CHZIRI

User's Manual for ZRMV High Voltage Solid Soft Starter

Zhejiang China

- **Please read through the instruction manual so as to properly carry out installation, circuit connection, operation and maintenance.**

- **Specification of this product is subject to change without prior notice.**

- **This instruction manual should be properly kept until the product is out of service.**

- **This instruction manual should be kept by real users.**

Table of Contents

Attentions on safety

To ensure proper use of this device, you must be read through the operating instructions before installation, wiring, operation and maintenance. In the course of operating, you must get familiar with mechanical drive conditions and others relating to safety.

Safety

- Please read these instructions carefully before using this soft starter and operate the device strictly in accordance with operating instructions;
- Installation and maintenance must be done strictly in accordance with these introductions and standards of the relative countries; we shall assume no responsibility, either directly or indirectly, for any action or consequences of any actions associated with the use of our products;
- Power must be cut off before maintenance is done to soft starter or motor;
- Please carefully check if any spare part is left inside soft starter after assembly.

Warning

- After this soft starter is connected to power supply, the voltage of certain elements inside the soft starter is equal to that of power supply. It will be dangerous to touch them with hand and may cause serious hurt to your body;
- ZRMV's load end is not allowed to be connected with capacitor power-factor compensator and piezoresistor for fear of causing impact current, which may damage SCR in starting. Do not attempt to repair damaged elements and contact your supplier please; and
- When soft starter is used together with frequency converter, their output terminals should be isolated with each other.

Section 1 General Introduction

ZRMV series high voltage solid soft starter (hereinafter referred to as soft starter) is a high voltage motor soft starter designed with up-to-date 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, crashers, agitators and conveyer belt etc.. It is the ideal device for starting and protecting high voltage motors.

1.1 Description of model
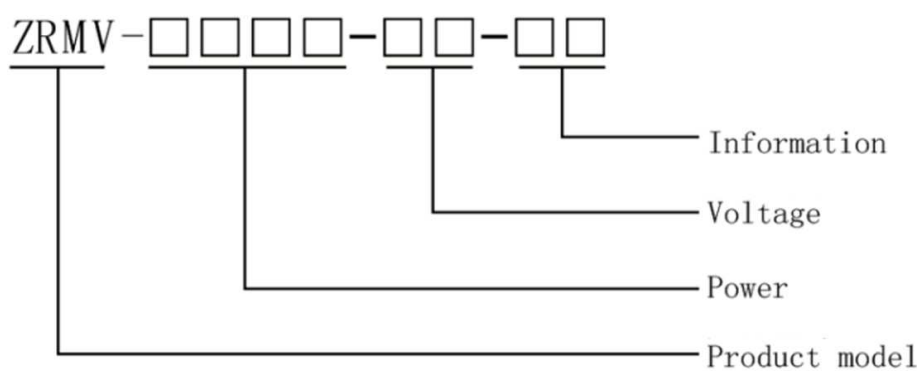
1.2 Technical indicators

Basic parameters	
Type of load	Three-phase squirrel cage asynchronous and synchronous motors
AC voltage	3000---10000VAC
Service frequency	50HZ/60HZ±2HZ
Phase sequence	ZRMV is allowed to work with any phase sequence (through setting parameter)
Composition of major loop	(12SCRS、18SCRS、30SCRS depend on model)
Bypass contactor	Contactor with direct starting capacity
Control power	AC220V±15%
Transient voltage overload protection	dv/dt snubber network
Start frequency	1---6 times per hour
Ambient condition	Ambient temperature: -20℃ -+50℃
	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%Ie
Unbalanced phase current protection	Unbalanced phase current protection: 0～100%
Overload protection	Overload protection grade: 5A、10、15、20、25、30
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	EachZRMV can communicate with 30 ZRMV equipments in network.
Function	Operation state and programming can be observed through communication interface.

Operating interface	
LCD display	LCD display/touch screen display
Language	Chinese and English
Keyboard	6 touch membrane keyboard

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

1.3 Diagram of major loop
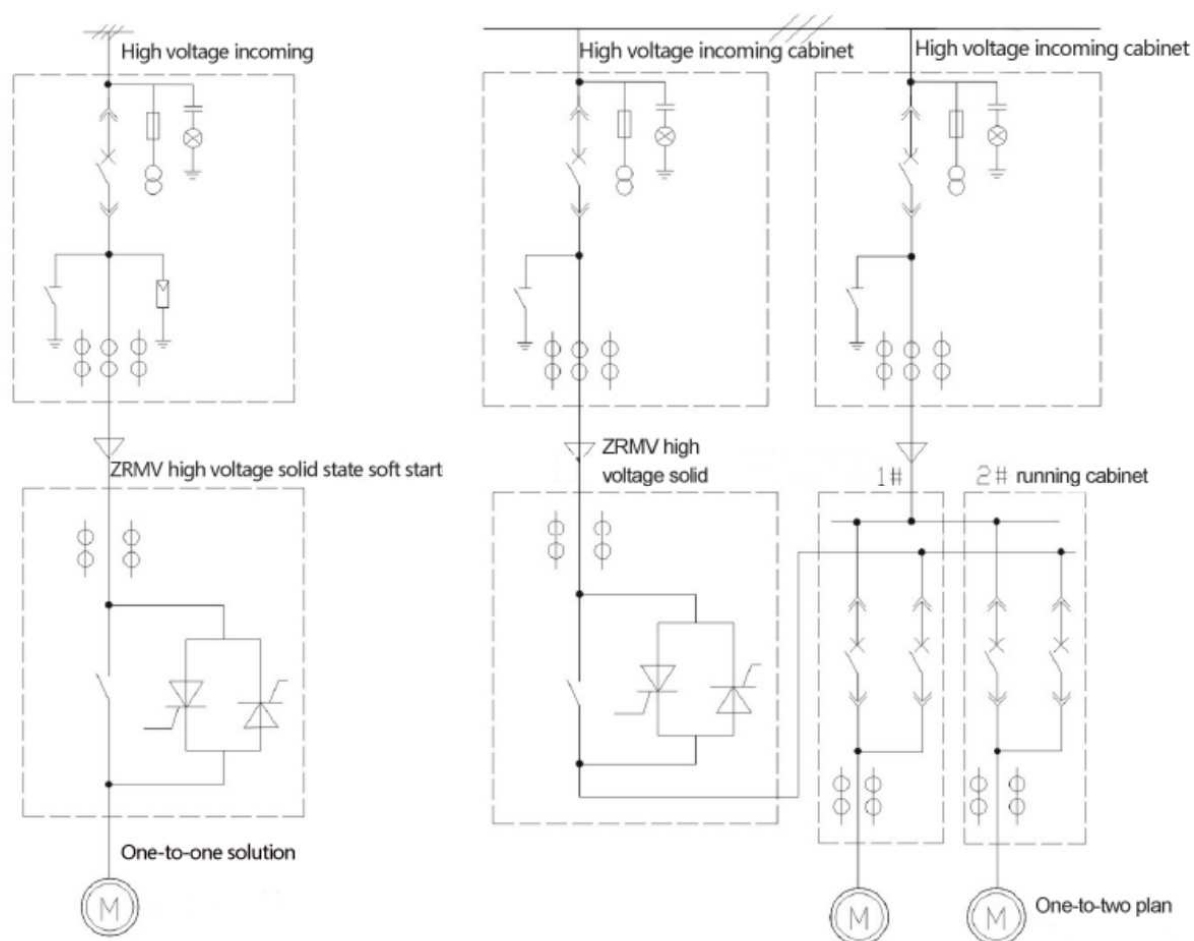
1.4 Design structure

Complete ZRMV 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 ZRMV 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.

1.5 General structure

The general structure of the ZRMV 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 ZRMV 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.

The power cables can enter the cabinet from the top or the bottom. There shall be enough space in the cabinet to facilitate the connection of the incoming line of power supply. The cable of the motor can be bent in a proper way when entering the cabinet from the bottom.

◆ **Earth wire:** To ensure the reliable running of ZRMV, 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.

1.6 Operating Principles

The control core of ZRMV 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, the current of the motor falls to the current value at normal full-speed running.ZRMV series soft starter has a bypass output 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).
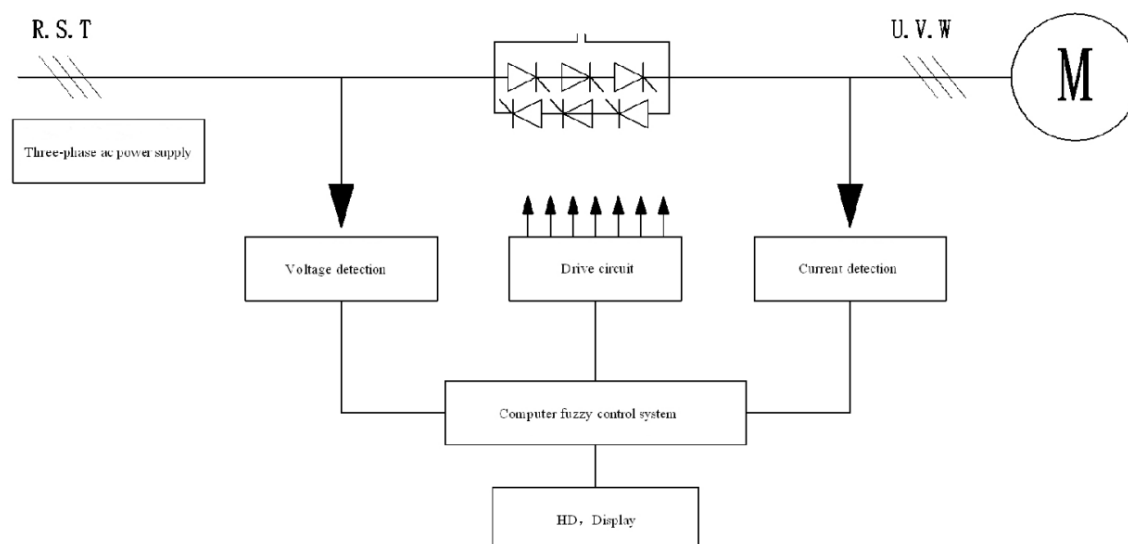
Figure (1)

Figure (1)

1.7 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**：ZRMV 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 ZRMV 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.

◆ ZRMV 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.

Section 2 Operating Instructions

2.1 Panel introduction

The device panel is composed of following elements:

a) LCD man-machine interface

b) Switcher

c) Digital display voltage meter

d) Digital display current meter

e) Operation indicator

f) Stop indicator

g) Fault indicator

h) Start-up button

i) Stop button

j) Emergency stop button

2.2 Operating principle and process

2.2.1 Wiring and check

（1）Please ensure that all switches are in off state before wiring.

（2）Install the soft start cabinet according to relevant standards of medium and high voltage cabinet.

（3）Major loop connection: Terminal R-S-T connects to power source.

Terminal U-V-W connects to motor.

（4）Control terminal connection: the power AC220V/50Hz provided by clients connects to the corresponding position of client terminal in low voltage chamber.

（5）Earthing: Connect the grounding cable to GND of the cabinet.

Check whether the major loop voltage and control loop voltage match the voltage of the soft starter.

The soft starter reserves part of signals on external wiring terminal and users may conduct wiring as needed.

2.2.2 Power on and operation

（1）When the micro circuit breaker of AC220V control power is placed at closed position, the LCD man-machine interface on the panel of the soft starter indicates "STOP", stop indicator (green) is lighted up and digital display voltage/current meters are lighted up respectively.

（2）When the upper primary power switch is placed at closed position, the LED of live display on the panel of the soft starter is lighted up indicating that three-phase power supply is switched on and digital display voltage meter displays the voltage of three-phase power supply.

（3）In standby, Browse internal set parameters of the soft starter to ensure that parameter setting matches the actual load.

（4）Please ensure that operating work is done when the current three-phase power supply is normal.

2.2.3 Way to control

(1) This device has three control modes including local,remote and DCS control. Users can change the control mode via the switcher on the panel(forbidden to change the control mode during the operation of the device).

(2) The startup control of this device has soft start and direct start.

Soft start mode: Turn the switcher to the position of "soft start"and press the startup button(green)to start the motor.Users can observe the starting course of the motor and the current via digital three-phase ampere meter

mounted on the device. After the startup of the motor, it automatically switches to bypass state and the operation indication indicating lamp on the device is lightened up(red).

Press the red stop button on the panel in the process of startup and operation, the motor will stop and indicator lamp on panel will be lightened up (green).

When a fault is detected in the soft starter, the fault indicator lamp (yellow) on the panel will be lighted up and the motor will stop automatically.

The next operation shall not be allowed until fault is removed (users can remove the fault display on the panel by cutting off the external AC220V power supply)

Direct start mode: Turn the switcher to the position of "direct start",press the startup button(green)and the vacuum contactor sucks up.Users can observe the starting course of the motor and the current via digital three-phase ampere meter mounted on the device. The motor operates directly through the vacuum contactor and the operation indicating lamp on the device is lightened up(red).

Press the red stop button on the panel in the process of startup and operation, the motor will stop and indicator lamp on panel will be lightened up (green).

When a fault is detected in the soft starter, the fault indicator lamp (yellow) on the panel will be lighted up and the motor will stop automatically.

The next operation shall not be allowed until fault is removed (users can remove the fault display on the panel by cutting off the external AC220V power supply)

In case of emergency occurs in the process of starting and operation, please press the emergency button on the panel of the soft starter for emergency stop.

The device is defaulted as local control, soft starting mode and the interlocking signal of switch cabinet is at closed position when it is delivered.

If the high voltage solid soft starter is one for multiple, please operate the device according to the method mentioned above. The second motor should be started with the interval greater than 10 minutes after the first motor starts.

Section 3 Installation

3.1 Specification and dimension

Voltage Grade	Specification	Rated Current (A)	W (mm)	H(mm)	L (mm)
3000V	ZRMV-400-3	100	1000	2300	1500
	ZRMV-630-3	150			
	ZRMV-1600-3	400	1300	2300	1600
	ZRMV-2500-3	≥600	Reserved		
6000V	ZRMV-420-6	50	1000	2300	1500

	ZRMV-630-6	75			
	ZRMV-1250-6	150			
	ZRMV-1600-6	200	1300	2300	1600
	ZRMV-2500-6	300			
	ZRMV-3300-6	400			
	ZRMV-4150-6	500			
	ZRMV-5000-6	≥600	Reserved		
10000V	ZRMV-420-10	30	1000	2300	1500
	ZRMV-630-10	45			
	ZRMV-800-10	60			
	ZRMV-1250-10	90			
	ZRMV-1500-10	110			
	ZRMV-1800-10	130			
	ZRMV-2250-10	160			
	ZRMV-2500-10	180			
	ZRMV-2800-10	200			
	ZRMV-3500-10	250			
	ZRMV-4000-10	280			
	ZRMV-4500-10	320	1300	2300	1600
	ZRMV-5500-10	400			
	ZRMV-6000-10	430			
	ZRMV-7000-10	500			
	ZRMV-8500-10	≥600	Reserved		

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

✧ Notice: 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.

3.2 Acceptance and unpacking

Tests of all the functions and running tests are made on every ZRMV soft starter before delivery. After receiving and unsealing the starter, please check according to the following steps. If problems are found, please contact the supplier immediately.

◆ Confirm that the product models you receive are the same as that you ordered. Product model is shown on the nameplate.

◆ Check whether the product is equipped with certificate of qualification, delivery inspection report, warranty card, product description and wiring diagram.

◆ Observe whether the product is damaged during transport and handling.

◆ Check whether the mechanical parts become loose and whether the line is broken during transport and

handling. Loose wiring will increase the impedance and interfere with the functions of the product.

3.3 安装（**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.
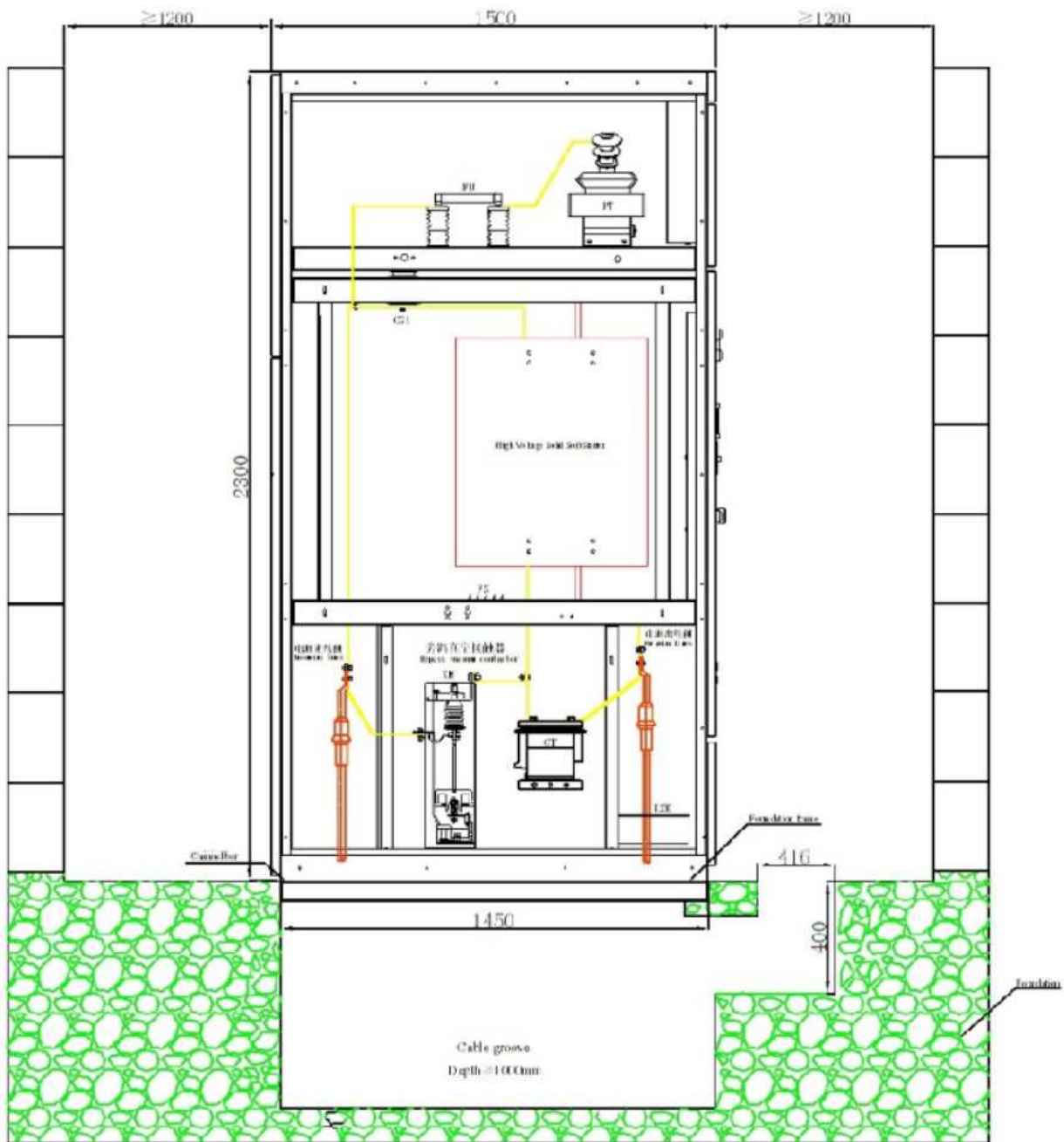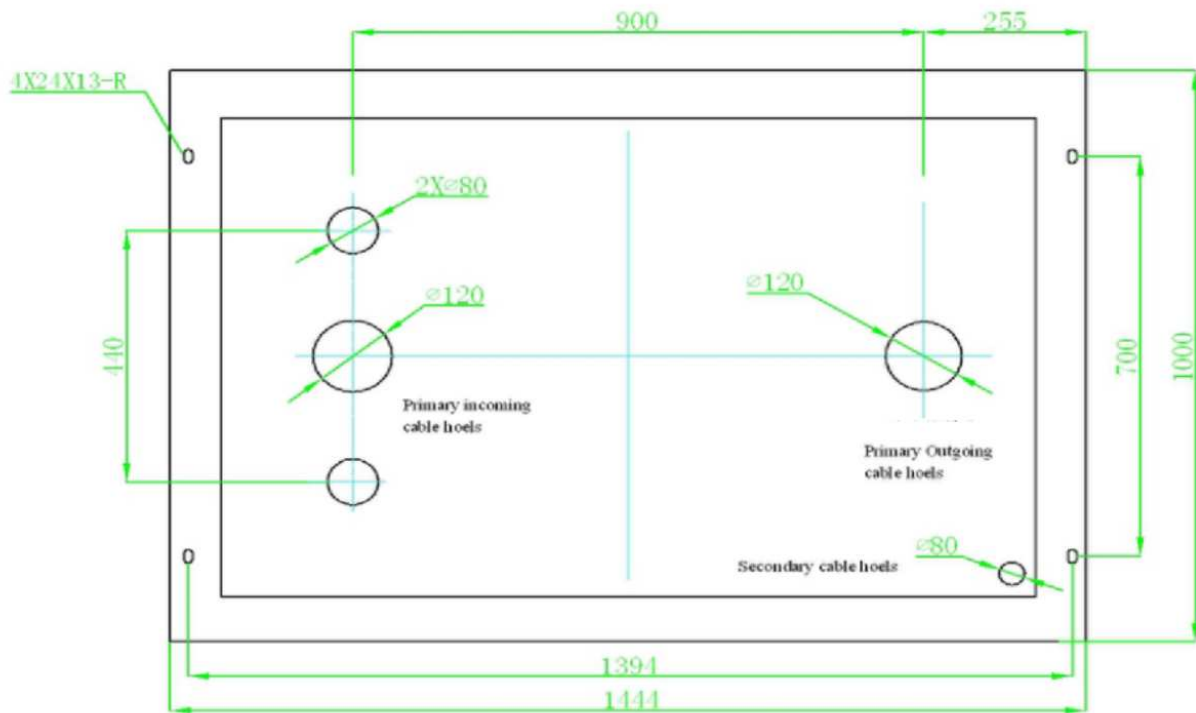
3.4 Additional reconstruction of the equipment

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.

Section 4 Operation of LCD Display

4.1 Functional description of keys

Signs	Item	Functional Description
Enter	Enter Key	Enter the parameter menu, and confirm the data of parameter items to be altered
Up	Increase Key	Increase parameter items or data
Down	Decrease Key	Decrease parameter items or data
Clean	ESC key	Confirm the altered parameter data and escape from the parameter items and parameter menu
Run	Run Key	The key can be used for running operation when effectively operated, and at this time the terminal 3 and 5 on the terminal block X1 are short-circuited.
Stop	Stop Key	The key can be used for stopping operation when effectively operated. Pressing the stop key for four seconds at the state of fault can reset the current fault.

4.2 Operation flow for altering parameter items

Functional description of Symbols：

$\ominus$—Enter key、 $\bigwedge$—UP key、 $\bigvee$—Down key、

$\copyright$—Clean key、 $\textcircled{|}$—Run key、 $\textcircled{0}$—Stop key

Browse the menu
Functions of submenu

Stand by

Press ⊖ key

Input password

key=xxx

Functions of main menu

Basic setup M1
Basic setup M2
Functional setup C
Record display N

Alter the parameter items

Save and back

Functions of submenu

Start mode
Step voltage
Step time
Start voltage/current
Start time
Multiple of current limit
Secondary starting allowed
Soft stop time
Final voltage of soft stop
Braking time
Rated current of motor
Class of overload protection
Imbalance of phase current
Over-current protection during running
Underload protection class
Underload protection time
Undefined parameter
Electrical leakage locking detection
Phase sequence detection

Functions of submenu

Browse the menu

Rated current of soft start
Current measurement and calibration
Current display accuracy
Accumulated number of times of running
Accumulated running time
Parameters of manufacturer
Record of number of faults
History record of faults

Alter the parameter items

Save and back

Basic setup M2 is same as basic setup M1

Functions of submenu

Browse the menu

Alter the parameter items

Save and back

Language selection
Display the selection
Run\Stop control mode
Function of digital interface D1
Function of digital interface D2
Selection of number of poles of motor
Analog input and output
Analog output mode
Macro control selection function
Macro control delay
Upper value of analog input
Lower value of analog input
Output relay K1
K1 output delay
Output relay K3
K3 output delay
K2 output delay
Timing stopping time
Communication address
Baud rate of communication
Start time limit
Undefined parameter
Undefined parameter
Undefined parameter
Undefined parameter
Undefined parameter
Password for entering parameters
Undefined parameter
Undefined parameter

Section 5 Start

Warning: ZRMV has potential voltage that may cause injury to human body, so it must be operated by the authorized and trained personnel. It can be put into operation only with the power line and motor line connected. The whole system can be tested electrically under low voltage (AC380V) before operating with high voltage.

5.1 Procedures for low voltage test

◆ Ensure that there is no any voltage on the electric parts.

◆ Check whether all conductors are well connected.

◆ Connect the input power supply (three-phase AC380V) to the input connecting terminals (R, S, T) of the soft starter.

◆ Pull out the three-phase synchronous plug on the main control board, and plug in the low voltage synchronous test wire, with the other side of the test wire connected to the incoming line sides R, S and T in the major loop.

◆ Connect AC220V power supply to the external control terminal L and N.

◆ Connect LV test load to U, V, W ends of ZRMV soft starter.

◆ Close the under-voltage protection function in the starter (refer to internal wiring diagram of the starter).

◆ After ensuring that all wirings are correct, close the QF circuit breaker in the cabinet.

◆ Close the door of the cabinet and get ready for low voltage test.

◆ Connect with AC380V power supply, and observe whether the starting of the load is normal or not by operating the start and stop button on the panel of the starter.

Remove the wiring after test and prepare for high voltage test.

5.2 Procedures for high voltage test

◆ Connect AC220V power supply to the external control terminal L and N1.

◆ Connect the input high voltage power supply to the input connecting terminals (R, S, T) of the soft starter.

◆ Connect the high voltage motor to the output connecting terminals (U, V, W) of the soft starter.

◆ After ensuring that all wirings are correct, close the QF circuit breaker in the cabinet.

◆ Close the door of the cabinet and be ready for high voltage test.

◆ Check whether the setting current of the soft starter matches the actual rated current of the motor.

◆ Check the starting control parameters of the motor, and refer to the detailed description in the programming part of Section 5 if the parameters need to be corrected.

◆ Observe whether the starting of the load is normal or not by pressing the start and stop button on the panel of the starter.

## 5.3 Control mode of soft start
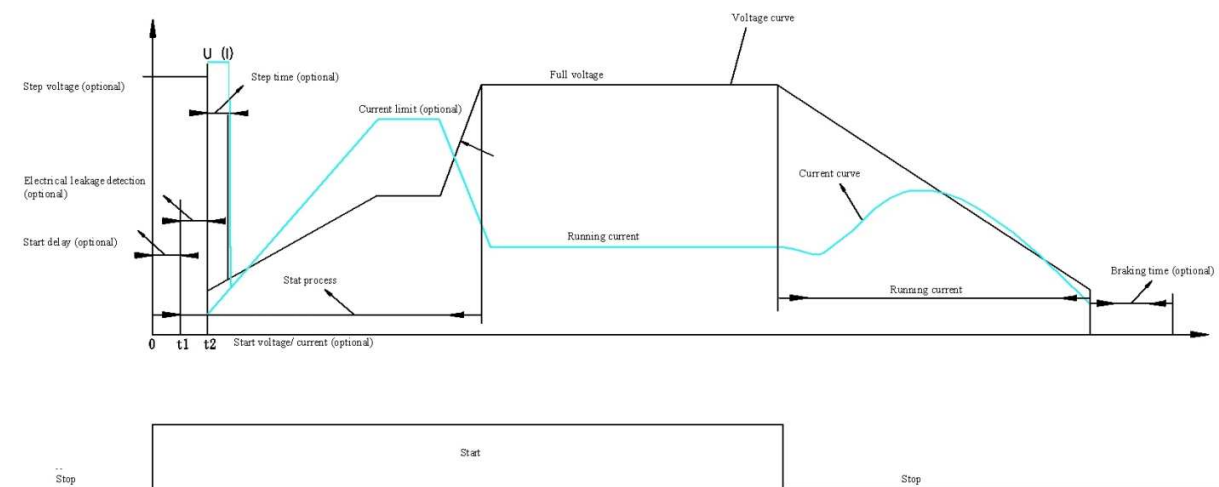
Characteristics Curve of Soft Start/Soft Stop Voltage (Current) Figure (2)

ZRMV series soft starters have many start modes: current-limiting soft start, voltage linear curve start, voltage exponential curve start, current linear curve start, current exponential start; and many stopping modes: free

stop, soft stop, braking, soft stop + braking, and inching function. Users can choose different starting and stopping modes according to the load and specific service conditions.

5.3.1 Current limiting soft start

Under the mode of current limiting soft start, set the ramp time at zero. After the softer starter receives the starting order, its output voltage increases rapidly until the output current reaches the desired limited current amplitude value Im, and the output current does not become larger any longer; the current decreases after the motor runs and accelerates for a period of time, and the output voltage increases rapidly until the output with full voltage, and the starting process is completed.
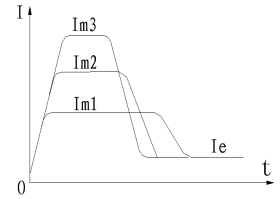
Parameter	Description	Range	Set value	Value
F03	Ramp time	0～120S	0	10
F04	Current limit	100～500%Ie	—	350

Note: "---" means that customer can set according to specific application.

5.3.2 Exponential curve of voltage

Output voltage increases with the exponent characterizes at the desired ramp time, and at the same time, the output current increases at a certain rate. When the start current increases to the limited current amplitude value Im, the current keeps constant until the starting is finished. In this mode, ramp time and multiple of current limit shall be set.

Parameter	Description	Range	Set value	Value
F01	Ramp mode of start	0～3	0	0
F02	Initial voltage	20～100%Ue	---	30%
F03	Ramp time	0～120S	---	10
F04	Current limit	100～500%Ie	---	350

5.3.3 Linear curve of voltage

Output voltage increases with the linear characterizes at the desired ramp time, and at the same time, the output current increases at a certain rate. When the start current increases to the limited current amplitude value Im, the current keeps constant until the starting is finished.
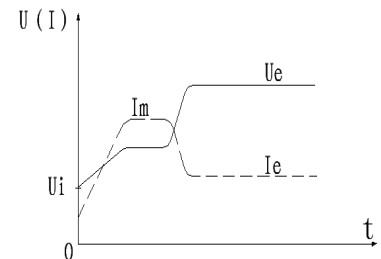
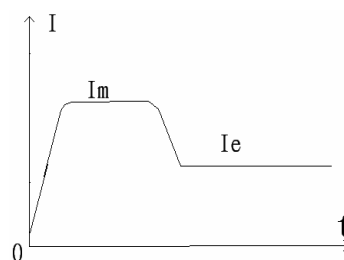| Parameter	Description	Range	Set value	Value
F01	Ramp mode of start	0～3	1	0
F02	Initial voltage	20～100%Ue	---	30%
F03	Ramp time	0～120S	---	10
F04	Current limit	100～500%Ie	---	350

5.3.4 Exponential curve of current

Output current increases with the exponent characterizes at the desired ramp time. When the start current increases to the limited current amplitude value Im, the current keeps constant until the starting is finished. In this mode, ramp time and multiple of current limit shall be set.

Parameter	Description	Range	Set value	Value
F01	Ramp mode of start	0～3	2	0
F02	Initial current	20～100%Ie	---	30%
F03	Ramp time	0～120S	---	10
F04	Current limit	100～500%Ie	---	350

5.3.5 Linear curve of current

Output voltage increases with the linear characterizes at the desired ramp time. When the start current increases to the limited current amplitude value Im, the current keeps constant until the starting is finished.

Parameter	Description	Range	Set value	Value
F01	Ramp mode of start	0～3	3	0
F02	Initial current	20～100%Ie	---	30%
F03	Ramp time	0～120S	---	10
F04	Current limit	100～500%Ie	---	350

5.3.6 Soft Start with step torque

The soft start mode with step torque is mainly applicable for the load motor with relatively big stiction. The static friction torque can be overcome by applying a relatively large transient starting torque. Under this mode, the output voltage reaches the step voltage fast, and falls to the start voltage after the time reaches the preset step time. Stable start is then realized in accordance with the preset start voltage/current and ramp time, until the starting is finished.

Parameter	Description	Range	Set value	Value
F02	Initial voltage\current	(20~100%)Ue\ (20~100%)Ie	---	30
F05	Voltage for kick start	20～100%Ue	---	20
F06	Duration of kick start	0～2000mS	---	0

⚠ **When using step torque start mode, it should be supported with other soft start modes and the step voltage and time are required.**

5.3.7 Free stop

Free stop mode refers to the mode with soft stop time (F08) and braking time (F10) set at zero at the same time. After receiving the stop order, the soft starter firstly locks the control relay of the bypass contactor, and subsequently locks the output of the thyristor of the main circuit, and the motor stops freely, depending on the inertia of the load.

Parameter	Description	Range	Set value	Value
F08	Ramp down time	0～120S	0	0
F10	Braking time	0～250S	0	0

5.3.8 Soft stop

Soft stop refers to the stop under the state of full voltage when the soft stopping time is not set at zero. Under such mode, the soft starter will firstly cut off the bypass contactor, and the output voltage of the soft starter will decrease to the desired soft stop final voltage value gradually within the desired soft stopping time. After the soft stop is finished, the starter turns to braking state (braking time is not zero) or stops freely.

Parameter	Description	Range	Set value	Value
F08	Ramp down time	0～120S	―――	0
F09	Final voltage of soft stop	20～60%Ue	―――	20
F10	Braking time	0～250S	0	0

5.3.9 Braking

When the braking time (function item F10) is preset and the braking time relay output is selected, after the softer starter stops freely, the output signal of the braking time relay will keep valid within the stop (braking) time. The output signals of the time relay are used to control the external braking units or electric control units with mechanical band-type braking.

Parameter	Description	Range	Set value	Value
F08	Ramp down time	0～120S	0	0
F10	Braking time	0～250S	―――	0
P10	Output signal of relay K 1	0～8	4	3
P12	Output signal of relay K 3	0～8	4	7

5.3.10 Soft stop + braking

When the soft stopping time and braking time are set, the soft starter will firstly cut off the bypass contactor, and the output voltage of the soft starter will decrease to the desired soft stop final voltage value gradually within the desired soft stopping time. After the soft stop is finished, it will brake within the preset braking time.

Parameter	Description	Range	Set value	Value
F08	Ramp down time	0～120S	---	0
F09	Final voltage of soft stop	20～60%Ue	---	20
F10	Braking time	0～250S	---	0
P10	Output signal of relay K 1	0～8	4	3
P12	Output signal of relay K 3	0～8	4	7

5.4 Parameters and Description

Customer may inquire or modify a parameter by scrolling through the main menu and four submenus which

involve all parameters can be modified and settings that can inquired. Customer can choose Chinese or English as displaying language according to different condition.

5.5 Control parameter list of soft starter

5.5.1Start/stop control parameters

All parameters should be set when in state of stand by.

Parameter	Item	Range	Value
F00	Rated motor current	Rated current setting of motor	---
F01	Ramp mode of start	0. Voltage ramp start exponent curve; 1. Voltage ramp start linear curve; 2. Current ramp start exponent curve; 3. Current ramp start linear curve;	0
F02	Initial voltage/current	(20～100%)Ue/(20～100%)Ie	30%
F03	Ramp time	0～120S	10
F04	Current limit	100～500%Ie	350
F05	Step voltage	20～100%Ue	20%
F06	Step time	0～2000mS	0
F07	Secondary start allowed	0～60S	0
F08	Soft stop time	0～120S	0
F09	Final voltage of soft stop	20～60%Ue	20
F10	Braking time	0～250S	0

5.5.2Specifications of start/stop control parameters

◆ **Start/stop control parametersF00----F10(refer to section 5.3 for start control modes**)

Users can select the start curve by parameter F01 to make the start curve fit in well with the practical load and achieve the optimal start effect. If the step voltage and step time are set, the starter will apply a relative large transient starting torque at the beginning of starting, and then perform the start according to the preset start voltage/current and ramp time. If secondary start time is set, in the case that the start is still unfinished after the time reaches the preset secondary ramp time, the secondary start will be carried out in accordance with the preset start voltage/start current and ramp time. In the process of starting, the start current is limited below the value set by means of the parameter F04. When F04 is set at 500%, the start current will not be limited in the process of starting.

Notice: When the voltage ramp start is selected as the starting mode, the parameter F02 represents start voltage; while when the current ramp start is selected as the starting mode, the parameter F02 represents start current. If the stop order is issued in the process of starting, the stop can only be free stop; if the stop order is issued after the starting is finished, the stop can be free stop, soft stop or braking.

The parameter F03 length of ramp time can decide when the starting torque can be increased to the final torque. If the ramp time is relatively long, a relatively small accelerating torque will be produced during the starting of the motor. In such way, long-time soft acceleration of motor can be realized. The length of ramp time shall be selected properly, so as to make the motor able to carry out soft acceleration until the rated speed is attained. In the case that the accelerating time finishes before the acceleration of the motor is finished, the torque will be limited to the preset torque limit within a certain period of time. Therefore, the ramp time here represents the rate at which the

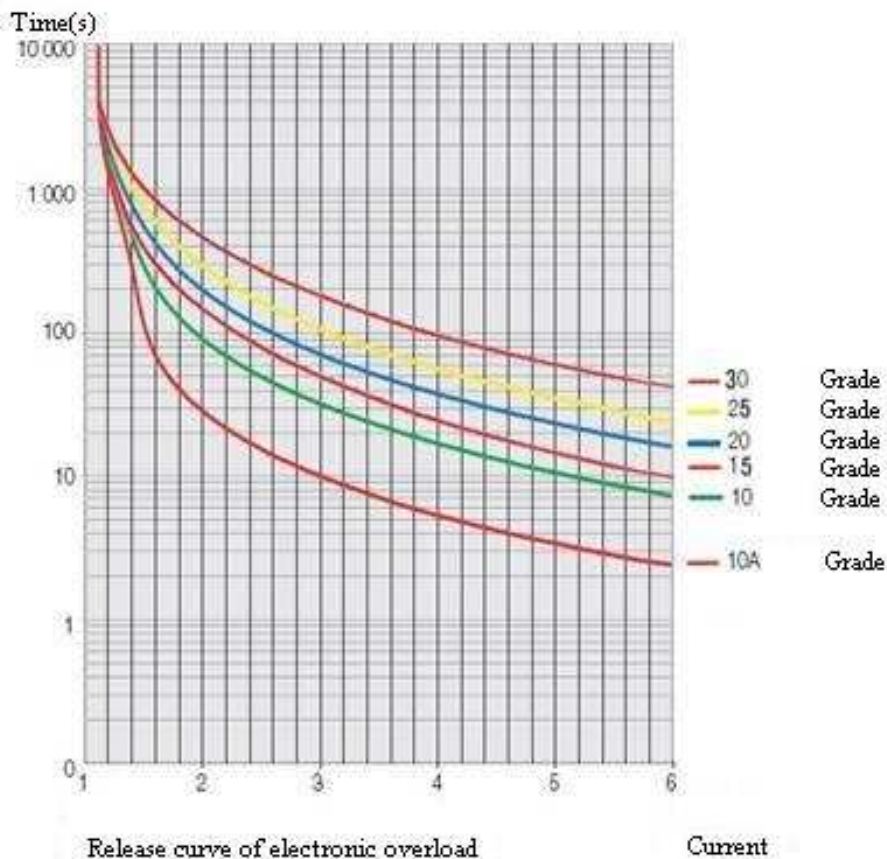speed changes, and does not completely equal to the start time of the motor.

5.5.3 Protection parameters

Parameter	Item	Range	Value
F11	Overload protection grade	5A、10、15、20、25、30	20
F12	Unbalanced phase current protection	0～100%	70%
F13	Over-current protection setting in operation	20～500%Ie	150%
F14	Underload protection grade	0～99%	0
F15	Action time of underload protection	0～250S	10
F16	Phase sequence detection	0. Disable 1. Enable	0

5.5.4 Specifications of protection parameters

◆ **Protection parameters F11---F16**

Users can set F00, the rated current of motor, according to the power of the motor, so as to make the soft starter fit in well with the motor and protect the motor perfectly. The soft starter will carry out the over-current protection when the current exceeds the over-current protection value set by means of the parameter F13 in the process of running. If the electronic heat overload class and tripping time set by means of the parameter F11 are exceeded, the soft starter will carry out overload protection. The soft starter can also perform underload protection according to the parameter F14 and F15. In addition, the soft starter can inspect three-phase current at all times, and perform phase current imbalance protection when the three-phase current exceeds the imbalance degree set by means of F12. It will display the type of the fault in the interface while providing protection, which can facilitate the search of users.

Release curve of electronic overload

5.5.5 Senior Parameters

Parameter	Item	Range	Value
P00	Display options	0-rate current of motor 1-average current 2-R current 3-S current 4-T current 5-analogue input (%) 6-output voltage (%) 7-start countdown 8-brake countdown	1
P01	Control mode of run/stop	0-panel run disabled /485 collective control disabled 1-panel run enabled /485 collective control disabled 2-panel run disabled /485collective control enabled 3-panel run enabled /485collective control enabled 4-panel jog enabled /485collective control disabled 5-panel jog enabled /485collective control enabled 6-panel jog disabled /485collective control enabled 7-panel jog disabled /485collective control disabled	1
P02	Signal of digital input terminal D1	0-F2 parameter 1-fault reset 2-jog 3-Closed contact macro control 4- Break contact macro control, 5-emergency input 6-time delay relay input	1
P03	Signal of digital input terminal D2	0-F2 parameter 1-fault reset 2-jog 3-Closed contact macro control 4- Break contact macro control 5-emergency input 6-electrical leakage locked input	1
P04	Analogue input and output	0-0~20mA analogue input and output (input logic plus) 1-4~20mA analogue input and output (input logic plus) 2-0~20mA analogue input,4~20mA analogue output (input logic plus) 3-4~20mA analogue input,0~20mA analogue output (input logic plus) 4-0~20mA analogue input and output (input logic minus) 5-4~20mA analogue input and output (input logic minus) 6-0~20mA analogue input,4~20mA analogue output (input logic minus) 7-4~20mA analogue input,0~20mA analogue output (input logic minus)	1
P05	Type of analogue output	0-average current 1 (0-200Ie)% 1-average current 2 (0-400Ie)%	0
P06	Function of macro control	0- macro control disabled 1-RUN macro control delay 2-digital input 1 COM connected macro control 3-digital input 2 COM connected macro control 4-analogue input macro control	0
P07	Macro control delay	0～250S	0
P08	Top limit of analogue input	0~~100%	80
P09	Lower limit of analogue input	0~~100%	20
P10	output signal of relay K1	0-full voltage 1-motor starting 2-soft stopping 3-fault 4-braking, 5-motor running 6-programmble time delay 7-electrical leakage detecting 8-under load protection(does not trip as a fault)	3
P11	K1 output delay	0~250s	0

P12	output signal of relay K3	0-full voltage 1-motor starting 2-soft stopping 3-fault 4-braking, 5-motor running 6-programmble time delay 7-electrical leakage detecting 8−under load protection(does not trip as a fault)	7
P13	K3 output delay	0~250S	0
P14	K2 output delay	0~250S	2
P15	Programmable operation timing	0---999.9h (valid when run is disconnected with com)	0
P16	Address for communication	1-32	1
P17	Baud rate	0-（600） 1-（1200） 2-（2400） 3-（4800） 4-（9600） 5-（19200）	4
P18	Time limit for starting	0~120S	80
P19	Password	0-----9999	----

5.5.6 Explanation of senior parameters

◆ **Parameter for displaying and run\stop control P00—P01**

Customer may choose the language for interface, and there are Chinese and English to select. Customer may scroll through the items that High Voltage Solid Soft Starter is monitoring by pressing button UP/Down when it is in operation, includes rate current of motor Ie, average current I, phase current R, phase current S, phase current T, % of analogue input, % of output voltage, countdown to start and countdown to brake. Moreover, customer can fix a item to display by setting up parameter P00. Parameter P01 are used to select control mode of run\stop. Customer may run or stop High Voltage Solid Soft Starter remotely through corresponding terminals no matter which control mode is selected.

◆ （**Function selection for digital input terminal P02—P03**

➢**F2 parameter**：High Voltage Solid Soft Starter provides a second set of primary parameters which can be selected by connecting terminal D1\D2 and COM. (When D1\D2 is set F2 parameter.) Disconnect D1\D2 and COM to select F1 primary parameter.

➢**Fault reset:** High Voltage Solid Soft Starter will start motor again if a run command present when the fault is reset.

➢**Jog**：Customer may jog the motor through panel (when parameter P01 is set panel jog enabled). Keep pressing button RUN to jog motor and release the button to stop. This function can be realized by connecting or dis-connecting the digital input terminal D1\D2. Connect it to jog and dis-connect it to stop.

➢**Emergency input**：disconnect D1\D2 and COM to stop motor emergently when D1\D2 is set emergency input and LCD panel will display a emergency stop page.

➢ **Time delay relay input**：the corresponding programmable relay should be set programmable time delay output when D1 is set time delay relay input. The corresponding relay will put out a signal (when time delay of the relay is up) if D1 is connected.

➢**Note：when macro control is selected, to connect or dis-connect the terminal is concerned with function of macro control. Please refer to function explanation of macro control.**

◆ **Analogue input\output selecting parameters P04—P05**

Customer may choose the range and signal type of analogue input\output according to particular application.

◆ **Macro control selecting parameters P06—P09**

Customer may start or stop High Voltage Solid Soft Starter automatically by applying a macro (need to start

the macro by button RUN on the panel). The following is explanation for parameter item P06.

➢**Macro control disabled：** starting or stopping of High Voltage Solid Soft Starter is not related to macro but is related to setting of parameter item P01 and connection of control terminals.

➢**RUN macro control：** start to run when time delay set by parameter P07 is up if the run command is valid. The time delay is only related to motor start but not to operation of macro.

➢**Digital 1　input terminal macro control：** to run or stop High Voltage Solid Soft Starter (when run command is valid). In accordance with setting of parameter P02: if it set COM dis-connected macro control：High Voltage Solid Soft Starter starts when digital input terminal D1 is connected and time delay set by parameter P07 is up. High Voltage Solid Soft Starter stops and macro stop is displayed on panel if the terminal is dis-connected during starting process. If it set COM connected macro control：High Voltage Solid Soft Starter starts when digital input terminal D1 is dis-connected and time delay set by parameter P07 is up. High Voltage Solid Soft Starter stop and macro stop is displayed on panel if the terminal is connected during starting process. Customer may dis-connect the terminal to start High Voltage Solid Soft Starter again.

➢**Digital 2　input terminal macro control：** to run or stop High Voltage Solid Soft Starter (when run command is valid). In accordance with the set of parameter P03: if it set COM dis-connected macro control：High Voltage Solid Soft Starter starts when digital input terminal D2 is connected and time delay set by parameter P07 is up. High Voltage Solid Soft Starter stops and macro stop is displayed on panel if the terminal is dis-connected during starting process. If it set COM connected macro control：High Voltage Solid Soft Starter starts when digital input terminal D2 is dis-connected and time delay set by parameter P07 is up. High Voltage Solid Soft Starter stop and macro stop is displayed on panel if the terminal is connected during starting process. Customer may dis-connect the terminal to start High Voltage Solid Soft Starter again.

➢**Analogue input macro control：** to run or stop the motor according to top limit and lower limit of the analogue input set by parameter P08 and P09. High Voltage Solid Soft Starter will stop the motor when the top limit is exceeded and will run the motor when the lower limit is outstrip (only when the run command is valid and time delay set by parameter P07 is up. Macro stop will display on panel if the macro condition is not fulfilled).

◆　**Parameter for relay output** P10—P14

There are three relays on the main board of High Voltage Solid Soft Starter and two of them are programmable. Customer may set them according to requirement and the rest is designed to control the bypass contactor.

Parameter P10、P11、P12、P13、P14：to set function of output and output delay.

➢**Full voltage:** contacts when output voltage reaches rate voltage (and time delay is up).

➢　**Starting:** soft starter is starting motor (and time delay is up). The signal will not put out if voltage increases to full before the time delay is up.

➢**Soft stopping:** the signal put out when soft starter is ramping down (and time delay is up and it is less than the soft stopping time set by parameter item F08).

➢　**Fault:** put out the signal when a fault is detected by soft starter (and time delay is up).

➢**Braking:** put out the signal when soft starter is braking (and time delay is up and it is less than the braking time set by parameter item F10).

➢**Running:** put out the signal during motor starting and running (and time delay is up).

➢**Programmable time delay:** parameter P02 must set time delay relay input which is regarded as a time delay relay.

➢**Under load protection (does not trip as a fault)：** the signal is put out when under load is detected (and preset time delay is up) but is not treated as a fault.

◆　**Parameter for operation timing** P15

Minimum set value of this parameter is 0.1h if it is needed. The parameter means High Voltage Solid Soft Starter will stop motor within the time in preset mode after motor starts up.（valid when dual-node control mode is applied）

◆ **Parameters for communication and password lockout** P16—P17、P19

在进行网络通讯时，可连接 32 台设备，并可通过 LCD 显示屏查看当前的通讯地址。参数 P19 进行功能项的密码设置，实现设置参数的密码保护。

32 High Voltage Solid Soft Starter soft starters can be connected to the net when collective control is required and customer can read present address through LCD panel. Parameter item P19 is to set password to parameter modification so that the settings are lockout.

5.5.7 Parameters for displaying and recording

Parameter	Item	Range	Value
S00	Rate current of Soft Starter	Can not be modified	----
S01	Total operations	Can not be modified	---
S02	Total operating time	Can not be modified	---
S03	Rectification to current measuring	Can not be modified	---
S04	Precision of displaying current	Can not be modified	---
S13- S14	Parameter for manufacturer	Can not be modified	---
S15	Fault record No.	Can not be modified	---
S16-S30	Fault history	Can not be modified	---

Display and record parameters and record the operation and status information of soft starter .This function should not be modified.

Section 6 Maintenance and Troubleshooting

ZRMV series products are designed to be free of maintenance. Like other electric equipments, this equipment should be regularly checked for fear of dust pollution, damp and environmental pollution resulted from industrial production. Serious pollution may result in high voltage discharge and affect the heat dissipation of SCR's cooler.

6.1 Fault analysis

When a fault occurs, the corresponding fault information will be displayed on LCD touch screen. The motor should be restarted after the fault is cleared. If the fault still can not be cleared using correct operating method and program processing, please contact the manufacturer.

6.2 Fault code

The soft starter has multiple protective functions. When the protective functions act, the soft starter will stop immediately and the current fault information will be displayed on LCD screen, touch screen and panel. Users can analyze and clear faults according to fault information.

Fault code	Fault	Cause	Troubleshooting
01	system failure	system failure	Contact the supplier or manufacturer
02	Primary power phase loss	Phase loss in starting or operation.	Check the reliability of three-phase power
03	Over-current in operation	Load suddenly becomes heavy. Load variation is too large.	Adjust load running state Adjust F13

04	Start timeout	Overburdened and start time is too short. Current limiting amplitude is too small.	Adjust ramp time F03 Adjust current limiting amplitude F04
05	Unbalanced phase current	Phase loss or phase voltage is unbalanced	Adjust F12
06	Electronic thermal overload	The duration of heavy current is too long. Overload operation or not.	Check if motor current is wrongly set. Overload or not.
07	Internal prohibition	Violate operating instruction	Ensure operating instruction
08	Phase sequence error	Phase sequence reservedly connected.	Adjust phase sequence or set phase sequence free of check.

6.3 Fault history

This starter can at most record the recent 15 faults information for users.

6.4 Troubleshooting

As fault has memory, after fault is cleared, you can reset fault through pressing button "STOP" for above 4 seconds, external fault clearance input terminal (D1 or D2 multifunction input) or cutting off AC220V control power to restore the starter to the state of ready to start.

6.5 Maintenance

The working field should be regularly cleaned to reduce dust in ambient environment.

The low and high voltage bins of ZRMV series high voltage soft starter should be regularly cleaned. It is necessary to use a brush or blower to remove dust inside bin (period less than 20 days)

It is also important to clean thyristor valve block. A blower with big power can be used to clean the valve block by blowing from up to down. Clean the field after blowing the thyristor valve block (period less than 6 months)

To ensure the normal operation, ZRMV series high voltage soft starter should be regularly dehumidified if the working field is wet. (Period is depended on the circumstance)

Considering that there is shake in working field when the soft starter is started, the secondary control wiring of ZRMV series high voltage soft starter should be regularly checked to examine whether the connecting terminal is loose. If yes, tighten the loose connecting terminal. (3 months as a period)

Section 7 Communication description

ZRMV series motor soft starter is provided with RS485 interface port for communication and adopts the standard Modbus protocol for communication between central devices and subsidiary devices. Customer may realize collective controlling by PC/PLC and upper computer to meet particular application.

7.1 Contains of the protocol

The Modbus serial communication protocol identified contents of frame, which is asynchronous transmitted,

and format of feedback frame from subsidiary devices. Frame contents of central device includes: addresses of subsidiary devices, command, data and error checking etc. Feedback of subsidiary devices is in the same structure. It includes: acknowledge of running, feedback data and error checking etc. The subsidiary device will organize a fault frame to central device as a feedback if error occurs or it can not execute the movement that central device required during frame receiving.

7.2 Structure of bus

（1）Interface port

RS485 communication port of hardware

（2）Mode of transmission

It is half-duplex asynchronous serial transmission. Communication between central devices and subsidiary devices is one-way transmission. Data is transmitted in the form of message and is sent frame by frame during the serial asynchronous communication.

（3）Structure of topology

It is a system formed by a central device and several subsidiary devices. Address of subsidiary devices is from 1 to 30 and the address for each subsidiary device is unique. This forms the foundation of ModBus serial communication.

7.3 Description of protocol

Communication protocol of ZRMV is serial asynchronous master-slave communication protocol. Only master device is suppose to set up the protocol and all slave devices response to "inquire and command" sent from master device by providing data or react according to "inquire and command". Mater device here refers to personal computer (PC), industrial control devices or programmable logic controller etc. While for slave devices refers to ZRMV soft starter or other control devices with same communication protocol.

7.4 Frame structure

Format of communication data of ZRMV soft starter's ModBus protocol is RTU (remote terminal unit). The following is format of each bite in RTU：

Code system： 8-bit binary

Hexadecimal 0—9、A—F,

Each 8-bit frame field includes two hexadecimal characters.

New transmission always starts with a silence period of 3.5 bits' transmitting time under this mode. A silence interval of 3.5 bits' transmitting time on the net, whose transmission speed is calculated in baud rate, can be recognized easily. The silence period is followed by fields of slave device address, controlling command, data and CRC check character. Each field is transmitted hexadecimal 0…9，A…F. The net device monitors activity of Modbus continuously even in silence interval. Every net device acknowledges the character when the first field (address information) is received. When the last character is transmitted there comes another silence period of 3.5 bits' transmitting time as the end of first frame. The transmission of a new frame will start after the silence period. Information of a frame must be transmitted as a continuous data stream. Receiving device will delete the interrupted information if there is any interval longer than 1.5 bits before an entire frame is transmitted.

7.5 State control word

State control word represents the state of soft starter and is represented by one character.

Position	Value	Description
0	1	Motor starts up

1	1	Motor is starting
2	1	Motor is (soft) stopping
3	1	Jog
4	0	F1 parameter
	1	F2 parameter
5	1	Run prohibit (emergency stop)
6	1	Fault
7	0	Stop
	1	Modifying
8		Displayed item which is metering during running/modifying
9	____	
10		
11		
12	1	Brake during running time relay control
13	0	Without decimal point
	1	With decimal point
14	1	Panel control enabled
15	0	Jog enabled
	1	Run via panel

7.6 Address for communication

Register address starts from 1. If the host computer's starting address starts from 0, register registershould be reduced by 1. If the host computer's starting address starts from 1, there will be no reduction of 1.

Primary parameters 1

Designation	No. of register	Type of data	R/W character
Rate current of motor	0001H	Uint	R/W
Ramp mode of start	0002H	Uint	R/W
Initial voltage\current	0003H	Uint	R/W
Ramp time	0004H	Uint	R/W
Current limit	0005H	Uint	R/W
Voltage for kick start	0006H	Uint	R/W
Duration of kick start	0007H	Uint	R/W
Second run permit	0008H	Uint	R/W
Ramp down time	0009H	Uint	R/W
Ramp down voltage	000AH	Uint	R/W
Braking time	000BH	Uint	R/W
Grade of over load protection	000CH	Uint	R/W
Phase current unbalance	000DH	Uint	R/W
Over current protection for running	000EH	Uint	R/W
Grade of under load protection	000FH	Uint	R/W
Trip time for under load	0010H	Uint	R/W
Phase sequence detecting	0011H	Uint	R/W

Primary parameters 2

Designation	No. of register	Type of data	R/W character
Rate current of motor	0015H	Uint	R/W
Ramp mode of start	0016H	Uint	R/W
Initial voltage\current	0017H	Uint	R/W
Ramp time	0018H	Uint	R/W
Current limit	0019H	Uint	R/W
Voltage for kick start	001AH	Uint	R/W
Duration of kick start	001BH	Uint	R/W
Second run permit	001CH	Uint	R/W
Ramp down time	001DH	Uint	R/W
Ramp down voltage	001EH	Uint	R/W
Braking time	001FH	Uint	R/W
Grade of over load protection	0020H	Uint	R/W
Phase current unbalance	0021H	Uint	R/W
Over current protection for running	0022H	Uint	R/W
Grade of under load protection	0023H	Uint	R/W
Trip time for under load	0024H	Uint	R/W
Phase sequence detecting	0025H	Uint	R/W
Not identified	0026H	Uint	R/W
Not identified	0027H	Uint	R/W
Not identified	0028H	Uint	R/W

Senior parameters

Designation	No. of register	Type of data	R/W character
Item to display	0029H	Uint	R/W
Control mode of run/stop	002AH	Uint	R/W
Function of digital input terminal D1	002BH	Uint	R/W
Function of digital input terminal D2	002CH	Uint	R/W
Analogue input/output	002DH	Uint	R/W
Signal of analogue output	002EH	Uint	R/W
Macro control selecting	002FH	Uint	R/W
Macro control delay	0030H	Uint	R/W
Top limit of analogue input	0031H	Uint	R/W
Lower limit of analogue input	0032H	Uint	R/W
Output of relay K1	0033H	Uint	R/W
Output delay of Relay K1	0034H	Uint	R/W
Output of relay K3	0035H	Uint	R/W
Output delay of Relay K3	0036H	Uint	R/W
Output delay of Relay K2	0037H	Uint	R/W
Programmable running time	0038H	Uint	R/W
Address of communication	0039H	Uint	R/W
Baud rate	003AH	Uint	R/W

Time limit for starting	003BH	Uint	R/W
Password	003CH	Uint	R/W

Item to display

Designation	No. of register	Type of data	R/W character
Rate current of soft starter	0047H	Uint	R
Total operations	0048H	Uint	R
Total operating time	0049H	Uint	R
Rectification to current measuring	004AH	Uint	R
Precision of displaying current	004BH	Uint	R
Parameter for manufacturer	004CH	Uint	R
Parameter for manufacturer	004DH	Uint	R
Parameter for manufacturer	004EH	Uint	R
Software versioning	004FH	Uint	R
Parameter for manufacturer	0050H	Uint	R
Parameter for manufacturer	0051H	Uint	R
Parameter for manufacturer	0052H	Uint	R
Calibration current output	0053H	Uint	R
Parameter for manufacturer	0054H	Uint	R
Parameter for manufacturer	0055H	Uint	R
Fault records	0056H	Uint	R
Fault record No. 1	0057H	Uint	R
Fault record No. 2	0058H	Uint	R
Fault record No. 3	0059H	Uint	R
Fault record No. 4	005AH	Uint	R
Fault record No. 5	005BH	Uint	R
Fault record No. 6	005CH	Uint	R
Fault record No. 7	005DH	Uint	R
Fault record No. 8	005EH	Uint	R
Fault record No. 9	005FH	Uint	R
Fault record No. 10	0060H	Uint	R
Fault record No. 11	0061H	Uint	R
Fault record No. 12	0062H	Uint	R
Fault record No. 13	0063H	Uint	R
Fault record No. 14	0064H	Uint	R
Fault record No. 15	0065H	Uint	R

Real-time metering

Designation	No. of register	Type of data	R/W character
Operating state of main control board	006EH	Uint	R
Latest err 1	006FH	Uint	R
Latest err 2	0070H	Uint	R
Latest err 3	0071H	Uint	R

Ie—rate current of motor	0072H	Uint	R
I—average current	0073H	Uint	R
R phase current	0074H	Uint	R
S phase current	0075H	Uint	R
T phase current	0076H	Uint	R
% of analogue input	0077H	Uint	R
% of output voltage	0078H	Uint	R
Start countdown	0079H	Uint	R
Brake countdown	007AH	Uint	R

Command of controlling

Designation	No. of register	Type of data	R/W character
To stop	0082H	0081H	W
To run	0084H	0083H	W
To reset	0085H	0084H	W

7.7 Notice

(1) When there are more than two devices in the net, the address of each ZRMV should be unique, namely any two ZRMV soft starters can not posses the same address (set through parameter P16).

(2) Baud rate of ZRMV soft starter should in accordance with that of controller (set through parameter P17).

(3) A resistor of 120 Ω should be connected to both communication wires A and B of the last ZRMV when there is more than one ZRMV soft starter in a net.
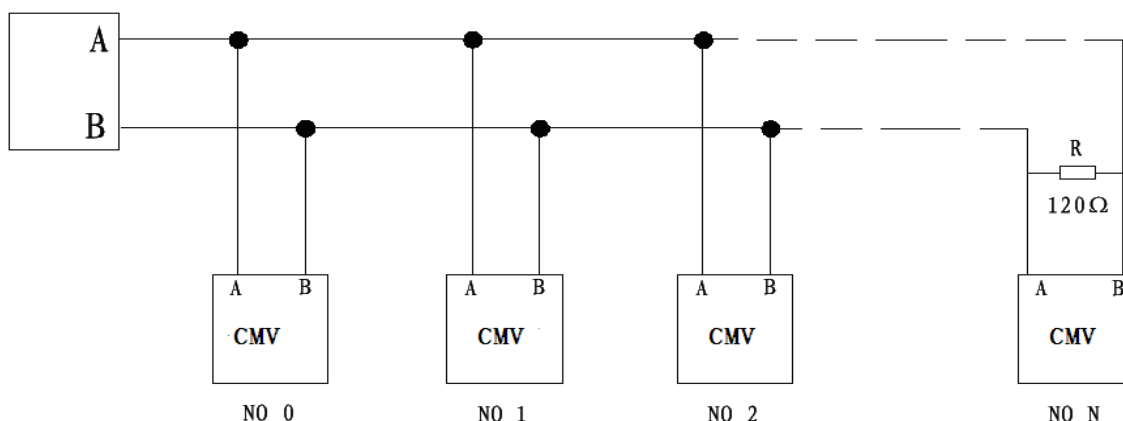

Section 8 Additional Information

8.1 Order information

Following information is required to be provided in the order:

◆ **Upper power condition**

◆ **Motor model, rated voltage, rated current, rated power and rated speed**

◆ **Motor drive load types (wind machine, water pump, etc.)**

◆ **Equipment incoming/outgoing cables**

◆ **Operating environment**

◆ **For other requirements, please contact us.**

8.2 **Schematic**

diagram
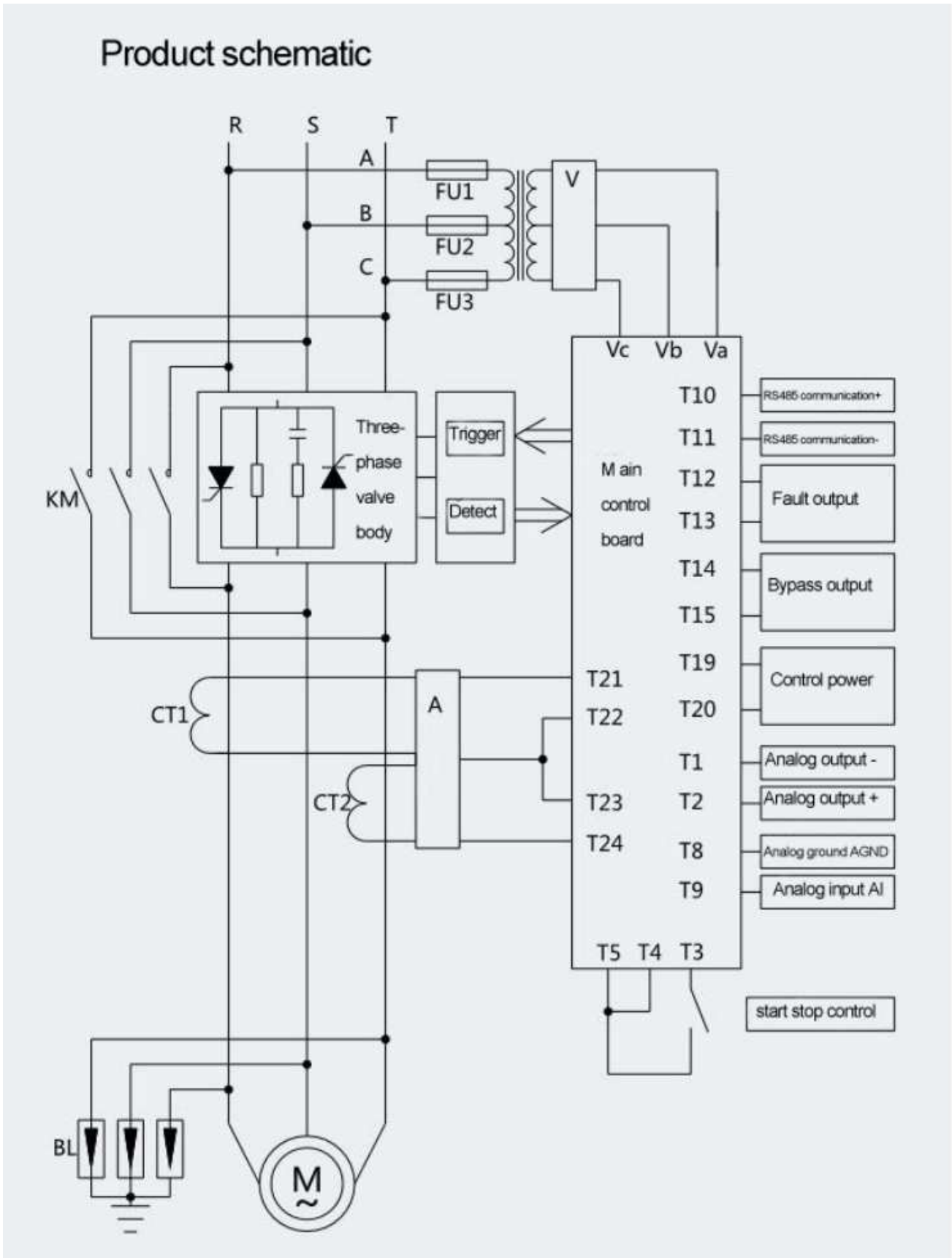
of wiring：

- The company keeps the right for product design and change, which are subject to change without prior notice.

- There maybe difference between pictures in this manual and physical object, and physical object shall prevail.

- The final power of interpretation belongs to Zhejiang Rongzhi Electric Co. , Ltd.