HTS Series High Performance Soft Starter
User Manual
V1.0

HNC Electric Limited

Foreword

Thank you for choosing the HTS LCD intelligent AC motor soft starter.

In order to fully utilize the functions of this product, please read this manual carefully before use. Please operate and use it correctly according to the regulations, and ensure the safety of the operator. When you find a problem in the use and this manual can not provide answers, please contact us. or agents and distributors. ,

We will be happy to help you.

Safety Precautions

1. The soft starter should be installed or guided by a professional technician;
2. Try to ensure that the motor power and specifications match the soft starter;
3. It is strictly forbidden to connect the capacitor at the output end of the soft starter (U.V.W);
4. Apply the insulation tape with the soft starter input and output connection;
5. The soft starter housing must be reliably grounded;
6. When the equipment is being repaired, the input power must be cut off first;
7. The internal circuit board has high voltage, and non-professionals should not repair it.

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1. HTS soft starter function and characteristics

HTS intelligent AC motor soft starter is a new type of motor starting equipment with current international advanced level designed and produced by power electronics technology, microprocessor technology and modern control theory. The product can effectively limit the starting current when the asynchronous motor starts. It can be widely used in loads such as fans, pumps, conveyors and compressors. It is a traditional star/delta conversion, auto-coupled buck, magnetically controlled buck, etc. The ideal replacement for starter equipment.

Effect

● Reduce the starting current of the motor, reduce the distribution capacity, and avoid investment in capacity expansion;

● Reduce starting stress and extend the service life of motors and related equipment;

● Smooth start and soft stop avoid the surge problem and water hammer effect of traditional starting equipment;

● A variety of starting modes and a wide range of current and voltage settings, can adapt to a variety of load occasions, improve the process; ● Improve the reliable protection function, more effectively protect the safety of the motor and related equipment; ● Can be used for frequent start and stop The occasion.

Special feature

● The HTS soft starter uses high-performance microprocessor technology for higher performance and a wider range of voltage adaptation.

● 6 kinds of starting modes can be selected to maximize the motor's optimal starting effect and soft stop.

● Large-screen LCD man-machine interface, English and Russian display modes, easy to operate, 7-color backlit LCD display can reflect the different working conditions of the soft starter, fully embodies the humanized design concept.

● A variety of protection monitoring functions, thermal overload protection is optional according to load requirements of 6 levels. The last three fault records can be queried to provide a basis for fault analysis.

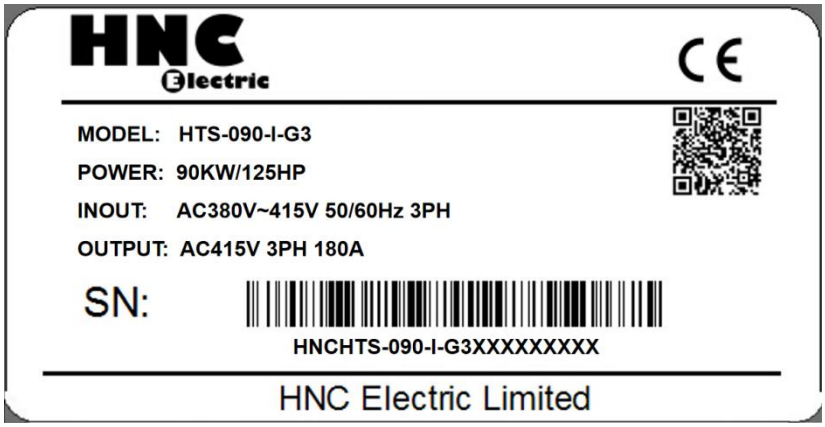
● This product can provide 4~20mA analog output, RS485 communication interface (using MODBUS RTU communication protocol), which can enter parameter setting, operation and monitoring through the host computer to achieve high intelligent control.

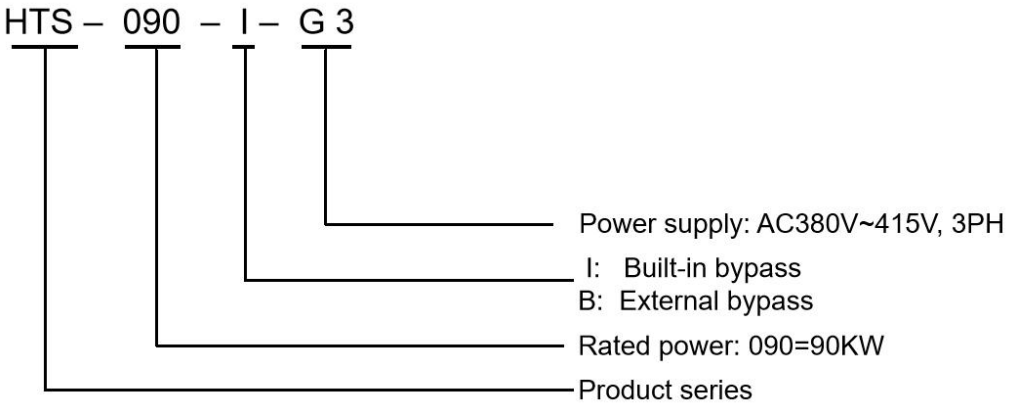
● Actual power setting: When the soft starter power is larger than the actual load power, the rated current of the soft starter can be set according to the actual load, so that the actual power of the soft starter matches the load to ensure starting, running, protection, etc. The accuracy of the parameters.

● Programmable output relay: It can easily realize interlock control with other equipment.

2. Product model and inspection

Each HTS soft starter has all functions and running tests before leaving the factory. After receiving the equipment, please check the following steps. If you find a problem, please contact the supplier immediately. Check the product nameplate: Verify that the goods you receive match the products you ordered.





- Check if the product is damaged during transportation, such as: internal parts falling off, shell depression, deformation and connection Lines fall off and other issues.
- Product certificate and instruction manual: Each soft starter is accompanied by a product certificate and a manual.

3. Conditions of use and installation

3.1 Conditions of Use

The conditions of use have an effect on the normal use and life of the soft starter, so install the soft starter in a location that meets the following conditions of use. Product use conditions:

- Power supply: mains, self-supplied power station, diesel generator set;
- Input voltage：AC380V（-10%～+15%），50Hz;
- Applicable motor: General squirrel cage asynchronous motor (please specify when ordering the winding motor);
- Starting frequency: standard products are recommended to start and stop no more than 30 times per hour;
- Cooling method: forced air cooling;
- Installation method: wall-mounted;

- Conditions of use: HTS soft starter should be equipped with bypass contactor when in use;
-
- Protection level：IP20;
-
- Environmental conditions: The altitude is over 2000 meters, and the capacity is reduced accordingly.； Ambient temperature between -10 ° C and +40 ° C;
-
- Relative humidity does not exceed 95%（20℃±5℃）;
-
- No condensation, no flammable, explosive, corrosive gas, no conductive dust. Indoor installation, well ventilated. Vibration less than 0.5G.

3.2 Cover disassembly and installation requirements

The HTS soft starter is mounted on a wall-mounted type, and its upper panel and control keyboard are all molded.

● HTS soft starter structure exploded view

Installation direction and distance

In order to ensure that the soft starter has good ventilation and heat dissipation conditions during use, the soft starter should be installed vertically and have sufficient heat dissipation space above and below the device.

●Cabinet installation

When the soft starter is to be installed in a power distribution cabinet, a well-ventilated cabinet must be used. The starter can be installed in a horizontal layout in the cabinet. It can also be installed in a vertical layout. However, when installing in a vertical layout (especially for forced air-cooled soft starters), an air baffle should be added between the upper and lower soft starters to prevent the thermal effects of the soft starters below. The soft starter above.

4. Working principle

The HTS soft starter uses three pairs of anti-parallel thyristors connected in series to the stator circuit of the AC motor. By using the electronic switch function of the thyristor, the degree of opening of the thyristor is changed by the The controlling the change of the firing angle, such changing the input voltage of the motor to achieve the purpose of controlling the soft start of the motor. The soft starter output reaches the rated voltage when the start is completed. At this time, the bypass Control signal will be used to automatically control the three-phase bypass contactor KM to pull the motor into the grid, as shown in Figure 4-1.

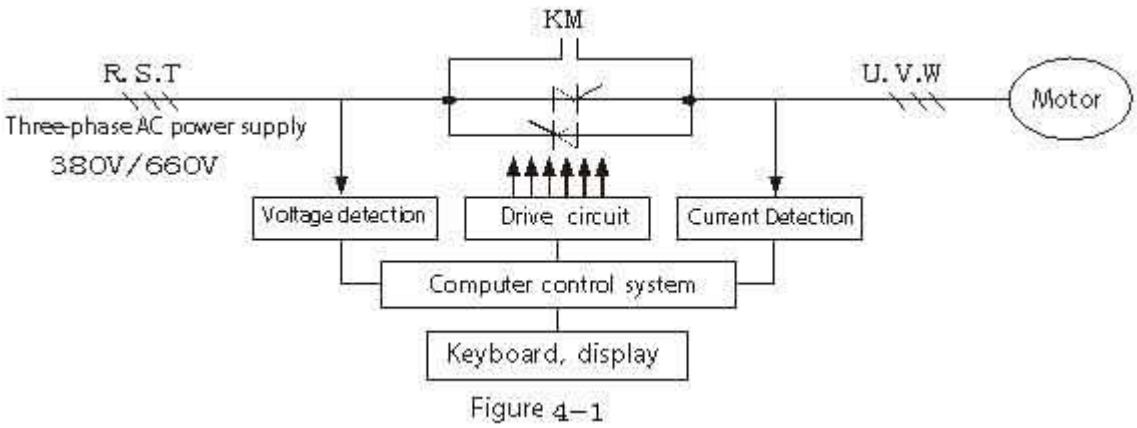


Figure 4-1

5. Basic wiring and external terminals

Figure 5-1 and Figure 5-2 show all the external terminals available for the HTS soft starter. For detailed functions, see Table 5-1 “External Terminal Description”.

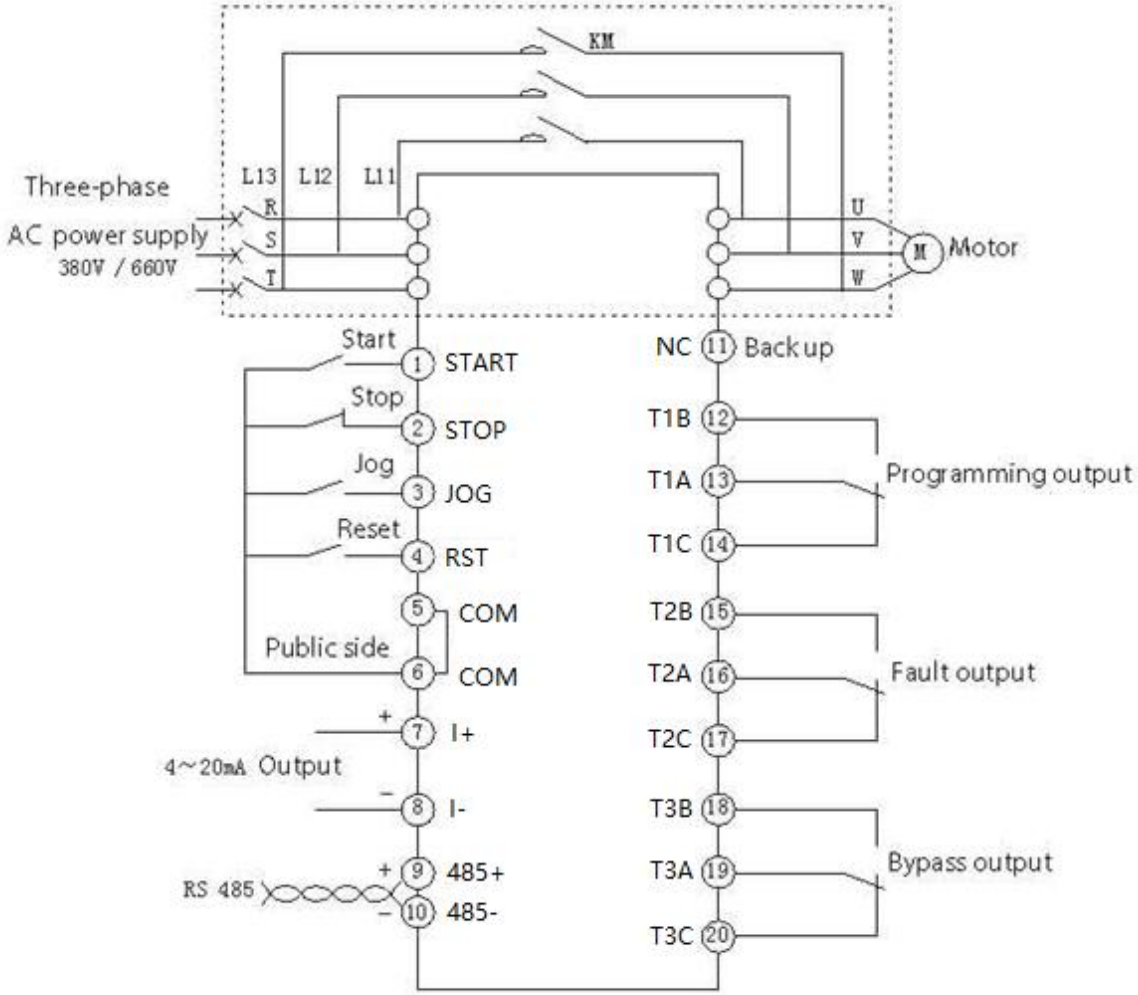
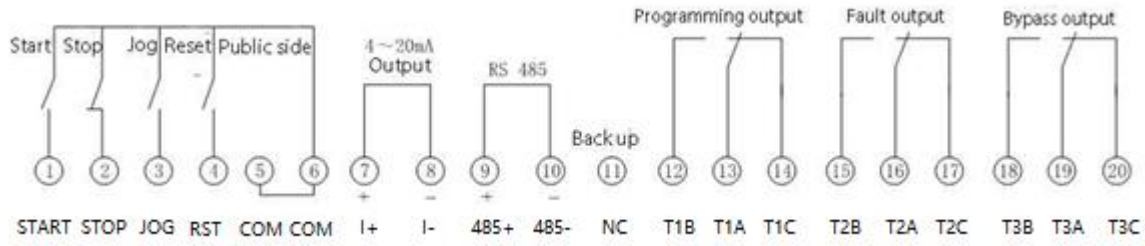


Figure 5-1

Built-in bypass soft start without KM (AC contactor)

5.2 HTS Soft Starter External Terminal Sorting Diagram



5.3 HTS Soft Starter External Terminal Description

<table>
<tr><th colspan="3">TERMINAL DESCRIPTION</th><th colspan="2">TERMINAL NAME</th><th>EXPLAIN</th></tr>
<tr><td colspan="2" rowspan="3">Main circuit</td><td>R.S.T</td><td colspan="2">AC power input terminals</td><td>Three phase AC power supply through circuit breaker (QF)</td></tr>
<tr><td>U.V.W</td><td colspan="2">Soft starter output terminal</td><td>Connecting three phase asynchronous motor</td></tr>
<tr><td>L11.L12.L13</td><td colspan="2">Special terminal for external bypass contactor</td><td>Refer to figure 11-1 for wiring method.</td></tr>
<tr><td rowspan="15">control circuit</td><td rowspan="5">Digitalinput</td><td>Start-up</td><td colspan="2">External control starting terminal</td><td>Starting and commonshort circuit can be controlled externa</td></tr>
<tr><td>Stop</td><td colspan="2">External control stop terminal</td><td>Start and public short access can stop external control</td></tr>
<tr><td>Spot move</td><td colspan="2">External control terminal</td><td>Starting and common shorting can achieve point movement</td></tr>
<tr><td>Reset</td><td colspan="2">External control reset terminal</td><td>RESET and public short access can achieve common reset</td></tr>
<tr><td rowspan="2">Common</td><td colspan="2" rowspan="2">Control signal common terminal</td><td rowspan="2">Internal power reference point</td></tr>
<tr><td rowspan="3">Digitaloutput</td></tr>
<tr><td>RS485+</td><td colspan="2">Connection communication</td><td></td></tr>
<tr><td>RS485-</td><td colspan="2">Connection communication</td><td></td></tr>
<tr><td rowspan="2">Analog output</td><td>4-20mA+</td><td colspan="2">4-20mA Positive output
Load input impedance≤400Ω</td><td rowspan="2">Im: motor output current (A)
Ic: rated current of motor (A)
Im = Ie(Io-4)/8
Io: (4-20mA) output current</td></tr>
<tr><td>4-20mA-</td><td colspan="2">4-20mA Negative output</td></tr>
<tr><td rowspan="3">Programmable relay output</td><td>Programming output</td><td>normally open</td><td rowspan="3">Programmable output terminal</td><td rowspan="3">0- invalid
1- power on effective effective time K34 K32
2- standby efficiency K31-K32
3- starting process is effective
4- start completion is effective electrocution capacity
5- soft stop effective AC:12A/250V
6- starting to stop effective or 5A/380V
7- failure effective DC: 15A/30V</td></tr>
<tr><td>Programming input</td><td>common</td></tr>
<tr><td>Programming output</td><td>normally close</td></tr>
<tr><td rowspan="6">Relay output</td><td>Fault output</td><td>NO</td><td rowspan="3">Fault output terminal</td><td rowspan="3">Contact capacity: AC:12A/250V or 5A/380V DC:15A/30V</td></tr>
<tr><td>Fault output</td><td>common</td></tr>
<tr><td>Fault output</td><td>NC</td></tr>
<tr><td>Bypass output</td><td>NO</td><td rowspan="3">External bypass controller control terminal</td><td rowspan="3">Contact capacity: AC:10A/250V or 5A/380V DC:15A/30V</td></tr>
<tr><td>Bypass output</td><td>common</td></tr>
<tr><td>Bypass output</td><td>NC</td></tr>
</table>

①There are two wiring modes for the external control start and stop signal. When the two-wire control is used, the stop terminal is not wired; see the basic wiring diagram 5-1 for details.
②For details on the programmable output settings, see "8.3 Start and Stop Parameter Setting

6. Soft starter control mode

6.1 Starting mode

HTS type soft starter has six starting modes, users can choose according to their own load conditions.

- Voltage ramp starting
- Current limiting starting
- Voltage slope + current limiting starting
- Current ramp starting
- Pulse jump + voltage ramp start
- Point movement

6.1.1 Voltage ramp starting

After starting, the output voltage of the soft starter rises rapidly to the "initial slope starting voltage" value U1, and then gradually increases the output voltage according to the "voltage ramp starting time" until starting is completed, as shown in Figure 6-1.
Voltage ramp starting mode is suitable for large inertia load or occasions where the starting current is not strict and the starting stability is high. This starting mode can greatly reduce starting impact and mechanical stress.
The bigger the initial voltage U1 is, the bigger the initial starting torque is, but the bigger the impact is at the moment of starting. The length of starting process is related to the setting value of starting time and the weight of load, and has nothing to do with the current limiting factor.

Parameters related to "voltage ramp start": initial ramp start voltage (U1): 30%-80% voltage ramp start time (t): 1-120 s

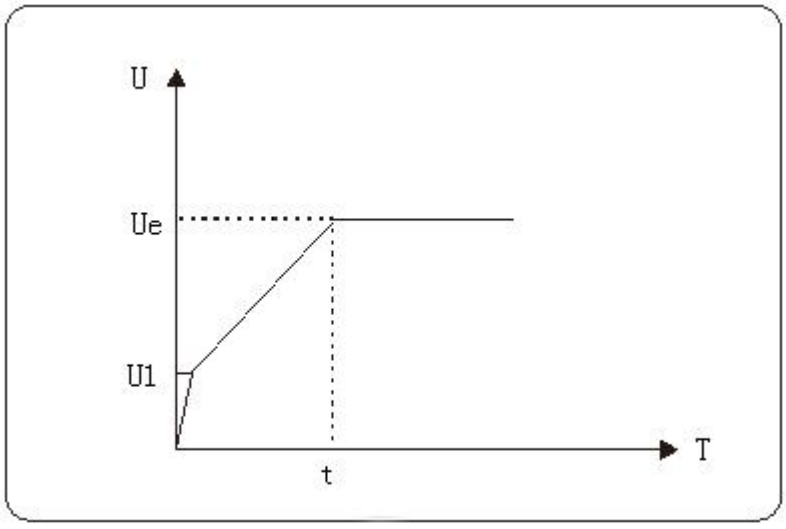


Figure 6-1

6.1.2 Current limiting start

After starting, the motor current rapidly rises to the set current limiting value Im, and keeps the output current not greater than that value, so that the motor accelerates gradually and the voltage rises gradually. When the motor approaches the rated speed, the motor current rapidly drops to the rated current Ie to complete the starting process, as shown in Figure 6-2.

Current limiting start-up mode is generally used in situations where there are strict requirements for starting current, especially when the capacity of power grid is too small. To limit the starting capacity, current limiting multiples can be set according to requirements, generally between 2.5 and 3 times, too small setting will also cause the normal starting. When starting with current limiting, the starting time is related to the magnitude of current limiting multiples. The larger the current limiting multiples, the shorter the starting time, and vice versa.

The parameters related to "current limiting start": current limiting starting current limiting multiplier (Im): 20% ~ 400%

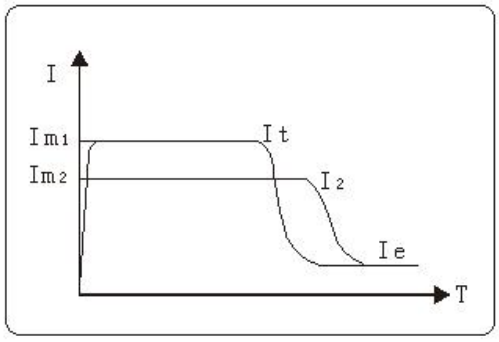


Figure 6-2

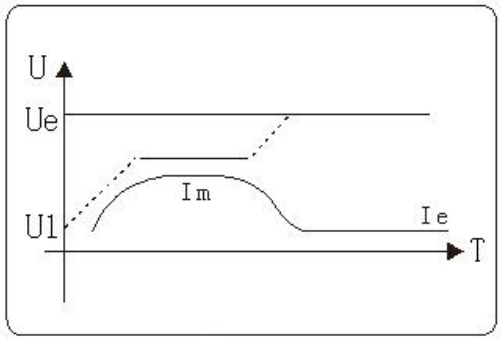


Figure 6-3

6.1.3 Voltage ramp + current limiting starting

The motor voltage rises according to the preset slope line, but if the current exceeds the current limit, the boost is suspended. With the motor speed rising, the current falls below the current limit, and then the linear boost is continued to the full voltage, starting is completed, as shown in Figure 6-3.

This starting mode is mainly used for small load capacity and requiring less load starting.

- The parameters related to "voltage ramp + current limiter":
  Initial voltage of ramp starting (U1): 30% ~ 80%
  Voltage ramp starting time (T): 1 ~ 120s
  Current limiting starting current limiting multiplier (Im): 20% ~ 400%

6.1.4 Current ramp starting

After the motor starts, the starting current rises gradually according to the set starting time until the start is completed; when the starting current reaches the set current slope current limiting multiple, the current remains unchanged until the start is completed, as shown in Figure 6-4.

The current ramp starting is usually used to drive faster or faster synchronous motors.

- Parameters related to "current ramp start":
  Current ramp starting time (T): 1 ~ 120s current
  Slope limiting multiple (Im): 20% ~ 400%

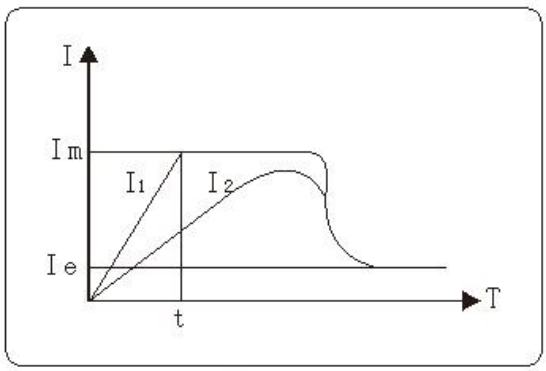


Figure 6-4

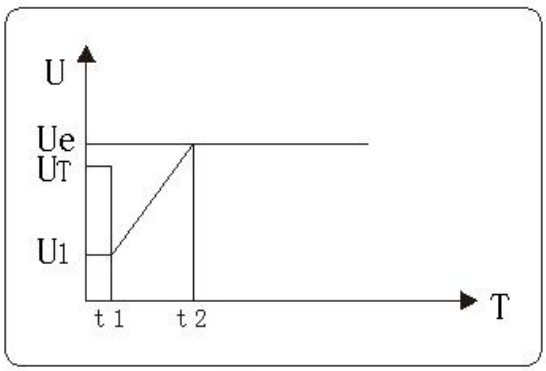


Figure 6-5

6.1.5 Jump + voltage ramp start

For some loads with larger static resistance, a larger moment is needed at the moment of starting, which can also start normally. This starting mode can be selected. When starting, the soft starter instantaneously outputs a higher voltage (time can be set), so that the motor rotates, and then starts according to the voltage ramp starting mode until the start is completed, as shown in Figure 6-5.

● This starting mode is mainly used for static resistance larger load.
Parameters related to "sudden jump + voltage ramp start":
Voltage slope initial voltage (U1): 30% ~ 80%
Voltage ramp starting time (T2): 1 ~ 120s
Pulse jumping time (T1): (0~500) MS

6.1.6 Point movement

When starting, the output voltage of the soft starter increases rapidly to the initial voltage U1 and remains unchanged. Changing the setting value of U1 can change the output torque of the motor when starting. This function is very convenient for the test run or the positioning of some loads, as shown in Figure 6-6.
The number of points related to "point movement": point voltage: 30% ~ 80%

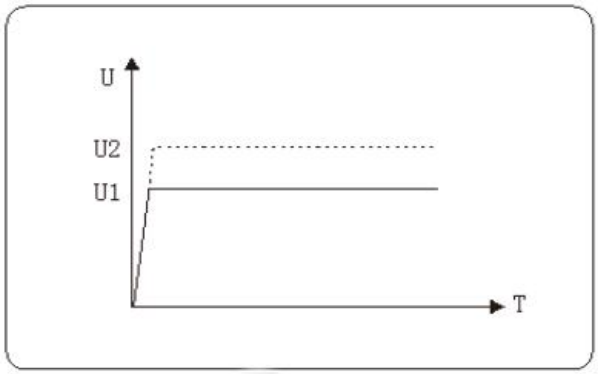


Figure 6-6

6.2 Stop mode

6.2.1 Free stop

When the stop command is received, the soft starter controls the bypass contactor to open, and at the same time, the output voltage of the main circuit thyristor is blocked, and the motor is gradually stopped according to the inertia.

6.2.2 Soft Stop

In this stop mode, the motor power is switched from the bypass contactor to the main circuit thyristor, and the control output voltage is gradually reduced until the motor stops smoothly. Soft Stop time:1S-10S

7. Control keyboard function and operation method

7.1 Operation keyboard

HTS soft starter adopts 128×64 dot matrix large-screen liquid crystal display module and micro-motion membrane button to form operation display keyboard. It has English/Russian display modes and 6 micro-motion buttons to realize soft starter. Start and stop operations, parameter settings, modifications, fault queries, fault resets, etc. See Figure 7-1 for details.

7.2 Operation keyboard

7.2.1 One-key operation

Run : Start key Press this button to start the motor
Stop: Stop key Press this button to stop the running motor
PRO: Programming Key In the standby or fault state, press this button to enter the programming state
Back:Programming exit
1.Press this button to exit the programming state and other functions.
2.Fault reset, in the fault state, press this button to exit the fault state and return to the standby state.
3.Back Use in combination with other keys for additional functions

▼▲ 1.Scroll through menu functions while editing

2.In the function parameter state，Press ▼▲ Can modify current function parameters ▲ Increase the parameter ▼ Reduce parameters

In the event of a fault ▼▲ The key can be flipped through the previous and previous 2 fault conditions.

7.2.2 Compound key operation (two keys pressed simultaneously during operation)

In standby mode
Back +▲ : Upload parameters，Copy the parameters in the soft starter to the operating keyboard.
Back +▼ : Download parameters，Copy the parameters in the operating keyboard to the soft starter.
In the running state
Run +▲ : Running current calibration，Increase display current。
Run +▼ : Running current calibration，Reduce display current。
In the state of communication interruption (display "communication failure") Back+Stop : Reconnectable communication。

7.2.3 Control keyboard hot swapping function

After the parameters of the HTS soft starter are set, the soft starter can be operated by external control

without the control keyboard. It can also be inserted or dialed in the running state and does not affect the normal use of the soft starter.

8.Parameter settings

The display interface of HTS soft starter is English/Russian two language display mode (settable).

8.1 Function parameter flow chart in English/Russian mode

HTS soft starter function parameter query and setting adopt Han display menu scrolling mode, which is divided into one main menu and four sub-menu, including all parameters that can be set and can be queried. Since all functions are English/Russian characters display, it
is intuitive and easy. Understand and easy to operate, the flow of all menu functions is shown in Figure 8-1.

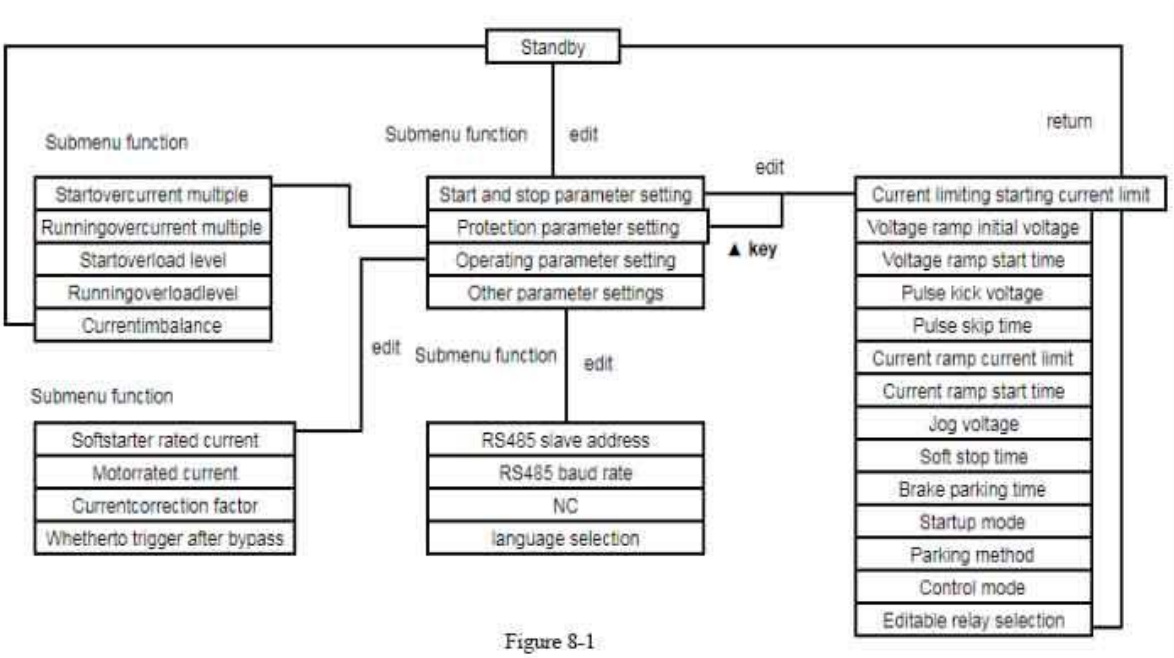


Figure 8-1

8.2 Parameter settings

Figure 8-2 shows the operation method of parameter query and setting of HTS soft starter.

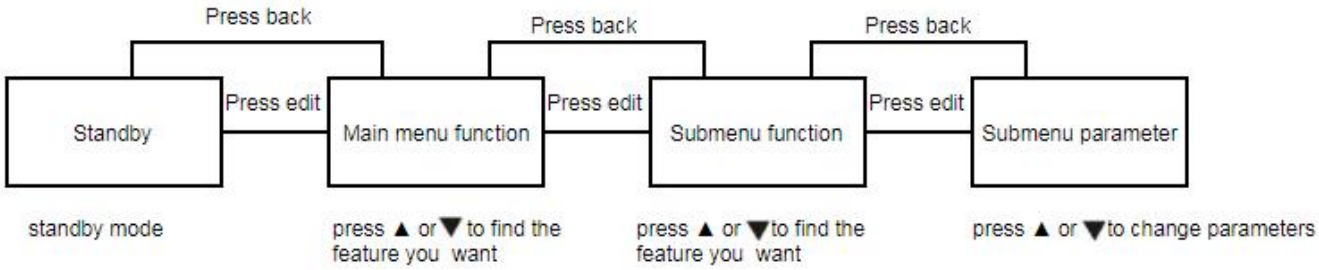


Figure 8-2

Method of operation：

●Press the programming key to enter the main menu or submenu functions and parameters;

●Press▲or ▼ key，Scroll through menu functions or modify parameter values;

●ress the return key，Can exit the main menu or submenu。

Note: Once the data is modified, it will be saved automatically, and will not be affected by the power failure, and will be kept until the next modification.

8.3 Operating parameter setting

Main Menu	Sub Menu	Parameter
A. S&P Para	A00.Curr Limit for CLS	10%~500%
	A01.Init Volt for VRS	30%~80%
	A02.Start Time for VRS	1~120s
	A03.Volt for Plus Start	30%~80%
	A04.Time for Plus Start	0~500ms
	A05.Curr Limit for CRS	10%~400%
	A06.Start Time for CRS	1~120s
	A07.Volt for Jog	30%~80%
	A08.Time for Soft Stop	1~10s
	A09.Start Mode	Volt Ramp Curr Limit Jog Curr Ramp Plus & Ramp C-Limit Ramp
	A10.Stop Mode	Free Stop Soft Stop
	A11.Control Mode	Forbid Key Board Terminal Ctrl Term & Key

	A12.Prog Relay Func	Non-Func Power On Standby Starting Bypass Stopping Running Fault
B.Protect	B00.Start OC Ratio	400%~600%
	B01.Running OC Ratio	200%~400%
	B02.Start OL Level	1~8
	B03.Running OL Level	1~8
	B04.Curr Unbalance Ratio	5%~85%
	B05.Over Volt Threshold	100%~140%
	B06.Under Volt Threshold	60%~100%
	B07.Under Load Threshold	0%~100%
	B08.Under Load Delay	0~200s
C.Run Para	C00.Starter Rated Curr	Factory Constant
	C01.Starter Rated Volt	Factory Constant
	C02.Motor Rated Curr	5A~Starter Rated Curr
	C03.Curr Cali Ratio	50~1500
	C04.Pulse Under Running	Pulse No Pulse
D. Misc	D00.MODBUS Addr	1~127
	D01.Baud Rate	19200 9600 4800 2400 1200
	D02.Volt Cali Ratio	5~200
	D04.Language	Chinese English Russian

9. Fault protection function and solution

9.1 Fault display and solution

Term	Fault Display	Fault Reason	Solution
1	Power On Phase Loss	Input Power Loss Phase	This fault can not be resetting. After cutting off power, checking three phases power and isolated circuit breaker
2	Running Phase Loss	During running, Power Loss Phase	Checking whether input power is lost Phase or not.
		The Thyristor disconnection?	Checking the thyristor or trigger circuit.
3	Starting Over Current	Current limiting mode: is the current limiting multiplier appropriate?	Appropriate adjustment of the parameters mentioned above.
		Slope mode: is the starting time suitable?	The initial voltage is too high.
4	Over current in Running	Load suddenly increased? Or fluctuate too?	Adjust load and check grid voltage
		Net weight drop caused by load increase?	Adjust appropriately value of current protection.
5	Overload during starting	Overload is too heavy during starting?	Check whether the load can be reduced properly or not?
			Check overload level or adjust appropriately.
6	Overload in Running	Motor run with overload ?	Adjust load, can be within rated value
		Feedback is inaccurate (showing larger current than actual)?	The calibration keyboard current value should be consistent with the actual value.
			Check whether the overload curve is suitable.
7	Current imbalance	thyristor trigger socke was not connected wellt?	Check the trigger signal or thyristor
		Thyristor disconnection?	Handling the power imbalance
		Does the motor imbalance three-phase current?	
8	Overheating protection	Is the startup too frequent?	Reduce the frequency of startup
		Does the cooling fan not turn?	Check the cooling fan
		Is the bypass contactor burned out?	Check the contactor
9	Overvoltage protection	Is the voltage too high?	Check the voltage
10	Undervoltage protection	Is the voltage too low?	Check the voltage
11	EPROM Parameter error	Parameter exceeds limit?	After the shutdown, check the setting parameters and reset
		Internal memory failure?	

9.2 Overload protection level and selection

The HTS soft starter has electronic overload protection function and is inverse-time characteristic. It is divided into 6 levels. The higher the level, the stricter the protection, that is, the shorter the protection action time, the shorter the protection action time. The HTS soft starter product start-up process and the operation overload protection are set at the factory:
Starting process overload level factory value: 5
Operating overload level Factory default: Level 2

When in use, users can also adjust accordingly according to specific load requirements.

Motor overload protection characteristic curve

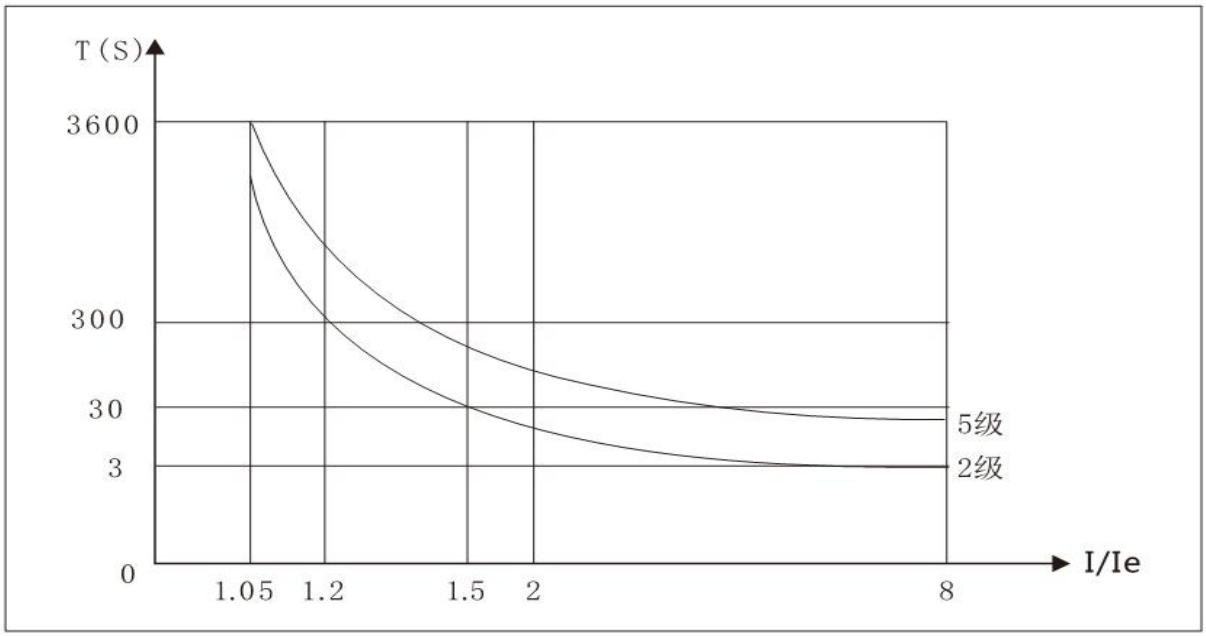


Figure 9-1

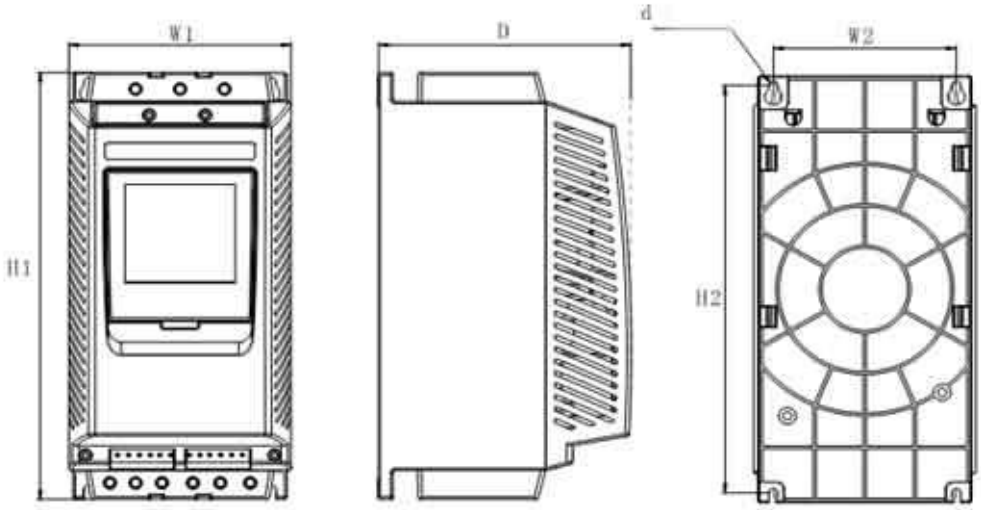
Motor overload protection characteristic level (hot state returns to cold state for 180 seconds)								Table 9-2
Load factor / Overload level	6Ie	5Ie	4Ie	3Ie	2Ie	1.5Ie	1.2Ie	1.05Ie
1	1s	3s	6s	8s	10s	15s	150s	3600s
2	3s	8s	12s	16s	20s	30s	300s	3600s
3	6s	15s	22s	30s	40s	60s	350s	3600s
4	10s	22s	35s	48s	60s	90s	400s	3600s
5	15s	35s	55s	75s	90s	120s	450s	3600s
6	20s	45s	70s	95s	120s	150s	500s	3600s

9.3 The last three faults

The HTS soft starter has the last three automatic fault storage functions and can be consulted at any time to analyze the cause of the fault and find a solution. Press and hold the back button to display the fault status.

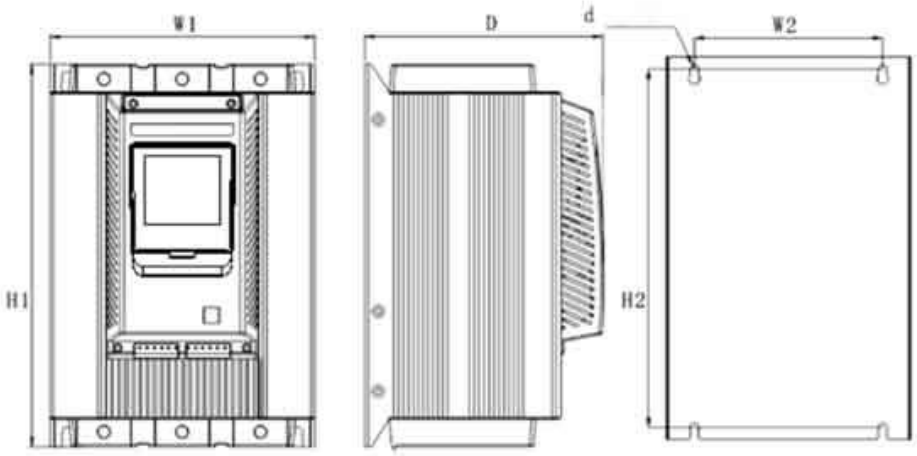
10. HTS Series Outline and Install Dimensions

10.1 5.5-55kw



Model	Rated Power (KW)	Rated Current (A)	Outline Dimension (mm)			Install Dimension (mm)			N.W (Kg)
			H1	W1	D	H2	W2	d	
Intelligent and Builtin bypass type	5.5~55	11~150	310	155	175	296	127	M6	5

10.2 75-630kw



Model	Rated Power (KW)	Rated Current (A)	Outline Dimension (mm)			Install Dimension (mm)			N.W (Kg)
			H1	W1	D	H2	W2	d	
Intelligent type	75~220	150~440	525	265	245	440	205	M8	20
	250~320	500~630	560	290	250	460	260	M8	25
	400~450	800~900	580	330	270	500	300	M10	30
	500~630	1000~1200	660	410	280	550	370	M10	35
Builtin bypass type	75~220	150~440	585	280	240	530	215	M8	23
	250~320	500~630	630	320	260	550	250	M10	30

11. MODBUS RTU

MODBUS RTU is a fully pre-defined standard communication protocol. Each piece of information from the host to the slave is asynchronously transmitted. The host computer (host) can modify, control, and read the measured values of the soft starter through the "read data" and "write data" frames.

- Read data request format from HTS Type soft starter：

Rest time	Slave address	Function code	Data area		CRC	Rest time
3.5 byte	Slave address	03H/04H	starting address	Number of data	CRC verify	3.5 byte

-- Slave address: 1Byte, The master must identify the selected slave, and the slave with no assigned address will only receive the message but will not execute the command.

-- Function code: 1Byte, The function code of the read command is 03H.

-- Data area:

--- starting address: 2Byte, The first byte is the high address byte and the second byte is the low address byte.

--- Number of data: 2Byte, Data starting from the starting address. The first byte is a high data byte and the second byte is a low data byte.

--- CRC verify: 2Byte.

Response format:

- Accept the correct response format:

Rest time	Slave address	Function code	Data area		CRC	Rest time
3.5 byte	Slave number	03H/04H	Number of byte	Parameter value	CRC verify	3.5 byte

-- Slave address: 1Byte, The slave address of the response is the same as the slave address requested by the host.

-- Function code: 1Byte, The function code of the read command is 03H.

-- Data area:

-- Number of byte: 1Byte, The number of bytes of data returned by the read command.

-- Parameter value: The data value returned by the read command.
-- CRC verify: 2Byte.

- Receive error response format:

Rest time	Slave address	Function code	Abnormal area	CRC	Rest time
3.5 byte	Slave number	83H/84H	01，02，03，04	CRC verify	3.5 byte

-- Slave address：1Byte，The responding slave address is the same as the slave address requested by the host.

-- Error code: 1Byte, 83H.

-- Abnormal code:

01= Unsupported function code;

02= Unsupported start address or unsupported "start address + number of data";
03= The number of unsupported data;

04= An error occurred while receiving a CRC check error or reading multiple data.
-- CRC verify: 2Byte.

Write to C

According to the request 0

Rest time	Slave address	Error code	Data area	CRC	Rest time
3.5 byte	Slave number	06H	starting address Data value	CRC verify	3.5 byte

-- Slave address: 1Byte, The master must identify the selected slave, and the slave with no assigned address will only receive the message but will not execute the command.

-- Function code: 1Byte, The function code for the write command is 10H.

-- Data area;

-- starting address: 2Byte, The first byte is the high address byte and the second byte is the low address byte.

--- Data value: 2Byte, The first byte is the high data quantity byte and the second byte is the low data quantity byte

-- CRC Check: 2Byte.

Response format:

- Accept the correct response format:
- Consistent with the data sent by the host
- Receive error response format:

Rest tune	Slave address	Error code	Abnormal zone	CRC	Rest time
3.5 character	Slave code	86H	01，02，03，04	CRC Check	3.5 character

-- Slave address：1Byte, The responding slave address is the same as the slave address requested by the host.

-- Error Code: 1Byte, 90H

-- Exception code:

01=Unsupported function code

02=Unsupported “starting address” or Unsupport”starting address+data numbers

03= Unsupported data number

04=Receivedd CRC Check fault or Or error when reading multiple data

-- CRC Check: 2Byte

11.2 Communication point table

Function code 03H Read soft starter parameter						
Address	Means	property	Type	coefficient	Unit	Description
0101	Rated voltage	R	Unsigned number	1	V	
0102	Rated current	R	Unsigned number	1	A	
0103	Fault record 1	R	Unsigned number			
0104	Fault record 2	R	Unsigned number			
0105	Fault record 3	R	Unsigned number			
Function code 04H Read soft starter measurements						
0000	Soft starter state	R	Unsigned number			00H Standby 01H Starting 02H Runing 03H Soft stopping 04H Reserved 05H Fault
0001	Voltage value	R	Unsigned number	1	V	
0002	Average current	R	Unsigned number	1	A	
0003	A Phase current	R	Unsigned number	1	A	
0004	A Phase current	R	Unsigned number	1	A	
0005	A Phase current	R	Unsigned number	1	A	
0006	Current fault	R	Unsigned number			00H No fault 01H Input power defaulf phase 02H starting default phase 03H Starting Overcurrent 04H Runing overcurrent 05H starting Overload 06H Starting Overload 07H Current imbalance 08H Overload fault 09H Over voltage fault 10H Under voltage fault 11H Inner fault
Function code 06H Control soft starter Run and stop						
0100	Control letter	W	Unsigned number			01H Stop order 02H start order 03H Eliminate malfunction state

12.HTS Soft starter Daily maintenance and precautions

12.1 Trial start Inspection and precautions

For safe operation, check the following conditions before powering up.

- Whether the soft start power matches the motor power or not?

  You can enter the “Motor rated current” item in “Operation parameter setting” and set according to the motor nameplate current value.。

- Does the motor insulation meet the requirements?
- Is the main circuit input and output wiring correct?
- Are all wiring nuts tightened?
- Check if the three-phase incoming power supply (R.S.T) has a short circuit with a multimeter?

After power-on, “Ready” is displayed to indicate that it is in the normal preparation start state. You can use the “jog” method to check whether the motor is turning correctly. If it is not correct, you can change any two phases of the motor.

During the trial operation, if the motor starting state is not good, you can set the starting mode and current, voltage, time and other parameters according to the starting and closing parameters of Table 8-1.

● If fault protection occurs during the entire power-on and operation, the fault status will be displayed. Please follow the corresponding prompts in Table 9-1 for processing.

● After the soft starter is energized, do not open the cover to avoid electric shock. During the trial operation, if abnormal phenomena are found, such as abnormal sounds, smoke or odor should be stopped quickly, cut off the power supply, and check the cause.

● When the soft starter output is not connected to the motor, the U.V.W three-phase has induced voltage, which is a normal phenomenon. After the motor is connected, the induced voltage disappears.

12.2 Daily maintenance and precautions

●Induced voltage: When the soft starter is turned on at the input end, when the load is open, even if it is in the stop state, there will be an induced voltage at the output end, which is caused by the leakage current of the thyristor, which is a normal phenomenon; After this, the induced voltage disappears, so you should pay attention to the danger of electric shock when using it.

Reactive power compensation: If a reactive power compensation circuit with improved power factor is added in the power distribution circuit, the reactive power compensation capacitor should be connected to the input end of the soft starter, and should not be connected to its output terminal, otherwise it will cause soft start. The power device of the device is damaged.

● Insulation test: It is strictly forbidden to measure the insulation resistance between the input and output of the soft starter with a megger. Otherwise, The power device and control board of the soft starter may be damaged by overvoltage.

● Circuit Wiring: The input and output of the soft starter cannot be reversed, otherwise the soft starter or motor may be damaged.

● Bypass Contactor Wiring: The soft starter must have the same phase sequence for the soft starter outputs U, V, W and bypass outputs L11, L21, L31 when mating the bypass contactor.

● External control terminal: external control terminal of soft starter Start, stop, jog, reset, public, not to be introduced.

External power supply, otherwise the soft starter control board will be damaged.

● In the case of dusty working conditions, dust should be cleaned regularly, otherwise the insulation of the soft starter will be reduced.

Level and heat dissipation, causing malfunction or damage.

● In humid environment, if the soft starter is not used for a long time, it must be dehumidified before use (such as using a hair dryer or electric oven), otherwise it will reduce the insulation level of the soft starter due to humidity or condensation, causing climbing. Electric, short circuit, damaged soft starter.

Before order

● When ordering, please inform the supplier of the product model, specifications, load conditions and conditions of use.

The product is selected correctly.

● external products should be equipped with bypass contactors when in use.

● For users who have special conditions or requirements for this product, please explain to the supplier when ordering, we will provide comprehensive services.

● If the load is a wound motor, it should be advise the supplier when ordering.

● If need RS485, please advise before ordering.

Version: 1.0

Thanks for choosing HNC product.

Any technique support, PLS feel free to contact our support team

Tel: 86(20) 84898493 Fax: 86(20)61082610

URL: www.hncelectric.com