

Certificate

This product is allowed to leave the factory according to the factory standard.

NENA

—— New Vision New Journey ——

Product Name: _____ soft starter _____

Product Model: _____

Factory No.: _____

Inspector: _____

Inspection Date: _____

Maintenance bond

The NR1000 series
built-in bypass soft starter
Product user manual

1. Warranty scope refers to the product body.
2. The warranty period of the product is 12 months. During there is any failure or damage under normal use, free maintenance.
3. If the following faults occur, that is, the repair cost be charged during the warranty period:
 - A) Failure caused by not using it in strict accordance Manual or beyond the standard specifications;
 - B) damage caused by loss or brutal handling after
 - C) Device aging or failure caused by use in an environment requirements of this manual;
 - D) faults caused by self-repair and modification without permission;
 - E) faults not caused by storage;
 - F) Failure caused when the product is used for abnormal
 - G) Due to fire, salt erosion, gas corrosion, earthquake, lightning, voltage abnormality or other natural Ffunction caused by disaster or causes;
 - H) arbitrarily tear product identification (such as nameplate, etc.)
4. Actual fee calculation of service fee technology, contract. To the principle of contract priority.
5. The warranty basis of this product is the warranty invoice. Please always keep this card and present it during the warranty.
6. If you have any questions, you can contact your agent directly.

After the warranty period, the company will maintenance service.

ZHEJIANG XINHANG ELECTRIC CO.,LTD.

<http://www.xnhang.com>

ZHEJIANG XINHANG ELECTRIC CO.,LTD.

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Warning items:

-  Be sure to read this operation instructions in detail before installation.
-  A soft starter must be installed by a professional technician
-  The specification of the motor must match this soft starter.
-  It is strictly prohibited to connect the capacitor at the output end (U, V, W) of the online intelligent motor soft starter.
-  After installation must be wrapped with insulation tape.
-  Soft starter or other related equipment shall be reliably grounded.
-  The input power supply must be cut off during the equipment maintenance.
-  It is not allowed to dismantle or refit the product without permission.

1. Installation preparation/usage and environmental conditions

1.1 Installation preparation

Read the NR 1000 installation instructions carefully before use. If you do not read the instructions carefully and violate the relevant safety regulations, the normal operation of the soft starter may be affected.

To install NR 1000, please prepare the following tools: small flat screwdriver, wire stripper, wrench, etc.

warn

Before installation, please be sure to read the "Safety Notes" in detail.

1.2 Usage and environmental conditions

[Line power supply] AC 380V $\pm$ 15% 50/60 HZ

[Power applicability] Rat cage three-phase asynchronous motor

[Cooling mode] Forced air cooling

[Applicable temperature] $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$, every 1°C higher, the capacity is reduced by 2%, the highest $+50^{\circ}\text{C}$

[Applicable humidity] 90% frost free

[Place of use] indoor no corrosive gas, no conductive dust, good ventilation

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

2. Features

2.1 Overview

The application of thyristor technology enables voltage reduction starting to achieve smooth voltage output without current or mechanical impact, demonstrating significantly superior performance compared to star-delta, autotransformer, and magnetron soft starters. Intelligent technologies further optimize thyristor-based soft starters by aligning with load characteristics, while integrating real-time data monitoring, motor protection, and bus control functions. This enhances operational reliability and performance excellence, making the equipment more reliable and efficient.

This built-in bypass intelligent soft starter is developed on a 32-bit DSC processor platform, integrating the latest motor control theories, protection technologies, and fuzzy control systems to create a next-generation high-performance solution. The device features an integrated bypass contactor that significantly reduces internal heat generation, making it particularly suitable for high-temperature environments. Its unique structural design, especially in models under 22 kW, delivers a compact and aesthetically pleasing appearance.

2.2 main functions

- Effectively reduces the starting current of the motor, can reduce the power distribution capacity, avoid power grid capacity investment.
- Reduced the starting stress of the motor and load equipment, extended the service life of the motor and related equipment.
- The soft shutdown function effectively solves the problem of shutdown surge in inertial system.
- A variety of unique starting modes, adapt to complex working conditions, achieve perfect starting effect.
- Improve the reliable protection function, effectively ensure the use safety of motors and related production equipment.
- Standard network protocol to meet the networking requirements of power automation.

2.3 Features

- Use simulation software to optimize the heat dissipation design, miniaturization with better heat dissipation capacity;
- Built-in bypass contactor, reduce the heat of soft starter itself, more suitable for high temperature environment;
- Based on the 32-bit DSC processor platform, the bandwidth is higher and the speed is faster, so that the fuzzy algorithm control is more accurate;
- Use 12-bit AD sampler and DMA data transmission mode to realize direct AC sampling with high real-time performance;
- Realize wide range linear data sampling, no dead zone of data acquisition, more accurate data;
- All faults can be turned on and off for convenient debugging;
- When soft start, it can automatically add time and force according to the load, and has stronger load adaptability;
- Rich monitoring data, while monitoring current and voltage, can also monitor phase sequence Angle, frequency, cumulative running time and other data;
- High precision 4–20 MA current output capacity, linear accuracy up to 0.5%;
- It has up to 12 kinds of protection functions, among which the anti-time limit overload protection can effectively prevent motor overheating and burning, so the equipment can be used more safely;
- Four-line LCD display, can switch between Chinese and English.

2.4 Technical indicators

Project name		Performance index
Scope of application		3 phase squirrel cage asynchronous motor
Power bracket		3~185kW(220V)、5.5~320kW(380V)、5.5~350kW(460V)
Input voltage		220V(±20%), 380V(±20%), 460V(±20%)
Incoming frequency		50/60HZ ±5%
Overload capacity		Less than 22KW: 300% for 30 seconds, 120% continuous>22KW: 400% for 60 seconds, 120% continuous
Control the power supply voltage		220V and 380V models do not need external Control power supply, The 460V model requires an external AC220V (50/60HZ) control voltage
Adjustable current multiplier		1 to 5 times
Softening time		1–90 seconds
Module working mode		Over a long period of time
cooling-down method		Forced air cooling or natural cooling (for some models)
Secondary terminals	Digital Input	Route 3
	relay output	≤115 KW 1 circuit (program mable) > 115KW 3 circuit (program mable)
	4–20mA	≤22KW: None>22KW: 1 channel (optional)
	RS485	≤22 KW : 1 circuit > 22 KW : 1 circuit (expand able)
Protect		Short circuit, overcurrent, overheating protection, reverse time overload, voltage phase loss, imbalance, etc Instant stop, undervoltage, overvoltage, underload, failure to start, wrong phase sequence.
Host overload protection		Overload reverse time limit, 1–6 levels optional
Protection of main electromechanical loss balance		Unbalanced trip standard: 5–100% any two phases unbalanced trip delay: 1–60 seconds can be set
Host short circuit protection		Fast cut time: ≤0.1S, can be set
Bus functionality		Inter face : RS 485 protocol: Mod bus RTU
HMI		4 rows of COG screens
Language		Chinese and English

2.5 Technical Parameter

Voltage level	rated power	Rated current	Voltage level	rated power	Rated current
220V	3kW	10.5A	380V	115kW	230A
220V	5.5kW	19A	380V	132kW	264A
220V	7.5kW	26A	380V	160kW	320A
220V	11kW	38A	380V	185kW	370A
220V	15kW	52A	380V	200kW	400A
220V	18.5kW	64A	380V	250kW	500A
220V	22kW	76A	380V	280kW	560A
220V	30kW	105A	380V	320kW	640A
220V	37kW	130A	380V	350kW	700A
220V	45kW	160A			
220V	55kW	190A	Voltage level	rated power	Rated current
220V	75kW	265A	460V	3KW	4.7A
220V	90kW	320A	460V	5.5KW	8.5A
220V	115kW	400A	460V	7.5KW	12A
220V	132kW	470A	460V	11KW	17A
220V	160kW	560A	460V	15KW	23A
220V	185kW	650A	460V	18.5KW	29A
			460V	22KW	34A
			460V	30KW	47A
Voltage level	rated power	Rated current	460V	37KW	57A
380V	3kW	6A	460V	45KW	70A
380V	5.5kW	11A	460V	55KW	85A
380V	7.5kW	15A	460V	75KW	116A
380V	11kW	22A	460V	90KW	140A
380V	15kW	30A	460V	115KW	178A
380V	18.5kW	37A	460V	132KW	205A
380V	22kW	44A	460V	160KW	248A
380V	30kW	60A	460V	185KW	286A
380V	37kW	74A	460V	200KW	310A
380V	45kW	90A	460V	250KW	388A
380V	55kW	110A	460V	280KW	434A
380V	75kW	150A	460V	320KW	496A
380V	90kW	180A	460V	350KW	543A

3 Purchase inspection

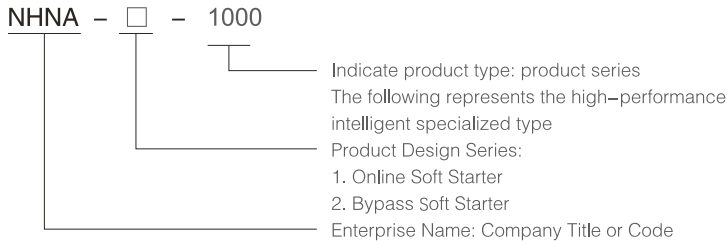
3.1 Arrival inspection

This soft starter has passed strict quality inspection when it leaves the factory, and the packaging is well protected against shock. However, there may be unexpected conditions during transportation. Please check the following after receiving the product.

- Check for any damage to the appearance and loose screws
- Check the nameplate to confirm if it is the product you ordered
- The packaging box contains a soft starter, a set of display kits, a certificate of conformity, and a warranty card. If any of these items are missing, please contact our agent, distributor, or directly contact our company's technical service center.

3.2 Soft Starter Model

soft starter
Roed Power: xxx Kw
Rated Input: 3PH 380V/50Hz
Rated Current: xxx xxx A
Darce of Manufacture :XX X XX



4 Installation and circuit connection

4.1 install

The soft starter must be installed vertically in the box. In order to prevent temperature accumulation in the space of the box, heat dissipation holes should be opened at the top and bottom of the box to ensure that the airflow can flow through the soft starter.

4.2 Terminal Description

4.2.1 Main circuit

Terminal marking	Terminal name	Describe
R、S、T (1L1、 3L2、 5L3)	Main circuit power terminal	Connect three-phase power supply
U、V、W (2T1、 4T2、 5T3)	Starter output terminal	Connect the motor

Note: When wiring, please mark the corresponding soft starter housing of the meter

4.2.1 Control terminal

- For models below 22KW (including 22KW), please refer to the Table: 4-1
Table: 4-1

Terminal marking	Terminal name	Describe
1、 2	Programmable relays	Please refer to programming Table 4-4
3	Snap stop (switching input point)	Instant stop system (normally closed) when 6 is disconnected
4	Stop (switching input point)	Stop with 6 short circuit normally open and closed can be set)
5	Start up (switching input points)	Connect to 6 for starting the soft starter (normally open)
6	Public terminals	
7	RS485-A	RS485 bus A terminal
8	RS485-B	RS485 bus terminal B

- For models below 115 KW (including 115 KW), please refer to Table 4-2
Table: 4-2

Terminal marking	Terminal name	Describe
1、 2	reserve	
3、 4	Programmable relays	Please refer to programming Table 4-4
5	Snap stop (switching input point)	When disconnected from 8, the instantaneous stop system is closed
6	Stop (switching input point)	Stop with 8 short circuit (normally open and closed can be set)
7	Start up (switching input points)	Connect with 8 to start the soft starter (normally open)
8	Public terminals	

- Models above 132 KW (including 132 KW) Please refer to Table 4-3
Table: 4-3

Terminal marking	Terminal name	Describe
1、 2	Port name	Please refer to programming Table 4-4
3、 4	Branch relay (programmable)	Please refer to programming Table 4-4
5、 6、 7	Programmable relays P	Please refer to programming Table 4-4
8	Instant stop (switch input point)	Short circuit with 11 instantaneous stop system (normally closed)
9	Stop (switch input point)	Short circuit stop with 11 (normally open or normally closed can be set)

Table: 4-3

Terminal marking	Terminal name	Describe
10	Start (switching input point)	Connect to 11 to start the soft starter (normally open)
11	Public terminals	
12	4-20mA -	4-20mA negative terminal
13	4-20mA +	4-20mA positive terminal
14	RS485-GND	RS485 shielded and grounded, not connected
15	RS485-A	RS485 bus A terminal
16	RS485-B	RS485 bus terminal B

Note: Programmable relay contact capacity AC 250V 5A

4.2.3 Expansion interface and terminal

The 30~115KW model of this soft starter uses an expansion board to expand the and RS485 interfaces. The soft starter control board has a 10 pin expansion interface located on the right side of the control terminal. The terminal instructions for the expansion board are shown in Table 4-3.

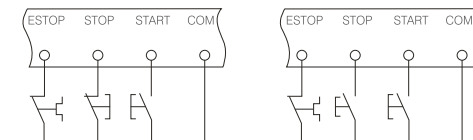
Table: 4-3

Terminal marking	Terminal name	Describe
1	4-20mA -	4-20mA negative terminal
2	4-20mA +	4-20mA positive terminal
3	RS485-A	RS485 bus A terminal
4	RS485-B	RS485 bus terminal B

4.2.4 Terminal usage and wiring

- Three-line control mode

The three wire control method is suitable for external start and stop buttons, where the stop can be set to two input modes: normally open and normally closed (related parameters: customer privilege → stop terminal). When set to normally open, an electric contact pressure gauge can be connected to start and stop the motor based on the upper and lower limits of the water level. To use the three wire system for external control, the "Operation Mode" option in the menu should be set to include options for external control, as described in section 5.3. When a fault occurs, press the stop button once to reset the fault. The wiring is shown in Figure 4-1.



Stop setting to normally closed wiring Stop setting to normally open wiring

Figure 4-1

● Three-line control mode

This control method is used when users operate the starters start/stop function through a switch (which can be either a self-holding button or PLC output point). As shown in Figure 4-2, soft-starter operation is activated when J is closed, while soft-starter stops occur when J is open. To implement this method, set the "Operation Mode" option in the menu to include external control functionality, and configure the "Stop Terminal" parameter to normally closed status. In case of faults, resetting the system can be achieved by manually operating this switch to activate or deactivate it.

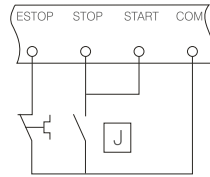


Figure 4-2

Please refer to 4-1 and Table 4-2 for relay information, and refer to Table 4-4 for programming.

Table: 4-4

order number	Set the value	Explain
1	The bypass is normally on	When the start process is complete, the relay contacts close and when the stop command is issued, the contacts open.
2	The fault is permanent	The fault-free contact is open and the fault contact is closed
3	The soft starter interlock is normally on	After the start delay of 0~240S (can be set), the contact closes
4	The fault remains closed	The fault-free contact closes and the fault contact opens
5	Soft start interlock normally closed	After the start delay of 0~240S (can be set), the contact opens
6	Feed is usually on	This relay is configured for feed output with a normally open function. The circuit boards power contacts remain open during soft start and soft stop operations. After the motor reaches full speed following startup, if the average current exceeds the "upper limit current", the contacts will open after a delay of the "action time". If the current remains below the "lower limit current", the contacts will close after the same delay period. All parameters—including the "lower limit current", "upper limit current", and "action time"—can be customized through the menu interface.
7	Feeding is normally closed	This relay is configured with a normally closed feed output function. The power-on contacts on the circuit board remain closed during soft start and soft stop operations, while the contacts open during these phases. After the motor reaches full speed following startup, the contacts open at the "action time" when the average current exceeds the "upper limit current", and close again at the "action time" when the current falls below the "lower limit current".
8	Run the interlock normally on	After full voltage cut, the contact closes after delay 0~240S (can be set)
9	Run the interlock normally closed	After full voltage cut, the contact is broken after a delay of 0~240S (can be set)

● Instant stop

To activate the instantaneous stop function, set the "Instant Stop Switch" in the protection switch to "On" or "Self-Recovery" mode. If not activated, set it to "Off". When the instantaneous stop function is enabled, the instantaneous stop terminal must be short-circuited with the common terminal during normal operation of the soft starter. If open, the soft starter will stop unconditionally and enter a fault protection state. This terminal can be controlled by the normally closed output point of an external protection device. The key difference between "On" and "Self-Recovery" lies in whether the terminal can automatically clear faults after returning from an open state. Here, "Self-Recovery" refers to the ability to automatically transition from a fault state to a shutdown state. Refer to Figure 4-1 for wiring instructions.

● CI

The standard 485 interface enables remote communication control and multi-machine coordinated operation. Beyond controlling start/stop functions, it monitors operational parameters including current, voltage, frequency, phase sequence angle, and fault detection through the standard ModbusRTU protocol. Wiring requires two shielded 2-core wires connected to terminals 485-A and 485-B respectively. The motherboard provides a 485-GND terminal for grounding, though this terminal may be omitted if required.

● 4-20mA interface

The 4~20 mA DC analog output is used to monitor the motor current for external PLC or DC meters. The 4~20 mA current flows out from terminal 4-20 mA+ and returns to terminal 4-20 mA- through the sampling resistor of external meters or PLC. Set the maximum current value in "20 mA range" in the "Communication parameters" of the soft starter, which corresponds to the DC output. The output current is 20 mA, while it corresponds to 4 mA when OA is applied. The 4 mA output current can be calibrated through "4 mA calibration" in the "Customer Privileges" section. The maximum value of the DC output load resistance is 500 ohms, and no external power supply is required. It uses a common ground wiring method (must be specified during ordering).

4.2.5 Main motor connection

The upper terminals R, S, T (1L1, 3L2, 5L3) (no phase sequence requirement) of the soft starter are connected to the three-phase power supply, while the lower terminals U, V, W (2T1, 4T2, 5T3) serve as output terminals connected to the motor. After trial operation, the motor direction can be changed by switching any two of the U, V, W (2T1, 4T2, 5T3) terminals.

5 keyboard and display instructions

The control panel consists of a four-row dot matrix LCD screen and six keys, as shown in Figure 5-1.

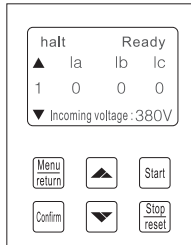


Figure 5-1

5.1 Keyboard Description

- Start: Press this key to start the motor when it is "off";
- Stop: Press this key to stop the motor when it is running, and press this key to reset the fault when it is faulty;
- Return: used to enter and exit the Settings menu. When the machine is stopped (the display shows "stop") or in a fault state, long press this key to enter the menu browsing state. After entering the menu, short press this key to return to the previous level;
- Confirmation: After entering the menu, press this key to select the current menu and enter the data setting state. Then press this key to confirm and save the current setting value, and return to the upper layer;
- Δ / ∇ : The add/subtract key, press 8 (or V) to increase (or decrease) the data. Long press this key, the data will be increased or decreased quickly, or you can use this key to browse the menu.

pour :

1. When the machine is stopped or in a fault state, long press the "Confirm" button to enter the historical fault query, and press the "Return" button to exit;
2. When the display screen is abnormal, press the "AV" button at the same time to initialize the display screen;
3. In the non- "set" state, press " Δ " and " ∇ " keys to flip pages to display monitoring data. If you do not press this key for a long time, the monitoring data screen will automatically restore to the first page;
4. In the "shutdown" state, long press the " ∇ " button to view the previous shutdown record, and the power-off data is not retained.

5.2 Display instructions

The panel display is mainly composed of seven parts: shutdown interface, setting interface, delay interface, soft start interface, bypass (full Voltage) interface, soft stop interface and fault interface.

- Shutdown interface After the system is powered on, if there is no fault, it will enter the shutdown interface. Entering this interface indicates that the motor is in shutdown state and the system is ready to start. As shown in Figure 5-1.

● Set the interface

When the system is in "shutdown" or "failure" mode, long-pressing the "Return" button will bring you to the settings interface. The parameters are primarily categorized into three types: A, B, and C. Categories B and C are also referred to as "Customer Privileges" and "Factory Settings". Category A parameters include: soft start parameters, protection parameters, protection switches, and communication parameters. During parameter configuration, the left column displays the status "Settings", the right column shows parameter categories, the second column lists subparameters for each category, the third column displays parameter values, and the fourth column shows prompt messages (as shown in Figure 5-2).

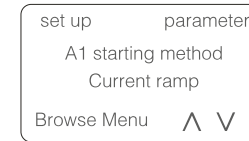


Figure 5-2

● Delayed interface

When the parameter "start delay" is set to a value greater than 0, a delay interface will appear during startup. The left side of the first row displays the status "delay", while the right side shows a countdown. Rows two, three, and four display monitoring data. Up and down arrows indicate that you can flip to view monitoring data on other pages, and the current page number is displayed, as shown in Figure 5-3.

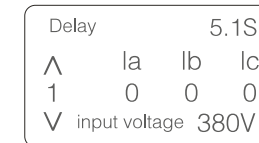


Figure 5-3

● Soft start interface

When the start button is pressed, the system immediately enters the soft-start interface without delay. If a delay setting is activated, the countdown will end before entering the soft-start interface. The first row displays "soft-start" status on the left and the countdown on the right, while rows two through four show monitoring data. As shown in Figure 5-4, pressing the "AV" key allows users to browse other pages of monitoring data.

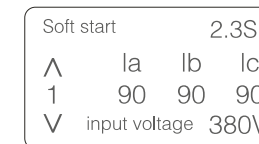


Figure 5-4

● Bypass or full voltage interface

After the soft starter, enter the bypass or full voltage interface. The left side of the first line displays the "full voltage" or "bypass" status, and the right side displays the running time of this operation. The second to fourth lines display the monitoring data, as shown in Figure 5–5. Press the "AV" key to view other pages of monitoring data.

Total pressure	0:	00:	20
^	la	lb	lc
1	90	90	90
V	input voltage	380V	

Figure 5–5

● Soft stop interface

When the menu "soft stop time" is greater than 0, the soft stop function is enabled. After pressing the stop button in "full pressure" or "bypass", the soft stop interface is entered. The left side of the first line displays the "soft stop" status, and the right side displays the soft stop countdown. The second to fourth lines display the monitoring data, as shown in Figure 5–6. Press the "AV" key to view other pages of monitoring data.

Soft Stop	3.5S		
^	la	lb	lc
1	90	90	90
V	input voltage	380V	

Figure 5–6

● Fault interface

When a fault occurs in any state, the soft start enters the fault alarm interface. The left side of the first row displays "Fault", and the right side displays fault information. The second to fourth rows display the locked monitoring data, as shown in Figure 5–7. Press The "AV" key selects to display other locked monitoring data. The interface can be reset by pressing the "Stop/Reset" button.

FaultE8	Undervoltage fault		
^	la	lb	lc
1	90	90	90
V	input voltage	380V	

Figure 5–7

Note: In case of failure, all monitoring data is locked in the data at the time of failure for easy viewing and analysis of the cause of failure. The data is not retained after power failure. This function can also be enabled or disabled in "Customer Privilege" - "Fault Screen Capture".

5.3 Parameter description

1.ParameterA

order number	name	Set the scope	Windows default	explain
Soft start parameters				
A1	Starting mode	0~3	3	0: Fixed test 1: voltage ramp 2: constant current 3: Current ramp
A2	starting voltage	0~100%	45%	0, 1 and 2 start modes are valid
A3	initial current	0~2.5 times	2.0 times	Method 3 is effective
A4	Flow limit multiplier	1.8~6.0 times	3.5 times	Methods 1, 2 and 3 are effective
A5	A spike in the jump	0~100	90%	
A6	Twitch cycles	0~2.0S	0.4S	
A7	Start delay	0~240.0S	0.0S	Delay start time
A8	Softening time	0~90.0S	20.0S	All starting methods are valid
A9	Soft stop time	0~60S	0S	Set to 0 to disable the soft stop function, and set to non-0 to enable it
A10	Delay in joint control	0~240.0S	0.0S	The start delay relay outputs when activated and can be used with a 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 current limit	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, hard time	0~60.0S	0	If the start is not completed within the "soft start time", the start is automatically added
A17	Soft start with power	2.0 times	0	If the start is not completed within the "soft start time", the force will be automatically applied
Protection parameters				
A18	Short circuit multiplier	0~12.0 times	5 times	Set greater than (flow limit multiple + soft start force + 0.5), valid throughout the process
A19	Cut it short	0~2.00S	0.050S	Short circuit block (disconnection) time
A20	Flow ratio	0~8.0	1.2	The bypass is effective
A21	Flow time	0~60.0S	5.0S	If the overcurrent exceeds this value, the thyristor is blocked and an error is reported
A22	Overheating time	0~60.0S	2.0S	If the accumulated overheating exceeds this value, the thyristor is blocked and an error is reported. 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, after bypass (full voltage) effective
A24	Phase loss time	0~60.0S	5.0S	If the accumulated voltage deficiency exceeds this value, the thyristor is blocked and an alarm is reported, which is effective throughout the whole process
A25	Electrolyte imbalance	0~100%	30%	Current imbalance proportion, soft start, bypass, soft stop effective
A26	The time of imbalance	0~60.0S	5.0S	If the accumulated time of loss of balance exceeds this value, the thyristor is blocked and an error is reported
A27	Undervoltage limit	0~100%	60%	The whole process is effective

soft starter

A28	Under voltage time	0~60.0S	2.0S	If the accumulated time of voltage drop exceeds this value, the thyristor is blocked and an error is reported
A29	Overvoltage limit	0~150%	120%	The whole process is effective
A30	Overpressure time	0~60.0S	2.0S	If the accumulated overpressure time exceeds this value, the thyristor is blocked and an error is reported
A31	Underloaded current	0~100%	50%	Under the lower limit of underload current, bypass and full voltage is effective
A32	Time of underloading	0~30.0s	2.0s	If the accumulated time of deficiency exceeds this value, the thyristor is blocked and an error is reported
protection switch				
A33	shortcircuiting switch	On, Off	On	Enable or disable output short circuit protection
A34	Overcurrent switch	On, Off	On	Overcurrent protection enabled or disabled
A35	overheat switch	On, Off	On	Overheat protection enabled or disabled
A36	Overload switch	On, Off	On	Enable or disable motor overload protection
A37	Phase loss switch	On, Off	On	Enable or disable input voltage phase loss protection
A38	The imbalance switch	On, Off	On	Enable or disable current imbalance (output phase loss) protection
A39	Instant start/stop switch	On, Off, Auto rst	Off	Enable or disable external instantaneous fault protection, Enable can be set to self-recovery
A40	Under voltage switch	On, Off	On	Enable or disable input voltage undervoltage protection
A41	Overvoltage switch	On, vff	On	Enable or disable input voltage overvoltage protection
A42	starting failure	On, Off	On	The motor is not fully protected or disabled when bypass (or full pressure) is applied
A43	Underload switch	On, Off	On	Please turn it on when water is needed for protection
A44	Phase switching	On, Off	On	Enable or disable phase sequence error protection
Communication parameters: can be ignored when not in use				
A45	principal and subordinate	0, 1, 2	0	0: Turn off 1: Host 2: Slave
A46	stop number	0~32	1	
A47	digit capacity	0~12	8	It is usually set to 8
A48	stop bit	0~2	1	It is usually set to 1
A49	even-odd check	0~2	0	It is usually set to 0
A50	Baud rate	0~96	8	Actual baud rate = baud rate * 1200
A51	Current flow	0~6000	400	4mA: corresponds to 0,20ma: corresponds to the range value
control				
A52	Customer privileges			Password: 10, access customer privileges
A53	Factory Settings			Password: 111, access factory settings menu

2. Parameter B (Customer Privilege)

control				
B1	Parameter modification enabled	Enable, prohibit	enable	
B2	language	Chinese and English	centre	
B3	Fault screen capture	On, off	open	

soft starter



B4	Stop the terminal	Always open, always closed	normal close	Set it as a normally open contact pressure gauge
B5	4mA calibration	0~100%	100%	In the 4~20mA DC output, 4mA (zero point) is calibrated
B6	contrast ratio	0~180	169	Adjust the contrast of the display
B7	Parametric learning			Copy the set A parameter to the "Restore Parameters" area
B8	Parameter restoration			Restore the parameters learned in the previous session to parameter A
B9	return			Exit after parameter setting is completed, or you can directly return the key to exit

3. Parameter C (manufacturer setting)

Factory Settings				
C1	rated voltage	0~1000V	380V	
C2	CT no load voltage ratio	0~1200	100	Use the turns ratio of current transformer
C3	Ia check	0~200%	100%	Adjust the display current A
C4	Ib check	0~200%	100%	Adjust the display current b
C5	Ic check	0~200%	100%	Calibrate the display current c
C6	Voltage correction	0~200%	100%	Calibrate the display voltage
C7	Online operation	Bypass, online	bypass	
C8	Relay 1	0-8	0	Programming of relay, refer to Table 4-4
C9	Relay 2	0-8	1	Programming of relay, refer to Table 4-4
C10	Relay 3	0-8	2	Programming of relay, refer to Table 4-4
C11	Current limits			Maximum values and default values are different for different power levels
C12	Power supply frequency	50, 60Hz	50Hz	Power supply voltage frequency, refer to Table 4-4

5.4 Parameter setting

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

order number	operate s	show	explain
1	power on	Standby ready Λ Ia Ib Ic 1 0 0 0 V input voltage 380V	Stop the machine after power on Note: The fault status can also be entered into the parameter setting
2	Long press the Settings button for 1 second	Standby Soft start parameters A01 Soft start mode Current ramp Browse menu/Λ V	Enter the Settings screen The second line is the menu number, and the third line in Chinese is the set value
3	Press the "Λ" or "V" key	Standby Soft start parameters A02 Starting voltage 45% Liu Gu menu Λ V	Go to the menu and find the menu item "starting voltage"
4	Press the "OK" button	Standby Soft start parameters A02 starting voltage	A cursor appears after the third number and flashes, indicating that the parameter can be modified

		45%I Browse menu $\wedge$ $\vee$	
5	Press the " $\wedge$ " or " $\vee$ " key	Standby Soft start parameters A1 Starting voltage 50%I Browse menu $\wedge$ $\vee$	Change to 50%, long press the " $\wedge$ " or " $\vee$ " key, can quickly add or subtract
6	Press the "OK" button	Standby Soft start parameters A1 soft start mode 50% Browse menu $\wedge$ $\vee$	The cursor disappears, indicating that the data modification is complete and saved. You can continue to browse other menu items
7	Press the "OK" button	Standby is ready $\wedge$ Ia Ib Ic 1 0 0 0 $\vee$ input voltage 380V	Exit to shutdown status

Note:

1. In the fault state, menu browsing and parameter modification can also be performed according to the above steps.

2. The "Setting" key and "Return" key are the same key. Long press this key for setting function, and short press for return function.

6 Fault protection description

The intelligent soft starter has up to 12 kinds of fault protection. All faults will stop after the set delay time and display the fault information.

Note: Use the Stop/Reset button to remove the fault condition

1. short-circuit protection

The short circuit protection function can quickly block the thyristor and disconnect the bypass contactor when a short circuit occurs at the output, so as to prevent the breakdown of the thyristor, the burnout of the soft starter or the expansion of external accidents. When it is necessary to disconnect the bypass contactor, please note that the contactor must have the ability to disconnect.

Related parameters: rated current, short circuit multiple, speed time, short circuit switch

- "Short circuit switch" is set to open to enable this function;
 - When the detection current is greater than or equal to "short circuit multiple" * "rated current" and the timing is greater than "fast break time", the response is broken and the fault of "short circuit" is reported;
 - Short circuit fault protection is effective throughout the whole process.
- Fault caused possibly by:
- Output cable short circuit, motor coil short circuit;
 - Rated current and short circuit multiplier are not set correctly.

2. Overcurrent protection

Overcurrent protection is used to prevent the motor or thyristor from being burned out due to excessive current caused by blockage when the motor is running at full voltage (bypass).

Related parameters: rated current, overcurrent multiple, overcurrent time, overcurrent switch

- "overcurrent switch" is set to open to enable this function;
 - Set the "overcurrent multiplier" to be greater than or equal to 1.2. When the detection current is greater than the "overcurrent multiplier" * "rated current" and the timing is greater than the "overcurrent time", the response will be interrupted and the "overcurrent" fault will be reported;
 - Effective at full voltage.
- Fault caused possibly by:
- Not at full speed when bypassed
 - Excessive load causes blockage
 - Rated current and overcurrent multiplier are not set correctly

3. Overheat protection

Overheat protection is used to prevent the thyristor from being damaged by working at high temperature for a long time. This function must be used in conjunction with a normally closed temperature switch.

Related parameters: overheating time, overheating shutdown

- When the "overheat switch" is set to on, this function is enabled;
- The time when the temperature switch is disconnected is equal to or greater than the overheating time, and the response protection is performed.

● Effective throughout

Fault caused possibly by:

- Start too frequently
- Excessive load and long starting time of large current
- 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, employing an inverse time algorithm with 1 to 6 level curves, where the level 1 curve has the shortest time, as shown in the following table:

curve	Action time (unit: S)								
	1.05	1.2	1.5	2.0	3.0	4.0	5.0	6.0	7.0
1	No	70	30	16	8	4.4	2.4	1.5	1
2	tripping	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

- When the 'overload switch' is set to on, this function is enabled;
- The higher the overload curve setting, the longer the protection time for the same multiple;
- Take the phase with the highest current value among the three-phase currents as the calculation parameter for the overload inverse time limit algorithm.

● Overload protection is effective in the bypass full pressure state.
Possible cause of malfunction

- Long term overload use of the motor
- Blocked rotor due to excessive load or low voltage
- The rated current setting is incorrect

Note: There is an overlap between overload protection and overcurrent protection. When conducting overload protection tests, please prohibit overcurrent protection.

5. Voltage is out of phase

Overvoltage phase loss protection is used to prevent phase loss or severe imbalance on the input side.

Related parameters: phase loss time, phase loss switch

- When the "phase loss switch" is set to open, this function is enabled;
- Protection will be provided for any single phase, two phases or all three phases out of phase;

● Effective throughout.

Fault caused possibly by:

- Poor contact of incoming line
- Network side voltage imbalance
- Not powered on

Note: When voltage phase loss occurs, please enter the second page of the monitoring screen and check the phase sequence Angle. The correct value of phase sequence Angle is about 120 degrees or 240 degrees.

6. Power loss balance

Electrical imbalance protection is used to prevent the expansion of faults caused by thyristor breakdown, voltage imbalance, motor coil failure, poor contact and other hidden dangers.

Related parameters: rated current, power loss balance (imbalance degree), imbalance time, imbalance switch

- When the "imbalance switch" is set to open, this function is enabled;
- When the current is far less than the rated current, the protection is not activated;
- When the maximum value of the difference between any phase and three-phase average current/average current is equal to or greater than "power loss balance", and the timing time is equal to or greater than "imbalance time", the response protection is activated and the "power loss balance" fault is reported;

● Effective during soft start, bypass (full voltage) and soft stop.

Fault caused possibly by:

- Poor contact between inlet and outlet
- Network side voltage imbalance
- Motor wire harness problem

Note: The menu "electricity loss balance" is called the percentage of electricity loss balance, also called imbalance.

7. Instant stop

The over-kill button is used to respond to a fault signal from an external device or the emergency stop button.

Related parameters: instantaneous stop switch

- The function is enabled when the "instant stop switch" is set to on or self-recovery;
- Effective throughout

Note: When set to self-recovery, the instantaneous stop fault will be automatically removed when the external fault is removed or the emergency stop button is closed again

8. Under-voltage protection

Under-voltage protection is used to prevent abnormal starting caused by low system voltage and damage to equipment.

Related parameters: rated voltage, under-voltage lower limit, under-voltage time, under-voltage switch

- "under-voltage switch" is set to open to enable this function;
 - The test voltage/ rated voltage $\leq$ the lower limit of under-voltage, and the timing time $\geq$ the under-voltage time, respond to the protection, and report the "under-voltage" fault;
 - Effective throughout the process.
- Fault caused possibly by:
- The lower limit of voltage or the rated voltage is set incorrectly
 - Overload magnetic saturation of power supply transformer
 - The cable is too long or too thin, and the voltage attenuation is serious

9. Overvoltage protection

Overvoltage protection is used to prevent equipment damage caused by excessive system voltage.

Related parameters: rated voltage, overvoltage upper limit, overvoltage time, overvoltage switch

- When the "overvoltage switch" is set to open, this function is enabled;
 - The test voltage/rated voltage is equal to or greater than the upper limit of overvoltage, and the timing time is equal to or greater than the overvoltage time, and the response protection is reported, and the "overvoltage" fault is reported;
 - Effective throughout the process.
- Fault caused possibly by:
- The upper limit of overvoltage or the rated voltage is set incorrectly
 - The network side voltage is too high

10. Possible fault causes:

Failure start protection is used to prevent the motor from engaging the bypass contactor or full voltage output at full speed after soft start, resulting in mechanical and grid shock.

Related parameters: Start failure (switch)

- When the "start failure" setting is enabled, enable this function;
 - When the bypass is cut off (online mode: full voltage), the motor does not respond to the protection at full speed;
 - Valid when the soft start ends and bypass (full voltage) is cut off.
- Fault caused possibly by:
- Start with a flow limiting function. The motor fails to run at full speed due to excessive load, bypass or full voltage

11. Underload

Underload protection is used to prevent the motor from no load or underload, which is usually caused by improper use and damage motor such as submersible pumps.

Related parameters: underload switch, underload current, underload time

- When the "underload switch" is set to On, this function is enabled;
 - (test current/rated current) * 100% $\leq$ underload current, and the timing time $\geq$ underload time, protection activated, and report "underload" fault;
 - Valid when bypass (full voltage);
- Fault caused possibly by:
- Parameter setting error;
 - The diving pump has no water, and the oil pump has no oil

12. Phase sequence error

Used for motor steering requirements, such as air compressor, to prevent mechanical damage caused by reverse rotation.

To use this function, first connect the R, S, T and U, V, W cables. Stop the machine or press the AV button on the fault interface to switch the monitoring data window to page 2, and observe whether phase sequence Angle PSab, PSbc and PSc a are both 120 degrees.

If not, swap any two of the R, S, or T leads. Run the motor unloaded and check its direction. If it reverses, switch any two of the U, V, W leads. For properly debugged equipment, the U, V, W output cables must remain fixed. If adjustments are made, reapply the reverse rotation adjustment method as described. After moving the equipment, incorrect connections between R, S, or T will trigger a "phase sequence error" fault message.

Related parameters: phase sequence switch.

- When the "phase sequence switch" is set to open, this function is enabled;
- A phase sequence error fault is detected that is not in the correct order
- Effective when powered on

Note: The function is more suitable for equipment with soft start and integrated motor installation. After debugging, do not change the U, V and W wiring arbitrarily, otherwise the steering protection will not work.

7 Starting methods

The starting mode of soft start can be set by "soft start mode" in the soft start parameters to meet different requirements. There are four modes available, as shown in 5.3 parameter description.

1. Point tests

This method is used for the aging of the whole soft starter. This method can trigger the thyristor for a long time with a certain conduction Angle, which can save energy and carry the motor or bulb fo a long time.

Related parameters: soft start mode, starting voltage

Parameter setting: "start mode" = fixed point test, "start voltage" =25%

2 . Voltage ramp

The voltage ramp method initiates motor operation by controlling the soft starters output voltage rise rate. This gradual transition from baseline to rated voltage ensures smooth acceleration throughout startup. By adjusting the initial voltage, operators can enhance the motors starting torque. To prevent current overloads, a current limiting multiplier factor can be configured. The setting of the current limiting multiple should be determined according to different load types. The value should be as small as possible without affecting the start, and the value should be set to the maximum if the current limiting function is not required. The characteristic curve is shown in Figure 7–1, and the empirical parameters are referenced in Table 7–1.

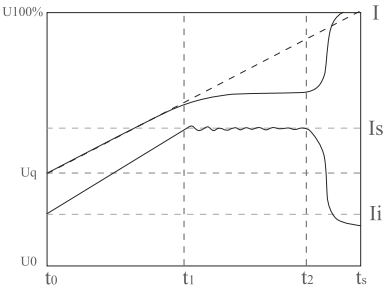


Figure 7–1

Related parameters: soft start mode, starting voltage, rated current, current limiting multiple, starting time

Figure 7–1

	water pump	Pilgrim	Ventilator	Dust removal fan	Hammer crushing	Cement crushing	oscilla ting screen
start voltage	35%	35%	35%	45%	45%	50%	50%
Current limiting multiple	3.0	3.0	3.0	4.5	3.5	3.5	5.0
START time	15s	20s	20s	45s	40s	40s	15

Note: This method is not suitable for motor shaft end operating conditions without load. During no-load connection, the low mechanical inertia may cause the motor to enter a vibration zone, which is normal. You can set the "current limiting multiplier" <2.0 times to eliminate this effect. After connecting actual loads, adjust this parameter accordingly. Typically, such operational conditions only occur during testing. Rest assured, its safe to use.

3. constant current

The characteristic curve of constant current mode is shown in Figure 7-2. Different from voltage slope mode, this mode will

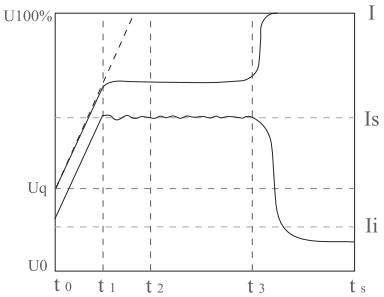


Figure 7–2

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

7-2

	water pump	Pilgrim	Ventilator	Dust removal fan	Hammer crushing	Cement crushing	oscillating screen
start voltage	3.0	3.0	3.0	4.5	3.5	3.5	5.0
Current limiting multiple	15s	20s	20s	45s	40s	40s	15s

4. Current ramp

The current ramping method uses current as the control target, with the current gradually increasing according to a preset ramp throughout the startup process until reaching the set current multiplier. This method demonstrates exceptional load adaptability, delivering optimal startup performance for both high-inertia and low inertia loads. The characteristic curve is shown in Figure 7-3, and parameter settings should be referenced from Table 7-3.

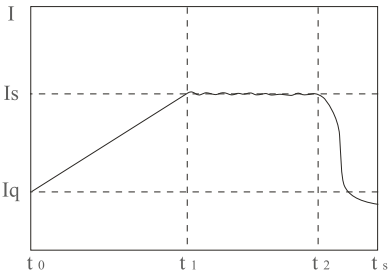


Table: 7-3



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

Figure 7-3

	water pump	air compressor	Pilgrim	Ventilator	Dust removal fan	Hammer crushing	Cement crushing	oscillating screen
initial current	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0
Flow limit multiplier	3.0	3.0	3.0	3.0	4.5	3.5	3.5	5.0
run-up time	15s	8s	15s	20s	45s	40s	40s	15s

8 Power on and test the machine

8.1 Check before power on

Before energized operation, carefully check and confirm according to the following clauses

- Whether the rated power of the soft starter (cabinet) matches the motor.
- Whether the insulation performance of the motor meets the requirements.
- Whether the main input/output circuit wiring is correct, and whether the corresponding phase of the bypass is correct.
- Check whether the fixing bolts of terminal blocks and copper bars are tightened.

8.2 Power on trial run

- After the power-on self-test is completed, the first line of the display screen shows "ready to stop", indicating that it can be started
- Set the rated current of the motor to match the rated current on the motor nameplate
- According to the equipment driven by the motor, refer to Table 7-1, 7-2 or 7-3 for coarse adjustment parameters. It is recommended to use "current slope" as the starting mode and turn on the "start failure" protection.
- Check whether the rotation direction of the motor is correct by point movement. If not, replace the motor wiring sequence.
- After starting, observe the input voltage, three-phase current, phase sequence Angle, frequency and other data. The three-phase current should be balanced, and the phase sequence Angle is 120 times of the multiple. The input voltage is balanced, and the monitoring data can be viewed by turning the page through the "AV" button.
- During the power-on trial run, if any abnormal sound, smoke or odor is found, the power supply should be cut off quickly and the cause should be ascertained.
- If the machine stops due to failure during startup or operation, the fault state can be reset by pressing the stop button when stopping

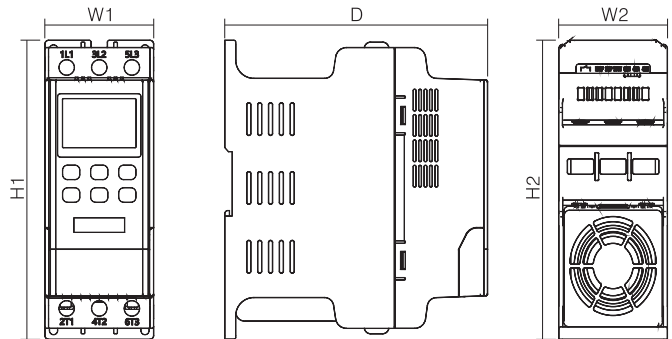
Note: When the ambient temperature is lower than -10 degrees Celsius, the display and other components may be abnormal. Power on and preheat for more than 30 minutes before disconnecting power and restarting

8.3 Common phenomena during trial run

- The blocking time is long in the initial start-up. The starting mode is "voltage slope" or "constant current mode". Please increase the "starting voltage" and increase the "starting current" when the starting mode is "current ramp". If the starting process is weak, please increase the "current limiting factor". If the starting current is too high, please decrease the "current limiting factor".
- The protection "start failure" is reported after startup. Please increase the "current limiting times" or extend the "start time".
- Motor vibration during startup. Please confirm whether the shaft end is connected without load. If not, Please determine whether to use the "current ramp" start-up and set the "current limit multiplier" to 2.0 or lower. Alternatively, you can connect the load without adjusting the parameters and the oscillation phenomenon will disappear.

- The startup process is too fast. Please check whether it is light load or no load. If so, you can extend the startup time by lowering the "current limiting ratio".

9 Dimensions



NR1000 series built-in bypass soft start shape and installation size

specifications and models	External dimensions (mm)			Installation size (mm)		
	H1	W1	D	W2	H2	D
5.5KW-22KW	165	60	145	55	155	
30KW-37KW	110	250	162	85	220	
45KW-75KW	140	270.5	139.5	110	245	
90KW-115KW	210	340	185	210	315	

10 Electrical schematic diagram

