

## User Manual GRDR-1 Single Tank Softening Valve

(GRDR2-1、GRDR4-1、GRDR10-1、GRDR10-1S)



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## I . Operating Board

#### 1, Instructions of the LCD display controller



Pic1: LCD Screen

Flow mode" Sinter	face	
	<b>B.wash:</b> (Appear according to the setting cycle	
	value)	
	S:0125: Setting water for backwash , measured by	
B.wash Brine Clean 🦳	the inlet flow meter,	
S Syc D:0125L D:0125:Decrementing State, Decrement to zero		
00.00t/h 0000000t	and switch to the next station ;	
	00.00t/h: The current flow rate of inlet	
	0000000t: Accumulative water amount of inlet	
	<b>Brine</b> (Brine in $\rightarrow$ Slow wash)	
	S:0125: Setting water for Brine absorb and Slow	
Brine Clean Soft	wash, measured by the inlet flow meter, it is	
$\frac{D^{+}Syc}{00.00t/h} = \frac{D:0125L}{000000t}$	amount of water passing through the ejector	
	D:0125:Decrementing State, Decrement to zero	
	and switch to the next station ;	

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	Clean (Wash+ Refill)	
Brine Clean Soft	S:0100: Setting of Washing and refill to salt tank	
	water, measured by the inlet flow meter;	
00.00t/h 0000000t	D:0100: Decrementing State,Decrement to zero	
	and switch to the next station;	
	Soft (Softening)	
Brine Clean Soft 🦰	S:0005.5: water volume of one cycle setting,	
Syc Syc S:0125 D:0125L	measured by the inlet flow meter.unit:ton	
00.00t/h 0000000t	D:0005.5: Decrementing State, to zero and	
	switch to the next station	

## Time mode" 🕒"interface



### The operation button:

A  $\$  Unlock : Press and hold  $\blacktriangleright$  & simultaneously for one second ,Displaying  $\square$ .

 $B_{\sim}$  Lock: After three minutes of inactivity, the display panel will automatically lock.

 $C_{3}$  Mode switch: When unlocked, pressing it switches between time mode  $\bigcirc$  and meter mode  $\backsim$ .



D. Manual button: When unlocked, pressing it switches to the next station.

E , O **Parameter setting**: When unlocked, pressing it display the interface to change parameter settings.

F. Backwash: When locked, press 6 times the valve shift to B.wash station.





### 2. LED Controller Operation instruction



Pic2: LED Screen

## LED Display

Day  $\ \ M^3 \ L \ M^3/H$  are the units of time or flow, respectively, with the content, as suggested by the highlighted display

- S : Flow mode symbol
- (): Time mode symbol
- $IIII : Indicator of station Brine \rightarrow Slow wash station$

Twinkling when the valve is in **B.wash** station

: Indicator of Wash + Refill station

## Run: Indicator of Softening station

- ②: Enter to the setting status indicator
- Buttons locked indicator Button:
- Name:

## ♨:

Manual button:Unlock state.press it the valve shifting to next station Backwash: Lock state.press it 6 times the valve shifting to B.wash



#### station

Parameter

%Set : Mode

► switch : Next

### ▲: Plus 1

## Setting the defined parameters

C1: Meter Mode, Setting water for Brine inhalation and slow wash water. Unit: L

C2: Meter Mode, Setting water of Wash+Refill. Unit: L

C3: Meter Mode, Setting Softening water quantity of one cycle. Unit: m<sup>3</sup> CO:

Meter mode:setting water volume for B.wash(backwash).unit:L

C4: Time mode: Setting Brine in and slow wash time. Unit: Min

C5: Time mode: Setting Wash + Refill water time. Unit: Min

C6: Time mode: Setting Softening time of one cycle. Unit: Min

**CP:** Time mode:setting time for B.wash.unit:Min

C7: Hour clock setting 0-23(Hours )

C8 Minute clock setting 0-59(Minutes )

**C9** Delay Regeneration 0-23. if the valve is in servicing and can not switch to regenerate.it can be take delay regeneration.set a day any 0-23 hour , set 99 is to cancel this function.

**CF:** When the delay regenerate is enabled, If you want to take days as the unit of time; Regenerate once per set number of days. To achieve daily regeneration, set parameter C6 not more than one day (1440 minutes) **CC**: Relay output control mode , set the mode 0, 1, 2, 3, 4, 5, 6 in the following table(page:9).

**CL**: Number of regeneration: Such as setting "2", the program will realize [[]] and [<sup>†††</sup>] twice one cycle ;

CE: Backwash cycle: The number is set to indicate how many cycles(  $\downarrow \downarrow \downarrow$   $\rightarrow \downarrow \downarrow \downarrow \rightarrow RUN$ ) backwash is performed once;

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#### (1), Working station parameter

	2 - 0 6 0	S: Meter mode C2-060: Station (Wash+Refill)
		set as 60L. Alternately display the
Day Hour	060 / 1	decrement state, decrement to
		zero and switch to the next
	🛄 Run 🙁 🖬	station.

### (2), Parameter setting (Flow mode example)



(3), Instantaneous flow and accumulative water quantity query







## II、Input/output control instructions

#### 1. Interlock line connection as below



#### 2. External control interface

In RUN station, The value can be controlled into  $Brine(\downarrow\downarrow\downarrow)$  by the external other control system.



Pic4: External control input

### 3. Relay Output and mode set (CC)

- A. The contact capacity of the relay is 5A/250V.
- B. Relay output port:

NO= normally open, NC=normally closed, COM = common

C. When connecting the output of the relay, the AC110V-220V power supply input end shall be connected with the leakage circuit breaker.

In different modes, the relay outputs NO and COM, which is connected as "C", disconnected as "x"

Mada	444	Brine→	<mark>∰</mark> Clean	RUN	Valve
Noue	B.wash	Rinse	Wash+Refill	Soft	shifting
0	С	С	С	С	×
1	С	×	С	×	×
2	×	×	×	С	×
3	С	С	С	×	×
4	С	С	С	×	×
5	×	×	×	СХ	×
6	С	×	×	×	×

Mode	Applications
0	Inlet Solenoid valve mode: Pressure relief transposition,lever switch and feed pump control. Pic 5
1	<b>Inlet pump mode</b> : When its station is in $\overline{\mu}$ (B.wash, Brine, Rinse) and $\overset{\text{fff}}{\text{III}}$ (Clean+Refill), Start the inlet booster pump
2	<b>Outlet pump mode</b> : For example, for subsequent RO high pressure pump start-stop control.
3	Two valve one RUN & one standby water inlet solenoid valve mode: interlock line connected. When one valve completes $\overline{\mu}$ (B.wash, Brine, Rinse) and $\overline{\mu}$ (Clean+Refill) and switches to soft(Run) station, judge that if another valve is also in Run(Soft) station, the valve close its own inlet solenoid valve and wait for backup. As shown in figure 6.
4	Inlet solenoid valve double valve parallel interlock respectively backwash mode: Interlock line connection is required, this mode for filter valve use.
5	<b>CX(Mode2 additional conditions)</b> : When the inlet flow meter check the water flow signal in Soft station.the Relay is Connected.
6	Backwash booster and compressed air mode





Pic5: Mode(0): Solenoid valve liquid level switch and feed pump



Pic6: Mode(3): Tow valve one RUN & one standby inlet water solenoid valve mode:



## Ш、 Process



Pic7: GR-1 fixed bed back flow regenerate flow process





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#### IV Configuration, installation and raw water condition

 If the raw water contains mechanical impurities of gel or powder, it is necessary to install sand filter, cloth bag or disc type functional filter, factory valve inlet filter can only ensure the occasional large particles into the valve body.

2. The diameter of the exchange tank should meet the flow rate requirements of ion exchange.

3. The volume of the salt tank is not less than the volume of the exchange tank.

4. The GR fixed bed resin filling rate ensures 30% backwash space on the top of the exchange tank.

5. The DR floated bed resin filling rate 90% space of the tank. to avoid resin layer disorder.

6, Drainage pipe exports nearly flush with the ground, too high or too low will affect the equipment of Brine,Pipe must be mounted stable.

7, Pipe valve specifications is not less than control valve in and out of the size.

8, Water static pressure is 0.1 $\sim$  0.6 MPa.water temperature is 0°C $\sim$ 55°C .

9, the equipment is installed in the room, the humidity should not be too high, there should be no corrosive chemical gas around, to avoid strong electromagnetic interference to affect the power supply of the control valve.

10. Floor drain or trench drainage shall be set around the equipment to avoid accidental water leakage causing the floor and other indoor items to be flooded.



## GR2-1\DR2-1 dimension drawing





## GR4-1\DR4-1 dimension drawing



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## GR10-1\DR10-1 dimension drawing





Pic12: GR10-1S\DR10-1S dimension drawing



## GR10-1S\DR10-1S Valve mounted frame drawing



## V. Configuration and setting

### Formula for GR

Describe	Display	Formula
Service	RUN (Soft) : T	C3=[resin filling volume (L) x 90%] $\div$ Raw water hardness (mmol/L)
Brine absorb →Rinse	∰ (Brine) : L	C1=Resin filling volume (L) x 250%*
Wash+Refill	(Clean) : L	C2=Resin filling volume (L) x 200%(40%+160)**
Backwash	(B.Wash) : L	CO=Resin filling volume (L) x 100%



#### Formula for DR

describe	display	Formula
0 i	vice RUN (Soft) : Ton	C3=[resin filling volume (L) x 70%] ÷ Raw water
Service		hardness (mmol/L)
Brine absorb →Rinse	때 (Brine) : L	C1=Resin filling volume (L) x 150%*
Wash + Refill	世 (Clean) : L	C2=Resin filling volume (L) x 150%**
Backwash	₩ (B.Wash) : L	CO=Resin filling volume (L) x 100%

Note!

1, \*The setting water refers to the process of jet injection quantity sum, including Brine Absorption and slow washing quantity;

2、\*\*1/5 of the set water amount is the salt tank refill water and 4/5 is the washing water. This ratio is based on the valve body channel design and test. The total water quantity shall be based on 200% resin filling quantity, and the principle shall meet the requirements of 1/5×200%=40% resin filling quantity (1 liter of pure brine regenerate 2.5 liters of resin). The only way to increase the salt absorption is to increase the value of this parameter;

- 3、Water hardness unit is mmol/L;
- 4. Resin work exchange capacity calculating is 1000 mol/m<sup>3</sup>;
- 5. Design and calculation of brine concentration is 20%;
- 6, 1Liter brine(20%)Molar value=1000g×20%/58.8g(NaCL)×1.4(specific

*consumption*)  $\approx$ *200/80=2.5mol* 

#### VI Mode choice

#### (1) Meter mode " \carcon" (Default mode)

Under normal circumstances, should choose meter mode, the mode is not affected by the feed water pressure changes in equipment operation effect.Very important,the flow meter have water stop memory.

### (2) Time mode" (standby mode)

When the water pressure is stable, instantaneous water yield stability,





equipment according to user requirements can choose Time mode. If the flow meter is fault, you can switch to Time mode by the button % temporary.

## VII. Curve of Flow and Pressure for the Valve



Pic14: GR2-1 /DR2-1 Curve of Flow and Pressure for the Valve 20





Pic15: GR4-1 /DR4-1 Curve of Flow and Pressure for the Valve

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Pic16: GR10-1\GR10-1S Flow and Pressure curve



## VIII. Tips and Precautions for Equipment

#### Produced water is not qualified

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Phenomena/reasons	Solution
No salt in the salt tank	Add salt to the brine tank
	Increase "I Clean" setting value
No enough absorption of salt water	to increase refilling water to salt
	tank
DR type No enough resin and too	Add more resin or other to reduce
much space at the top of the tank	the space
The sealing problem of the center pipe	Check the center pipe and the
or the pipe is too short	sealing ring

#### Brine water leaking out to the water outlet

Phenomena/reasons	Solution
Insufficient amount of cleaning	Increase " III Brine " value to
	extended slow wash time

#### Increase of the inflow pressure and decrease of the flow rate of outlet

Phenomena/reasons	Solution
Resin is being polluted by the suspended matter	Manual carry out Backwash in unlock state,or reduce the backwash cycle,or increases B.wash water amount
Water distributor is blocked by	Unload the water distributor and
broken resin	clean it.
Water Outlet pipe system have jam phenomenon	Check and eliminate the problem

#### The salt tank overflowed

Phenomena/reasons	Solutions
The ##Clean value setting is too	Reduce the parameter of the $\ddagger$ . or
large or the salt tank is too small	exchange the large salt tank

#### No brine absorb in

Phenomena/reasons	Reasons and Solution
Drainage pipe have less water out, no brine absorption	Check whether the drain pipe system have any jam ,or check the jet nozzle has any jam
Inflow pressure become low	Check feed water and inflow pipe system have any jam.

## IX. Tips and Precautions of Equipment

#### 1. Add salt to salt tank

The equipment should use large particles industrial salt. 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. Clean salt tank

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

#### 3. Clean inflow filter

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 amount.



## X Control valve structure



Pic17: Control valve structure (GRDR2-1\GRDR4-1)





Pic18: Controller front shell disassembly (GRDR2-1\GRDR4-1)



Pic19: GRDR10-1 Control valve structure





### Pic20: GRDR10-1S Control valve structure

## XI, Explode drawing (GR4-1 example)



## XL, Explode drawing (GR4-1 example)



Pic21:Explode drawing (GR4-1 example)





Pic22:Brine valve explode drawing (GR2-1 example)



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