

DX200 OPTIONS INSTRUCTIONS

JANCD-YEW01-E BOARD (INTERFACE BOARD FOR WELDING POWER SOURCE)

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS
DX200 INSTRUCTIONS
DX200 OPERATOR'S MANUAL (for each purpose)
DX200 MAINTENANCE MANUAL

The DX200 Operator's manual above corresponds to specific usage. Be sure to use the appropriate manual.

Part Number: 167646-1CD
Revision: 1

MANUAL NO.

HW1481264 ◆

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MANDATORY

- This manual explains about the JANCD-YEW01-E board of the DX200 system. Read this manual carefully and be sure to understand its contents before handling the DX200.
- General items related to safety are listed in the Chapter 1: Safety of the DX200 Instructions. To ensure correct and safe operation, carefully read the DX200 Instructions before reading this manual.



CAUTION

- Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.
- The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.
- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.
- If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems (ANSI/RIA R15.06-2012). You can obtain this document from the Robotic Industries Association (RIA) at the following address:

Robotic Industries Association

900 Victors Way

P.O. Box 3724

Ann Arbor, Michigan 48106

TEL: (734) 994-6088

FAX: (734) 994-3338

www.roboticsonline.com

Ultimately, well-trained personnel are the best safeguard against accidents and damage that can result from improper operation of the equipment. The customer is responsible for providing adequately trained personnel to operate, program, and maintain the equipment. **NEVER ALLOW UNTRAINED PERSONNEL TO OPERATE, PROGRAM, OR REPAIR THE EQUIPMENT!**

We recommend approved YASKAWA training courses for all personnel involved with the operation, programming, or repair of the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the DX200.

In this manual, the Notes for Safe Operation are classified as “DANGER”, “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.



DANGER

Indicates an imminent hazardous situation which, if not avoided, could result in death or serious injury to personnel.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.



MANDATORY

Always be sure to follow explicitly the items listed under this heading.



PROHIBITED

Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations. At any rate, be sure to follow these important items.



To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.

 **PROHIBITED**

- Do not use or maintain this board under the following conditions:
 - Direct sunlight
 - Excessive vibration and shock
 - High humidity
 - Proximity to a strong magnetic field source
 - Excessive dust
 - Large temperature change
 - Corrosive gas
 - Condensation

Failure to observe this instruction may result in the failure of the board.

**DANGER**

- Do not touch the inside of the controller cabinet for at least 5 minutes after turning the power off.

Failure to observe this warning may result in electric shock or personal injury because of the residual voltage of the condenser.

- During power on, make sure to close the door and mount the protective cover, and do not touch the board.

Failure to observe this warning may result in fire or electric shock.

**WARNING**

- Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the DX200 and the programming pendant are pressed. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

Fig. : Emergency Stop Button



- Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

Fig. : Release of Emergency Stop



- Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
 - Be sure to use a lockout device to the safeguarding when going inside. Also, display the sign that the operation is being performed inside the safeguarding and make sure no one closes the safeguarding.
 - View the manipulator from the front whenever possible.
 - Always follow the predetermined operating procedure.
 - Keep in mind the emergency response measures against the manipulator's unexpected motion toward you.
 - Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

- Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
 - Turning ON the DX200 power
 - Moving the manipulator with the programming pendant
 - Running the system in the check mode
 - Performing automatic operations

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there is a problem. The emergency stop buttons are located on the right of the front door of the DX200 and the programming pendant.



CAUTION

- Perform the following inspection procedures prior to conducting manipulator teaching. If problems are found, repair them immediately, and be sure that all other necessary processing has been performed.
 - Check for problems in manipulator movement.
 - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the DX200 cabinet after use.

The programming pendant can be damaged if it is left in the manipulator's work area, on the floor, or near fixtures.

- Read and understand the Explanation of the Warning Labels in the DX200 Instructions before operating the manipulator.
- Wiring and installation must be performed by authorized or certified personnel.

Failure to observe this caution may result in fire or electric shock.

- Check to be sure that there is no foreign matter (metal piece, etc.) on the board.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Check to be sure that there is no problem (damage, bend, etc.) with the components of the board.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Connect the cables and connectors properly.

Failure to observe this caution may result in fire or equipment failure.

- Make sure to properly perform the setting of the switches, etc.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Do not touch the component-mounting surface of the board directly with a finger.

Failure to observe this caution may result in the failure of IC, etc. because of static electricity.

- Do not touch the solder surface of the board directly with a finger.

Failure to observe this caution may result in personal injury because of solder projection, etc.

- Avoid shock on the board.

Failure to observe this caution may result in the failure of the board.

Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and manipulator cables.

In this manual, the equipment is designated as follows:

Equipment	Manual Designation
DX200 Controller	DX200
DX200 Programming Pendant	Programming Pendant
Cable between the manipulator and the controller	Manipulator cable

Descriptions of the programming pendant keys, buttons, and displays are shown as follows:

Equipment	Manual Designation	
Programming Pendant	Character Keys Symbol Keys	The keys which have characters printed on them are denoted with []. ex. [ENTER]
	Axis Keys Numeric Keys	“Axis Keys” and “Numeric Keys” are generic names for the keys for axis operation and number input.
	Keys pressed simultaneously	When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex. [SHIFT]+[COORD]
	Displays	The menu displayed in the programming pendant is denoted with { }. ex. {JOB}

Description of the Operation Procedure

In the explanation of the operation procedure, the expression “Select •••” means that the cursor is moved to the object item and the [SELECT] is pressed.

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.

Customer Support Information

If you need assistance with any aspect of your Interface Board for Welding Power Supply system, please contact YASKAWA Customer Support at the following 24-hour telephone number:

(937) 847-3200

For **routine** technical inquiries, you can also contact YASKAWA Customer Support at the following e-mail address:

techsupport@motoman.com

When using e-mail to contact YASKAWA Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.



Please use e-mail for **routine** inquiries only. If you have an urgent or emergency need for service, replacement parts, or information, you must contact YASKAWA Customer Support at the telephone number shown above.

Please have the following information ready before you call Customer Support:

- | | |
|----------------------------|--|
| • System | Interface Board for Welding Power Supply |
| • Primary Application | _____ |
| • Controller | DX200 |
| • Software Version | Access this information on the Programming Pendant's LCD display screen by selecting {MAIN MENU} - {SYSTEM INFO} - {VERSION} |
| • Robot Serial Number | Located on the robot data plate |
| • Robot Sales Order Number | Located on the DX200 controller data plate |

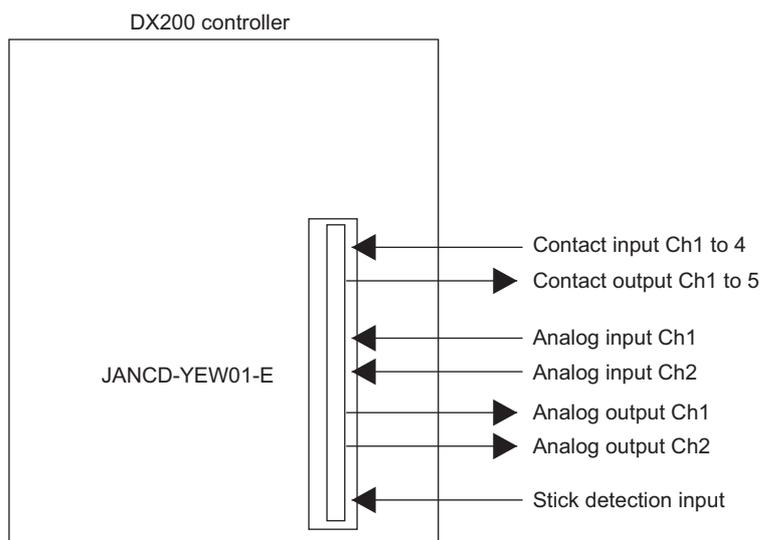
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1 Outline

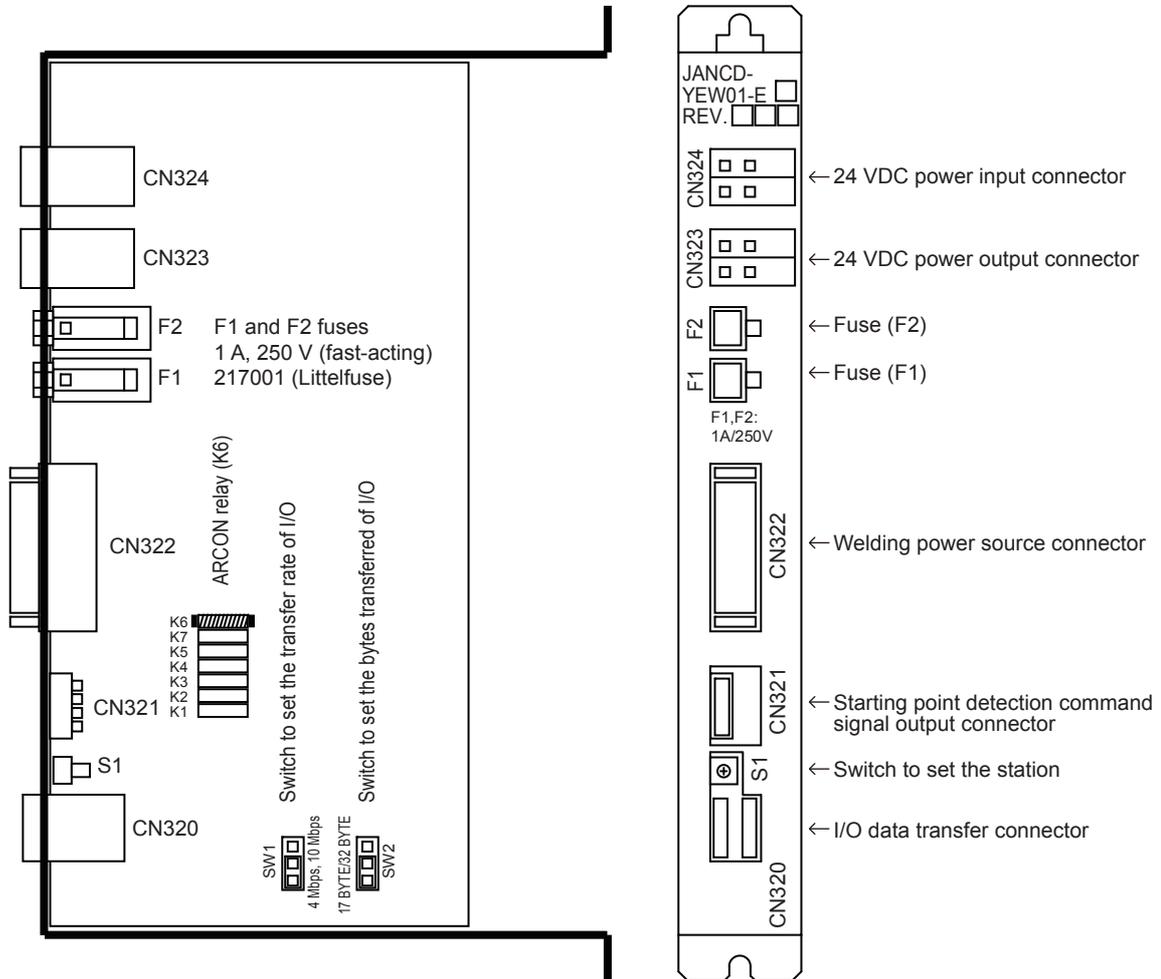
This instruction manual is for JANCD-YEW01-E, a welding power source interface board. This board can connect an arc welding power source of analog command to the DX200.

1.1 System Configuration Example



2 Hardware Specifications

2.1 Board Outline Drawing

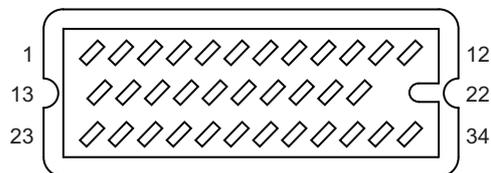


2.2 Board Specifications

Item	Specification
Board mounting location	Optional-board mounting space in the DX200 cabinet
External I/O	4 welding power source specific inputs 4 welding power source specific outputs 1 general output
Stick detection input	1 input
Number of analog input channels	2 channels
Number of analog output channels	2 channels

2.3 Connector for Welding Power Source (CN322)

Details of connector (view from the fitting surface of the cable connector)

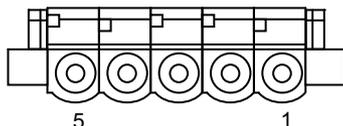


Connector type: MR-34MG (soldering type) See Note 1.
 MRP-34M01 (crimping type insulator) See Note 1.
 MRP-M103 (crimping type contact, strip form terminal) See Note 2.
 MRP-M113 (crimping type contact, loose piece terminal) See Note 2.
 MR-34L+ (vertical type case)
 All manufactured by Honda Tsushin Kogyo Co., Ltd.

Note 1: Use either MR-34MG or MRP-34M01.
 Note 2: When using MRP-34M01, use either MRP-M103 or MRP-F113.
 Note 3: Cable connector is not attached. Must be prepared by user.

2.4 Starting Point Detection Output Connector (CN321)

Details of connector (view from the fitting surface of the cable connector)



Connector type: 231-105/037-000 See Note 1.
 All manufactured by WAGO Company of Japan, Ltd.

Note 1: Cable connector is attached to the board.

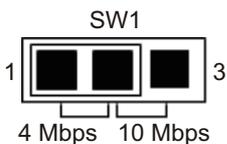
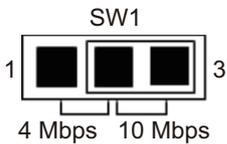
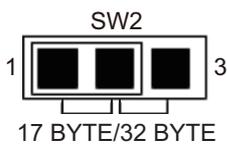
3 Function Settings

3.1 Description of Function Setting Switches

The names of the switches to set the functions of this board and how each switch works are shown below. Make sure to perform proper settings according to the following description. For details of the settings, refer to the next page.

- S1: Sets the station of this board on the DX200.
The setting range of the station is 1 (ST#01) to D (ST#13).
0, E, or F cannot be set.
- SW1: Sets the transfer rate.
Switches between 4 Mbps and 10 Mbps.
Make sure to set SW1 to 4 Mbps. 10 Mbps cannot be used.
If this board's information is not displayed on the programming pendant screen although the communication cable and power cable are connected correctly according to *section 5.1 "I/O Module Setting" on page 5-1*, SW1 may be set to 10 Mbps. If so, change it to 4 Mbps.
- SW2: Sets the I/O communication mode.
Switches between 17 BYTE or 32 BYTE.
Make sure to set SW2 to 17 BYTE. 32 BYTE cannot be used.
If this board's information is not displayed on the programming pendant screen although the communication cable and power cable are connected correctly according to *section 5.1 "I/O Module Setting" on page 5-1*, SW2 may be set to 32 BYTE. If so, change it to 17 BYTE.

3.2 Switch Settings

Switch	How to set																
S1 Station setting	 <p>Sets the station. The relations of the switch settings and the stations are shown below. Set the arrow to the number corresponding to the desired station by using a precision screwdriver (Phillips or flathead).</p> <table> <tr> <td>0: Not available</td> <td>8: ST#08</td> </tr> <tr> <td>1: ST#01 (factory setting)</td> <td>9: ST#09</td> </tr> <tr> <td>2: ST#02</td> <td>A: ST#10</td> </tr> <tr> <td>3: ST#03</td> <td>B: ST#11</td> </tr> <tr> <td>4: ST#04</td> <td>C: ST#12</td> </tr> <tr> <td>5: ST#05</td> <td>D: ST#13</td> </tr> <tr> <td>6: ST#06</td> <td>E: Not available</td> </tr> <tr> <td>7: ST#07</td> <td>F: Not available</td> </tr> </table> <p>The number after ST# is the station number which is displayed on the programming pendant screen when setting the I/O module.</p>	0: Not available	8: ST#08	1: ST#01 (factory setting)	9: ST#09	2: ST#02	A: ST#10	3: ST#03	B: ST#11	4: ST#04	C: ST#12	5: ST#05	D: ST#13	6: ST#06	E: Not available	7: ST#07	F: Not available
0: Not available	8: ST#08																
1: ST#01 (factory setting)	9: ST#09																
2: ST#02	A: ST#10																
3: ST#03	B: ST#11																
4: ST#04	C: ST#12																
5: ST#05	D: ST#13																
6: ST#06	E: Not available																
7: ST#07	F: Not available																
SW1 Transfer rate setting	 <p>1 to 2 short circuit: 4 Mbps (factory setting)</p> <p>* Must be set to 4 Mbps.</p>  <p>2 to 3 short circuit: 10 Mbps</p> <p>* Not available</p>																
SW2 I/O communication mode setting	 <p>1 to 2 short circuit: 17 BYTE (factory setting)</p> <p>* Must be set to 17 BYTE.</p>  <p>2 to 3 short circuit: 32 BYTE</p> <p>* Not available</p>																



- Do not set S1 to 0, E, or F. Also, do not set 2 or more boards to the same station. Otherwise, this board cannot be recognized correctly.
- Do not set SW1 to 10 Mbps. If it is set to 10 Mbps, this board cannot be recognized correctly.
- Do not set SW2 to 32 BYTE. If it is set to 32 BYTE, this board cannot be recognized correctly.

4 Board Installation



DANGER

- Before wiring or installation, make sure to turn the primary power supply off, and put up a warning sign. (e.g. DO NOT TURN THE POWER ON.)

Failure to observe this warning may result in electric shock or personal injury.

- Do not touch the inside of the controller cabinet for at least five minutes after turning the power off.

Failure to observe this warning may result in electric shock or personal injury because of the residual voltage of the capacitors.

- During power on, make sure to close the door and mount the protective cover, and do not touch the board.

Failure to observe this warning may result in fire or electric shock.



CAUTION

- Wiring and installation must be performed by authorized or certified personnel.

Failure to observe this caution may result in fire or electric shock.

- Check to be sure that there is no foreign matter (metal piece, etc.) on the board.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Check to be sure that there is no problem (damage, bend, etc.) with the components of the board.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Connect the cables and connectors properly.

Failure to observe this caution may result in fire or equipment failure.

- Make sure to properly perform the setting of the switches, etc.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Do not touch the component-mounting surface of the board directly with a finger.

Failure to observe this caution may result in the failure of IC, etc. because of static electricity.

- Do not touch the solder surface of the board directly with a finger.

Failure to observe this caution may result in personal injury because of solder projection, etc.

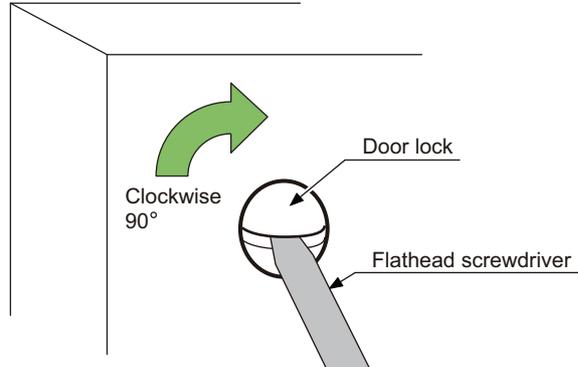
- Avoid shock on the board.

Failure to observe this caution may result in the failure of the board.

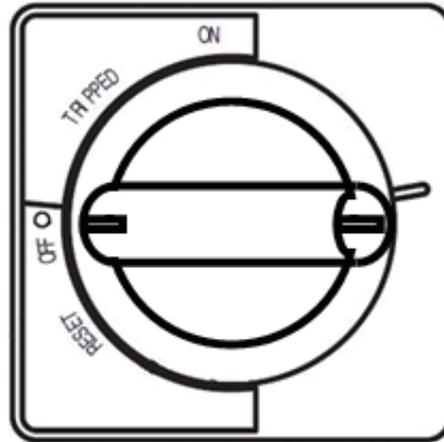
4.1 Opening the Front Door of DX200

Install the JANCD-YEW01-E board according to the following procedure:

1. By using a coin or a flathead screwdriver, rotate the door locks on the front of the DX200 (two places) 90 degrees clockwise.



2. Rotate the main power supply switch to the "OFF" position and open the door gently.



4.2 Checking the Switch Setting of JANCD-YEW01-E Board

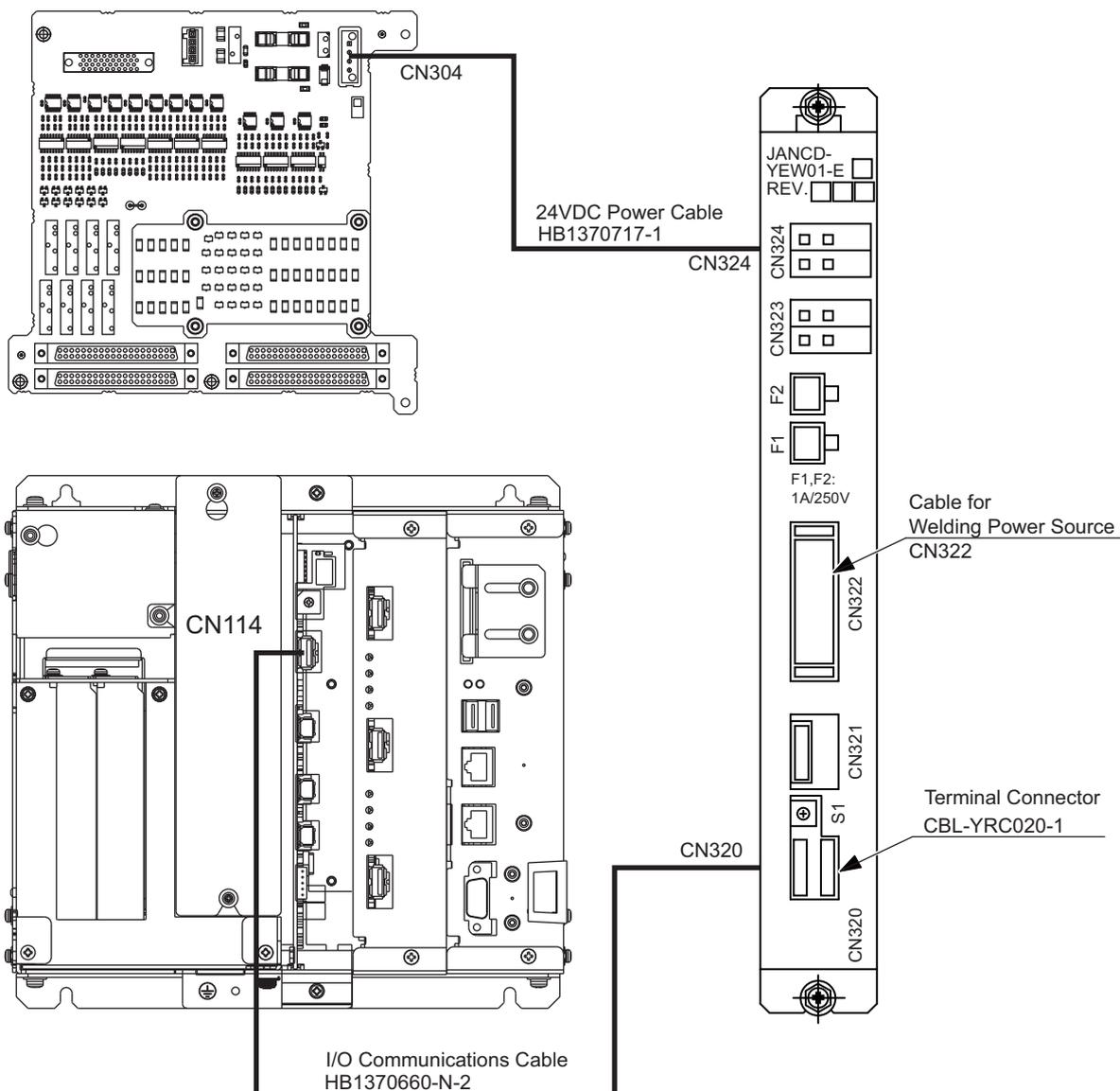
1. Check to be sure that the settings of the switches on the JANCD-YEW01-E board are correct.
2. For the switch setting, refer to *chapter 3*.

4.3 Installing JANCD-YEW01-E Board to DX200

1. Check to be sure that the main power supply is turned OFF.
2. Securely fix the JANCD-YEW01-E board to the DX200 by tightening the board fixing screws firmly.

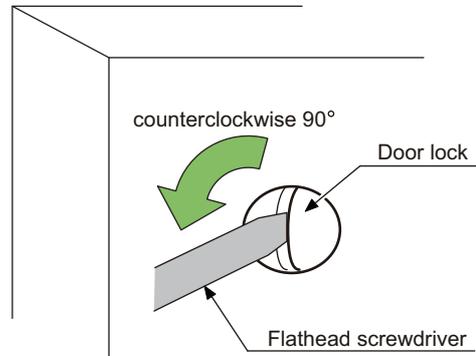
4.4 Connecting Cables

1. Connect the 24 VDC power cable to CN324 of the JANCD-YEW01-E board.
2. Connect the I/O communication cable to CN320 of the JANCD-YEW01-E board.
Connect the terminal connector which is connected to CN114 of the JZNC-D-YIF01-2E board to the unoccupied side of CN320 of the JANCD-YEW01-E board.
3. Connect the cable for welding power source to CN322 of the JANCD-YEW01-E board.



4.5 Closing the Front Door of DX200

1. Close the door gently.
2. By using a coin or a flathead screwdriver, rotate the door locks on the front of the DX200 (two places) 90 degrees counterclockwise.



5 I/O Signal Allocation

5.1 I/O Module Setting

To use the JANCD-YEW01-E board on the DX200, the I/O module must be set according to the following procedure.

Check to be sure that the power supply of the DX200 is turned OFF. Then, install the JANCD-YEW01-E board all of whose switches are properly set to the inside of the DX200 cabinet. When installing the board, refer to *chapter 4 "Board Installation"*.



When setting the I/O module, set the security mode to the management mode.

When the security mode is set either to the operation mode or the editing mode, only the setting status can be referred to.

1. Press and hold [MAIN MENU], and turn ON the power.
 - The Main Menu is displays.

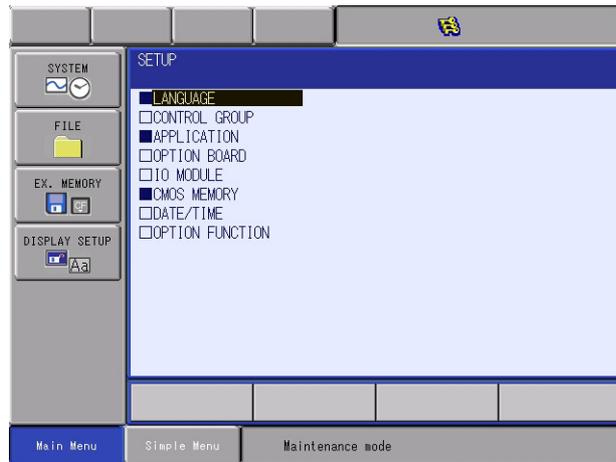


2. Select the {SYSTEM} under the Main Menu.



3. Set the security mode to the "Management Mode".

4. Select {SETUP}.

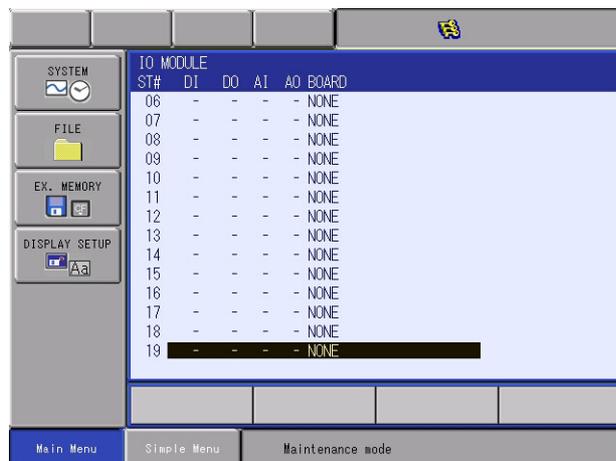


5. Select {I/O MODULE}.

- The current installation status of I/O modules is displayed as shown below.



- Press [ENTER] to display the other stations.



6. Check the installation status of I/O modules.

– Only the currently installed I/O modules are shown. Check that the details of each station (ST#) are the same as the installation status of I/O modules.

– The meanings of the columns are as follows:

ST#	Station number of I/O module
DI	Number of contact inputs ¹⁾
DO	Number of contact outputs ¹⁾
AI	Number of analog inputs ¹⁾
AO	Number of analog outputs ¹⁾
BOARD	Board type ²⁾

1 If “-” is displayed, the corresponding input or output is not implemented.

2 If the board type cannot be determined, “*****” is displayed in the BOARD column. Even so, there is no problem as long as the values of DI, DO, AI, and AO are normal.

– The following combination of boards is displayed in this example.

ST#00: JANCD-YI021-E board

This board is shown as YSF21 on the IO module display.

(Digital input 40 points, digital output 40 points)

This board is fixed to ST#00.

ST#01: JANCD-YEW01-E board

(16 contact inputs, 16 contact outputs, 2 analog inputs, 2 analog outputs)

Note that even though 16 contact inputs and 16 contact outputs are displayed, they cannot be used for external devices because they are used by the system.

Switch S1: Set to 1. (This value is the value of ST#.)

7. Press {ENTER}.

- A confirmation dialog box appears.



8. Select {YES}.

- When the mounted status of an I/O module is correct, select “YES.” The I/O module setting is updated, and the IO MODULE window changes to the EXTERNAL IO SETUP window.

If the displayed details of each station (ST#) and the installation status of I/O modules are different, check the settings of cables and switches again. The following causes are possible:

- (1) Wrong I/O communication setting
The setting of SW1 or SW2 of the JANCD-YEW01-E board may be wrong. If so, the board cannot be determined correctly.
- (2) Wrong station setting
S1 may be set to 0, E, or F (not available). Also, only one optional board can be set to one station. Change the setting of S1 so that two or more boards are not set to one station.
- (3) Wrong connection of the 24 VDC power cable or the I/O communication cable
The 24 VDC power cable or the I/O communication cable may not be connected correctly. If the 24 VDC power cable is not connected to CN324 correctly, the power cannot be supplied properly. Check the connection of cables according to *chapter 4 “Board Installation”*.
- (4) Failure of I/O module
If the displayed details and the installation status are still different even after the correction above, failure of the I/O module is possible. Contact your Yaskawa representative.



9. The EXTERNAL IO SETUP window appears.



10. Select {AUTO} or {MANUAL} in the ALLOCATION MODE.

– The selection menu appears after selecting {AUTO} or {MANUAL}.



If the allocation mode is changed from {MANUAL} to {AUTO}, the set allocation data is discarded. The data will be allocated by AUTO MODE again. Save the set allocation data to the external devices in advance, if needed.

11. Select the allocation mode to set up.

- Select {AUTO} to allocate I/O signal allocation automatically.
Select {MANUAL} to allocate I/O signal allocation manually.
- The selected allocation mode is set up.



12. Select {DETAIL} of {EXTERNAL IO ALLOCATION}.

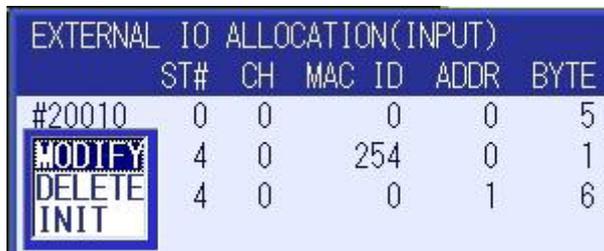
- When select {AUTO}, the following procedures No.13 to 15 are not necessary. Operate the procedure from No.16.
- When select {MANUAL}, operate the following procedures No.13 to 15 accordant with the setting manually.



The IO allocation of the XEW board and the YEW board cannot be changed even if select the {MANUAL} in the allocation mode.

The error [ERROR 8230: Cannot change the setting for XEW or YEW board.] occurs if attempt to change.

13. Select the external I/O signal number (at the change source) to be changed.
- The select menu appears.
 - Select the {INIT} when add the YEW board to the system, which has already allocated the external I/O allocation manually.



EXTERNAL IO ALLOCATION(INPUT)						
	ST#	CH	MAC ID	ADDR	BYTE	
#20010	0	0	0	0	5	
MODIFY	4	0	254	0	1	
DELETE	4	0	0	1	6	
INIT						

14. Select {MODIFY}, and input the external input signal number (at the change destination) to be changed.
- The external input signal number is changed.
15. Likewise, select/modify the number of the external input signal.
- Repeat select/modify until it becomes the desired allocation to set up.
16. Press {ENTER}.
- The allocation window of the external output signal appears.



EXTERNAL IO ALLOCATION(OUTPUT)						
	ST#	CH	MAC ID	ADDR	BYTE	NAME
#30010	0	0	0	0	5	YSF21
#35110	1	0	0	0	2	YEW01

17. Select/modify the number of the external output signal same as the external input signal.
- Repeat select/modify until it becomes the desired allocation to set up.

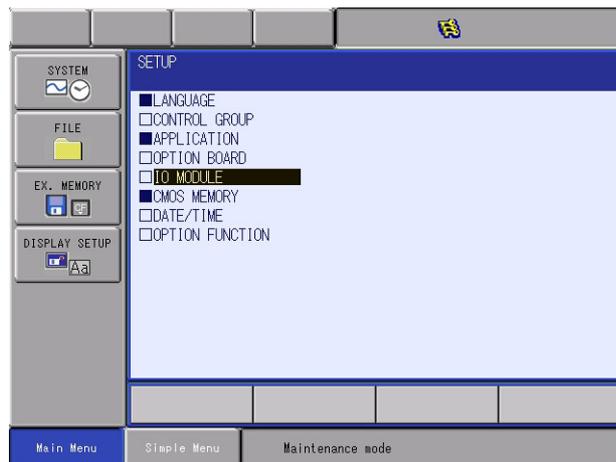
18. Press {ENTER}.

– Confirmation dialog appears.



19. Select {YES}.

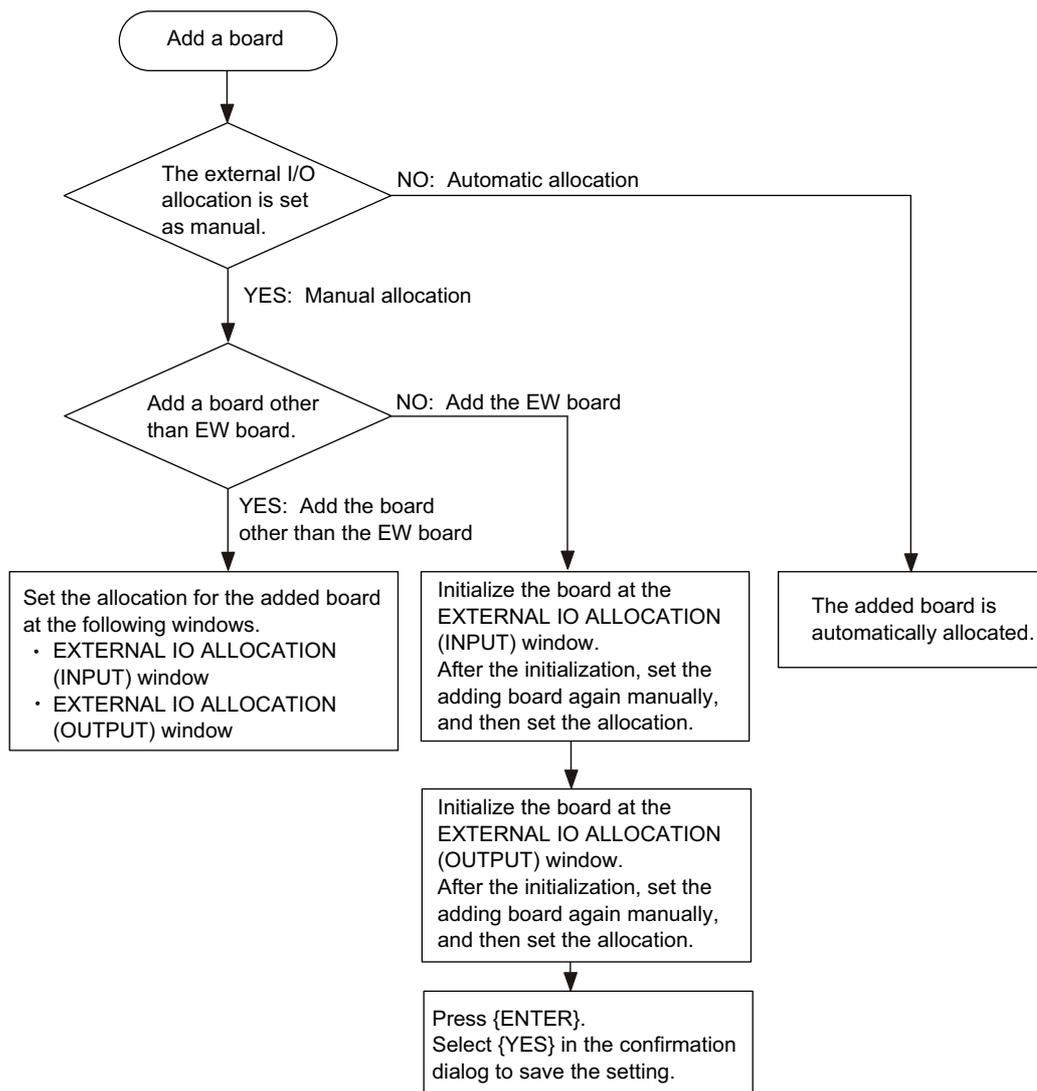
– The settings are confirmed, and returns to the SETUP window.



To add a board when using the YEW board

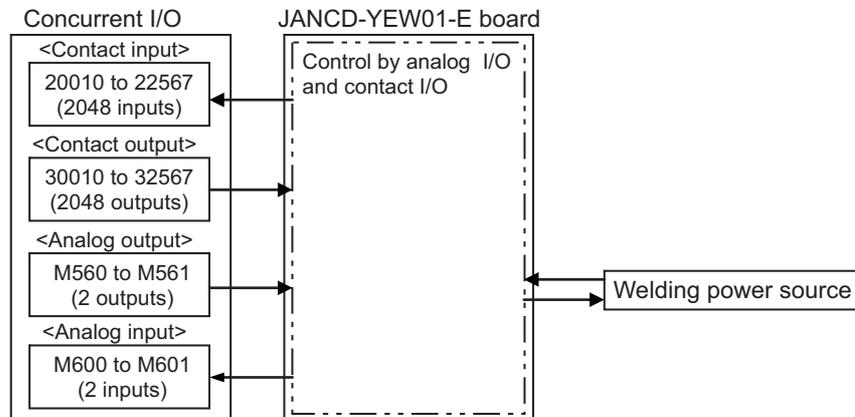
The XEW board and the YEW board (It is called EW board below) do not support external I/O allocation function.

As for the external I/O allocation setting to add a optional board in the system using the EW board, please refer to the following flow chart.



5.2 Transmission Data

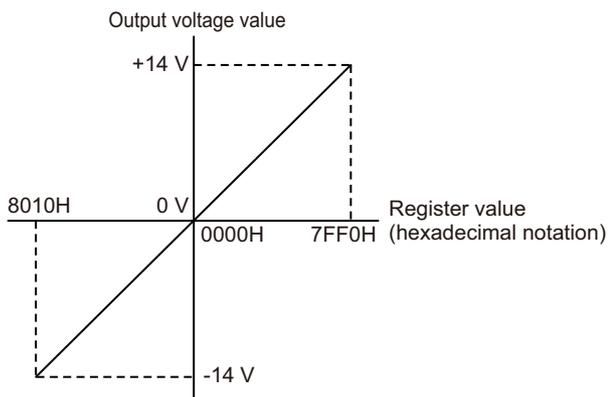
Data transferred from the JANCD-YEW01-E board to the DX200 are 16 contact inputs, 16 contact outputs, and 3 analog outputs (12 bit each). The I/O data of the JANCD-YEW01-E board are allocated to the external I/O signals of the concurrent I/O signals.



When only the JANCD-YEW01-E board is installed as an optional board, the concurrent I/O of the board are allocated as shown below:

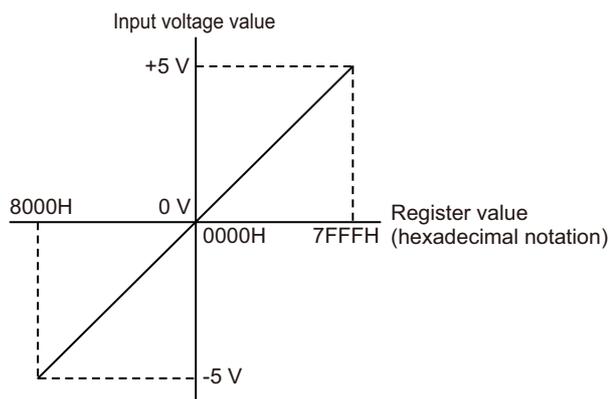
Contact input	Contact output
22550: GASOF (gas shortage) input	32550: System reservation
22551: WIRCUT (wire shortage) input	32551: ARCON (arc-ON) output
22552: ARCOFF (arc failure) input	32552: WIRINCH (wire inching) output
22553: ARCACT (arc establishment) input	32553: WIRRTR (wire retract inching) output
22554: STICK (wire stick) input	32554: System reservation
-	32555: Starting point detection command output (optional)
22555 to 22557: System reservation	32556 to 32557: System reservation
22560 to 22567: System reservation	32560 to 32566: System reservation
-	32567: General output
Analog input	Analog output
M600: Channel 1	M560: Channel 1
M601: Channel 2	M561: Channel 2

The relationship between the write contents and the output voltage values of the registers M560 to M561 are shown below.



Although the register setting value is 16-bit wide, the lower 4 bits of the write content are invalid because the D/A resolution is 12 bit. (The output voltage values of the write contents ***0H to ***FH are the same.) Also, the write contents 8000H to 800FH are not used.

The relationship between the input voltage and the read contents of the registers M600 to M601 are shown below.



The allocation of the concurrent I/O is shown above, but note that only the 2 analog inputs, 2 analog outputs, 5 contact inputs, and 4 contact outputs can be used for communication between the JANCD-YEW01-E board and external devices.

The contact inputs and outputs other than described above are used by the system, so they cannot be used for communications with external devices.

6 Analog I/O Circuit

6.1 Analog Output Circuit

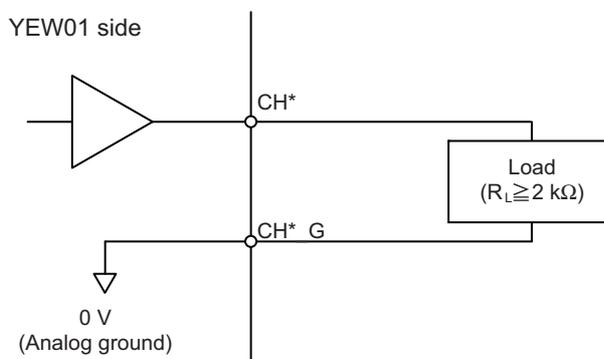
Two analog output circuits (channel 1 for voltage command, and channel 2 for current command) are available.



- When connecting a load to the analog output circuit, the load resistance must be $2\text{ k}\Omega$ or more. If the load resistance is less than $2\text{ k}\Omega$, abnormal output voltage or damage to the output circuit may result.
- The analog output becomes undefined when the DX200 is turned on or off. Use an external circuit so that there is no problem even if the analog output becomes undefined.
- Use shielded twisted-pair wires (24 to 28 AWG) for the analog output wiring, and make the wiring length as short as possible.

Number of channels and application	2 channels for voltage output
Output range	-14 V to +14 V
Digital resolution	12 bit
LSB value	Approx. 6 mV (0.0068 V)
D/A output voltage error	$\pm 14\text{ V}$, equal to or less than $\pm 1\%$
Linearity error	Equal to or less than $\pm 0.2\%$
Forward and reverse error	Equal to or less than $\pm 1\%$
Ripple voltage	Equal to or less than $\pm 0.1\text{ V}$
Temperature drift	Equal to or less than $\pm 1850\text{ PPM}/^\circ\text{C}$ For 0 V, equal to or less than $\pm 20.5\text{ mV}$ (3 LSB)
Conversion cycle	Every communication cycle
Conversion time	Approx. 7 ms (including communication time)
External load resistance	Equal to or more than $2\text{ k}\Omega$

Fig. 6-1: Example connection



6.2 Analog Input Circuit

Two analog input circuits (channel 1 for voltage feedback, and channel 2 for current feedback) are available.

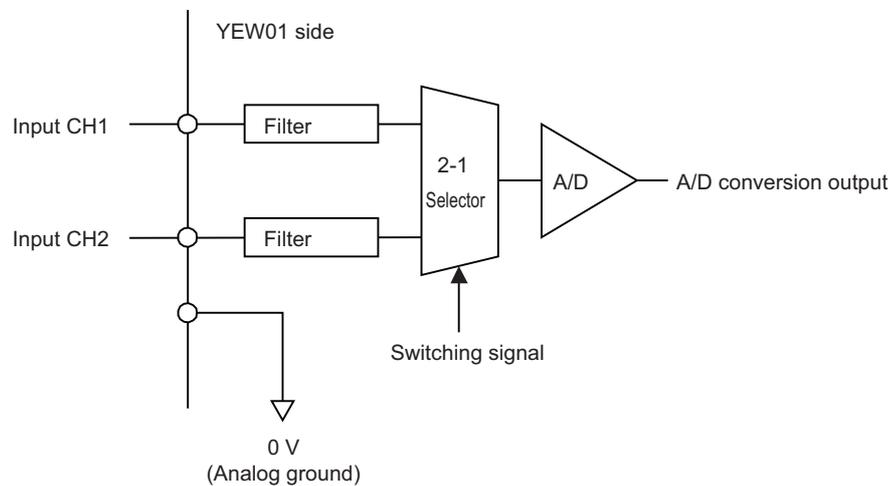


- The input voltage must be within -5 V to +5 V.
- Use shielded twisted-pair wires (24 to 28 AWG) for the analog input wiring, and make the wiring length as short as possible.

Number of channels and application	2 channels for voltage output
Output range	-5 V to +5 V
Digital resolution	16 bit
LSB value	Approx. 153 μ V (153×10^{-6} V/bit)
D/A output voltage error	$\pm 0.5\%$ full scale
Linearity error	± 5 LSB
Conversion cycle	Convert designated channel per every 2 ms.
Conversion time ¹⁾	Maximum 60 μ s
Input impedance	Equal to or more than 1 M Ω

1 Includes the delay of 50 μ s from the input to the A/D converter.

Fig. 6-2: Example connection



7 Contact I/O Circuit

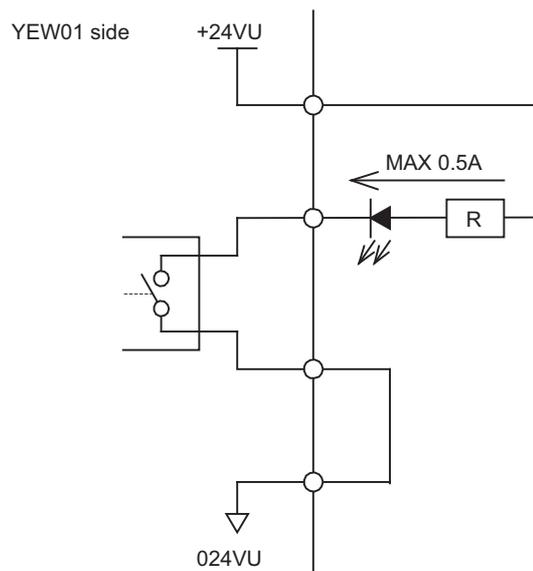
7.1 Contact Output Circuit

Five contact output circuits (4 welding power source specific outputs (arc-ON, wire inching, wire retract inching, starting point detection command (optional function)), and 1 universal output) are available

Number of outputs and application	5 outputs	ARCON	Stick start command (Refer to the note 1)
		WIRINCH	Wire inching command
		WIRRTR	Wire retract command
		SEARCH	Starting point detection
		OUT	General output
Output method	Relay contact output		
Insulation method	Insulation by photocoupler		
Output current per point	0.5A (DC, AC, 250 V) ¹⁾		
Number of commons	No common connection. Independent for each output.		
Active level	0 output = "Contact ON", 1 output = "Contact OFF"		
Output protection type	JIS B3501, Output with no protection		

1 This is a maximum value in the case of the resistive load. Maximum rate differs depending on the type of the load (AC/DC, resistive/inductive/capacity load). Relay contact sticking, and open-close life reduction may occur. When connecting the inductive load, install elements such as flywheel diode on the load side. In the case of using I/O current (+24 VU), maximum of approx. 500 mA can be taken out (fuses F1, F2 may blow out when the current exceeds the above limit).

Fig. 7-1: Example connection



The life of the arc-ON output relay (ARCON relay) is 20 million times (approx. 10 years). Therefore, periodical replacement is necessary. When replacing the ARCON relay, specialized tool is required. Contact your Yaskawa representative. Be sure that the output current does not exceed 0.5 A even instantaneously. When there is a possibility of exceeding 0.5 A due to inrush current etc., current limit measures such as installing the resistors in series are required.

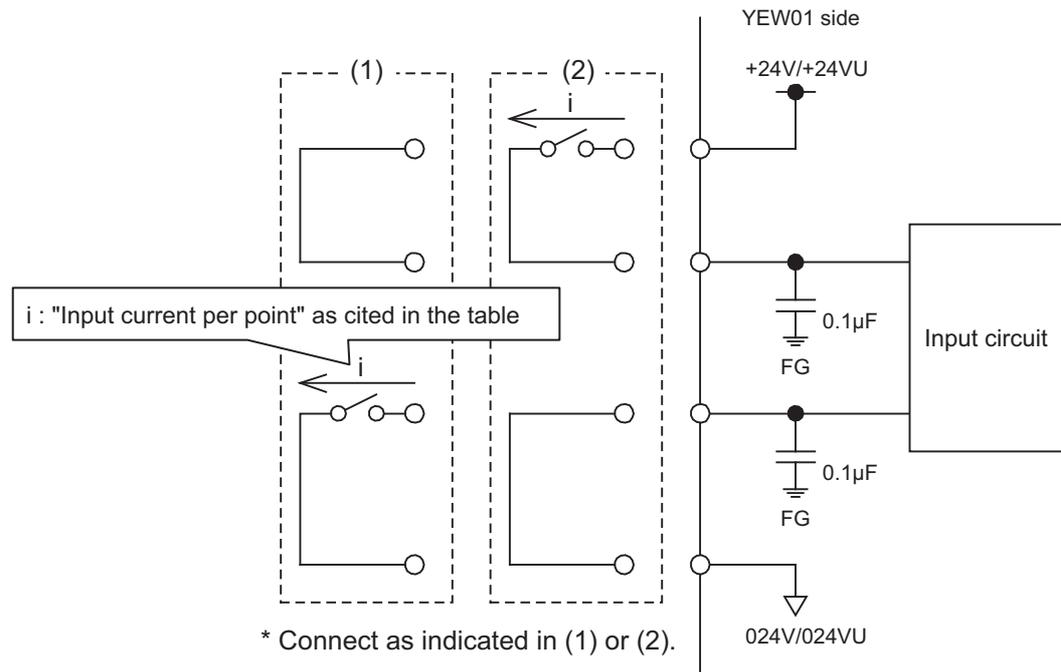
7.2 Contact Input Circuit

The contact input circuit includes 4 welding power source specific inputs (gas shortage, wire shortage, arc establishment, arc failure).

Number of inputs and application	4 inputs	GASOF	Gas shortage detection signal
		WIRCUT	Wire shortage detection signal
		ARCOF	Arc failure detection signal
		ARCACT	Arc start detection signal
Input method	Sink/Source switching available		
Insulation method	Insulation by photocoupler		
Input current per point	6.9 mA (Type) (6.1 mA to 7.8 mA)		
Number of commons	No common connection. Independent for each output.		
Active level of the signal	Contact ON = "0", Contact OFF = "1"		
Input threshold	8.8 V (Type) (6.3 V to 11.4 V)		
Input delay	Ton = 850 μ s + communication cycle ¹⁾ Toff = 958 μ s + communication cycle ¹⁾		

1 The communication cycle depends on the communication cycle setting of the master side.

Fig. 7-2: Example connection



The contact input circuit is provided with a capacitor of 0.1 μ F as a noise control. When the input signal is ON, large inrush current flows. Therefore, when the current capacity of the input circuit is small, current limit measures such as installing resistors in series are required.

8 Stick Detection Circuit

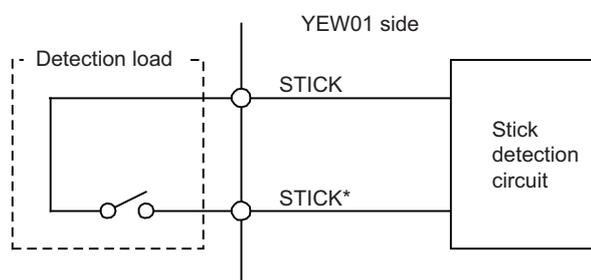
8.1 Stick Detection Input Circuit

Stick detection operates in a state where there is no arc signal. Detection is available under a condition where the ARCON signal is disabled (stick command OFF), and the STICK_EN is enabled.

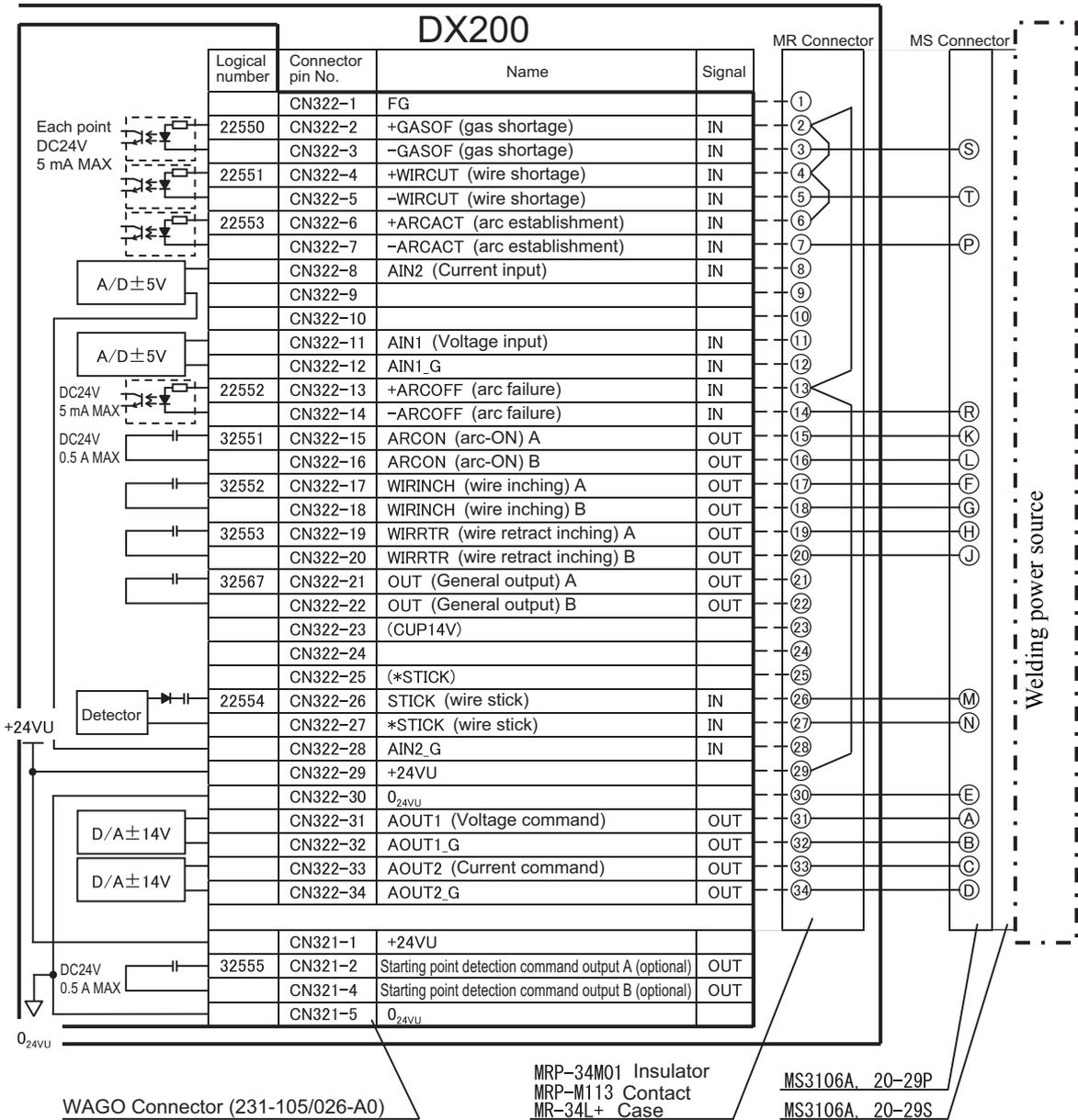
The specifications are described in the following table:

Base voltage	5.7 [V]
Detection resistance	100 [Ω] or less

Fig. 8-1: Example connection



9 Example Connection



DX200 OPTIONS INSTRUCTIONS

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(INTERFACE BOARD FOR WELDING POWER SOURCE)

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