

DX100 OPTIONS INSTRUCTIONS

STANDARD I/O SIGNAL ASSIGNMENT TABLE (PNP SPECIFICATION)
FOR ROBOT I/F UNIT TYPE: JZNC-YIU02-E

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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS
DX100 INSTRUCTIONS
DX100 OPERATOR'S MANUAL
DX100 MAINTENANCE MANUAL

The DX100 operator's manuals above correspond to specific usage.
Be sure to use the appropriate manual.

Part Number: 168533-1CD
Revision: 0



MANDATORY

- This supplementary manual describes the standard I/O signal assignments for the PNP specification. Read this manual carefully and be sure to understand its contents before handling the DX100.
- The differences are described based on Section 13.12.1 through Section 13.12.4 "User I/O Signal Assignment" in the "DX100 INSTRUCTIONS" (Manual No. 162536-1CD). Read this manual thoroughly replacing the subject matters for changes with this supplementary instruction manual.
- General items related to safety are listed in Section 1: Safety of the DX100 Instructions. To ensure correct and safe operation, carefully read the section.



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.

Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the DX100.

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



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 "CAUTION" and "WARNING."



WARNING

- 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 DX100 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 are problems. The emergency stop buttons are located on the right of the front door of the DX100 and the programming pendant.

- Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
 - View the manipulator from the front whenever possible.
 - Always follow the predetermined operating procedure.
 - Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

- Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the DX100 and 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.

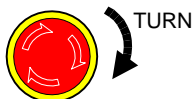
Emergency Stop Button



- 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.

Release of Emergency Stop





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 DX100 cabinet after use.

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

- Read and understand the Explanation of the Warning Labels before operating the manipulator.

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 the manipulator cables.

In this manual, the equipment is designated as follows:

Equipment	Manual Designation
DX100 Controller	DX100
DX100 Programming Pendant	Programming Pendant
Cable between the manipulator and the controller	Manipulator Cable

 Standard I/O Signal
 Assignment (PNP)

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

Equipment		Manual Designation
Programming Pendant	Character Keys	The keys which have characters printed on them are denoted with []. ex. [ENTER]
	Symbol Keys	The keys which have a symbol printed on them are not denoted with [] but depicted with a small picture. ex. page key  The cursor key is an exception, and a picture is not shown.
	Axis Keys Number Keys	“Axis Keys” and “Number 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 key is pressed, or that the item is directly selected by touching the screen.

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.

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1 Arc Welding

Fig. 1-1: JZNC-YIU02-E(CN308 Connector) I/O Allocation and Connection Diagram (For Arc Welding)

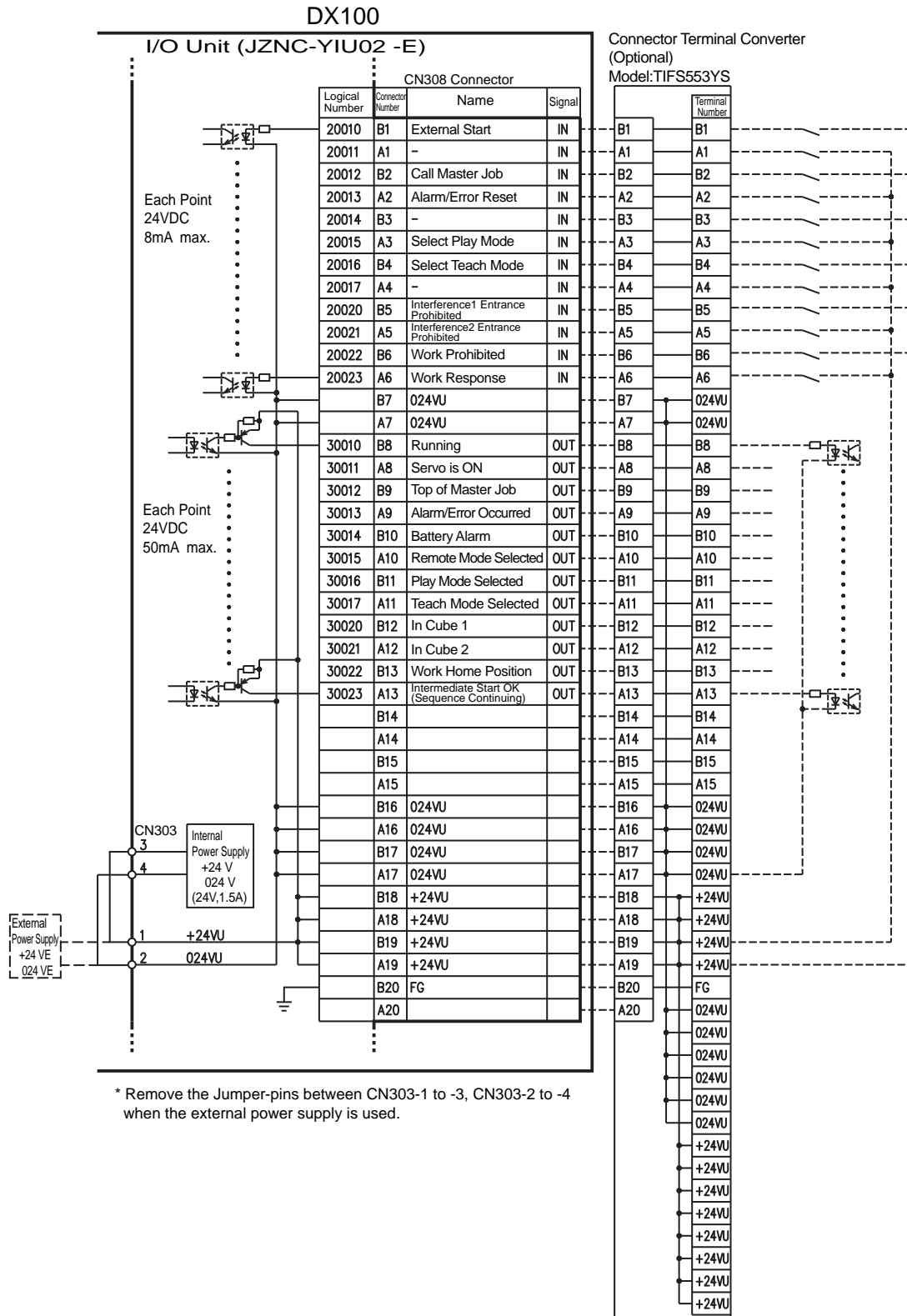
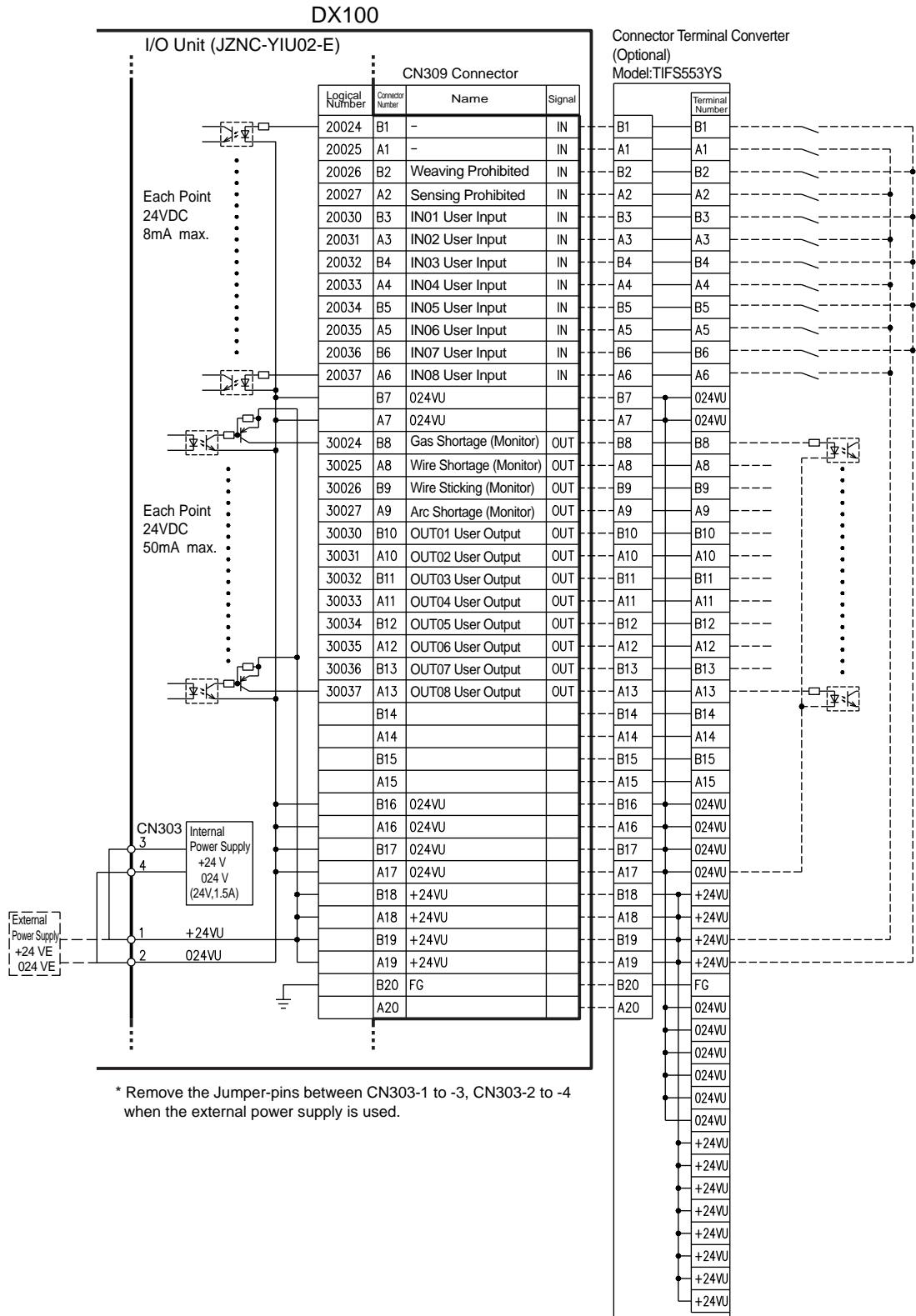


Fig. 1-2: JZNC-YIU02-E (CN309 Connector) I/O Allocation and Connection Diagram (For Arc Welding)



Standard I/O Signal Assignment (PNP)

1 Arc Welding

Fig. 1-3: JZNC-YIU02-E (CN306 Connector) I/O Allocation and Connection Diagram (For Arc Welding)

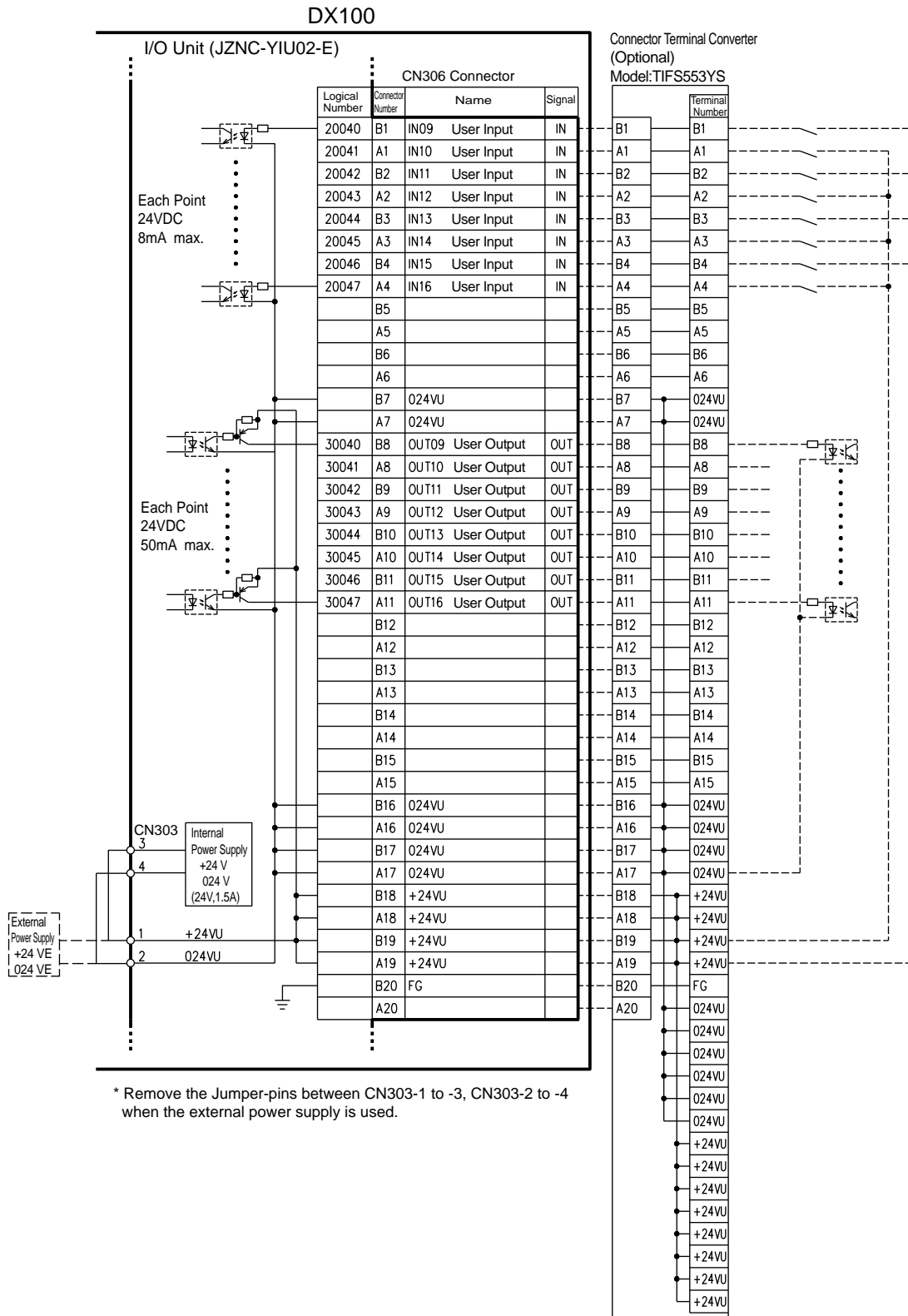
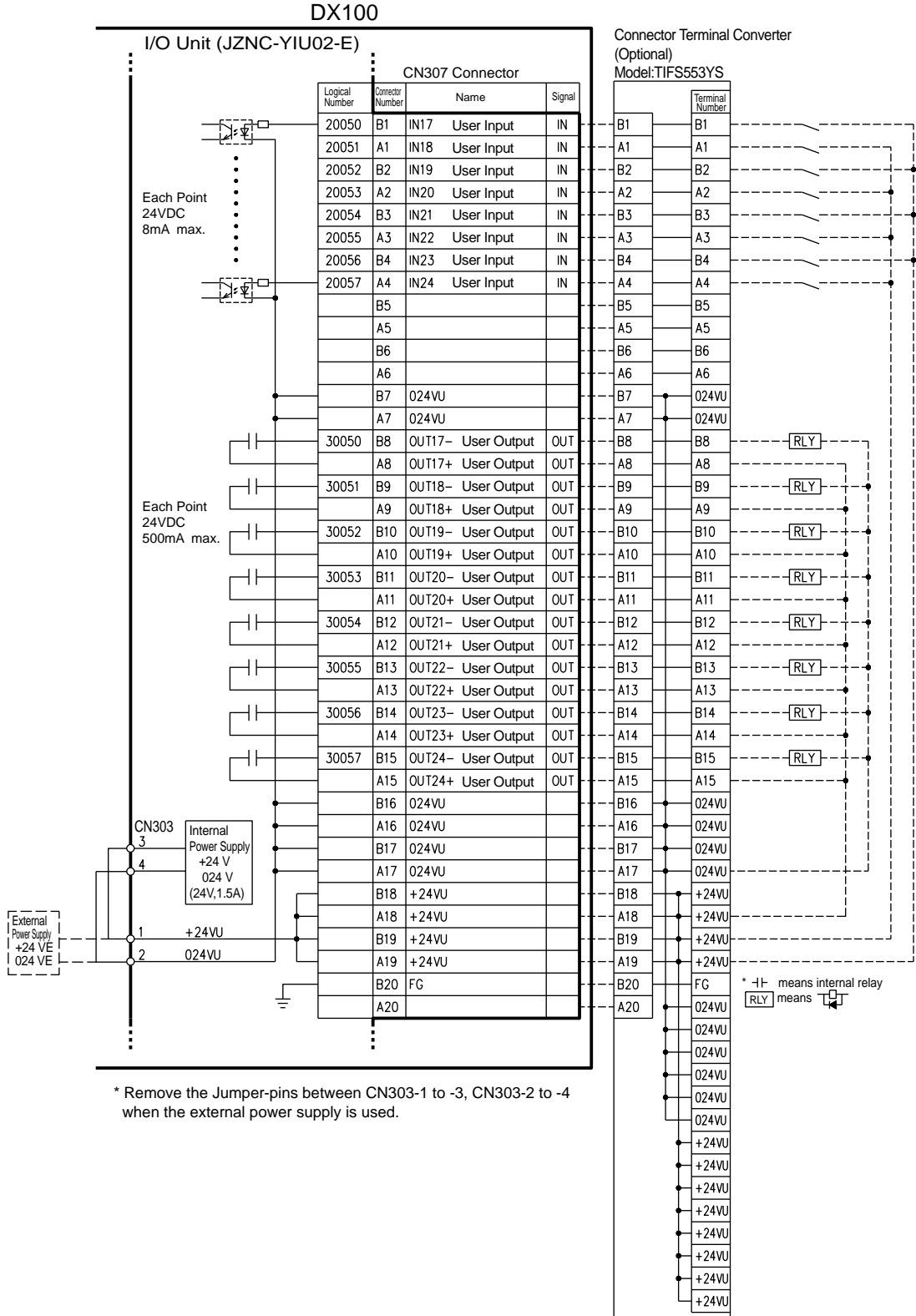


Fig. 1-4: JZNC-YIU02-E (CN307 Connector) I/O Allocation and Connection Diagram (For Arc Welding)



Standard I/O Signal 1 Arc Welding
Assignment (PNP)

Table 1-1: Specific Input (Arc Welding)

Logical Number	Input Name / Function
20010	EXTERNAL START Functions the same as the [START] button in the programming pendant. Only the rising edge of the signal is valid. It starts robot operation (playback). This signal is invalid if external start is prohibited from the playback condition display.
20012	CALL MASTER JOB Only the rising edge of the signal is valid. It calls up the top of the robot program, that is the top of the master job ¹⁾ . This signal is invalid during playback, during teach lock and when play master or call is prohibited (set from the playback operation condition display).
20013	ALARM/ERROR RESET After an alarm or error has occurred and the cause been corrected, this signal resets the alarm or error.
20015	SELECT PLAY MODE The play mode is selected when the mode key on the programming pendant is set at "REMOTE". Only the rising edge of the signal is valid. When this selection signal assigned concurrently with other mode selection signal, the teach mode is selected on a priority basis. The signal is invalid while EXTERNAL MODE SWITCH is prohibited.
20016	SELECT TEACH MODE The teach mode is selected when the mode key of the programming pendant is set at "REMOTE". The other mode selection is unavailable when this signal is ON; the signal is selected by priority even when the other selection signal is ON, enabling the teach mode selection.
20020	INTERFERENCE 1 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 1 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20021	INTERFERENCE 2 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 2 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20022	WORK PROHIBITED (Arc Generation Prohibited) Arc generation is prohibited while this signal is ON. Arc generation starts when this signal turns OFF inside the arc-generation area. Use this signal to confirm teaching.
20023	WORK RESPONSE (Pseudo Arc ON Response) This signal is used as a pseudo signal in cases that "Arc Generation Confirmation" signal is not equipped on a welding power supply. Wire this signal ON normally (short to OV).
20026	WEAVING PROHIBITED Weaving is prohibited while this signal is ON. Use this signal to check taught steps and movements without performing the weaving operation.
20027	SENSING PROHIBITED Arc sensing is prohibited while this signal is ON. Use this signal to check taught steps and movements if an arc sensor is mounted.

1 A master job is a job (program) which can be called by CALL MASTER JOB. Other functions are the same as for normal jobs. Normally, the parent job, which manages the child jobs called up immediately after the power is turned ON, is set as the master job.

2 See Section 8.6 "Interference Area" in the DX100 INSTRUCTIONS.

Table 1-2: Specific Output (Arc Welding)

Logical Number	Input Name / Function
30010	RUNNING This signal signifies that the job is running. (Signifies that the job is running, system status is waiting reserved start, or test run is running.) This signal status is the same status as [START] in the programming pendant.
30011	SERVO IS ON This signal signifies that the servo power is turned ON, internal processing such as current position creation is complete, and the system is able to receive the START command. This signal turns OFF when the servo power supply turns OFF. It can be used for DX100 status diagnosis for an external start.
30012	TOP OF MASTER JOB This signal signifies that the execution position is the top of the master job. This signal can be used to confirm that the master job has been called. ¹⁾
30013	ALARM/ERROR OCCURRED This signal signifies that an alarm or an error occurred. If a major error occurs, this signal remains ON until the main power is turned OFF.
30014	BATTERY ALARM This signal turns ON to notify that the battery requires replacing when the voltage drops from the battery for backup memory of the encoder. Major problems may result if memory data is lost because of an expired battery. It is recommended to avoid these problems by using this signal as a warning signal.
30015 to 30017	REMOTE/PLAY/TEACH MODE SELECTED This signal notifies the current mode setting. These signals are synchronized with the mode select switch in the programming pendant. The signal corresponding to the selected mode turns ON.
30020	IN CUBE 1 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 1). Use this signal to prevent interference with other manipulators and positioners.
30021	IN CUBE 2 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 2). Use this signal to prevent interference with other manipulators and positioners.
30022	WORK HOME POSITION (IN CUBE 32)²⁾ This signal turns ON when the current TCP lies inside the work home position area. Use this signal to evaluate whether the manipulator is in the start position.
30023	INTERMEDIATE START OK (Sequence Continuing) This signal turns ON when the manipulator operates. It turns OFF when the currently executed line is moved with the cursor or when editing operation is carried out after HOLD is applied during operation. Therefore, this signal can be used as a restart interlock after a HOLD is applied. However, it also turns ON in the teach mode and TEACH MODE SELECTED signal must be referred together.
30024	GAS SHORTAGE (MONITOR) This signal stays ON while the gas shortage signal from the welding power supply is ON.
30025	WIRE SHORTAGE (MONITOR) This signal status ON while the wire shortage signal from the welding power supply is ON.
30026	WIRE STICKING (MONITOR) The wire sticking check is conducted automatically when the arc turns OFF. If wire sticking is detected, this signal remains ON until the wire sticking is released.
30027	ARC SHORTAGE (MONITOR) This signal stays ON while the arc shortage signal from the welding power supply is ON.

1 This signal is not output during operation.

2 The work home position cube and Cube 32 are the same.

2 Handling

Fig. 2-1: JZNC-YIU02-E (CN308 Connector) I/O Allocation and Connection Diagram (For Handling)

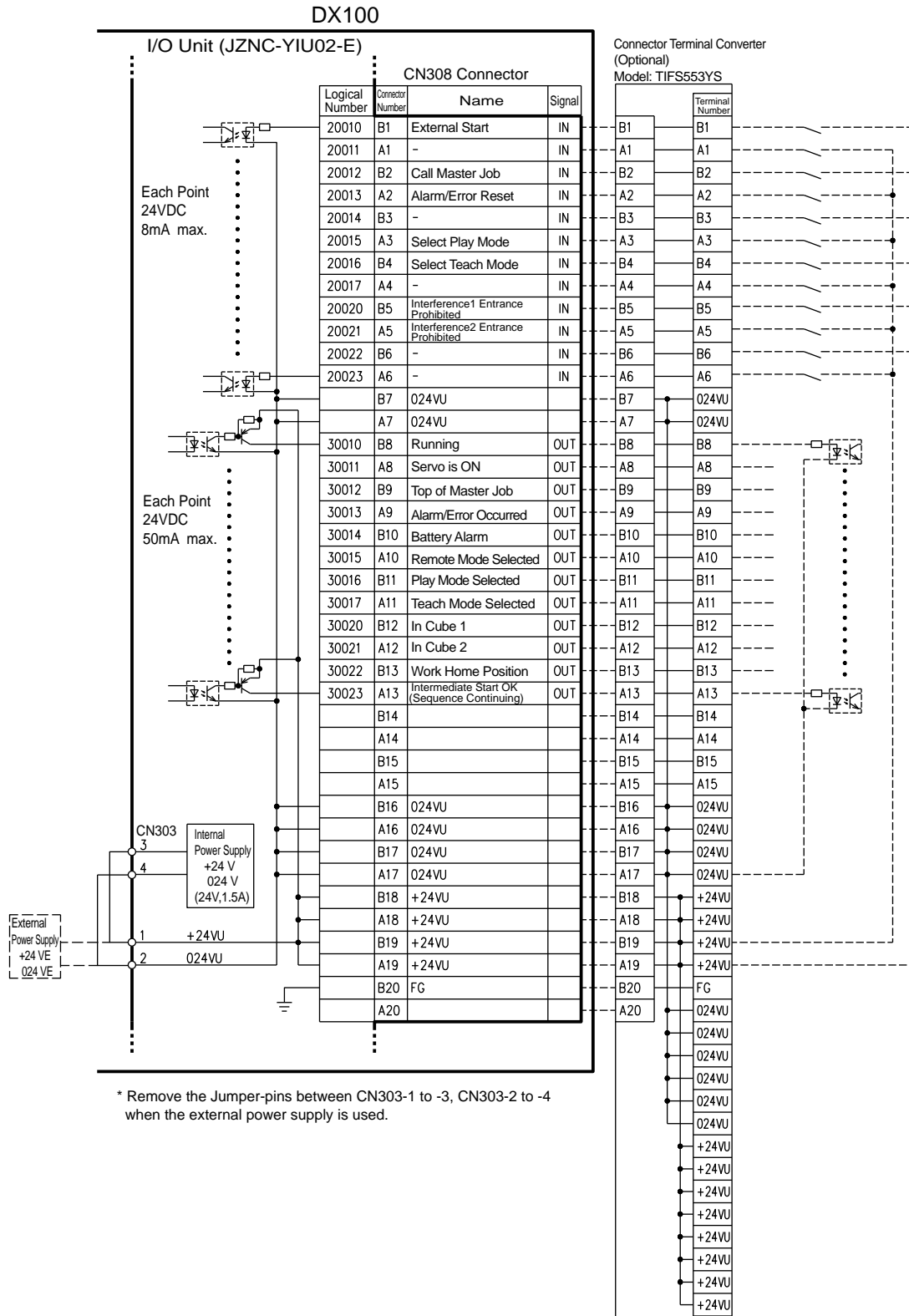


Fig. 2-2: JZNC-YIU02-E (CN309 Connector) I/O Allocation and Connection Diagram (For Handling)

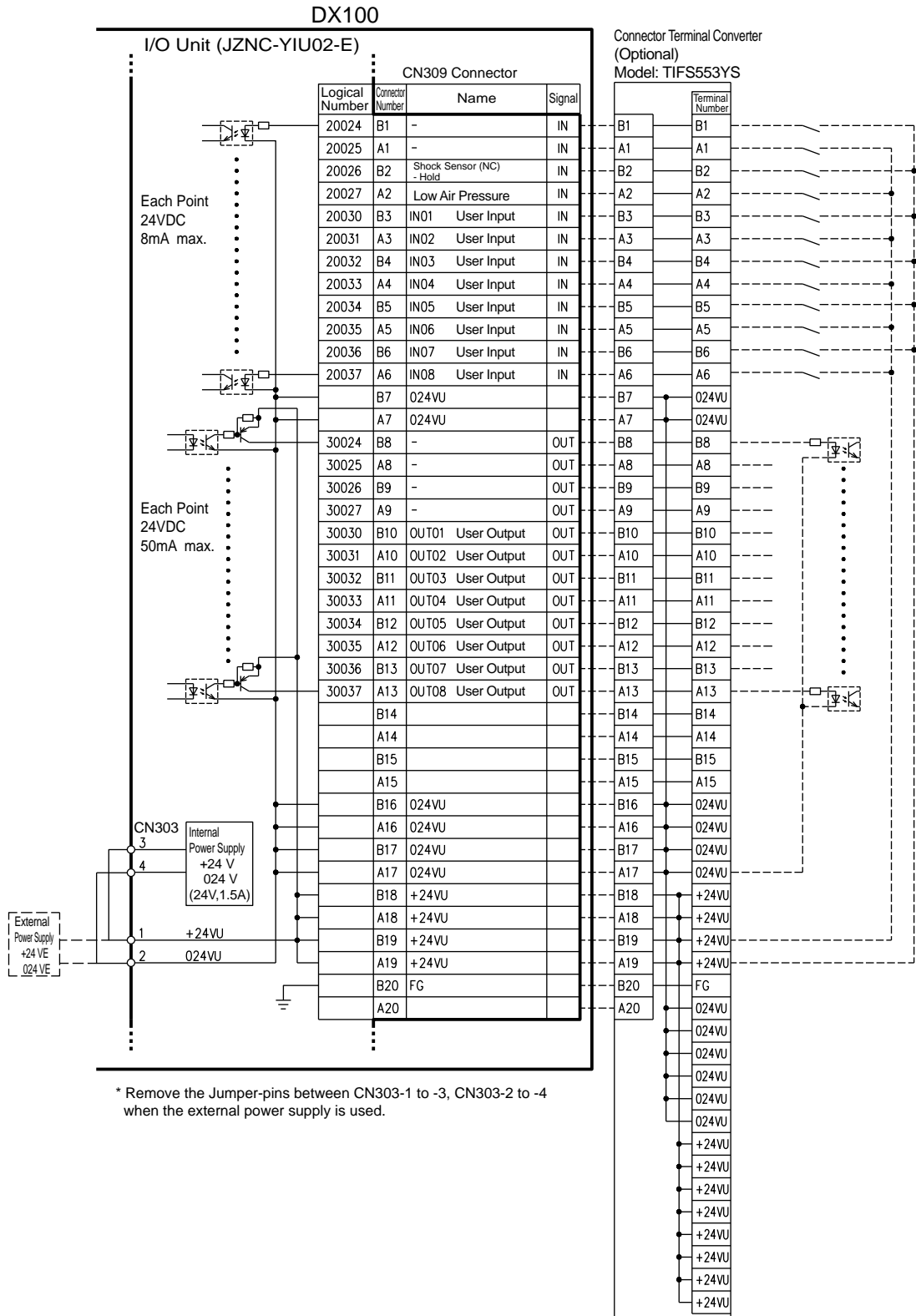


Fig. 2-3: JZNC-YIU02-E (CN306 Connector) I/O Allocation and Connection Diagram (For Handling)

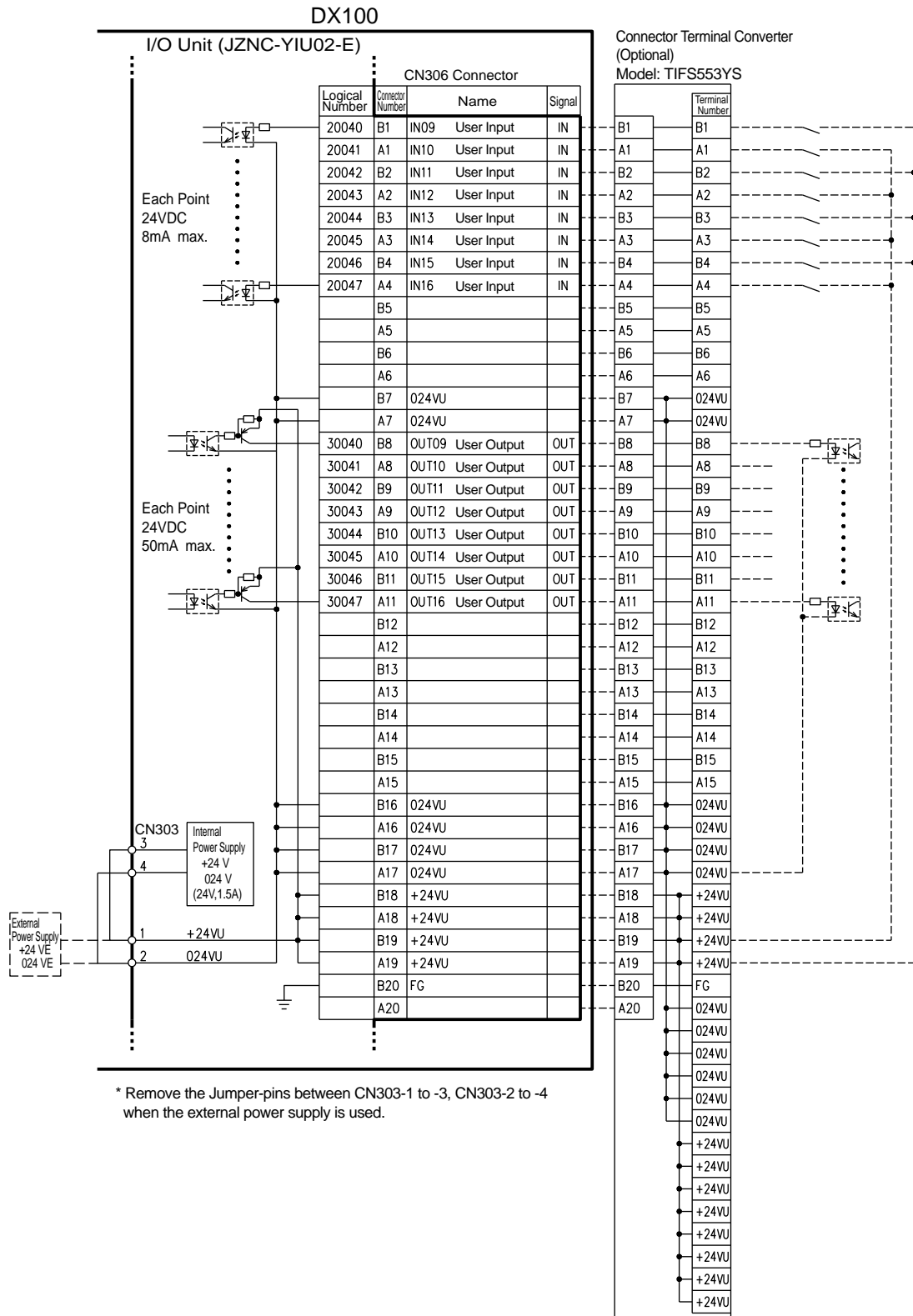


Fig. 2-4: JZNC-YIU02-E (CN307 Connector) I/O Allocation and Connection Diagram (For Handling)

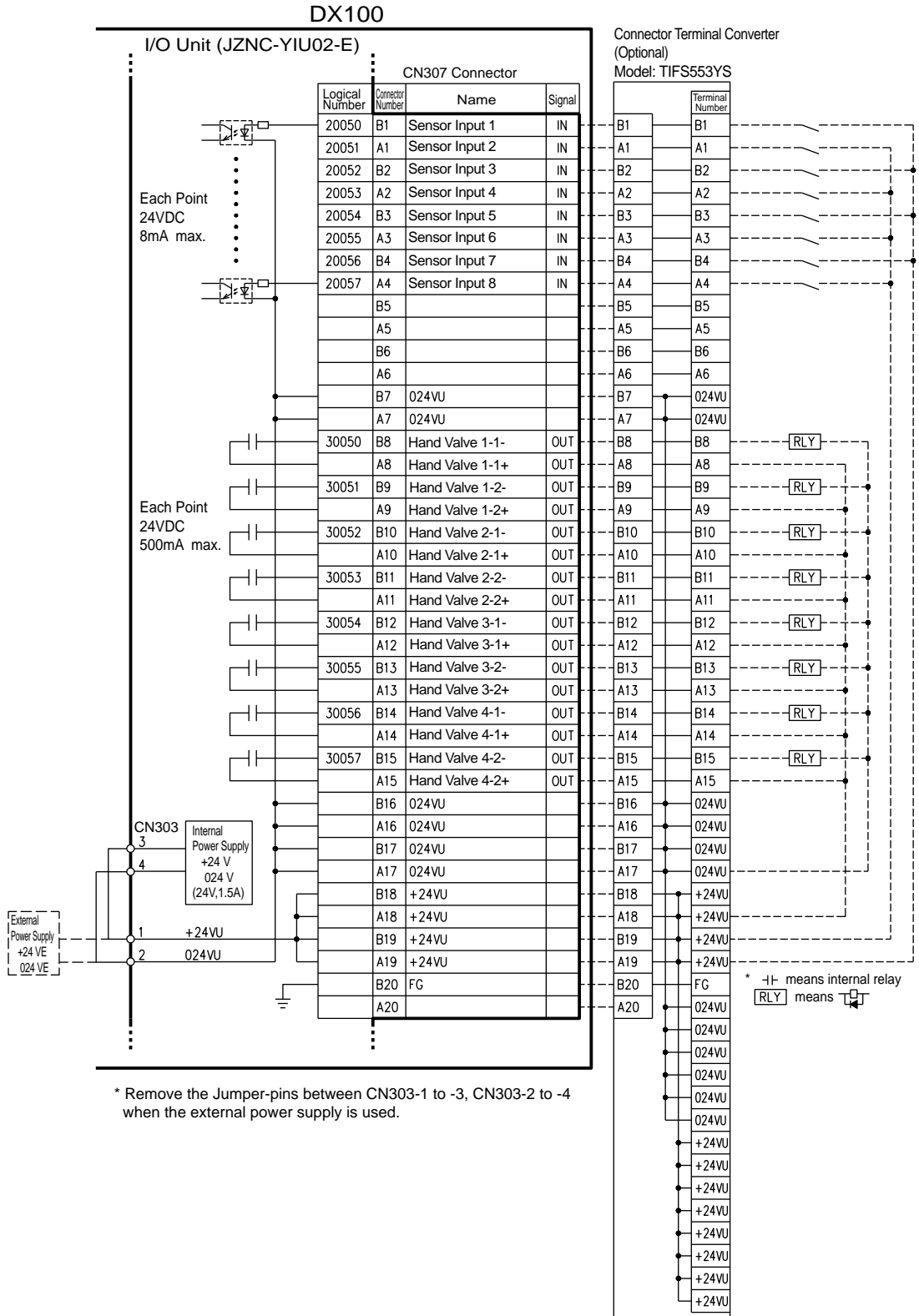


Table 2-1: Specific Input (Handling)

Logical Number	Input Name / Function
20010	EXTERNAL START Functions the same as the [START] button in the programming pendant. Only the rising edge of the signal is valid. It starts robot operation (playback). This signal is invalid if external start is prohibited from the playback condition display.
20012	CALL MASTER JOB Only the rising edge of the signal is valid. It calls up the top of the robot program, that is the top of the master job ¹⁾ . This signal is invalid during playback, during teach lock and when play master or call is prohibited (set from the playback operation condition display).
20013	ALARM/ERROR RESET After an alarm or error has occurred and the cause been corrected, this signal resets the alarm or error.
20015	SELECT PLAY MODE The play mode is selected when the mode key on the programming pendant is set at "REMOTE". Only the rising edge of the signal is valid. When this selection signal assigned concurrently with other mode selection signal, the teach mode is selected on a priority basis. The signal is invalid while EXTERNAL MODE SWITCH is prohibited.
20016	SELECT TEACH MODE The teach mode is selected when the mode key of the programming pendant is set at "REMOTE". The other mode selection is unavailable when this signal is ON; the signal is selected by priority even when the other selection signal is ON, enabling the teach mode selection.
20020	INTERFERENCE 1 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 1 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20021	INTERFERENCE 2 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 2 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20026	TOOL SHOCK SENSOR This is normally ON (NC) signal input. When it turns OFF, the DX100 displays a message "HAND TOOL SHOCK SENSOR OPERATING" and a HOLD is applied. The releasing in teach mode is done on the handling application diagnostic display. Set tool shock sensor function "NOT USE" on the handling applications diagnostic display if this signal is not be used.
20027	LOW AIR PRESSURE This signal is normally OFF (NO). When it turns ON, the DX100 displays user alarm in the PLAY mode or displays user message in the teach mode.
20050 to 20057	SENSOR INPUT 1 - 8 Inputs 1 to 8 are monitored with the HSEN handling specific instructions. Sensor inputs 1 to 8 correspond to HSEN 1 to 8.

1 A master job is a job (program) which can be called by CALL MASTER JOB. Other functions are the same as for normal jobs. Normally, the parent job, which manages the child jobs called up immediately after the power is turned ON, is set as the master job.

2 See Section 8.6 "Interference Area" in the DX100 INSTRUCTIONS.

Table 2-2: Specific Output (Handling)

Logical Number	Output Name / Function
30010	RUNNING This signal signifies that the job is running. (Signifies that the job is running, system status is waiting reserved start, or test run is running.) This signal status is the same status as [START] in the programming pendant.
30011	SERVO IS ON This signal signifies that the servo power is turned ON, internal processing such as current position creation is complete, and the system is able to receive the START command. This signal turns OFF when the servo power supply turns OFF. It can be used for DX100 status diagnosis for an external start.
30012	TOP OF MASTER JOB This signal signifies that the execution position is the top of the master job. This signal can be used to confirm that the master job has been called. ¹⁾
30013	ALARM/ERROR OCCURRED This signal signifies that an alarm or an error occurred. If a major error occurs, this signal remains ON until the main power is turned OFF.
30014	BATTERY ALARM This signal turns ON to notify that the battery requires replacing when the voltage drops from the battery for backup memory of the encoder. Major problems may result if memory data is lost because of an expired battery. It is recommended to avoid these problems by using this signal as a warning signal.
30015 to 30017	REMOTE/PLAY/TEACH MODE SELECTED This signal notifies the current mode setting. These signals are synchronized with the mode select switch in the programming pendant. The signal corresponding to the selected mode turns ON.
30020	IN CUBE 1 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 1). Use this signal to prevent interference with other manipulators and positioners.
30021	IN CUBE 2 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 2). Use this signal to prevent interference with other manipulators and positioners.
30022	WORK HOME POSITION (IN CUBE 32)²⁾ This signal turns ON when the current TCP lies inside the work home position area. Use this signal to evaluate whether the manipulator is in the start position.
30023	INTERMEDIATE START OK (Sequence Continuing) This signal turns ON when the manipulator operates. It turns OFF when the currently executed line is moved with the cursor or when editing operation is carried out after HOLD is applied during operation. Therefore, this signal can be used as a restart interlock after a HOLD is applied. However, it also turns ON in the teach mode and TEACH MODE SELECTED signal must be referred together.
30050 to 30057	HAND VALVE 1-4 These outputs are controlled by the HAND handling specific instructions. Hand valves 1 to 4 correspond to HAND 1 to 4.

1 This signal is not output during operation.

2 The work home position cube and Cube 32 are the same.

3 General Application

Fig. 3-1: JZNC-YIU02-E (CN308 Connector) I/O Allocation and Connection Diagram (For General Application)

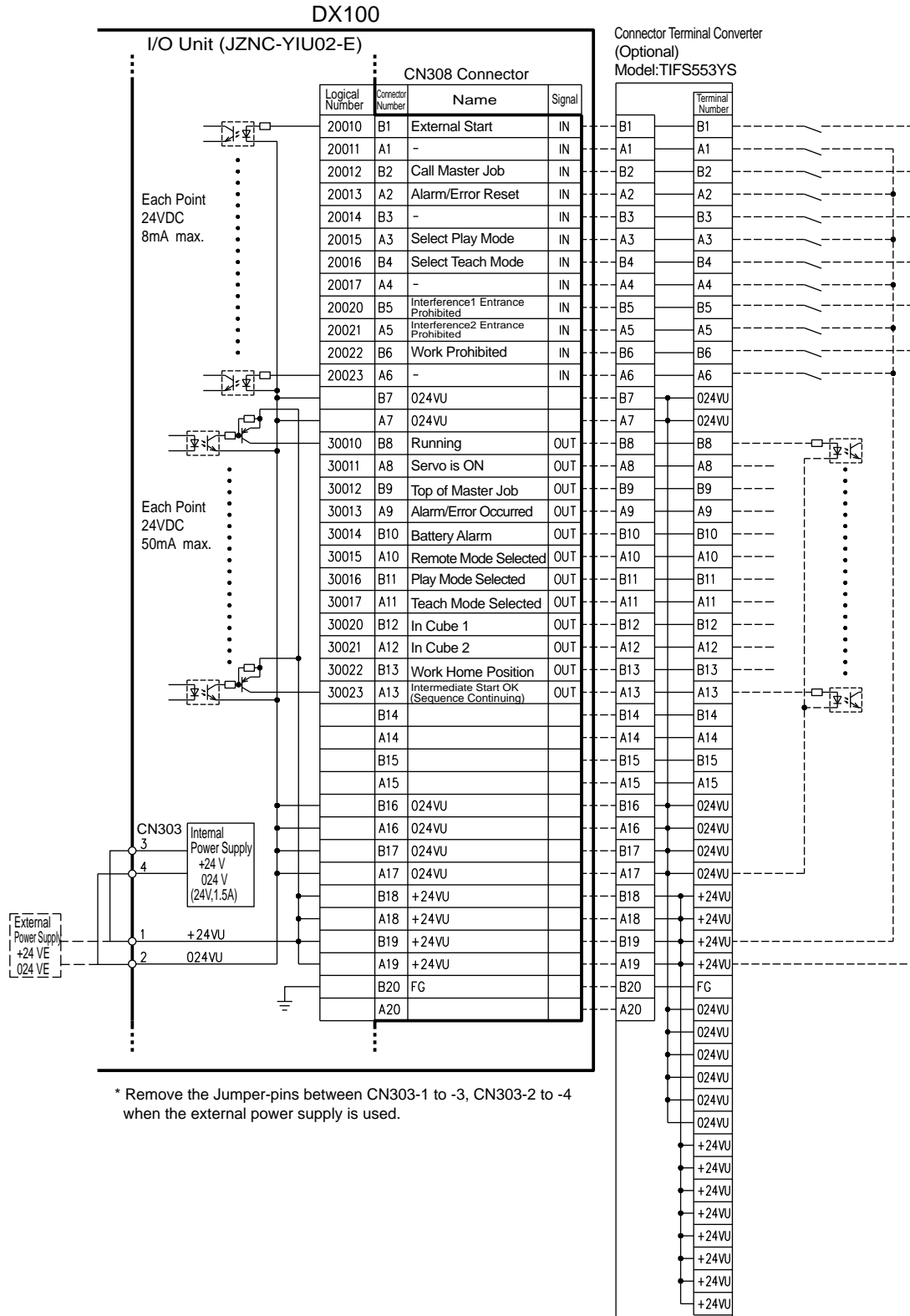


Fig. 3-2: JZNC-YIU02-E (CN309 Connector) I/O Allocation and Connection Diagram (For General Application)

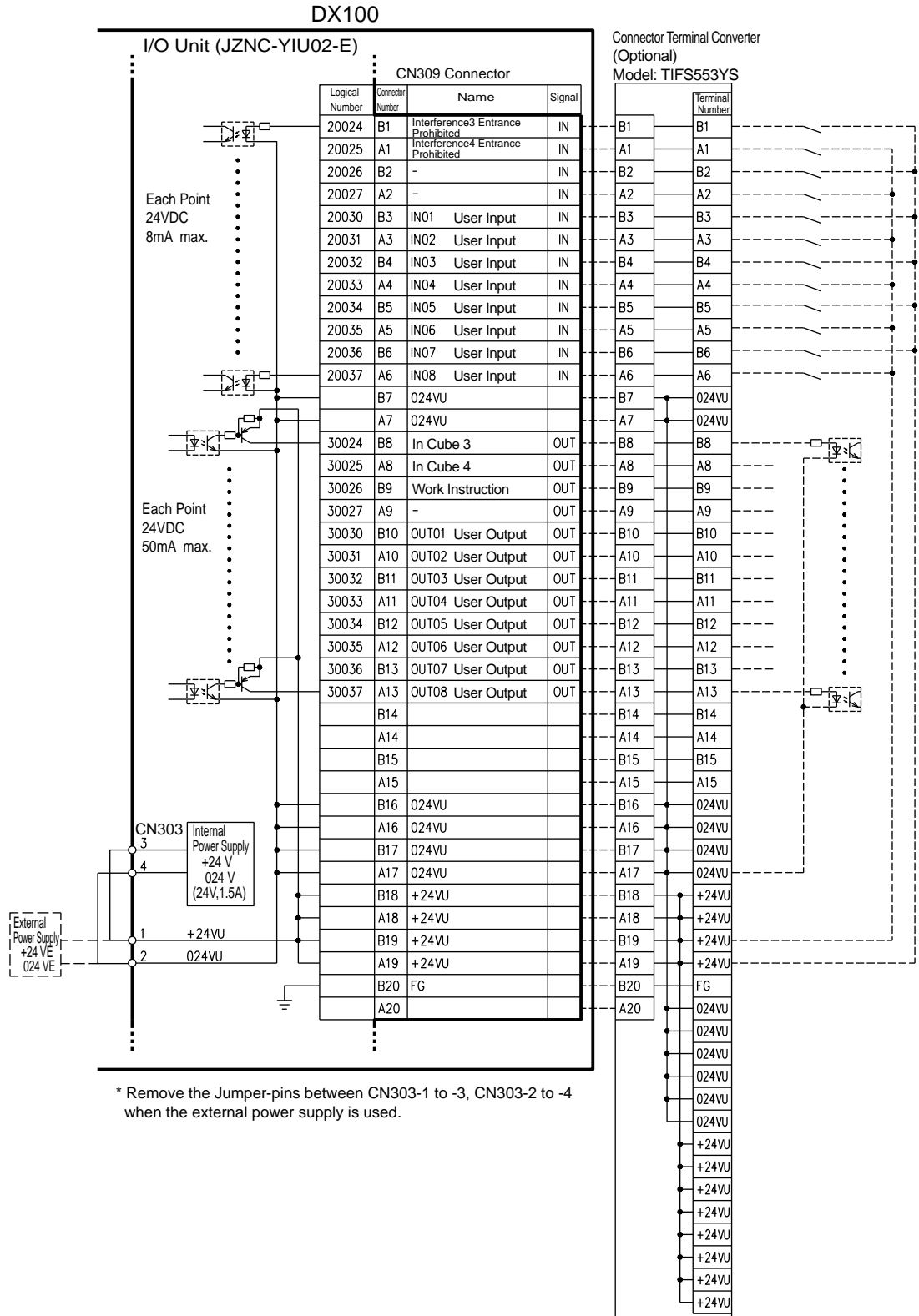


Fig. 3-3: JZNC-YIU02-E (CN306 Connector) I/O Allocation and Connection Diagram (General Application)

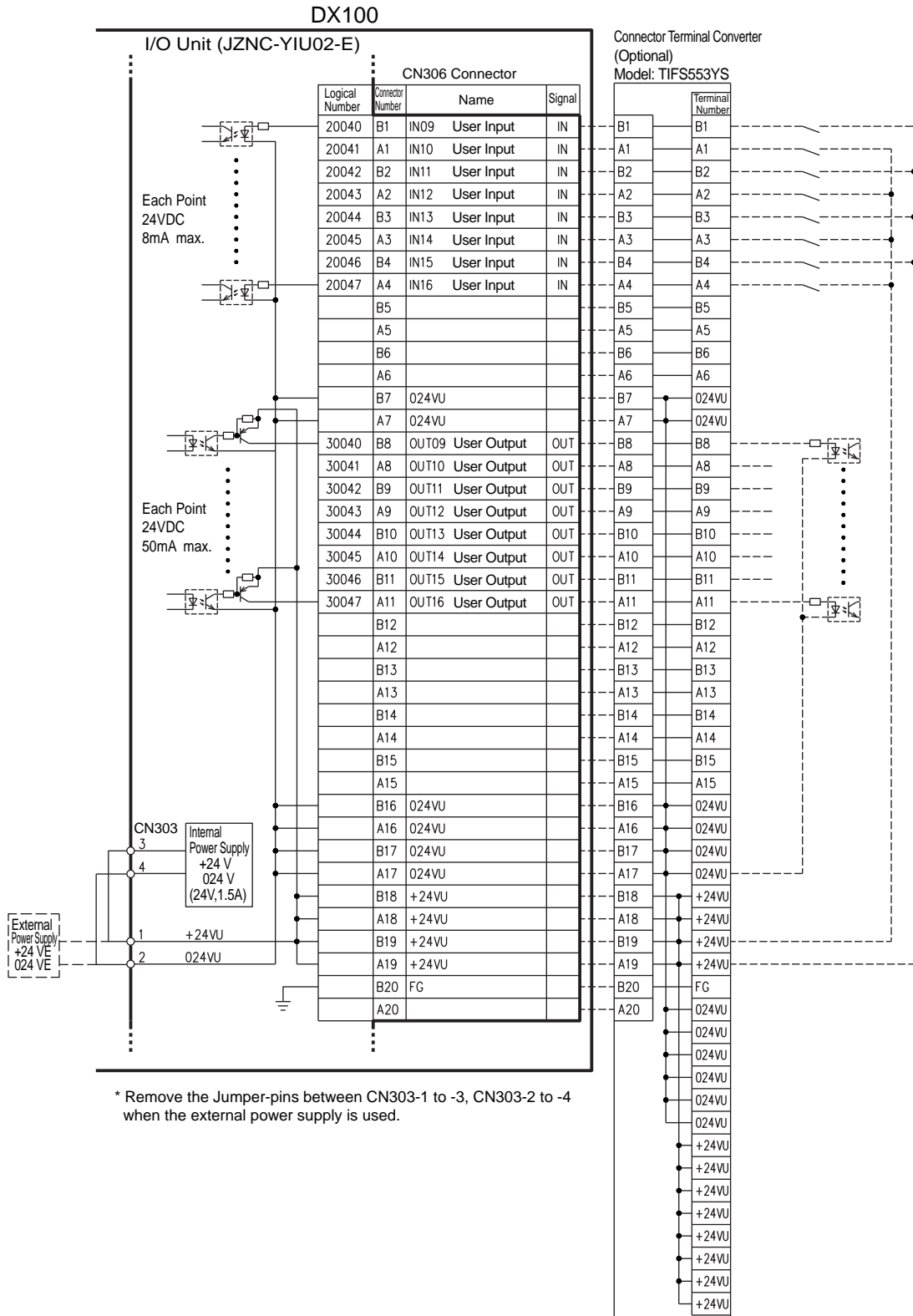


Fig. 3-4: JZNC-YIU02-E (CN307 Connector) I/O Allocation and Connection Diagram (For General Application)

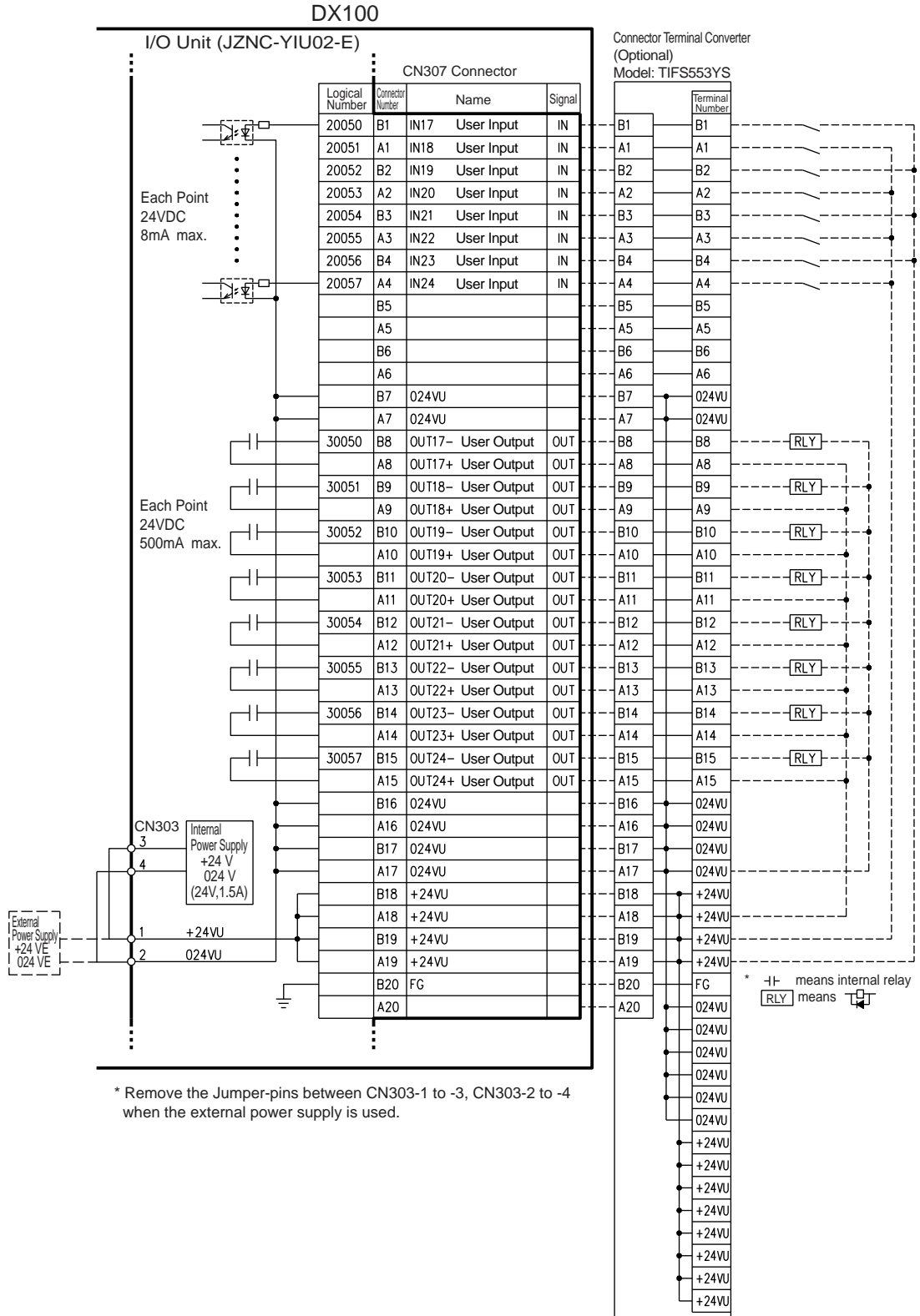


Table 3-1: Specific Input (General application)

Logical Number	Input Name / Function
20010	EXTERNAL START Functions the same as the [START] button in the programming pendant. Only the rising edge of the signal is valid. It starts robot operation (playback). This signal is invalid if external start is prohibited from the playback condition display.
20012	CALL MASTER JOB Only the rising edge of the signal is valid. It calls up the top of the robot program, that is the top of the master job ¹⁾ . This signal is invalid during playback, during teach-lock and when play master or call is prohibited (set from the playback operation condition display).
20013	ALARM/ERROR RESET After an alarm or error has occurred and the cause been corrected, this signal resets the alarm or error.
20015	SELECT PLAY MODE The play mode is selected when the mode key on the programming pendant is set at "REMOTE". Only the rising edge of the signal is valid. When this selection signal assigned concurrently with other mode selection signal, the teach mode is selected on a priority basis. The signal is invalid while EXTERNAL MODE SWITCH is prohibited.
20016	SELECT TEACH MODE The teach mode is selected when the mode key of the programming pendant is set at "REMOTE". The other mode selection is unavailable when this signal is ON; the signal is selected by priority even when the other selection signal is ON, enabling the teach mode selection.
20020	INTERFERENCE 1 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 1 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20021	INTERFERENCE 2 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 2 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20022	WORK PROHIBITED (Tool ON Prohibited) Even if TOOLON instruction is executed, the DX100 doesn't output to external while this signal is ON.
20024	INTERFERENCE 3 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 3 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20025	INTERFERENCE 4 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 4 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.

1 A master job is a job (program) which can be called by CALL MASTER JOB.

Other functions are the same as for normal jobs. Normally, the parent job, which manages the child jobs called up immediately after the power is turned ON, is set as the master job.

2 See Section 8.6 "Interference Area" in the DX100 INSTRUCTIONS.

Table 3-2: Specific Output (General application)

Logical Number	Output Name / Function
30010	RUNNING This signal signifies that the job is running. (Signifies that the job is running, system status is waiting reserved start, or test run is running.) This signal status is the same status as [START] in the programming pendant.
30011	SERVO IS ON This signal signifies that the servo power is turned ON, internal processing such as current position creation is complete, and the system is able to receive the START command. This signal turns OFF when the servo power supply turns OFF. It can be used for the DX100 status diagnosis for an external start.
30012	TOP OF MASTER JOB This signal signifies that the execution position is the top of the master job. This signal can be used to confirm that the master job has been called. ¹⁾
30013	ALARM/ERROR OCCURRED This signal signifies that an alarm or an error occurred. If a major error occurs, this signal remains ON until the main power is turned OFF.
30014	BATTERY ALARM This signal turns ON to notify that the battery requires replacing when the voltage drops from the battery for backup memory of the encoder. Major problems may result if memory data is lost because of an expired battery. It is recommended to avoid these problems by using this signal as a warning signal.
30015 to 30017	REMOTE/PLAY/TEACH MODE SELECTED This signal notifies the current mode setting. These signals are synchronized with the mode select switch in the programming pendant. The signal corresponding to the selected mode turns ON.
30020	IN CUBE 1 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 1). Use this signal to prevent interference with other manipulators and positioners.
30021	IN CUBE 2 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 2). Use this signal to prevent interference with other manipulators and positioners.
30022	WORK HOME POSITION (IN CUBE 32)²⁾ This signal turns ON when the current TCP lies inside the work home position area. Use this signal to evaluate whether the robot is in the start position.
30023	INTERMEDIATE START OK (Sequence Continuing) This signal turns ON when the manipulator operates. It turns OFF when the currently executed line is moved with the cursor or when editing operation is carried out after HOLD is applied during operation. Therefore, this signal can be used as a restart interlock after a HOLD is applied. However, it also turns ON in the teach mode and TEACH MODE SELECTED signal must be referred together.
30024	IN CUBE 3 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 3). Use this signal to prevent interference with other manipulators and positioners.
30025	IN CUBE 4 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 4). Use this signal to prevent interference with other manipulators and positioners.
30026	WORK INSTRUCTION This signal provides the command for the general tool to operate. TOOL ON instruction execution or the [TOOL ON] key in the programming pendant turns this signal ON and TOOL OFF instruction execution or the [TOOL OFF] key in the programming pendant turns it OFF. However, it remains OFF while the WORK PROHIBITED signal (20022) is input or while the robot is stopped.

1 This signal is not output during operation.

2 The work home position cube and Cube 32 are the same.

4 Spot Welding

Fig. 4-1: JZNC-YIU02-E (CN308 Connector) I/O Allocation and Connection Diagram (For Spot Welding)

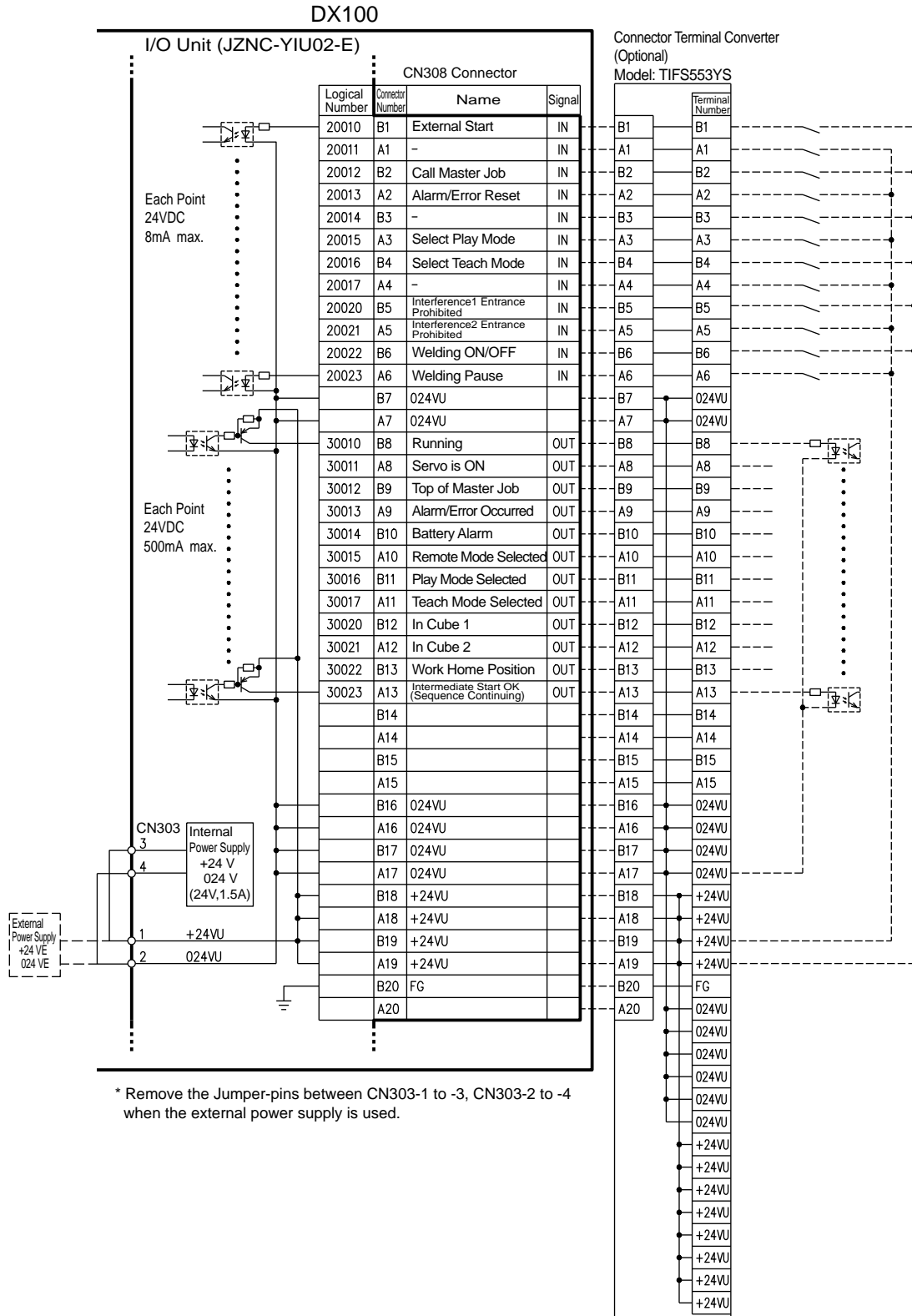


Fig. 4-2: JZNC-YIU02-E (CN309 Connector) I/O Allocation and Connection Diagram (For Spot Welding)

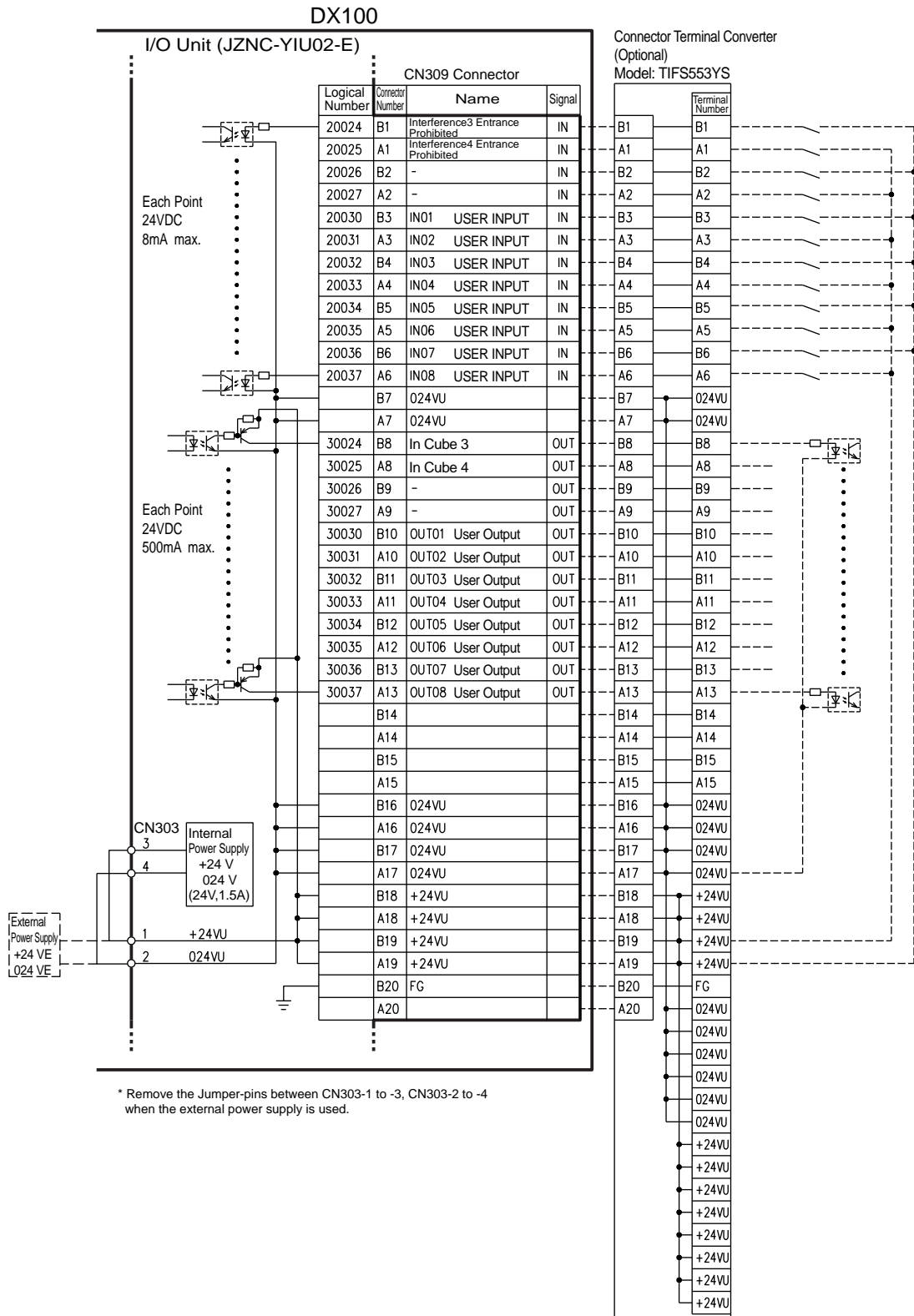


Fig. 4-3: JZNC-YIU02-E (CN306 Connector) I/O Allocation and Connection Diagram (For Spot Welding)

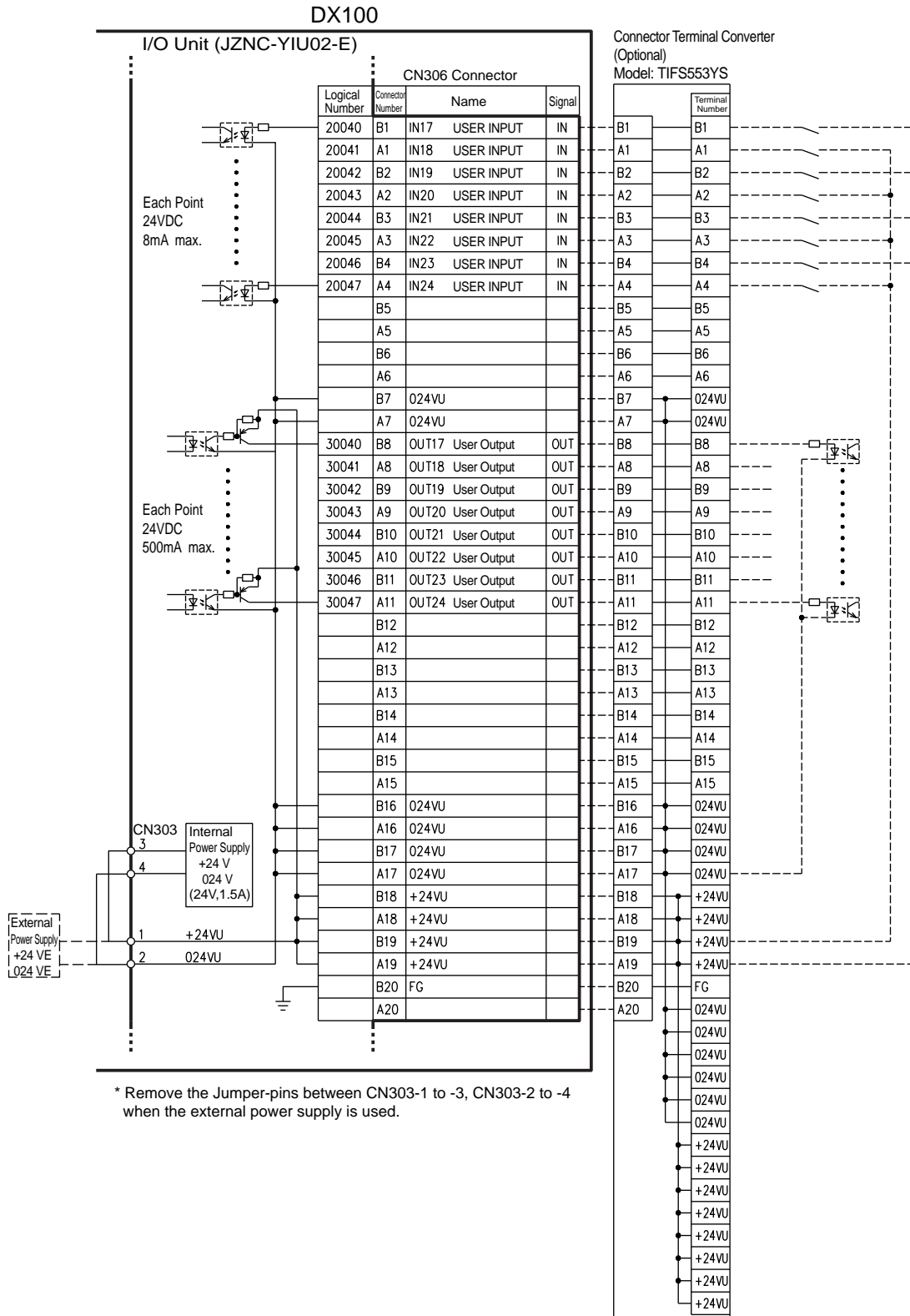
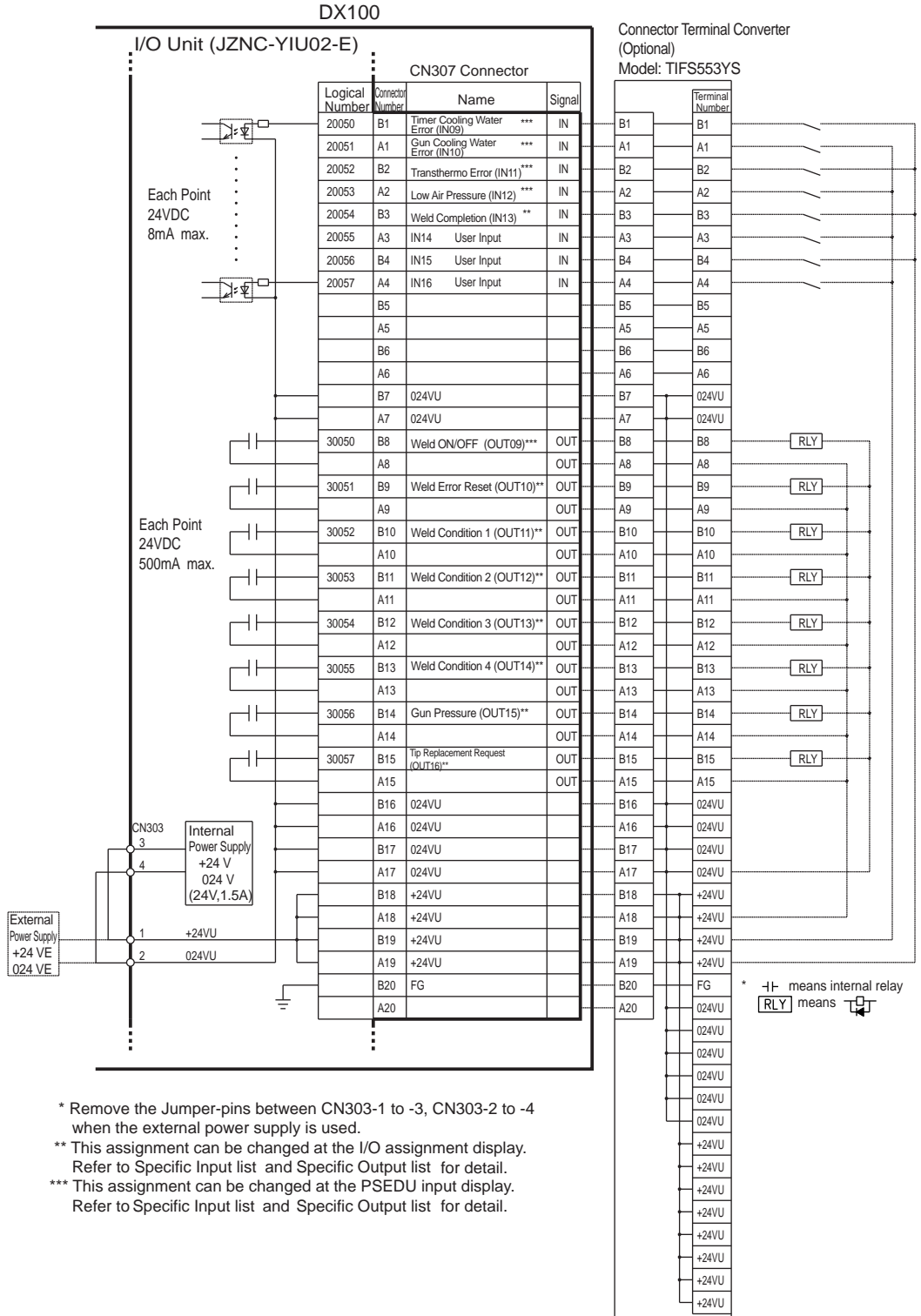


Fig. 4-4: JZNC-YIU02-E (CN307 Connector) I/O Allocation and Connection Diagram (For Spot Welding)



* Remove the Jumper-pins between CN303-1 to -3, CN303-2 to -4 when the external power supply is used.
 ** This assignment can be changed at the I/O assignment display. Refer to Specific Input list and Specific Output list for detail.
 *** This assignment can be changed at the PSEDU input display. Refer to Specific Input list and Specific Output list for detail.

Standard I/O Signal 4 Spot Welding
Assignment (PNP)

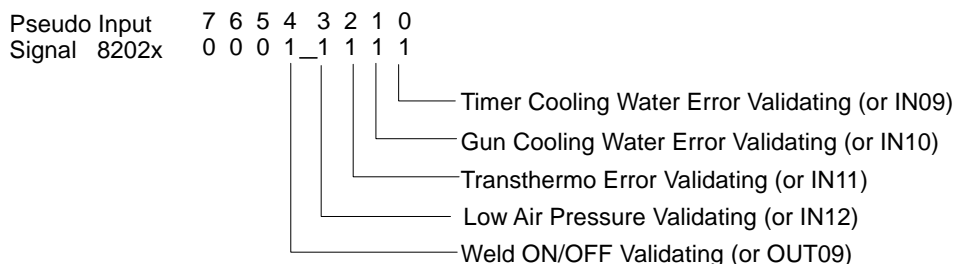
Table 4-1: Specific Input (Spot Welding) (Sheet 1 of 2)

Logical Number	Input Name / Function
20010	EXTERNAL START Functions the same as the [START] button in the programming pendant. Only the rising edge of the signal is valid. It starts robot operation (playback). This signal is invalid if external start is prohibited from the playback condition display.
20012	CALL MASTER JOB Only the rising edge of the signal is valid. It calls up the top of the robot program, that is the top of the master job ¹⁾ . This signal is invalid during playback, during teach-lock and when play master or call is prohibited (set from the playback operation condition display).
20013	ALARM/ERROR RESET After an alarm or error has occurred and the cause been corrected, this signal resets the alarm or error.
20015	SELECT PLAY MODE The play mode is selected when the mode key on the programming pendant is set at "REMOTE". Only the rising edge of the signal is valid. When this selection signal assigned concurrently with other mode selection signal, the teach mode is selected on a priority basis. The signal is invalid while EXTERNAL MODE SWITCH is prohibited.
20016	SELECT TEACH MODE The teach mode is selected when the mode key of the programming pendant is set at "REMOTE". The other mode selection is unavailable when this signal is ON; the signal is selected by priority even when the other selection signal is ON, enabling the teach mode selection.
20020	INTERFERENCE 1 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 1 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20021	INTERFERENCE 2 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 2 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20022	WELDING ON/OFF (From sequencer) This signal inputs the welding ON/OFF selector switch status from the sequencer in the interlock unit. The WELD ON/OFF signal is output to the Power Source according to this signal and the manipulator status.
20023	WELDING PAUSE (From sequencer) This signal is used to move the manipulator to the home position when an error occurs in the Power Source or the gun. The robot ignores the spot welding instruction and operates playback motion.
20024	INTERFERENCE 3 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 3 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20025	INTERFERENCE 4 ENTRANCE PROHIBITED If the manipulator attempts to enter the cube 4 ²⁾ area while this signal is ON, the manipulator goes to wait status (with servo power ON). During wait status, the manipulator operation restarts if this signal turns OFF.
20050 ³⁾	TIMER COOLING WATER ERROR This signal monitors the status of timer cooling water. The manipulator displays alarm and stops when this signal is input. The servo power remains ON.
20051 ³⁾	GUN COOLING WATER ERROR This signal monitors the status of gun cooling water. The manipulator displays alarm and stops when this signal is input. The servo power supply remains ON.

Table 4-1: Specific Input (Spot Welding) (Sheet 2 of 2)

Logical Number	Input Name / Function
20052 3)	TRANSTHERMO ERROR Error signal is sent from the transformer in the gun to the robot. This signal is ON normally (NC) and an alarm occurs when the signal is OFF. The servo power supply remains ON.
20053 3)	LOW AIR PRESSURE When air pressure is reduced and this input is turned ON, an alarm occurs. The servo power supply remains ON.
20054 4)	WELD COMPLETION This signal indicates that the Power Source completed welding without error. This signal is used as a confirmation signal for welding instruction execution and manual spot welding. After this signal is input, the welding sequence is completed and the next step is executed when confirmation limit switch is not provided.
4)	WELDING ERROR This signal indicates an abnormal welding result or Power Source's error. Alarm occurs and the manipulator stops if this signal is input during welding.
4)	STICK DETECTION This signal indicates an abnormal welding result or Power Source's error. Alarm occurs and the manipulator stops if this signal is input during welding.
4)	GUN FULL OPEN DETECTION This signal indicates that the stroke of the double stroke gun is full open.
4)	GUN SHORT OPEN DETECTION This signal is connected with a single gun open verification limit switch or a double stroke gun short open verification limit switch to verify the gun open.
4)	GUN PRESSURE DETECTION This signal indicates that a gun is in pressing status.
4)	TIP REPLACE COMPLETION When this signal is input after tip replacement, the TIP REPLACE REQUEST signal turns OFF, and the stored number of welding is cleared.

- 1 A master job is a job (program) which can be called by CALL MASTER JOB. Other functions are the same as for normal jobs. Normally, the parent job, which manages the child jobs called up immediately after the power is turned ON, is set as the master job.
- 2 See Section 8.6 "Interference Area" in the DX100 INSTRUCTIONS.
- 3 This signal can be set as "USE" or "NOT USE" by pseudo input signal "8202x". If "NOT USE" is selected, this signal can be used as the universal I/O signal described in parentheses.



- 4 This signal can be allocated to any universal I/O signal at the I/O allocation display in operation condition.

Standard I/O Signal 4 Spot Welding
Assignment (PNP)

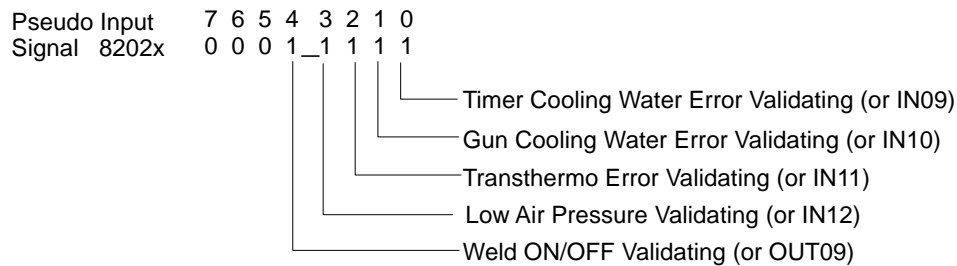
Table 4-2: Specific Output (Spot Welding) (Sheet 1 of 2)

Logical Number	Output Name / Function
30010	RUNNING This signal signifies that the job is running. (Signifies that the job is running, system status is waiting reserved start, or test run is running.) This signal status is the same status as [START] in the programming pendant.
30011	SERVO IS ON This signal signifies that the servo power is turned ON, internal processing such as current position creation is complete, and the system is able to receive the START command. This signal turns OFF when the servo power supply turns OFF. It can be used for DX100 status diagnosis for an external start.
30012	TOP OF MASTER JOB This signal signifies that the execution position is the top of the master job. This signal can be used to confirm that the master job has been called. ^{1)*I}
30013	ALARM/ERROR OCCURRED This signal signifies that an alarm or an error occurred. If a major error occurs, this signal remains ON until the main power is turned OFF.
30014	BATTERY ALARM This signal turns ON to notify that the battery requires replacing when the voltage drops from the battery for backup memory of the encoder. Major problems may result if memory data is lost because of an expired battery. It is recommended to avoid these problems by using this signal as a warning signal.
30015 to 30017	REMOTE/PLAY/TEACH MODE SELECTED This signal notifies the current mode setting. These signals are synchronized with the mode select switch in the programming pendant. The signal corresponding to the selected mode turns ON.
30020	IN CUBE 1 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 1). Use this signal to prevent interference with other manipulators and positioners.
30021	IN CUBE 2 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 2). Use this signal to prevent interference with other manipulators and positioners.
30022	WORK HOME POSITION (IN CUBE 3)²⁾ This signal turns ON when the current TCP lies inside a the work home position area. Use this signal to evaluate whether the robot is in the start position.
30023	INTERMEDIATE START OK (Sequence Continuing) This signal turns ON when the manipulator operates. It turns OFF when the currently executed line is moved with the cursor or when editing operation is carried out after HOLD is applied during operation. Therefore, this signal can be used as a restart interlock after a HOLD is applied. However, it also turns ON in the teach mode and TEACH MODE SELECTED signal must be referred together.
30024	IN CUBE 3 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 3). Use this signal to prevent interference with other manipulators and positioners.
30025	IN CUBE 4 This signal turns ON when the current TCP lies inside a pre-defined space (Cube 4). Use this signal to prevent interference with other manipulators and positioners.
30050 3)	WELD ON/OFF Outputs a signal input from the interlock panel, etc. considering the robot status.
30051 4)	WELD ERROR RESET This signal commands the reset error status of the Power Source. This is operated with the programming pendant operation.

Table 4-2: Specific Output (Spot Welding) (Sheet 2 of 2)

Logical Number	Output Name / Function
30052 to 30055 4)	WELD CONDITION (Level signals) 1(1), 2(2), 4(3), 8(4), 16(5), 32(6), 64(7), 128(8) Sets the welding conditions for the Power Source. The output format can be selected as binary or discrete (bit number). It can handle up to 255 conditions. Most-significant bit is the parity bit (when specified).
30056 4)	GUN PRESSURE This outputs gun press command.
30057 4)	TIP REPLACEMENT REQUEST This signal is output when the stored number of welding reaches the number of welding set for the tip replacement.
4)	WELDING COMMAND This signal outputs execution command signal to the Power Source. This signal is not necessary for a Power Source which is executed using the WELDING CONDITION signal.
4)	STROKE CHANGE1 SINGLE SOLENOID DOUBLE SOLENOID This is a signal, when a double stroke gun is used, to change the open stroke of the welding gun.

- 1 This signal is not output during operation.
- 2 The work home position cube and Cube 32 are the same.
- 3 This signal can be selected "USE" or "NOT USE" by pseudo input signal "8202x". If "NOT USE" is selected, this signal can be used as the universal I/O signal described in parentheses.



- 4 This signal can be allocated to any universal I/O signal at the I/O allocation display in operation condition.

DX100

STANDARD I/O SIGNAL ASSIGNMENT TABLE

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Specifications are subject to change without notice
 for ongoing product modifications and improvements.