Island Series Service Guide

Version 3,0
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Model 4S4	Model 3S4

prepared by GPD Global® Documentation Dept.

GPD Global®
PRECISION DISPENSING SYSTEMS

611 Hollingsworth Street
Grand Junction, CO, USA 81505
tel: +1.970.245-0408 • fax +1.970.245-9674
request@gpd-global.com • www.gpd-global.com

Table of Contents

Passwords

System security set by OEM.

Type	Password	Where Used
System parameters	0502	Main window > 5.PARAMETER
PLC data	0196	Main window > 6.PLC > Up/Download

Monitoring

1. From the main window, select 3.MONITORING.
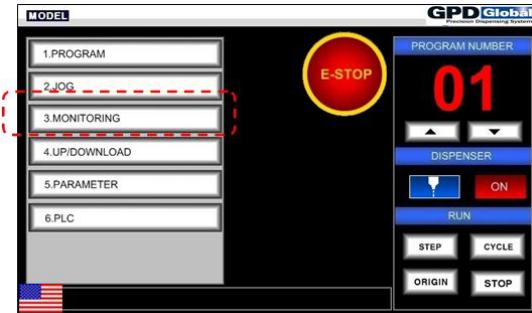

2. Press a button (in right hand column of dialog that displays) and follow the associated instructions:
   - PI (pg 2)
   - PO (pg 3)
   - PF (pg 4)
   - UI (pg 4)
   - UO (pg 5)

PI

Press PI to display status of external input ports.

| Red : input ON | Input port No. | Not used in input monitoring |
| Blue : input OFF | -> 0 ~ 23 | (No matter in case of input checked) |
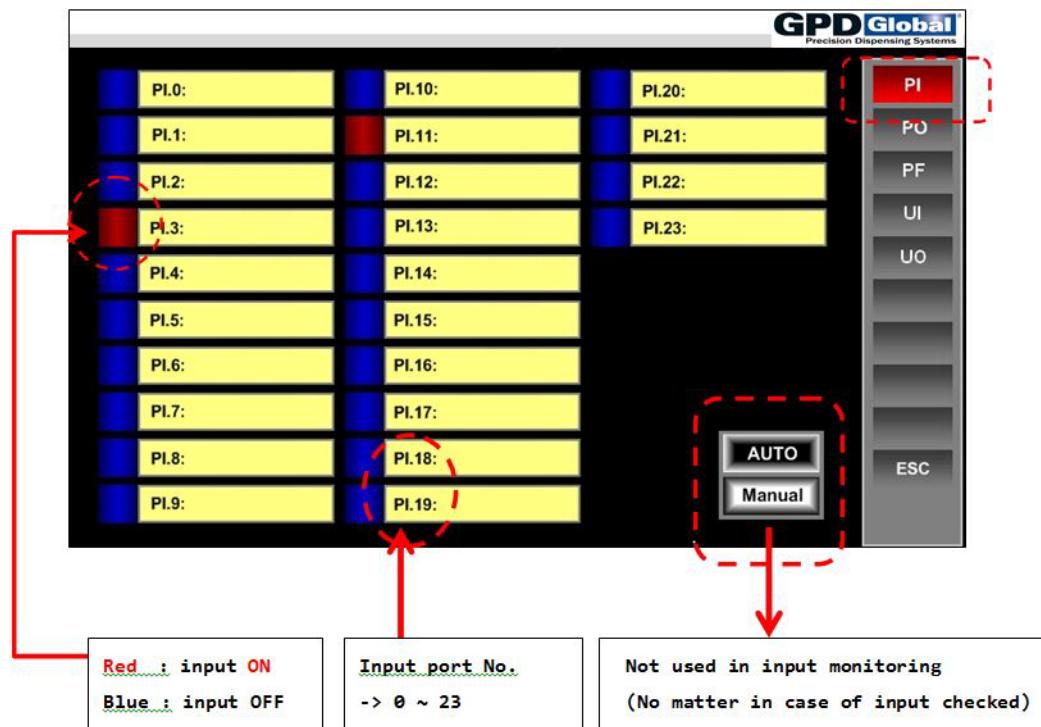
PO

Press PO to display external output status.

Item	Description
AUTO	Displays output status of the port in line with internal PLC program status.
Manual	Manual output by user. After changing the mode, window displaying port condition will be used for ON/OFF test.
	NOTE: Manual output is prohibited when user program is running.

PF

Press PF to display internal output interface status.

| Item	Description
PF.0	To be ON when you press emergency stop button in touch screen.
PF.1	Dispensing is executed while user program is running. If "Dispensing" item is ON, among point parameter set by the user, relevant port will be ON.
PF.2	Emergency stop switch is in input condition.
PF.3	Start switch is in input condition.
PF.4	Reference point movement switch is in input condition.
PF.5	Stop switch is in input condition.
PF.13	Z axis brake is off.
PF.14	Axis is running. It will be OFF when it pauses and be ON when it's moving.
PF.15	In the condition of emergency pause - combination of emergency button of touch screen and that of robot body in input condition.

UI

Press UI to display status of user input interface.

- Displays UI interface status among internal interfaces
- Set value of UI port is to be changed using instruction words like OUT, SET, and RST.
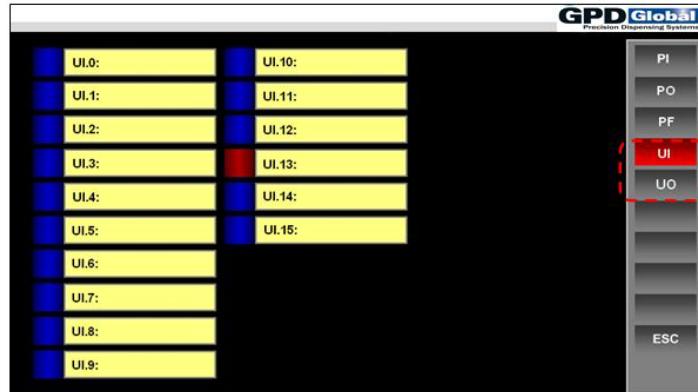
UO

Press UO to display status of user output interface.

- Displays UO interface status among internal interfaces
- Output condition will be changed in line with set value of OUTPUT among set value of each point parameter when user program is running.
- When both input and output are set at the same time in point window, input (UI) interface prevails.
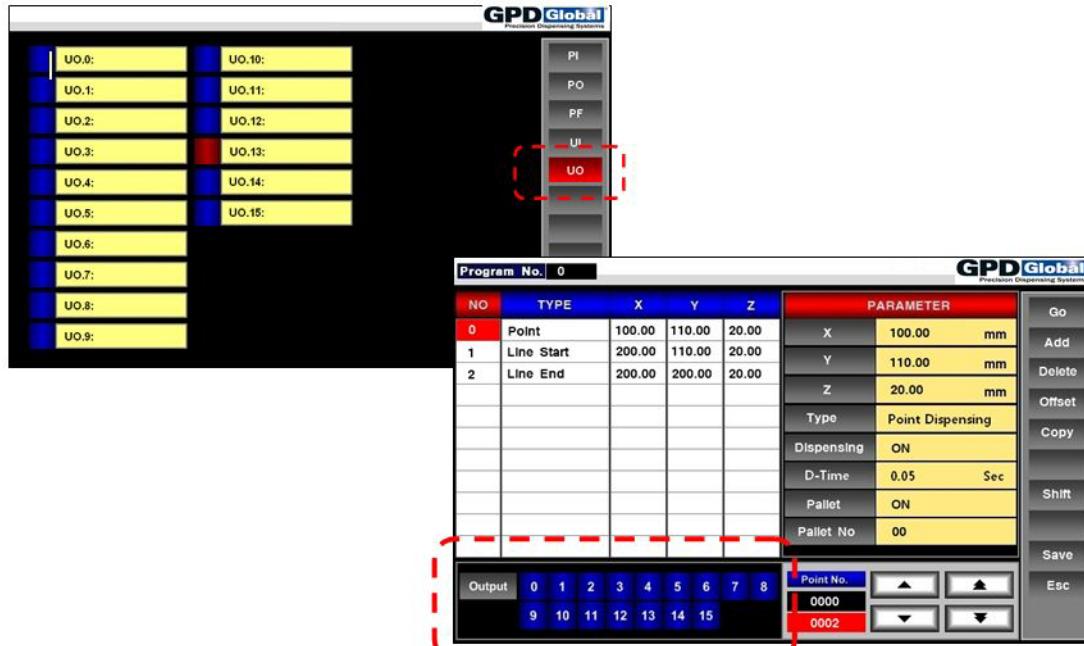
User Input / Output (User UI / UO)
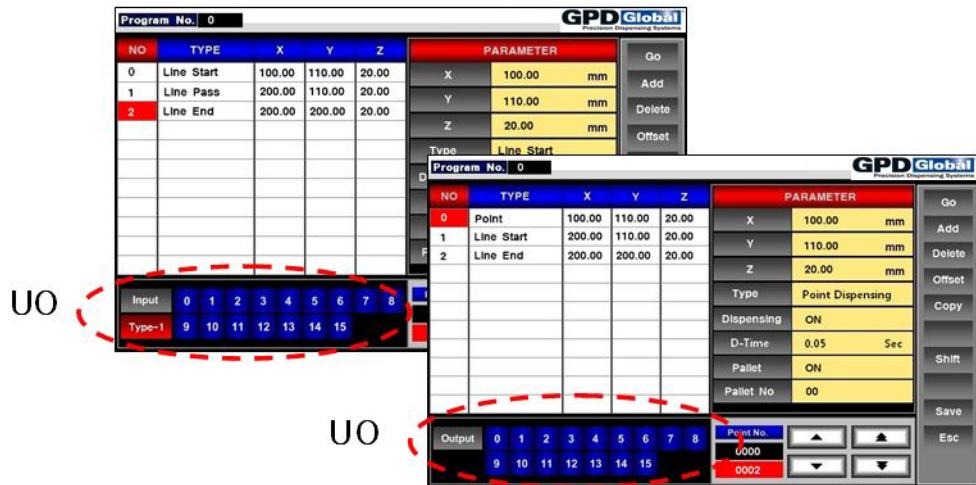
Use example 1:
- – LOAD PI.0
- – OUT UI.6

UI.6 interface will be ON if PI.0 input is ON.

Compare the input status of US when executing program, and check waiting condition.

Use example 2:
- – LOAD UO.0
- – OUT PO.0

Interface status of UO.0 will be applied to PO.0.

UP.0 will be changed depending on the value set by the user when program is executed.

PLC

Interface Description

	Range	R/W	Description
PI	PI.0-PI.23	Reading	Interface for hardware input
PO	PO.0-PO.22	Writing	Interface for hardware output (PO.23 is only for Z axis brake ON/OFF)
PM	PM.0-PM.79	Reading/Writing	Interface for internal input/output
UI	UI.0-UI.15	Writing	Internal interface for user program sequence
UO	UO.0-UO.15	Reading	Internal interface for user program sequence
T	T.0-T.19	Reading/Writing	Register for timer condition
T0-T19	T0-T19	Writing	Time-setting register for timer (per approx. 10 m sec)
PF	PF.0-PF.79	Reading	Interface for internal input of Firmware reservation

## Instruction Words

LOAD

To read ON/OFF status of PI, PF, PM, UO, T interfaces

Program example:
 – LOAD PI.3 : read bit3 status of PI interface
 – LOAD T.0 : read bit0 status of T interface
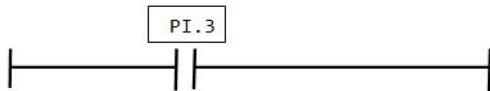
LOADN

To read ON/OFF inversion status of PI, PF, PM, UO, T interfaces

Program example:
 – read inversion status of PI 3 interface
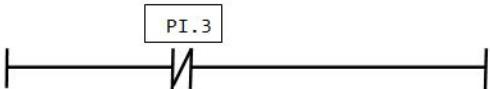
AND

Serial connection of ON/OFF status of PI, PF, PM, UO, T interfaces

Program example:
- LOAD PI.3
- AND PI.6
- OUT PO.3

    PO.3 output will be ON if PI.3 is ON and PI.6 is ON.

    If either or both inputs is OFF, output will be OFF.
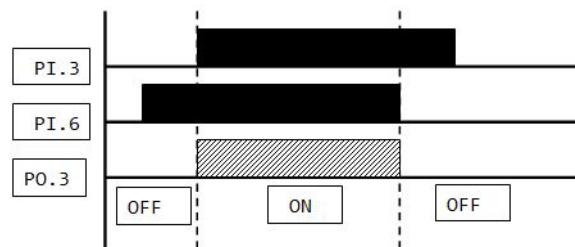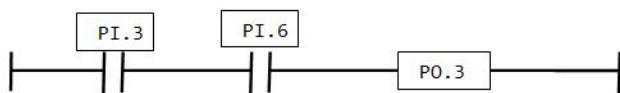
ANDN

Serial connection of ON/OFF inversion status of PI, PF, PM, UO, T interfaces

Program example 1:
- LOAD PI.3
- AND PI.6
- OUT PO.3

    PO.3 output will be OFF if PI.3 is ON and PI.6 is OFF.

    PO.3 output will be OFF if the condition is not satisfied.
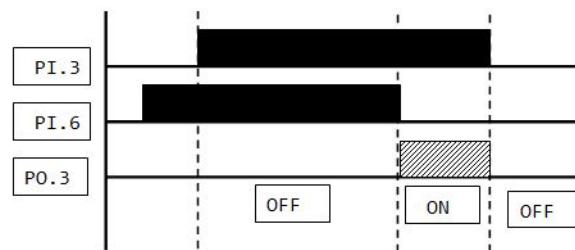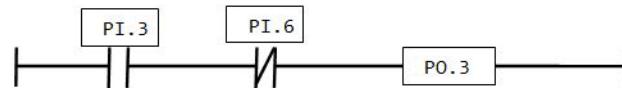
Program example 2:
  – LOAD PI.3
  – ANDN PI.6
  – AND PI.7
  – OUT PO.3

  > PO.3 output will be OFF if PI.3 is ON and PI.6 is OFF and PI.7 is ON.

  > PO.3 output will be OFF if the condition is not satisfied.
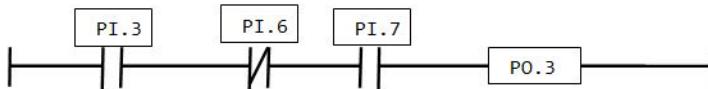

OR

Serial connection of ON/OFF status of PI, PF, PM, UO, T interfaces

Program example 1:
  – LOAD PI.3
  – OR PI.6
  – OUT PO.3

  > PO.3 output will be ON if more than one from PI.3 and PI.6 is ON.
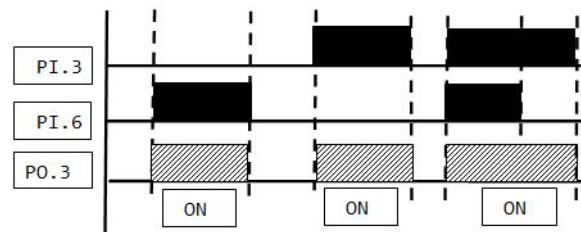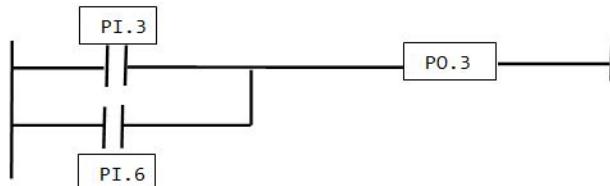
Program example 2:
  − LOAD PI.3
  − OR PI.6
 − OR PI.4
  − OUT PO.3.
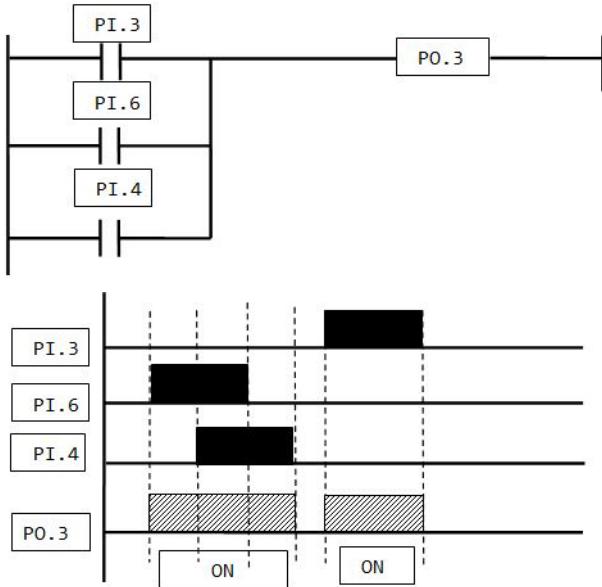
ORN

Serial connection of ON/OFF inversion status of PI, PF, PM, UO, T interfaces

Program example:
  − LOAD PI.3
  − ORN PI.6
  − OUT PO.3

PO.3 output will be ON if PI.3 is ON and PI.6 is OFF.
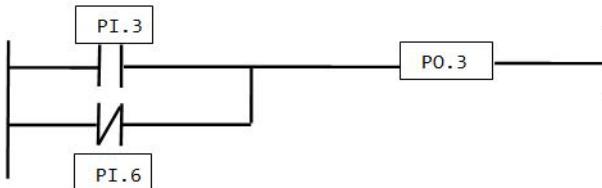
OUT

Output of PO, PM, UI interfaces

Interface output will be ON if the result of previous calculation is True, and it will be OFF if the foregoing result is False.

SET

PO, PM, UI interface output

Interface output will be ON if the result of previous calculation is True, and will con-
tinue to be ON even if the result of subsequent calculation changes to False.

Program example:
- LOAD PI.3
- AND PI.6
- SET PO.3
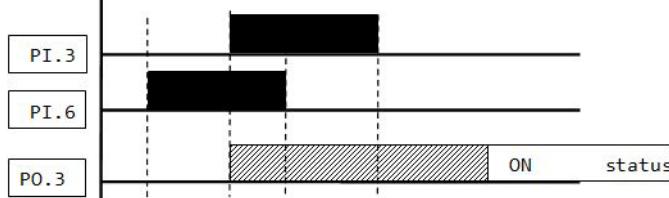
RST

PO, PM, UI interface output

Interface output will be OFF if the result of previous calculation is True, and will con-
tinue to be OFF even if the result of subsequent calculation changes to False.

Program example:
- LOAD PI.3
- SET PO.6
- LOAD PI.6
- RST PO.6
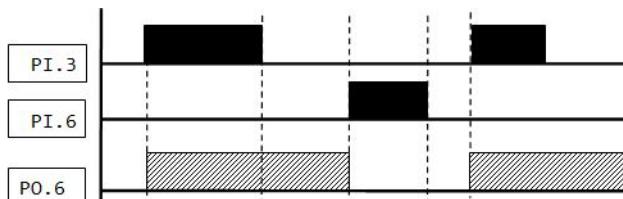
ANDB(AND BLCOK)

AND calculation between two blocks

Program example:
- – LOAD PI.1
- – OR P1.2
- – OR PM.0
- – LOAD PI.3
- – OR PI.4
- – ANDB
- – OUT PO.0
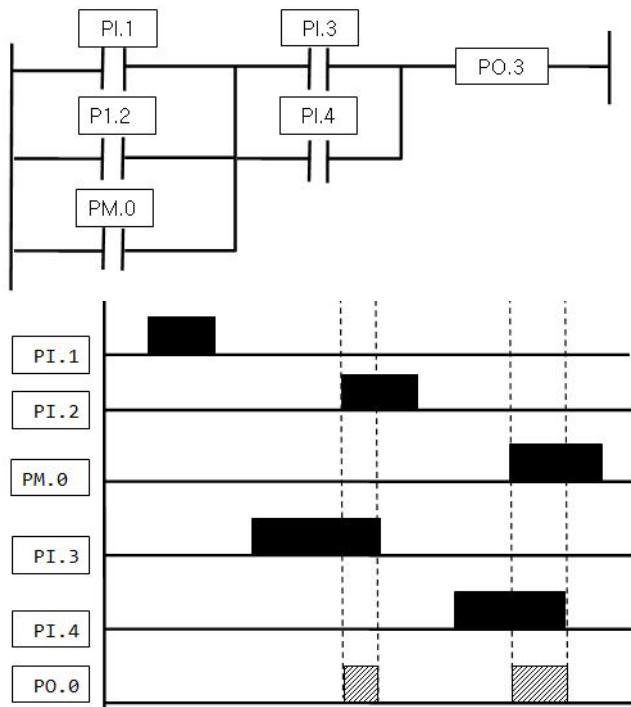
ORB(OR BLCOK)

OR calculation between two blocks

Program example:
- – LOAD PI.1
- – AND P1.2
- – LOAD PI.3
- – AND PI.4
- – ORB
- – OUT PO.0
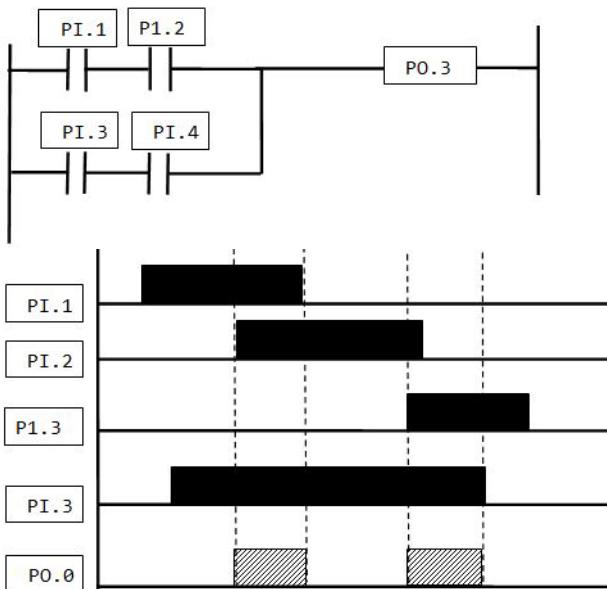
TMR(TIMER)

Set timer and start timer

Timer starts if the result of previous calculation is True.

Timer to be initialized and timer interface will be off if the result of previous calculation is False.

Timer interfaces (T.00-7.19) will SET if set time elapses after timer started.

Total 20EA from T0 to T19A, approximately 10 m sec x maximum 50000

Program example:
- LOAD PI.0
- TMR T0 20
- LOAD T.00
- OUT PO.00

If PI.0 is ON, 20 (about 200 m sec) will be set for T0 and time will start to run and T.00 bit will be set after 200 m sec.

T.00 value will be initialized when "PI.0 is OFF" or by instruction of "RST T.00".

TMR instruction should be preceded by LOAD instruction.

Exercise PLC Program

Exercise 1

Condition:

Automatic dispensing during execution of user program and manual dispensing by input of "SHOT switch (input: PO.1) will be dispensed (output: PO.1) only when the switch is "ON", dispensing signal will be "OFF" when switch input of "SHOT ON/OFF" is changed to "OFF" during dispensing. Manual dispensing by "SHOT switch" is executed only when "AUTO/MANUAL" switch is on "MANUAL(AND PI.3).

//// USER INPUT ////

//PI.0 : START SW   => UI.0

//PI.1 : STBY   => UI.1

//PI.2 : SHOT PB

//PI.3 : AUTO/Manual Toggle Switch

//PI.4 : Needle Adjust   => UI.4

//// USER OUTPUT ////

//PO.1 : DISPENSING ON

//PO.2 : COUNTER   => UO.2

// DISPENSER ON,OFF SETTING //

LOAD PF.1   //DISPENSER ON/OFF SEL.(Choose from touch screen)

AND PF.12   //RUN MODE

OUT PM.0

LOAD PI.2   //SHOT PB

AND PI.3   //Manual Mode

OUT PM.1

LOAD PM.0

OR PM.1

OUT PO.1   //DISPENSING ON SIG.

// START SW SET //

LOAD PI.O   //START SW ON

ANDN PI.3   //Auto Mode

OUT UI.O   //TOUCH INPUT NO.=0

//STBY SET//

LOAD PI.1   //STBY SW

OUT UI.1   //TOUCH INPUT NO.=1

//Needle Adjust SET//

LOAD PI.4   //STBY SW

OUT UI.4   //TOUCH INPUT NO.=4

// COUNTER SET //

LOAD **UO.2**   //TOUCH OUTPUT NO.=2

AND PF.12   //RUN MODE

OUT **PO.2**   //COUNTER ON

Figure 1: *Description of counter movement*

Counter output : PO.2 -> UO.2

Output (UO.2) should be chosen in the window for point data input.

Waiting time (W-time) should be set after setting output signal. (needs ON/OFF time of relay)

Exercise 2

Condition:

TFT-LCD Auto-Align Back Dispensing, Autoshot, Jig Tilting

RTV Silicone Cartridge, SV405-3EA

```
//// USER INPUT ////

//PI.0 : AUTO/MANU

//PI.1 : START SW                => UI.0

//PI.2 : VAC. TOGGLE

//PI.3 : EXP. TOGGLE

//PI.4 : SHOT PB

//PI.5 : HOR. ALIGN ON TOGGLE

//PI.6 : VER. ALIGN ON TOGGLE

//PI.7 : Needle Adjust PB        => UI.7

//PI.8 : ALARM SIG.

//PI.9 : LEFT or RIGHT SELECT TOGGLE

//PI.10: JIG VACUUM OK SIG.      => UI.10

//PI.11: JIG HORI. FRONT SENSOR  => UI.11

//PI.12: JIG VERT. FRONT SENSOR  => UI.12

//PI.13: AutoShot Toggle         => UI.13

//PI.14: Tilting On Cyl. Sensor  => UI.14

//PI.15: Tilting Off Cyl. Sensor => UI.15

//PI.16: Tilting On Toggle Sig.

//PI.17: Tilting Off Toggle Sig.


//// USER OUTPUT ////

//PO.1 : DISPENSING ON      => UO.1

//PO.2 : COUNTER            => UO.2

//PO.3 : JIG VACUUM ON      => UO.3

//PO.4 : JIG EXPLODE ON

//PO.5 : HOR. ALIGN CYL. ON

//PO.6 : VER. ALIGN CYL. ON

//PO.7 : ALARM ON

//PO.8 : Tilting On Sig.    => UO.8

//PO.9 : Tilting Off Sig.   => UO.9
```

```
// DISPENSER ON,OFF SETTING //
LOAD PF.1    //DISPENSER ON/OFF SEL.
AND PF.12    //RUN MODE
OUT PM.0


LOAD PI.4    //SHOT PB
AND PI.0     //MANUAL MODE
OUT PM.1


LOAD PI.13   //AUTOSHOT TOGGLE ON
//ANDN PF.12   // NOT RUN MODE
OUT PM.50
OUT UI.13


LOAD PM.50
TMR T10 5000 //5000*10=50000 msec=50 second=AutoShot Interval Time
LOAD T.10
TMR T11 50   //Autoshot Dispensing Time
OUT PM.52    //AUTOSHOT ICP


LOAD T.11
RST T.10


LOAD PM.0
OR PM.1
OR PM.52
OUT PO.1     //DISPENSING ON SIG.


// START SW SET //
LOADN PI.0     //AUTO MODE
AND PI.1       //START SW ON
OUT UI.0       //TOUCH INPUT NO.=0
SET PM.13


LOAD PM.13
```

```
TMR T4 10

LOAD T.04

ANDN PI.1        //START SW ON-NOT

OUT PM.11

RST PM.13


LOAD PM.11

ANDN PM.12

LOAD PM.12

ANDN PM.11

ORB

ANDN PM.70    //JOB OFF SIG.

OUT PM.12     //START RESERV. ICP


LOAD PM.12

ANDN PI.1      //START SW ON-NOT

SET PM.20


LOAD PM.20

AND PI.1

RST PM.20

SET PM.21


LOAD PM.21

TMR T3 30

LOAD T.03

OUT PM.7

RST PM.21


// JIG VAC. & EXP. TOGGLE SET //

// Vacuum Set //

LOAD PI.0     //MANUAL MODE

AND PI.2      //VAC. TOGGLE

LOADN PI.0    //AUTO MODE

AND PM.12     //START RESERV. ICP
```

```
ORB
ANDN PM.70    //JOB OFF SIG.
OUT PO.3      //JIG VACUUM ON


// Explode Set //
LOAD PI.0     //MANUAL MODE
AND PI.3      //EXP TOGGLE
LOADN PI.0    //AUTO MODE
AND PM.70     //JOB OFF SIG.
ORB
OR PM.7
OUT PO.4      //JIG EXPLODE ON


// X-JIG AUTO-Align Setting //
LOADN PI.0   //AUTO MODE
ANDN PM.12   //START RESERV. ICP- NOT
AND PI.9     //<LEFT> or RIGHT SELECT TOGGLE
OUT PM.3     //LEFT SELECT ICP


LOAD PM.12   //START RESERV. ICP
ANDN PI.0    //AUTO MODE
OUT PM.4     //JIG VAC. ICP


LOADN PM.4   //JIG VAC. ICP-NOT
OUT PM.5


LOAD PM.4
TMR T0 10    //10*10= 100 msec= 0.1 second.
LOAD T.00
OUT PM.71    //JIG ALIGN CYCLE ON ICP


LOAD PM.71    //JIG ALIGN HORI. ICP
TMR T1 50     //50*10= 500 msec= 0.5 second.
LOAD T.01
OUT PM.72     //JIG ALIGN VERT. ICP
```

```
// VACUUM-CHUCKING ALIGN OPERATING SET //
LOAD PI.0        //MANUAL MODE
AND PI.5         //HORI. ALIGN ON TOGGLE
LOAD PM.71       //JIG ALIGN CYCLE ON ICP
ANDN PI.9        //LEFT or <RIGHT> SELECT TOGGLE
ORB
OR PM.3          //LEFT SELECT ICP
OUT PO.5         //HORI. ALIGN CYL. ON


LOAD PI.0        //MANUAL MODE
AND PI.6         //VERT. ALIGN ON TOGGLE
LOADN PI.0       //AUTO MODE
AND PM.72        //JIG ALIGN VERT. ICP
ORB
OUT PO.6         //VERT. ALIGN CYL. ON



// Tilting On/Off Set //
LOAD PI.0        //MANUAL MODE
ANDN PF.12    //RUN MODE-NOT
AND PI.16        //TILTING ON SIG.
LOADN PI.0       //AUTO MODE
AND UO.8
ORB
OUT PO.8         //Tilting On Sig.


LOAD PI.0        //MANUAL MODE
ANDN PF.12    //RUN MODE-NOT
AND PI.17        //TILTING ON SIG.
LOADN PI.0       //AUTO MODE
AND UO.9
ORB
OUT PO.9         //Tilting Off Sig.


// Tilting On/Off Sensor Set //
```

```
LOAD PI.14  //Tilting On Sensor
OUT UI.14


LOAD PI.15  //Tilting Off Sensor
OUT UI.15


// LOADCELL ALARM SETTING //
LOAD PI.8    //ALARM SIG.
ANDN T.05
OUT PM.8


LOAD PM.8
TMR T2 50  //50*10= 500 msec= 0.5 second.
LOAD T.02
TMR T5 50  //50*10= 500 msec= 0.5 second.
LOAD T.02
OUT P0.7   //ALARM BUZZER ON




// COUNTER SET //
LOAD UO.2
AND PF.12    //RUN MODE
OUT PO.2     //COUNTER ON
OUT PM.70    //JOB OFF SIG.


// Needle Adjust PB SET //
LOAD PI.7
OUT UI.7


//JIG VAC. OK SET//
LOAD PI.10
OUT UI.10
```

```
// VERTICAL FRONT SENSOR SET //
LOAD PI.12
OUT UI.12


// SIG. RST SETTING //
LOAD PF.5    //RST
RST PM.4     //JIG VAC. ICP
RST PM.71    //JIG ALIGN CYCLE ON ICP
RST PM.72    //JIG ALIGN VERT. ICP
RST PM.7     //JIG EXP. ICP
RST PM.12    //START RESERV. ICP
```

Connectors

Connector 1
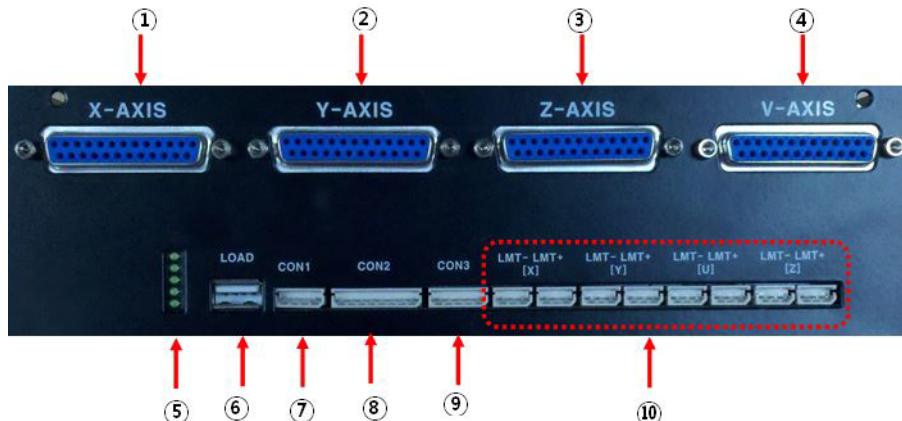
| Item	Description
1	External driver connector
2	
3	
4	
5	
6	touch screen connectors
7	
8	Switch and communication connector
9	Switch lamp output connector
10	Axis limit sensor connector

External Driver Connectors

- X-AXIS (X axis), Y-AXIS (Y axis), Z-AXIS (Z axis), V-AXIS (X2 axis–only for TWIN Robot)
- CW/CCW input type: DC 5V line drive output
- Input: DC24V photo coupler input
- Output: NPN Open Collector output

No.	Signal Name	I/O	Description
1	ENV_ AP_INPUT	INPUT	Encoder A phase + input
2	ENV_ BP_INPUT	INPUT	Encoder B phase + input
3	CW_P_OUTPUT	OUTPUT	CW/PULSE + output
4	CCW_P_OUTPUT	OUTPUT	CCW/DIR + output
5	DC 5V	OUTPUT	Externally supplied DC5V +
6	CCW_LIMIT_OUTPUT	OUTPUT	CCW LIMIT signal output
7	ALM_RESET_OUTPUT	OUTPUT	Alarm RESET output
8	GND		GND
9	RESERVED		Not used
10	RESERVED		Not used
11	DC 24V	OUTPUT	Externally supplied DC24V +
12	ALM_INPUT	INPUT	Alarm input

No.	Signal Name	I/O	Description
13	NO CONNECTION		Not used
14	ENV_AN_INPUT	INPUT	Encoder A phase - input
15	ENV_BN_INPUT	INPUT	Encoder B phase - input
16	CW_N_OUTPUT	OUTPUT	CW/PULSE - output
17	CCW_N_OUTPUT	OUTPUT	CCW/DIR - output
18	GND		GND
19	CW_LIMIT_OUTPUT	OUTPUT	CW limit signal output
20	SVR_ON_OUTPUT	OUTPUT	Servo ON signal output
21	DC 24V	OUTPUT	Externally supplied DC24V +
22	RESERVED		Not used
23	SVR_RDY_INPUT	INPUT	Driver Ready signal input
24	SVR_INPOSI_INPUT	INPUT	Driver In position signal output
25	NO CONNECTION		Not used

Touch Screen (HMI) Connectors
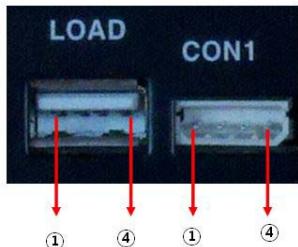
No.	Signal Name	Description
1	DC24V+	Externally supplied DC24V + OUTPUT
2	TX	RS232 TX_1
3	RX	RS232 RX_1
4	GND	GND

Switch & Communication Connector
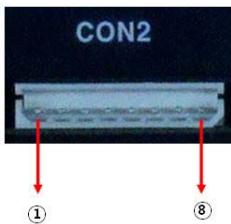
No.	Description
1	Externally supplied DC24V + OUTPUT
2	EMG emergency pause switch signal input
3	START SWITCH INPUT
4	ORIGIN SWITCH INPUT
5	STOP SWITCH INPUT
6	RS232 TX_2 (not used)
7	RS232 RX_2 (not used)

No.	Description
8	GND

Switch Lamp Output Connector
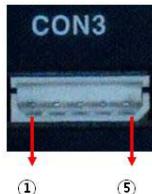
No.	Description
1	Externally supplied DC24V +
2	STOP Switch Lamp Output
3	START Switch Lamp Output
4	ORIGIN Switch Lamp Output
5	GND

## Axis Limit Sensor Connector

- LMT - : connected to reference point sensor
- LMT + : connected to limit sensor (not used)
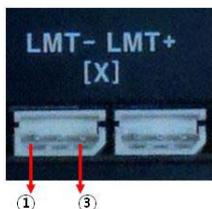
No.	Description
1	Sensor supplying DC24V +
2	Sensor signal INPUT
3	GND

Connector 2
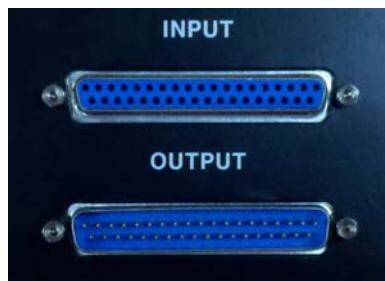
INPUT - EXT Input Connector

| No.	Description	No.	Description
1	GND	21	INPUT 22
2	INPUT 23	22	INPUT 20
3	INPUT 21	23	INPUT 19
4	GND	24	INPUT 17
5	INPUT 18	25	DC 24V + (output)
6	INPUT 16	26	INPUT 15
7	GND	27	NIPUT 13
8	INPUT 14	28	GND
9	INPUT 12	29	INPUT 10
10	INPUT 11	30	INPUT 8
11	INPUT 9	31	GND
12	DC 24V + (output)	32	INPUT 6
13	INPUT 7	33	INPUT 4
14	INPUT 5	34	INPUT 3
15	GND	35	INPUT 1
16	INPUT 2	36	DC 24V + (output)
17	INPUT 0	37	NO CONNECTION
18	NO CONNECTION		
19	NO CONNECTION		
20	GND		

☞ DC 24V photo coupler input

OUTPUT - EXT Output Connector

- OUTPUT 23: to be used as OFF signal for Z axis motor brake only. Arbitrary use by the user is not allowed.
- Rated current: DC 24V ±10%, 150 mA

No.	Description	No.	Description
1	DC 24V + (output)	21	OUTPUT 2
2	OUTPUT 1	22	GND
3	OUTPUT 3	23	OUTPUT 5
4	OUTPUT 4	24	OUTPUT 7
5	OUTPUT 6	25	DC 24V + (output)
6	GND	26	OUTPUT 9
7	OUTPUT 8	27	OUTPUT 11
8	OUTPUT 10	28	OUTPUT 12
9	GND	29	OUTPUT 14
10	OUTPUT 13	30	GND
11	OUTPUT 15	31	OUTPUT 16
12	DC 24V + (output)	32	OUTPUT 18
13	OUTPUT 17	33	GND
14	OUTPUT 19	34	OUTPUT 21
15	OUTPUT 20	35	OUTPUT 23
16	OUTPUT 22	36	GND
17	GND	37	NO CONNECTION
18	NO CONNECTION		
19	NO CONNECTION		
20	OUTPUT 0		

☞ NPN TR output

Q1
MMBT5551
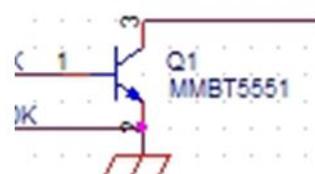
Power Supply Connector for Controller