2 Basic Specifications

2-1 Table of Basic Specifications

Table 2-1 Basic Specifications

Item				Specification
Robot model				SC06F-02
Construction				Articulated
Number of axis				6
Drive system				AC servo system
Max. operating range	Arm	S	Swivel	±2. 97 rad *
		H	Forward and backward	+2.62 to −1.57 rad
		V	Upward and downward	+2.09 to −2.09 rad
	Wrist	R2	Rotation 2	±6.28 ad
		B	Bend	±2.48 rad
		R1	Rotation 1	±7.85 rad
Max. speed	Arm	S	Swivel	2.71 rad/s
		H	Forward and backward	2.71 rad/s
		V	Upward and downward	2.71 rad/s
	Wrist	R2	Rotation 2	6.98 rad/s
		B	Bend	6.98 rad/s
		R1	Rotation 1	8.73 rad/s
Payload	Wrist			6 kg
	Fore arm			13 kg
Wrist torque		R2	Rotation 2	19.6 N·m
		B	Bend	19.6 N·m
		R1	Rotation 1	8.82 N·m
Position repeatability				± 0.1 mm
Ambient temperature				0 to 45 °C
Mounting method				Floor, Upside down, Wall and Angle mount
Robot mass				128 kg

* :±0.52 rad (±30°) in case of wall mount.

2-3 Axes Identification

Table 2-2 Operating axes

Axis name	Operation	Teach pendant button	
S	Arm swivel	RIGHT	LEFT
H	Arm forward and backward	FWRD	BACK
V	Arm upward and downward	UP	DOWN
R2	Wrist rotation 2	CCW	CW
B	Wrist bend	CCW	CW
R1	Wrist rotation 1	CCW	CW

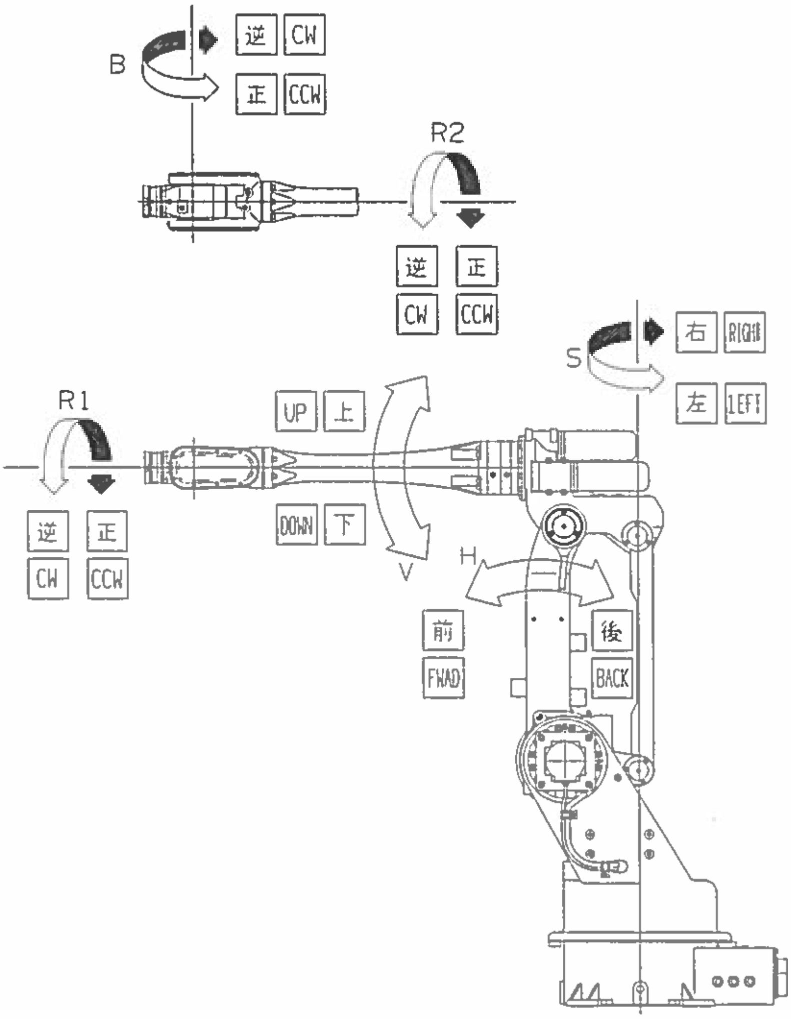

B
逆
CW
正
CCW
R2
逆
正
CW
CCW
S
右
RIGHT
左
LEFT
R1
UP
上
DOWN
下
V
H
逆
正
CW
CCW
前
FWRD
後
BACK

Fig. 2-2 Robot side view and operating axes

2-4 Detail of Tool Mounting Plate

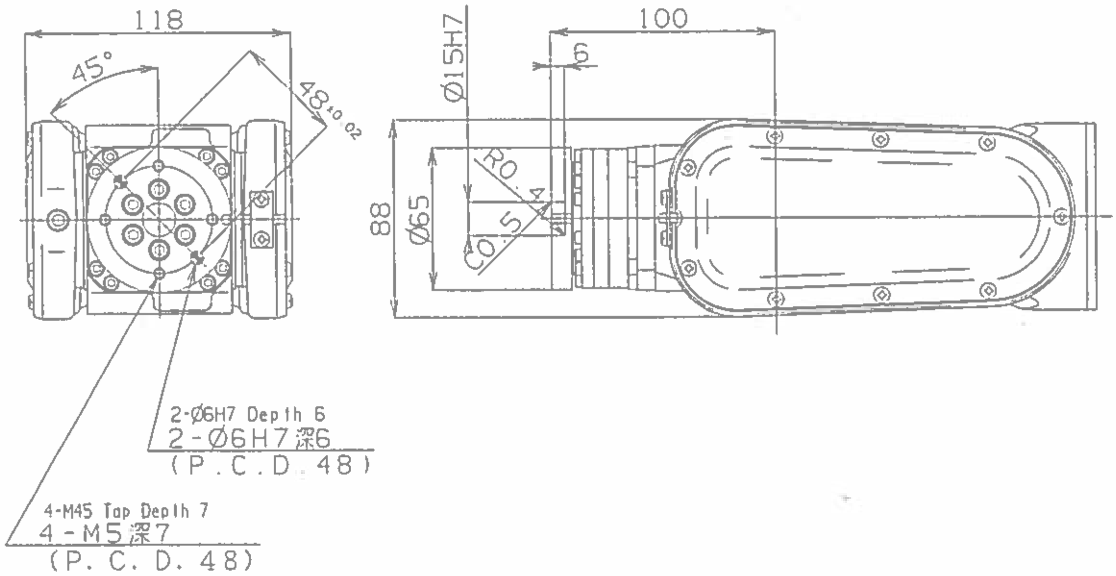
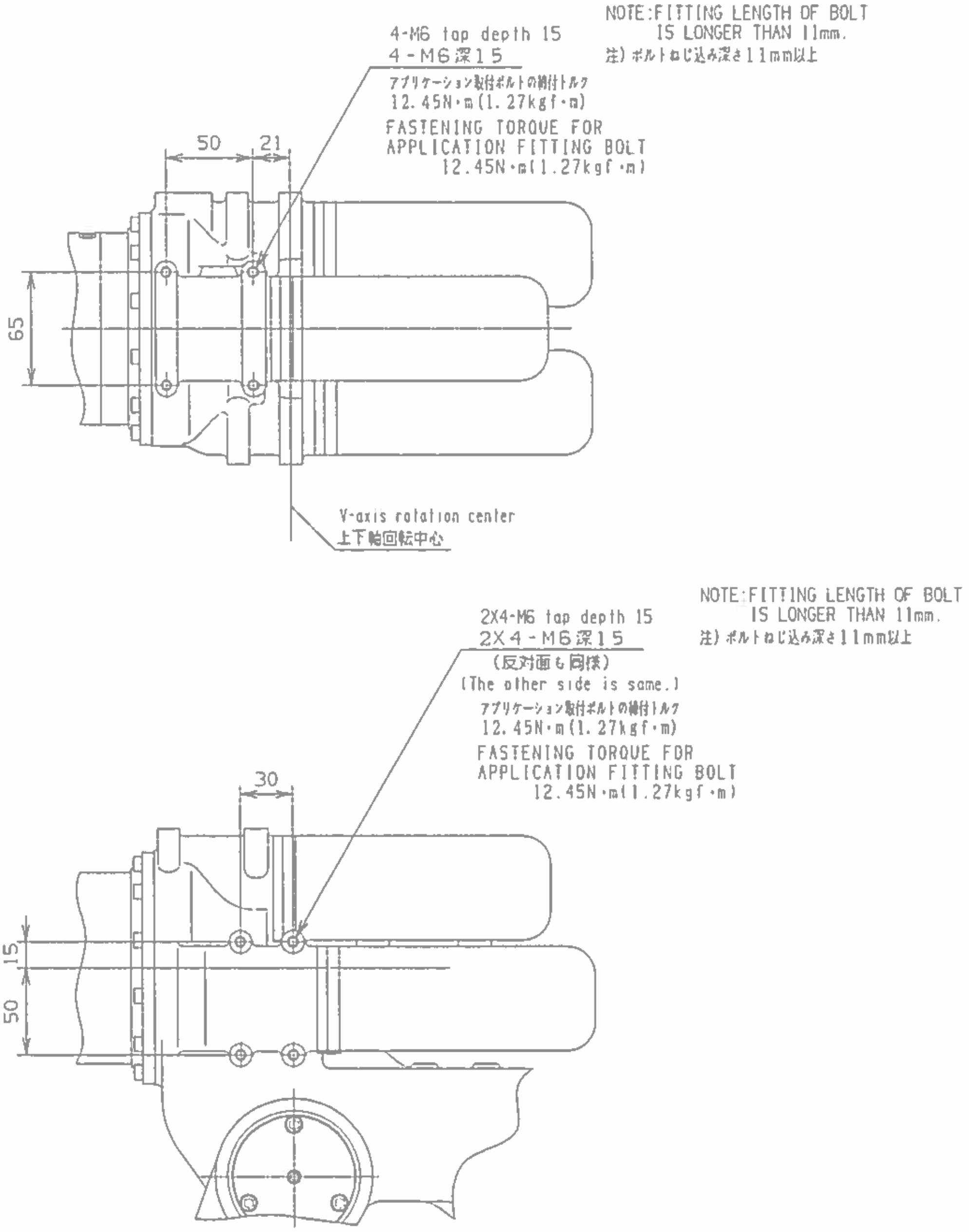

118
45°
48±0.02
Ø15H7
100
6
R0.4
C0.5
88
Ø65
2-Ø6H7 Depth 6
2-Ø6H7深6
(P.C.D.48)
4-M45 Tap Depth 7
4-M5深7
(P.C.D.48)

Fig. 2-3 Detail of tool mounting plate

2-5 Detail of Forearm Risers



4-M6 tap depth 15
4-M6深15

アプリケーション取付ボルトの締付トルク
12.45N·m(1.27kgf·m)
FASTENING TORQUE FOR
APPLICATION FITTING BOLT
12.45N·m(1.27kgf·m)

NOTE:FITTING LENGTH OF BOLT
IS LONGER THAN 11mm.
注)ボルトねじ込み深さ11mm以上

V-axis rotation center
上下軸回転中心

2X4-M6 tap depth 15
2X4-M6深15
(反対面も同様)
(The other side is same.)
アプリケーション取付ボルトの締付トルク
12.45N·m(1.27kgf·m)
FASTENING TORQUE FOR
APPLICATION FITTING BOLT
12.45N·m(1.27kgf·m)

NOTE:FITTING LENGTH OF BOLT
IS LONGER THAN 11mm.
注)ボルトねじ込み深さ11mm以上

Fig. 2-4 Detail of forearm peripheral equipment mounting risers

2-6 Wiring and Piping Diagram for Application

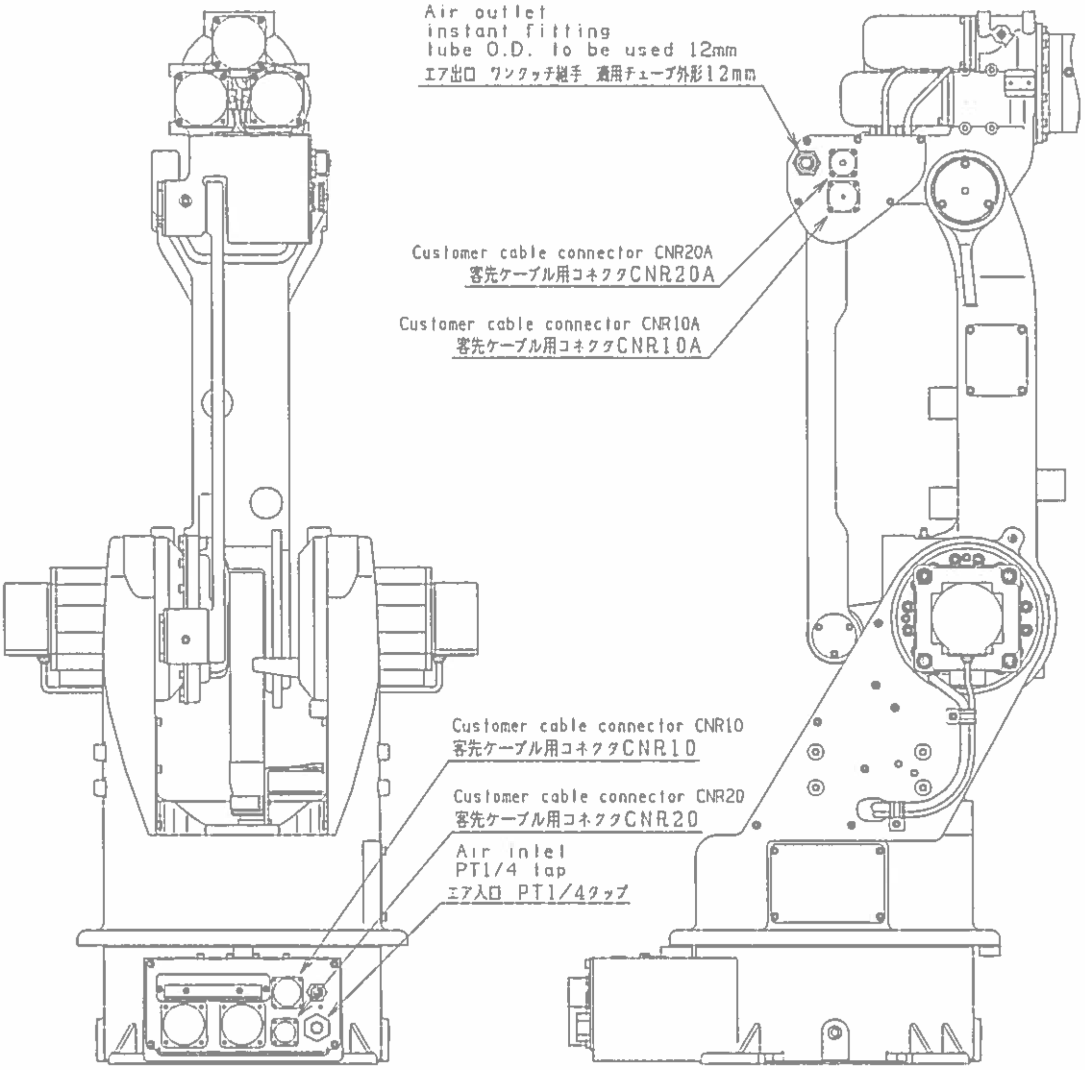
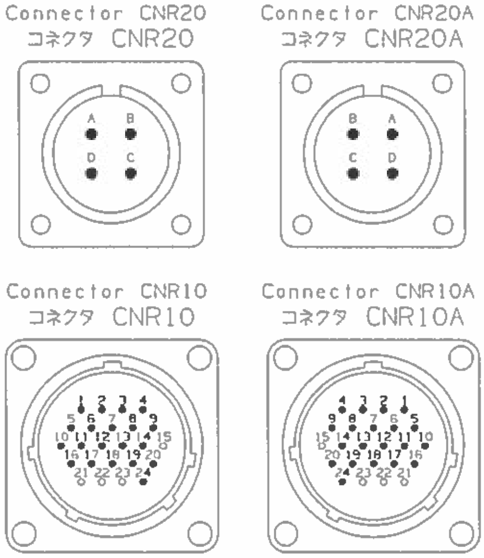

Air outlet
instant fitting
tube O.D. to be used 12mm
エア出口 ワンタッチ継手 適用チューブ外形12mm
Customer cable connector CNR20A
客先ケーブル用コネクタCNR20A
Customer cable connector CNR10A
客先ケーブル用コネクタCNR10A
Customer cable connector CNR10
客先ケーブル用コネクタCNR10
Customer cable connector CNR20
客先ケーブル用コネクタCNR20
Air inlet
PT1/4 tap
エア入口 PT1/4タップ

Fig. 2-5 . Wiring and piping diagram for application

2-6-1 Detail of application connector


Connector CNR20
コネクタ CNR20
A B
D C
Connector CNR20A
コネクタ CNR20A
B A
C D
Connector CNR10
コネクタ CNR10
1 2 3 4
5 6 7 8 9
10 11 12 13 14 15
16 17 18 19 20
21 22 23 24
Connector CNR10A
コネクタ CNR10A
4 3 2 1
9 8 7 6 5
15 14 13 12 11 10
20 19 18 17 16
24 23 22 21

・ケーブル(Cable)
0.75mm²×4 pcs.
・コネクタ型式(Connector type)
レセプタクル(Receptacle)
CNR20 :MS3102A14S-2P
CNR20A:MS3102A14S-2S
相手コネクタ(Mating connector type)
CNR20 :MS3106B14S-2S
CNR20A:MS3106B14S-2P

・ケーブル(Cable)
0.2mm²×20 pcs.
・コネクタ型式(Connector type)
レセプタクル(Receptacle)
CNR10 :SRCN2A25-24P
CNR10A:SRCN2A25-24S
相手コネクタ(Mating connector type)
CNR10 :SRCN6A25-24S
CNR10A:SRCN6A25-24P

Fig. 2-6 Application connector

7 I/O SIGNAL

Assignment of I/O terminals are described in this chapter.

Contents

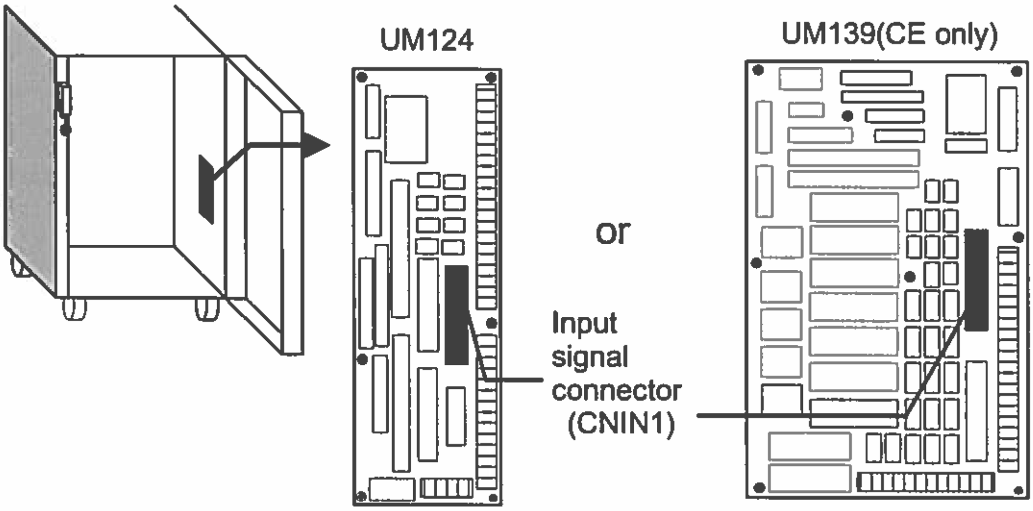
7.1 Input signal connector (CNIN1) ········· 7-2
7.2 Output signal connector (CNOT1) ········· 7-6
7.3 Terminal block (TBEX1,TBEX2) ········· 7-10
7.4 Cautions ········· 7-14

7.1 Input signal connector (CNIN1)

Outline of input signal connector (CNIN1)

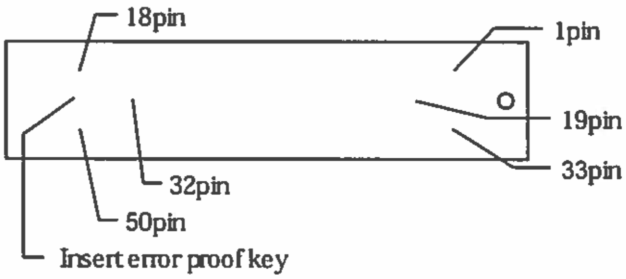
The input signal connector (CNIN1) is a connector to connect I-signals (i.e. input signal) to the controller.

Location of input signal connector (CNIN1)


UM124
UM139(CE only)
or
Input signal connector (CNIN1)

Layout of input signal connector (CNIN1) pins

The pin layout below is CNIN1 shown from its solder side of cable side connector.
.Connector type : MR-50LM(HONDA comm.)


18pin
1pin
19pin
33pin
32pin
50pin
Insert error proof key

Assignment list of input signal connector (CNIN1) pins

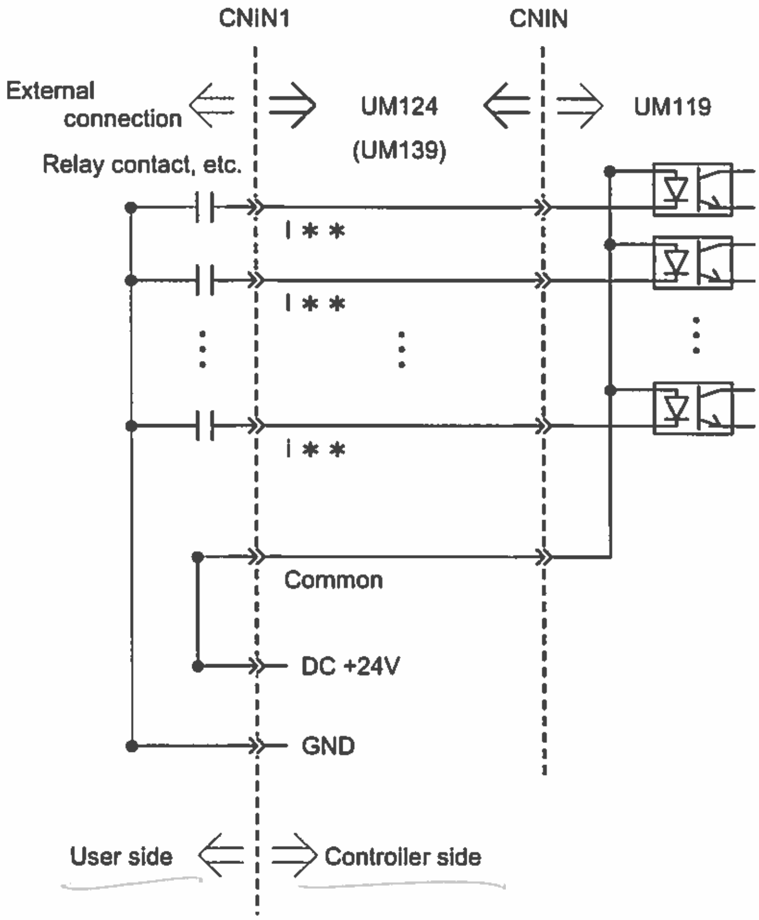
Connector pin	Signal name	Role of signals (factory settings). (Roles of signals, other than "General purpose signals," can be changed.)
1	I 1	General purpose input : I 1
2	I 2	General purpose input : I 2
3	I 3	General purpose input : I 3
4	I 4	General purpose input : I 4
5	I 5	General purpose input : I 5
6	I 6	General purpose input : I 6
7	I 7	General purpose input : I 7
8	I 8	General purpose input : I 8
9	Common	Common to input (I 1 ~ I 8)
10	I 9	General purpose input : I 9
11	I 10	General purpose input : I 10
12	I 11	General purpose input : I 11
13	I 12	General purpose input : I 12
14	I 13	General purpose input : I 13
15	I 14	General purpose input : I 14
16	I 15	General purpose input : I 15
17	I 16	General purpose input : I 16
18	Common	Common to input (I 9 ~ I 16)
19	I 17	Program select bit 1 Discrete : 1 Binary : 2^0
20	I 18	Program select bit 2 Discrete : 2 Binary : 2^1
21	I 19	Program select bit 3 Discrete : 3 Binary : 2^2

7.1 *Input signal connector (CNIN1)*

Connector pin	Signal name	Role of signals (factory settings). (Roles of signals, other than "General purpose signals," can be changed.)
22	I 20	Program select bit 4 Discrete : 4 Binary : 2^3
23	I 21	Program select bit 5 Discrete : 5 Binary : 2^4
24	I 22	Program select bit 6 Discrete : 6 Binary : 2^5
25	I 23	Program select bit 7 Discrete : 7 Binary : 2^6
26	I 24	Program select bit 8 Discrete : 8 Binary : 2^7
27	Common	Common to input (I 17 ~ I 24)
28~32	Not used	Not used
33	I 25	Program strobe : R1
34	I 26	Weld completed (W1) : G1
35	I 27	Weld started
36	I 28	General purpose input : I 28
37	I 29	General purpose input : I 29
38	I 30	External start
39	I 31	External stop (Input signal when not in use.)
40	I 32	External motors de-energized
41	Common	Common to input (I 25 ~ I 32)
42~43	Not used	Not used
44~46	DC +24V	DC +24V
47	Not used	Not used
48~50	GND	GND

Please refer to [Constants] [4 Signal attributes] [2 Input signal assignment] for details of assigned roles, Factory settings (default) and change of [Input signal assignment].

Basic configuration of input circuit


CNIN1
CNIN
External connection
UM124
(UM139)
UM119
Relay contact, etc.
I * *
I * *
I * *
Common
DC +24V
GND
User side
Controller side

- ✧ Input power can be supplied from the Controller.

  DC +24V : Any of 44 pins to 46 pins can be used.

  GND : Any of 48 pins to 50 pins can be used.

- ✧ Electric specification on input circuit is as follows:

  Input impedance : about 3 KΩ

  Input current : 8 mA

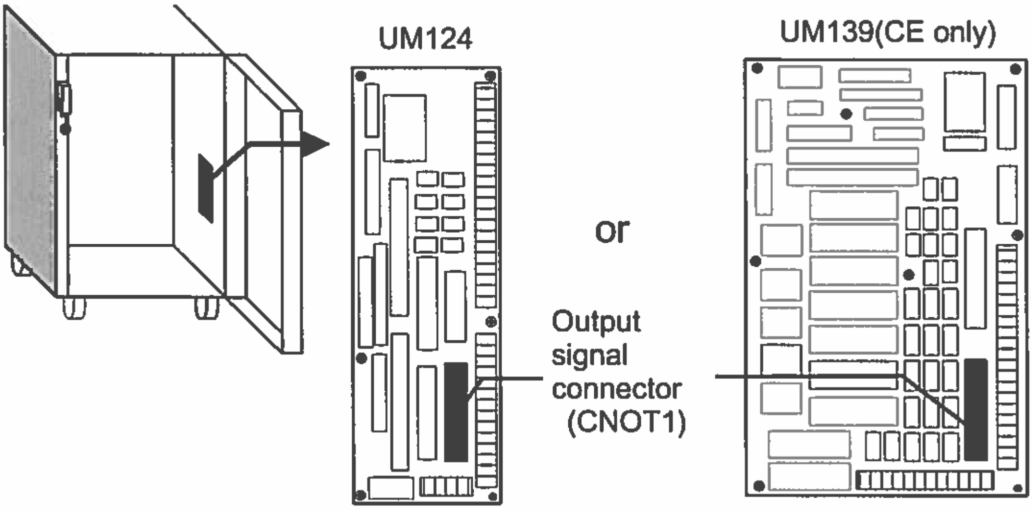
- ✧ Do not apply voltage to input.

7.2 Output signal connector (CNOT1)

Outline of output signal connector (CNOT1)

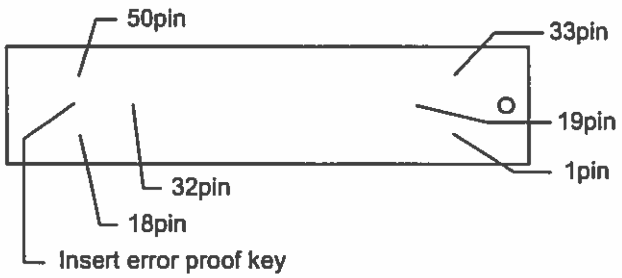
The output signal connector (CNOT1) is a connector to connect M signal (that is, output signal) to the controller.

Location of output signal connector (CNOT1)


UM124
UM139(CE only)
or
Output signal connector (CNOT1)

Layout of output signal connector (CNOT1) pins

The pin layout below is CNOT1 shown from its solder side of cable side connector.
Connector type: MR-50LF (HONDA Comm.)


50pin
33pin
19pin
1pin
32pin
18pin
Insert error proof key

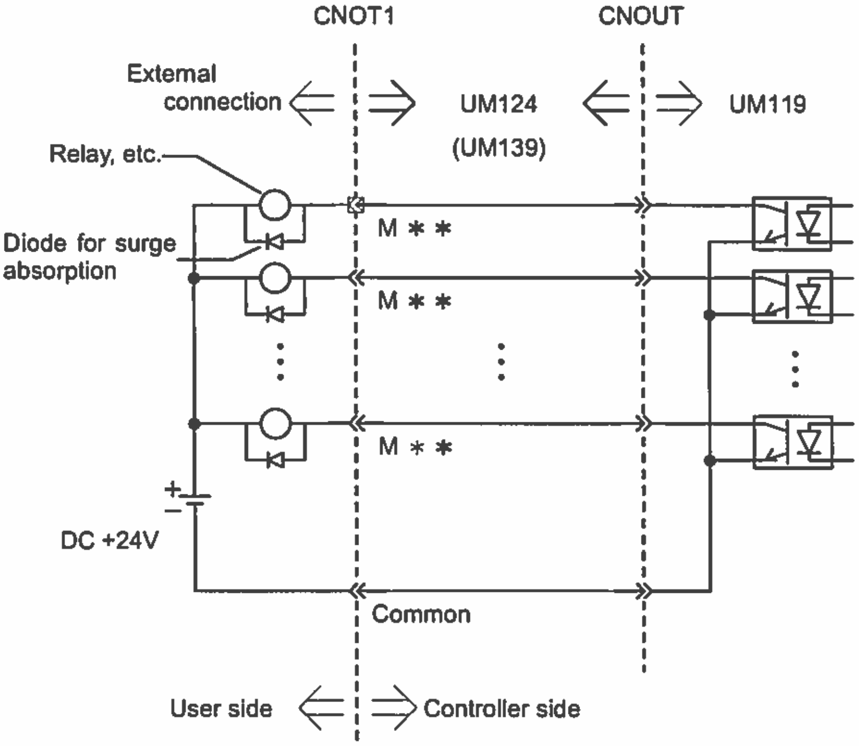
Output signal (CNOT1)

Connector pin	Signal name	Role of signals (factory settings). (Roles of signals, other than "General purpose signals," can be changed.)
1	M 1	General purpose output : M 1
2	M 2	General purpose output : M 2
3	M 3	General purpose output : M 3
4	M 4	General purpose output : M 4
5	M 5	General purpose output : M 5
6	M 6	General purpose output : M 6
7	M 7	General purpose output : M 7
8	M 8	General purpose output : M 8
9	Common	Common to output (M 1 ~ M 8)
10	M 11	General purpose output : M 11
11	M 12	General purpose output : M 12
12	M 13	General purpose output : M 13
13	M 14	General purpose output : M 14
14	M 15	General purpose output : M 15
15	M 16	General purpose output : M 16
16	M 17	General purpose output : M 17
17	M 18	General purpose output : M 18
18	Common	Common to output(M 11 ~ M 18)
19	M 21	Gun 1 : G1
20	M 22	Full open signal (MX) : G1

Connector pin	Signal name	Function set as initial value (Functions, other than general purpose output assigned to M＊＊ signal, can be changed to another signal name.)
21	M23	Stick alarm
22	M24	Program end : R1
23	M25	System error
24	M26	Interlock error
25	M27	Operator error
26	M28	Emergency stop now
27	Common	Common to output (M21 ～ M28)
28 ～ 32	Not used	Not used
33	M31	Teach mode now
34	M32	Start now : R1
35	M33	External program select underway
36	M34	External start select underway
37	M35	Motors energized
38	M36	Robot is ready : R1
39	M37	Home position 1
40	M38	General purpose output : M38
41	Common	Common to output (I25 ～ I32)
42 ～ 43	Not used	Not used
44 ～ 46	DC+24V	DC+24V
47	Not used	Not used
48 ～ 50	GND	GND

Refer to [Constants] [4 Signal attributes] [3 Output signal assignment] and [Spot welding] or [Arc welding] Manuals for details of assigned roles, Factory settings (default) and change of [Output signal assignment].

Basic configuration of output circuit


CNOT1
CNOUT
External connection
UM124
(UM139)
UM119
Relay, etc.
Diode for surge absorption
M ＊＊
M ＊＊
M ＊＊
DC +24V
Common
User side
Controller side

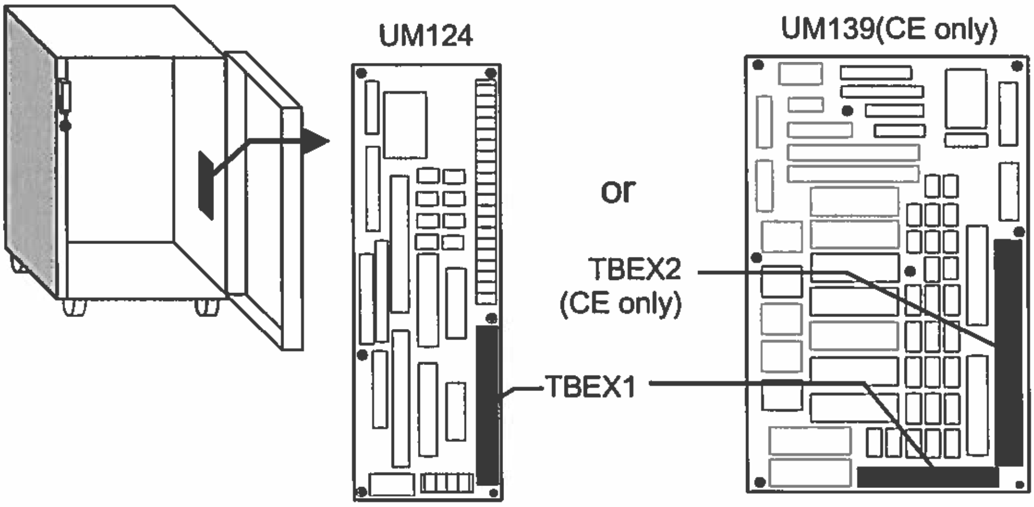
- ✧ Electric specification on output circuit is as follows:
  Rated close/open capability : DC +24V±3V, 0.1A
  Be sure to use within the rated capability
- ✧ User must prepare output power source
- ✧ Make sure a surge absorption diode for load is used.

7.3 Terminal block (TBEX1,TBEX2)

Outline of terminal block (TBEX1,TBEX2)

The terminal block connects fixed I/O signals particularly important for safety, such as External emergency stop, external MOTORS ON and safety plug.

Location of terminal block (UM124-TBEX1 / UM139-TBEX1,TBEX2)



TBEX1(UM124)

Terminal No.	Terminal name	Explanation
1 ~ 2	SFP	For safety plug. AW controller detects when the safety plug signal is lost when a person enters the fenced area. [Normal Close]
3 ~ 4	E.E.STOP	For External Emergency Stop button [Normal Close] (*)
5 ~ 6	E.M.ON	For External Motor energized On signal [Normal Open]
7 ~ 8	E.STOP.OUT.1	External emergency stop output 1 (Relay contact output signal) This signal outputs the status of emergency stop button of Teach pendant.
9 ~ 10	E.STOP.OUT.2	External emergency stop output 2 (Relay contact output signal) This signal outputs the status of emergency stop button of Operation panel.
11	CRMON 1	Not used (Nothing to be connected)
12	CRMON 2	Not used (Nothing to be connected)
13	EXMON	Not used (Nothing to be connected)
14	No name	Not used (Nothing to be connected)

(*)**Note:** If not used please add a jumper to the circuit.

TBEX1(UM139)

Terminal No.	Terminal name	Explanation
1 - 2	E.STOP.OUT1	Not used (Nothing to be connected)
3 - 4	E.STOP.OUT2	Not used (Nothing to be connected)
5 - 6	E.STOP.OUT3	Not used (Nothing to be connected)
7 - 8	ES.OUT.TIP(*)	Emergency stop output for tip dresser (Relay contact output signal) Emergency stop status will turn on this signal [Normal Open].
9 - 10	ES.OUT.COM(*)	Emergency stop output for external device (Relay contact output signal) Emergency stop status will turn on this signal [Normal Open].
11	EX24V	For external power DC24V input (Jumpered to No.1,2 on TBEX2)
12	EX0V	For external power DC24V input (Jumpered to No.3,4 on TBEX2)

(*)Note: These two are equal signals.

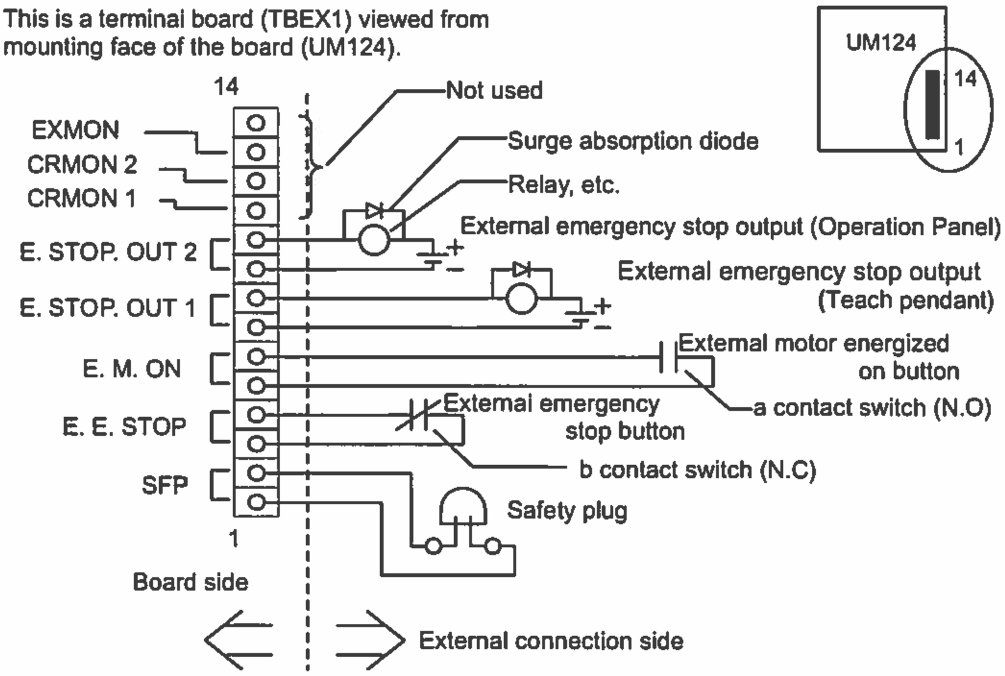
TBEX2(UM139)

Terminal No.	Terminal name	Explanation	
1 , 2	24V	For external power DC24V input (Jumpered to No.11 on TBEX1)	
3 , 4	0V	For external power DC24V input (Jumpered to No.12 on TBEX1)	
5 - 6	E.E.STOP1	External Emergency stop 1 [Normal Close]	If either one of these signals is lost Emergency stop state will result.(Doubled for safety) (*)
7 - 8	E.E.STOP2	External Emergency stop 2 [Normal Close]	
9 - 10	EX.MON1	External MOTORS ON 1 [Normal Open]	Both these signals must be input to energize motors.
11 - 12	EX.MON2	External MOTORS ON 2 [Normal Open]	
13 - 14	G.STOP (General Stop)	External stop [Normal Close] (*) If this signal is lost robot will stop. This signal is available at step go/back and in playback mode.	
15 - 16	A.STOP (Auto Stop)	External stop [Normal Close] (*) If this signal is lost robot will stop. This is available only in playback mode.	
17 - 18	SFP	For safety plug. AW controller detects when the safety plug signal is lost when a person enters the fenced area. [Normal Close]	
19 - 20	T.DELAY	Internally used in controller.Do not use.	

(*)Note: If not used please add a jumper to the circuit.

Basic configuration of terminal connection(TBEX1 on UM124)

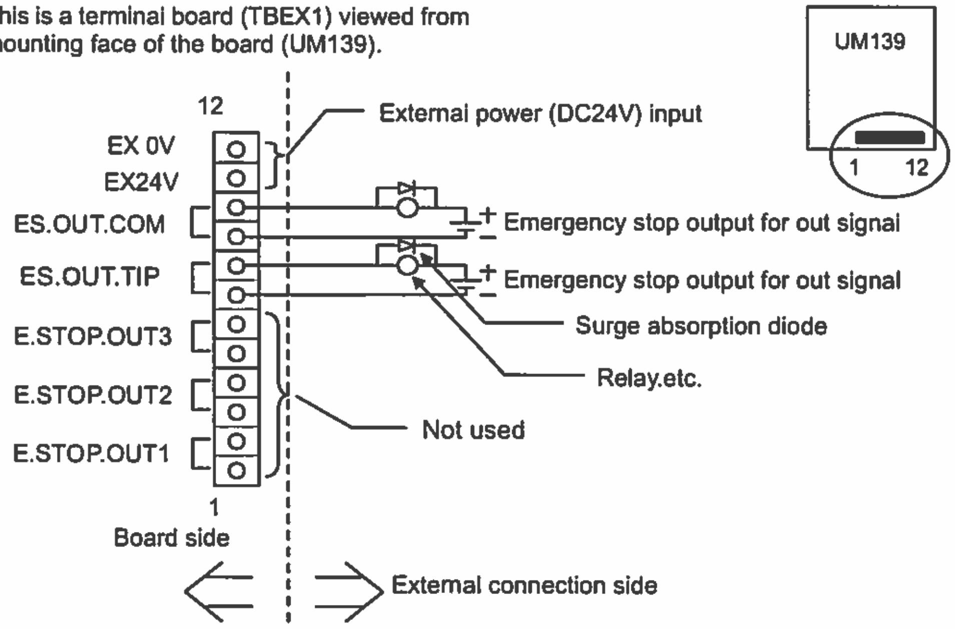
This is a terminal board (TBEX1) viewed from mounting face of the board (UM124).


UM124
14
1
14
Not used
EXMON
CRMON 2
CRMON 1
Surge absorption diode
Relay, etc.
E. STOP. OUT 2
External emergency stop output (Operation Panel)
+
−
E. STOP. OUT 1
External emergency stop output
(Teach pendant)
+
−
E. M. ON
External motor energized
on button
a contact switch (N.O)
E. E. STOP
External emergency
stop button
b contact switch (N.C)
SFP
Safety plug
1
Board side
External connection side

✧ Use a crimp-type terminal or Y-type terminal for signal cable to be connected to the terminal board.

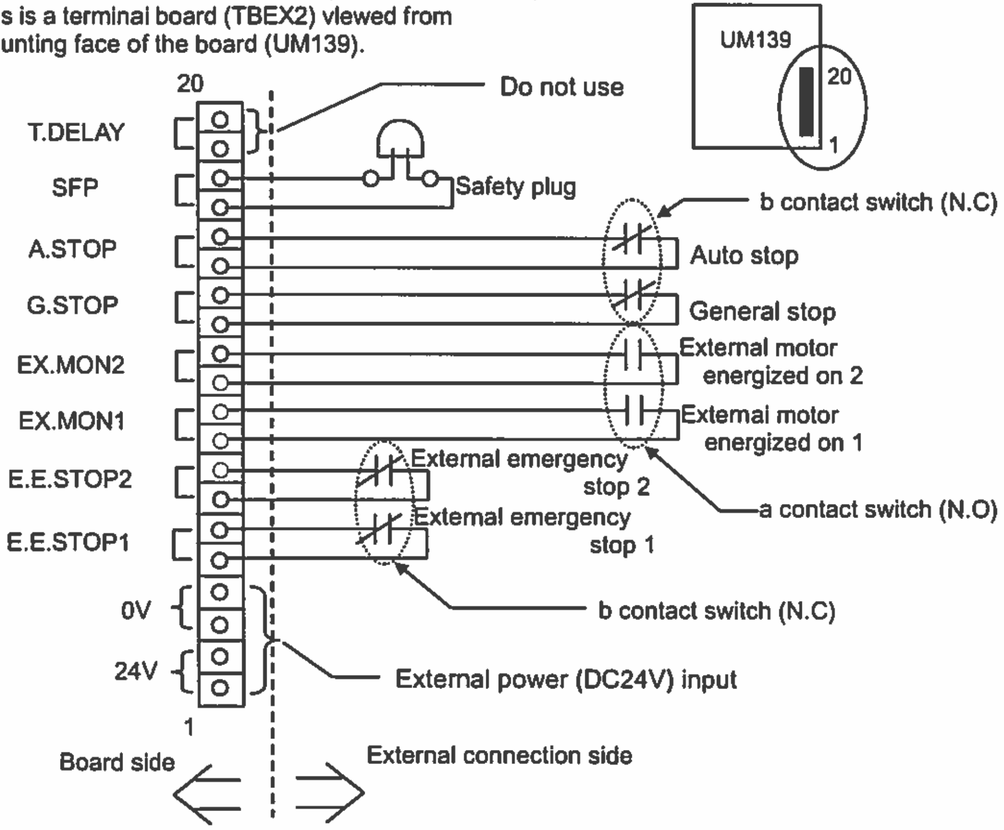
Basic configuration of terminal connection(TBEX1 on UM139)

This is a terminal board (TBEX1) viewed from mounting face of the board (UM139).


UM139
1
12
12
External power (DC24V) input
EX 0V
EX24V
ES.OUT.COM
+
−
Emergency stop output for out signal
ES.OUT.TIP
+
−
Emergency stop output for out signal
Surge absorption diode
E.STOP.OUT3
Relay.etc.
E.STOP.OUT2
Not used
E.STOP.OUT1
1
Board side
External connection side

Basic configuration of terminal connection(TBEX2 on UM139)

This is a terminal board (TBEX2) viewed from mounting face of the board (UM139).

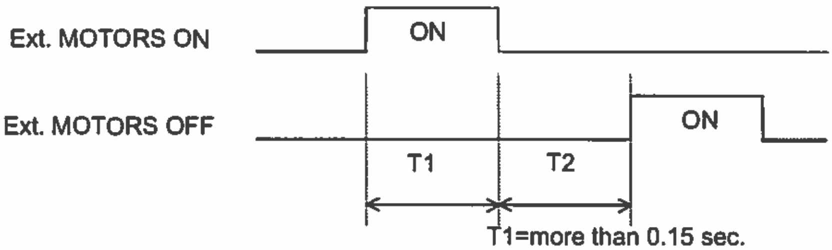

UM139
20
1
20
Do not use
T.DELAY
SFP
Safety plug
b contact switch (N.C)
A.STOP
Auto stop
G.STOP
General stop
EX.MON2
External motor energized on 2
EX.MON1
External motor energized on 1
E.E.STOP2
External emergency stop 2
a contact switch (N.O)
E.E.STOP1
External emergency stop 1
0V
b contact switch (N.C)
24V
External power (DC24V) input
1
Board side
External connection side

✧ Use a crimp-type terminal or Y-type terminal for signal cable to be connected to the terminal board.

7.4 Cautions

[Ext. MOTORS ON] signal

- [Ext. MOTORS ON] signal should be a pulse signal.
- Timing of [Ext. MOTORS ON] signal and [Ext. MOTORS OFF] signal should be as shown below.


Ext. MOTORS ON
ON
Ext. MOTORS OFF
ON
T1
T2

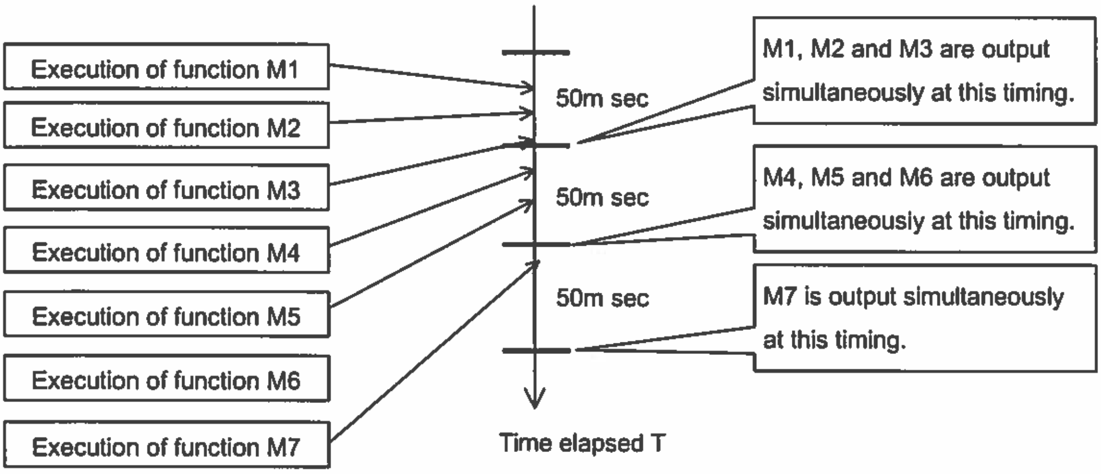
T1=more than 0.15 sec.

T2=more than 0.15 sec.

- If MOTORS ON signal is not received after an error occurred during external MOTORS ON, input an Emergency stop signal once and then input [External MOTORS ON] signal again.

Output signal timing

- Output signals are output every 50ms. Output signals processed within 50ms period as shown in the figure below are output at the next output time.
- Function process time and the above 50ms timing is synchronized. Therefore a 50ms max. lag time may exist between function executing and signal output. Take this into consideration when preparing a sequence.
- These are characteristics common to all output signals.

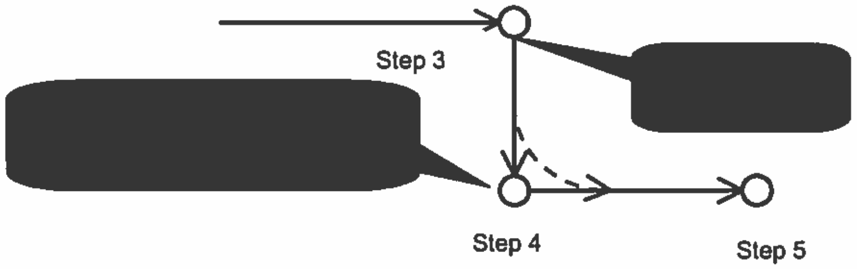

Execution of function M1
Execution of function M2
Execution of function M3
Execution of function M4
Execution of function M5
Execution of function M6
Execution of function M7
50m sec
50m sec
50m sec
Time elapsed T
M1, M2 and M3 are output simultaneously at this timing.
M4, M5 and M6 are output simultaneously at this timing.
M7 is output simultaneously at this timing.

I signal (input) process timing

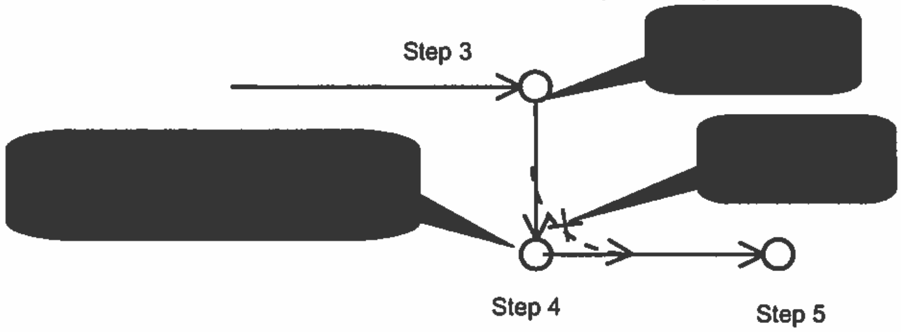
- ✧ In order to shorten a cycle time for AW controller, input wait function (I signal) is processed prior to arriving at a record point.

  I signal is detected before leaving Step 3 as is shown in the figure below. Tool tip passes along a locus of dotted arrow if I signal is detected and ON.

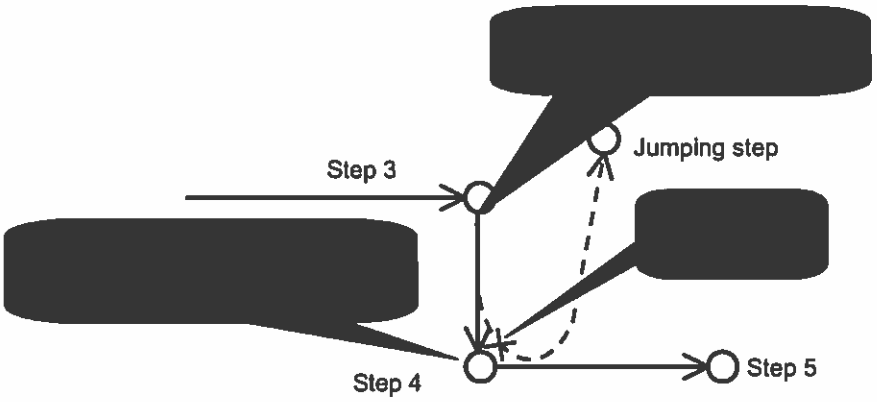
  Set an accuracy of Step 4 to [Pause] (P) if the above is hard to set in view of application. In this case, I signal is detected after arriving at Step 4.


Step 3
[redacted]
[redacted]
Step 4
Step 5

Example 1: Signals are executed as is shown below in case that functions (M1,I1) are recorded in this order at Step 4. Set an accuracy of Step 4 to [Pause] (P) if the above is hard to set from the viewpoint of application.


Step 3
[redacted]
[redacted]
[redacted]
Step 4
Step 5

Example 2: Signals are executed as is shown below in case that functions (M1, (M23: step jump with condition)) are recorded at Step 4. Set an accuracy of Step 4 to [Pause] (P) if the above is hard to set in view of application.


[redacted]
Jumping step
Step 3
[redacted]
[redacted]
Step 4
Step 5