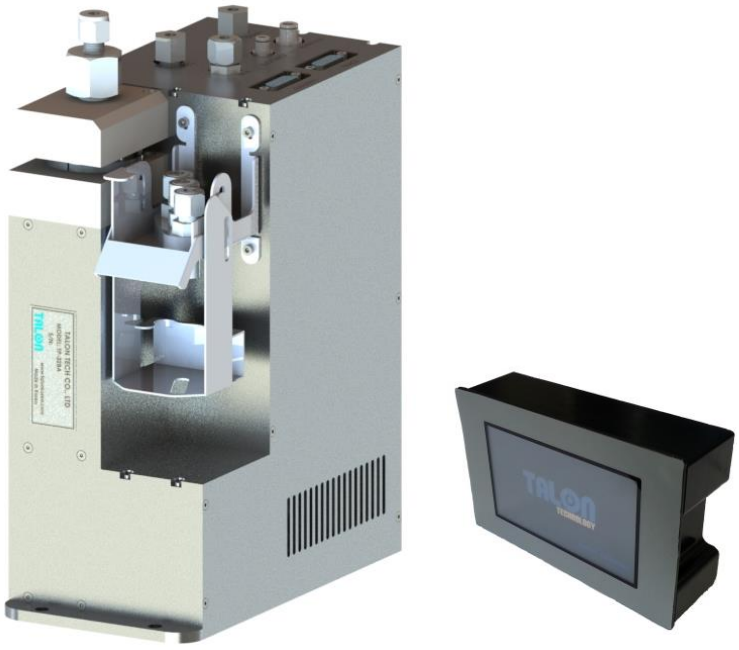
Excellent Dispense Volume Reliability **Pump & Controller – Built-in type**

PUMP MANUAL

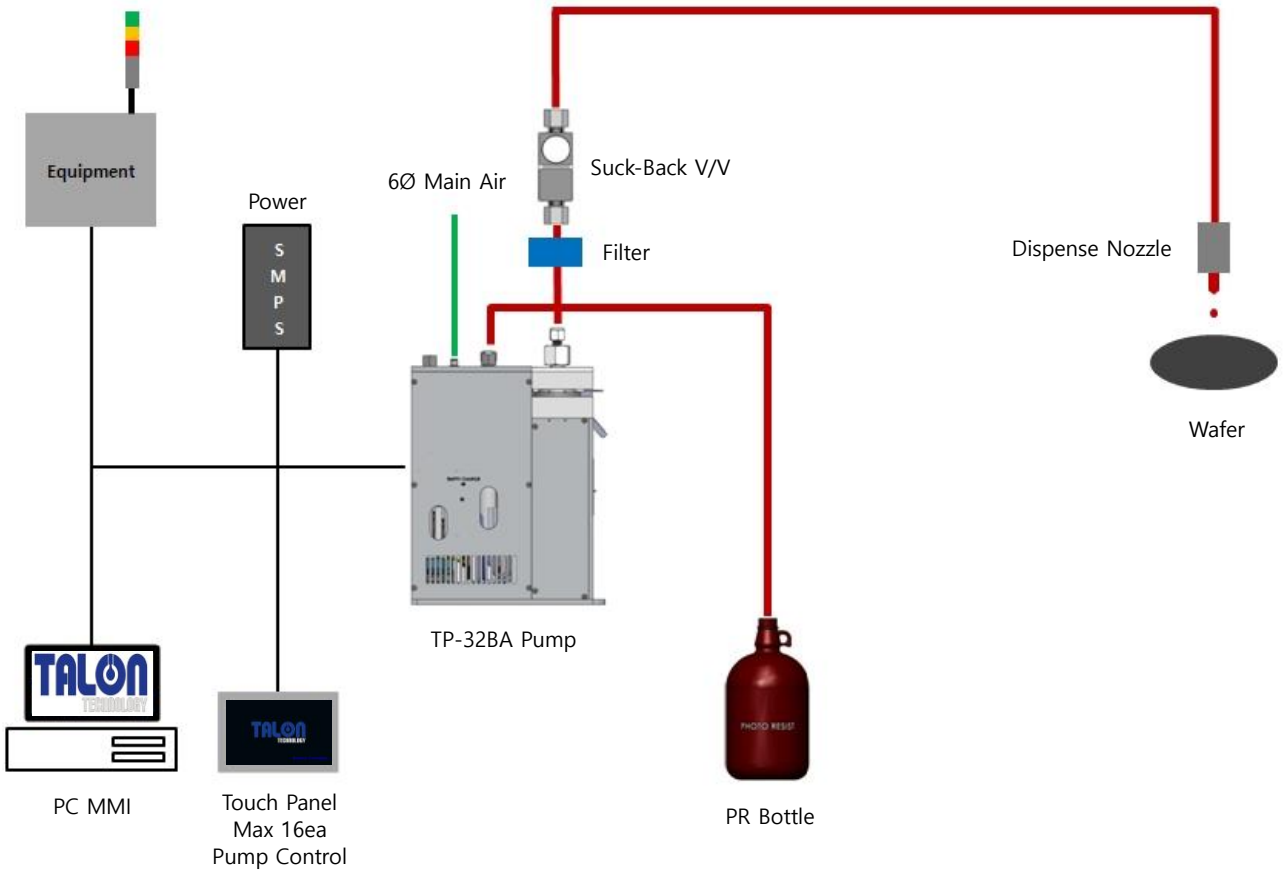
MODEL : TP-32BA



TALON TECH CO. LTD.

CONTENTS

1 System Configurations



TP-32BA 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-32BA 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 : Outer type Bellows / Ball screw equipped with serve motor.
3. Automatic bubble removal system / Automatic degasing function.
4. Touch pad has the same function of controller & it can control upto16 pumps.
5. Normal trigger signal.

2 System Specifications

2-1 Pump [TP-32BA]

ITEM	SPEC	REMARKS
Dispense Volume Range	0.5cc ~ 7.0cc	
Dispense / Reload Rate	0.1cc/sec ~ 7.0cc/sec	
Dispense Volume Resolution	0.0025cc	
Dispense Repeatability	≤±0.02(2.2cp, 23℃)	
Viscosity	Max : 150cp(with filter)	
Pump Driving Type	Servo Motor	
1-Cycle Step	4-Dispense Step Suck-Back Step Reload Step	
Motor Power Source	DC 24V (current consumption : 1A)	
Ambient Temperature	5 ~ 40 ℃	
Weight	6.46kg	
Pump Dimension	W : 120mm, L : 228mm, H : 325mm	

2-2 Controller

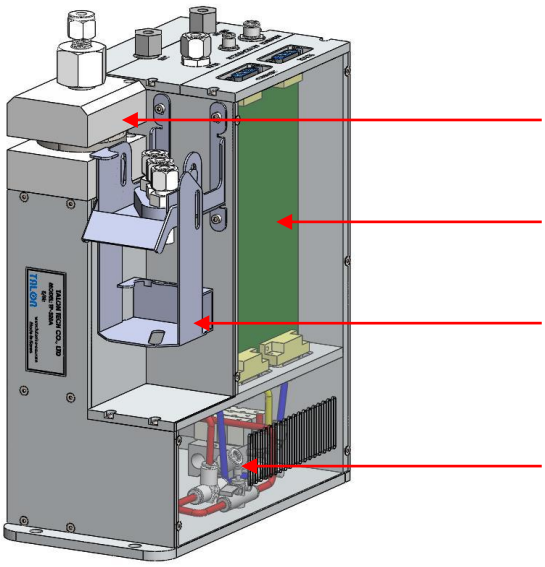
ITEM	SPEC	REMARKS
Power Source	DC 24V (current consumption : 1A)	Panel Use
Drive Pump No.	1 Pumps	
Pump Operation Mode	Fixed Mode	
Main CPU	80c296 (16bit Processor)	
Input Signal	1. Pump Driving Signal From Track M/C-Pump Start Signal (3ea) 2. Degas Pump Up/Down Signal 3. Degas Empty Signal 4. Motor In Position Signal	
Output Signal	1. Home Signal & Pump Operation Completion Signal To Track M/C. 2. Suck-Back V/V Controlled Sol V/V Signal 3. Alarm Signal for Pump Operation Error 4. Outside Communication (RS 232,422). 5. Vent/PR Inlet Sol V/V Signal	

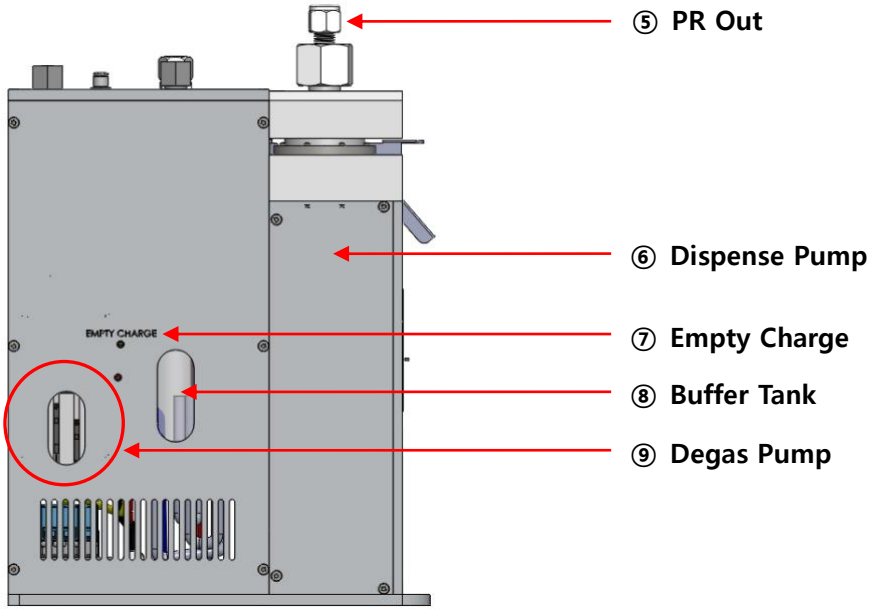
2-3 Touch Pad

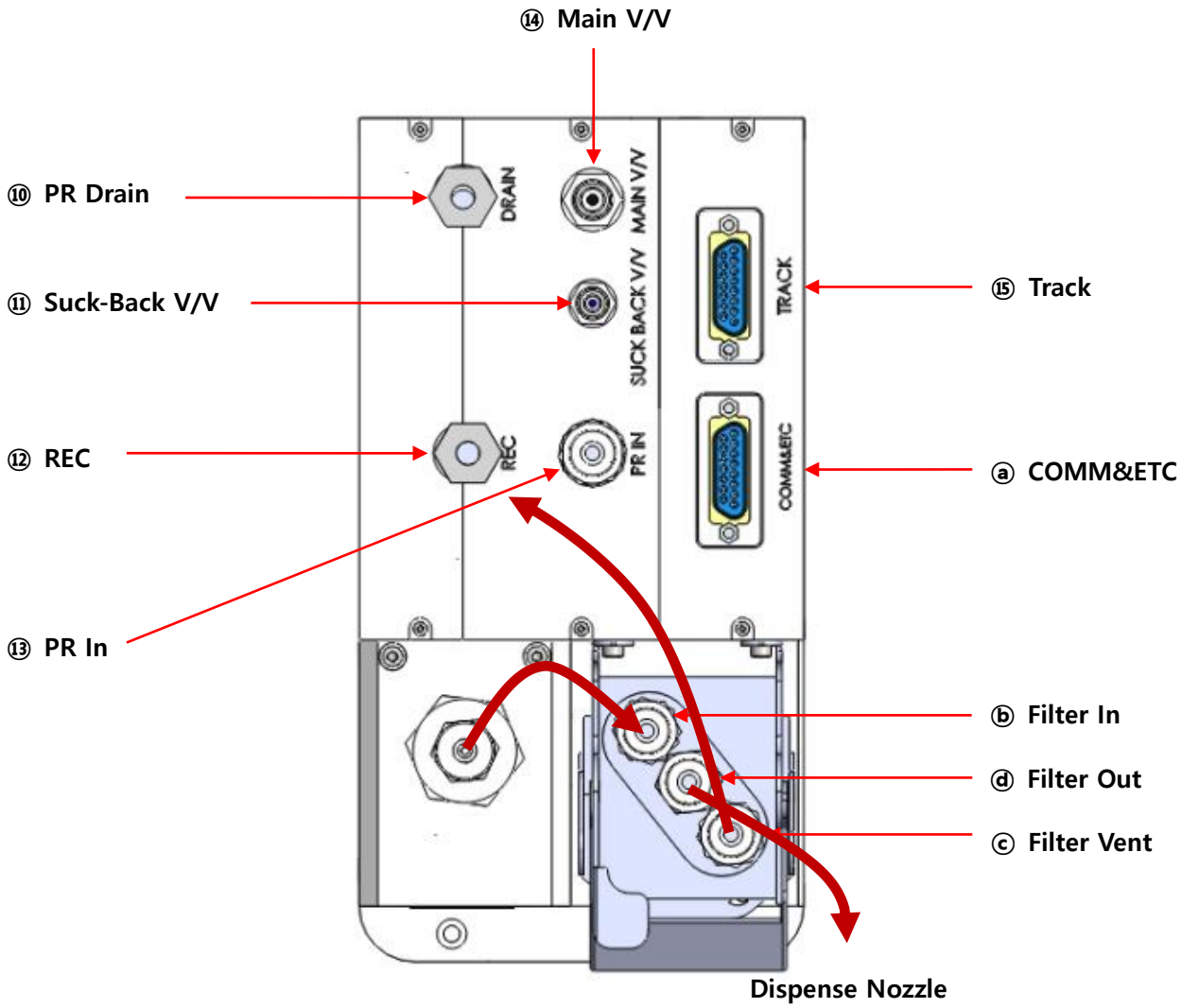
ITEM	SPEC	REMARKS
Main CPU	32Bit ARM920T	
Ram	64Mb (OS:32Mb/App:32Mb)	
Flash	NAND Flash 64Mb (OS:32Mb/App:32Mb)	
LCD Size	4.3 Inch TFT Wide (480*272)	
RTC Function Built-in	Exchangeable Coin Battery	
Max connect Pump	16 Pumps	
Communication	RS422	
Touch Pad Power	DC 12~24V, current consumption : 5W (400~700mA)	
Ambient Temperature	- 10 ~ 55C	
Weight	0.64kg	
Dimension	W : 140mm, L : 44mm, H : 88mm	

3 System In/Exterior Names

3-1 Pump In/Exterior Names







3-1-1 Pump Name Explanation

① **Cylinder**

- Function of containing PR and dispensed by bellows

② **Main Control Board**

- Main Control Board for all pump controls

③ **Filter Housing**

- Housing for Filter installation

④ **Air Sol Block Ass'y**

- Sol Block Ass'y for Degas Pump & Air V/V operation. (2 channel Sol Block)

⑤ **PR Out**

- Chemical Dispense. (¼ Inch Teflon)

⑥ **Dispense Pump**

- Pump for the accurate PR dispense

⑦ **Empty Charge**

- Auto Charge / Manual Charge on Buffer Tank Empty by Sensor

⑧ **Buffer Tank**

- Bubble removal and buffering function of about 30cc PR

⑨ **Degas Pump**

- Air Cylinder Type Pump for charging PR into Buffer Tank

⑩ **PR Drain**

- Drain for Bubble made by Chemical (¼ Inch Teflon)

⑪ **Suck-Back V/V**

- Air outlet to operate suck-back valve. (4Ø Air Tube)

⑫ **REC**

- Filter Vent Function : Send the recirculated Chemical to Buffer

⑬ **PR In**

- Chemical Supply. (¼ Inch Teflon)

⑭ **Main V/V**

- Main Air Supply to Degas Pump & Air Valve

⑮ **Track**

- Track cable connector from pump to machine. (D-SUB Male 15P)

ⓐ **COMM&ETC**

- Pump to Touch Pad Communication Cable Connector. (D-SUB Female 15P)

ⓑ **Filter In**

- Filter inlet: Chemical from 'PR Out' to 'Filter In'

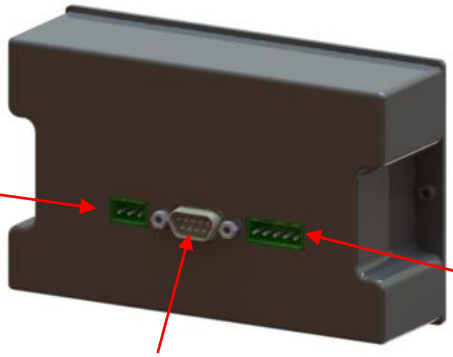
ⓒ **Filter Vent**

- Recirculate Bubble & Chemical to Buffer Tank thru Filter Vent

ⓓ **Filter Out**

- Chemical Outlet: Send PR from Filter Out to Dispense Nozzle

3-2 Touch Pad Exterior Names



3-2-1 Touch Pad Name Explanation

① **Touch Panel**

- Touching area

② **Power In**

- Touch Pad Power DC 12~24V Connector.

③ **Com Port**

- Touch Pad RS422 Communication Connector. (D-SUB 9P Male)

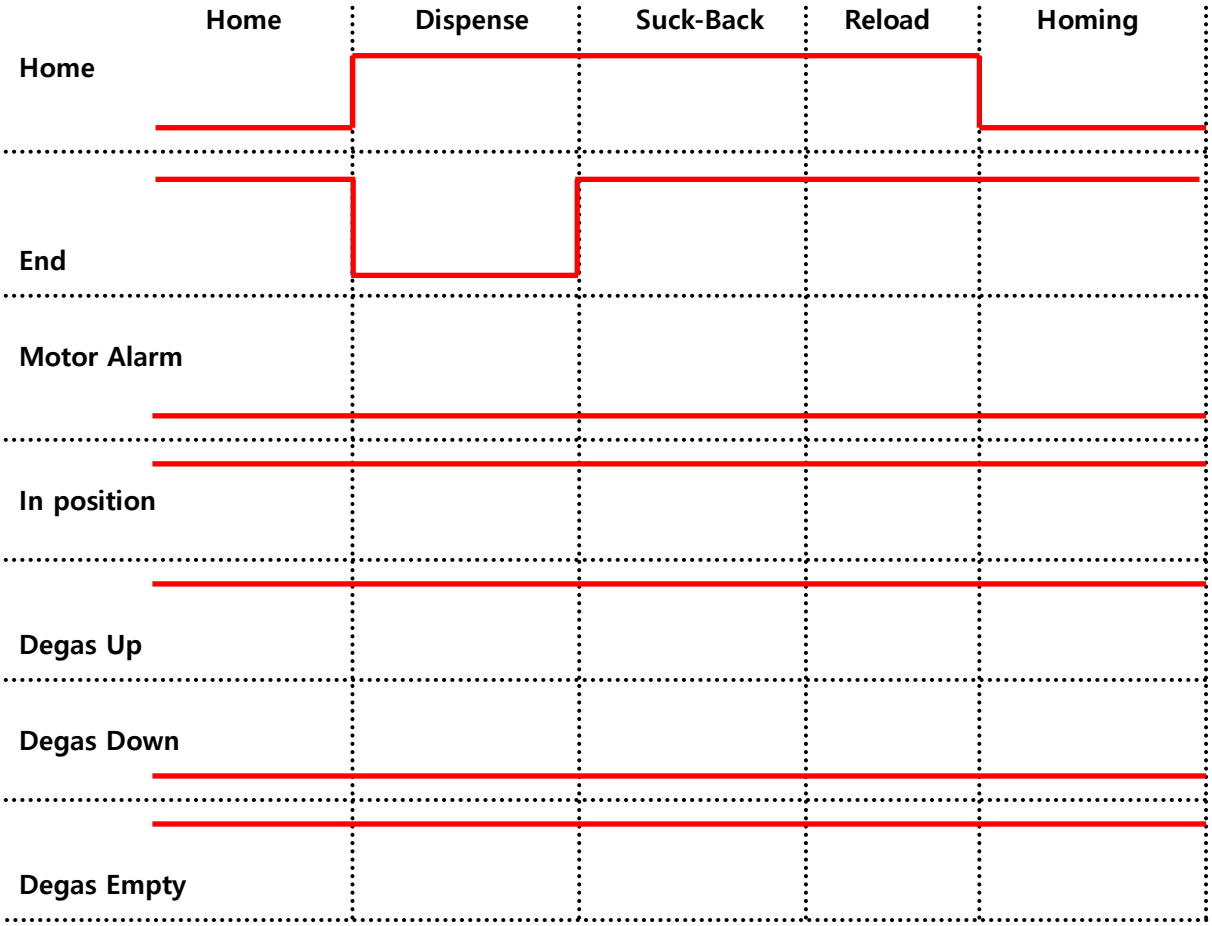
④ **Com Port**

- Touch Pad RS422 Communication Connector.

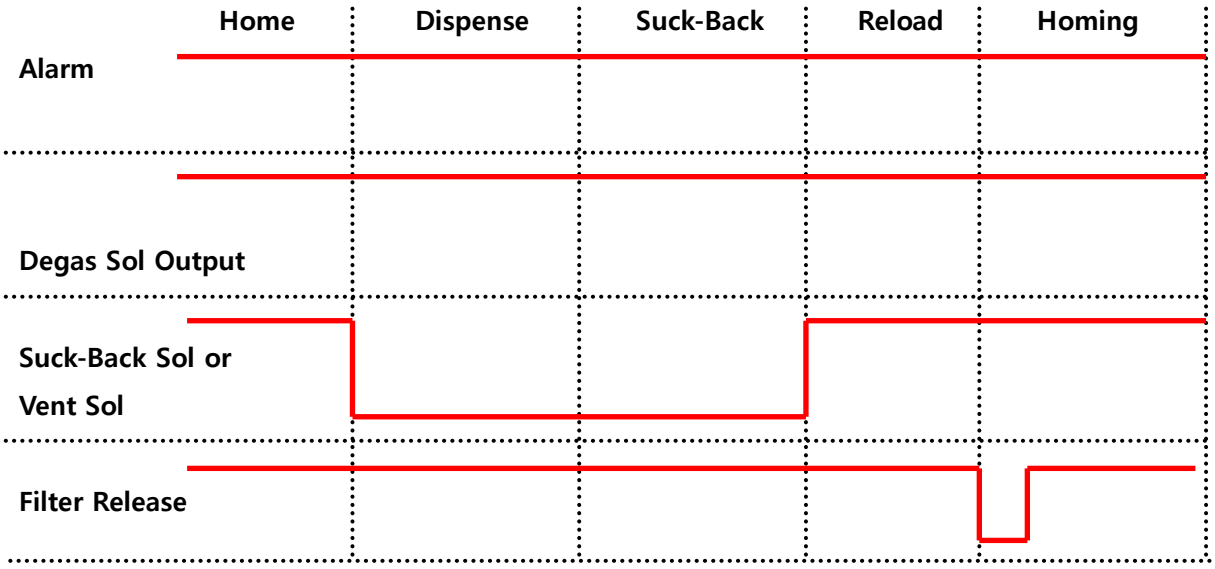
4 Wiring & Signal Interface

4-1 Signal Timing Chart

4-1-1 Input State Change

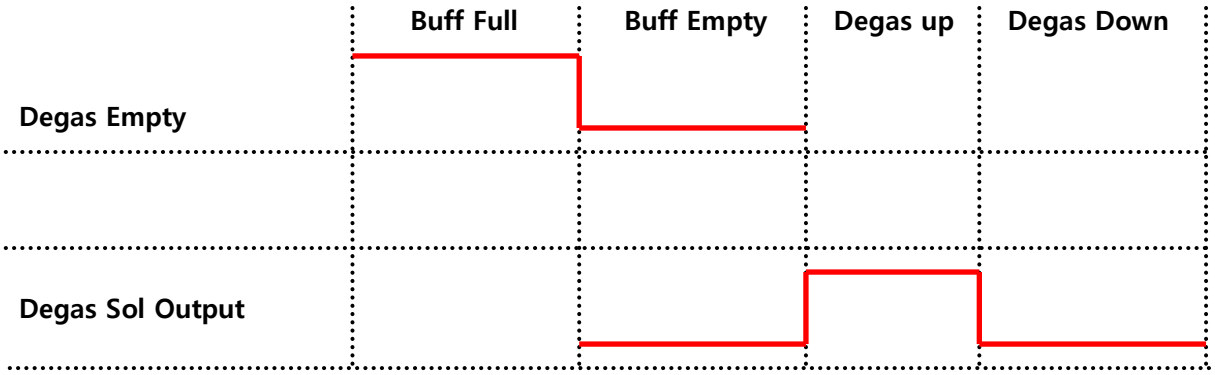


4-1-2 Output State Change



▶ On Input Timing Chart, Degas Up/Down & Empty Signal's Change don't affect Dispense.

4-1-3 In/Output State's Change for Degas



4-2 Track Pin Assign

Track (Standard) Pin Assign [D-SUB 15P]			
Pin NO.	**Signal Name**	**I/O**	**Description**
1	+ 24V	Input	Input VCC 1
2	+ 24V	Input	
3	Home +	Input	Input Dummy Coater
4	G24V	Input	Input GND
5	Start 1	Input	Dispense Trigger Select
6	Start 2	Input	
7	Start 3	Input	
8	Stop	Output	Warning/Stop Alarm Output
9	Warning	Output	
10	Home	Output	Home/End Signal Output
11	End	Output	
12	Home -	Input	Input Dummy Coater
13	+ 12V	Output	Output EX Power
14	+ 5V	Output	
15	GND	Output	

Track (Mark) Pin Assign [D-SUB 15P]			
Pin NO.	**Signal Name**	**I/O**	**Description**
1	+ 24V	Input	Input VCC 1
2	+ 24V	Input	
3	Not Use	Not Use	Not Use
4	G24V	Input	Input GND
5	Start 1	Input	Dispense Trigger Select
6	Not Use	Not Use	Not Use
7	Not Use	Not Use	Not Use
8	Stop	Output	Warning/Stop Alarm Output
9	Warning	Output	
10	Home	Output	Home/End Signal Output
11	End	Output	
12	Not Use	Not Use	Not Use
13	+ 5V	Output	Home/End Signal Output
14	+ 12V	Output	Output EX Power
15	GND	Output	

4-3 COMM & ETC Pin Assign

COM & ETC (Standard) Pin Assign [D-SUB 15P]			
Pin NO.	**Signal Name**	**I/O**	**Description**
1	+ 5V	Output	Output VCC
2	TX	Output	Output RS232C
3	RX	Input	Input RS232C
4	TX +	In/Output	In/Output RS422
5	TX -	In/Output	
6	RX +	In/Output	
7	RX -	In/Output	
8	G5V	Output	Output GND
9	Not Use	Not Use	Not Use
10	Not Use	Not Use	
11	Not Use	Not Use	
12	Not Use	Not Use	
13	Not Use	Not Use	
14	Not Use	Not Use	
15	Not Use	Not Use	

COM & ETC (Mark) Pin Assign [D-SUB 15P]			
Pin NO.	**Signal Name**	**I/O**	**Description**
1	Not Use	Not Use	Not Use
2	Not Use	Not Use	Not Use
3	Not Use	Not Use	Not Use
4	TX +	In/Output	In/Output RS422
5	TX -	In/Output	
6	RX -	In/Output	
7	RX +	In/Output	
8	Not Use	Not Use	Not Use
9	Not Use	Not Use	Not Use
10	Not Use	Not Use	Not Use
11	+24V	Output	Output VCC
12	Not Use	Not Use	Not Use
13	Not Use	Not Use	Not Use
14	GND	Output	Output GND
15	Not Use	Not Use	Not Use

4-4 Dispense Trigger Select

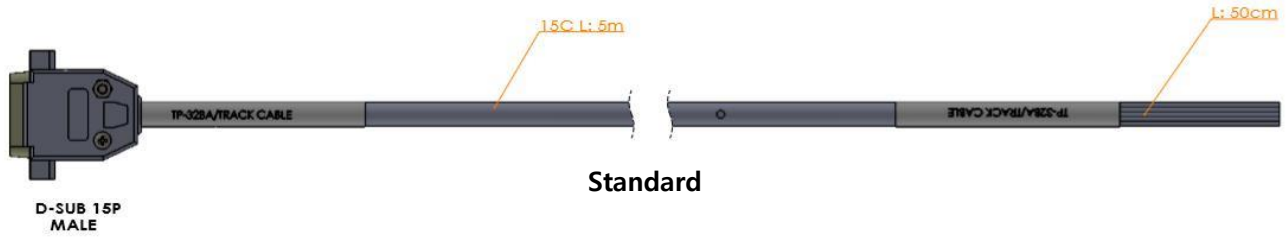
"0" Trigger Off

"1" Trigger On

Recipe Select	Start1 [1]	Start2 [2]	Start3 [3]	Remark
1	1	0	0	
2	0	1	0	
3	1	1	0	
4	0	0	1	Cycle Recipe
5	1	0	1	
6	0	1	1	
7	1	1	1	

5 External Cable Length

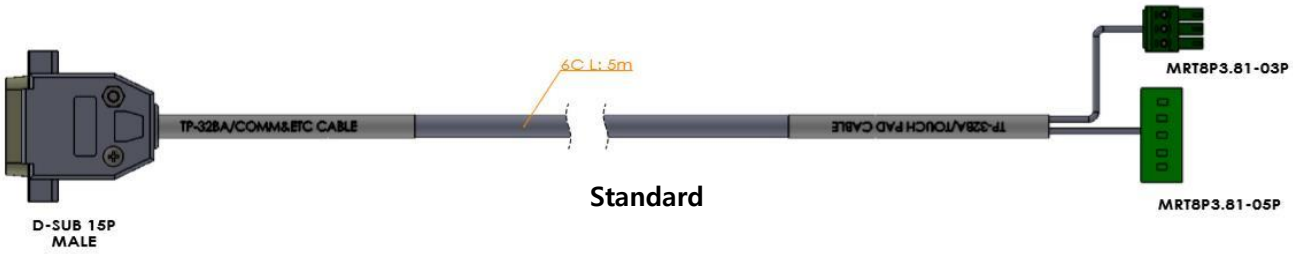
5-1 Track Cable



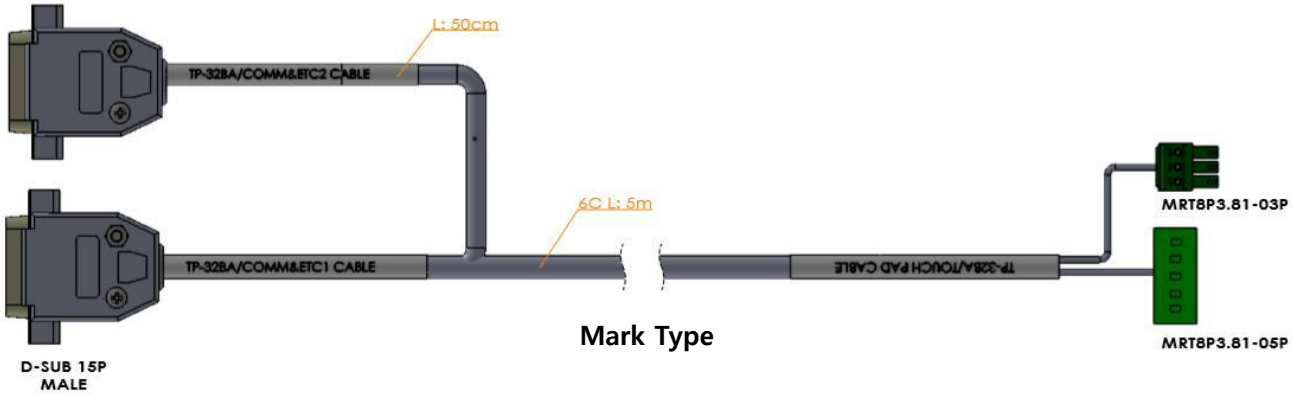
Standard

Mark Type

5-2 COMM&ETC Cable



Standard

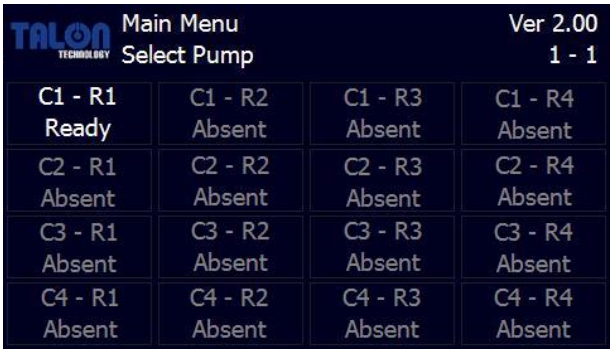


Mark Type

6 Touch Pad Operation

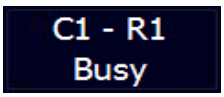
6-1 Operation

6-1-1 Initial Screen

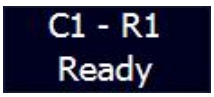


The pumps' ID, which are cable-connected to touch pad, are auto-searched every 20 sec. On every lower menu, if there isn't any input for 1 min, the initial screen is back. The pump, which is not searched, cannot be chosen.

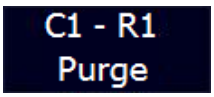
6-1-2 Pump Condition Indicate In Use



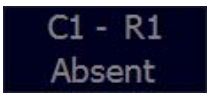
Dispense



Ready

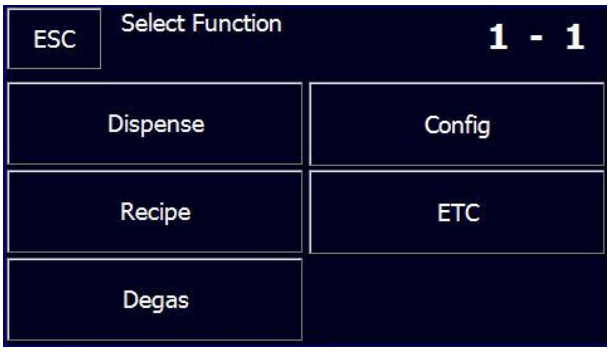


Purge Mode



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.

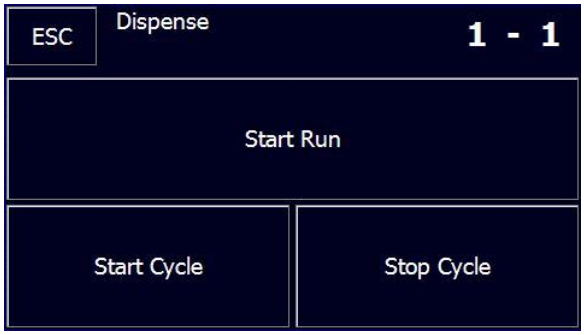
Recipe - Run Recipe & Dispense Recipe Setting.

Degas - Degas Count, Manual Degas, Empty Sensor Setting.

Config - Pump Mode, Reset, Error & ID Setting.

ETC - Each recipe's calibration setting.

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

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.

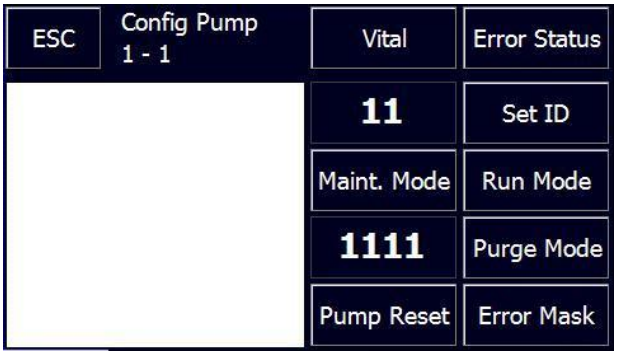
However, 4th recipe is for cycle recipe and which works only by Start Cycle of Dispense on touch pad. Run Recipe No. is Recipe No. used by Start Run under Dispense menu.

6-1-6 Degas

Degas Count means to set the degas counts after the empty sensor senses the buffer tank's empty. When the set counts are over, warning or stop alarm occurs depending on 'Error Mask Setting'.
'Using Empty Sensor' is about the empty sensor's setting. So, it becomes 'Yes' on normal situation. In case of 'No', degas doesn't work even if the buffer tank is empty.
Degas count can be set from 0 ~ 999.
Degas Run / Degas Stop has the function to make Degas work manually even if the buffer tank is not empty.

Notice : When the degas is working due to the buffer tank's empty, touch panel's command never works.

6-1-7 Configuration of Pump

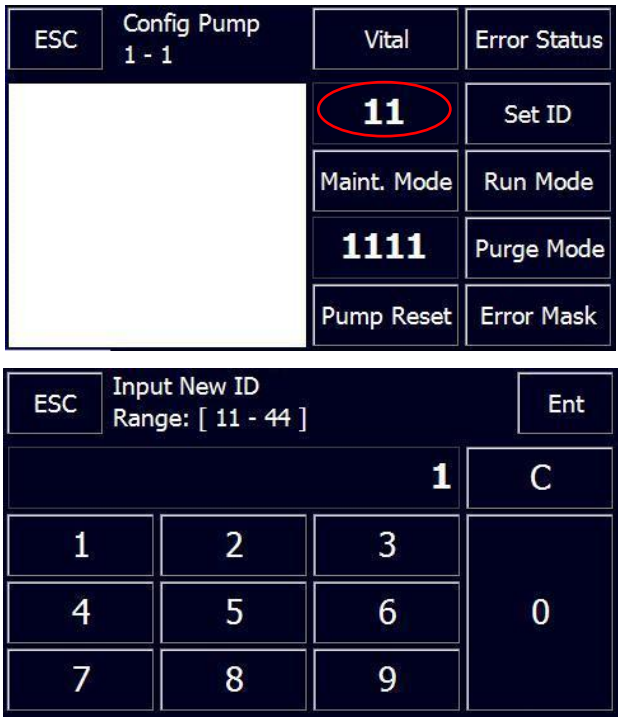


On Config Pump, the password needs for the important items' set. The password is set as '0901'.

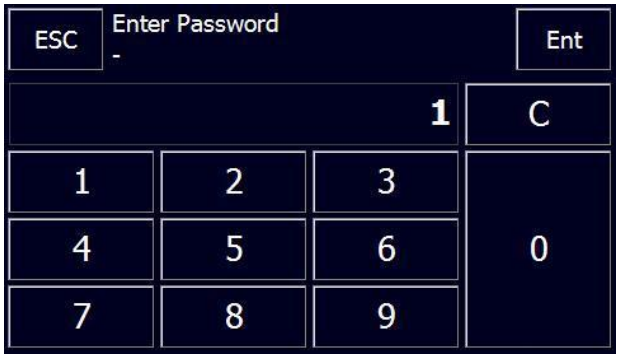
Vital	-	Check pump's response and in case of response, 'vital' window activates and disappears right away. At the left window, the response data is shown.
Error Status	-	Shown Error Code Data.
Set ID	-	Change Pump ID. [Discuss with Talon Tech]
Maint Mode	-	Change Pump Mode to Maint.
Run Mode	-	Change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

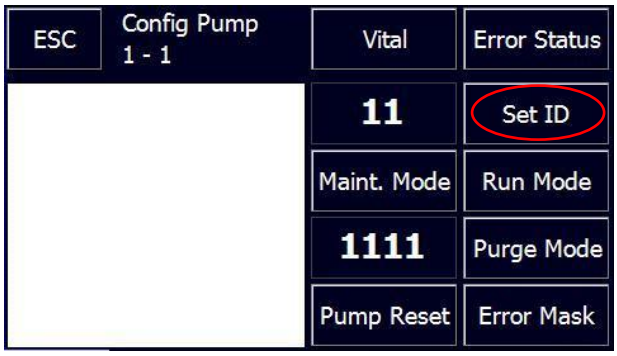
▶ **ID Setting**

For ID Setting, Click no. next to Set ID window. On the below screen, input ID and touch Ent.



On Config Pump screen, when you touch 'Set ID', Password input screen shows and input '0901'and touch Ent. And then, 'Check ID' 'Set ID' screen shows and disappears right away so the initial starts.





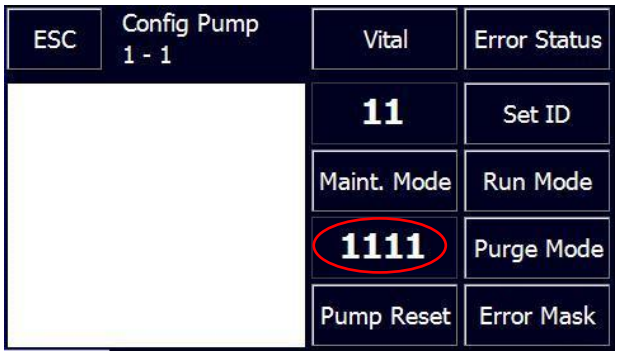
If there is no response from the pump, the window keeps showing. If there is already the same pump ID, the window – 'Conflict' shows and push 'OK' and reset.

▶ Maint Mode, Run Mode, Pump Reset Setting

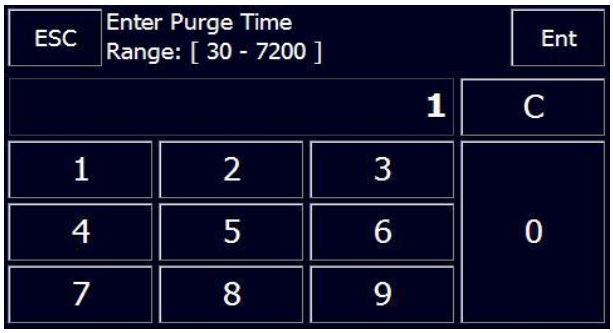
Main Mode is to show the message of pump work on the text window. Run Mode only shows as data code. The setting method is to touch Maint Mode, Run Mode button and input password and touch 'Ent'. In case of no response from pump, message of mode keeps showing. Pump reset works right after input password.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

▶ Purge Mode

Purge Mode makes a certain Valve on/off according to a certain number input. The number input consists of total 4 digits. The 4th digit is unconditionally 1 as default value. The 3rd digit means Degas Valve. The 2nd digit means Vent Valve. And the 1st digit means Suck-Back Valve. At this time, Dispense & Degas don't work. '0' means Valve ON and '1' means OFF.

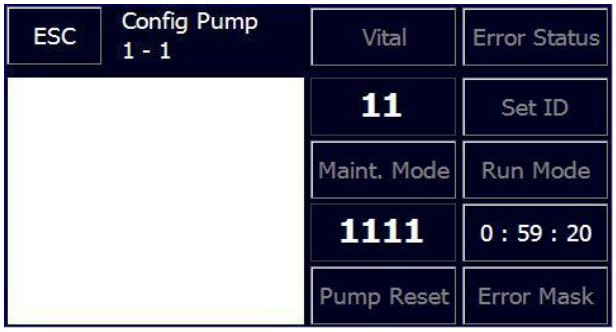


When Purge Mode is touched & Password is input, the below window – Purge Time is shown. The setting time is from 30 sec~ 7200 sec [2 hours].

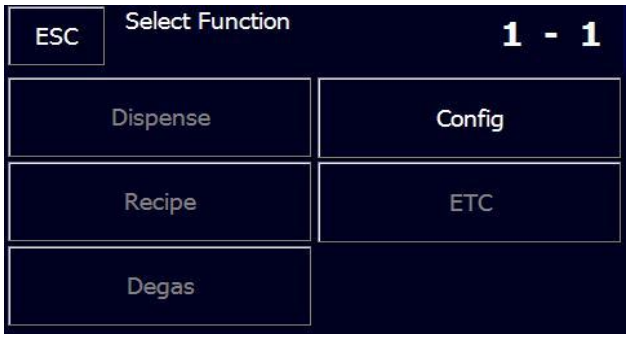


After Setting & touching Ent, The below window is shown in case of the normal case.

Time is expressed. In case of Cancel, you touch 'Cancel' button. But, for 20sec, be careful that Cancel doesn't work. When you touch 'OK', the below window is shown and other pumps can be controlled. If you choose Time again, Time window is shown again. When Purge time is over or is cancelled, automatically Run Mode is converted.



When Purge Mode is converted, 'Vital', 'Error Status', 'Set ID', 'Maint Mode', 'Run Mode', 'Pump Reset', 'Error Mask' buttons cannot be touched on the applied pump. 'Dispense', 'Recipe', 'Degas', 'ETC' menus under Select Function as well as Config Pump menu cannot be touched on the applied pump for Purge mode also. After completion of Purge Count, it takes 20sec to convert into Run mode.



▶ **Error Mask**

Error Mask means that when a certain Error occurs, it explains Pump Stop. Error Mask menu can be entered with Password. When an error is checked and set, the applied error becomes Pump Stop Error.

For Error Mask, basically it is set before ship out. If Error Mask is changed, must discuss Talon Tech Co., Ltd.

6-1-8 ETC

Vent Count - when Vent Valve is open after how many times of Dispenses. For example, if Vent Count is set with 10, Vent Valve is open at the 11th dispense.

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.

Press Release - Vent Valve is open for about 1sec after completion of Dispense.
No need Password on ETC menu.

6-2 Example

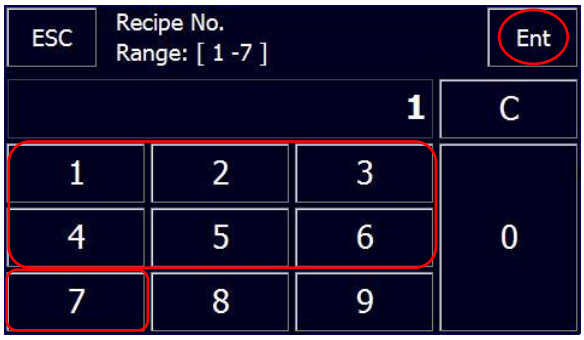
6-2-1 Dispense

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.

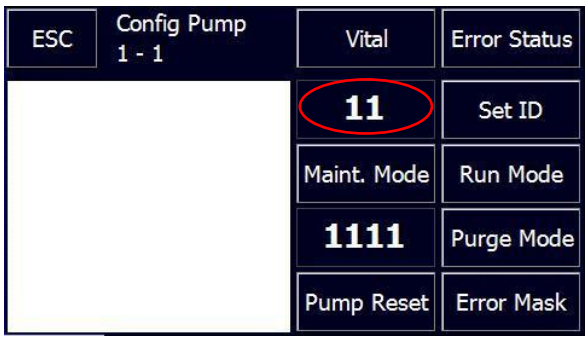
6-2-2 Recipe

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

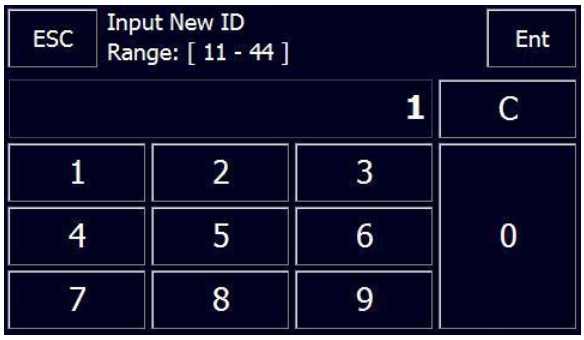


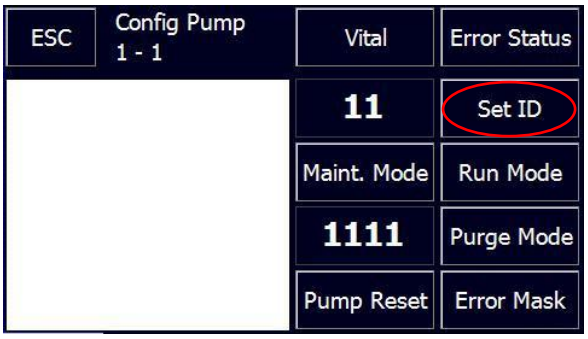
Set the recipe's volume & time and touch 'Set' button.

6-2-3 ID Setting



Choose ID # which you want to change from 11~44. ID consists of 2 digits. The 2nd digit means Coater# and the 1st digit means Nozzle#. Total 16 ID setting is possible.

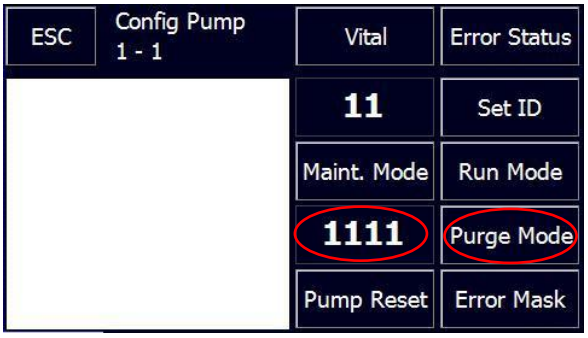




After inputting ID & touch 'Set ID', input the password and enter.

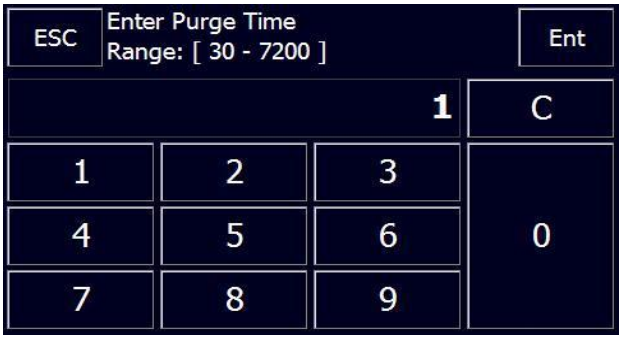
After exchanging for new ID, the pump is automatically initialized.

6-2-4 Purge Mode



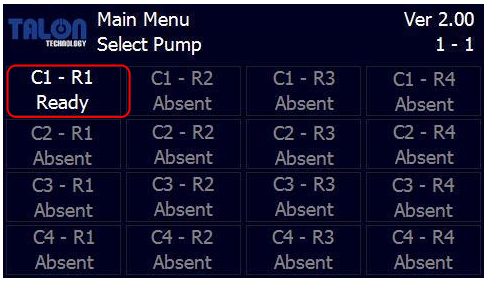
On Purge Mode use, the 4th digit means In Valve. Default value is 1 and cannot change with '0'. The 3rd digit means Degas Valve, the 2nd means Vent Valve, and the 1st means Suck-Back Valve. . '0' means Valve ON and '1' means OFF.

Password is **'0901'**.



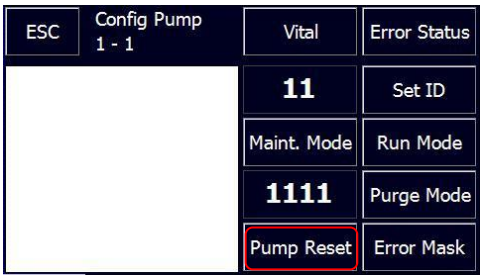
During Purge Mode operating, all menus for pump's setting is inactivated so you must remember what you will do. After completion of Purge Mode Time Count or Cancel, it takes 20sec to convert into Run mode. During this time, all menus cannot be chosen.

6-2-5 Reset on Pump Error



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.

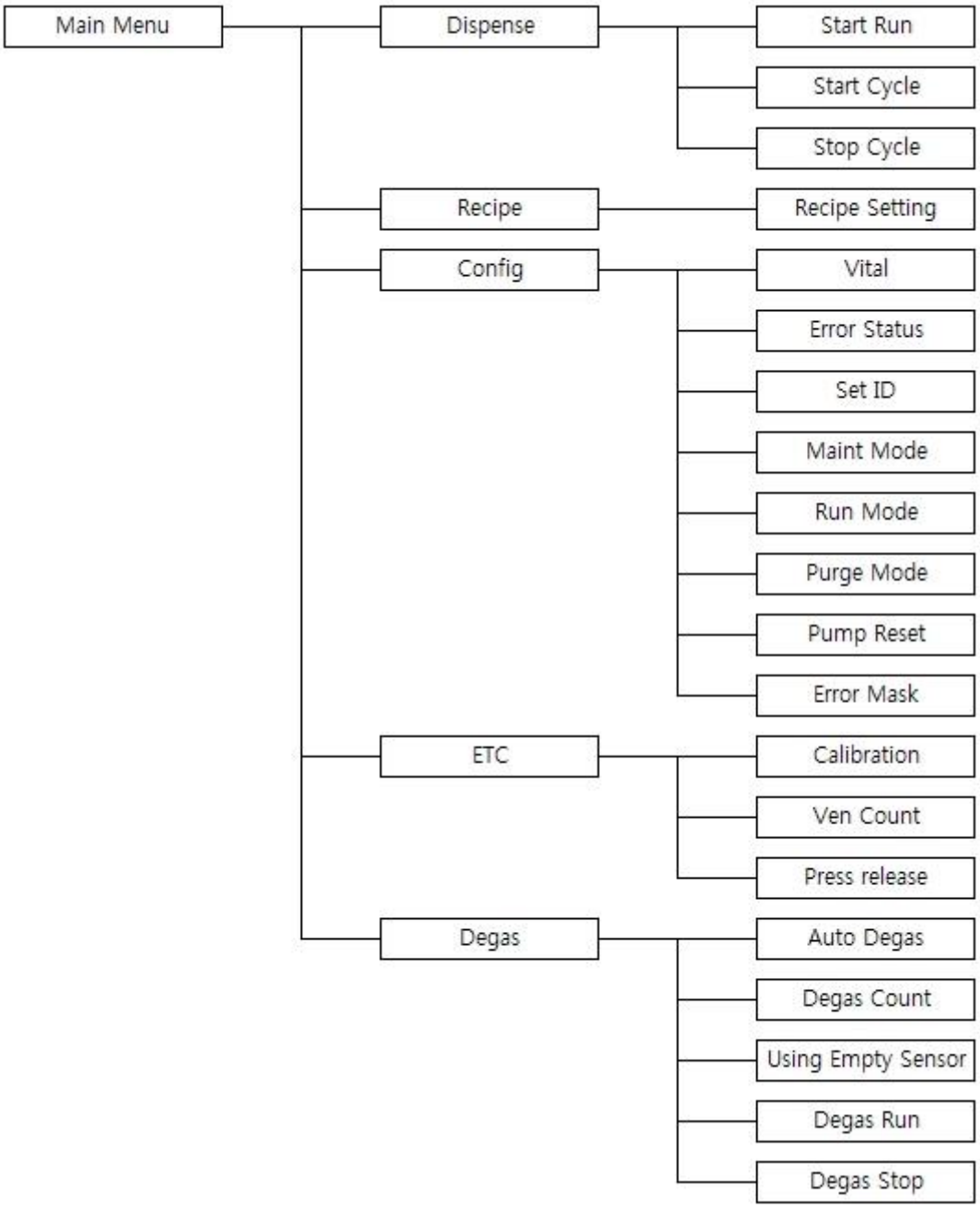
2. Touch Config button on Select Function menu.



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.

6-3 Touch Pad Menu Tree



6-4 Notice

6-4-1 Degas Function

Degas Overtime : Degas Pump's Overtime counts. If the real pumping is more than the Degas setting count and the empty sensor still senses as empty, the error occurs. At this time, you set the overtime counts. If you want 10 times of pumping, input '10'.

Notice) If the data sets "0", even if Degas Pump keeps pumping, no alarm message.

6-4-2 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.

6-4-3 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.

6-4-4 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.

6-4-5 Purge Mode

In case you take out and connect Touch Pad's power cable under Purge Mode Operation unintentionally, Purge Mode, Time, & Count cannot be realized on Touch Pad. When you want to finish Purge Mode, you have to convert to Run Mode or Maint Mode to end Purge Mode on Touch Pad forcibly.

7 Pump Operation Sequence

TP-32BA Pump Operation Sequence consists of Degas Pump and Dispense Pump.

7-1 Degas Pump

7-1-1 Degas Pump Role

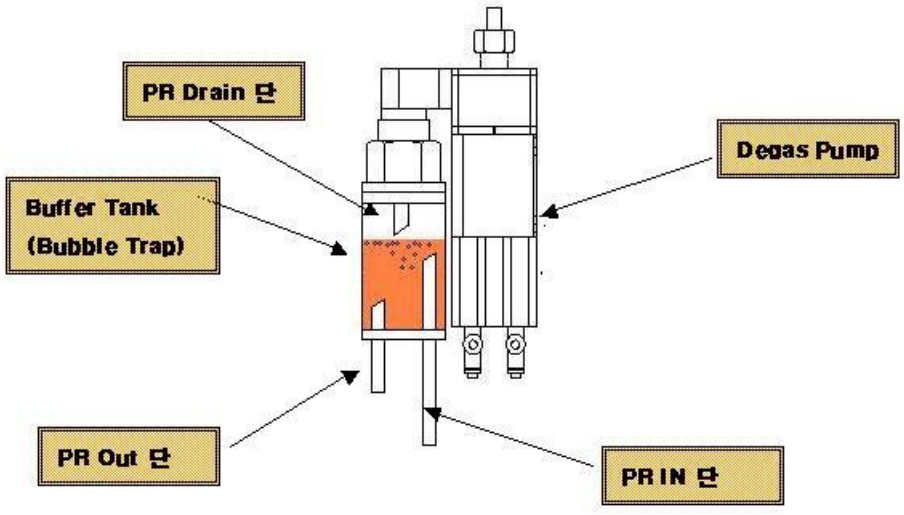
Degas Pump has two functions roughly.

1. Take away bubbles made by PR before dispense.

When PR fills up in the buffer tank, bubbles go up and PR goes down. So, PR can be dispensed without bubbles through the buffer tank (bubble trap).

2. Even though PR Bottle gets empty, about 30cc of PR still remains inside the buffer tank, which prevents the process error to some extent.

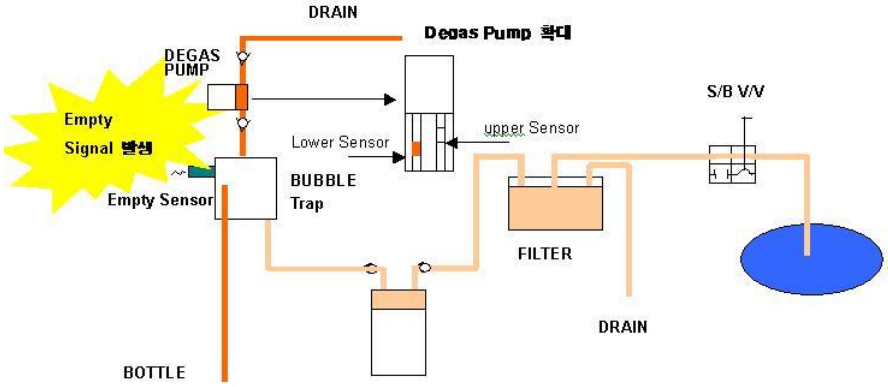
3. Degas Pump Exterior



7-1-2 Degas Pump Operation Sequence

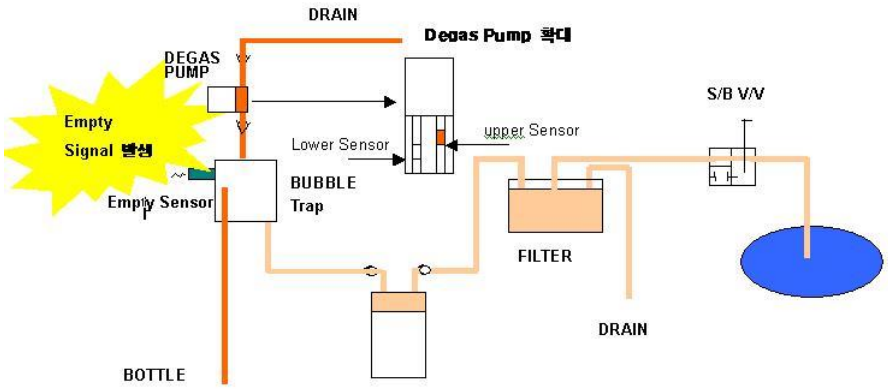
1. Buffer Empty

If PR doesn't fills up at the level of the empty sensor, the empty sensor sends the empty signal to the controller.



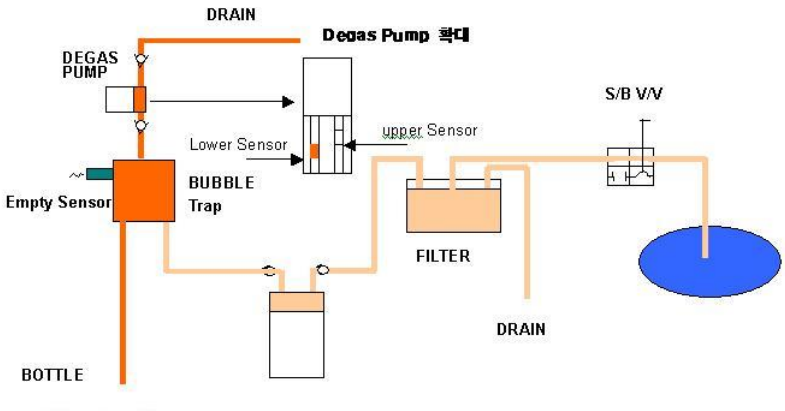
2. Degas Sol V/V Operation

When the empty signal inputs, the controller makes the degas sol work. The air supplies to the degas pump and the retracted bellows pulls up PR from the PR bottle. At this time, the degas pump locates at the upper position.



3. Degas Sol V/V Operation Stop and Empty Check

When the upper signal of the degas pump checks, the controller makes the degas Sol stop. Accordingly, the air of Sol V/V stops and the degas pump locates at the lower position. At this time, the controller checks the empty signal. If it is empty, keep working from #1 to #3.



7-2 Dispense Pump

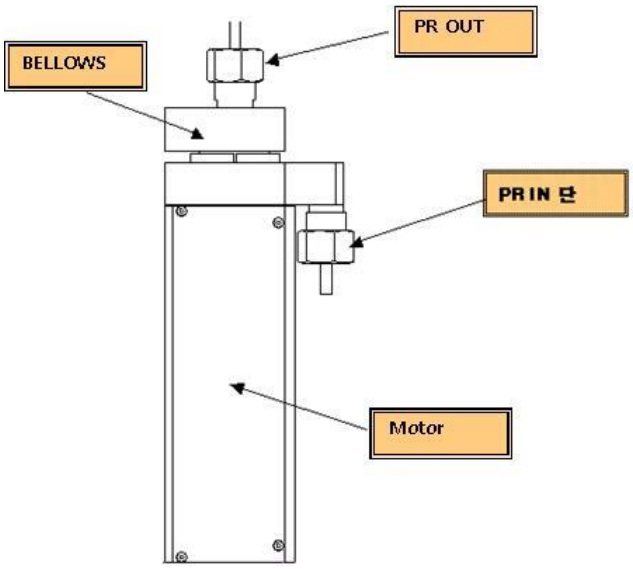
7-2-1 Dispense Pump's Role

Dispense Pump function is to dispense PR within the set time and with the accuracy.

1. Dispense Pump Configuration

Dispense Pump consists of the driving motor, driver, bellows, position sensors, etc.

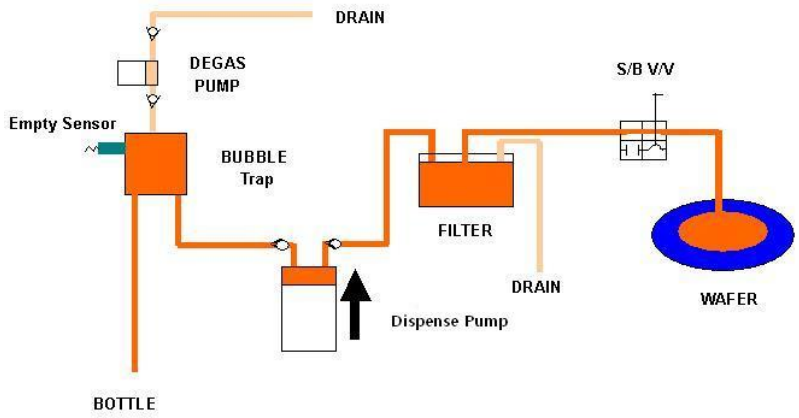
2. Dispense Pump Exterior



7-2-2 Dispense Pump Operation Sequence

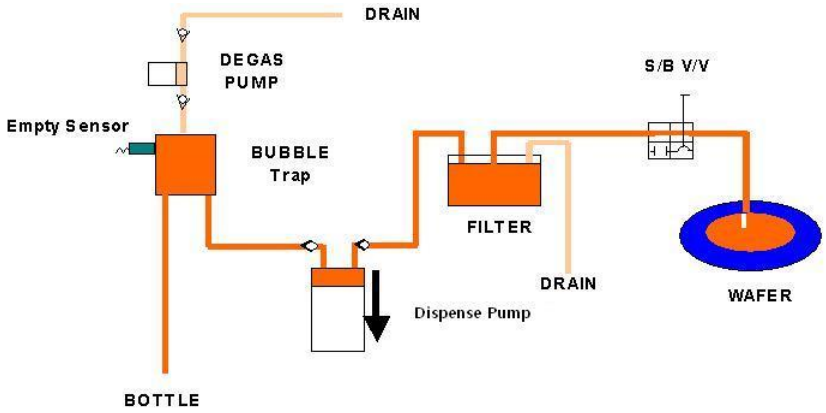
1. Dispensing

When the controller receives the start signal (or, any start on communication), the controller gives the pulse to the motor as per the recipe which the user set in advance. At this time, the controller also gives the signal to the suck back sol to open the suck back sol valve in order to dispense PR.



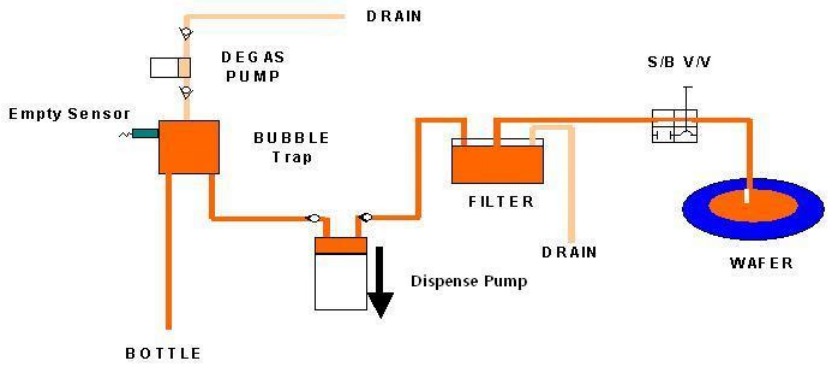
2. Suck-Back

After Dispense finish, the suck back valve is open upto the set time in order to reload. At this time, PR is suck-backed at the tip of nozzle.



3. Reload

After Suck-Back finish, during suck-back V/V close, the reload proceeds up to home sensor. After Homing completes, it is ready up to the next start signal.



8 Maintenance

8-1 Pump Parts Dis/Assembly

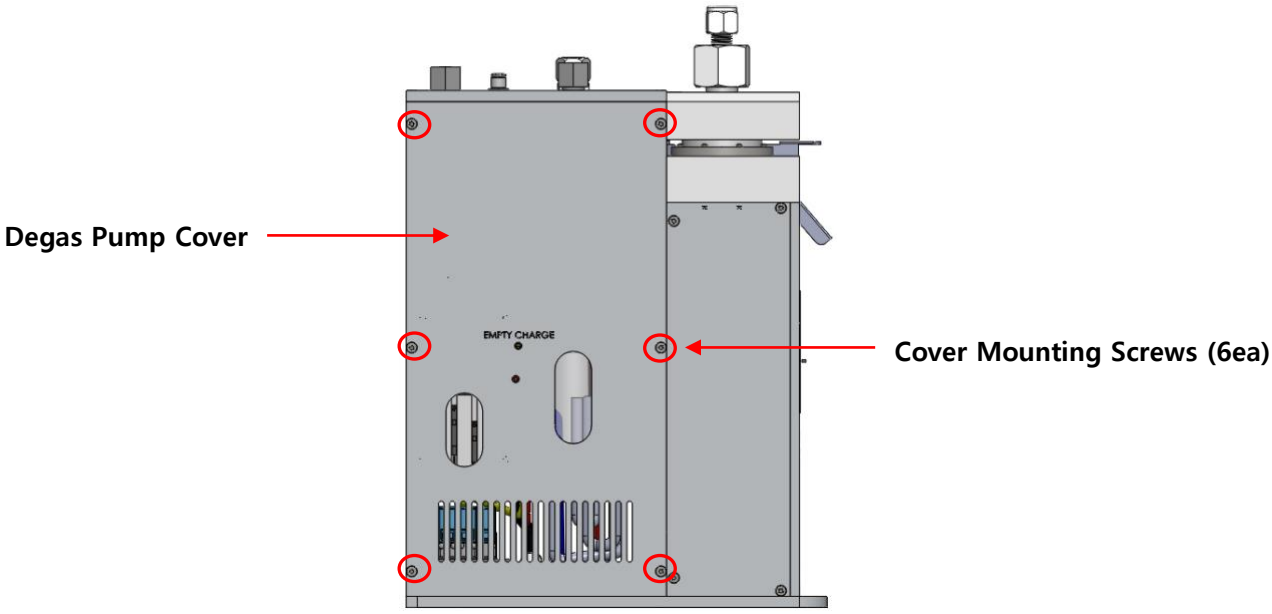
8-1-1 Degas Pump Cover Dis/Assembly

1. As per the below [PIC 1], use 2mm wrench to release Pump Cover Mounting M2.5 Screw(6ea) to open the cover.
2. The assembly is the reverse order of the disassembly.

[Notice]

When the cover opens, be careful not to cut the finger.

Don't dis/assemble the interior parts inside the pump.

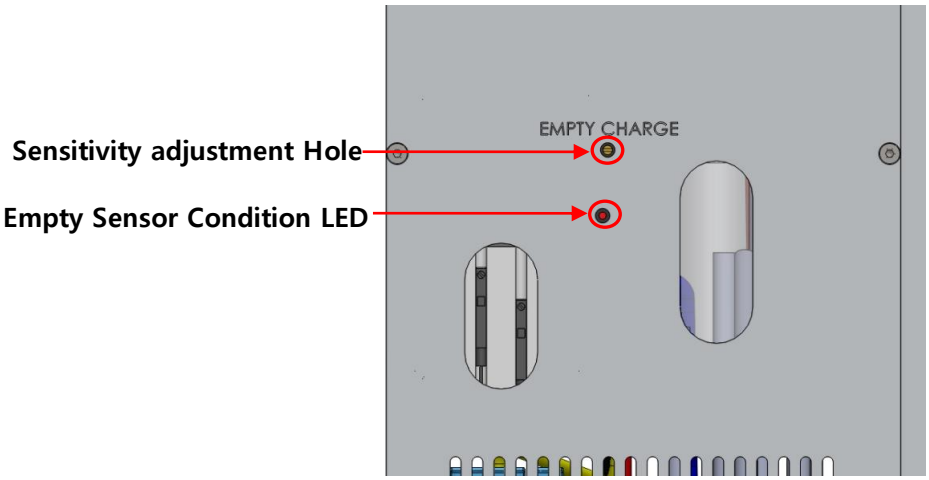


[PIC 1]

8-1-2 Buffer Tank Empty Sensor Sensitivity Adjustment

Before the pump is sold out, the sensitivity of the buffer tank empty sensor is set. But, if in need to charge the buffer tank manually, pls. follow up the below.

1. As per [PIC 2], set the max to turn CCW with the driver (-).
2. Start to set the sensitivity by filling up into the buffer tank.
3. PR begins to fill up, the sensor works, the degas pump operation stops, and no more PR in. Turn the sensor CW for the sensor not to work. And then, PR keeps filling up until the sensor works. Keep doing it in order for PR goes out through the drain outlet. After bubbles go out (drain), turn the sensor CCW with the half way



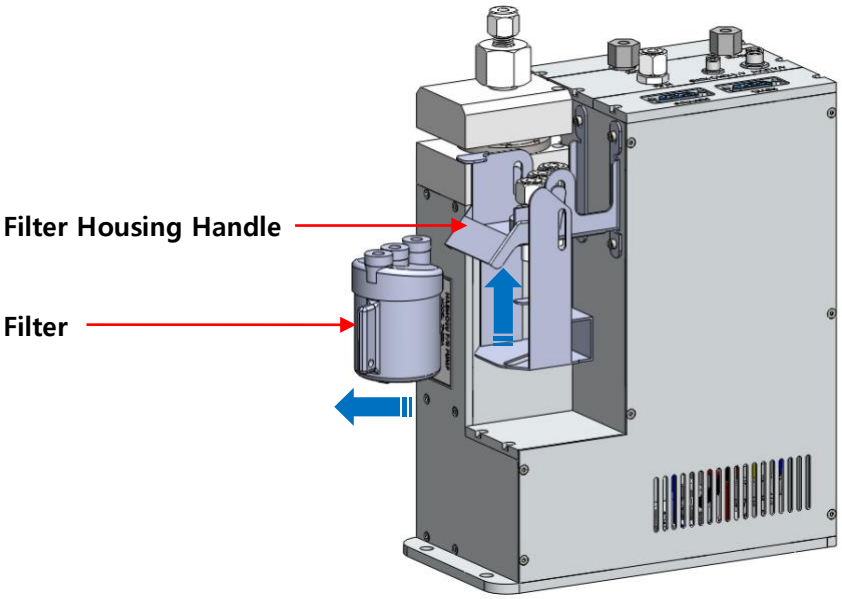
[PIC 2]

8-1-3 Filter Exchange Method

1. Purge Chemical line before Filter exchange.
2. Lift up the handle of Filter Housing to separate Filter & Housing as per [PIC 3].
3. Take out Filter by hand from Housing.
4. The assembly is the reverse order of the disassembly.

[Notice]

Must purge Chemical Line to prevent contamination.



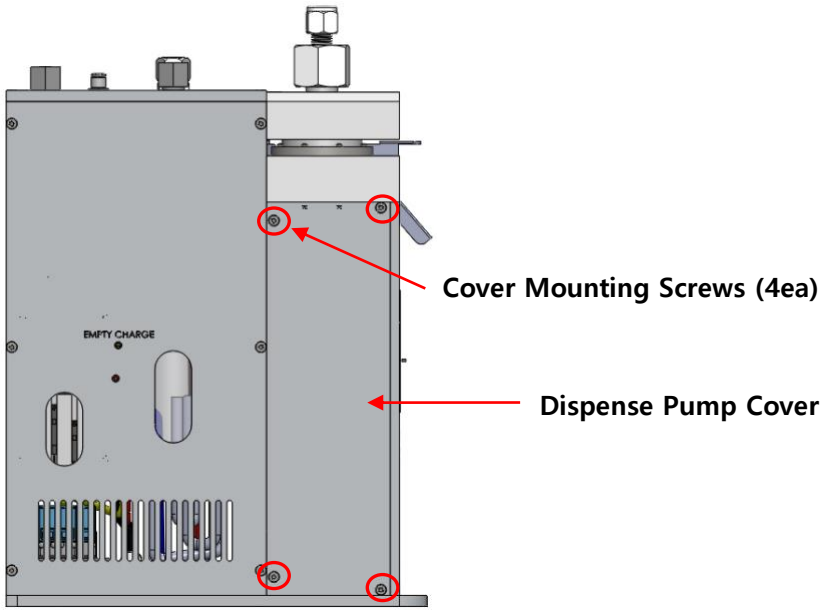
[PIC 3]

8-1-4 Driving Shaft Condition Check & Grease up on Ball Screw

1. As per the below [PIC 3], use 2mm wrench to release Pump Cover Mounting M2.5 Screw(4ea), Screw to open the cover.
2. Check the motor's vibration & noise when the pump works.
3. Check the bolts tightening condition and ball screw worn-out condition.
4. Check any interruption between cables & moving parts.
5. Check the conditions of linear bushing /shaft when the pump works.
6. Grease up on ball screw & LM linear bushing.
7. Grease up every 6 months.
8. The assembly is the reverse order of the disassembly.

[Notice]

Don't disassemble the moving parts, which can be the root cause of any problems.



[PIC 4]

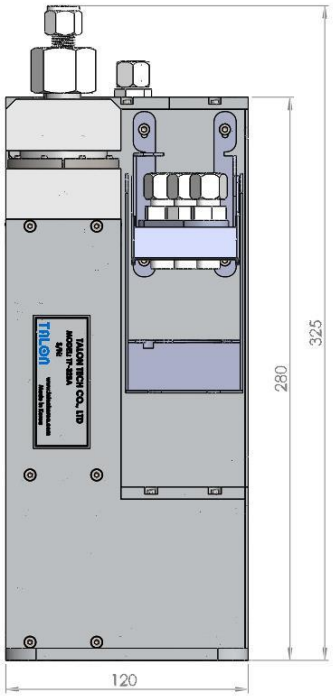
9 Recommended Spares / Mechanical Dimensions

9-1 TP-32BA Spare Parts

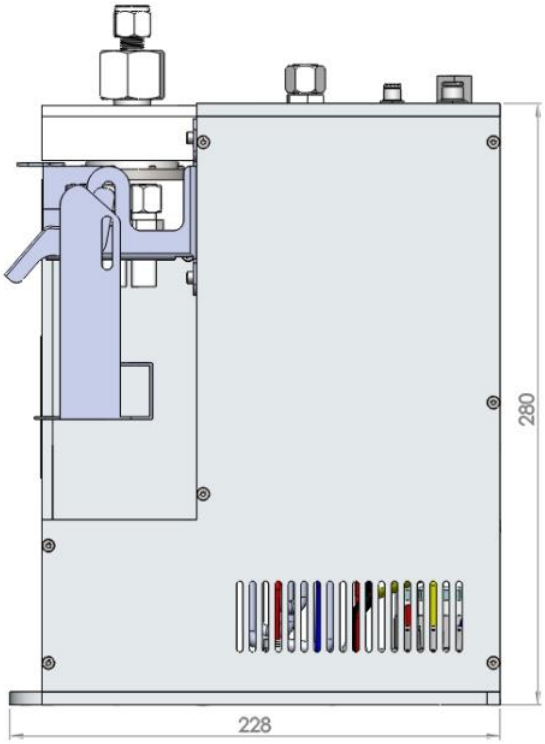
Division	Part NO.	Description	Qty
Main Pump	TL-32BA-TA-001	Outer Type Bellows	1
	TL-32BA-TA-002	Body	2
	TL-32BA-TA-003	Check Valve Assembly	2
	TL-32BA-TA-004	Cylinder	1
	TL-32BA-TA-005	Union Nut	2
	TL-32BA-TA-006	¼" Ferrule	2
	TL-32BA-TA-007	¼" Back Ferrule	2
	TL-32BA-MA-001	Ball Screw	1
	TL-32BA-MA-002	Support Unit	1
	TL-32BA-MA-003	Coupling	1
	TL-32BA-MA-004	LM Guide	1
	TL-32BA-EB-001	Motor	1
	TL-32BA-ET-001	Filter Housing	1
	TL-32BA-EA-001	Photo Sensor	2
	TL-32BA-CA-001	Suck-Back Valve	1
	TL-32BA-CA-002	Air Valve	3
	TL-32BA-EB-002	Solenoid Valve (DC24V)	4
	TL-32BA-CA-003	Sol Block Assembly	1
	TL-32BA-EA-002	SMPS	1
Degas Pump	TL-32BA-TA-008	Buffer Tank	1
	TL-32BA-TA-009	Bellow	1
	TL-32BA-TA-010	Pump Head	1
	TL-32BA-TA-011	Pilot	1
	TL-32BA-TA-012	Check Valve Assembly	2
	TL-32BA-TA-013	¼" Ferrule	2
	TL-32BA-TA-014	¼" Back Ferrule	2
	TL-32BA-CA-005	Air Cylinder	1
	TL-32BA-CB-002	Air Speed Controller	2
	TL-32BA-EA-003	Empty Sensor	1
Touch Pad	TL-32BA-EB-003	Touch Pad Assembly	1
Main Board	TL-32BA-EB-004	Main Board Assembly	1

9-2 Pump Dimensions

9-2-1 Front View

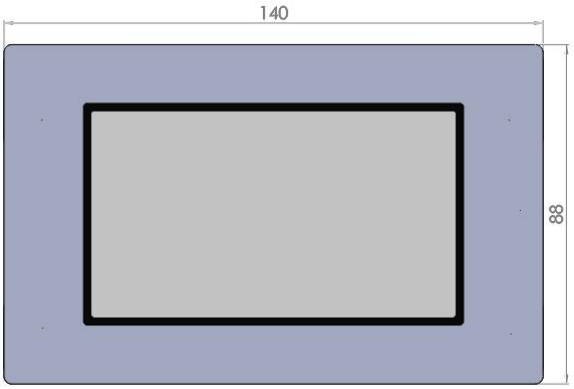


9-2-2 Side View

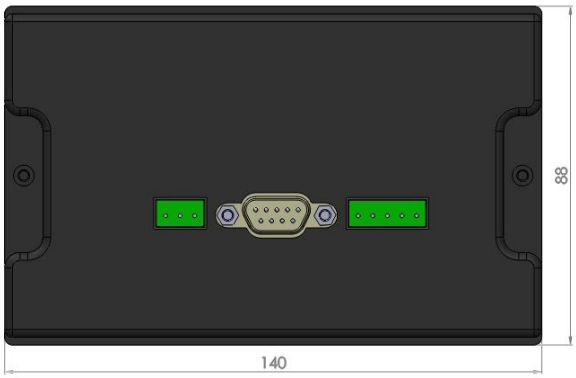


9-3 Touch Pad Dimensions

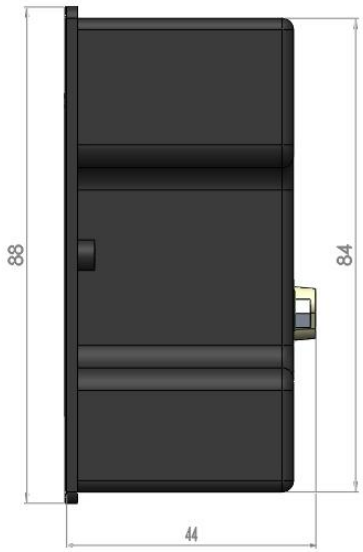
9-3-1 Front View



9-3-2 Rear View



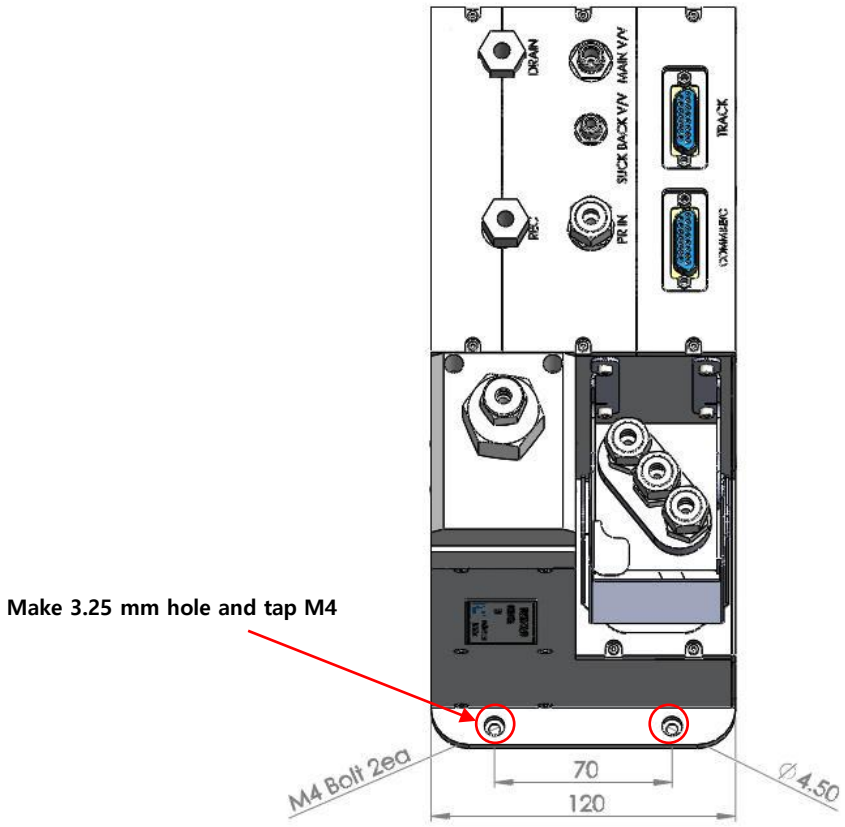
9-3-3 Side View



9-4 Installation Method

9-4-1 Pump Installation Sequence

1. Set aside the space for the pump installation.
2. As per the below picture, tighten the panel base plate with 2 pieces of M4 screw.



9-4-2 Piping Method

1. PR Tube Piping

1) Refer to the picture of **[3-1 Pump In/Exterior Names]** in page 5 Insert ¼" union nuts on tube at PR In / Out / Vent areas.

2) At PR In / Out areas, insert Ferrule / Back Ferrule and tighten Union Nut.

3) At the vent area, insert ¼" sleeve into tube after enlarging tube with the tube expansion tool and then tighten nut.

2. Main V/V Air Tube Piping

1) Connect 6Ø Air Tube into Main V/V.

3. Suck-Back V/V Air Tube Piping

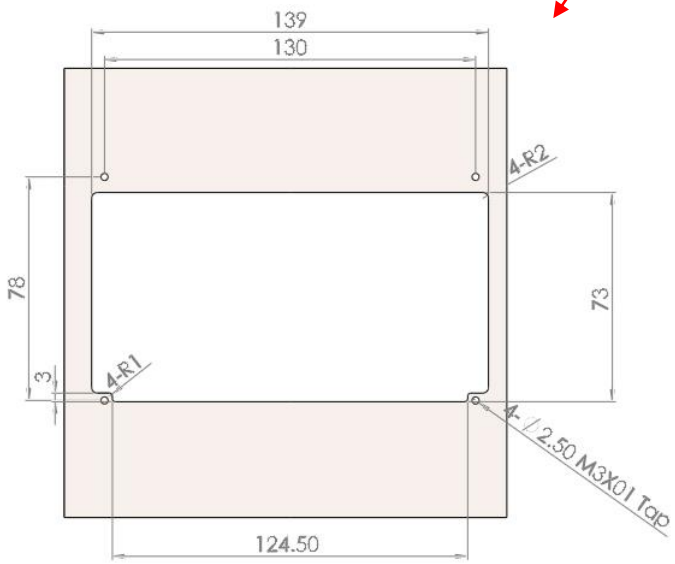
1) Connect 4Ø Air Tube into Suck-back V/V.

9-4-3 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.

<THE END>