MSS1000 Series User Manual

Soft Starter

Model: MSS1000/ □□□-□-□

3AC 220V 22 -280KW

3AC 380V 5.5 -800KW

3AC 660V 18.5-630KW

Please hand the manual to ultimate user, and keep it for future reference

Preface

Thank you for choosing the LCD intelligent soft starter produced by our company. In order to give full play to the function of this product, before using, please read this manual carefully. Please operate and use correctly according to the procedures and ensure the safety of the operator. When you find difficult problems in use or this manual cannot provide solutions, Please contact our company or local agents and dealers, We will serve you wholeheartedly.

Safety precautions

- The soft start shall be installed or guided by professional technicians.
- The power and specification of the motor shall be matched with the soft start as far as possible.
- It is forbidden to connect capacitors at the output end (u.v.w) of soft start.
- The input and output connecting wires with the soft starter shall be wrapped with insulating tape.
- The shell of soft starter must be reliably grounded.
- During equipment maintenance, the input power must be cut off first.
- The internal circuit board has high voltage. Do not repair it by nonprofessionals.

Contents

Chapter 1 Function and Features

The soft Starter is a new type of motor starting equipment which is designed and produced with power electronic technology, microprocessor technology and modern control theory. This product can effectively limit the starting current of asynchronous motor when starting. It can be widely used in fans, pumps, conveyors, compressors and other loads. It is an ideal replacement product for traditional star/triangle conversion, self-lotus voltage-reducing, magnetic control voltage-reducing and other voltage-reducing starting equipment.

1.1 Function

1. Reduce the starting current of the motor, reduce the distribution capacity and avoid capacity investment.
2. Reduce the starting stress and prolong the service life of motor and related equipment. The smooth starting and soft stopping can avoid the surge and water hammer effect of traditional starting equipment.
3. A variety of starting mode and wide range of current, voltage settings, can adapt to a variety of load occasions, improve the process.
4. Improve the reliable protection function, more effective protection of motor and Related Equipment Safety.
5. Can be used for frequent starting and stopping occasions.

1.2 Features

1. The MSS1000 series soft starter uses high performance microprocessor technology for higher performance and wider voltage adaptation.
2. 3 kinds of starting mode can be chosen, which can make the motor realize the best starting effect.
3. Two parking mode can be chosen: Free Parking, soft parking.
4. On-line type and by-pass type can be set freely.
5. Two independent programmable output relays: It is convenient to realize interlock control with other devices, and has delay action function, delay time is adjustable.
6. The three-phase current value can be displayed at the same time, and the current value can be calibrated independently.
7. Large screen LCD machine interface, Chinese (Chinese display) and English two display modes, easy to operate.
8. Multiple protection monitoring functions, heat overload protection according to load requirements adjustable grade, multiple protection functions can be opened and closed independently.
9. The last 12 failure records can be checked to provide the basis for failure analysis.
10. A set of 4 ~ 20mA (0 ~ 20mA) analog outputs.
11. MODBUS RTU communication (RS485) is available. You can set parameters, operate and monitor by computer software.
12. Actual Power Setting: When the power of the soft starter is larger than the actual load power, the rated current of the soft starter can be set according to the actual load to match the actual power of

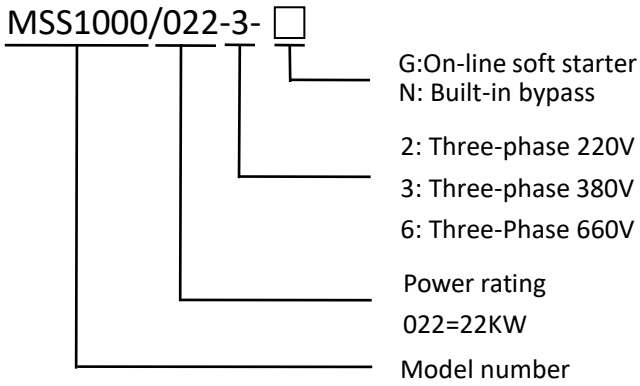
the soft starter with the load, to ensure the start, operation, protection and other parameters of the accuracy.

Chapter 2 Product Information

Before leaving the factory, all the unctions and running tests of each soft starter are carried out. After receiving the equipment, users should check the following steps. If you find any problem, please contact the supplier immediately.

2.1 Model Description

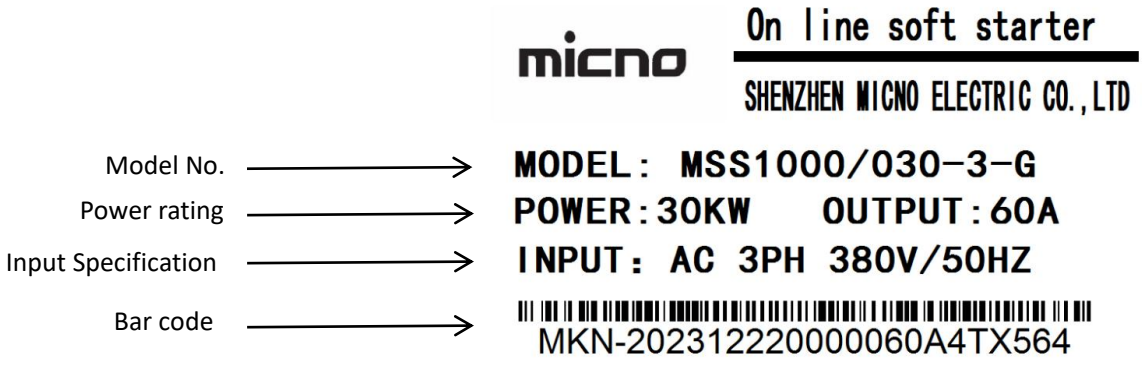
CHECK THE PRODUCT NAMEPLATE: Make sure the goods you received are in accordance with the products you ordered.



Check whether the product is damaged during transportation, such as: internal parts falling off, Shell sinking, deformation and line falling off.

Product qualification certificate an Operation Manual: Each soft starter is provided with one product qualification certificate and one operation manual.

2.2 Description of Nameplate



2.3 Selection Guide

Table 2-1 MSS1000 Series On-line Soft Starter Model and Technical Data

Model	motor		Rated Output Current	Size(W*H*D)
	KW	HP	(A)	(mm)
3AC 380V-415V±15%				
MSS1000/011-3-G	11	15	24	156*298*190
MSS1000/015-3-G	15	20	30	
MSS1000/018-3-G	18.5	25	39	
MSS1000/022-3-G	22	30	45	
MSS1000/030-3-G	30	40	60	
MSS1000/037-3-G	37	50	75	
MSS1000/045-3-G	45	60	90	
MSS1000/055-3-G	55	75	110	
MSS1000/075-3-G	75	100	150	
MSS1000/090-3-G	90	125	180	390*430*237
MSS1000/115-3-G	115	150	230	
MSS1000/132-3-G	132	175	260	
MSS1000/160-3-G	160	210	320	
MSS1000/185-3-G	185	250	370	390*490*237
MSS1000/200-3-G	200	260	400	
MSS1000/220-3-G	220	300	440	
MSS1000/250-3-G	250	330	500	390*545*237
MSS1000/280-3-G	280	370	560	
MSS1000/320-3-G	320	420	630	
MSS1000/400-3-G	400	530	800	
MSS1000/500-3-G	500	660	998	453*692*310
3AC 660V-690V±15%				
MSS1000/018-6-G	18.5	25	22	156*298*190
MSS1000/022-6-G	22	30	30	
MSS1000/030-6-G	30	40	37	
MSS1000/037-6-G	37	50	44	
MSS1000/045-6-G	45	60	54	
MSS1000/055-6-G	55	75	66	
MSS1000/075-6-G	75	100	90	
MSS1000/090-6-G	90	125	110	390*430*237
MSS1000/115-6-G	115	150	140	
MSS1000/132-6-G	132	175	160	
MSS1000/160-6-G	160	210	200	
MSS1000/185-6-G	185	250	220	390*490*237

MSS1000/200-6-G	200	260	240	390*490*237
MSS1000/220-6-G	220	300	270	
MSS1000/250-6-G	250	330	300	390*545*237
MSS1000/280-6-G	280	370	340	
MSS1000/320-6-G	320	420	370	
MSS1000/400-6-G	400	530	500	
MSS1000/500-6-G	500	660	600	453*692*310
MSS1000/630-6-G	630	840	760	

Table 2-2 MSS1000 Series Bypass Soft Starter Model and Technical Data

Model	motor		Rated Output Current	Size(W*H*D)
	KW	HP	(A)	(mm)
3AC 220V-240V±15%				
MSS1000/022-2	22	30	75	145*273*168
MSS1000/030-2	30	40	110	
MSS1000/037-2	37	50	125	
MSS1000/045-2	45	60	150	
MSS1000/055-2	55	75	180	260*435*205
MSS1000/075-2	75	100	250	
MSS1000/090-2	90	125	320	
MSS1000/115-2	115	150	370	
MSS1000/132-2	132	175	440	290*465*205
MSS1000/160-2	160	210	530	
MSS1000/185-2	185	250	610	
MSS1000/200-2	200	260	700	
MSS1000/220-2	220	300	770	
MSS1000/250-2	250	330	880	330*480*205
MSS1000/280-2	280	370	980	
3AC 380V-415V±15%				
MSS1000/011-3	11	15	24	145*273*168
MSS1000/015-3	15	20	30	
MSS1000/018-3	18.5	25	39	
MSS1000/022-3	22	30	45	
MSS1000/030-3	30	40	60	
MSS1000/037-3	37	50	75	
MSS1000/045-3	45	60	90	
MSS1000/055-3	55	75	110	
MSS1000/075-3	75	100	150	
MSS1000/090-3	90	125	180	260*435*205
MSS1000/115-3	115	150	220	

MSS1000/132-3	132	175	270	260*435*205
MSS1000/160-3	160	210	320	
MSS1000/185-3	185	250	365	
MSS1000/200-3	200	250	400	
MSS1000/220-3	220	260	440	290*465*205
MSS1000/250-3	250	300	500	
MSS1000/280-3	280	330	560	
MSS1000/320-3	320	420	640	
MSS1000/400-3	400	530	800	330*480*205
MSS1000/500-3	500	660	1020	
MSS1000/630-3	630	840	1200	330*520*205
3AC 660V-690V±15%				
MSS1000/030-6	30	40	36	145*273*168
MSS1000/037-6	37	50	44	
MSS1000/045-6	45	60	54	
MSS1000/055-6	55	75	66	
MSS1000/075-6	75	100	90	
MSS1000/090-6	90	125	108	260*435*205
MSS1000/115-6	115	150	132	
MSS1000/132-6	132	175	158	
MSS1000/160-6	160	210	192	
MSS1000/185-6	185	250	222	
MSS1000/200-6	200	260	240	
MSS1000/220-6	220	300	264	
MSS1000/250-6	250	330	300	290*465*205
MSS1000/280-6	280	370	336	
MSS1000/320-6	320	420	384	
MSS1000/400-6	400	530	480	330*480*205
MSS1000/500-6	500	660	600	

Table 2-3 MSS1000 Series Built-in Bypass Soft Starter Model and Technical Data

Model	motor		Rated Output Current	Size(W*H*D)
	KW	HP	(A)	(mm)
3AC 380V-415V±15%				
MSS1000/011-3-N	11	15	22	180*340*178
MSS1000/015-3-N	15	20	30	
MSS1000/018-3-N	18.5	25	37	
MSS1000/022-3-N	22	30	45	
MSS1000/030-3-N	30	40	60	
MSS1000/037-3-N	37	50	75	

MSS1000/045-3-N	45	60	90	180*340*178
MSS1000/055-3-N	55	75	110	
MSS1000/075-3-N	75	100	150	
MSS1000/090-3-N	90	125	180	312*585*205
MSS1000/115-3-N	115	150	230	
MSS1000/132-3-N	132	175	260	
MSS1000/160-3-N	160	210	320	
MSS1000/185-3-N	185	250	370	
MSS1000/200-3-N	200	260	400	
MSS1000/220-3-N	220	300	440	348*634*228
MSS1000/250-3-N	250	330	500	
MSS1000/280-3-N	280	370	560	
MSS1000/320-3-N	320	420	630	
MSS1000/400-3-N	400	530	800	641*465*228
3AC 660V-690V±15%				
MSS1000/030-6-N	30	40	36	180*340*178
MSS1000/037-6-N	37	50	45	
MSS1000/045-6-N	45	60	54	
MSS1000/055-6-N	55	75	66	
MSS1000/075-6-N	75	100	90	
MSS1000/090-6-N	90	125	110	312*585*205
MSS1000/115-6-N	115	150	140	
MSS1000/132-6-N	132	175	160	
MSS1000/160-6-N	160	210	200	
MSS1000/185-6-N	185	250	220	
MSS1000/200-6-N	200	260	240	
MSS1000/220-6-N	220	300	270	348*634*228
MSS1000/250-6-N	250	330	300	
MSS1000/280-6-N	280	370	340	
MSS1000/320-6-N	320	420	400	

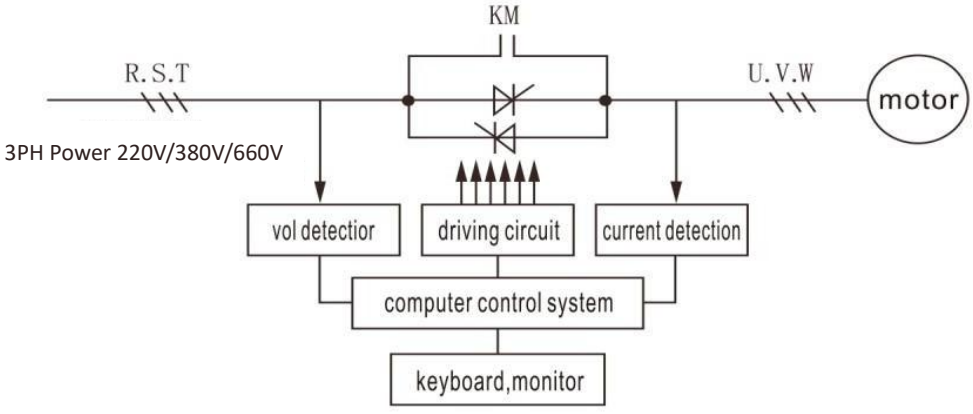
Chapter 3 Conditions of Use and Installation

The service condition has certain influence to the soft starter's normal service and the service life, therefore please installs the soft starter in the place which meets the following service condition.

Power supply: Grid Power, self-contained power stations, diesel generator;
Input voltage: AC: 220V, 380V, 660V (- 15% ~ + 15%) , 50Hz/60hz;
Applicable motor: General squirrel-cage Induction Motor (please specify when ordering winding motor) ;
Starting times: The Standard Products recommended to start and stop no more than 15 times per hour;
Cooling mode: Forced Cooling (on-line thyristor)/Natural Cooling (by-pass) ;
Installation: Wall hanging type, Cabinet Body Type;
Conditions of use: the intelligent soft starter should be equipped with bypass contactors;
Protection level: IP20 (55KW and below)/IP00 (75KW and above);
Environmental conditions: altitude blow 2000 meters, more than 2000 meters to reduce capacity use; the ambient temperature is between -25°C and 40°C;
Relative humidity: not more than 95%(20 °C ± 5 °C);
Pollution Environment: no flammable,explosive, corrosive gases, no conductive dust; Ventilation vibration: Indoor installation, good ventilation, vibration less than 0.5 g.

Chapter 4 How It Works

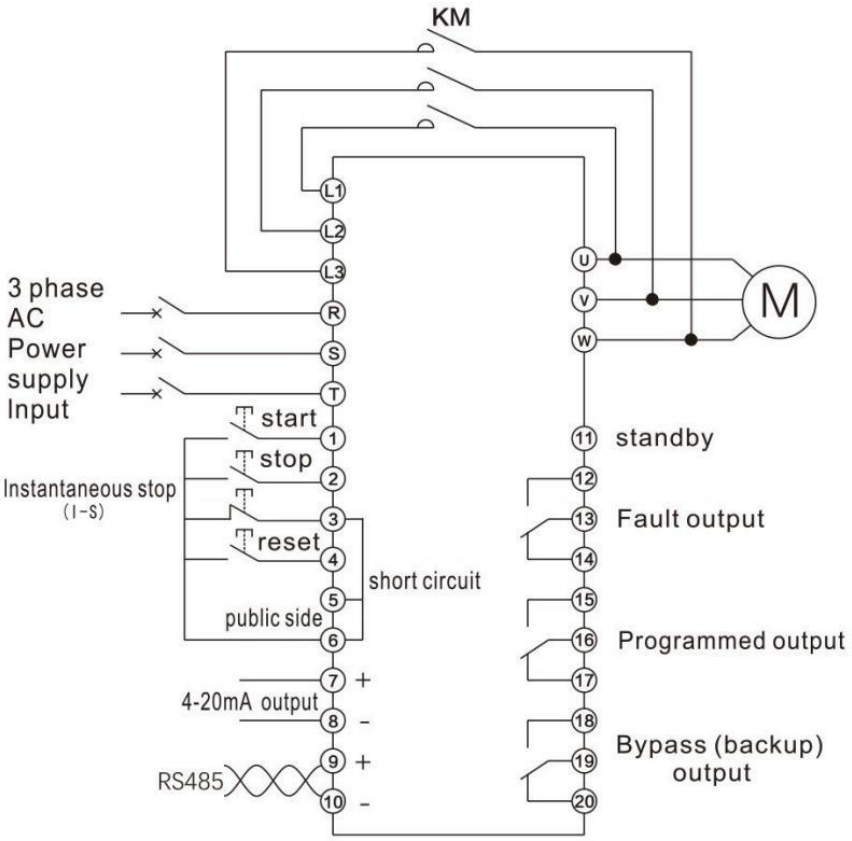
The MSS1000 series soft starter uses three pairs of anti parallel thyristors connected in series to the electronic circuit of the AC motor. By using the function of electronic switch of thyristor and controlling the change of trigger angle of thyristor by microprocessor, the opening degree of thyristor can be changed, thus the input voltage of motor can be changed, so as to control the soft starter of motor. When the starting is completed, the soft starter output reaches the rated voltage. At this point, the three-phase by-pass contactor KM is automatically controlled by the by-pass control signal, and the motor is put into power grid operation.



figuer 4-1

Chapter 5 Basic Connection and external terminal

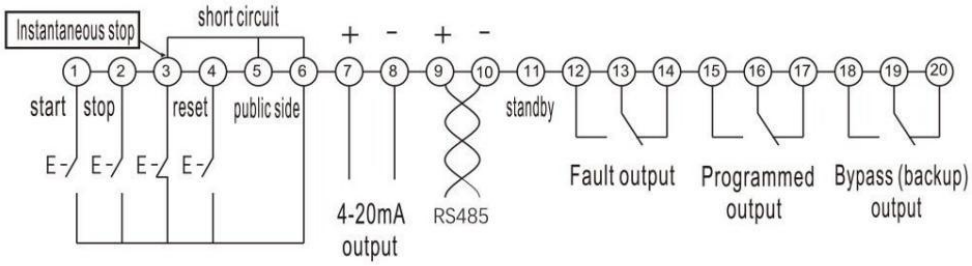
5.1 Schematic diagram of terminal wiring of soft starter



figuer 5-1

Note: built-in bypass and on-line soft starters do not have L1, l2, L3 terminals and do not require external ac contactors KM.

5.2 Secondary terminal sequence diagram of soft starter



figuer 5-2

Note 1: Terminal ①-⑩ internal power supply, only the external access to the switch volume, does not need to access the power supply.
Note 2: Terminal ⑫- ⑳ need to provide external power and load indicator circuit diagram, etc.

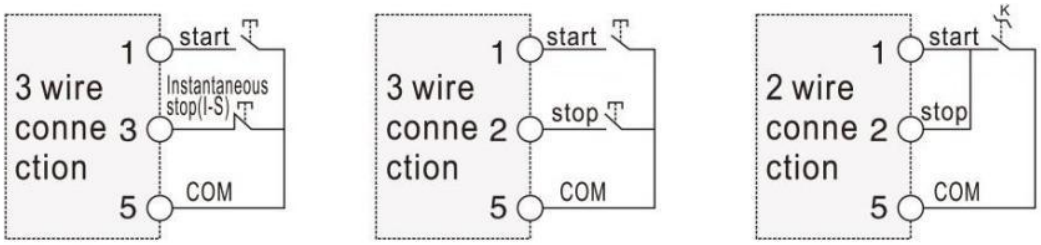


figure 5-3

Note: There are two kinds of connection modes for external control start-stop signal. When two-wire control is used, the stop end is connected with the start end.

5.3 Specification of soft starter external terminal

Terminal type	Terminal number	Terminal Name		Description
Main circuit	R、S、T	Power input		Soft starter three-phase electric power input
	U、V、W	Soft starter output		Connect three-phase asynchronous motor
	L1、L2、L3	By-pass contact terminal		For use with bypass contactors. Only the external bypass type soft starter has this terminal, the built-in bypass type and thyristor on-line type soft starter does not have this terminal.
Control loop	Digital input	1	External starting	The soft starter can be started by short connection with the Common Terminal (5,6)
		2	The external controls are down	Disconnect from Common Terminal(5,6) to stop soft starter
		3	External instantaneous shutdown	Starting with the common terminal (5, 6) must be short-circuited, and disconnection will stop
		4	External Control Reset	In case of failure, Short connection with Common Terminal (5,6) can clear the failure state
		5	Digital Input Common Terminal	Digital Input Terminal Common Terminal
		6		

	Analog output	7	4-20mA output positive pole	4-20mA output and 20mA corresponding current can be adjusted by parameters C10, C11 and C12
		8	4-20mA output negative pole	
	Communication	9	RS485+	Used in Modbus RTU communication
		10	RS485-	
	Stand by	11	Stand by	No function, reserve
	Programming Relay 1	12	Programming Relay 1 normally on	Programmable output can be selected from the following features 0. Disable 1. Power On 2. Starting 3. Bypass 4. Stopping 5. Jogging 6. Running 7. Stand By 8. Fault 9. SCR Fault
		13	Programming Relay 1 common	
		14	Programming Relay 1 normally closed	
	Programming Relay 2	15	Programming Relay 1 normally on	
		16	Programming Relay 1 common	
		17	Programming Relay 1 normally closed	
	Bypass relay	18	By-pass relay always on	By-pass Operation Suction
		19	By-pass relay common	
		20	By-pass relay normally closed	

Chapter 6 Keyboard function and operation

The soft starter uses the large screen liquid crystal display module and the micro-movement type key to constitute the Operation Display Keyboard, 6 micro-movement type keys. It can realize the start, stop operation, parameter equipment, modification, fault inquiry, fault reset and so on.

Soft starter screen opening size: 112 * 89mm

1. Press the “PGR” key to enter the parameter group and press △or ▽ to switch the parameter group.
2. Parameter modification, press the “PRG” key to enter the parameters, press△or ▽ to modify the parameter value. Then press the”PRG”key to save the parameters, press the”return” key to return to the main interface.
3. Press the “Run” button to start the soft starter.
4. Press “Stop” to stop the soft starter.
5. Press the “Return” button to view the failure record while the machine is in standby mode.
6. Long press the △ key, there will be 2 options: OK and ESC. OK means clear the fault record, ESC: not clear.
7. Long-press the ▽ key, there will be 2 options: OK and ESC. OK: factory reset, ESC: not reset.

Chapter 7 Soft starter parameter list

Principal term	Code	Subordinate term	Parameter	Default value	Notes
A Basic parameter	A00	Control Mode	0. Do not start or stop 1. Keyboard control 2. External control 3. Keyboard + external control 4. Communication control 5. Keyboard +communication 6. External control+ communications 7. Keyboard + external control + communication	3: keyboard + external control	
	A01	Starting Mode	0. Current limiting start 1. Voltage ramp start 2. Break-through voltage ramp start	0:Current limiting start	
	A02	Starting Current Limiting Percentage	50%～600%	300%	
	A03	Percentage of Starting Voltage	10%～80%	35%	
	A04	Voltage ramp starting time	1s～120s	15s	
	A05	Surge voltage	10%～95%	80%	
	A06	Pop-up time	30ms～2000ms	500ms	
	A07	Stop Mode	0: Free Parking	0: Free Parking	

			1: Soft parking		
	A08	Soft Stop Time	1s～60s	5s	
	A09	Soft starter type	0:On-line type 1:Bypass type	1: Bypass type	
B Basic parameter	B00	Starting overload level	0～30	10	0:Shut down
	B01	Run overload level	0～30	10	0:Shut down
	B02	Run-over multiple	0%～600%	0%	0:Shut down
	B03	Run overcurrent protection time	0s～6000s	5s	
	B04	Overvoltage protection value	100%～140%	120%	100: Shut down
	B05	Overvoltage protection time	1s～60s	5s	
	B06	Under voltage protection value	60%～100%	80%	100: Shut down
	B07	Under voltage protection time	1s～60s	5s	
	B08	Three-phase unbalance	20%～100%	40%	100: Shut down
	B09	Three-phase unbalance time	0.1s～60.0s	10.0s	
	B10	Start Timeout	0s～150s	60s	0:Shut down
	B11	Click timeout	0s～150s	0s	0:Shut down
	B12	Under load protection value	0%～100%	0%	0:Shut down
	B13	Protection time under load	1s～60s	10s	
C Basic parameter	C00	Programmable relay1	FEATURES: 0. Disable 1. Power On 2. Starting 3. Bypass 4. Stopping 5. Jogging 6. Running 7. Stand By	8: Fault	
	C01	Programmable output delay1		0s	
	C02	Programmable relay2		6:Running	
	C03	Programmable output delay2		0s	

			8. Fault 9. SCR Fault delay:0-600s		
	C04	Correspondence address	1～127	1	
	C05	Communication baud rate	0: 2400 1: 4800 2: 9600 3: 19200	2:9600	
	C06	A phase current calibration	10%～1000%	100%	
	C07	B phase current calibration	10%～1000%	100%	
	C08	C phase current calibration	10%～1000%	100%	
	C09	AB Calibration value of phase voltage	10%～1000%	100%	
	C10	4-20mA Lower bound calibration	0%～150.0%	20.0%	
	C11	4-20mA Upper Bound calibration	0%～150.0%	100.0%	
	C12	4-20mA Upper bound current	50%～500.0%	200%	
D Basic parameter	D00	Soft starting rated current			
	D01	Sot starting rated voltage			
	D02	Rated current of motor			
	D03	Soft Start times			
	D04	Cumulative running time			
	D05	Maser software version			
	D06	User password	000000	0	
E Basic parameter	E00	Standby display mode	0: Patterns 0 Single-phase current display 1: Patterns 1 Three-phase current display	0:Patterns 0	
	E01	Run display mode	0: Patterns 0 Single-phase current display 1: Patterns 1 Three-phase	0:Patterns 0	

			current display		
	E02	Operating language selection	0:English 1:Chinese	1:Chinese	
	E03	Screen saver time	0s～1800s	120s	0:No Protect -ion
	E04	Keyboard software version			
	E05	Screen contrast	0～115		

Note：

○: Indicates that the parameter value can be modified when the soft starter is stopped and running.

◎ : Indicates that this parameter value cannot be modified while the soft starter is running.

●: Indicates that the parameter value is a read-only parameter and cannot be modified.

Chapter 8 Specification of soft starter parameters

8.1 Start method

The soft starter has the following 3 starting modes, which users can choose according to their load conditions.

0：Current limiting start

1: Voltage ramp start

2：Step voltage ramp start

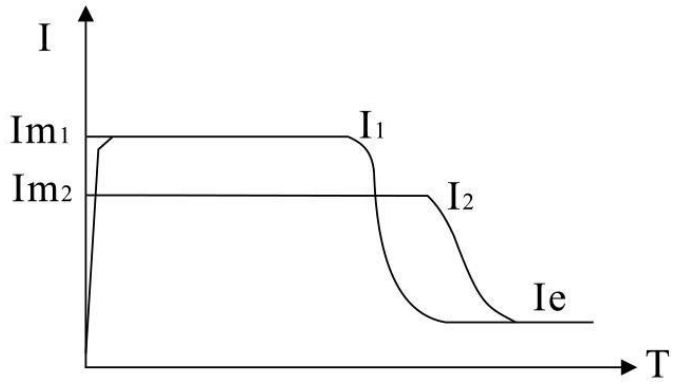
All start modes except point start are subject to B11 start timeout limit, soft starter reports start timeout failure and stops when the start time exceeds the start timeout limit, and B11 is set to 0, that turns off the start-up timeout protection.

8.1.1 Current limiting start

After starting, the motor current quickly rises to the set current Value Im, and keeps the output current not more than this value, so that the motor gradually increases, when the motor is close to the rated speed, the motor current quickly drops to the rated current Ie, completing the starting process, Figure 8-1.

The current limiting starting mode is usually used in the situation where the starting current is strictly required, especially when the power grid capacity is relatively small. When the starting capacity is to be limited, the current limiting multiple can be set according to the requirements, generally between 2.5 and 3 times, too small a setting can also cause a failure to start properly. When current-limiting starting is adopted, the starting time is related to the current-limiting multiple, the larger the current-limiting multiple, the shorter the starting time, and vice versa.

Parameters related to “Current limiting start”:



A01. Starting Mode, A02. Starting current limiting percentage

Figure 8-1

8.1.2 Voltage ramp start

After starting, the output voltage of the soft starter rises rapidly to the “Starting voltage”value u 1, and then gradually increases the output voltage according to the “Voltage ramp starting time”until the starting is completed, as shown in Figure 8-2.

Voltage ramp starting mode s suitable for inertia load, or the starting current requirements are not strict, but the starting stability requirements are higher occasions. This starting mode can greatly reduce the starting impact and mechanical stress. The larger the initial voltage U 1 is, the larger the initial torque is, but the larger the impact is. The voltage ramp starting is also controlled by the limited current starting multiple, that is, the starting current will not exceed the starting limit current value during the voltage ramp starting. This measure is to prevent the system from damage caused by improper parameter setting, therefore, the starting current limit should be raised properly when using voltage ramp mode. The length of the starting process is related to the setting value of the starting time and the weight of the load.

Parameters related to “voltage ramp start”:

A01. Starting Mode, A03. starting voltage percentage, A04. Voltage ramp start time,

A02. Starting current limiting percentage

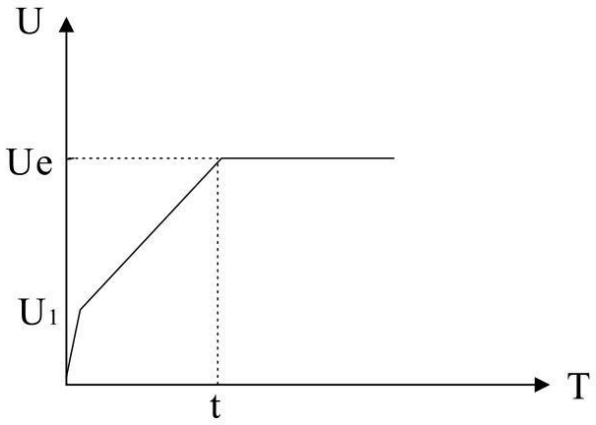


Figure 8-2

8.1.3 Step voltage ramp start

Some static resistance of the load, in the moment to start a larger Torque, also can start normally, you can choose this starting mode. When starting, soft starter instantaneous output a higher voltage (time can be set) , so that the motor rotation, and then according to the voltage ramp starting mode, until the completion of starting, as shown in Figure 8-3.

Parameters related to “step voltage ramp start”:

A01. Starting mode

A02. Starting current limiting percentage

A03. starting voltage percentage

A04. Voltage ramp start time

A05. Surge voltage

A06. Pop-up time

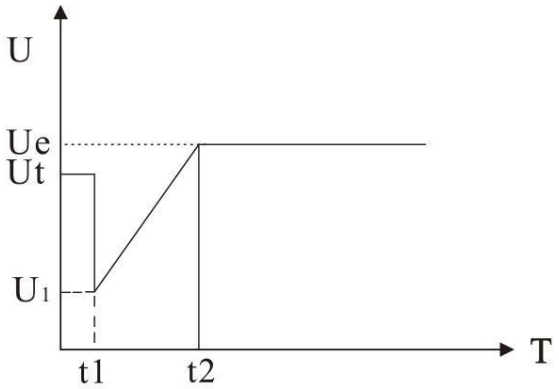


Figure 8-3

8.2 Stop Mode

The soft starter has the following two stop modes:

0：Free Parking

1：Soft Parking

8.2.1 Free Parking

When receiving the Stop Command, soft starter control bypass contactor disconnects, at the same time, block the main circuit thyristor output voltage, motor according to inertia gradually stop.

8.2.2 Soft parking

In this shutdown mode, the motor power supply is switched from the by-pass contactor to the main circuit thyristor, and the control output voltage gradually decreases until the motor stops smoothly. The model is generally used to prevent the vertical water supply pipeline equipment in the moment of Horizontal Stop Water Hammer Phenomenon, to extend the service life of pipeline valves.

The parameters associated with “Soft parking”are:

A07. Stop Mode A08. Soft Stop Time

8.3 Type Selection of soft starter

You can choose online or bypass type by parameter A12. On-line soft starter saves the trigger state of the cassette tube in the running state, which is used for the on-line operation of the soft starter. The trigger state is saved by the thyristor in the running state of the online soft starter, which is used for the on-line work of the soft starter. In by-pass type (including built-in bypass and external bypass), the thyristor stops triggering in the running state, and the bypass contactor is responsible for turning on the main circuit when the motor runs at full voltage.

8.4 Overload protection

Anti-time limit control is used for overload protection Duration of protection:

Time to protection: $t = \dfrac{35 \times Tp}{(I / Ip)^2 - 1}$

Note:

t : action time

Tp : protection level

I : running current

Ip : motor rated current.

Motor overload protection characteristic curve: Figure 8-4

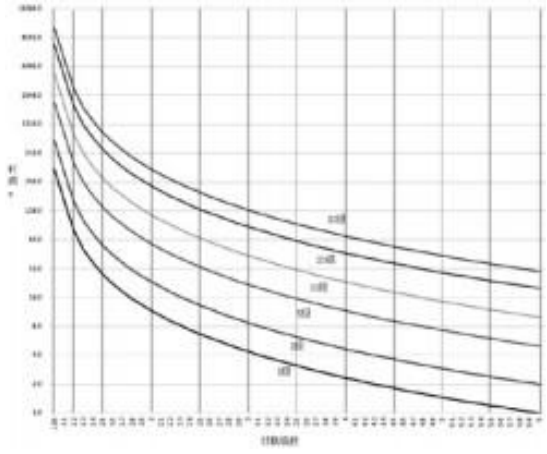


Figure 8-4

Overload Multiplier / Overload Level	1.05Ie	1.2Ie	1.5Ie	2Ie	3Ie	4Ie	5Ie	6Ie
1	∞	79.5s	28s	11.7s	4.4s	2.3s	1.5s	1s
2	∞	159s	56s	23.3s	8.8s	4.7s	2.9s	2s
5	∞	398s	140s	58.3s	22s	11.7s	7.3s	5s
10	∞	795.5s	280s	117s	43.8s	23.3s	14.6s	10s
20	∞	1591s	560s	233s	87.5s	46.7s	29.2s	20s
30	∞	2386s	840s	350s	131s	70s	43.8s	30s

∞ : It means no movement

8.5 Analog current output function

The analog current output function can realize the analog current output function of 4-20mA, 0-20mA, etc. .

C10. 4-20mA lower limit calibration: used to set the upper limit of analog current output, 20% means 4mA.

C11. 4-20mA upper limit calibration: for setting analog current output upper limit value, 100% means 20mA.

C12. 4-20mA upper limit current: used to set the upper limit of analog current output corresponding to the soft starter current.

“Analog current output ”parameter setting example:

Example 1

20mA corresponds to 2 times rated current of motor, 4mA corresponds to 0A

C12=200%　　C10=20%　　C11=100%

Example 2

20mA corresponds to 1 times rated current of motor, 4mA corresponds to 0A

C12=100%　　C10=0%　　C11=100%

Note: Parameters C10 and C11 can also be used for fine tuning if the analog current output is biased.

8.6 Screen saver time

Screen saver time is used to set the screen back lighting time. After the last keyboard operation, the screen backlight turns off following the E03 screen protection time, serving to save energy and extend the lifespan of the screen backlight. The screen saver time is set to 0 to turn off this feature, and the screen always remains light.

8.7 Screen contrast

If the screen displays too faint or too intense, please use parameter E05 to adjust the contrast on the soft starter screen to a comfortable level.

8.8 Communication function

All soft starts have built-in Modbus RTU communication function.

Modbus address	Function name	Setting Range	Default value	Notes
0×0000	Control Mode	0. Do not start or stop 1. Keyboard control 2. External control 3. Keyboard + external control 4. Communication control 5. Keyboard +communication 6. External control + communications 7. Keyboard + external control + communication	3：Keyboard + external	
0×0001	Stating Mode	0. Current limiting start 1. Voltage ramp start 2. Break-through voltage ramp start 3. Retention	0: Current limiting start	
0×0002	Starting current limiting percentage	50%～600%	300%	
×0003	Percentage of starting voltage	10%～80%	35%	
0×0004	Voltage ramp starting time	1s～120s	15s	
0×0005	Surge voltage	10%～95%	80%	
0×0006	Pop-up time	10ms～2000ms	500ms	
0×0013	Stop Mode	0: Free Parking 1: Soft parking	0: Free Parking	
0×0014	Soft Stop Time	1s～60s	5s	
0×0015	DC Brake Force	10%～100%	40%	

0×001B	Soft starter type	0:On-line type 1:Bypass type	1: Bypass type	
0×001C	Programmable relay1	FEATURES: 0. Disable 1. Power On 2. Starting 3. Bypass 4. Stopping 5. Jogging 6. Running 7. Stand By 8. Fault 9. SCR Fault	8:Fault	
0×001D	Programmable output delay1	0～600s	0s	
0×001E	Programmable relay2	FEATURES: 0. Disable 1. Power On 2. Starting 3. Bypass 4. Stopping 5. Jogging 6. Running 7. Stand By 8. Fault 9. SCR Fault	6:Running	
0×001F	Programmable output delay1	0～600s	0s	
0×0020	Stand by			
0×0021	Stand by			
0×0022	Stand by			
0×0023	A Phase current calibration	10%～1000%	100%	
0×0024	B Phase current calibration	10%～1000%	100%	
0×0025	C Phase current calibration	10%～1000%	100%	
0×0026	AB Calibration value of phase voltage	10%～1000%	100%	
0×0027	Stand by			
0×0028	Stand by			
0×0029	4-20mA Lower bound calibration	0%～150.0%	20.0%	
0×002A	4-20mA Upper	0%～150.0%	100.0%	

	bound calibration			
0×002B	4-20mA Upper bound current	50%～500.0%	200%	
0×002D	Starting Overload level	0～30	10	0: no protection
0×002E	Run overload level	0～30	10	0: no protection
0×002F	Stan by			
0×0030	Stand by			
0×0031	Run-over multiple	0%～600%	0%	0: no protection
0×0032	Run overcurrent protection time	0s～6000s	5s	
0×0033	Overvoltage protection value	100%～140%	120%	100: no protection
0×0034	Overvoltage protection time	1s～60s	5s	
0×0035	Under voltage protection value	60%～100%	80%	100: no protection
0×0036	Under voltage protection time	1s～60s	5s	
0×0037	Three-phase unbalance	20%～100%	40%	100: no protection
0×0038	Three-phase unbalance time	0.1s～60.0s	10.0s	
0×0039	Start Timeout	0s～150s	60s	0: no protection
0×003A	Click timeout	0s～150s	0s	0: no protection
0×003B	Under load protection value	0%～100	0%	0: no protection
0×003C	Protection time under load	1s～60s	10s	
0×003D	Correspondence address	1～127	1	
0×003E	Communication Baud rate	0: 2400 1: 4800 2: 9600 3: 19200	2:9600	
0×003F	Communication Mode	n,8,1		
0×0043～ 0×0063	Stand by			

0x0064	Soft starting rated current			Read only
0×0065	Soft starting rated voltage			Read only
0×0066	Rated current of motor			
0×0067	Soft Start Times			Read only
0×0068	Cumulative running time			Read only
0×0069	Current running seconds			Read only
0×006A	Software version			Read only
0×006B～ 0×006F	Stand by			
0x0100	Soft starter status	0. Ready 1. Starting 2. Running 3. Stopping 5.Fault		Read only
0×0101	Current fault			Read only
0×0104	Percentage of output voltage			Read only
0×0105	Percent Average current			Read only
0×0106	Apparent power value			Read only
0×0107	Three-phase current unbalance			Read only
0×0108	A Phase current value			Read only
0×0109	B Phase current value			Read only
0×010A	C Phase current value			Read only
0×010B	AB Phase voltage value			Read only
0×010E	Current elapsed time (minutes)			Read only
0×010F～ 0×011F	Stand by			
0×0120	Fault record 1			Read only
0×0121	Fault record 2			Read only
0×0122	Fault record 3			Read only
0×0123	Fault record 4			Read only
0×0124	Fault record 5			Read only
0×0125	Fault record 6			Read only
0×0126	Fault record 7			Read only

0×0127	Fault record 8			Read only
0×0128	Fault record 9			Read only
0×0129	Fault record 10			Read only
0×012A	Fault record 11			Read only
0×012B	Fault record 12			Read only
0×012C 0×012F	Stand by			
0×0130	Control Command Register	0×0001 Start up 0×0003 Stop 0×0004 Clear the fault		Just write

Chapter 9 Failure protection function and solution

No.	Fault	Possible Cause	Solution
1	Input PL	Input phase failure	Check whether the three-phase power supply is a lack of phase. Check whether the power supply line and circuit breaker is in good condition
2	Curr Unbalance	Output phase failure	Check if the motor wiring is good, and whether there is fault in the motor
3	Run OC	1. Motor overload start 2. Incorrect Motor rating current setting 3. The overload level election is inappropriate 4. The current reading is inaccurate	1. Check if there is overload 2. Check if parameter D02 is set correctly 3. Check if parameter B01 is set properly 4. Adjust parameters C06, C07, C08 to make 5. the three-phase display current of soft starter accord with the actual current
4	Start OL	1. Motor overload operation 2. Incorrect Motor rating current setting 3. The run overload level selection is not appropriate 4. The current reading is inaccurate	1. Check the load situation, whether there is overloading phenomenon 2. Check that the parameter D02 is set correctly 3. Check whether the parameter B00 is set properly 4. Adjust parameters C06, C07, C08 to make the three-phase display current of soft starter accord with the actual current
5	Under Load	1. Motor underload parameter setting is not correct 2. The current reading is inaccurate	1. Adjust parameters B12 and B13 to appropriate values 2. Adjust parameters C06, C07, C08 to make the three-phase display current of soft starter accord with the actual current
6	Curr Unbalance	1. There's something wrong with the motor coil	1. Replacement or repair of motor 2. Tighten the terminals again

		2. Faulty connection of main line terminal 3. The current reading is inaccurate	3. Adjust parameters C06, C07, C08 to make the three-phase display current of soft starter accord with the actual current
7	Over Heat	1. Soft starter starts too often 2. The external temperature of soft starter is too high 3. The soft starter is surrounded by larger heating devices and is too compact to be mounted	1. Increase the start interval, wait for the soft starter to cool before the next start, or add a cooling device to cool down the soft starter faster 2. Improve the soft starter of the external environment, or for the use of capacity reduction 3. Improve the layout or strengthen the cooling intensity in the cabinet
8	Over Volt	1. The power supply voltage is too high 2. The current reading is inaccurate	1. Adjust the supply voltage of the transformer 2. Adjust the parameter C09 to make the display voltage of the soft starter consistent with the actual voltage
9	Under Volt	1. Power supply voltage is too low 2. The current reading is inaccurate	1. Adjust the transformer power supply voltage; check the incoming cable is too small, check the power margin of the transformer is too small 2. Adjust the parameter C09 to make the display voltage of the soft starter consistent with the actual voltage
10	SCR Fault	Two-phase thyristor breakdown, soft starter in the state of shutdown current flow	The fault will be reported if there is current in the shutdown state, power cut off, check whether there is breakdown phenomenon of two-phase thyrisor
11	Start Timeout	The start time exceeds the B10 setting	1. Check that the B10 setting is appropriate 2. Check if the load is too heavy and the starting time is too long 3. Adjust the starting parameters properly to shorten the starting time
12	Run OC	1. Running current is too high 2. Incorrect setting of motor rated current 3. The run-through value is not set correctly 4. The current reading is inaccurate	1. Check the load situation, whether there is overloading phenomenon 2. Check that the parameter D02 is setting correctly 3. Check whether the parameter B02, B03 is set properly 4. Adjust parametersC06, C07, C08 to make the three-phase display current of soft starter accord with the actual current
13	Keypad Comm	Check for connection or	Reinsert or replace the cable

	Fault	cable damage	

Chapter 10 Trial Operation & daily maintenance

10.1 Test run inspection and points for attention

In order to run safely before electrification should be checked in accordance with the following terms.

※ Does the soft start power match the motor power? It is available through D02. Motor rated current item, according to the motor nameplate current value set.

※ Does the motor insulation meet the requirements?

※ Is the input and output wiring of the main circuit correct?

※ Is the input and output wiring of the main circuit correct?

※ Check with multimeter whether there is short circuit in the three-phase power supply (R, S, T) ?

※ After power-on, display “Stand-by”means in the normal state of ready to start, you can use the “Point to move”way to check whether the motor steering is correct, if not correct, replaceable motor end arbitrary two-phase.

※ During the trial operation, if the starting state of the motor is not ideal, the starting and stopping parameters can be set according to the parameter list, and the starting mode and parameters such as current, voltage and time can be modified accordingly.

※ If the fault protection appears in the whole process of power supply and operation, the fault state will be displayed, please follow the corresponding tips in Chapter 9 to deal with it.

※ Do not open the cover of the machine after the soft starter is powered on to avoid electric shock.

※ During the trial operation, if abnormal phenomena are found, such as abnormal sound, smoke or peculiar smell, the machine should be stopped quickly, the power supply should be cut off, and the cause should be checked.

※ In the case of soft starter output motor is not connected, then U, V, W three-phase induction voltage, is a normal phenomenon, connected to the motor after this induction voltage can disappear.

10.2 Matters needing attention in daily maintenance

※ Induction Voltage: When the power supply is connected to the input terminal of the soft starter, the output terminal of the soft starter will have an induction voltage when the load is open, even when it is stopped. This is caused by the leakage current of the thyristor, which is normal. The induction voltage will disappear after the motor is connected. Therefore, attention

should be paid to the risk of electric shock.

※ Reactive power compensation: If a reactive power compensation circuit with higher power factor needs to be installed in the distribution circuit, the reactive power compensation capacitor should be connected to the input end of the soft starter, not to its output end; otherwise, the power device of soft starter will be damaged.

※ Insulation Test: Do not use megohm meter to measure the insulation resistance between the input and output of the motor soft starter, otherwise the power device and the Control Board of the soft starter may be damaged by overvoltage.

※ Circuit Connection: The input and output of the motor soft starter cannot be connected inversely. Otherwise the soft starter or motor may be damaged.

※ By-pass contactor wiring: When Motor soft starter is equipped with by-pass contactor, the phase sequence of soft starter output U, V, W and by-pass output L11, L12, L13 must be same.

※ External Control Terminal: The External Control Terminal of the soft starter starts, stops, actuates, resets, and is public. No external power shall be introduced, or the control panel of the soft starter will be damaged.

※ In the case of more dust, dust cleaning should be carried out regularly; otherwise the insulation level and heat dissipation effect of soft starter will be reduced, resulting in failure or damage.

※ In a humid environment, such as long-term non-use of soft starter, before use, must be dehumidified treatment (such as drying with a hair dryer or electric oven) , otherwise, as a result of moisture or condensation, reduce the insulation level of soft starter, resulting in creepage, short circuit, damage the soft starter.

Notice of order

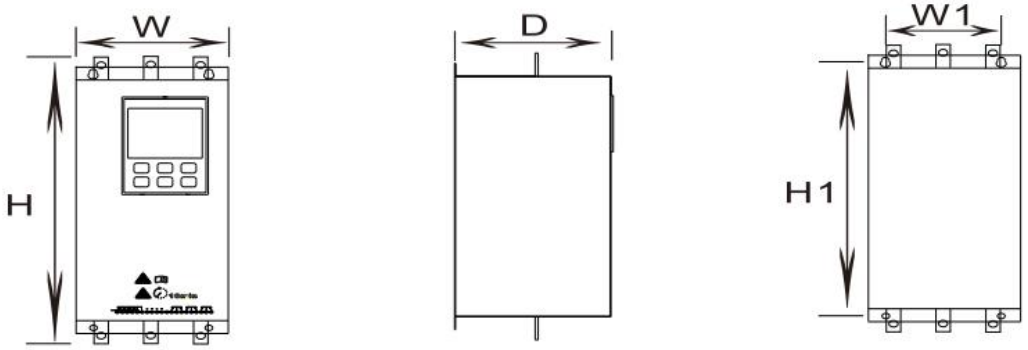
※ when ordering, please inform the supplier of the product model, specification, load condition and use condition so as to select the product correctly.

※ AC motor external type products should be equipped with bypass contactors.

※ For users who have special conditions or requirements for this product, please indicate to the supplier at the time of ordering. We will provide perfect service.

※ If the load is wound motor, the order should be stated.

Chapter 11 Structure and outline dimensions of MSS1000-G on-line intelligent soft starter



11.1 Three-phase 380V

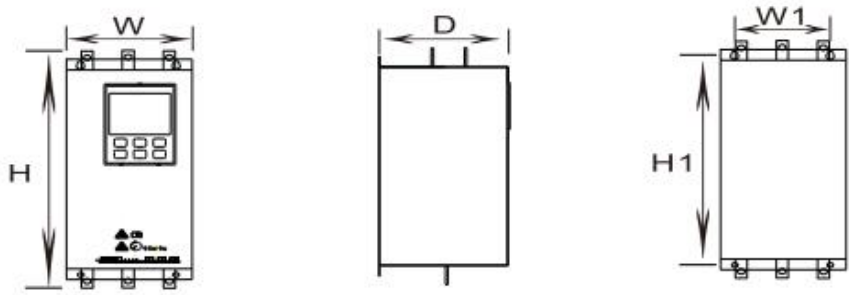
Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
5.5KW-75KW	298	156	190	267	100	M6
90KW-160KW	430	390	237	360	351	M8
185KW-220KW	490	390	237	410	351	M8
250KW-400KW	545	390	237	460	351	M10
500KW	692	453	310	590	393	M10

11.2 Three-phase 660V

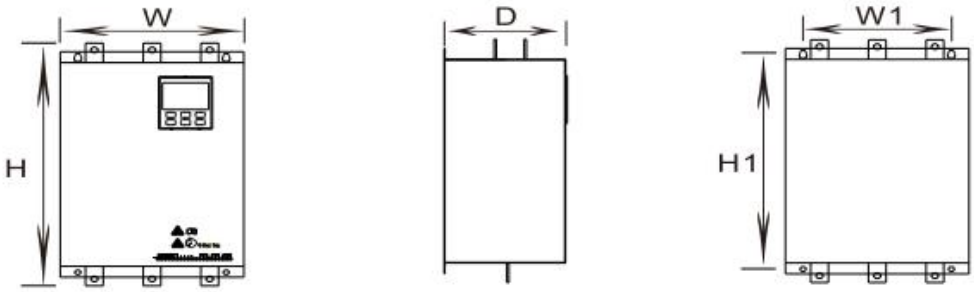
Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
5.5KW-75KW	298	156	190	267	100	M6
90KW-160KW	430	390	237	360	351	M8
185KW-220KW	490	390	237	410	351	M8
250KW-400KW	545	390	237	460	351	M10
500KW-630KW	692	453	310	590	393	M10

Chapter 12 Structure and outline dimensions of MSS1000 bypass intelligent soft starter

● 5.5kW–75kW



② 90kW–630kW



12.1 Three-phase 220V

Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
22KW-45KW	273	145	168	245	100	M6
55KW-115KW	435	260	205	358	226	M8
132KW-220KW	465	290	205	380	256	M8
250KW-280KW	480	330	205	440	296	M10

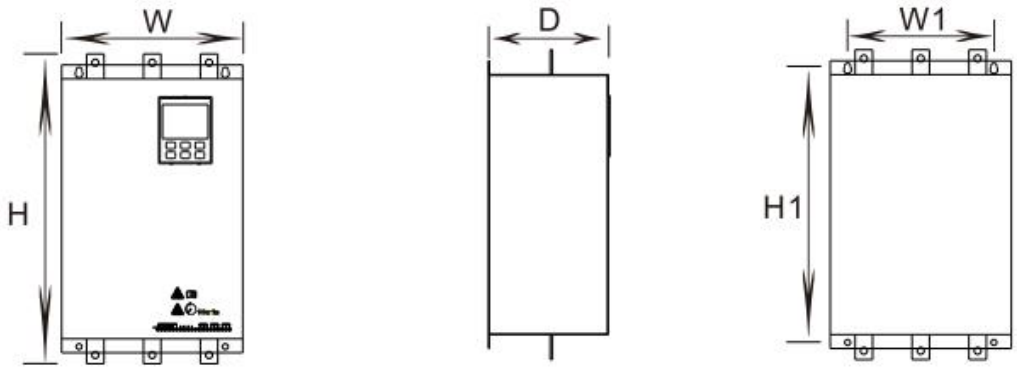
12.2 Three-phase 380V

Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
5.5KW-75KW	273	145	168	245	100	M6
90KW-220KW	435	260	205	358	226	M8
250KW-320KW	465	290	205	380	256	M8
400KW-500KW	480	330	205	440	296	M10
630KW	520	330	205	440	296	M10

12.3 Three-phase 660V

Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
5.5KW-75KW	273	145	168	245	100	M6
90KW-220KW	435	260	205	358	226	M8
250KW-320KW	465	290	205	380	256	M8
400KW-500KW	480	330	205	440	296	M10

Chapter13 External Dimensions of MSS1000-N intelligent soft starter with built-in bypass



13.1 Three-phase 380V

Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
11KW-75KW	340	180	178	320	120	M6
90KW-200KW	585	312	205	476	252	M8
220KW-320KW	634	348	228	524	289	M10
400KW	641	465	228	585	400	M10

13.2 Three-phase 660V

Specifications	Overall dimensions(mm)			Installation dimension		
	H	W	D	H1	W1	Φ
11KW-75KW	340	180	178	320	120	M6
90KW-200KW	585	312	205	476	252	M8
220KW-320KW	634	348	228	524	289	M10

Softer model	Rated power (KW)	Rated current (A)	(MCCB) (A)	Bypass contactor	Primary line (mm^2)
MSS1000/005-3	5.5	11	32	MSS1000-16	Copper 2.5
MSS1000/007-3	7.5	15	40	MSS1000-16	Copper 4
MSS1000/011-3	11	23	63	MSS1000-25	Copper 6
MSS1000/015-3	15	30	63	MSS1000-40	Copper 10
MSS1000/018-3	18.5	37	100	MSS1000-40	Copper 10
MSS1000/022-3	22	45	100	MSS1000-63	Copper 16
MSS1000/030-3	30	60	100	MSS1000-63	Copper 25
MSS1000/037-3	37	75	100	MSS1000-100	Copper 35
MSS1000/045-3	45	90	100	MSS1000-100	Copper 35
MSS1000/055-3	55	110	160	MSS1000-160	Copper 35
MSS1000/075-3	75	150	250	MSS1000-160	Cop35/ Alu.50
MSS1000/090-3	90	180	250	MSS1000-250	Cop50/ Alu.70
MSS1000/115-3	115	230	350	MSS1000-250	Cop70/ Alu.95
MSS1000/132-3	132	260	400	MSS1000-400	Cop95/Alu.120
MSS1000/160-3	160	320	400	MSS1000-400	Cop95/Alu.150
MSS1000/185-3	185	370	400	MSS1000-400	Cop120/Alu.185
MSS1000/200-3	200	400	400	MSS1000-400	Cop150/Alu.185
MSS1000/250-3	250	500	630	MSS1000-630	Cop185/Alu.240
MSS1000/280-3	280	560	630	MSS1000-630	Cop240/Alu.300
MSS1000/320-3	320	640	630	MSS1000-630	Cop240/Alu.400

Product Warranty Card

<table>
<tr><td rowspan="3">Customer info</td><td colspan="2">Company Add:</td></tr>
<tr><td>Company name:</td><td>Contact:</td></tr>
<tr><td>Zip code:</td><td>Phone:</td></tr>
<tr><td rowspan="3">Product info</td><td colspan="2">Model:</td></tr>
<tr><td colspan="2">Serial number:</td></tr>
<tr><td colspan="2">Agent name:</td></tr>
<tr><td>Fault info</td><td colspan="2">Maintenance time and content

Maintenance person:</td></tr>
</table>

Please read the instruction manual carefully to understand the contents for correct installation,circuit connection, operation and maintenance.

The technical specification of this product changes without prior notice.

This manual should be kept until the end of the product.

This manual should be kept in the hands of the actual end user.