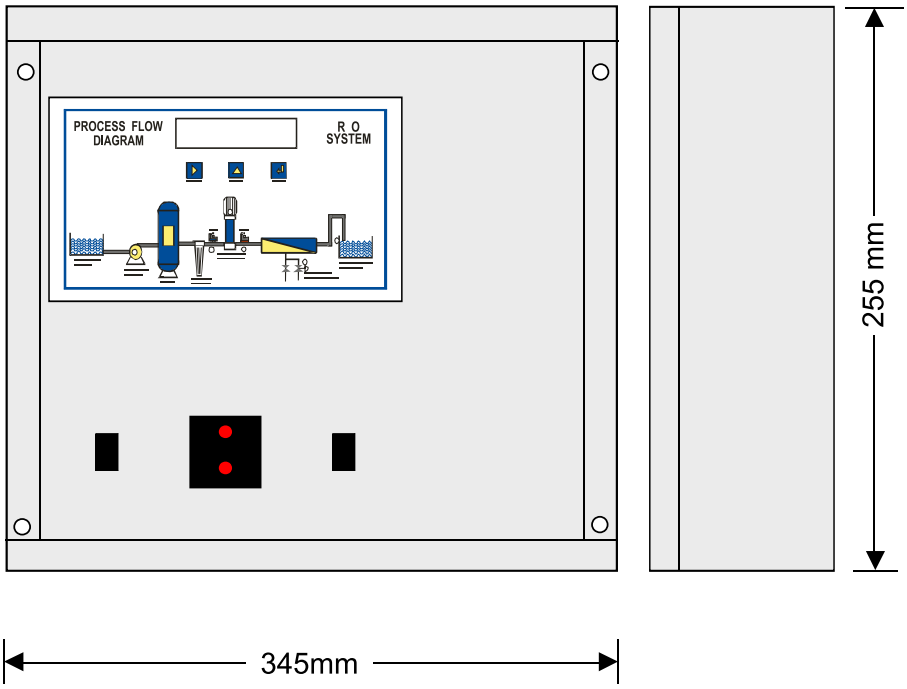
ASTRO RO & TP CONTROLLER
WITH CONDUCTIVITY & TOTALIZER
(16 X 2 LCD DISPLAY V 5)



Cut out size: 305mm Horizontal x 222 mm vertical

ASTRO-PANEL 133/333

1

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Tel.: +91 8691009127/26 Email: filtraw@gmail.com Website: www.ewatertreatmentindia.com

FACTORY SETTINGS	STANDARD	CHANGES
OVERLOAD CURRENT ASTERO 133	RWP: 4.0 Amps ☐ HPP : 4.0 Amps ☐ TP : 4.0 Amps ☐	
OVERLOAD CURRENT ASTERO 333	RWP: 4.0 Amps ☐ HPP : 4.0 Amps ☐ TP : 4.0 Amps ☐	
RW CONTROL	OFF	
CONDUCTIVITY CONTROL OPRATION	OFF	
DRY RUN CONTROL	OFF	
PUMP 3	TRANSFER	
MAXIMUM HP ASTERO 133	RWP: 2HP 1P ☐ HPP : 5HP 3P ☐ TP : 5HP 3P ☐	
MAXIMUM HP ASTERO 333	RWP: 5HP 3P ☐ HPP : 5HP 3P ☐ TP : 5HP 3P ☐	
AUTO PRETREATMENT	OFF	
AUX IP 1	RWT LVL	
AUX IP 2	TP/IP	
CHANGES MADE, IF ANY		
MOV	**320V, D14mm**	
FUSE	**630mA**	

Tested By,

Name ---------

Sign ---------

Date ---------

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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 5 inputs from the three devices namely low pressure switch **(LPS),** High pressure switch **(HPS)** , permeate tank level switch **(LS)**,& 2 Auxiliary Inputs (can be configured as RWLVL,RL2,ORP,DOSING TANK LEVEL or TP IP) and controls four outputs **R**aw **W**ater **P**ump **(RWP), H**igh **P**ressure **P**ump **(HPP), T**ransfer **P**ump**(TP)** & flushing solenoid valve. 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 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 delay(typically 5 seconds). The ***de-bounce time*** helps in avoiding unnecessary chattering of the high pressure pump due to initial dipping in the suction pressure.

Third pump can be configured as TRANSFER PUMP or FLUSHING PUMP. If configured as TRANSFER PUMP it will work on transfer pump input (TP IP) which can be permeate tank low level. Pump will trip if this input is SHORT)

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 over, the processor will check for low pressure input. If input is ON (short), HPP (High Pressure Pump) will start after delay (typically 5 seconds).
3. The Transfer pump can be made ON/OFF just by pressing START/STOP keys from panel.

Stopping Sequence: Under following conditions processor will stop RO operation.

1. If stop key is pressed (It will ask whether RO or Third pump has to be stopped)
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.(To resume operation press START. Then it will ask for RO/TP.)

1. High pressure
2. High Conductivity
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 curser 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**).

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Maximum recommended HP ratings:

Panel Configuration:	**133**	**333**
Raw water Pump:	2 HP Single Phase	5 HP Three Phase
HP Pump:	5 HP Three Phase	5 HP Three Phase
Third pump :	5 HP Three Phase	5 HP Three Phase

Solenoid type: Normally closed type (230 VAC): Client's Scope.

TERMINAL CONNECTIONS :

For 133

INCOMING WIRE SHOULD BE OF 2.5 sqmm													LPS		HPS		TW TANK FLOATY		AUX I/P 1		AUX I/P 2		COND-TIVITY SENSOR		FLOW SENSOR			TP			
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	NC	R	B	R	G	B	R	Y	B	N

For 333

INCOMING WIRE SHOULD BE OF 2.5 sqmm													LPS		HPS		TW TANK FLOATY		AUX I/P 1		AUX I/P 2		COND-TIVITY SENSOR		FLOW SENSOR			TP			
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	NC	R	B	R	G	B	R	Y	B	N

TERMINAL DETAILS :

Terminal	Description	Connections
HPP	High Pressure Pump	RYB/P-Phase N–Neutral
RWP	Raw Water Pump	RYB/P-Phase N–Neutral
T/P	Transfer/Flushing Pump	RYB/P-Phase N–Neutral
FLUSH VALVE	Flush Solenoid Valve #	P-Phase N-Neutral
DOSER	Dosing Pump	P-Phase N-Neutral
LPS	Low Pressure Switch	C-Common NO-Normally Open
HPS	High Pressure Switch	C-Common NO-Normally Open
TWT FLT	Treated Water Tank 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
	RL 1	NC-Normally Closed
	RL 2	NO-Normally Open
	TP IP (Transfer Pump Input)	NO-Normally Open
CONDUCTIVITY SENSOR	CONDUCTIVITY SENSOR	R - Red ; B - Black
FLOW SENSOR	FLOW SENSOR	R - Red ; G - Green ; B - Black

In case of **AUTO MULTIPORT VALVE** in pretreatment AUX I/P 1 & 2 automatically configured as RL2 & RL1 respectively.

 # 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 230V AC** and the valve is **NORMALLY CLOSED** type

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TO VIEW THE FACTORY SETTINGS	
Key Pressed	**Display**
MENU	VIEW?
Display scrolls through all the settings done at factory.	
MENU	LEVEL SW : ON
	LO PRESS. SW : ON
	TIME :015
	HI PRESS. SW : ON
	AUX I/P 1 : RWLVL
	AUX I/P 2 : TP IP
	RWCNTRL : OFF
	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 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 normal running 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?04.5
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	HPP OVL CRT?
MENU	HPP OVL CRT?04.5
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	TP OVL CRT?
MENU	TP OVL CRT?04.5
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
USE STOP KEY TO MAKE IT ON(IF DISPLAY SCROLLING IS REQUIRED)	
MENU	COND/TDS?
MENU	DISP
MENU	DISP:µSM
USE STOP KEY TO MAKE IT PPM IF REQUIRED	

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MENU	SET PT :
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/TDS beyond which the system will trip. Delay is the time up to which the increase in conductivity/TDS will be ignored (Typically during start up)	
USE STOP AND START KEY TO SET DESIRED VALUE	
MENU	EXIT?
MENU	DISP CRT ?
MENU	DISP CRT ? YES
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 SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 123 WITH START & STOP KEY	
MENU	PHASE UNBAL:
MENU	PHASE UNBAL: 40
What is this ? This is the maximum percentage value of current unbalance between two phases which will be ignored. If unbalance exceeds 40% controller will trip the plant with Single phasing	
USE START & STOP KEY TO ALTER THE 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	TP DRY CRT?
MENU	TP DRY CRT?01.5
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?

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CONDUCTIVITY CALIBRATION (SEC--1.3)	
Why to calibrate? **If there is mismatch in actual and required reading there is need for recalibration then 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**	
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	CALB CMPL (calibration complete)
MENU	COND.OFFSET ?
MENU	COND.OFFSET ? 000
MENU	EXIT?
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 MULTIPORT 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.** **Incase High Pressure Flushing 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	LEVEL SW:
MENU	LEVEL SW:ON
USE STOP KEY TO MAKE IT OFF	(only if no level control required)

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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 CHANGE IT ACCORDING TO PUMP CONFIGURATION(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	PUMP 3 : 3 PH
MENU	PUMP 3 : TRANSFER
USE STOP KEY TO MAKE IT FLUSHING	
MENU	EXIT?
TIME BASED AUTOFLUSHING SETTINGS (SEC--1.6)	
What is time based auto flushing? **It is recommended to flush the membrane after certain(typically four) hours of operation(besides starting and stopping of plant).By following below guideline one can set FLUSH DELAY (time after which flushing will happen) & FLUSH TIME (time for flushing will happen).**	
START & STOP SIMULTANEOUSLY	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
USE START & STOP KEY TO SET REQUIRED VALUE.	
MENU	FLUSH TIME
MENU	TIME : 015 S
USE START & STOP KEY TO SET REQUIRED VALUE.	
MENU	EXIT?
MENU	
CURRENT CHECKING(SEC--1.7)	
What is CURRENT CHECKING feature? **Using this feature one can check the normal running currents of motor.**	

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START & STOP SIMUTANEOUSLY	PASSWORD:000
ENTER PASSWORD 456 WITH START & STOP KEY	
MENU	SELECT PUMP ?
START	RWP
USE STOP KEY TO SELECT RWP/HPP/TP FOR WHICH U ARE GOING TO CHECK THE CURRENT	
MENU	RWP or HPP or TP R:00.0 B:00.0
MENU	MANUAL STOP
NOTE : FOR ALL SETTING PROCEDURES. **In each setting routine changes made are stored only when the MENU key is pressed once after the display shows QUIT/EXIT.**	

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.
		→ Motor is drawing more current than normal. Check Motor
	RW SINGLE PHASING	→ If there is mismatch between the R-Y-B phase currents drawn by the pump. Increase the phase unbalance value.
	RW DRY RUNNING	→ 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***

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LED Blinking	Message ON Display	Cause & Action
HPP	HPP OVERLOAD	→ More current than the normal rating. Set Overload current accordingly. ***Refer:section1.1***
		→ Motor is drawing more current than normal. Check Motor
	HPP SINGLE PH	→ If there is mismatch between the R-Y-B phase currents drawn by the pump. Increase the phase unbalance value.
	HPP DRY RUNNING	→ If current drawn by the pump is less than the set value. SET current as given in instructions section. ***Refer:section1.2***
TP	TP OVERLOAD	→ More current than the normal rating. Set Overload current accordingly. ***Refer:section1.1***
		→ Motor is drawing more current than normal. Check Motor
	TP SINGLE PH	→ If there is mismatch between the R-Y-B phase currents drawn by the pump. Increase the phase unbalance value.
	TP DRY RUNNING	→ If current drawn by the pump is less than the set value. SET current as given in instructions section. ***Refer:section1.2***

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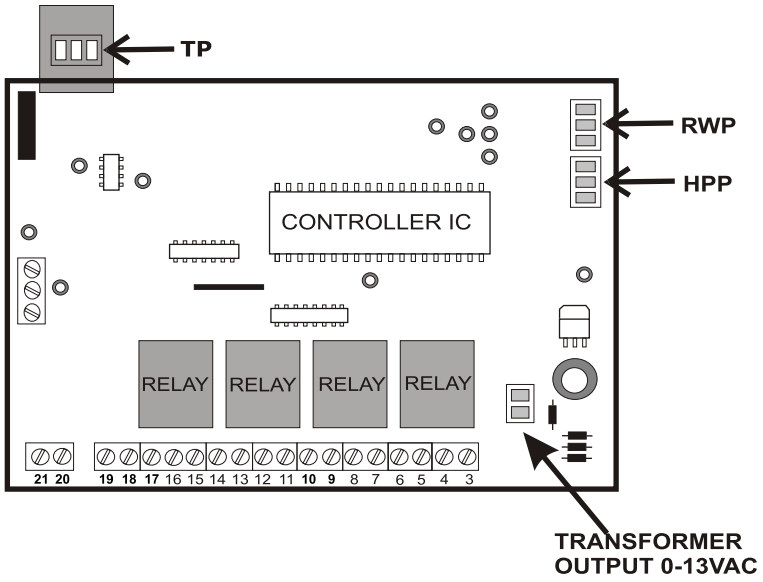
QUICK REFERENCE

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

CONNECTIONS ON PCB



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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.

To switch ON the Transfer Pump press MENU & then press START key and to switch OFF the Transfer Pump press MENU & then press STOPT key.

HOW TO GO IN AUTO MODE:

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

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