Soft Starter SSN / SSA Series

数字式交流电动机软起动器
AC Motor Smart Soft Starter

User Manual

V2.1

NIetz Electrci Co.,Ltd

Directory

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1.Overview

This manual is applicable to SSN/SSA serial products.

This manual is intended to guide qualified personnel in the installation and operation of this products.

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Although the information in this manual is checked carefully, but there may be some mistakes. If you find them, please phone us as soon as possible.

Because this product is improved continuously, so user should regard this manual as the reference.

The parameters in the manual is only used to describe the product, In order to meet the needs of the customers, we will improving our products continuously to fulfils the latest technical criteria.

2.Safty 

Pay attention to the Note, warning and tips mentioned in this manual.

Only professional technician can be permitted to install or guide the installation of this products.

Ensuring the power and specification of the motor is matched to those of this products;

The capacitor is prohibited strictly to be connected with the output terminal (U.V.W) of this production

The cables connecting to the input and output terminals of this product should be packed well by insulating tape;

The shell of this product must be connected to the ground reliably;

Make sure the power of this product must be cut off before it is maintained.

This manual is packed with the product. Operator must take it as the guide of this product.

Please read it carefully before using this product.

3. Safty Mark

Warning、Tips and Not

- ◆ Attention Something can lead to personal injury or death
- ◆ Warning Something can lead to damage of the device or software.
- ◆ Note Remind user something related.

1.Function and feature

SSN/SSA Series digital AC motor soft starter is new type starting equipment with advanced international level. This equipment designed and manufactured by the technique of power electronics microprocessor and modern control theory. This equipment can limit the start current efficiently when the asynchronous motor starts. It is widely applied in the field such as winding machine, pump, transition and compressor etc. It is the ideal product to replace the traditional voltage dropping start equipment such as star/triangle conversion, self-coupling voltage dropping, magnetic control dropping voltage etc.

Function

◆ Reduce the starting current of motor; reduce capacity of power distribution; reduce the investment cost;

◆ Reduce the start stress; prolong the operation lifetime of the motor and correspond equipments;

◆ Smooth and steady starting and soft stopping; The Water hammer and surge can be avoid;

◆ Several sorts of starting mode, wide range setting of the current and voltage. It can be used in a lot of load conditions, so the technic can be improved;

◆ Perfect and reliable protection; The safeguard of the motor and relative equipment can be achieved effectively;

◆ It can be used in the state in which motor should star and stop frequently。

feature

◆ Starting Mode： Based on the load characteristics, different starting mode can the related parameters can be selected. So the best starting effect can be gained;

◆ Technical Performance： The higher performance microprocessor and software are used, so the control circuit is simplified. The best perform speed can gained without the adjustment of the circuit parameters;

◆ Reliability：All the electronic components of this product are selected strictly. Additionally, the main control board is tested in high temperature environment above seventy-two hours. The reliability of this product can be guaranteed

◆ Configuration： The modularization configuration and up-in-down-out wiring mode are adopted. It is easy to used and integrated;

◆ Multi-Protection：The motor protection circuit is not be added if the single product is in used. Because this product have multiple protection function such as Overload; Line fault; Over current; the starting time and so on.So the cost can be reduced,the circuit can be simplified。

◆ Keyboard：Operation of the keyboard is easy. User can set and modify the parameters (for example, starting, stopping running protection) by this keyboard based on the different load

condition

◆ Analog signal: 4-20mA output analog signal is provided;

◆ Actual power setting: When the rate power of Soft Starter is higher than the power of actual load, soft starter can be matched to the actual load by modifying the actual current parameter. So the parameters about starting、running and protection are correct

2.Product Type and Inspection

Each SSN/SSA series soft starter is tested. Only the starter that passes the function and running test can leave the factory. After receiving the equipment, the user should inspect it according the steps described below. Please notify the supplier immediately if you find any problem

◆ Check the nameplate: Check the item(s) nameplate catalog number against the purchase order. Make sure that the equipment you received is matched with the product you ordered。

SSN/SSA series motor soft starter

Type: SSN/SSA

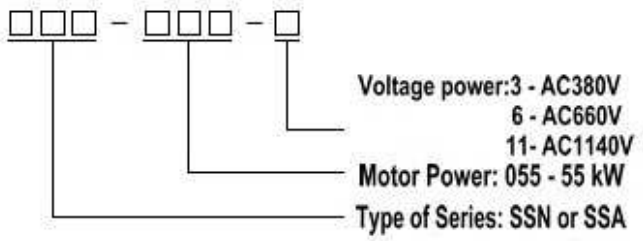
Voltage: 3φ AC380V

Moter Power: KW

Rated Current: A

Factory Number:

Nietz Electric Co.,Ltd



◆ Inspect whether or not the product is damaged through the delivery, for example: Inner parts falls off, She11 is deformed or depressed, the wires is loose etc

◆ Quality certificate and user manual: the package of each soft start includes quality certificate and user manual

3. Environment and Installation

3.1 Environment

The environment is important to the equipment life. So please install the soft starter on the site described below

◆ **Operation Condition for the regular products**

Power Supply: Urban power, self-provided substation, diesel generating sets

Three-phase AC: 380V or 660V or 1140V (-10%, +15%), 50Hz.

(note: voltage level should be matched to the rate voltage of the actually motor, user should explain the voltage level in the purchase order if it is special.)

Motor: Squirrel cage asynchronous motor. (Please explain in the purchase order if it is special)

Start frequency: less than 20 times per hour for Standard products (Please explain in the purchase order if the motor should be start more frequent)

Cooling: Natural air-cooled or Fan air cooling

IP Code:IP20

Environment condition: If the altitude is above 2000 M, user should select the higher power equipment

Environment Temperature: -25℃ to +40℃.

Relative humidity: ≤95% (20℃±5℃) non-condensing, no inflammable, explosive gases, no conducive dust.

Install in an enclosure with good ventilation. The vibration is less than 0.5G

Structure Form: for the SSN series product, bypass contactor should be allocated by user
for the SSA series product, there is inner bypass contactor

◆ **Special conditions**

If unconventional products using in the special conditions is needed, please explain in the purchase order

3.2 Installation

◆ **Direction and Distance**

The product must be vertically installed. There should be enough space to dissipate the heat, as shown in figure 3-1. For the cabinet product, there should be a certain distance between back door of the product and wall. Therefore it is easy to maintain .

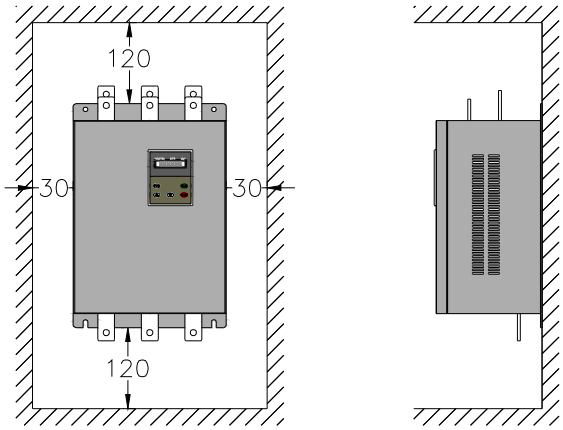


Figure3-1

◆ **Cabinet installation**

If the product is installed in the cabinet, make sure there are good ventilation in the cabinet. The products can be installed vertically or horizontally. Horizontal layout shows in Figure 3-2. Vertical layout shows in Figure 3-3. User can adopt any of them.

Note: If the vertical layout is adopted (especial in fan air cooling mode), a clapboard should be installed between them to avoid that the upper starter is affected by heat generated by the lower starter.

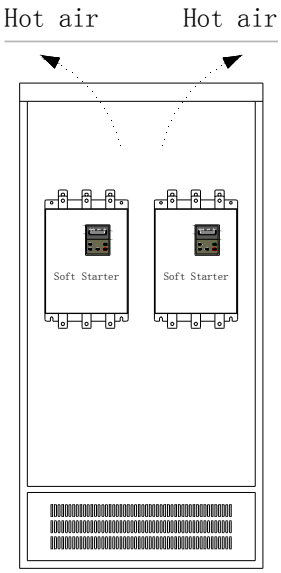


Figure3-2
Horizontal layout

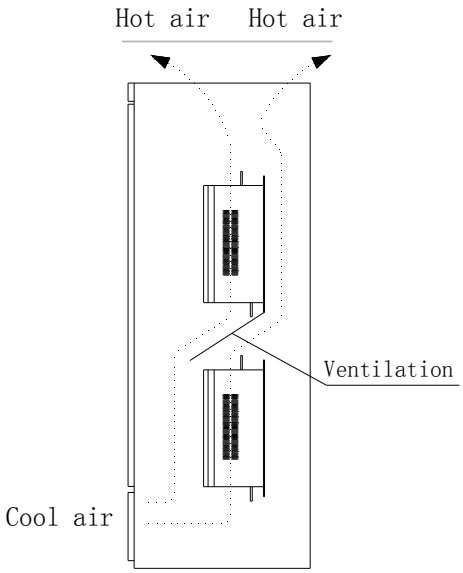


Figure3-3
Vertical layout

4. Operating principle

There are three pairs of anti-parallel thyristors connected to the stator of motor. Using the electric switch feature of the thyristors, the voltage of the motor can be controlled by changing the triggering angel of the thyristors. The triggering angel of the thyristors is controlled by microprocessor. So the motor can be started softer and smooth. After the equipment is up to full voltage, it outputs a bypass signal. User can use this signal to control the bypass contactor to supply the motor. See figure4-1.

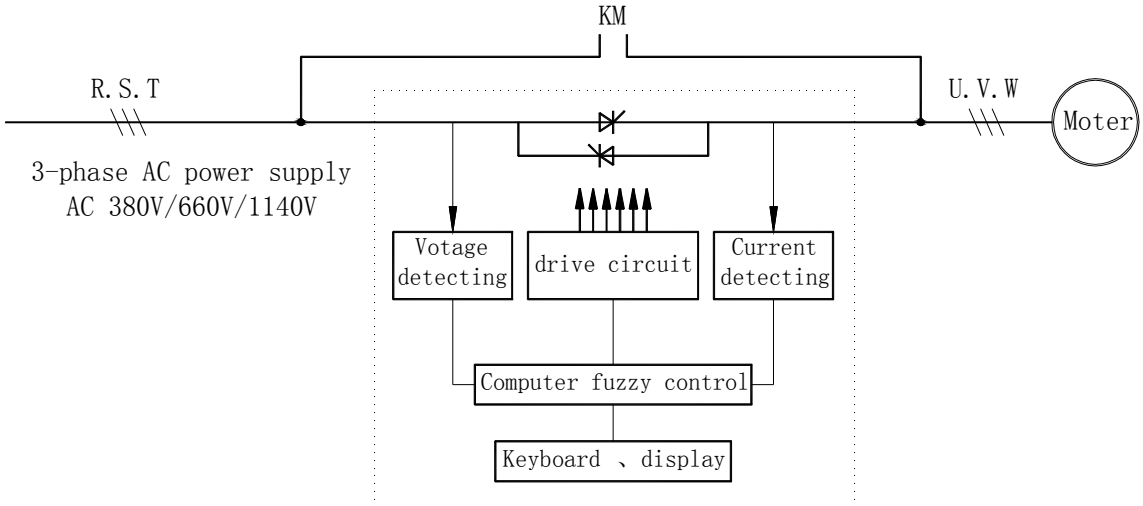


Figure 4-1

5. General wiring and external terminal

5.1 Wiring schematic

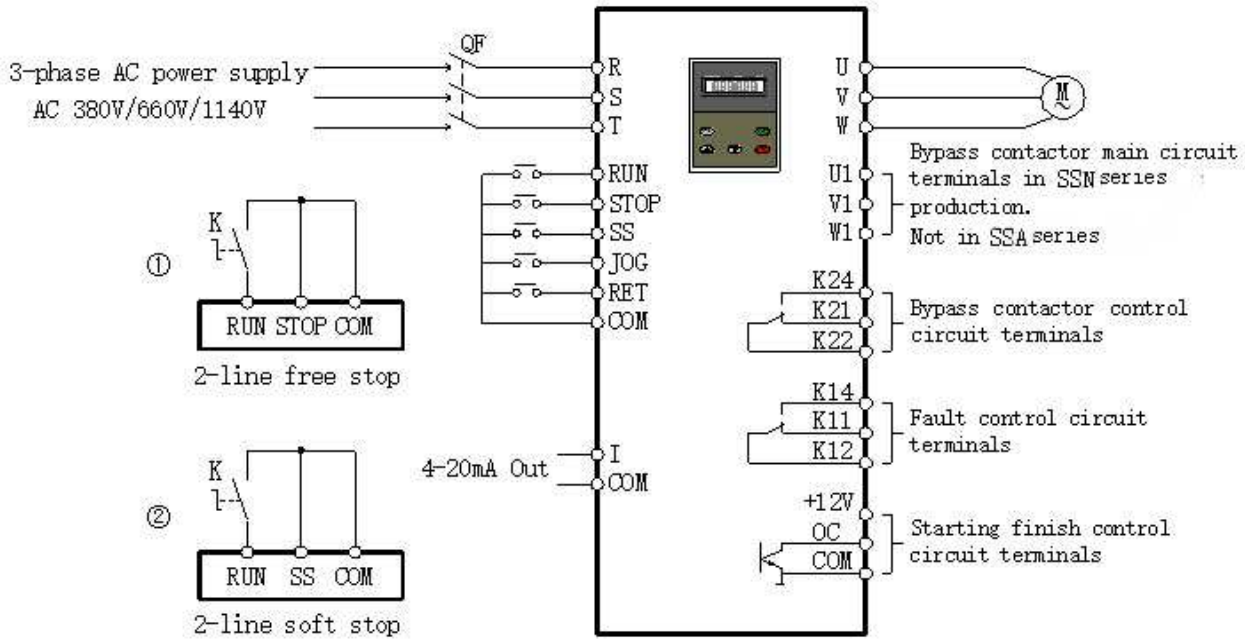


Figure 5-1

Note:

1. There are two wiring ways to control starting and stopping the startor externally. They are three-line and two-line wiring. (See ①and② in the figure above).Start signal is given by connecting terminal RUN and COM. Stop signal is given by disconnecting terminal RUN and COM
   Connect according the figure①, free stop
   Connect according the figure②, soft stop

2. In the SSA series product, there is no terminals U1,V1,W1.Because there is inner bypass contactor。

3. In the SSA series product, the end of start output terminal (+12V/OC) are used interior. it is strictly prohibited to external wiring。

4. In SSA series product, There is build-in bypass contactor. External terminals" L" and" N" are added and External 220V power supply is needed for the product which power is above 90KW.

5.2 External terminals explain

表 5-1

Terminal Name			Terminal function		Explanation	
Main circuit		R.S.T	Input		Connect to three-phase power source through breaker (QF)	
		U.V.W	Output		Connect to three-phase asynchronous motor	
		U1.V1.W1	Bypass		See figure F-6	
Control circuit	Digital input	SS	Soft stop		Connect SS and COM directly, Soft stop①	
		RUN	Start		Connect RUN and COM directly, Start①	
		STOP	stop		Connect STOP and COM directly, Stop①	
		JOG	jog		Connect JOG and COM directly, jog	
		RET	reset		Connect Reset and COM directly, reset the fault	
		COM	common		Logic Ground	
	Digital output	+12V	Internal power supply terminals		Internal output power supply: DC12V,100mA	注③
		OC	Starting end terminals		Starting end: OC Conduction	
		COM	common		Logic Ground	
	analog output	I	4-20Ma output Load input resistance≤ 400Ω		Im=Ie(I-4)/8 **Im:** motor output current (A) **Ie:** motor rate current (A) **I :** 4-20mA output current(mA)	
		COM	4～20mA output reference			
	Relay output	K14	NO	Fault output terminals②	In Fault: K14-K12 close ; K11-K12 open Contacts capacity AC:10A/250V DC:10A/30V;	
		K11	NC			
		K12	COM			
		K24	NO	Bypass terminals②	Starting end: K24-K22close; K21-K22open Contacts capacity: AC:10A/250V 或 5A/380V DC:10A/30V	
		K21	NC			
		K22	COM			

注①: There are two connecting mode, see figure 5-1

注②: Fault,bypass and starting end output terminals are all dry contact。

注③: In the SSA series product, the end of start output terminal (+12V/OC) are used interior.it is strictly prohibited to external wiring。

5.3 Main circuit wiring

There are six power terminals for SSAseries product. R, S, T(Power line) and U, V, W(Motor line).See figure F-5

There are nine power terminals for SSN series product. R, S, T(Power line) and U, V, W(Motor line) and U1,V1,W1(Bypass line).See figure F-6

5.4 Control circuit terminals

There are control circuit terminals on the main control board. This control circuit terminal provides convenience for the user to realize remote control and external signal control. User can connect the corresponding terminals according to the actual state. By setting the parameter, user can select keyboard mode or terminal mode by to control product to start and stop. There are three terminals, X1(10 bit) and X2(6 bit), for detail see figure 5-2 below.

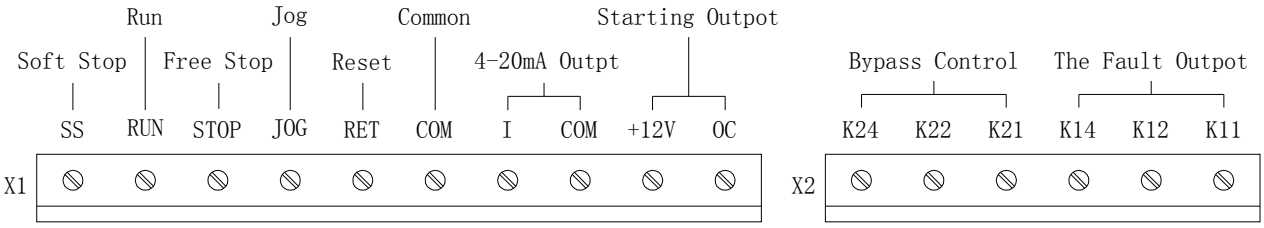
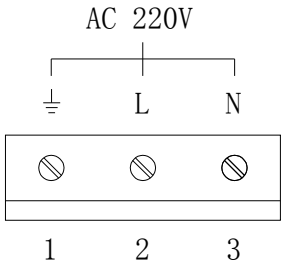


Figure 5-2

Note: For detail see table 5-1

Note:In SSA series product, There is build-in bypass contactor. External terminals” L” and” N” are added and External 220V power supply is needed for the product which power is above 90KW.



6. Control mode

This product has three start modes: Current Limit and Voltage Ramp and jogging. These start modes is independent. Only one of them can be chosen. Text below introduce that the different of them and which mode should be selected.

6.1 Voltage Ramp

The waveform of the voltage shows in Figure 6-1. U1 in figure is initial output voltage. When starting, the output voltage is up to U1 immediately, and then ramps up gradually according to the parameter Start Time “t” setting in advance. Then the motor accelerates continuously. When the output voltage reaches the rate value Ue, the motor reaches the rate speed. Starting process is finished. The Initial Voltage U1 and the Start Time t can be set according to the load. The range of U1 is 5~75%Ue, and the range of t is 1~200s.

This mode is used in the state with large inertia load, or in the state in which the current is not the important parameter but the stability is important. Using the mode, the mechanical stress and starting striking may decreased greatly. The bigger the initial voltage is, the more the initial torque and starting striking is. The time of starting is related to the parameter of “starting time” and load. It is unconcerned with current limited. For detail see chapter 8 and chapter 9.

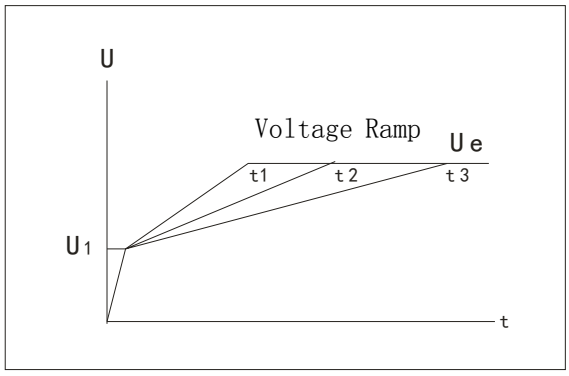


Figure 6-1

6.2 Current Limit

At the Current Limiting mode, the output voltage increases quickly until the output current reaches the limited current value Im. See figure 6-2. And then the output current maintains below this limited value. Then the output voltage is increased gradually, and the motor accelerate gradually; when the motor's speed is close to the rated, the output current decreases quickly to the rated value Ie, the starting is over. The limited current value can be set according to the load instance. The range of this parameter is 0.2-4Ie.

This mode is used in the state in which the current is very important parameter. Special in the state in which the grid capacity is small. The parameter of the current limit multiples should be set 2.5-3. If this value is small, the starting will be abnormal. At this mode, the time of

starting is concerned to the parameter of the current limit multiples. The more this value is, the shorter the time of starting is. Vice versa. For detail see chapter 8 and chapter 9.

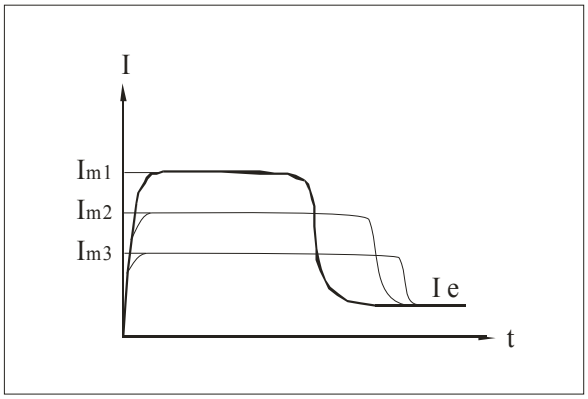


Figure 6-2

6.3 Jogging

At this start mode, the output voltage reaches the initial voltage U1 quickly, and remains unchanged. Changing the U1, the output voltage and torque of the motor will change corresponding. (See figure 6-3). It is convenient to judge the director of the motor.

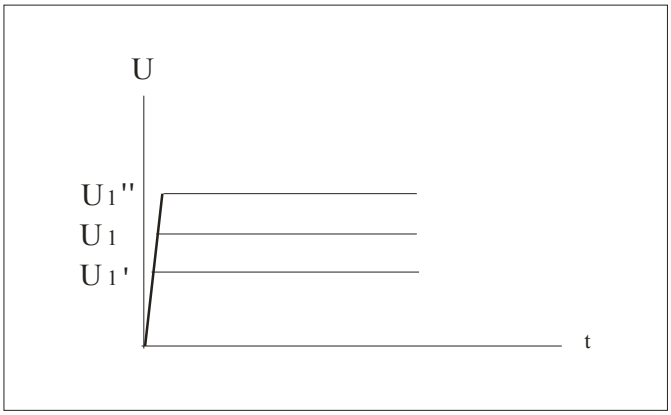


Figure 6-3

6.4 Stop Mode

There are two stop mode, user can set this parameter according to load and working condition.

● Free stop

When receiving the stop signal, the terminals K22,K24 is open, the bypass contactor is disconnect. The trigger signal of the SCR module is close at the same time. Motor inertia stop according the load.

● soft stop

At this stop mode, when receiving the stop signal, the bypass contactor is disconnected. At the same time, motor is controlled through SCR. The output voltage decreases gradually. At last motor stop completely. The stop time is related to the parameter of load and factor of soft stop time. To gain the smooth stop effect, the “soft stop time” should be set carefully.

7. Keyboard

7.1 Keyboard Description

There is a Keyboard on the front of the soft starter. User can operate it to display data, save data, check data, display fault, reset fault, start or stop the motor etc. The construction of the keyboard shows in figure 7-1.

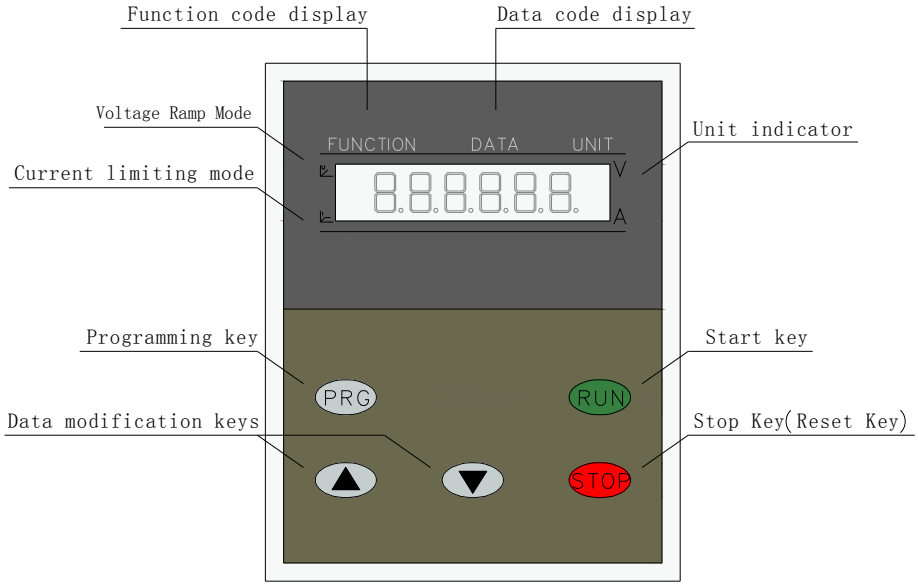


Figure 7-1

7.2 Key Function

There are five key on the keyboard: RUN (start), STOP (stop), PRG (program) ▲ (increase), ▼ (decrease)

● RUN (start): When the system is on ready state Sr8rdy, press this key, the motor start according the start mode user set.

● STOP (stop): When the system is on starting or running state, press this key, the motor stop, then the system enter ready state Sr8rdy. When the system is on setting state, press this key, system enter ready state Sr8rdy, and the parameter user modified is saved at the same time. When the system is on fault state, the fault code shows on the keyboard. Press this key, release it 5 minutes later, system enter ready state Sr8rdy if the fault is deal with.

● PRG(program) : On ready state, press this key, release it 5 minutes later, system enter setting state. On setting state, user can switch between different parameter groups

● ▲ (increase) : On SETTING state, user can increase the parameter value by press this key。

● ▼ (decrease) : On SETTING state, user can decrease the parameter value by press this key。

Note: 1. On SETTING state, press PRG key or STOP key, the modified data are saved automatically.

2. If user selects external control, the keyboard can be taken off after all the parameters set.

8.Parameter function table

Table 8-1

NO.	DISPLAY	Name	Range and mean	The default value	Remarks		
1	A0 8888	Starting mode	1: Ramp▲ 2: limit★ 3:jog■	1	▲	★	■
2	A1 8888	Initial voltage	5%~75% of Supply Voltage	30	▲		
3	A2 8888	Jog voltage	5%~75% of Supply Voltage	30			■
4	A3 8888	Ramp time	(1-120) S	30	▲		
5	A4 8888	Curr. Limit Level	20%~400% of rated current	300		★	
6	A5 8888	Curr. Limit time	(1-120) S	30		★	
7	A6 8888	OverCurr.protect	400%~600% of rated current	400	▲	★	■
8	A7 8888	unbalance factor	5%~50% of present current	30	▲	★	■
9	A8 8888	Control Mode	1: keyboard control 2: external control 3: keyboard and external	3	▲	★	■
10	A9 8888	SCR trigger select	1: close trigger 2: not close trigger 3: close trigger,show b-p②	2	▲	★	
11	Ab 8888	Start overload level	1-8	4	▲	★	
12	Ac 8888	Over running current protect	20%~400% of rated current	200	▲	★	
13	Ad 8888	Stop mode select ①	1: free stop 2: soft stop(ramp)	1	▲	★	
14	Ar 8888	Soft stop time factor	1-10	5	▲	★	
15	IE 8888	rated current	See chapter9.7 and 10	Motor current			
16	Er 8888	Fault	See chapter12				
17	Sr 8rdy	Ready state	User can't modify				

Note: ▲: It is valid at Voltage Ramp mode.。

★: It is valid at Current Limit mode。

■: It is valid at Jogging mode 。

①: Parameter "stop mode select" is valid when control mode is keyboard. If the external control mode is selected, stop mode is determined by external line. For detail see figure 5-1。

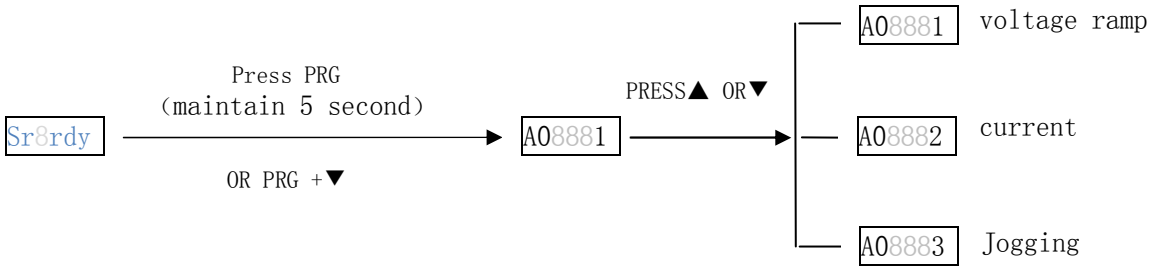
②: If the parameter A9 8888 is set 3, Sr 8b-p displays in the keyboard, and the product can't monitor the state, and the protection is lost.

9.Parameter setting

9.1 Starting mode

On READY state Sr8rdy, press PRG key and release it 5 minutes later (or press PRG and ▼ key at the same time), system enter the Starting mode selecting state A08888. Then press ▲or▼ key to modify the parameter to set the "starting mode code". IF "1" is selected, the lamp on the top-left of the keyboard "voltage ramp" is light, the Starting mode is voltage ramp. If "2" is selected, the lamp on the top-left of the keyboard "current limit" is light, the Starting mode is voltage ramp. If "3" is selected, the starting mode is jogging. Any lamp on the left of keyboard is not light. After the starting mode parameter is selected, press PRG key, other parameter at selected Starting mode can be modified.

For Example:



Note:

Normally the voltage ramp mode and current limit mode are adopted. User can select the Starting mode according to the load type. For the normal load, any of two modes can be adopted. But for big inertia load type, the Voltage Ramp mode is the best choice. The default value is 1 A08881 Voltage Ramp mode.

9.2 parameter setting and inquiry(Voltage Ramp)

If the voltage ramp mode is selected, the flow chart of the related parameters setting is show in figure 9-2

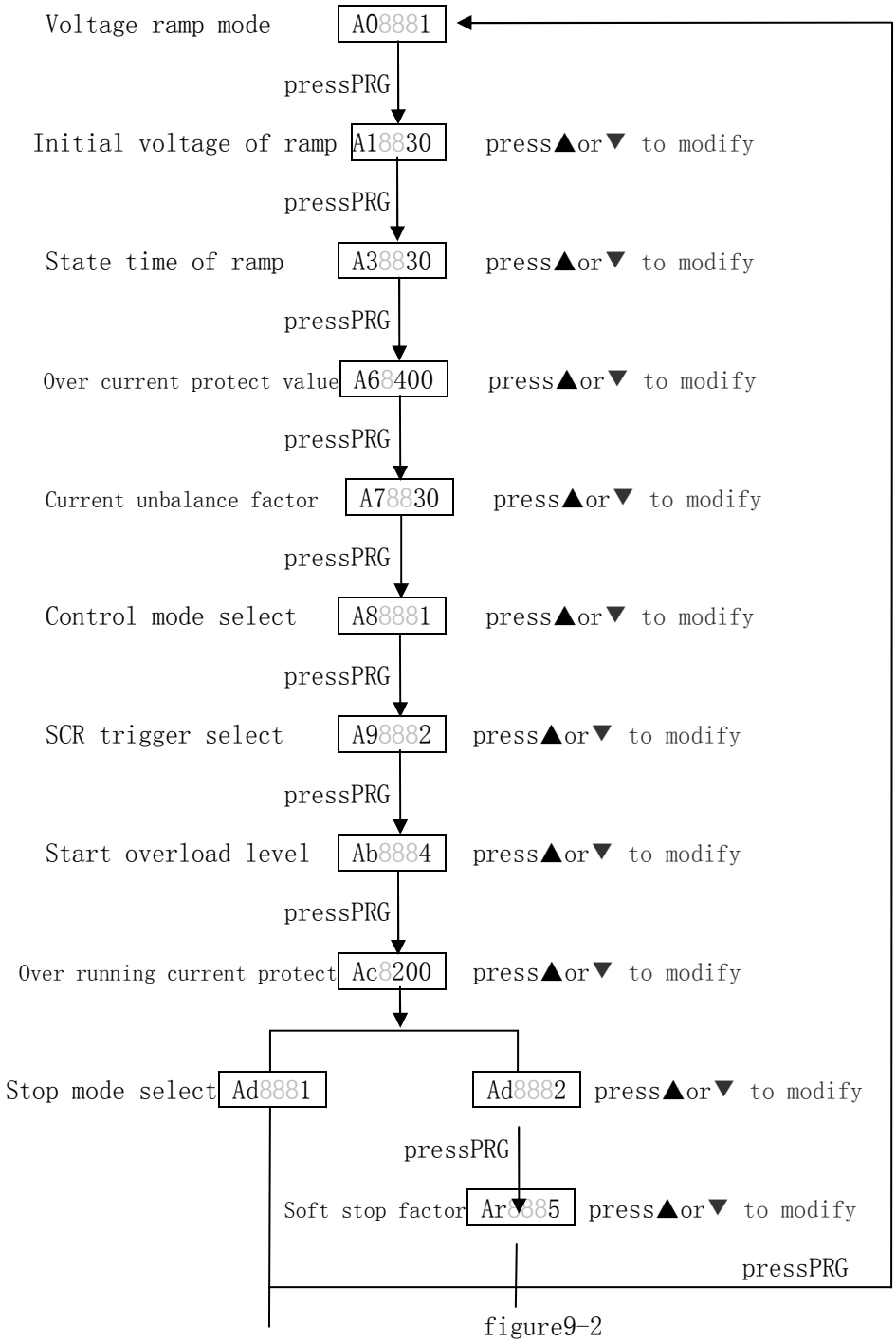


figure9-2

note:

1. When any of one parameter is selected, press whether PRG key (change page) or STOP key to return READY state Sr8rdy, the modified parameters will be saved automatic.

2.When modify any of the parameter, press STOP key to return the READY state Sr8rdy.

9.3 parameter setting and inquiry(Current Limit)

If the Current Limit mode is selected, the flow chart of the related parameters setting is show in figure 9-3。

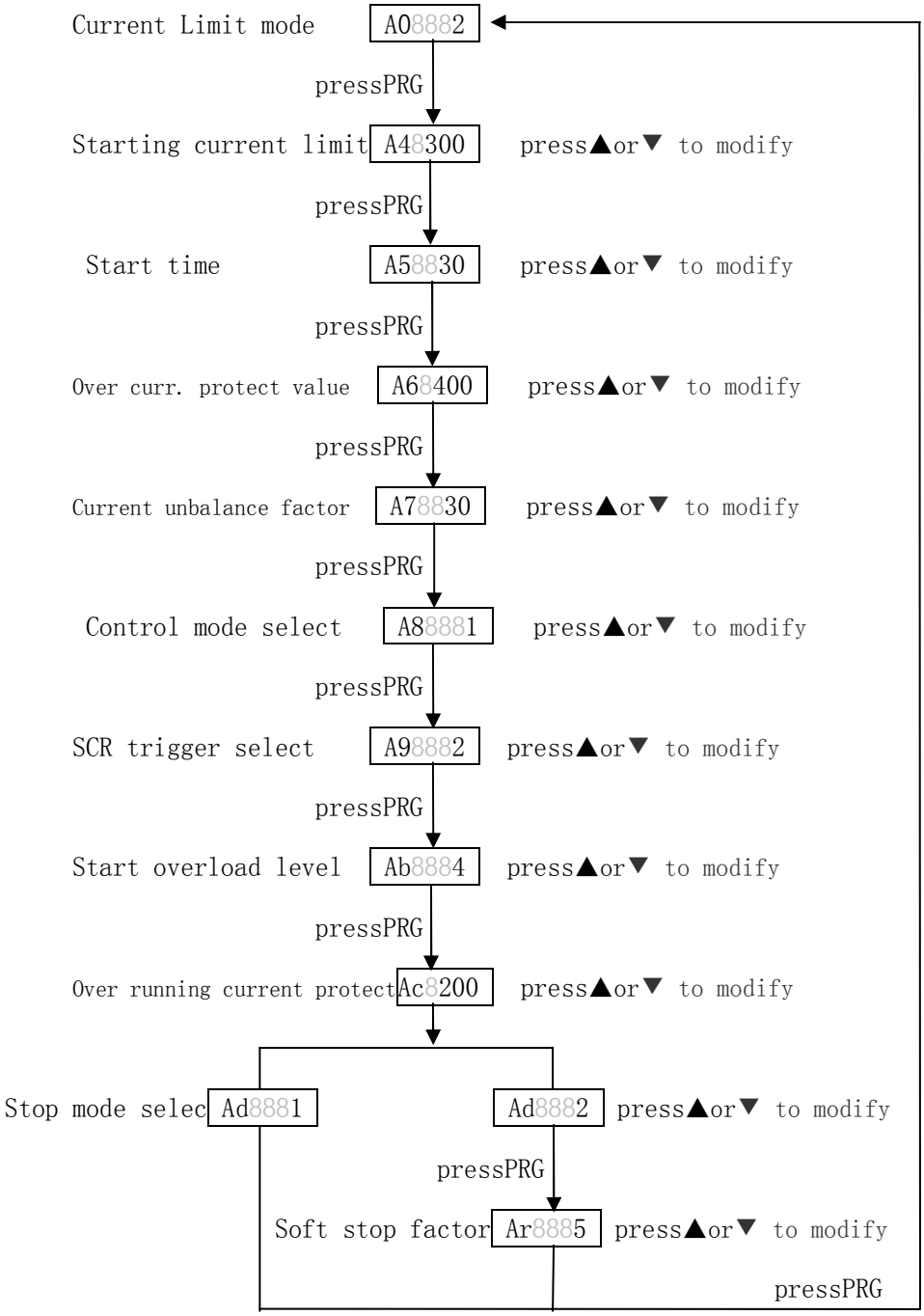


figure9-3

NOTE:

1. When any of one parameter is selected, press whether PRG key (change page) or STOP key to return READY state Srdy, the modified parameters will be saved automatic.
2. When modify any of the parameter, press STOP key to return the READY state Srdy.

9.4 parameter setting and inquiry(Jogging)

The Jogging mode is used in the state of device location and the motor director judged and the 3-phase current balance tested. In Jogging mode, the voltage maintain unchanged. The flow chart of the related parameters setting is show in figure 9-4

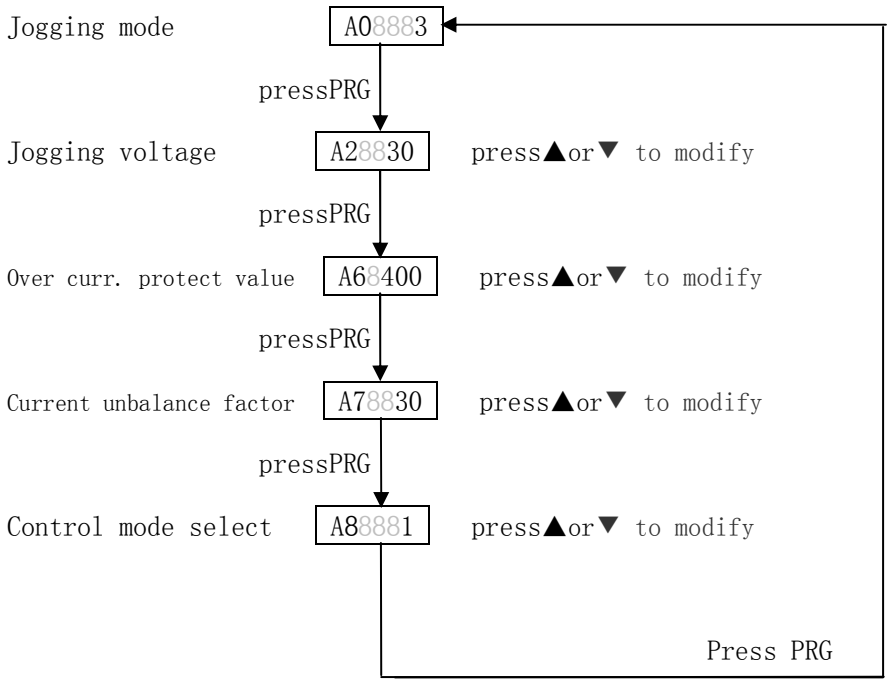


Figure 9-4

NOTE:

1. When any of one parameter is selected, press whether PRG key (change page) or STOP key to return READY state Sr8rdy, the modified parameters will be saved automatic.
2. When modify any of the parameter, press STOP key to return the READY state Sr8rdy.

9.5 Control Mode

There are two ways to start and stop the motor through the soft starter: keyboard control and terminal control. In any way, user can set the parameter according to the situation(see figure 9-2、9-3、9-4). When A88888 shows on the keyboard, press up and down arrow to select the control mode you want.

For Example :

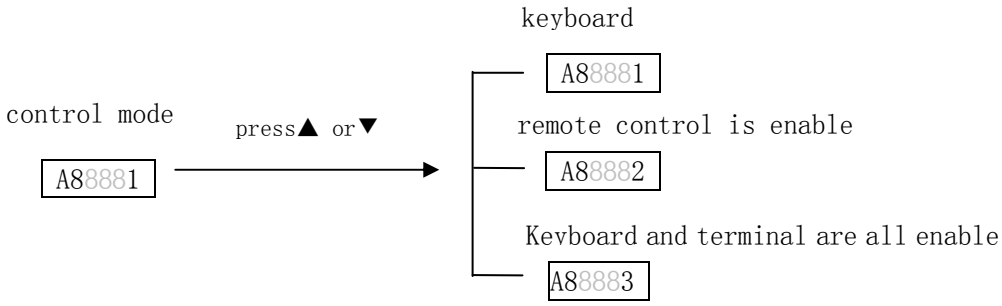


Figure 9-5

NOTE:

1. When modify any of the parameter, press STOP key to return the READY state Srrdy.
2. When the value is set 3 A88883 (keyboard and terminal are all enable), the keyboard control can't work if the two-line connect way is select (see figure 5-1).

9.7 parameter details

A08888	**Starting Mode** There are 3 starting mode. User can set this parameter by keyboard referring to chapter 8-1 and chapter 9.
A18888	**Initial Voltage** This parameter is valid at the Voltage Ramp mode. If the Voltage Ramp mode is selected, the lamp V at the keyboard are light. This parameter indicates that the initial output voltage of the product at the instant of starting and also indicates the initial voltage of the motor (see figure 6-1).The more this parameter is, the more the starting torque is. The default value is 30. For the fan pump load, this parameter should not set bigger. For the load which has bigger static resistance, this parameter can be increased. This parameter can be adjusted between 20-50%. If the Current Limit mode is selected, this parameter is invalid.
A28888	Jogging **Voltage** At this mode, the parameter range is 5-75%. When this parameter is set the lamp V at the keyboard are light. At Jogging mode, the output voltage of this product maintains unchanged(it is the set parameter). If this parameter is too low, the motor may don’ t turn. It’ s normal. User can set this parameter by keyboard referring to chapter 8-1 and chapter 9.4.
A38888	**Ramp Time** This parameter indicates that the maximum time between the beginning of the starting to the end of the starting. The default is 30s.。 If the starting current is not less the 125% of rate current after the time is reached, the soft starter enter the protection state 3s later automatic. This parameter is set according to the load type. For the heavy load and big inertia load type, this value can be increased. For light load type, the starting time may be shorter then the time user set. It is normal if the starting process is all right. This parameter is invalid at the Current Limit mode.
A48888	**Starting Current Limit** At the Current Limit mode, this parameter indicate the maximum current limit during starting. The range of this parameter is 20%~400% of Ie. The default is 300, it means the starting current is the triple of the rate current. When this parameter is set, lame A on the keyboard is light, For the fun and pump load type, it is all right. For other load type, user can modify it according to the character of load type. It is better to set between 250% and 350%. This parameter is invalid at the Voltage Ramp mode.

A58888	**Current Limit Time** The range of Limit Time is 1~120 second at the Current Limit mode. The default is 30。 In the Current Limit Mode, if the actual starting time is longer than this value, and the starting current is not less than the 125% of the motor rate current, system enter the Protection State。
A68888	**Over Current protect at starting and stopping** The range of this parameter is 400~600%Ie. This parameter is set for the protect function aimed at the big current at the starting process. The default value is 400. This parameter should be increased when the inertial of the load is bigger。
A78888	**Current unbalance factor** This parameter is set for the protect function aimed at that the difference of 3 phases current is bigger at running. The default value is 30%.The smaller this parameter is, the more the sensitivity is. This parameter should not is too small, in order to avoid the protection is too sensitive to influence the normal operation of the equipment. Note: This protect function is active only when the average current is bigger than the 20% of the rate current The calculation of the current unbalance factor current unbalance factor △I% = (Imax-Imin) /Iaver Iaver= (Ia+Ib+Ic) /3
A88888	**Control Mode** Modifying this parameter, user can change between the keyboard and terminal easily. The default is 1. It means the keyboard control. If it is set 2, it means the terminal control. If it is set 3, it means the terminal control and keyboard control are all available Note: If it is set 3(the terminal control and keyboard control are all available), the keyboard is invalid ,if two-line way is used. User can set this parameter by keyboard referring to chapter 8-1 and chapter 9.5.
A98888	**SCR trigger select** The operation mode of SCR is decided by it after the bypass contactor is on. 1—when the bypass is on, SCR trigger is blocked. The running current shows on the keyboard, and the protection functions are all on. 2-- when the bypass is on, SCR trigger is not blocked. The running current shows

	on the keyboard, and the protection functions are all on. 3-- when the bypass is on, SCR trigger is closed. The running current doesn't show on the keyboard, and the protection functions are all off. The default value is 2.
Ab8888	**Starting overload level** There are 8 levels. The protection time of every level is different. The relation between overload multiples and protection operation time shows in chapter12.2. The default value is 4 (corresponding to IEC60947-4-2 standard 15 class)。 Note: The overload protection is inverse time after the bypass contactor is on. It isn't selected. For detail see chapter 12.2.
Ac8888	**over current protection during running** This protection function will put into work as soon as the instant current is big. The default value is 200%. It means the protection value is twice as the rate current。
Ad8888	**Stopping mode** There are two stopping mode: soft stop and free stop. The default value is 1-free stop. The soft stop function is for "water hammer". The Free stop is set as normal. For detail see chapter 6.4。
Ar8888	**Soft stop factor** This parameter is valid only when the stopping mode is free stop. It decide the time and effect of the soft stop. The smooth stop effect will be gained if this parameter is set correct

9.8 Special parameter

● Rate Current

The Rate Current indicate that the output current of the soft starter at the rate power. This parameter changes with the output power of the soft starter. For detail see chapter 10. The methods shows below. On READY state Sr8rdy, press ▼ key and not release, IE8888 displays on the keyboard, the unit is ampere. Release this key, system return to READY state.

For Example : rate current is 150A

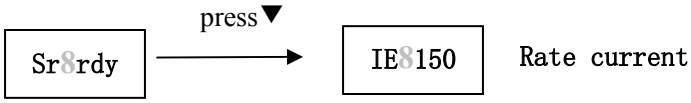


Figure 9-6

● Last Fault

On READY state Sr8rdy, press STOP key and release it 5 minutes later, the last fault code display on the keyboard Er8888. Release the key, return READY state.

For example: the last fault is missing phase

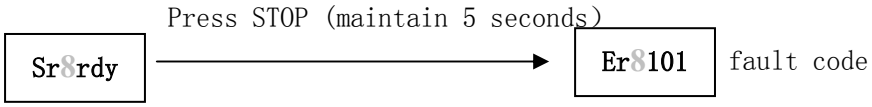


Figure 9-7

9.9 Working State

● **Ready**

When the soft Starter is power on, self-inspection is performed. The self-inspection includes: test the parameters that the user changed (fault protection of parameters setting), check if the phase of voltage is not right (protection of missing supply phase) and check if the system temperature is too high (protection of overheating) etc. Any fault is detected, the system immediately enter FAULT mode. If no fault is detected, the system enter the READY state, and the keyboard panel display Sr8rdysign. At the same time, the lamp on the left of the keyboard is light, it shows which start mode is.

● **Setting**

When soft starter is in the READY state, press the PRG button and keep press this button 5 minutes, or press PRG button and ▼ button at the same time, system enter SETTING state. In this state, use can modify all the parameter. For detail see chapter 9

● **Starting**

When soft starter is in the READY state, and it is allowed to start the motor, then user can press RUN button to start the motor according to the starting mode user set. At the same time, current value shows on the keyboard. At the process of Starting or running, user can press the STOP button at any time to stop the motor, and then the system enter READY state Sr8rdy。

In this state, the system detects the parameter voltage phase, high current suddenly, the time of starting and the system temperature etc. So during the motor is running, soft starter can protect motor.

● **Bypass**

After the starting process completed, the terminals K22,K24 is close automatically. User can control bypass conductor KM by this terminals, then the motor is powered by electric net through the bypass conductor KM. Then the SCR trigger is open or close according to the value of the parameter A 98888 (SCR trigger select) show in table 8-1. The code show on the keyboard is depended this parameter two.(display the current value or Sr8b-p).

● **Fault**

When soft starter is on the process of STARTING, OPERATING and READY state, system monitor all the protect parameter. If the value of measured is over the limited value user set, the trigger signal of the SCR module is cut off, system enters the FAULT state. Fault code shows on the keyboard. The explain of the fault code introduce in the chapter 12.1 “fault display explanation and solutions”

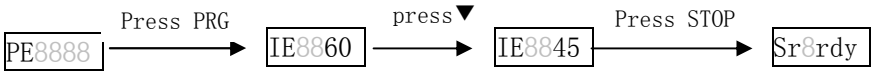
10. Rate Current adjust

The displayed current of each Soft starter is calibrated before leave factory, if user finds the current value showing on the keyboard is not equal to the actual current value, this parameter must be calibrated to ensure the motor can gain the better starting effect and protect function. The way of calibration is that: Before power on, connect terminal RET and COM, then power on, the P shows in the keyboard. Press the key PRG within 5 seconds, and keep press this key until the rate current displays in the keyboard. Press the key ▲or▼ to modify this parameter. Press the key PRG and keep 5 seconds to save and return ready state. Then the rate current is the value user set. Remove the line connect the terminal RET and COM at last.

Note:

This value must be smaller then the default value. The range is 50-100%

For example: adjust the rate current from 60A to 45A



11. Displayed Current adjust

The displayed current of each Soft starter is calibrated before leave factory. If user finds the current value showing on the keyboard is not equal to the actual current value, this parameter must be calibrated.

WAY1:Setting the starting mode to JOGGING, and the motor must be connected to its load, the parameter of JOGGING VOLTAGE is set below 40%, keep press RUN key (enter the JOGGING state), press PRG and up or down key at the same time to modify this value until it is equal to the actual current. Then release the RUN key and PRG key, the modified parameter save automatic.

The other way can be adopted sometimes.

WAY2: At the BYPASS state, press RUN+▲ key or RUN+▼ key, this parameter can be modified to match to the actual current.

12.Fault Protection and Display

There are 11 protections. When the fault is detected, soft starter stop immediately, the fault code displays on the keyboard. User can find the solution by check the explaination to this fault code. After the fault is solved, pres the STOP key(keep 3 seconds) or connect terminal RET and COM to reset and return ready state。For detail see table 12-1

12.1 Fault displaying and Solution

Table 12-1

Code	explaination	Fault reason	Solution
Er8100	Parameter error	Parameter lose	Check the parameter and reset them
Er8101	Phase loss	Power Line is unconnected A phase output open	Check the power line and output line
Er8102	Over current or flug	Current is bigger at starting instant	Check the load Initial voltage is high Current Limit is high
Er8103	Over heat	heat sink is over heat	If the fan is normal If bypass contactor connect reliable
Er8104	Start time exceed the limit value	Load is too heavy Start time is too short	Check the load Increase the start time Increase the current limit
Er8105	overload	Is it overload	If the load current exceed the limit
Er8106	Over current at running	Load increase suddenly Fluctuate of the load is too big.	Adjust the load
Er8107	Current unbalance	Motor have fault The parameter of unbalance factor is too small	Check the motor Reset the parameter of unbalance factor
Er8108	Over current at starting	Current at starting is over the limit	Adjust the limit and protect value
Er8109	Over current at soft stop	Current at soft stop is over the limit	Adjust the limit of current Adjust the protect of current Adjust the soft stop factor
Er8111	interference	External interference	Eliminate interference source

Note:

①: The way of inquire of the last error code shows at the chapter 9.7 “the last fault inquiring.”

②: If the fault appears, user can reset the fault by 3 methods showing below.

2. In fault state, user can reset the fault as following:

- Press STOP key and maintain 3 seconds.
- Connect controlled terminals RET and COM, and maintain 3 seconds.
- Shut down the power and power on again.

12.2 Overload

Overload protection function is in used during the process of starting and running

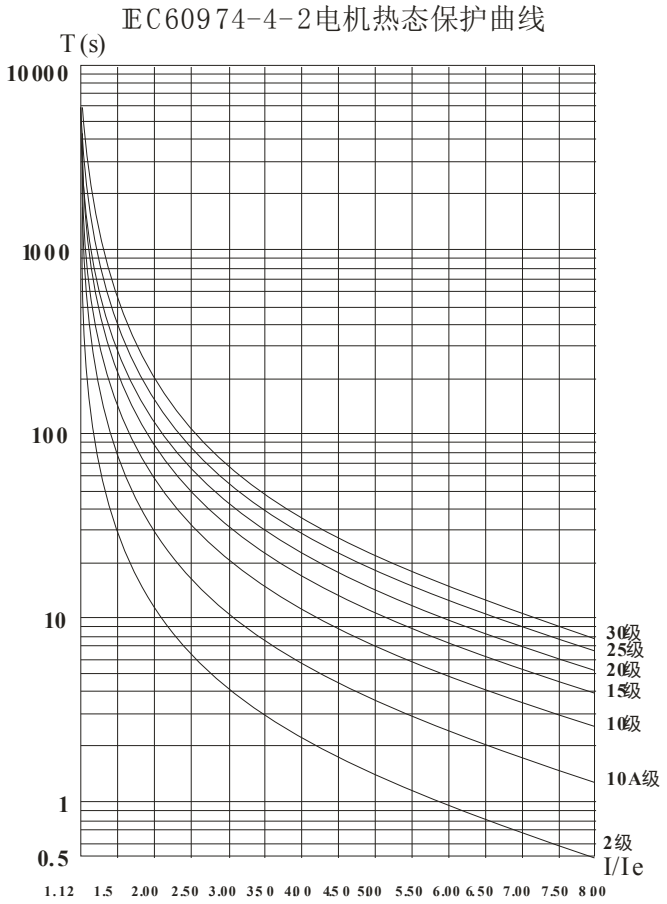
● There are 8 protection levels. The default is 4(same as 15 in IEC60974-4-2 standard). User can set this parameter according to de load situation, the smaller this parameter is, the shorter the starting time of protection is, vice verse.

● The level 2 can’ t be selected(same as 10A in IEC60974-4-2 standard).for detail see the table 12-2 .

Standard curve graph of IEC60974-4-2

Table 12-2

Overload protection levels	IEC60947-4-2	5Ie	4Ie	3Ie	2Ie	1.5Ie	1.2Ie	1.05Ie
1	Class 2	1.5s	2.5s	4.5S	13S	35S	180S	—
2	Class 10A	4s	6S	12S	30S	80S	460S	—
3	Class 10	8s	13S	23S	60S	180S	800S	—
4	Class 15	12s	18S	32S	90S	230S	1200S	—
5	Class 20	16s	25S	46S	130S	320S	1650S	—
6	Class 25	18s	30S	58S	170S	520S	2200S	—
7	Class 30	23s	36S	68S	190S	650S	2800S	—
8	Class Special	28s	45S	82S	224S	—	—	—



13.Test running

● **Inspection before running**

For safe running, user should inspection the items show as following items before power on.

→ Is the power of the soft starter match to that of the motor?

→ Does the insulation of the motor meet the requirement?

→ Is the wiring of power and motor line right?

→ Do all the nut screw tightly

→ Measure the input power (R\S\T) using multimeter, Check whether there is short circuit.

Note: 1. There is linear power transformer between any two phases of power side. Static resistance is about 300Ω.

2. There are fans between any two phases of load side. Static resistance is about 2KΩ.

● **Power on and trial running**

→ When power is on, system enter READY state, Sr8rdy shows on the keyboard means everything is right. There are two lamp on the left of the keyboard to indicate the starting mode(voltage ramp or current limit)。User can select it according to the load.

➢ → If the keyboard display correctly, press RUN key to start the motor, then the actual current displays on the keyboard.

At running state, press STOP key to stop the motor, return to ready state Sr8rdy.

→ During trial running, if the terminal mode is selected, setting parameter A88888 according to chapter 8,table 8-1

→ If the motor is not connected to the output load terminal U、V、W of the soft starter, step above can also be executed. It is used to check wiring of operate system, bypass contactor, all the lamp etc.

● Attention and Safe

→ If any fault is detected, responded fault code will show on the keyboard. See Table 12-1, Please deal with them according to the corresponding tips

→ Warning: If the soft starter is power, don't open the shell cover to avoid electric shock。

→ Warning: At the course of trial running, any abnormal phenomenon is fond, such as: Abnormal sound, Smoking or abnormal smell, user should cut off the power immediately。

→ If the motor is not connected to the output load terminal, power on, voltage can be measured at the output power connections. This is inductive voltage. This is normal phenomenon. This inductive voltage disappears immediately after the motor is connected。

→ During trial running, if the starting effect is not ideal, user can modify the parameter such as starting mode, current, voltage and time etc。

Appendix 1. Specification and Type

SSN/SSA/SSN-G

Table F-1

motor power (KW)	AC 380V			
	Rating current (A)	SSN	SSA	SSN-G
7.5	18	SSN-008-3	SSA-008-3	SSN-008G-3
15	30	SSN-015-3	SSA-015-3	SSN-015G-3
22	45	SSN-022-3	SSA-022-3	SSN-022G-3
30	60	SSN-030-3	SSA-030-3	SSN-030G-3
37	75	SSN-037-3	SSA-037-3	SSN-037G-3
45	90	SSN-045-3	SSA-045-3	SSN-045G-3
55	110	SSN-055-3	SSA-055-3	SSN-055G-3
75	150	SSN-075-3	SSA-075-3	SSN-075G-3
90	180	SSN-090-3	SSA-090-3	SSN-090G-3
110	220	SSN-110-3	SSA-110-3	SSN-110G-3

132	260	SSN-132-3	SSA-132-3	SSN-132G-3
160	320	SSN-160-3	SSA-160-3	SSN-160G-3
187	375	SSN-187-3	SSA-187-3	SSN-187G-3
200	400	SSN-200-3	SSA-200-3	SSN-200G-3
250	480	SSN-250-3	SSA-250-3	SSN-250G-3
280	550	SSN-280-3	SSA-280-3	SSN-280G-3
320	620	SSN-320-3	SSA-320-3	SSN-320G-3
400	780	SSN-400-3	SSA-400-3	SSN-400G-3
450	850	SSN-450-3	SSA-450-3	SSN-450G-3
500	1000	SSN-500-3	SSA-500-3	SSN-500G-3

Note: SSN-G is the standard cabinet, the circuit diagram show in table F-7

Ordering

● Users should inform the agent the information such as product type, specification, and load when ordering, for ensuring what you ordered is proper。

● The SSN/SSA series product is equipped with a bypass contactor terminals. These terminals is used in above bypass connection mode (for detail see Appendix 2) , For the users who wish to use below bypass connection mode, please say it to the supplier when ordering.

Appendix 2: SSA serie Structure Size (Built-in bypass contactor)

Table F-2

Type	Appearance dimension (mm)			Installation dimension(mm)					Sheet copper dimension(mm)					weight Kg	Installation Method
	W1	H1	D	W2	H2	D1	D2	d	W3	W4	H3	D4	d1		
SSA-008-3 ～ SSA-030-3	205	295	235	180	270	138	70	Φ7	63	25	289	3	Φ9	10	Wall-suspending figure F-2
SSA-037-3 ～ SSA-045-3	230	380	250	160	355	153	71	Φ7	63	25	371	3	Φ9	14	
SSA-055-3 ～ SSA-075-3	260	380	266	180	354	173	97	Φ7	75	25	371	3	Φ9	18	
SSA-090-3 ～ SSA-187-3	265	500	248	220	475	75	42	Φ9	78	35	513	8	Φ11	22	

SSA-200-3 ～ SSA-320-3	300	564	248	260	532	88	55	Φ9	95	40	560	8	ϕ13	36	

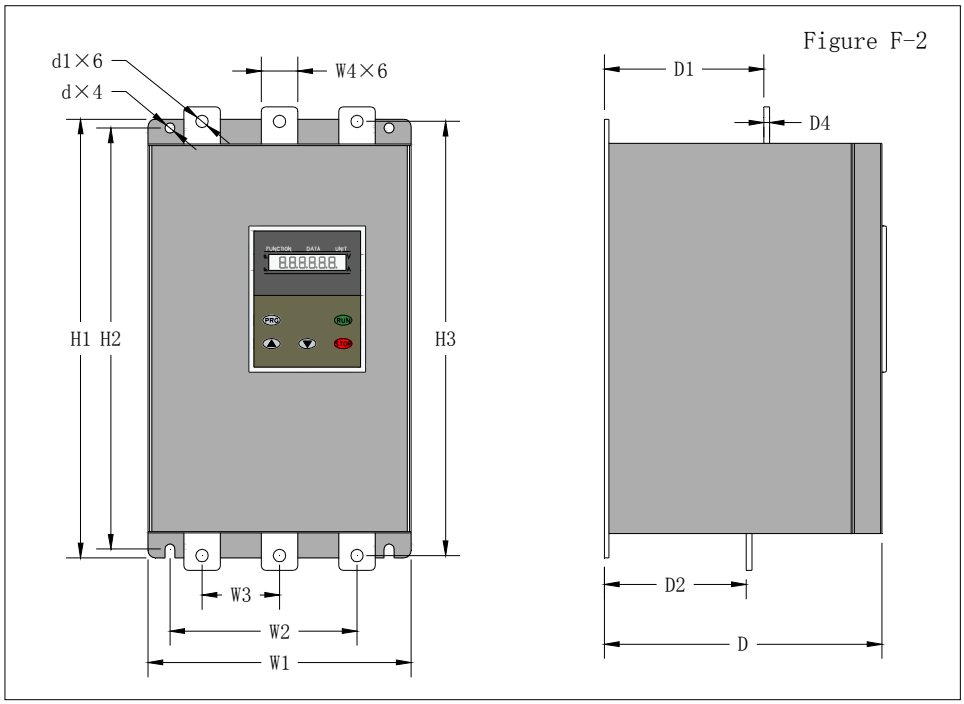


Figure F-2

Appendix 3: SSN serie Structure Size (bypass above)

Table F-3

Type	Appearance Dimension (mm)			Installation dimension(mm)						Sheet copper dimension(mm)					weight Kg	Installation Method
	W1	H1	D	W2	H2	D1	D2	D3	d	W3	W4	H3 H4	D4	d1		
SSN-008-3～ SSN-030-3	180	240	196	165	224	122	92	125	Φ 5.5	53	15	262 282	3	Φ6	6.5	Wall-suspending figure F-3
SSN-037-3～ SSN-075-3	180	240	196	165	224	122	92	125	Φ 5.5	53	20	262 282	3	Φ8	7	
SSN-090-3～ SSN-200-3	274	400	205	230	380	128	73	39	ϕ 8.5	78	30	406 426	5	Φ 10.5	20	
SSN-250-3～ SSN-400-3	304	448	211	270	430	143	89	51	ϕ 8.5	87.5	40	456 486	6	Φ 11	24	
SSN-450-3～ SSN-500-3	472	530	310	400	505	230	55	130	Φ11	150	40	510	5	Φ 11	45	

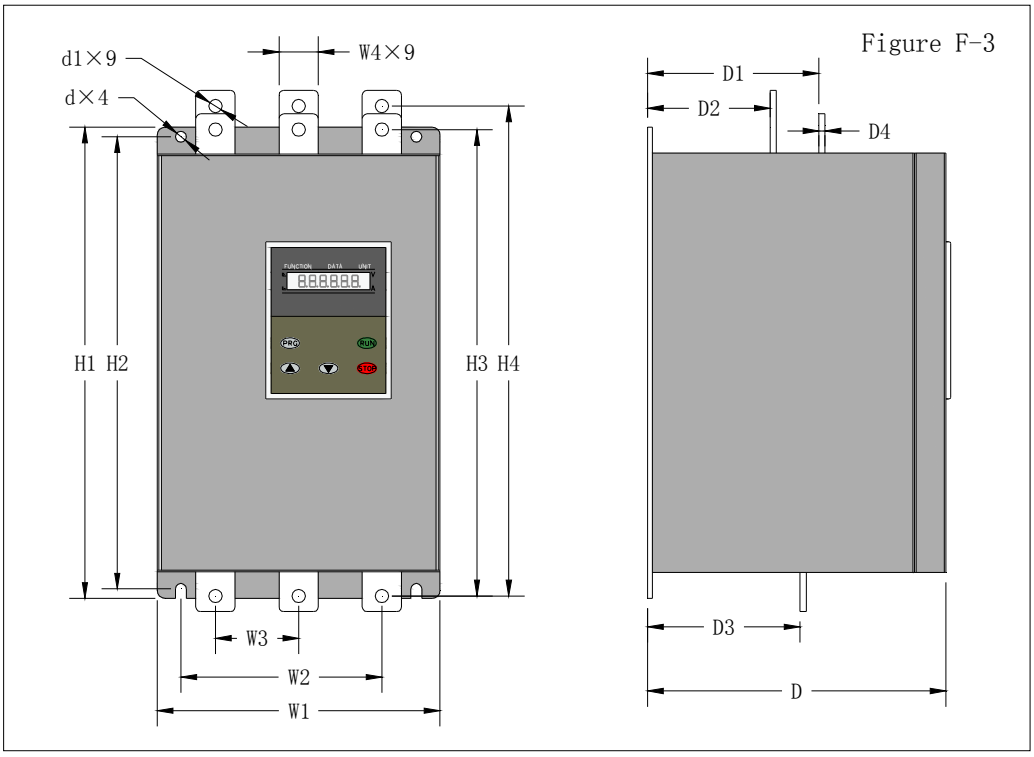
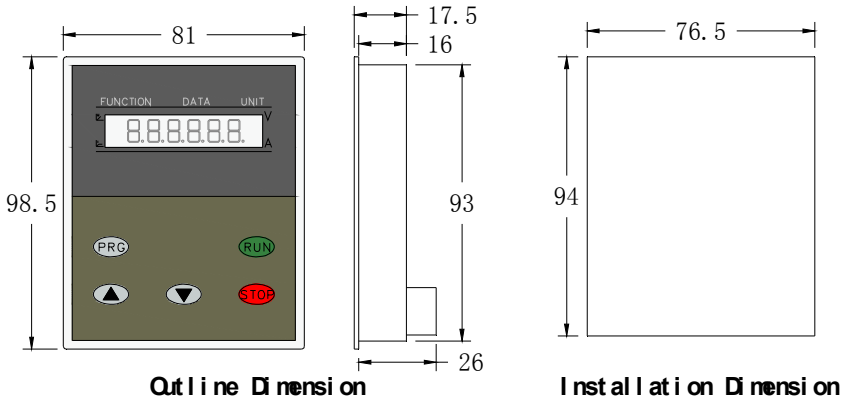


Figure F-3

Appendix 4： Keyboard shape ande Dimension



Outline Dimension Installation Dimension

Appendix5： 200G serie stucture size (bypass above)

表 F-5

Type	Outline Demension(mm)			Installation Demension(mm)			Weight	Installation
	W1	H1	D	W2	H2	d	Kg	Method
SSN-008G-3 ～ SSN-075G-3	560	1800	450	350	240	Φ11	.90	. Cabinet Figure F-7
SSN-090G-3 ～ SSN-160G-3	600	1800	560	390	350	Φ11	130	
SSN-187G-3 ～ SSN-400G-3	700	2000	600	490	390	Φ11	180	
SSN-450G-3 ～ SSN-500G-3	800	2000	600	590	390	Φ11	200	

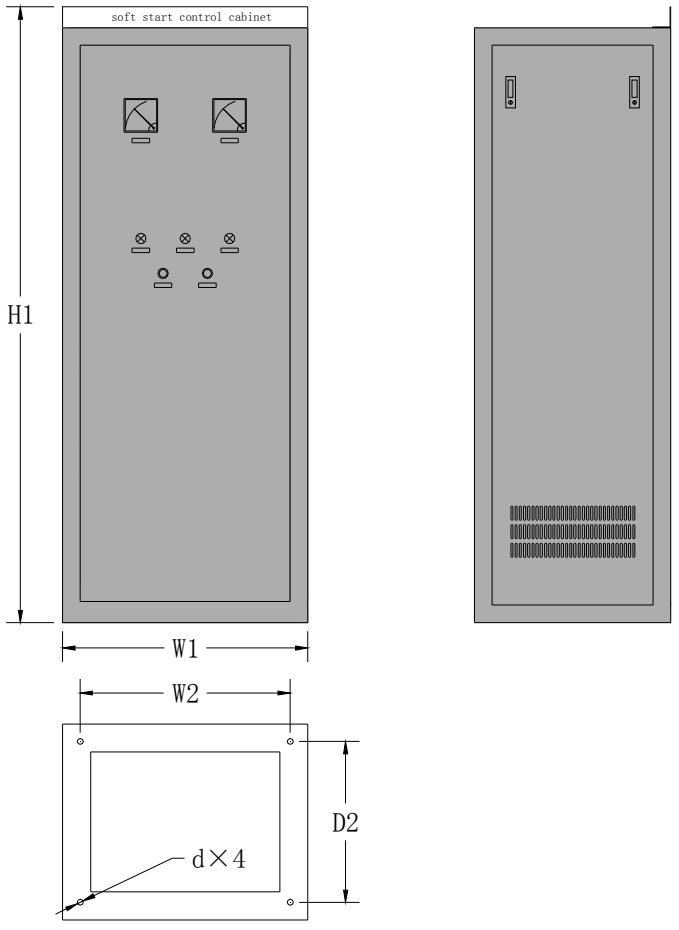
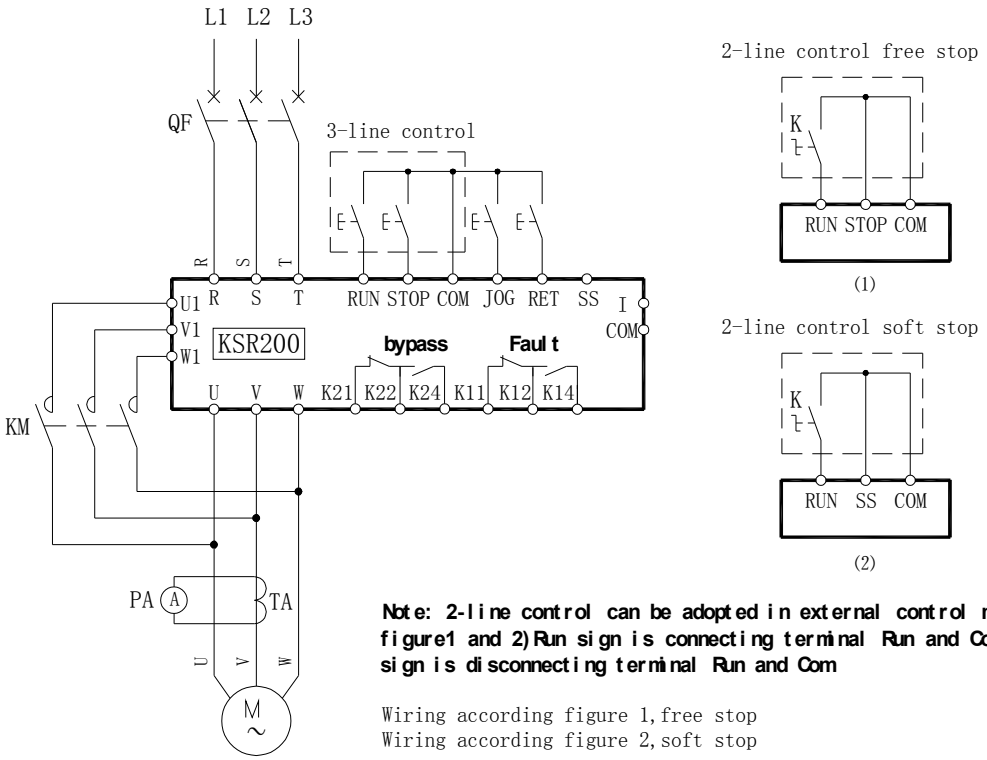


Figure F-7

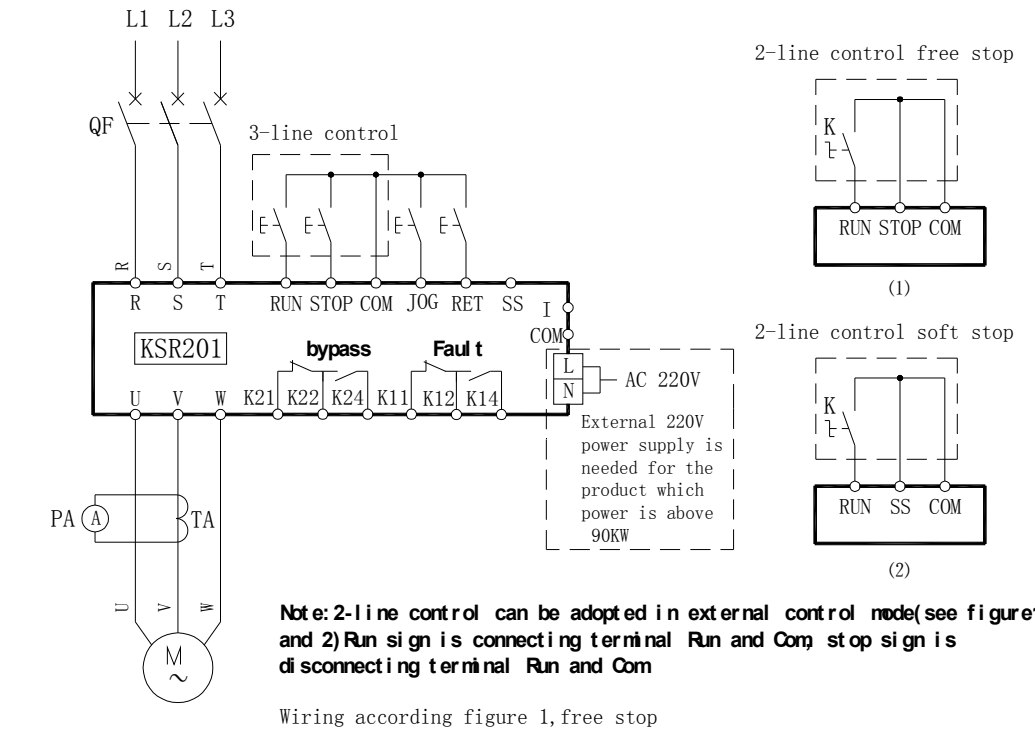
Appendix6： SSB serie Typical wiring diagram



Note: 2-line control can be adopted in external control mode(see figure1 and 2)Run sign is connecting terminal Run and Com, stop sign is disconnecting terminal Run and Com

Wiring according figure 1,free stop
Wiring according figure 2,soft stop

Appendix7: SSA serie Typical wiring diagram

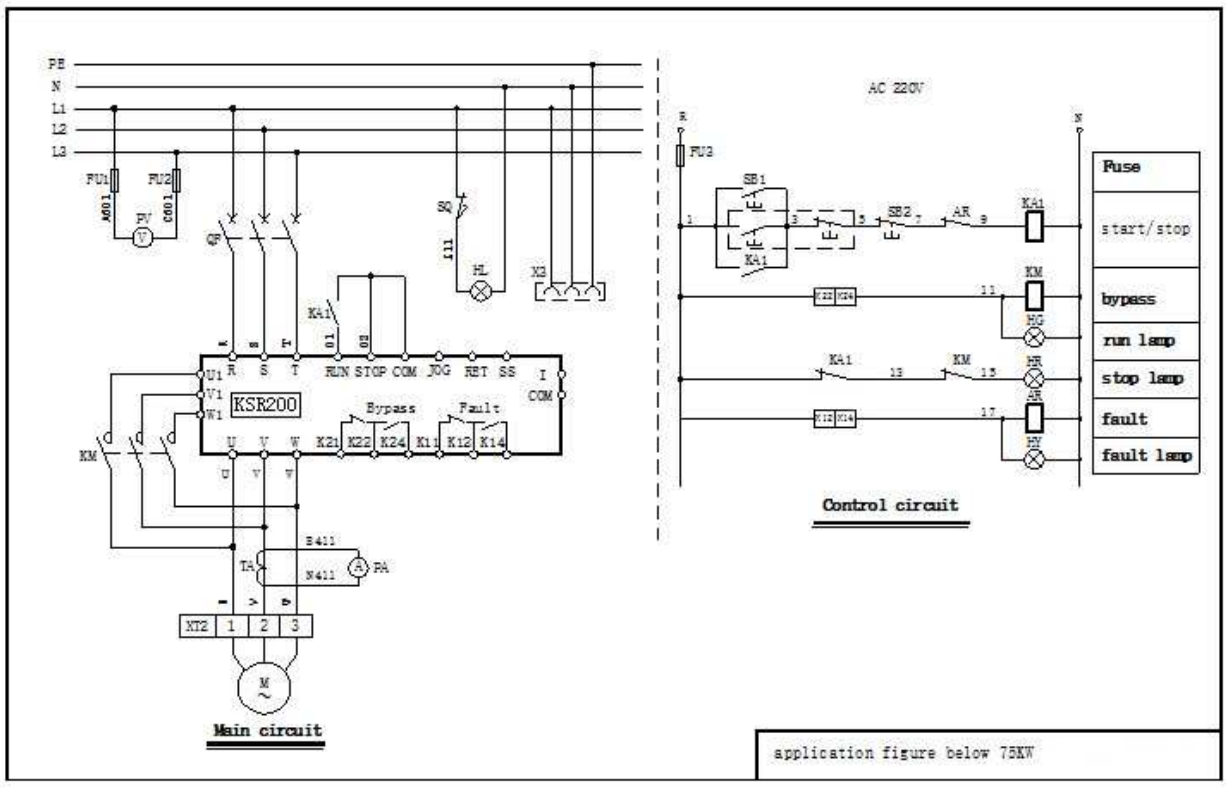


Note:2-line control can be adopted in external control mode(see figure1 and 2)Run sign is connecting terminal Run and Com, stop sign is disconnecting terminal Run and Com

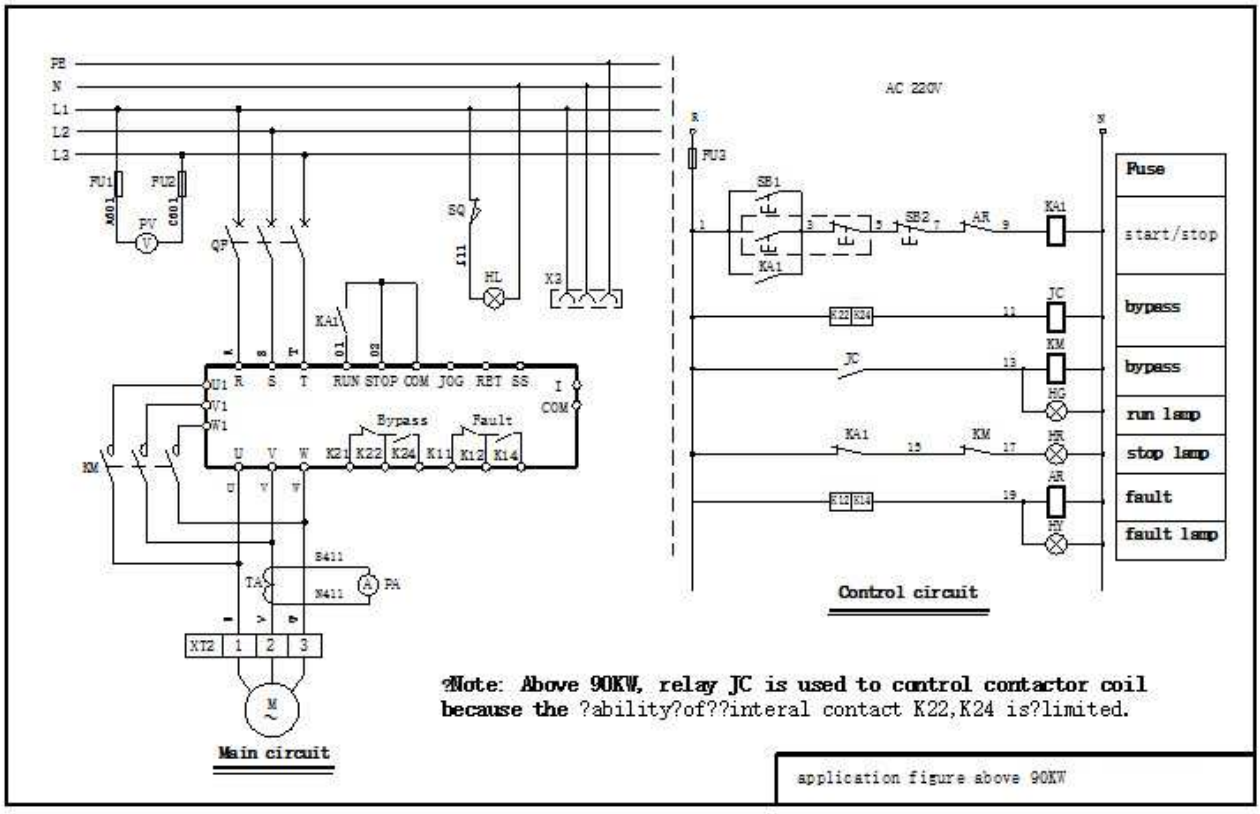
Wiring according figure 1,free stop
Wiring according figure 2,soft stop
Terminals +12V CC have be used in KSR201 series, Prohibit other use

Appendix 8: SSN-G serie Typical wiring diagram

application figure below 75KW in SSN Series



application figure above 90KW in SSN Series



Warranty card

User Name:			
Detail address:			
Zip code:	Type:		
Tel:	Product NO:		
Purchased Date:	Device:		
contacts:	Supplier:		
maintenance company:	contacts:	tel:	
Maintenance date	Maintenance Record		Maintenance man

NIetz Electric Co.,Ltd

Certificate

Type: _____

Product NO: _____

Inspector: _____

The quality of this product is be controled strictly, the assurance department inspected the performance parameters,make sure that it meet the regulation mentioned on the user manuel include in the pakage. Products granted factory

Warranty

We solemnly promises that user can enjoy the after-sale guarantee service show as following since user purchase our product ,

1. This product has 24 months free warranty from the date users buy it. (except the products exported / product with special need / SSN-G series product)
2. user Enjoy the paid service for life from the date you buy the products.
3. escape clause: User can't enjoy the 18 months free warranty, if the Product failure is caused by the following
   - Use can't operate the product in accordance with the User Manual
   - products failure is caused by that Users transform and repair the product without communication with us
   - product failure is caused by that the product is used at the environment which exceeding the range of Regulations
   - Abnormal aging and failure of products are caused by that it use in the bad environment
   - product failure is caused by the irresistible cause such as earthquake fire flooding wind lightning abnormal voltage, or other natural disasters
   - product failure is caused by that Users select the Improper way of transportation. or caused by fall damage or other external forces invaded(User select reasonable way of transportation, we assist to handle the formalities)
4. In the following cases, we shall have the right not to provide warranty service
   - Brand 、trademark、 serial number 、plate can't be recognizable
   - Users did not pay the payment for goods according to the sales contract signed by both parties
   - Users conceal Incorrect use in the the process of Wiring installation operation and maintenanceproducts and others

Nietz Electric Co.,Ltd

Atention: Data Download

Related information about KSR series soft starter, please refer to our company website

www.nietz.cn

download the information you need by clicking on the "download center" in the menu bar

data content:

User manual

Sample

design manual

Typical application diagram collection (*.CAD)

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