

The logo for XICHI, featuring the word "XICHI" in a bold, white, sans-serif font. The 'X' is stylized with a double-stroke effect. The background is a solid blue color with abstract white geometric shapes, including circles and lines, some of which are semi-transparent.

CMV High-voltage
Solid-state Soft Starter

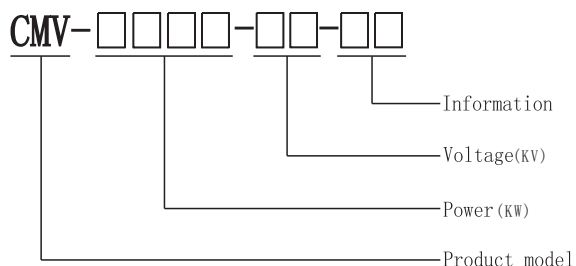
XI'AN XICHI ELECTRIC CO., LTD.

High-voltage solid-state soft starter

CMV series high voltage solid soft starter (hereinafter referred to as soft starter) is a high voltage motor soft starter designed with newer concept, and mainly applicable to the control of and protection for the starting and stopping of squirrel-cage type asynchronous and synchronous motors. The starter is composed of several thyristors in series-parallel, and it can meet different current and voltage requirements.

The product is widely used in electric industry with rated voltage 3000 to 10000V, building materials, chemical industry, metallurgy, steel and paper-making industries etc., and can perform well if used together with various kinds of electromechanical devices including water pumps, fans, compressors, crushers, agitators and conveyer belt etc.. It is the ideal device for starting and protecting high voltage motors.

Description of model



- Information
- 1、Stationary
 - 2、Handcart
 - 3、All-in-one
 - 4、Explosion-proof
 - 5、Plateau



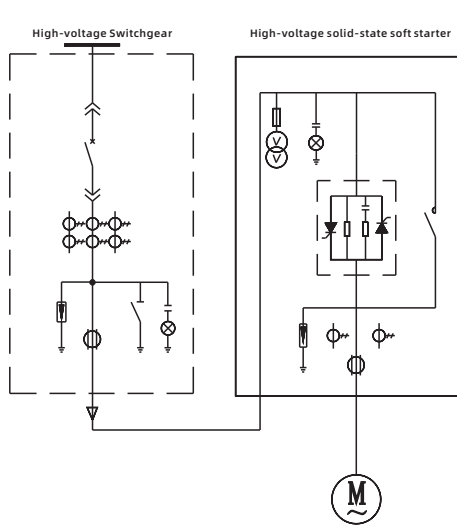
Technical indicators

Basic parameters	
Type of load	Three phase squirrel cage asynchronous and synchronous motors
AC voltage	3000---10000VAC
Service frequency	50HZ/60HZ±2HZ

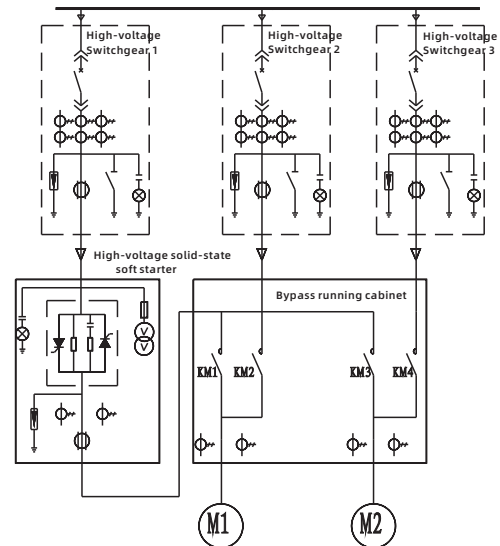
Phase sequence	CMV is allowed to work with any phase sequence (through setting parameter)
Composition of major loop	(12SCRS、18SCRS、30SCRS depend on model)
Bypass contactor	Contactors with direct starting capacity
Control power	AC/DC (110~220)V \pm 15%
Transient voltage overload protection	dv/dt snubber network
Start frequency	1-3 times per hour
Ambient condition	Ambient temperature: -20°C -+50°C
	Relative humidity: 5%---95% no condensation
	Altitude less than 1500m (derating when altitude is more than 1500m)
Protective functions	
Open-phase protection	Cut off any phase of primary power supply in the course of starting or operation.
Over-current protection in operation	Operational Over-current protection setting: 20~500%I _e
Unbalanced phase current protection	Unbalanced phase current protection: 0~100%
Overload protection	Overload protection grade: 10A、10、15、20、25、30、OFF
Underload protection	Underload protection grade: 0~99% Action time of underload protection: 0~250S
Start timeout	Start time limit: 0~120S
Over-voltage protection	When voltage of primary power supply is 120% higher than rated value, over-voltage protection is enabled.
Under-voltage protection	When voltage of primary power supply is 70% lower than rated value, under-voltage protection is enabled.

Phase protection	Allow to work with any phase sequence (through setting parameter)	
Ground protection	Protection available when grounding current is higher than set value	
Description of communication		
Protocol	Modbus RTU	
Communication interface	RS485	
Network connection	Each CMV can communicate with 31 CMV equipments in network.	
Function	Operation state and programming can be observed through communication interface	
Operating interface		
Keyboard box	LCD display	LCD display/touch screen display
	Language	Chinese and English
	Keyboard	6 touch membrane keyboard
Touch screen	Resistive screen, Display and modify parameters	
Meter display		
Voltage of primary power supply	Display voltage of three-phase primary power supply	
Three phase current	Display current of three-phase major loop	
Data record		
Fault history	Record recent 15 faults information	
History of number of starts	Record number of starts of this soft starter	

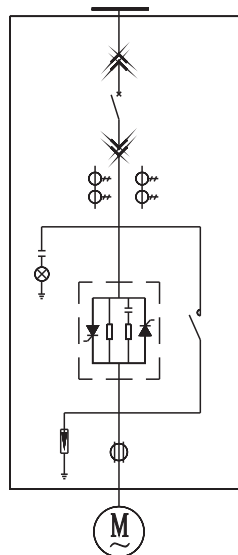
Diagram of major loop



One for one plan (G/S type)



One for two program (G/S type)



One for one plan (E type)

Design structure

Complete CMV series soft starter is a standard device for starting and protecting motors, and can be used to control and protect high voltage AC motors. Standard CMV product is composed of the following parts: high voltage thyristor module, thyristor-protecting parts, optical fiber triggering parts, vacuum switch parts, signal acquiring and protecting parts, system controlling and displaying parts.

Thyristor module: The thyristors of the same parameters are assembled in series-parallel in each phase. The number of the selected thyristors to be assembled in series is different, which depends on the peak voltage requirements of the grid used.

Thyristor-protecting parts: mainly include over-voltage snubber network composed of RC network and the voltage balance protecting network composed of voltage balancing units.

Optical fiber triggering parts: The consistency and reliability of triggering are ensured by strong triggering pulse circuit; optical fiber triggering is used for reliable separation of high voltage and low voltage.

Vacuum switch parts: After the starting is completed, three-phase vacuum bypass contactor closes automatically, and the motor is put into grid for operation.

Signal acquiring and protecting parts: The acquisition of the voltage and current signals in the major loop, control of main CPU and corresponding protection are realized by voltage transformer, current transformer, arrester and zero sequence current transformer.

System controlling and displaying parts: 32-bit ARM-core microcontroller performs the central control. LCD/touch screen display can display three-phase voltage, current, fault information and running state etc.

General structure

The general structure of the CMV series incorporates careful consideration with the purpose of meeting the requirements of various application objects and working environments.

Structure: The structure meets the common technical requirements of GB11022-1999-T high voltage switchgear and control equipment. Sealing treatment is adopted in the cabinet to reduce the pollution to the inside of the machine, with reasonable layout. The advanced digital triggering system connects the LV control to the high voltage part through optical fiber, and the convenient maintenance design allows the modules of different phases to be replaced rapidly and separately. To ensure the running safety, high voltage part shall be separated from the LV part completely.

Parts: The general structure of CMV is divided into three parts with mutual isolation, including the high voltage loop composed of high voltage thyristor module, thyristor-protecting parts, vacuum switch parts etc.; the thyristor triggering and signal acquiring and system protecting unit composed of optical fiber triggering parts, signal acquiring and protecting parts; and the system controlling and human-computer interacting unit composed of system controlling and displaying parts. The three units shall be isolated from each other, and the reliable isolation of high voltage from LV shall be achieved.

Earth wire: To ensure the reliable running of CMV, the earth wires of the control units in the cabinet shall be connected to the earthing copper bar at the lower part of the cabinet.

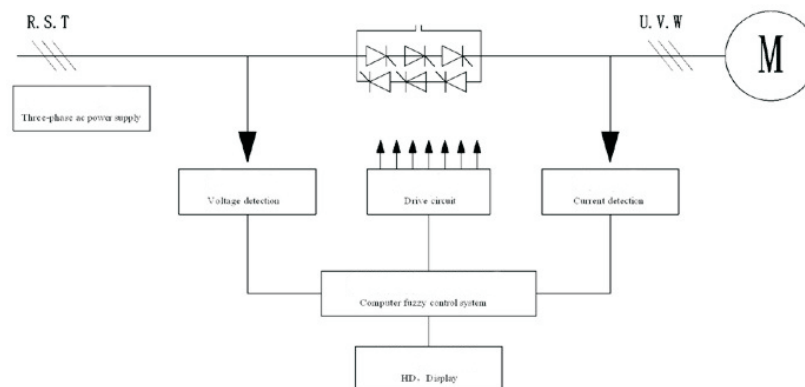
Transportation provisions: The openings and the bent corners on the cabinet can bear and support the max weight of the whole cabinet structure.

Operating Principles

The control core of CMV series is a microprocessor CPU. The microprocessor controls the phase-angle triggering of SCR to reduce the voltage on motor, and then control the voltage and current on the motor slowly and increase the motor torque smoothly, until the motor steps up to full-speed running. Such starting method can reduce the impulse current during the starting of motor and the impact on grid and the motor itself, and also reduce the mechanical impact on the mechanical loading devices attached to the motor, so as to prolong the service life of the equipment and reduce faults and stop detection time.

In the state of full-speed running, it has a bypass output the current of the motor falls to the current value at normal full-speed running. CMV series soft starter relay, which can make the bypass high voltage vacuum contact closed and make the current of the motor pass through the contactor, so as to prevent the heat loss arising from the voltage drop caused by the on-state of SCR, and improve the operating efficiency and reliability, as shown in Figure

(1).



Technical characteristics

Free of maintenance: Thyristor is an electric device without contacts. Different from other kinds of products that need frequent maintenance on liquid and parts etc., it turns the mechanical lift into the service life of electronic components, so it needs no maintenance after running for many years.

Easy installation and operation: CMV is a complete system for controlling and protecting the starting of motor. It can put into operation only with the power line and motor line connected. The whole system can be tested electrically under low voltage before operating with high voltage.

Backup: The starter comes equipped with a vacuum contactor which can be used to start the motor directly in the inside. If CMV fails, the vacuum contactor can be used to start the motor directly to ensure the continuity of the production.

High voltage thyristor is a component of major loop, equipped with voltage balancing protection system and over-voltage protection system.

CMV comes equipped with an electromagnetic blocking device for fear of entering the high voltage device in the electrified state.

Advanced optical fiber transmission technique realizes the triggering detection of high voltage thyristor and the isolation between LV control loops.

32-bit ARM-core microcontroller is used to perform central control which is real-time and high efficient with , high reliability and excellent stability.

LCD/touch screen display system in both Chinese and English with human-friendly operation interface.

RS-485 communication port can be used to communicate with the upper computer or centralized control center.

Aging experiments are made on all circuit boards.

Installation

Specification and dimension

Voltage Grade	Specification	Rated Current (A)	W (mm)	H(mm)	L (mm)
3000V	CMV-400-3	100	1000	2300	1500
	CMV-630-3	150			
	CMV-1600-3	400	1300	2300	1660
	CMV-2500-3	≥600	Reserved		
6000V	CMV-420-6	50	1000	2300	1500
	CMV-630-6	75			
	CMV-1250-6	150			
	CMV-1600-6	200			
	CMV-2500-6	300	1300	2300	1660
	CMV-3300-6	400			
	CMV-4150-6	500			
CMV-5000-6	≥600	Reserved			
10000V	CMV-420-10	30	1000	2300	1500
	CMV-630-10	45			
	CMV-800-10	60			
	CMV-1250-10	90			
	CMV-1500-10	110			
	CMV-1800-10	130			
	CMV-2250-10	160			
	CMV-2500-10	180			
	CMV-2800-10	200			
	CMV-3500-10	250			
	CMV-4000-10	280			
	CMV-4500-10	320	1300	2300	1660
	CMV-5500-10	400			
	CMV-6000-10	430			
	CMV-7000-10	500			
	CMV-8500-10	≥600			

The above models are typical product models. If the models you require are not included in the table, please contact the manufacturer.

The above dimensions are just for reference. If you need precise dimensions, please contact the manufacturer.

Net-side contactor is optional. If you want net-side contactor, please specify it in the order.

Additional reconstruction of the equipment

If the connection of wires that come into the cabinet require additional holes due to improper positions, the electric parts in the cabinet shall be covered to prevent the metal filings from staying in the machine and resulting in serious accident of short circuit. Clean the inside of the cabinet carefully after drilling the hole, and check whether there are damages in the working area.

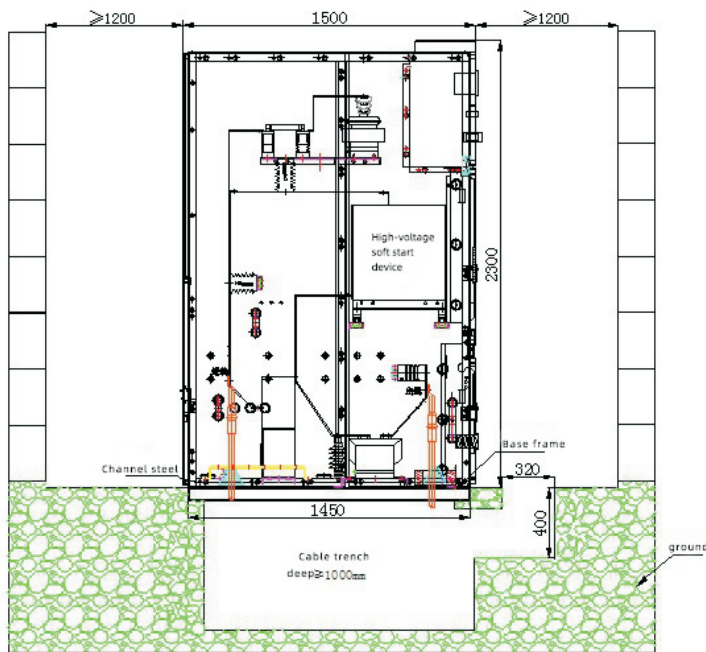
Installation

The soft starter must be installed vertically;

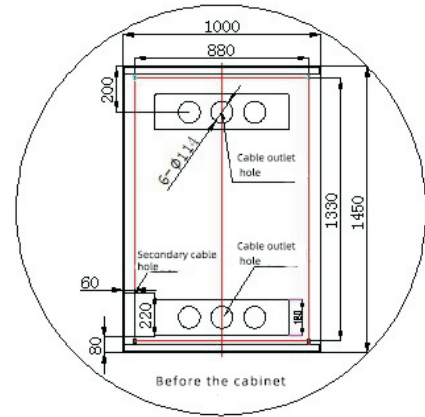
Never install the soft starter at the place of heat source;

Disconnect all the power supplies before installation;

The installation shall be in compliance with the local regulations and standards of electric apparatus as well as IEEE standard.

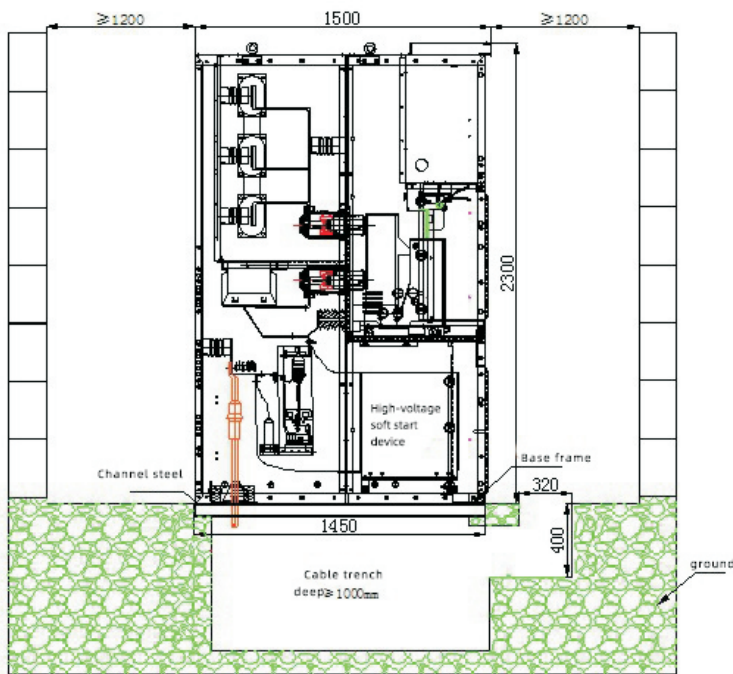


Installation foundation diagram

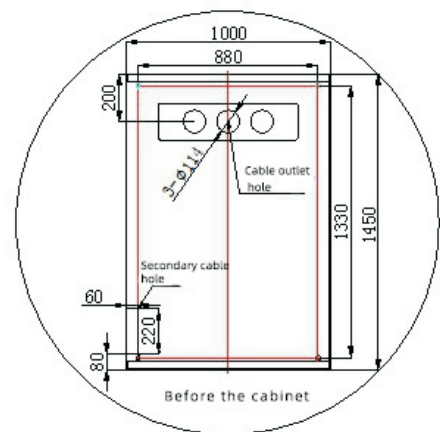


The bottom of the cabinet opening hole drawing

G/S type (Stationary /Handcart)



Installation foundation diagram



The bottom of the cabinet opening hole drawing

E type (One-body)



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If the size and parameters of the products change, the latest products shall prevail