

# User Manual ROS-2210 Single stage reverse osmosis and conductivity controller



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#### 1. General

The ROS-2210 combines reverse osmosis control and dual conductivity measurement. It is equipped with a typical process control program for the RO system. It can easily and clearly view the measurement data of the inlet water conductivity and produced water conductivity and the operating status of the RO equipment. Combined PLC and two-way conductivity meter.

The latest full-view LCD screen and image flow control panel make it easier to reflect the status of pumps, valves and pressure detection. The menu parameter settings in the password mode can meet the various indicators of the system automatic operation.

The instrument has been further optimized with many improvements and version upgrades. It is suitable for the automatic management of the first-stage reverse osmosis water-making equipment. It only needs to add a small amount of electrical components to achieve manual and automatic double

function to make complicated problems simple.

#### 2. Process Flow Selections

There are two typical operation modes for RO system (as shown in Fig.1A: Source tank supply water;



Fig. 1-B First level RO process flow with direct water supply

## 3. Main control funcion:

#### Low feed water protection function:

In case of source water supply break-off (1. Water tank pressure, 2. Supply water pressure too low), the "Source water liquid level and Source water tank" lamp will be lightened, the LCD screen status display " NO ", and the buzzer will give an alarm, the controller will shut down the whole RO system.

After that, the controller will keep detecting the low feed switch. When the water supply is resumed, the system will delay one minute (the status display interface displays 1 minute to start the countdown) and then restart system.

# Low pressure protection function:

If the security filter is dirty, or the pipeline leaks, the normal water supply pressure can not be provided to the RO system, indicating that the pressure is insufficient, a low-pressure alarm occurs, the 'low-voltage switch' lamp is lightened, and the LCD system status display "LO", the buzzer alarm, the controller shuts down the entire RO system.

After that, the system delays for 1 minute ( (the status display interface displays 1 minute to start the countdown) and then be restarted system. If after 3 times re-starts, they system can't return to the normal working status, the system enters the deadlock protection state, prompt the reason for downtime, and the buzzer alarms, waiting for manual processing.

#### High pressure protection:

If the RO membrane is dirty, the pipeline pressure will rise. After reaching the limit value, a high-pressure alarm will appear, the 'high-voltage switch' lamp is lightened, and the LCD system status display will display the "Hl", buzzer alarm. The controller closes the entire RO system and opens the flush valve for pressure relief.

After that, the system continuously detects the high-voltage switch. If the pressure is restored, the flush valve is closed, and the delay is 1 minute ( (the status display interface displays 1 minute to start the countdown) and then be restarted system. If after 3 times re-starts, they system can't return to the normal working status, the system enters the deadlock protection state, prompt the reason for downtime, and the buzzer alarms, waiting for manual processing.

#### Conductivity over limit alarm:

When the conductivity of the produced water is higher than the set upper limit value, the 'excessive' lamp is lightened, the controller opens the over-standard valve for discharge. When the conductivity of the produced water is lower than the set value, the controller closes the over-standard valve, the produced water flows to the pure water tank.

# Pure water level control function:

The pure water tank has two liquid levels, which are high liquid level and low liquid level, and can also be used in parallel as a single point. When the pure water tank liquid level is lower than the low liquid level and the high liquid level at the same time, the controller immediately starts the RO system to produce water, until the water storage tank liquid level is higher than the low liquid level and the high liquid level, the system is flushed with water -> water full standby.

#### *Timing Membrane flushing function:*

The controller's running program is: start-up flushing, water full flushing, continuous water production after N hours of flushing, continuous standby after N hours of flushing, all flushing time can be set in the user menu, and flushed countdown time can be monitored in the 'System Run Status' interface.

# 4. Main technique specification:

Measuring range: source water:  $0 \sim 4000$  us / cm; water production:  $0 \sim 1000$  ppm;

Matched electrode: ABS1.0 plastic electrode, Cable length 4.5 meters;

Power supply: AC220V ±15% 50HZ; Optional: DC24V, etc power supply;

Power consumption:  $\leq 10W$ 

Environmental conditions: Temperature: 5~60°C; Humidity: ≤85%RH

Accuracy: 1.5% FS;

Output: 3A/250V AC (solenoid valve and pump must be driven by intermediate

relay); Conductivity working pressure: 0~0.5 MPa;

Medium temperature: 5~60 °C;

Temperature compensation: automatic temperature compensation based on 25 °C;

Measuring distance: no more than 30m;

Display mode: full-view LCD liquid crystal display;

Dimensions: 96\*96\*130 mm (L \*W \*D)

Dial opening: 92\*92mm

# 5. Front Panel Illustration



LCD dis	LCD display zone			
No. 1	Press key on main	1: Main interface 1: Display inlet water conductivity, produced water conductivity value, current water temp., Desalination rate.		
Zone	interface	2: Main interface 2: Diplay current system working mode, countdown time, alarm status		
		3: Display user parameter settings		
RO Com	ponent operation status			
2	Source water level / Source water tank	The source water tank 'no water' alarm indicator, means that no water or water supply pressure is low for the source water tank;		
	Low pressure switch	The high pressure pump water supply pressure indicator, means that inlet water pressure of high pressure pump is too low;		
	High pressure switch	The high pressure pump over pressure operation indicator, imeans that outlet pressure of high pressure pump is too high;		
	Flush valve	Flushing the solenoid valve to open the indicator light, means that flushing solenoid valve has been opened;		
	Low pressure pump	Low-pressure pump running indicator light, means that the low-pressure pump has been turned on;		
	Inlet water valve	The water inlet solenoid valve is turned on, means that inlet water solenoid valve has been opened;		
	Pre-treatment	Pre-processing regeneration start indicator, means that the RO is in the pre-processing regeneration mode;		
	High pressure pump	The high pressure water pump running indicator, means that the high pressure pump has been turned on;		
	RO membrane	The produced water status indicator, means that the RO system is running;		
	Pure water tank FULL	The pure water tank water full indicator, means that the pure water tank reaches the upper limit level;		
RO Syste	em operation mode			

3	Stop	RO System is in stop status	
	Flush	RO system is in a flush state, which includes: start flushing, running flushing,	
		full flushing or standby flushing;	
	Producing water	RO system is in the state of producing water;	
	Water full	The pure water tank is full of water, standby status	
	Excess	The water conductivity value exceeds the limit;	
	Regeneration	Pre-treatment regeneration;	
Press ke	y operation instructions:		
4		RO system ON/OFF key	
		Can be manually turned off or turned on; long press for 3 seconds;	
		Shift key	
		1: In the user menu, for the menu page key, the next menu selection; 2: In	
		parameter setting interface, thousands, hundred, ten, and ones are selected for	
		the loop, and are selected to be in a twinkling state;	
		Add key	
		1: In the main interface, the main parameter measurement value and the RO	
		system status can be switched and displayed;	
		2: In parameter setting interface, thousands, hundred, ten, and ones are selected	
		for the loop, and are selected to be in a twinkling state;	
		Confirmation key;	

Note:

In the user menu, after modifying the setting parameters, press the "Shift Key" until all menus are exited. When the interface displays 'END', the set parameters are saved.

#### Display interface description:



System operation status---water production mode



RO System shutdown mode

# 6. Parameter setting description:

1. The meter is powered on, and the "external control" is turned on. At this time, if the "SYS" system startup mode is setted to 0, you need to manually press the "on/off button" for three seconds, then the system starts running. If the "SYS" system startup mode is setted to 1, the system starts automatically;

2. In the main interface, press "Confirm" to enter the password input interface. The default password is 1000. After the password is entered correctly, enter the user parameter setting menu. The user parameter setting description:

No.	Parameter	Function description	Default value	Setting range
1	CELL1	(Channel 1 / CH1) Inlet water conductivity,	1.0	0.01/0.1/
		Conductivity cell type selection;		1.0/10.0
2	CON1	(Channel 1 / CH1) Inlet water conductivity,	1.000	0.0009.999
		Electrode constant setting;		
3	CELL2	(Channel 2 /CH2) Produced water conductivity,	1.0	0.01/0.1/
		Conductivity cell type selection;		1.0/10.0
4	CON2	(Channel 2 /CH2) Produced water conductivity,	1.000	0.0009.999
		Conductivity cell type selection;		
5	HI.ON	(Channel 2 /CH2)	200.0	1.0200.0
		The produced water conductivity upper limit relay pull-		
		in value setting;		
6	HI.OF	(Channel 2 /CH2)	190.0	0.1199.0
		The water conductivity upper limit relay disconnection value		
		setting;		
7	DLY	(Channel 2 /CH2)	3	0099
		After the produced water conductivity exceeds the limit		
		value, the delay is X seconds and then alarm;		
8	ALA	Buzzer mute switch after alarm.	ON	ON/
		ON: Turn on the audible alarm; OFF: mute		OFF
9	EC-T	Conductivity temperature compensation coefficient setting:	0.020	0.0000.099
10	485	ADDR: RS485 communication address	01	1-255
11	485	BPS: RS485 communication baude rate	9600	1200/2400/
		1 CD healtight eatting		4800/9600
12	LCD	LUD backlight setting.	OFF	UN/
	1	UN: always on; UFF: off delay		OFF:1-99

				Second
13	FLU.1	(FLUSH)	60	1-999
		Boot flush time x seconds setting;		
14	FLU.2	Full flushing, running flushing,	30	1-999
		standby flushing time x seconds setting;		
15	FLU.3	Continuous produced water or continuous standby x hours,	3	1-99
		flushing time setting		
16	F-LH	High pressure pump status during flushing; ON:	ON	ON/
		Start ; OFF: Stop		OFF
17	SYS	(System)	1	0/1
		System startup status setting;		
		0: manual start (need to press the power button to start)		
		1: automatic start		
18	CODE	User menu password modification	1000	0000-9999

# 7. Wire connection description:



#### Note:

Due to the space of the controller, the design uses a small relay. When driving a large inductive load, the intermediate relay or the base paint must be used to extend the load capacity, so as to prolong the service life of the relay and reduce the failure;

#### Switching signal input terminal description:

1	Pure water tank high level detection. Normally open, the pure water tank is closed when the liquid level is higher than the high liquid level.
2	Pure water tank low level detection. Normally closed, the pure water tank is disconnected when the liquid level is lower than the low liquid level.
3	Over pressure detection of booster pump. Normally closed, over pressure disconnected.
4	Insufficient low pressure is detected. Normally open, closed after normal pressure.
5	No source water is detected. Normally open, closed when have water
6	The controller external operation switch, Normally open, the system starts working after closing.
	The external control switch can be controlled by the key switch into the panel of

	the installation cabinet. If not used, short the terminal and the detection common terminal (6, 8 short circuit);
7	The signal is given by the external pre-cleaning controller. When the pre-processing valve head is working, the closing signal is given (short 7 and 8), and the system is in the pre-processing regeneration mode to start the low-pressure pump water supply;
8	Terminal (COM2) used for terminal $1, 2, 3, 4, 5, 6$ and 7 detection signals

# Relay output and power input terminal description:

9	High pressure pump start/stop, control contact (normally open passive)
10	Low pressure pump start/stop, control contact (normally open passive)
11	Inlet solenoid valve Start/stop, control contact (normally open passive)
12	Flush solenoid valve start/stop, control contact (normally open passive)
13	Conductivity over limit control contact (normally open passive)
14	Terminal (COM1) used for terminal 9.10.11.12.13
15 16	Power supply terminal (standard is AC220V/50HZ)

#### Inlet water conductivity electrode wiring:

17	Inlet water conductivity electrode ()	White)
18	Inlet water conductivity electrode (1	Black)
19	Inlet water conductivity electrode (	Yellow)
20	Inlet water conductivity electrode (I	Red)

# Outlet water conductivity electrode wiring:

22	Outlet water conductivity electrode (White)
23	Outlet water conductivity electrode (Black)
24	Outlet water conductivity electrode (Yellow)
25	Outlet water conductivity electrode (Red), no internal connection Note: If it is single-electrode mode, please connect this Red line to 20, or short 2 and 25

#### RS485 Commnuication port:

21	RS485 Communication port A+
26	RS485 Communication port B+。

# 8. Electrical Wiring Reference Diagram (see attached table)

# 9. Full set products including:

1) ROS-2210 controller	1pc
2) ABS 1.0cm-1 Pt. Black electrode	2pcs ( 316L S.S. sensor optional)
3) Operation manual	1pc
4) Qualified certficate	1pc
5) Conroller fixed calmp	1pair



For other question, feel free to contact us.

Thank you for choosing ChiMay!

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