User Manual

Single Stage Reverse Osmosis Controller

ROS-2015

Shanghai ChiMay Technology Co., Limited

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Content

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1. General

The controller is of an automatic operation management controller designed for small-scale first-class anti-osmosis water preparation system. which can realize automatic operation of reverse osmosis devices only by adding few electric elements at periphery. It has digital input (DI) ports in five states and four output control ports, and it Is a small-scale economical controller.

The operating principle of complete machine is referred to block diagram 1

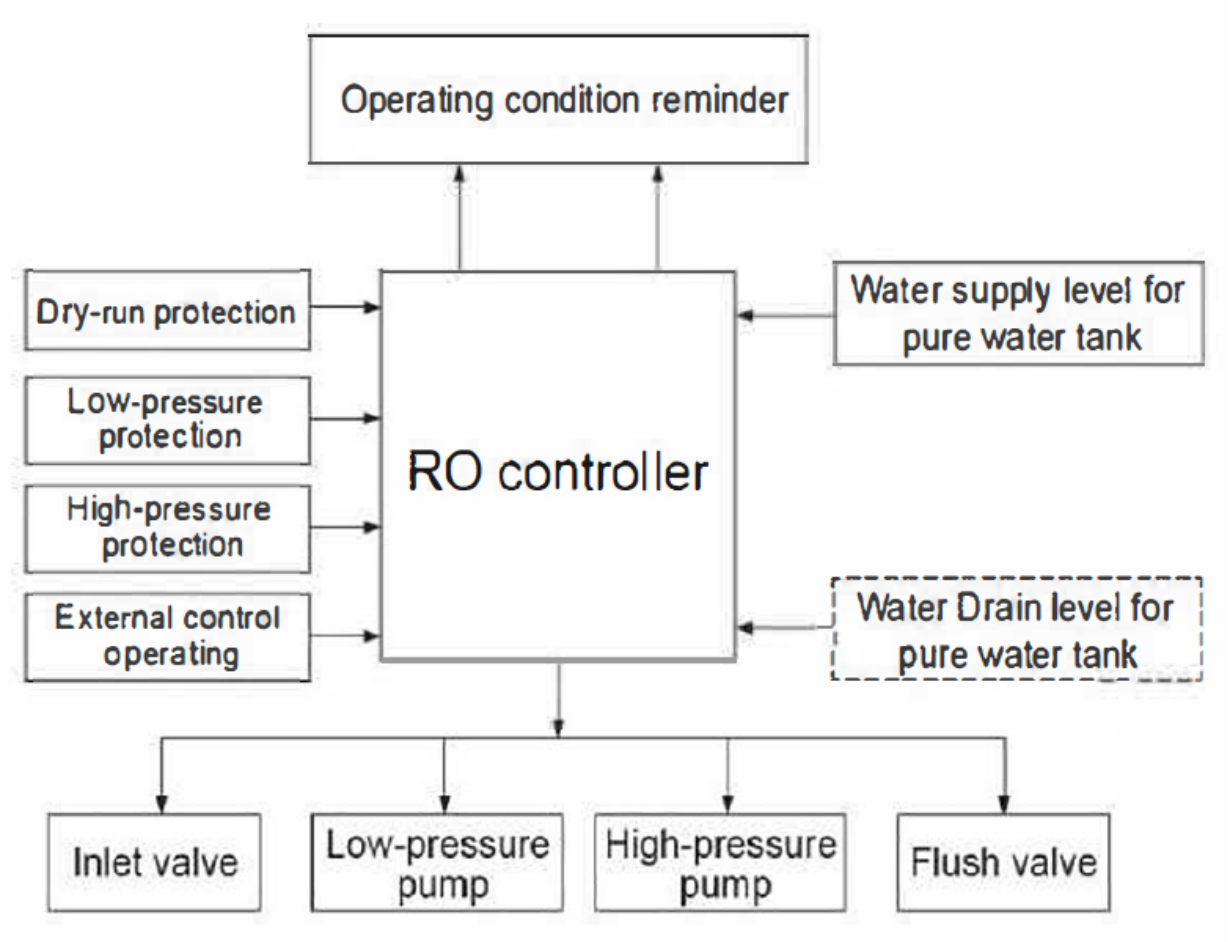

Figure 1: Operating Diagram

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2. Basic workflow chart of complete machine is as follows

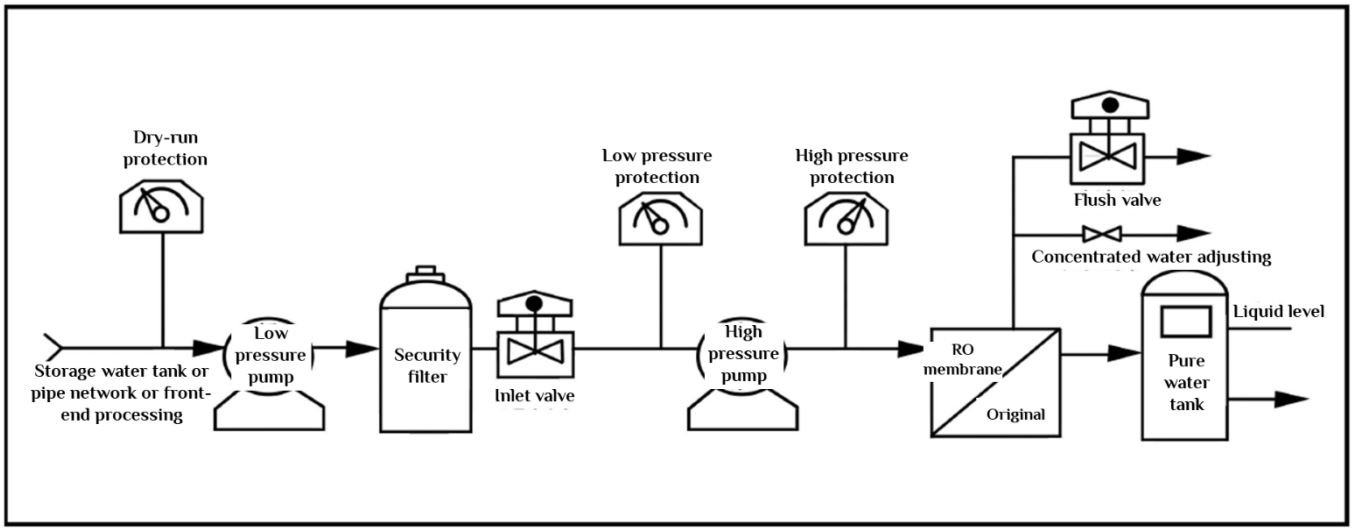

Figure 2: Basic workflow chart of complete machine

3. Main control functions

Dry-run protection function	It is used to monitor water source when raw water is cut off (low level of water storage tank and the pressure of pipeline getting too low) to prevent from system idling, The controller stops the operation of whole RO system, while lhe indicator fight on panel for "LOW FEED PRESS'lightens and buzzer sounds. After tha the controller will detect dry-run switch uninterruptedly, and if the water supply pressure or water level returns to normal, the controller will restart RO system for operation.
Low-pressure protection function	When front-end pretreatment system is in flushing or regenerating state, the security mter being dirtied and jammed, and cannot supply normal feeding pressure for RO system (namely the low pressure is insufficient), the controller will temporally shut down the whole RO system. At this moment, the indicator light for "LOW PRESS'and the buzzer sounds. Then, the controller will continuously detect the low-pressure protection switch, and after the pressure recovery for 1 minute, RO control system will start at first time. and operate RO system. In event of low-pressure protection for system again, stop the operation of RO system. The proceedure sets three times of trial running, and when they are not successful, the system will enter deadlock protection state. The indicator light

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	for low-pressure protection is on to reminder the reason to shut down, and 1s waiting for restart by pressing the reset key after treatment by manpower.
High-pressure protection function	In some systems with high-pressure protection, 1f lhe system has overpressure, the controller will automatically close the whole RO sys1em, and the indicator light for "HIGH PRESS" lights up After elimination of high pressure for 1 minute, the controller will perform trial running at the rs! time lf the outlet pr essure still has overpressure, the system will become into protection stage again. The high pressure protection procedure sets three times of trial running, and when they are not successful, the system will go into deadlock protection state and the buzzer sounds. *lf the system has no high-pressure protection, short out the terminal (COM+HP)
Pure water tnk level control function	When pure water tank level is at preset low level, the controller wfll start RO syslem immediately to generate water till the level or pure water tank up to the preset high level, and the system will flush membrane co mpletely and shift to standby state.
Membrane flushing function	When the protective device and state is normal, the system will perform membrane flushing every time power up, and then repeat it every low-level water preparing. When the water producing tan is filled, the membrane flushing will be automatically ended.

4. Main technology parameters:

Supply voltage	AC 220 ± 10% 50/60 Hz
Power comsuption	≤2W
Environmental conditions	1) Temperature:0-50℃ 2) Humidity: ≤85% RH
Load capacity of output contacts	5A/250V AC (resistive load)
Dimensions	48*86*80mm (H*W*D)
Hole size	44*92mm (H*W)

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5. Instructions of display panel

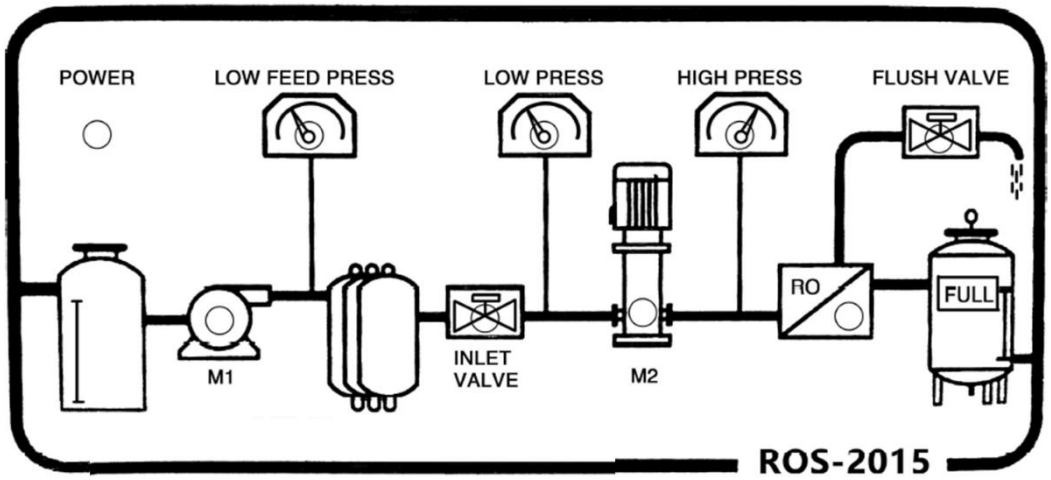

Figure 3: Display Panel

Display panel has 10 indicator lights, respectively showing the working state of each point.

POWER	Power-on indicater light for controller
INLET VALVE	Indicator light for start of feeding water solenoid valve
M1	Indicator light for operation of low-pressure pump
M2	Indicator light for operation of high-pressure pump
RO	Indicator light for reverse osmosis membrane modulus in water preparing state
FLUSH VALVE	Indicator light for flushing solenoid valve
FULL	Indicator light for pure water tank filing
LOW FEED PRESS	Indicator light for water low pressure or no water warning. (No water alarm when connected to the low liquid level switch of water tank in reserve)
LOW PRESS	Indicator light for low-pressure warning (securiy filter and electromagnetic valve supervision)
HIGH PRESS	Indicator light for high-pressure and hyperpressure warning

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6. Back wiring terminal arrangement diagram and contacts linking

Fig.4 Back wiring terminal diagram

Connection of signals collection terminals	
H/L	High-pressure and low-pressure flushing selection, disconnecting incase of High-pressure, and short incase of low-pressure
HP	Access terminal for overpressure detection of Booster (high pressure) pump (normally closed, disconnecting in case of overpressure, and short out COM at top right corner when not using)
NW	Detection on low level of original water tank or low pressure of pipeline (use liquid level switch or pressure switch and installation of sampling point)
LP	Access terminal of switch for detecting security filter pressure at back of low-pressure pump(Contact normally open, and closed when up to the pressure as required)
FULL	Input terminal of switch for detecting level of pure water tank (normally closed, disconnecting in case of the water full and closed meeting low liquid level)
EC	Whether the control system operates for access terminal for external control(control by remote and panel switch)
COM	Common port for upper acquisition terminal

Connection of control termal	
AC 220V	Firewire end for 220V power supply (220V AC powers on)
	Zero line for power grid
COM	Common point for control relay
IV	Output contact for controlling on and off of water feeding solenoid valve (normally open and passive)
FV	Control contact for on and off of RO flushing solenoid valve (normally open and passive)
LM	Contact for controlling start/stop of booster pump(normally open and passive)
HM	Contact for controlling start/stop of low-pressure water pump (normally open and passive)
*All the above control ports are terminals of dry contact of relay (without power distribution), sharing COM common terminal.	

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Schematic diagram for input wiring:

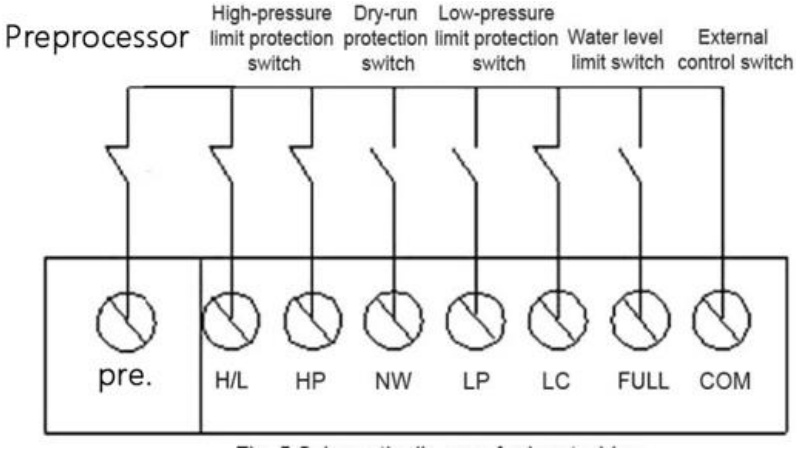

Figure 5: Schematic diagram for input wiring

7. Control flow chart

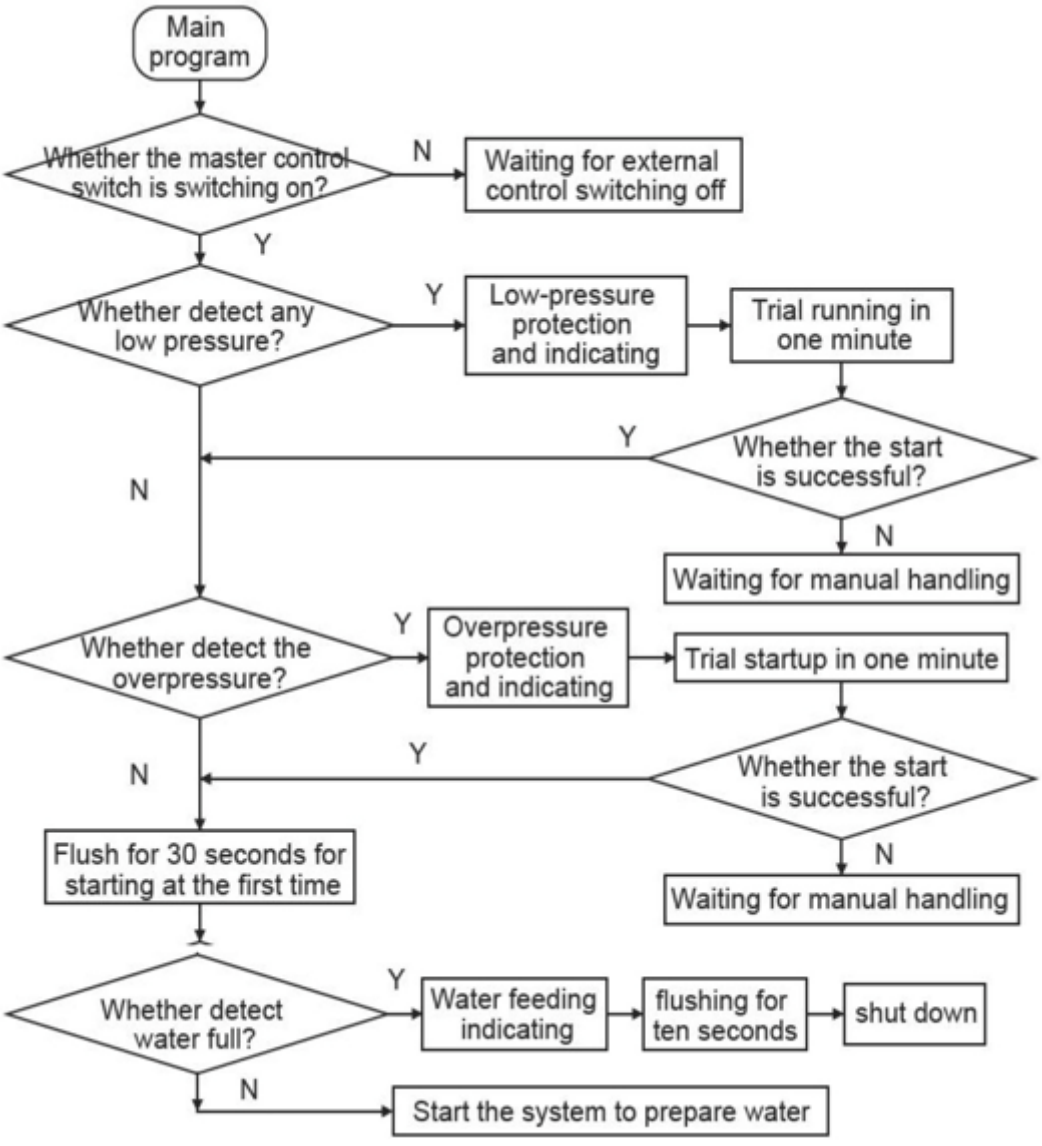

Figure 6: Brief procedure flowchart

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External control starts	When master control switch or remote control switch starts, the controller performs self-check. When confirming the water tank is not full, successively open the water inlet valve, low-pressure pump, and high-pressure pump, flushing valve, starting up and supplement water to the high level.
Operation monitoring	The acquisition part of controller checks the logic state of each control switch with scanning mode, make a judgement on start/stop and protection, and ensure the system runs safely.
Running protection	If water supply is insufficient during system starting or operation, it will play the role of protection. After water pressure recovery, delay trial startup, and if it still cannot continuously operate after three times of trial start, it will go into protection state, waiting for manual handling; if high-pressure pump runs beyond its limit for one second, the system will stop safely. Perform trial running every one minute for high-pressure pump. If after three times of trial running, the warning of high-pressure pump is still not clear, then store the current state, to wait for manual handling; the controller will ignore the abnormal alarm which is less than one second.
Membrane flushing	For initial power on, the system performs 30s of membrane flushing. During operation, flush for 10s for each time of starting up or water full. Automatic flushing for 10s after continuous operation for 3h or in standby for 3h after water full.
Change and extension	In application of project, when the above working modes not suitable for user, it may fax the requirements of working mode so as to modify the working procedure applicable to them.

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For other question, feel free to contact us.

Thank you for choosing ChiMay!

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