

Dear HAS & DEL Friends,

We Thank you on your purchase of this automation system. The instruction manual will help you in readying and starting up of your new HAS & DEL system. Operation is very simple and user friendly .Please contact HAS & DEL for any technical clarification.

We wish you much success with your new system.

Sincerely,

HAS & DEL Engineering
Navi Mumbai , India

Index:

1. GENERAL



We have put in our best efforts to ensure the accuracy of the contents of this manual. However, shall any errors be detected during use of this manual, it would be highly appreciated if the same is informed to HAS & DEL Engineering

General

HAS & DEL was established in year 2013 with objective of providing customized solution and consultancy for agriculture sector. We are team of professional experts having grass root knowledge and ready to take challenges. HAS & DEL started its operation by providing global technology for local applications in the field of fertigation, climate control, Green house automation, water & nutrient management, hydroponics and soil less growing technology. Our aim is to maximize yields and profitability for professional growers by providing innovative, efficient, durable and most importantly economical solution. Our controller's help growers to create best growing conditions as well as complete fertigation needs for any type of crops.

We also provide consultancy for customize green house projects. We strive to create fruitful partnership with entrepreneurs who wish to start professional cultivation with modern techniques which give more yield and profitability helping them to grow their business. HAS & DEL is committed to provide services to growers with customized solution.

The following products and services can be supplied and by HAS & DEL

Fertigation controller for Open field, Golf Course, Lawn, Farm house etc.

Fogging Controller

Roof Top Sprinkler Controller

Fan/Pad Controller

Shade Net Controller

Fertilizer dosing unit with EC & pH Control

Lighting Controller

Green House / Poly House automation

Upgrading existing systems

Water and Nutrient Management

Climate Control

Customized green House project consultancy

Hydroponic Growing Technology

Soil less Growing Technology

Solenoid Valve for Irrigation etc.

Filter, pipes, irrigation materials etc.

Advantage of Automation

The traditional farming concept is switching to corporate business therefore each involved factors cost you lot and ultimately affects your turn over. If there is improper use of fertilizers, water, power, availability of man power, human errors etc. will effect to qualitative output or product or yield. Now you can add automation for better and correct utilization of resources and improving your product quality, yields & Profits.

HAS & DEL can offer you automation to achieve correct EC & pH levels with minimum dependence on manpower / less human errors / proper usage of water & fertilizers thus saving man power, reducing wastage of water, fertilizers etc and finally cost saving and improved quality & yield of crops.

HAS & DEL has an experience in automation and provide complete support to our customer. We welcome inputs from our customers to further improve our products & services.

Machine space requirement : 1500 mm x 1500 mm x 1000 mm
Height x Width x Depth

(Note – machine size can change and this is only approximate size for your reference)

Pump connection Type

Electrical

Panel Size : 800 x 600 x 300 with Top mounted screen.

Input Source line : 3 Φ + Neutral + Earthling (Please make sure of earthling)
6 mm² copper 4 core wire with separate Earth for panel

Main Switch : 32 Amp 3 Φ Switch.

Installed Load : It is depending on the motor size therefore its varying according to customer requirement. So please consult.

Earth : Separate earth pit has to be made for panel

No. of Dosing : Two EC solution and one pH dosing
Max. EC dosing is ten which is optional

Dosing as Feedback system : This is as per customer requirement.

Dosing Valve Type : Fertigation compatibility. 24 VDC solenoid diaphragm valve

Dosing Valve Ratio : Optional

Sensor start : Optional

Agitator : Optional (Control signal only)

Sand Filter Flushing : Optional (Control signal only)

NOTE : Please discuss your requirement

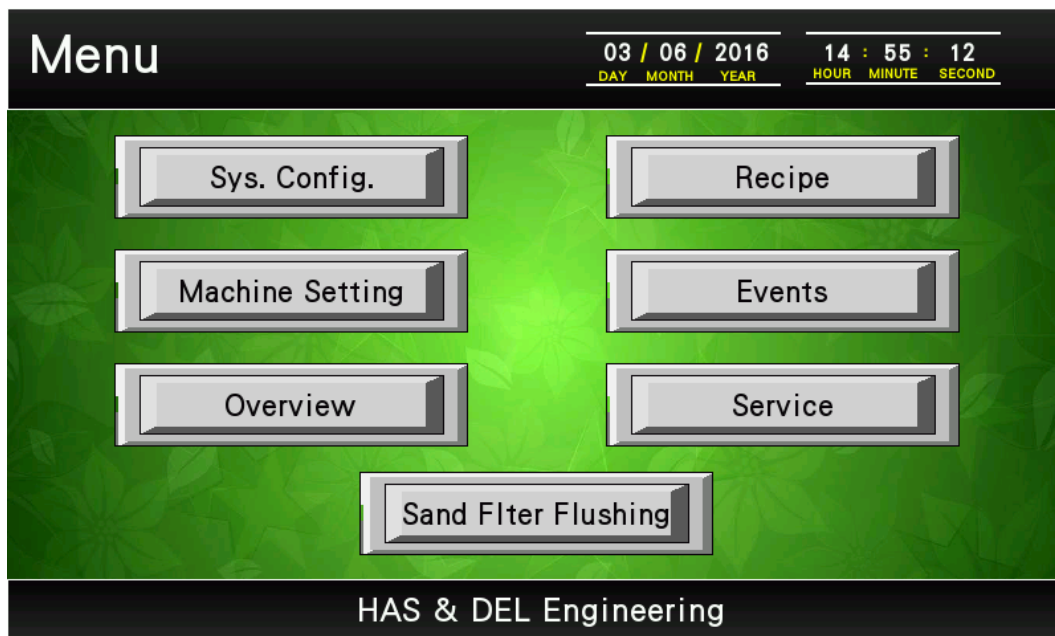
Selector switches on panel door

1. Main switch
2. Auto / Manual switch (for manual operation from service page this switch should be in manual mode)
3. Main Pump ON / OFF switch
4. Booster Pump On / OFF switch
5. Cycle Start / Stop switch
6. Emergency switch

Start up page -

Main power switched ON then it will show screen saver with company name tap on this page to go to Menu screen.

Image below shows Menu page



Press corresponding page key and jump to page.

The system is designed for future expansion without additional huge investment. We always try to innovate and try to provide simple and efficient solutions which give more productivity and HAS & DEL is bound for their commitment. Now please do not worry about your future expansion additional cost and please feel free to call us for any assistance regarding expansion.

Please note that system configuration is handled by HAS & DEL engineer and is **PASSWORD** protected. It is advised not to make any changes in this page as this can cause harm to man & machine.

System Configuration

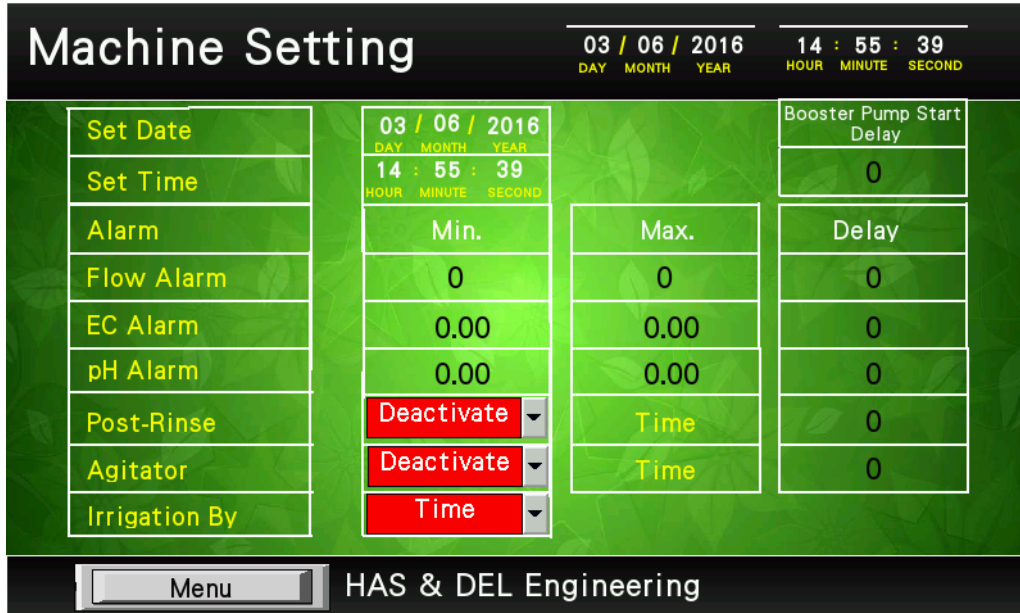
System Configuration will give an installed details of the machine and its changed by HAS & DEL Engineer only. Press **System Configuration** button and the following page will appear. It is password protected.

The screenshot shows a 'System Configuration' window with a dark header. The header contains the title 'System Configuration', the date '03 / 06 / 2016' (with sub-labels DAY, MONTH, YEAR), and the time '14 : 54 : 43' (with sub-labels HOUR, MINUTE, SECOND). Below the header, there are two columns of configuration items. The left column includes: Irrigation Pump (text input: pump1), Booster Pump (text input: booster), EC Type (dropdown: Control), pH Type (dropdown: Control), Dosing Tanks (text input: 0), Irrigation Valves (text input: 0), Isolation Valve (dropdown: Both), and Sensor Start (text input: NO). The right column includes: Dosing Valve Ratio (checkbox: YES), Agitator (checkbox: YES), Sand Filter Flushing (checkbox: YES), Isolation Valve (checkbox: YES), Flow Meter (checkbox: YES), Pulse/ltr (text input: 0), and No. of DO Station (text input: 0). At the bottom, there is a 'Menu' button and the text 'HAS & DEL Engineering'.

Irrigation Pump	Capacity of Main irrigation Pump
Booster pump	Capacity of main Booster pump
EC Type	Control / Monitoring type for EC used in the machine
pH Type	Control / Monitoring type for pH used in the machine
Dosing Tank	No. of dosing tanks installed in the system.
Irrigation Valve	No. of irrigation valves output available in the system.
Isolation Valve	Number of isolation valve installed in the system.
Dosing Ratio	Activate / De-activate dosing ratio if included in the system.
Agitator	Agitator control signal can get activated /De-activated if included in the system.
Sand Filter Flushing	Control signal for sand filter flushing get activated / De-Activated if included in the
Sensor Start	Start the fertigation cycle based on sensor if included in the system.
Flow meter	For volume based irrigation if included in the system.
Pulse/Ltr	To calculate media flow in the system
No. Of DO Station	Number of remote DO station installed in the system.

Machine Setting

Press **Machine setting** button and jump to corresponding page which allow to set the parameters



Set Date	Allow to change date
Set Time	Allow to change time
Alarm EC / pH / Flow	Allow to set min / max range of deviation for alarm with delay time
EC & pH Alarm delay	Allow to set delay time as well as range
Post Rinse	Allow to activate or deactivate of post rinse feature. The machine will run with additional set post rinse time without fertigation dosing.
Agitator	Allow to activate or de-activate of Agitator . Agitator time can set in corresponding window.
Irrigation by	Please set type of irrigation by time or volume as per your system configuration This is special optional request and activated by HAS & DEL Engineer
Booster Pump start Delay	Start the booster pump as per set delayed time.

Please consult with HAS & DEL Engineer for setting this parameters which gives you more flexibility in the process as well as trouble free run.

Machine Setting – Motorized Valve

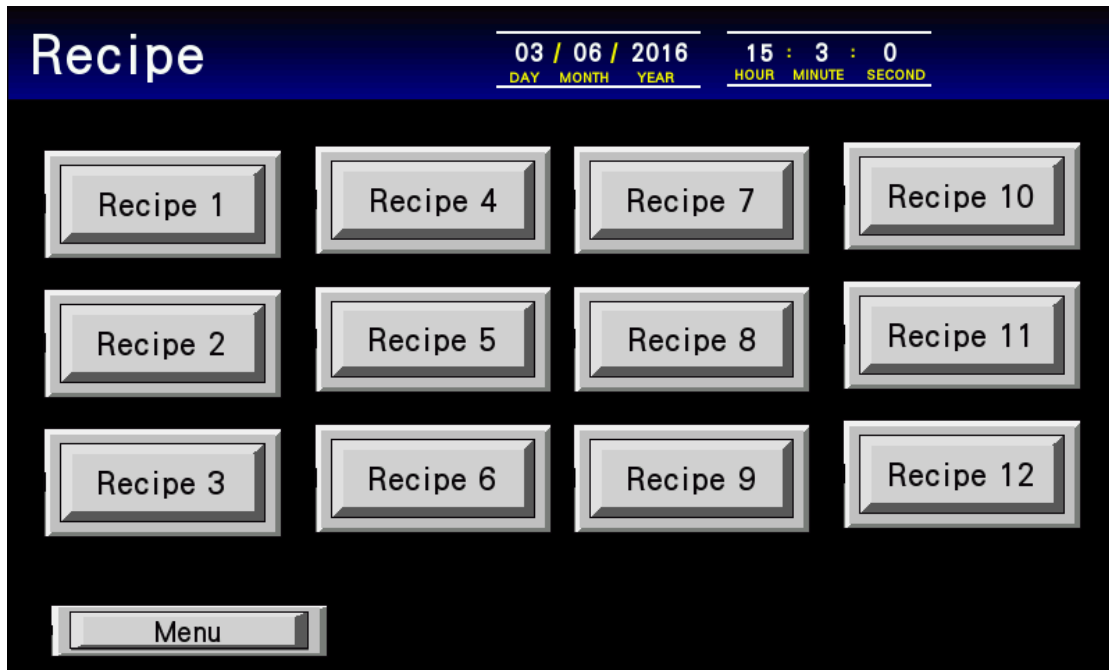
The machine is equipped with motorized valve with feedback control system which is designed by HAS & DEL Engineer. It takes sensor signals and gives command to motorized valve for precise fertigation dosing to get precise set value.



This is optional attachment of the machine. The motorized valves are used for precise control therefore please ask for motorized valve setting / calibration procedure for future. Please understand calibration procedure at the time of installation.

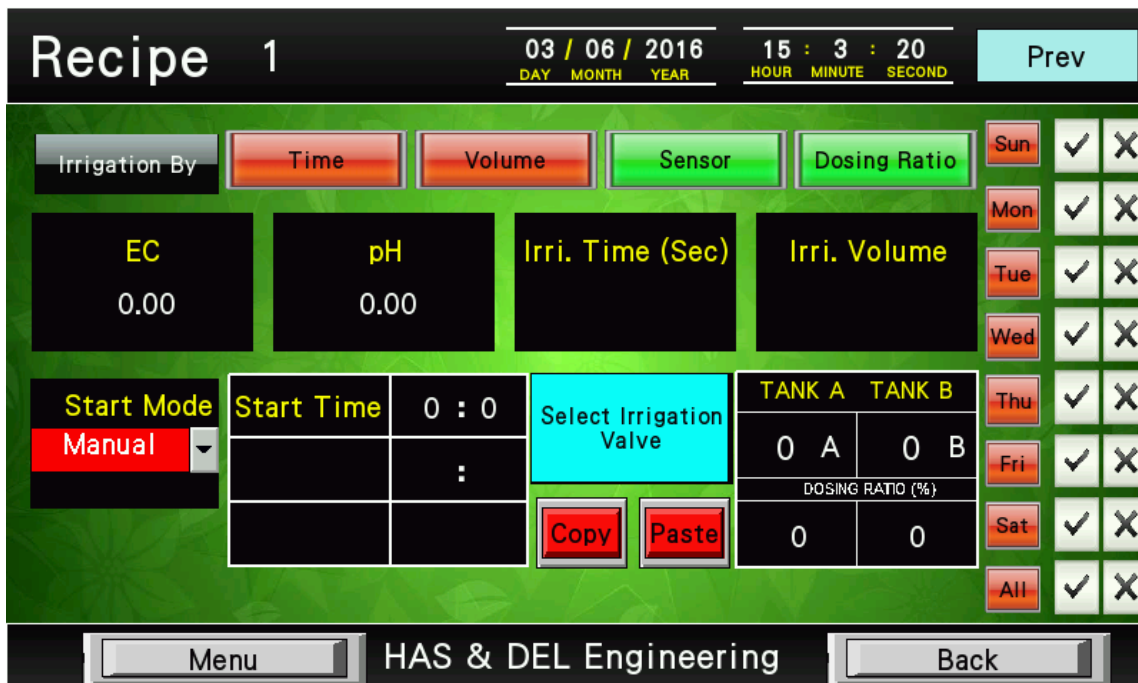
Recipe

Press **Recipe** button and jump to recipe page which give you selection and setting of number of recipes which makes your operation more flexible



Press recipe key and corresponding recipe page will open which allow you to set recipe.

Please press recipe 1 which jump to corresponding recipe 1 page



HAS & DEL Engineering

Recipe Setting

Irrigation by	This is an indication only that your recipe will run based on time or volume. You have to set irrigation by time or volume from machine settings page. Selected setting will become green.
EC & pH set value	Allow to set EC & pH value
Irrigation Time	Set irrigation time and it's allowed to set if you have selected irrigation by time
Irrigation by Volume	Set irrigation volume and its allowed to set if you have selected irrigation by
Dosing Ratio	By activating this allow to activate dosing ratio process. Please check system configuration before setting the same.
Tank A & Tank B	Its allow to select tanks
Dosing Ratio	Allow percentage of ratio for corresponding selected tank.
Start Mode	Select Manual / auto / Sensor Mode
Start Time	Manual Mode – select the recipe & press start button on panel to start M/c Auto Mode – Set start time & select day M/c will start automatically as per set time and day. Sensor Mode – M/c will start as per sensor settings.
Selection Irrigation Valves	If you press the button then valve selection page will appear which allow you to selects valve sequence.
Day Selection	Select days for selected recipe to start in auto / sensor mode
Copy & Paste	Copy any recipe and paste in required recipe

The machine setting is very simple and user friendly therefore please understand at time of an installation from HAS & DEL Engineer.

Recipe Valve Setting

You can select valve combination for simultaneous valve operation. Please make sure your pump capacity before selecting valve combination. If irrigation pump capacity is not available then selection of multiple simultaneous valves will disturb machine performance. So please discuss with HAS & DEL Engineer at the time of installation.

Sr. No.	VALVE PAIR				Sr. No.	VALVE PAIR				Sr. No.	VALVE PAIR				Sr. No.	VALVE PAIR				R e c i p e 1 A L L Z E R O B a c k
	1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4	
1	0	0	0	0	17	0	0	0	0	33	0	0	0	0	49	0	0	0	0	
2	0	0	0	0	18	0	0	0	0	34	0	0	0	0	50	0	0	0	0	
3	0	0	0	0	19	0	0	0	0	35	0	0	0	0	51	0	0	0	0	
4	0	0	0	0	20	0	0	0	0	36	0	0	0	0	52	0	0	0	0	
5	0	0	0	0	21	0	0	0	0	37	0	0	0	0	53	0	0	0	0	
6	0	0	0	0	22	0	0	0	0	38	0	0	0	0	54	0	0	0	0	
7	0	0	0	0	23	0	0	0	0	39	0	0	0	0	55	0	0	0	0	
8	0	0	0	0	24	0	0	0	0	40	0	0	0	0	56	0	0	0	0	
9	0	0	0	0	25	0	0	0	0	41	0	0	0	0	57	0	0	0	0	
10	0	0	0	0	26	0	0	0	0	42	0	0	0	0	58	0	0	0	0	
11	0	0	0	0	27	0	0	0	0	43	0	0	0	0	59	0	0	0	0	
12	0	0	0	0	28	0	0	0	0	44	0	0	0	0	60	0	0	0	0	
13	0	0	0	0	29	0	0	0	0	45	0	0	0	0	61	0	0	0	0	
14	0	0	0	0	30	0	0	0	0	46	0	0	0	0	62	0	0	0	0	
15	0	0	0	0	31	0	0	0	0	47	0	0	0	0	63	0	0	0	0	
16	0	0	0	0	32	0	0	0	0	48	0	0	0	0	64	0	0	0	0	

Valve selection– You can operate up to 4 valves together depending on your pump capacity.

Valves selected in horizontal row will operate simultaneously (Max. 4), if selected 0 then it's not activated therefore make sure of your set valve.

Valves selected in vertical column will work in sequence (max 64)

Example

Valve no 1, 2, 3, 4 in row 1

Valve no 5, 6, 7 in row 2

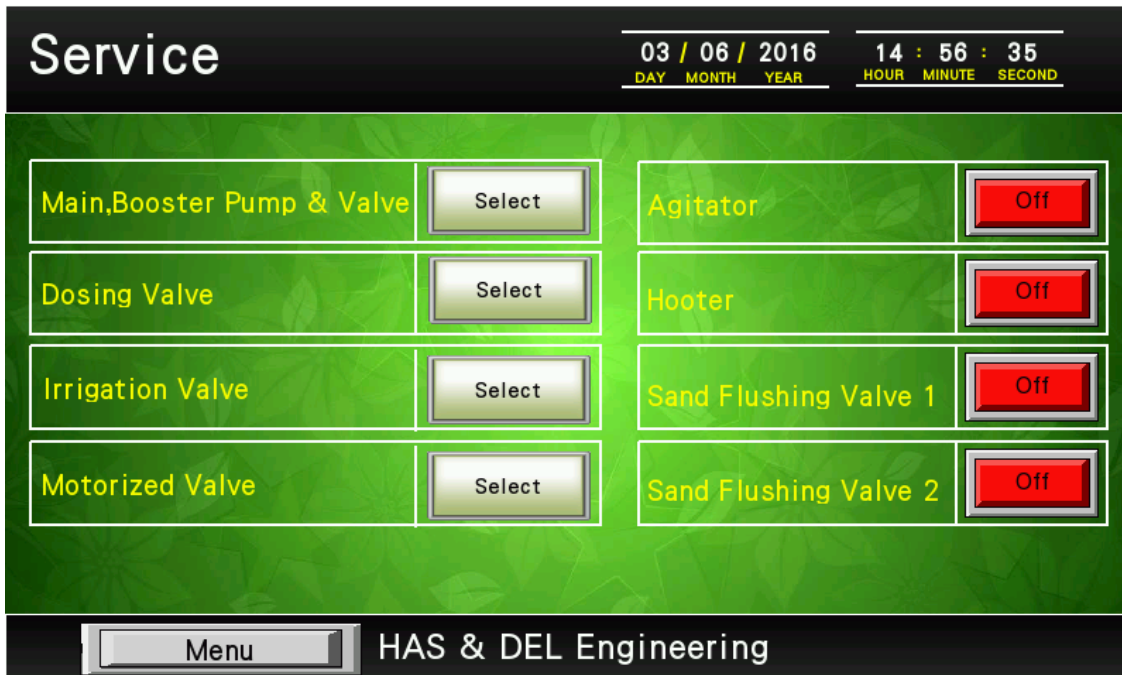
Valve no 8, 9 in row 3

Valve no 10 in row

This means Valve 1. 2. 3. 4 will operate together for set period of time after this automatically valve no 5, 6, 7 will operate together, then Valve no 8, 9 will operate and finally valve no 10 will operate for set period to time. This is your set cycle which will get completed and stop the machine or its jump to another recipe run for further run.

Service

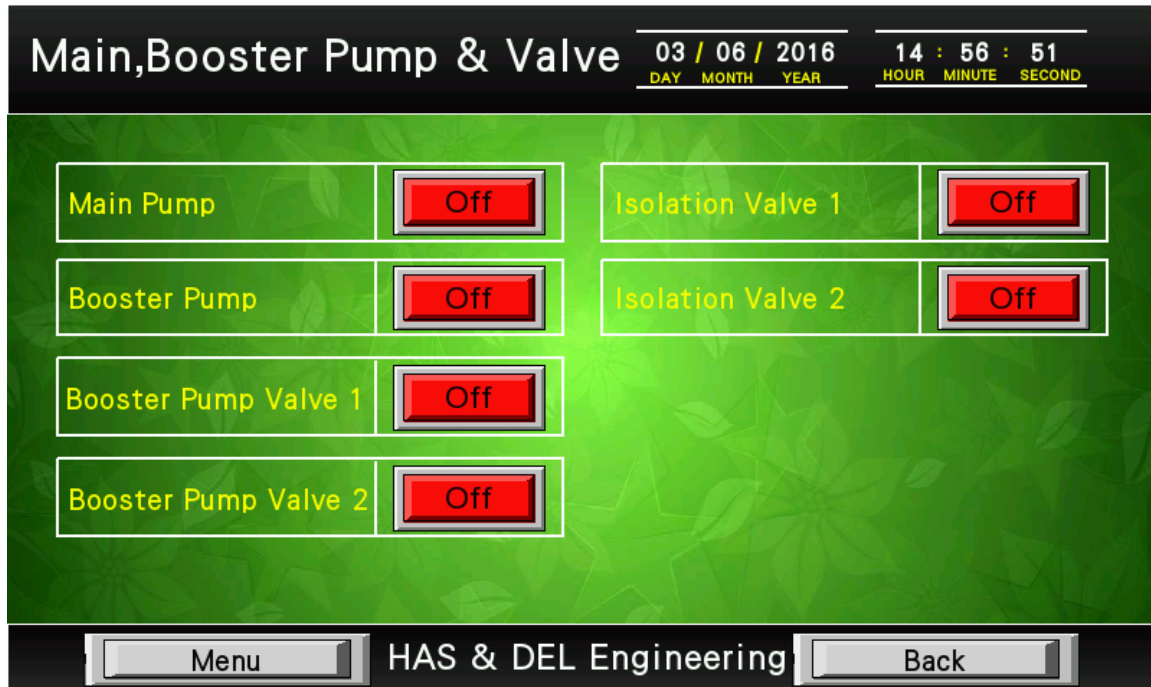
The service page will allow you to operate pumps, valves etc in manual mode



Main, Booster Pump & Valve	Select this page to switch main pump / booster pump and corresponding valves ON or OFF in manual mode.
Dosing Valve	Select this page to switch dosing valve ON or OFF in manual mode
Irrigation Valve	Select this page to switch irrigation valve ON or OFF in manual mode
Motorized Valve	Select Motorized valve and check manually. You can set the motorized position and run manually also. But please make sure that your machine has motorized valve because this is not allow in all machines.
Dosing Tank	No. of dosing tank can use, 2A+2B & additional pH tank are standard and additional tank I possible as per your request.
Agitator	This is optional feature, make sure that the machine is provided the same and activated in System Configuration
Hooter	To switch ON or OFF the hooter in manual mode
Sand Flushing Valve 1 & 2	Please make sure Sand Flushing is activated in System, configuration and its allow to check manual or activate manually.

The service page is used to operate individual components manually in manual mode which helps in diagnosing of problems.

In service page, you can switch ON or OFF the device by just clicking soft key button. This is very simple and easy to check manual run of the device as well as check in maintenance.

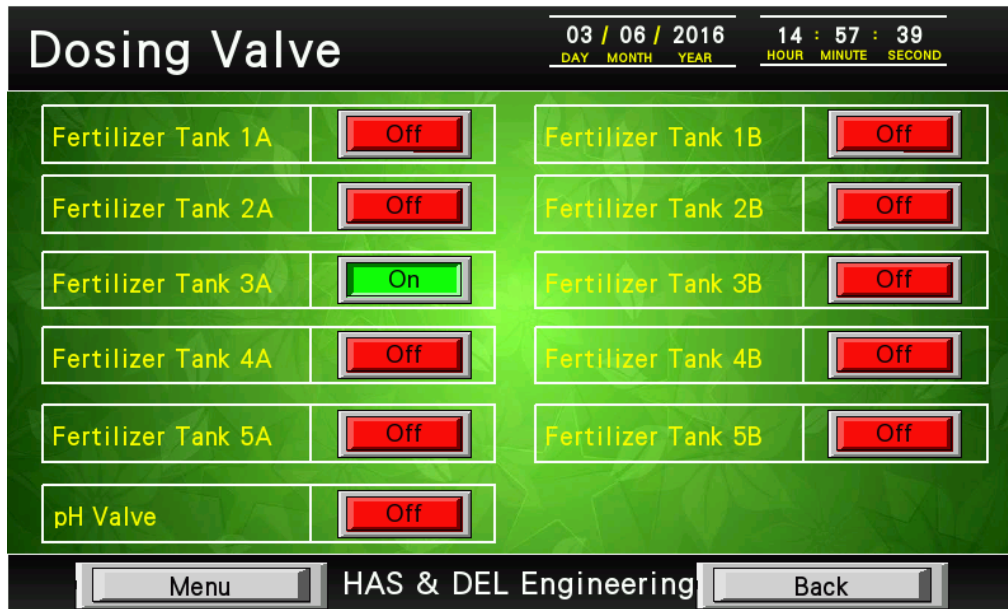


Main Pump	Switch on Main pump by just pressing corresponding soft key only. If you release key then pump will get switch off.
Booster Pump	Switch on Booster pump by just pressing corresponding soft key only. If you release key then pump will get switch off
Booster pump Valve 1 & 2	<p>Please understand function of the same from HAS & DEL Engineer. This is allow water for booster venture motive flow and also allow booster pump media throw into main line. This is separate main line form the dosing system and not read any EC and pH value.</p> <p>Ex. If switch of this valve then there is no water for venture therefore no fertigation suction will take place.</p>
Isolation Valve 1 & 2	This is an optional feature in the machine which is activated as per the customer requirement. Therefore please discuss with HAS & DEL Engineer. Please make sure activation of Isolation valve in configuration page.

This is very important for diagnosis the machine problem also. So it's so simple and use friendly system for our customer.

Service – Dosing Valves

In service page, you can switch ON or OFF the device by just clicking soft key button. This is very simple and easy to check manual run of the device as well as check in maintenance.



Fertilizer Tanks

HAS & DEL system is ready with ten dosing tanks or 5 sets of dosing tanks and one pH tank, but standard attachment is 2 tanks 1 set for EC and one tank for pH. You can check each valve activation by just switch ON or OFF the corresponding soft key. Please press corresponding soft key to switch ON then 24 VDC will available across corresponding valve coil which magnetize coil and pull diaphragm to open the same. The EC diaphragm valve is suitable for fertigation and pH diaphragm is suitable for acid etc. which make you machine maintenance free.

If corresponding voltage is available and also not allow the flow then please clean diaphragm or contact with HAS & DEL engineer. Please make sure of regular cleaning of valves which benefits for trouble free run of the system

Ex. No fertigation suction or sufficient in the suction line.

Please check 24 VDC of corresponding valve.

Check suction availability at mouth of suction pipe.

Clean corresponding valve diaphragm.

Check motorized or manual valve in the line is open.

Check sufficient motive flow available in the corresponding venture input.

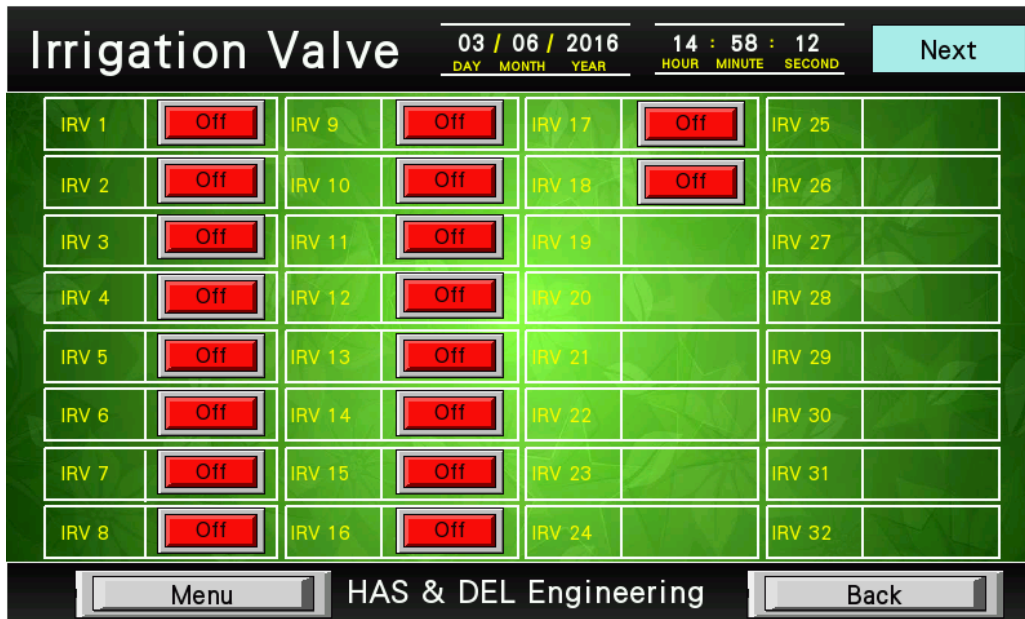
Please check irrigation pump output pressure.

Please check pressure after filter

Please make sure to not having pressure fluctuation in the main irrigation line.

Service – Irrigation Valve

In service page, you can switch ON or OFF the device by just clicking soft key button. This is very simple and easy to check manual run of the device as well as check in maintenance.



Irrigation Valve

In this service page you can switch ON or OFF each irrigation valve individually to check function of the valve. Please check number of irrigation valve selection in the **SYSTEM CONFIGURATION** page. This makes you ease of fault finding and finding line blockage etc. Normally, this valve with 24 VAC available through step down transformer, so please refer circuit diagram for the same.

Ex. No water at the output line or sufficient in the flow line.

Please check 24 VAC of corresponding valve.

Check any blockage in the valve.

Clean corresponding valve or in build filter in the valve (some of the valves are available with in builds filter).

Check any leakage in the valve

Please make sure to have prepare fitting of the valve assembly or called HAS & DEL Engineer or valve suppliers

Please check irrigation pump output pressure.

Please check pressure after filter

Please make sure to not having pressure fluctuation in the main irrigation line.

Service – Motorized Valve

The motorized valve is designed by HAS & DEL Engineer and

The motorized valve is designed by HAS & DEL Engineer Please make sure to not having pressure fluctuation in the main irrigation line.

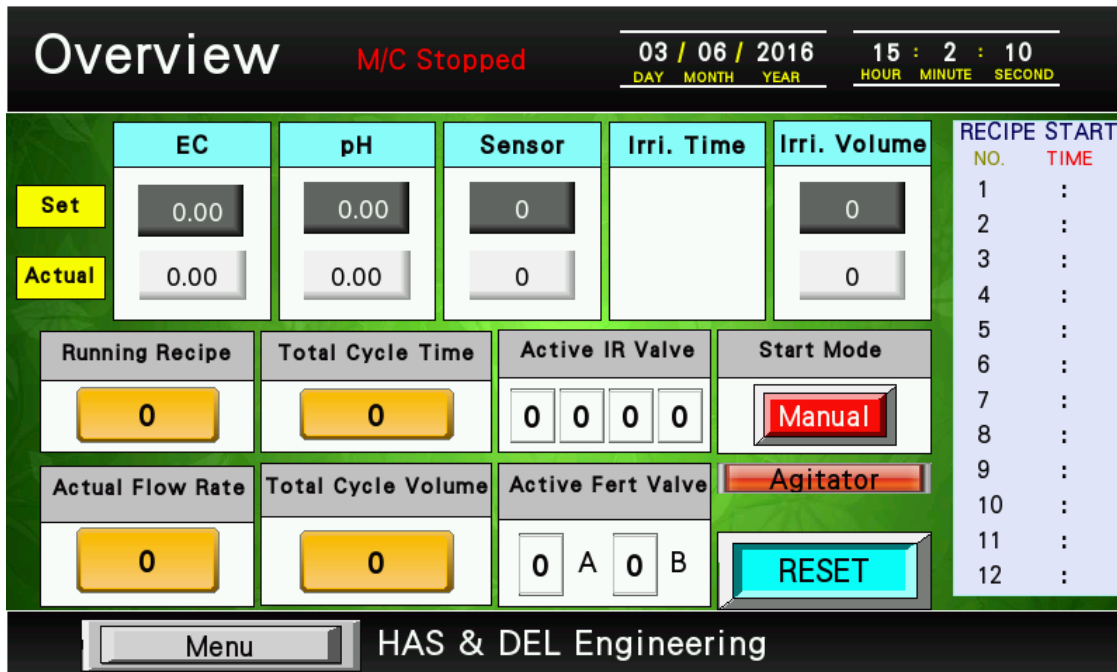


pH Valve Select	Switching ON / OFF pH valve as per set postion
pH Valve Position	Set required position (0 – 2500) 0 – Completely close & 2050 mean complete open
pH Valve Speed	Set the valve speed for maul opening closing.
EC1 & EC 2 Valve Select	Switching ON / OFF EC valve as per set postion
EC1 & EC2 Valve Position	Set required position (0 – 2500) 0 – Completely close & 2050 mean complete open
EC1 & EC2 Valve Speed	Set the valve speed for maul opening closing.

Please consult with HAS & DEL Engineer for the motorized valve calibration.

Overview

In Overview page, you can see actual value of the recipe parameters of the running recipe which gives you brief about your running recipe and process.



EC / pH / Sensor Value	It will show actual and set EC / pH value
Irrigation Time or Volume	Give you actual and set irrigation time or volume.
Running Recipe	It will show which recipe is running
Total Cycle Time / Volume	Show you Total cycle time
Active IR Valve	Will show active irrigation Valves
Start Mode	Display mode of the machine i.e. in manual / automatic / sensor
Actual Flow Rate	Show what flow is in the cycle
Total Cycle Volume	Will Display total volume for the cycle
Active Fert. Valve	Will display active fertilizer valve in the cycle
RESET	This button is used to reset the running recipe. Eg if you stop the m/c in between and start it again it will start from where it stopped, if you press reset it start from beginning
Recipe Start	After selection start time in the recipe it calculates end time by calculating selected irrigation valve time. Each recipe start time will display here which ease to set in recipe.

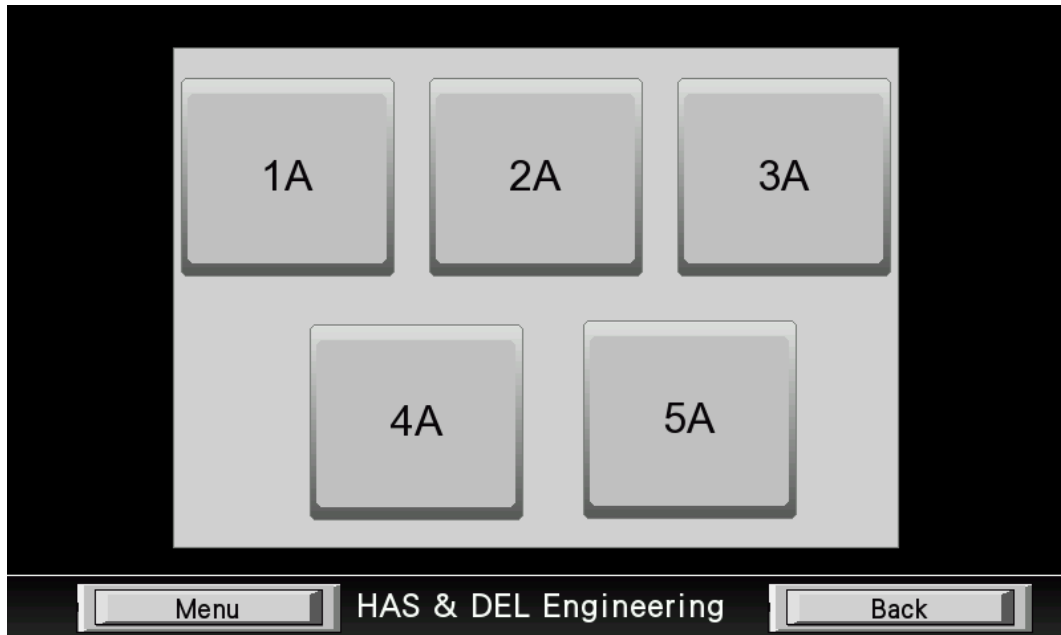
Sand Flushing

Sand flushing is an optional feature so please makes sure its activated in **System Configuration** page, if it's not activated and made changes in the hardware then corresponding page will not appear. So please discuss with HAS & DEL Engineer for your requirement need.



You can set automatic sand filter flushing from this page if this feature is available. Enter the time & select the day for starting the sand filter flushing

Fertilizer Tank selection



This page should come after valve selection page. From this page you can select desired fertilizer tank for that particular recipe,

Event 03 / 06 / 2016 14 : 56 : 13
DAY MONTH YEAR HOUR MINUTE SECOND

NO.	DATE	TIME	FAULT/ALARM
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Menu HAS & DEL Engineering

The machine has any problem and corresponding related alarm will display and its ease to understand about the problem and sort the same.

Trouble Shooting

M/c is not getting ON

- Check input 3 Φ power.
- Check input supply fuse & available of all phase as well as voltages. If the phase is missing or below nominal set value of phase detector device then tripped OFF.
- Check MCB position in the machine panel.

Irrigation or booster is not getting ON

- Check input supply fuse & available of all phase as well as voltages. If the phase is missing or below nominal set value of phase detector device then tripped OFF.
- Check MCB position in the machine panel.
- Any alarm in the machine.
- Check free movement of the pump

Insufficient or no flow from Irrigation Valve

- No blockage in the irrigation valve, Please clean or service.
- Check corresponding valve is activated & 24 VAC is available, check 24 VAC is available at transformer output . Please refer electrical circuit diagram.
- Check pump irrigation flow & pressure, check blockage In the line filter.

DO Station is not ready

- Check 24 VDC power is available in the DO station & Main panels also.
- Any loose connection in optical fiber cable or damage in the cable.
- Check optical components, please discuss with HAS & DEL Engineer.

No suction or insufficient suction

- Corresponding Dosing valve activated or 24 VDC is available.
- Clean dosing valve diaphragm or check any damage or blockage in diaphragm.
- Check sufficient motive flow at the input of ventury or no fluctuation or sufficient main line pressure.
- No leakage in the suction line or any restriction to develop enough vacuum.
- Check motorized valve is activated or in open position.
- Check Booster pump valves are activated or 24 VAC is available.
- Check machine setting.

No power for PLC or PLC is not getting ON

- Check main line 3 phase is okay and then 24 VDC is available.
- Check 24 VDC power supply and corresponding MCB.
- Check phase detector is not tripped OFF.