

DX100

Concurrent I/O

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 manual above corresponds to specific usage.
Be sure to use the appropriate manual.

Part Number: 155491-1CD

Revision: 0





MANDATORY

- This manual explains the Concurrent I/O of the DX100 system. Read this manual carefully and be sure to understand its contents before handling the DX100.
- General items related to safety are listed in Chapter 1: Safety of the DX100 Instructions. To ensure correct and safe operation, carefully read the DX100 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.

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

- Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX100 and the programming pendant. 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:
 - 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 power for the DX100.
 - 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 front door of the DX100 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 cabinet of the DX100 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 Warning Labels in the DX100 Instructions 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 supply 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

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.

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1 Concurrent I/O

Concurrent I/O control is an I/O control function that processes controls relative to the DX100 I/O independent of the manipulator operation (in parallel with manipulator operation).

1.1 Features of Concurrent I/O

Terminals and connectors to which I/O signals are connected can be used effectively.

Terminals and connectors are provided for connecting I/O signals. Although the number of connections are limited, the terminals can be used effectively because only the necessary signals can be selected and connected to the desired terminal.

Instructions relative to the I/O (Robot Language: INFORM III) can be simplified for smooth manipulator operation.

Fixed procedures relative to the I/O can be registered as independent ladder programs, thus enabling simplification of I/O instructions of the job (operation program) and reducing interruptions.

Reserved signals can be accepted while the manipulator is operating.

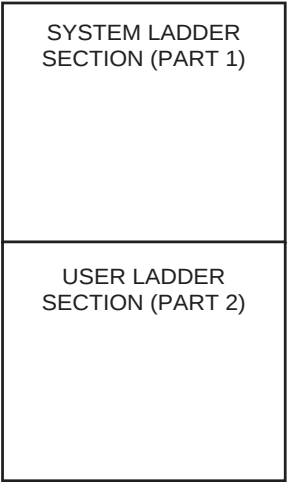
Reserved signals can be accepted during operation since manipulator operation processing and I/O processing can be executed at the same time.

DX100	1	Concurrent I/O
	1.2	Construction and Specifications of the Concurrent I/O

1.2 Construction and Specifications of the Concurrent I/O

The Concurrent I/O consists of the following two blocks.

Fig. 1-1: Construction of Concurrent I/O Ladder Program



System Ladder Section	A standard ladder selected for your applications is prepared at the factory. For more information, see “12 Standard Ladder Program” The ladder program cannot be edited.
User Ladder Section	Specification of signal connections and interface signal with system ladder are prepared at the factory. The ladder program can be edited including these signals.

DX100	1	Concurrent I/O
	1.2	Construction and Specifications of the Concurrent I/O

Table 1-1: Concurrent I/O Specifications

Item	Contents
Control Method	Scan control by stored program
Programming	Relay ladder program symbology
Scan Time	4 msec
Memory Capacity	20000 steps
Number of Instructions	33 types
General Input Port	2048 points (Concurrent I/O → Manipulator Control Section)
General Output Port	2048 points (Concurrent I/O ← Manipulator Control Section)
Specific Input Port	1280 points including unspecified signals (Concurrent I/O → Manipulator Control Section)
Specific Output Port	1600 points including unspecified signals (Concurrent I/O ← Manipulator Control Section)
Hardware Status Signal Points	512 points (Concurrent I/O → Manipulator Control Section)
Auxiliary Relays	7992 points
External Inputs	2048 points
External Outputs	2048 points
Register (Numeric Data)	General Register 560 points (0-65535) System Register 360 points (0-65535) Analog output register 40 points (0-65535) Analog input register 40 points (0-65535)
Pseudo Input Signal Points	160 points (Concurrent I/O ← System Parameter)
Power Failure Protective Function	Ladder Program (Battery Back-Up) Output status is reset.
Diagnostic Functions	Error Detection of CPU, system program and ladder programs. Ladder programming error detection as follows: Double Use of Output Relay No END Instruction Circuit Error Format Error Exceeded Program Capacity
Monitor Function	Monitor each signal status in concurrent I/O on CRT window.

2 Classification of I/O Signals

Table 2-1: Classification of I/O signals

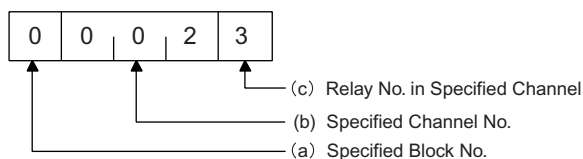
Logic Name	Classification	Description	Range
0 xxxx	General Input	Referenced with input instruction of the job	00010 - 02567 (2048 signals)
1 xxxx	General Output	Referenced with output instruction of the job	10010 - 12567 (2048 signals)
2 xxxx	External Input	Signal No. corresponding to the input terminal	20010 - 22567 (2048 signals)
3 xxxx	External Output	Signal No. corresponding to the output terminal	30010 - 32567 (2048 signals)
4 xxxx	Specific Input	Signal to change the operating condition of the robot	40010 - 41607 (1280 signals)
5 xxxx	Specific Output	Signal notifying the operating condition of the robot	50010 - 52007 (1600 signals)
6 xxxx	Interface Panel Input	Signal notifying the operating condition of the interface panel	60010 - 60647 (512 signals)
7 xxxx	Auxiliary Relay	Auxiliary relay in the concurrent I/O	70010 - 79997 (7992 signals)
80 xxx	Control Status	Monitoring of the hardware signal status of the robot control section	80010 - 80647 (512 signals)
82 xxx	Pseudo Input	Pseudo input relay reading from the system parameter	82010 - 82207 (160 signals)
25 xxx	Network Input	Input signal from the network device	25010 - 27567 (2048 signals)
35 xxx	Network Output	Input signal to the network device	35010 - 37567 (2048 signals)
M xxx	Register	1 word data (16 bits) General Register: M000 - M559 Analog Output Register: M560 - M599 Analog Input Register: M600 - M639 System Register: M640 - M999	M000 - M999 (1000 signals)

2.1 I/O Signals

2.1.1 Meaning of Number

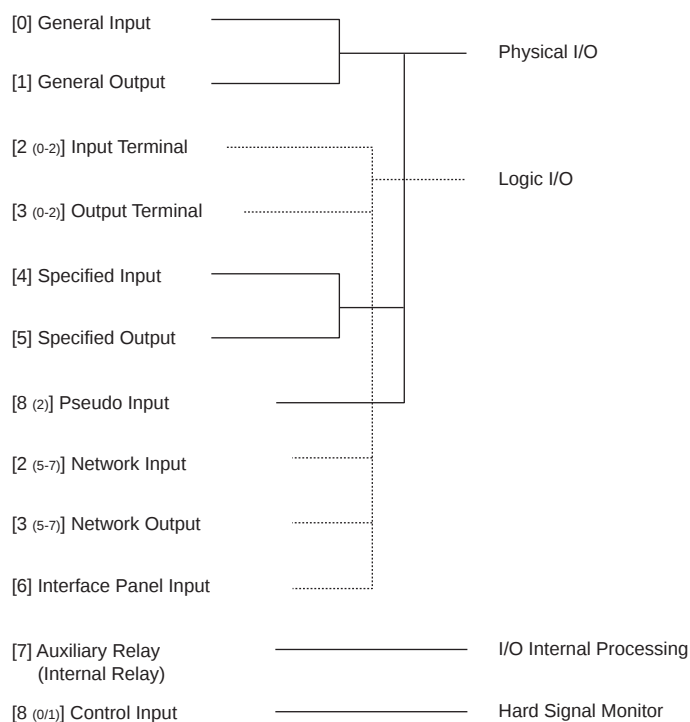
The I/O processing part and the manipulator operation processing part are connected by "Logical I/O". However, for the function, they are separated as a quite independent function. How to handle each signal is also different from the manipulator operation processing part.

In ladder programming, to specify each signal unitedly, the number is set to as follows. "Relay number" is specified by the numerical value of five digits. This numerical value is composed of the following three information.



1. Specified Block Number

This is divided into the following block.



2. Specified Channel Number

Eight signals are defined as one channel.

[001] Last eight signals

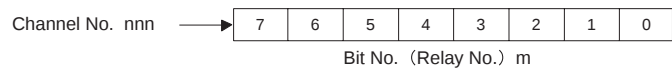


[nnn] Last eight signals

Refer to the under mentioned table for concrete channel number.

3. Relay Number in Specified Channel

One of eight signals is specified by numerical value (0-7).



As for each block, a minimum digit is specified by the numerical value to 0-7 for a relay number as understood from the table. In a word, it is a serial number which omits 8 and 9.

Moreover, the first relay number of each block starts from xxx10 because channel number enters between digits of 10, 100, and 1000. The relay number will be specified by the numerical value of the fifth digit in the frame.

Block Number: 0

Relay Number: 0 nnn m

nn: Channel01 →	00019	00018	00017	00016	00015	00014	00013	00012	00011	00010
Channel02 →	00029	00028	00027	00026	00025	00024	00023	00022	00021	00020
Channel03 →	00039	00038	00037	00036	00035	00034	00033	00032	00031	00030
Channel04 →	00049	00048	00047	00046	00045	00044	00043	00042	00041	00040
Channel05 →	00059	00058	00057	00056	00055	00054	00053	00052	00051	00050
Channel06 →	00069	00068	00067	00066	00065	00064	00063	00062	00061	00060

↑ There are no relays which correspond to these numbers.
(These numbers cannot be used.)



The relay is occasionally treated by the units (8 bits) of the byte (channel) or the units (16bits) of the word.

2.2 Register

The register is data of each every word (16 bits).

General register (M000 - M559) and analog output register (M560 - M599) are readable and writable.

System register (M640 - M999) and analog input register (M600 - M639) are readable only, and the data is set by the system.



The register is treated by the unit of one word (16 bits).

Therefore, it is not possible to handle it by the bit specification instruction (STR, AND, OR, and OUT, etc.) and the PLS instructions, etc.

1. General Register

This is composed of one word (16 bits).

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
M000																
M001																
:																
M559																

2. System Register

This is composed of one word (16 bits).

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
M640																
M641																
:																
M999																

3. Analog Output Register

This is composed of one word (16 bits). The analog output registers (M560 - M599) correspond to the analog outputs 1 to 40. Since an analog output board with different digital resolution (D/A circuit) is used in common with the analog output register, the data below the resolution is cut off at output.

Analog output	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
AOUT01 M560																	
AOUT02 M561																	
:	:																
AOUT40 M599																	

4. Resolution and Valid Data

8-bit resolution : Bit 8 to Bit 15 are valid data.

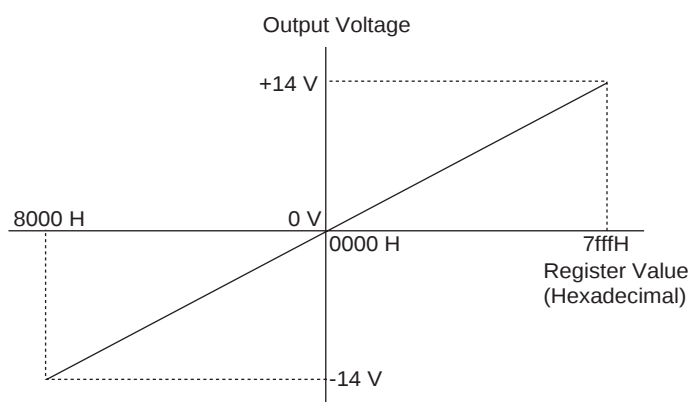
12-bit resolution: Bit 4 to Bit 15 are valid data.

16-bit resolution: Bit 0 to Bit 15 are valid data.

Resolution	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8-bit																	
12-bit																	
16-bit																	

Regardless of the resolution, the register value per 1 V is:

$$1 \text{ (V)} = 32767 \text{ (7fffH)} / 14 \text{ (V)} \doteq 2340 \text{ (924H)}$$



Analog output board (JANCD-YEW01-□, JANCD-XEW01-□, JANCD-XEW02) uses a 12-bit resolution D/A circuit.

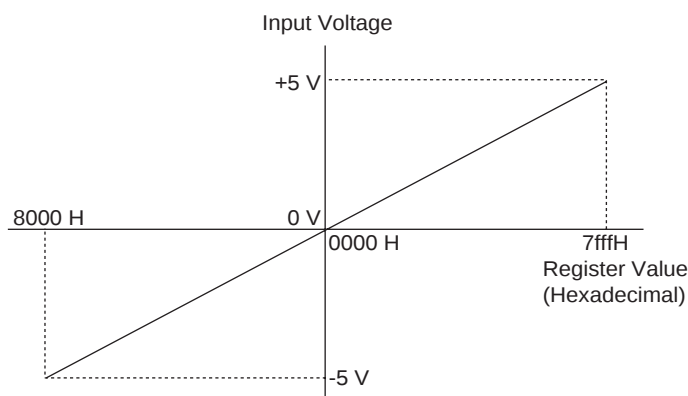
5. Analog Input Register

This is composed of one word (16 bits). The analog input registers (M600 - M639) correspond to the analog inputs 1 to 40.

Analog input	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
AIN01	M600																
AIN02	M601																
:	:																
AIN40	M639																

The register value per 1 V is:

$$1 \text{ (V)} = 32767 \text{ (7fffH)} / 5 \text{ (V)} \doteq 6553 \text{ (1999H)}$$



6. Numeric Data

Binary number is the one that the numeric data was expressed by 1(ON) and 0(OFF). Internal data of a usual computer is expressed by the binary number. On the other hand, BCD (Binary Code Decimal) makes one digit of the decimal number by using four bits of the binary number, that is, four digits, combines these, and shows the decimal number. The equipment connected with DX100 occasionally uses BCD as an input and a output signal. When transferring the data between these, it is necessary to convert BCD into the binary number when DX100 receives the data, and it is necessary to convert the binary number into BCD when outputting the data to the equipment. It is possible to convert the data by BIN and the BCD instruction in the concurrent I/O function.

Table 2-2: Binary Number

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Table 2-3: BCD

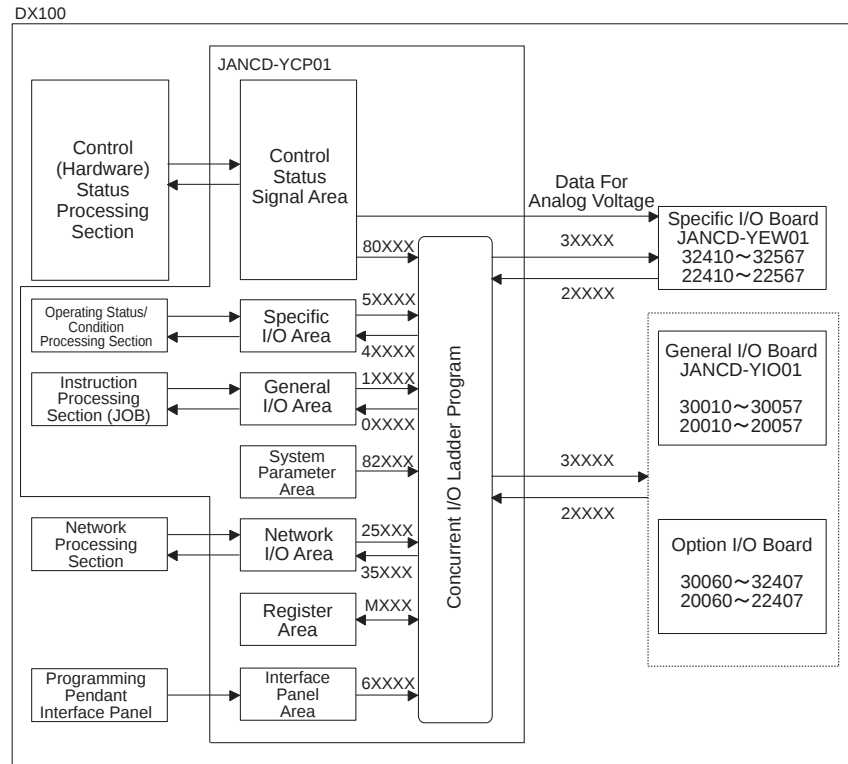
	←Digit of 1000→				←Digit of 100→				←Digit of 10→				←Digit of 1→			
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	2^3	2^2	2^1	2^0	2^3	2^2	2^1	2^0	2^3	2^2	2^1	2^0	2^3	2^2	2^1	2^0

Table 2-4: Binary number and BCD expression of the decimal number

Decimal Number	Binary	BCD
1	0000 0000 0000 0001	0000 0000 0000 0001
12	0000 0000 0000 1100	0000 0000 0001 0010
123	0000 0000 0111 1011	0000 0001 0010 0011
1234	0000 0100 1101 0010	0001 0010 0011 0100

3 Configuration of I/O Signals

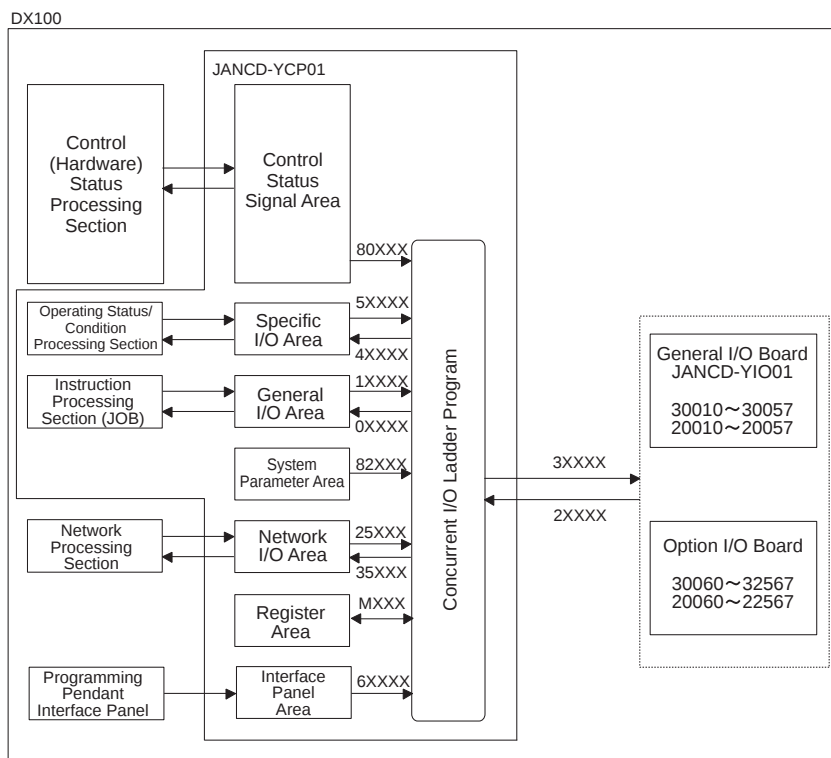
3.1 Arc Welding



How to Monitor Signal Status

To monitor a signal, verify the signal status of the signal logic number in the I/O monitor window (refer to *chapter 13.1.1 "I/O Windows" at page 13-1*).

3.2 Handling, Spot Welding, and General-Purpose Applications



How to Monitor Signal Status

To monitor a signal, verify the signal status of the signal logic number in the I/O monitor window (refer to *chapter 13.1.1 "I/O Windows" at page 13-1*).

4 Specific I/O Signals

4.1 Specific Input Signals for All Applications

40017	40016	40015	40014	40013	40012	40011	40010
SIN#008	SIN#007	SIN#006	SIN#005	SIN#004	SIN#003	SIN#002	SIN#001
	SAFETY SPEED		ALARM RESET	USER MESSAGERE QUEST	USER ALARM REQUEST	SYSTEM MESSAGERE QUEST	SYSTEM ALARM REQUEST

40027	40026	40025	40024	40023	40022	40021	40020
SIN#016	SIN#015	SIN#014	SIN#013	SIN#012	SIN#011	SIN#010	SIN#009
SUB TASK 7 ALARM REQUEST	SUB TASK 6 ALARM REQUEST	SUB TASK 5 ALARM REQUEST	SUB TASK 4 ALARM REQUEST	SUB TASK 3 ALARM REQUEST	SUB TASK 2 ALARM REQUEST	SUB TASK 1 ALARM REQUEST	

40037	40036	40035	40034	40033	40032	40031	40030
SIN#024	SIN#023	SIN#022	SIN#021	SIN#020	SIN#019	SIN#018	SIN#017
SUB TASK 15 ALARM REQUEST	SUB TASK 14 ALARM REQUEST	SUB TASK 13 ALARM REQUEST	SUB TASK 12 ALARM REQUEST	SUB TASK 11 ALARM REQUEST	SUB TASK 10 ALARM REQUEST	SUB TASK 9 ALARM REQUEST	SUB TASK 8 ALARM REQUEST

40047	40046	40045	40044	40043	40042	40041	40040
SIN#032	SIN#031	SIN#030	SIN#029	SIN#028	SIN#027	SIN#026	SIN#025
PROHIBIT WEAVING	CHECK RUN	EXT SERVO ON	EXT START		CMD REMOTE SELECT	PLAY MODE SEL	TEACH MODE SEL

40057	40056	40055	40054	40053	40052	40051	40050
SIN#040	SIN#039	SIN#038	SIN#037	SIN#036	SIN#035	SIN#034	SIN#033
PROHIBIT I/O	PROHIBIT PP		EXT SERVO OFF 3 (E-STOP CATEGORY 1)	PLAY MODE ENABLE	CONTINUE CYCLE SELECT	1 CYCLE SELECT	STEP CYCLE SELECT

40067	40066	40065	40064	40063	40062	40061	40060
SIN#048	SIN#047	SIN#046	SIN#045	SIN#044	SIN#043	SIN#042	SIN#041
EXT HOLD	EXT SERVO OFF 2 (E-STOP CATEGORY 0)	EXT SERVO OFF 1 HOLD STOP	EDIT LOCK	OT RELEASE REQ		SHOCK DETECTION INVALID	MACHINE LOCK

40077	40076	40075	40074	40073	40072	40071	40070
SIN#056	SIN#055	SIN#054	SIN#053	SIN#052	SIN#051	SIN#050	SIN#049
SUB MASTER JOB 7 CALL	SUB MASTER JOB 6 CALL	SUB MASTER JOB 5 CALL	SUB MASTER JOB 4 CALL	SUB MASTER JOB 3 CALL	SUB MASTER JOB 2 CALL	SUB MASTER JOB 1 CALL	MASTER JOB CALL

40087	40086	40085	40084	40083	40082	40081	40080
SIN#064	SIN#063	SIN#062	SIN#061	SIN#060	SIN#059	SIN#058	SIN#057
SUB MASTER JOB 15 CALL	SUB MASTER JOB 14 CALL	SUB MASTER JOB 13 CALL	SUB MASTER JOB 12 CALL	SUB MASTER JOB 11 CALL	SUB MASTER JOB 10 CALL	SUB MASTER JOB 9 CALL	SUB MASTER JOB 8 CALL

40097	40096	40095	40094	40093	40092	40091	40090
SIN#072	SIN#071	SIN#070	SIN#069	SIN#068	SIN#067	SIN#066	SIN#065
STEP BACK R8J	STEP BACK R7J	STEP BACK R6J	STEP BACK R5J	STEP BACK R4J	STEP BACK R3J	STEP BACK R2J	STEP BACK R1J

40107	40106	40105	40104	40103	40102	40101	40100
SIN#080	SIN#079	SIN#078	SIN#077	SIN#076	SIN#075	SIN#074	SIN#073

40117	40116	40115	40114	40113	40112	40111	40110
SIN#088	SIN#087	SIN#086	SIN#085	SIN#084	SIN#083	SIN#082	SIN#081

40127	40126	40125	40124	40123	40122	40121	40120
SIN#096	SIN#095	SIN#094	SIN#093	SIN#092	SIN#091	SIN#090	SIN#089

40137	40136	40135	40134	40133	40132	40131	40130
SIN#104	SIN#103	SIN#102	SIN#101	SIN#100	SIN#099	SIN#098	SIN#097
WAIT JOB SEQ R8J	WAIT JOB SEQ R7J	WAIT JOB SEQ R6J	WAIT JOB SEQ R5J	WAIT JOB SEQ R4J	WAIT JOB SEQ R3J	WAIT JOB SEQ R2J	WAIT JOB SEQ R1J

40147	40146	40145	40144	40143	40142	40141	40140
SIN#112	SIN#111	SIN#110	SIN#109	SIN#108	SIN#107	SIN#106	SIN#105
WAIT JOB SEQ STATION 8J	WAIT JOB SEQ STATION 7J	WAIT JOB SEQ STATION 6J	WAIT JOB SEQ STATION 5J	WAIT JOB SEQ STATION 4J	WAIT JOB SEQ STATION 3J	WAIT JOB SEQ STATION 2J	WAIT JOB SEQ STATION 1J

40157	40156	40155	40154	40153	40152	40151	40150
SIN#120	SIN#119	SIN#118	SIN#117	SIN#116	SIN#115	SIN#114	SIN#113
WAIT JOB SEQ STATION 16J	WAIT JOB SEQ STATION 15J	WAIT JOB SEQ STATION 14J	WAIT JOB SEQ STATION 13J	WAIT JOB SEQ STATION 12J	WAIT JOB SEQ STATION 11J	WAIT JOB SEQ STATION 10J	WAIT JOB SEQ STATION 9J

40167	40166	40165	40164	40163	40162	40161	40160
SIN#128	SIN#127	SIN#126	SIN#125	SIN#124	SIN#123	SIN#122	SIN#121
WAIT JOB SEQ STATION 24J	WAIT JOB SEQ STATION 23J	WAIT JOB SEQ STATION 22J	WAIT JOB SEQ STATION 21J	WAIT JOB SEQ STATION 20J	WAIT JOB SEQ STATION 19J	WAIT JOB SEQ STATION 18J	WAIT JOB SEQ STATION 17J

40177	40176	40175	40174	40173	40172	40171	40170
SIN#136	SIN#135	SIN#134	SIN#133	SIN#132	SIN#131	SIN#130	SIN#129
OPE ORG RET R8	OPE ORG RET R7	OPE ORG RET R6	OPE ORG RET R5	OPE ORG RET R4	OPE ORG RET R3	OPE ORG RET R2	OPE ORG RET R1

40187	40186	40185	40184	40183	40182	40181	40180
SIN#144	SIN#143	SIN#142	SIN#141	SIN#140	SIN#139	SIN#138	SIN#137

4 Specific I/O Signals

4.1 Specific Input Signals for All Applications

40197	40196	40195	40194	40193	40192	40191	40190
SIN#152	SIN#151	SIN#150	SIN#149	SIN#148	SIN#147	SIN#146	SIN#145

40207	40206	40205	40204	40203	40202	40201	40200
SIN#160	SIN#159	SIN#158	SIN#157	SIN#156	SIN#155	SIN#154	SIN#153

40217	40216	40215	40214	40213	40212	40211	40210
SIN#168	SIN#167	SIN#166	SIN#165	SIN#164	SIN#163	SIN#162	SIN#161
			SYSTEM ALARM CODE (BINARY)				
		d5	d4	d3	d2	d1	d0

40227	40226	40225	40224	40223	40222	40221	40220
SIN#176	SIN#175	SIN#174	SIN#173	SIN#172	SIN#171	SIN#170	SIN#169
			USER ALARM CODE (BINARY)				
		d5	d4	d3	d2	d1	d0

40237	40236	40235	40234	40233	40232	40231	40230
SIN#184	SIN#183	SIN#182	SIN#181	SIN#180	SIN#179	SIN#178	SIN#177
			SYSTEM MESSAGE CODE (BINARY)				
		d5	d4	d3	d2	d1	d0

40247	40246	40245	40244	40243	40242	40241	40240
SIN#192	SIN#191	SIN#190	SIN#189	SIN#188	SIN#187	SIN#186	SIN#185
			USER MESSAGE CODE (BINARY)				
		d5	d4	d3	d2	d1	d0

40257	40256	40255	40254	40253	40252	40251	40250
SIN#200	SIN#199	SIN#198	SIN#197	SIN#196	SIN#195	SIN#194	SIN#193
SUB TASK 7 START REQUEST	SUB TASK 6 START REQUEST	SUB TASK 5 START REQUEST	SUB TASK 4 START REQUEST	SUB TASK 3 START REQUEST	SUB TASK 2 START REQUEST	SUB TASK 1 START REQUEST	MASTER JOB START REQUEST

40267	40266	40265	40264	40263	40262	40261	40260
SIN#208	SIN#207	SIN#206	SIN#205	SIN#204	SIN#203	SIN#202	SIN#201
SUB TASK 15 START REQUEST	SUB TASK 14 START REQUEST	SUB TASK 13 START REQUEST	SUB TASK 12 START REQUEST	SUB TASK 11 START REQUEST	SUB TASK 10 START REQUEST	SUB TASK 9 START REQUEST	SUB TASK 8 START REQUEST

40277	40276	40275	40274	40273	40272	40271	40270
SIN#216	SIN#215	SIN#214	SIN#213	SIN#212	SIN#211	SIN#210	SIN#209
SUB TASK 7 HOLD REQUEST	SUB TASK 6 HOLD REQUEST	SUB TASK 5 HOLD REQUEST	SUB TASK 4 HOLD REQUEST	SUB TASK 3 HOLD REQUEST	SUB TASK 2 HOLD REQUEST	SUB TASK 1 HOLD REQUEST	MASTER JOB HOLD REQUEST

40287	40286	40285	40284	40283	40282	40281	40280
SIN#224	SIN#223	SIN#222	SIN#221	SIN#220	SIN#219	SIN#218	SIN#217
SUB TASK 15 HOLD REQUEST	SUB TASK 14 HOLD REQUEST	SUB TASK 13 HOLD REQUEST	SUB TASK 12 HOLD REQUEST	SUB TASK 11 HOLD REQUEST	SUB TASK 10 HOLD REQUEST	SUB TASK 9 HOLD REQUEST	SUB TASK 8 HOLD REQUEST

40297	40296	40295	40294	40293	40292	40291	40290
SIN#232	SIN#231	SIN#230	SIN#229	SIN#228	SIN#227	SIN#226	SIN#225

40307	40306	40305	40304	40303	40302	40301	40300
SIN#240	SIN#239	SIN#238	SIN#237	SIN#236	SIN#235	SIN#234	SIN#233

40317	40316	40315	40314	40313	40312	40311	40310
SIN#248	SIN#247	SIN#246	SIN#245	SIN#244	SIN#243	SIN#242	SIN#241

40327	40326	40325	40324	40323	40322	40321	40320
SIN#256	SIN#255	SIN#254	SIN#253	SIN#252	SIN#251	SIN#250	SIN#249

40337	40336	40335	40334	40333	40332	40331	40330
SIN#264	SIN#263	SIN#262	SIN#261	SIN#260	SIN#259	SIN#258	SIN#257

40347	40346	40345	40344	40343	40342	40341	40340
SIN#272	SIN#271	SIN#270	SIN#269	SIN#268	SIN#267	SIN#266	SIN#265

40357	40356	40355	40354	40353	40352	40351	40350
SIN#280	SIN#279	SIN#278	SIN#277	SIN#276	SIN#275	SIN#274	SIN#273

40367	40366	40365	40364	40363	40362	40361	40360
SIN#288	SIN#287	SIN#286	SIN#285	SIN#284	SIN#283	SIN#282	SIN#281

40377	40376	40375	40374	40373	40372	40371	40370
SIN#296	SIN#295	SIN#294	SIN#293	SIN#292	SIN#291	SIN#290	SIN#289

40387	40386	40385	40384	40383	40382	40381	40380
SIN#304	SIN#303	SIN#302	SIN#301	SIN#300	SIN#299	SIN#298	SIN#297

40397	40396	40395	40394	40393	40392	40391	40390
SIN#312	SIN#311	SIN#310	SIN#309	SIN#308	SIN#307	SIN#306	SIN#305

40407	40406	40405	40404	40403	40402	40401	40400
SIN#320	SIN#319	SIN#318	SIN#317	SIN#316	SIN#315	SIN#314	SIN#313

40417	40416	40415	40414	40413	40412	40411	40410
SIN#328	SIN#327	SIN#326	SIN#325	SIN#324	SIN#323	SIN#322	SIN#321

40427	40426	40425	40424	40423	40422	40421	40420
SIN#336	SIN#335	SIN#334	SIN#333	SIN#332	SIN#331	SIN#330	SIN#329

40437	40436	40435	40434	40433	40432	40431	40430
SIN#344	SIN#343	SIN#342	SIN#341	SIN#340	SIN#339	SIN#338	SIN#337

40447	40446	40445	40444	40443	40442	40441	40440
SIN#352	SIN#351	SIN#350	SIN#349	SIN#348	SIN#347	SIN#346	SIN#345

40457	40456	40455	40454	40453	40452	40451	40450
SIN#360	SIN#359	SIN#358	SIN#357	SIN#356	SIN#355	SIN#354	SIN#353

40467	40466	40465	40464	40463	40462	40461	40460
SIN#368	SIN#367	SIN#366	SIN#365	SIN#364	SIN#363	SIN#362	SIN#361

40477	40476	40475	40474	40473	40472	40471	40470
SIN#376	SIN#375	SIN#374	SIN#373	SIN#372	SIN#371	SIN#370	SIN#369

40487	40486	40485	40484	40483	40482	40481	40480
SIN#384	SIN#383	SIN#382	SIN#381	SIN#380	SIN#379	SIN#378	SIN#377

40497	40496	40495	40494	40493	40492	40491	40490
SIN#392	SIN#391	SIN#390	SIN#389	SIN#388	SIN#387	SIN#386	SIN#385

40507	40506	40505	40504	40503	40502	40501	40500
SIN#400	SIN#399	SIN#398	SIN#397	SIN#396	SIN#395	SIN#394	SIN#393

40517	40516	40515	40514	40513	40512	40511	40510
SIN#408	SIN#407	SIN#406	SIN#405	SIN#404	SIN#403	SIN#402	SIN#401

40527	40526	40525	40524	40523	40522	40521	40520
SIN#416	SIN#415	SIN#414	SIN#413	SIN#412	SIN#411	SIN#410	SIN#409
BUZZER OUTPUT							

40537	40536	40535	40534	40533	40532	40531	40530
SIN#424	SIN#423	SIN#422	SIN#421	SIN#420	SIN#419	SIN#418	SIN#417

40547	40546	40545	40544	40543	40542	40541	40540
SIN#432	SIN#431	SIN#430	SIN#429	SIN#428	SIN#427	SIN#426	SIN#425

40557	40556	40555	40554	40553	40552	40551	40550
SIN#440	SIN#439	SIN#438	SIN#437	SIN#436	SIN#435	SIN#434	SIN#433

40567	40566	40565	40564	40563	40562	40561	40560
SIN#448	SIN#447	SIN#446	SIN#445	SIN#444	SIN#443	SIN#442	SIN#441
							AUTO BACKUP

40577	40576	40575	40574	40573	40572	40571	40570
SIN#456	SIN#455	SIN#454	SIN#453	SIN#452	SIN#451	SIN#450	SIN#449

40587	40586	40585	40584	40583	40582	40581	40580
SIN#464	SIN#463	SIN#462	SIN#461	SIN#460	SIN#459	SIN#458	SIN#457

40597	40596	40595	40594	40593	40592	40591	40590
SIN#472	SIN#471	SIN#470	SIN#469	SIN#468	SIN#467	SIN#466	SIN#465

40607	40606	40605	40604	40603	40602	40601	40600
SIN#480	SIN#479	SIN#478	SIN#477	SIN#476	SIN#475	SIN#474	SIN#473

40617	40616	40615	40614	40613	40612	40611	40610
SIN#488	SIN#487	SIN#486	SIN#485	SIN#484	SIN#483	SIN#482	SIN#481

40627	40626	40625	40624	40623	40622	40621	40620
SIN#496	SIN#495	SIN#494	SIN#493	SIN#492	SIN#491	SIN#490	SIN#489

40637	40636	40635	40634	40633	40632	40631	40630
SIN#504	SIN#503	SIN#502	SIN#501	SIN#500	SIN#499	SIN#498	SIN#497

40647	40646	40645	40644	40643	40642	40641	40640
SIN#512	SIN#511	SIN#510	SIN#509	SIN#508	SIN#507	SIN#506	SIN#505

40657	40656	40655	40654	40653	40652	40651	40650
SIN#520	SIN#519	SIN#518	SIN#517	SIN#516	SIN#515	SIN#514	SIN#513

40667	40666	40665	40664	40663	40662	40661	40660
SIN#528	SIN#527	SIN#526	SIN#525	SIN#524	SIN#523	SIN#522	SIN#521

40677	40676	40675	40674	40673	40672	40671	40670
SIN#536	SIN#535	SIN#534	SIN#533	SIN#532	SIN#531	SIN#530	SIN#529

40687	40686	40685	40684	40683	40682	40681	40680
SIN#544	SIN#543	SIN#542	SIN#541	SIN#540	SIN#539	SIN#538	SIN#537

40697	40696	40695	40694	40693	40692	40691	40690
SIN#552	SIN#551	SIN#550	SIN#549	SIN#548	SIN#547	SIN#546	SIN#545

40707	40706	40705	40704	40703	40702	40701	40700
SIN#560	SIN#559	SIN#558	SIN#557	SIN#556	SIN#555	SIN#554	SIN#553

40717	40716	40715	40714	40713	40712	40711	40710
SIN#568	SIN#567	SIN#566	SIN#565	SIN#564	SIN#563	SIN#562	SIN#561

40727	40726	40725	40724	40723	40722	40721	40720
SIN#576	SIN#575	SIN#574	SIN#573	SIN#572	SIN#571	SIN#570	SIN#569

40737	40736	40735	40734	40733	40732	40731	40730
SIN#584	SIN#583	SIN#582	SIN#581	SIN#580	SIN#579	SIN#578	SIN#577

40747	40746	40745	40744	40743	40742	40741	40740
SIN#592	SIN#591	SIN#590	SIN#589	SIN#588	SIN#587	SIN#586	SIN#585

40757	40756	40755	40754	40753	40752	40751	40750
SIN#600	SIN#599	SIN#598	SIN#597	SIN#596	SIN#595	SIN#594	SIN#593

40767	40766	40765	40764	40763	40762	40761	40760
SIN#608	SIN#607	SIN#606	SIN#605	SIN#604	SIN#603	SIN#602	SIN#601

40777	40776	40775	40774	40773	40772	40771	40770
SIN#616	SIN#615	SIN#614	SIN#613	SIN#612	SIN#611	SIN#610	SIN#609

40787	40786	40785	40784	40783	40782	40781	40780
SIN#624	SIN#623	SIN#622	SIN#621	SIN#620	SIN#619	SIN#618	SIN#617

40797	40796	40795	40794	40793	40792	40791	40790
SIN#632	SIN#631	SIN#630	SIN#629	SIN#628	SIN#627	SIN#626	SIN#625

40807	40806	40805	40804	40803	40802	40801	40800
SIN#640	SIN#639	SIN#638	SIN#637	SIN#636	SIN#635	SIN#634	SIN#633

40817	40816	40815	40814	40813	40812	40811	40810
SIN#648	SIN#647	SIN#646	SIN#645	SIN#644	SIN#643	SIN#642	SIN#641

40827	40826	40825	40824	40823	40822	40821	40820
SIN#656	SIN#655	SIN#654	SIN#653	SIN#652	SIN#651	SIN#650	SIN#649

40837	40836	40835	40834	40833	40832	40831	40830
SIN#664	SIN#663	SIN#662	SIN#661	SIN#660	SIN#659	SIN#658	SIN#657

40847	40846	40845	40844	40843	40842	40841	40840
SIN#672	SIN#671	SIN#670	SIN#669	SIN#668	SIN#667	SIN#666	SIN#665

40857	40856	40855	40854	40853	40852	40851	40850
SIN#680	SIN#679	SIN#678	SIN#677	SIN#676	SIN#675	SIN#674	SIN#673

40867	40866	40865	40864	40863	40862	40861	40860
SIN#688	SIN#687	SIN#686	SIN#685	SIN#684	SIN#683	SIN#682	SIN#681

40877	40876	40875	40874	40873	40872	40871	40870
SIN#696	SIN#695	SIN#694	SIN#693	SIN#692	SIN#691	SIN#690	SIN#689

40887	40886	40885	40884	40883	40882	40881	40880
SIN#704	SIN#703	SIN#702	SIN#701	SIN#700	SIN#699	SIN#698	SIN#697

40897	40896	40895	40894	40893	40892	40891	40890
SIN#712	SIN#711	SIN#710	SIN#709	SIN#708	SIN#707	SIN#706	SIN#705

40907	40906	40905	40904	40903	40902	40901	40900
SIN#720	SIN#719	SIN#718	SIN#717	SIN#716	SIN#715	SIN#714	SIN#713

40917	40916	40915	40914	40913	40912	40911	40910
SIN#728	SIN#727	SIN#726	SIN#725	SIN#724	SIN#723	SIN#722	SIN#721

40927	40926	40925	40924	40923	40922	40921	40920
SIN#736	SIN#735	SIN#734	SIN#733	SIN#732	SIN#731	SIN#730	SIN#729

40937	40936	40935	40934	40933	40932	40931	40930
SIN#744	SIN#743	SIN#742	SIN#741	SIN#740	SIN#739	SIN#738	SIN#737

40947	40946	40945	40944	40943	40942	40941	40940
SIN#752	SIN#751	SIN#750	SIN#749	SIN#748	SIN#747	SIN#746	SIN#745

40957	40956	40955	40954	40953	40952	40951	40950
SIN#760	SIN#759	SIN#758	SIN#757	SIN#756	SIN#755	SIN#754	SIN#753

40967	40966	40965	40964	40963	40962	40961	40960
SIN#768	SIN#767	SIN#766	SIN#765	SIN#764	SIN#763	SIN#762	SIN#761

40977	40976	40975	40974	40973	40972	40971	40970
SIN#776	SIN#775	SIN#774	SIN#773	SIN#772	SIN#771	SIN#770	SIN#769

40987	40986	40985	40984	40983	40982	40981	40980
SIN#784	SIN#783	SIN#782	SIN#781	SIN#780	SIN#779	SIN#778	SIN#777

40997	40996	40995	40994	40993	40992	40991	40990
SIN#792	SIN#791	SIN#790	SIN#789	SIN#788	SIN#787	SIN#786	SIN#785

41007	41006	41005	41004	41003	41002	41001	41000
SIN#800	SIN#799	SIN#798	SIN#797	SIN#796	SIN#795	SIN#794	SIN#793

41017	41016	41015	41014	41013	41012	41011	41010
SIN#808	SIN#807	SIN#806	SIN#805	SIN#804	SIN#803	SIN#802	SIN#801

41027	41026	41025	41024	41023	41022	41021	41020
SIN#816	SIN#815	SIN#814	SIN#813	SIN#812	SIN#811	SIN#810	SIN#809

41037	41036	41035	41034	41033	41032	41031	41030
SIN#824	SIN#823	SIN#822	SIN#821	SIN#820	SIN#819	SIN#818	SIN#817

41047	41046	41045	41044	41043	41042	41041	41040
SIN#832	SIN#831	SIN#830	SIN#829	SIN#828	SIN#827	SIN#826	SIN#825

41057	41056	41055	41054	41053	41052	41051	41050
SIN#840	SIN#839	SIN#838	SIN#837	SIN#836	SIN#835	SIN#834	SIN#833

41067	41066	41065	41064	41063	41062	41061	41060
SIN#848	SIN#847	SIN#846	SIN#845	SIN#844	SIN#843	SIN#842	SIN#841

41077	41076	41075	41074	41073	41072	41071	41070
SIN#856	SIN#855	SIN#854	SIN#853	SIN#852	SIN#851	SIN#850	SIN#849

41087	41086	41085	41084	41083	41082	41081	41080
SIN#864	SIN#863	SIN#862	SIN#861	SIN#860	SIN#859	SIN#858	SIN#857

DX100

4 Specific I/O Signals
4.1 Specific Input Signals for All Applications

41097	41096	41095	41094	41093	41092	41091	41090
SIN#872	SIN#871	SIN#870	SIN#869	SIN#868	SIN#867	SIN#866	SIN#865

41107	41106	41105	41104	41103	41102	41101	41100
SIN#880	SIN#879	SIN#878	SIN#877	SIN#876	SIN#875	SIN#874	SIN#873

41117	41116	41115	41114	41113	41112	41111	41110
SIN#888	SIN#887	SIN#886	SIN#885	SIN#884	SIN#883	SIN#882	SIN#881

41127	41126	41125	41124	41123	41122	41121	41120
SIN#896	SIN#895	SIN#894	SIN#893	SIN#892	SIN#891	SIN#890	SIN#889

4.2 Specific Input Signals for Arc Welding

4.2.1 Device 1

41137	41136	41135	41134	41133	41132	41131	41130
SIN#904	SIN#903	SIN#902	SIN#901	SIN#900	SIN#899	SIN#897	SIN#897
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41147	41146	41145	41144	41143	41142	41141	41140
SIN#912	SIN#911	SIN#910	SIN#909	SIN#908	SIN#907	SIN#906	SIN#905
	CLEAR ANTI-STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41157	41156	41155	41154	41153	41152	41151	41150
SIN#920	SIN#919	SIN#918	SIN#917	SIN#916	SIN#915	SIN#914	SIN#913

41167	41166	41165	41164	41163	41162	41161	41160
SIN#928	SIN#927	SIN#926	SIN#925	SIN#924	SIN#923	SIN#922	SIN#921
							PROHIBIT SENSING

41177	41176	41175	41174	41173	41172	41171	41170
SIN#936	SIN#935	SIN#934	SIN#933	SIN#932	SIN#931	SIN#930	SIN#929

41187	41186	41185	41184	41183	41182	41181	41180
SIN#944	SIN#943	SIN#942	SIN#941	SIN#940	SIN#939	SIN#938	SIN#937

4.2.2 Device 2

41197	41196	41195	41194	41193	41192	41191	41190
SIN#952	SIN#951	SIN#950	SIN#949	SIN#948	SIN#947	SIN#946	SIN#945
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41207	41206	41205	41204	41203	41202	41201	41200
SIN#960	SIN#959	SIN#958	SIN#957	SIN#956	SIN#955	SIN#954	SIN#953
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41217	41216	41215	41214	41213	41212	41211	41210
SIN#968	SIN#967	SIN#966	SIN#965	SIN#964	SIN#963	SIN#962	SIN#961

41227	41226	41225	41224	41223	41222	41221	41220
SIN#976	SIN#975	SIN#974	SIN#973	SIN#972	SIN#971	SIN#970	SIN#969
							PROHIBIT SENSING

41237	41236	41235	41234	41233	41232	41231	41230
SIN#984	SIN#983	SIN#982	SIN#981	SIN#980	SIN#979	SIN#978	SIN#977

41247	41246	41245	41244	41243	41242	41241	41240
SIN#992	SIN#991	SIN#990	SIN#989	SIN#988	SIN#987	SIN#986	SIN#985

4.2.3 Device 3

41257	41256	41255	41254	41253	41252	41251	41250
SIN#1000	SIN#999	SIN#998	SIN#997	SIN#996	SIN#995	SIN#994	SIN#993
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41267	41266	41265	41264	41263	41262	41261	41260
SIN#1008	SIN#1007	SIN#1006	SIN#1005	SIN#1004	SIN#1003	SIN#1002	SIN#1001
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41277	41276	41275	41274	41273	41272	41271	41270
SIN#1016	SIN#1015	SIN#1014	SIN#1013	SIN#1012	SIN#1011	SIN#1010	SIN#1009

41287	41286	41285	41284	41283	41282	41281	41280
SIN#1024	SIN#1023	SIN#1022	SIN#1021	SIN#1020	SIN#1019	SIN#1018	SIN#1017
							PROHIBIT SENSING

41297	41296	41295	41294	41293	41292	41291	41290
SIN#1032	SIN#1031	SIN#1030	SIN#1029	SIN#1028	SIN#1027	SIN#1026	SIN#1025

41307	41306	41305	41304	41303	41302	41301	41300
SIN#1040	SIN#1039	SIN#1038	SIN#1037	SIN#1036	SIN#1035	SIN#1034	SIN#1033

4.2.4 Device 4

41317	41316	41315	41314	41313	41312	41311	41310
SIN#1048	SIN#1047	SIN#1046	SIN#1045	SIN#1044	SIN#1043	SIN#1042	SIN#1041
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41327	41326	41325	41324	41323	41322	41321	41320
SIN#1056	SIN#1055	SIN#1054	SIN#1053	SIN#1052	SIN#1051	SIN#1050	SIN#1049
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41337	41336	41335	41334	41333	41332	41331	41330
SIN#1064	SIN#1063	SIN#1062	SIN#1061	SIN#1060	SIN#1059	SIN#1058	SIN#1057

41347	41346	41345	41344	41343	41342	41341	41340
SIN#1072	SIN#1071	SIN#1070	SIN#1069	SIN#1068	SIN#1067	SIN#1066	SIN#1065
							PROHIBIT SENSING

41357	41356	41355	41354	41353	41352	41351	41350
SIN#1080	SIN#1079	SIN#1078	SIN#1077	SIN#1076	SIN#1075	SIN#1074	SIN#1073

41367	41366	41365	41364	41363	41362	41361	41360
SIN#1088	SIN#1087	SIN#1086	SIN#1085	SIN#1084	SIN#1083	SIN#1082	SIN#1081

4.2.5 Device 5

41377	41376	41375	41374	41373	41372	41371	41370
SIN#1096	SIN#1095	SIN#1094	SIN#1093	SIN#1092	SIN#1091	SIN#1090	SIN#1089
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41387	41386	41385	41384	41383	41382	41381	41380
SIN#1104	SIN#1103	SIN#1102	SIN#1101	SIN#1100	SIN#1099	SIN#1098	SIN#1097
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41397	41396	41395	41394	41393	41392	41391	41390
SIN#1112	SIN#1111	SIN#1110	SIN#1109	SIN#1108	SIN#1107	SIN#1106	SIN#1105

41407	41406	41405	41404	41403	41402	41401	41400
SIN#1120	SIN#1119	SIN#1118	SIN#1117	SIN#1116	SIN#1115	SIN#1114	SIN#1113
							PROHIBIT SENSING

41417	41416	41415	41414	41413	41412	41411	41410
SIN#1128	SIN#1127	SIN#1126	SIN#1125	SIN#1124	SIN#1123	SIN#1122	SIN#1121

41427	41426	41425	41424	41423	41422	41421	41420
SIN#1136	SIN#1135	SIN#1134	SIN#1133	SIN#1132	SIN#1131	SIN#1130	SIN#1129

4.2.6 Device 6

41437	41436	41435	41434	41433	41432	41431	41430
SIN#1144	SIN#1143	SIN#1142	SIN#1141	SIN#1140	SIN#1139	SIN#1138	SIN#1137
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41447	41446	41445	41444	41443	41442	41441	41440
SIN#1152	SIN#1151	SIN#1150	SIN#1149	SIN#1148	SIN#1147	SIN#1146	SIN#1145
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41457	41456	41455	41454	41453	41452	41451	41450
SIN#1160	SIN#1159	SIN#1158	SIN#1157	SIN#1156	SIN#1155	SIN#1154	SIN#1153

41467	41466	41465	41464	41463	41462	41461	41460
SIN#1168	SIN#1167	SIN#1166	SIN#1165	SIN#1164	SIN#1163	SIN#1162	SIN#1161
							PROHIBIT SENSING

41477	41476	41475	41474	41473	41472	41471	41470
SIN#1176	SIN#1175	SIN#1174	SIN#1173	SIN#1172	SIN#1171	SIN#1170	SIN#1169

41487	41486	41485	41484	41483	41482	41481	41480
SIN#1184	SIN#1183	SIN#1182	SIN#1181	SIN#1180	SIN#1179	SIN#1178	SIN#1177

4.2.7 Device 7

41497	41496	41495	41494	41493	41492	41491	41490
SIN#1192	SIN#1191	SIN#1190	SIN#1189	SIN#1188	SIN#1187	SIN#1186	SIN#1185
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41507	41506	41505	41504	41503	41502	41501	41500
SIN#1200	SIN#1199	SIN#1198	SIN#1197	SIN#1196	SIN#1195	SIN#1194	SIN#1193
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41517	41516	41515	41514	41513	41512	41511	41510
SIN#1208	SIN#1207	SIN#1206	SIN#1205	SIN#1204	SIN#1203	SIN#1202	SIN#1201

41527	41526	41525	41524	41523	41522	41521	41520
SIN#1216	SIN#1215	SIN#1214	SIN#1213	SIN#1212	SIN#1211	SIN#1210	SIN#1209
							PROHIBIT SENSING

41537	41536	41535	41534	41533	41532	41531	41530
SIN#1224	SIN#1223	SIN#1222	SIN#1221	SIN#1220	SIN#1219	SIN#1218	SIN#1217

41547	41546	41545	41544	41543	41542	41541	41540
SIN#1232	SIN#1231	SIN#1230	SIN#1229	SIN#1228	SIN#1227	SIN#1226	SIN#1225

4.2.8 Device 8

41557	41556	41555	41554	41553	41552	41551	41550
SIN#1240	SIN#1239	SIN#1238	SIN#1237	SIN#1236	SIN#1235	SIN#1234	SIN#1233
ANTI-STICK REQUEST	RETRY RET REQUEST	RETRY REQUEST	NOZZLE CLEANED	TIP CHANGED	TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41567	41566	41565	41564	41563	41562	41561	41560
SIN#1248	SIN#1247	SIN#1246	SIN#1245	SIN#1244	SIN#1243	SIN#1242	SIN#1241
	CLEAR ANTI- STICK NO	CLEAR RESTART NO	CLEAR RETRY NO	RESTART RESET	RESTART/ WIRE	RESTART/ GAS	RESTART/ ARC

41577	41576	41575	41574	41573	41572	41571	41570
SIN#1256	SIN#1255	SIN#1254	SIN#1253	SIN#1252	SIN#1251	SIN#1250	SIN#1249

41587	41586	41585	41584	41583	41582	41581	41580
SIN#1264	SIN#1263	SIN#1262	SIN#1261	SIN#1260	SIN#1259	SIN#1258	SIN#1257
							PROHIBIT SENSING

41597	41596	41595	41594	41593	41592	41591	41590
SIN#1272	SIN#1271	SIN#1270	SIN#1269	SIN#1268	SIN#1267	SIN#1266	SIN#1265

41607	41606	41605	41604	41603	41602	41601	41600
SIN#1280	SIN#1279	SIN#1278	SIN#1277	SIN#1276	SIN#1275	SIN#1274	SIN#1273

4.3 Specific Input Signals for Handling

4.3.1 Device 1

41137	41136	41135	41134	41133	41132	41131	41130
SIN#904	SIN#903	SIN#902	SIN#901	SIN#900	SIN#899	SIN#897	SIN#897
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41147	41146	41145	41144	41143	41142	41141	41140
SIN#912	SIN#911	SIN#910	SIN#909	SIN#908	SIN#907	SIN#906	SIN#905
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41157	41156	41155	41154	41153	41152	41151	41150
SIN#920	SIN#919	SIN#918	SIN#917	SIN#916	SIN#915	SIN#914	SIN#913

41167	41166	41165	41164	41163	41162	41161	41160
SIN#928	SIN#927	SIN#926	SIN#925	SIN#924	SIN#923	SIN#922	SIN#921

41177	41176	41175	41174	41173	41172	41171	41170
SIN#936	SIN#935	SIN#934	SIN#933	SIN#932	SIN#931	SIN#930	SIN#929

41187	41186	41185	41184	41183	41182	41181	41180
SIN#944	SIN#943	SIN#942	SIN#941	SIN#940	SIN#939	SIN#938	SIN#937

4.3.2 Device 2

41197	41196	41195	41194	41193	41192	41191	41190
SIN#952	SIN#951	SIN#950	SIN#949	SIN#948	SIN#947	SIN#946	SIN#945
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41207	41206	41205	41204	41203	41202	41201	41200
SIN#960	SIN#959	SIN#958	SIN#957	SIN#956	SIN#955	SIN#954	SIN#953
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41217	41216	41215	41214	41213	41212	41211	41210
SIN#968	SIN#967	SIN#966	SIN#965	SIN#964	SIN#963	SIN#962	SIN#961

41227	41226	41225	41224	41223	41222	41221	41220
SIN#976	SIN#975	SIN#974	SIN#973	SIN#972	SIN#971	SIN#970	SIN#969

41237	41236	41235	41234	41233	41232	41231	41230
SIN#984	SIN#983	SIN#982	SIN#981	SIN#980	SIN#979	SIN#978	SIN#977

41247	41246	41245	41244	41243	41242	41241	41240
SIN#992	SIN#991	SIN#990	SIN#989	SIN#988	SIN#987	SIN#986	SIN#985

4.3.3 Device 3

41257	41256	41255	41254	41253	41252	41251	41250
SIN#1000	SIN#999	SIN#998	SIN#997	SIN#996	SIN#995	SIN#994	SIN#993
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41267	41266	41265	41264	41263	41262	41261	41260
SIN#1008	SIN#1007	SIN#1006	SIN#1005	SIN#1004	SIN#1003	SIN#1002	SIN#1001
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41277	41276	41275	41274	41273	41272	41271	41270
SIN#1016	SIN#1015	SIN#1014	SIN#1013	SIN#1012	SIN#1011	SIN#1010	SIN#1009

41287	41286	41285	41284	41283	41282	41281	41280
SIN#1024	SIN#1023	SIN#1022	SIN#1021	SIN#1020	SIN#1019	SIN#1018	SIN#1017

41297	41296	41295	41294	41293	41292	41291	41290
SIN#1032	SIN#1031	SIN#1030	SIN#1029	SIN#1028	SIN#1027	SIN#1026	SIN#1025

41307	41306	41305	41304	41303	41302	41301	41300
SIN#1040	SIN#1039	SIN#1038	SIN#1037	SIN#1036	SIN#1035	SIN#1034	SIN#1033

4.3.4 Device 4

41317	41316	41315	41314	41313	41312	41311	41310
SIN#1048	SIN#1047	SIN#1046	SIN#1045	SIN#1044	SIN#1043	SIN#1042	SIN#1041
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41327	41326	41325	41324	41323	41322	41321	41320
SIN#1056	SIN#1055	SIN#1054	SIN#1053	SIN#1052	SIN#1051	SIN#1050	SIN#1049
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41337	41336	41335	41334	41333	41332	41331	41330
SIN#1064	SIN#1063	SIN#1062	SIN#1061	SIN#1060	SIN#1059	SIN#1058	SIN#1057

41347	41346	41345	41344	41343	41342	41341	41340
SIN#1072	SIN#1071	SIN#1070	SIN#1069	SIN#1068	SIN#1067	SIN#1066	SIN#1065

41357	41356	41355	41354	41353	41352	41351	41350
SIN#1080	SIN#1079	SIN#1078	SIN#1077	SIN#1076	SIN#1075	SIN#1074	SIN#1073

41367	41366	41365	41364	41363	41362	41361	41360
SIN#1088	SIN#1087	SIN#1086	SIN#1085	SIN#1084	SIN#1083	SIN#1082	SIN#1081

4.3.5 Device 5

41377	41376	41375	41374	41373	41372	41371	41370
SIN#1096	SIN#1095	SIN#1094	SIN#1093	SIN#1092	SIN#1091	SIN#1090	SIN#1089
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41387	41386	41385	41384	41383	41382	41381	41380
SIN#1104	SIN#1103	SIN#1102	SIN#1101	SIN#1100	SIN#1099	SIN#1098	SIN#1097
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41397	41396	41395	41394	41393	41392	41391	41390
SIN#1112	SIN#1111	SIN#1110	SIN#1109	SIN#1108	SIN#1107	SIN#1106	SIN#1105

41407	41406	41405	41404	41403	41402	41401	41400
SIN#1120	SIN#1119	SIN#1118	SIN#1117	SIN#1116	SIN#1115	SIN#1114	SIN#1113

41417	41416	41415	41414	41413	41412	41411	41410
SIN#1128	SIN#1127	SIN#1126	SIN#1125	SIN#1124	SIN#1123	SIN#1122	SIN#1121

41427	41426	41425	41424	41423	41422	41421	41420
SIN#1136	SIN#1135	SIN#1134	SIN#1133	SIN#1132	SIN#1131	SIN#1130	SIN#1129

4.3.6 Device 6

41437	41436	41435	41434	41433	41432	41431	41430
SIN#1144	SIN#1143	SIN#1142	SIN#1141	SIN#1140	SIN#1139	SIN#1138	SIN#1137
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41447	41446	41445	41444	41443	41442	41441	41440
SIN#1152	SIN#1151	SIN#1150	SIN#1149	SIN#1148	SIN#1147	SIN#1146	SIN#1145
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41457	41456	41455	41454	41453	41452	41451	41450
SIN#1160	SIN#1159	SIN#1158	SIN#1157	SIN#1156	SIN#1155	SIN#1154	SIN#1153

41467	41466	41465	41464	41463	41462	41461	41460
SIN#1168	SIN#1167	SIN#1166	SIN#1165	SIN#1164	SIN#1163	SIN#1162	SIN#1161

41477	41476	41475	41474	41473	41472	41471	41470
SIN#1176	SIN#1175	SIN#1174	SIN#1173	SIN#1172	SIN#1171	SIN#1170	SIN#1169

41487	41486	41485	41484	41483	41482	41481	41480
SIN#1184	SIN#1183	SIN#1182	SIN#1181	SIN#1180	SIN#1179	SIN#1178	SIN#1177

4.3.7 Device 7

41497	41496	41495	41494	41493	41492	41491	41490
SIN#1192	SIN#1191	SIN#1190	SIN#1189	SIN#1188	SIN#1187	SIN#1186	SIN#1185
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41507	41506	41505	41504	41503	41502	41501	41500
SIN#1200	SIN#1199	SIN#1198	SIN#1197	SIN#1196	SIN#1195	SIN#1194	SIN#1193
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41517	41516	41515	41514	41513	41512	41511	41510
SIN#1208	SIN#1207	SIN#1206	SIN#1205	SIN#1204	SIN#1203	SIN#1202	SIN#1201

41527	41526	41525	41524	41523	41522	41521	41520
SIN#1216	SIN#1215	SIN#1214	SIN#1213	SIN#1212	SIN#1211	SIN#1210	SIN#1209

41537	41536	41535	41534	41533	41532	41531	41530
SIN#1224	SIN#1223	SIN#1222	SIN#1221	SIN#1220	SIN#1219	SIN#1218	SIN#1217

41547	41546	41545	41544	41543	41542	41541	41540
SIN#1232	SIN#1231	SIN#1230	SIN#1229	SIN#1228	SIN#1227	SIN#1226	SIN#1225

4.3.8 Device 8

41557	41556	41555	41554	41553	41552	41551	41550
SIN#1240	SIN#1239	SIN#1238	SIN#1237	SIN#1236	SIN#1235	SIN#1234	SIN#1233
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41567	41566	41565	41564	41563	41562	41561	41560
SIN#1248	SIN#1247	SIN#1246	SIN#1245	SIN#1244	SIN#1243	SIN#1242	SIN#1241
SENSOR INPUT 8	SENSOR INPUT 7	SENSOR INPUT 6	SENSOR INPUT 5	SENSOR INPUT 4	SENSOR INPUT 3	SENSOR INPUT 2	SENSOR INPUT 1

41577	41576	41575	41574	41573	41572	41571	41570
SIN#1256	SIN#1255	SIN#1254	SIN#1253	SIN#1252	SIN#1251	SIN#1250	SIN#1249

41587	41586	41585	41584	41583	41582	41581	41580
SIN#1264	SIN#1263	SIN#1262	SIN#1261	SIN#1260	SIN#1259	SIN#1258	SIN#1257

41597	41596	41595	41594	41593	41592	41591	41590
SIN#1272	SIN#1271	SIN#1270	SIN#1269	SIN#1268	SIN#1267	SIN#1266	SIN#1265

41607	41606	41605	41604	41603	41602	41601	41600
SIN#1280	SIN#1279	SIN#1278	SIN#1277	SIN#1276	SIN#1275	SIN#1274	SIN#1273

4.4 Specific Input Signals for Spot Welding

4.4.1 Device 1

41137	41136	41135	41134	41133	41132	41131	41130
SIN#904	SIN#903	SIN#902	SIN#901	SIN#900	SIN#899	SIN#897	SIN#897
WELDING STOP WELDER 1		ELECTRODE EXCHG WELDER 1			TIME MEASURE	END WORK ANSWER	WORK START ANSWER

41147	41146	41145	41144	41143	41142	41141	41140
SIN#912	SIN#911	SIN#910	SIN#909	SIN#908	SIN#907	SIN#906	SIN#905
WELDING STOP WELDER 2		ELECTRODE EXCHG WELDER 2					

41157	41156	41155	41154	41153	41152	41151	41150
SIN#920	SIN#919	SIN#918	SIN#917	SIN#916	SIN#915	SIN#914	SIN#913
WELDING STOP WELDER 3		ELECTRODE EXCHG WELDER 3					

41167	41166	41165	41164	41163	41162	41161	41160
SIN#928	SIN#927	SIN#926	SIN#925	SIN#924	SIN#923	SIN#922	SIN#921
WELDING STOP WELDER 4		ELECTRODE EXCHG WELDER 4					

41177	41176	41175	41174	41173	41172	41171	41170
SIN#936	SIN#935	SIN#934	SIN#933	SIN#932	SIN#931	SIN#930	SIN#929
WELDING STOP WELDER 5		ELECTRODE EXCHG WELDER 5					

41187	41186	41185	41184	41183	41182	41181	41180
SIN#944	SIN#943	SIN#942	SIN#941	SIN#940	SIN#939	SIN#938	SIN#937
WELDING STOP WELDER 6		ELECTRODE EXCHG WELDER 6					

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4 Specific I/O Signals

4.4 Specific Input Signals for Spot Welding

4.4.2 Device 2

41197	41196	41195	41194	41193	41192	41191	41190
SIN#952	SIN#951	SIN#950	SIN#949	SIN#948	SIN#947	SIN#946	SIN#945
WELDING STOP WELDER 7		ELECTRODE EXCHG WELDER 7					

41207	41206	41205	41204	41203	41202	41201	41200
SIN#960	SIN#959	SIN#958	SIN#957	SIN#956	SIN#955	SIN#954	SIN#953
WELDING STOP WELDER 8		ELECTRODE EXCHG WELDER 8					

41217	41216	41215	41214	41213	41212	41211	41210
SIN#968	SIN#967	SIN#966	SIN#965	SIN#964	SIN#963	SIN#962	SIN#961

41227	41226	41225	41224	41223	41222	41221	41220
SIN#976	SIN#975	SIN#974	SIN#973	SIN#972	SIN#971	SIN#970	SIN#969

41237	41236	41235	41234	41233	41232	41231	41230
SIN#984	SIN#983	SIN#982	SIN#981	SIN#980	SIN#979	SIN#978	SIN#977

41247	41246	41245	41244	41243	41242	41241	41240
SIN#992	SIN#991	SIN#990	SIN#989	SIN#988	SIN#987	SIN#986	SIN#985

4.4.3 Device 3

41257	41256	41255	41254	41253	41252	41251	41250
SIN#1000	SIN#999	SIN#998	SIN#997	SIN#996	SIN#995	SIN#994	SIN#993

41267	41266	41265	41264	41263	41262	41261	41260
SIN#1008	SIN#1007	SIN#1006	SIN#1005	SIN#1004	SIN#1003	SIN#1002	SIN#1001

41277	41276	41275	41274	41273	41272	41271	41270
SIN#1016	SIN#1015	SIN#1014	SIN#1013	SIN#1012	SIN#1011	SIN#1010	SIN#1009

41287	41286	41285	41284	41283	41282	41281	41280
SIN#1024	SIN#1023	SIN#1022	SIN#1021	SIN#1020	SIN#1019	SIN#1018	SIN#1017

41297	41296	41295	41294	41293	41292	41291	41290
SIN#1032	SIN#1031	SIN#1030	SIN#1029	SIN#1028	SIN#1027	SIN#1026	SIN#1025

41307	41306	41305	41304	41303	41302	41301	41300
SIN#1040	SIN#1039	SIN#1038	SIN#1037	SIN#1036	SIN#1035	SIN#1034	SIN#1033

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4 Specific I/O Signals
4.4 Specific Input Signals for Spot Welding

4.4.4 Device 4

41317	41316	41315	41314	41313	41312	41311	41310
SIN#1048	SIN#1047	SIN#1046	SIN#1045	SIN#1044	SIN#1043	SIN#1042	SIN#1041

41327	41326	41325	41324	41323	41322	41321	41320
SIN#1056	SIN#1055	SIN#1054	SIN#1053	SIN#1052	SIN#1051	SIN#1050	SIN#1049

41337	41336	41335	41334	41333	41332	41331	41330
SIN#1064	SIN#1063	SIN#1062	SIN#1061	SIN#1060	SIN#1059	SIN#1058	SIN#1057

41347	41346	41345	41344	41343	41342	41341	41340
SIN#1072	SIN#1071	SIN#1070	SIN#1069	SIN#1068	SIN#1067	SIN#1066	SIN#1065

41357	41356	41355	41354	41353	41352	41351	41350
SIN#1080	SIN#1079	SIN#1078	SIN#1077	SIN#1076	SIN#1075	SIN#1074	SIN#1073

41367	41366	41365	41364	41363	41362	41361	41360
SIN#1088	SIN#1087	SIN#1086	SIN#1085	SIN#1084	SIN#1083	SIN#1082	SIN#1081

4.4.5 Device 5

41377	41376	41375	41374	41373	41372	41371	41370
SIN#1096	SIN#1095	SIN#1094	SIN#1093	SIN#1092	SIN#1091	SIN#1090	SIN#1089

41387	41386	41385	41384	41383	41382	41381	41380
SIN#1104	SIN#1103	SIN#1102	SIN#1101	SIN#1100	SIN#1099	SIN#1098	SIN#1097

41397	41396	41395	41394	41393	41392	41391	41390
SIN#1112	SIN#1111	SIN#1110	SIN#1109	SIN#1108	SIN#1107	SIN#1106	SIN#1105

41407	41406	41405	41404	41403	41402	41401	41400
SIN#1120	SIN#1119	SIN#1118	SIN#1117	SIN#1116	SIN#1115	SIN#1114	SIN#1113

41417	41416	41415	41414	41413	41412	41411	41410
SIN#1128	SIN#1127	SIN#1126	SIN#1125	SIN#1124	SIN#1123	SIN#1122	SIN#1121

41427	41426	41425	41424	41423	41422	41421	41420
SIN#1136	SIN#1135	SIN#1134	SIN#1133	SIN#1132	SIN#1131	SIN#1130	SIN#1129

4.4.6 Device 6

41437	41436	41435	41434	41433	41432	41431	41430
SIN#1144	SIN#1143	SIN#1142	SIN#1141	SIN#1140	SIN#1139	SIN#1138	SIN#1137

41447	41446	41445	41444	41443	41442	41441	41440
SIN#1152	SIN#1151	SIN#1150	SIN#1149	SIN#1148	SIN#1147	SIN#1146	SIN#1145

41457	41456	41455	41454	41453	41452	41451	41450
SIN#1160	SIN#1159	SIN#1158	SIN#1157	SIN#1156	SIN#1155	SIN#1154	SIN#1153

41467	41466	41465	41464	41463	41462	41461	41460
SIN#1168	SIN#1167	SIN#1166	SIN#1165	SIN#1164	SIN#1163	SIN#1162	SIN#1161

41477	41476	41475	41474	41473	41472	41471	41470
SIN#1176	SIN#1175	SIN#1174	SIN#1173	SIN#1172	SIN#1171	SIN#1170	SIN#1169

41487	41486	41485	41484	41483	41482	41481	41480
SIN#1184	SIN#1183	SIN#1182	SIN#1181	SIN#1180	SIN#1179	SIN#1178	SIN#1177

4.4.7 Device 7

41497	41496	41495	41494	41493	41492	41491	41490
SIN#1192	SIN#1191	SIN#1190	SIN#1189	SIN#1188	SIN#1187	SIN#1186	SIN#1185

41507	41506	41505	41504	41503	41502	41501	41500
SIN#1200	SIN#1199	SIN#1198	SIN#1197	SIN#1196	SIN#1195	SIN#1194	SIN#1193

41517	41516	41515	41514	41513	41512	41511	41510
SIN#1208	SIN#1207	SIN#1206	SIN#1205	SIN#1204	SIN#1203	SIN#1202	SIN#1201

41527	41526	41525	41524	41523	41522	41521	41520
SIN#1216	SIN#1215	SIN#1214	SIN#1213	SIN#1212	SIN#1211	SIN#1210	SIN#1209

41537	41536	41535	41534	41533	41532	41531	41530
SIN#1224	SIN#1223	SIN#1222	SIN#1221	SIN#1220	SIN#1219	SIN#1218	SIN#1217

41547	41546	41545	41544	41543	41542	41541	41540
SIN#1232	SIN#1231	SIN#1230	SIN#1229	SIN#1228	SIN#1227	SIN#1226	SIN#1225

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4 Specific I/O Signals
4.4 Specific Input Signals for Spot Welding

4.4.8 Device 8

41557	41556	41555	41554	41553	41552	41551	41550
SIN#1240	SIN#1239	SIN#1238	SIN#1237	SIN#1236	SIN#1235	SIN#1234	SIN#1233

41567	41566	41565	41564	41563	41562	41561	41560
SIN#1248	SIN#1247	SIN#1246	SIN#1245	SIN#1244	SIN#1243	SIN#1242	SIN#1241

41577	41576	41575	41574	41573	41572	41571	41570
SIN#1256	SIN#1255	SIN#1254	SIN#1253	SIN#1252	SIN#1251	SIN#1250	SIN#1249

41587	41586	41585	41584	41583	41582	41581	41580
SIN#1264	SIN#1263	SIN#1262	SIN#1261	SIN#1260	SIN#1259	SIN#1258	SIN#1257

41597	41596	41595	41594	41593	41592	41591	41590
SIN#1272	SIN#1271	SIN#1270	SIN#1269	SIN#1268	SIN#1267	SIN#1266	SIN#1265

41607	41606	41605	41604	41603	41602	41601	41600
SIN#1280	SIN#1279	SIN#1278	SIN#1277	SIN#1276	SIN#1275	SIN#1274	SIN#1273

4.5 Specific Input Signals for General-Purpose Applications

4.5.1 Device 1

41137	41136	41135	41134	41133	41132	41131	41130
SIN#904	SIN#903	SIN#902	SIN#901	SIN#900	SIN#899	SIN#897	SIN#897
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41147	41146	41145	41144	41143	41142	41141	41140
SIN#912	SIN#911	SIN#910	SIN#909	SIN#908	SIN#907	SIN#906	SIN#905

41157	41156	41155	41154	41153	41152	41151	41150
SIN#920	SIN#919	SIN#918	SIN#917	SIN#916	SIN#915	SIN#914	SIN#913

41167	41166	41165	41164	41163	41162	41161	41160
SIN#928	SIN#927	SIN#926	SIN#925	SIN#924	SIN#923	SIN#922	SIN#921

41177	41176	41175	41174	41173	41172	41171	41170
SIN#936	SIN#935	SIN#934	SIN#933	SIN#932	SIN#931	SIN#930	SIN#929

41187	41186	41185	41184	41183	41182	41181	41180
SIN#944	SIN#943	SIN#942	SIN#941	SIN#940	SIN#939	SIN#938	SIN#937

4.5.2 Device 2

41197	41196	41195	41194	41193	41192	41191	41190
SIN#952	SIN#951	SIN#950	SIN#949	SIN#948	SIN#947	SIN#946	SIN#945
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41207	41206	41205	41204	41203	41202	41201	41200
SIN#960	SIN#959	SIN#958	SIN#957	SIN#956	SIN#955	SIN#954	SIN#953

41217	41216	41215	41214	41213	41212	41211	41210
SIN#968	SIN#967	SIN#966	SIN#965	SIN#964	SIN#963	SIN#962	SIN#961

41227	41226	41225	41224	41223	41222	41221	41220
SIN#976	SIN#975	SIN#974	SIN#973	SIN#972	SIN#971	SIN#970	SIN#969

41237	41236	41235	41234	41233	41232	41231	41230
SIN#984	SIN#983	SIN#982	SIN#981	SIN#980	SIN#979	SIN#978	SIN#977

41247	41246	41245	41244	41243	41242	41241	41240
SIN#992	SIN#991	SIN#990	SIN#989	SIN#988	SIN#987	SIN#986	SIN#985

4.5.3 Device 3

41257	41256	41255	41254	41253	41252	41251	41250
SIN#1000	SIN#999	SIN#998	SIN#997	SIN#996	SIN#995	SIN#994	SIN#993
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41267	41266	41265	41264	41263	41262	41261	41260
SIN#1008	SIN#1007	SIN#1006	SIN#1005	SIN#1004	SIN#1003	SIN#1002	SIN#1001

41277	41276	41275	41274	41273	41272	41271	41270
SIN#1016	SIN#1015	SIN#1014	SIN#1013	SIN#1012	SIN#1011	SIN#1010	SIN#1009

41287	41286	41285	41284	41283	41282	41281	41280
SIN#1024	SIN#1023	SIN#1022	SIN#1021	SIN#1020	SIN#1019	SIN#1018	SIN#1017

41297	41296	41295	41294	41293	41292	41291	41290
SIN#1032	SIN#1031	SIN#1030	SIN#1029	SIN#1028	SIN#1027	SIN#1026	SIN#1025

41307	41306	41305	41304	41303	41302	41301	41300
SIN#1040	SIN#1039	SIN#1038	SIN#1037	SIN#1036	SIN#1035	SIN#1034	SIN#1033

4.5.4 Device 4

41317	41316	41315	41314	41313	41312	41311	41310
SIN#1048	SIN#1047	SIN#1046	SIN#1045	SIN#1044	SIN#1043	SIN#1042	SIN#1041
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41327	41326	41325	41324	41323	41322	41321	41320
SIN#1056	SIN#1055	SIN#1054	SIN#1053	SIN#1052	SIN#1051	SIN#1050	SIN#1049

41337	41336	41335	41334	41333	41332	41331	41330
SIN#1064	SIN#1063	SIN#1062	SIN#1061	SIN#1060	SIN#1059	SIN#1058	SIN#1057

41347	41346	41345	41344	41343	41342	41341	41340
SIN#1072	SIN#1071	SIN#1070	SIN#1069	SIN#1068	SIN#1067	SIN#1066	SIN#1065

41357	41356	41355	41354	41353	41352	41351	41350
SIN#1080	SIN#1079	SIN#1078	SIN#1077	SIN#1076	SIN#1075	SIN#1074	SIN#1073

41367	41366	41365	41364	41363	41362	41361	41360
SIN#1088	SIN#1087	SIN#1086	SIN#1085	SIN#1084	SIN#1083	SIN#1082	SIN#1081

4.5.5 Device 5

41377	41376	41375	41374	41373	41372	41371	41370
SIN#1096	SIN#1095	SIN#1094	SIN#1093	SIN#1092	SIN#1091	SIN#1090	SIN#1089
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41387	41386	41385	41384	41383	41382	41381	41380
SIN#1104	SIN#1103	SIN#1102	SIN#1101	SIN#1100	SIN#1099	SIN#1098	SIN#1097

41397	41396	41395	41394	41393	41392	41391	41390
SIN#1112	SIN#1111	SIN#1110	SIN#1109	SIN#1108	SIN#1107	SIN#1106	SIN#1105

41407	41406	41405	41404	41403	41402	41401	41400
SIN#1120	SIN#1119	SIN#1118	SIN#1117	SIN#1116	SIN#1115	SIN#1114	SIN#1113

41417	41416	41415	41414	41413	41412	41411	41410
SIN#1128	SIN#1127	SIN#1126	SIN#1125	SIN#1124	SIN#1123	SIN#1122	SIN#1121

41427	41426	41425	41424	41423	41422	41421	41420
SIN#1136	SIN#1135	SIN#1134	SIN#1133	SIN#1132	SIN#1131	SIN#1130	SIN#1129

4.5.6 Device 6

41437	41436	41435	41434	41433	41432	41431	41430
SIN#1144	SIN#1143	SIN#1142	SIN#1141	SIN#1140	SIN#1139	SIN#1138	SIN#1137
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41447	41446	41445	41444	41443	41442	41441	41440
SIN#1152	SIN#1151	SIN#1150	SIN#1149	SIN#1148	SIN#1147	SIN#1146	SIN#1145

41457	41456	41455	41454	41453	41452	41451	41450
SIN#1160	SIN#1159	SIN#1158	SIN#1157	SIN#1156	SIN#1155	SIN#1154	SIN#1153

41467	41466	41465	41464	41463	41462	41461	41460
SIN#1168	SIN#1167	SIN#1166	SIN#1165	SIN#1164	SIN#1163	SIN#1162	SIN#1161

41477	41476	41475	41474	41473	41472	41471	41470
SIN#1176	SIN#1175	SIN#1174	SIN#1173	SIN#1172	SIN#1171	SIN#1170	SIN#1169

41487	41486	41485	41484	41483	41482	41481	41480
SIN#1184	SIN#1183	SIN#1182	SIN#1181	SIN#1180	SIN#1179	SIN#1178	SIN#1177

4.5.7 Device 7

41497	41496	41495	41494	41493	41492	41491	41490
SIN#1192	SIN#1191	SIN#1190	SIN#1189	SIN#1188	SIN#1187	SIN#1186	SIN#1185
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41507	41506	41505	41504	41503	41502	41501	41500
SIN#1200	SIN#1199	SIN#1198	SIN#1197	SIN#1196	SIN#1195	SIN#1194	SIN#1193

41517	41516	41515	41514	41513	41512	41511	41510
SIN#1208	SIN#1207	SIN#1206	SIN#1205	SIN#1204	SIN#1203	SIN#1202	SIN#1201

41527	41526	41525	41524	41523	41522	41521	41520
SIN#1216	SIN#1215	SIN#1214	SIN#1213	SIN#1212	SIN#1211	SIN#1210	SIN#1209

41537	41536	41535	41534	41533	41532	41531	41530
SIN#1224	SIN#1223	SIN#1222	SIN#1221	SIN#1220	SIN#1219	SIN#1218	SIN#1217

41547	41546	41545	41544	41543	41542	41541	41540
SIN#1232	SIN#1231	SIN#1230	SIN#1229	SIN#1228	SIN#1227	SIN#1226	SIN#1225

4.5.8 Device 8

41557	41556	41555	41554	41553	41552	41551	41550
SIN#1240	SIN#1239	SIN#1238	SIN#1237	SIN#1236	SIN#1235	SIN#1234	SIN#1233
					TIME MEASURE	WORK END ANSWER	WORK START ANSWER

41567	41566	41565	41564	41563	41562	41561	41560
SIN#1248	SIN#1247	SIN#1246	SIN#1245	SIN#1244	SIN#1243	SIN#1242	SIN#1241

41577	41576	41575	41574	41573	41572	41571	41570
SIN#1256	SIN#1255	SIN#1254	SIN#1253	SIN#1252	SIN#1251	SIN#1250	SIN#1249

41587	41586	41585	41584	41583	41582	41581	41580
SIN#1264	SIN#1263	SIN#1262	SIN#1261	SIN#1260	SIN#1259	SIN#1258	SIN#1257

41597	41596	41595	41594	41593	41592	41591	41590
SIN#1272	SIN#1271	SIN#1270	SIN#1269	SIN#1268	SIN#1267	SIN#1266	SIN#1265

41607	41606	41605	41604	41603	41602	41601	41600
SIN#1280	SIN#1279	SIN#1278	SIN#1277	SIN#1276	SIN#1275	SIN#1274	SIN#1273

4.6 Specific Input Signals: Explanation

The following symbols are used in the explanation to represent the signal condition.



The signal takes effect while it is in ON state.



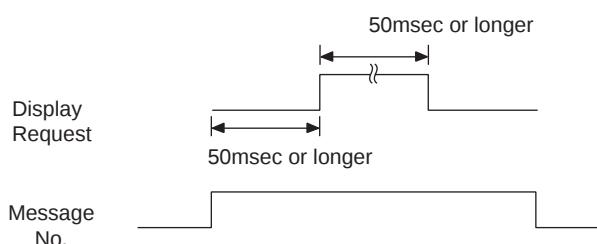
The rising edge is detected as the signal.

4.6.1 Alarm and Message Display

Various information items about the application can be displayed as messages on the programming pendant screen of the DX100. This section explains how to select already created messages. For registration, refer to “Registration of I/O Alarms and Messages”.

Fig. 4-1: Signal Timing

- Display request signal is a state signal, which continues to update the display while the signal is ON.



■ 40010: SYSTEM ALARM REQUEST



When this signal is ON, a system alarm occurs and the manipulator stops. At the same time, an alarm message corresponding to the alarm code of the specific inputs (40210 to 40215) appears on the programming pendant screen.

40210 to 40215: System alarm No. (binary)

Up to 64 system alarms can be specified. Assign messages by coding decimals from 0 to 63 into binaries.

No.	Setting Value 0: OFF 1: ON					
	40215	40214	40213	40212	40211	40210
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
:	:	:	:	:	:	:
63	1	1	1	1	1	1

■ 40011: SYSTEM MESSAGE REQUEST



When this signal is on, the message of the corresponding message code of specific inputs (40230 to 40235) appears on the programming pendant screen.

Manipulator operation will not be affected even if the message is displayed.

40230 to 40235: System alarm No. (binary)

Up to 64 system messages can be specified. Assign messages by coding decimals from 0 to 63 into binaries.

No.	Setting Value 0: OFF 1: ON					
	40235	40234	40233	40232	40231	40230
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
:	:	:	:	:	:	:
63	1	1	1	1	1	1

■ 40012: USER ALARM REQUEST



When this signal is on, a user alarm occurs and the manipulator stops. At the same time, an alarm message corresponding to the alarm code of the specific input (40220 to 40225) appears on the programming pendant screen.

40220 to 40225: User Alarm No.

Up to 64 system alarms can be specified. Assign messages by coding decimals from 0 to 63 into binaries.

No.	Setting Value 0: OFF 1: ON					
	40225	40224	40223	40222	40221	40220
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
:	:	:	:	:	:	:
63	1	1	1	1	1	1

■ **40013: USER MESSAGE REQUEST**



When this signal is on, the message of the corresponding message code of specific inputs (40240 to 40245) appears on the programming pendant screen.

Manipulator operation will not be affected even if the message is displayed.

40240 to 40245: User Message No. (Binary)

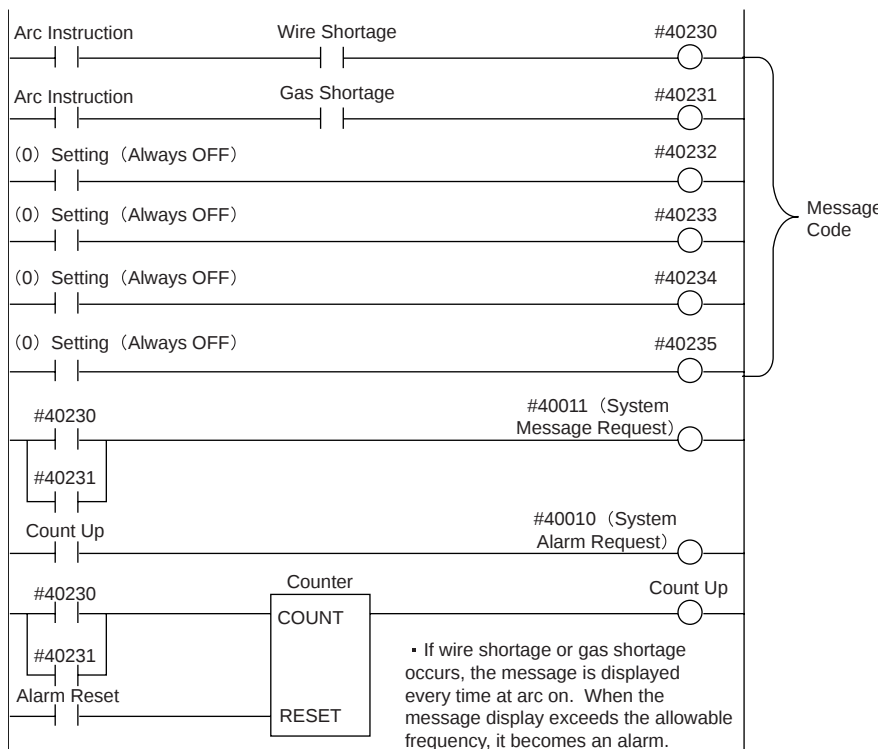
Up to 64 user messages can be specified. Assign messages by coding decimals from 0 to 63 into binaries.

No.	Setting Value 0: OFF 1: ON					
	40245	40244	40243	40242	40241	40240
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
:	:	:	:	:	:	:
63	1	1	1	1	1	1

■ **40014: ALARM RESET**

This signal clears alarms or errors when there is a minor failure, system alarm, user alarm, or user error. Use this signal when desiring to reset an alarm or error from the outside.

<Example>



DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

4.6.2 Selecting Mode/Cycle and Calling Master Job

■ 40070: MASTER JOB CALLING



This signal resets the operating sequence. When the signal is on, the heading of the master job (Line: 0) will be called up as an execution job. This can be used for executing system initialization automatically when the power is turned on.

However, it is invalid in the following cases:

- While the manipulator is operating (job is executing)
- While the servo power is ON in the teach mode.
- "MASTER CALLING UP PROHIBIT" is shown on the operating condition window.

■ 40040, 40041: Selection of Modes



These signals have the same function as the mode key on the programming pendant. Use these signals when desiring to change mode specifications from the outside.

If two or more modes are specified at the same time, TEACH MODE has a priority over another.

They are invalid when "EXT. MODE SWITCH PROHIBIT" is shown on the operating condition window, and when the mode key on the programming pendant is set to "TEACH" or "PLAY". (The mode specified with the mode key prevails.)

■ 40042, 40056, 40057: Selection of Operating Modes



40042 CMD REMOTE SELECT

This signal selects a command remote function such as transmission. When the system transmission function (optional) is valid, "CMD REMOTE SETTING" (50056) signal goes on and the DX100 gets ready for transmission with the master computer.

40056 PROHIBIT PP OPERATION

When this signal is on, cycle, start and servo on master job call from the programming pendant are prohibited. However, this prohibition is released by setting the PP Operation at Remote Mode parameter (S2C230).

40057 PROHIBIT IO

When this signal is on, the following operation from external input is prohibited.

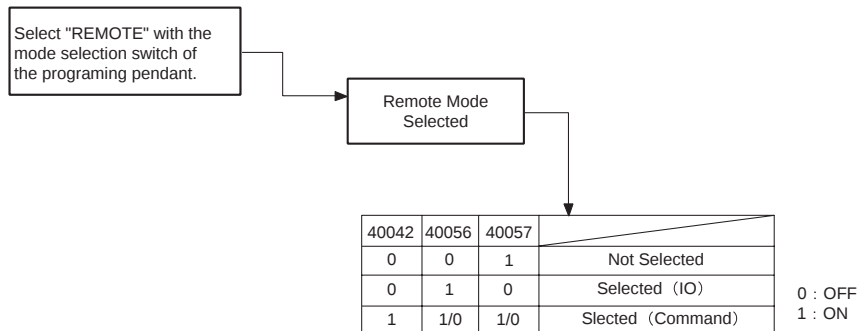
Selection of Cycle (40050 to 40052)

Calling Up Master Job (40070)

External Servo On (40045)

External Start (40044)

Fig. 4-2: Operation Mode Processing Standard Ladders



- For remote function selection, refer to the “chapter 7.1 “Pseudo Input Signals” at page 7-1”.
- Transmission function is an optional function.

■ 40050 to 40052: Selection of Cycles



Use the signals when desiring to change cycle specifications from the outside. These can also be used when desiring to fix a specified cycle.

If two or more cycles are specified at the same time, or it is operated with the programming pendant at the same time, the cycle will not change.

These are invalid when “EXT. MODE SWITCH PROHIBIT” is shown on the operating condition window.

DX100	4 Specific I/O Signals 4.6 Specific Input Signals: Explanation
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4.6.3 Start and Stop Signals

■ 40044: EXTERNAL START



This signal has the same function as the “START” button on the programming pendant. Automatic operation starts in accordance with cycle specifications. When this signal is accepted, “OPERATING” (50070) and “PERMISSIBLE WORK OPERATING” (50490) signals will be turned on. The signal can be used when starting from a panel other than the DX100 programming pendant such as an external operator’s panel. Since only one place on the programming pendant or external input can be specified as the “STARTING” base from the stand point of safety, specify “EXTERNAL START PROHIBIT” on the operating condition window.

This signal is invalid under the following conditions:

- Servo power supply is turned off.
- Remote mode is not selected.
- “EXTERNAL START PROHIBIT” is on the operating condition window.
- Manipulator is still operating. [When “OPERATING” (50070) signal is on].
- When “HOLDING” (50071) signal is on.
- “EXTERNAL HOLD” (40067) signal is on.

■ 40045: EXTERNAL SERVO ON



This signal turns on the servo power. Use the signal when turning on the servo power from the outside.

To use this signal, connect the external servo on signal (EXSVON) on the specific input terminal block to +24V (29 - 30). For details, see *chapter 10 “I/O Except Concurrent I/O” at page 10-1*. For safe use of the robot, it is recommended to use the above external servo on input on the I/O power on unit without intervention of the ladder.

This signal is invalid when “EXT. MODE SWITCH PROHIBIT” is shown on the operating condition window.

DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

■ **40054, 40065, 40066: EXTERNAL SERVO OFF**



When these signals are on, the servo power supply is cut off and the manipulator stops. Use the signals when desiring to cut off the servo power supply from the outside or by ladder conditions for reasons other than the emergency stop. While these signals are on, the servo power remains off even if the servo on reference (from programming pendant, or outside) is turned on.

40065: EXTERNAL SERVO OFF 1 (Deceleration stop)

40066: EXTERNAL SERVO OFF 2 (Emergency stop category 0)

40054: EXTERNAL SERVO OFF 3 (Emergency stop category 1)

■ **40067: EXTERNAL HOLD**



This signal has the same function as the “HOLD” button on the programming pendant. Use the signal when instructing “HOLD” from a location other than the programming pendant. While the signal is on, the “HOLD” lamp on the programming pendant is blinking and the “HOLDING” (50071) signal goes ON.

DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

4.6.4 Operating Instructions

■ 40016: In-Guard Safe Operating Instruction



When this signal is on, the playback operating speed is limited by in-guard safe operation speed. If approaching the manipulator during operation for unavoidable reasons, the operating speed can be limited by turning the signal on. It will therefore be convenient to interlink the signal with the safety guardrail or safety mat.



This signal is only to limit speed. Since the manipulator operates as taught, prepare the "EMERGENCY STOP" button so that it can be pressed at any time in the event of an emergency when one approaches the robot.

■ 40046: Check Operation



This signal is not a start instruction. When the signal is on, the work instruction in the job is not executed. Use the signal to check the taught steps and motions. This signal is invalid when "CHECK/ MACHINE LOCK PROHIBIT" on the operating condition window is on.

■ 40047: PROHIBIT WEAVING

When this signal is on, weaving in the job are not executed. Use the signal to check the taught steps and motions with weaving off.



■ 40053: PLAY MODE ENABLE



This signal is used as an alternative for the Play Mode Enable switch in the Play Mode Enable function.

Enabling this signal after switching the mode to "PLAY" allows operation of the programming pendant in the Play Mode.

■ 40060: MACHINE LOCK



When this signal is on, the machine lock mode is selected.

■ **40061: INVALID SHOCK DETECTION**



When this signal is on, the shock detection function is invalid.

■ **40063: OVERRUN RELEASE REQUEST**



When this signal is on, the overrun status is released.

This signal has the same function as the overrun release operation in the overrun and shock sensor release window; however, setting the value for S2C575 allows whether to enable the function depending on the window displayed on the programming pendant screen.

0: Standard (The function is enabled when any window is displayed)

1: Enabled with interface panel (The function is enabled only when interface panel is displayed)

■ **40064: EDIT LOCK**



When this signal is on, the job editing operation is prohibited.

■ **40090 to 40097: 1-Step Back Operating Instruction**



When these signals are on at start up, the manipulator moves to one step before the displayed step at low speed and stops there disregarding the cycle. These can be used for performing the operation one step before since some operations are difficult to be executed.

For a system with one manipulator, use signal No. 40090.

■ **40130 to 40137: SEQUENCE WAIT**



The manipulator pauses while this signal is on. Although it is functionally the same as “HOLD”, it differs in the following ways:

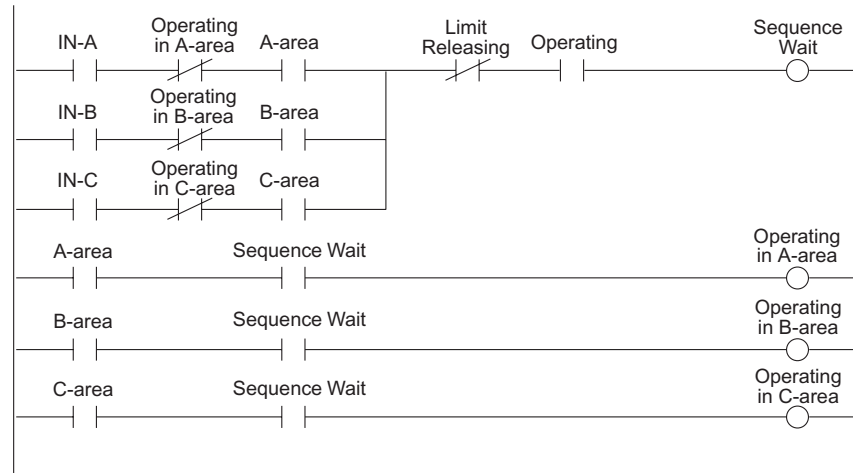
When these signals are turned on while the manipulator is operating, the manipulator pauses temporarily, but it is still in an operating state. If these signals are turned on during an instruction other than a moving instruction (MOV), the instruction is continued. The “START” lamp remains lit and the “OPERATING” signal remains ON. If these signals are turned on while the manipulator is operating at high speed, the manipulator reduces its speed and stops.

The status of these signals are controlled. Motion of the manipulator is automatically resumed when changing from on to off.

For a system with one manipulator, use signal No. 40130.

<Example 1>

The following is an example of using the signal to check S-Axis/ Cube Interference.

**Explanation of ladder**

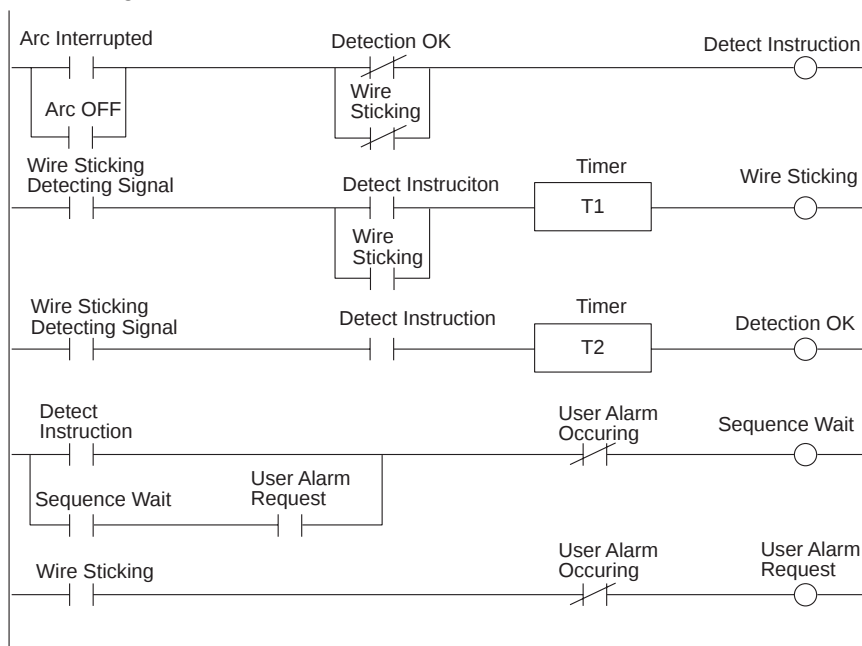
Meaning of above terms	
A, B, C:	Area Name e.g. S-Axis (right), Cube 1, etc
IN-A, IN-B, IN-C:	Status of the combined equipment input externally
Area A, Area B, Area C:	Individual status signals The signals indicate whether the manipulator is in the area.
Operating in A-area, Operating in B-area, Operating in C-area:	ON when operating in the area The signals are assigned to the combined equipment.

If the signal "Area A", "Area B", or "Area C" is turned on while the combined equipment is outside the area, the signal "Operating in A-area", "Operating in B-area", or "Operating in C-area" is turned ON and the operation continues.

If the combined equipment is in the area first, the SEQUENCE WAIT signal goes ON and robot operation is stopped until the combined equipment leaves the area. When the combined equipment leaves the area, the SEQUENCE WAIT signal goes off and manipulator operation resumes.

<Example 2>

The following is an example of using the signal to detect wire sticking in arc welding.

**Explanation of ladder**

Monitor the state of welding when an ARC OFF instruction is issued, or if the arc is interrupted while the instruction is being issued. When detecting wire sticking, the SEQUENCE WAIT REQUEST goes ON and the manipulator pauses.

Normal

Detection OK will be determined when the OFF state of the wire sticking detection signal continues for the prescribed time. SEQUENCE WAIT will then be released and the manipulator will resume operation.

Abnormal

Welding is determined abnormal if the ON state of the wire sticking detecting signal continues longer than the prescribed time.

I/O alarm will occur if welding is abnormal, and SEQUENCE WAIT will then be cleared.

■ **40170 to 40177: Work Home Position Return Request**



The manipulator moves to the work home position at the speed of parameter SICxG056 at joint operation by starting up these signals in the play mode.

During returning to the home position, the "START" lamp is lit ("during start" is entered) and the message "Operation Origin Returning" is displayed on the programing pendant screen.

Do not use these signals unless interlocking to check that the manipulator is at a position from which it can return to the home position.

For a system with one manipulator, use signal No. 40170.

■ **40527: PP Buzzer**



When this signal is on, the buzzer of programming pendant sounds.

DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

4.6.5 Independent Control Signals (Optional)

■ 40021 to 40037: SUB 1 to 15 ALARM REQUEST



These signals are used to stop the specified sub task with an alarm when system section alarm request (40010) or user section alarm request (40012) is issued.

Input the alarm request (40010 or 40012) after setting the conditions of individual requirements.

■ 40071 to 40087: SUB1 to 15 MASTER CALL



Operation sequence is reset. When these signals are turned on, the head of the master job in sub take 1 to 15 is called up as an execution job.

These signals are invalid in any of the following cases:

- The manipulator is operating (during job execution).
- While the servo power is on in the teach mode.
- "MASTER CALLING UP PROHIBIT" is shown on the operating condition window.
- Master job is not registered.

■ 40250 to 40267: SUB 1 to 15 and MASTER START REQUEST



When the signals are turned on, the robot starts its operation automatically by each sub task 1 to 15 and the master job individually. When the signals are accepted, the signals "RUN", 50640 to 50657 are turned on. The signals can be used when starting from a panel such as an external operator's panel other than the DX100 programming pendant. Specify the condition on the operating condition window.

These signals are invalid in any of the following cases: i

- The servo power is not turned on.
- The PLAY mode is not set.
- The "EXTERNAL START PROHIBIT" is shown on the operating condition window.
- The corresponding signal "RUN" is on. That is the robot is operating.
- The signal "HOLDING" is on.
- The signal "EXTERNAL HOLD" is on
- The corresponding signal "HOLDING" is on.

■ 40270 to 40287: SUB 1 to 15 HOLD REQUEST



When these signals are turned on, the manipulator, which is running individually in accordance with each sub task 1 to 15 and the master job, pauses. The corresponding signal "HOLDING" (50660 to 50677) is turned on when this signal is ON.

DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

4.6.6 Signals for Arc Welding

Signals from 41130 to 41607 are classified into eight blocks and assigned to input signals that have different meanings depending on the application. Most of these inputs are used by the system and they cannot be used from the outside of the DX100.

This section explains exceptional signals available for using from the outside.

- **41130, 41190, 41250, 41310, 41370, 41430, 41490, 41550**
: **WORK START RESPONSE**



The "WORK START RESPONSE" signals are used for response to the "WORK START" instructions (51530, 51590, 51650, 51710, 51770, 51830, 51890, 51950).

- **41131, 41191, 41251, 41311, 41371, 41431, 41491, 41551**
: **WORK END RESPONSE**



The "WORK END RESPONSE" signals are used for response to the "WORK END" instructions (51531, 51591, 51651, 51711, 51771, 51831, 51891, 51951).

- **41132, 41192, 41252, 41312, 41372, 41432, 41492, 41552**
: **WORK TIME MEASURE**



The time during which these signals are on is measured as the operating time.

The operating time can be checked on the system monitoring time window.

For a system with one application, use signal No. 41132.

- **41133, 41193, 41253, 41313, 41373, 41433, 41493, 41553**
: **TIP REPLACEMENT COMPLETED**



When these signals are on, tip replacement time is reset and the "TIP REPLACEMENT REQUEST" (51533, 51593, 51653, 51713, 51773, 51833, 51893, 51953) signal goes off.

For a system with one application, use signal No. 41133.

- **41134, 41194, 41254, 41314, 41374, 41434, 41494, 41554**
: **NOZZLE CLEANING COMPLETED**



When these signals are on, nozzle cleaning time is reset and the "NOZZLE CLEANING REQUEST" (51534, 51594, 51654, 51714, 51774, 51834, 51894, 51954) signal goes off.

For a system with one application, use signal No. 41134.

- **41135, 41195, 41255, 41315, 41375, 41435, 41495, 41555**
: **RETRY REQUEST**



■ **41136, 41196, 41256, 41316, 41376, 41436, 41496, 41556**
: RETRY RETURN REQUEST



The "WORK START RESPONSE" signal is used for response to the "WORK START INSTRUCTION" (51530, 51590, 51650, 51710, 51770, 51830, 51890, 51950) signal. When the "RETRY REQUEST" signal is used simultaneously, retry operation is performed; when the "RETRY RETURN

REQUEST" signal is used simultaneously, retry return operation is performed. By responding individually, the work start instruction is completed.

For a system with one application, use signal No. 41130, 41135, 41136.

■ **41137, 41197, 41257, 41317, 41377, 41437, 41497, 41557**
: AUTOMATIC ANTI-STICKING REQUEST



The "WORK END RESPONSE" signal is used for response to the "WORK START INSTRUCTION" (51531, 51591, 51651, 51711, 51771, 51831, 51891, 51951) signal. When the "AUTOMATIC ANTI-STICKING REQUEST" signal is used simultaneously, anti-sticking operation is performed.

By responding individually, the work start instruction is completed.

For a system with one application, use signal No. 41131 or 41137.

■ **41140, 41200, 41260, 41320, 41380, 41440, 41500, 41560**
: RESTART REQUEST (ARC SHORTAGE)



■ **41141, 41201, 41261, 41321, 41381, 41441, 41501, 41561**
: RESTART REQUEST (GAS SHORTAGE)



■ **41142, 41202, 41262, 41322, 41382, 41442, 41502, 41562**
: RESTART REQUEST (WIRE SHORTAGE)



When these signals are on, restart operations are requested. The restart operation differs from each restart mode.

For a system with one application, use signal No. 41140, 41141, 41142.



Multiple requests cannot be made.

The priority order of requests is arc shortage → gas shortage → wire shortage.

■ **41143, 41203, 41263, 41323, 41383, 41443, 41503, 41563**
: RESTART RESET PROCESS



When these signals are on, the restart process is released. When "manual intervention method" is selected as a restart method, use these signals to release the restart process after manual intervention. For the initial value, OT#2046 (user open signal) is connected.

For a system with one application, use signal No. 41143.

■ **41144, 41204, 41264, 41324, 41384, 41444, 41504, 41564**
: RETRY TIMES CLEAR



When these signals are on, the number of retries is cleared.

For a system with one application, use signal No. 41144.

■ **41145, 41205, 41265, 41325, 41385, 41445, 41505, 41565**
: ARC SHORTAGE RESTART TIMES CLEAR



When these signals are on, the number of arc shortage restarts is cleared.

For a system with one application, use signal No. 41145.

■ **41146, 41206, 41266, 41326, 41386, 41446, 41506, 41566**
: AUTOMATIC ANTI-STICKING TIMES CLEAR



When these signals are on, the number of automatic anti-stickings is cleared.

For a system with one application, use signal No. 41146.

■ **41160, 41220, 41280, 41340, 41400, 41460, 41520, 41580**
: SENSING PROHIBIT



When these signals are on, sensing is not performed in the started job. Use the signals to check the taught steps and motions with the sensing function off.

4.6.7 Signals for Handling

Signals from 41130 to 41607 are classified into eight blocks and assigned to input signals that have each different meanings depending on the application. As most of these input signals are used for the system, they cannot be used from outside of the DX100.

This section explains exceptional signals that are available for external use.

■ **41130, 41190, 41250, 41310, 41370, 41430, 41490, 41550**
: WORK START RESPONSE



These signals are used for response to "WORK START INSTRUCTION" (51530, 51590, 51650, 51710, 51770, 51830, 51890, 51950) signal. The work start instruction is completed by the response.

For a system with one application, use signal No. 41130.

■ **41131, 41191, 41251, 41311, 41371, 41431, 41491, 41551**
: WORK END RESPONSE



These signals are used for response to "WORK END INSTRUCTION" (51531, 51591, 51651, 51711, 51771, 51831, 51891, 51951) signal. The work end instruction is completed by the response.

For a system with one application, use signal No. 41131.

■ **41132, 41192, 41252, 41312, 41372, 41432, 41492, 41552**
: WORK TIME MEASURE



The time during which these signals are on is measured as the operating time.

The operating time can be checked on the system monitoring time window.

For a system with one application, use signal No. 41132.

■ **41140 to 41147, 41200 to 41207, 41260 to 41267, 41320 to 41327,**
41380 to 41387, 41440 to 41447, 41500 to 41507, 41560 to 41567
: SENSOR INPUT



These signals are specific inputs which allow to grasp the signal status using the specific instruction "HSEN" for handling. When using the "HSEN" instruction, connect the sensor to the specific input of the YIO01 board which is connected to these signals.

For a system with one manipulator, use signal Nos. 41140 to 41147.

DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

4.6.8 Signals for Spot Welding

Signals from 41130 to 41607 are classified into eight blocks and are assigned to input signals according to its welding application. As most of these input signals are used for the system, they cannot be used from outside of the DX100.

This section explains exceptional signals that are available for external use.

■ 41132, 41192, 41252, 41312, 41372, 41432, 41492, 41552 : WORK TIME MEASURE



The time during which these signals are ON is measured as the operating time.

The operating time can be checked on the system monitoring time window.

For a system with one application, use signal No. 41132.

■ 41135, 41145, 41155, 41165, 41175, 41185, 41195, 41205 : ELECTRODE REPLACEMENT



When a SVGUNCL instruction is executing with this signal on, the electrode wear amount absolute value is compared to the threshold value. The signal outputs the wear detection normal in the case that the absolute value is less than the threshold value after the replacement.

■ 41137, 41147, 41157, 41167, 41177, 41187, 41197, 41207 : WELDING STOP



This signal stops execution of the welding instruction.

While this signal is ON, the robot playbacks disregarding the spot welding instruction.

Use this signal when errors in welders or guns occur and the robot should return to the working home position, etc.

DX100	4	Specific I/O Signals
	4.6	Specific Input Signals: Explanation

4.6.9 Signals for General-Purpose Applications

Signals from 41130 to 41607 are classified into eight blocks and assigned to input signals that have each different meanings depending on the application. As most of these input signals are used for the system, they cannot be used from the outside of the DX100.

This section explains exceptional signals that are available for external use.

■ **41130, 41190, 41250, 41310, 41370, 41430, 41490, 41550**
: **WORK START RESPONSE**



These signals are used for response to "WORK START INSTRUCTION" (51530, 51590, 51650, 51710, 51770, 51830, 51890, 51950) signal. The work start instruction is completed by the response.

For a system with one application, use signal No. 41130.

■ **41131, 41191, 41251, 41311, 41371, 41431, 41491, 41551**
: **WORK END RESPONSE**



These signals are used for response to "WORK END INSTRUCTION" (51531, 51591, 51651, 51711, 51771, 51831, 51891, 51951) signal.

For a system with one application, use signal No. 41131.

■ **41132, 41192, 41252, 41312, 41372, 41432, 41492, 41552**
: **WORK TIME MEASURE**



The time during which these signals are on is measured as the operating time.

This operating time can be checked on the system monitoring time window.

For a system with one application, use signal No. 41132.

4.7 Specific Output Signals for All Applications

50017	50016	50015	50014	50013	50012	50011	50010
SOUT#008	SOUT#007	SOUT#006	SOUT#005	SOUT#004	SOUT#003	SOUT#002	SOUT#001
COOLING FAN ERROR	ENCODER BATTERY WEAK	MEM BATTERY WEAK	ERROR OCCUR	USER ALARM OCCUR	SYSTEM ALARM OCCUR	MINOR ALARM OCCUR	MAJOR ALARM OCCUR

50027	50026	50025	50024	50023	50022	50021	50020
SOUT#016	SOUT#015	SOUT#014	SOUT#013	SOUT#012	SOUT#011	SOUT#010	SOUT#009
TOP SUB MASTER JOB 7	TOP SUB MASTER JOB 6	TOP SUB MASTER JOB 5	TOP SUB MASTER JOB 4	TOP SUB MASTER JOB 3	TOP SUB MASTER JOB 2	TOP SUB MASTER JOB 1	TOP MASTER JOB

50037	50036	50035	50034	50033	50032	50031	50030
SOUT#024	SOUT#023	SOUT#022	SOUT#021	SOUT#020	SOUT#019	SOUT#018	SOUT#017
TOP SUB TASK 15 MASTER JOB	TOP SUB TASK 14 MASTER JOB	TOP SUB TASK 13 MASTER JOB	TOP SUB TASK 12 MASTER JOB	TOP SUB TASK 11 MASTER JOB	TOP SUB TASK 10 MASTER JOB	TOP SUB TASK 9 MASTER JOB	TOP SUB TASK 8 MASTER JOB

50047	50046	50045	50044	50043	50042	50041	50040
SOUT#032	SOUT#031	SOUT#030	SOUT#029	SOUT#028	SOUT#027	SOUT#026	SOUT#025

50057	50056	50055	50054	50053	50052	50051	50050
SOUT#040	SOUT#039	SOUT#038	SOUT#037	SOUT#036	SOUT#035	SOUT#034	SOUT#033
	CMD REMOTE SET		PLAY MODE SET	TEACH MODE SET	CONT CYCLE SET	1-CYCLE SET	STEP CYCLE SET

50067	50066	50065	50064	50063	50062	50061	50060
SOUT#048	SOUT#047	SOUT#046	SOUT#045	SOUT#044	SOUT#043	SOUT#042	SOUT#041
RUNNING AT FULL-SPEED	POSITION CHECKED	APL KEY	CHECK RUN SET	SOFT LIMIT SET RELEASE	MACHINE LOCK SET	DRY RUN SET	SAFETY SPEED SET

50077	50076	50075	50074	50073	50072	50071	50070
SOUT#056	SOUT#055	SOUT#054	SOUT#053	SOUT#052	SOUT#051	SOUT#050	SOUT#049
OPERATION MODE SET	JOG OPERATION INFORM	JOB EDIT INFORM	I/O SIMULATED	SERVO ON		HOLDING (HOLD LAMP)	RUNNING

50087	50086	50085	50084	50083	50082	50081	50080
SOUT#064	SOUT#063	SOUT#062	SOUT#061	SOUT#060	SOUT#059	SOUT#058	SOUT#057
CUBE INTERFERENCE							
8	7	6	5	4	3	2	1

50097	50096	50095	50094	50093	50092	50091	50090
SOUT#072	SOUT#071	SOUT#070	SOUT#069	SOUT#068	SOUT#067	SOUT#066	SOUT#065
CUBE INTERFERENCE							
16	15	14	13	12	11	10	9

50107	50106	50105	50104	50103	50102	50101	50100
SOUT#080	SOUT#079	SOUT#078	SOUT#077	SOUT#076	SOUT#075	SOUT#074	SOUT#073
CUBE INTERFERENCE							
24	23	22	21	20	19	18	17

50117	50116	50115	50114	50113	50112	50111	50110
SOUT#088	SOUT#087	SOUT#086	SOUT#085	SOUT#084	SOUT#083	SOUT#082	SOUT#081
CUBE INTERFERENCE							
32	31	30	29	28	27	26	25

50127	50126	50125	50124	50123	50122	50121	50120
SOUT#096	SOUT#095	SOUT#094	SOUT#093	SOUT#092	SOUT#091	SOUT#090	SOUT#089
CUBE INTERFERENCE							
40	39	38	37	36	35	34	33

50137	50136	50135	50134	50133	50132	50131	50130
SOUT#104	SOUT#103	SOUT#102	SOUT#101	SOUT#100	SOUT#099	SOUT#098	SOUT#097
CUBE INTERFERENCE							
48	47	46	45	44	43	42	41

50147	50146	50145	50144	50143	50142	50141	50140
SOUT#112	SOUT#111	SOUT#110	SOUT#109	SOUT#108	SOUT#107	SOUT#106	SOUT#105
CUBE INTERFERENCE							
56	55	54	53	52	51	50	49

50157	50156	50155	50154	50153	50152	50151	50150
SOUT#120	SOUT#119	SOUT#118	SOUT#117	SOUT#116	SOUT#115	SOUT#114	SOUT#113
CUBE INTERFERENCE							
64 (WORK HOME POSITION R1)	63 (WORK HOME POSITION R2)	62 (WORK HOME POSITION R3)	61 (WORK HOME POSITION R4)	60 (WORK HOME POSITION R5)	59 (WORK HOME POSITION R6)	58 (WORK HOME POSITION R7)	57 (WORK HOME POSITION R8)

50167	50166	50165	50164	50163	50162	50161	50160
SOUT#128	SOUT#127	SOUT#126	SOUT#125	SOUT#124	SOUT#123	SOUT#122	SOUT#121
S-AXIS INTERFERENCE							
R4 (LEFT)	R4 (RIGHT)	R3 (LEFT)	R3 (RIGHT)	R2 (LEFT)	R2 (RIGHT)	R1 (LEFT)	R1 (RIGHT)

50177	50176	50175	50174	50173	50172	50171	50170
SOUT#136	SOUT#135	SOUT#134	SOUT#133	SOUT#132	SOUT#131	SOUT#130	SOUT#129
S-AXIS INTERFERENCE							
R8 (LEFT)	R8 (RIGHT)	R7 (LEFT)	R7 (RIGHT)	R6 (LEFT)	R6 (RIGHT)	R5 (LEFT)	R5 (RIGHT)

50187	50186	50185	50184	50183	50182	50181	50180
SOUT#144	SOUT#143	SOUT#142	SOUT#141	SOUT#140	SOUT#139	SOUT#138	SOUT#137

50197	50196	50195	50194	50193	50192	50191	50190
SOUT#152	SOUT#151	SOUT#150	SOUT#149	SOUT#148	SOUT#147	SOUT#146	SOUT#145

50207	50206	50205	50204	50203	50202	50201	50200
SOUT#160	SOUT#159	SOUT#158	SOUT#157	SOUT#156	SOUT#155	SOUT#154	SOUT#153

50217	50216	50215	50214	50213	50212	50211	50210
SOUT#168	SOUT#167	SOUT#166	SOUT#165	SOUT#164	SOUT#163	SOUT#162	SOUT#161

50227	50226	50225	50224	50223	50222	50221	50220
SOUT#176	SOUT#175	SOUT#174	SOUT#173	SOUT#172	SOUT#171	SOUT#170	SOUT#169

50237	50236	50235	50234	50233	50232	50231	50230
SOUT#184	SOUT#183	SOUT#182	SOUT#181	SOUT#180	SOUT#179	SOUT#178	SOUT#177

50247	50246	50245	50244	50243	50242	50241	50240
SOUT#192	SOUT#191	SOUT#190	SOUT#189	SOUT#188	SOUT#187	SOUT#186	SOUT#185

50257	50256	50255	50254	50253	50252	50251	50250
SOUT#200	SOUT#199	SOUT#198	SOUT#197	SOUT#196	SOUT#195	SOUT#194	SOUT#193

50267	50266	50265	50264	50263	50262	50261	50260
SOUT#208	SOUT#207	SOUT#206	SOUT#205	SOUT#204	SOUT#203	SOUT#202	SOUT#201

50277	50276	50275	50274	50273	50272	50271	50270
SOUT#216	SOUT#215	SOUT#214	SOUT#213	SOUT#212	SOUT#211	SOUT#210	SOUT#209

50287	50286	50285	50284	50283	50282	50281	50280
SOUT#224	SOUT#223	SOUT#222	SOUT#221	SOUT#220	SOUT#219	SOUT#218	SOUT#217

50297	50296	50295	50294	50293	50292	50291	50290
SOUT#232	SOUT#231	SOUT#230	SOUT#229	SOUT#228	SOUT#227	SOUT#226	SOUT#225

50307	50306	50305	50304	50303	50302	50301	50300
SOUT#240	SOUT#239	SOUT#238	SOUT#237	SOUT#236	SOUT#235	SOUT#234	SOUT#233

50317	50316	50315	50314	50313	50312	50311	50310
SOUT#248	SOUT#247	SOUT#246	SOUT#245	SOUT#244	SOUT#243	SOUT#242	SOUT#241

50327	50326	50325	50324	50323	50322	50321	50320
SOUT#256	SOUT#255	SOUT#254	SOUT#253	SOUT#252	SOUT#251	SOUT#250	SOUT#249
SERVO ON STATUS R8	SERVO ON STATUS R7	SERVO ON STATUS R6	SERVO ON STATUS R5	SERVO ON STATUS R4	SERVO ON STATUS R3	SERVO ON STATUS R2	SERVO ON STATUS R1

50337	50336	50335	50334	50333	50332	50331	50330
SOUT#264	SOUT#263	SOUT#262	SOUT#261	SOUT#260	SOUT#259	SOUT#258	SOUT#257
SERVO ON STATUS S8	SERVO ON STATUS S7	SERVO ON STATUS S6	SERVO ON STATUS S5	SERVO ON STATUS S4	SERVO ON STATUS S3	SERVO ON STATUS S2	SERVO ON STATUS S1

50347	50346	50345	50344	50343	50342	50341	50340
SOUT#272	SOUT#271	SOUT#270	SOUT#269	SOUT#268	SOUT#237	SOUT#266	SOUT#265
SERVO ON STATUS S16	SERVO ON STATUS S15	SERVO ON STATUS S14	SERVO ON STATUS S13	SERVO ON STATUS S12	SERVO ON STATUS S11	SERVO ON STATUS S10	SERVO ON STATUS S9

50357	50356	50355	50354	50353	50352	50351	50350
SOUT#280	SOUT#279	SOUT#278	SOUT#277	SOUT#276	SOUT#275	SOUT#274	SOUT#273
SERVO ON STATUS S24	SERVO ON STATUS S23	SERVO ON STATUS S22	SERVO ON STATUS S21	SERVO ON STATUS S20	SERVO ON STATUS S19	SERVO ON STATUS S18	SERVO ON STATUS S17

50367	50366	50365	50364	50363	50362	50361	50360
SOUT#288	SOUT#287	SOUT#286	SOUT#285	SOUT#284	SOUT#283	SOUT#282	SOUT#281
WAIT JOB SEQ R8J	WAIT JOB SEQ R7J	WAIT JOB SEQ R6J	WAIT JOB SEQ R5J	WAIT JOB SEQ R4J	WAIT JOB SEQ R3J	WAIT JOB SEQ R2J	WAIT JOB SEQ R1J

50377	50376	50375	50374	50373	50372	50371	50370
SOUT#296	SOUT#295	SOUT#294	SOUT#293	SOUT#292	SOUT#291	SOUT#290	SOUT#289
WAIT JOB SEQ S8J	WAIT JOB SEQ S7J	WAIT JOB SEQ S6J	WAIT JOB SEQ S5J	WAIT JOB SEQ S4J	WAIT JOB SEQ S3J	WAIT JOB SEQ S2J	WAIT JOB SEQ S1J

50387	50386	50385	50384	50383	50382	50381	50380
SOUT#304	SOUT#303	SOUT#302	SOUT#301	SOUT#300	SOUT#299	SOUT#298	SOUT#297
WAIT JOB SEQ S16J	WAIT JOB SEQ S15J	WAIT JOB SEQ S14J	WAIT JOB SEQ S13J	WAIT JOB SEQ S12	WAIT JOB SEQ S11J	WAIT JOB SEQ S10J	WAIT JOB SEQ S9J

50397	50396	50395	50394	50393	50392	50391	50390
SOUT#312	SOUT#311	SOUT#310	SOUT#309	SOUT#308	SOUT#307	SOUT#306	SOUT#305
WAIT JOB SEQ S24J	WAIT JOB SEQ S23J	WAIT JOB SEQ S22J	WAIT JOB SEQ S21J	WAIT JOB SEQ S20	WAIT JOB SEQ S19J	WAIT JOB SEQ S18J	WAIT JOB SEQ S17J

50407	50406	50405	50404	50403	50402	50401	50400
SOUT#320	SOUT#319	SOUT#318	SOUT#317	SOUT#316	SOUT#315	SOUT#314	SOUT#313
CONTINUE JOB SEQ R8J	CONTINUE JOB SEQ R7J	CONTINUE JOB SEQ R6J	CONTINUE JOB SEQ R5J	CONTINUE JOB SEQ R4J	CONTINUE JOB SEQ R3J	CONTINUE JOB SEQ R2J	CONTINUE JOB SEQ R1J

50417	50416	50415	50414	50413	50412	50411	50410
SOUT#328	SOUT#327	SOUT#326	SOUT#325	SOUT#324	SOUT#323	SOUT#322	SOUT#321

50427	50426	50425	50424	50423	50422	50421	50420
SOUT#336	SOUT#335	SOUT#334	SOUT#333	SOUT#332	SOUT#331	SOUT#330	SOUT#329

50437	50436	50435	50434	50433	50432	50431	50430
SOUT#344	SOUT#343	SOUT#342	SOUT#341	SOUT#340	SOUT#339	SOUT#338	SOUT#337

50447	50446	50445	50444	50443	50442	50441	50440
SOUT#352	SOUT#351	SOUT#350	SOUT#349	SOUT#348	SOUT#347	SOUT#346	SOUT#345
CONTROL GROUP ON R8	CONTROL GROUP ON R7	CONTROL GROUP ON R6	CONTROL GROUP ON R5	CONTROL GROUP ON R4	CONTROL GROUP ON R3	CONTROL GROUP ON R2	CONTROL GROUP ON R1

50457	50456	50455	50454	50453	50452	50451	50450
SOUT#360	SOUT#359	SOUT#358	SOUT#357	SOUT#356	SOUT#355	SOUT#354	SOUT#353

50467	50466	50465	50464	50463	50462	50461	50460
SOUT#368	SOUT#367	SOUT#366	SOUT#365	SOUT#364	SOUT#363	SOUT#362	SOUT#361

50477	50476	50475	50474	50473	50472	50471	50470
SOUT#376	SOUT#375	SOUT#374	SOUT#373	SOUT#372	SOUT#371	SOUT#370	SOUT#369

50487	50486	50485	50484	50483	50482	50481	50480
SOUT#384	SOUT#383	SOUT#382	SOUT#381	SOUT#380	SOUT#379	SOUT#378	SOUT#377
WORK RESTART PROHIBIT R8J	WORK RESTART PROHIBIT R7J	WORK RESTART PROHIBIT R6J	WORK RESTART PROHIBIT R5J	WORK RESTART PROHIBIT R4J	WORK RESTART PROHIBIT R3J	WORK RESTART PROHIBIT R2J	WORK RESTART PROHIBIT R1J

50497	50496	50495	50494	50493	50492	50491	50490
SOUT#392	SOUT#391	SOUT#390	SOUT#389	SOUT#388	SOUT#387	SOUT#386	SOUT#385
WORK PERMIT RUN R8J	WORK PERMIT RUN R7J	WORK PERMIT RUN R6J	WORK PERMIT RUN R5J	WORK PERMIT RUN R4J	WORK PERMIT RUN R3J	WORK PERMIT RUN R2J	WORK PERMIT RUN R1J

50507	50506	50505	50504	50503	50502	50501	50500
SOUT#400	SOUT#399	SOUT#398	SOUT#397	SOUT#396	SOUT#395	SOUT#394	SOUT#393
SEARCHING R8J	SEARCHING R7J	SEARCHING R6J	SEARCHING R5J	SEARCHING R4J	SEARCHING R3J	SEARCHING R2J	SEARCHING R1J

50517	50516	50515	50514	50513	50512	50511	50510
SOUT#408	SOUT#407	SOUT#406	SOUT#405	SOUT#404	SOUT#403	SOUT#402	SOUT#401
SERVO FLOAT ON R8	SERVO FLOAT ON R7	SERVO FLOAT ON R6	SERVO FLOAT ON R5	SERVO FLOAT ON R4	SERVO FLOAT ON R3	SERVO FLOAT ON R2	SERVO FLOAT ON R1

50527	50526	50525	50524	50523	50522	50521	50520
SOUT#416	SOUT#415	SOUT#414	SOUT#413	SOUT#412	SOUT#411	SOUT#410	SOUT#409
LOCUS DEVIATE R8	LOCUS DEVIATE R7	LOCUS DEVIATE R6	LOCUS DEVIATE R5	LOCUS DEVIATE R4	LOCUS DEVIATE R3	LOCUS DEVIATE R2	LOCUS DEVIATE R1

50537	50536	50535	50534	50533	50532	50531	50530
SOUT#424	SOUT#423	SOUT#422	SOUT#421	SOUT#420	SOUT#419	SOUT#418	SOUT#417

50547	50546	50545	50544	50543	50542	50541	50540
SOUT#432	SOUT#431	SOUT#430	SOUT#429	SOUT#428	SOUT#427	SOUT#426	SOUT#425

50557	50556	50555	50554	50553	50552	50551	50550
SOUT#440	SOUT#439	SOUT#438	SOUT#437	SOUT#436	SOUT#435	SOUT#434	SOUT#433

50567	50566	50565	50564	50563	50562	50561	50560
SOUT#448	SOUT#447	SOUT#446	SOUT#445	SOUT#444	SOUT#443	SOUT#442	SOUT#441
SHOCK DETECTION VALID R8	SHOCK DETECTION VALID R7	SHOCK DETECTION VALID R6	SHOCK DETECTION VALID R5	SHOCK DETECTION VALID R4	SHOCK DETECTION VALID R3	SHOCK DETECTION VALID R2	SHOCK DETECTION VALID R1

50577	50576	50575	50574	50573	50572	50571	50570
SOUT#456	SOUT#455	SOUT#454	SOUT#453	SOUT#452	SOUT#451	SOUT#450	SOUT#449

50587	50586	50585	50584	50583	50582	50581	50580
SOUT#464	SOUT#463	SOUT#462	SOUT#461	SOUT#460	SOUT#459	SOUT#458	SOUT#457

50597	50596	50595	50594	50593	50592	50591	50590
SOUT#472	SOUT#471	SOUT#470	SOUT#469	SOUT#468	SOUT#467	SOUT#466	SOUT#465

50607	50606	50605	50604	50603	50602	50601	50600
SOUT#480	SOUT#479	SOUT#478	SOUT#477	SOUT#476	SOUT#475	SOUT#474	SOUT#473
SUB TASK 7 HELD	SUB TASK 6 HELD	SUB TASK 5 HELD	SUB TASK 4 HELD	SUB TASK 3 HELD	SUB TASK 2 HELD	SUB TASK 1 HELD	

50617	50616	50615	50614	50613	50612	50611	50610
SOUT#488	SOUT#487	SOUT#486	SOUT#485	SOUT#484	SOUT#483	SOUT#482	SOUT#481
SUB TASK 15 HELD	SUB TASK 14 HELD	SUB TASK 13 HELD	SUB TASK 12 HELD	SUB TASK 11 HELD	SUB TASK 10 HELD	SUB TASK 9 HELD	SUB TASK 8 HELD

50627	50626	50625	50624	50623	50622	50621	50620
SOUT#496	SOUT#495	SOUT#494	SOUT#493	SOUT#492	SOUT#491	SOUT#490	SOUT#489
SUB TASK 7 ALARM OCCUR	SUB TASK 6 ALARM OCCUR	SUB TASK 5 ALARM OCCUR	SUB TASK 4 ALARM OCCUR	SUB TASK 3 ALARM OCCUR	SUB TASK 2 ALARM OCCUR	SUB TASK 1 ALARM OCCUR	

50637	50636	50635	50634	50633	50632	50631	50630
SOUT#504	SOUT#503	SOUT#502	SOUT#501	SOUT#500	SOUT#499	SOUT#498	SOUT#497
SUB TASK 15 ALARM OCCUR	SUB TASK 14 ALARM OCCUR	SUB TASK 13 ALARM OCCUR	SUB TASK 12 ALARM OCCUR	SUB TASK 11 ALARM OCCUR	SUB TASK 10 ALARM OCCUR	SUB TASK 9 ALARM OCCUR	SUB TASK 8 ALARM OCCUR

50647	50646	50645	50644	50643	50642	50641	50640
SOUT#512	SOUT#511	SOUT#510	SOUT#509	SOUT#508	SOUT#507	SOUT#506	SOUT#505
SUB TASK 7 RUN	SUB TASK 6 RUN	SUB TASK 5 RUN	SUB TASK 4 RUN	SUB TASK 3 RUN	SUB TASK 2 RUN	SUB TASK 1 RUN	

50657	50656	50655	50654	50653	50652	50651	50650
SOUT#520	SOUT#519	SOUT#518	SOUT#517	SOUT#516	SOUT#515	SOUT#514	SOUT#513
SUB TASK 15 RUN	SUB TASK 14 RUN	SUB TASK 13 RUN	SUB TASK 12 RUN	SUB TASK 11 RUN	SUB TASK 10 RUN	SUB TASK 9 RUN	SUB TASK 8 RUN

50667	50666	50665	50664	50663	50662	50661	50660
SOUT#528	SOUT#527	SOUT#526	SOUT#525	SOUT#524	SOUT#523	SOUT#522	SOUT#521
SUB TASK 7 HOLD	SUB TASK 6 HOLD	SUB TASK 5 HOLD	SUB TASK 4 HOLD	SUB TASK 3 HOLD	SUB TASK 2 HOLD	SUB TASK 1 HOLD	

50677	50676	50675	50674	50673	50672	50671	50670
SOUT#536	SOUT#535	SOUT#534	SOUT#533	SOUT#532	SOUT#531	SOUT#530	SOUT#529
SUB TASK 15 HOLD	SUB TASK 14 HOLD	SUB TASK 13 HOLD	SUB TASK 12 HOLD	SUB TASK 11 HOLD	SUB TASK 10 HOLD	SUB TASK 9 HOLD	SUB TASK 8 HOLD

50687	50686	50685	50684	50683	50682	50681	50680
SOUT#544	SOUT#543	SOUT#542	SOUT#541	SOUT#540	SOUT#539	SOUT#538	SOUT#537

50697	50696	50695	50694	50693	50692	50691	50690
SOUT#552	SOUT#551	SOUT#550	SOUT#549	SOUT#548	SOUT#547	SOUT#546	SOUT#545
SHOCK DTCT ALM	JOB DATA MISMATCH		PLAY MODE ENABLE SET		SECURITY MANAGEMENT MODE SET	SECURITY EDITING MODE SET	SECURITY OPERATION MODE SET

50707	50706	50705	50704	50703	50702	50701	50700
SOUT#560	SOUT#559	SOUT#558	SOUT#557	SOUT#556	SOUT#555	SOUT#554	SOUT#553

50717	50716	50715	50714	50713	50712	50711	50710
SOUT#568	SOUT#567	SOUT#566	SOUT#565	SOUT#564	SOUT#563	SOUT#562	SOUT#561

50727	50726	50725	50724	50723	50722	50721	50720
SOUT#576	SOUT#575	SOUT#574	SOUT#573	SOUT#572	SOUT#571	SOUT#570	SOUT#569

50737	50736	50735	50734	50733	5073	50731	50730
SOUT#584	SOUT#583	SOUT#582	SOUT#581	SOUT#580	SOUT#579	SOUT#578	SOUT#577

50747	50746	50745	50744	50743	50742	50741	50740
SOUT#592	SOUT#591	SOUT#590	SOUT#589	SOUT#588	SOUT#587	SOUT#586	SOUT#585

50757	50756	50755	50754	50753	50752	50751	50750
SOUT#600	SOUT#599	SOUT#598	SOUT#597	SOUT#596	SOUT#595	SOUT#594	SOUT#593

50767	50766	50765	50764	50763	50762	50761	50760
SOUT#608	SOUT#607	SOUT#606	SOUT#605	SOUT#604	SOUT#603	SOUT#602	SOUT#601

50777	50776	50775	50774	50773	50772	50771	50770
SOUT#616	SOUT#615	SOUT#614	SOUT#613	SOUT#612	SOUT#611	SOUT#610	SOUT#609

50787	50786	50785	50784	50783	50782	50781	50780
SOUT#624	SOUT#623	SOUT#622	SOUT#621	SOUT#620	SOUT#619	SOUT#618	SOUT#617

50797	50796	50795	50794	50793	50792	50791	50790
SOUT#632	SOUT#631	SOUT#630	SOUT#629	SOUT#628	SOUT#627	SOUT#626	SOUT#625

50807	50806	50805	50804	50803	50802	50801	50800
SOUT#640	SOUT#639	SOUT#638	SOUT#637	SOUT#636	SOUT#635	SOUT#634	SOUT#633

50817	50816	50815	50814	50813	50812	50811	50810
SOUT#648	SOUT#647	SOUT#646	SOUT#645	SOUT#644	SOUT#643	SOUT#642	SOUT#641

50827	50826	50825	50824	50823	50822	50821	50820
SOUT#656	SOUT#655	SOUT#654	SOUT#653	SOUT#652	SOUT#651	SOUT#650	SOUT#649

50837	50836	50835	50834	50833	50832	50831	50830
SOUT#664	SOUT#663	SOUT#662	SOUT#661	SOUT#660	SOUT#659	SOUT#658	SOUT#657

50847	50846	50845	50844	50843	50842	50841	50840
SOUT#672	SOUT#671	SOUT#670	SOUT#669	SOUT#668	SOUT#667	SOUT#666	SOUT#665

50857	50856	50855	50854	50853	50852	50851	50850
SOUT#680	SOUT#679	SOUT#678	SOUT#677	SOUT#676	SOUT#675	SOUT#674	SOUT#673

50837	50836	50835	50834	50833	50832	50831	50830
SOUT#688	SOUT#687	SOUT#686	SOUT#685	SOUT#684	SOUT#683	SOUT#682	SOUT#681

50877	50876	50875	50874	50873	50872	50871	50870
SOUT#696	SOUT#695	SOUT#694	SOUT#693	SOUT#692	SOUT#691	SOUT#690	SOUT#689

50887	50886	50885	50884	50883	50882	50881	50880
SOUT#704	SOUT#703	SOUT#702	SOUT#701	SOUT#700	SOUT#699	SOUT#698	SOUT#697

50897	50896	50895	50894	50893	50892	50891	50890
SOUT#712	SOUT#711	SOUT#710	SOUT#709	SOUT#708	SOUT#707	SOUT#706	SOUT#705

50907	50906	50905	50904	50903	50902	50901	50900
SOUT#720	SOUT#719	SOUT#718	SOUT#717	SOUT#716	SOUT#715	SOUT#714	SOUT#713

50917	50916	50915	50914	50913	50912	50911	50910
SOUT#728	SOUT#727	SOUT#726	SOUT#725	SOUT#724	SOUT#723	SOUT#722	SOUT#721

50927	50926	50925	50924	50923	50922	50921	50920
SOUT#736	SOUT#735	SOUT#734	SOUT#733	SOUT#732	SOUT#731	SOUT#730	SOUT#729

50937	50936	50935	50934	50933	50932	50931	50930
SOUT#744	SOUT#743	SOUT#742	SOUT#741	SOUT#740	SOUT#739	SOUT#738	SOUT#737

50947	50946	50945	50944	50943	50942	50941	50940
SOUT#752	SOUT#751	SOUT#750	SOUT#749	SOUT#748	SOUT#747	SOUT#746	SOUT#745

50957	50956	50955	50954	50953	50952	50951	50950
SOUT#760	SOUT#759	SOUT#758	SOUT#757	SOUT#756	SOUT#755	SOUT#754	SOUT#753

50967	50966	50965	50964	50963	50962	50961	50960
SOUT#768	SOUT#767	SOUT#766	SOUT#765	SOUT#764	SOUT#763	SOUT#762	SOUT#761

50977	50976	50975	50974	50973	50972	50971	50970
SOUT#776	SOUT#775	SOUT#774	SOUT#773	SOUT#772	SOUT#771	SOUT#770	SOUT#769

50987	50986	50985	50984	50983	50982	50981	50980
SOUT#784	SOUT#783	SOUT#782	SOUT#781	SOUT#780	SOUT#779	SOUT#778	SOUT#777

50997	50996	50995	50994	50993	50992	50991	50990
SOUT#792	SOUT#791	SOUT#790	SOUT#789	SOUT#788	SOUT#787	SOUT#786	SOUT#785

51007	51006	51005	51004	51003	51002	51001	51000
SOUT#800	SOUT#799	SOUT#798	SOUT#797	SOUT#796	SOUT#795	SOUT#794	SOUT#793

51017	51016	51015	51014	51013	51012	51011	51010
SOUT#808	SOUT#807	SOUT#806	SOUT#805	SOUT#804	SOUT#803	SOUT#802	SOUT#801

51027	51026	51025	51024	51023	51022	51021	51020
SOUT#816	SOUT#815	SOUT#814	SOUT#813	SOUT#812	SOUT#811	SOUT#810	SOUT#809

51037	51036	51035	51034	51033	51032	51031	51030
SOUT#824	SOUT#823	SOUT#822	SOUT#821	SOUT#820	SOUT#819	SOUT#818	SOUT#817

51047	51046	51045	51044	51043	51042	51041	51040
SOUT#832	SOUT#831	SOUT#830	SOUT#829	SOUT#828	SOUT#827	SOUT#826	SOUT#825

51057	51056	51055	51054	51053	51052	51051	51050
SOUT#840	SOUT#839	SOUT#838	SOUT#837	SOUT#836	SOUT#835	SOUT#834	SOUT#833

51067	51066	51065	51064	51063	51062	51061	51060
SOUT#848	SOUT#847	SOUT#846	SOUT#845	SOUT#844	SOUT#843	SOUT#842	SOUT#841

51077	51076	51075	51074	51073	51072	51071	51070
SOUT#856	SOUT#855	SOUT#854	SOUT#853	SOUT#852	SOUT#851	SOUT#850	SOUT#849

51087	51086	51085	51084	51083	51082	51081	51080
SOUT#864	SOUT#863	SOUT#862	SOUT#861	SOUT#860	SOUT#859	SOUT#858	SOUT#857

51097	51096	51095	51094	51093	51092	51091	51090
SOUT#872	SOUT#871	SOUT#870	SOUT#869	SOUT#868	SOUT#867	SOUT#866	SOUT#865

51107	51106	51105	51104	51103	51102	51101	51100
SOUT#880	SOUT#879	SOUT#878	SOUT#877	SOUT#876	SOUT#875	SOUT#874	SOUT#873

51117	51116	51115	51114	51113	51112	51111	51110
SOUT#888	SOUT#887	SOUT#886	SOUT#885	SOUT#884	SOUT#883	SOUT#882	SOUT#881

51127	51126	51125	51124	51123	51122	51121	51120
SOUT#896	SOUT#895	SOUT#894	SOUT#893	SOUT#892	SOUT#891	SOUT#890	SOUT#889

51137	51136	51135	51134	51133	51132	51131	51130
SOUT#904	SOUT#903	SOUT#902	SOUT#901	SOUT#900	SOUT#899	SOUT#898	SOUT#897

51147	51146	51145	51144	51143	51142	51141	51140
SOUT#912	SOUT#911	SOUT#910	SOUT#909	SOUT#908	SOUT#907	SOUT#906	SOUT#905

51157	51156	51155	51154	51153	51152	51151	51150
SOUT#920	SOUT#919	SOUT#918	SOUT#917	SOUT#916	SOUT#915	SOUT#914	SOUT#913

51167	51166	51165	51164	51163	51162	51161	51160
SOUT#928	SOUT#927	SOUT#926	SOUT#925	SOUT#924	SOUT#923	SOUT#922	SOUT#921

51177	51176	51175	51174	51173	51172	51171	51170
SOUT#936	SOUT#935	SOUT#934	SOUT#933	SOUT#932	SOUT#931	SOUT#930	SOUT#929

51187	51186	51185	51184	51183	51182	51181	51180
SOUT#944	SOUT#943	SOUT#942	SOUT#941	SOUT#940	SOUT#939	SOUT#938	SOUT#937

51197	51196	51195	51194	51193	51192	51191	51190
SOUT#952	SOUT#951	SOUT#950	SOUT#949	SOUT#948	SOUT#947	SOUT#946	SOUT#945

51207	51206	51205	51204	51203	51202	51201	51200
SOUT#960	SOUT#959	SOUT#958	SOUT#957	SOUT#956	SOUT#955	SOUT#954	SOUT#953

51217	51216	51215	51214	51213	51212	51211	51210
SOUT#968	SOUT#967	SOUT#966	SOUT#965	SOUT#964	SOUT#963	SOUT#962	SOUT#961

51227	51226	51225	51224	51223	51222	51221	51220
SOUT#976	SOUT#975	SOUT#974	SOUT#973	SOUT#972	SOUT#971	SOUT#970	SOUT#969

51237	51236	51235	51234	51233	51232	51231	51230
SOUT#984	SOUT#983	SOUT#982	SOUT#981	SOUT#980	SOUT#979	SOUT#978	SOUT#977

51247	51246	51245	51244	51243	51242	51241	51240
SOUT#992	SOUT#991	SOUT#990	SOUT#989	SOUT#988	SOUT#987	SOUT#986	SOUT#985

51257	51256	51255	51254	51253	51252	51251	51250
SOUT#1000	SOUT#999	SOUT#998	SOUT#997	SOUT#996	SOUT#995	SOUT#994	SOUT#993

51267	51266	51265	51264	51263	51262	51261	51260
SOUT#1008	SOUT#1007	SOUT#1006	SOUT#1005	SOUT#1004	SOUT#1003	SOUT#1002	SOUT#1001

51277	51276	51275	51274	51273	51272	51271	51270
SOUT#1016	SOUT#1015	SOUT#1014	SOUT#1013	SOUT#1012	SOUT#1011	SOUT#1010	SOUT#1009

51287	51286	51285	51284	51283	51282	51281	51280
SOUT#1024	SOUT#1023	SOUT#1022	SOUT#1021	SOUT#1020	SOUT#1019	SOUT#1018	SOUT#1017

51297	51296	51295	51294	51293	51292	51291	51290
SOUT#1032	SOUT#1031	SOUT#1030	SOUT#1029	SOUT#1028	SOUT#1027	SOUT#1026	SOUT#1025

51307	51306	51305	51304	51303	51302	51301	51300
SOUT#1040	SOUT#1039	SOUT#1038	SOUT#1037	SOUT#1036	SOUT#1035	SOUT#1034	SOUT#1033

51317	51316	51315	51314	51313	51312	51311	51310
SOUT#1048	SOUT#1047	SOUT#1046	SOUT#1045	SOUT#1044	SOUT#1043	SOUT#1042	SOUT#1041

51327	51326	51325	51324	51323	51322	51321	51320
SOUT#1056	SOUT#1055	SOUT#1054	SOUT#1053	SOUT#1052	SOUT#1051	SOUT#1050	SOUT#1049

51337	51336	51335	51334	51333	51332	51331	51330
SOUT#1064	SOUT#1063	SOUT#1062	SOUT#1061	SOUT#1060	SOUT#1059	SOUT#1058	SOUT#1057

51347	51346	51345	51344	51343	51342	51341	51340
SOUT#1072	SOUT#1071	SOUT#1070	SOUT#1069	SOUT#1068	SOUT#1067	SOUT#1066	SOUT#1065

51357	51356	51355	51354	51353	51352	51351	51350
SOUT#1080	SOUT#1079	SOUT#1078	SOUT#1077	SOUT#1076	SOUT#1075	SOUT#1074	SOUT#1073

51367	51366	51365	51364	51363	51362	51361	51360
SOUT#1088	SOUT#1087	SOUT#1086	SOUT#1085	SOUT#1084	SOUT#1083	SOUT#1082	SOUT#1081

51377	51376	51375	51374	51373	51372	51371	51370
SOUT#1096	SOUT#1095	SOUT#1094	SOUT#1093	SOUT#1092	SOUT#1091	SOUT#1090	SOUT#1089

51387	51386	51385	51384	51383	51382	51381	51380
SOUT#1104	SOUT#1103	SOUT#1102	SOUT#1101	SOUT#1100	SOUT#1099	SOUT#1098	SOUT#1097

51397	51396	51395	51394	51393	51392	51391	51390
SOUT#1112	SOUT#1111	SOUT#1110	SOUT#1109	SOUT#1108	SOUT#1107	SOUT#1106	SOUT#1105

51407	51406	51405	51404	51403	51402	51401	51400
SOUT#1120	SOUT#1119	SOUT#1118	SOUT#1117	SOUT#1116	SOUT#1115	SOUT#1114	SOUT#1113
					ARITHMTC ERROR FLAG	ARITHMTC ZERO FLAG	ARITHMTC CARRY FLAG

51417	51416	51415	51414	51413	51412	51411	51410
SOUT#1128	SOUT#1127	SOUT#1126	SOUT#1125	SOUT#1124	SOUT#1123	SOUT#1122	SOUT#1121

51427	51426	51425	51424	51423	51422	51421	51420
SOUT#1136	SOUT#1135	SOUT#1134	SOUT#1133	SOUT#1132	SOUT#1131	SOUT#1130	SOUT#1129

51437	51436	51435	51434	51433	51432	51431	51430
SOUT#1144	SOUT#1143	SOUT#1142	SOUT#1141	SOUT#1140	SOUT#1139	SOUT#1138	SOUT#1137

51447	51446	51445	51444	51443	51442	51441	51440
SOUT#1152	SOUT#1151	SOUT#1150	SOUT#1149	SOUT#1148	SOUT#1147	SOUT#1146	SOUT#1145

51457	51456	51455	51454	51453	51452	51451	51450
SOUT#1160	SOUT#1159	SOUT#1158	SOUT#1157	SOUT#1156	SOUT#1155	SOUT#1154	SOUT#1153

51467	51466	51465	51464	51463	51462	51461	51460
SOUT#1168	SOUT#1167	SOUT#1166	SOUT#1165	SOUT#1164	SOUT#1163	SOUT#1162	SOUT#1161

51477	51476	51475	51474	51473	51472	51471	51470
SOUT#1176	SOUT#1175	SOUT#1174	SOUT#1173	SOUT#1172	SOUT#1171	SOUT#1170	SOUT#1169

51487	51486	51485	51484	51483	51482	51481	51480
SOUT#1184	SOUT#1183	SOUT#1182	SOUT#1181	SOUT#1180	SOUT#1179	SOUT#1178	SOUT#1177

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4 Specific I/O Signals
4.7 Specific Output Signals for All Applications

51497	51496	51495	51494	51493	51492	51491	51490
SOUT#1192	SOUT#1191	SOUT#1190	SOUT#1189	SOUT#1188	SOUT#1187	SOUT#1186	SOUT#1185

51507	51506	51505	51504	51503	51502	51501	51500
SOUT#1200	SOUT#1199	SOUT#1198	SOUT#1197	SOUT#1196	SOUT#1195	SOUT#1194	SOUT#1193

51517	51516	51515	51514	51513	51512	51511	51510
SOUT#1208	SOUT#1207	SOUT#1206	SOUT#1205	SOUT#1204	SOUT#1203	SOUT#1202	SOUT#1201

51527	51526	51525	51524	51523	51522	51521	51520
SOUT#1216	SOUT#1215	SOUT#1214	SOUT#1213	SOUT#1212	SOUT#1211	SOUT#1210	SOUT#1209

4.8 Specific Output Signals for Arc Welding

4.8.1 Device 1

51537	51536	51535	51534	51533	51532	51531	51530
SOUT#1224	SOUT#1223	SOUT#1222	SOUT#1221	SOUT#1220	SOUT#1219	SOUT#1218	SOUT#1217
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONT	END WORK	START WORK

51547	51546	51545	51544	51543	51542	51541	51540
SOUT#1232	SOUT#1231	SOUT#1230	SOUT#1229	SOUT#1228	SOUT#1227	SOUT#1226	SOUT#1225
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIRE	RESTARTING/ GAS	RESTARTING/ ARC

51557	51556	51555	51554	51553	51552	51551	51550
SOUT#1240	SOUT#1239	SOUT#1238	SOUT#1237	SOUT#1236	SOUT#1235	SOUT#1234	SOUT#1233
			GAS OUTPUT				

51567	51566	51565	51564	51563	51562	51561	51560
SOUT#1248	SOUT#1247	SOUT#1246	SOUT#1245	SOUT#1244	SOUT#1243	SOUT#1242	SOUT#1241

51577	51576	51575	51574	51573	51572	51571	51570
SOUT#1256	SOUT#1255	SOUT#1254	SOUT#1253	SOUT#1252	SOUT#1251	SOUT#1250	SOUT#1249

51587	51586	51585	51584	51583	51582	51581	51580
SOUT#1264	SOUT#1263	SOUT#1262	SOUT#1261	SOUT#1260	SOUT#1259	SOUT#1258	SOUT#1257

4.8.2 Device 2

51597	51596	51595	51594	51593	51592	51591	51590
SOUT#1272	SOUT#1271	SOUT#1270	SOUT#1269	SOUT#1268	SOUT#1267	SOUT#1266	SOUT#1265
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONT	END WORK	START WORK

51607	51606	51605	51604	51603	51602	51601	51600
SOUT#1280	SOUT#1279	SOUT#1278	SOUT#1277	SOUT#1276	SOUT#1275	SOUT#1274	SOUT#1273
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51617	51616	51615	51614	51613	51612	51611	51610
SOUT#1288	SOUT#1287	SOUT#1286	SOUT#1285	SOUT#1284	SOUT#1283	SOUT#1282	SOUT#1281
			GAS OUTPUT				

51627	51626	51625	51624	51623	51622	51621	51620
SOUT#1296	SOUT#1295	SOUT#1294	SOUT#1293	SOUT#1292	SOUT#1291	SOUT#1290	SOUT#1289

51637	51636	51635	51634	51633	51632	51631	51630
SOUT#1304	SOUT#1303	SOUT#1302	SOUT#1301	SOUT#1300	SOUT#1299	SOUT#1298	SOUT#1297

51647	51646	51645	51644	51643	51642	51641	51640
SOUT#1312	SOUT#1311	SOUT#1310	SOUT#1309	SOUT#1308	SOUT#1307	SOUT#1306	SOUT#1305

DX100

4 Specific I/O Signals

4.8 Specific Output Signals for Arc Welding

4.8.3 Device 3

51657	51656	51655	51654	51653	51652	51651	51650
SOUT#1320	SOUT#1319	SOUT#1318	SOUT#1317	SOUT#1316	SOUT#1315	SOUT#1314	SOUT#1313
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONTINUE	END WORK	START WORK

51667	51666	51665	51664	51663	51662	51661	51660
SOUT#1328	SOUT#1327	SOUT#1326	SOUT#1325	SOUT#1324	SOUT#1323	SOUT#1322	SOUT#1321
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51677	51676	51675	51674	51673	51672	51671	51670
SOUT#1336	SOUT#1335	SOUT#1334	SOUT#1333	SOUT#1332	SOUT#1331	SOUT#1330	SOUT#1329
			GAS OUTPUT				

51687	51686	51685	51684	51683	51682	51681	51680
SOUT#1345	SOUT#1343	SOUT#1342	SOUT#1341	SOUT#1340	SOUT#1339	SOUT#1338	SOUT#1337

51697	51696	51695	51694	51693	51692	51691	51690
SOUT#1352	SOUT#1351	SOUT#1350	SOUT#1349	SOUT#1348	SOUT#1347	SOUT#1346	SOUT#1345

51707	51706	51705	51704	51703	51702	51701	51700
SOUT#1360	SOUT#1359	SOUT#1358	SOUT#1357	SOUT#1356	SOUT#1355	SOUT#1354	SOUT#1353

4.8.4 Device 4

51717	51716	51715	51714	51713	51712	51711	51710
SOUT#1368	SOUT#1367	SOUT#1366	SOUT#1365	SOUT#1364	SOUT#1363	SOUT#1362	SOUT#1361
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBITW ORK CONTINUE	END WORK	START WORK

51727	51726	51725	51724	51723	51722	51721	51720
SOUT#1376	SOUT#1375	SOUT#1374	SOUT#1373	SOUT#1372	SOUT#1371	SOUT#1370	SOUT#1369
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51737	51736	51735	51734	51733	51732	51731	51730
SOUT#1384	SOUT#1383	SOUT#1382	SOUT#1381	SOUT#1380	SOUT#1379	SOUT#1378	SOUT#1377
			GAS OUTPUT				

51747	51746	51745	51744	51743	51742	51741	51740
SOUT#1392	SOUT#1391	SOUT#1390	SOUT#1389	SOUT#1388	SOUT#1387	SOUT#1386	SOUT#1385

51757	51756	51755	51754	51753	51752	51751	51750
SOUT#1400	SOUT#1399	SOUT#1398	SOUT#1397	SOUT#1396	SOUT#1395	SOUT#1394	SOUT#1393

51767	51766	51765	51764	51763	51762	51761	51760
SOUT#1408	SOUT#1407	SOUT#1406	SOUT#1405	SOUT#1404	SOUT#1403	SOUT#1402	SOUT#1401

4.8.5 Device 5

51777	51776	51775	51774	51773	51772	51771	51770
SOUT#1416	SOUT#1415	SOUT#1414	SOUT#1413	SOUT#1412	SOUT#1411	SOUT#1410	SOUT#1409
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONTINUE	END WORK	START WORK

51787	51786	51785	51784	51783	51782	51781	51780
SOUT#1424	SOUT#1423	SOUT#1422	SOUT#1421	SOUT#1420	SOUT#1419	SOUT#1418	SOUT#1417
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51797	51796	51795	51794	51793	51792	51791	51790
SOUT#1432	SOUT#1431	SOUT#1430	SOUT#1429	SOUT#1428	SOUT#1427	SOUT#1426	SOUT#1425
			GAS OUTPUT				

51807	51806	51805	51804	51803	51802	51801	51800
SOUT#1440	SOUT#1439	SOUT#1438	SOUT#1437	SOUT#1436	SOUT#1435	SOUT#1434	SOUT#1433

51817	51816	51815	51814	51813	51812	51811	51810
SOUT#1448	SOUT#1447	SOUT#1446	SOUT#1445	SOUT#1444	SOUT#1443	SOUT#1442	SOUT#1441

51827	51826	51825	51824	51823	51822	51821	51820
SOUT#1456	SOUT#1455	SOUT#1454	SOUT#1453	SOUT#1452	SOUT#1451	SOUT#1450	SOUT#1449

4.8.6 Device 6

51837	51836	51835	51834	51833	51832	51831	51830
SOUT#1464	SOUT#1463	SOUT#1462	SOUT#1461	SOUT#1460	SOUT#1459	SOUT#1458	SOUT#1457
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONTINUE	END WORK	START WORK

51847	51846	51845	51844	51843	51842	51841	51840
SOUT#1472	SOUT#1471	SOUT#1470	SOUT#1469	SOUT#1468	SOUT#1467	SOUT#1466	SOUT#1465
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51857	51856	51855	51854	51853	51852	51851	51850
SOUT#1480	SOUT#1479	SOUT#1478	SOUT#1477	SOUT#1476	SOUT#1475	SOUT#1474	SOUT#1473
			GAS OUTPUT				

51867	51866	51865	51864	51863	51862	51861	51860
SOUT#1488	SOUT#1487	SOUT#1486	SOUT#1485	SOUT#1484	SOUT#1483	SOUT#1482	SOUT#1481

51877	51876	51875	51874	51873	51872	51871	51870
SOUT#1496	SOUT#1495	SOUT#1494	SOUT#1493	SOUT#1492	SOUT#1491	SOUT#1490	SOUT#1489

51887	51886	51885	51884	51883	51882	51881	51880
SOUT#1504	SOUT#1503	SOUT#1502	SOUT#1501	SOUT#1500	SOUT#1499	SOUT#1498	SOUT#1497

4.8.7 Device 7

51897	51896	51895	51894	51893	51892	51891	51890
SOUT#1512	SOUT#1511	SOUT#1510	SOUT#1509	SOUT#1508	SOUT#1507	SOUT#1506	SOUT#1505
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONTINUE	END WORK	START WORK

51907	51906	51905	51904	51903	51902	51901	51900
SOUT#1520	SOUT#1519	SOUT#1518	SOUT#1517	SOUT#1516	SOUT#1515	SOUT#1514	SOUT#1513
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51917	51916	51915	51914	51913	51912	51911	51910
SOUT#1528	SOUT#1527	SOUT#1526	SOUT#1525	SOUT#1524	SOUT#1523	SOUT#1522	SOUT#1521
			GAS OUTPUT				

51927	51926	51925	51924	51923	51922	51921	51920
SOUT#1536	SOUT#1535	SOUT#1534	SOUT#1533	SOUT#1532	SOUT#1531	SOUT#1530	SOUT#1529

51937	51936	51935	51934	51933	51932	51931	51930
SOUT#1544	SOUT#1543	SOUT#1542	SOUT#1541	SOUT#1540	SOUT#1539	SOUT#1538	SOUT#1537

51947	51946	51945	51944	51943	51942	51941	51940
SOUT#1552	SOUT#1551	SOUT#1550	SOUT#1549	SOUT#1548	SOUT#1547	SOUT#1546	SOUT#1545

4.8.8 Device 8

51957	51956	51955	51954	51953	51952	51951	51950
SOUT#1560	SOUT#1559	SOUT#1558	SOUT#1557	SOUT#1556	SOUT#1555	SOUT#1554	SOUT#1553
RETURN RETRY	RETRACT	INCHING	CLEAN NOZZLE	TIP CHANGE REQUEST	PROHIBIT WORK CONTINUE	END WORK	START WORK

51967	51966	51965	51964	51963	51962	51961	51960
SOUT#1568	SOUT#1567	SOUT#1566	SOUT#1565	SOUT#1564	SOUT#1563	SOUT#1562	SOUT#1561
RETRY REPLAY MODE	OVER ANTI- STICK NO	OVER RESTART	OVER RETRY	RETURN RESTART	RESTARTING/ WIR	RESTARTING/ GAS	RESTARTING/ ARC

51977	51976	51975	51974	51973	51972	51971	51970
SOUT#1576	SOUT#1575	SOUT#1574	SOUT#1573	SOUT#1572	SOUT#1571	SOUT#1570	SOUT#1569
			GAS OUTPUT				

51987	51986	51985	51984	51983	51982	51981	51980
SOUT#1584	SOUT#1583	SOUT#1582	SOUT#1581	SOUT#1580	SOUT#1579	SOUT#1578	SOUT#1577

51997	51996	51995	51994	51993	51992	51991	51990
SOUT#1592	SOUT#1591	SOUT#1590	SOUT#1589	SOUT#1588	SOUT#1587	SOUT#1586	SOUT#1585

52007	52006	52005	52004	52003	52002	52001	52000
SOUT#1600	SOUT#1599	SOUT#1598	SOUT#1597	SOUT#1596	SOUT#1595	SOUT#1594	SOUT#1593

4.9 Specific Output Signals for Handling

4.9.1 Device 1

51537	51536	51535	51534	51533	51532	51531	51530
SOUT#1224	SOUT#1223	SOUT#1222	SOUT#1221	SOUT#1220	SOUT#1219	SOUT#1218	SOUT#1217
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONTINUE	END WORK	START WORK

51547	51546	51545	51544	51543	51542	51541	51540
SOUT#1232	SOUT#1231	SOUT#1230	SOUT#1229	SOUT#1228	SOUT#1227	SOUT#1226	SOUT#1225
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51557	51556	51555	51554	51553	51552	51551	51550
SOUT#1240	SOUT#1239	SOUT#1238	SOUT#1237	SOUT#1236	SOUT#1235	SOUT#1234	SOUT#1233

51567	51566	51565	51564	51563	51562	51561	51560
SOUT#1248	SOUT#1247	SOUT#1246	SOUT#1245	SOUT#1244	SOUT#1243	SOUT#1242	SOUT#1241

51577	51576	51575	51574	51573	51572	51571	51570
SOUT#1256	SOUT#1255	SOUT#1254	SOUT#1253	SOUT#1252	SOUT#1251	SOUT#1250	SOUT#1249

51587	51586	51585	51584	51583	51582	51581	51580
SOUT#1264	SOUT#1263	SOUT#1262	SOUT#1261	SOUT#1260	SOUT#1259	SOUT#1258	SOUT#1257

4.9.2 Device 2

51597	51596	51595	51594	51593	51592	51591	51590
SOUT#1272	SOUT#1271	SOUT#1270	SOUT#1269	SOUT#1268	SOUT#1267	SOUT#1266	SOUT#1265
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBITW ORK CONTINUE	END WORK	START WORK

51607	51606	51605	51604	51603	51602	51601	51600
SOUT#1280	SOUT#1279	SOUT#1278	SOUT#1277	SOUT#1276	SOUT#1275	SOUT#1274	SOUT#1273
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51617	51616	51615	51614	51613	51612	51611	51610
SOUT#1288	SOUT#1287	SOUT#1286	SOUT#1285	SOUT#1284	SOUT#1283	SOUT#1282	SOUT#1281

51627	51626	51625	51624	51623	51622	51621	51620
SOUT#1296	SOUT#1295	SOUT#1294	SOUT#1293	SOUT#1292	SOUT#1291	SOUT#1290	SOUT#1289

51637	51636	51635	51634	51633	51632	51631	51630
SOUT#1304	SOUT#1303	SOUT#1302	SOUT#1301	SOUT#1300	SOUT#1299	SOUT#1298	SOUT#1297

51647	51646	51645	51644	51643	51642	51641	51640
SOUT#1312	SOUT#1311	SOUT#1310	SOUT#1309	SOUT#1308	SOUT#1307	SOUT#1306	SOUT#1305

4.9.3 Device 3

51657	51656	51655	51654	51653	51652	51651	51650
SOUT#1320	SOUT#1319	SOUT#1318	SOUT#1317	SOUT#1316	SOUT#1315	SOUT#1314	SOUT#1313
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONTINUE	END WORK	START WORK

51667	51666	51665	51664	51663	51662	51661	51660
SOUT#1328	SOUT#1327	SOUT#1326	SOUT#1325	SOUT#1324	SOUT#1323	SOUT#1322	SOUT#1321
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51677	51676	51675	51674	51673	51672	51671	51670
SOUT#1336	SOUT#1335	SOUT#1334	SOUT#1333	SOUT#1332	SOUT#1331	SOUT#1330	SOUT#1329

51687	51686	51685	51684	51683	51682	51681	51680
SOUT#1344	SOUT#1343	SOUT#1342	SOUT#1341	SOUT#1340	SOUT#1339	SOUT#1338	SOUT#1337

51697	51696	51695	51694	51693	51692	51691	51690
SOUT#1352	SOUT#1351	SOUT#1350	SOUT#1349	SOUT#1348	SOUT#1347	SOUT#1346	SOUT#1345

51707	51706	51705	51704	51703	51702	51701	51700
SOUT#1360	SOUT#1359	SOUT#1358	SOUT#1357	SOUT#1356	SOUT#1355	SOUT#1354	SOUT#1353

4.9.4 Device 4

51717	51716	51715	51714	51713	51712	51711	51710
SOUT#1368	SOUT#1367	SOUT#1366	SOUT#1365	SOUT#1364	SOUT#1363	SOUT#1362	SOUT#1361
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONT	END WORK	START WORK

51727	51726	51725	51724	51723	51722	51721	51720
SOUT#1376	SOUT#1375	SOUT#1374	SOUT#1373	SOUT#1372	SOUT#1371	SOUT#1370	SOUT#1369
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51737	51736	51735	51734	51733	51732	51731	51730
SOUT#1384	SOUT#1383	SOUT#1382	SOUT#1381	SOUT#1380	SOUT#1379	SOUT#1378	SOUT#1377

51747	51746	51745	51744	51743	51742	51741	51740
SOUT#1392	SOUT#1391	SOUT#1390	SOUT#1389	SOUT#1388	SOUT#1387	SOUT#1386	SOUT#1385

51757	51756	51755	51754	51753	51752	51751	51750
SOUT#1400	SOUT#1399	SOUT#1398	SOUT#1397	SOUT#1396	SOUT#1395	SOUT#1394	SOUT#1393

51767	51766	51765	51764	51763	51762	51761	51760
SOUT#1408	SOUT#1407	SOUT#1406	SOUT#1405	SOUT#1404	SOUT#1403	SOUT#1402	SOUT#1401

4.9.5 Device 5

51777	51776	51775	51774	51773	51772	51771	51770
SOUT#1416	SOUT#1415	SOUT#1414	SOUT#1413	SOUT#1412	SOUT#1411	SOUT#1410	SOUT#1409
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONT	END WORK	START WORK

51787	51786	51785	51784	51783	51782	51781	51780
SOUT#1432	SOUT#1431	SOUT#1430	SOUT#1429	SOUT#1428	SOUT#1427	SOUT#1426	SOUT#1425
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51797	51796	51795	51794	51793	51792	51791	51790
SOUT#1432	SOUT#1431	SOUT#1430	SOUT#1429	SOUT#1428	SOUT#1427	SOUT#1426	SOUT#1425

51807	51806	51805	51804	51803	51802	51801	51800
SOUT#1440	SOUT#1439	SOUT#1438	SOUT#1437	SOUT#1436	SOUT#1435	SOUT#1434	SOUT#1433

51817	51816	51815	51814	51813	51812	51811	51810
SOUT#1448	SOUT#1447	SOUT#1446	SOUT#1445	SOUT#1444	SOUT#1443	SOUT#1442	SOUT#1441

51827	51826	51825	51824	51823	51822	51821	51820
SOUT#1456	SOUT#1455	SOUT#1454	SOUT#1453	SOUT#1452	SOUT#1451	SOUT#1450	SOUT#1449

4.9.6 Device 6

51837	51836	51835	51834	51833	51832	51831	51830
SOUT#1464	SOUT#1463	SOUT#1462	SOUT#1461	SOUT#1460	SOUT#1459	SOUT#1458	SOUT#1457
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONT	END WORK	START WORK

51847	51846	51845	51844	51843	51842	51841	51840
SOUT#1472	SOUT#1471	SOUT#1470	SOUT#1469	SOUT#1468	SOUT#1467	SOUT#1466	SOUT#1465
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51857	51856	51855	51854	51853	51852	51851	51850
SOUT#1480	SOUT#1479	SOUT#1478	SOUT#1477	SOUT#1476	SOUT#1475	SOUT#1474	SOUT#1473

51867	51866	51865	51864	51863	51862	51861	51860
SOUT#1488	SOUT#1487	SOUT#1486	SOUT#1485	SOUT#1484	SOUT#1483	SOUT#1482	SOUT#1481

51877	51876	51875	51874	51873	51872	51871	51870
SOUT#1496	SOUT#1495	SOUT#1494	SOUT#1493	SOUT#1492	SOUT#1491	SOUT#1490	SOUT#1489

51887	51886	51885	51884	51883	51882	51881	51880
SOUT#1504	SOUT#1503	SOUT#1502	SOUT#1501	SOUT#1500	SOUT#1499	SOUT#1498	SOUT#1497

4.9.7 Device 7

51897	51896	51895	51894	51893	51892	51891	51890
SOUT#1512	SOUT#1511	SOUT#1510	SOUT#1509	SOUT#1508	SOUT#1507	SOUT#1506	SOUT#1505
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONT	END WORK	START WORK

51907	51906	51905	51904	51903	51902	51901	51900
SOUT#1520	SOUT#1519	SOUT#1518	SOUT#1517	SOUT#1516	SOUT#1515	SOUT#1514	SOUT#1513
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51917	51916	51915	51914	51913	51912	51911	51910
SOUT#1528	SOUT#1527	SOUT#1526	SOUT#1525	SOUT#1524	SOUT#1523	SOUT#1522	SOUT#1521

51927	51926	51925	51924	51923	51922	51921	51920
SOUT#1536	SOUT#1535	SOUT#1534	SOUT#1533	SOUT#1532	SOUT#1531	SOUT#1530	SOUT#1529

51937	51936	51935	51934	51933	51932	51931	51930
SOUT#1544	SOUT#1543	SOUT#1542	SOUT#1541	SOUT#1540	SOUT#1539	SOUT#1538	SOUT#1537

51947	51946	51945	51944	51943	51942	51941	51940
SOUT#1552	SOUT#1551	SOUT#1550	SOUT#1549	SOUT#1548	SOUT#1547	SOUT#1546	SOUT#1545

4.9.8 Device 8

51957	51956	51955	51954	51953	51952	51951	51950
SOUT#1560	SOUT#1559	SOUT#1558	SOUT#1557	SOUT#1556	SOUT#1555	SOUT#1554	SOUT#1553
SH-SNSR VALID	SH-SNSR FUNCTION SELECT				PROHIBIT WORK CONT	END WORK	START WORK

51967	51966	51965	51964	51963	51962	51961	51960
SOUT#1568	SOUT#1567	SOUT#1566	SOUT#1565	SOUT#1564	SOUT#1563	SOUT#1562	SOUT#1561
TOOL VALVE 4-2	TOOL VALVE 4-1	TOOL VALVE 3-2	TOOL VALVE 3-1	TOOL VALVE 2-2	TOOL VALVE 2-1	TOOL VALVE 1-2	TOOL VALVE 1-1

51977	51976	51975	51974	51973	51972	51971	51970
SOUT#1576	SOUT#1575	SOUT#1574	SOUT#1573	SOUT#1572	SOUT#1571	SOUT#1570	SOUT#1569

51987	51986	51985	51984	51983	51982	51981	51980
SOUT#1584	SOUT#1583	SOUT#1582	SOUT#1581	SOUT#1580	SOUT#1579	SOUT#1578	SOUT#1577

51997	51996	51995	51994	51993	51992	51991	51990
SOUT#1592	SOUT#1591	SOUT#1590	SOUT#1589	SOUT#1588	SOUT#1587	SOUT#1586	SOUT#1585

52007	52006	52005	52004	52003	52002	52001	52000
SOUT#1600	SOUT#1599	SOUT#1598	SOUT#1597	SOUT#1596	SOUT#1595	SOUT#1594	SOUT#1593

4.10 Specific Output Signals for Spot Welding

4.10.1 Device 1

51537	51536	51535	51534	51533	51532	51531	51530
SOUT#1224	SOUT#1223	SOUT#1222	SOUT#1221	SOUT#1220	SOUT#1219	SOUT#1218	SOUT#1217
WELDING ON/OFF	WORK SVSPOT WELD 1	TIP CHANGE ALARM WELD 1	WEAR DETECT ERROR WELD 1	WEAR DETECT NORMAL WELD 1			

51547	51546	51545	51544	51543	51542	51541	51540
SOUT#1232	SOUT#1231	SOUT#1230	SOUT#1229	SOUT#1228	SOUT#1227	SOUT#1226	SOUT#1225
	WORK SVSPOT WELD 2	TIP CHANGE ALARM WELD 2	WEAR DETECT ERROR WELD 2	WEAR DETECT NORMAL WELD 2			SENSOR SEARCHING WELD 1

51557	51556	51555	51554	51553	51552	51551	51550
SOUT#1240	SOUT#1239	SOUT#1238	SOUT#1237	SOUT#1236	SOUT#1235	SOUT#1234	SOUT#1233
	WORK SVSPOT WELD 3	TIP CHANGE ALARM WELD 3	WEAR DETECT ERROR WELD 3	WEAR DETECT NORMAL WELD 3			SENSOR SEARCHING WELD 2

51567	51566	51565	51564	51563	51562	51561	51560
SOUT#1248	SOUT#1247	SOUT#1246	SOUT#1245	SOUT#1244	SOUT#1243	SOUT#1242	SOUT#1241
	WORK SVSPOT WELD 4	TIP CHANGE ALARM WELD 4	WEAR DETECT ERROR WELD 4	WEAR DETECT NORMAL WELD 4			SENSOR SEARCHING WELD 3

51577	51576	51575	51574	51573	51572	51571	51570
SOUT#1256	SOUT#1255	SOUT#1254	SOUT#1253	SOUT#1252	SOUT#1251	SOUT#1250	SOUT#1249
	WORK SVSPOT WELD 5	TIP CHANGE ALARM WELD 5	WEAR DETECT ERROR WELD 5	WEAR DETECT NORMAL WELD 5			SENSOR SEARCHING WELD 4

51587	51586	51585	51584	51583	51582	51581	51580
SOUT#1264	SOUT#1263	SOUT#1262	SOUT#1261	SOUT#1260	SOUT#1259	SOUT#1258	SOUT#1257
	WORK SVSPOT WELD 6	TIP CHANGE ALARM WELD 6	WEAR DETECT ERROR WELD 6	WEAR DETECT NORMAL WELD 6			SENSOR SEARCHING WELD 5

4.10.2 Device 2

51597	51596	51595	51594	51593	51592	51591	51590
SOUT#1272	SOUT#1271	SOUT#1270	SOUT#1269	SOUT#1268	SOUT#1267	SOUT#1266	SOUT#1265
	WORK SVSPOT WELD 7	TIP CHANGE ALARM WELD 7	WEAR DETECT ERROR WELD 7	WEAR DETECT NORMAL WELD 7			SENSOR SEARCHING WELD 6

51607	51606	51605	51604	51603	51602	51601	51600
SOUT#1280	SOUT#1279	SOUT#1278	SOUT#1277	SOUT#1276	SOUT#1275	SOUT#1274	SOUT#1273
	WORK SVSPOT WELD 8	TIP CHANGE ALARM WELD 8	WEAR DETECT ERROR WELD 8	WEAR DETECT NORMAL WELD 8			SENSOR SEARCHING WELD 7

51617	51616	51615	51614	51613	51612	51611	51610
SOUT#1288	SOUT#1287	SOUT#1286	SOUT#1285	SOUT#1284	SOUT#1283	SOUT#1282	SOUT#1281
							SENSOR SEARCHING WELD 8

51627	51626	51625	51624	51623	51622	51621	51620
SOUT#1296	SOUT#1295	SOUT#1294	SOUT#1293	SOUT#1292	SOUT#1291	SOUT#1290	SOUT#1289

51637	51636	51635	51634	51633	51632	51631	51630
SOUT#1304	SOUT#1303	SOUT#1302	SOUT#1301	SOUT#1300	SOUT#1299	SOUT#1298	SOUT#1297

51647	51646	51645	51644	51643	51642	51641	51640
SOUT#1312	SOUT#1311	SOUT#1310	SOUT#1309	SOUT#1308	SOUT#1307	SOUT#1306	SOUT#1305

4.10.3 Device 3

51657	51656	51655	51654	51653	51652	51651	51650
SOUT#1320	SOUT#1319	SOUT#1318	SOUT#1317	SOUT#1316	SOUT#1315	SOUT#1314	SOUT#1313

51667	51666	51665	51664	51663	51662	51661	51660
SOUT#1328	SOUT#1327	SOUT#1326	SOUT#1325	SOUT#1324	SOUT#1323	SOUT#1322	SOUT#1321

51677	51676	51675	51674	51673	51672	51671	51670
SOUT#1336	SOUT#1335	SOUT#1334	SOUT#1333	SOUT#1332	SOUT#1331	SOUT#1330	SOUT#1329

51687	51686	51685	51684	51683	51682	51681	51680
SOUT#1344	SOUT#1343	SOUT#1342	SOUT#1341	SOUT#1340	SOUT#1339	SOUT#1338	SOUT#1337

51697	51696	51695	51694	51693	51692	51691	51690
SOUT#1352	SOUT#1351	SOUT#1350	SOUT#1349	SOUT#1348	SOUT#1347	SOUT#1346	SOUT#1345

51707	51706	51705	51704	51703	51702	51701	51700
SOUT#1360	SOUT#1359	SOUT#1358	SOUT#1357	SOUT#1356	SOUT#1355	SOUT#1354	SOUT#1353

4.10.4 Device 4

51717	51716	51715	51714	51713	51712	51711	51710
SOUT#1368	SOUT#1367	SOUT#1366	SOUT#1365	SOUT#1364	SOUT#1363	SOUT#1362	SOUT#1361

51727	51726	51725	51724	51723	51722	51721	51720
SOUT#1376	SOUT#1375	SOUT#1374	SOUT#1373	SOUT#1372	SOUT#1371	SOUT#1370	SOUT#1369

51737	51736	51735	51734	51733	51732	51731	51730
SOUT#1384	SOUT#1383	SOUT#1382	SOUT#1381	SOUT#1380	SOUT#1379	SOUT#1378	SOUT#1377

51747	51746	51745	51744	51743	51742	51741	51740
SOUT#1392	SOUT#1391	SOUT#1390	SOUT#1389	SOUT#1388	SOUT#1387	SOUT#1386	SOUT#1385

51757	51756	51755	51754	51753	51752	51751	51750
SOUT#1400	SOUT#1399	SOUT#1398	SOUT#1397	SOUT#1396	SOUT#1395	SOUT#1394	SOUT#1393

51767	51766	51765	51764	51763	51762	51761	51760
SOUT#1408	SOUT#1407	SOUT#1406	SOUT#1405	SOUT#1404	SOUT#1403	SOUT#1402	SOUT#1401

4.10.5 Device 5

51777	51776	51775	51774	51773	51772	51771	51770
SOUT#1416	SOUT#1415	SOUT#1414	SOUT#1413	SOUT#1412	SOUT#1411	SOUT#1410	SOUT#1409

51787	51786	51785	51784	51783	51782	51781	51780
SOUT#1424	SOUT#1423	SOUT#1422	SOUT#1421	SOUT#1420	SOUT#1419	SOUT#1418	SOUT#1417

51797	51796	51795	51794	51793	51792	51791	51790
SOUT#1432	SOUT#1431	SOUT#1430	SOUT#1429	SOUT#1428	SOUT#1427	SOUT#1426	SOUT#1425

51807	51806	51805	51804	51803	51802	51801	51800
SOUT#1440	SOUT#1439	SOUT#1438	SOUT#1437	SOUT#1436	SOUT#1435	SOUT#1434	SOUT#1433

51817	51816	51815	51814	51813	51812	51811	51810
SOUT#1448	SOUT#1447	SOUT#1446	SOUT#1445	SOUT#1444	SOUT#1443	SOUT#1442	SOUT#1441

51827	51826	51825	51824	51823	51822	51821	51820
SOUT#1456	SOUT#1455	SOUT#1454	SOUT#1453	SOUT#1452	SOUT#1451	SOUT#1450	SOUT#1449

4.10.6 Device 6

51837	51836	51835	51834	51833	51832	51831	51830
SOUT#1464	SOUT#1463	SOUT#1462	SOUT#1461	SOUT#1460	SOUT#1459	SOUT#1458	SOUT#1457

51847	51846	51845	51844	51843	51842	51841	51840
SOUT#1472	SOUT#1471	SOUT#1470	SOUT#1469	SOUT#1468	SOUT#1467	SOUT#1466	SOUT#1465

51857	51856	51855	51854	51853	51852	51851	51850
SOUT#1480	SOUT#1479	SOUT#1478	SOUT#1477	SOUT#1476	SOUT#1475	SOUT#1474	SOUT#1473

51867	51866	51865	51864	51863	51862	51861	51860
SOUT#1488	SOUT#1487	SOUT#1486	SOUT#1485	SOUT#1484	SOUT#1483	SOUT#1482	SOUT#1481

51877	51876	51875	51874	51873	51872	51871	51870
SOUT#1496	SOUT#1495	SOUT#1494	SOUT#1493	SOUT#1492	SOUT#1491	SOUT#1490	SOUT#1489

51887	51886	51885	51884	51883	51882	51881	51880
SOUT#1504	SOUT#1503	SOUT#1502	SOUT#1501	SOUT#1500	SOUT#1499	SOUT#1498	SOUT#1497

4.10.7 Device 7

51897	51896	51895	51894	51893	51892	51891	51890
SOUT#1512	SOUT#1511	SOUT#1510	SOUT#1509	SOUT#1508	SOUT#1507	SOUT#1506	SOUT#1505

51907	51906	51905	51904	51903	51902	51901	51900
SOUT#1520	SOUT#1519	SOUT#1518	SOUT#1517	SOUT#1516	SOUT#1515	SOUT#1514	SOUT#1513

51917	51916	51915	51914	51913	51912	51911	51910
SOUT#1528	SOUT#1527	SOUT#1526	SOUT#1525	SOUT#1524	SOUT#1523	SOUT#1522	SOUT#1521

51927	51926	51925	51924	51923	51922	51921	51920
SOUT#1536	SOUT#1535	SOUT#1534	SOUT#1533	SOUT#1532	SOUT#1531	SOUT#1530	SOUT#1529

51937	51936	51935	51934	51933	51932	51931	51930
SOUT#1544	SOUT#1543	SOUT#1542	SOUT#1541	SOUT#1540	SOUT#1539	SOUT#1538	SOUT#1537

51947	51946	51945	51944	51943	51942	51941	51940
SOUT#1552	SOUT#1551	SOUT#1550	SOUT#1549	SOUT#1548	SOUT#1547	SOUT#1546	SOUT#1545

4.10.8 Device 8

51957	51956	51955	51954	51953	51952	51951	51950
SOUT#1560	SOUT#1559	SOUT#1558	SOUT#1557	SOUT#1556	SOUT#1555	SOUT#1554	SOUT#1553

51967	51966	51965	51964	51963	51962	51961	51960
SOUT#1568	SOUT#1567	SOUT#1566	SOUT#1565	SOUT#1564	SOUT#1563	SOUT#1562	SOUT#1561

51977	51976	51975	51974	51973	51972	51971	51970
SOUT#1576	SOUT#1575	SOUT#1574	SOUT#1573	SOUT#1572	SOUT#1571	SOUT#1570	SOUT#1569

51987	51986	51985	51984	51983	51982	51981	51980
SOUT#1584	SOUT#1583	SOUT#1582	SOUT#1581	SOUT#1580	SOUT#1579	SOUT#1578	SOUT#1577

51997	51996	51995	51994	51993	51992	51991	51990
SOUT#1592	SOUT#1591	SOUT#1590	SOUT#1589	SOUT#1588	SOUT#1587	SOUT#1586	SOUT#1585

52007	52006	52005	52004	52003	52002	52001	52000
SOUT#1600	SOUT#1599	SOUT#1598	SOUT#1597	SOUT#1596	SOUT#1595	SOUT#1594	SOUT#1593

4.11 Specific Output Signals for General-Purpose Applications

4.11.1 Device 1

51537	51536	51535	51534	51533	51532	51531	51530
SOUT#1224	SOUT#1223	SOUT#1222	SOUT#1221	SOUT#1220	SOUT#1219	SOUT#1218	SOUT#1217
					PROHIBIT WORK CONTINUE	END WORK	START WORK

51547	51546	51545	51544	51543	51542	51541	51540
SOUT#1232	SOUT#1231	SOUT#1230	SOUT#1229	SOUT#1228	SOUT#1227	SOUT#1226	SOUT#1225

51557	51556	51555	51554	51553	51552	51551	51550
SOUT#1240	SOUT#1239	SOUT#1238	SOUT#1237	SOUT#1236	SOUT#1235	SOUT#1234	SOUT#1233

51567	51566	51565	51564	51563	51562	51561	51560
SOUT#1248	SOUT#1247	SOUT#1246	SOUT#1245	SOUT#1244	SOUT#1243	SOUT#1242	SOUT#1241

51577	51576	51575	51574	51573	51572	51571	51570
SOUT#1256	SOUT#1255	SOUT#1254	SOUT#1253	SOUT#1252	SOUT#1251	SOUT#1250	SOUT#1249

51587	51586	51585	51584	51583	51582	51581	51580
SOUT#1264	SOUT#1263	SOUT#1262	SOUT#1261	SOUT#1260	SOUT#1259	SOUT#1258	SOUT#1257

4.11.2 Device 2

51597	51596	51595	51594	51593	51592	51591	51590
SOUT#1272	SOUT#1271	SOUT#1270	SOUT#1269	SOUT#1268	SOUT#1267	SOUT#1266	SOUT#1265
					PROHIBIT WORK CONTINUE	END WORK	START WORK

51607	51606	51605	51604	51603	51602	51601	51600
SOUT#1280	SOUT#1279	SOUT#1278	SOUT#1277	SOUT#1276	SOUT#1275	SOUT#1274	SOUT#1273

51617	51616	51615	51614	51613	51612	51611	51610
SOUT#1288	SOUT#1287	SOUT#1286	SOUT#1285	SOUT#1284	SOUT#1283	SOUT#1282	SOUT#1281

51627	51626	51625	51624	51623	51622	51621	51620
SOUT#1296	SOUT#1295	SOUT#1294	SOUT#1293	SOUT#1292	SOUT#1291	SOUT#1290	SOUT#1289

51637	51636	51635	51634	51633	51632	51631	51630
SOUT#1304	SOUT#1303	SOUT#1302	SOUT#1301	SOUT#1300	SOUT#1299	SOUT#1298	SOUT#1297

51647	51646	51645	51644	51643	51642	51641	51640
SOUT#1312	SOUT#1311	SOUT#1310	SOUT#1309	SOUT#1308	SOUT#1307	SOUT#1306	SOUT#1305

4.11.3 Device 3

51657	51656	51655	51654	51653	51652	51651	51650
SOUT#1320	SOUT#1319	SOUT#1318	SOUT#1317	SOUT#1316	SOUT#1315	SOUT#1314	SOUT#1313
					PROHIBITW ORK CONTINUE	END WORK	START WORK

51667	51666	51665	51664	51663	51662	51661	51660
SOUT#1328	SOUT#1327	SOUT#1326	SOUT#1325	SOUT#1324	SOUT#1323	SOUT#1322	SOUT#1321

51677	51676	51675	51674	51673	51672	51671	51670
SOUT#1336	SOUT#1335	SOUT#1334	SOUT#1333	SOUT#1332	SOUT#1331	SOUT#1330	SOUT#1329

51687	51686	51685	51684	51683	51682	51681	51680
SOUT#1344	SOUT#1343	SOUT#1342	SOUT#1341	SOUT#1340	SOUT#1339	SOUT#1338	SOUT#1337

51697	51696	51695	51694	51693	51692	51691	51690
SOUT#1352	SOUT#1351	SOUT#1350	SOUT#1349	SOUT#1348	SOUT#1347	SOUT#1346	SOUT#1345

51707	51706	51705	51704	51703	51702	51701	51700
SOUT#1360	SOUT#1359	SOUT#1358	SOUT#1357	SOUT#1356	SOUT#1355	SOUT#1354	SOUT#1353

4.11.4 Device 4

51717	51716	51715	51714	51713	51712	51711	51710
SOUT#1368	SOUT#1367	SOUT#1366	SOUT#1365	SOUT#1364	SOUT#1363	SOUT#1362	SOUT#1361
					PROHIBIT WORK CONTINUE	END WORK	START WORK

51727	51726	51725	51724	51723	51722	51721	51720
SOUT#1376	SOUT#1375	SOUT#1374	SOUT#1373	SOUT#1372	SOUT#1371	SOUT#1370	SOUT#1369

51737	51736	51735	51734	51733	51732	51731	51730
SOUT#1384	SOUT#1383	SOUT#1382	SOUT#1381	SOUT#1380	SOUT#1379	SOUT#1378	SOUT#1377

51747	51746	51745	51744	51743	51742	51741	51740
SOUT#1392	SOUT#1391	SOUT#1390	SOUT#1389	SOUT#1388	SOUT#1387	SOUT#1386	SOUT#1385

51757	51756	51755	51754	51753	51752	51751	51750
SOUT#1400	SOUT#1399	SOUT#1398	SOUT#1397	SOUT#1396	SOUT#1395	SOUT#1394	SOUT#1393

51767	51766	51765	51764	51763	51762	51761	51760
SOUT#1408	SOUT#1407	SOUT#1406	SOUT#1405	SOUT#1404	SOUT#1403	SOUT#1402	SOUT#1401

4.11.5 Device 5

51777	51776	51775	51774	51773	51772	51771	51770
SOUT#1416	SOUT#1415	SOUT#1414	SOUT#1413	SOUT#1412	SOUT#1411	SOUT#1410	SOUT#1409
					PROHIBITW ORK CONTINUE	END WORK	START WORK

51787	51786	51785	51784	51783	51782	51781	51780
SOUT#1424	SOUT#1423	SOUT#1422	SOUT#1421	SOUT#1420	SOUT#1419	SOUT#1418	SOUT#1417

51797	51796	51795	51794	51793	51792	51791	51790
SOUT#1432	SOUT#1431	SOUT#1430	SOUT#1429	SOUT#1428	SOUT#1427	SOUT#1426	SOUT#1425

51807	51806	51805	51804	51803	51802	51801	51800
SOUT#1440	SOUT#1439	SOUT#1438	SOUT#1437	SOUT#1436	SOUT#1435	SOUT#1434	SOUT#1433

51817	51816	51815	51814	51813	51812	51811	51810
SOUT#1448	SOUT#1447	SOUT#1446	SOUT#1445	SOUT#1444	SOUT#1443	SOUT#1442	SOUT#1441

51827	51826	51825	51824	51823	51822	51821	51820
SOUT#1456	SOUT#1455	SOUT#1454	SOUT#1453	SOUT#1452	SOUT#1451	SOUT#1450	SOUT#1449

4.11.6 Device 6

51837	51836	51835	51834	51833	51832	51831	51830
SOUT#1464	SOUT#1463	SOUT#1462	SOUT#1461	SOUT#1460	SOUT#1459	SOUT#1458	SOUT#1457
					PROHIBIT WORK CONTINUE	END WORK	START WORK

51847	51846	51845	51844	51843	51842	51841	51840
SOUT#1472	SOUT#1471	SOUT#1470	SOUT#1469	SOUT#1468	SOUT#1467	SOUT#1466	SOUT#1465

51857	51856	51855	51854	51853	51852	51851	51850
SOUT#1480	SOUT#1479	SOUT#1478	SOUT#1477	SOUT#1476	SOUT#1475	SOUT#1474	SOUT#1473

51867	51866	51865	51864	51863	51862	51861	51860
SOUT#1488	SOUT#1487	SOUT#1486	SOUT#1485	SOUT#1484	SOUT#1483	SOUT#1482	SOUT#1481

51877	51876	51875	51874	51873	51872	51871	51870
SOUT#1496	SOUT#1495	SOUT#1494	SOUT#1493	SOUT#1492	SOUT#1491	SOUT#1490	SOUT#1489

51887	51886	51885	51884	51883	51882	51881	51880
SOUT#1504	SOUT#1503	SOUT#1502	SOUT#1501	SOUT#1500	SOUT#1499	SOUT#1498	SOUT#1497

4.11.7 Device 7

51897	51896	51895	51894	51893	51892	51891	51890
SOUT#1512	SOUT#1511	SOUT#1510	SOUT#1509	SOUT#1508	SOUT#1507	SOUT#1506	SOUT#1505
					PROHIBITW ORK CONTINUE	END WORK	START WORK

51907	51906	51905	51904	51903	51902	51901	51900
SOUT#1520	SOUT#1519	SOUT#1518	SOUT#1517	SOUT#1516	SOUT#1515	SOUT#1514	SOUT#1513

51917	51916	51915	51914	51913	51912	51911	51910
SOUT#1528	SOUT#1527	SOUT#1526	SOUT#1525	SOUT#1524	SOUT#1523	SOUT#1522	SOUT#1521

51927	51926	51925	51924	51923	51922	51921	51920
SOUT#1536	SOUT#1535	SOUT#1534	SOUT#1533	SOUT#1532	SOUT#1531	SOUT#1530	SOUT#1529

51937	51936	51935	51934	51933	51932	51931	51930
SOUT#1544	SOUT#1543	SOUT#1542	SOUT#1541	SOUT#1540	SOUT#1539	SOUT#1538	SOUT#1537

51947	51946	51945	51944	51943	51942	51941	51940
SOUT#1552	SOUT#1551	SOUT#1550	SOUT#1549	SOUT#1548	SOUT#1547	SOUT#1546	SOUT#1545

4.11.8 Device 8

51957	51956	51955	51954	51953	51952	51951	51950
SOUT#1560	SOUT#1559	SOUT#1558	SOUT#1557	SOUT#1556	SOUT#1555	SOUT#1554	SOUT#1553
					PROHIBIT WORK CONTINUE	END WORK	START WORK

51967	51966	51965	51964	51963	51962	51961	51960
SOUT#1568	SOUT#1567	SOUT#1566	SOUT#1565	SOUT#1564	SOUT#1563	SOUT#1562	SOUT#1561

51977	51976	51975	51974	51973	51972	51971	51970
SOUT#1576	SOUT#1575	SOUT#1574	SOUT#1573	SOUT#1572	SOUT#1571	SOUT#1570	SOUT#1569

51987	51986	51985	51984	51983	51982	51981	51980
SOUT#1584	SOUT#1583	SOUT#1582	SOUT#1581	SOUT#1580	SOUT#1579	SOUT#1578	SOUT#1577

51997	51996	51995	51994	51993	51992	51991	51990
SOUT#1592	SOUT#1591	SOUT#1590	SOUT#1589	SOUT#1588	SOUT#1587	SOUT#1586	SOUT#1585

52007	52006	52005	52004	52003	52002	52001	52000
SOUT#1600	SOUT#1599	SOUT#1598	SOUT#1597	SOUT#1596	SOUT#1595	SOUT#1594	SOUT#1593

DX100	4 Specific I/O Signals 4.12 Specific Output Signals: Explanation
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4.12 Specific Output Signals: Explanation

The following symbols are used in the explanation to represent the signal conditions.



The signal takes effect while it is in the on state.



The rising edge is detected as the signal.

4.12.1 Alarms and Messages Display

■ 50010 to 50014: ALARM/ERROR OCCURRENCE



These signals indicate the occurrence of alarms or errors. The “MAJOR ALM OCCUR” (50010) signal remains ON until power is turned off.

■ Register M640 Alarm Code (Binary/BCD)

If an alarm occurs in the system, the corresponding alarm code is output. If there are two or more alarms, the code of the first occurring alarm is output. To switch binary and BCD data type, use the parameter (S2C315). Factory setting is binary.

■ Register M641, 642 Alarm Data (Binary/BCD)

This data is detailed information added to the alarm code.

■ 50015, 50016: BATTERY WEAK



These signals are turned ON to indicate that batteries need replacement when voltage drops in the memory protection battery and the absolute encoder memory retention battery. Loss of data in memory due to a weak battery causes much damage.

Take the signals as a kind of alarm and take appropriate action.

■ 50017: COOLING FAN ERROR



This signal is turned ON to inform that the cooling fan is required to be changed when the CPU rack cooling fan inside DX100 or the cooling fan connected to the power on unit is not operating normally. Such an error as non-operating cooling fan causes damages to DX100 and robot components.

Take the signal as a kind of alarm and take appropriate action.

DX100	4	Specific I/O Signals
	4.12	Specific Output Signals: Explanation

4.12.2 Setting of Mode / Cycle and Particular Play Operation

- **50050 to 50052: CYCLE SETTING**



These signals indicate the status of specifications of current cycle setting. The signal corresponding to the selected cycle is turned on.

- **50053 to 50054: MODE SETTING**



These signals indicate the status of specifications of current mode settings. The signals are synchronized with the mode select key lamps on the front door of the DX100. The signal corresponding to the selected mode is turned on.

- **50056: COMMAND REMOTE SETTING**



This signal indicates that the command remote function such as transmission is valid.

- **50060: IN-GUARD SAFE OPERATION SETTING**



This signal indicates that the manipulator is in the in-guard safe operation status.

- **50061: DRY-RUN SETTING**



This signal indicates that the dry-run is set.

- **50062: MACHINE LOCK SETTING**



This signal indicates that the machine lock is set.

- **50063: SOFT LIMIT RELEASE SETTING**



This signal indicates that the soft limit is released. Switching to the play mode releases the soft limit automatically and turns off this signal.

- **50064: CHECK RUN SETTING**



This signal indicates the check run is set.

4.12.3 Start and Stop Signals

■ **50020: HEAD OF MASTER JOB**



This signal indicates that the execution position is at the head of the master job. The signal can be used as a check signal calling for master job.

■ **50065: PERMISSIBLE WORK IN TEST RUN (FOR ARC ONLY)**



The signal turns ON while the [INTERLOCK]+[WELD ON/OFF] keys are pressed simultaneously. The LED on the [WELD ON/OFF] button is lit while the signal is ON.

This signal takes effect only in the teach mode.

■ **50066: POSITION CHECK COMPLETED**



This signal indicates that the position check operation has been completed after "Alarm 4107: OUT OF RANGE (ABSO DATA)" occurred. The signal stays ON if the alarm does not occur after power ON.

■ **50067: FULL SPEED RUNNING**



This signal indicates that the manipulator is running in the condition that the safe speed limit is released.

■ **50070: RUNNING (Start Lamp)**



This signal indicates that the manipulator is running. That is, the manipulator is either executing jobs, ready for reserved starting, ready for multi-series starting, or performing test run. This signal is synchronized with the state of the "START" button on the programming pendant.

■ **50071: HOLDING (Hold Lamp)**



This signal indicates that the manipulator is in the "HOLDING" status as "HOLD" being instructed. This signal is synchronized with the state of the "HOLD" button on the programming pendant.

■ **50073: SERVO ON**



This signal indicates that after the servo power is turned on, internal processing such as current position setting has been completed and the system is ready to accept "START" instruction. This can be used for determining external starting conditions.

■ **50074: I/O SIMULATED**



This signal indicates any of the signals that are in the simulation mode in the IO windows.

■ **50075: JOB EDITING OPERATION INDICATION**



This signal indicates that the job to be executed has just been edited, searched, or manipulated with the cursor on. This can be used for determining starting conditions after editing.

■ **50076: JOG OPERATION INDICATION**



This signal indicates that the manipulator was made to move an axis or followed the FWD/BWD operation on the programming pendant. This signal goes OFF automatically when playback is started. This can be used for determining restarting condition.

■ **50077: OT RELEASE**



This signal indicates that the overrun status is released.

■ **50320 to 50357: SERVO ON STATUS**



These signals indicate that the servo power for each robot/station is ON. With the signal ON, the corresponding servo power for each robot/station is ON.

■ **50360 to 50367: SEQUENCE WAITING**



These signals indicate that the manipulator is stopped by the "SEQUENCE WAIT" (40130 to 40137) signal. After accepting the above signal and the manipulator has stopped, these signals go ON. When sequence wait is cleared, these signals go OFF before the manipulator starts operating.

■ **50400 to 40407: SEQUENCE CONTINUING**



These signals indicate that manipulator operation is in executing state in the sequence of instruction as taught. These signals go ON when the initial job is executed after the power is turned on.

The same conditions as above are applied to the "FWD" and "TEST" operations on the programming pendant.

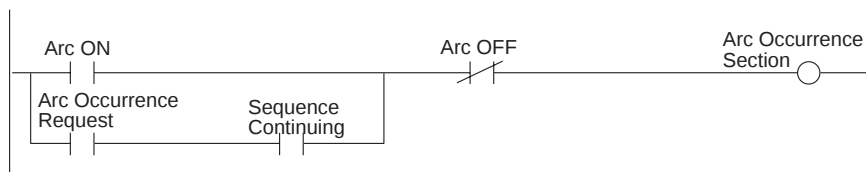
These signals go OFF in the following cases.

- When the cursor is moved by the operation such as change of the line No. with the programming pendant at the manipulator stop.
- When a different job is called up.
- When edit operation (insertion, modification, deletion) is executed from the programming pendant.

For a system with one manipulator, use signal No. 50400.

<Example>

These signals can be used for intentional reset of work section information as shown below.



■ **50440 to 50447: CONTROL GROUP RUNNING**



This signal indicates that the manipulator is running (segment data is not equal to 0)

■ **50480 to 50487: WORK RESTART PROHIBIT**



When an emergency stop is executed during running at high-speed, the job instruction stop position may advance from the actual manipulator position due to the servo delay. At restarting, the manipulator moves adjusting this delay, then the job is executed. When the instruction stop position is in the work section of arc welding, etc., these signals are ON until the manipulator moves for the delay to reach the position of work start (Arc ON, etc.). and indicate the work restart prohibited status.

For a system with one manipulator, use signal No. 50480 (R1).

■ **50490 to 50497: PERMISSIBLE WORK RUNNING**



These signals indicate that the manipulator is running at the actual workable speed. These signals are turned on being synchronized with "RUNNING" (50490) signal. The status of these signals during operations other than normal playback operation are shown below. .

State 0 : OFF 1 : ON	Meaning
0	- Machine Lock Operation - Dry-Run Operation - Low-Speed Start-Up Operation
1	- During in-guard safety operation - During continuous operation with the programming pendant - When adjusting speed during operation - When speed is limited by the sensor

For a system with one manipulator, use R1J (50490)

■ **50500 to 50507 : SEARCH START**



These signals indicate that "SEARCH" instruction being executed. These signals can be used as effective sensing signals for external sensor.

For a system with one manipulator, use signal No. 50500.

DX100	4	Specific I/O Signals
	4.12	Specific Output Signals: Explanation

■ **50520 to 50527: LOCUS DEVIATION**



These signals indicate that the corresponding manipulators are deviating from the natural locus, as jog operation after the emergency stop or motion stop.

For a system with one manipulator, use signal No. 50520.

■ **50690, 50691, 50692: SECURITY MODE**



These signals indicate the current setting of security mode.

50690: Operation mode

50691: Editing mode

50692: Management mode

■ **50694: PLAY MODE ENABLE**



This signal indicates that the play mode enable signal is turned on after changing the mode to PLAY in the play mode enable function.

4.12.4 Interference Signals

■ 50080 to 50157: IN-CUBE



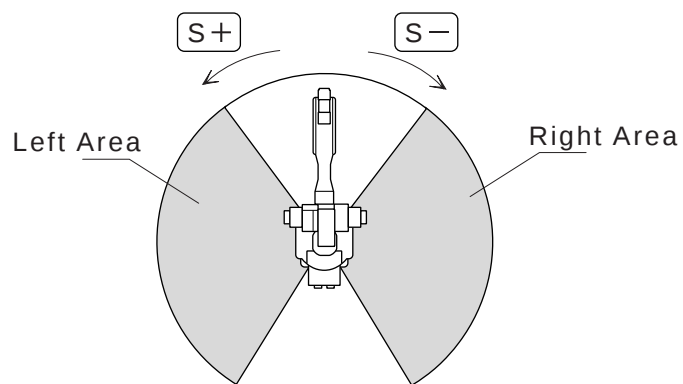
These signals indicate the area in which the current control point is positioned, or in which the axis is positioned in the initially set area. Set the area by parameters (S2C003 to S2C194, S3C064 to S2C1087). These can be used to prevent interference with other manipulators or jigs.

■ 50160 to 50177: S-AXIS INTERFERENCE AREA



These signals indicate the area in which the current S-Axis is positioned in the initially set area. Set the area by parameters (S2C002, S3C048 to S3C063). These can be used to prevent interference with other manipulators or jigs.

Fig. 4-3: Relation Between the Area and the Signal



DX100	4	Specific I/O Signals
	4.12	Specific Output Signals: Explanation

4.12.5 Arithmetic Instruction Signal

- **51400, 51401, 51402: Arithmetic Flag**



These signals reflect the result of the arithmetic instruction in the following steps. There are three kinds of flag: Carry Flag(51400), Zero Flag(51401), and Error Flag(51402).

4.12.6 Signals During Operation and for Jog Offset Junction (Optional)

- **50021 to 50037 : TOP SUB 1 to 15 MASTER**



These signals indicate that the execution position is at the head of the master job in sub task 1 to 15. Use as a checking signal of master job in each sub task call.

- **50601 to 50617: SUB HELD**



These signals indicate sub task 1 to 15 stops the operation by alarm occurrence or the "PAUSE" instruction. Operation can be restarted by pressing the [START] key on the front door of the DX100 or inputting external start (40044).

These signals are turned off when all tasks stop or the sub task is released.

- **50621 to 50637 : SUB ALARM OCCUR**



These signals indicate that the sub task is generating an alarm individually during the system section alarm occurrence (50012) or user section alarm occurrence (50013).

- **50640 to 50657: CRD WORKING**



It notifies the operator that master and sub tasks No. 1 to 15 are in execution.

- **50660 to 50677: SUB 1 to 15 MASTER OPERATING**



These signals indicate that the robot is operating by sub task 1 to 15 and the master job signals.

4.12.7 Signals for Servo Float Function (Optional)

■ **50510 to 50517: SERVO FLOAT ON**



These signals indicate the servo float operating status.

In the system with one manipulator, use signal No. 50274 (R1).

■ **50560 to 50567: SHOCK DETECTION VALID**



This signal indicates that the shock detection function is valid.

■ **50697: SHOCK DTCT ALM**



This signal indicates that the shock detection alarm "4315: SHOCK DETECTION" currently occurs.

4.12.8 Singals for Arc Welding

Signals from 51530 to 52007 are classified into eight blocks and assigned to output signals that have different meanings depending on the application. Most of these outputs are used by the system so they cannot be used from the outside of the DX100. This section explains exceptional signals that are available for external use.

■ **51530, 51590, 51650, 51710, 51770, 51830, 51890, 51950**
: WORK START Instructions



These signals indicate work starting and wait for inputting of the "WORK START RESPONSE" (41130, 41190, 41250, 41310, 41370, 41430, 41490, 41550) signal.

For a system with one application, use signal No. 51530.

■ **51531, 51591, 51651, 51711, 51771, 51831, 51891, 51951**
: WORK END Instructions



These signals indicate work ending and wait for inputting of the "WORK END RESPONSE" (41131, 41191, 41251, 41311, 41371, 41431, 41491, 41551) signal.

For a system with one application, use signal No. 51531.

■ **51532, 51592, 51652, 51712, 51772, 51832, 51892, 51952**
: WORK CONTINUING PROHIBIT Instructions



These signals indicate whether to continue the operation when resuming after stopping during the operation. When the signals are on, the operation is not continued.

For a system with one application, use signal No. 51532.

■ **51533, 51593, 51653, 51713, 51773, 51833, 51893, 51953**
: TIP REPLACEMENT REQUEST



These signals indicate that the preset tip replacement time has come. The signals are reset by the "TIP REPLACEMENT COMPLETED" (41133, 41193, 41253, 41313, 41373, 41433, 41493, 41553) signals.

For a system with one application, use signal No. 51533.

■ **51534, 51594, 51654, 51714, 51774, 51834, 51894, 51954**
: NOZZLE CLEANING REQUEST



These signals indicate that the set nozzle cleaning request time has come. These signals are reset by "NOZZLE CLEANED" (41134, 41194, 41254, 41314, 41374, 41434, 41494, 41554) signals.

For a system with one application, use signal No. 51534.

■ **51535, 51595, 51655, 51715, 51775, 51835, 51895, 51955**
: INCHING



These signals go ON when using the inching of the work instructions.

For a system with one application, use signal No. 51535.



For normal inching, use signal No. OT# 2047, 2039, 2031, 2023, 2015, 2007, 1999, 1991.

■ **51536, 51596, 51656, 51716, 51776, 51836, 51896, 51956**
: RETRACT



These signals go ON when using retract of the work instructions.

For a system with one application, use signal No. 50536.



For normal inching, use signal No. OT# 2048, 2040, 2032, 2024, 2016, 2008, 2000, 1992.

■ **51537, 51597, 51657, 51717, 51777, 51837, 51897, 51957**
: RETRY RETURN PROCESSING



These signals indicate that the retry returning is executed by the "RETRY RETURN REQUEST" (41136, 41196, 41256, 41316, 41376, 41436, 41496, 41556) signals.

For a system with one application, use signal No. 50537.

■ **51540, 51600, 51660, 51720, 51780, 51840, 51900, 51960**
: RESTART PROCESSING (ARC SHORTAGE)



- **51541, 51601, 51661, 51721, 51781, 51841, 51901, 51961**
: RESTART PROCESSING (GAS SHORTAGE)



- **51542, 51602, 51662, 51722, 51782, 51842, 51902, 51962**
: RESTART PROCESSING (WIRE SHORTAGE)



These signals indicate that restarting is executed by the "RESTART REQUEST" (41140 to 41142, 41200 to 41202, 41260 to 41262, 41320 to 41322, 41380 to 41382, 41440 to 41442, 41500 to 41502, 41560 to 41562) signals. These can be released by the "RESTART PROCESS RESET" OT# 2046, 2038, 2030, 2022, 2014, 2006, 1998 signals.

For a system with one application, use signal No. 51540, 51541, or 51542.

- **51543, 51603, 51663, 51723, 51783, 51843, 51903, 51963**
: RESTART RETURN PROCESSING



These signals are one of the signals related to the restarting operations and indicate that the restart returning is executed.

For a system with one application, use signal No. 51543.

- **51544, 51604, 51664, 51724, 51784, 51844, 51904, 51964**
: RETRY SETTING TIME EXCEEDED



These signals indicate that the accumulated number of restart times has been reached or exceeded the set value.

For a system with one application, use signal No. 51544.

- **51545, 51605, 51665, 51725, 51785, 51845, 51905, 51965**
: ARC SHORTAGE RESTART SETTING TIMES EXCEEDED



These signals indicate that the accumulated number of arc shortage restart times has been reached or exceeded the set value.

For a system with one application, use signal No. 51545.

- **51546, 51606, 51666, 51726, 51786, 51846, 51906, 51966**
: AUTOMATIC ANTI-STICKING SETTING TIMES EXCEEDED



These signals indicate that the accumulated number of automatic anti-sticking times has been reached or exceeded the set value.

For a system with one application, use signal No. 51546.

■ **51547, 51607, 51667, 51727, 51787, 51847, 51907, 51967
: RETRY REPLAY MODE**



These signals inform that arc retry is being executed in the replay operation mode.

For a system with one application, use signal No. 51547.

■ **51554, 51614, 51674, 51734, 51794, 51854, 51914, 51974
: GAS OUTPUT**



It notifies the operator that gas output is in progress.

For a system with one application, use signal No. 51554.

DX100	4 Specific I/O Signals
	4.12 Specific Output Signals: Explanation

4.12.9 Signals for Handling

Signals from 51530 to 52007 are classified into eight blocks and assigned to output signals that have different meanings depending on the application. Most of these outputs are used by the system so they cannot be used from the outside of the DX100. This section explains exceptional signals that are available for external use.

■ **51536, 51596, 51656, 51716, 51776, 51836, 51896, 51956**
: **SHOCK SENSOR FUNCTION SELECT**



This signal monitors the status of the shock sensor function use in the handling application.

For a system with one application, use signal No. 51536.

■ **51537, 51597, 51657, 51717, 51777, 51837, 51897, 51957**
: **SHOCK SENSOR INPUT**



These signals output the status signal to show whether the shock sensor input function is valid in the teach mode for the handling application. When concurrent I/O is the standard handling ladder, an alarm occurs by shock sensor input when these signals are ON; only a message is displayed on the programming pendant when these are OFF. "JOG" and other operations can be executed.

For a system with one application, use signal No. 51537.

■ **51540 to 51547, 51600 to 51607, 51660 to 51667, 51720 to 51727, 51780 to 51787, 51840 to 51847, 51900 to 51907, 51960 to 51967**
: **TOOL VALVE OUTPUT**



These signals are specific output signals for tool valves which are turned on/off by the instruction "HAND". When using the "HAND" instruction, connect it to the specific input section of the YIO01 board which is connected to these signals.

For a system with one manipulator, use signal No. 51540 to 51547.

4.12.10 Signals for Spot Welding

Signals from 51530 to 52007 are classified into eight blocks and assigned to output signals for spot welding applications. Most of these inputs are used by the system so they cannot be used from the outside of the DX100. This section explains exceptional signals that are available for external use.

■ **51533, 51543, 51553, 51563, 51573, 51583, 51593, 51603**
: WEAR DETECTION NORMAL



These signals are turned on when the detected wear friction amount is normal after executing the wear detection with a sensor (TWC-B) by a SVGUNCL instruction.

■ **51534, 51544, 51554, 51564, 51574, 51584, 51594, 51604**
: WEAR DETECTION ERROR (Motor Gun)



These signals output pulses (pulse width: 500 msec) if the signal from a sensor is not turned on/off properly when executing the wear detection with the sensor.

For a system for one application, use signal No. 51534.

■ **51535, 51545, 51555, 51565, 51575, 51585, 51595, 51605**
: CHANGE TIP ALM (Motor Gun)



These signals output pulses (pulse width: 500 msec) if the electrode wear amount exceeds the alarm set value (parameter AxP016 and AxP017) when executing the wear detection.

For a system for one application, use signal No. 51535.

■ **51536, 51546, 51556, 51566, 51576, 51586, 51596, 51606**
: SVSPOT EXECUTE (Motor Gun)



These signals turn on while a SVSPOT instruction is executing in a job.

For a system for one application, use signal No. 51536.

■ **51537: WELDING ON/OFF**



This signal monitors the welding on/off from the programming pendant.

Use this signal when the manual spot welding in the teach mode.

■ **51540, 51550, 51560, 51570, 51580, 51590, 51600, 51610**
: SENSOR DETECTING



These signals are turned on when the wear detection with a sensor (TWC-B) is executing by a SVGUNCL instruction.

DX100	4	Specific I/O Signals
	4.12	Specific Output Signals: Explanation

4.12.11 Signals for General-Purpose Applications

Signals from 51530 to 52007 are classified into eight blocks and assigned to output signals that have different meanings depending on the application. Most of these outputs are used by the system so they cannot be used from the outside of the DX100. This section explains exceptional signals that are available for external use.

■ **51530, 51590, 51650, 51710, 51770, 51830, 51890, 51950**
: **WORK START Instructions**



These signals indicate work starting and wait for inputting of the "WORK START RESPONSE" (41130, 41190, 41250, 41310, 41370, 41430, 41490, 41550) signal.

For a system with one application, use signal No. 51530.

■ **51531, 51591, 51651, 51711, 51771, 51831, 51891, 51951**
: **WORK END Instructions**



These signals indicate work ending and wait for inputting of the "WORK END RESPONSE" (41131, 41191, 41251, 41311, 41371, 41431, 41491, 41551) signal.

For a system with one application, use signal No. 51531.

■ **51532, 51592, 51652, 51712, 51772, 51832, 51892, 51952**
: **WORK CONTINUING PROHIBIT Instructions**



These signals indicate whether to continue the operation when resuming, after stopping while at the operation. When the signals are ON, the operation is not continued.

For a system with one application, use signal No. 51532.

5 Internal Signal Used in Standard Ladder

5.1 Signals for Arc Welding

70017	70016	70015	70014	70013	70012	70011	70010
CONTROL POWER ON COMPLETED (NORMALITY ON)	SYSTEM RESERVE	SYSTEM RESERVE				EXT START RECEIVING READY	EXT START

70027	70026	70025	70024	70023	70022	70021	70020
		REMOTE SELECT			SEQUENCE PROGRAM WAIT REQUEST	WAIT UNTIL INTRFRNC OFF	ALARM OCCUR

70037	70036	70035	70034	70033	70032	70031	70030
IN CUBE 4	IN CUBE 3	IN CUBE 2	IN CUBE 1	INTRF 4 ENTRANCEPR OHIBIT	INTRF 3 ENTRANCE PROHIBIT	INTRF 2 ENTRANCEPR OHIBIT	INTRF 1 ENTRANCEPR OHIBIT

70047	70046	70045	70044	70043	70042	70041	70040
MOTOR STOP MEMORY	ARC OCCUR PROHIBIT	PSEUDO ARC ON	STICK DETECTION	WIRE SHORTAGE	GAS SHORTAGE	ARC SHORTAGE	ARC OCCUR CHECK

70057	70056	70055	70054	70053	70052	70051	70050
WIRE RETRACT REQUEST	WIRE INCHING REQUEST	MOTOR REVERSE ROTATION PERMIT	MOTOR FORWARD ROTATION PERMIT	MOTOR REVERSE ROTATION MEMORY	MOTOR FORWARD ROTATION MEMORY	MOTOR DIRECTION CHANGE PROHIBIT	MOTOR DIRECTION CHANGE PERMIT

70067	70066	70065	70064	70063	70062	70061	70060
ARC ANSWER ERROR (SUB)	ARC OCCUR CONDITION OK	ARC OCCUR CONDITIONM ODE	ARC OCCUR CONDITION CYCLE	ARC STOP	ARC ON INTERVAL	WIRE RETRACT	WIRE INCHING

70077	70076	70075	70074	70073	70072	70071	70070
STICKING (AT ON/OFF)	STICKING (AT ON)	STICKING (AT OFF)	STICKING DETECTION (AT OFF/ ERROR)	STICKING CHECK REQUEST	ARC OCCRRNC MEMORY	ARC ON CONTINUE PROHIBIT	ARC OCCUR

70087	70086	70085	70084	70083	70082	70081	70080
STICKING CHECKED (AT ARC ANS ERROR)	ARC SHORTAGE (AT ARC ON)	AUTO STICKING RELEASE COUNTINUE	AUTO STICKING RELEASE	STICKING CHECKED	STICKING CHECK	NO STICKING	STICKING (FINAL)

70097	70096	70095	70094	70093	70092	70091	70090
RESTART RETURN MEMORY	RETRYING	RETRY COUNT	RETRY PROCES-SING	RETRY TESTED	RETRY REQUEST MEMORY	ARC ANSWER ERROR OUTPUT	ARC ANSWER ERROR (FINAL)

70107	70106	70105	70104	70103	70102	70101	70100
WIRE SHORTAGE MESSAGE CONDITION	GAS SHORTAGE MESSAGE CONDITION	ARC SHORTAGE ALARM CONDITION	RESTART INVALID	RESTARTING	RESTART MEMORY	ARC SHORTAGE RESTART MEMORY RESET	ARC SHORTAGE RESTART MEMORY

70117	70116	70115	70114	70113	70112	70111	70110
ARC SHORTAGE ALARM CONDITIONW AITING 2	ARC SHORTAGE ALARM CONDITIONW AITING 1	RESTART MESSAGE INVALID	ARC ALARM REQUEST MEMORY	WIRE SHORTAGE ALARM REQUEST MEMORY	GAS SHORTAGE ALARM REQUEST MEMORY	WIRE SHORTAGE ALARM CONDITION	GAS SHORTAGE ALARM CONDITION

70127	70126	70125	70124	70123	70122	70121	70120
ARC RESTART FAILURE	ARC SHORTAGE RESTART REQUEST	OPERATION CONTINUING	ARC STOP (AT ARC SHORTAGE RESTART)	WIRE SHORTAGE MESSAGE CONDITION WAITING 2	WIRE SHORTAGE MESSAGE CONDITION WAITING 1	GAS SHORTAGE MESSAGE CONDITIONW AITING 2	GAS SHORTAGE MESSAGE CONDITIONW AITING 1

70137	70136	70135	70134	70133	70132	70131	70130
STICKING (MOVE CHECK)	STICKING DETECTION AT MOVING (MOVE CHECK)	NO STICKING (MOVE CHECK)	MOVE STICKING CHECK PROHIBIT	MOVE STICKING CHECKING	MOVE STICKING CHECK	TEST RUN ARC ON SELECT (OPERATION & EDIT)	TEST RUN ARC ON SELECT (MANAGE- MENT)

70147	70146	70145	70144	70143	70142	70141	70140
ARC ALARM OCCUR	WIRE SHORTAGE ALARM OCCUR	GAS SHORTAGE ALARM OCCUR			GAS CHECK	SYSTEM ALARM REQUEST ASSISTANCE	STICKING ALARM REQUEST

70157	70156	70155	70154	70153	70152	70151	70150
ARC AND RELAY STICKING CONFIRM AUXILIARY	ARC CONFIRM RELAY STICKING	ARC OCCURING (STATE)	ARC SHORTAGE (ROBOT SIDE)	WELDING POWER ERROR	ARC SHORTAGE REQUEST DELAY TIME 12 msec	ARC SHORTAGE REQUEST DELAY TIME 8 msec	ARC SHORTAGE REQUEST DELAY TIME 4 msec

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79997	79996	79995	79994	79993	79992	79991	79990

5.2 Signals for Handling

70017	70016	70015	70014	70013	70012	70011	70010
CONTROL POWER ON COMPLETED (NORMALITY ON)	SYSTEM RESERVE	SYSTEM RESERVE					EXT START

70027	70026	70025	70024	70023	70022	70021	70020
		REMOTE SELECT			EXT HOLD	WAIT UNTIL INTRFNC OFF	ALARM OCCUR

70037	70036	70035	70034	70033	70032	70031	70030
IN CUBE 4	IN CUBE 3	IN CUBE 2	IN CUBE 1	INTRF 4 ENTRANCE PROHIBIT	INTRF 3 ENTRANCE PROHIBIT	INTRF 2 ENTRANCE PROHIBIT	INTRF 1 ENTRANCE PROHIBIT

70047	70046	70045	70044	70043	70042	70041	70040
	IN CUBE 7	IN CUBE 6	IN CUBE 5		INTRF 7 ENTRANCE PROHIBIT	INTRF 6 ENTRANCE PROHIBIT	INTRF 5 ENTRANCE PROHIBIT

70057	70056	70055	70054	70053	70052	70051	70050
			AIR PRESSURE LOW INPUT	SHOCK SENSOR INPUT	WORK INST CONT PROHIBIT	WORK RUNNING	WORK INSTRUCTION

70067	70066	70065	70064	70063	70062	70061	70060
PLAY/CONT SELECT	PLAY/CONT SELECTING	PLAY/1 CYCLE SELECT	PLAY/1 CYCLE SELECTING				

⋮
⋮

79997	79996	79995	79994	79993	79992	79991	79990

5.3 Signals for Spot Welding

70017	70016	70015	70014	70013	70012	70011	70010
CONTROL POWER ON COMPLETED (NORMALITY ON)	SYSTEM RESERVE	SYSTEM RESERVE				START RECEIVING READY	EXT START

70027	70026	70025	70024	70023	70022	70021	70020
		REMOTE SELECT				WAITING UNTIL INTRFRNC OFF	ALARM OCCUR

70037	70036	70035	70034	70033	70032	70031	70030
IN CUBE 4	IN CUBE 3	IN CUBE 2	IN CUBE 1	INTRF 4 ENTRANCE PROHIBIT	INTRF 3 ENTRANCE PROHIBIT	INTRF 2 ENTRANCE PROHIBIT	INTRF 1 ENTRANCE PROHIBIT

70047	70046	70045	70044	70043	70042	70041	70040
						WELDING STOP INPUT	WELDING ON/ OFF REQUEST

70057	70056	70055	70054	70053	70052	70051	70050
			GUN COOL WATER ERROR INPUT				TIMER COOL WATER ERROR INPUT

70067	70066	70065	70064	70063	70062	70061	70060
			AIR PRESSURE LOW ERROR INPUT				TRANS THERMO ERROR INPUT

70077	70076	70075	70074	70073	70072	70071	70070
							WELDING ON/ OFF OUTPUT

70087	70086	70085	70084	70083	70082	70081	70080
				AIR PRESS LOW ALARM REQUEST	TRANS THERMO ALARM REQUEST	GUN COOL WATER ALARM REQUEST	TIMER COOL WATER ALARM REQUEST

70097	70096	70095	70094	70093	70092	70091	70090
				AIR PRESS LOW MESSAGE REQUEST		GUN COOL WATER MESSAGE REQUEST	TIMER COOL WATER MESSAGE REQUEST

DX100	5 Internal Signal Used in Standard Ladder 5.3 Signals for Spot Welding
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79997	79996	79995	79994	79993	79992	79991	79990

5.4 Signals for General-Purpose Applications

70017	70016	70015	70014	70013	70012	70011	70010
CONTROL POWER ON COMPLETED (NORMALITY ON)	SYSTEM RESERVE	SYSTEM RESERVE				EXT START RECEIVING READY	EXT START

70027	70026	70025	70024	70023	70022	70021	70020
		REMOTE SELECT				WAIT UNTIL INTRFRNC OFF	ALARM OCCUR

70037	70036	70035	70034	70033	70032	70031	70030
IN CUBE 4	IN CUBE 3	IN CUBE 2	IN CUBE 1	INTRF 4 ENTRANCE PROHIBIT	INTRF 3 ENTRANCE PROHIBIT	INTRF 2 ENTRANCE PROHIBIT	INTRF 1 ENTRANCE PROHIBIT

70047	70046	70045	70044	70043	70042	70041	70040
				WORK PROHIBIT	WORK INSTRUCTION CONTINUE PROHIBIT	WORK OPERATING	WORK INSTRUCTION

70057	70056	70055	70054	70053	70052	70051	70050

⋮
⋮

79997	79996	79995	79994	79993	79992	79991	79990

6 Internal Control Status Signals

6.1 Internal Control Status Signals

* : NC contact

80017	80016	80015	80014	80013	80012	80011	80010
SVON	START	HOLD		TEACH	PLAY	REMOTE	EDIT_LOCK

EDIT_LOCK	Editing Prohibit
REMOTE	Remote Mode Select
PLAY	Play Mode Select
TEACH	Teach Mode Select
*HOLD	Hold (Programming Pendant)
START	Operation Start (Programming Pendant)
SVON	Servo On (Programming Pendant)

80027	80026	80025	80024	80023	80022	80021	80020
PBESP	PPESP	EXESP	ERRCPU	SAFF			

*SAFF	Safety Plug Input
*ERRCPU	YCP01 CPU Error (Emergency Stop)
*EXESP	External Emergency Stop
*PPESP	Programming Pendant Emergency Stop
*PBESP	DX100 Door Emergency Stop

80037	80036	80035	80034	80033	80032	80031	80030
EXSVON	EXDSW	EXHOLD	DSW	SVCNRDY1		SVONRDY0	

SVON RDY0	Servo ON Condition 1
SVON RDY1	Servo ON Condition 2
DSW	Enable Switch Input
*EXHOLD	External Hold
EXDSW	External Enable Switch Input
EXSVON	External Servo On

DX100	6	Internal Control Status Signals
	6.1	Internal Control Status Signals

80047	80046	80045	80044	80043	80042	80041	80040
FST	SSP					SAFSPD1	SAFSPD2

SAFSPD2 Safe Speed 2
SAFSPD1 Safe Speed 1
SSP Safe Speed Mode Select
FST Full-speed Test

80057	80056	80055	80054	80053	80052	80051	80050
						EX24VU_OK	24VU_OK

24VU_OK 24V OK
EX24VU_OK External 24V OK

80067	80066	80065	80064	80063	80062	80061	80060
OT	EXOT	SHOCK1	ERRSVCPU		FUCUT	ON_EN	SHOCK2

*SHOCK2 Shock Sensor Operation Hold
*ON_EN Servo On Enabled
*FUCUT Blake Fuse Blown
*ERRSVCPU Servo CPU Error
*SHOCK1 Shock Sensor Operation Emergency Stop
*EXOT Ex-Axis Over Travel
*OT Over Travel

80077	80076	80075	80074	80073	80072	80071	80070
				CPDIN4	CPDIN3	CPDIN2	CPDIN1

CPDIN1 (CPRIN1) Direct In (System) 1
CPDIN2 (CPRIN2) Direct In (System) 2
CPDIN3 (CPRIN3) Direct In (System) 3
CPDIN4 (CPRIN4) Direct In (System) 4

80087	80086	80085	80084	80083	80082	80081	80080
		AXDIN6	AXDIN5	AXDIN4	AXDIN3	AXDIN2	AXDIN1

AXDIN1 (RIN1)	Direct In (Servo) 1
AXDIN2 (RIN2)	Direct In (Servo) 2
AXDIN3 (RIN3)	Direct In (Servo) 3
AXDIN4 (RIN4)	Direct In (Servo) 4
AXDIN5 (RIN5)	Direct In (Servo) 5
AXDIN6 (RIN6)	Direct In (Servo) 6

80097	80096	80095	80094	80093	80092	80091	80090

:
:

80647	80646	80645	80644	80643	80642	80641	80640

6.1.1 Internal Control Status Signal (Monitor)

The following symbols are used in the explanation to represent the signal conditions.



The signal takes effect while it is in the on state.



The rising edge is detected as the signal.

■ 80010: EDITING PROHIBITION



This signal indicates the operating status of the [EDIT LOCK] key.

■ 80011 to 80013: MODE SELECTION



These signals indicate the status of the mode key of the programming pendant.

■ 80015: *PROGRAMMING PENDANT PANEL HOLD



These signals indicate the status of the mode key of the programming pendant.

■ 80016: OPERATION START



This signal indicates the operating status of the [START] key on the programming pendant.

■ 80017: SERVO POWER ON



This signal indicates the operating status of the [SERVO POWER] key on the programming pendant.

■ 80023: *SAFETY PLUG INPUT



This signal turns off when the safety guard input signal, connected to the specific input terminal block, operates.

For the connection, refer to “12.3.2 Units and Circuit Boards in the CPU Unit” of the DX100 Instructions.

■ 80024: *YCP01 CPU ERROR



This signal turns off when the servo turns off in the system (YCP01 CPU).

■ 80025: *EXTERNAL EMERGENCY STOP



This signal is OFF when the emergency stop signal, connected to the specific input terminal block, is operating.

For the connection, refer to the “12.3.2 Units and Circuit Boards in the CPU Unit” of the DX100 Instructions.

■ **80026: *PROGRAMMING PENDANT EMERGENCY STOP**



This signal is OFF when the emergency stop on the programming pendant is operating.

■ **80027: * DX100 DOOR EMERGENCY STOP**



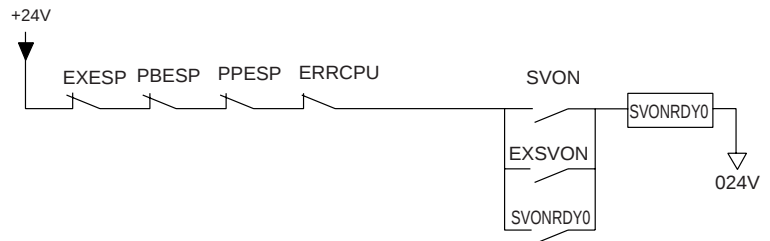
This signal is OFF when the emergency stop on the upper part of the DX100 door is operating.

■ **80031: SERVO ON CONDITION 1**



This signal turns on when the following signals satisfy the conditions for servo ON status.

When this signal turns off while the servo is ON, the servo power supply is shut down.

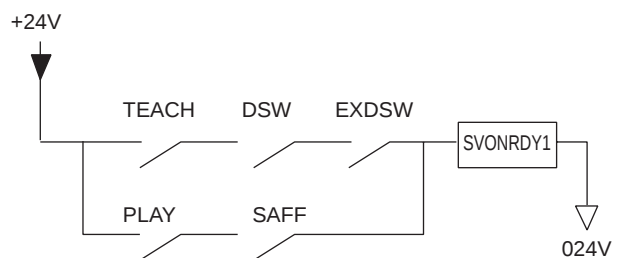


■ **80033: SERVO ON CONDITION 2**



This signal turns on when the following signals satisfy the conditions for servo ON status.

When this signal turns off while the servo is ON, the servo power supply is shut down.



TEACH: Teach Mode
PLAY : Play Mode

■ **80034: ENABLE SWITCH INPUT**



This signal indicates the operating status of deadman switch input signal.

This signal turns on by holding the enable switch and turns off by holding longer until it clicks.

■ **80035: *EXTERNAL HOLD**



This signal indicates the operation status of the hold signal from the outside.

The signal is input from the specific input terminal block.

For the connection, refer to the “12.3.2 Units and Circuit Boards in the CPU Unit” of the DX100 Instructions.

■ **80036: EXTERNAL ENABLE SWITCH INPUT**



This signal indicates the operating status of the external enable switch input signal.

■ **80037: EXTERNAL SERVO ON INPUT**



This signal is ON when the servo power instruction is input from the outside.

The signal is input from the specific input terminal block.

For the connection, refer to the “12.3.2 Units and Circuit Boards in the CPU Unit” of the DX100 Instructions.

■ **80040: SAFE SPEED 2**



This signal turns on in the safe speed 2 condition.

■ **80041: SAFE SPEED 1**



This signal turns on in the safe speed 1 condition.

■ **80046: SAFE SPEED MODE SELECT**



This signal is ON either in the safe speed 1 or the safe speed 2 condition.

■ **80047: FULL-SPEED TEST**



This signal is ON when the safe speed limit is released.

■ **80050: 24V OK**



This signal is ON when 24V power for I/O is supplied normally.

For the connection of I/O power supply, refer to the “12.3.2 Units and Circuit Boards in the CPU Unit” of the DX100 Instructions.

DX100	6	Internal Control Status Signals
	6.1	Internal Control Status Signals

■ **80051: EXTERNAL 24V OK**



This signal is ON when 24V external power for I/O is supplied normally.

For the connection of I/O power supply, refer to the “12.3.2 Units and Circuit Boards in the CPU Unit” of the DX100 Instructions.

■ **80060: *SHOCK SENSOR OPERATION HOLD**



This signal indicates the detecting status of the shock sensor operation detecting circuit.

This signal is input from the YSU01 board.

This signal is valid when “HOLD” is set for the shock sensor stop designation in the overrun and shock sensor release window.

■ **80061: *SERVO ON ENABLED**



This signal indicates the detecting status of servo ON enabled.

This signal is input from the YSU01 board.

■ **80062: *BRAKE FUSE BLOWN-OFF**



This signal turns off when the fuse of the brake excitation circuit is blown off.

■ **80064: *SERVO CPU ERROR**



This signal turns off when an error is detected in the servo system (EAXA01 CPU).

■ **80065: *SHOCK SENSOR OPERATION EMERGENCY STOP**



This signal indicates the detecting status of the shock sensor operation detecting circuit.

This signal is input from the YSU01 board.

This signal is valid when “EMERGENCY STOP” is set for the shock sensor stop designation in the overrun and shock sensor release window.

■ **80066: *EXTERNAL AXIS OVERTRAVEL**



This signal turns off when the external axis overrun LS operates.

This signal is input from the YSU01 board.

■ **80067: *OVERTRAVEL**



This signal turns off when the robot axis overrun LS operates.

■ **80070 to 80073: DIRECT IN (SYSTEM) 1 to 4**



These signals indicate the status of direct in (system) input signals.

The signals are input from the specific input terminal block.

DX100	6 Internal Control Status Signals 6.1 Internal Control Status Signals
	■ 80080 to 80085: DIRECT IN (SERVO) 1 to 6 State These signals indicate the status of direct in (servo) input signals. The signals are input from the specific input terminal block.

7 Pseudo Input Signals

The following symbols are used in the explanation to represent the signal conditions.



The signal takes effect while it is in the on state.



The rising edge is detected as the signal.

7.1 Pseudo Input Signals

■ 82014 to 82016: REMOTE FUNCTION SELECTION



The pseudo input signal window allows to set whether the I/O, commands, or programming pendant is used at the remote mode selection.

These signals indicate the status set in the pseudo input signal window as shown below.

(0:OFF 1:ON)

82014	IO	0:Used	1:Not Used
82015	Command	0:Not Used	1:Used
82016	Programming Pendant	0:Used	1:Not Used

■ 82020 to 82027: SIGNAL SELECT STATUS (SPOT WELDING)



The pseudo input signal window allows to set the use of the signals for the spot welding.

The signals indicate the setting status in the pseudo input signal window.

If the setting is OFF, the general output signals are assigned.

The status is as follows;

(0:OFF 1:ON)

82020	TIMER COOLING WATER ERROR INPUT	0:Not Used	1:Used
82021	GUN COOLING WATER ERROR INPUT	0:Not Used	1:Used
82022	TRANS. THERMO. ERROR INPUT	0:Not Used	1:Used
82023	AIR PRESSURE LOWERED INPUT	0:Not Used	1:Used
82024	WELDING ON/OFF OUTPUT	0:Not Used	1:Used
82025	SHUT OFF VALVE CONTROL	0:Not Used	1:Used
82026	ENERGY-SAVING MODE	0:Invalid	1:Valid
82027	STAND ALONE MODE	0:Invalid	1:Valid

8 Network I/O Signals

Network input signals are related to optional network functions. For the detailed information, refer to the operator's manual regarding each network function.

9 Interface Panel Signals

Interface panel signals are related to the optional interface panel functions. For details, refer to "DX100 OPTIONS INSTRUCTIONS FOR INTERFACE PANEL FUNCTION" (Manual No. HW0485444).

10 I/O Except Concurrent I/O

The following signal is connected directly to the manipulator control section without passing through the concurrent I/O.

Adequate care should be taken for switch setting and method of connection when using this signal.

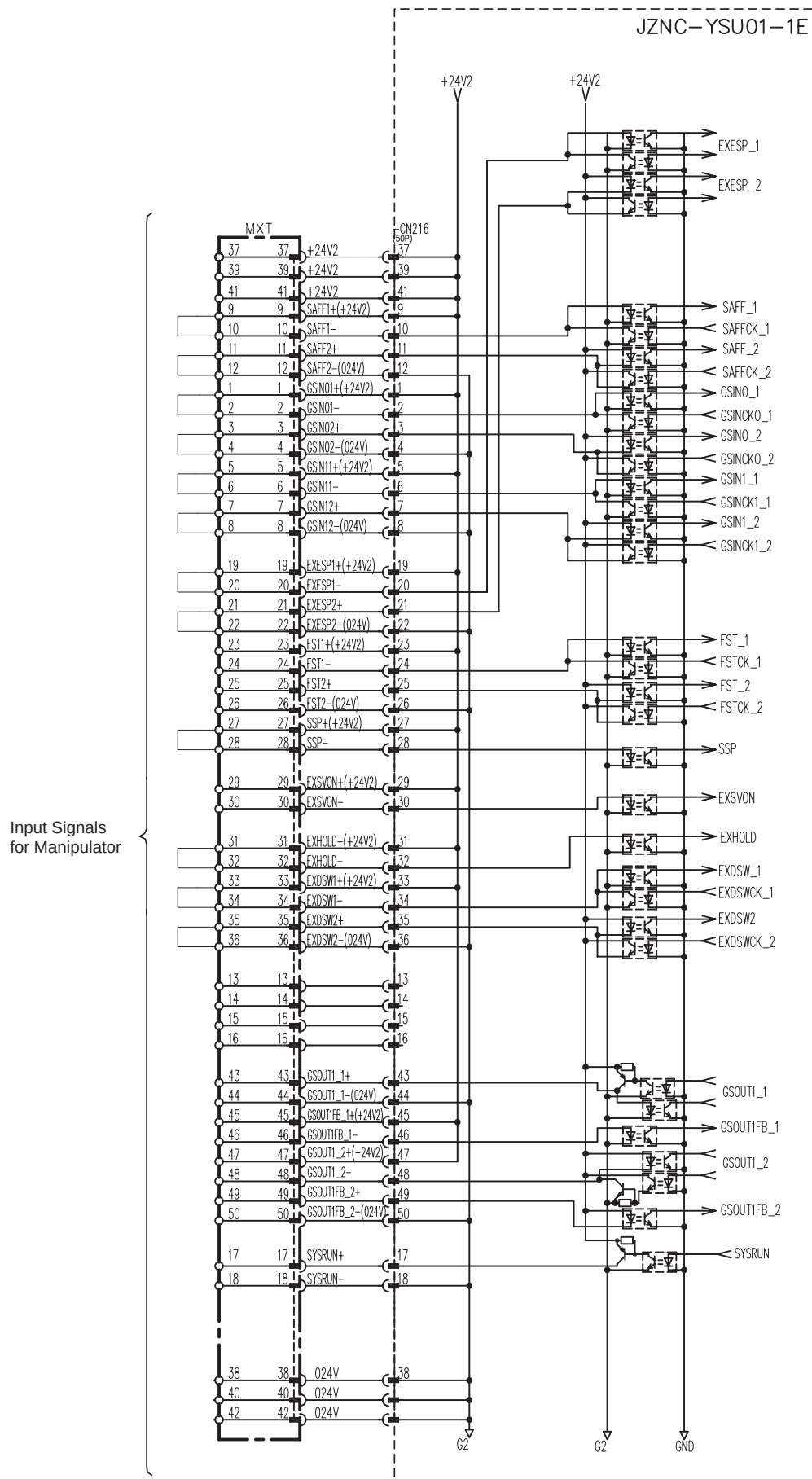
10.1 Hardware Specific Input



CAUTION

- Before use, remove any jumper leads from the specific input signals.

Failure to observe this instruction may result in the malfunction leading to injury or damage to the equipment.



10.2 I/O Except Concurrent I/O: Explanation

■ EXESP: FOR EXTERNAL EMERGENCY STOP



This signal allows to use the emergency stop switch of an external operation equipment.

When this signal is input, the servo power goes OFF, and the job execution is stopped.

The servo power cannot be turned on while this signal is being input.

This function becomes invalid by connecting the jumper wire.

■ EXHOLD: FOR EXTERNAL HOLD



This signal allows to use the hold switch of an external operation equipment.

When this signal is input, the job execution stops.

The start and axis functions cannot be used while this signal is being input.

This function becomes invalid by connecting the jumper wire.

■ SAFF: FOR SAFETY PLUG



This signal turns off the servo power when the door of the safeguard is open.

Connect interlock signals such as a safety plug installed in the safeguard door. Install an interlock signal such as safety plugs in door of the safeguard.

When the interlock signal is input, the servo power goes OFF, and the servo power cannot be turned on.

However, this signal is invalid in the teach mode.

■ EXSVON: FOR EXTERNAL SERVO ON



This signal allows to turn on the servo power.

Use the signal to turn on the servo power by external equipment.

Apart from this signal, the external servo on signal as the specific input (40045) is provided. Make this signal invalid by connecting the jumper wire before using this signal.

For safer use of the robot, use of this signal (EXSVON) which has no intervention of ladders (software) is recommended.

■ CPDIN1 to 4: FOR DIRECT IN (SYSTEM) INPUT SIGNAL 1 to 4



This signal can be used in conjunction with the serch function.

■ AXDIN1 to 6: FOR DIRECT IN (SERVO) INPUT SIGNAL 1 to 6



This signal can be used in conjunction with the serch function.

11 Register

11.1 Common Usage for All Applications

11.1.1 General Register

M009	M008	M007	M006	M005	M004	M003	M002	M001	M000

M019	M018	M017	M016	M015	M014	M013	M012	M0011	M010

M029	M028	M027	M026	M025	M024	M023	M022	M021	M020

M039	M038	M037	M036	M035	M034	M033	M032	M031	M030

M049	M048	M047	M046	M045	M044	M043	M042	M041	M040

M059	M058	M057	M056	M055	M054	M053	M052	M051	M050

M069	M068	M067	M066	M065	M064	M063	M062	M061	M060

M079	M078	M077	M076	M075	M074	M073	M072	M071	M070

M089	M088	M087	M086	M085	M084	M083	M082	M081	M080

M099	M098	M097	M096	M095	M094	M093	M092	M091	M090

M109	M108	M107	M106	M105	M104	M103	M102	M101	M100

⋮
⋮

M399	M398	M397	M396	M395	M394	M393	M392	M391	M390

M569	M568	M567	M566	M565	M564	M563	M562	M561	M560
ANALOG OUTPUT									
10	9	8	7	6	5	4	3	2	1

M579	M578	M577	M576	M575	M574	M573	M572	M571	M570
ANALOG OUTPUT									
20	19	18	17	16	15	14	13	12	11

M589	M588	M587	M586	M585	M584	M583	M582	M581	M580
ANALOG OUTPUT									
30	29	28	27	26	25	24	23	22	21

M599	M598	M597	M596	M595	M594	M593	M592	M591	M590
ANALOG OUTPUT									
40	39	38	37	36	35	34	33	32	31

11.1.2 System Register

M609	M608	M607	M606	M605	M604	M603	M602	M601	M600
ANALOG INPUT									
10	9	8	7	6	5	4	3	2	1

M619	M618	M617	M616	M615	M614	M613	M612	M611	M610
ANALOG INPUT									
20	19	18	17	16	15	14	13	12	11

M629	M629	M628	M627	M626	M625	M624	M623	M622	M620
ANALOG INPUT									
30	29	28	27	26	25	24	23	22	21

M639	M638	M637	M636	M635	M634	M633	M632	M631	M630
ANALOG INPUT									
40	39	38	37	36	35	34	33	32	31

M649	M648	M647	M646	M645	M644	M643	M642	M641	M640
			ERROR DATA H	ERROR DATA L	ERROR CODE	CONTROL GROUP (UNIT)	ALARM DATA H	ALARM DATA L	ALARM CODE

M659	M658	M657	M656	M655	M654	M653	M652	M651	M650
		SYSTEM RESERVE	SYSTEM RESERVE	SYSTEM RESERVE	SYSTEM RESERVE	IO ALARM (65 - 128)	IO ALARM (33 - 64)	IO ALARM (17 - 32)	IO ALARM (1 - 16)

M669	M668	M667	M666	M665	M664	M663	M662	M661	M660
		SYSTEM RESERVE	SYSTEM RESERVE	SYSTEM RESERVE	SYSTEM RESERVE	IO ALARM (65 - 128)	IO ALARM (33 - 64)	IO ALARM (17 - 32)	IO ALARM (1 - 16)

M679	M678	M677	M676	M675	M674	M673	M672	M671	M670

DX100

11 Register
11.1 Common Usage for All Applications

M689	M688	M687	M686	M685	M684	M683	M682	M681	M680

M699	M698	M697	M696	M695	M694	M693	M692	M691	M690

M709	M708	M707	M706	M705	M704	M703	M702	M701	M700

M719	M718	M717	M716	M715	M714	M713	M712	M711	M710

M729	M728	M727	M726	M725	M724	M723	M722	M721	M720

⋮

M919	M918	M917	M916	M915	M914	M913	M912	M911	M910

11.2 Arc Welding

Device 8

M409	M408	M407	M406	M405	M404	M403	M402	M401	M400

Device 7

M419	M418	M417	M416	M415	M414	M413	M412	M411	M410

Device 6

M429	M428	M427	M426	M425	M424	M423	M422	M421	M420

Device 5

M439	M438	M437	M436	M435	M434	M433	M432	M431	M430

Device 4

M449	M448	M447	M446	M445	M444	M443	M442	M441	M440

Device 3

M459	M458	M457	M456	M455	M454	M453	M452	M451	M450

Device 2

M469	M468	M467	M466	M465	M464	M463	M462	M461	M460

Device 1

M479	M478	M477	M476	M475	M474	M473	M472	M471	M470
SYSTEM RESERVE				AUTO-WELD RELEASE DETECTION (EXISTENCE)	WIRE INCHING DELAY	WIRE RETRACT DELAY	WELDING POWER SUPPLY ERROR TIMER (PRESENT VALUE)	ARC SHORTAGE TIMER (ROBOT SIDE)	ARC GENERATING CHECK RELAY WELDING TIMER

Device 8

M489	M488	M487	M486	M485	M484	M483	M482	M481	M480

Device 7

M499	M498	M497	M496	M495	M494	M493	M492	M491	M490

Device 6

M509	M508	M507	M506	M505	M504	M503	M502	M501	M500

Device 5

M519	M518	M517	M516	M515	M514	M513	M512	M511	M510

Device 4

M529	M528	M527	M526	M525	M524	M523	M522	M521	M520

Device 3

M539	M538	M537	M536	M535	M534	M533	M532	M531	M530

Device 2

M549	M548	M547	M546	M545	M544	M543	M542	M541	M540

Device 1

M559	M558	M557	M556	M555	M554	M553	M552	M551	M550
STICKING CHECK (MOVE)	NO STICKING CHECK	STICKING RELEASE (PRESENT VALUE)	RESTART (PRESENT VALUE)	RETRY (PRESENT VALUE)	WIRE OPERATION SWITCH (PRESENT VALUE)	ANTI STICKING (PRESENT VALUE)	NO STICKING CHECK (PRESENT VALUE)	STICKING CHECK (PRESENT VALUE)	ARC ANSWER ERROR (PRESENT VALUE)

Device 1

M929	M928	M927	M926	M925	M924	M923	M922	M921	M920
		STICKING RELEASE (3 TIMES)	RESTART (ONCE)	RETRY (ONCE)	WIRE OPERATION SWITCH (0.5 SEC)	ANTI STICKING (0.3 SEC)	NO STICKING CHECK (0.2 SEC)	STICKING CHECK (1.0 SEC)	ARC ANSWR ERROR (1.0 SEC)

Device 2

M939	M938	M937	M936	M935	M934	M933	M932	M931	M930

Device 3

M949	M948	M947	M946	M945	M944	M943	M942	M941	M940

Device 4

M959	M958	M957	M956	M955	M954	M953	M952	M951	M950

Device 5

M969	M968	M967	M966	M965	M964	M963	M962	M961	M960

Device 6

M979	M978	M977	M976	M975	M974	M973	M972	M971	M970

Device 7

M989	M988	M987	M986	M985	M984	M983	M982	M981	M980

Device 8

M999	M998	M997	M996	M995	M994	M993	M992	M991	M990

11.3 Handling

Device 8

M409	M408	M407	M406	M405	M404	M403	M402	M401	M400

Device 7

M419	M418	M417	M416	M415	M414	M413	M412	M411	M410

Device 6

M429	M428	M427	M426	M425	M424	M423	M422	M421	M420

Device 5

M439	M438	M437	M436	M435	M434	M433	M432	M431	M430

Device 4

M449	M448	M447	M446	M445	M444	M443	M442	M441	M440

Device 3

M459	M458	M457	M456	M455	M454	M453	M452	M451	M450

Device 2

M469	M468	M467	M466	M465	M464	M463	M462	M461	M460

Device 1

M479	M478	M477	M476	M475	M474	M473	M472	M471	M470
SYSTEM RESERVE									

Device 8

M489	M488	M487	M486	M485	M484	M483	M482	M481	M480

Device 7

M499	M498	M497	M496	M495	M494	M493	M492	M491	M490

Device 6

M509	M508	M507	M506	M505	M504	M503	M502	M501	M500

Device 5

M519	M518	M517	M516	M515	M514	M513	M512	M511	M510

Device 4

M529	M528	M527	M526	M525	M524	M523	M522	M521	M520

Device 3

M539	M538	M537	M536	M535	M534	M533	M532	M531	M530

Device 2

M549	M548	M547	M546	M545	M544	M543	M542	M541	M540

Device 1

M559	M558	M557	M556	M555	M554	M553	M552	M551	M550

Device 1

M929	M928	M927	M926	M925	M924	M923	M922	M921	M920

Device 2

M939	M938	M937	M936	M935	M934	M933	M932	M931	M930

Device 3

M949	M948	M947	M946	M945	M944	M943	M942	M941	M940

Device 4

M959	M958	M957	M956	M955	M954	M953	M952	M951	M950

Device 5

M969	M968	M967	M966	M965	M964	M963	M962	M961	M960

Device 6

M979	M978	M977	M976	M975	M974	M973	M972	M971	M970

Device 7

M989	M988	M987	M986	M985	M984	M983	M982	M981	M980

Device 8

M999	M998	M997	M996	M995	M994	M993	M992	M991	M990

11.4 General Purposes

Device 8

M409	M408	M407	M406	M405	M404	M403	M402	M401	M400

Device 7

M419	M418	M417	M416	M415	M414	M413	M412	M411	M410

Device 6

M429	M428	M427	M426	M425	M424	M423	M422	M421	M420

Device 5

M439	M438	M437	M436	M435	M434	M433	M432	M431	M430

Device 4

M449	M448	M447	M446	M445	M444	M443	M442	M441	M440

Device 3

M459	M458	M457	M456	M455	M454	M453	M452	M451	M450

Device 2

M469	M468	M467	M466	M465	M464	M463	M462	M461	M460

Device 1

M479	M478	M477	M476	M475	M474	M473	M472	M471	M470
SYSTEM RESERVE									

Device 8

M489	M488	M487	M486	M485	M484	M483	M482	M481	M480

Device 7

M499	M498	M497	M496	M495	M494	M493	M492	M491	M490

Device 6

M509	M508	M507	M506	M505	M504	M503	M502	M501	M500

Device 5

M519	M518	M517	M516	M515	M514	M513	M512	M511	M510

Device 4

M529	M528	M527	M526	M525	M524	M523	M522	M521	M520

Device 3

M539	M538	M537	M536	M535	M534	M533	M532	M531	M530

Device 2

M549	M548	M547	M546	M545	M544	M543	M542	M541	M540

Device 1

M559	M558	M557	M556	M555	M554	M553	M552	M551	M550

Device 1

M929	M928	M927	M926	M925	M924	M923	M922	M921	M920

Device 2

M939	M938	M937	M936	M935	M934	M933	M932	M931	M930

Device 3

M949	M948	M947	M946	M945	M944	M943	M942	M941	M940

Device 4

M959	M958	M957	M956	M955	M954	M953	M952	M951	M950

Device 5

M969	M968	M967	M966	M965	M964	M963	M962	M961	M960

Device 6

M979	M978	M977	M976	M975	M974	M973	M972	M971	M970

Device 7

M989	M988	M987	M986	M985	M984	M983	M982	M981	M980

Device 8

M999	M998	M997	M996	M995	M994	M993	M992	M991	M990

11.5 Spot Welding

Device 8

M409	M408	M407	M406	M405	M404	M403	M402	M401	M400

Device 7

M419	M418	M417	M416	M415	M414	M413	M412	M411	M410

Device 6

M429	M428	M427	M426	M425	M424	M423	M422	M421	M420

Device 5

M439	M438	M437	M436	M435	M434	M433	M432	M431	M430

Device 4

M449	M448	M447	M446	M445	M444	M443	M442	M441	M440

Device 3

M459	M458	M457	M456	M455	M454	M453	M452	M451	M450

Device 2

M469	M468	M467	M466	M465	M464	M463	M462	M461	M460

Device 1

M479	M478	M477	M476	M475	M474	M473	M472	M471	M470
SYSTEM RESERVE									

Device 8

M489	M488	M487	M486	M485	M484	M483	M482	M481	M480

Device 7

M499	M498	M497	M496	M495	M494	M493	M492	M491	M490

Device 6

M509	M508	M507	M506	M505	M504	M503	M502	M501	M500

Device 5

M519	M518	M517	M516	M515	M514	M513	M512	M511	M510

Device 4

M529	M528	M527	M526	M525	M524	M523	M522	M521	M520

Device 3

M539	M538	M537	M536	M535	M534	M533	M532	M531	M530

Device 2

M549	M548	M547	M546	M545	M544	M543	M542	M541	M540

Device 1

M559	M558	M557	M556	M555	M554	M553	M552	M551	M550
							AIR PRESSURE LOWERED (PRESENT VALUE)	GUN COOL ERROR (PRESENT VALUE)	TIMER COOL ERROR (PRESENT VALUE)

Device 1

M929	M928	M927	M926	M925	M924	M923	M922	M921	M920
							AIR PRESSURE LOWERED (3.0 SEC)	GUN COOL ERROR (3.0 SEC)	TIMER COOL ERROR (3.0 SEC)

Device 2

M939	M938	M937	M936	M935	M934	M933	M932	M931	M930

Device 3

M949	M948	M947	M946	M945	M944	M943	M942	M941	M940

Device 4

M959	M958	M957	M956	M955	M954	M953	M952	M951	M950

Device 5

M969	M968	M967	M966	M965	M964	M963	M962	M961	M960

Device 6

M979	M978	M977	M976	M975	M974	M973	M972	M971	M970

Device 7

M989	M988	M987	M986	M985	M984	M983	M982	M981	M980

Device 8

M999	M998	M997	M996	M995	M994	M993	M992	M991	M990

12 Standard Ladder Program

12.1 List of Usable Instructions

The following table shows a list of usable instructions in concurrent I/O.



In the instruction, there are two kinds of instructions, the one which uses the memory of one step and the other which uses the memory of two steps.

Table 12-1: List of usable instructions in concurrent I/O.

Instruction	Symbol	Function	Format	Remarks
STR		Logic line starting Temporary storing of intermediate result in logical operation Relay No. #XXXXX	STR #XXXXX	1 Step Instruction
STR-NOT		NC contact used to start the logic line Temporary storing of intermediate result in logical operation Relay No. #XXXXX	STR-NOT #XXXXX	1 Step Instruction
AND		Logical AND Relay No. #XXXXX	AND #XXXXX	1 Step Instruction
AND-NOT		Logical AND negation Relay No. #XXXXX	AND-NOT #XXXXX	1 Step Instruction
OR		Logical OR Relay No. #XXXXX	OR #XXXXX	1 Step Instruction
OR-NOT		Logical OR negation Relay No. #XXXXX	OR-NOT #XXXXX	1 Step Instruction
AND-STR		Logical AND for intermediate are result	AND-STR	1 Step Instruction
OR-STR		Logical OR for intermediate are result	OR-STR	1 Step Instruction
OUT		External or internal output Relay No. #XXXXX	OUT #XXXXX	1 Step Instruction
PART		User/System Identification (Not displayed on the programming pendant)	PART N	1 Step Instruction
END		Program end (Not displayed on the programming pendant)	END	1 Step Instruction
TMR		ON-delay time (100ms) Set Value (S) • Decimal (0-65535) • Register (M000-M999) Curr value (D) • Register (M000-M559)	TMR D,S	2 Steps Instruction
CNT		Subtract counter Set value (S) • Decimal (0-65535) • Register (M000-M999) Curr value (D) • Register (M000-M559)	CNT D,S	2 Steps Instruction

Table 12-1: List of usable instructions in concurrent I/O.

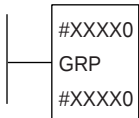
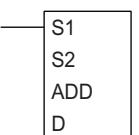
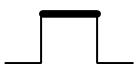
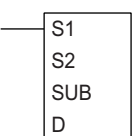
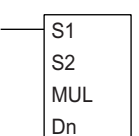
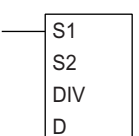
Instruction	Symbol	Function	Format	Remarks
GSTR		Transmission of batch contents of 1 group (8 bits) Relay No. #XXXX0	GSTR #XXXX0	1 Step Instruction
GOUT			GOUT #XXXX0	1 Step Instruction
PLS		Rising up pulse output Relay No. #XXXXX	PLS #XXXXX	1 Step Instruction Exe Condition 
PLF		Rising down pulse output Relay No. #XXXXX	PLF #XXXXX	1 Step Instruction Exe Condition 
ADD	 $D \leftarrow S1 + S2$ Arith Flag: Carry=0/1; Zero=0/1; (Error=0)	Add 16 bits unsigned binary data (0-65535) S1, S2: Source • Decimal (0-65535) • Register (M000-M999) D: Destination • Register (M000-M599)	ADD S1,S2,D	2 Steps Instruction Exe Condition 
SUB	 $D \leftarrow S1 - S2$ Arith Flag: Carry=0/1; Zero=0/1; (Error=0)	Subtract 16 bits unsigned binary data (0-65535) S1, S2: Source • Decimal (0-65535) • Register (M000-M999) D: Destination • Register (M000-M599)	SUB S1,S2,D	2 Steps Instruction Exe Condition 
MUL	 $Dn+1, Dn \leftarrow S1 \times S2$ Arith Flag: (Carry=0); (Zero=0); (Error=0)	Multiply 16 bits unsigned binary data (0-65535) S1, S2: Source • Decimal (0-65535) • Register (M000-M999) $Dn, Dn+1$: Destination Dn : Low data storing register $Dn+1$: High data storing register • Register (M000-M599)	MUL S1,S2,D	2 Steps Instruction Exe Condition 
DIV	 $D(\text{Quotient}) \leftarrow S1 / S2$ Arith Flag: (Carry=0); (Zero=0); Error=0/1	Divide 16 bits unsigned binary data (0-65535) S1, S2: Source • Decimal (0-65535) • Register (M000-M999) D: Destination • Register (M000-M599)	DIV S1,S2,D	2 Steps Instruction Exe Condition 

Table 12-1: List of usable instructions in concurrent I/O.

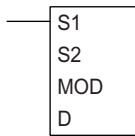
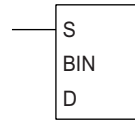
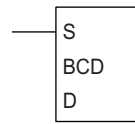
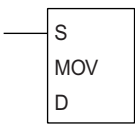
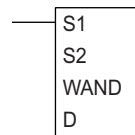
Instruction	Symbol	Function	Format	Remarks
MOD	 $D(\text{Modulus}) \leftarrow S1/S2$ Arith Flag: (Carry=0); (Zero=0); Error=0/1	Modules of 16 bits unsigned binary data (0-65535) S1, S2: Source • Decimal (0-65535) • Register (M000-M999) D: Destination • Register (M000-M599)	MOD S1,S2,D	2 Steps Instruction Exe Condition 
BIN	 $D \leftarrow S$ Arith Flag: Carry=0/1; (Zero=0); Error=0/1	Convert 8/16 bits data from BCD to BIN S: Source • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	BIN S,D	2 Steps Instruction Exe Condition 
BCD	 $D \leftarrow S$ Arith Flag: Carry=0/1; (Zero=0); Error=0/1	Convert 8/16 bits data from BIN to BCD S: Source • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	BCD S,D	2 Steps Instruction Exe Condition 
MOV	 $D \leftarrow S$	Transmit 8/16 bits data S: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	MOV S,D	2 Steps Instruction Exe Condition 
WAND	 $D \leftarrow S1 \cap S2$	Logical AND of 8/16 bits data S1, S2: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	WAND S1,S2,D	2 Steps Instruction Exe Condition 

Table 12-1: List of usable instructions in concurrent I/O.

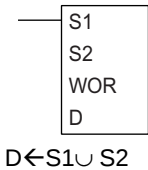
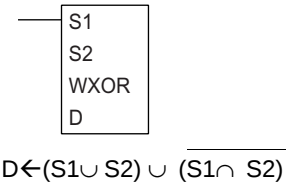
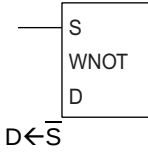
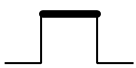
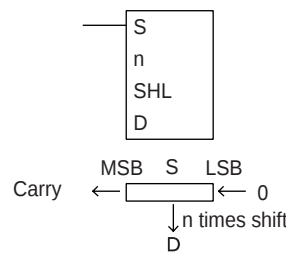
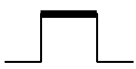
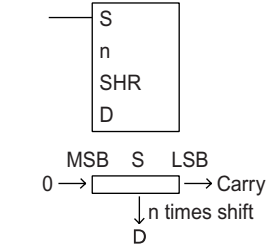
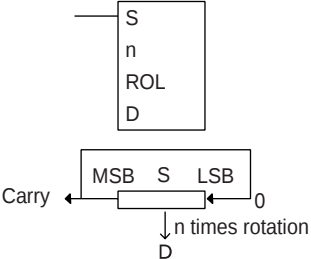
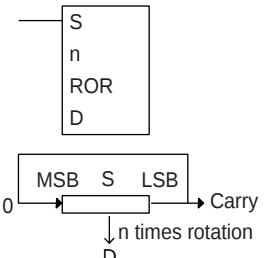
Instruction	Symbol	Function	Format	Remarks
WOR	 $D \leftarrow S1 \cup S2$	Logical OR of 8/16 bits data S1, S2: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	WOR S1,S2,D	2 Steps Instruction Exe Condition 
WXOR	 $D \leftarrow (S1 \cup S2) \cup (S1 \cap S2)$	Exclusive OR of 8/16 bits data S1, S2: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	WXOR S1,S2,D	2 Steps Instruction Exe Condition 
WNOT	 $D \leftarrow \bar{S}$	Logical NOT of 8/16 bits data S: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	WNOT S,D	2 Steps Instruction Exe Condition 
SHL	 Arith Flag: Carry=0/1; (Zero=0); (Error=0)	Left shift of 8/16 bits data S: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXX0 • Relay No. (word) W#XXXX0 n: Shift count • Decimal (0-16) D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	SHL S,n,D	2 Steps Instruction Exe Condition 

Table 12-1: List of usable instructions in concurrent I/O.

Instruction	Symbol	Function	Format	Remarks
SHR	 Arith Flag: Carry=0/1; (Zero=0); (Error=0)	Right shift of 8/16 bits data S: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 n: Shift count • Decimal (0-16) D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	SHR S,n,D	2 Steps Instruction Exe Condition 
ROL	 (Note) Carry flag is not included in rotation. Arith Flag: Carry=0/1; (Zero=0); (Error=0)	Left rotation of 8/16 bits data S: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 n: Rotation count • Decimal (0-16) D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	ROL S,n,D	2 Steps Instruction Exe Condition 
ROR	 (Note) Carry flag is not included in rotation. Arith Flag: Carry=0/1; (Zero=0); (Error=0)	Right rotation of 8/16 bits data S: Source • Decimal (0-65535) • Register (M000-M999) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0 n: Rotation count • Decimal (0-16) D: Destination • Register (M000-M599) • Relay No. (byte) #XXXX0 • Relay No. (word) W#XXXX0	ROR S,n,D	2 Steps Instruction Exe Condition 

#XXXXX: Relay No., MXXX: Register Number, YYYY: Numerical Value (0-65535),
N: Numerical Value (1-2)

12.2 Instruction Description

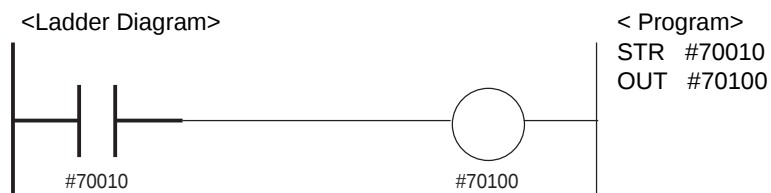
NOTE

- Output to each single relay is only once. It is unable to use multiple times of output to the same relay.
- The numbers of the output relays are limited to 0XXXX, 3XXXX, 4XXXX, and 7XXXX.
- It is able to register up to 560 TMR/CNT instructions and operation instructions that can use registers.

It is unable to use the multiple times outputs of the registers that were used as current values of TMR/CNT instructions. However, it is able to use the multiple times outputs of the registers that were used as the destination registers of arithmetic instructions.

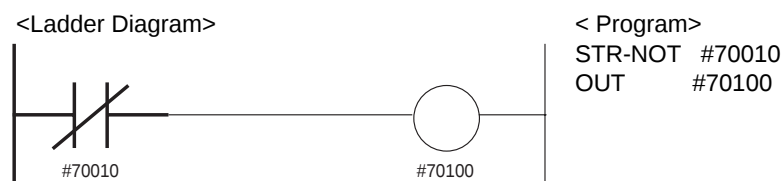
12.2.1 STR Instruction

1. Format
STR #XXXXX
#XXXXX: Relay No.
2. Function
Operates as a Normal Open at the beginning of logical line.
Stores temporarily the preliminary result of the logic operation.
3. Ladder Program Example



12.2.2 STR-NOT Instruction

1. Format
STR-NOT #XXXXX
#XXXXX: Relay No.
2. Function
Operates as a Normal Close at the beginning of logical line.
Stores temporarily the preliminary result of the logic operation.
3. Ladder Program Example



12.2.3 AND Instruction

1. Format
AND #XXXXX
#XXXXX: Relay No.
2. Function
Performs logical AND operation.
3. Ladder Program Example

<Ladder Diagram>



< Program>

```
STR #70010  
AND #70011  
OUT #70100
```

12.2.4 AND-NOT Instruction

1. Format
AND-NOT #XXXXX
#XXXXX: Relay No.
2. Function
Performs logical AND negation operation.
3. Ladder Program Example

<Ladder Diagram>



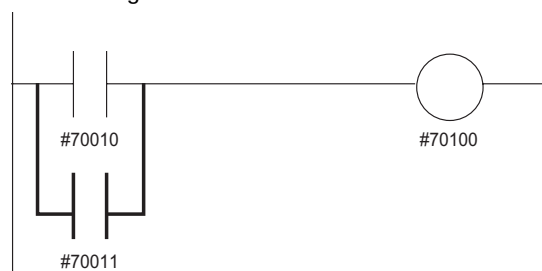
< Program>

```
STR #70010  
AND-NOT #70011  
OUT #70100
```

12.2.5 OR Instruction

1. Format
OR #XXXXX
#XXXXX: Relay No.
2. Function
Performs logical OR operation.
3. Ladder Program Example

<Ladder Diagram>

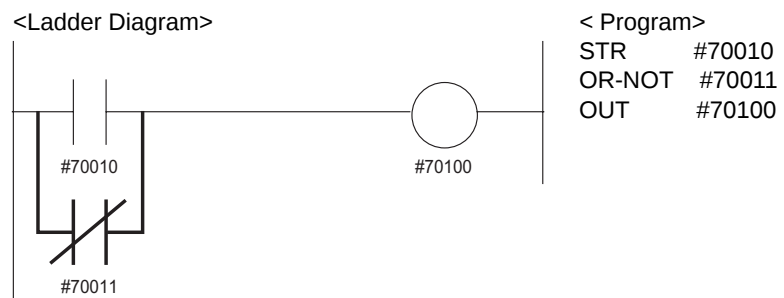


< Program>

```
STR #70010  
OR #70011  
OUT #70100
```

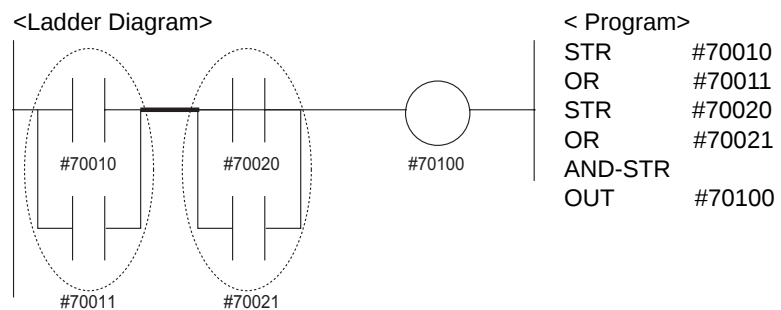
12.2.6 OR-NOT Instruction

1. Format
OR-NOT #XXXXX
#XXXXX: Relay No.
2. Function
Performs logical OR negation operation.
3. Ladder Program Example



12.2.7 AND-STR Instruction

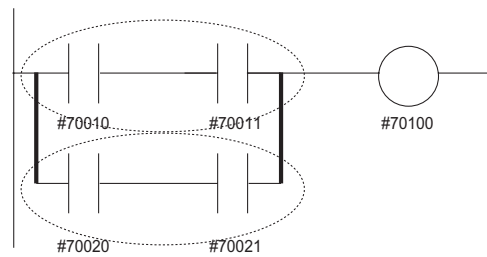
1. Format
AND-STR
2. Function
Performs logical AND operation with the preliminary results.
3. Ladder Program Example



12.2.8 OR-STR Instruction

1. Format
OR-STR
2. Function
Performs logical OR operation with the preliminary results.
3. Ladder Program Example

<Ladder Diagram>



< Program>

```

STR    #70010
AND    #70011
STR    #70020
AND    #70021
OR-STR
OUT    #70100

```

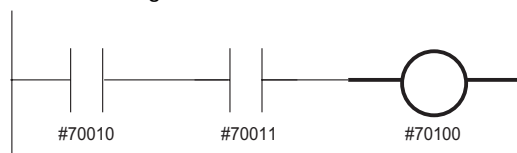
12.2.9 OUT Instruction

1. Format
OUT #XXXXX
#XXXXX: Relay No.
2. Function
Outputs to the internal or the external.
3. Ladder Program Example



Two or more times output to the same relay cannot be used.

<Ladder Diagram>



< Program>

```

STR    #70010
AND    #70011
OUT    #70100

```

12.2.10 PART Instruction

1. Format
PART N
N: Ladder Identification Number (1: System Ladder, 2: User Ladder)
2. Function
Identifies the system ladder from the user ladder.
3. Ladder Program Example



This instruction is not displayed in the programming pendant screen.

<Ladder Diagram>

There is no symbol.

System

User

< Program>

```
PART 1
STR #70010
OUT #70100
:
PART 2
:
END
```

12.2.11 END Instruction

1. Format
END
2. Function
Ends the ladder program.
3. Ladder Program Example



This instruction is not displayed in the programming pendant screen.

<Ladder Diagram>

There is no symbol.

< Program>

```
STR #70010
OUT #70100
END
```

12.2.12 TMR Instruction**1. Format**

TMR Curr Value, Set Value

Set Value: Register (M000-M999), Decimal (0-65535)

Curr Value: Register (M000-M559)

Set Value Curr Value	Decimal	Register (M000 - M999)
Mxxx (M000 - M559)	0 - 65535 (0.0 - 6553.5sec)	0 - 65535 (0.0 - 6553.5sec)

2. Function

This instruction is an On Delay Timer to handle the subtraction formula and counter circuit by binary value. The internal clock is 0.1 second. While the start input is OFF, counting is not performed and Curr Value = Set value is maintained. Additionally, the TMR contact is turned off. Curr Value is decremented by 1 every 0.1 seconds as soon as the start input is turned on. The TMR contact is turned on when the Curr Value equals to 0. This state is maintained while the start input is at ON state.

Start Input	Curr Value	TMR Contact
OFF	Set Value	OFF
ON (Curr Value > 0)	Decrement by 1 every 0.1 seconds	OFF
ON (Curr Value = 0)	0	ON
ON→OFF (Curr Value > 0)	Return to Set Value	OFF
ON→OFF (Curr Value = 0)	Return to Set Value	ON→OFF

3. Ladder Program Example

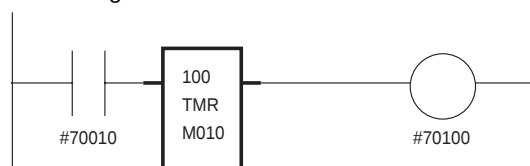
The timer is reset when the DX100 power is turned on. Therefore, Curr Value becomes Set Value by the reset function even if the DX100 power is turned on in the ON state of the timer start input.



Two or more times output to the same relay cannot be used.

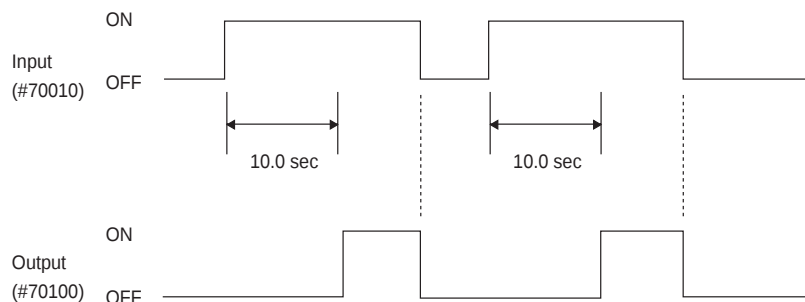
It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction

<Ladder Diagram>



< Program >

```
STR    #70010
TMR    M010,100
OUT    #70100
```



12.2.13 CNT Instruction

1. Format

CNT Curr Value, Set Value

Set Value: Register (M000-M999), Decimal (0-65535)

Curr Value: Register (M000-M559)

Set Value Curr Value	Decimal	Register (M000 - M999)
	Mxxx (M000 - M559)	0 - 65535

2. Function

Even if the counter input is turned to ON from OFF, counting is not performed and Curr Value = Set Value is maintained while the reset input is ON. Additionally, the CNT contact is turned OFF.

The Curr Value is decremented by 1 each time the counter input is turned to ON from OFF in OFF state of the reset input. The CNT contact is turned on when the Curr Value becomes 0. This state is maintained in OFF state of the reset signals.

Powering on the DX100 resets the counter. Consequently, the Curr Value remains as the Set Value by the reset function even if the counter input is in the ON state when the DX100 power is on.

Reset Input	Curr Value	CNT Contact
ON	Set Value	OFF
OFF (Curr Value > 0)	Decrement by 1 each time the counter input turns from OFF→ON	OFF
OFF (Curr Value = 0)	0	ON
OFF→ON (Curr Value > 0)	Return to Set Value	OFF
OFF→ON (Curr Value = 0)	Return to Set Value	ON→OFF

3. Ladder Program Example

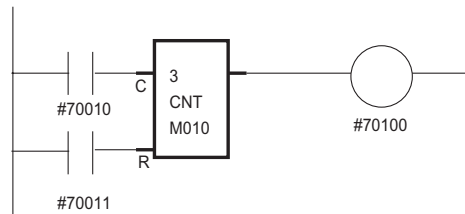
The counter input is ignored once the counter is counted up. Start counting after turning the counter input to OFF from ON. The reset input is given priority when the counter input and reset input are turned on at the same time.



Two or more times output to the same relay cannot be used.

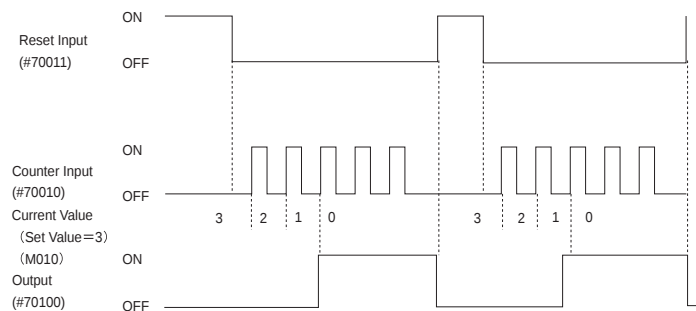
It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```
STR  #70010
Counter Input
STR  #7011
Reset Input
CNT  M010, 3
CNT instruction
OUT  #70100
Output
```



12.2.14 GSTR Instruction / GOUT Instruction

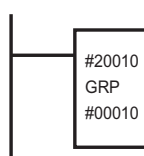
- Format
GSTR #XXXX0
GOUT #XXXX0
#XXXX0: Relay No. (byte)
- Function
The GSTR instruction stores the relay number (8 bits).
The GOUT instruction outputs 8 bits data stored by the GSTR instruction to the relay number (8 bits).
- Ladder Program Example



The GSTR instruction and the GOUT instruction should be pairs.

The output cannot be done to the same relay two or more times.

<Ladder Diagram>



< Program>

```
GSTR #20010
GOUT #00010
```

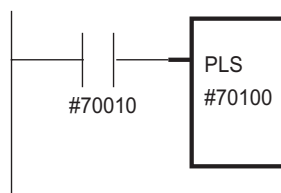
12.2.15 PLS Instruction

1. Format
PLS #XXXXX
#XXXXX: Relay No.
2. Function
The PLS instruction outputs one scanning pulse signal when specified signal is turned to ON from OFF.
3. Ladder Program Example



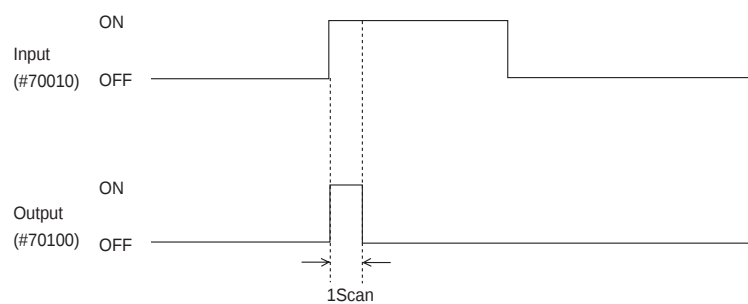
The output cannot be done to the same relay two or more times.

<Ladder Diagram>



< Program >

```
STR #70010  
PLS #70100
```



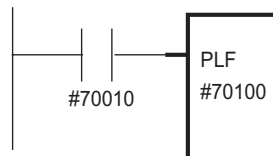
12.2.16 PLF Instruction

1. Format
PLF #XXXXX
#XXXXX: Relay No.
2. Function
The PLF instruction outputs one scanning pulse signal when specified signal is turned to OFF from ON.
3. Ladder Program Example



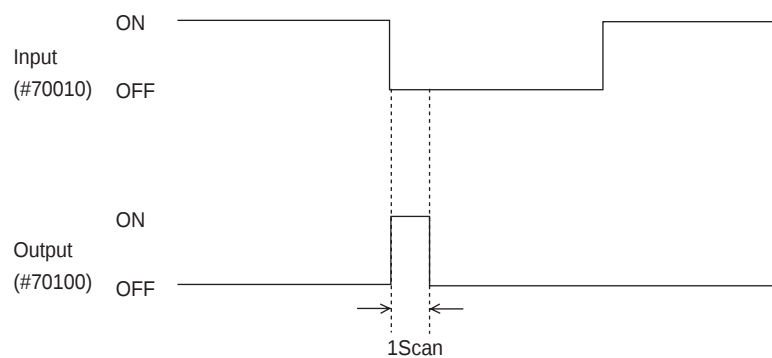
The output cannot be done to the same relay two or more times.

<Ladder Diagram>



< Program >

```
STR #70010  
PLF #70100
```



12.2.17 ADD Instruction

1. Format

ADD S1, S2, D

S1: Source 1	Register (M000-M999) Decimal (0-65535)
S1: Source 2	Register (M000-M999) Decimal (0-65535)
D: Destination	Register (M000-M599)

2. Function

S1 and S2 (16 bits unsigned binary data) are added and the addition result is output to D when the input signal is in ON state. As a result of calculation, the carry flag (#51400) and the zero flag (#51401) of a specific output are changed. The error flag (#51402) is not used.

Table 12-2: <Arithmetic Flag>

S1+S2	D	Carry Flag	Zero Flag	Error Flag
0	0	0	1	Not Used(0)
1-65535	1-65535	0	0	Not Used(0)
65536	0(S1+S2-65536)	1	1	Not Used(0)
65536 or more	S1+S2-65536	1	0	Not Used(0)

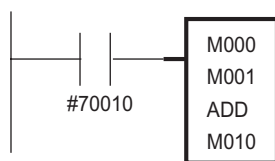
Unused flag is cleared.

3. Ladder Program Example



It is unable to use the multiple times outputs of register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```

STR  #70010
ADD  M000, M001, M010
  
```

12.2.18 SUB Instruction

1. Format

SUB S1, S2, D

S1: Source 1	Register (M000-M999) Decimal (0-65535)
S1: Source 2	Register (M000-M999) Decimal (0-65535)
D: Destination	Register (M000-M599)

2. Function

S1 and S2 (16 bits unsigned binary data) are subtracted and the subtraction result is output to D when input signal is in ON state. As a result of calculation, the carry flag (#51400) and the zero flag (#51401) of a specific output are changed. The error flag (#51402) is not used.

Table 12-3: <Arithmetic Flag>

S1-S2	D	Carry Flag	Zero Flag	Error Flag
0	0	0	1	Not Used(0)
1-65535	1-65535	0	0	Not Used(0)
Negative Number	$S1-S2+65536$	1	0	Not Used(0)

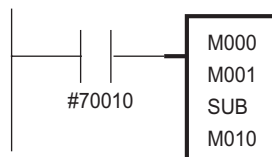
Unused flag is cleared.

3. Ladder Program Example



It is unable to use the multiple times outputs of register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



12.2.19 MUL Instruction

1. Format

MUL S1, S2, Dn

S1: Source 1	Register (M000-M999) Decimal (0-65535)
S1: Source 2	Register (M000-M999) Decimal (0-65535)
Dn+1(High), Dn(Low): Destination	Register (M000-M599)

2. Function

S1 and S2 (16 bits unsigned binary data) are multiplied and the multiplication result is output to D when the input signal is in ON state. The carry flag (#51400), the zero flag (#51401), and the error flag (#51402) are not used.

Table 12-4: Arithmetic Flag

S1 x S2	Dn+1	Dn	Carry Flag	Zero Flag	Error Flag
0	0	0	Not Used(0)	Not Used(0)	Not Used(0)
1-65535	0	1-65535	Not Used(0)	Not Used(0)	Not Used(0)
65536 or more	High Word	Low Word	Not Used(0)	Not Used(0)	Not Used(0)

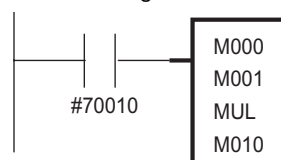
Unused flag is cleared.

3. Ladder Program Example



It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```

STR  #70010
MUL  M000,M001,M010
When results=65536:
M011=1(0000000000000001 Binary Data)
M010=0(0000000000000000 Binary Data)

```

12.2.20 DIV Instruction

1. Format

DIV S1, S2, D

S1: Source 1	Register (M000-M999) Decimal (0-65535)
S1: Source 2	Register (M000-M999) Decimal (0-65535)
D: Destination (Quotient)	Register (M000-M599)

2. Function

S1 and S2 (16 bits unsigned binary data) are divided and the division result (Quotient) is output to D when the input signal is in ON state. As a result of calculation, the error flag (#51402) of a specific output is changed. The carry flag (#51400) and the zero flag (#51401) are not used.

Table 12-5: <Arithmetic Flag>

S1	S2	D	Carry Flag	Zero Flag	Error Flag
0-65535	Excepted for 0	Quotient	Not Used(0)	Not Used(0)	0
0-65535	0	No changes	Not Used(0)	Not Used(0)	1

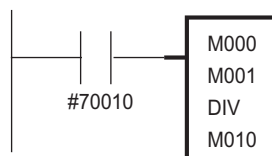
Unused flag is cleared.

3. Ladder Program Example



It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



12.2.21 MOD Instruction1. Format
MOD S1, S2, D

S1: Source 1	Register (M000-M999) Decimal (0-65535)
S1: Source 2	Register (M000-M999) Decimal (0-65535)
D: Destination (Residuum)	Register (M000-M599)

2. Function

S1 and S2 (16 bits unsigned binary data) are divided and the division result (Residuum) is output to D when the input signal is in ON state. As a result of calculation, the error flag (#51402) of a specific output is changed. The carry flag (#51400) and the zero flag (#51401) are not used.

Table 12-6: <Arithmetic Flag>

S1	S2	D	Carry Flag	Zero Flag	Error Flag
0-65535	Excepted for 0	Surplus	Not Used(0)	Not Used(0)	0
0-65535	0	No changes	Not Used(0)	Not Used(0)	1

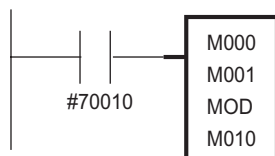
Unused flag is cleared.

3. Ladder Program Example



It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



1. Format
BIN S, D

S: Source	Register (M000-M999) Relay (byte) #XXXX0 Relay (word) W#XXXX0
D: Destination	Register (M000-M599) Relay (byte) #XXXX0 Relay (word) W#XXXX0

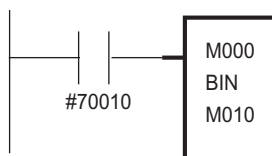
S (BCD data) is converted to binary data and is output to D when the input signal is in ON state. As a result of calculation, the carry flag (#51400) and the error flag (#51402) of a specific output are changed. The zero flag (#50401) is not used.

S	D	Carry Flag	Zero Flag	Error Flag
BCD	BIN	0/1	Not Used(0)	0
Excepted for BCD	No Changes	0	Not Used(0)	1

The carry flag is set when the conversion result is the relay (byte) and the conversion data is more than 256 (BCD). Unused flag is cleared.

NOTE

The output cannot be done to the same relay two or more times.
It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction.



STR #70010
BIN M000.M010

12.2.23 BCD Instruction1. Format
BCD S, D

S: Source	Register (M000-M999) Relay (byte) #XXXX0 Relay (word) W#XXXX0
D: Destination	Register (M000-M599) Relay (byte) #XXXX0 Relay (word) W#XXXX0

2. Function

S (binary data) is converted to BCD data and is output to D when the input signal is in ON state. As a result of calculation, the carry flag (#51400) and the error flag (#51402) of a specific output are changed. The zero flag (#51401) is not used.

Table 12-8: <Arithmetic Flag>

S	D	Carry Flag	Zero Flag	Error Flag
9999 or less (binary data)	BCD	0/1	Not Used(0)	0
10000 or more (binary data)	No Changes	0	Not Used(0)	1

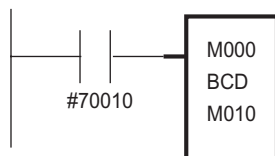
The carry flag is set when the conversion result is the relay (byte) and the conversion data is more than 256 (BCD). Unused flag is cleared.

3. Ladder Program Example



The output cannot be done to the same relay two or more times.
It is unable to use the multiple times outputs of the register used as a current value of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```

STR  #70010
BCD  M000,M010
  
```

12.2.24 MOV Instruction**1. Format**
MOV S, D

S: Source	Register (M000-M999)
	Decimal (0-65535)
	Relay (byte) #XXXX0
D: Destination	Relay (word) W#XXXX0
	Register (M000-M599)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0

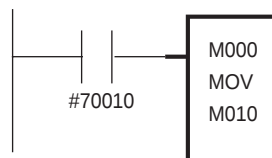
2. Function

S is output to D in ON state of the input signal. As a result of calculation, the carry flag (#51400) of a specific output is changed. The zero flag (#51401) and the error flag (#51402) are not used. The carry flag is set when the transmission result is the relay (byte) and the transmission data is more than 256 (BCD).

3. Ladder Program Example

The output cannot be done to the same relay two or more times.
It is unable to use the multiple outputs of the register used as a current position of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```
STR #70010
MOV M000, M010
```

12.2.25 WAND Instruction

1. Format

WAND S1, S2, D

S1: Source	Register (M000-M999)
S2: Source	Decimal (0-65535)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0
D: Destination	Register (M000-M599)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0

2. Function

Logical AND operation between S1 and S2 is performed and the result is output to D when the input signal is in ON state. The logic operation is performed in each correspondence bit of S1 and S2.

$$D \leftarrow S1 \cap S2$$

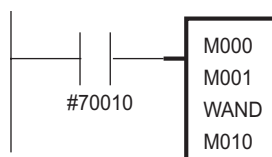
S1	1100110011001100	Binary Data
S2	1010101010101010	Binary Data
	↓	
D	1000100010001000	Binary Data

3. Ladder Program Example



The output cannot be done to the same relay two or more times.
It is unable to use the multiple outputs of the register used as a current position of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```

STR    #70010
WAND   M000, M001, M010
  
```

12.2.26 WOR Instruction

1. Format

WOR S1, S2, D

S1: Source	Register (M000-M999)
S2: Source	Decimal (0-65535)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0
D: Destination	Register (M000-M599)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0

2. Function

Logical OR operation between S1 and S2 is performed and the result is output to D when the input signal is in ON state. The logic operation is performed in each correspondence bit of S1 and S2.

$$D \leftarrow S1 \cup S2$$

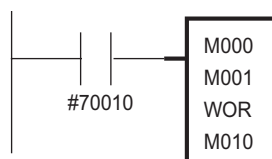
S1	1100110011001100	Binary Data
S2	1010101010101010	Binary Data
	↓	
D	1110111011101110	Binary Data

3. Ladder Program Example



The output cannot be done to the same relay two or more times.
It is unable to use the multiple outputs of the register used as a current position of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```
STR #70010
WOR M000, M001, M010
```

12.2.27 WXOR Instruction

1. Format

WXOR S1, S2, D

S1: Source	Register (M000-M999)
S2: Source	Decimal (0-65535)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0
D: Destination	Register (M000-M599)
	Relay (byte) #XXXX0
	Relay (word) W#XXXX0

2. Function

Exclusive OR operation between S1 and S2 is performed and the result is output to D when the input signal is in ON state. The logic operation is performed in each correspondence bit of S1 and S2.

$$D \leftarrow (S1 \cup S2) \cap \overline{(S1 \cap S2)}$$

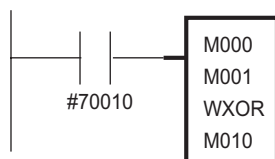
S1	1100110011001100	Binary Data
S2	1010101010101010	Binary Data
	↓	
D	0110011001100110	Binary Data

3. Ladder Program Example



The output cannot be done to the same relay two or more times.
It is unable to use the multiple times outputs of the register used as a current position of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program>

```
STR    #70010
WXOR   M000, M001, M010
```

12.2.28 WNOT Instruction

1. Format

WNOT S, D

S: Source	Register (M000-M999) Decimal (0-65535) Relay (byte) #XXXX0 Relay (word) W#XXXX0
D: Destination	Register (M000-M599) Relay (byte) #XXXX0 Relay (word) W#XXXX0

2. Function

Logical negation operation of S is performed and the result is output to D when the input signal is in ON state. The logic operation is performed in each correspondence bit of S1 and S2.

$$D \leftarrow \bar{S}$$

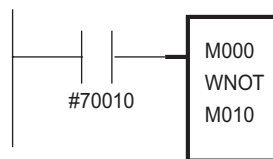
S1	1100110011001100	Binary Data
	↓	
D	0011001100110011	Binary Data

3. Ladder Program Example



The output cannot be done to the same relay two or more times.
It is unable to use the multiple times outputs of the register used as a current position of the TMR instruction and the CNT instruction.

<Ladder Diagram>



< Program >

```
STR #70010
WNOT M000, M010
```

12.2.29 SSSL Instruction

1. Format

SHL S, n, D

S: Source

Register (M000-M999)

Decimal (0-65535)

Relay (byte) #XXXXX0

Relay (word) W#XXXXX0

n: Shift count

Decimal (0-16)

D: Destination

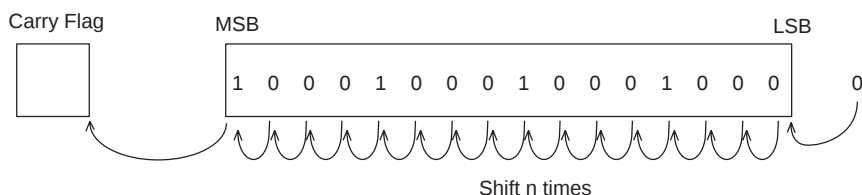
Register (M000-M599)

Relay (byte) #XXXXX0

Relay (word) W#XXXXX0

2. Function

16 bits data contents of S is shifted to the high bit direction (left) n times and the result is output to D when the input signal is in ON state. 0 is shifted to the lowest bit (LSB) and the highest bit (MSB) is shifted to the carry flag.



3. Ladder Program Example

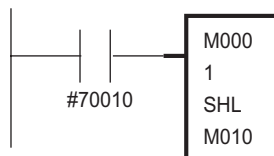
NOTE

The output cannot be done to the same relay two or more times.

It is unable to use the multiple times outputs of the register used as a current position of the TMR instruction and the CNT instruction.

The operation is performed each scanning when the input signal is in ON state. For one time operation, use the pulse output instruction (PLS, PLF) in the input circuit.

<Ladder Diagram>



< Program>

```
STR #70010
SHL M000,1,M010
```

When M000 = 1000100010001000
(binary data), the result is as follows.

M010: 0001000100010000

Carry flag: 1

12.2.30 SHR Instruction

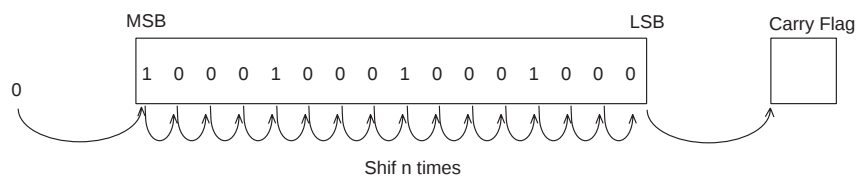
1. Format

SHR S, n, D

S: Source	Register (M000-M999) Decimal (0-65535) Relay (byte) #XXXX0 Relay (word) W#XXXX0
n: Shift count	Decimal (0-16)
D: Destination	Register (M000-M599) Relay (byte) #XXXX0 Relay (word) W#XXXX0

2. Function

16 bits data contents of S is shifted to the low bit direction (right) n times and the result is output to D when the input signal is in ON state. 0 is shifted to the highest bit (MSB) and the lowest bit (LSB) is shifted to the carry flag.

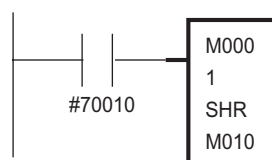


3. Ladder Program Example



The output cannot be done to the same relay two or more times.
It is unable to use the multiple times outputs of the register used as a current position of the TMR instruction and the CNT instruction.
The operation is performed each scanning when the input signal is in ON state. For one time operation, use the pulse output instruction (PLS, PLF) in the input circuit.

<Ladder Diagram>



< Program>

```
STR #70010
SHR M000, 1, M010
```

When M000 = 1000100010001000 (binary data), the result is as follows.
M010: 0100010001000100
Carry flag: 0

12.2.31 ROL Instruction

1. Format

ROL S, n, D

S: Source

Register (M000-M999)

Decimal (0-65535)

Relay (byte) #XXXX0

Relay (word) W#XXXX0

n: Shift count

Decimal (0-16)

D: Destination

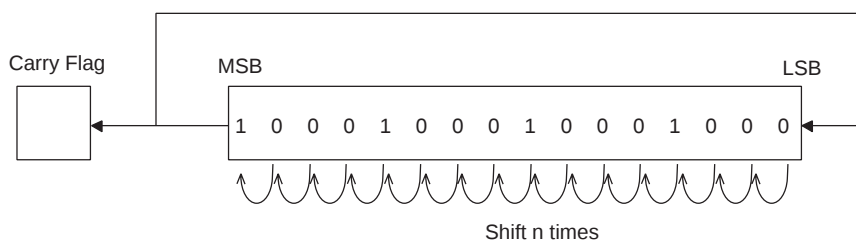
Register (M000-M599)

Relay (byte) #XXXX0

Relay (word) W#XXXX0

2. Function

16 bits data contents of S is shifted to the high bit direction (left) n times and the result is output to D when the input signal is in ON state. The highest bit (MSB) is shifted to the carry flag and the lowest bit (LSB).



3. Ladder Program Example

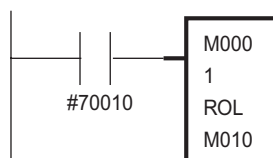


The output cannot be done to the same relay two or more times.

It is unable to use the multiple times outputs of the register used as a current position of the TMR instruction and the CNT instruction.

The operation is performed each scanning when the input signal is in ON state. For one time operation, use the pulse output instruction (PLS, PLF) in the input circuit.

<Ladder Diagram>



< Program>

STR #70010

ROL M000, 1, M010

When M000 = 1000100010001000 (binary data), the result is as follows.

M010: 0001000100010001

Carry flag: 1

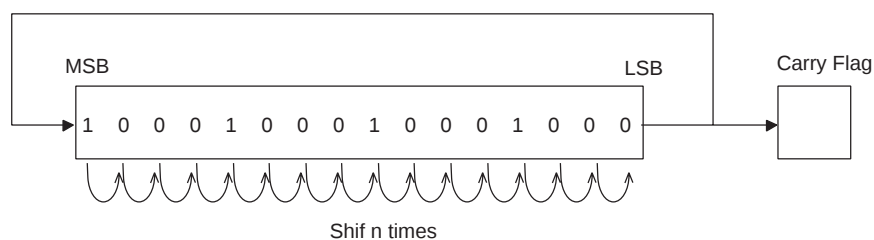
12.2.32 ROR Instruction

1. Format
ROR S, n, D

S: Source	Register (M000-M999) Decimal (0-65535) Relay (byte) #XXXX0 Relay (word) W#XXXX0
n: Shift count	Decimal (0-16)
D: Destination	Register (M000-M599) Relay (byte) #XXXX0 Relay (word) W#XXXX0

2. Function

16 bits data contents of S is shifted to the low bit direction (right) n times and the result is output to D when the input signal is in ON state. The lowest bit (LSB) is shifted to the carry flag and the highest bit (MSB).



3. Ladder Program Example

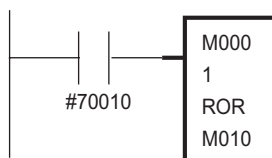


The output cannot be done to the same relay two or more times.

It is unable to use the multiple times outputs of the register used as a current position of the TMR instruction and the CNT instruction.

The operation is performed each scanning when the input signal is in ON state. For one time operation, use the pulse output instruction (PLS, PLF) in the input circuit.

<Ladder Diagram>



< Program>

```
STR #70010
ROL M000, 1, M010
```

When M000 = 1000100010001000 (binary data), the result is as follows.

M010: 0100010001000100

Carry flag: 0

12.3 Arithmetic Flag

12.3.1 Flag Type

The arithmetic flag is a signal to reflect calculation result in the operation of the following steps. There are three types of flags. These flags are allocated to the following specific outputs.

- #51400: Carry Flag
- #51401: Zero Flag
- #51402: Error Flag



Refer to *chapter 12.1 "List of Usable Instructions"* for the instructions which influence the flag.

(1) Carry Flag

- Case of ADD Instruction:
This flag is set when the place of digit is moved to the left as a result of the operation.
- Case of SUB Instruction:
This flag is set when the result is negative.

(2) Zero Flag

- Case of ADD or SUB Instruction:
This flag is set when the result is 0.

(3) Error Flag

- This flag is set when the error occurs. The instruction is not executed.

12.3.2 Flag Transition under Scanning

- The flag is cleared before ladder program processing of every scanning.
- When the processing of the instruction which influences the flag starts, the flag is set by the operation result when the execution condition of the instruction consists. The flag is cleared when the execution condition of the instruction is a failure.
- The state of the flag does not change regardless of execution or non-execution in the processing of the instruction which does not influence the flag.

DX100	12	Standard Ladder Program
	12.4	Arc Welding

12.4 Arc Welding

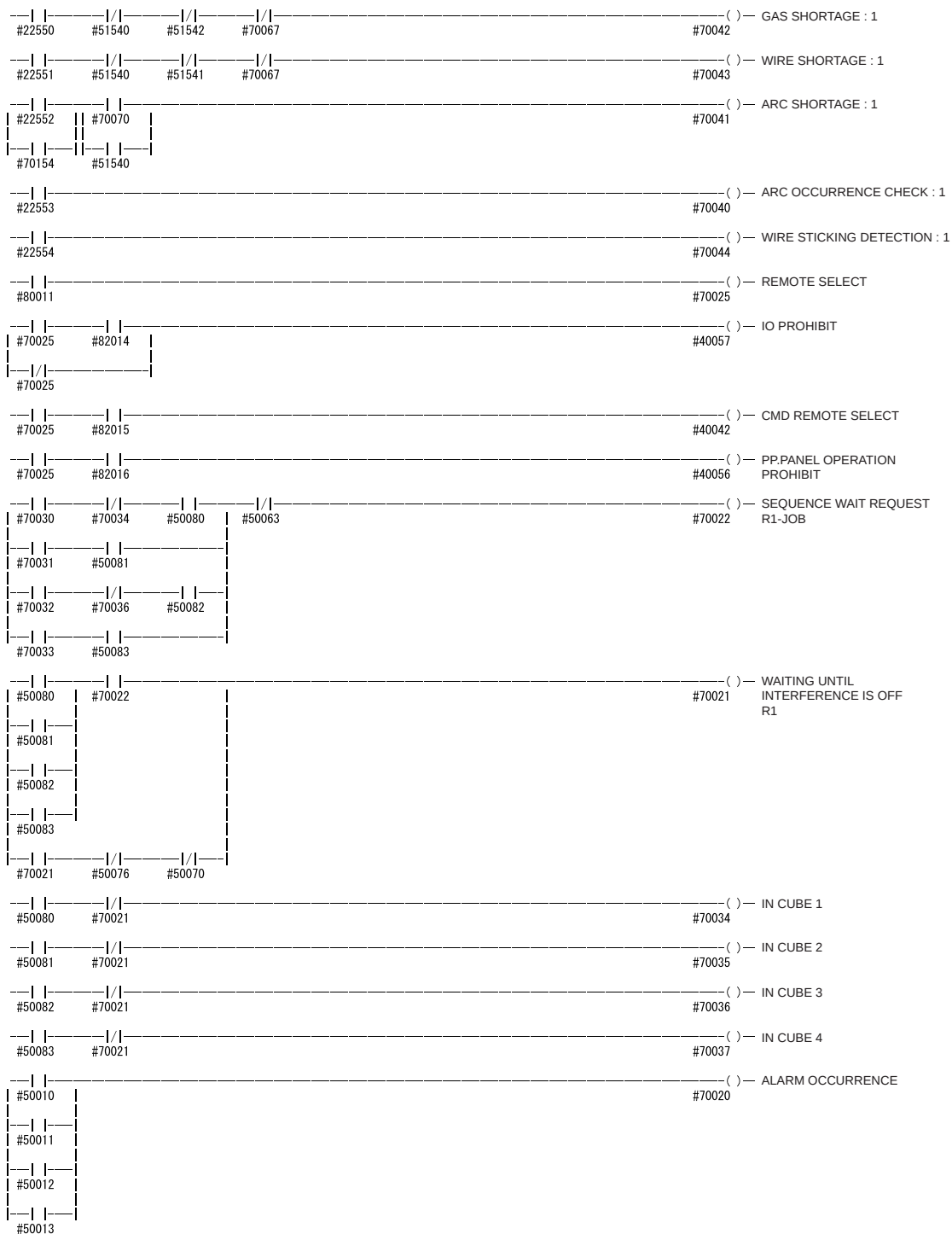
12.4.1 Ladder Program List

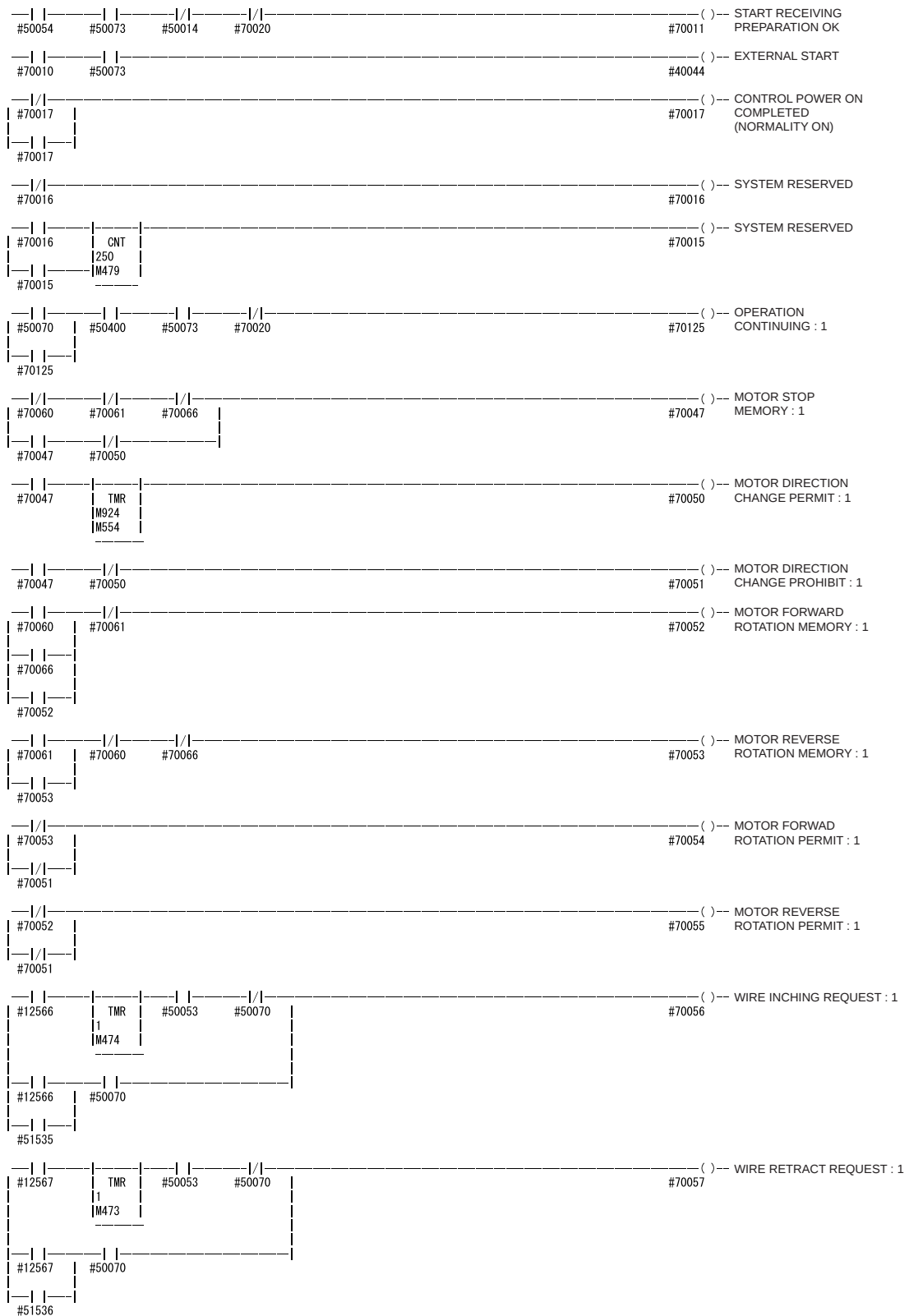


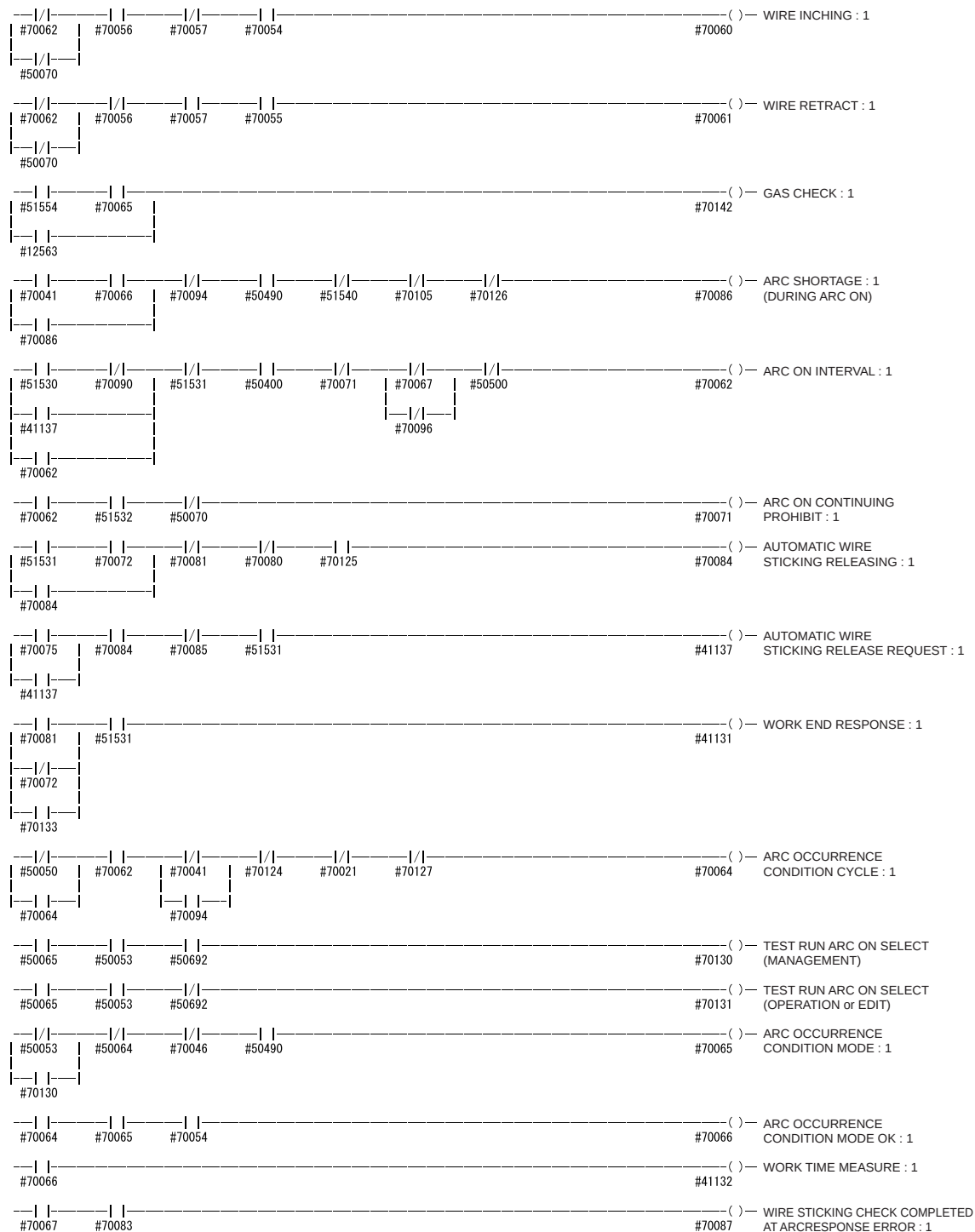
System ladder section differs according to the version.
Check the version of the software used for the DX100.

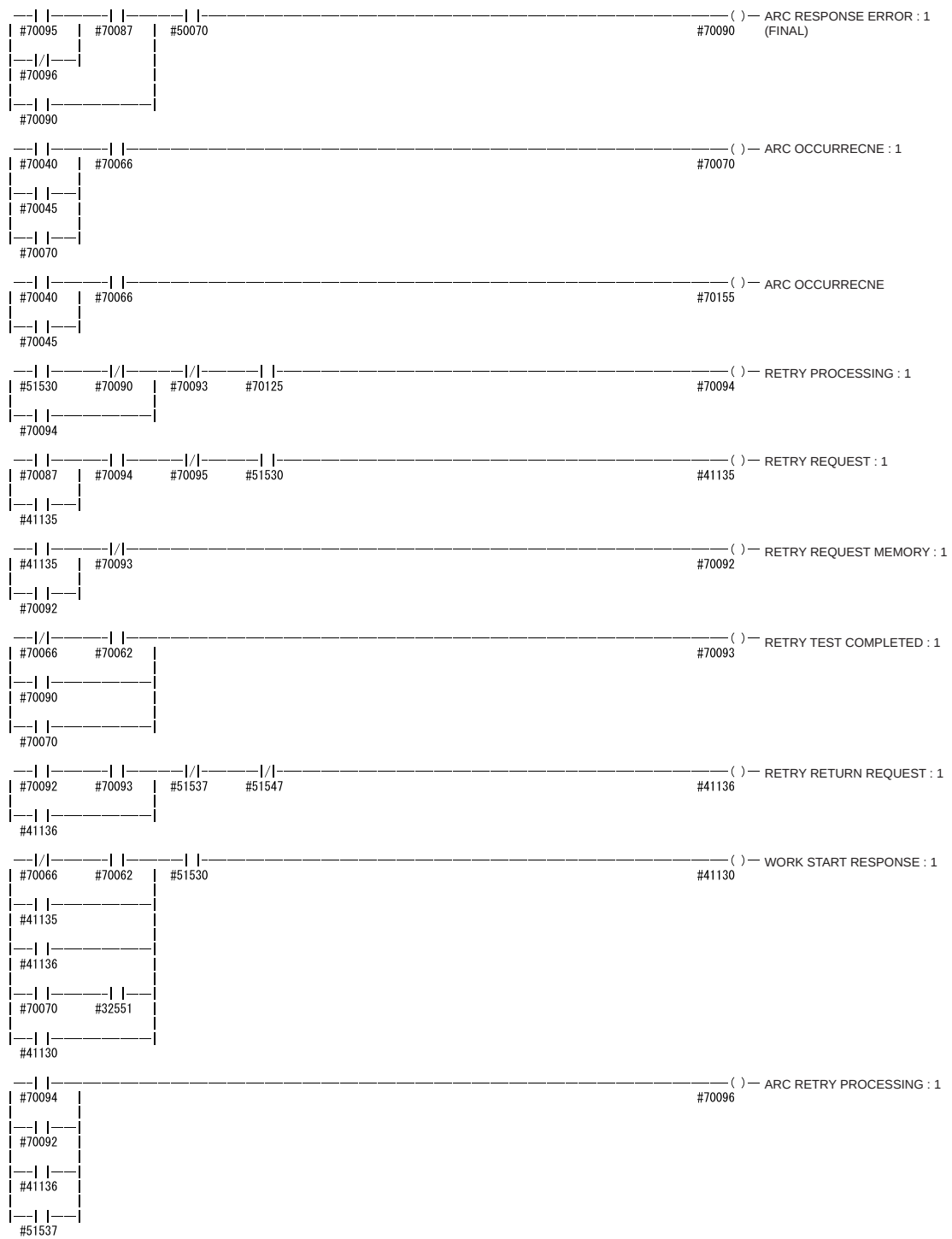
■ System Ladder Section

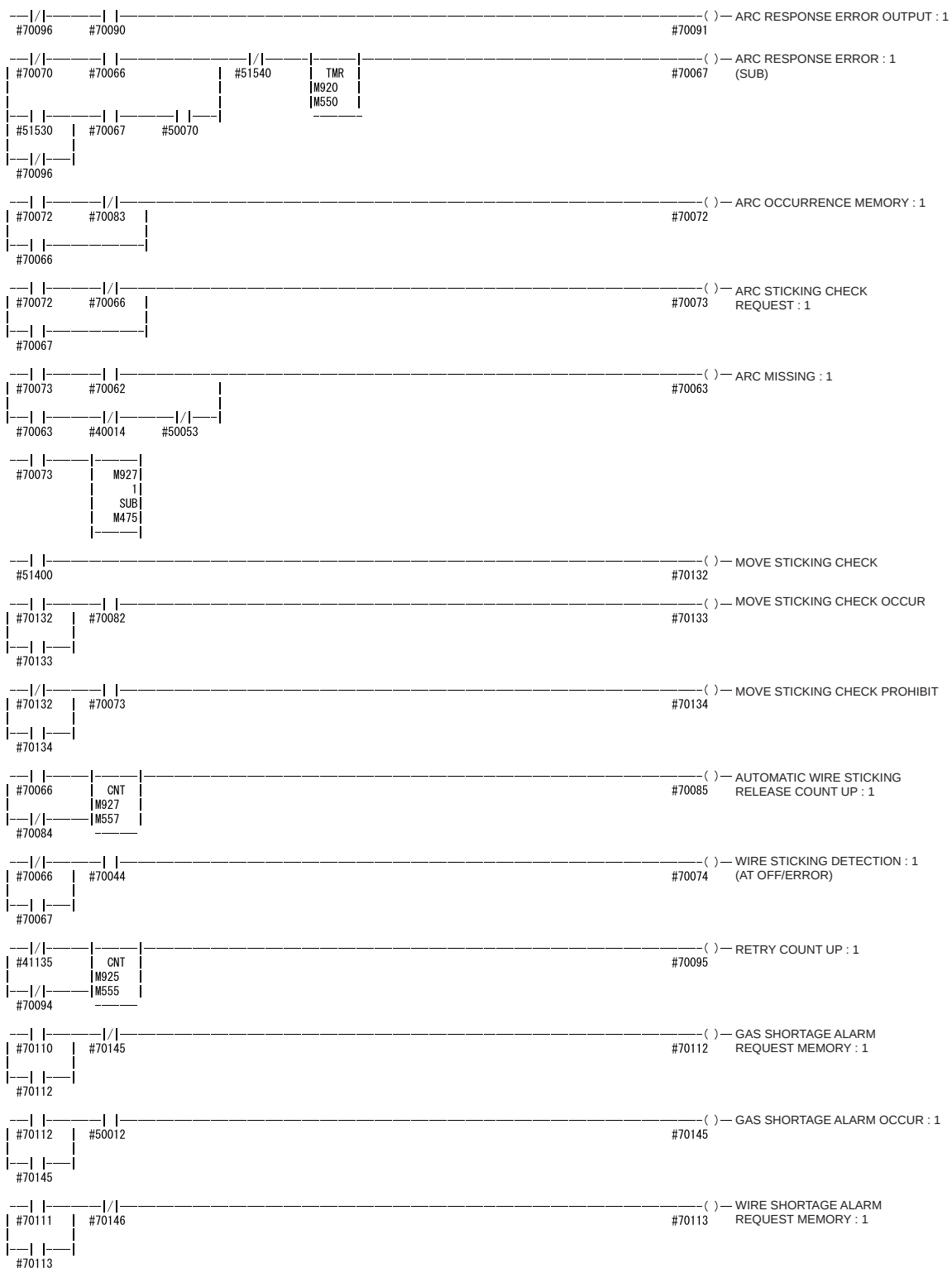
Standard ladders are prepared for each application prior to shipment.
Ladder programs cannot be edited.

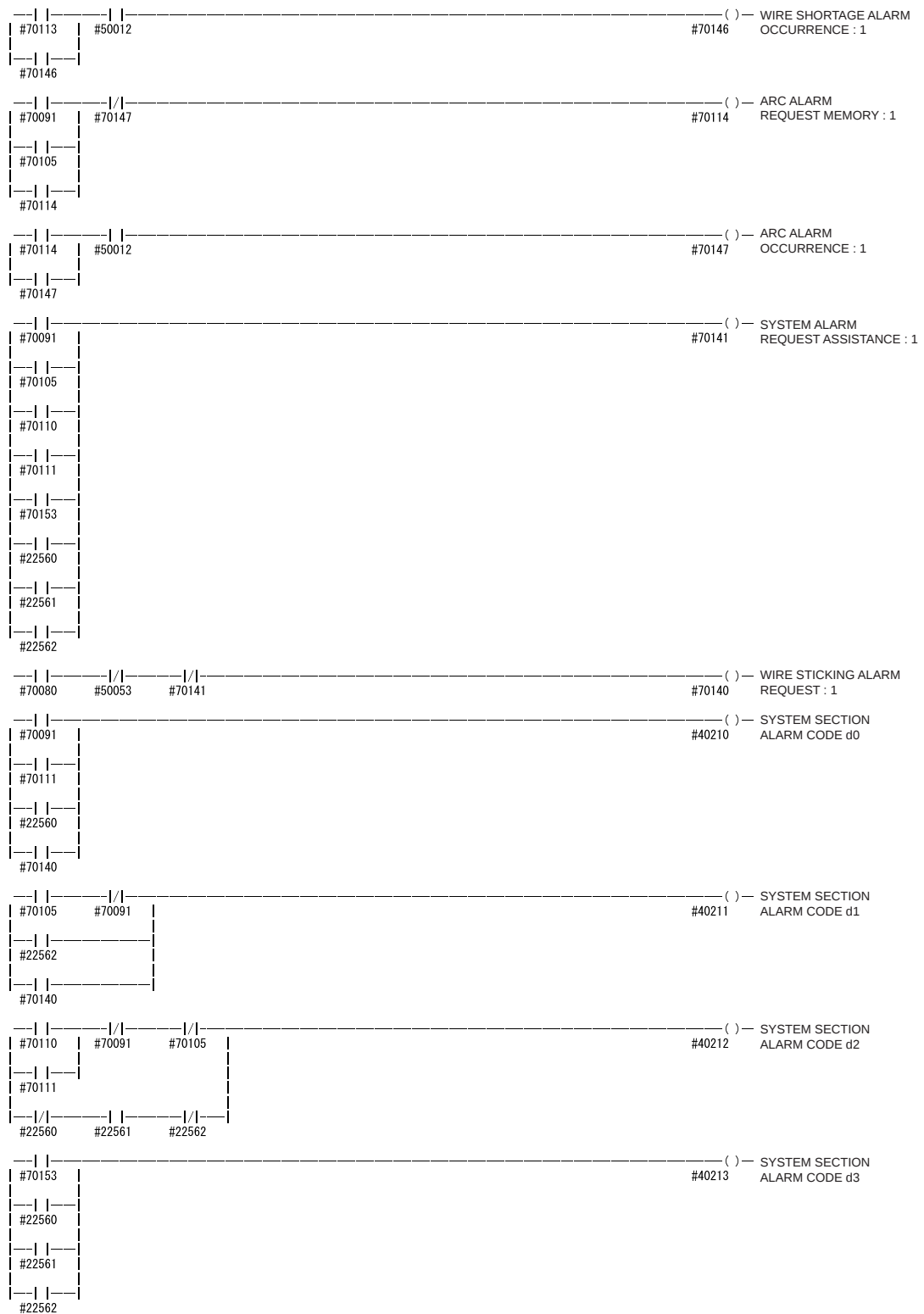


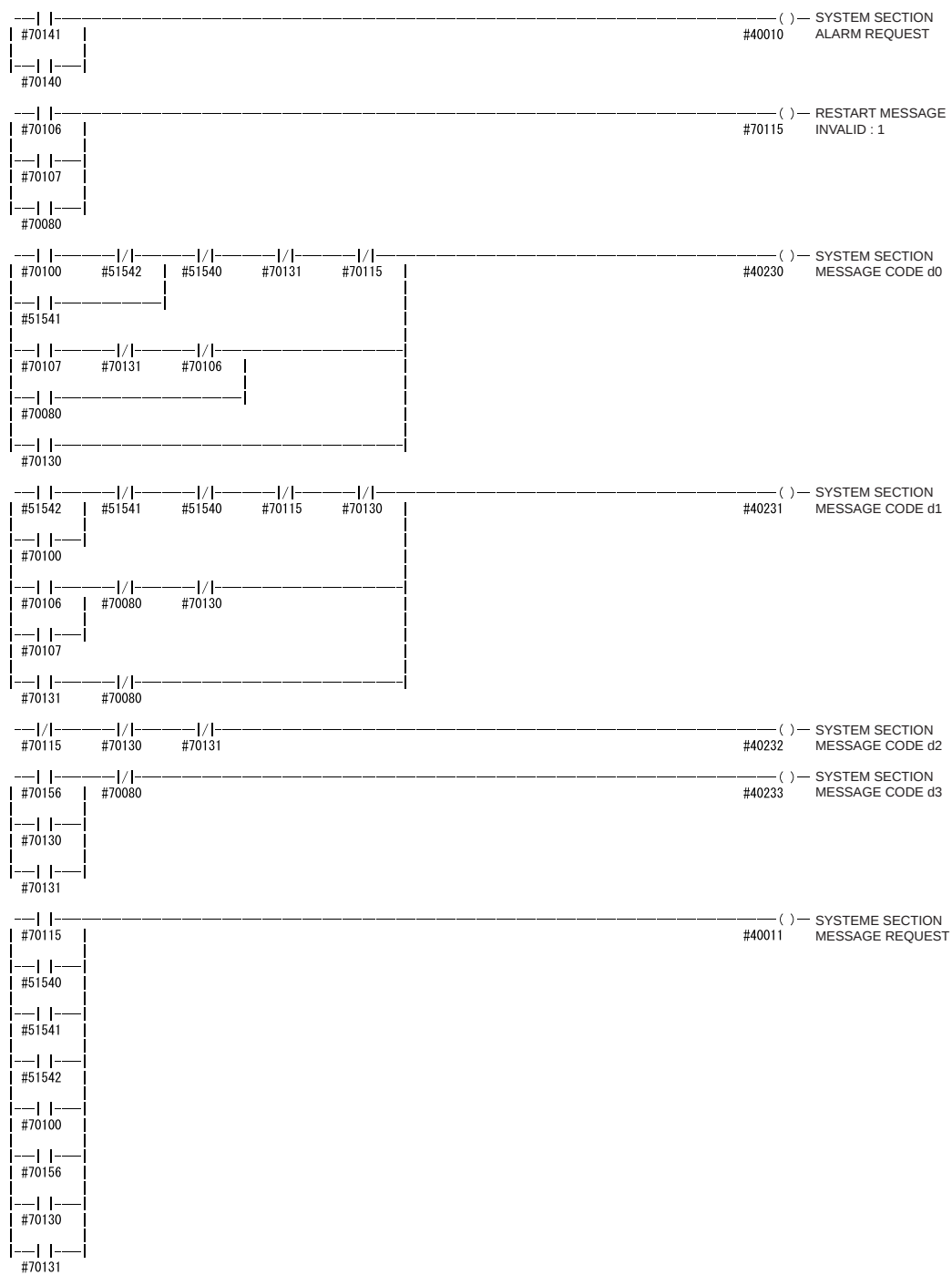


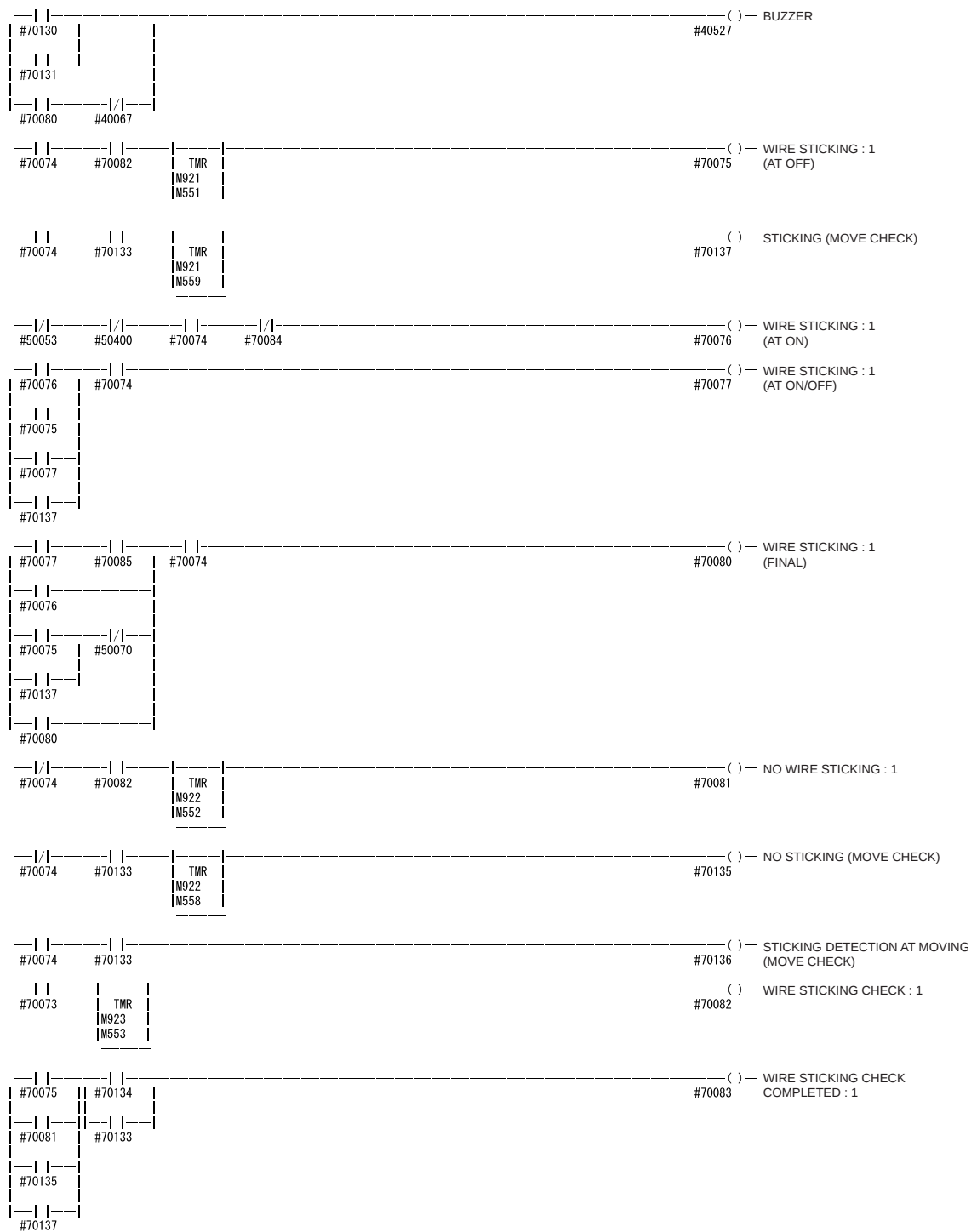


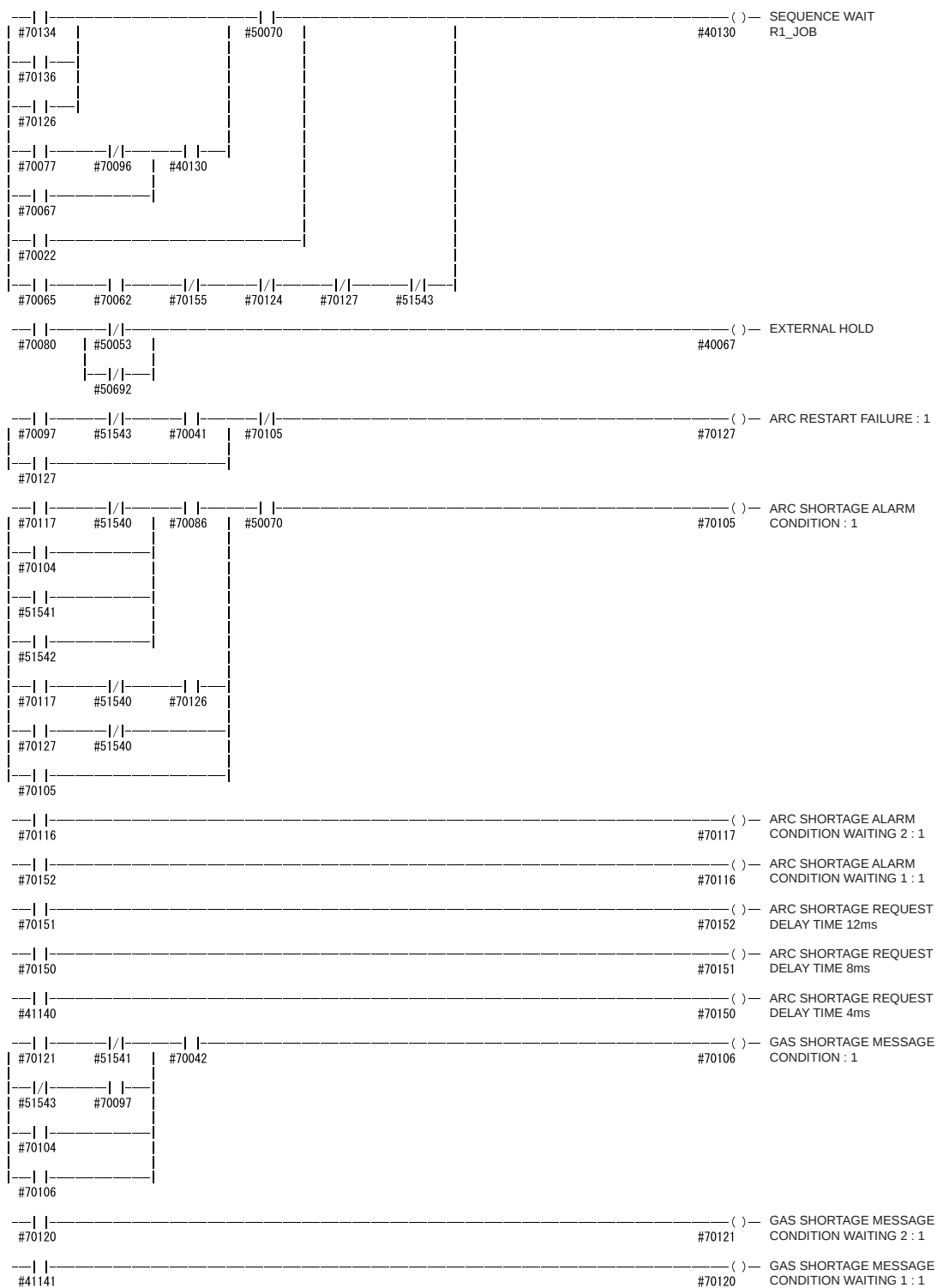


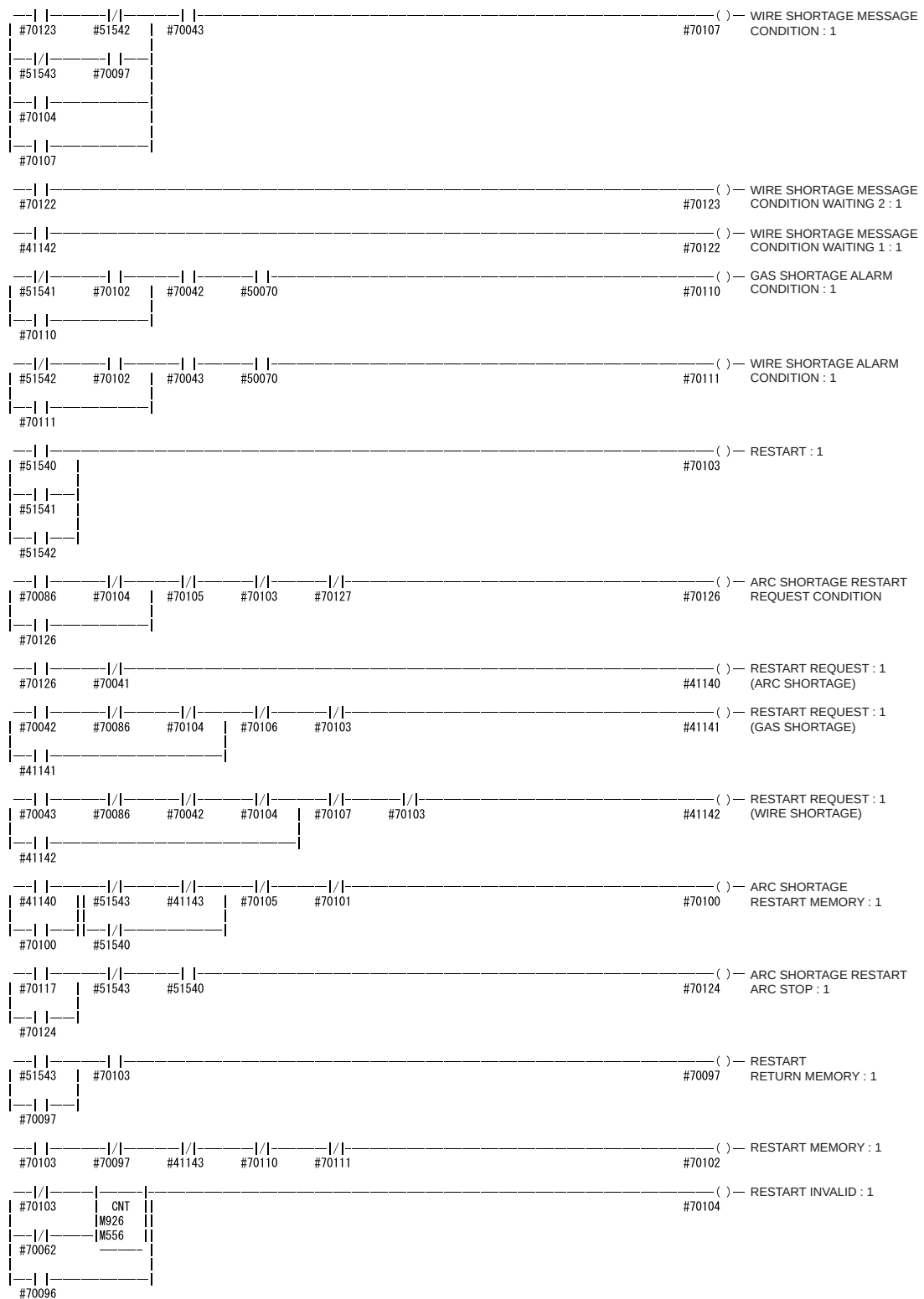


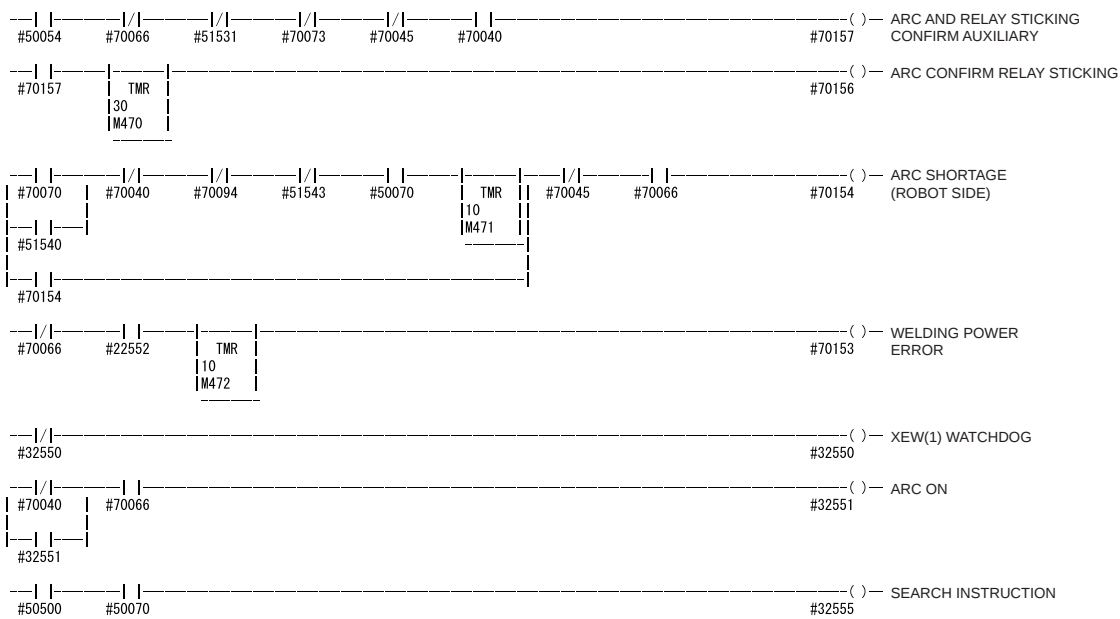












■ User Ladder Section

Signal connection specification and interface signals with system ladder are prepared prior to shipment. Including, these signals, ladder programs can be edited.

#20010	()	EXTERNAL START	#70010
#20012	()	MASTER JOB CALL	#40070
#20013	()	ALARM/ERROR RESET	#40014
#20015	()	PLAY MODE SELECT	#40041
#20016	()	TEACH MODE SELECT	#40040
#20020	()	INTERFERENCE 1 ENTRANCE PROHIBIT	#70030
#20021	()	INTERFERENCE 2 ENTRANCE PRHIBIT	#70031
#20022	()	WORK PROHIBIT (ARC OCCURRENCE PROHIBIT) : 1	#70046
#20023	()	WORK RESPONSE (PSEUDO ARC ON RESPONSE) : 1	#70045
#20026	()	WEAVING PROHIBIT	#40047
#20027	()	SENSING PROHIBIT : 1	#41160
#12564	()	ARC SHORTAGE RESTART MEMORY RESET : 1	#70101
#12565	()	RESTART RESET REQUEST : 1	#41143
#50070	()	OPERATING	#30010
#50073	()	SERVO ON	#30011
#50020	()	TOP MASTER JOB	#30012
#70020	()	ALARM/ERROR OCCURRENCE	#30013
#50015	()	BATTERY ALARM	#30014
#50016			
#40057	()	REMOTE MODE SELECTING	#30015
#50056			
#50054	()	PLAY MODE SELECTING	#30016
#50053	()	TEACH MODE SELECTING	#30017
#70034	()	IN CUBE 1	#30020
#70035	()	IN CUBE 2	#30021
#50157	()	WORK HOME POSITION (IN CUBE 64)	#30022



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| GRP |
|#11180 |
|#31200 |
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12.4.2 I/O Alarm

	Alarm No.	Register No.	I/O Alarm Message
System Section			
	9000	00	
	9001	01	MISSING ARC GENERATION CONFIRM
	9002	02	ARC SHORTAGE
	9003	03	WIRE STICK/ SHORT
	9004	04	GAS SHORTAGE (RESTART)
	9005	05	WIRE SHORTAGE (RESTART)
	9006	06	
	9007	07	
	9008	08	WELDER MALFUNCTION ERROR
	9009	09	HUSE DISCONNECTION (WELDING BOARD 24V)
	9010	10	DETECTION CIRCUIT ERROR (WELDING BOARD 24V)
	9011	11	EXTERNAL POWER SUPPLY OFF (WELDING BOARD 24V)
	9012	12	DISCONNECTION (WELDING BOARD 18V)
	9013	13	
	9014	14	
	9015	15	
	9016	16	
	9017	17	
	9018	18	
	9019	19	
	9020	20	
	9021	21	
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	9063	63	
User Section			
	9064	64	
	9065	65	
	9066	66	
	9067	67	
	9068	68	
	9069	69	
	:	:	
	9127	127	

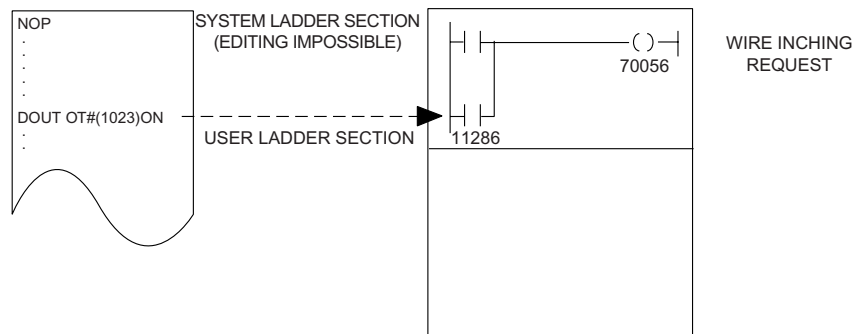
12.4.3 I/O Message

	Register No.	I/O Message
System Section		
	00	
	01	WIRE STICK/ SHORT
	02	GAS SHORTAGE
	03	WIRE SHORTAGE
	04	RESTARTING FOR ARC
	05	RESTARTING FOR GAS
	06	RESTARTING FOR WIRE
	07	END OF ARC RESTARTING
	08	ARC CONFIRM RELAY STICKING
	09	ARC OCCUR AT TEST RUN
	10	VALID ONLY IN MANAGEMENT MODE (WELD ON)
	11	
	12	
	13	
	14	
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User Section	:	
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	127	

12.4.4 USER OPEN SIGNALS

Editing of system ladder is impossible, however, the seven signals which are necessary for user's operation are available. For example, wire inching can be programmed as shown below.

JOB



- **OT#2044 to OT#2048, OT#2036 to OT#2040, OT#2028 to OT#2032, OT#2020 to OT#2024, OT#2012 to OT#2016, OT#2004 to OT#2008, OT#1996 to OT#2000, OT#1988 to OT#1992: USER OPEN SIGNALS**

Output Number	Ladder Input Number	Meaning
OT#2044 OT#2036 OT#2028 OT#2020 OT#2012 OT#2004 OT#1996 OT#1988	12563, 12553, 12543, 12533, 12523, 12513, 12503, 12493	GAS Output
OT#2045 OT#2037 OT#2029 OT#2021 OT#2013 OT#2005 OT#1997 OT#1989	12564, 12554, 12544, 12534, 12524, 12514, 12504, 12494	Arc shortage restart memory reset
OT#2046 OT#2038 OT#2030 OT#2022 OT#2014 OT#2006 OT#1998 OT#1990	12565, 12555, 12545, 12535, 12525, 12515, 12505, 12495	Restart reset
OT#2047 OT#2039 OT#2031 OT#2023 OT#2015 OT#2007 OT#1999 OT#1991	12566, 12567, 12568, 12569, 12570, 12571, 12572, 12573	Inching

DX100

12 Standard Ladder Program
12.4 Arc Welding

Output Number	Ladder Input Number	Meaning
OT#2048	12567,	Retract
OT#2040	12557,	
OT#2032	12547,	
OT#2024	12537,	
OT#2016	12527,	
OT#2008	12517,	
OT#2000	12507,	
OT#1992	12497	

- **OT#2044, OT#2036, OT#2028, OT#2020, OT#2012, OT#2004, OT#1996, OT#1988 : Gas output**



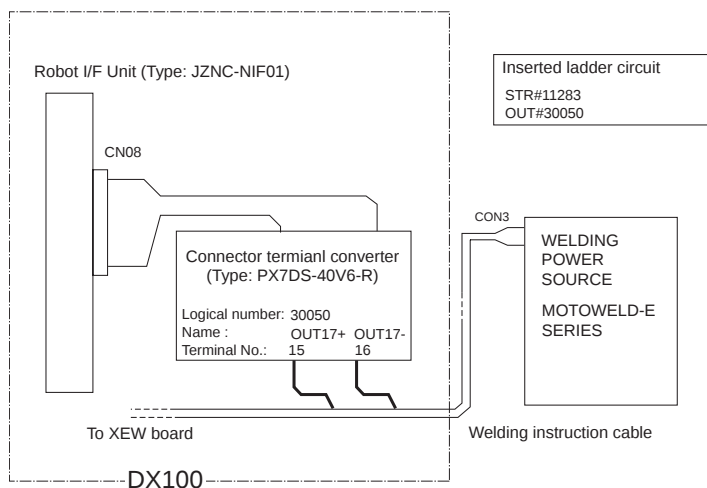
One signal from user open signals and general outputs [#2044 (for arc 1), #2036 (for arc 2), #2028 (for arc 3), #2020 (for arc 4), #2012 (for arc 5), #2004 (for arc 6), #1996 (for arc 7), #1988 (for arc 8)] turns ON while the [INTERLOCK]+[2] keys are pressed simultaneously.

For a system with one application, use OT#2044.



o function gas flow control using above user open signals, the above general outputs need to be assigned to external output signals by concurrent I/O ladder so that the signals can be connected to the welder's input signals for gas flow control.

An example of connection with one of the YASKAWA's digital welder MOTOWELD-E series is shown below:



■ **OT#2045, OT#2037, OT#2029, OT#2021, OT#2013, OT#2005,
OT#1997, OT#1989: ARC SHORTAGE RESTART MEMORY RESET**



These signals are connected to signal Nos. 70101, 70301, 70501, 70701, 70901, 71101, 71301, and 71501 in the user ladder. When these signals are on, the arc shortage restart memory signal Nos. 70100, 70300, 70500, 70700, 70900, 71100, 71300, and 71500 are reset. Use the signals to reset the memory after taking necessary action, when “1:Output error and continue operation” is selected for the arc shortage restart method. For a system with one application, use output No. 2045 and signal Nos. 70101, or 70100.

**70100, 70300, 70500, 70700, 70900, 71100, 71300, 71500
: ARC SHORTAGE RESTART MEMORY RESET**

These signals are turned on at inadvertent arc shortage if “1: Output error and continue operation” is selected for the arc shortage restart method. When these signals are turned on, a message “END OF ARC RESTARTING” is displayed on the programming pendant. Use the signals to check arc shortage during operation.

■ **OT#2046, OT#2038, OT#2030, OT#2022, OT#2014, OT#2006,
OT#1998, OT#1990: RESTART RESET**



These signals are connected to signal Nos. 41143, 41203, 41263, 41323, 41383, 41443, 41503, and 41563 in the user ladder. When these signals are on, restarting is cancelled. Use the signals to cancel restarting when “manual intervention” is selected for the restarting method. For a system with one application, use OT#2046 and signal No. 41143.

- **OT#2047, OT#2048, OT#2039, OT#2040, OT#2031, OT#2032, OT#2023, OT#2024, OT#2015, OT#2016, OT#2007, OT#2008, OT#1999, OT#2000, OT#1991, OT#1992: WIRE OPERATION**



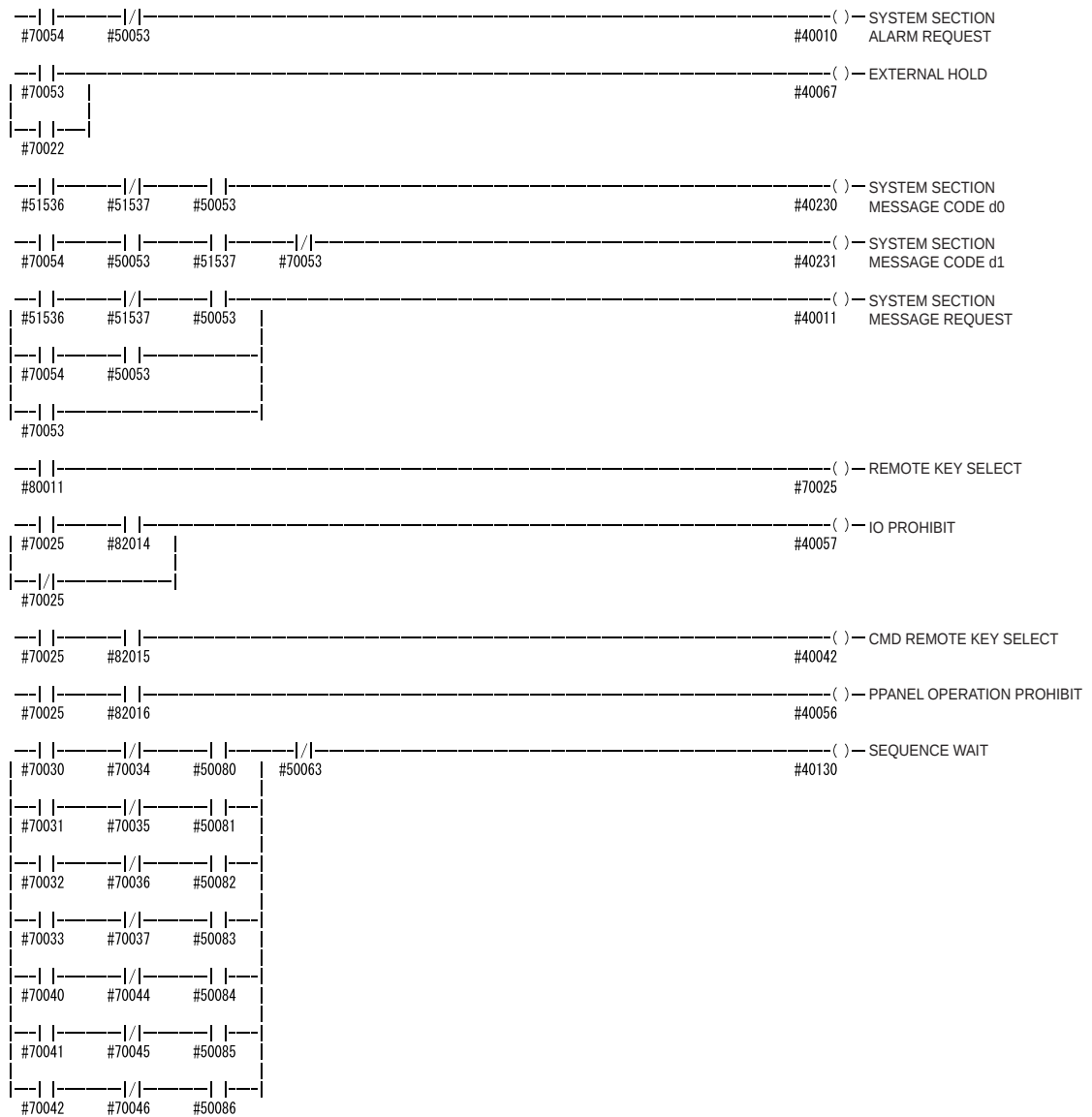
These signals are connected in the system ladder. When these signals are on, the wire operation output to the welder is executed. Use the signals to control wire in the job. The feed speed is determined by the last welding current output value in the playback. To control this speed, place the “ARCSET” instruction before the wire operation. For a system with one application, use OT#2046 to OT#2048.

12.5 Handling

12.5.1 LADDER PROGRAM LIST

■ System Ladder Section

Standard ladders are prepared for each application prior to shipment. Ladder programs cannot be edited.

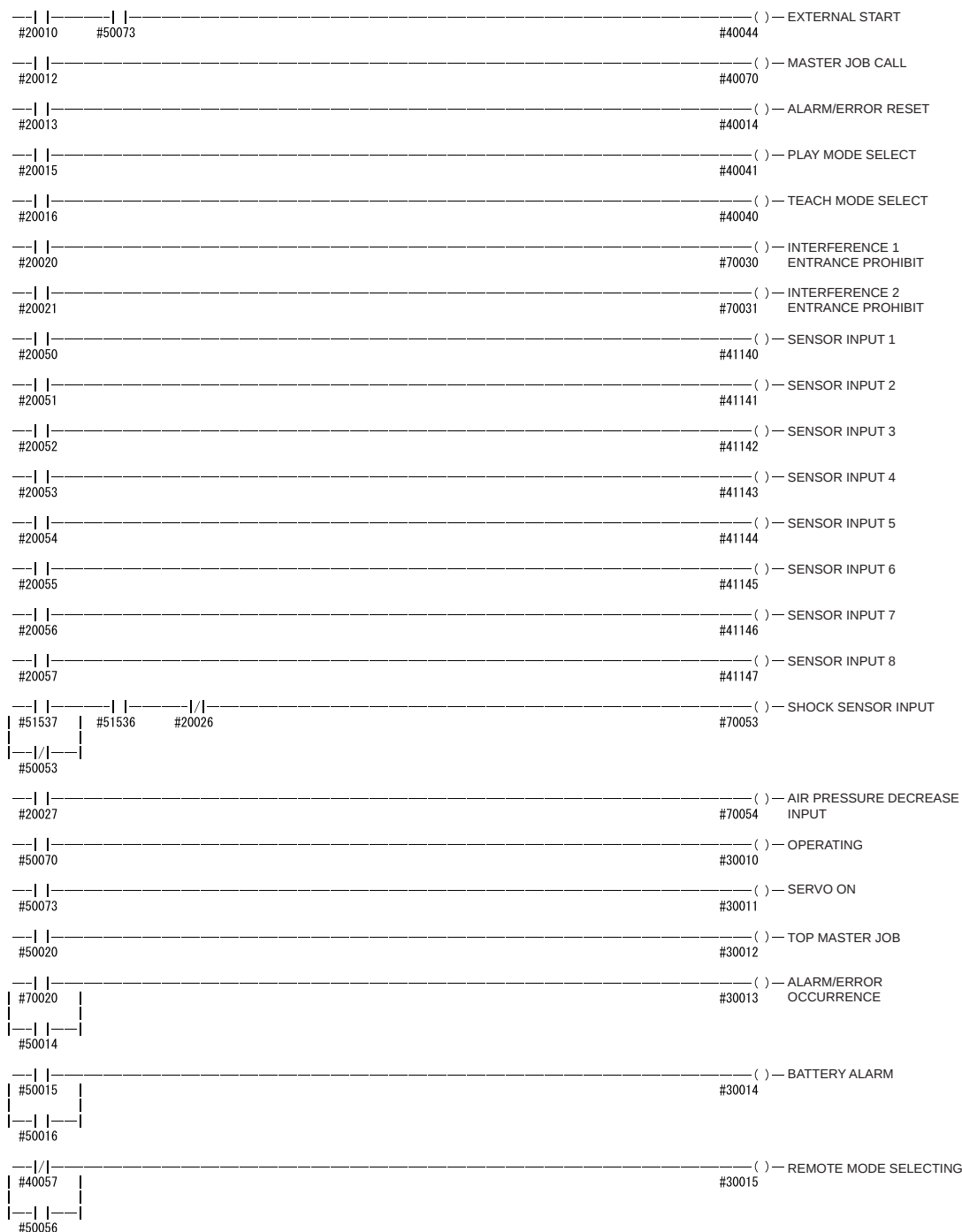


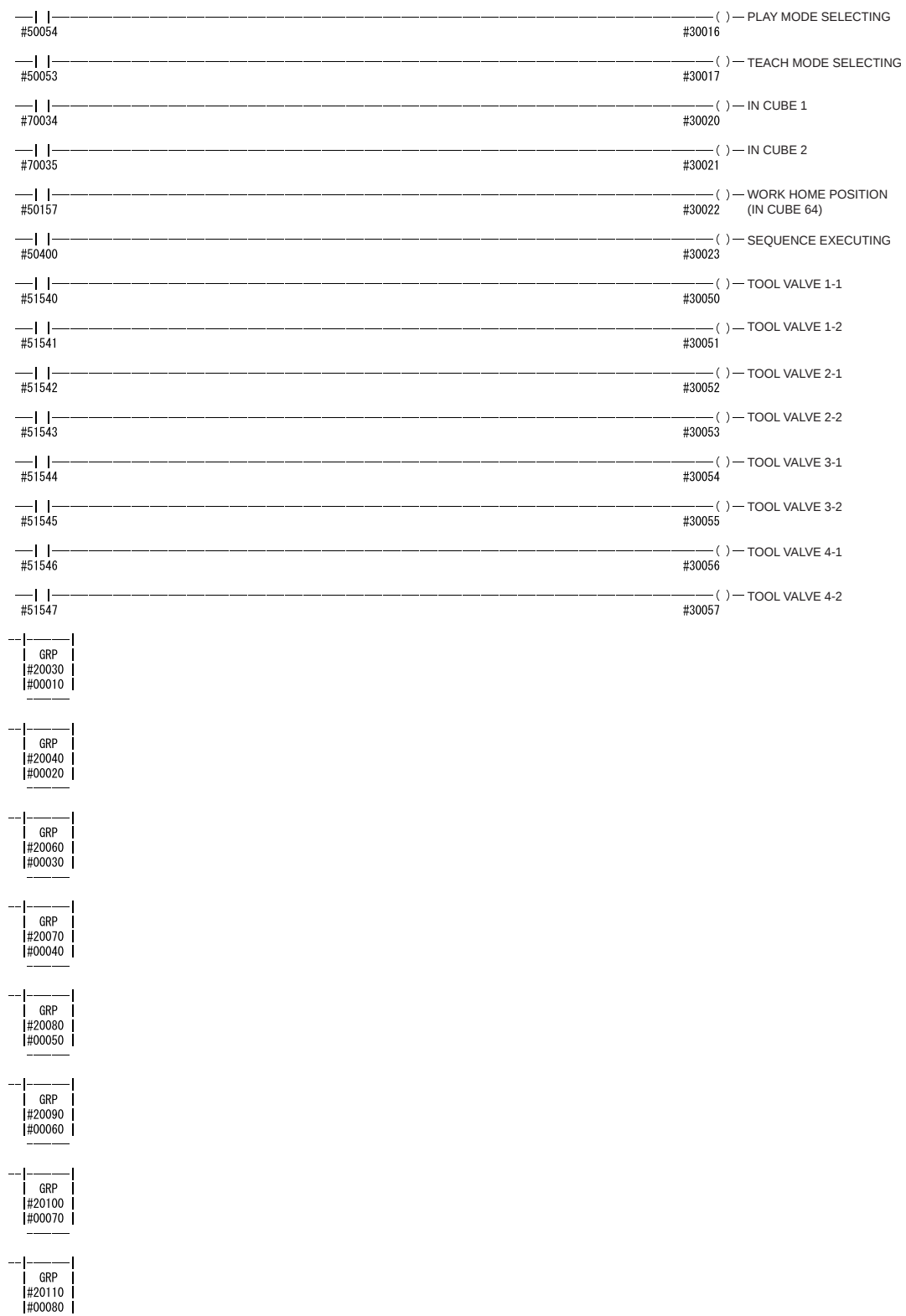




■ User Ladder Section

Signal connection specification and interface signals with system ladder are prepared prior to shipment. Including these signals, ladder programs can be edited.





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DX100	12 Standard Ladder Program 12.5 Handling
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#31270

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12.5.2 I/O ALARM

System Section

Alarm No.	Register No.	I/O Alarm Message
9000	00	AIR PRESSURE LOWERED
9001	01	
9002	02	
9003	03	
9004	04	
9005	05	
9006	06	
9007	07	
9008	08	
9009	09	
9010	10	
9011	11	
9012	12	
9013	13	
9014	14	
9015	15	
9016	16	
9017	17	
9018	18	
9019	19	
9020	20	
9021	21	
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9063	63	
9064	64	
9065	65	
9066	66	
9067	67	
9068	68	
9069	69	
:	:	
9127	127	

User Section

12.5.3 I/O Message

System Section

	Register No.	I/O Message
	00	TOOL SHOCK SENSOR WORKING
	01	TOOL SHOCK SENSOR INP. RELEASING
	02	AIR PRESSURE LOWERING
	03	
	04	
	05	
	06	
	07	
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	09	
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	12	
	13	
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	64	
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	67	
	68	
	69	
	:	
	123	

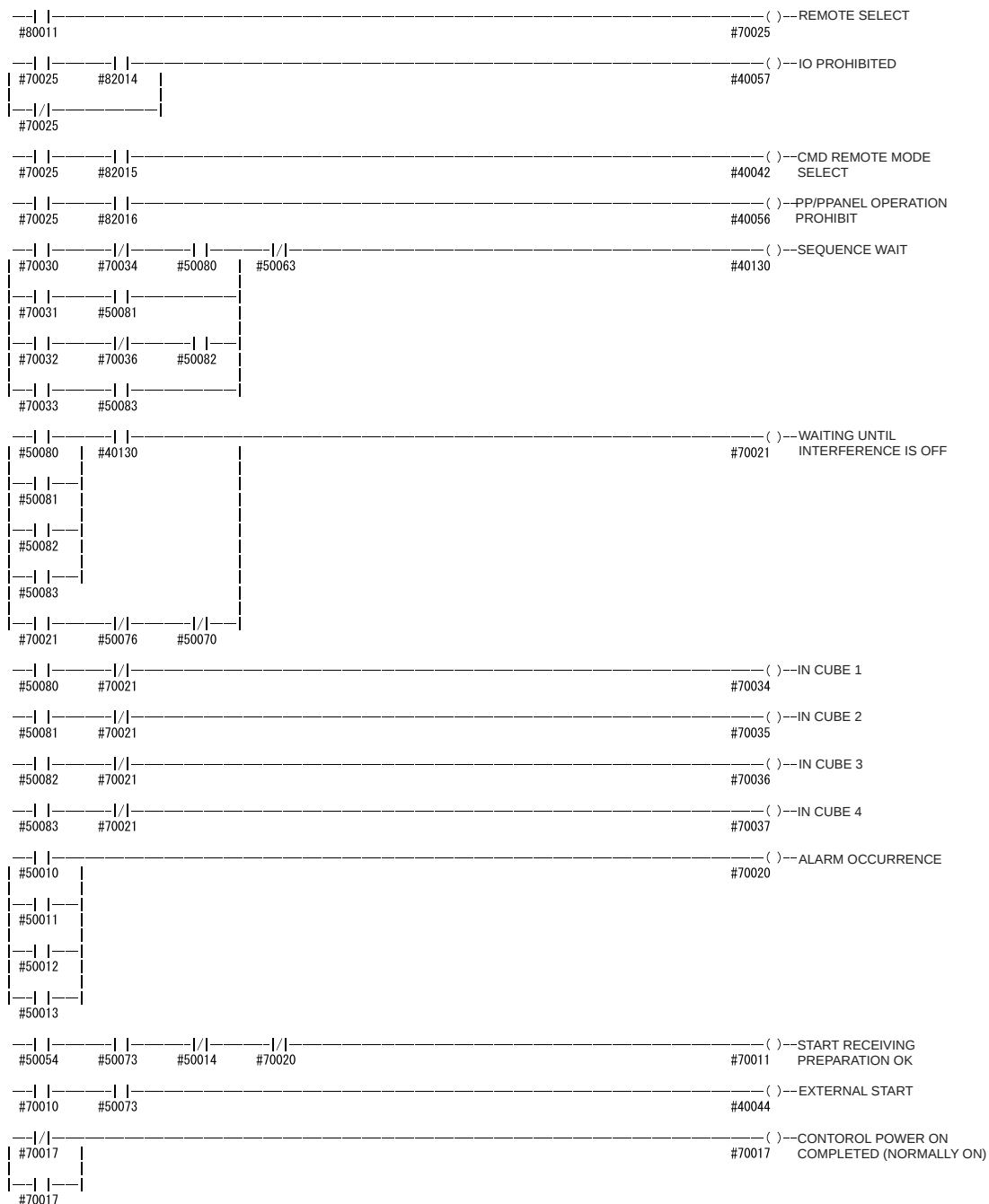
User Section

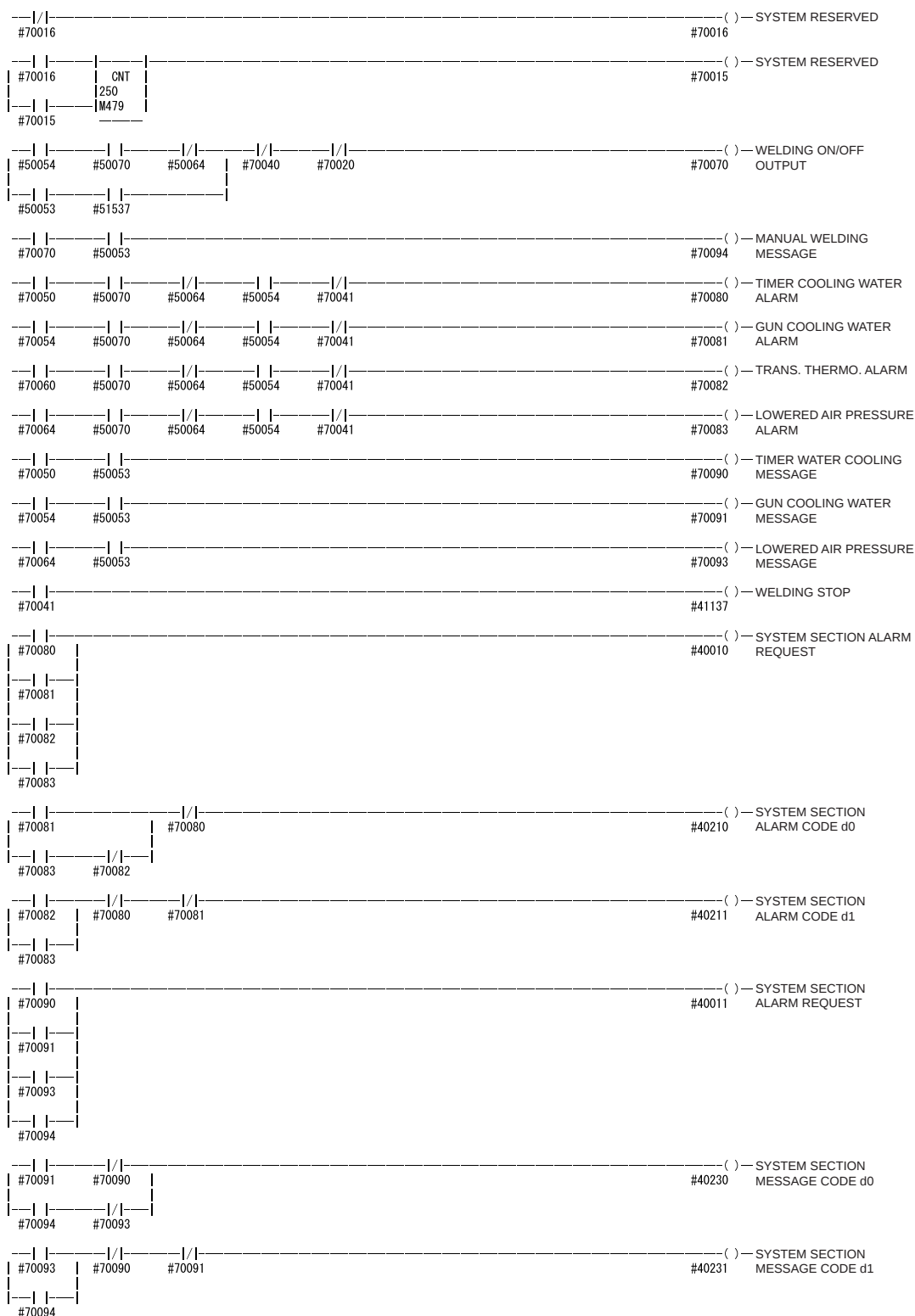
12.6 Spot Welding

12.6.1 Ladder Program List

■ System Ladder Section

Standard ladders are prepared for each application prior to shipment.
Ladder programs cannot be edited.

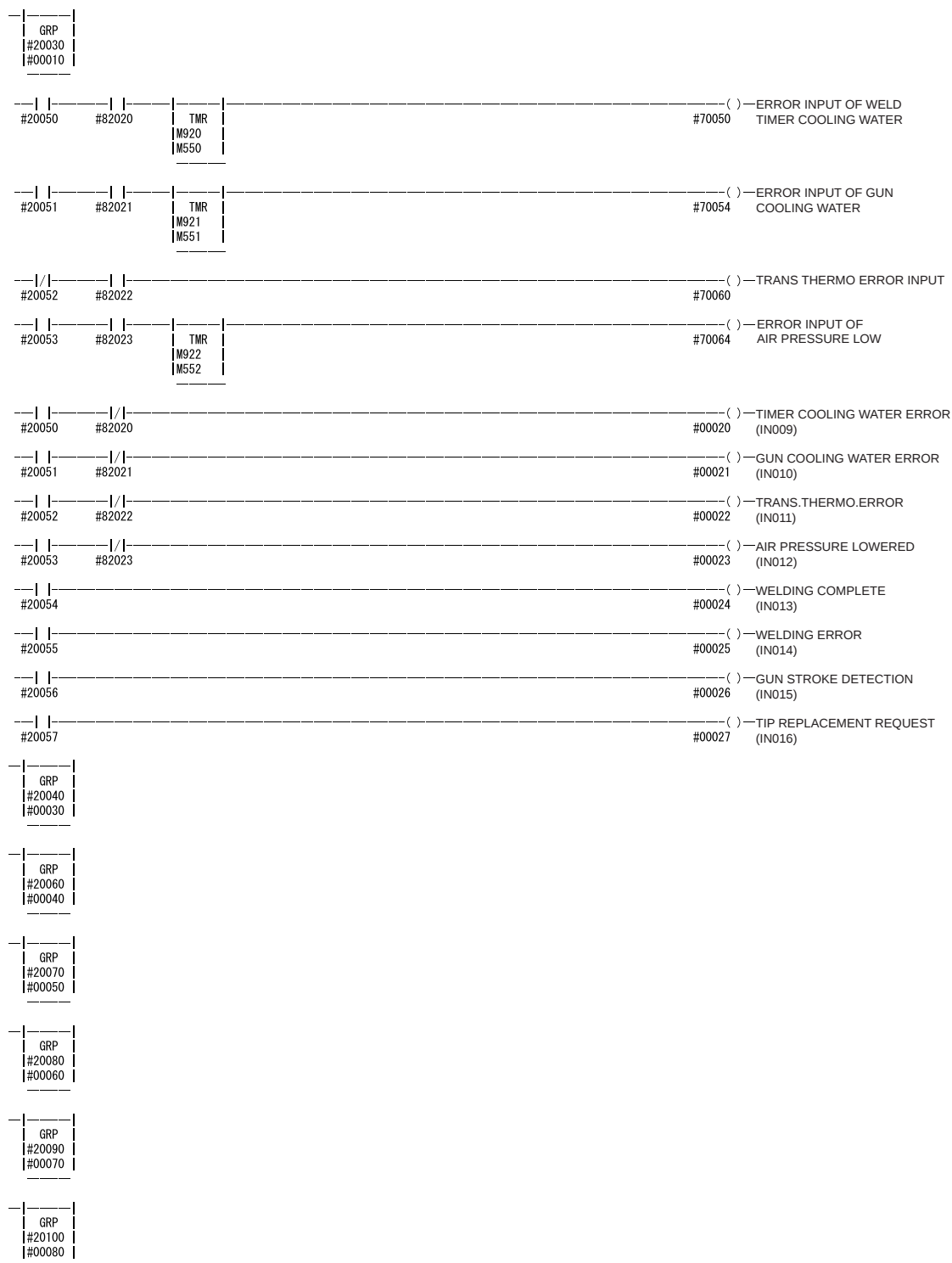




■ User Ladder Section

Signal connection specification and interface signals with system ladder are prepared prior to shipment. Including these signals, ladder programs can be edited.

#20010	() -- EXTERNAL START	#70010
#20012	() -- MASTER JOB CALL	#40070
#20013	() -- ALARM/ERROR RESET	#40014
#20015	() -- PLAY MODE SELECT	#40041
#20016	() -- TEACH MODE SELECT	#40040
#20020	() -- INTERFERENCE 1 ENTRANCE PROHIBIT	#70030
#20021	() -- INTERFERENCE 2 ENTRANCE PROHIBIT	#70031
#20022	() -- WELD ON/OFF REQUEST	#70040
#20023	() -- WELDING STOP INPUT	#70041
#20024	() -- INTERFERENCE 3 ENTRANCE PROHIBIT	#70032
#20025	() -- INTERFERENCE 4 ENTRANCE PROHIBIT	#70033
#50070	() -- OPERATING	#30010
#50073	() -- SERVO ON	#30011
#50020	() -- TOP MASTER JOB	#30012
#70020	() -- ALARM/ERROR OCCURRENCE	#30013
#50014		
#50015	() -- BATTERY ALARM	#30014
#50016		
#40057	() -- REMOTE MODE SELECTING	#30015
#50056		
#50054	() -- PLAY MODE SELECTING	#30016
#50053	() -- TEACH MODE SELECTING	#30017
#70034	() -- IN CUBE 1	#30020
#70035	() -- IN CUBE 2	#30021
#50157	() -- WORK HOME POSITION (IN CUBE 64)	#30022
#50400	() -- SEQUENCE EXECUTING	#30023
#70036	() -- IN CUBE 3	#30024
#70037	() -- IN CUBE 4	#30025



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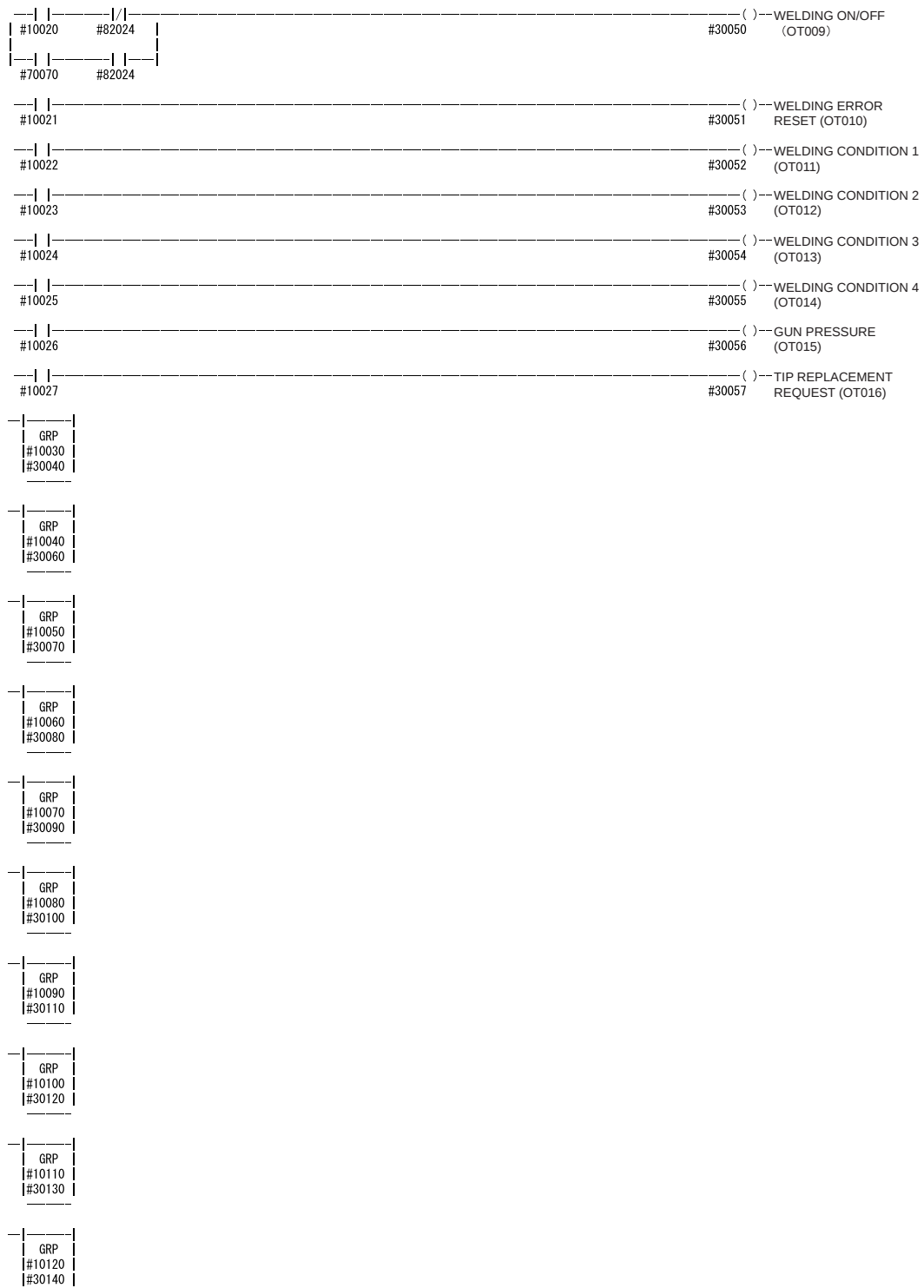
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GRP
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12.6.2 I/O Alarm

System Section

Alarm No.	Register No.	I/O Alarm Message
9000	00	ERR OF WELD TIMER COOLING WATER
9001	01	ERROR OF GUN COOLING WATER
9002	02	ERROR IN TRANSTHERMO OF GUN
9003	03	AIR PRESSURE LOWERED
9004	04	
9005	05	
9006	06	
9007	07	
9008	08	
9009	09	
9010	10	
9011	11	
9012	12	
9013	13	
9014	14	
9015	15	
9016	16	
9017	17	
9018	18	
9019	19	
9020	20	
9021	21	
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9063	63	
9064	64	
9065	65	
9066	66	
9067	67	
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9127	127	

User Section

DX100

12 Standard Ladder Program
12.6 Spot Welding

12.6.3 I/O Message

System Section

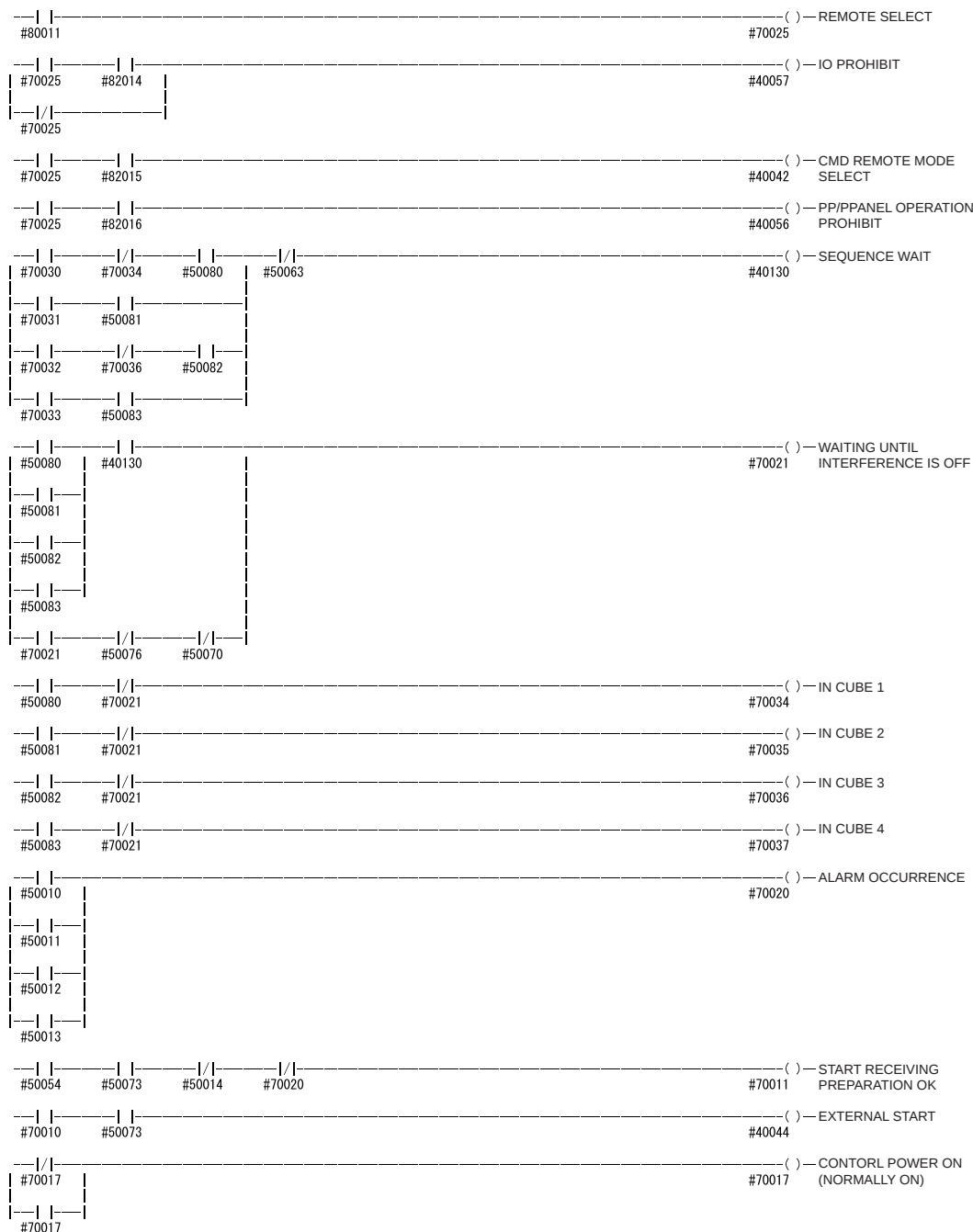
	Register No.	I/O Message
	00	ERR OF WELD TIMER COOLING WATER
	01	ERROR OF GUN COOLING WATER
	02	AIR PRESSURE LOWERING
	03	AVAILABLE TO MANUAL SPOT WELDING
	04	
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User Section		
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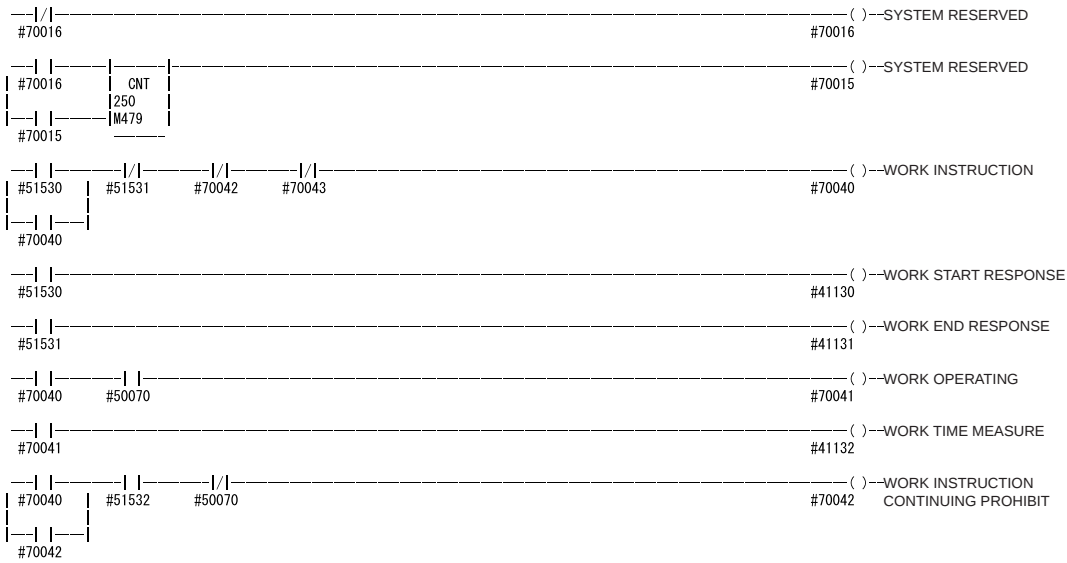
12.7 General-Purpose Applications

12.7.1 LADDER PROGRAM LIST

■ System Ladder Section

Standard ladders are prepared for each application prior to shipment.
Ladder programs cannot be edited.?





■ User Ladder Section

Signal connection specification and interface signals with system ladder are prepared prior to shipment. Including these signals, ladder programs can be edited.

#20010	() — EXTERNAL START
#20012	() — MASTER JOB CALL
#20013	() — ALARM/ERROR RESET
#20015	() — PLAY MODE SELECT
#20016	() — TEACH MODE SELECT
#20020	() — INTERFERENCE 1 ENTRANCE PROHIBIT
#20021	() — INTERFERENCE 2 ENTRANCE PROHIBIT
#20022	() — WORK PROHIBIT
#20024	() — INTERFERENCE 3 ENTRANCE PROHIBIT
#20025	() — INTERFERENCE 4 ENTRANCE PROHIBIT
#50070	() — OPERATING
#50073	() — SERVO ON
#50020	() — TOP MASTER JOB
#70020	() — ALARM/ERROR OCCURRENCE
#50014	
#50015	() — BATTERY ALARM
#50016	
#40057	() — REMOTE MODE SELECTING
#50056	
#50054	() — PLAY MODE SELECTING
#50053	() — TEACH MODE SELECTING
#70034	() — IN CUBE 1
#70035	() — IN CUBE 2
#50157	() — WORK HOME POSITION (IN CUBE 32)
#50400	() — SEQUENCE EXECUTING
#70036	() — IN CUBE 3
#70037	() — IN CUBE 4
#70040	() — WORK INSTRUCTION

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| GRP |
|#20030 |
#00010

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| GRP |
|#20040 |
#00020

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| GRP |
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#00030

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| GRP |
|#20060 |
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| GRP |
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| GRP |
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| GRP |
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| GRP |
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	#20290	
	#00270	
—	GRP	
	#20300	
	#00280	
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|#01240|

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| GRP |
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| GRP |
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| GRP |
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| GRP |
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#31000

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| GRP |
|#10990|
#31010

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| GRP |
| #11000 |
| #31020 |
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| GRP |
| #11010 |
| #31030 |
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| GRP |
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| GRP |
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| GRP |
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| GRP |
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| GRP |
| #11140 |
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| GRP |
|#11150 |
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| GRP |
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| GRP |
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#31190

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| GRP |
|#11180 |
#31200

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| GRP |
|#11190 |
#31210

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| GRP |
|#11200 |
#31220

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| GRP |
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| GRP |
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| GRP |
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| GRP |
|#11250 |
#31270

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| GRP |
|#11260 |
#31280

12.7.2 I/O ALARM

System Section

Alarm No.	Register No.	I/O Alarm Message
9000	00	
9001	01	
9002	02	
9003	03	
9004	04	
9005	05	
9006	06	
9007	07	
9008	08	
9009	09	
9010	10	
9011	11	
9012	12	
9013	13	
9014	14	
9015	15	
9016	16	
9017	17	
9018	18	
9019	19	
9020	20	
9021	21	
:	:	
9063	63	
9064	64	
9065	65	
9066	66	
9067	67	
9068	68	
9069	69	
:	:	
9127	127	

User Section

12.7.3 I/O MESSAGE

System Section

	Register No.	I/O Message
	00	
	01	
	02	
	03	
	04	
	05	
	06	
	07	
	08	
	09	
	10	
	11	
	12	
	13	
	14	
	15	
	16	
	17	
	18	
	19	
	20	
	21	
	:	
	63	
	64	
	65	
	66	
	67	
	68	
	69	
	:	
	127	

User Section

13 How to Monitor Signals

Signal status can be monitored in the windows described in the following sections.

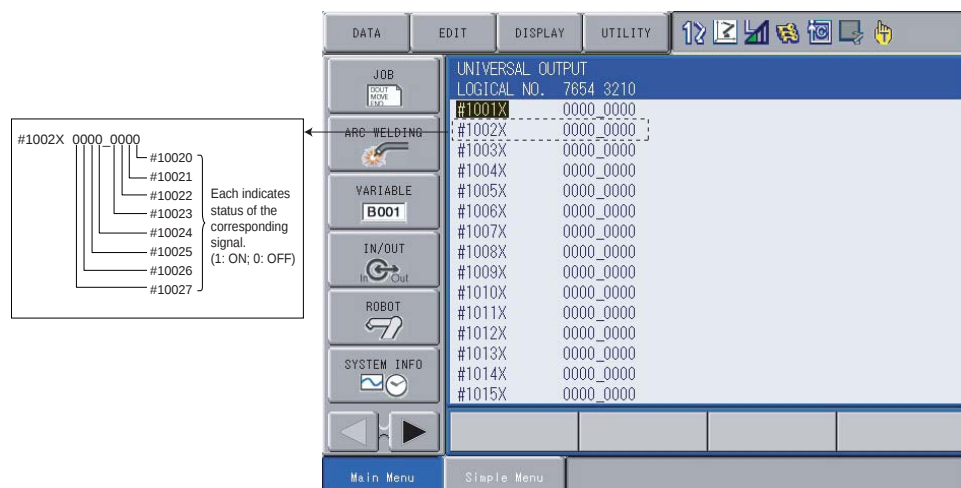
13.1 Monitoring I/O Signals

The following example shows one of the I/O monitor windows.

13.1.1 I/O Windows

1. Select {IN/OUT} under the main menu.
2. Select an I/O window to be monitored.
 - The following I/O windows can be selected.
 - {UNIVERSAL INPUT}: Signals referred with instructions in JOBS (#0xxxx)
 - {UNIVERSAL OUTPUT}: Signals output from JOBS (#1xxxx)
 - {EXTERNAL INPUT}: Signals input from external devices (#2xxxx)
 - {EXTERNAL OUTPUT}: Signals output to external devices (#3xxxx)
 - {SPECIFIED INPUT}: Signals change manipulator operation mode (#4xxxx)
 - {SPECIFIED OUTPUT}: Signals inform manipulator operation mode and status (#5xxxx)
 - {AUX. RELAY}: Signals used in concurrent I/O (#7xxxx)
 - {CONTROL INPUT}: Signals refer to hardware status controller (#8xxxx)
 - {NETWORK INPUT}: Signals input from network devices (#25xxx)
 - {NETWORK OUTPUT}: Signals output to network devices (#35xxx)

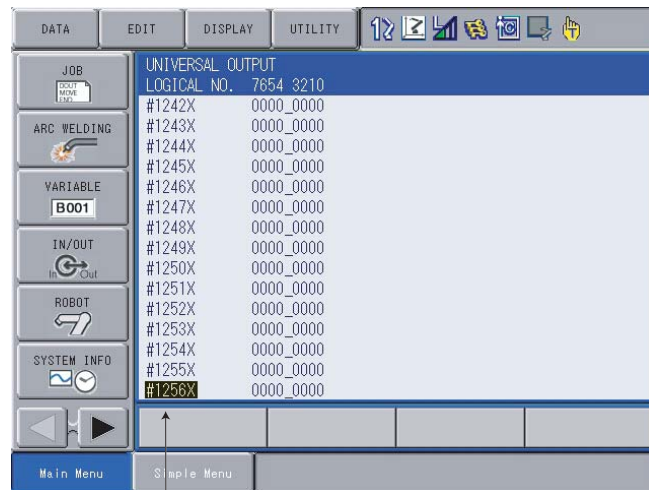
The same applies to the signals on other windows.



If the desired relay number is not displayed on the screen, perform the following operation to point the cursor to the desired relay number.

1. Point the cursor to the desired relay number.

- (1) Move the cursor to a relay number, and press [SELECT].
- (2) Input the desired relay number with the numeric keys, then press [ENTER] to point the cursor to the specified number.



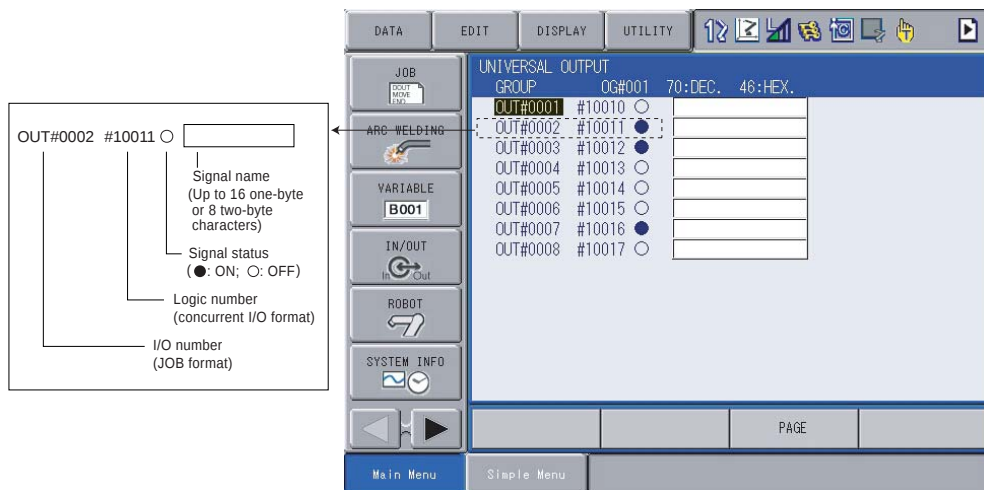
The cursor moved to the desired relay number.

13.2 I/O Status Window

The signal status can be monitored by switching the UNIVERSAL INPUT/OUTPUT, EXTERNAL INPUT/OUTPUT, SPECIFIED INPUT/OUTPUT windows to the I/O status window.

In this window, each signal name can be monitored as well.

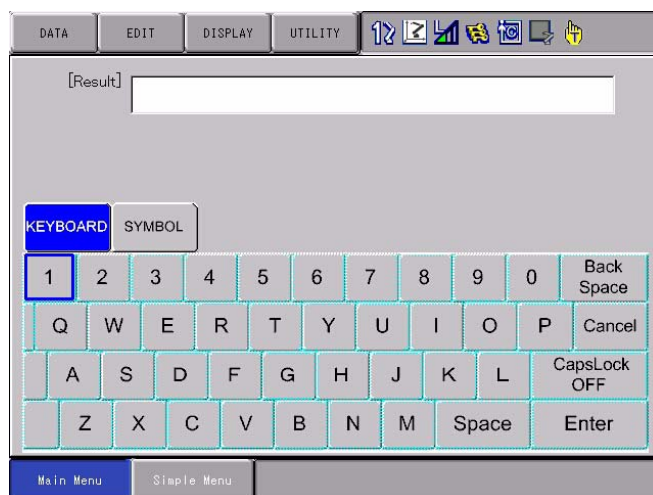
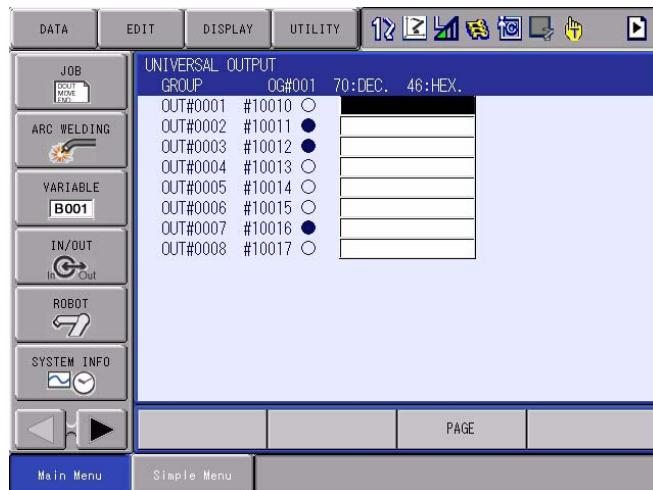
1. Select {DISPLAY} under the menu.
2. Select {DETAIL}.
 - The I/O window is switched to the I/O status window.
3. Select {SIMPLE}.
 - The I/O status window is switched to the I/O window.
4. Press page key.
 - Pressing the page key changes the relay number displayed on the screen.
 - The relay numbers are displayed in the following order each time the page key is pressed:
 #1001X → #1102X → ... → #1255X → #1256X (the last page) → #1001X → ...
 - The relay numbers change in the following reverse order each time the [SHIFT] + page key are pressed:
 #1001X → #1256X (the last page) → #1255X → ... → #1002X → #1001X → ...
 - <Example> Universal Output window



- In the Universal Output status window, the output signal on/off status can be changed.
Once the status is changed, the status is maintained unless the next output instruction of JOB (DOUT) is executed.
- In the status windows "Universal Input", "External Input" and "External Output", the signal ON/OFF status can be forcibly changed.
Once the status is changed, the status is maintained unless the forced change status is cancelled.

13.2.1 Signal name registration

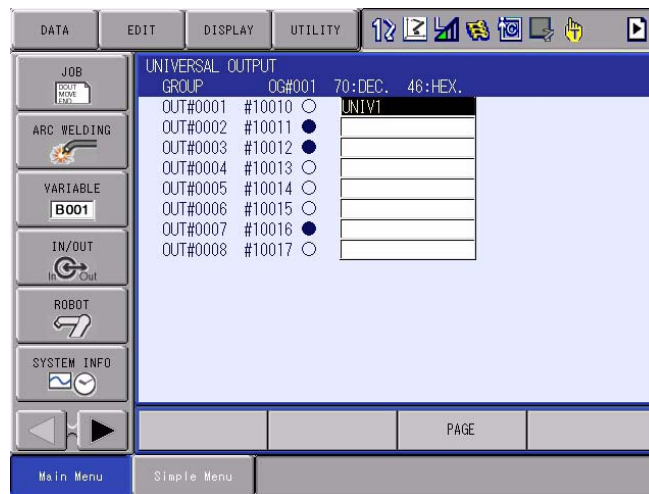
1. Select the signal name to be registered.
 - (1) Move the cursor to the desired signal name to be registered, and press [SELECT] to enable character entry.
 - Enter up to 16 one-byte (or 8 two-byte) characters.



2. Enter the signal name.

3. Press [ENTER].

– The name is registered.

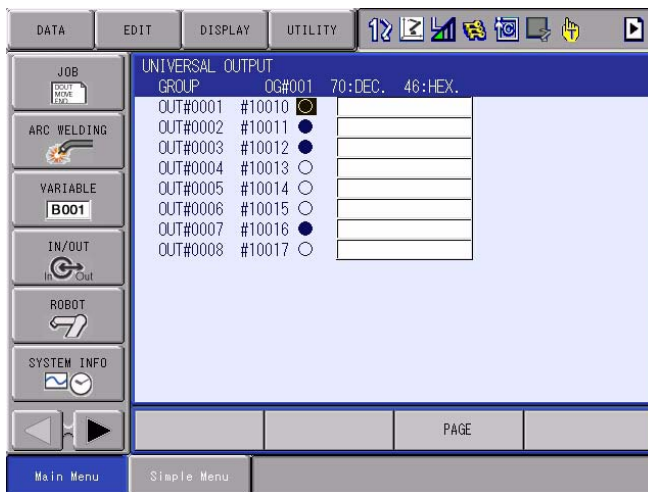


13.2.2 Universal Output Window

The ON-OFF status of the universal output signals can be changed by performing the following procedure.

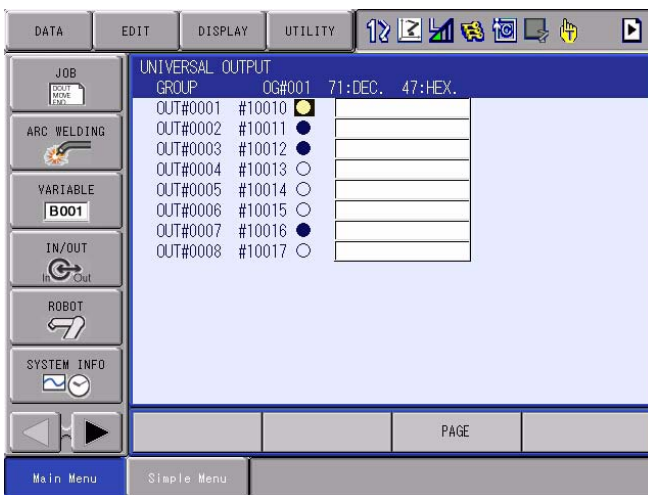
1. Select the signal status desired to be changed.

- Move the cursor to the status ("●" or "○") of desired signal in the Universal Output window.



2. Select the signal status.

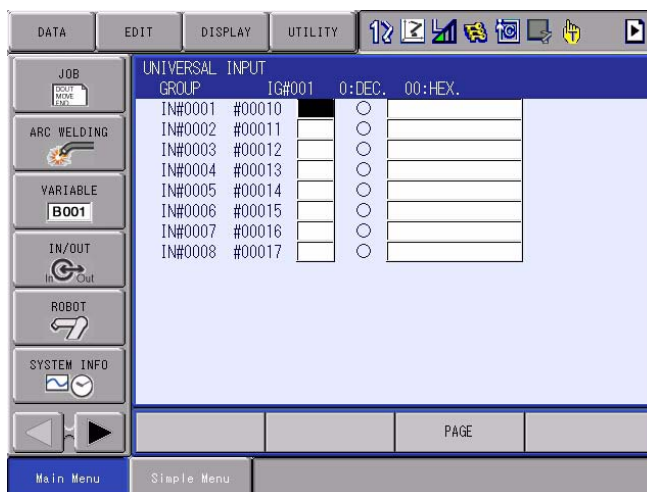
- The signal status changes each time the [INTERLOCK] +[SELECT] keys are pressed.



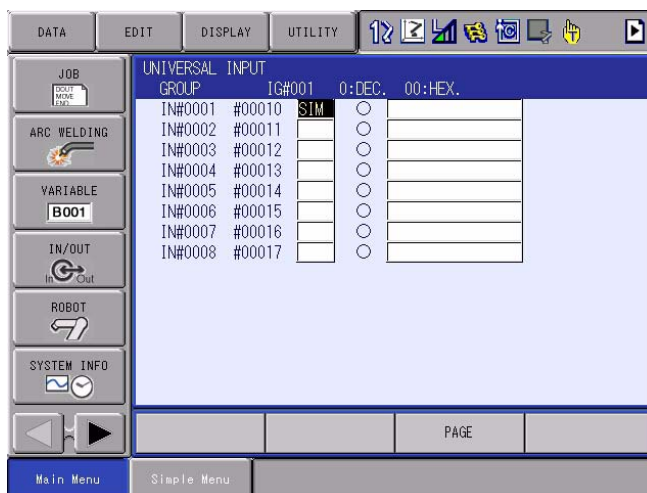
13.2.3 Universal Input Window

The status of the universal input signals can be changed by performing the following procedure.

1. Select the signal desired to be changed.
 - Move the cursor to the small box on the row of the signal to be changed in the Universal Input window.

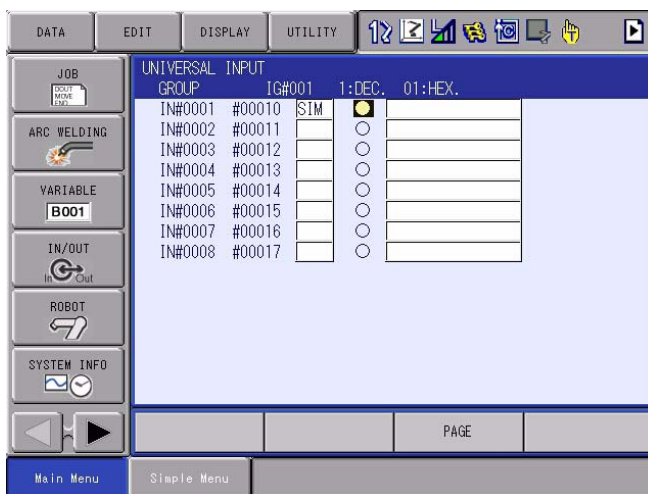


2. Select the forced status.
 - The signal status changes each time the [SELECT] key is pressed.
 - [SIM] : status of forced signal output
 - [Blank] : standard status



3. Select the signal status.

- Move the cursor to the status ("●" or "○") specified as "SIM". Only the signal status specified as "SIM" changes each time the [INTERLOCK] +[SELECT] keys are pressed.



If "SIM" (forced signal output) is selected, the user parameter S4C488 enables the continuous operation of the next instruction even if the signal status does not correspond to the condition when executing the WAIT instruction that specifies the infinite wait status for the universal input signal.

(Example) When the following instruction is given in a JOB with "SIM" specified for the IN#0001.

WAIT IN#0001=ON

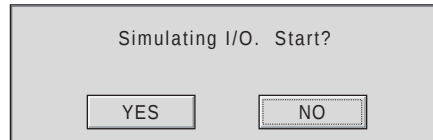
1. S4C488=0: infinite wait status until the signal status corresponds to the condition.
2. S4C488=non-0: executes the next instruction after a time specified in S2C488 (in units of 0.01 msec) has passed even if the signal status does not correspond to the condition.

For example, when the parameter is set to "S4C488=100", the above WAIT instruction executes the next instruction a second later if IN#0001 is set to "OFF" enabled by selecting "SIM".



- Perform the following check operation for safety when operating the manipulator with "SIM" (forced signal output) is remained selected for the universal input signal.

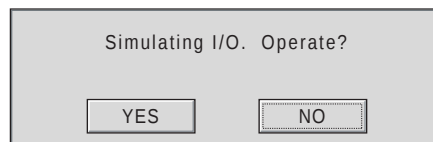
1. If any of the universal input signal is set to "SIM", the confirmation dialog box appears when starting a job.



Select "YES" when executing the job in the status of the forced signal output. The job starts running by performing the start operation again after the dialog box disappears.

Select "NO" when not executing the job in the status of the forced signal output. Cancel the "SIM" status after the dialog box disappears.

2. If any of the external output signal is set to "SIM", the confirmation dialog box appears when operating the manipulator (JOG, FWD/BWD operations) with the programming pendant.



Select "YES" when operating the manipulator in the status of the forced signal output. The manipulator can be operated after the dialog box disappears.

Select "NO" when not operating the manipulator in the status of the forced signal output. Cancel the "SIM" status after the dialog box disappears.

- Concurrent I/O program reflects the actual signal status regardless of the "SIM" setting status of the universal input signal.

For example, even if building a circuit in the ladder program as follows, #30010 is not ON when "SIM" is selected and the signal status set to "ON" ("●") for #00010. (The ON-OFF status of normal signal is referred in the ladder program.)

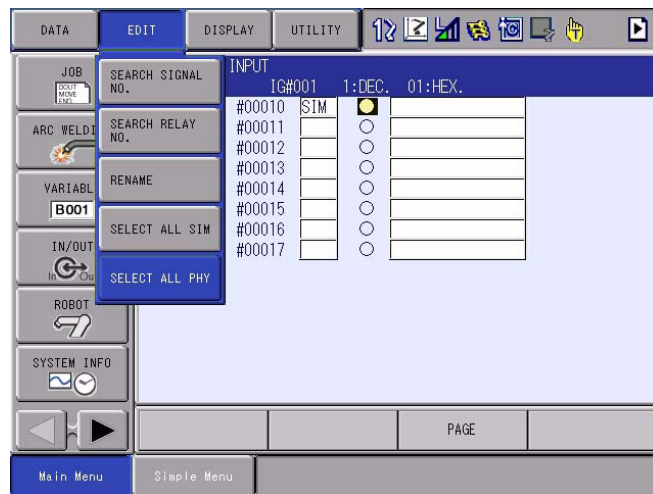
STR #00010

OUT #30010

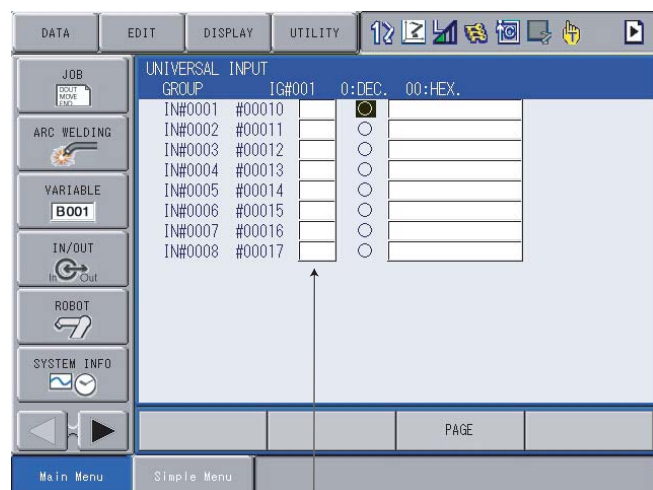
13.2.3.1 Bundle cancellation

The "SIM" status of the universal input signal can be collectively cancelled by performing the following procedure.

1. Select {EDIT} from the Menu Area.



2. Select {SELECT ALL PHY}.
 - The forced status of all the signals is cancelled.

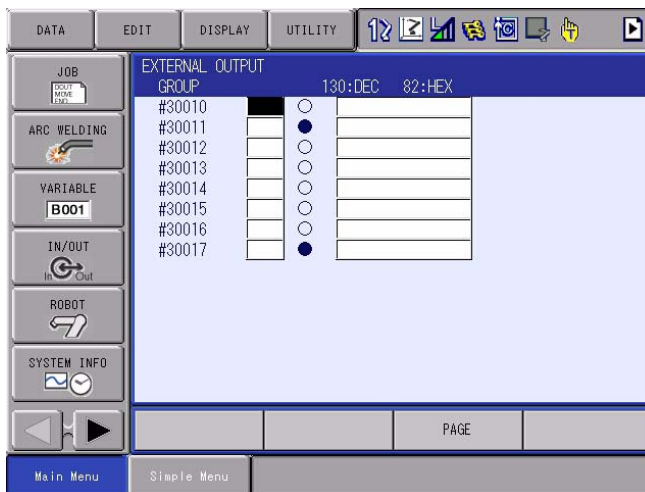


Cancels the forced status ("SIM") of all the signals.
(IN#0001 to IN#2048)

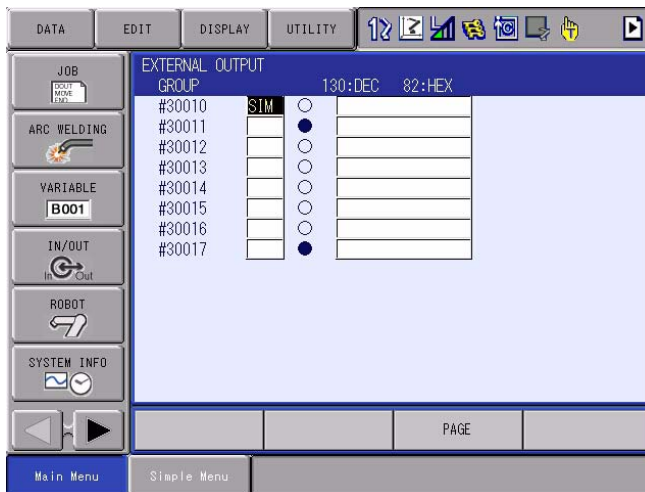
13.2.4 Changing Signal Status from the External Output Window

The status of the external output signals can be changed by performing the following procedure.

1. Select the signal desired to be changed.
 - Move the cursor to the small box on the row of the signal to be changed in the Universal Input window.

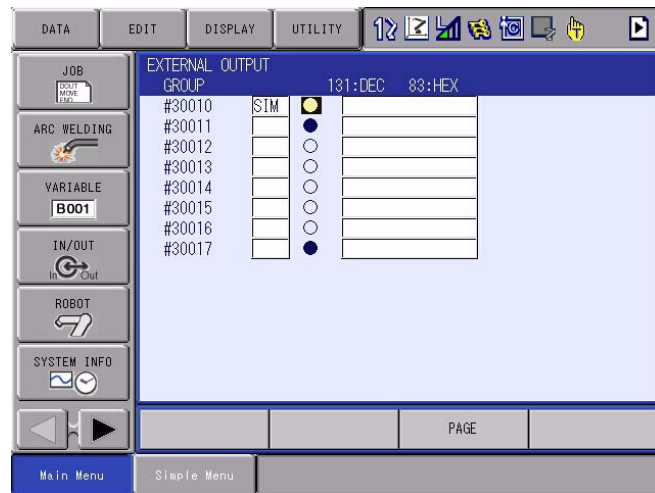


2. Select the forced status.
 - The signal status changes each time the [SELECT] key is pressed.
 - [SIM] : status of forced signal output
 - [Blank] : standard status



3. Select the signal status.

- Move the cursor to the status ("●" or "○") specified as "SIM". Only the signal status specified as "SIM" changes each time the [INTERLOCK] +[SELECT] keys are pressed.

**CAUTION**

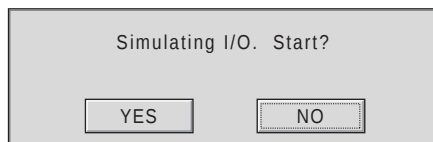
- Changing the status of external output signal by specifying "SIM" also changes the signals output to the actual external devices. Before forcibly changing the signal status, verify the destination device of each signal, and check on how the change effects on the device.

Failure to observe this caution may result in injury or damage to equipment.



- Perform the following check operation for safety when operating the manipulator with "SIM" (forced signal output) is remained selected for the universal input signal.

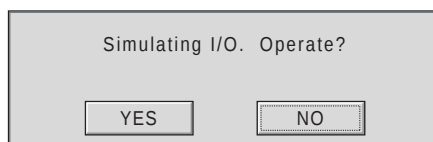
1. If any of the universal input signal is set to "SIM", the confirmation dialog box appears when starting a job.



Select "YES" when executing the job in the status of the forced signal output. The job starts running by performing the start operation again after the dialog box disappears.

Select "NO" when not executing the job in the status of the forced signal output. Cancel the "SIM" status after the dialog box disappears.

2. If any of the external output signal is set to "SIM", the confirmation dialog box appears when operating the manipulator (JOG, FWD/BWD operations) with the programming pendant.



Select "YES" when operating the manipulator in the status of the forced signal output. The manipulator can be operated after the dialog box disappears.

Select "NO" when not operating the manipulator in the status of the forced signal output. Cancel the "SIM" status after the dialog box disappears.

- Concurrent I/O program reflects the actual signal status regardless of the "SIM" setting status of the external output signal.

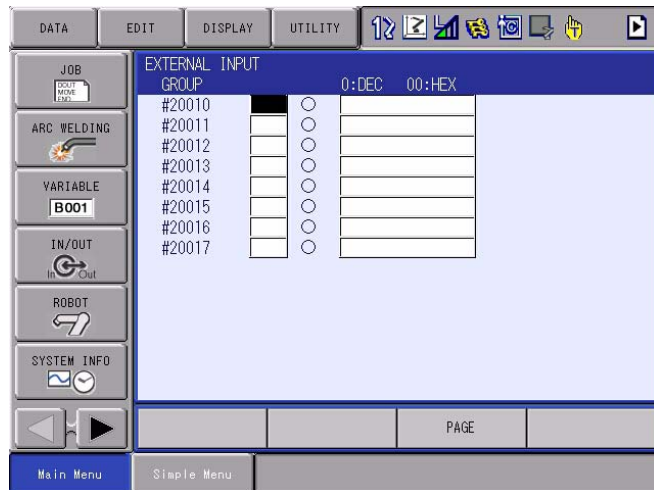
For example, even if building a circuit in the ladder program as follows, #30011 is not ON when "SIM" is selected and the signal status set to "ON" ("●") for #30010. (The ON-OFF status of normal signal is referred in the ladder program.)

STR #30010
OUT #30011

13.2.5 Changing Signal Status from the External Input Window

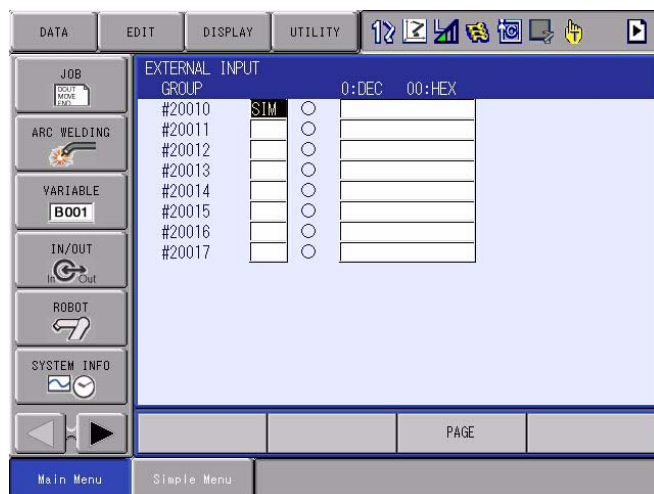
The status of the external input signals can be changed by performing the following procedure.

1. Select the signal desired to be changed.
 - Move the cursor to the small box on the row of the signal to be changed in the Universal Input window.



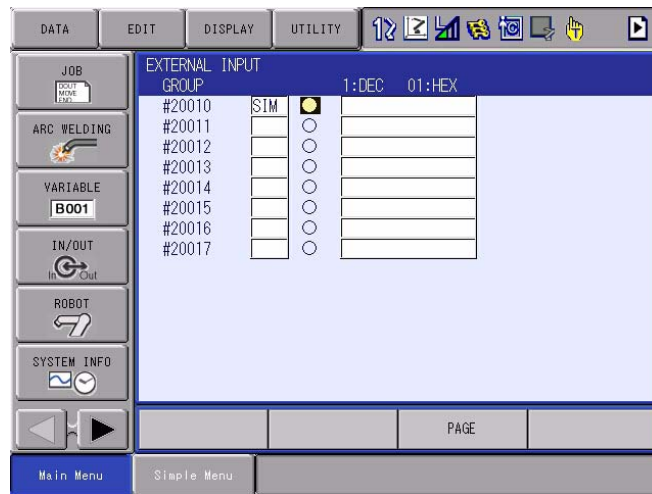
2. Select the forced status.

- The signal status changes each time the [SELECT] key is pressed.



3. Select the signal status.

- Move the cursor to the status ("●" or "○") specified as "SIM". Only the signal status specified as "SIM" changes each time the [INTERLOCK] +[SELECT] keys are pressed.



CAUTION

- When changing the status of external input signal by specifying "SIM", parameters can be set as follows:

S2C394=0 (Default)

Changes only the internal status (signal indication) if the output status of signals to the external device has been changed with the concurrent I/O program due to the change of external input signals. The output status for external device remains the same condition when the "SIM" mode was selected. Restores the original status by cancelling all the "SIM" mode.

S2C394=1

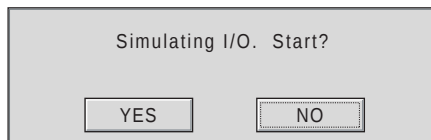
Changes the signals output to the actual external devices if the output status of signals to the external device has been changed with the concurrent I/O program due to the change of external input signals. Before forcibly changing the signal status, verify the destination device of each signal, and check on how the change effects on the device.

Failure to observe this caution may result in injury or damage to equipment.



- Perform the following check operation for safety when operating the manipulator with "SIM" (forced signal output) is remained selected for the universal input signal.

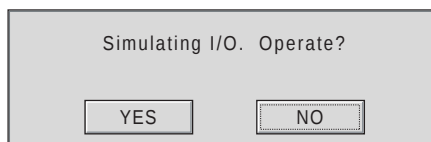
1. If any of the universal input signal is set to "SIM", the confirmation dialog box appears when starting a job.



Select "YES" when executing the job in the status of the forced signal output. The job starts running by performing the start operation again after the dialog box disappears.

Select "NO" when not executing the job in the status of the forced signal output. Cancel the "SIM" status after the dialog box disappears.

2. If any of the external output signal is set to "SIM", the confirmation dialog box appears when operating the manipulator (JOG, FWD/BWD operations) with the programming pendant.



Select "YES" when operating the manipulator in the status of the forced signal output. The manipulator can be operated after the dialog box disappears.

Select "NO" when not operating the manipulator in the status of the forced signal output.

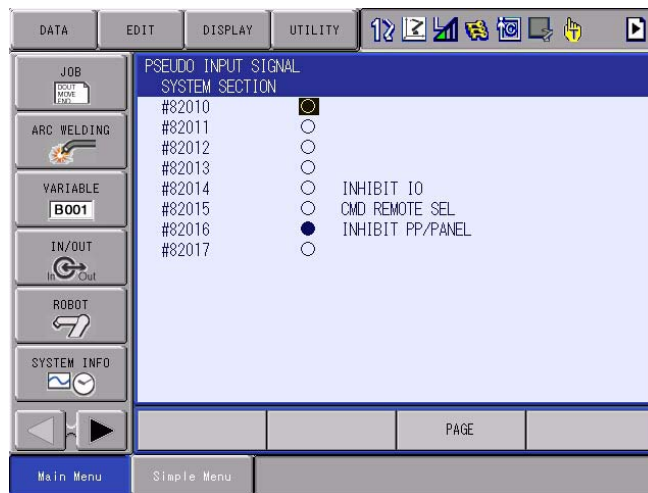
Cancel the "SIM" status after the dialog box disappears.

13.3 Pseudo Input Signal Window

13.3.1 Check of Pseudo Input Signal state

The status and name of the pseudo input signals can be checked with this window.

1. Select {IN/OUT} under the main menu
2. Select {PSEUDO INPUT SIG}
- The pseudo input signal window appears.



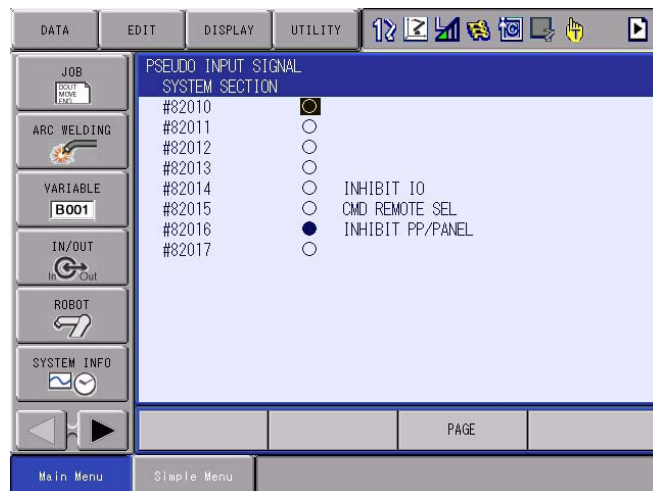
3. Press the page key.
- The system section (#82010-#82167) and the user section (#82170-#82207) are changed alternately with the page key.

13.3.2 Change of Pseudo Input Signal state

The signals can be turned ON/OFF in the pseudo input signal window in the management mode.

The status of the pseudo input signals can be changed by performing the following procedure.

1. Select the signal to be changed.
 - Move the cursor to the signal status to be changed. The signal status is indicated as either “○” or “●”.



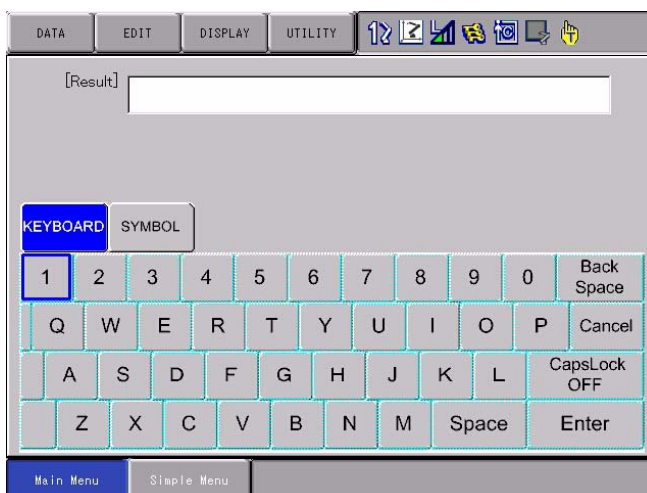
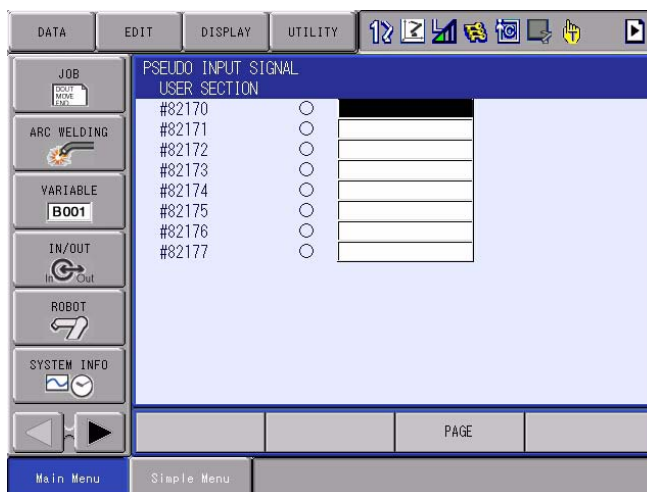
2. Select the signal status.
 - The signal status changes each time the [INTERLOCK] +[SELECT] keys are pressed. (● : ON; ○ : OFF)

13.3.3 Signal name registration

Signal name can be registered in the user section of the pseudo input signal window in the management mode.

The signal name can be registered by performing the following procedure.

1. Select the signal name to be changed.
 - (1) Move the cursor to the desired signal name to be registered, and press [SELECT] to enable character entry.
- Enter up to 8 one-byte characters.



2. Input the signal name.

3. Press [ENTER].

(1) Input the signal name and press [ENTER].

– The name is registered.

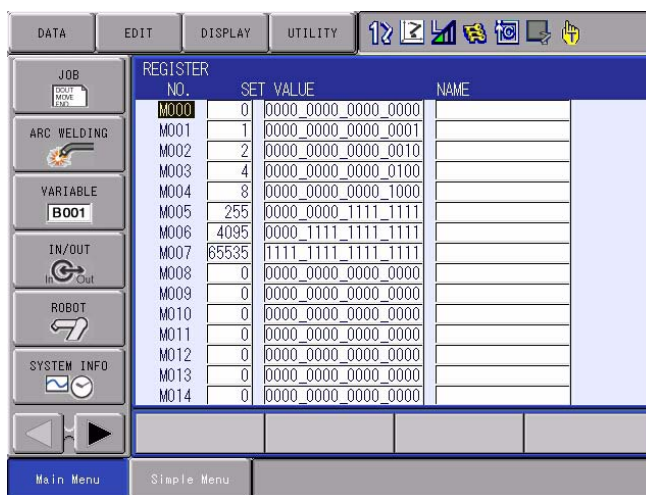


13.4 Register Window

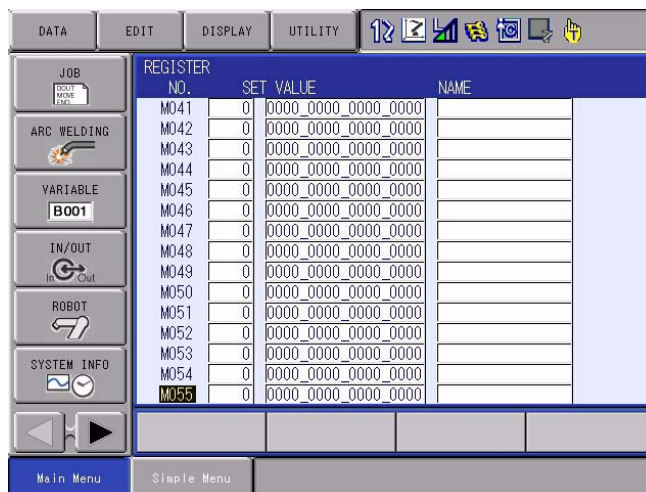
13.4.1 Check registers

The register can be checked in the register window.

1. Select {IN/OUT} under the main menu.
 2. Select {REGISTER}.
- The register window appears.



3. Move the cursor to the desired register number.
- When the desired register number is not displayed, move the cursor in the following manner: move the cursor to “NO.” and press [SELECT]; enter the desired register number using the numeric keys, then press [ENTER].
The cursor moves to the specified register number.



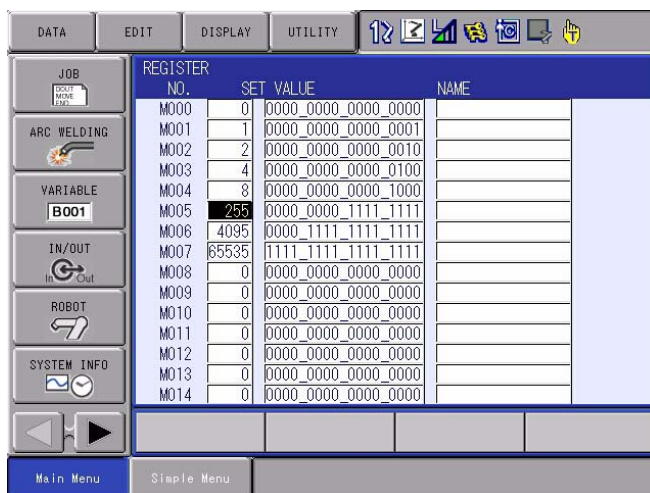
13.4.2 Register setting

A register can be set in the management mode.

1. Select the register data to be set.

(1) Move the cursor to the data (decimal or binary) of the register number to be set in the register window, and press [SELECT].

- When the decimal data is selected, enter a decimal value.
- When the binary data is selected, enter a binary value.



2. Enter a desired numerical value.

- When a decimal value is selected, enter decimal value data using the numeric keys.

M005 127 ← Enter data with the numeric keys

- When a binary value is selected, move the cursor to a binary data to be set in the input line, and press [SELECT]. Each time [SELECT] is pressed, "0" and "1" are displayed alternately.

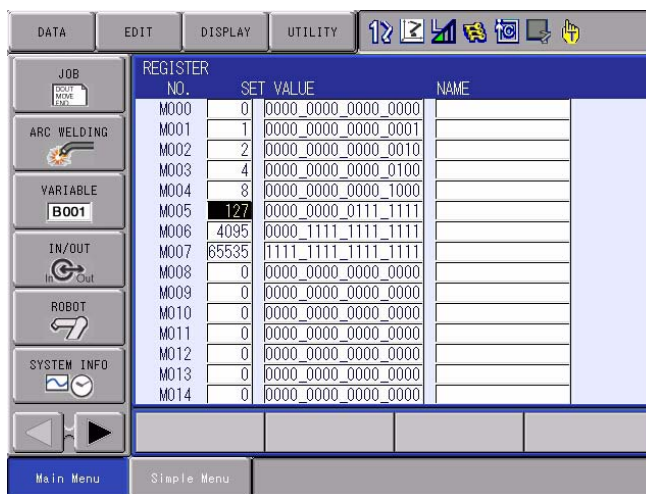
M005 255

0	0	0	0	0	0	0	0
				0	1	1	1

Change values (1↔0) with the SELECT key

3. Press [ENTER].

- The entered numerical value is set at the cursor position.



The registers used as current value of TMR/CNT instruction in the ladder program cannot be set.

<Example of Ladder Program>

STR #70010

TMR M010, M011 <-- M010 (current value) cannot be set in the register window;
M011 (set value) can be set in the register window.

OUT #70011

STR #70020

STR #70021

CNT #M020, M021 <-- M020 (current value) cannot be set in the register window;
M021 (set value) can be set in the register window.

OUT #70021

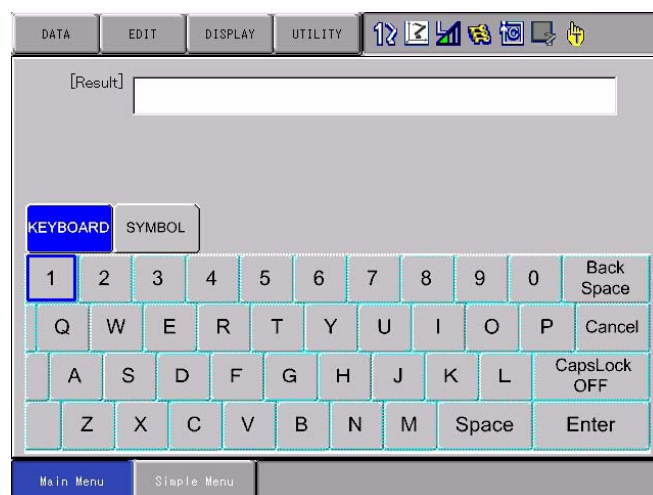
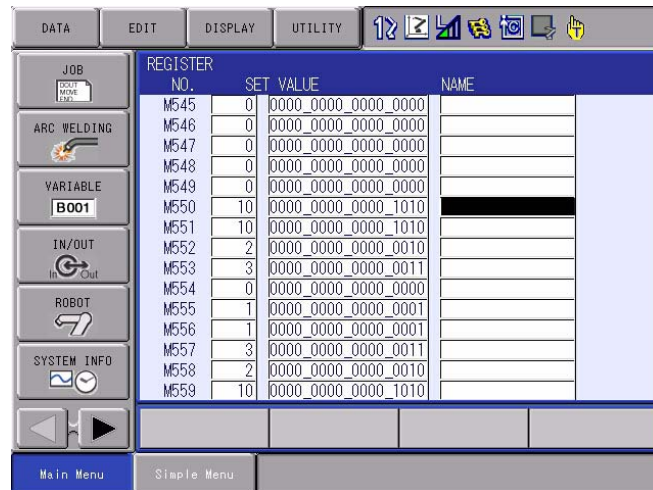
13.4.3 Signal name registration

The signal name can be registered by performing the following procedure.

1. Select the signal name to be registered.

(1) Move the cursor to the desired signal name to be registered, and press [SELECT] to enable character entry.

– Enter up to 16 one-byte (or 8 two-byte) characters.

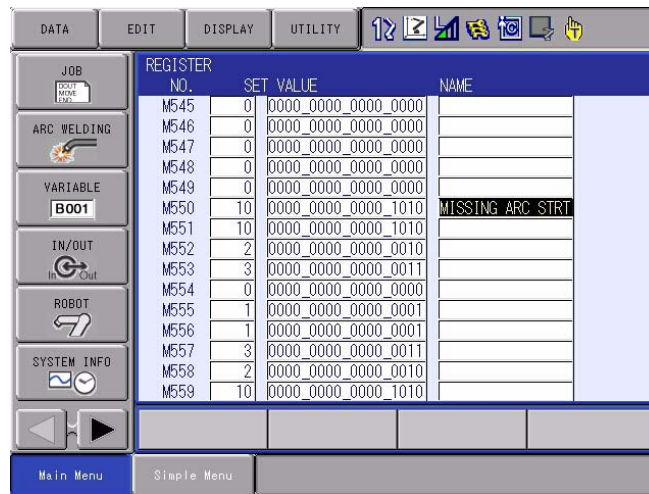


2. Enter the signal name.

3. Press [ENTER].

(1) Input the signal name and press [ENTER].

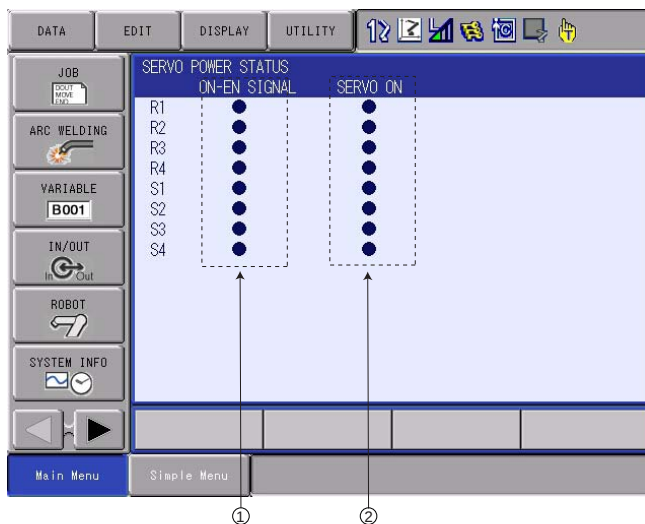
– The name is registered.



13.5 Servo Power Status Window

The status of "ON_EN" signals connected to each power ON unit and servo power supply of each control group can be checked in the Servo Power Status window.

1. Select {IN/OUT} under the main menu.
 2. Select {SERVO POWER STATUS}.
- The servo power status window appears.



① ON_EN SIGNAL

Displays the status of Power On unit "ON_EN" signal that each control group is connected.

○: Open (OFF) status

The servo power supply is shut down.

●: Close (ON) status

When the servo ON lamp is lit, the servo power supply is turned ON.

② SERVO ON

Displays the status (specific output 50320 to 50357) of servo power supply of each control group.

○: Servo power supply shut down

●: Servo power ON completed

13.6 Analog Output Window

The current settings can be checked in the Analog Output window.



① TERMINAL

The general-purpose analog output ports are displayed.

② OUTPUT (V)

The current output voltage is displayed.

③ BASIC (V)

The basic voltage used for executing the analog output corresponding to speed is displayed.

The value can be overwritten by setting a new value using ARATION instruction.

④ TRAIT

The current output characteristic of output port is displayed.

SP RAT: Executing analog output corresponding to speed.

STATIC: The output is fixed.

⑤ OFFSET (V)

The offset voltage used for executing the analog output corresponding to speed is displayed.

The value can be overwritten by setting a new value using ARATION instruction.

⑥ BASIC SPD

The basic speed used for executing the analog output corresponding to speed is displayed.

The value can be overwritten by setting a new value using ARATION instruction.

⑦ ROBOT

The manipulator No. for the analog output corresponding to speed is displayed.

13.6.1 OPERATION

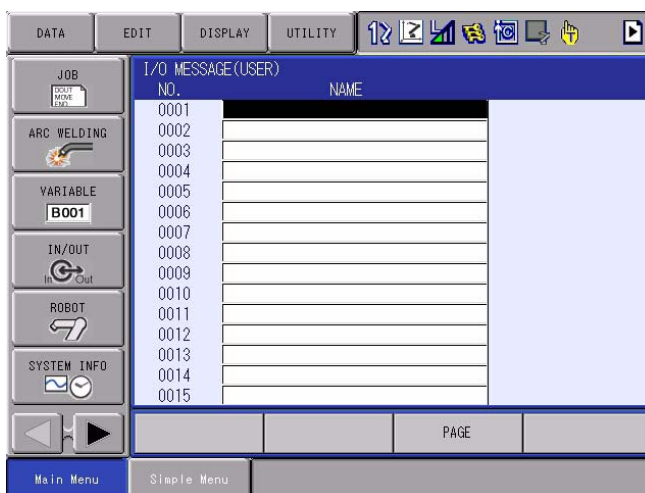
1. Select {IN/OUT} under the main menu.
2. Select {ANALOG OUTPUT}.
 - The analog output window appears.
 - The window for the output terminal AOUT1 to 4, AOUT 5 to 8, and AOUT 9 to 12 can be switched by pressing the page key.

13.7 I/O Messages and I/O Alarms

13.7.1 displayed for User Section

User section I/O alarms and I/O messages can be displayed or registered in the management mode by the following procedures:

1. Select {IN/OUT} under the main menu.
2. Select {IO ALARM} or {IO MESSAGE}.
 - The user section or the system section under the selected submenu (I/O Alarm or I/O Message) is displayed.



3. Press the page key.
 - To change between the user section and the system section, use the page key.

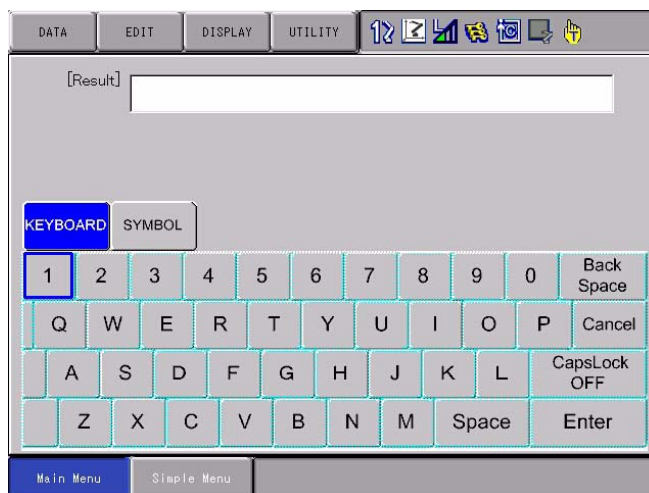


13.7.2 Registered User Section

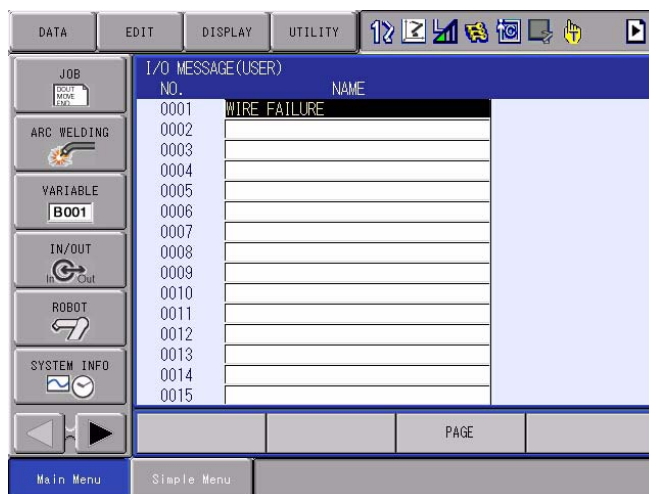
User section I/O alarms and I/O messages can be displayed or registered by the following procedures.

However, the system I/O alarms and I/O messages cannot be edited.

1. Select the name to be changed.
 - (1) Move the cursor to the name to be changed in either the I/O Alarm (User Section) window or the I/O Message (User Section) window, and press [SELECT].
 - (2) The character input status window appears.
 - Enter up to 32 one-byte characters for the Alarm and Message windows respectively.
 - Up to 8 messages can be registered for each window.



2. Input the I/O Alarm Name or the I/O Message Name.
3. Press [ENTER].
 - (1) Enter the name in the input line, and press [ENTER].
 - The name is displayed.



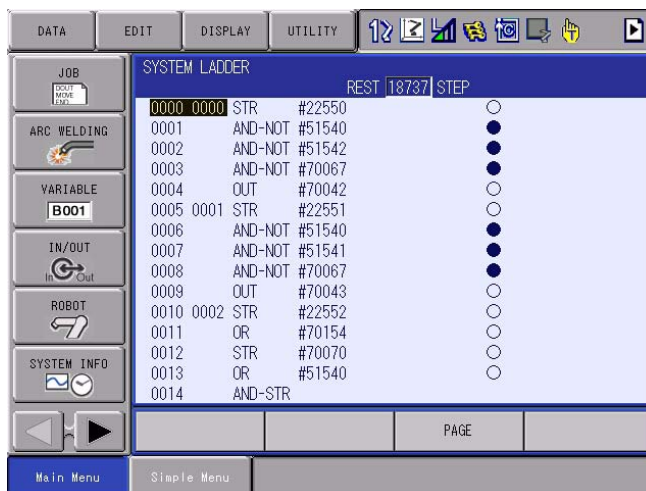
13.8 Ladder Program Window

This window allows operators to check the ON-OFF status of signals and register values included in the ladder program.

Set the security mode to the management mode.

(The {LADDER PROGRAM} menu is not displayed in the operation/edit mode.)

1. Select {IN/OUT} from the main menu.
 2. Select {LADDER PROGRAM}.
- The ladder program window appears.

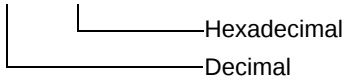
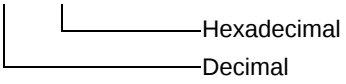


The programming pendant will not display the monitor indication while the ladder program is edited.

The monitor indication restarts if compiling the edited ladder program succeeds and ends with a normal termination.

The monitor indication may be displayed differently depending on the instruction types of ladder program.

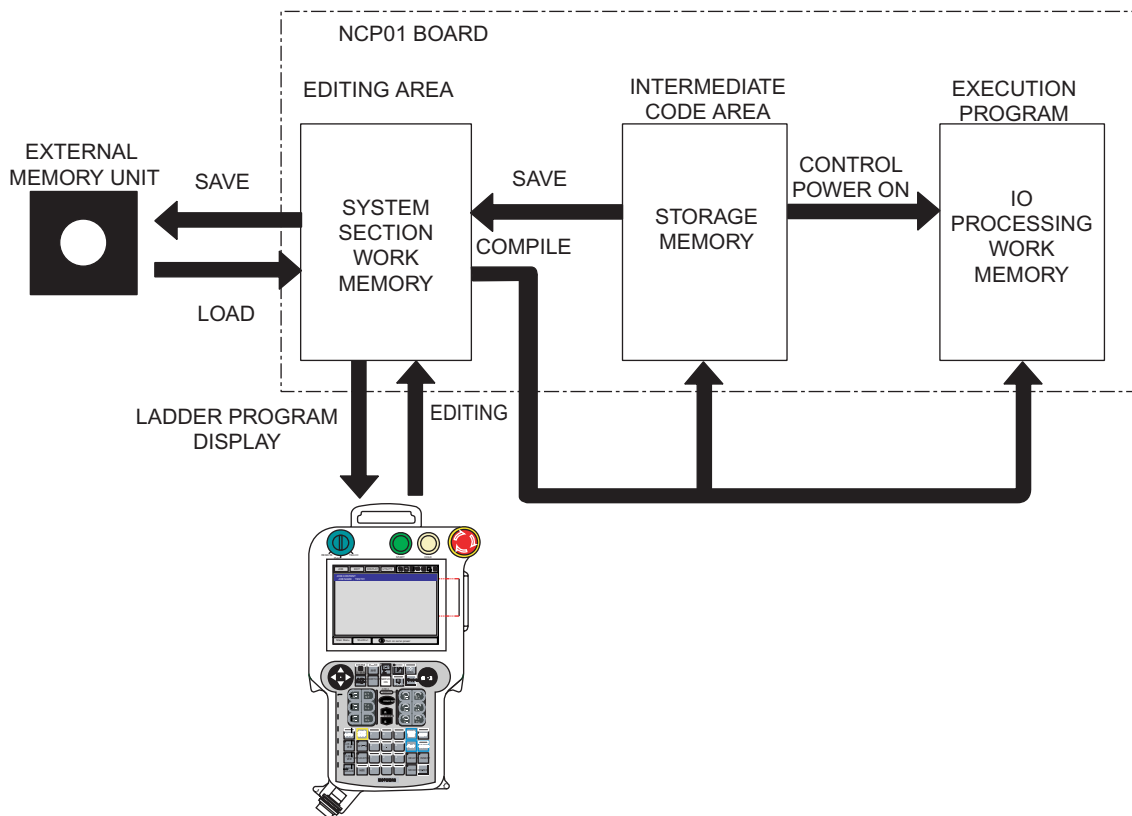
Instruction	Description
STR OR AND OUT PLS PLF	"●" signifies the ON status of operand relay number signal. "○" signifies the OFF status of operand relay number signal. <Example> STR #20010 ● : #20010=ON-status
STR-NOT OR-NOT AND-NOT	"●" signifies the OFF status of operand relay number signal. "○" signifies the ON status of operand relay number signal. <Example> STR-NOT #20010 ● : #20010=OFF-status
GSTR GOUT	Indicates the 8 bit data value from the operand relay number in the decimal/ hexadecimal number. (The value in parentheses indicates the hexadecimal number.) <Example> GOUT #00010 128 (80H) In this case, #00010 to #00016=OFF-status, and #00017=ON-status.
CNT TMR	Indicates the register value (16 bits) of the current value operand (the 1st operand) in the decimal/hexadecimal number. (The value in parentheses indicates the hexadecimal number.) <Example> TMR M010, M011 10 (000aH) In this case, setting is M010=10.
ADD SUB DIV MOD	Indicates the register value (16 bits) of the calculation result operand (the 3rd operand) in the decimal/hexadecimal number. (The value in parentheses indicates the hexadecimal number.) <Example> ADD M020, M021, M022 100 (0064H) In this case, setting is M022=100.
MUL	Indicates the register value (16 bits) of the calculation result operand (the 3rd operand) in the decimal/hexadecimal number. (The value in parentheses indicates the hexadecimal number.) However, if the calculation result exceeds 16 bits, the register value will be indicated in 32-bit value in the decimal/hexadecimal number. <Example> MUL M030, M031, M032 65536 (00010000H) In this case, setting is M032=65536.

Instruction	Description
WAND WOR WXOR SHL SHR ROL ROR	Indicates the value of the register/word-type relay/byte type relay of the calculation result operand (the 3rd operand) in the decimal/hexadecimal number. (The value in parentheses indicates the hexadecimal number.) Register, word-type relay: 16 bits Byte-type relay: 8 bits <Example> SHL M040, 4, M041 4096 (1000H)  In this case, setting is M041=4096.
WNOT MOV BIN BCD	Indicates the value of the register/word-type relay/byte type relay of the calculation result operand (the 2nd operand) in the decimal/hexadecimal number. (The value in parentheses indicates the hexadecimal number.) Register, word-type relay: 16 bits Byte-type relay: 8 bits <Example> MOV 255, #70010 255 (ffH)  In this case, #70010 to #70017=ON-status.
AND-STR OR-STR END (PART) (NOP)	The monitor indication will not be displayed.

14 Editing Ladder Programs

14.1 Flow of Data by Ladder Programs

Flow of data in editing, storage, and execution areas by operation of ladder program is shown below.



NOTE

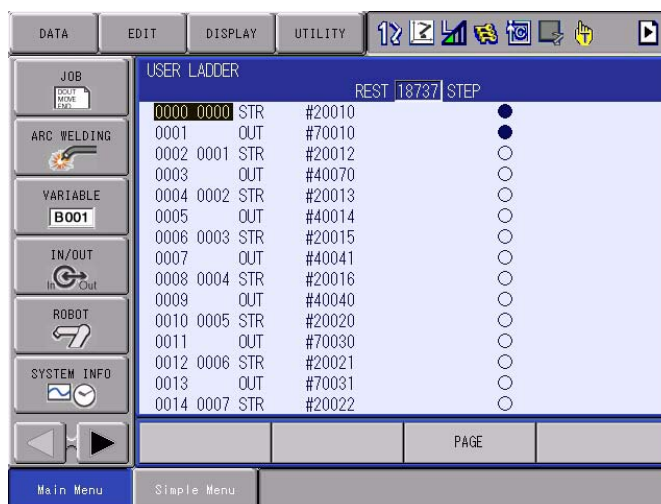
- Only the user ladder program can be edited. The system ladder program cannot be edited.
- When the system ladder program is changed, the ladder program from the external memory unit cannot be loaded.
- If control power is shut down while the ladder program is being edited, the edited ladder program is lost. The intact program remains in the execution area.
- During editing of ladder programs, "EDITING" is displayed on the upper right of the user section window. This indication appears only when the program in the editing area and that in the execution area do not match. Nothing is displayed after compilation or cancellation of editing when the programs in the two areas match.

14.2 Editing by Mnemonic and Ladder Editor Program

The editing operations for ladder programs are two ways as follows.

1. Editing by Mnemonic Codes

- Ladder programs can be edited in mnemonic codes as shown below.



2. Ladder Editor Program (Optional Function)

- Ladder programs can be edited with the image of ladders as shown in the window below.



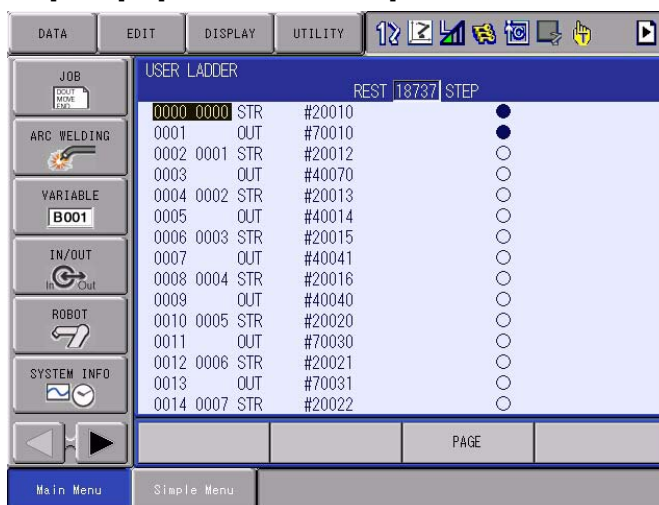
14.3 Mnemonic Editing Window

14.3.1 Basic Operation

Ladder program is protected so that it cannot be easily changed.

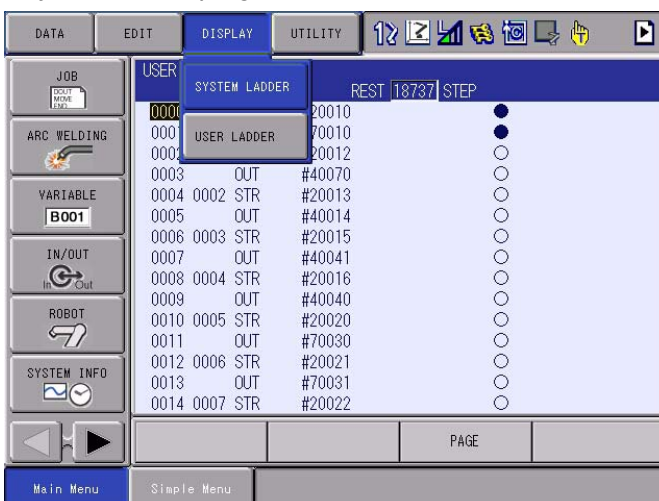
The following operations are authorized only to those who can input a user ID No. (security: management mode).

1. Select {IN/OUT} under the main menu
2. Select {LADDER PROGRAM}
 - The C.I/O user section is displayed.
 - To confirm the system ladder program, press the PAGE KEY , or select [DISP]→[SYSTEM LADDER] under the menu.



3. Edit Operation

- For each editing operations, see chapter 14.3.2 “Editing Operation” on the following pages.
- The system ladder program cannot be edited.

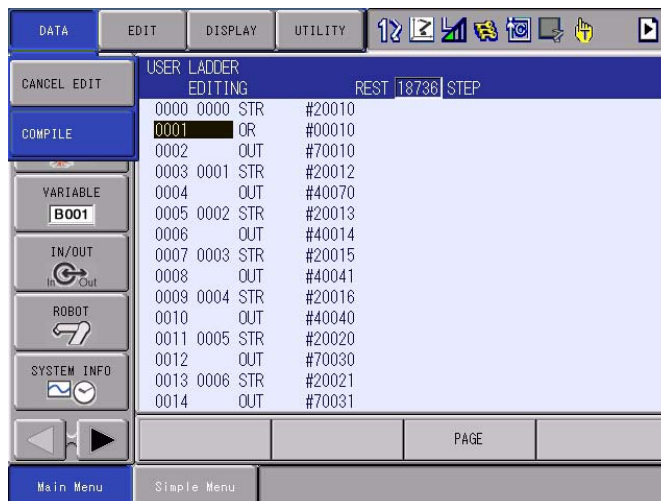


4. Select {DATA} under the menu

5. Select {COMPILE}

6. Select "YES"

- The edited ladder program is checked for syntax error. If no error is found, the new program is written into the execution area to run.
- If any error is found in the edited ladder program, the erroneous step is identified. In this case, the program stored in the execution area remains unchanged.



The cursor moves up/down by line each time the up/down cursor key is pressed.

Pressing [SHIFT] + up/down cursor key moves the cursor up/down by five lines at a time.

14.3.2 Editing Operation

The editing operation is divided into the instruction registration operation (adding, changing, and deleting) and the operand edit operation.

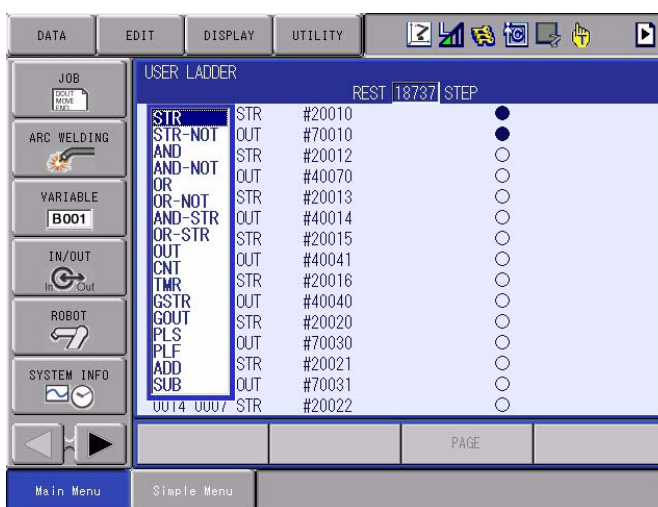
14.3.2.1 Inserting Instruction

1. Move the cursor to the address area



2. Select the line before the line you wish to add

- (1) The instruction list dialog box is displayed.
- (2) Move the cursor to the instruction list dialog, and the cursor in the address area becomes underlined.



3. Select the instruction to be inserted

- Move the cursor to the input buffer line instruction.



- When there are more than two kinds of operand instructions, move the cursor to the instruction and press [SELECT]. A detailed screen is displayed.
- When changing numeric data, move the cursor to the data to be corrected and press the [SHIFT] + [CURSOR KEY] simultaneously. The numeric data then increases and decreases.



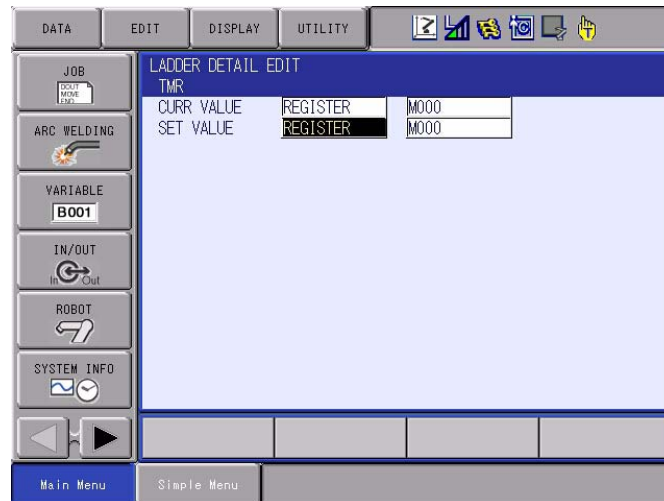
- To directly input the numeric value, press [SELECT]. The input line is displayed, then input the data using the [NUMBER KEY] and press [ENTER].



- Instructions with Two or More Kinds of Operands
The input line is displayed. Input the data using the [NUMBER KEY] and press [ENTER].

- Instructions with Two or More Kinds of Operands

- (1) When changing the type of operand, move the cursor to the operand and press [SELECT] to select the operand type.



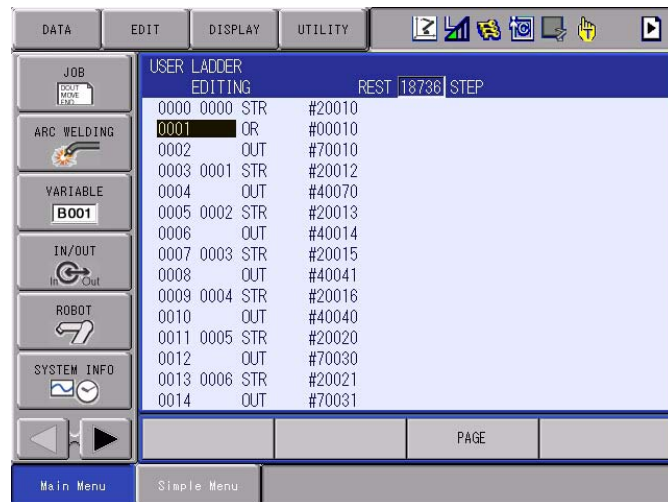
- (2) Move the cursor to the operand data and press [SELECT] to change the operand.



- (3) If the type of operand and data are changed, press [ENTER].
 - (4) The ladder detail edit window closes, and the ladder program window is displayed.
4. Press [ADD]

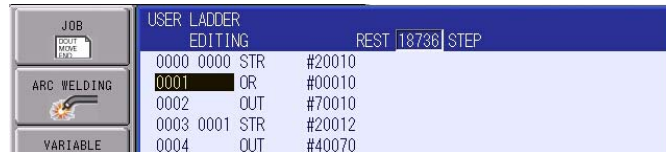
5. Press [ENTER]

- The instruction indicated in the input buffer line is added.
- When adding an instruction just before the END instruction, do not press [ADD].
- If there is a change, press [SELECT] in the instruction area, and repeat the numeric input operation.



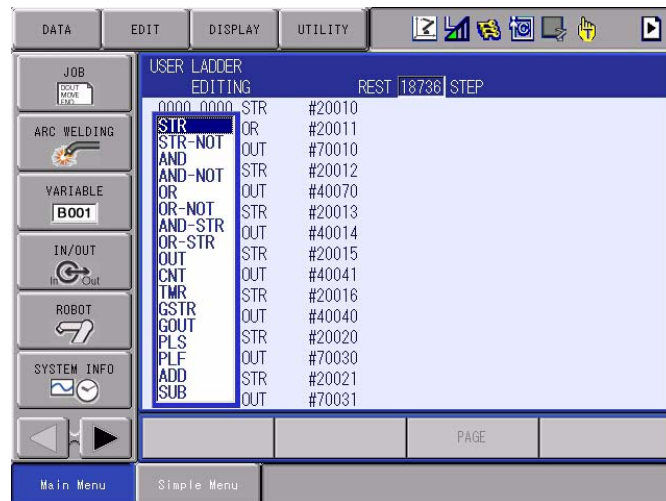
14.3.2.2 Changing Instructions

1. Move the cursor to the address area



2. Select the line to be changed

- The instruction select dialog box is displayed.
- The cursor moves to the instruction list, and the cursor in the address area is underlined.



3. Select the instruction to be changed

- Move the cursor to the input buffer line instruction.



- When there are more than two kinds of operand instructions, move the cursor to the instruction and press [SELECT]. A detailed screen is displayed.
- When changing numeric data, move the cursor to the data to be corrected and press the [SHIFT] + CURSOR simultaneously. The numeric data then increases and decreases.



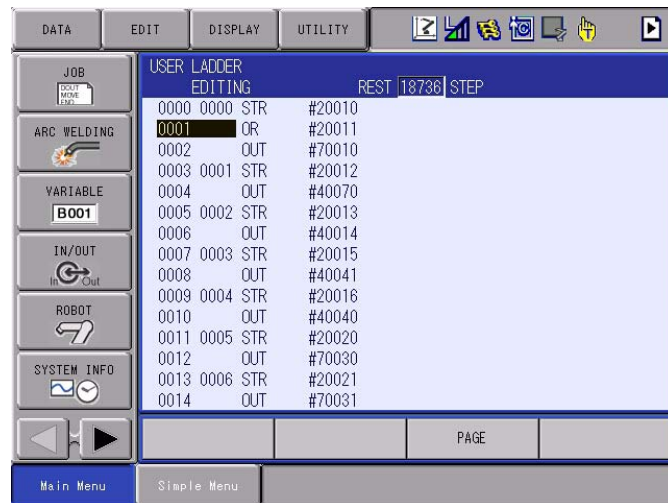
- (1) To directly input the numeric value, press [SELECT].
- (2) The input line appears. Input the data using the NUMBER KEY and press [ENTER].



4. Press [MODIFY]

5. Press [ENTER]

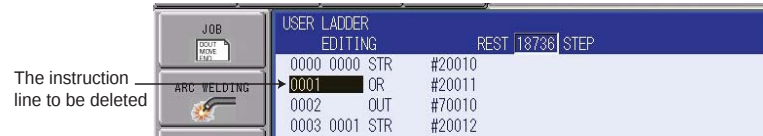
- The instruction displayed in the input buffer line is changed.



14.3.2.3 Delete Instructions

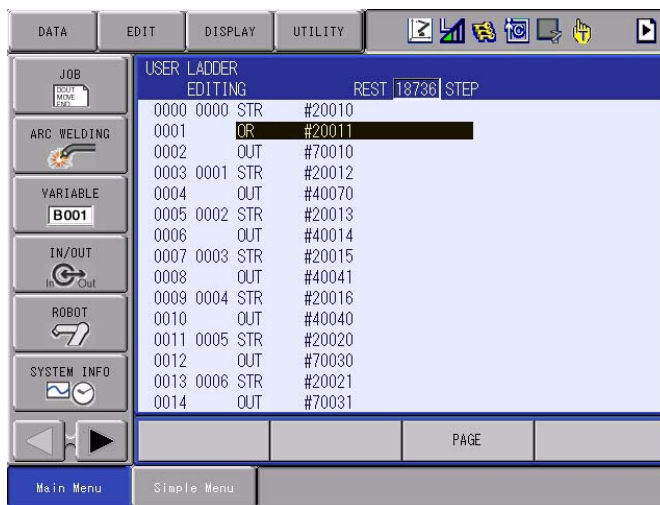
1. Move the cursor to the address area
2. Move the cursor to the line to be deleted
3. Press [DELETE]
4. Press [ENTER]

– The cursor line instruction is deleted.



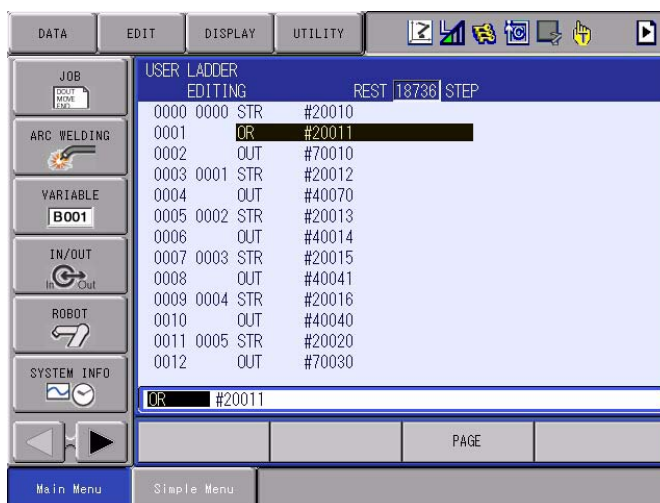
14.3.2.4 Editing Operands

1. Move the cursor to the instruction area



2. Select the line of the operand to be edited

- Move the cursor to the input buffer line instruction.



3. Edit Operation

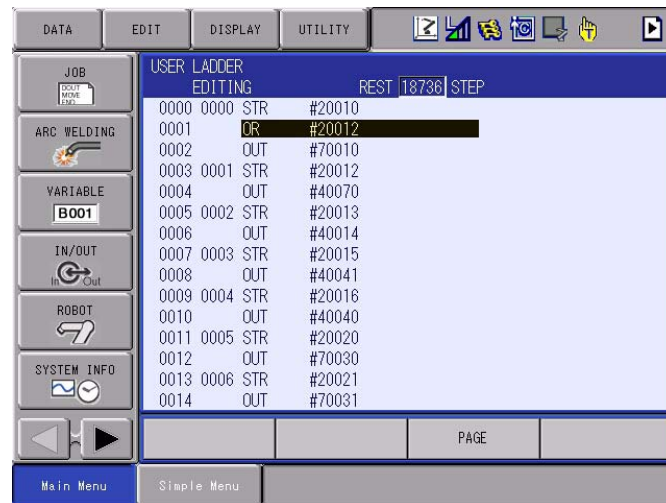
- When there are more than two kinds of operand instructions, move the cursor in the instruction to and press [SELECT]. A detailed screen is displayed.
- When changing numeric data, move the cursor to the data to be corrected and press the [SHIFT] + CURSOR simultaneously. The numeric data then increases and decreases.



- To directly input the numeric value, press [SELECT]. The input line appears. Input the data using the NUMBER KEY and press [ENTER].

4. Press [ENTER]

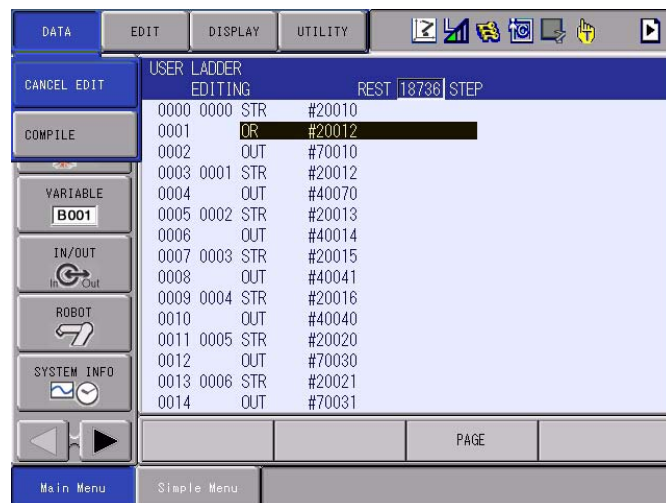
- The cursor line operand is changed.



14.3.2.5 Cancelling Editing

Use the following steps to cancel editing during the ladder program editing and to return to the preceding program.

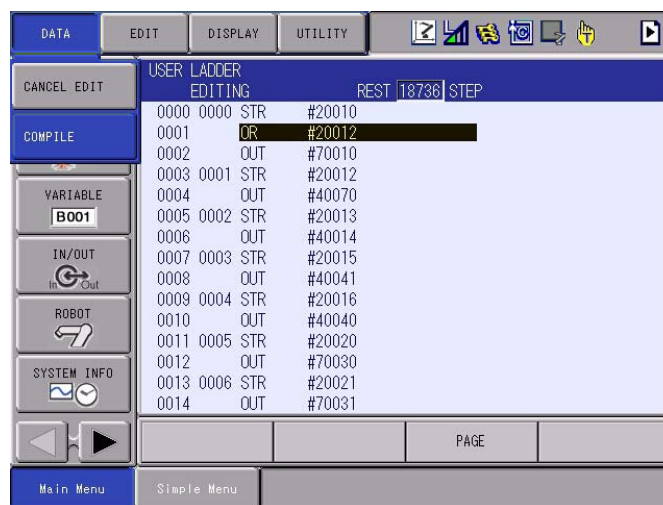
1. Select {DATA} under the menu
2. Select {CANCEL EDIT}
3. Select "YES"
 - The confirmation dialog box is displayed.
 - When "YES" is selected, the program returns to the ladder program (executing program) before editing.
 - When "NO" is selected, the cancel edit operation is cancelled, and the ladder program on the edit is displayed.



14.3.3 Compile

Use the following steps to compile the ladder program after editing.

1. Select {DATA} under the menu
2. Select {COMPILE}
 - The ladder program starts compiling.
 - The edited ladder program is checked for syntax error. If no error is found, the new program is written into the execution area to run.
 - If any error is found in the edited ladder program, the erroneous step is identified. In this case, the program stored in the execution area remains unchanged.



After completing the compilation, the current values of the TMR/CNT instructions in the register are restored to the set values.

14.3.4 Search

The search function can be used for the edit and confirmation.

Search can be executed when the cursor is either in the address area, or the instruction area of the user ladder window or the system ladder window.

The search is an operation to move the cursor to a specified line or relay No. line in the ladder window. This allows to find out a target position at once without using the cursor.

1. Select {IN/OUT} under the main menu
2. Select {LADDER PROGRAM}
 - The user ladder window or the system ladder window appears.
 - Press the PAGE KEY to switch the window.
3. Select {EDIT} under the menu
 - The pull down menu appears.

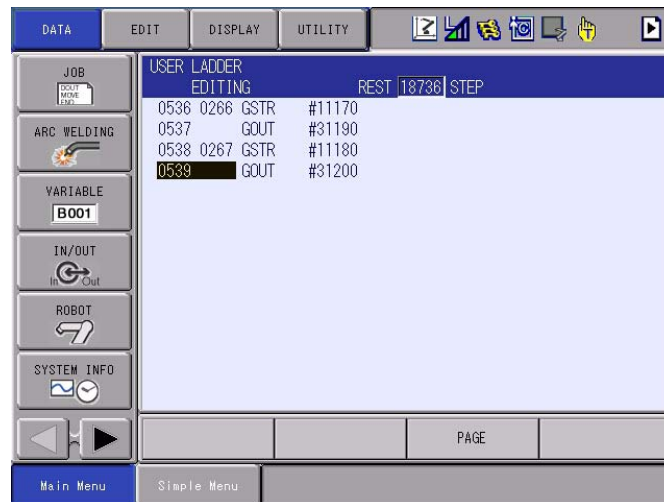


4. Select a desired search from the pull down menu

14.3.4.1 Top Line, End Line

This is the operation to move the cursor to the first line or the last line in the current window.

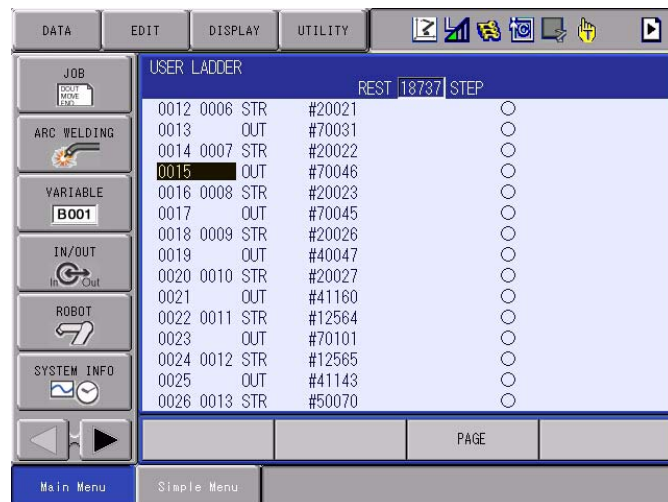
1. Select “TOP LINE” or “END LINE” under the pull down menu
 - The cursor moves to “TOP LINE” or “END LINE” of the window, then the selected line is displayed.



14.3.4.2 Search for Line No. and Block No.

This is the operation to move the cursor to a line or a block in the current window.

1. Select “SEARCH LINE NO.” or “SEARCH BLOCK NO.” under the pull down menu
 - Numbers can be input.
2. Input a line No. or block No. using the NUMBER KEYS
3. Press [ENTER]
 - The cursor moves to the entered line No. or block No., then the selected line or block is displayed.



14.3.4.3 Search for Relay No. and Register No.

This is the operation to move the cursor to a relay No. or register line in the current window.

1. Select "SEARCH RELAY NO." or "SEARCH REGISTER NO." under the pull down menu
 - Numbers can be input.
2. Input a desired relay No. or register No. using the NUMBER KEYS
3. Press [ENTER]
 - The cursor moves to the entered relay No. or register No. and the selected relay or register is displayed.



- While searching, "SEARCH" is displayed in the screen.
4. Continues searching with the cursor
 - In search status, forward and backward searching can be executed by [↓] and [↑] cursors.
 - Press the PAGE KEY to switch the window between the user ladder and the system ladder to continue searching.
 - To end the search, press [Cancel] or move the cursor to the address area or the instruction area by using [→] and [←] cursors. The search status is canceled and the indication of "SEARCH" disappears.



15 Clearing Signals

By setting parameters, the signal status can be automatically cleared when the power is turned ON or the mode is changed.

15.1 Clearing the Universal Output Signals

15.1.1 Clearing Signals when Powering ON

Set the parameter S2C235 to specify whether to collectively clear the universal output signals (2048 points) when powering ON, or to hold the signals in the statuses when powering OFF.

Parameter	Signal	Setting Value
S2C235	#10010 - #12567 (Collective setting)	0: Hold; 1: Clear If S2C235 is set to "1", all the statuses of the universal output signals become OFF when the power is turned ON.

15.1.2 Clearing Signals when Changing the Teach/Play Mode

Set the parameters S4C064 - S4C079 to specify whether to clear the universal output signals when changing modes, or to hold the signal statuses.

(Every 8 points; 0: hold; 1: clear)

Parameter	Signal		Setting Value
S4C064	d00: #10010 - #10017	d01: #10020 - #10027	Bit specified in every 8 points 0: Hold; 1: Clear The universal output signals whose specified bit is set to "1" will be in the "OFF" status when the mode is changed.
	d02: #10030 - #10037	d03: #10040 - #10047	
	d04: #10050 - #10057	d05: #10060 - #10067	
	d06: #10070 - #10077	d07: #10080 - #10087	
	d08: #10090 - #10097	d09: #10100 - #10107	
	d10: #10110 - #10117	d11: #10120 - #10127	
	d12: #10130 - #10137	d13: #10140 - #10147	
	d14: #10150 - #10157	d15: #10160 - #10167	
S4C065	d00: #10170 - #10177	d01: #10180 - #10187	
	d02: #10190 - #10197	d03: #10200 - #10207	
	d04: #10210 - #10217	d05: #10220 - #10227	
	d06: #10230 - #10237	d07: #10240 - #10247	
	d08: #10250 - #10257	d09: #10260 - #10267	
	d10: #10270 - #10277	d11: #10280 - #10287	
	d12: #10290 - #10297	d13: #10300 - #10307	
	d14: #10310 - #10317	d15: #10320 - #10327	
S4C066	d00: #10330 - #10337	d01: #10340 - #10347	
	d02: #10350 - #10357	d03: #10360 - #10367	
	d04: #10370 - #10377	d05: #10380 - #10387	
	d06: #10390 - #10397	d07: #10400 - #10407	
	d08: #10410 - #10417	d09: #10420 - #10427	
	d10: #10430 - #10437	d11: #10440 - #10447	
	d12: #10450 - #10457	d13: #10460 - #10467	
	d14: #10470 - #10477	d15: #10480 - #10487	
S4C067	d00: #10490 - #10497	d01: #10500 - #10507	
	d02: #10510 - #10517	d03: #10520 - #10527	
	d04: #10530 - #10537	d05: #10540 - #10547	
	d06: #10550 - #10557	d07: #10560 - #10567	
	d08: #10570 - #10577	d09: #10580 - #10587	
	d10: #10590 - #10597	d11: #10600 - #10607	
	d12: #10610 - #10617	d13: #10620 - #10627	
	d14: #10630 - #10637	d15: #10640 - #10647	

S4C068	d00: #10650 - #10657	d01: #10660 - #10667	Bit specified in every 8 points 0: Hold; 1: Clear The universal output signals whose specified bit is set to "1" will be in the "OFF" status when the mode is changed.
	d02: #10670 - #10677	d03: #10680 - #10687	
	d04: #10690 - #10697	d05: #10700 - #10707	
	d06: #10710 - #10717	d07: #10720 - #10727	
	d08: #10730 - #10737	d09: #10740 - #10747	
	d10: #10750 - #10757	d11: #10760 - #10767	
	d12: #10770 - #10777	d13: #10780 - #10787	
	d14: #10790 - #10797	d15: #10800 - #10807	
S4C069	d00: #10810 - #10817	d01: #10820 - #10827	
	d02: #10830 - #10837	d03: #10840 - #10847	
	d04: #10850 - #10857	d05: #10860 - #10867	
	d06: #10870 - #10877	d07: #10880 - #10887	
	d08: #10890 - #10897	d09: #10900 - #10907	
	d10: #10910 - #10917	d11: #10920 - #10927	
	d12: #10930 - #10937	d13: #10940 - #10947	
	d14: #10950 - #10957	d15: #10960 - #10967	
S4C070	d00: #10970 - #10977	d01: #10980 - #10987	
	d02: #10990 - #10997	d03: #11000 - #11007	
	d04: #11010 - #11017	d05: #11020 - #11027	
	d06: #11030 - #11037	d07: #11040 - #11047	
	d08: #11050 - #11057	d09: #11060 - #11067	
	d10: #11070 - #11077	d11: #11080 - #11087	
	d12: #11090 - #11097	d13: #11100 - #11107	
	d14: #11110 - #11117	d15: #11120 - #11127	
S4C071	d00: #11130 - #11137	d01: #11140 - #11147	
	d02: #11150 - #11157	d03: #11160 - #11167	
	d04: #11170 - #11177	d05: #11180 - #11187	
	d06: #11190 - #11197	d07: #11200 - #11207	
	d08: #11210 - #11217	d09: #11220 - #11227	
	d10: #11230 - #11237	d11: #11240 - #11247	
	d12: #11250 - #11257	d13: #11260 - #11267	
	d14: #11270 - #11277	d15: #11280 - #11287	
S4C072	d00: #11290 - #11297	d01: #11300 - #11307	
	d02: #11310 - #11317	d03: #11320 - #11327	
	d04: #11330 - #11337	d05: #11340 - #11347	
	d06: #11350 - #11357	d07: #11360 - #11367	
	d08: #11370 - #11377	d09: #11380 - #11387	
	d10: #11390 - #11397	d11: #11400 - #11407	
	d12: #11410 - #11417	d13: #11420 - #11427	
	d14: #11430 - #11437	d15: #11440 - #11447	

S4C073	d00: #11450 - #11457	d01: #11460 - #11467	Bit specified in every 8 points 0: Hold; 1: Clear The universal output signals whose specified bit is set to "1" will be in the "OFF" status when the mode is changed.
	d02: #11470 - #11477	d03: #11480 - #11487	
	d04: #11490 - #11497	d05: #11500 - #11507	
	d06: #11510 - #11517	d07: #11520 - #11527	
	d08: #11530 - #11537	d09: #11540 - #11547	
	d10: #11550 - #11557	d11: #11560 - #11567	
	d12: #11570 - #11577	d13: #11580 - #11587	
	d14: #11590 - #11597	d15: #11600 - #11607	
S4C074	d00: #11610 - #11617	d01: #11620 - #11627	
	d02: #11630 - #11637	d03: #11640 - #11647	
	d04: #11650 - #11657	d05: #11660 - #11667	
	d06: #11670 - #11677	d07: #11680 - #11687	
	d08: #11690 - #11697	d09: #11700 - #11707	
	d10: #11710 - #11717	d11: #11720 - #11727	
	d12: #11730 - #11737	d13: #11740 - #11747	
	d14: #11750 - #11757	d15: #11760 - #11767	
S4C075	d00: #11770 - #11777	d01: #11780 - #11787	
	d02: #11790 - #11797	d03: #11800 - #11807	
	d04: #11810 - #11817	d05: #11820 - #11827	
	d06: #11830 - #11837	d07: #11040 - #11047	
	d08: #11850 - #11857	d09: #11860 - #11867	
	d10: #11870 - #11877	d11: #11880 - #11887	
	d12: #11890 - #11897	d13: #11900 - #11907	
	d14: #11910 - #11917	d15: #11920 - #11927	
S4C076	d00: #11930 - #11937	d01: #11940 - #11947	
	d02: #11950 - #11957	d03: #11960 - #11967	
	d04: #11970 - #11977	d05: #11980 - #11987	
	d06: #11990 - #11997	d07: #12000 - #12007	
	d08: #12010 - #12017	d09: #12020 - #12027	
	d10: #12030 - #12037	d11: #12040 - #12047	
	d12: #12050 - #12057	d13: #12060 - #12067	
	d14: #12070 - #12077	d15: #12080 - #12087	
S4C077	d00: #12090 - #12097	d01: #12100 - #12107	
	d02: #12110 - #12117	d03: #12120 - #12127	
	d04: #12130 - #12137	d05: #12140 - #12147	
	d06: #12150 - #12157	d07: #12160 - #12167	
	d08: #12170 - #12177	d09: #12180 - #12187	
	d10: #12190 - #12197	d11: #12200 - #12207	
	d12: #12210 - #12217	d13: #12220 - #12227	
	d14: #12230 - #12237	d15: #12240 - #12247	

S4C078	d00: #12250 - #12257	d01: #12260 - #12267	Bit specified in every 8 points 0: Hold; 1: Clear The universal output signals whose specified bit is set to "1" will be in the "OFF" status when the mode is changed.
	d02: #12270 - #12277	d03: #12280 - #12287	
	d04: #12290 - #12297	d05: #12300 - #12307	
	d06: #12310 - #12317	d07: #12320 - #12327	
	d08: #12330 - #12337	d09: #12340 - #12347	
	d10: #12350 - #12357	d11: #12360 - #12367	
	d12: #12370 - #12377	d13: #12380 - #12387	
	d14: #12390 - #12397	d15: #12400 - #12407	
S4C079	d00: #12410 - #12417	d01: #12420 - #12427	
	d02: #12430 - #12437	d03: #12440 - #12447	
	d04: #12450 - #12457	d05: #12460 - #12467	
	d06: #12470 - #12477	d07: #12480 - #12487	
	d08: #12490 - #12497	d09: #12500 - #12507	
	d10: #12510 - #12517	d11: #12520 - #12527	
	d12: #12530 - #12537	d13: #12540 - #12547	
	d14: #12550 - #12557	d15: #12560 - #12567	

15.2 Clearing the Interface Panel Signals

15.2.1 Clearing Signals when Powering ON

Set the parameters S4C569 - S4C572 to specify whether to clear the interface panel signals when powering ON, or to hold the signals in the statuses when powering OFF.

(Every 8 points; 0: hold; 1: clear)

Parameter	Signal		Setting Value
S4C569	d00: #60010 - #60017	d01: #60020 - #60027	Bit specified in every 8 points 0: Hold; 1: Clear The interface panel signals whose specified bit is set to "1" will be in the "OFF" status when the power is ON.
	d02: #60030 - #60037	d03: #60040 - #60047	
	d04: #60050 - #60057	d05: #60060 - #60067	
	d06: #60070 - #60077	d07: #60080 - #60087	
	d08: #60090 - #60097	d09: #60100 - #60107	
	d10: #60110 - #60117	d11: #60120 - #60127	
	d12: #60130 - #60137	d13: #60140 - #60147	
	d14: #60150 - #60157	d15: #60160 - #60167	
S4C570	d00: #60170 - #60177	d01: #60180 - #60187	
	d02: #60190 - #60197	d03: #60200 - #60207	
	d04: #60210 - #60217	d05: #60220 - #60227	
	d06: #60230 - #60237	d07: #60240 - #60247	
	d08: #60250 - #60257	d09: #60260 - #60267	
	d10: #60270 - #60277	d11: #60280 - #60287	
	d12: #60290 - #60297	d13: #60300 - #60307	
	d14: #60310 - #60317	d15: #60320 - #60327	
S4C671	d00: #60330 - #60337	d01: #60340 - #60347	
	d02: #60350 - #60357	d03: #60360 - #60367	
	d04: #60370 - #60377	d05: #60380 - #60387	
	d06: #60390 - #60397	d07: #60400 - #60407	
	d08: #60410 - #60417	d09: #60420 - #60427	
	d10: #60430 - #60437	d11: #60440 - #60447	
	d12: #60450 - #60457	d13: #60460 - #60467	
	d14: #60470 - #60477	d15: #60480 - #60487	
S4C572	d00: #60490 - #60497	d01: #60500 - #60507	
	d02: #60510 - #60517	d03: #60520 - #60527	
	d04: #60530 - #60537	d05: #60540 - #60547	
	d06: #60550 - #60557	d07: #60560 - #60567	
	d08: #60570 - #60577	d09: #60580 - #60587	
	d10: #60590 - #60597	d11: #60600 - #60607	
	d12: #60610 - #60617	d13: #60620 - #60627	
	d14: #60630 - #60637	d15: #60640 - #60647	

15.3 Clearing the Auxiliary Relay Signals

15.3.1 Clearing Signals when Powering ON

Set the parameters S4C080 - S4C095 to specify whether to clear the auxiliary relay signals when powering ON, or to hold the signals in the statuses when powering OFF.

(Every 32 points; 0: clear; 1: hold)

Parameter	Signal		Setting Value
S4C080	d00: #70010 - #70047	d01: #70050 - #70087	Bit specified in every 32 points 0: Clear; 1: Hold The interface panel signals whose specified bit is set to "1" will be in the "OFF" status when the power is ON.
	d02: #70090 - #70127	d03: #70130 - #70167	
	d04: #70170 - #70207	d05: #70210 - #70247	
	d06: #70250 - #70287	d07: #70290 - #70327	
	d08: #70330 - #70367	d09: #70370 - #70407	
	d10: #70410 - #70447	d11: #70450 - #70487	
	d12: #70490 - #70527	d13: #70530 - #70567	
	d14: #70570 - #70607	d15: #70610 - #70647	
S4C081	d00: #70650 - #70687	d01: #70690 - #70727	
	d02: #70730 - #70767	d03: #70770 - #70807	
	d04: #70810 - #70847	d05: #70850 - #70887	
	d06: #70890 - #70927	d07: #70930 - #70967	
	d08: #70970 - #71007	d09: #71010 - #71047	
	d10: #71050 - #71087	d11: #71090 - #71127	
	d12: #71130 - #71167	d13: #71170 - #71207	
	d14: #71210 - #71247	d15: #71250 - #71287	
S4C082	d00: #71290 - #71327	d01: #71330 - #71367	
	d02: #71370 - #71407	d03: #71410 - #71447	
	d04: #71450 - #71487	d05: #71490 - #71527	
	d06: #71530 - #71567	d07: #71570 - #71607	
	d08: #71610 - #71647	d09: #71650 - #71687	
	d10: #71690 - #71727	d11: #71730 - #71767	
	d12: #71770 - #71807	d13: #71810 - #71847	
	d14: #71850 - #71887	d15: #71890 - #71927	
S4C083	d00: #71930 - #71967	d01: #71970 - #72007	
	d02: #72010 - #72047	d03: #72050 - #72087	
	d04: #72090 - #72127	d05: #72130 - #72167	
	d06: #72170 - #72207	d07: #72210 - #72247	
	d08: #72250 - #72287	d09: #72290 - #72327	
	d10: #72330 - #72367	d11: #72370 - #72407	
	d12: #72410 - #72447	d13: #72450 - #72487	
	d14: #72490 - #72527	d15: #72530 - #72567	

S4C084	d00: #72570 - #72607	d01: #72610 - #72647	Bit specified in every 32 points 0: Clear; 1: Hold The interface panel signals whose specified bit is set to "1" will be in the "OFF" status when the power is ON.
	d02: #72650 - #72687	d03: #72690 - #72727	
	d04: #72730 - #72767	d05: #72770 - #72807	
	d06: #72810 - #72847	d07: #72850 - #72887	
	d08: #72890 - #72927	d09: #72930 - #72967	
	d10: #72970 - #73007	d11: #73010 - #73047	
	d12: #73050 - #73087	d13: #73090 - #73127	
	d14: #73130 - #73167	d15: #73170 - #73207	
S4C085	d00: #73210 - #73247	d01: #73250 - #73287	
	d02: #73290 - #73327	d03: #73330 - #73367	
	d04: #73370 - #73407	d05: #73410 - #73447	
	d06: #73450 - #73487	d07: #73490 - #73527	
	d08: #73530 - #73567	d09: #73570 - #73607	
	d10: #73610 - #73647	d11: #73650 - #73687	
	d12: #73690 - #73727	d13: #73730 - #73767	
	d14: #73770 - #73807	d15: #73810 - #73847	
S4C086	d00: #73850 - #73887	d01: #73890 - #73927	
	d02: #73930 - #73967	d03: #73970 - #74007	
	d04: #74010 - #74047	d05: #74050 - #74087	
	d06: #74090 - #74127	d07: #74130 - #74167	
	d08: #74170 - #74207	d09: #74210 - #74247	
	d10: #74250 - #74287	d11: #74290 - #74327	
	d12: #74330 - #74367	d13: #74370 - #74407	
	d14: #74410 - #74447	d15: #74450 - #74487	
S4C087	d00: #74490 - #74527	d01: #74530 - #74567	
	d02: #74570 - #74607	d03: #74610 - #74647	
	d04: #74650 - #74687	d05: #74690 - #74727	
	d06: #74730 - #74767	d07: #74770 - #74807	
	d08: #74810 - #74847	d09: #74850 - #74887	
	d10: #74890 - #74927	d11: #74930 - #74967	
	d12: #74970 - #75007	d13: #75010 - #75047	
	d14: #75050 - #75087	d15: #75090 - #75127	
S4C088	d00: #75130 - #75167	d01: #75170 - #75207	
	d02: #75210 - #75247	d03: #75250 - #75287	
	d04: #75290 - #75327	d05: #75330 - #75367	
	d06: #75370 - #75407	d07: #75410 - #75447	
	d08: #75450 - #75487	d09: #75490 - #75527	
	d10: #75530 - #75567	d11: #75570 - #75607	
	d12: #75610 - #75647	d13: #75650 - #75687	
	d14: #75690 - #75727	d15: #75730 - #75767	

S4C089	d00: #75770 - #75807	d01: #75810 - #75847	Bit specified in every 32 points 0: Clear; 1: Hold The interface panel signals whose specified bit is set to "1" will be in the "OFF" status when the power is ON.
	d02: #75850 - #75887	d03: #75890 - #75927	
	d04: #75930 - #75967	d05: #75970 - #76007	
	d06: #76010 - #76047	d07: #76050 - #76087	
	d08: #76090 - #76127	d09: #76130 - #76167	
	d10: #76170 - #76207	d11: #76210 - #76247	
	d12: #76250 - #76287	d13: #76290 - #76327	
	d14: #76330 - #76367	d15: #76370 - #76407	
S4C090	d00: #76410 - #76447	d01: #76450 - #76487	
	d02: #76490 - #76527	d03: #76530 - #76567	
	d04: #76570 - #76607	d05: #76610 - #76647	
	d06: #76650 - #76687	d07: #76690 - #76727	
	d08: #76730 - #76767	d09: #76770 - #76807	
	d10: #76810 - #76847	d11: #76850 - #76887	
	d12: #76890 - #76927	d13: #76930 - #76967	
	d14: #76970 - #77007	d15: #77010 - #77047	
S4C091	d00: #77050 - #77087	d01: #77090 - #77127	
	d02: #77130 - #77167	d03: #77170 - #77207	
	d04: #77210 - #77247	d05: #77250 - #77287	
	d06: #77290 - #77327	d07: #77330 - #77367	
	d08: #77370 - #77407	d09: #77410 - #77447	
	d10: #77450 - #77487	d11: #77490 - #77527	
	d12: #77530 - #77567	d13: #77570 - #77607	
	d14: #77610 - #77647	d15: #77650 - #77687	
S4C092	d00: #77690 - #77727	d01: #77730 - #77767	
	d02: #77770 - #77807	d03: #77810 - #77847	
	d04: #77850 - #77887	d05: #77890 - #77927	
	d06: #77930 - #77967	d07: #77970 - #78007	
	d08: #78010 - #78047	d09: #78050 - #78087	
	d10: #78090 - #78127	d11: #78130 - #78167	
	d12: #78170 - #78207	d13: #78210 - #78247	
	d14: #78250 - #78287	d15: #78290 - #78327	
S4C093	d00: #78330 - #78367	d01: #78370 - #78407	
	d02: #78410 - #78447	d03: #78450 - #78487	
	d04: #78490 - #78527	d05: #78530 - #78567	
	d06: #78570 - #78607	d07: #78610 - #78647	
	d08: #78650 - #78687	d09: #78690 - #78727	
	d10: #78730 - #78767	d11: #78770 - #78807	
	d12: #78810 - #78847	d13: #78850 - #78887	
	d14: #78890 - #78927	d15: #78930 - #78967	

S4C094	d00: #78970 - #79007 d02: #79050 - #79087 d04: #79130 - #79167 d06: #79210 - #79247 d08: #79290 - #79327 d10: #79370 - #79407 d12: #79450 - #79487 d14: #79530 - #79567	d01: #79010 - #79047 d03: #79090 - #79127 d05: #79170 - #79207 d07: #79250 - #79287 d09: #79330 - #79367 d11: #79410 - #79447 d13: #79490 - #79527 d15: #79570 - #79607	Bit specified in every 32 points 0: Clear; 1: Hold The interface panel signals whose specified bit is set to "1" will be in the "OFF" status when the power is ON.
S4C095	d00: #79610 - #79647 d02: #79690 - #79727 d04: #79770 - #79807 d06: #79850 - #79887 d08: #79930 - #79967	d01: #79650 - #79687 d03: #79730 - #79767 d05: #79810 - #79847 d07: #79890 - #79927 d09: #79970 - #79997	

15.4 Clearing the Universal Register

15.4.1 Clearing Registers when Powering ON

Set the parameters S4C835 - 869 to specify whether to clear the universal registers when powering ON, or to hold the signals in the statuses when powering OFF.

(Every 1 point; 0: hold; 1: clear)

Parameter	Signal					Setting Value
S4C835	d00: M000	d01: M001	d02: M002	d03: M003		Bit specified in every 1 points 0: Hold; 1: Clear The values of the universal registers whose specified bit is set to 1 will be "0" when the power is ON.
	d04: M004	d05: M005	d06: M006	d07: M007		
	d08: M008	d09: M009	d10: M010	d11: M011		
	d12: M012	d13: M013	d14: M014	d15: M015		
S4C836	d00: M016	d01: M017	d02: M018	d03: M019		
	d04: M020	d05: M021	d06: M022	d07: M023		
	d08: M024	d09: M025	d10: M026	d11: M027		
	d12: M028	d13: M029	d14: M030	d15: M031		
S4C837	d00: M032	d01: M033	d02: M034	d03: M035		
	d04: M036	d05: M037	d06: M038	d07: M039		
	d08: M040	d09: M041	d10: M042	d11: M043		
	d12: M044	d13: M045	d14: M046	d15: M047		
S4C838	d00: M048	d01: M049	d02: M050	d03: M051		
	d04: M052	d05: M053	d06: M054	d07: M055		
	d08: M056	d09: M057	d10: M058	d11: M059		
	d12: M060	d13: M061	d14: M062	d15: M063		
S4C839	d00: M064	d01: M065	d02: M066	d03: M067		
	d04: M068	d05: M069	d06: M070	d07: M071		
	d08: M072	d09: M073	d10: M074	d11: M075		
	d12: M076	d13: M077	d14: M078	d15: M079		
S4C840	d00: M080	d01: M081	d02: M082	d03: M083		
	d04: M084	d05: M085	d06: M086	d07: M087		
	d08: M088	d09: M089	d10: M090	d11: M091		
	d12: M092	d13: M093	d14: M094	d15: M095		
S4C841	d00: M096	d01: M097	d02: M098	d03: M099		
	d04: M100	d05: M101	d06: M102	d07: M103		
	d08: M104	d09: M105	d10: M106	d11: M107		
	d12: M108	d13: M109	d14: M110	d15: M111		
S4C842	d00: M112	d01: M113	d02: M114	d03: M115		
	d04: M116	d05: M117	d06: M118	d07: M119		
	d08: M120	d09: M121	d10: M122	d11: M123		
	d12: M124	d13: M125	d14: M126	d15: M127		
S4C843	d00: M128	d01: M129	d02: M130	d03: M131		
	d04: M132	d05: M133	d06: M134	d07: M135		
	d08: M136	d09: M137	d10: M138	d11: M139		
	d12: M140	d13: M141	d14: M142	d15: M143		

S4C844	d00: M144 d04: M148 d08: M152 d12: M156	d01: M145 d05: M149 d09: M153 d13: M157	d02: M146 d06: M150 d10: M154 d14: M158	d03: M147 d07: M151 d11: M155 d15: M159	Bit specified in every 1 points 0: Hold; 1: Clear The values of the universal registers whose specified bit is set to 1 will be "0" when the power is ON.
S4C845	d00: M160 d04: M164 d08: M168 d12: M172	d01: M161 d05: M165 d09: M169 d13: M173	d02: M162 d06: M166 d10: M170 d14: M174	d03: M163 d07: M167 d11: M171 d15: M175	
S4C846	d00: M176 d04: M180 d08: M184 d12: M188	d01: M177 d05: M181 d09: M185 d13: M189	d02: M178 d06: M182 d10: M186 d14: M190	d03: M179 d07: M183 d11: M187 d15: M191	
S4C847	d00: M192 d04: M196 d08: M200 d12: M204	d01: M193 d05: M197 d09: M201 d13: M205	d02: M194 d06: M198 d10: M202 d14: M206	d03: M195 d07: M199 d11: M203 d15: M207	
S4C848	d00: M208 d04: M212 d08: M216 d12: M220	d01: M209 d05: M213 d09: M217 d13: M221	d02: M210 d06: M214 d10: M218 d14: M222	d03: M211 d07: M215 d11: M219 d15: M223	
S4C849	d00: M224 d04: M228 d08: M232 d12: M236	d01: M225 d05: M229 d09: M233 d13: M237	d02: M226 d06: M230 d10: M234 d14: M238	d03: M227 d07: M231 d11: M235 d15: M239	
S4C850	d00: M240 d04: M244 d08: M248 d12: M252	d01: M241 d05: M245 d09: M249 d13: M253	d02: M242 d06: M246 d10: M250 d14: M254	d03: M243 d07: M247 d11: M251 d15: M255	
S4C851	d00: M256 d04: M260 d08: M264 d12: M268	d01: M257 d05: M261 d09: M265 d13: M269	d02: M258 d06: M262 d10: M266 d14: M270	d03: M259 d07: M263 d11: M267 d15: M271	
S4C852	d00: M272 d04: M276 d08: M280 d12: M284	d01: M273 d05: M277 d09: M281 d13: M285	d02: M274 d06: M278 d10: M282 d14: M286	d03: M275 d07: M279 d11: M283 d15: M287	
S4C853	d00: M288 d04: M292 d08: M296 d12: M300	d01: M289 d05: M293 d09: M297 d13: M301	d02: M290 d06: M294 d10: M298 d14: M302	d03: M291 d07: M295 d11: M299 d15: M303	

S4C854	d00: M304 d04: M308 d08: M312 d12: M316	d01: M305 d05: M309 d09: M313 d13: M317	d02: M306 d06: M310 d10: M314 d14: M318	d03: M307 d07: M311 d11: M315 d15: M319	Bit specified in every 1 points 0: Hold; 1: Clear The values of the universal registers whose specified bit is set to 1 will be "0" when the power is ON.
S4C855	d00: M320 d04: M324 d08: M328 d12: M332	d01: M321 d05: M325 d09: M329 d13: M333	d02: M322 d06: M326 d10: M330 d14: M334	d03: M323 d07: M327 d11: M331 d15: M335	
S4C856	d00: M336 d04: M340 d08: M344 d12: M348	d01: M337 d05: M341 d09: M345 d13: M349	d02: M338 d06: M342 d10: M346 d14: M350	d03: M339 d07: M343 d11: M347 d15: M351	
S4C857	d00: M352 d04: M356 d08: M360 d12: M364	d01: M353 d05: M357 d09: M361 d13: M365	d02: M354 d06: M358 d10: M362 d14: M366	d03: M355 d07: M359 d11: M363 d15: M367	
S4C858	d00: M368 d04: M372 d08: M376 d12: M380	d01: M369 d05: M373 d09: M377 d13: M381	d02: M370 d06: M374 d10: M378 d14: M382	d03: M371 d07: M375 d11: M379 d15: M383	
S4C859	d00: M384 d04: M388 d08: M392 d12: M396	d01: M385 d05: M389 d09: M393 d13: M397	d02: M386 d06: M390 d10: M394 d14: M398	d03: M387 d07: M391 d11: M395 d15: M399	
S4C860	d00: M400 d04: M404 d08: M408 d12: M412	d01: M401 d05: M405 d09: M409 d13: M413	d02: M402 d06: M406 d10: M410 d14: M414	d03: M403 d07: M407 d11: M411 d15: M415	
S4C861	d00: M416 d04: M420 d08: M424 d12: M428	d01: M417 d05: M421 d09: M425 d13: M429	d02: M418 d06: M422 d10: M426 d14: M430	d03: M419 d07: M423 d11: M427 d15: M431	
S4C862	d00: M432 d04: M436 d08: M440 d12: M444	d01: M433 d05: M437 d09: M441 d13: M445	d02: M434 d06: M438 d10: M442 d14: M446	d03: M435 d07: M439 d11: M443 d15: M447	
S4C863	d00: M448 d04: M452 d08: M456 d12: M460	d01: M449 d05: M453 d09: M457 d13: M461	d02: M450 d06: M454 d10: M458 d14: M462	d03: M451 d07: M455 d11: M459 d15: M463	

S4C864	d00: M464	d01: M465	d02: M466	d03: M467	Bit specified in every 1 points 0: Hold; 1: Clear The values of the universal registers whose specified bit is set to 1 will be "0" when the power is ON.
	d04: M468	d05: M469	d06: M470	d07: M471	
	d08: M472	d09: M473	d10: M474	d11: M475	
	d12: M476	d13: M477	d14: M478	d15: M479	
S4C865	d00: M480	d01: M481	d02: M482	d03: M483	
	d04: M484	d05: M485	d06: M486	d07: M487	
	d08: M488	d09: M489	d10: M490	d11: M491	
	d12: M492	d13: M493	d14: M494	d15: M495	
S4C866	d00: M496	d01: M497	d02: M498	d03: M499	
	d04: M500	d05: M501	d06: M502	d07: M503	
	d08: M504	d09: M505	d10: M506	d11: M507	
	d12: M508	d13: M509	d14: M510	d15: M511	
S4C867	d00: M512	d01: M513	d02: M514	d03: M515	
	d04: M516	d05: M517	d06: M518	d07: M519	
	d08: M520	d09: M521	d10: M522	d11: M523	
	d12: M524	d13: M525	d14: M526	d15: M527	
S4C868	d00: M528	d01: M529	d02: M530	d03: M531	
	d04: M532	d05: M533	d06: M534	d07: M535	
	d08: M536	d09: M537	d10: M538	d11: M539	
	d12: M540	d13: M541	d14: M542	d15: M543	
S4C869	d00: M544	d01: M545	d02: M546	d03: M547	
	d04: M548	d05: M549	d06: M550	d07: M551	
	d08: M552	d09: M553	d10: M554	d11: M555	
	d12: M556	d13: M557	d14: M558	d15: M559	



It is configurable if the register values allocated to the current TMR and CNT command values should be retained in the parameters below or cleared when the power is turned ON.

S2C488=0:

- The current register values for CNT and TMR commands will be configured in the register's setting values.

S2C488=1:

- The current register value for CNT command shall be retained.
- The current register values for TMR command will be configured in the register's setting values.

S2C488=2:

- The current register values for CNT command will be configured in the register's setting values.
- The current register value for TMR command shall be retained.

S2C488=3:

- The current register value for CNT and TMR commands shall be retained.

DX100

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