NIETZ
Innovation & Technology

Medium Voltage Soft Starter

SSM Series
Procuct Manuals

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Product description

SSM medium pressure solid state soft starter is a new soft starter developed by our company. This device is a new intelligent device with high performance, versatility, and high security that is designed and developed using DSP technology and modern advanced control theory. It is mainly used for the starting ,running,control and protection of parking for medium voltage motors. SSM series medium voltage soft starter adopts high speed digital signal processor as carrier, integrates modern advanced control methods, and is equipped with multiple dynamic and static protection measures to achieve high performance of the device. The device can dynamically, in real time and efficiently limit that current during start-up is within the set value, so as to avoid that the current during start-up is too large and the voltage of the power grid drops sharply. So the start-up is smooth, the capacity of the power distribution equipment is reduced and the investment cost of the project is saved. This device has reliable and accurate over-current, overload, current imbalance, phase loss, thyristor failure and other comprehensive protection functions for motor.

Function and features

- Adopt modular structure, modular installation and easy maintenance.
- Adopt 32-bit digital signal processor and high-performance programmable controller PLC, real-time and high-efficiency, high reliability and good stability for device control;
- With voltage ramp, kick + voltage ramp, current limit, voltage ramp + current limit, inching and other starting methods, it can set the starting time interval;
- Choose free parking or soft parking according to load conditions;
- Strong anti-interference ability, complete isolation of high voltage and control parts, safe and reliable operation of the device;
- Measurement function: three-phase current measurement, voltage measurement, zero-sequence current;
- Lightning overvoltage protection, operation overvoltage protection , multiple static and dynamic pressure equalization processes, multiple overvoltage absorption protection technology;
- Protection functions: phase loss, over-current, over-voltage, under-voltage, overload, under-load, over-temperature, current imbalance, thyristor fault detection, zero-sequence protection and other perfect protection function ;
- Display function: large-screen touches man-machine interface screen , easy operation, more humane;
- Communication function: Isolated RS485 communication, MODBUS RTU protocol. The upper computer can be used for centralized control.

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SSM main technical indicators

Load type	three-phase medium voltage asynchronous motor, synchronous motor
AC voltage	3KV～10KV(-15%～+10%)
Overvoltage	Line voltage / Short-term power frequency (1min) / Load type 3KV / 18KV / 30KV 6KV / 35KV / 60KV 10KV / 42KV / 75KV
Overload capacity	Continuous: 125% controller nominal value Overload: 200%/60S
Frequency	50Hz(±2Hz)
Main circuit composition	3KV:12SCRS 6KV:18SCRS 10KV:30SCRS
Instantaneous overvoltage protection	dv/dt absorption network, composite overvoltage protector
Cool down	Natural cooling
bypass contactor	With direct start capacity
Control method	The user provides 2 or 3 wire 220VAC

Features	Protection of the soft starter itself
Protection of too long time starting time	Start overload (inverse time) protection
Input phase loss	Three phase power supply can not start without any phase
Thyristor over temperature	Thyristor over-temperature cannot start
The times of starts per hour	The start time interval can be set, and the number of load starts per hour does not exceed 10 times

Features	Protection of the motor
Current	Start overcurrent protection Overcurrent protection Three-phase current imbalance protection
Voltage	low voltage protection; overvoltage protection
Overload	Overload protection (inverse time characteristics)

Operation interface and communication interface

Operation interface	Set parameters, control start and stop for the soft starter, touch screen operation of large screen , Chinese and English display
Communication Interface	Rs485 communication interface, MODBUS RTU communication protocol

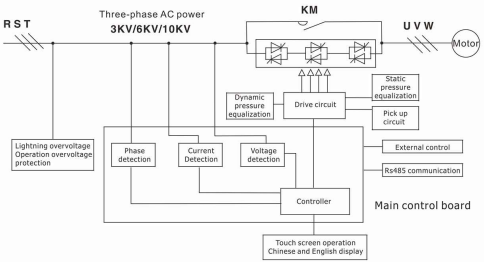
The applied Evironment

Power supply:	Three-phase AC3KV, AC6KVAC10KV, (-15%~10%) 50HZ
Control power supply:	AC220V (+10%, -15%), 50HZ
Applicable motor:	Medium voltage three-phase asynchronous motor, synchronous motor
Starting frequency:	10 times/hour
Cooling method:	Natural cooling
Protection class:	Ip20 (it can be customized according to user's requirements
Altitude:	No more than 2000 meters.if it exceeds,it will be required derating
Ambient temperature:	-25°C~+40°C
Relative temperature:	95% non-condensing
Other conditions:	No corrosive gas, no conductive dust, no violent vibration (less than 0.5G), well ventilated

For special environmental equipment, please specify when you order.

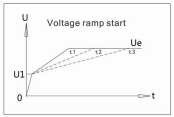
Soft starter working principle

SSM series medium voltage motor solid state soft starter uses multiple thyristors connected in series between three-phase AC voltage and three-phase motor to adjust the delay conduction angle of multiple independent anti-parallel thyristor valve components to change AC input voltage of three-phase motor.So it achieves the purpose of constant current starting or voltage starting with a certain slope change. When the start is completed, the three-phase bypass contactor KM automatically pulls in and the electric motor is put into the grid operation (see the figure below).



SSM start and stop mode

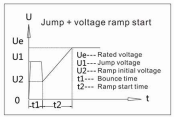
SSM series medium voltage soft starter has a variety of starting methods: voltage ramp, kick + voltage ramp, current limit, jog, etc. Parking modes are: free stop and soft stop. Users can choose different start and stop modes according to different loads and specific conditions of use



- Voltage ramp start mode

The soft start output voltage rises exponentially with the set initial voltage and set start time, while the output current increases at a constant rate until the start is completed.

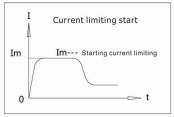
Name	Range	Factory default
Starting voltage	5~100%Ue	40%
Starting time	5~200S	30S



- Jump + voltage ramp start mode

In the initial stage of start-up, a large pulse torque is applied to the load motor. Its amplitude and hold time are determined by the parameters "kick-off voltage" and "kick-off time", and then start the motor in the manner of a voltage ramp.

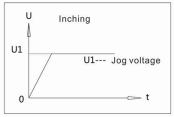
Name	Range	Factory default
Jump voltage	0~100%Ue	0%
Bounce time	0~5000mS	0
Starting voltage	5~100%	40%
Starting time	0~200S	30S



- Current limiting start mode

After the soft start gets the start command, the output voltage increases rapidly until the output current reaches the set current limit value of 1 yang, the output current no longer increases, the current starts to decrease after the motor runs for a while, and the output voltage increases rapidly until the full voltage Output, start process is completed.

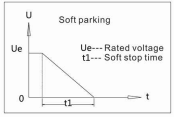
Name	Range	Factory default
Current limiting multiple	50~500%Ie	300%



- Jog mode

In this mode, the soft-start outputs voltage and rapidly increases to the inching voltage U1 and remains unchanged. This function is suitable for judging the direction of motor steering or load when the device is commissioned.

Name	Range	Factory default
Jog voltage	5~100%Ue	30%



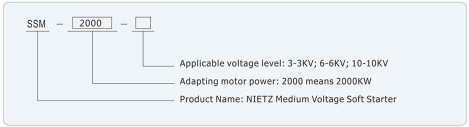
- Soft parking mode

When the soft stop time is not set to zero, the stop in the full pressure state is the soft stop. In this mode, the soft starter first turns off the bypass contactor, and the output voltage of the soft starter is soft in the setting. It gradually decreases during the stop time until the motor stops.

Name	Range	Factory default
Soft stop time	1~100S	1S

Device specifications and models

- Soft start mounting model and description



- Order Notice

Users need to clarify the content when you order
1 Motor model, rated voltage, rated power, rated current, rated speed;
2. The type of load;
3. Device main circuit inlet and outlet modes;
4. If you have special requirements, please contact the company and specify when you order.

Application

high-voltage solid-state soft-start devices can be widely applied to the following loads:

- Pump load
- Pumping unit
- Conveyor belt
- Mixer
- Centrifuge, blower, induced draft fan and other fan loads
- Air compressor, refrigeration compressor
- Lifts, cranes, tractors
- Ball mill, Crusher

Safety Warnings and Precautions

- Safety warning

1. The installation, operation and maintenance of the soft starter shall be conducted in strict accordance with this manual and relevant national standards and industry practices;
2. SSM medium voltage soft start device must be operated by authorized and professional personnel;
3. All power must be turned off before servicing the motor and the soft starter;
4. The interlocking of the high-voltage switchgear and the soft-starting device and the interlocking of the soft-starting internaldevice are a medium-voltage measure to ensure safety.
5. Ensure that the soft starter is properly grounded.

- Precautions

1. It must be installed or guided by professional technicians to install the device;
2. Try to ensure that the load of low-level power, specifications and equipment matching;
3. The reactive power compensation controller which is used to increase the power factor must not be connected to the output of the soft starter, otherwise it will damage the silicon controlled power devices in the soft starter.
4. It is forbidden to measure the insulation resistance between the input and output terminals of the soft starter by using a megohmmeter. Otherwise, the thyristor and the control board of the soft starter may be damaged due to overvoltage. When you measure motor insulation, the above principle should also be followed.

SSM Medium Voltage Soft Starter Selection and Overall Dimensions

Nominal voltage (kV)	Model	Nominal current (A)	Rated power (kW)	Dimensions (mm)		
				W	H	D
3	SSM-620-3	150	620	1000	2300	1500
	SSM-830-3	200	830			
	SSM-1100-3	270	1100			
	SSM-3500-3	850	3500			
6	SSM-500-6	63	500	1000	2300	1500
	SSM-800-6	100	800			
	SSM-1000-6	125	1000			
	SSM-1400-6	175	1400			
	SSM-2150-6	270	2150			
	SSM-3400-6	400	3400	1400	2300	1500
	SSM-4500-6	500	4500	2400	2300	1500
	SSM-5600-6	630	5600			
	SSM-7700-6	900	7700			
	SSM-8600-6	950	8600			
	SSM-11000-6	1230	11000	2600	2300	1500
	SSM-14000-6	1560	14000			
	SSM-20000-6	2250	20000	4200	2300	1500
10	SSM-500-10	38	500	1000	2300	1500
	SSM-800-10	60	800			
	SSM-1000-10	76	1000			
	SSM-1650-10	120	1650			
	SSM-2000-10	145	2000			
	SSM-3500-10	255	3500			
	SSM-4500-10	350	4500	1400	2300	1500
	SSM-5600-10	405	5600			
	SSM-6650-10	480	6650			
	SSM-7100-10	520	7100	2400	2300	1500
	SSM-8000-10	600	8000			
	SSM-9300-10	670	9300			
	SSM-12000-10	880	12000			
	SSM-15000-10	1100	15000	4200	2300	1500
	SSM-19000-10	1370	19000			
	SSM-22000-10	1600	22000