Pump for PR Dispense **High Viscosity Pump**

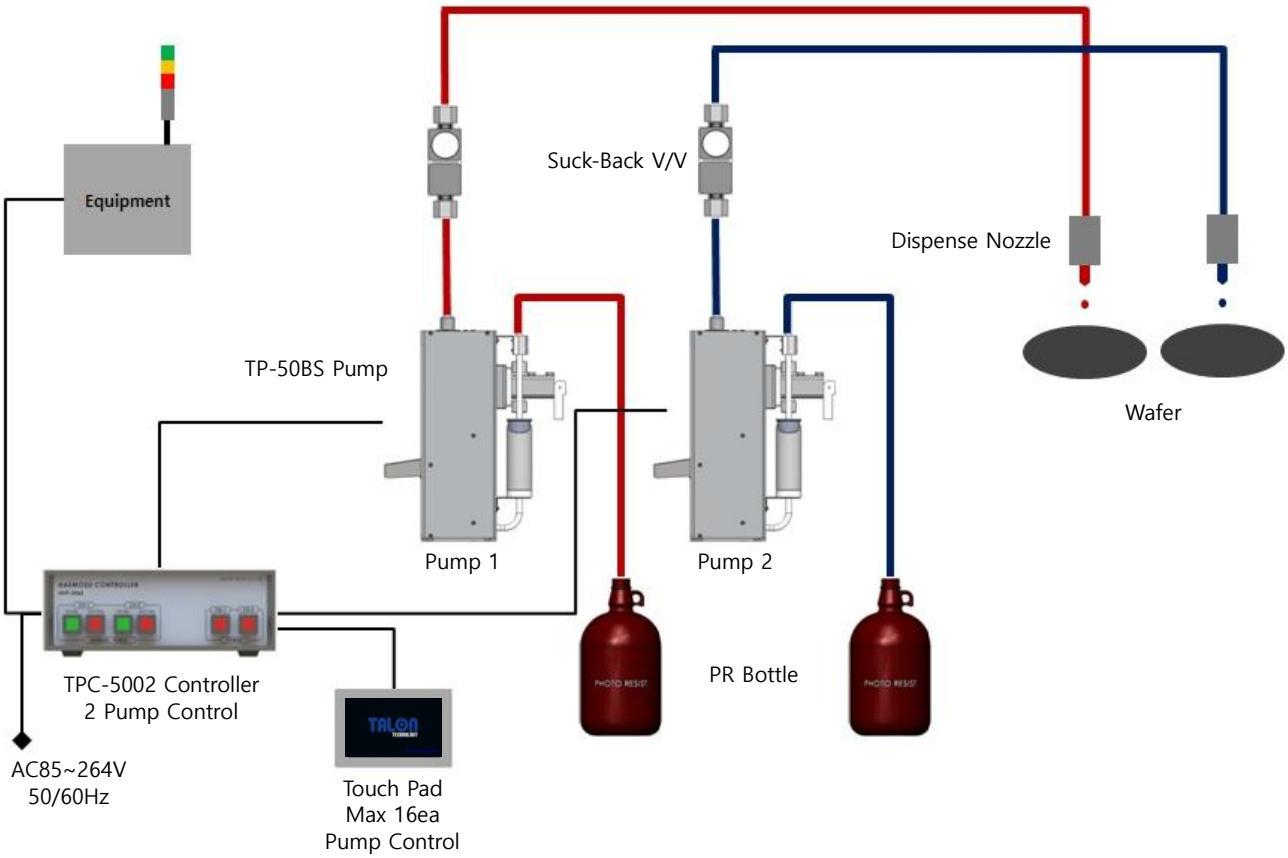
PUMP MANUAL

MODEL : TP-50BS

TALON TECH CO. LTD.

CONTENTS

1 System Configurations



TP-50BS pump can be used as the above configuration and has been developed for the semiconductor system's automation by operating RS422 communication. Especially, the adoption of servo motor is good for the high degree of PR dispense. The basic communication between the touch pad and the pump is RS422 Multi Drop method. By synchronizing with Windows CE Operating System, Touch Pad MMI 2.0 Software operates TP-50BS pump.

Be careful to use the pump by following this manual or Talon Tech's acceptance. Or, other defects should be paid even under the warranty period.

※ Features & Merits

1. All the PR contacting points are made by Teflon.
2. Driving Method : Diaphragm & bubble trap technology.
3. Micro bubble control : Special Welding, no leak point.
4. Touch pad has the same function of controller & it can control up to 16 pumps.
5. Encompass or Normal trigger signal.
6. Compact sized resist pump and controller. (1 Controller covers 2 pumps)

2 System Specifications

2-1 Pump [TP-50BS]

ITEM	SPEC	REMARKS
Dispense Volume Range	1.0cp ~ 7cc	
Dispense Volume Resolution	±0.01cc	
Dispense / Reload Rate	0.3cc/sec ~ 1.2cc/sec	
Dispense Repeatability	≤±0.04 (Polyimide PIX/PIQ)	
Viscosity	200cp ~ 20,000cp	
Drive System	DC Servo Motor	
Pump Type	Diaphragm Type	
Ambient Temperature	5 ~ 40 ℃	
Motor Power	DC 24V (current consumption : 1A)	
Air	0.1 ~ 0.3Mpa	
Resist In/Out	3/8 Inch Teflon	
Weight	6.30kg	
Pump Dimension	W : 97mm, D : 291mm, H : 362mm	

2-2 Controller [TPC-5002]

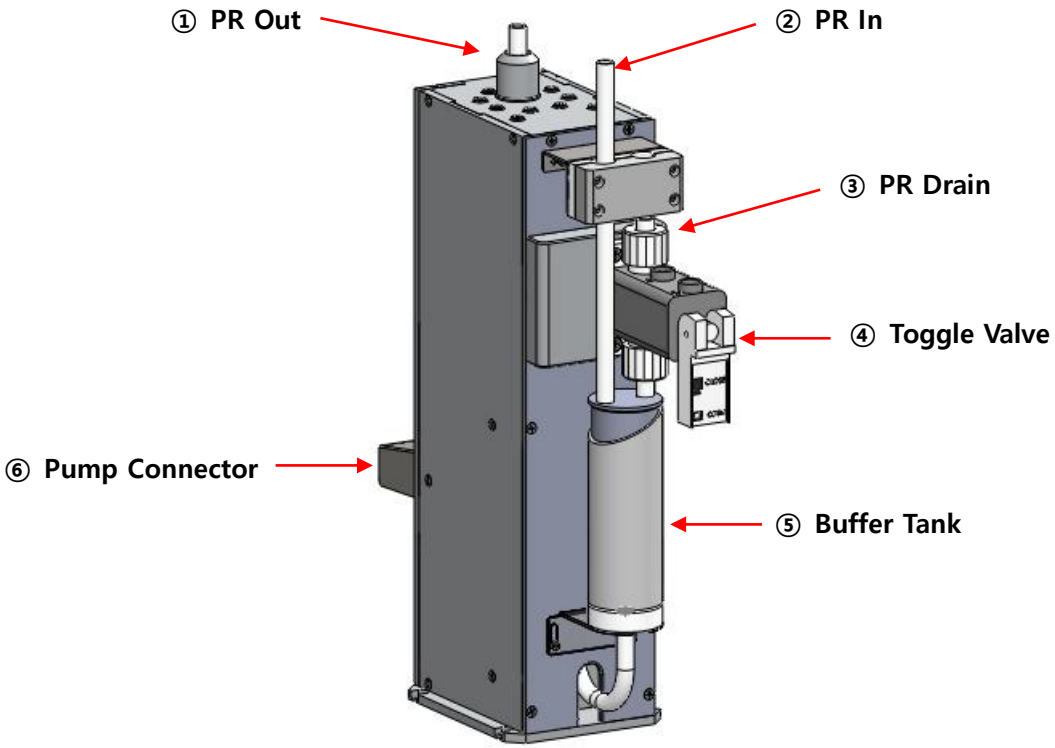
ITEM	SPEC	REMARKS
Electric Power	85VAC ~ 264VAC, 50~60Hz	
Controller Power	DC 24V (current consumption Max 1A)	Panel Use
Drive Pump No.	2 Pumps	
Pump Operation Mode	Fixed Mode	
Main CPU	80c296 (16bit Processor)	
Input Signal	1. Pump Driving Signal From Track M/C- Pump Start Signal.	
Output Signal	1. Home Signal & Pump Operation Completion Signal To Track M/C. 2. Air V/V controlled Sol V/V Signal. 3. Alarm Signal on Pump Error. 4. Outside Communication (RS 232,422,485).	
Weight	3.30kg	
Dimension	W : 250mm, D : 261mm, H : 94mm	

2-3 Touch Pad [TTP-5016]

ITEM	SPEC	REMARKS
Main CPU	32Bit ARM920T	
Ram	64Mb (OS:32Mb/App:32Mb)	
Flash	NAND Flash 64Mb (OS:32Mb/App:32Mb)	
LCD Size	4.3 Inch TFT Wide (480*272)	
RTC Function Built-in	Exchangeable Coin Battery	
Max. Connecting Pump No.	16 Pumps	
Communication	RS422	
Touch Pad Power	DC12~24V, current consumption: 5W (400~700mA)	
Ambient Temperature	-10 ~ 55C	
Weight	0.64kg	
Dimension	W : 140mm, D : 44mm, H : 88mm	

3 System In/Exterior Names

3-1 Pump In/Exterior Names



3-1-1 Pump Name Explanation

① PR Out

- Chemical Dispense. (⅜ Inch Teflon)

② PR In

- Chemical Supply. (⅜ Inch Teflon)

③ PR Drain

- Chemical Drain. (⅜ Inch Teflon)

④ Toggle Valve

- One Touch Toggle Valve for chemical drain.

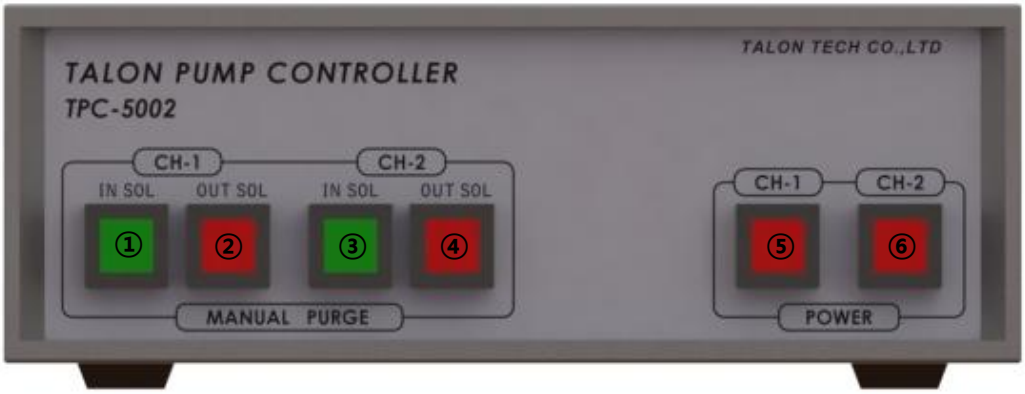
⑤ Buffer Tank

- Bubble removal and buffering function

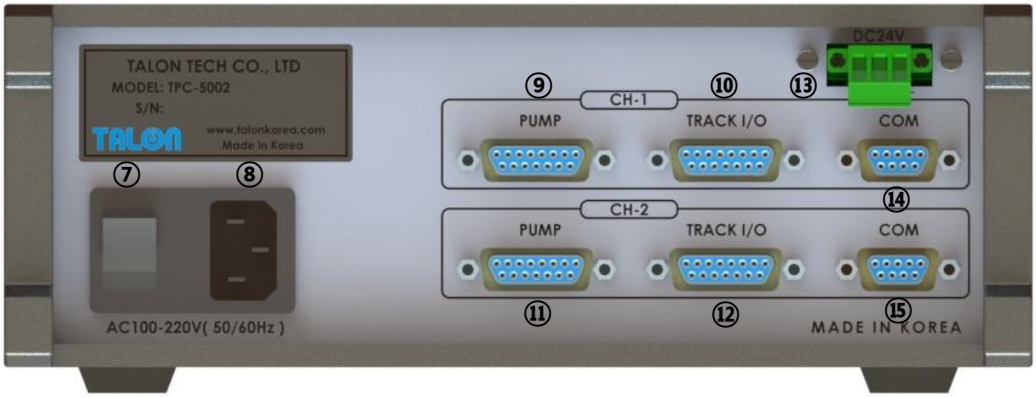
⑥ Pump Connector

- Pump to Controller. Connector for Pump Operation. (D-SUB 15P Female)

3-2 Controller Exterior Names



[TPC-5002 Front]



[TPC-5002 Rear]

3-2-1 Controller Name Explanation

① **CH-1 In Sol S/W**

- After CH-1 Pump Dispense, LED Lamp Switch for Reload Operation Condition.

② **CH-1 Out Sol S/W**

- After CH-1 Manual Purge, Suck-Back Valve On-Switch.

③ **CH-2 In Sol S/W**

- After CH-2 Pump Dispense, LED Lamp Switch for Reload Operation Condition.

④ **CH-2 Out Sol S/W**

- On CH-2 Manual Purge, Suck-Back Valve On-Switch.

⑤ **CH-1 Power S/W**

- CH-1 Power On / Off Switch.

⑥ **CH-2 Power S/W**

- CH-2 Power On / Off Switch.

⑦ **Controller Main S/W**

- Main Power Switch for controller.

⑧ **Main AC-IN**

- AC100~220V (50 / 60Hz) Power Connector.

⑨ **CH-1 Pump Connector**

- CH-1 Pump Connector. (D-SUB 15P Female)

⑩ **CH-1 Track I/O Connector**

- CH-1 Track I/O Connector. (D-SUB 15P Female)

⑪ **CH-2 Pump Connector**

- CH-2 Pump Connector. (D-SUB 15P Female)

⑫ **CH-2 Track I/O Connector**

- CH-2 Track I/O Connector. (D-SUB 15P Female)

⑬ **DC 24V Connector**

- Touch Pad Power Connector.

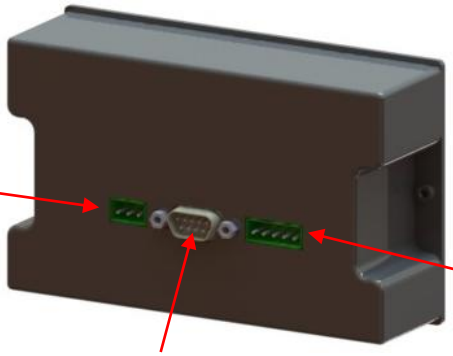
⑭ **COM In Connector**

- Touch Pad RS-422 Communication In Connector. (D-SUB 9P Female)

⑮ **COM Out Connector**

- Touch Pad RS-433 Communication Out Connector. (D-SUB 9P Female)

3-3 Touch Pad Exterior Names



3-3-1 Touch Pad Name Explanation

① **Touch Panel**

- Touching area

② **Power In**

- Touch Pad Power DC12~24V Connector.

③ **Not Use**

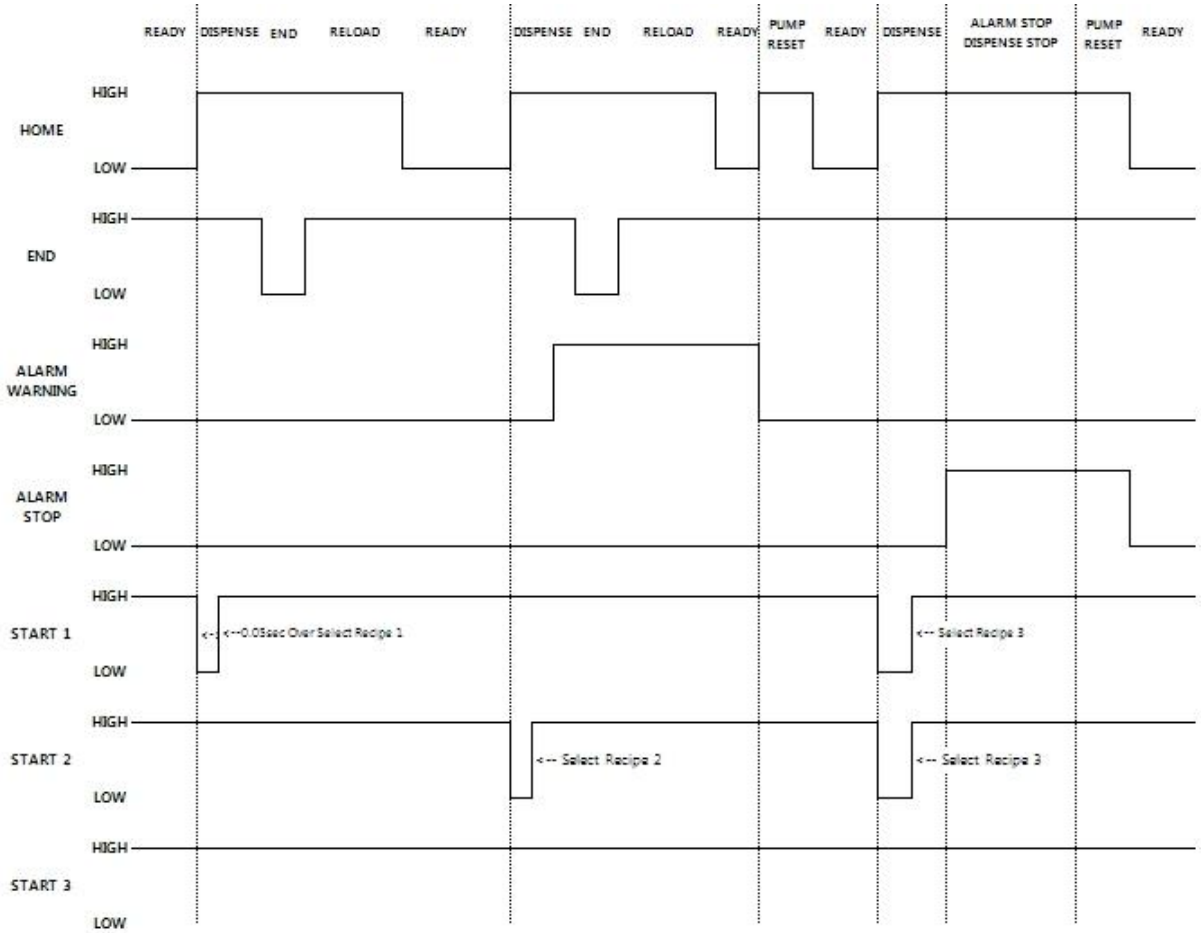
- No Use. (D-SUB 9P Male)

④ **Com Port**

- Touch Pad RS-422 Communication Connector.

4 Track / Auxiliary Interface

4-1 Track Interface Signal

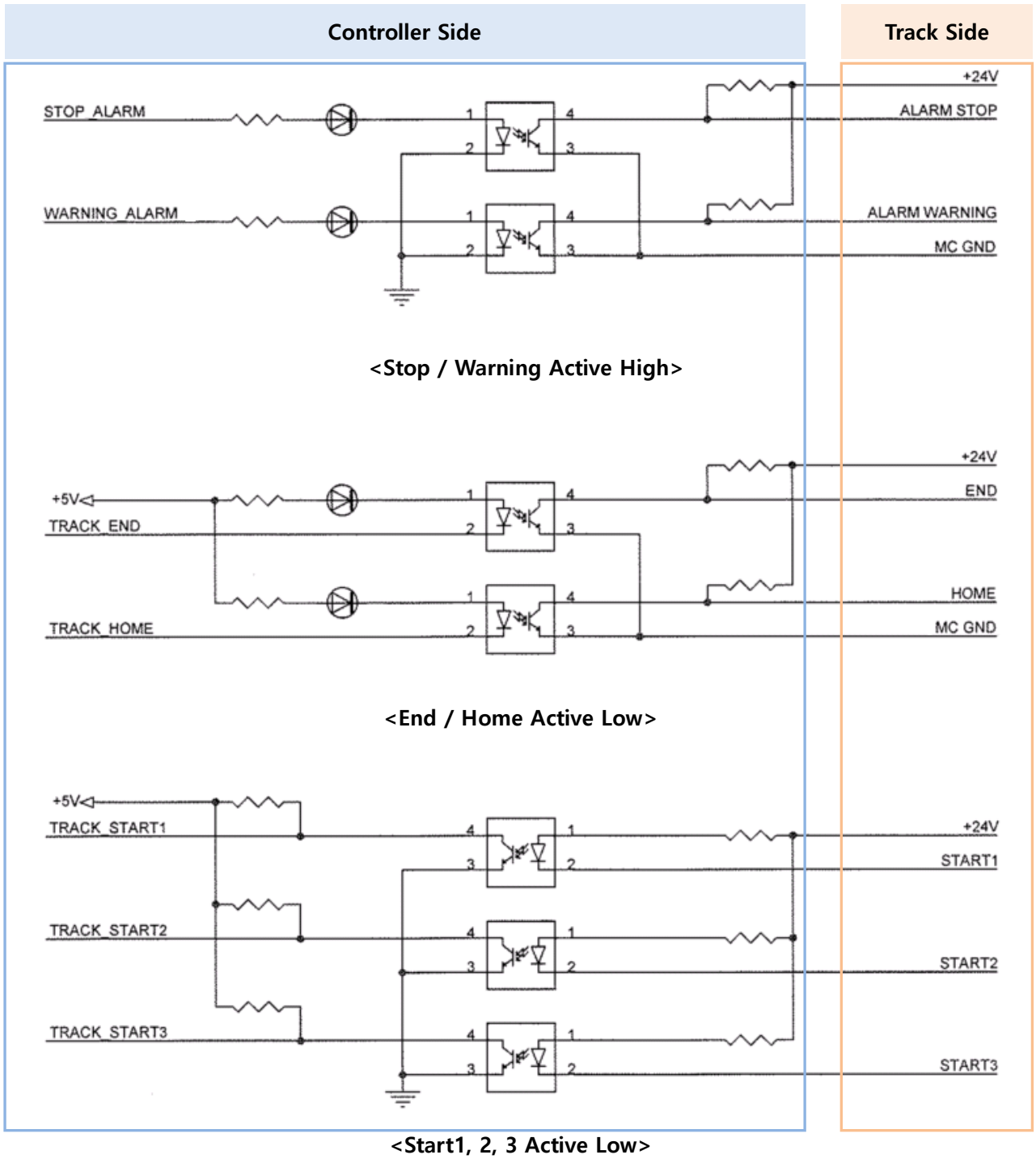


Recipe Select START			Active Recipe
1	2	3	
Low	High	High	1
High	Low	High	2
Low	Low	High	3
Low	High	Low	5
High	Low	Low	6
Low	Low	Low	7

[Recipe Select Table]

It is Timing Chart. On Ready condition, when Start Signal becomes active, each signal is same as the chart. When Stop Alarm occurs, all stop even during dispensing. But, the warning alarm does dispense. The alarm becomes clear by reset after pump clear.

4-2 Track Interface Wiring



4-3 Cable Pin Assign

Pin Number	Pump Cable(D-SUB 15P)	
	Controller	Pump
1	+5V	1 : 1
2	PUMP_CW	1 : 1
3	PUMP_CCW	1 : 1
4	+24V	1 : 1
5	E_HOME_SIGNAL	1 : 1
6	E_END_SIGNAL	1 : 1
7	E_MOTOR_ALARM	1 : 1
8	E_MOTOR_INPOSITION	1 : 1
9	GND	1 : 1
10	GND	1 : 1
11	Not Use	1 : 1
12	EX_IN_SOL V/V +24V	Sol V/V Connector share
13	E_SUCK_BACK_SOL_V/V +24V	1 : 1
14	EX_IN_SOL V/V -24V	Sol V/V Connector share
15	E_SUCK_BACK_SOL_V/V -24V	1 : 1

Pin Number	Track Cable(D-SUB 15P)	N2 Type	Connecting Way
	Controller	Track (ACT-12)	Track (ACT-12)
1	N.C	Not Use	Alarm is only for Stop. After disconnecting EXT High 5, link NO/COM with EXT 2P cable. Dispense Trigger links Suck-Back V/V Cable from the system after checking (+, -).
2	COM	EXT High 5 (link after disconnect)	
3	N.O	EXT High 5 (link after disconnect)	
4	START 3	Not Use	
5	START 1	Dispense Trigger (-) 2P	
6	START 2	Not Use	
7	IN SOL	Not Use	
8	ALARM STOP	Not Use	
9	ALARM WARNING	Not Use	
10	HOME	Not Use	
11	END	Not Use	
12	OUT SOL	Not Use	
13	+24V	Not Use	
14	+24V	Dispense Trigger (+24) 2P	
15	MC GND	Not Use	

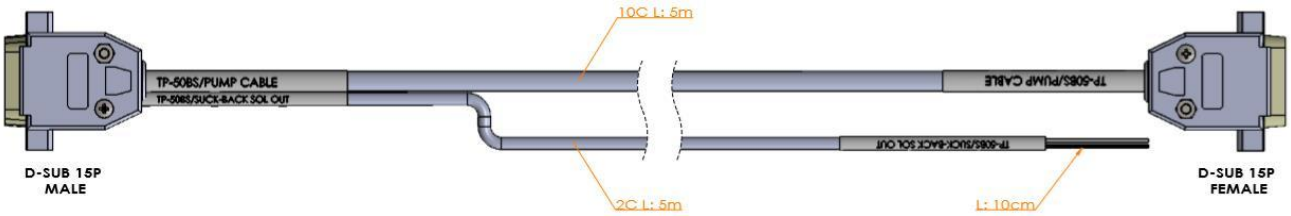
Pin Number	Track Cable(D-SUB 15P) Controller	Encompass Type Track (ACT-12) Horose 20P	Connecting Way
1	Not Use	X	Pump I/O Board ↓ Pump I/O CONN Board ↓ I/F Board ↓ CN3, 4, 6, 7 ↓ **J164~167(Track1~4)** **(Refer to Electric Diagram)**
2	Not Use	X	
3	Not Use	X	
4	Not Use	X	
5	START 1	18	
6	START 2	17	
7	OUT SOL V/V	6 => Jump to END 7	
8	ALARM STOP	5	
9	ALARM WARNING	4	
10	HOME	3	
11	END	7 => Jump from 6	
12	IN SOL V/V	8	
13	+24V JUMP	2	
14	+24V JUMP		
15	GND	20	

Division	Pin Number	Touch Pad Cable(D-SUB 9P)		Controller to Controller Cable	
		COM-IN	Touch Pad	COM-IN	COM-OUT
RS422	1	Not Use	1:1 Cable	Not Use	1:1 Cable
	2	Not Use		Not Use	
	3	Not Use		Not Use	
	4	TX+		TX+	
	5	TX-		TX-	
	6	RX+		RX+	
	7	RX-		RX-	
	8	Not Use		Not Use	
	9	Not Use		Not Use	
3P Connector	1	+24	+24	Not Use	
	2	Not Use	Not Use	Not Use	
	3	GND	GND	Not Use	

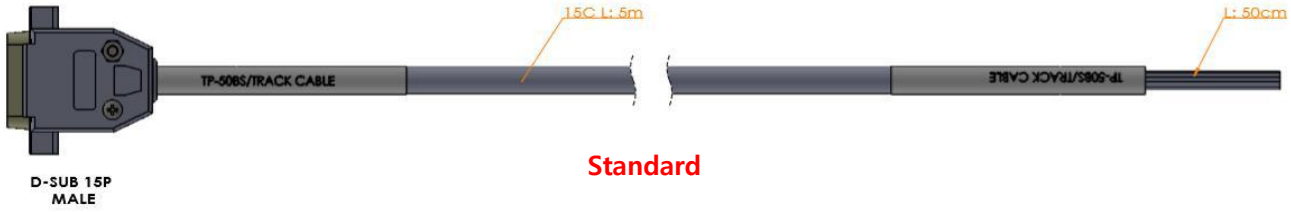
[New Type Controller Touch Pad]

5 External Cable Length

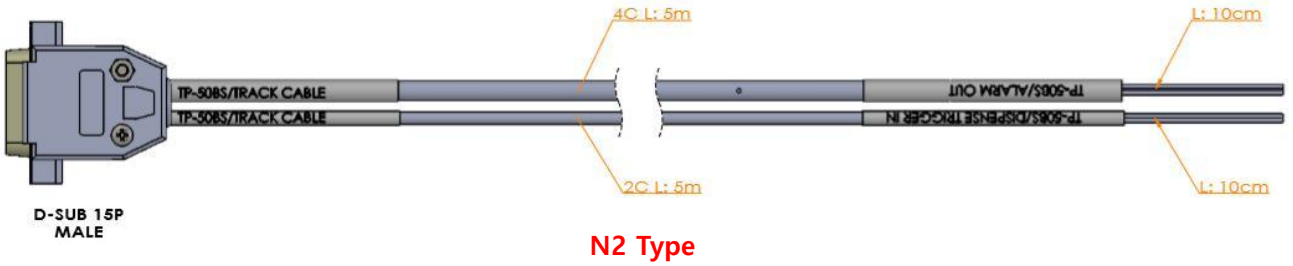
5-1 Pump Cable



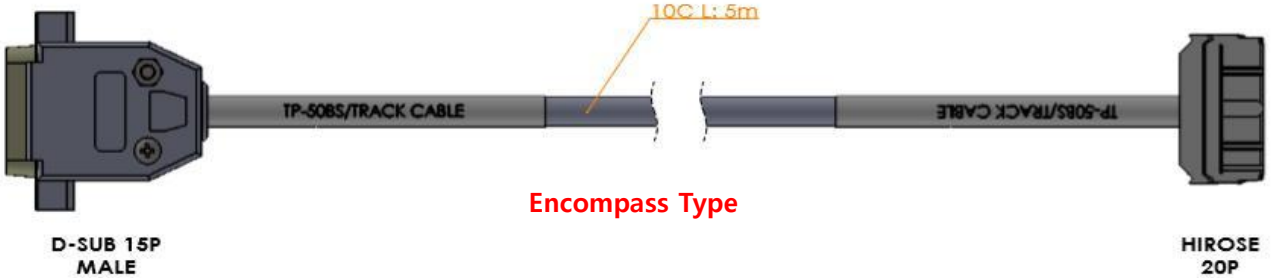
5-2 Track Cable



Standard

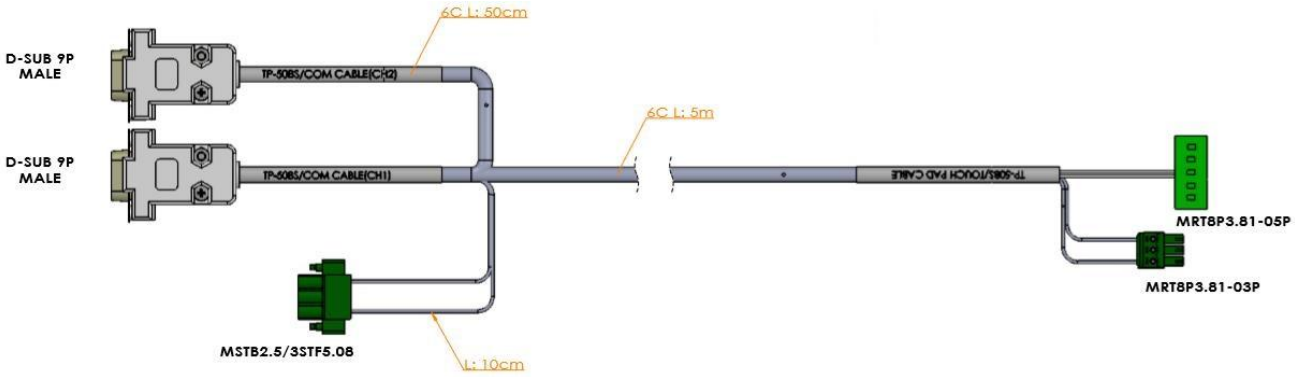


N2 Type



Encompass Type

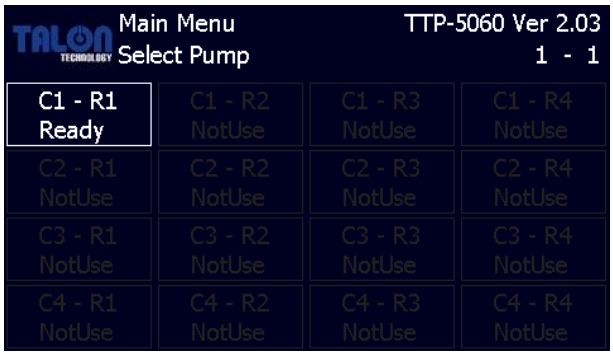
5-3 Touch Pad Cable



6 Touch Pad Operation

6-1 Operation

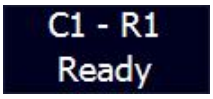
6-1-1 Initial Screen



The pumps' ID, which are cable-connected to touch pad, are auto-searched every 20 sec. On every lower menu, if there isn't any input for 1 min, the initial screen is back. The pump, which is not searched, cannot be chosen.

6-1-2 Pump Condition Indicate In Use

<Dispense>



<Ready>

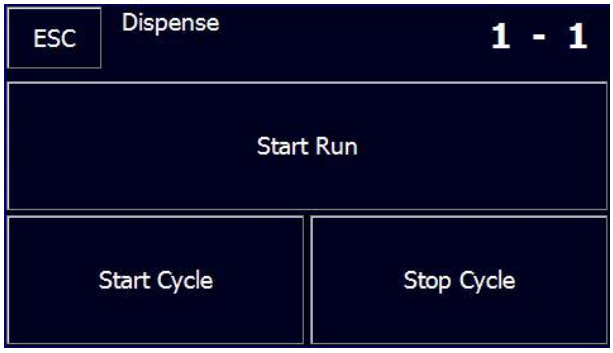
<Not Connect>

6-1-3 Select Function

When ID is chosen, the above screen is shown.

ESC	-	Go to the previous menu.
Dispense	-	Dispense by touching the pad.
Recipe	-	Run Recipe & Dispense Recipe Setting.
Degas	-	Degas Count, Manual Degas, Empty Sensor Setting.
Config	-	Pump Mode, Reset, Error & ID Setting.
Calibration	-	Each recipe's calibration setting.
Purge	-	Not Use.

6-1-4 Dispense



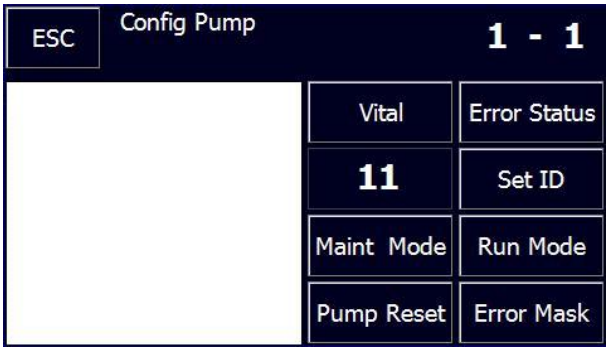
On executing Start Run, Run Recipe runs one time dispense. In case of Start Cycle, Cycle Recipe (4th Recipe) works as many as set counts.

6-1-5 Recipe Setting

For Recipe Setting, touch # under No. and input recipe # that you want to go in and touch 'Ent'. At this time, Recipe Data is automatically shown on the screen. And you can input the data that you want and touch 'set' button for setting. 'Count' is only for 4th recipe(cycle recipe). Total recipes are 1~7. Recipes are automatically chosen by each trigger signal.

However, 4th recipe is for cycle recipe and which works only by Start Cycle of Dispense on touch pad. Run Recipe No. is Recipe No. used by Start Run under Dispense menu.

6-1-6 Configuration of Pump



On Config Pump, the password needs for the important items' set.

Vital	-	Check pump's response and in case of response, 'vital' window activates and disappears right away. At the left window, the response data is shown.
Error Status	-	Shown Error Code Data.
Set ID	-	Change Pump ID. [Discuss with Talon Tech]
Maint Mode	-	Change Pump Mode to Maint.
Run Mode	-	Change Pump Mode to Run
Pump Reset	-	Reset Pump. It means Pump Restart, not Data Reset.
Error Mark	-	Stop Error Setting. [Discuss with Talon Tech]

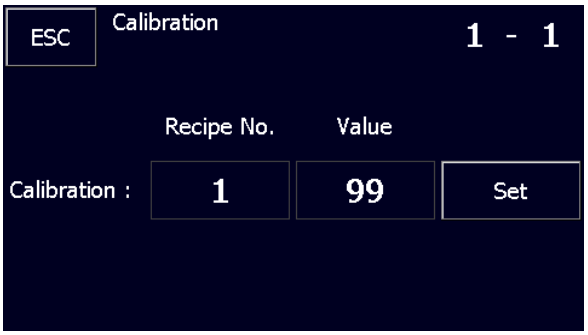
6-1-6-1 ID Setting

ID changes without any discussion could make the controller error. It is much better to ask Talon Tech.

6-1-6-2 Maint Mode, Run Mode, Pump Reset Setting

Main Mode is to show the message of pump operation on the text window. Run Mode only shows as data code. The setting method is to touch Maint Mode, Run Mode button and input password and touch 'Ent'. In case of no response from pump, message of mode keeps showing. Pump reset works right after input password. It goes to the initial screen same as power off and on. It takes about 20sec.

6-1-7 Calibration



Calibration – Per each Recipe, it is possible to set the calibration value. If there is the differences between the real value and the setting value, set the calibration value higher or lower % at the standard- 100.

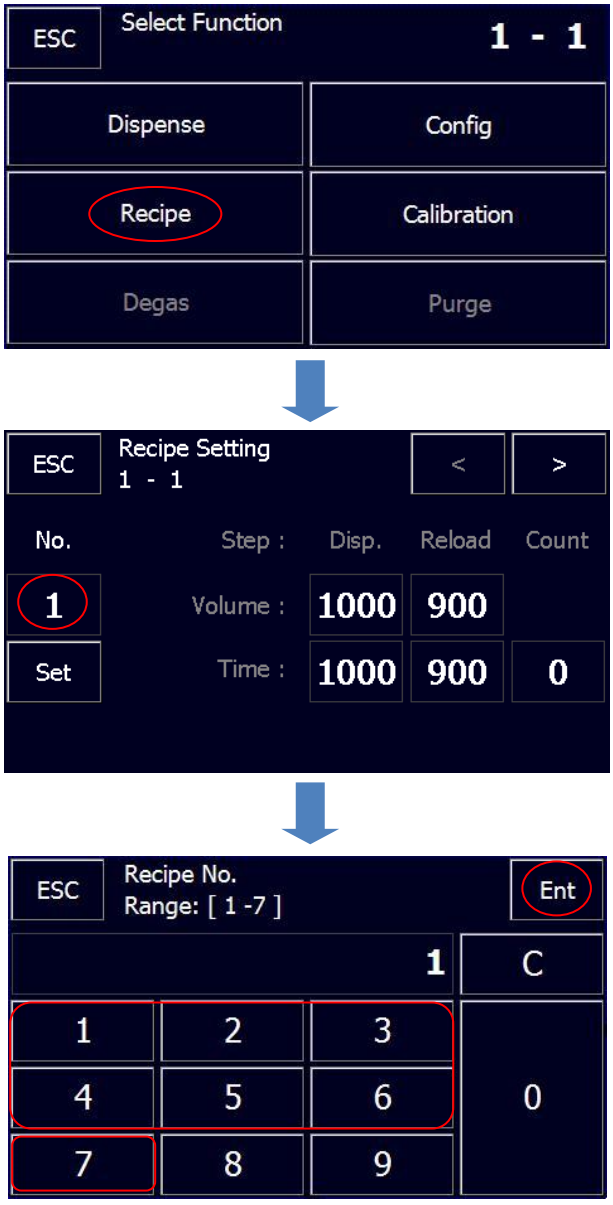
6-2 Example

6-2-1 Dispense Test

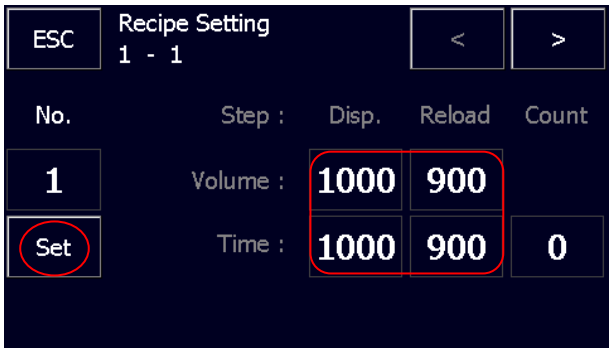
If you want to dispense one time, use Start Run. This recipe is Run recipe which set on Recipe menu. Start Cycle below is 4th Recipe.

Stop Cycle only works the case of using Start Cycle. Keep touching Stop Cycle button.

6-2-2 Recipe Setting

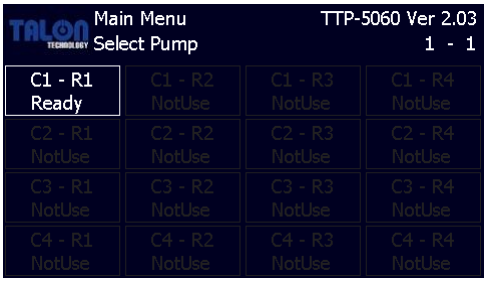


Choose the recipe # and touch 'Ent' button. The chosen recipe data is automatically read from the pump.



Set the recipe's volume & time and touch 'Set' button.

6-3 Cycle Purge Method



[PIC 1]

1. Choose the pump nozzle for the cycle purge.
 - Pump condition is same as Ready of [PIC 1].

* On Busy condition, Cycle Start cannot be done on the screen.

[PIC 2]

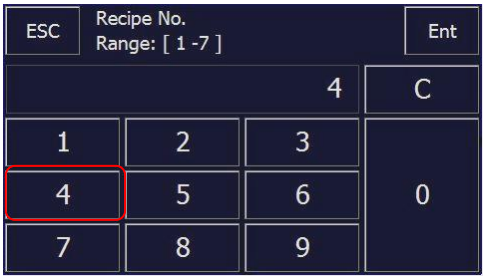
2. Under Select Function, touch Recipe button.
 - Move to [PIC 3] and automatically, No.1 Recipe Data is shown.

* In case of no read Data, Recipe window cannot disappear.

[PIC 3]

3. Touch # under no. to read Cycle Recipe.

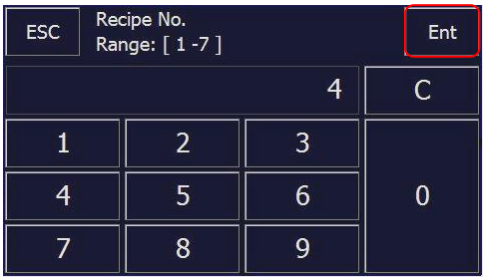
* Dispense Recipe can be changed on this menu. So, watch out.



[PIC 4]

4. Touch #4.
 - Each # means Recipe Number.

* Run Recipe : 1 or 2, Cycle Recipe : 4.



[PIC 5]

5. Touch Ent button.
 - When touch Ent button, the related Recipe shows automatically.

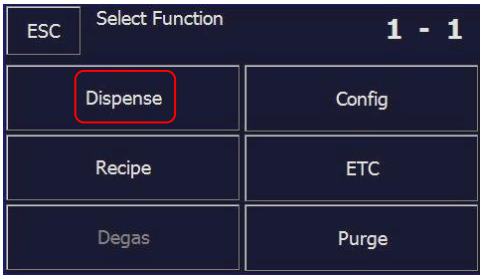
* In case of no read Data, Recipe window cannot disappear.

[PIC 6]

6. Input Recipe Data to be changed.
 - Count means Dispense #.
 - In case of Count #10 and Start Cycle on Dispense menu, Recipe #4 executes 10 times of Dispense.
 - Reload Volume inputs same as Disp. Volume automatically.

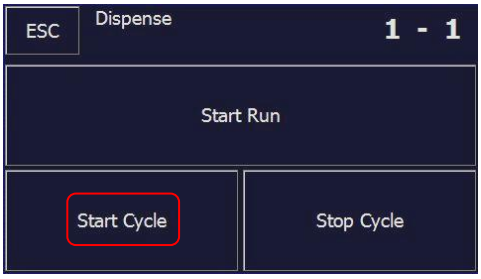
[PIC 7]

7. Touch Set button.
 - When touch Set button, the related Recipe Data stores on Pump.
8. Touch ESC button.



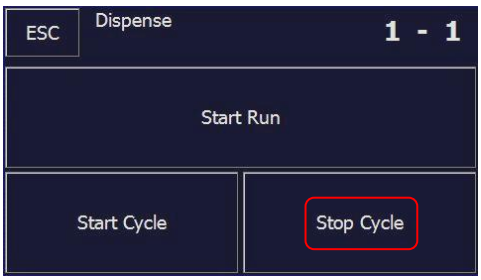
[PIC 8]

9. Touch Dispense button under Select Function.



[PIC 9]

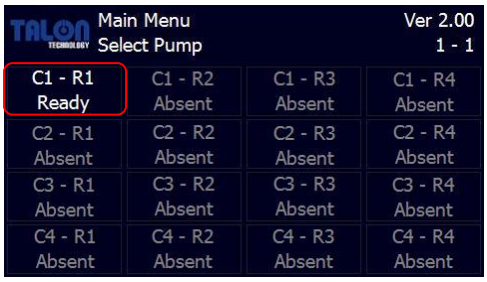
10. Touch Start Cycle button.
 - #4 Recipe (Cycle Recipe), which input on [PIC 6], [PIC 7], executes as many as Dispense counts.



[PIC 10]

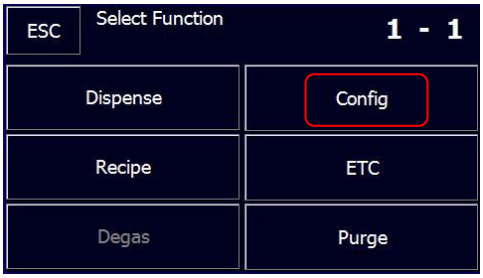
11. Touch Stop Cycle for a forced Dispense finish.
 - In case **'Stop Cycle..Busy'** window shows, keep touching Stop Cycle button until disappear.

6-4 Reset on Pump Error



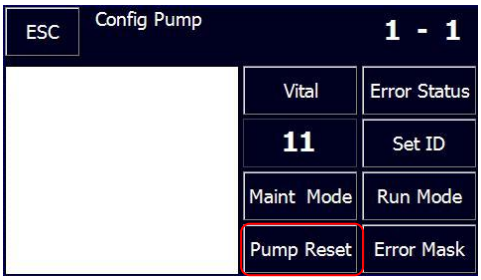
[PIC 1]

1. Choose the alarmed pump.
   Check the errored pump before Pump Reset.
   When the alarm occurs on the pump, you can check the alarm Thru the alarm LED beside Sub Panel and check the nozzle on the system's Panel.



[PIC 2]

2. Touch Config button on Select Function menu.

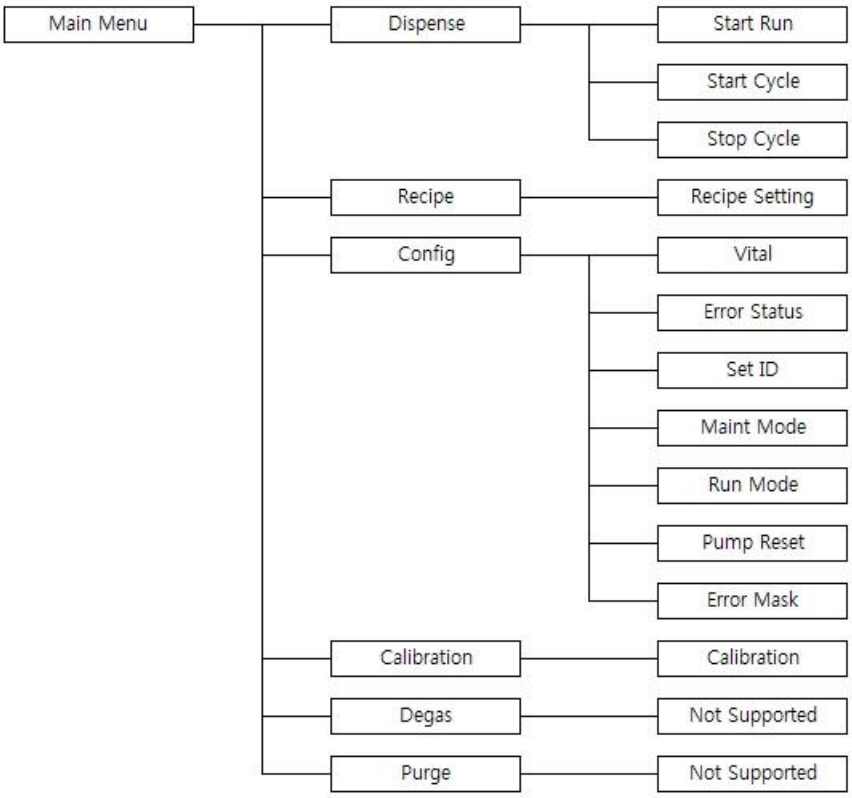


[PIC 3]

3. Touch OK button "Are you Sure?" window.
   - Right after touching OK, Reset progresses and Alarm is clear.
   - On left Text window, #0 means Initial finish.

* Reset makes the system occur the alarm.
Never use this function when the alarm doesn't happen.

6-5 Touch Pad Menu Tree



6-6 Notice

6-6-1 Dispense Cycle

During the system or the manual dispense, the pump doesn't save Recipe changes and setting changes. At this time, 'Busy' window is shown normally.

6-6-2 Pump ID Setting

The basic ID is '11'. If pump & touch pad is set in the first time, connect pump & touch pad as 1:1 not to double ID. ex) Pump1 : [11], Pump2 : [12], Pump3 : [13], Pump4 : [14], Pump5 : [21]. Otherwise, pump cannot be searched or although pump is searched, the setting data are overlapped or Data Error / System Error occur. Before setting Pump ID, check that ID is valid or not.

6-6-3 Recipe Setting

In case Recipe is not set properly, there is "Write Recipe Error" window.

But, this window is shown in only case each total dispense volume is not same as reload volume. Other cases are applied as normal. So, be careful for "Dispense Time" setting.

6-7 Notice on Pump Operation

1. During Pump is under process (RUN OR CYCLE) don't try to modify the data.

(Please do it after Pump had stop properly)

▶ In this term of "modify data" means changing recipe, cycle, CAL value etc. If you modified the data during pump operation, BUSY screen will be pop-up and it will be not saved.

▶ Screen moving in touch pad is OK.

▶ **In case of Encompass Type, when Key pad / Touch Pad dispenses, the pump works normally even Warning Alarm occurs. After Pump operation stops, Alarm Auto Clear.**
(If the alarm happens during Data modification, the old data is back up.)

2. For Pump Recipe Setting, Recipe 1 and 4 are applied same.

▶ Dispense Volume => set the volume range between 100(1cc) ~ 1000(10cc)

▶ Reason : For protect the pump , upper limit alarm set.

▶ Dispense Time => It should be bigger than Dispense Volume. It should be smaller than system recipe step time.

▶ Reason : As using the high cp PR , sudden pump operation could have the motor damaged and could cause the MICRO BUBBLE.

▶ Reload Time => depend on PR cp.

▶ Typically, high cp PR case, adjust 3~8 times reload time than dispense volume.

900 ~ **2400**

ex) **Dispense** **Reload**

Vol[300] Time[500] **Vol[300] Time[900]**

▶ **This would be main reason of bubble issues. So please watch out for this.**

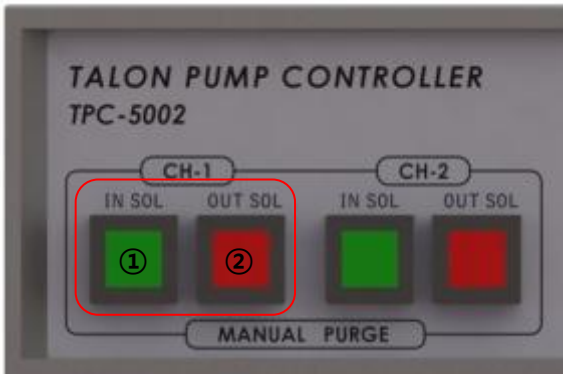
3. Please do not impact to any of pump welding joint or others.

4. Please do not impact to Buffer Tank.

7 Maintenance

7-1 Manual Purge Method

[PIC 1]

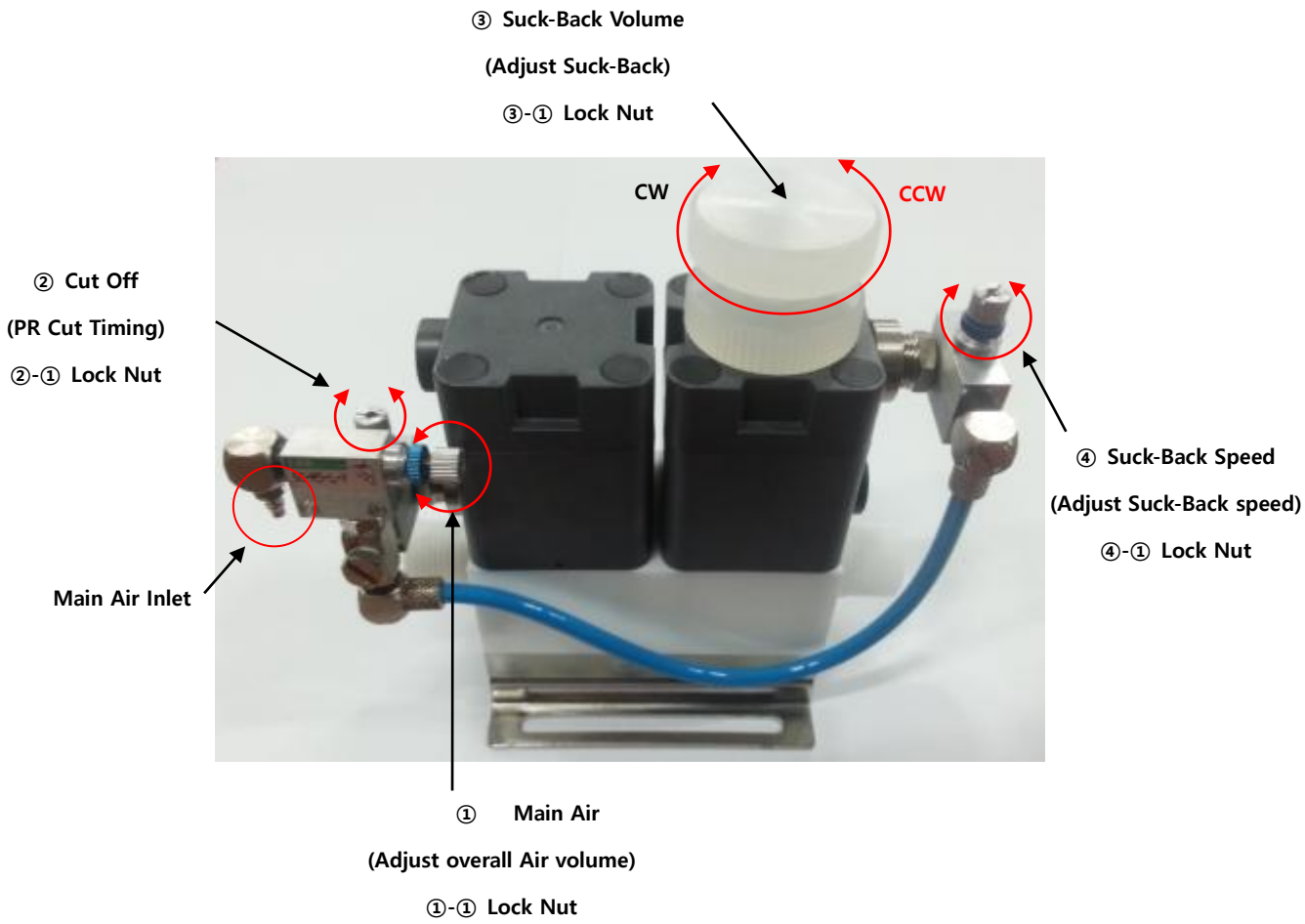


[PIC 2]

In order to purge, press N2 into PR bottle as per [PIC 1] and push ② (OUT SOL) Button of Manual Purge S/W as per [PIC 2] to open Suck Back Valve.

After Purge finishes, push ② (OUT SOL) Button of Manual Purge S/W to close Suck Back Valve and stop N2 pressure into PR Bottle.

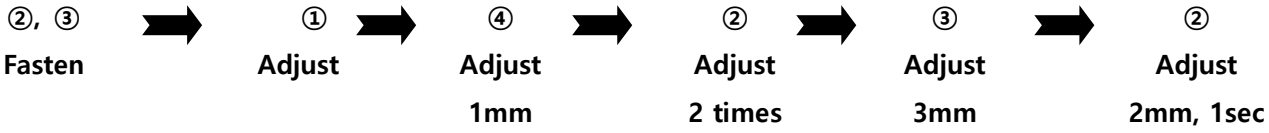
7-2 Suck-Back Setting



1. Un-fasten Lock Nut②-①, ③-① and fasten the knob ②, ③ make it close perfectly.
2. Once Dispense signal is on, un-fasten lock-nut①-① to dispense PR and adjust speed control knob①
   (Want to delay dispense timing rotate the knob to CW, want to make quick dispense rotate CCW)
3. Once Dispense signal going "Off" please un-fasten Lock nut④-① for consume the liquid just 1mm ahead of nozzle, rotate speed control knob④ and adjust.
4. Un-fasten Lock Nut②-① and close speed control knob②, rotate 2 times toward CCW.
5. Un-fasten Lock Nut③-① and rotate the suck-back control knob③, resist in nozzle will move up and down. Please make resist place about 3mm from nozzle tip.
   ((Increase Suck-Back flow, turn CW, decrease suck-back flow, turn CCW)
6. Un-fasten Lock Nut②-① and after 1 sec open the operate suck-back, make the suck-back about 2mm in 1 sec to rotate the speed control knob②.
7. If Suck-Back Speed ④ is too fast, turn it CW, too slow, turn it CCW.

8. Fasten every knob's lock nut. (①-①, ②-①, ③-①, ④-①)
9. Dispense resist again to final check.
10. If value is not correct, go back to order NO.3.

- **REFERENCES FOR WORKING SEQUENCE**



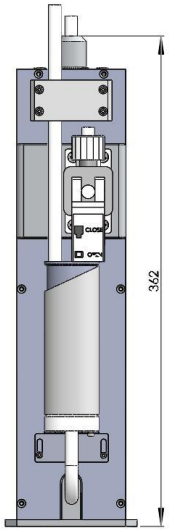
8 Recommended Spares / Mechanical Dimensions

8-1 TP-50BS Spare Parts

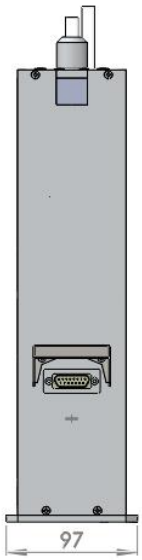
Division	Part NO.	Description	Qty
Pump	TL-50BS-TA-001	Buffer Tank Ass'y	1
	TL-50BS-MA-001	Ball Screw	1
	TL-50BS-MA-002	Coupling	1
	TL-50BS-MA-003	LM Guide	1
	TL-50BS-MA-004	Support Unit	1
	TL-50BS-EA-001	Sensor	2
	TL-50BS-EB-004	Motor	1
	TL-50BS-ET-001	O-Ring	1
	TL-50BS-CA-005	Toggle Valve	1
Controller	TL-50BS-EB-005	SMPS	1
	TL-50BS-EA-002	Push Switch (Green)	2
	TL-50BS-EA-003	Push Switch (Red)	2
	TL-50BS-EA-004	Fuse (5X20 5A)	1
	TL-50BS-EB-001	Controller Main Board Ass'y	1
Key Pad	TL-50BS-EB-002	Key Pad Ass'y	1
Touch Pad	TL-50BS-EB-003	Touch Pad Ass'y	1
Set-up Part's	TL-50BS-CA-001	Sol Valve Ass'y	1
	TL-50BS-CA-002	Regulator	1
	TL-50BS-CA-003	Sol Valve +24VDC	1
	TL-50BS-CA-004	Suck-Back Valve Ass'y	1

8-2 Pump Dimensions

8-2-1 Front/Rear View

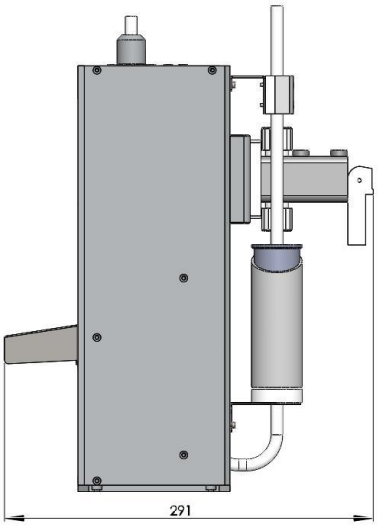


[Front View]



[Rear View]

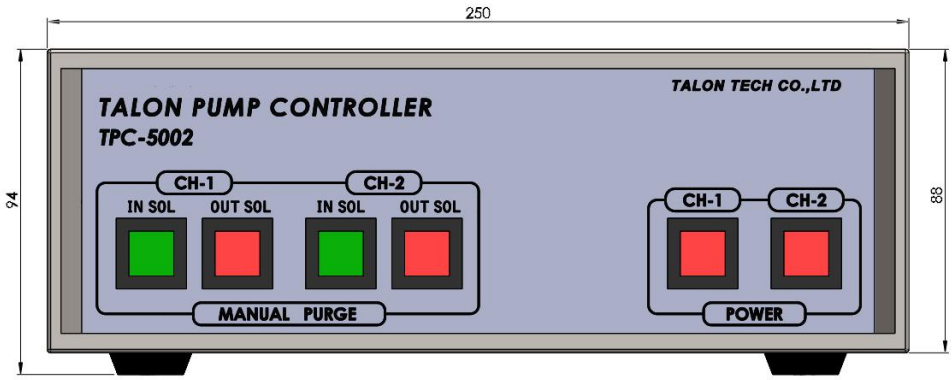
8-2-2 Side View



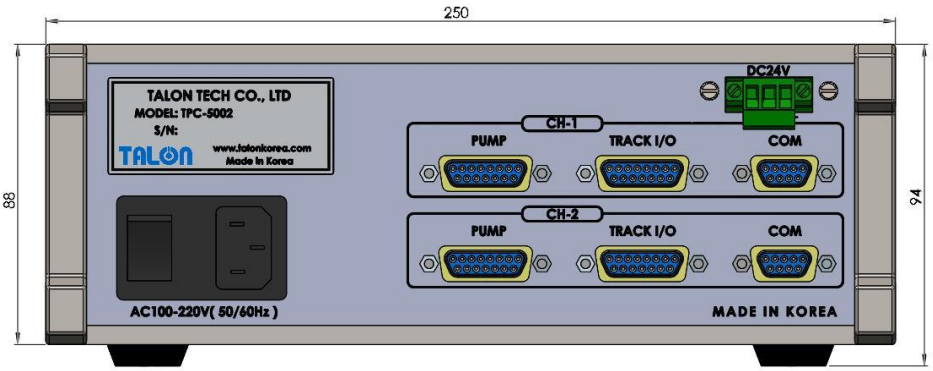
[Side View]

8-3 Controller Dimensions

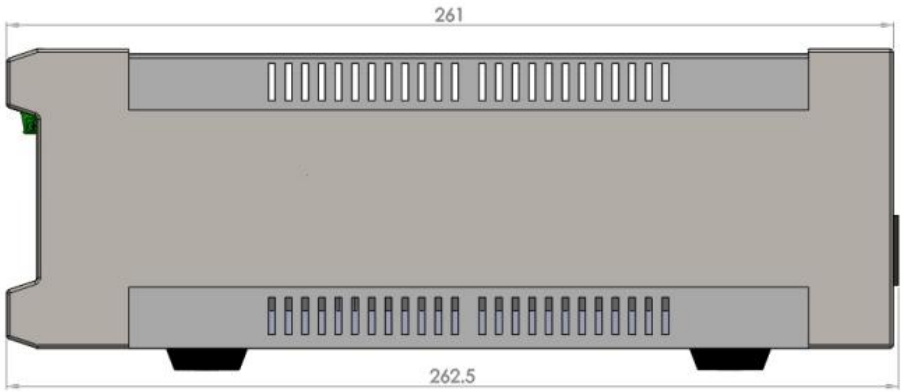
8-3-1 Front View



8-3-2 Rear View

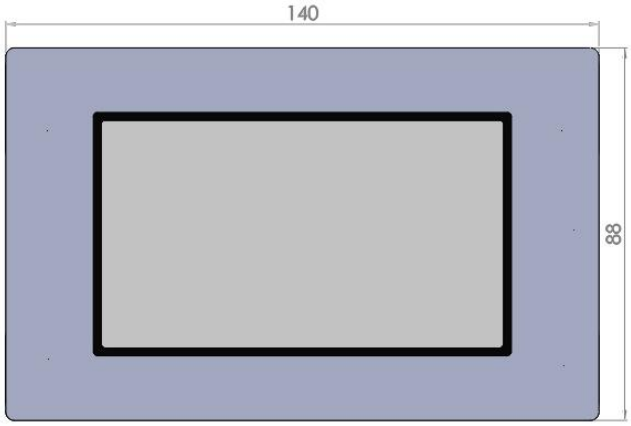


8-3-3 Side View

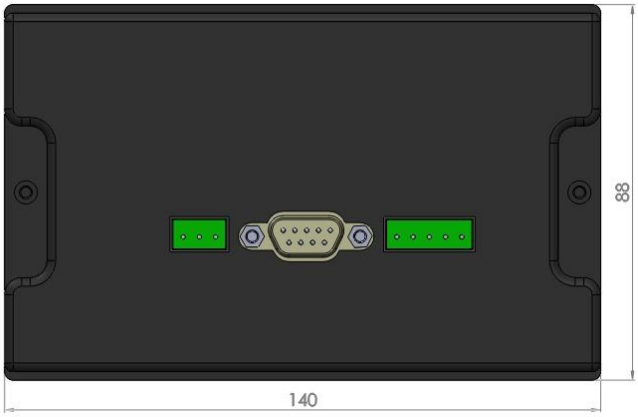


8-4 Touch Pad Dimensions

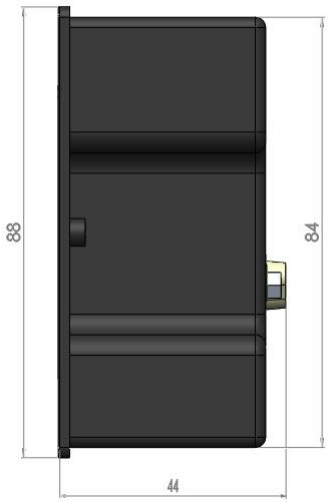
8-4-1 Front View



8-4-2 Rear View



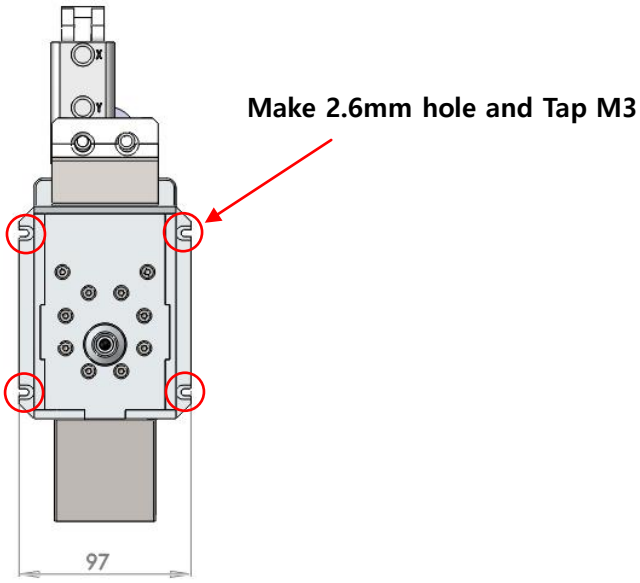
8-4-3 Side View



8-5 Installation Method

8-5-1 Pump Installation Sequence

1. Prepare the space for the pump installation.
2. As per the below picture, tighten the panel base plate with 4 pieces of M3 screw.



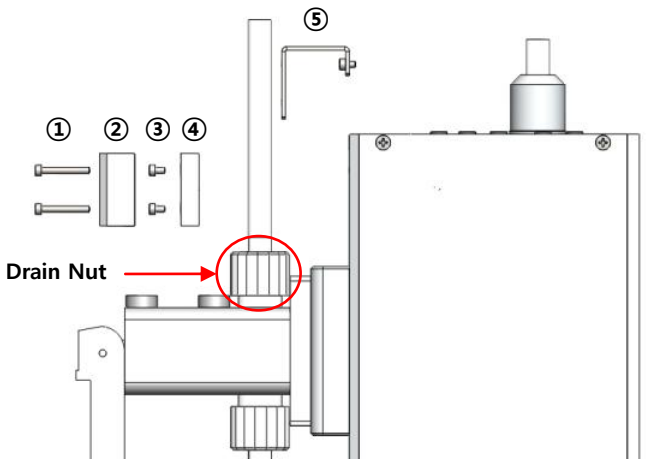
8-5-2 Piping Method

1. PR Tube Piping

1) Insert ⅜" union nuts on tube at PR In / Out / Vent areas.
2) Position between PR bottle and Pump max. closely.
3) At the vent area, insert ⅜" sleeve into tube after enlarging tube with the tube expansion tool and then tighten nut.

▶ **Detail connecting way for Drain**

1. Disassemble Tube tightening brackets,
   ①, ②, ③, ④, ⑤ in the order.
2. Disassemble Drain Valve Nut.
3. Insert Drain Nut onto ⅜" Tube.
4. Insert Sleeve into Tube by using ⅜" enlargement tool.
5. Tighten Nut of Drain Valve.
6. Assemble Tube tightening Bracket vice versa.

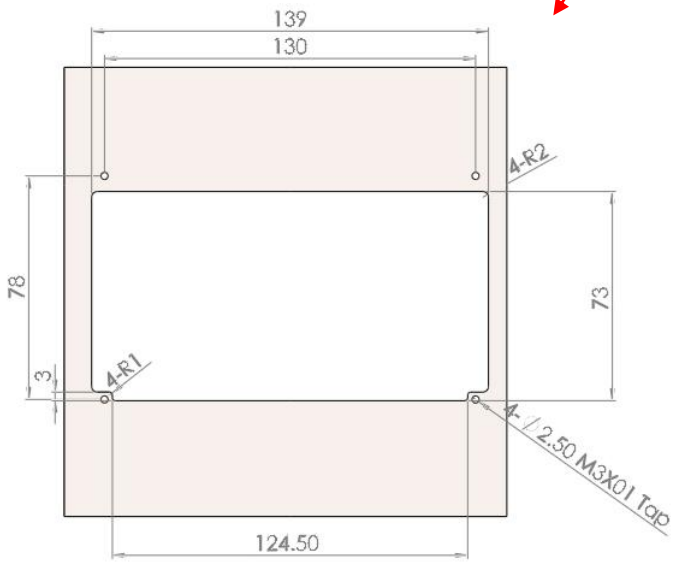


8-5-3 Touch Pad Installation Method

EX)

[PIC 1]

[PIC 2]



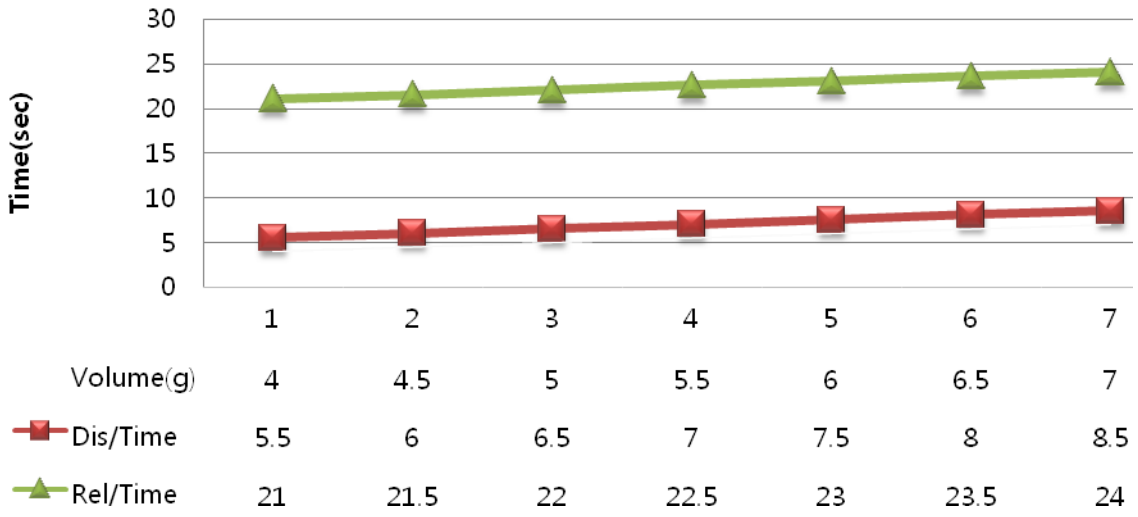
[PIC 3]

1. As per [PIC 1], peel the sticker a little until the screw is seen. And loose the screw to take the back cover apart.
2. Prepare the panel to make the square hole by matching [PIC 3].
3. As per [PIC 2], install the touch pad on the equipment.
4. The panel type can be changed up to the equipment's position.

8-5-4 Suggested Recipe Setting Value (PR viscosity: 1,800cP)

Volume(g)	Data Input	Dispense/Time	Data Input	Reload/Time	Data Input
4.0	400	5.5	550	21	2100
4.5	450	6.0	600	21.5	2150
5.0	500	6.5	650	22	2200
5.5	550	7.0	700	22.5	2250
6.0	600	7.5	750	23	2300
6.5	650	8.0	800	23.5	2350
7.0	700	8.5	850	24	2400

Suggested setting value as per time



Dispense time(D/T) formula : Volume(g)+1.5=D/T => ex) 5+1.5=6.5

Reload time formula : Volume(g)+16=R/T => ex) 5+17=22

※ The above data is based on 1,800cP. It is supposed to be changed upon cP.

<THE END>