YCQR7 series

Intelligent motor soft starter

OPERATION INSTRUCTION

Standard: IEC60947-4-2

CNC **Deliver**
Power For Better Life

⚠ Before installing and using this product,
please read this manual carefully and
pay more attention to safety.

Safety precautions

⚠ **Warn**

Only professional and technical personnel will allow the Online soft start

⚠ **Warn**

Ensure that the motor matches properly with Online soft start, and must follow the user manual when installing

⚠ **Warn**

No input terminal (R, S, T) is allowed to the output terminal (U, V, W)

⚠ **Warn**

The U, V, and W output terminals of the drive controller are not allowed to connect to the capacitor

⚠ **Warn**

Online soft start After installation, the input and output copper wire nose is wrapped with insulating tape

⚠ **Warn**

The Online soft start must be firmly grounded

⚠ **Warn**

When repairing the equipment, the access cable power supply must be cut off

⚠ **Warn**

It is not allowed to assemble and repair the product without permission

⚠ **Warn**

Internal hidden software copyright statement, not through illegal means to counterfeit the product, unauthorized users, will be investigated for legal responsibility

1 Installation preparation / use and environmental conditions

1.1 Installation and preparation

Read the Online soft start installation instructions carefully before use. If you do not read the relevant instructions carefully, you will violate the relevant safety regulations, which may affect the normal use of the soft starter. To install the Online soft start, please prepare the following tools : small word screwdriver, wire cutter, wrench, etc.

⚠ **Warn**

Be sure to read the safety precautions in detail before installation.

1.2 Use and environmental conditions

[Incoming line power supply] AC 380V ± 15% 50 / 60 HZ

[Power supply is applicable] mouse cage three–phase asynchronous motor

[Cooling mode] forced air cooling

[App licable temperature] −10℃ ~ + 40℃ , 1℃, 2%, + 50℃

[app licable humidity] 90% without frost

[Place of use] No corrosive gas without conductive dust indoor is well ventilated

[Elevation vibration] The altitude is below 3000 meters, and the vibration power device is below 0.5G

2 Performance characteristics

2.1 General

The app lication of SCR technology makes the infinite and smooth voltage output, no current and mechanical impact, and the performance is far better than the star triangle, self-coup ling and magnetic control step-down soft rise. Intelligent technology makes the soft starter based on CR technology more consistent with the load characteristics, and realizes the real-time data monitoring, motor protection and bus control functions, making the equipment operation more reliable and better performance. This intelligent soft starter is developed based on the 32-bit DSC processor platform, and combines the latest motor control theory, motor protection technology and fuzzy control technology. The app lication of simulation software optimizes the air duct design, so that the soft starter miniaturization has higher heat dissipation ability, better performance and more stable and reliable use.

2.2 Main role

● Effectively reduce the starting current of the motor, can reduce the distribution capacity, avoid the grid capacity increase investment.
● Reduce the starting stress of the motor and the load equipment, and prolong the service life of the motor and related equipment.
● Soft shutdown function effectively solves the parking surge problem of the inertia system.
● A variety of unique starting modes, to adapt to the comp lex working conditions, to achieve a perfect starting effect.
● Perfect and reliable protection function, effectively ensure the safety of the motor and related production equipment.
● Standardized network protocol to meet the networking requirements of power automation.

2.3 Features

● Use simulation software to optimize the heat dissipation design, miniaturization at the same time have better heat dissipation ability.   ;
● Based on the 32-bit DSC processor plat form, higher bandwidth, faster speed, make the fuzzy algorithm control more accurate.
● Use of 12-bit AD sampler, DMA data transmission mode, to achieve direct AC sampling, high real-time performance ;
● Realize a wide range of linear data sampling, data collection without dead area, more accurate data ;
● All faults can be turned on and closed for easy debugging
● Soft up can be realized according to the load of automatic overtime and force force, load adaptability is stronger ;
● Rich monitoring data, monitoring current and voltage can monitor phase sequence Ang le, frequency, cumulative running time and other data.

● Online operation mode, no contact adhesion phenomenon ;
● High precision 4-20MA current output capacity, linear accuracy up to 0.5% ;
● Has up to 12 kinds of protection functions, among which the reverse time limit overload protection can effectively prevent the motor from overheating and burning, the use of equipment is more assured
● Four lines of LCD display, can achieve both Chinese and English switch display.

2.4 Technical Indicators

| Item		performance index
scope of application		3 phase rat cage asynchronous motor
power bracket		5.5~450kW
input voltage		380V ± 15%
supply frequency		50/60HZ ± 5%
overload capacity		400%60sec、120% continuous
Adjustable current multiple		From 1 to 5 times each time
Soft up time		1-90 Seconds
Module working mode		over a long period of time
cooling-down method		forced air cooling
Secondary interface terminal	on-off input	3 Road
	relay output	1 (programmable) or 3 (programmable)
	4-20MA	Route (extension is optional)
	RS485	1-way (extended as optional)
Protection		Short circuit speed break, overcurrent, overheat protection, reverse time overload, voltage phase deficiency, imbalance, Insient stop, undervoltage, overvoltage, underload, starting failure, phase sequence error.
Host overload protection		Overload and reverse time limit, level 1 -5 is optional
Host current imbalance protection		Unbalanced trip standard : 5- 100% any two-phase unbalanced trip delay · 1-60 seconds can be set
Host short circuit protection		Quick break time . 0.18, can be set
Bus function		Interface : RS485 protocol · ModbusRTU
Human-computer interface		4 Line COG Screen
Language		Chinese, English

3 Purchase inspection

3.1 Delivery inspection

The soft starter has undergone strict quality inspection when it leaves the factory, and has seismic treatment on the packaging, but there may be accidents during transportation, Please conduct the following inspection after receiving the product.

● Check whether the appearance is damaged and whether the screws are loose
● Check the namep late to confirm the product you ordered
● The packing box contains a soft starter, a set of display kit, qualification certificate and warranty card. If any item is missing, p lease contact our agent, dealer or refer to our technical service center directly.

3.2 Model of soft starter

YC QR 7 □ □

- Voltage
- Power
- Design sequence number
- Soft-Starter
- Company code
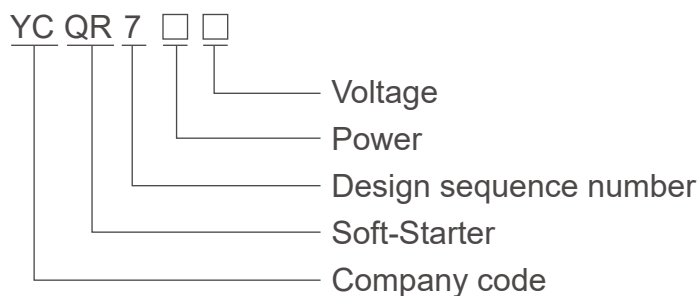
4 Installation / circuit connection

4.1 Installation

The soft starter must be installed vertically in the box. In order to prevent temperature aggregation in the box space, please open the heat dissipation hole in the upper and lower part of the box and ensure the air flow through the soft starter.

4.2 Terminal description

4.2.1 Main loop

Terminal mark	Terminal name	Explain
R、S、T	Main-loop power supply terminal	Connect the three-phase power supply
U、V、W	Starter output	Connect the motor

Note: Please mark the soft starter housing when wiring

4.2.2 Control terminal

● **For the models below ● 115KW (including 115KW), please refer to the table below 4-1**

Table 4-1

Terminal Number	Terminal Name	Explain
1、2	reserve	
3、4	Programmable relays	Please refer to the programming sheet 4-4
5	Insient stop (switch quantity input point)	Wi th8 short connection instantaneous stop system (normally closed)
6	Stop (switch quantity input point)	Stop with 8 short connection (normally open and normally closed)
7	Start (switch quantity input point)	With 8 short starter soft starter (normally open)
8	Public terminal	

● **Please refer to Table 4-2 below for models above 132KW (including 132KW)**

Table 4-2

Terminal number	Terminal name	Explain
1、2	Bypass relay (programmable)	Please refer to the programming sheet 4-4
3、4	Programmable relays	Please refer to the programming sheet 4-4
5、6、7	Fault output normally closed and normally open (programmable)	Please refer to the programming sheet 4-4
8	Insient stop (switch quantity input point)	With 11 (normally closed)
9	Stop (switch quantity input point)	Stop with 11(Normally open and normally closed, can be set)
10	Start (switch quantity input point)	With 11 (normally open)

11	Public terminal	
12	4−20MA−	4−20MA minus terminal
13	4−20MA+	4−20MA plus terminal
14	RS485−GND	Rs485 shield grounding, not connected
15	RS485−A	The RS485 bus A terminal
16	RS485−B	Rs485 bus terminal B

Note : Programmable relay contact capacity is AC250V 5A

### 4.2.3 Extended interface and terminals

Below 115KW uses the 4−20MA interface with the extension board, and the soft starter control board has a 10−p in extension interface, which is located on the right side of the control terminal. The expansion board terminals are described in Table 4−3.

Terminal number	Terminal name	Explain
1	4−20MA−	4−20MA minus terminal
2	4−20MA+	4−20MA plus terminal
3	RS485−A	The RS485 bus A terminal
4	RS485−B	Rs485 bus terminal B

### 4.2.4 Terminal use and wiring

● Three−line control mode

The three−line control mode is suitable for external start and stop buttons, and the stop can be set to two input modes of normal open and constant close (related parameters : customer privilege stop terminal). When set to normal open, the power contact pressure gauge can be connected to start and stop the motor according to the upper and lower limits of the water level. Using the three−line mode, set the " Operation mode" option of the menu to the option including the external control, refer to the 5.3 parameter description. In case of a failure, p lease press the stop button Resignation failure. The wiring is shown in Figure Figure 4−1.

Stop setting to normally closed wiring

Stop setting to normally open wiring
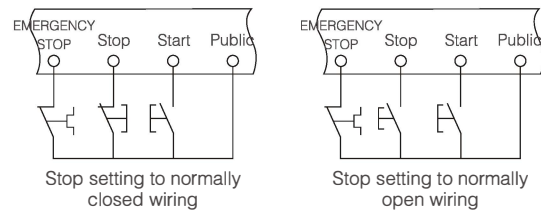
Graph 4−1

● Two−line control mode

This control mode is used when the user uses a switch (using the self−hold button or PLC output point). See Figure 4−2, J closes soft start operation and J breaks soft start stops. In this method, set the "Operation Mode" option of the menu to the option containing external control, and set the "Stop terminal" in the parameter to normally closed. In case of failure, this switch can be used to open and break to reset the fault ;
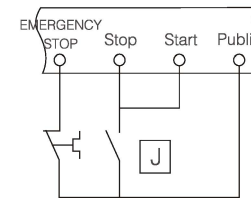
Graph 4−2

● Programmable relay

Refer to 4−1 and Table 4−2 for relay information and to Table 4−4 for programming.

Table 4−4

Order number	Set the value	Explain
1	Bypass often open	After the starting process, the relay contacts close, and the contacts separate when the stop command is issued.
2	Fault often open	No fault contact open, with fault contact closed
3	Soft and joint control is often closed	The contact is closed after starting with a delay of 0~240S (setting)
4	Fault is often closed	No fault contact closed, with fault contact open
5	Soft and joint control is often closed	The contact opens after starting with delay 0~240S (setting)
6	Feed often open	For the relay set as the constant open function of feeding output, the electrical contact on the circuit board is disconnected, the contact is disconnected during the soft start and soft stop. After the motor, when the average current is greater than the "upper limit current", the delay to the "action time" contact is disconnected, less than the "lower limit current", and the delay to the "action time" contact closes. Lower Current, Upper Current and Action Time can be set in the menu .
7	Feed often closed	Set the relay with the normally closed function of feeding output, the electrical contact on the circuit board is closed, the contact is disconnected during the soft start and soft stop. After the motor, when the average current is greater than the "upper limit current", the delay to the "action time" contact is disconnected, less than the "lower limit current", and the delay to the "action time" contact is closed.
8	Operation joint control is open	After cutting full pressure, the contact is closed after delay 0~240S (can be set)
9	Operation joint control is often closed	After cutting full pressure, the contact is disconnected after delay 0~240S (can be set)

● Instantaneous stop

To enable the instantaneous stop function, set the instantaneous stop switch to the on or the Self recovery state, or off if not enabled. After the instantaneous stop function is enabled, the instantaneous stop terminal must be short connected to the public terminal when the soft starter is working normally. If the open circuit is open, the soft starter will stop working unconditionally and be in the fault protection state. This terminal can be controlled at the normally closed output point of the external protection device. The difference between "on" and "self- recovery" is whether the fault can be automatically lifted after the terminal recovers from the open circuit to the closed circuit. Here, "self-recovery" can automatically recover from the fault state to the shutdown state. Refer to Figure 4-1 for the wiring

● CI

Standard 485 interface, which can realize remote communication control and multi-machine linkage control. In addition to controlling the start and stop, you can also monitor the operating current, voltage, frequency, phase sequence angle and fault information, using the standard Modbus RTU protocol. Please use 2-core shield wire to connect 485-A and 485-B terminals respectively. The main board provides 485-GND terminals to be grounded or connected.

● 4-20mA interface

The 4~20mA DC analog output is used for the external PLC or DC meter to monitor the motor current. The 4-20mA current flows from the terminal 4-20 mA + and through the external meter or PLC back to the terminal 4-20 mA-. Through The maximum current value is set in the "20 mA range" in the "communication parameters" of the soft starter, which corresponds to the DC output 20 mA, whereas 0A corresponds to the output of 4 mA. The 4 mA output current can be adjusted by the 4 mA calibration in Customer Privilege. The maximum DC output load resistance is 500 euros, without external power supply, and the common ground type wiring mode. (Instructions are required when ordering).

4.2.5 Main motor connection

The upper end of the soft starter R, S and T (no phase sequence requirements) are connected to the three-phase power supply, and the lower end U, V and W are connected to the motor. After the test run, the motor steering can be changed by replacing U, V and W.

5 Keyboard and disp lay instructions

The control panel consists of a four-line dot array LCD screen and six buttons, as shown in Figure 5-1
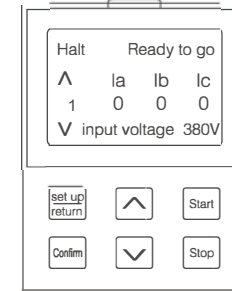
Graph 5-1

5.1 Keyboard instructions

● Start : press this key to start the motor ;
● Stop : the motor can stop the motor by pressing the key during the operation, and press the key to reset the fault ;
● Settings / Return : used to enter and exit the Settings menu, in the shutdown (display display "shutdown") or fault state long press the key to enter the menu browsing state, after entering the menu, and then short press this key to return to the previous level ;
● Confirm : After entering the menu, press this key to select the current menu to enter the data setting state, and then press this key to confirm and save the current setting value, and return to the previous level. ;
● AV : add or subtract key, key A (or V key) increase (or decrease) data, long press this key, data fast fast decrease, can also use this key to browse the menu.

pour :
1. In the state of shutdown or failure, long press the "Confirm" button to enter the historical fault query, and p lease press the "Return" button ;
2. When the display screen is abnormal, press the "AV" button to initialize the display screen ;
3. In the non- "setting" state, press the "A" and "V" buttons to turn the page and display the monitoring data. Without pressing this button for A long time, the monitoring data screen will automatically recover to page 1 ;
4. In the "shutdown" state, long press the V " button to view the previous shutdown record, but the power loss data is not retained.

5.2 Display instructions

The panel disp lay is mainly composed of shutdown interface, setting interface, delay interface, soft start interface, bypass (full pressure) interface, soft stop interface and fault interface.
● shutdown interface
After the system is powered up, it will enter the shutdown interface, which indicates that the motor is in the shutdown state, and the system is ready and can start, as shown in Figure 5-1.

● Setup interface

In the "Stop" or "fault" interface, long press the "Settings" button to enter the setting interface. The parameters are mainly divided into three categories : A, B and C. The B and C parameters are also known as "customer privilege" and "manufacturer setting" A parameters are divided into : soft start parameters, protection parameters, protection switch and communication parameters. When the parameter is set, the left side of the first line is used to display the state "setting", the right side is used to disp lay the parameter category, the second row is used to disp lay the subpara meters of the category, the third row is used to display the parameter value, and the fourth row displays the prompt information, as shown in Figure 5-2.

```
Set              Soft start
                 parameters
A1 mode of the soft starting
     Current slope
Browse Menu    ∧  ∨
```

Graph 5-2

● Time-lapse interface

When the parameter "start delay" is set value greater than 0, the delay interface will appear when starting. The left side of the first line shows the status "delay", the right side shows the countdown, and the second, third and fourth rows display the monitoring data. The upper and lower arrows indicate that the monitoring data can look at other pages and disp lay the current page number, as shown in Figure 5-3.

```
Delayed           5.1S
∧       Ia    Ib    Ic
1        0     0     0
∨   Input voltage 380V
```

Graph 5-3

● Soft-up interface

When the start button is pressed, directly enter the soft start interface. When there is no delay, enter the soft start interface after the countdown. The left side of the first row shows the "soft rise" state, the right side shows the soft start countdown, the second to four rows show the monitoring data, and the interface is shown in Figure 5-4. Press AV to review other pages to monitor data.

```
Soft start         2.3S
∧       Ia    Ib    Ic
1       90    90    90
∨   Input voltage 380V
```

Graph 5-4

● Bypass or full-pressure interface

After the soft start ends, enter the bypass or full pressure interface. The left side of the first line shows the "full pressure" or "bypass" state, the right side shows the running time, and the second to four rows show the monitoring data, as shown in Figure 5-5. Press AV to review other pages to monitor data.

```
Full pressure: 0:00:20
∧       Ia    Ib    Ic
1       90    90    90
∨   Input voltage 380V
```

Graph 5-5

● Soft stop interface

When the menu "soft stop time" is greater than 0, the soft stop function is enabled. Press the stop button after "full pressure" or "by the button" to enter the soft stop interface. The left side of the first line shows the "soft stop" state, and the right side shows the soft stop countdown, The second to four rows display the monitoring data, and the interface is shown in Figure 5-6. Press AV to review other pages to monitor data.

```
Soft Stop          3.5S
∧       Ia    Ib    Ic
1       90    90    90
∨   Input voltage 380V
```

Graph 5-6

● Fault interface

If the fault occurs in any state, the soft start enters the fault alarm interface. The first row shows "fault" on the left, the fault information, and the second row to four rows, the locked monitoring data. The interface is shown in Figure 5-7. Press The AV key selects to disp lay other locked monitoring data. This interface can press the "stop / reset" button to reset the fault.

```
Fault E8      Undervoltage
                  fault
∧       Ia    Ib    Ic
1       90    90    90
∨   Input voltage 380V
```

Graph 5-7

Note : During the fault, all the monitoring data are locked in the data of the failure, so that it is easy to view and analyze the fault cause, and the data is not retained after the power failure. It can also be turned on or off in Customer Privilege-Fault Catch Screen.

5.3 Parameter description

1、And A parameter

Order number	Name	Set the scope	Windows default	Explain
Soft−up parameters				
A1	Start way	0~3	3	0: aging 1: voltage ramp 2: constant current 3: current ramp
A2	Starting voltage	0~100%	45%	0,1,2 The starting mode is effective
A3	Initial current	0~2.5 Times	2.0 Times	Method 3 valid
A4	Flow limit multiple	1.8~6.0 Times	3.5 Times	Method 1,2,3 valid
A5	Sudden jump peak	0~100	90%	
A6	The jump cycle	0~2.0S	0.4S	
A7	Start delay	0~240.0S	0.0S	Delayed start time
A8	Soft up time	0~90.0S	20.0S	All starting modes are valid
A9	Soft stop time	0~60S	0S	Set to 0 no soft stop function, non−0 valid
A10	Joint control delay	0~240.0S	0.0S	Start the delay relay output, use with programmable relay
A11	mode of operation	0~6	3	0 : Full open 1 : keyboard 2 : external control 3 · keyboard + external control 4 : Communication 5 : Communication + keyboard 6 · communication + external control
A12	Rated current	0~ Current limit	100A	Set according to the rated current on the motor nameplate
A13	Upper limit current	0~200%	120%	The relay is set to feed effectively
A14	Lower limit current	0~120%	90%	The relay is set to feed effectively
A15	actuation time	0~10.0S	1.0S	The relay is set to feed effectively
A16	Soft start plus time	0~60.0S	0	"Soft start time" does not complete the start, automatic extra time
A17	Soft strength	2.0 Times	0	"Soft start time" does not complete the start, automatic force force
Protection parameters				
A18	Short circuit multiple	0~12.0 Times	5.5 Times	Set greater than (current limit multiple + soft starting force + 0.5), the whole process is effective
A19	Speed break time	0~2.00S	0.20S	Short circuit block (break) time
A20	Overflow multiple	0~8.0	1.2	Bypass effective
A21	Overflow time	0~60.0S	10.0S	If the overflow exceeds this value, block the silicon
A22	Overheat time	0~60.0S	10.0S	When overheating exceeds this value, blocking the SCR, the whole process is effective
A23	Overload curve	1~6	1	Motor reverse time limit protection, reverse time limit curve number, the larger the value, the longer the time, bypass (full pressure) after the effective
A24	Lack of phase time	0~60.0S	10.0S	If the voltage phase deficiency exceeds this value, the SCR is blocked, and the whole process is effective
A25	Current imbalance	0~100%	30%	Current imbalance ratio, soft rise, bypass, soft stop effective
A26	Imbalance time	0~60.0S	5.0S	If the accumulated time of imbalance exceeds this value, block the silicon controller
A27	Underpressure lower limit	0~100%	70%	Full effective
A28	Overpressure time	0~60.0S	2.0S	If the accumulated time of underpressure exceeds this value, the thyristor is blocked
A29	Overpressure upper limit	0~150%	120%	Full effective
A30	Overpressure time	0~60.0S	2.0S	If the cumulative time of overpressure exceeds this value, the thyristors is blocked
A31	Under−load current	0~100%	50%	Lower undercurrent, bypass and full pressure effective
A32	Adue time	0~30.0s	2.0s	If the cumulative time exceeds this value, the thyristor is blocked
Protection switch				
A33	Short−circuiting switch	Close, open	Open	Output short−circuit protection is enabled or prohibited
A34	Overflow switch	Close, open	Open	Overcurrent protection enables or forbids
A35	Overheat awitch	Close, open	Open	Overheat protection enables or prohibited
A36	overload cut−out	Close, open	Open	Motor overload protection is enabled or prohibited
A37	Lack of phase switch	Close, open	Open	Input voltag ephas eabs enceprotection enabled or prohibition
A38	Imbalance switch	Close, open	Open	Current imbalance (output phase deficiency) protection enabled or prohibition
A39	Instantaneous stop switch	Close, open, and self−recovery	Close	External instantaneous stop fault protection enabled or prohibited, enabling can be set to self−recovery
A40	Undervoltage switch	Close, open	Open	Input voltage protection enabled or prohibited
A41	Overvoltage switch	Close, open	Open	Input voltage overvoltage protection enable or prohibited
A42	Starting failure	Close, open	Open	Motor is not enabled or prohibited by full speed protection during bypass (or full pressure)
A43	Underload switch	Close, open	Close	Underload protection is enabled or prohibited
A44	Phase sequences switch	Close, open	Close	Phase order error protection enables or prohibition
Communication parameters : not considered when not used				
A45	principal and subordinate	0、1、2	0	0 Close 1 Host 2 slave
A46	Stop number	0~32	1	
A47	Digit capacity	0~12	8	Usually set to 8
A48	Stop bit	0~2	1	Usually set to 1
A49	Even−odd check	0~2	0	Usually set to 0
A50	Baud rate	0~96	8	Actual baud rate−baud rate * 1200
A51	Current range	0~6000	1000	4 mA corresponds to 0 and 20 macorresponds to range values
Control				
A52	Customer privilege			Password 10, go to the customer privilege menu
A53	Manufacturer setting			Password 111, enter the manufacturer setting menu

2、B parameter (customer privilege)

Customer privilege				
B1	Parameter modification enables	Enable, prohibit	Enable	
		In, English	Centre	
B3	Fault grab screen	Close, open	Open	

B4	Stop the terminal	Often open, often closed	Normal close	Set to connect to the electrical contact pressure gauge when normally open
B5	4mA calibration	0~100%	100%	In4-20 mA DC output,4mA (zero)calibration
B6	Parameyer learning			The set A parameter i scopied to the Recovery Paraeters region
B7	Parameyer recovery			Retum the previous learned parameter to the A parameter
B8	Return			After the parameter setting, is finished, exit, you can also directly return to the key to exit

3、C parameter (manufacturer setting)

Manufacturer setting				
C1	rated voltage	0~1000V	380V	
C2	CT no−load voltage ratio	0~1200	100	Use the current transformer turn number ratio
C3	La check	0~200%	100%	The correction shows that the current, a
C4	Ib check	0~200%	100%	Correction shows the current b
C5	Ic check	0~200%	100%	The correction shows the current o
C6	Voltage correction	0~200%	100%	Calibration shows voltage
C7	Run online	By the way, online	Online	
C8	Relay 1	0~8	0	Relay programming, refer to Table 4−4
C9	Relay 2	0~8	1	Relay programming, refer to Table 4−4
C10	Relay 3	0~8	2	Relay programming, refer to Table 4−4
C11	Power supply frequency	50、60Hz	50Hz	For the frequency of the power supply voltage, refer to Table 4−4

5.4 Parameter setting

When the factory data of the soft starter does not meet your load requirements, you can follow the following steps (to modify the starting voltage" as an example)

order number	Operate	Show	Explain
1	power on	Down time Ready for ∧ Ia Ib Ic 1 0 0 0 ∨ Input voltage i s 380V	Stop state after power−up Note The fault state can also enter the parameter settings
2	Long press the Settings button for 1 second	Set parameter A01 Soft start mode Current slope Browse the menu ∧ ∨	Enter the Setup interface The number in the second line is the menu serial number, and the Chirese line i sthe third behavior setting value of the menu item
3	Press " ∧ " or " ∨ " key	Set parameter A02 starting voltage 45% Browse the menu ∧ ∨	Browse to the menu to find the menu item Start Voltage
4	Press "affirm" key	Set parameter A02 starting voltage	The cursor appears after the third line number and flashes, indicating that the parameters can be modified
5	Press " ∧ " or " ∨ " keys	45%I Browse the menu ∧ ∨ Set parameter A1 starting voltage 50%I Browse the menu ∧ ∨	Modify to 50%,long press " ∧ " or " ∨ " keys, can add or subtract
6	Press "confirm" keys	Set parameter A1 Soft start mode 50% Browse the menu ∧ ∨	The cursor d sappe rs, indi ca ing that the data i smodified and saved to continue to browse other menu items
7	Press "Return" keys	Haltbe all set ∧ Ia Ib Ic 1 0 0 0 ∨ Voltage i s380V	

Note : 1. In the fault state, the menu browsing and parameter modification can also be made according to the above steps.
2. The "Set" key and the "Return" key are the same key. Long press this key for the setting function, and short press for the return function

6 Failure protection description

The intelligent soft starter has up to 12 fault protection, all faults will be shut down after the set delay time, and disp lay the fault information.
Note : Use the Stop / Reset " button to remove the fault

1. Short-circuit protection

The short circuit protection function can quickly block the CR and the bypass contactor when the output short circuit occurs to prevent the breakdown, soft starter burning or external accident expansion. When you need to break the bypass contactor, p lease note that the contactor must have the breaking ability.
Related parameters : rated current, shortcircuit multiple, short circuit time, short circuit switch.
● "short circuit switch" set to turn on, enable this function ;
● When detecting the current> = "short circuit multip le" * "rated current", and the time> "quick break time", the response breaks, and reported "short circuit" fault ;
● Short circuit fault protection is effective.

Possible failure causes :
● Short circuit to output cable, short circuit is made to motor coil
● The rated current and short circuit multiple are not set correctly

2. Overflow protection

Over current protection is used to prevent the motor or silicon from burning due to excessive current during full voltage (bypass) operation.
Related parameters : rated current, over current multiple, over current time, over current switch.
● "overcurrent switch" is set to turn on, to enable this function ;
● Set "over current multiple"> =1.2, in the detection of current "" over current multiple "*" rated current ", and timing>" over current time ", response break, and the" over current " fault ;
● Effective at full pressure.

Possible failure causes :
● Full speed during bypass
● Excessive load occurs in blocking rotation
● The rated current and overcurrent multiple are not set correctly

3、 Overheat protection

Overheat protection is used to prevent silicon from breaking for a long time. This function must be used in conjunction with a normal−closed temperature switch.
Related parameters : overheating time, overheating withdrawal
● The "Overheat switch" is set to turn on to enable the function ;
● Temperature switch disconnection time> = overheat time, response protection.
● is effective throughout

Possible cause of failure
● Start−up starts too frequently
● The load is too large, and the large current starting time is too long
● The temperature switch is damaged
● The fan is not working or the speed is slow

4、 Overload protection

Overload protection is used to prevent long−term overload operation of the motor. The reverse time limit algorithm is divided into level 1−6 curves, in which the level 1 curve has the shortest time, as shown below :

Curve	Action time (unit: S)								
	1.05	1.2	1.5	2.0	3.0	4.0	5.0	6.0	7.0
1	Don't take off button up	70	30	16	8	4.4	2.4	1.5	1
2		140	60	32	16	8.8	4.8	3	2
3		210	90	48	24	13.2	7.2	4.5	3
4		280	120	64	32	17.6	9.6	6	4
5		350	150	80	40	22	12	7.5	5
6		420	180	96	48	26.4	14.4	9	6

Related parameters : rated current, overload curve,overload switch
● "Overload switch" is set to turn on, to enable the function ;
● The higher the overload curve is set, the longer the protection time of the same multiple ;
● The phase with the largest current value in the three−phase current is taken as the calculation parameter of the overload reverse time limit algorithm.
● Overload protection is effective in the bypass full pressure state. Possible cause of failure
● The motor is overloaded for a long time
● The load is too large or the voltage is too low
● The rated current is set as incorrect
Note : Overload protection and over current protection overlap. During the "overload" protection test, please prohibit the "over current" protection.

5、Voltage imbalance

Overvoltage phase absence protection is used to prevent input side phase breaking or severe imbalance.
Related parameters : phase time, phase switch
● The "missing phase switch" is set to turn on to enable the function ;
● Any one phase, two phase or all three−phase fracture phase, will be protected ;
● is effective throughout.
Possible failure causes
● Poor incoming line contact
● Grid side voltage imbalance
● no power on
Note : When the voltage phase deficiency occurs, p lease enter the second page of the monitoring screen to check the phase sequence ang le, and the correct value is about 120 degrees or 240 degrees.

6、Current imbalance

Current imbalance protection is used to prevent the expansion of faults caused by si breakdown, voltage imbalance, motor wire package fault, poor contact and other hidden dangers.
Related parameters : rated current, current imbalance (imbalance), imbalance time, imbalance switch
● " imbalance switch" is set to turn on, to enable this function ;
● Far less than the rated current, do not stimulate the protection ;
● The maximum value of the difference between any one phase and the three−phase average current / average current> = "current imbalance", and the timing time> = " imbalance time", the response protection, and the "current imbalance" fault ;
● Soft start, bypass (full pressure), soft stop when effective.
Possible failure causes :
● Poor contact between the access and exit lines
● Grid−side voltage imbalance
● Motor wire package problem
Note : The menu "current imbalance" is the current imbalance percentage, also imbalance

7、Instantaneous stop

Overtransient stop is used to fault signal or emergency stop button of external equipment. Related parameters : Instant stop switch
● When the " instantaneous stop switch" is set to turn on or self− restore, enable this function ;
● is effective throughout
Note : When set to self−recovery, the instantaneous stop fault Page will be automatically lifted when the external fault is removed or the emergency stop button is closed.

8、Under voltage protection

Undervoltage protection is used to prevent abnormal damage to the equipment due to low system voltage.
Related parameters : rated voltage, lower undervoltage, undervoltage time, undervoltage switch

● "undervoltage switch" is set on to enable the functıon ;
● Detect voltage / rated voltage <= undervoltage lower limit, and timing time> = undervoltage time, response protection, and report the "undervoltage" fault ;
● is effective throughout.

Possible failure causes :
● Undervoltage lower limit or rated voltage set error
● Power supply transformer has overload and magnetic saturation
● The Cable is too long or too thin, and the voltage attenuation is serious

9、Over voltage protection

Over voltage protection is used to prevent equipment damage caused by excessive system voltage.
Related parameters : rated voltage, upper over voltage limit, over voltage time and over voltage switch
● "Overvoltage switch" is set to turn on to enable the function ;
● Detection voltage / rated voltage> = upper over voltage limit, and timing time> = over voltage time, response protection, and report the "over voltage" fault ;
● is effective throughout.

Possible failure causes :
● Overvoltage upper limit or rated voltage is set ın error
● The network side voltage is too high

10、Start-up failure

Starting failure protection is used to prevent the bypass contactor or full pressure transmission after the motor starts at full speed Out, leading to mechanical and power grid shocks. Related parameters : Start failure (switch)
● "Start failure" is set to enable the function ;
● Cut bypass (online mode : full pressure), the motor is not full speed response protection ;
● Effective when soft start ends to bypass (full pressure). Possible failure causes :
● Starting mode with limited flow function, the motor fails to achieve full speed during bypass or full pressure due to excessive load

11、Under load

Under load protection is used to prevent no-load or light-load operation of motors, usually due to improper use and thus damage to equipment, such as submersible pumps.

Related parameters: under load switch, under load current, under load time
● "under load switch" is set to turn on, to enable this function;
● (Detection current / rated current) * 100% <= under-load current (percentage), and timing time> = under-load time, response protection, and reported "under-load" fault ;
● Effective during the bypass (full pressure) ;

Possible failure causes:
● Incorrect parameter setting ;
● Submersible pump no water, oil pump no oil

12、Phase sequence error

For motor steering requirements, such as air compressor, to prevent mechanical damage caused by reversal.

With this function, p lease first connect R, S, T, U, V, W cables, press the AV button in the shutdown or fault interface, switch the monitoring data window to page 2, observe whether the phase sequence angles PSab, PSbc and PSca are all 120 degrees, if not, p lease change any two R, S and T. Motor idling, observe the motor steering, if reverse, p lease change any two U, V, W.

Usually, the U, V and W output cables can not be changed. If the change is made, p lease adjust the motor steering again according to the above method. After moving the machine, if the R, S, T wiring error, the "phase order error" fault will be reported.

Related parameters: phase sequence switch.
● The "phase sequence switch" is set to turn on to enable the function;
● A phase order fault was detected It works when
● is powered
Note: the equipment installed with soft start and motor is more suitable for this function. After debugging steering, please do not change U, V, W wiring, not steering protection.

7 Description of the starting mode

The soft starting mode can be set by the "soft start mode" in the soft start parameter to meet different requirements.

There are four ways to choose from, refer to the 5.3 parameter description.

1. Fixed-point test

This method is used for the aging of the soft starter. This method can trigger the SCR for a long time with a certain conduction Ang le, that is, save electricity, and can take the motor or bulb for a long time.
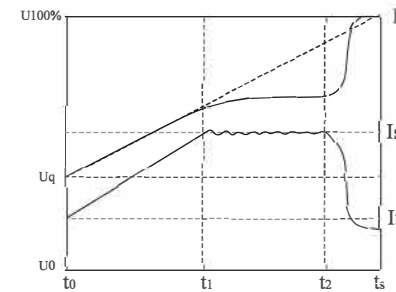Related parameters: soft start mode, starting voltage
Parameter setting : "Start mode" = fixed point test, "starting voltage" =25%

2. Voltage slope

The voltage ramp mode completes the motor starting process by setting the output voltage rise rate of the soft starter. Because the voltage is a smooth transition from the initial value to the rated value, the motor is very smooth throughout the starting process. The initial output torque can be increased by setting the initial voltage. The current limit value can be set to prevent current limit,

The setting of the current limiting multiple should be determined according to the load type. The value should not affecting the starting. If the flow limiting function is not required, the value should be set to the maximum. Characteristic curves are shown in Figure 7-1, and reference table for empirical parameters

Graph 7-1

Related parameters: soft start mode, starting voltage, rated current, current limiting multiple, and starting time
Parameter setting: "Start mode" = voltage ramp, "Rated current" = nameplate calibration, rest reference
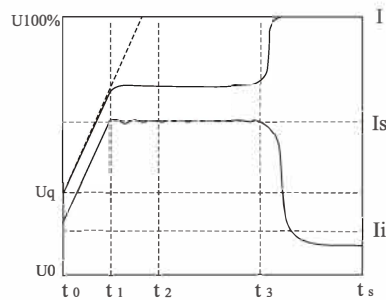
Table 7-1

	water pump	Belt machine	Ventilati on fan	Dust fan	Hammer type broken	Jaw type broken	oscilla ting screen
Starting voltage	35%	35%	35%	45%	45%	50%	50%
Flow limit multiple	3.0	3.0	3.0	4.5	3.5	3.5	5.0
Run-up time	15s	20s	20s	45s	40s	40s	15

Note : This method is not suitable for the load–free working condition of the motor shaft end. When the air connection, because the mechanical inertia is too small, the electric opportunity enters the shock area, and the electric opportunity has the shock phenomenon, which is a normal phenomenon. You can set the "current limit multiple" <2.0 times elimination, and then adjust the parameter after connecting the actual load. Usually this working condition is only encountered in the test machine, p lease rest assured to use.

3. Constant current

The characteristic curve of the constant current mode is shown in Figure Figure 7–2. The difference from the voltage ramp mode is that it will go through a very short ramp and quickly enter the flow limit until the start is complete. Reference Table 7–2 for the empirical parameters.

Graph 7–2

Related parameters : soft start mode, starting voltage, rated current, current limiting multiple, and starting time
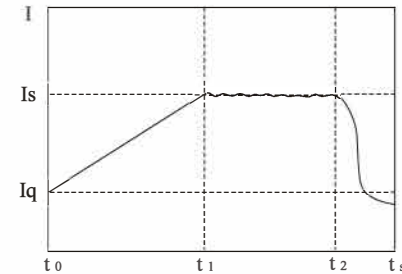Parameter setting : "Start mode" = constant current, "Start voltage" =45%, "Rated current" = namep late calibration

Table 7–2

	water pump	Belt m achine	Ventilati on fan	Dust fan	Hammer type broken	Jaw type br dken	oscilla ting screen
Flow limit multiple	3.0	3.0	3.0	4.5	3.5	3.5	5.0
Run–up time	15s	20s	20s	45s	40s	40s	15

4. Current ramp

The current ramp mode is to take the current as the control target. During the whole starting process, the current gradually increases according to the set slope until the set current multip le. This mode of load is very adaptable, and has a good starting effect for both large inertia and small inertia load. Characteristic curves are shown in Figure 7–3 and refer to Table 7–3 for parameter settings.

Graph 7–3

Related parameters: soft start mode, starting voltage, rated current, current limiting multiple, and starting time
Parameter setting: "Start mode" = voltage ramp, "Rated current" = nameplate calibration, rest reference

Table 7–3

	water pump	air compr esso	Bel t machine	Ventilati on fan	Dust fan	Hammer type br dken	Jaw type br dken	oscill a ting scr een
Ini ti al curr ert	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0
Flow limit mul tiple	3.0	3.0	3.0	3.0	4.5	3.5	3.5	5.0
Run–up time	15s	8s	20s	20s	45s	40s	40s	15

8 Electric test machine

8.1 Check before power-on

Carefully check and confirm according to the following terms and conditions before power–on operation
● Whether the rated power of the soft starter (cabinet) matches with the motor.
● Whether the insulation performance of the motor meets the requirements.
● Whether the input and output main circuit wiring is correct, and whether the bypass corresponding phase is correct.
● Whether the fixing bolts of wiring terminals and copper bars are tightened.

8.2 Power trial operation

● After the self–test is completed, the first line of the display shows "Stop" ready to stop, indicating that it can be started
● Set the rated current of the motor according to the rated current on the motor namep late
● According to the equipment driven by the motor, refer to table 7–1,7–2 or 7–3 coarse adjustment parameters, the starting mode suggests using the " current ramp", and turning on the "start failure" protection.

● Point to check whether the rotation direction of the motor is correct, and rep lace the motor line order incorrectly.

● After starting, observe the input voltage, three–phase current, phase order Ang le, frequency and other data. The three–phase current needs to be balanced. When the phase order Ang le is a multip le of 120, it indicates the input voltage balance. You can turn the page through the "AV" button to view the monitoring data.

● In the process of power trial operation, if found abnormal, such as abnormal sound, smoke or odor, should quickly cut off the power supply and find out the reason.

● If there is a fault shutdown during startup or operation, press the stop key to reset the fault state during shutdown.

Note : When the ambient temperature is lower than–10 degrees Celsius, the display screen and other components may be abnormal, should be powered up for more than 30 minutes before power off to start again.

8.3 Common phenomena in the trial run

● The initial starting blocking time is long, the starting mode is "voltage slope" or "constant current mode" is, Raise the Start voltage and start with the current ramp, increase the Start current. The starting process is weak, p lease increase the "current limit multip le". If the starting current is too high, p lease reduce the current limit multiple.

● After starting, report the "start failure" protection, p lease increase the "current limit multip le" or extend the "start time".

● During the starting process, p lease confirm whether there is no load connection at the shaft end. If there is no load connection,

Determine whether to use the current ramp start type, and set the current limit multiple to 2.0, or lower. You can also disappear without adjusting the parameters, connecting the load shock phenomenon.

● The starting process is too fast, p lease confirm whether it is light or no load, if the starting process time can be extended by lowering the "current limit multiple".

9 Overal dimensions
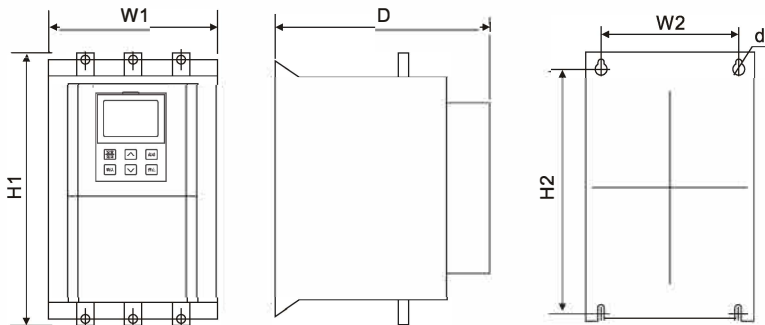
External size and installation size of the online soft starter

Specificati ons and models	Overall dimensions (mm)			Installation size (mm)		
	W1	H1	D	W2	H2	D
18.5kW-37kW	105	240	170	85	214	M6
45kW-75kW	150	280	179	117	240	M6
90kW-115kW	200	370	214	168	328	M6
132kW-200kW	/	/	/	/	/	/
220kW-400kW	/	/	/	/	/	/

Overall and mounting dimensions of the online soft start cabinet

Specificati ons and models	Overall dimensions (mm)		
	W1	H1	D
18.5kW-75kW	315	820	320
90kW-115kW	350	1000	400
132kW-200kW	/	/	/
220kW-400kW	/	/	/

10 Electrical schematic diagram

Basic wiring diagram of on line soft start be low 115KW (including 115KW)
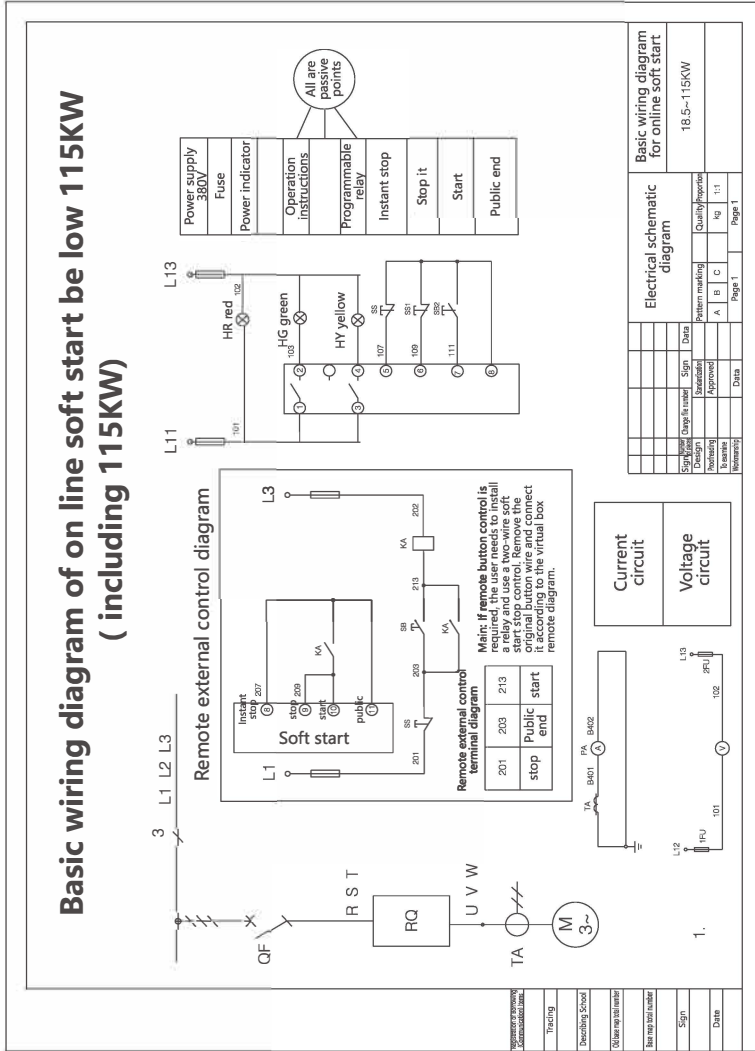
CERTIFICATE

Product Model: YCQR7 Series

Standard : IEC60947-4-2

Inspector : CNC009

Production date: Printed on the product or package

This product is qualified after delivery inspection

CNC ELECTRIC
Tel: 0086-577-61989999   Fax: 0086-577-61891122
wwwcncele.com   E-mail: cncele@cncele.com

YCQR7 Series