Bit 2)	2 (Bit 1)	1 (Bit 0)
Enabled (1)/ Disabled (0)	0	0	1	0	0	0	1	1

A lower bit is Group 1.

The value of "Continuous access enable selection" of Groups 1 to 8 is 00100011 = 35
Groups 9 to 16, Groups 17 to 24, Groups 25 to 32, and Groups 33 to 40 do not use this setting, and thus the factory set value of 255 (all enabled) should remain unchanged.

Group No.	Group 1 to 8	Group 9 to 16	Group 17 to 24	Group 25 to 32	Group 33 to 40
Set value	35	255	255	255	255

[Continuous accesses enable selection]

COM-JG initial setting item	Set value
Continuous accesses enable selection 1 to 8	35
Continuous accesses enable selection 9 to 16	255
Continuous accesses enable selection 17 to 24	255
Continuous accesses enable selection 25 to 32	255
Continuous accesses enable selection 33 to 40	255

Data range: 0 to 255

■ Static data read/write range

Since the Modbus register address of the communication data is different for the Z-TIO module and Z-DIO module of the controller (SRZ), if only one Modbus register address is specified at communication item setting, the separate contents of each are read. To avoid this, the data which can be communicated is allocated to each module of the same type. A table is created that shows the correspondence between communication item groups and controller addresses.

Communication item	Controller address				Corresponding module	Static data read/write range channel
	No. 1	No. 2	No. 3	No. 4		
Group 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Z-TIO	Read CH1
Group 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Group 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Group 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Z-DIO	Read CH2
Group 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Group 6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Z-TIO	Write CH1
Group 7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Group 8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Z-DIO	Write CH2

O: Valid data

For one type of module, set the valid data range to one channel for read and one channel for write.

Five channels each can be set for read and write. For each channel, set the number of connected modules (upper-byte) and the number of communication items (lower-byte).

Static data read/write range channel	Number of connection modules (Set value upper-byte)	Number of communication items (Set value lower-byte)	Set value
Read CH1	3	3	0303H (771)
Read CH2	1	2	0102H (258)
Write CH1	3	2	0302H (770)
Write CH2	1	1	0101H (257)

[Static data read/write range]

COM-JG initial setting item	Set value
Static data read range CH1	0303H (771)
Static data read range CH2	0102H (258)
Static data write range CH1	0302H (770)
Static data write range CH2	0101H (257)

Static data read ranges CH3 to CH5 and static data write ranges CH3 to CH5 are not used, and thus the set value is "0."

Data range: 0 to 65535

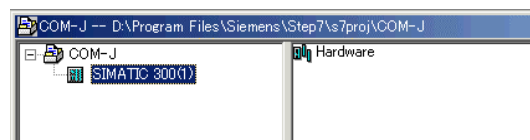
3.4 PLC Tool Setting

The procedure of using the Programming Software STEP7 is as follows.

- Creating a new project Refer to ■ Creating a new project
- Register a GSD file Refer to ■ Register a GSD file
- PLC master setting Refer to ■ PLC master setting
- Register a COM-JG Refer to ■ Register a COM-JG
- COM-JG initial setting Refer to ■ COM-JG initial setting
- Communication item setting Refer to ■ Communication item setting

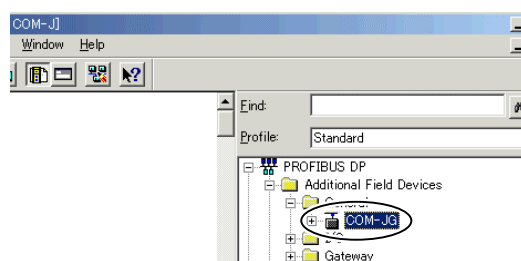
■ Creating a new project

- Start programming software STEP7.
- Select the menu command **File** → **New...**, and creating a new project. The project name is "COM-J."
- Clicking "OK" displays the new project on the SIMATIC Manager.
- The PLC is registered to the created object. Here, "SIMATIC 300 Station" is selected.
- If the PLC is registered, the display becomes as follows.



■ Register a GSD file

- Click the "SIMATIC 300" folder on the screen registered with the PLC and then double-click "Hardware" on the right side of the window.
- Go to the "Options" on the menu bar and click on "Install New GSD..." to register GSD file for COM-JG downloaded from the RKC official website.
- After the GSD file is registered, "COM-JG" is displayed on the HW configuration screen.

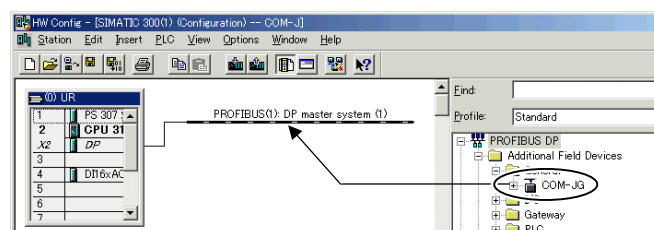


■ PLC master setting

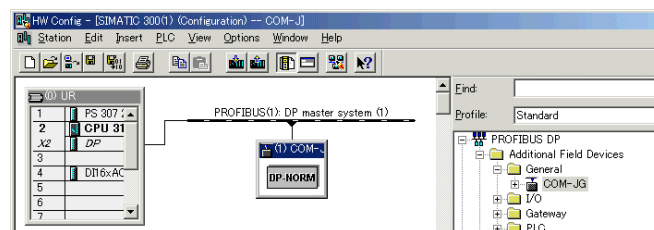
- Select a rack in a hardware catalog, and double-click. In this example, select "Rail" of "RACK-300."
- Drag and drop "PS 307 2A" of the power supply module, "PS-300" within the rack.
- Succeeding drag and drop "6ES7-315-2AF00-0AB0" of the CPU module, "CPU 315-2 DP."
- As the properties are displayed, click "New" to set the network. In this example, the "Highest PROFIBUS Address" is set to 126 and the "Transmission Rate," to 12 Mbps.
- Drag and drop "SM 321 DI16xAC120V" of the DI module, "DI-300."

■ Register a COM-JG

- Drag and drop "COM-JG" onto "PROFIBUS (1): DP master system (1)" from the hardware catalog.



- As the properties are displayed, set the PROFIBUS address. In this example, "1" is set.
- If the COM-JG is registered, the display becomes as follows.



■ COM-JG initial setting

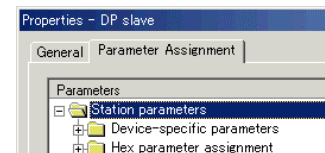
The following four items are set as COM-JG initial setting items.

- Number of continuous accesses
- Continuous accesses enable selection
- Static data read range
- Static data write range

Repeat the following procedure for each initial setting item. The example below explains how to set the "Number of continuous accesses."

● Data parameter setting

- Double-click "COM-JG" registered to set each controller (SRZ) communication item.



- Set the number of data of the communication item (Number of continuous accesses) in "Number of Channel" in "Device-specific parameters." In this example, "4" (because there are four modules) is set.
- Set the number of read/write items to "Group read/write allocation." In this example, the number of read items set to 1, and the number of write items, to 39.

- Sets read and write items in order from "Group 1 ID (base ten)." The set value sets the Modbus register address of the controller (SRZ) connected in a decimal number. In this example, make the setting as follows.

Read item: Group 1 ID (base ten): 65024 (No. 1 Number of continuous accesses)
Write item: Group 2 ID (base ten): 65024 (No. 1 Number of continuous accesses)

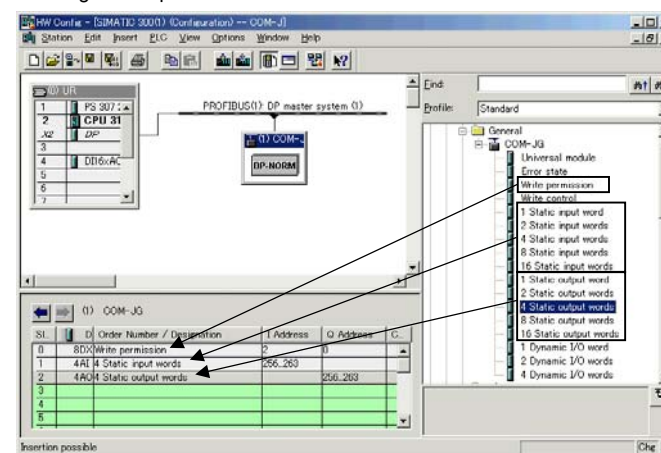
Blank items will be the factory set value "65535."

For Modbus register address of COM-JG initial setting items, refer to **COM-JG [For SRZ] Communication Data List (IMR01Y31-ED)**.

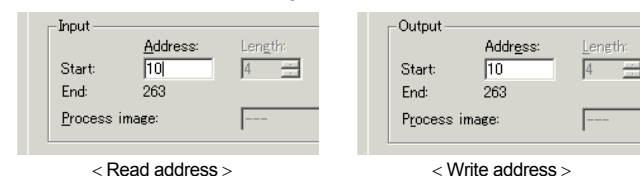
- After the allocation of data parameters is finished, click "OK."

● Configuration setting

- Select "COM-JG" and then set the write permission flag register. Select "Write permission" from the hardware catalog and then drag and drop it to the COM-JG rack.
- Set the number of static data words.
Read/writes, data length of one item become a single word.
Number of read words = Number of communication items × Number of read items
= 4 × 1 = 4
Number of write words = Number of communication items × Number of write items
= 4 × 1 = 4
Select "Static input word" and "Static output word" from the hardware catalog and then drag and drop it to the COM-JG rack. 1/2/4/8/16 words are available.



- Set the PLC register address for static data read and write requests. Double-click the "Static input word" cell and the "Static output word" cell in the COM-JG rack, and set the starting address.



- Save a project, and execute a compilation.

- Download a project to the PLC, and be ends.

Then, use the variable monitor/modify function of STEP7 to write the COM-JG initial setting item to COM-JG.

For the details, refer to **COM-JG [For SRZ] Instruction Manual (IMR01Y35-ED)** and Instruction Manual of STEP7.

■ Communication item setting

Create a new project for communication item setting, set a PLC master, and register a COM-JG. And set the following.

● Data parameter setting

- Double-click "COM-JG" registered to set each controller (SRZ) communicating item.
- Set the number of connecting channels (total number of continuous accesses) to "Number of Channel" of "Device-specific parameters." In this example, set is "11."
- Set the number of read/write items to "Group read/write allocation." In this example, the number of read items set to 5, and the number of write items, to 35.

- Sets read and write items in order from "Group 1 ID (base ten)." The set value sets the Modbus register address of the controller (SRZ) connected in a decimal number. In this example, make the setting as follows.

Group 1 ID (base ten): 0: Measured value (PV) [Z-TIO CH1]
Group 2 ID (base ten): 142: Set value (SV) [Z-TIO CH1]
Group 3 ID (base ten): 109: RUN/STOP transfer [Z-TIO]
Group 4 ID (base ten): 0: Digital input (DI) state [Z-DIO]
Group 5 ID (base ten): 70: RUN/STOP transfer [Z-DIO]
Group 6 ID (base ten): 142: Set value (SV) [Z-TIO CH1]
Group 7 ID (base ten): 109: RUN/STOP transfer [Z-TIO]
Group 8 ID (base ten): 70: RUN/STOP transfer [Z-DIO]

For Modbus register address of controller (SRZ), refer to **COM-JG [For SRZ] Communication Data List (IMR01Y31-ED)**.

● Configuration setting

- Select "COM-JG" and then set the error state register. Select "Error state" from the hardware catalog and then drag and drop it to the COM-JG rack.
- Select "COM-JG" and then set the write permission flag register. Select "Write permission" from the hardware catalog and then drag and drop it to the COM-JG rack.
- Set the number of static data words.
Read/writes, data length of one item become a single word.
Number of read words = Total number of words of each static data read range channel
= 23 + 2 = 25 words (Number of "O" of the table below)
Number of write words = Total number of words of each static data write range channel
= 13 + 1 = 14 words (Number of "O" of the table below)

Communication item	Controller address No./ Connection channel No.*											Static data read/write range channel
	1	2	3	4	5	6	7	8	9	10	11	
Group 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Read CH1
Group 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Group 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Group 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Read CH2
Group 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Group 6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Write CH1
Group 7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Group 8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Write CH2

O: Valid data

* Continuous access number is a number distributed sequentially from the No. 1 controller address.

- Set the PLC register address for static data read and write requests. Double-click the "Static input word" cell and the "Static output word" cell in the COM-JG rack, and set the starting address.
- Save a project, and execute a compilation.
- Download a project to the PLC, and be ends.

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