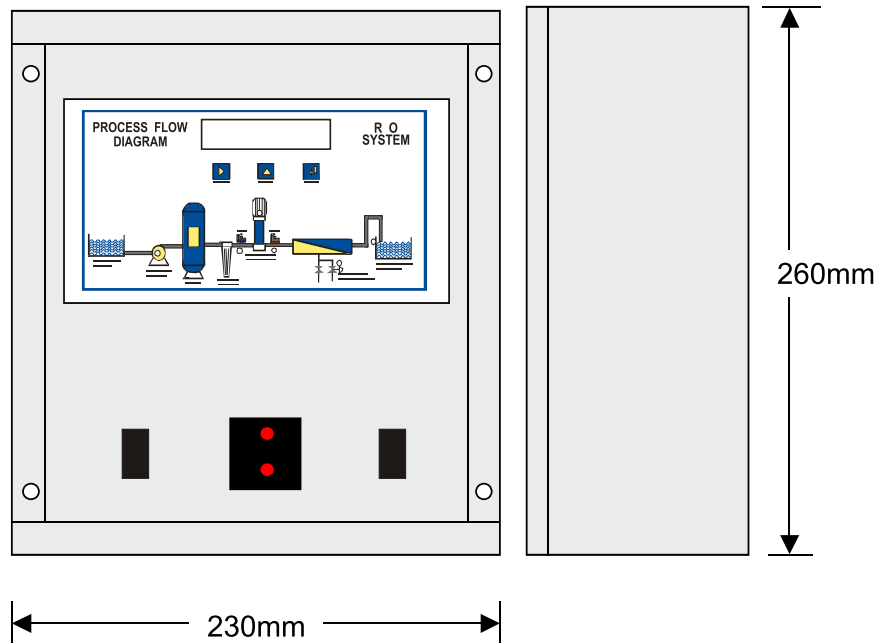


**ASTRO RO CONTROLLER
WITH CONDUCTIVITY & TOTALIZER
(16 X 2 LCD DISPLAY V 5)**



Cut out size: 190mm (H) x 222 mm (V)

ASTRO-PANEL NG

Automation Philosophy:

The Astero microprocessor based panels are ideally suited for small and medium sized RO plants as they have the complete operating logic of the process pre-programmed. The panels basically can take 6 inputs from the three devices namely low pressure switch (**LPS**), High pressure switch (**HPS**), permeate tank level switch (**LS**), conductivity & 2 Auxiliary Input (*Auxiliary input* can be configured as RWLV, RL2, ORP, DOSING) and a Flow sensor input & controls four outputs Raw water pump (**RWP**), High pressure pump (**HPP**), the flushing solenoid valve, **ALARM**. The advanced electronics also takes care of the required motor protection such as **over load, dry running, and single phasing**.

Operating Logic:

Upon switching ON power supply of the panel, if the level of the permeate tank is low, the raw water pump will start and the reject solenoid valve will open for a programmed time (flush the membrane). After the flush time is over, the processor will check for low pressure input. If the input is ON (short), the high pressure pump will start after the set de-bounce time. The **de-bounce time** helps in avoiding unnecessary chattering of the high pressure pump contactor due to initial dipping in the suction pressure.

This panel is also equipped to suit the applications with AUTO MULTIPORT VALVE pretreatment. In that case Auxiliary input 1 & Auxiliary input 2 are automatically configured as RL2 & RL1 respectively. And one can configure the **Auxiliary O/P as PUMP ON** (which is other wise an Alarm).

OPERATION OF THE PANEL:

Starting Sequence: After switching ON power supply of the panel, it checks for the following inputs.

1. If level of permeate tank is low the RWP (Raw Water Pump) will start and reject solenoid valve will open for the programmed time period.
2. After flush time is over, the processor will check for low pressure input. If input is ON (short), HPP (High Pressure Pump) will start after the set debounce time.

Stopping Sequence: Under following conditions processor will stop its operation

1. If stop key is pressed
2. If treated water tank is full(open)
3. If high pressure switch is ON(short)
4. If raw water tank is empty (short)

If any one of the above condition occurs, then

- HPP stops (If HP Flushing is OFF)
- Reject solenoid valve will open for the programmed time.
- RWP stops & STATUS is displayed on MIMIC

Trip sequence: Under following conditions processor will trip, at that time press start to resume operation. (The Hooter relay will be energized in these conditions & can be reset by pressing START)

1. High pressure
2. High Conductivity (If Control operation is ON)
3. High ORP
4. Dry Run, Single phase, Overload

Instructions for Setting the Panel: Use the following keys for setting the panel as per given instructions.

- **▶ START:** This key is used to start the operation and move the cursor forward
- **◀ STOP:** This key is used to end the operation and increase the value
- **↵ MENU:** This key is used to go to next step (**Enter**).

Maximum recommended HP ratings:

Panel Configuration:11

13

33

Raw water Pump: 2 HP Single phase 2 HP Single phase 5 HP Three phase

High Pressure Pump: 2 HP Single phase 5 HP Three phase 5 HP Three phase

Solenoid valve: Normally closed type(230 V A.C.) Client's Scope.

Terminal Connections:

Astero 33

INCOMING WIRE SHOULD BE OF 2.5 sqmm														LPS		HPS		TW TANK FLOATY		AUXILIARY 1 INPUT 2			COND- TIVITY SENSOR		FLOW SENSOR		
INPUT				HPP			RWP			FLUSH VALVE		DOSER								DOS LVL	C	RWT LVL					
R	Y	B	N	R	Y	B	R	Y	B	P	N	P	N	NO	C	NO	C	NC	C	NO	C	NO	R	B	R	G	B

Astero 13

INCOMING WIRE SHOULD BE OF 2.5 sqmm												LPS		HPS		TW TANK FLOATY		AUXILIARY 1 INPUT 2		COND- TIVITY SENSOR		FLOW SENSOR				
INPUT				HPP		RWP		FLUSH VALVE		DOSER								DOS LVL	C					RWT LVL		
R	Y	B	N	R	Y	B	P	N	P	N	P	N	NO	C	NO	C	NC	C	NO	C	NO	R	B	R	G	B

Astero 11

INCOMING WIRE SHOULD BE OF 2.5 sqmm										LPS		HPS		TW TANK FLOATY		AUXILIARY 1 INPUT 2			COND- TIVITY SENSOR			FLOW SENSOR		
INPUT		HPP		RWP		FLUSH VALVE		DOS LVL	C							RWT LVL								
P	N	P	N	P	N	P	N	NO	C	NO	C	NC	C	NO	C	NO	R	B	R	G	B			

Terminal	Description	Connections
HPP	High Pressure Pump	RYB/P- Phase N-Neutral
RWP	Raw Water Pump	RYB/P- Phase N-Neutral
SOL	Solenoid Valve #	P-Phase N-Neutral
LPS	Low Pressure Switch	C-Common NO-Normally Open
HPS	High Pressure Switch	C-Common NO-Normally Open
FLT	Floaty	C-Common NC-Normally Closed
*AUX. I/P 1 & 2	Auxiliary Input	C-Common
	Raw water level	NC-Normally Closed (At Low)
	Dosing	NC-Normally Closed (At Low)
	ORP	NO-Normally Open
	RL1	NC-Normally Closed
	RL2	NO-Normally Open
CONDUCTIVITY SENSOR	Conductivity Sensor	R-Red ; B-Black
FLOW SENSOR	Flow Sensor	R-Red ; G-Green ; B-Black

In case of **FILTER WITH AUTO MULTIPOINT VALVE PRETREATMENT** The Aux I/P1 and AUX I/P2 automatically configured as RL 2 and RL 1 respectively.RL1 is normally closed and RL2 is normally open from Auto valve.

Accessories:

MCB (Optional): Available with 13/33 Panel

NOTE: Connections for flushing solenoid valve is directly from terminal as P for Phase and N for Neutral.**Ensure that the solenoid valve coil voltage is 230 V AC and the valve is normally closed type.**

TO VIEW THE FACTORY SETTINGS	
Key Pressed	Display
MENU	VIEW?
Display scrolls through all the settings set by factory.	
MENU	LO PRESS. SW : ON
	TIME :015
	HI PRESS. SW : ON
	LEVEL SW : ON
	AUX IP1:DOSING
	AUX IP2:RW LEVEL
	RW CNTRL:OFF
	AUX OP : ALARM
	SETTINGS?
TO SET OVERLOAD CURRENTS(SEC--1.1)	
Why to set overload current? When the motor draws more current than the normal running current then it is said to be an overload current which is an abnormal condition which leads to motor burns or failures. To take care of it we set overload currents, the panel trips when the current drawn by the motor is more than the overload current value set by us (20% more than actual running current)	
How to know normal(actual) running motor current? There are two methods (1)With the Clamp Meter check the output currents of individual phases(R/Y/B).(2) Using our control panel Refer section 1.7	
MENU	RWP OVL CRT?
MENU	RWP OVL CRT?04.0
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	HPP OVL CRT?
MENU	HPP OVL CRT?04.0
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	FLUSHING VLV :
MENU	TIME :015 S
What is this time? (in seconds) This is amount of time for which flushing should be done during Starting and Stopping of controller,	
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	LO PRESS. SW
MENU	TIME :015 S
What is this time?(in seconds) This is the debounce time, which helps in avoiding unnecessary chattering of High pressure pump contactor due to initial dipping in the suction pressure The High pressure pump will start after set debounce time.	
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	EXIT?
MENU	SCROLL?
MENU	SCROLL? OFF
Why to make scroll ON/OFF? This scrolling facility provided to the users who want see only CONDUCTIVITY & plant status on display during plant operation they have to make scroll OFF otherwise display will show permeate flow rate & Volume,Operation hours along with plant status & conductivity in scrolling.	
USE STOP KEY TO MAKE IT ON	
MENU	COND/TDS?

MENU	DISP
MENU	DISP: μ SM
USE STOP KEY TO MAKE IT PPM IF REQUIRED	
MENU	SET PT :(If CNTRL OPRN:ON)
MENU	SET PT :500
MENU	DELAY :
MENU	DELAY :010
What is this delay time(max 225 sec) and set point?(max 999) Set point is the value of conductivity beyond which the system will trip. Delay is the time up to which the increase in conductivity will be ignored (Typically during start up)	
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	EXIT?
MENU	DISP CRT ?
MENU	DISP CRT ? NO
USE STOP KEY TO MAKE IT YES.THEN PANEL WILL SHOW CURRENTS OF BOTH PUMPS.	
TO SET DRY RUN CURRENTS(SEC--1.2)	
Why to set Dry Run current? If the pump is running without any water, is termed as motor dry running and current drawn by the motor is lesser than the normal running current. The controller avoids the dry running of motor by tripping the RWP / HPP. Dry running can lead to pump failures and therefore there is a need to trip pump/motor in such a condition How to know dry running motor current? Run the motor without any load and check the phase currents with Clamp meter. The set point must be kept between normal running current and actual dry running current	
START & STOP	
SIMULTANEOUSLY	PASSWORD:000
ENTER PASSWORD 123 WITH START & STOP KEY	
USE STOP KEY TO MAKE IT ON	
MENU	PHASE UNBAL :
	PHASE UNBAL :40
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	DRY RUN OPRN:
MENU	DRY RUN OPRN:OFF
USE STOP KEY TO MAKE IT ON	
MENU	RWP DRY CRT?
MENU	RWP DRY CRT?01.5
USE STOP AND START KEY TO SET DESIRED VALUE BELOW WHICH THE PUMP MUST TRIP	
MENU	HPP DRY CRT?
MENU	HPP DRY CRT?01.5
USE STOP AND START KEY TO SET DESIRED VALUE BELOW WHICH THE PUMP MUST TRIP	
MENU	AUTO RESTART?
MENU	AUTO RESTART? OFF
What is AUTO RESTART ? Once the pump go dry running and if Auto Restart is ON then the motor starts automatically after set time is elapsed else we have to start the motors manually.	
USE STOP KEY TO MAKE IT ON	
MENU	TIME : 015 m
MENU	EXIT?

CONDUCTIVITY CALIBRATION (SEC--1.3)	
Why to calibrate? If there is mismatch between actual and required value of conductivity then there is need for recalibration. For that 1) Dip the sensor in standard known solution and set the required value. Ex. If actual value is 400µs/cm and required value is 450µs/cm then calibrate as:	
START & STOP	
SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 234 WITH START & STOP KEY	
MENU	CALIB.COND ?
MENU	ACT VAL 400
STOP	REQ VAL 450
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	CALIB CMPL (calibration complete)
MENU	COND. OFFSET?
MENU	COND. OFFSET? 000
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	EXIT?
MENU	
TO CONFIGURE INPUTS (SEC--1.4)	
Panel can take 5 switch inputs viz. LPS, HPS, LEVEL SWITCH (permeate floaty) Aux I/P 1 :- Can be set as RWLVL/ORP/DOSNG or OFF Aux I/P 2 :- Can be set as RWLVL/RL2 or OFF INCASE of FILTER with AUTO MULTIPOINT VALVE pretreatment The Aux I/P 1 and Aux I/P 2 automatically configured as RL2 and RL1 and a conductivity & a Flow sensor I/P. Password 678 is used for the input configuration. One can put this password only if plant is NOT RUNNING.	
START & STOP	
SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 678 WITH START & STOP KEY	
MENU	HP FLUSHING :OFF
What is HP FLUSHING? Normally flushing is done by RWP during Starting and Stopping of system. Incuse High Pressure Flushing during stopping is required then make HP FLUSHING ON	
USE STOP KEY TO MAKE IT ON	
MENU	CONDUCTIVITY:
MENU	CONDUCTIVITY:ON
USE STOP KEY TO MAKE IT OFF/ON	
MENU	CONTRL OPRN:
	CONTRL OPRN:OFF
What is CONTRL OPRN? This is an interlock for conductivity ,When the conductivity exceeds set maximum value then panel trips showing HI CONDUCTIVITY on display if CONTROL OPERATION is ON else it neglects value of conductivity.	
MENU	FLOW SENSORS:
MENU	NO OF SENSOR:
MENU	NO OF SENSOR:1
MENU	SENSOR CONST:
MENU	SENSOR CONST: 060.0

Use START & STOP key to set desired value(as mentioned on Sensor)	
MENU	QUIT?
MENU	AUX OP:
MENU	AUX OP: ALARM
Use STOP key to make it DOSOP or PMPON	
What is this ? Basically this is an Auxiliary Output which can be configured as ALARM(will be ON in case of any fault)/DOSING PUMP (will be ON along with HPP) or PUMP ON SIGNAL(will be ON with RWP- Especially used in pretreatment with AMPV)	
MENU	LEVEL SW:
MENU	LEVEL SW:ON
USE STOP KEY TO MAKE IT OFF	(only if no level control required)
MENU	LO PRESS. SW:
MENU	LO PRESS. SW:ON
USE STOP KEY TO MAKE IT OFF	(only if LPS needs to be bypassed)
MENU	HI PRESS. SW:
MENU	HI PRESS. SW:ON
USE STOP KEY TO MAKE IT OFF	(only if HPS needs to be bypassed)
MENU	AUX. IP1:
MENU	AUX. IP1:DOSING
USE STOP KEY TO MAKE IT RWLVL/ORP/RL2/OFF	
MENU	AUX. Ip2:
MENU	AUX. IP2:RWLVL
USE STOP KEY TO MAKE IT RL2/OFF	
MENU	EXIT?
MENU	
TO CONFIGURE OUTPUT (SEC--1.5)	
START & STOP	
SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 191 WITH START & STOP KEY	
MENU	MP TYPE :1-3
USE STOP KEY TO MAKE IT 1-1/1-3/3-3	
MENU	RW CONTROL :OFF
What is RW control ? If you make RW CONTROL ON then you can Start and Stop RWP/RO independently.	
MENU	EXIT?
MENU	
TIME BASED AUTOFLUSHING SETTINGS (SEC--1.6)	
What is time based autoflushing? Normally our panel comes with facility of flushing during starting and stopping of panel but somebody wants to flush besides this on timely manner this feature also provided with us. For that you have to make FLUSH OPRN ON and provide span between flush time for which flushing should go on.	
START & STOP	
SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 345 WITH START & STOP KEY	
MENU	FLUSH OPRN:
	FLUSH OPRN:OFF
USE STOP KEY TO MAKE IT ON	

MENU	FLUSH DELAY
MENU	TIME : 060 m
MENU	FLUSH TIME
MENU	TIME : 015 S
MENU	EXIT?
MENU	
CURRENT CHECKING(SEC--1.7)	
What is CURRENT CHECKING feature?	
If you want check the normal running currents of motor then use this feature	
START & STOP	
SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 456 WITH START & STOP KEY	
MENU	R:0.9
START	RWP
USE STOP KEY TO SELECT RWP/HPP FOR WHICH YOU ARE GOING TO CHECK THE CURRENT	
MENU	R:0.9
USE STOP KEY TO SELECT R/ B PHASE	
MENU	MANUAL STOP
PRESS START KEY TO START THE PLANT.	
TO CONFIGURE AUTOMPV (SEC--1.8)	
This set up should be altered ONLY incase the FILTER is with AUTO MULTIPOINT VALVE pretreatment	
START & STOP SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 084 WITH START & STOP KEY	
MENU	MPV CONTRL :
MENU	MPV CONTRL :OFF
USE STOP KEY TO MAKE IT ON THEN	
One has to configure AUX OP as PMPON when there is AMPV in pretreatment.	
MENU	EXIT?
MENU	
Press START key to see Operational Hours.	
NOTE:FOR ALL SETTING PROCEDURES	
In each setting routine , the changes made are finally stored only when the menu key is pressed once exit after the display shows QUIT	

WIRING CONNECTIONS IN CASE OF AUTO MULTIPOINT VALVE

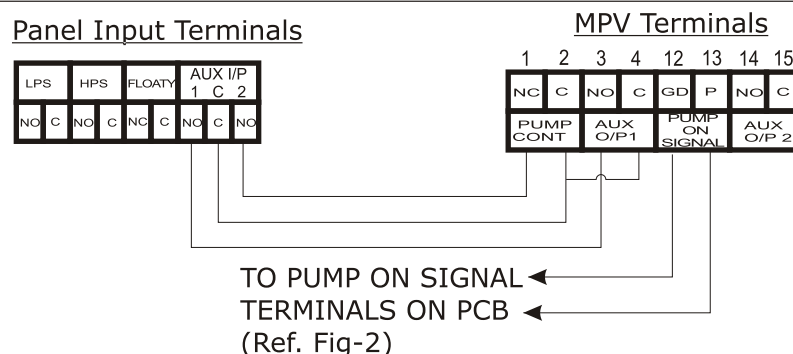


FIG-1

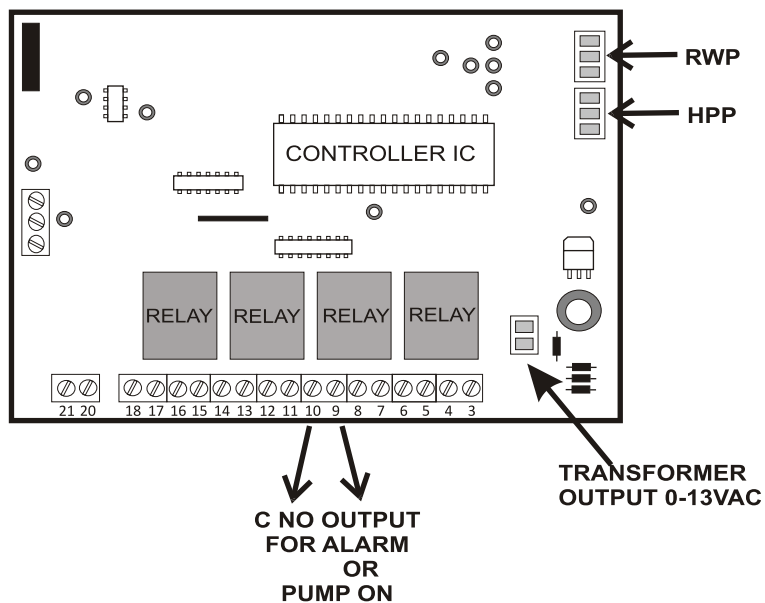
TROUBLESHOOTING

LED Blinking	Message ON Display	Cause & Action
LPS	LOW PRESSURE!!	→ Check, is it C NO contact? If not make it.
		→ Pressure Lower than set value. Increase pressure or reduce set point
		→ LPS not connected
HPS	HI PRESSURE!!	→ Pressure higher than the set value. Reduce pressure or increase set point
		→ Check, is it C NO contact? If not make it.
FLOATY (level)	TW TANK FULL!!	→ Actually tank is full.
		→ Floaty is not connected. Short FLOATY terminal by an external wire link.
		→ Check, is it C NC contact? If not make it.
—	HI CONDUCTIVITY!	→ High conductivity in the line Or set point is LOW in that case increase the set point.
RWP	RW OVERLOAD	→ More current than the normal ratings. Set Overload current accordingly.
	RW SINGLE PHASING	→ Motor is drawing more current than normal. Check Motor
	RW DRY RUNNING	→ If there is mismatch between the R-Y-B phase currents drawn by the pump. Increase the phase unbalance value.
HPP	HPP OVERLOAD	→ If current drawn by the pump is less than the set value. If tank is empty. SET current as given in instructions section. Refer:section1.2
		→ More current than the normal rating. Set Overload current accordingly. Refer:section1.1
	HPP SINGLE PH	→ Motor is drawing more current than normal. Check Motor
	HPP DRY RUNNING	→ If there is mismatch between the R-Y-B phase currents drawn by the pump. Increase the phase unbalance value.
----	FR : 0000 (Flow rate remains Zero)	→ If current drawn by the pump is less than the set value. SET current as given in instructions section. Refer:section1.2
		→ Remove sensor from line & check for any obstacle. Check FR by blowing into sensor.
		→ Check connections.

QUICK REFERENCE

Sr. No	Password	Feature	Section	Page No
1	123	Dry run current setting	1.2	6
2	234	Conductivity Calibration	1.3	7
3	345	Time base auto flushing	1.6	8
4	—	Overload Current Setting	1.1	5
5	678	Input Configuration	1.4	7
6	191	Output Configuration	1.5	8
7	456	Current Checking	1.7	8
8	084	Configure AUTO MPV	1.8	9

CONNECTIONS ON PCB



Panel has an AUTO/MANUAL facility. To put the system in MANUAL MODE one has to put SYSTEM AUTO/MANUAL switch in MANUAL position & switch OFF the panel power and switch it ON again.

Upon power ON display will show MANUAL MODE. In this mode only inputs will get bypassed & pump protection (like Overload, Single phasing) will be there. Use START key to switch ON/OFF the Raw water pump & STOP key to switch ON/OFF the High Pressure Pump.

Note : If RWP is OFF in manual mode then HPP can't be started.

HOW TO GO IN AUTO MODE:

Put the SYSTEM Auto/Manual switch in Auto position, Switch OFF panel power & switch it ON again.