

# User Manual SINGLE TANK SERIES LARGE SOFTEN VALVE

(GRDR20、GRDR40、GRDR50)



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## I 、 the control principle



1. Back wash (Appears in according to the set cycles)



2、 Regenerating



3、Slow back wash



### Control valve station action description:

1,**B.Wash**(backwash:Set according to cycle appear) : after the softening station, the main valve of rotation to the next position includes backwash station(**B.Wash**), Regeneration station(**Brine**), slow wash station(**S.Wash**), the sum of the backwash station not every cycle, is set according to the cycle frequency, backwashing when external pilot solenoid valve open electricity (DC12V), main backwash valve inside main valve to open.

2, **Brine**(Regeneration station): the station brine electric valve (DC12V) is opened, raw water through the jet to generate negative pressure suction brine mixed into the multi-way valve.

3, **S.Wash**(Slow washing station): brine electric valve is closed, raw water continues to enter the main valve through the jet, into the resin layer to continue to slow wash the resin.

4, **Wash**(Washing station): the main valve turn an Angle, brine electric valve is closed, raw water through the main valve, water flow direction and softening consistent with a large amount of water to thoroughly rinse the resin.

5. **Soft**(Softening station): the main valve turns an Angle and the softening process begins. At the same time, the brine electric valve is opened, and the main valve in the softening process is refill water to the salt tank at the same time. When the quantity set by the salt tank water is reached, the electric valve is closed, the water filling is finished, and the softening process continues.



1 .Back wash (Appears in according to the set cycles)



Figurez. DK noating bed valve principl

### ${\rm I\hspace{-.1em}I}$ 、Controller display and operation

### The operation button.:

**B、Lock:** Equipment without any operation after 3 minutes, automatic to lock.

 $C_{\mathcal{V}} \xrightarrow{\sim} Mode switch: Unlock state, the operation button in time mode" <math>\bigcirc$ " and flow Mode"  $\bigcirc$ " display to switch between.

D, Im Manual switch: Unlock state, when pushing the button the valve switch to next station.



- E. Parameter setting: Unlock state, press the button, the screen will show the interface of setting parameters
- F. Manual forced backwash: locking "atate, push" fing 6 times, the valve enter into B.Wash



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#### Setup project description:

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**Brine refill:** Meter mode, The set quantity is the amount of water to absorb Brine and also the amount of water to refill salt tank, which is measured by the brine flow meter in both directions.

S.Wash Wash & Soft : Meter mode, the set value is measured by inflow flow meter.

**Delay regenerate**: Delay Regeneration function, According to the system for 24 hours, the default 99 is to cancel the delay, set the range of 0-23 hour representing an hour a day, <u>01</u> D means once of 1 day. Detailed explanatory below.

Address: Set the device definition to be used and used only when extending 485 communication modules. Shift\_W Time: Set only when installing inlet solenoid or electric valve, solenoid for 7 seconds, electric valve for 28 seconds.

Output mode(0-6): Represent the extension control output functions, external booster pump from spreading.

Detailed explanatory to see "Electric valve", "Booster pump" relay output interface: mode setting.

**B.Wash:6** Sycles/1: The water softener performs backwash once every 6 cycles by default. The water softener can be adjusted from 1-9 according to the water source. Backwash is not recommended for every cycle, because it will



lose the characteristics of countercurrent regeneration resin layer.

#### **Delay regeneration**

As the function is enable, When the set digital of **Soft** station decrease to "0", the valve does not shift to the next station and stays at the "**Soft**" station until the preset 0-23 clock begins to regenerate. If the user regenerates according to the set day as the unit of time, change the value in -01D, and at the same time, the setting time of **soft** station shall not be more than 1 day (1440 minutes) or the water amount set in the flow mode shall be guaranteed to run within one day. To cancel functions, simply set the regeneration clock to "99".

### Input/output control instructions



Figure 4: Output control board

#### 1, S1\S2: Interlock line connection as below



Figure 5: Multiple-valve interlock

#### 2. RS-485: The communication port

This function according to user requirements to add 485 communication protocol

### 3. "External control" (main board): The external switch priority control interface

When the control valve is in a "soft" state, the valve can be controlled into "Brine" by other external control systems, such as an online water quality monitoring access.





### Figure6: external switch priority control instruction

**4**, **"Electric valve":** Output wiring of inlet electric valve or solenoid valve is shown in Figure 7. **5**, **"level switch" (figure 9):** Soften water tank water level switch closing signal input, inlet electric (Solenoid) valve closed, the softener to stop service.(Note! The water level switch receives the closed loop signal, the active voltage cannot be connected!)



<sup>5. &</sup>quot;Electric valve", "Booster pump" relay output interface: mode setting

 $A_{\scriptscriptstyle N}$  The contact capacity of the relay is 5A/250V.



C. When connecting the output of the relay, the AC220V power supply input end shall be connected with the leakage circuit breaker.

Different mode, the relay output NO and COM, below:

(Connected for "C", disconnect for "x")

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Mode	Relay	B.wash	Brine	S.wash	Clean	Soft	Shift	Applications
0	Electric valve	С	С	С	С	С	×	Inlet electric valve mode: relay break when shifting station.
1	Deceter	С	×	×	С	×	×	<b>booster pump mode:</b> this mode is for filter valve.
2	pump	×	×	×	×	С	×	<b>Pump starting mode:</b> for the subsequent reverse osmosis high pressure pump starting.default mode
3	Electric	С	С	С	С	×	×	Tow valve one RUN & one standby mode: :.As shown in figure 8.
4	valve	С	С	С	С	×	×	Tow valve RUN Backwash respectively mode: this mode for filter valve.
5	Booster pump	×	×	×	×	C×	×	CX(Mode2 additional conditions) : When the inlet flow meter check the water flow signal in Soft station.the Relay is Connected.
6		С	×	×	×	×	×	Backwash booster & compressed air mode



Interlock wire connected. When one valve completes Brine and Wash and will switch to soft , judge that if another valve is also Soft, the valve close its own inlet solenoid valve and wait for standby

Figure 8: Mode (3) Tow valve one RUN & one standby inflow water solenoid valve mode

### III, Recommended configuration and operation parameter setting

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### 1, Recommended parameter setting table

Station and description	Bed type	Formula			
	DR	(filled amount of resin(L)×70%) $\div$ raw water hardness (mmol/L)			
Soft (Ion)	GR	(filled amount of resin(L)×90%) $\div$ raw water hardness (mmol/L)			
	DR	30%×filled amount of resin(L)			
Brine (L)	GR	40%×filled amount of resin(L)			
Slow wash (L)	DR/GR	50%×filled amount of resin(L)			
	DR	50%×filled amount of resin(L)			
Wash	GR	100%×filled amount of resin(L)			
B.Wash	DR/GR	100%×filled amount of resin(L)			
Note: Resin Filling rate of DR $\ge 90\%$ Resin Filling rate of CR $\ge 70\%$					

Note!

- 1. Water hardness unit is mmol/L;
- 2. Resin work exchange capacity calculating is 1000 mol/m<sup>3</sup>=1mol/L
- 3. Design and calculation of brine concentration is 20%;
- 4、1Liter brine(20%)Molar value=1000g×20%/58.8g(NaCL)×1.4(specific consumption) ≈200/80=2.5mol, That is, the brine used for regeneration is equivalent to 40% of the resin filling

### amount

5, 3. The volume of the salt tank is not less than the volume of filling resin

### 2、DR15/GR15/GR15T Softener configuration (reference)

Production			10T/h	15 T/h	20 T/h
pressure			0.1-0.5MPa		
Raw water hardness		I : ≤6mmol/L; II : ≤12mmol/L			
Swap tank (D× effective height )	DR	Ι	D500×1600	D600×1800	D750×1800
		II	D500×1800	D600×2000	D750×2000
Swap tank (diameter D× effective		Ι	D600×1600	D750×1600	D900×1800
height)	GR	II	D600×1800	D750×1800	D900×2000
Salt tank volume		500L	500L	800L	

### 3、DR20/GR20/GR20T Softener configuration (reference)

Production			15T/h	20 T/h	25 T/h
pressure			0.1-0.4MPa		
Raw water hardness		I : ≤6mmol/L; II : ≤12mmol/L			
Swap tank		Ι	D600×1600	D750×1800	D750×1800
(D× effective height)	DR	II	D600×1800	D750×2000	D750×2000
Swap tank (diameter D× effective		Ι	D750×1600	D750×1600	D900×1800
height )		II	D750×1800	D750×1800	D900×2000
Salt tank volume			500L	800L	800L



### 4、 DR40 Softener configuration (reference)

Production		25T/h	30T/h	40T/h
pressure		0.1-0.4MPa		
Raw water hardness	I : ≤6mmol/L; II : ≤12mmol/L			
	Ι	D750×1600	D900×1800	D1000×1800
Swap tank(D× Effective height)	II	D750×1800	D900×2000	D1000×2000
Salt tank volume	500L	800L	1000L	

### 5、GR40/GR40T Softener configuration (reference)

Production	25T/h	30T/h	40T/h	
Power and consumption	AC 90-220V; Power: 0.03kw			
Soften hardness value	≤0.03mmol/L			
Raw water hardness	I : ≤6mmol/L; II : ≤12mmol/L			
Swap tank(D× Effective height))	D900×1500	D1000×1500	D1200×1800	
Salt tank volume	800L	1000L	1500L	

### 6、GR50 Softener configuration (reference)

Production	40T/h	50T/h	60T/h	
pressure	0.1-0.4MPa			
Raw water hardness	I : ≤6mmol/L; II : ≤12mmol/L			
Swap tank	Ι	D1000×1500	D1200×1500	D1500×1800
(D× Effective height ) )	II	D1200×2000	D1500×2200	D1500×2400
Salt tank volume		1500L	2000L	2000L

### 7、 DR50 Softener configuration (reference)

Production	40T/h	50T/h	60T/h	
User pressure	0.1-0.4MPa			
Raw water hardness	I: ≤6mmol/L; II: ≤12mmol/L			
Swap tank	Ι	D900×1800	D1000×1800	D1200×1800
(D× Effective height)	II	D900×2000	D1000×2200	D1200×2400
Salt tank volume		1500L	2000L	2000L



# ${ m IV}$ 、 Install

1. Installation of control valve unpacking parts











### 2, Side mounted control valve support seat





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### **3** Internal configuration and installation of side equipment





### 4. The Valve body geometry size





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### V. Tips and Precautions of Equipment

1. The equipment should use industrial salt with the size of more than 4mm to guarantee the smooth passage of water filling and salt absorbing. If some fine salt is used, please keep it at small amount. Otherwise, it will get agglomerated, leak to the salt filter and clog the tube.

2. The bottom of the salt tank needs to be checked frequently; the deposit and sludge need to be cleared out.

3. The filter of inflow needs to be cleaned periodically in case that the inflow clogs the tubes and leads to low efficiency of the equipment as well as the decrease of the outflow water amount.

# VI .Conditions of use

1, The equipment must be installed the water filter in the feed water pipe to prevent clogging;

2, Feed water pressure should be kept constant, When the water source is well water or low water tank provided by the inlet pressure for the feed pump, A check valve shall be installed in the feed water line to prevent the feed water in the equipment from back flow when the pump stops. The outlet pressure of the equipment outlet pipe should be kept constant, and the inlet and outlet of the softening water tank should be higher than that of the equipment.

3, Equipment installed in the indoor, the working environment should be 1  $^{\circ}C \rightarrow 45 ^{\circ}C$ , humidity is not too high, there should be no corrosive chemical gases, control valve note waterproof. Strong electromagnetic interference may have influence on the normal work of the device. Environment should be tolerated to some extent the leaking equipment accident.

4, The water pressure 0.10MPa  $\sim$ 0.6 MPa, less than 0.10 MPa should add booster pump, above 0.6 MPa should add pressure reducing valve.

5, Brine absorption and water refilling are automatically controlled by the brine flow meter and electric valve. The salt valve serves as a safety protection for water refilling and has the function of filtering and water refilling and throttling.

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# VII. Regular failure and failure elimination

### 1, Soft water hardness become high

Phenomena/reasons	Solution
No salt in the brine tank	Add salt to the brine tank
Clogged salt filter in the salt tank	Clean it regularly and guarantee sufficient amount of water injection
Water rate is too large, running velocity is too high	Reduce the pressure difference between the inflow and outflow
No enough resin and too much space at the top of the swap tank	Add more resin to reduce the space

### 2 、 Salt leaking out to the water outlet

Too little washing water	Set to increase washing water
No enough resin, existence of concentration water at the top of	
the swap tank and too much space cause incomplete cleaning	Add more resin and reduce the space

### **3 .** Increase of the inflow pressure and decrease of the flow rate of outlet

Resin's being polluted by the suspended matter	Shorten the number of backwash cycles and increase the amount of backwash water
The upper water distributor is blocked by broken resin	Unload the water distributor and clean it
Outlet Water pipes system have blocking phenomenon	Check and eliminate the problem

### 4. Poor brine absorption of the controlling valve

Phenomena/reasons	Solution
drainage pipe has jam	Check whether the exit of the drain pipe is clogged
Clogged ejector	Remove the water injector end cover, check the jet nozzle and clean.

### 5. The value of inlet flow parameter does not decrease

The equipment has water flow out, the inlet flow parameter value does not decrease, the	If the impeller of the inlet flow meter is stuck by foreign matter or foreign matter is absorbed by the magnet, which causes rotation failure, remove the inlet flow meter and clean up
main valve does not switch.	Abnormal flow sensor or sensor wire plug comes off
	The impeller of the brine flow meter is stuck by foreign matter or foreign
During regeneration, the brine flow value does not decrease	matter is attracted on the magnet, which causes the rotation to be ineffectual.

### 6 Abnormal discharge

Phenomena/reasons	Solutions
Water is discharged from the	If there is any foreign matter or damage in the valve core, ceramic ring or
drainage pipe all the time when	silica gel ring,open the main valve, remove and repair it and check whether the
it is servicing	front filter is abnormal.

### VIII、 DR floating bed resin scrub

During the long-time use of DR floating bed water softener, the suspended substance, turbidity and iron deposition in the raw water will condense into viscous pollutants around the resin, leading to the decrease of water quality, the increase of water pressure and the decrease of water flow rate. At this time, the resin needs to be scrubbed. Scrubbing process can be part of the resin out of the tank, respectively stirring, recoil, rinse, borrow the device itself.



# $IX_{\mbox{\tiny N}}$ Control valve decomposition figure





























### $\boldsymbol{X}$ Curve of Flow and Pressure for the Valve



Figure 39: Curve of Flow and Pressure for the Valve GR15/DR15



Figure 40: Curve of Flow and Pressure for the Valve GR20/DR20





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GRDR50 Flow rate pressure curve ( $\Phi_6 \times \Phi_{10}$ ) Figure 42: Curve of Flow and Pressure for the Valve GR50/DR50

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