

安全注意事项

CAUTIONS

- 1) 主回路电源得电后即存在危险电压。
There is dangerous voltage when main circuit is energized;
- 2) 不允许将输入端(1L1、3L2、5L3)接到输出端(2T1、4T2、6T3)或(B1、B2、B3)。
It is forbidden to connect input terminal (1L1, 3L2, 5L3) to output terminal (2T1, 4T2, 6T3) or (B1, B2 and B3);
- 3) 不允许软起动器输出端(2T1、4T2、6T3) 和(B1、B2、B3)接补偿电容或压敏电阻。
It is forbidden to connect compensation capacitor or piezoresistor to output terminal (2T1, 4T2, 6T3) of soft starter;
- 4) 软起动器与变频器互为备用时，二者输出端要彼此隔离。
When soft starter and frequency converter are mutually in standby, their output terminals should be isolated from each other.
- 5) 不要试图修理损坏的器件，请与供货商联系。
Do not attempt to repair damaged components. Please contact your supplier.
- 6) 散热器的温度可能较高。
Radiator's temperature maybe much higher.
- 7) 严禁在软起动输出端反送电。
Do not reversely feed power at output terminal of soft starter.
- 8) 软起动器在起动或停止状态时，输出侧都存在高压。
Output terminal remains high voltage either when soft starter is active or in state of rest.

前 言

Foreword

感谢您使用西安西驰电气股份有限公司生产的 CMC-HX 电动机软起动器。为了充分发挥软起动器的功能，请您按规程正确操作和使用，并确保操作者的安全，在使用前请详细阅读本《产品说明书》。当您在使用中发现疑难问题而本产品说明书无法提供解答时，请与西安西驰电气股份有限公司或各地代理、经销商联系，我们将竭诚为您服务。

Thank you for choosing CMC-HX motor soft starter manufactured by Xi'an Xichi Electric Co., Ltd. In order to properly use this soft starter, please read through this Product Manual before starting operation. Please do operate this soft starter in accordance with the instructions for the purpose of ensuring the personal safety. When you have any problem to which the solution is not described in this manual, please contact our agent or dealer. We are always at your service.

第一章 CMC-HX 软起动器的作用及特点

Chapter 1 Function and Characteristic of CMC-HX Soft Starter

CMC-HX 软起动器一种新型智能化的异步电动机起动、保护装置。它是集起动、显示、保护、数据采集于一体的电机终端控制设备。用户使用较少的元件，就可实现较复杂的控制功能。而中英文界面显示又使得操作更简便。同时 CMC-HX 软起动器内部集成电流互感器，用户无需外配。

CMC-HX soft starter is a new intelligent asynchronous motor starting and protection device. It is a motor terminal control equipment that integrates start, display, protection, and data collection. With the fewer components, user can achieve more complex control functions. The Chinese and English interface display makes the operation much easier. As CMC-HX soft starter is inbuilt with a current transformer, the external one is not needed.

1.1 作用 Functions

- 降低电机的起动电流，减少配电容量，避免增容投资；
- Reduce the motor starting current, reduce the distribution capacity, and avoid capacity investment;
- 减小起动应力，延长电动机及相关设备的使用寿命；
- Reduce the starting stress, extend the life of the motor and related equipment;
- 平稳的起动和软停车避免了传统起动设备的喘振问题、水锤效应；
- Smooth start and soft stop avoid the surge problem and water hammer effect of traditional start-up equipment;
- 多种起动模式及宽范围的电流、电压等设定，可适应多种负载情况；
- A variety of start-up mode and a wide range of current, voltage and other settings can adapt to a variety of load conditions;
- 完善可靠的保护功能，更有效地保护电机及相关设备的安全；
- Perfect and reliable protective function protects motor and related equipment in a more effective manner.

1.2 特点 Characteristics

◆ 独特的 SCR 触发闭环控制算法 Unique SCR triggering close-loop control algorithm

独特的 SCR 闭环控制功能，专为标准负载和重型负载特殊设计。用户可根据负载情况选择限流起动和电压斜坡起动，实现平滑的无转矩震荡起动效果。

The unique SCR close-loop control is specially designed for standard load and heavy load. User can choose current-limit start or voltage ramp start according to load conditions so as to realize smooth start without torque oscillation.

◆ 独特的负载应用参数 Unique load application parameters

内置十种负载类型可供用户选择，针对于每类负载提供独特的起动控制曲线，一定程度使得软起动与负载进行匹配，以达到良好的起动、停止效果。

It is built-in ten types of load for users to choose. It provides a unique start control curve for each type of load to make soft start match the load to a certain extent, so as to achieve a good starting and stopping effect.

◆ 多种起动、停车方式 Multiple start and stop modes

电压指数曲线、电压线性曲线、电流指数曲线、电流线性曲线，并可在每种方式下施加可编程突跳起动转矩及起动电流限制。根据不同的负载，可选择相应的起动曲线，达到最佳的起动效果。多种停车方式，可编程软停车、自由停车、制动刹车、泵停。独特的基础算法使得电机起动、停止更加准确、平滑。

Voltage exponential curve starting, voltage linear curve starting, current exponential curve starting, current linear curve starting, and programmable step starting torque and starting current limit can be applied in each mode. According to different loads, the corresponding starting curve can be selected to achieve the best starting effect. Multiple stopping modes, programmable soft stop, free stop, braking, and pump stop. The unique basic algorithm makes the motor start and stop more accurate and smoother.

◆ **先进的通讯功能 Advanced communication function**

标配 Modbus RTU 通讯。选配以太网/GPRS 通讯模块，方便用户网络连接控制，提高系统的自动化水平及可靠性。

Standard Modbus RTU communication. Optional Ethernet/GPRS communication module makes user's network connection control easier and improves the system's automation level and reliability.

◆ **模拟信号控制 Analog signal control**

用户可输入 4—20mA 或 0—20mA 标准信号，并可进行模拟量的上、下限设定，实现对电机起、停控制及报警。还可通过软起动器进行数据(压力、温度、流量等)的传输。具有 4—20mA 或 0—20mA 标准模拟信号输出功能。

Users can input 4-20mA or 0-20mA standard signal, and conduct upper and lower limit setting of analog to achieve the start and stop control of motor and alarm. The data (pressure, temperature, flow, etc.) can also be transmitted via a soft starter. It is provided with 4-20mA or 0-20mA standard analog signal output function.

◆ **全耐火材料 Fireproof material**

90KW 以下为全塑壳结构，采用阻燃 ABS 材料加工而成，90KW 及以上功率段上盖为塑壳结构、主框架采用敷铝锌板材料加工而成，具有耐热、抗腐蚀特性。

The product of below 90KW is in plastic structure made with inflaming retarding ABS material; for the product of 90KW and above, the upper cover is in plastic structure and main frame is made of aluminium-zinc plate with features of heatproof and corrosion resistance.

◆ **可外引面板 Movable panel**

可通过机身接口将面板外引至设备操作面远程操作，方便现场使用。

The panel can be moved to the operating surface of the equipment through the machine interface for remote operation, which is convenient for onsite use.

◆ **强大的抗干扰性 Powerful anti-interference property**

所有外部控制信号均采用光电隔离，并设置了不同的抗噪级别，适应在特殊的工业环境中使用。

All external control signals are subject to optoelectronic isolation, and different anti-noise levels are set to adapt to the application in special industrial environments.

◆ **双参数功能 Dual parameter function**

具有两套基本参数，可分别控制两台不同功率的电机。

It has two sets of basic parameters to control two motors of different powers respectively.

◆ **电源频率自适应 Automatic adaption of power frequency**

电源频率 50/60Hz 自适应功能，方便用户使用。

Automatic adaption of power frequency 50/60 makes user easy to use.

◆ **动态故障记忆 Dynamic fault memory**

最多可以记录 10 次故障。便于查找故障原因。

Up to 10 failures can be recorded, making it easy to find the cause of the malfunction.

◆ **完善的保护功能 Perfect protective function**

全程检测电流及负载参数，具有过流、过载、欠载、过热、断相、短路、三相电流不平衡、相序检测、频率错误等微机保护功能。

It detects current and load parameters, having overcurrent, overload, underload, overheating, phase failure, short circuit, three-phase current imbalance, phase sequence detection, frequency error and other functions.

◆ **友好的人机界面 Friendly human-machine interface**

采用 LCD 液晶显示面板，具有中英文两种显示界面，使编程及参数调整更加方便。

The use of LCD liquid crystal display panel, Chinese and English display interface makes programming and parameter adjustment more convenient.

第二章 收货检查

Chapter 2 Goods Acceptance and Inspection

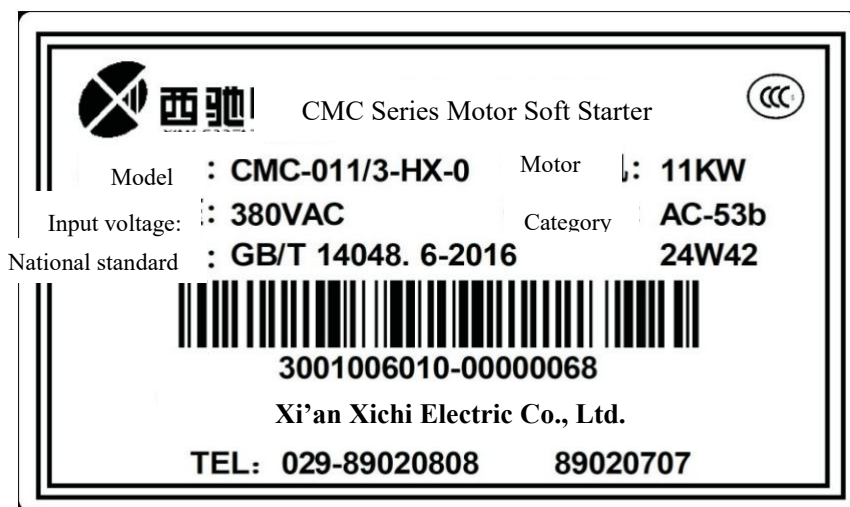
每台软起动器在出厂前均进行了全部功能及运行测试，用户在收到设备并拆封后，请按下列步骤检查。如发现问题，请立即与供货商联系。

Each soft starter has been functionally tested for normal operation before delivery. After user receives the equipment, please carry out inspection as per the following procedures. For any problem found in inspection, please contact your supplier as soon as possible.

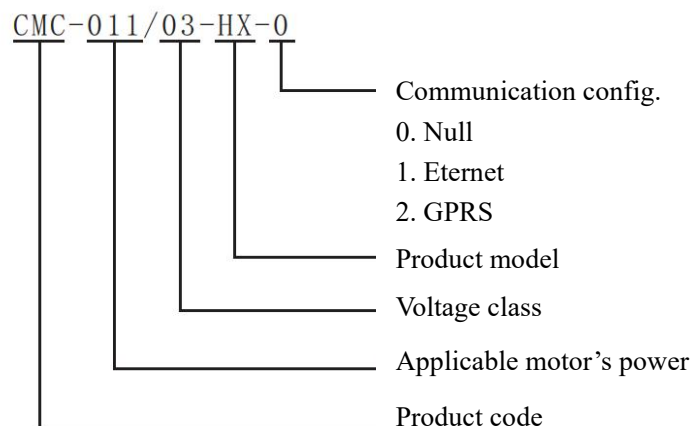
1、检查铭牌以确认收到的产品与订购的产品一致

1. Check nameplate to confirm that the equipment you receive is consistent with the one you ordered.

(1)软起动器铭牌说明 Description of soft starter's nameplate



(2)软起动器型号说明 Description of soft starter's model



2、检查产品在运输中是否有损伤，如：外壳凹陷、变形，内部连线、连接件松动等。

2. Check whether product is damaged during transport, such as housing sunken and deformed and inner wiring and connecting fittings are loose.

3、检查是否随机配备产品合格证、保修卡、装箱单、《产品说明书》等。

3. Check whether product certificate, warranty card, package list and user's manual are attached.
- 4、产品出厂后依据保修卡对产品实行保修。请您在收到货物后，认真填写保修卡并将保修卡寄回西安西驰电气股份有限公司或供货单位。
4. After delivered, the product's after-sale service shall be subject to warranty card. After receiving the product, please fill in warranty card and mail it back to Xi'an Xichi Electric Co., Ltd. or your supplier.

第三章 使用条件及安装

Chapter 3 Service Conditions and Installation

3.1 使用条件 Service conditions

控制电源 Control power	AC110V--AC220V±15% 50/60Hz
三相电源 Three-phase power	标准接线 AC380V、660V、1140V±15%，内三角接线 AC380V±15% Standard wiring AC380V, 660V, 1140V±15% Inner delta wiring AC380V±15%
标称电流 Nominal current	18A--1400A，共 24 种额定值 18A--1400A, 24 rated values in total
适用电机 Applicable motor	一般鼠笼型交流异步电机 Ordinary squirrel cage asynchronous motor
起动方式 Starting mode	电压指数曲线、电压线性曲线、电流指数曲线、电流线性曲线 Voltage exponential curve, voltage linear curve, current exponential curve, current linear curve
停车方式 Stop mode	自由停车、软停车、制动刹车、泵停 Free stop, soft stop, brake, and pump stop
逻辑输入 Logical input	阻抗 1.8KΩ，电源+24V Impedance 1.8 KΩ, power supply +24V
起动频度 Start frequency	可做频繁或不频繁起动,建议每小时起动不超过 10 次 Frequent or infrequent start available, start is advised not to exceed 10 times each other
保护功能 Protective function	过流、过载、欠载、过热、缺相、三相电流不平衡、相序检测、电机过热、频率错误等 Overcurrent, overload, underload, overheat, phase failure, three-phase current imbalance, phase sequence detection, overheat of motor and frequency error, etc.
防护等级 Protection level	IP00、IP20
冷却方式 Cooling type	自然冷却或强迫风冷 Natural cooling or forced air cooling
安装方式 Installation type	壁挂式 Wall mounted
环境条件 Environmental condition	海拔超过 2000 米，应相应降低容量使用 When the sea altitude is above 2,000m, soft starter should be derated for use. 环境温度在-25-+45℃ 之间 Ambient temperature: -25-+45℃ 相应湿度不超过 95%(20℃±5℃) Relative humidity: less than 95%(20℃±5℃)

	无易燃、易爆、腐蚀性气体，无导电尘埃，室内安装，通风良好，振动小于 0.5G Free of flammable, explosive and corrosive gas or conductive dust. Good ventilation for indoor installation and vibration is less than 0.5G
--	---

3.2 安装方向 Installation direction

为了确保软起动器在使用中具有良好的通风及散热条件，软起动器应垂直安装。

In order to ensure that the soft starter has good ventilation and heat dissipation conditions in use, the soft starter should be installed vertically.

3.3 安装空间 Installation space

在设备周围留有足够的散热空间，为便于维护请将设备与墙壁保持一定距离(见附表三)。如需选用风机，请在我公司网站(www.xichi.cn)下载相关风机尺寸。

Leave enough space around the equipment for heat dissipation. For convenience of maintenance, please keep a certain distance between the equipment and wall (see appendix 3). To choose air blower, please log on our website www.xichi.cn to download air blower's size.

3.4 电路安装 Circuit installation

主回路采用上进下出，导线应保证足够的载流量。外围配件的选用请参见附表。

Main circuit uses up-in and down-out wiring and cable should be guaranteed to have enough current-carrying capacity. For selection of supportive fittings, please refer to the appendix.

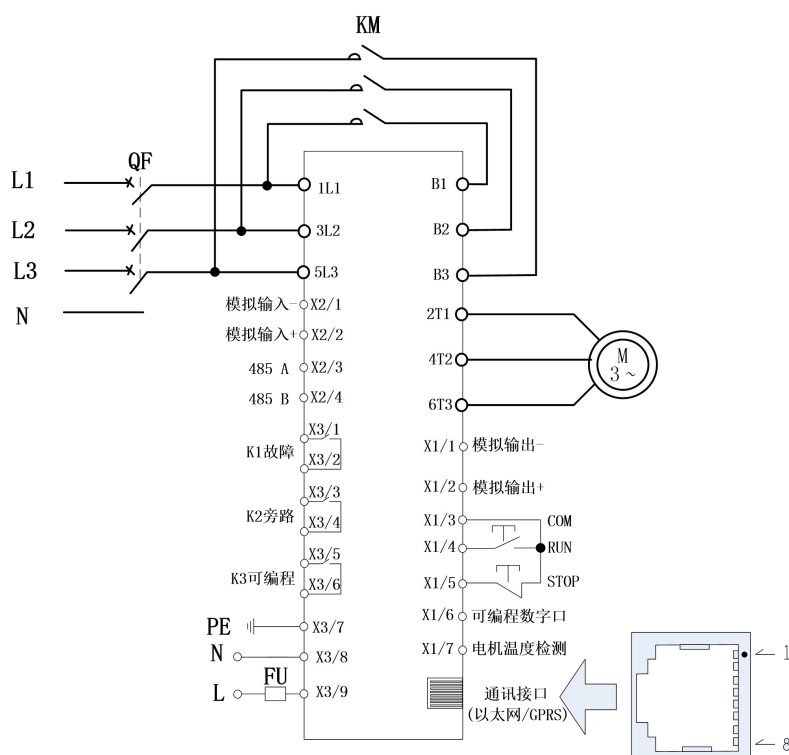
第四章 电路连接

Chapter 4 Circuit Connection

4.1 基本接线原理图 Basic wiring diagram

软起动器端子 1L1、3L2、5L3 接三相电源，软起动器端子 2T1、4T2、6T3 接电动机。软起动器可通过参数设定选择是否检测相序。当采用旁路接触器时，接触器一边接软起动器端子 1L1、3L2、5L3，另一边接端子 B1、B2、B3。

Soft starter's terminals 1L1, 3L2 and 5L3 are connected to three-phase power supply and terminals 2T1, 4T2 and 6T3 connected to electric motor. Soft starter's detection of phase sequence can be determined by parameter setting. When bypass contactor is used, one end of contactor is connected to terminals 1L1, 3L2, 5L3 of soft starter and the other end connected to terminals B1, B2, B3.

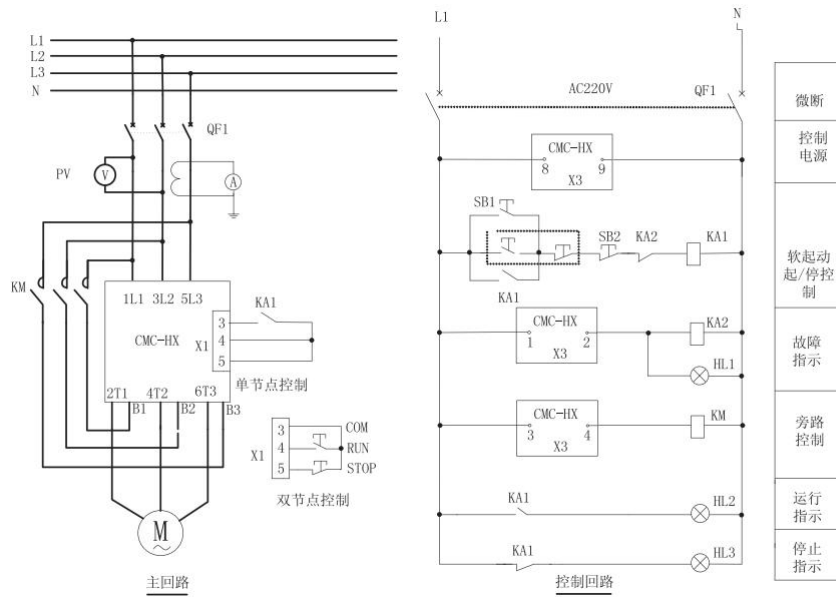


模拟输入 Analog input K2 旁路 K2 bypass 可编程数字口 Programmable digital port
模拟输出 Analog output K3 可编程 K3 programmable K1 故障 K1 fault
电机温度检测 Motor temperature measurement
通讯接口（以太网/GPRS）Communication port (Ethernet/GPRS)

注：通讯接口为选配口，采用光纤水晶头的连接端子，如图所示从上到下依次是 1 脚到 8 脚。具体端子定义参考端子说明。

NOTE: The communication port is optional, and the connecting terminals of the optical fiber connector are pins 1 to 8 from top to bottom, as shown in the figure. For the specific terminal definition, refer to the terminal description.

4.2 典型应用接线图 Wiring diagram for typical application



微断 Miniature breaker 控制电源 Control power
软起启动/停控制 Soft starting start/stop control 旁路控制 Bypass control
故障指示 Fault indication 运行指示 Operation indication 停止指示 Stop indication
控制回路 Control circuit
双节点控制 Dual-node control
单节点控制 Single-node control

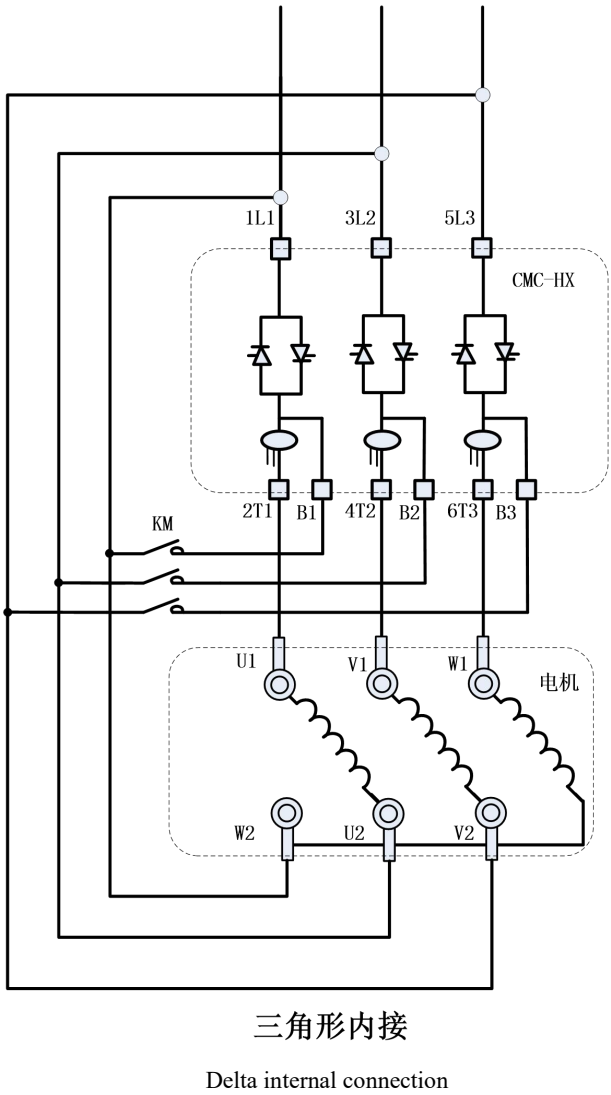
注意: NOTES:

1. 上图所示为单节点控制方式。接点闭合软起动器启动，接点打开软起动器停止。但要注意这种接线 LCD 面板启动操作无效。端子 3、4、5 起停信号是一个无源节点。
1. The above diagram shows the single-node control mode. When contact closes, soft starter starts, otherwise, it stops. But it needs to be noted that LED panel's start is ineffective with this type of wiring. Terminals 3, 4 and 5 start and stop signal is a passive node.
2. PE 接地线应尽可能短，接于距软起动器最近的接地点，合适的接地点应位于安装板上紧靠软起动器处，安装板也应接地，此处接地为功能地而不是保护接地。
2. PE grounding wire should be as short as possible. It should be connected to an earth connection point close to soft starter. The proper earth connection point should be on installation board and close to soft starter. Installation board should be grounded too. This earth connection is for function rather than protection.

4.3 内三角接线方式 Internal delta connection

使用内三角接线方式时，请严格依照下图接线

When internal delta connection is adopted, please strictly follow the connection below.



4.4 端子说明 Description of terminal

CMC-HX 软起动器有 20 个外引控制端子，为用户实现外部信号控制、远程控制及系统控制提供方便。

CMC-HX series soft starter is provided with 20 external control terminals which help users realize external signal control, remote control and system control.

端子号 Terminal No.		端子名称 Name of terminal	说明 Description
主回路 Main circuit	1L1、3L2、5L3	交流电源输入端子 AC power input terminal	接三相交流电源，旁路接触器 Connected to three-phase AC power supply and bypass contactor
	2T1、4T2、6T3	软起动输出端子 Soft start output terminal	接三相异步电动机 Connected to three-phase asynchronous motor
	B1、B2、B3	旁路接触器端子 Bypass contactor terminal	接旁路接触器 Connected to bypass contactor
控制回路	模拟输出	X1/1	模拟电流输出负(AO-) 通过参数项 C04、C05 进行设定

Control circuit	Analog output		Analog current output (AO-)	Set via parameter C04 and C05
		X1/2	模拟电流输出正(AO+) Analog current output (AO+)	
	数字输入 Digital input	X1/3	COM	COM
		X1/4	外控起动端子 (RUN) Externally-controlled start terminal (RUN)	X1/3 与 X1/4 短接则起动 Start when X1/3 and X1/4 are short circuited
		X1/5	外控停止端子 (STOP) Externally-controlled stop terminal (STOP)	X1/3 与 X1/5 断开则停止 Stop when X1/3 and X1/5 break
		X1/6	可编程数字口(D1) Programmable digital interface (D1)	通过参数项 C03 进行设定 Set via parameter C03
		X1/7	电机温度检测 (PTC) Motor's temp. detection (PTC)	通过参数项 M22 关闭或开启 Stop or start via parameter M22
	模拟输入 Analog input	X2/1	外部信号地(AGND) External signal ground (AGND)	外部输入电流的参考地 Reference ground of external input current
		X2/2	模拟输入(NI) Analog input (NI)	通过参数项 C04 进行设定 Set via parameter C04
	RS 485-A	X2/3	RS 485 通讯正(485-A) RS485 Comm. positive (485-A)	
	RS 485-B	X2/4	RS 485 通讯负(485-B) RS485 Comm. negative (485-B)	
	K1 继电器 输出 K1 relay output	X3/1	故障输出继电器 (K11、K12) Fault output relay (K11, K12)	故障时有效, K11-K12 闭合,接点容量 AC250V/5A, DC30V/5A Effective in case of fault, K11-K12 close, contact capacitor AC250V/5A, DC30V/5A
		X3/2		
	K2 继电器 输出 K2 relay output	X3/3	旁路输出继电器 (K21、K22) Bypass output relay (K21, K22)	旁路时有效, K21-K22 闭合,接点容量 AC250V/5A, DC30V/5A Effective in case of bypass, K21-K22 close, contact capacitor AC250V/5A, DC30V/5A
		X3/4		
	K3 继电器 输出 K3 relay output	X3/5	可编程输出继电器 (K31、K32) Programmable output relay (K31, K32)	输出有效时 K31-K32 闭合,接点容量 AC250V/5A, DC30V/5A K31-K32 close when output is effective and contact capacity AC250V/5A, DC30V/5A
		X3/6		
	控制电源	X3/7	PE	接大地

	Control power			Grounding
		X3/8	控制电源（220VAC）	AC110V--AC220V±15% 50/60Hz
		X3/9	Control power (220VAC)	
通讯口选配 Comm. Port (optional)	GPRS 接口 GPRS interface	GND 1/2	电源地 Power ground	端子定义配合基本接线原理图使用 Terminal definition cooperates the basic wiring diagram for use
		A+ 3/4	通讯端子	
		B- 5/6	Communication terminal	
		24V 7/8	电源正 Power positive	
	以太网接口 Ethernet interface	使用标准水晶头与上位机网口相连,MODBUS TCP/IP 通信协议 Use standard crystal plug to connect network port of upper computer, MODBUS TCP/IP communication protocol		

第五章 显示及操作说明

Chapter 5 Instruction to Display and Operation

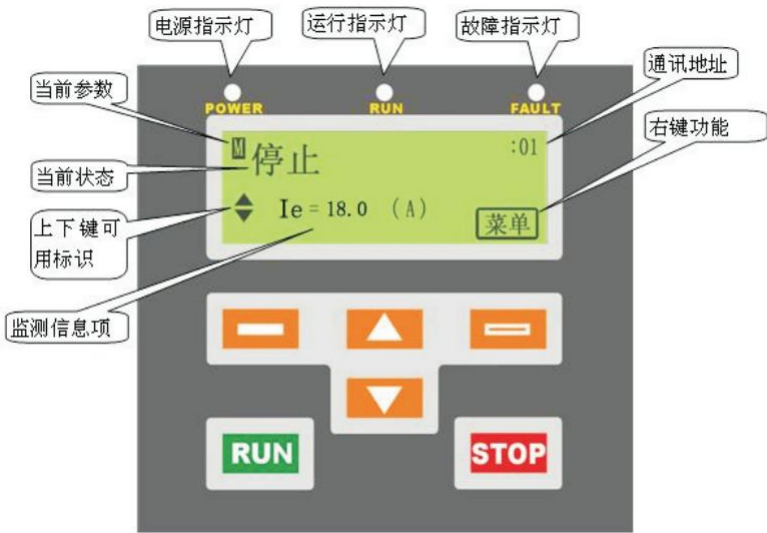
人机界面用于软起动器的编程输入和输出设定、保护功能、警告、总线通讯、参数设定、本地控制和显示软起动器的状态信息。

The human-machine interface is used for soft starter programming input and output settings, protection functions, warnings, bus communication, parameter setting, local control and display of soft starter status information.

5.1 按键功能说明 Description of keys

人机界面由三个部分组成，分别为 LED 指示灯、LCD 液晶显示屏、面膜键盘。如图 5-1 所示。

The man-machine interface consists of three parts which are LED indicator lamp, LCD and keyboard. See Figure 5-1.



当前参数	Current parameters	电源指示灯	Power indicator light
运行指示灯	Running indicator light	故障指示灯	Fault indicator light
当前状态	Current status	通讯地址	Communication address
上下键可用标识	Up/down key available sign	右键功能	Right key's function
监测信息项	Monitoring information		

图 5-1 面板功能介绍
Fig. 5-1 Introduction to Panel

注：一旦数据写入将一直保持到下一次修改，不受掉电影响。
Note: Once the data is written, it will remain until the next modification, not subject to power failure.

面板按键说明 Description of panel keys

符号 Symbol	名称 Name	功能说明 Functional description
	左键 Left key	设置参数、保存数据等。 Set parameters and save data. 液晶屏左下角出现的按钮对应该键

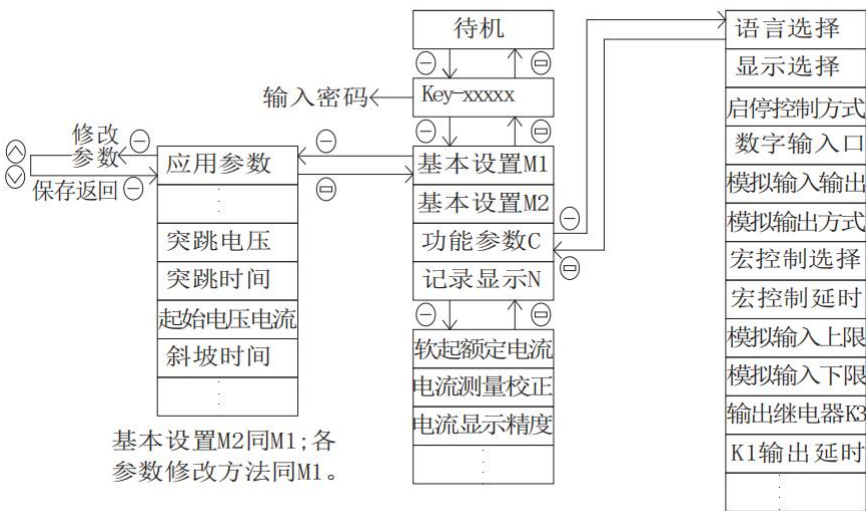
		The button shown in the lower left corner of the LCD screen corresponds to the key
	上键 Up key	参数项或数据的增加 Add parameter value or data
	下键 Down key	参数项或数据的减小 Minus parameter value or data
	右键 Right key	进入菜单、退出菜单、取消选择等。 Enter menu, exit menu or cancel selection. 液晶屏右下角出现按钮对应该键 The button shown in the lower right corner of the LCD screen corresponds to the key.
	起动键 Run key	电机起动、点动和宏开启等功能，只有外部端子 X1/3, X1/5 短接且软件使能该键，该键才能起作用 Functions such as motor starting, inching, and macro activation can only work when the external terminals X1/3 and X1/5 are short - circuited and the key is enabled in the software.
	停止 Stop key	完成电机的停止功能，停止方式由软件参数决定 Complete the stop function of the motor and stop mode is subject to software's parameter

面板显示信息说明 Description of information displayed on panel

按 键 Key	作 用 Functions
监测信息项 Monitoring information	显示当前测量的信息量。详见“功能参数 C01” It displays the currently measured information. Refer to “Functional parameter C01” for detail.
上下键可用标识 Up and down keys' available mark	有该标识，可以通过“上下翻”键浏览“实时参数”项 When there is this mark, you can use the "up and down scroll" keys to browse the items in the "Real-time Parameters".
当前状态 Current status	说明当前电机处在的状态 It indicates the current status of the motor
当前参数 Current parameters	显示系统当前使用的是“M1”还是“M2”参数(系统共有两套参数可供使用) Display the system is currently using the "M1" or "M2" parameters (the system has two sets of parameters available)
电源指示灯 Power indicator light	系统控制电源上电后该指示灯亮 It goes on when the system control power is energized
运行指示灯 Running indicator light	停止状态该灯熄灭；起动完成状态常亮；其他状态为闪烁 It goes off in state of rest; it remains on in state of completing start; it flashes in other states
故障指示灯 Fault indicator light	当系统处于保护或故障状态，该指示灯亮；其他状态该灯熄灭 When the system is in a protected or faulty state, the indicator light is on; it goes off in the other states.
通讯地址	显示机器通讯地址，该地址是指外接端子(X2-3/4)上的地址，当使用

Communication address	该端子通讯时，它会闪烁 It displays the machine's communication address, which is the address on the external terminal (X2- 3/4). It flashes when this terminal is used for communication.
右键功能 Right key	显示键盘的“右键”当前功能 Display the current function of the “right key” of keyboard

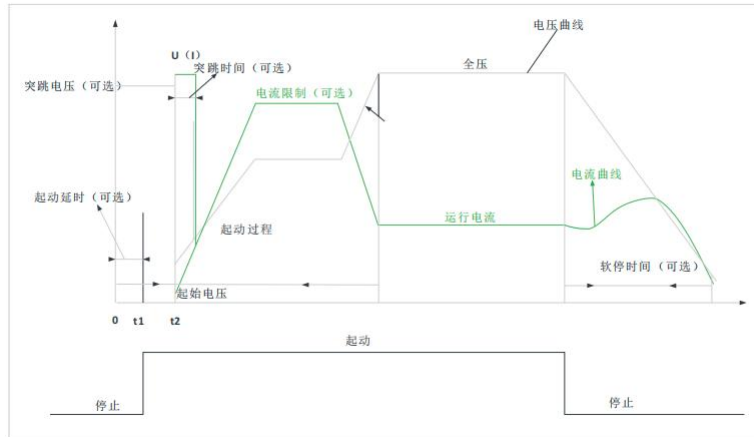
5.2 修改参数项操作流程 Flow of modifying parameters



修改参数	Modify parameter	电流显示精度	Current display accuracy
保存返回	Save and return	语言选择	Select language
应用参数	Application parameter	显示选择	Display selection
突跳电压	Step voltage	启停控制方式	Start/stop control mode
突跳时间	Step time	数字输入口	Digital input port
起始电压/电流	Initial voltage/current	模拟输入输出	Analog input/output
斜坡时间	Ramp time	模拟输出方式	Analog output mode
输入密码	Input password	宏控制选择	Macro-control selection
待机	Standby	宏控制延时	Macro-control delay
基本设置 M1	Basic setting M1	模拟输入上限	Upper limit of analog input
基本设置 M2	Basic setting M2	模拟输入下限	Lower limit of analog input
功能参数 C	Functional parameter C	输出继电器 K3	Output relay K3
记录显示 N	Record display N	K1 输出延时	K1 output delay
软起额定电流	Soft start's rated current		
电流测量校正	Current measurement correction		

第六章 软起动器的控制模式

Chapter 6 Control Mode of Soft Starter



突跳电压（可选）	Step voltage (optional)	电流曲线	Current curve
突跳时间（可选）	Step time (optional)	运行电流	Running current
全压	Full voltage	启动过程	Starting process
电压曲线	Voltage curve	起始电压	Initial voltage
启动延时（可选）	Starting delay (optional)	软停时间（可选）	Soft-stop time (optional)
启动	Start	停止	Stop

软起\软停电压(电流)特性曲

Characteristic curve of soft start/stop voltage (current)

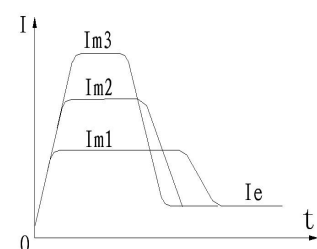
CMC-HX 软起动器有多种起动方式：电压线性曲线起动、电压指数曲线起动、电流线性曲线起动，电流指数曲线起动；多种停车方式：自由停车、软停车、制动刹车、泵停，还具有点动功能。用户可根据负载不同及具体使用条件选择不同的起动方式和停车方式。

The CMC-HX soft starter comes with a variety of starting modes including voltage linear curve start, voltage exponential curve start, current linear curve start, current exponential curve start; a variety of stop modes: free stop, soft stop, braking, as well as inching function. Users can choose different starting and stopping modes according to the different load and the specific use conditions.

6.1 电流斜坡起动 Current ramp starting

使用电流斜坡起动模式时，软起动器得到起动指令后，其输出电流会按照设定曲线增加，直至输出电流达到设定电流限幅值 I_m ，输出电流不再增大，电动机运转加速持续一段时间后电流开始下降，输出电压迅速增加，直至全压输出，起动过程完成。

When current ramp starting mode is used, after soft starter receives command to start, its output current will increase as per the given curve



until output current reaches limit value I_m of the given current, and output current will no longer increase. After electric motor runs and accelerates for a period of time, current starts to decrease and output voltage rapidly increases until total voltage output and start finishes.

参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M05	斜坡时间 Ramp time	0~120S	---	10
1M06	限流倍数 Current-limiting multiple	100~500% I_e	---	350%

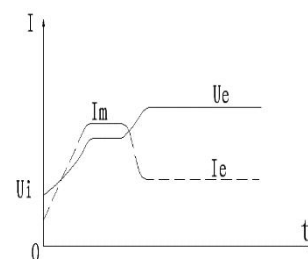
注：“---”表示用户自己根据需要进行设定(下同)。

NOTE: “---” means that user can set value according to the need (the same below).

6.2 电压指数曲线 Voltage exponential curve starting

输出电压以设定的斜坡时间按照指数特性上升,同时输出电流以一定的速率增加,当起动电流增至限幅值 I_m 时,电流保持恒定,直至起动完成。使用此模式时,需同时设定斜坡时间和限流倍数。

The output voltage increases according to the exponential characteristic within the set ramp time, and in the mean time output current rises at a certain rate. When the starting current increases to the limit value I_m , the current remains constant until the start finishes. The ramp time and current-limiting multiple need to be set when this mode is used.

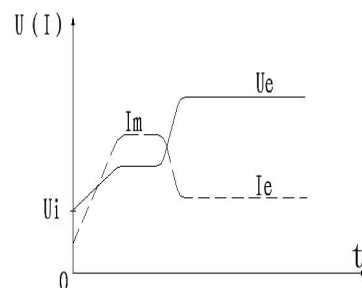


参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M01	起动方式 Starting mode	0~3	0	0
1M04	起始电压/电流 Initial voltage/current	25~100% U_e \25~100% I_e	---	30%
1M05	斜坡时间 Ramp time	0~120S	---	10
1M06	限流倍数 Current-limiting multiple	100~500% I_e	---	350%

6.3 电压线性曲线 Voltage linear curve starting

输出电压以设定的斜坡时间按照线性特性上升,同时输出电流以一定的速率增加,当起动电流增至限幅值 I_m 时,电流保持恒定,直至起动完成。

The output voltage increases according to linear characteristic within the preset ramp time and in the mean time output current rises at a certain rate. When the starting current increases to the limit value I_m , the current remains constant until the start finishes.



参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
-----------------	------------	-------------	------------------	------------------------

1M01	起动方式 Starting mode	0~3	1	0
1M04	起始电压/电流 Initial voltage/current	25~100%Ue\25~100%Ie	---	30%
1M05	斜坡时间 Ramp time	0~120S	---	10
1M06	限流倍数 Current-limiting multiple	100~500%Ie	---	350%

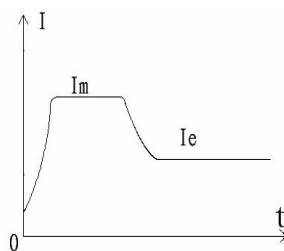
6.4 电流指数曲线 Current exponential curve starting

输出电流以设定的斜坡时间按照指数特性上升，当起动电流增至限幅值 I_m 时，电流保持恒定，直至起动完成。

使用此模式时，需同时设定斜坡时间和限流倍数。

Output current increases according to exponential characteristic within the preset ramp time. When the starting current increases to the limit value I_m , the current remains constant until the start finishes.

The ramp time and current-limiting multiple need to be set when this mode is used.



参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M01	起动方式 Starting mode	0~3	3	0
1M04	起始电压/电流 Initial voltage/current	25~100%Ue\25~100%Ie	---	30%
1M05	斜坡时间 Ramp time	0~120S	---	10
1M06	限流倍数 Current-limiting multiple	100~500%Ie	---	350%

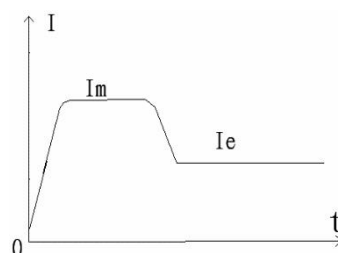
6.5 电流线性曲线 Current linear curve starting

输出电流以设定的斜坡时间按照线性特性上升，当起动电流增至限幅值 I_m 时，电流保持恒定，直至起动完成。

使用此模式时，需同时设定斜坡时间和限流倍数。

Output current increases according to linear characteristic within the preset ramp time. When the starting current increases to the limit value I_m , the current remains constant until the start finishes.

The ramp time and current-limiting multiple need to be set when this mode is used.



参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M01	起动方式 Starting mode	0~3	3	0
1M04	起始电压/电流 Initial voltage/current	25~100%Ue\25~100%Ie	---	30%

1M05	斜坡时间 Ramp time	0~120S	---	10
1M06	限流倍数 Current-limiting multiple	100~500%Ie	---	350%

6.6 突跳转矩软起动 Step torque soft starting

突跳转矩软起动模式主要应用在静态阻力比较大的负载电动机上，通过施加一个瞬时较大的起动力矩以克服大的静摩擦力矩。该模式下输出电压迅速达到设定的突跳电压，当达到预先设定的突跳时间后降为起始电压，再根据所设定的起始电压\电流、斜坡时间平稳起动，直至起动完成。

Step torque soft starting mode is mainly used for loaded motor with large stiction by applying an instant greater start torque to overcome the big static friction torque. In this mode, output voltage rapidly reaches the preset step voltage. After it reaches the preset step time, it smoothly starts according to preset initial voltage and ramp time until start finishes.

参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M04	起始电压\电流 Initial voltage\current	(25~100%)Ue\ (25~100%)Ie	---	30%
1M02	突跳电压 Step voltage	20~100%Ue	---	20%
1M03	突跳时间 Step time	0~2000mS	---	0



使用突跳转矩起动模式时必须与其它软起动方式配合使用，而且要设置突跳电压和突跳时间。Step torque starting mode must be used together with other soft starting modes and it is required to set step voltage and step time.

6.7 自由停车 Free stop

当停车方式(1M07)设置为0时为自由停车模式，软起动器接到停机指令后，首先封锁旁路接触器的控制继电器并随即封锁主电路晶闸管的输出，电动机依负载惯性自由停机。

Motor will stop freely when the stop mode (1M07) is set to zero. After the soft starter receives the stop command, it first disconnects the control relay of bypass contactor and blocks the output of thyristor on main circuit consequently. The motor will stop freely by the load inertia.

参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M07	停车方式 Stop mode	0、自由停车 1、软停车 2、泵停车 3、制动刹车 0. Free stop 1. Soft stop 2. Pump stop 3. Braking	0	0
1M08	停车时间 Stop time	0~120S	0	10

6.8 软停车/泵停车 Soft stop/pump stop

当停车方式设置为软停和泵停时，在全压状态下停车则为软停车/泵停，在该方式下停机，软起动器首先断开旁路接触器，软起动器的输出电压在设定的软停车时间内逐渐降至所设定的软停终止电压值，软停车过程结束起动器转为刹车制动状态(刹车时间不为零)或自由停止。

When soft stop and pump stop are selected, stop in the full voltage state will be soft stop/pump stop. To stop in this mode, the soft starter first disconnects the bypass contactor, the soft starter's output voltage gradually reduced to the preset soft stop voltage value within the preset soft stop time. After the soft stop

finishes, the starter turns to braking state (braking time is not zero) or free stop.

参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M07	停车方式 Stop mode	0、自由停车 1、软停 2、泵停 3、制动刹车 0. Free stop 1. Soft stop 2. Pump stop 3. Braking	1、2	0
1M08	停车时间 Stop time	0~120S	---	10
1M09	停车终止电压 Stop voltage	20-80%Ue	---	30%

6.9 制动刹车 Braking

当停车方式(1M07)设置为 3 时为制动刹车，刹车时间(1M10)设置不为 0，并且选择了刹车时间继电器输出。当软起动器自由停止后，刹车时间继电器输出信号在停(刹)车时间内保持有效。用 K3 时间继电器输出信号控制外部制动单元或机械抱闸电气控制单元。

When the stop mode (1M07) is set to the value 3, it is for braking. The braking time (1M10) is not set to 0 and the braking time relay output is selected. When the soft starter stops freely, the braking time relay output signal remains active during the stop time. Use the K3 time relay output signal to control the external brake unit or the mechanical-brake electrical control unit.

参数 Parameter	名称 Name	范围 Range	设定值 Set value	出厂值 Factory default
1M07	停车方式 Stop mode	0、自由停车 1、软停车 2、泵停车 3、制动刹车 0. Free stop 1. Soft stop 2. Pump stop 3. Braking	3	0
1M10	刹车时间 Braking time	0~250S	---	10
C10	继电器 K3 功能 Function of relay K3	0~6	4	3

第七章 参数项及其说明

Chapter 7 Parameters and Description

CMC-HX 软起动器功能参数项查询及设置采用滚动方式，分为四个菜单，包含了所有可设置及可查询的功能。用户可根据需要选择中 \英文显示。

The function parameter inquiry and setting of the CMC-HX soft starter adopt a scrolling method, divided into four menus, which contain all settable and queryable functions. Users can select Chinese/English display as needed.

7.1 基本参数项 Primary parameters

CMC-HX 有两套不同的基本参数，可分别控制两套不同功率的电机。基本设置 M2 参数项用于设定第二套基本功能，参数项设置方法同基本设置 M1。M2 参数组通过数字端口 D1 外部控制接点来选择。在停止状态下功能设置有效。

CMC-HX has two different sets of basic parameters, which can respectively control two sets of motors of different powers. Basic setting M2 parameter is used to set the second set of basic functions. The parameter setting method is the same as the basic setting M1. The M2 parameter group is selected via the digital port D1 external control contact. The function setting is valid in the stop state.

参数 Parameter	名称 Name	范围 Range	出厂值 Factory default
1M00	应用参数 Application parameter	0、无应用 1、离心泵 2、液压泵 3、轴流风机 4、离心风机 5、皮带机 6、压缩机 7、破碎机 8、搅拌机 9、球磨机、10、推进器 0. No application 1. Centrifugal pump 2. Hydraulic pump 3. Axial flow fan 4. Centrifugal fan 5. Belt conveyor 6. Compressor 7. Crusher 8. Mixer 9. Ball crusher 10. Propeller	0
1M01	起动方式 Starting mode	0、电压指数曲线 1、电压线性曲线 0. Voltage exponential curve 1. Voltage linear curve 2、电流指数曲线 3、电流线性曲线 2. Current exponential curve 3. Current linear curve	1
1M02	突跳电压 Step voltage	20~100%Ue	20%
1M03	突跳时间 Step time	0~2000mS	0
1M04	起始电压\电流 Initial voltage\current	(25~100%)Ue(25~100%)Ie	30%
1M05	斜坡时间 Ramp time	0~120S	10
1M06	限流倍数 Current-limiting multiple	100~500%Ie	350%

1M07	停车方式 Stop mode	0、自由停车 1、软停车 2、泵停车 3、制动刹车 0. Free stop 1. Soft stop 2. Pump stop 3. Braking	0
1M08	停车时间 Stop time	0~120S	10
1M09	停车终止电压 Stop final voltage	20~80%Ue	30%
1M10	刹车(制动)时间 Braking time	0~250S	10
1M11	二次起动允许 Second run permit	0~60S	0
1M12	二次限流倍数 Second current-limiting multiple	100%~500%	400%
1M13	电机额定电流 Rated current of motor	15~9999	---
1M14	过载保护级别 Overload protection class	10A、10、15、20、25、30、Off	20
1M15	电流失衡保护 Current imbalance protection	0~100%	70%
1M16	电流失衡延时 Current imbalance delay	0~10S	2
1M17	运行过流保护 Overcurrent protection during running	100~500%Ie	150%
1M18	过流保护延时 Overcurrent protection delay	0~10S	2
1M19	欠载级别 Underload level	0~99%	0
1M20	欠载时间 Underload time	0~10S	2
1M21	相序检测 Phase sequence detection	0、关闭 1、开启 0. Disable 1. Enable	0
1M22	电机温度检测 Motor's temp. detection	0、关闭 1、开启 0. Disable 1. Enable	0
1M23	电机温度时间	0~10S	2

	Motor's temp. time		
1M24	起动间隔时间 Start interval time	0~60 min.	0
1M25~29	未定义 Undefined	0~9999	0

参数列表 List of parameters

基本参数说明 Description of basic parameters

- ◆ **起停控制参数 1M01---1M12**（起动控制模式说明见第六章）
- ◆ **Start/stop control parameter 1M01---1M12 (for description of start control mode, refer to Chapter 6)**

用户可通过参数 1M01 进行起动曲线的选择，使得起动曲线与实际负载很好配合，以达到最佳的起动效果。如果设置了突跳电压和突跳时间，在起动开始时将首先施加一个瞬时较大的起动力矩，然后按照所设定的起始电压\电流，斜坡时间进行起动。当限流倍数 (1M06) 设置为 500 时，按照预定曲线起动，不进入限流状态。如果设置了二次起动允许 1M11，在达到二次起动所设置的时间后如果还没有起动完成，将会按照所设定的起始电压\起始电流、斜坡时间进行二次起动。在二次起动过程中，起动电流被限制在参数 1M12 所设置的值以内。当 1M12 设定为 500%时，二次起动过程中的起动电流将不受限制。

Users may select the starting curve by parameter 1M01 to make the starting curve match the actual load so as to achieve the best starting effect. If the step voltage and step time are set, a momentarily large starting torque will be applied at the beginning of the start, and then it starts at the set starting voltage\current and ramp time. When the current-limiting multiple (1M06) is set to 500, it is started according to the preset curve and it does not enter the current-limiting state. When a second start permit 1M11 is set, if the start does not finish yet after the time set for the second start, the second start will be enabled at the starting voltage, starting current and ramp time. During the second start, the starting current is limited to the value of parameter 1M12. When 1M12 is set to 500%, the starting current during the second start is unrestricted.

注：当起动方式选择为电压斜坡起动时，参数 1M04 代表起始电压；当起动方式选择为电流斜坡起动时，参数 1M04 代表起始电流。起动过程中如果有停止命令，则停止只能是自由停车；起动完成后如果有停止命令，则停止可以是自由停车、软停车、制动刹车。

Note: When the voltage ramp starting mode is selected, the parameter 1M04 represents the starting voltage; when the current ramp starting mode is selected, the parameter 1M04 represents the starting current. If there is a stop command made during motor start, it can only be free stop; if there is a stop command made after the start finishes, it can be free stop, soft stop or braking.

参数 1M05 斜坡时间的长短可决定在什么时间内将起动转矩升高到最终转矩。当斜坡时间较长时，就会在电机起动过程中产生较小的加速转矩。这样就可实现较长时间的电机软加速,应适当选择斜坡时间的长短，使电机能够进行软加速，一直到达其额定转速为止。当加速时间在完成电机加速之前结束时，就会在一定的时间内将转矩限制到所设置的极限转矩。因此，这里的斜坡时间表示了转速变化的速率，并不完全等同于电机的起动时间。

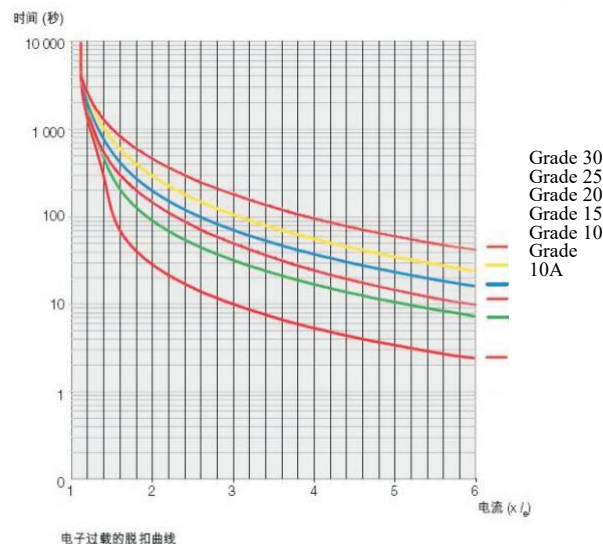
Parameter 1M05 ramp time determines the time at which the starting torque is up to final torque. If ramp time is longer, smaller accelerating torque shall be generated in starting process of motor, in this way, the motor shall be subject to soft acceleration in longer time, thus, ramp time shall be properly selected to make motor able to be subject to soft acceleration till its rated speed is achieved. If acceleration time is over before completion of motor acceleration, the torque shall be limited to the set ultimate torque in specified

time. Accordingly, the ramp time indicates rate of change of rotary speed, it is not completely equal to starting time of motor.

◆ 保护参数 Protection parameter 1M13---1M24

用户可以根据所带电机功率的大小设定 1M13 电机的额定电流，使得软起动器与电机很好地匹配并能很完善地对电机进行保护。运行过程中的电流超过了参数 1M17 所设定的过流保护值并持续时间超过 1M18 设定的过流动作时间，软起动器将会进行过流保护。超过了参数 1M14 所设置的电子热过载等级和脱扣时间，软起动器将会进行过载保护。根据参数 1M19, 1M20 也将进行欠载保护。同时软起动也时时检测三相电流，当三相电流超出了 1M15 所设定的不平衡度时，且时间达到 1M16 设定的时间时，也将进行相电流不平衡保护；保护的同时将会在界面上显示相应的故障类型，便于用户查找。如果在使用过程中对电源相序没有要求，则将参数 1M21 设置为 0，关闭相序检测；否则将其设置为 1，打开相序检测。

Users can set the rated current of the 1M13 motor according to the motor power so that the soft starter matches the motor well to protect the motor. The soft starter will enable the overcurrent protection when the current during operation exceeds the overcurrent protection value set by parameter 1M17 and the duration exceeds the overcurrent operation time set by parameter 1M18. The soft starter will enable the overload protection when the load exceeds the electronic thermal overload rating and trip time set by parameter 1M14. The soft starter will also enable the underload protection according to the parameters 1M19 and 1M20. At the same time the soft starter also detects three-phase current and it will enable the phase current imbalance protection when the three-phase current exceeds the imbalance set by parameter 1M15, and the time reaches the value set by parameter 1M16. At the time of protection, the corresponding fault information will be displayed for user to check. If the power phase sequence is not required during use, set parameter 1M21 to zero to turn off phase sequence detection; otherwise set it to 1 to turn on phase sequence detection.



电子热过载脱扣时间曲线表
Electronic thermal overload trip time curve

7.2 功能参数 Functional parameters

参数列表 List of parameters

参数 Para.	名称 Name	范围 Range	出厂值 Factory default
-------------	------------	-------------	------------------------

C00	语言选择 Language selection	0、中文 0. Chinese	1、English 1. English	0
C01	显示选择 Display selection	0、电机额定电流(Ie) 1、平均电流(Ip) 2、L1 相电流(Ia) 3、L2 相电流(Ib) 4、L3 相电流(Ic) 5、模拟输入%(Ai) 6、输出电压%(Uo) 7、起动倒计时(Ss) 8、刹车倒计时时间 (Bs) 9、起动剩余时间(Ts) 0. Motor's rated current (Ie) 1. Average current (Ip) 2. L1 phase current (Ia) 3. L2 phase current (Ib) 4. L3 phase current (Ic) 5. Analog input % (Ai) 6. Output voltage % (Uo) 7. Start countdown time (Ss) 8. Brake countdown time (Bs) 9. Start remaining time (Ts)		1
C02	起停控制 Start/stop control	0、键盘控制 1、485 通讯控制 2、键盘+485 允许 3、键盘+485 禁止 4、键盘点动 0. Keyboard control 1. 485 comm. control 2. Keyboard+485 permitted 3. Keyboard+485 forbidden 4. Keyboard inching 说明：上述仅在端子双接点接法时有效 Note: The above is valid only when terminal has two contacts		0
C03	数字输入口功能 Function of digital input port	0、M2 参数选择 1、故障复位 2、点动 3、闭合宏控制 4、断开宏控制 5、急停输入 6、延时继电器 0. M2 parameter selection 1. Fault reset 2. Inching 3. Enable macro control 4. Disable macro control 5. Emergency stop input 6. Delay time relay		1
C04	模拟输入输出 Analog input/output	0、0~20mA 输入、输出(正逻辑) 1、4~20mA 输入、输出(正逻辑) 2、0~20mA 输入、4~20mA 输出(正逻辑) 3、4~20mA 输入、0~20mA 输出(正逻辑)		1

		4、0~20mA 输入、输出(负逻辑) 5、4~20mA 输入、输出(负逻辑) 6、0~20mA 输入、4~20mA 输出(负逻辑) 7、4~20mA 输入、0~20mA 输出(负逻辑) 0. 0~20mA input, output (positive logic) 1. 4~20mA input, output (positive logic) 2. 0~20mA input, 4~20mA output (positive logic) 3. 4~20mA input, 0~20mA output (positive logic) 4. 0~20mA input, output (negative logic) 5. 4~20mA input, output (negative logic) 6. 0~20mA input, 4~20mA output (negative logic) 7. 4~20mA input, 0~20mA output (negative logic)	
C05	模拟输出方式 Analog output mode	0、平均电流输出 1(0~200Ie)% 1、平均电流输出 2(0~400Ie)% 0. Average current output 1(0~200Ie)% 1. Average current output 2(0~400Ie)%	0
C06	宏控制 Macro control	0、无宏控制 1、数字口宏控制 2、模拟输入 0. No macro control 1. Digital port macro control 2. Analog input	0
C07	起动延时 Start delay	0~250S	0
C08	模拟输入上限值 Analog input upper limit	0~100%	80
C09	模拟输入下限值 Analog input lower limit	0~100%	20
C10	输出继电器 K3 Output relay K3	0、全压输出 1、起动过程输出 2、软停过程输出 3、故障输出 4、刹车输出 5、运行过程输出 6、可编程延时 0. Full voltage output 1. Start process output 2. Soft start process output 3. Fault output 4. Braking output 5. Running process output 6. Programmable delay	3
C11	K1 输出延时 K1 output delay	0~250S	0
C12	K2 输出延时 K2 output delay	0~250S	0

C13	K3 输出延时 K3 output delay	0~250S	0
C14	定时停车时间 Timing stop time	0 ~ 999.9h(运行 断 开 有 效) (effective when run is disabled)	0
C15	起动时间限制 Starting time limit	10~120S	80
C16	电机接线方式 Motor's connection mode	0、外接 1、内接 2、未定义(内接, 不进行接线判断, 直接按照内接起动) 0. External connection 1. Internal connection 2. Undefined (for internal connection, do not conduct connection judgment, start directly with internal connection)	0
C17	通信地址 Communication address	1~32	1
C18	通讯波特率 Communication baud rate	0. 1200 1. 2400 2. 4800 3.9600 4. 19200	3
C19	通讯频率选择 Selection of communication frequency	0. 50HZ 1. 60HZ 2. Automatic adaption 自适应	0
C20	密码设置 Password setting	0~9999	0
C21	未定义参数 Undefined parameter	0~9999	0
C22	外部通讯模块选择 External communication module selection	0、以太网模块 0. Ethernet module 1. GPRS	0
C23	IP 地址 address	0.0.0.0~255.255.255.255	192.168.1.10
C24	子网掩码 Subnet mask	0.0.0.0~255.255.255.255	255.255.255.0
C25	默认网关 Default gateway	0.0.0.0~255.255.255.255	192.168.1.1
C26	模拟输出校正 Analog output calibration	1~1000	500
C27	外部通讯控制选择 Selection of external communication control	0、关闭 1、开启 0. Disable 1. Enable	1
C28 ~	未定义 Undefined	0~9999	0

C36			
-----	--	--	--

功能参数说明 Description of functional parameters

◆ 显示及起/停控制参数 Display and start/stop control parameters C00—C02

用户可根据实际需要通过对 C00 的设定进行语言种类的选择，现有中英文两种显示界面。在停止及运行过程中用户可通过 $\wedge$ / $\vee$ 键浏览实际的测量量(电机额定电流 I_e 、平均电流 I_p 、L1 相电流、L2 相电流、L3 相电流、模拟输入 $A_i(\%)$ 、输出电压 $U_o(\%)$ 、起动倒计时时间 S_s 、刹车倒计时时间 B_s 、起动剩余时间 T_s ，也可通过设定参数 C01，使软起动器固定显示某一个测量量。参数 C02 用来选择软起动器的起动/停止控制方式，如果选择通讯禁止则不能通过通讯起停软起动器。在任何一种起动/停止控制方式下，用户均可通过接线端子进行起动/停止的控制。

Users can select language by setting parameter C00 according to the actual needs. There are Chinese and English display interfaces. In the process of stopping and running, users can check the actual measurement (rated current I_e , average current I_p , L1 phase current, L2 phase current, L3 phase current, analog input $A_i(\%)$, output voltage $U_o(\%)$, start countdown time S_s , brake countdown time B_s , and start remaining time T_s by pressing Up and Down keys, and also let the soft starter always display a certain measurement by setting parameter C01. Parameter C02 is used to select the soft starter's start/stop control mode. Provided that the communication is disabled, it is not possible to start or stop the soft starter via communication. In any of the start/stop control mode, users can conduct start/stop control via the terminal.

◆ 数字口功能选择参数 C03 Digital port functional selection parameter C03

➤ M2 参数选择：CMC-HX 型软起动器具有两套基本功能参数项，用户可以通过闭合数字口与 COM 端实现对第二套基本功能项的选择(数字口设置为 M2 参数选择)。断开为 M1 套基本参数项。

➤ M2 parameter selection: CMC-HX soft starter has two basic function parameters. Users can achieve the selection of the second basic function items by closing the digital port and the COM terminal (the digital port is set to M2 parameter selection). It is M1 basic parameter when it is disconnected.

➤ 故障清除：故障清除后若起动命令存在则软起动器再次起动。

➤ Fault clearing: If the start command remains after the fault is cleared, the soft starter starts again.

➤ 点动：软起动器的点动功能可以通过键盘进行点动控制(参数 C02 设置为键盘点动)，RUN 键按下则软起动点动运行，RUN 键松开软起动器停止；也可通过数字口进行点动控制，数字口闭合软起动点动运行，断开软起动器停止。

➤ Inching: The soft starter's inching function can help to achieve inching control through the keyboard control (set parameter C02 to the keyboard inching). After RUN key is pressed, the soft starter begins inching operation; when RUN key is released, the soft starter stops. The inching control can also be achieved through the digital port. When the digital port closes, the soft starter begins inching operation, otherwise, the soft starter stops.

➤ 急停控制输入：当数字口设置为急停控制输入时，通过断开数字口与 COM 端实现软起动器急停且 LCD 面板处于急停显示界面。

➤ Emergency stop control input: When the digital port is set to emergency stop control input, the soft starter's emergency stop will be achieved by disconnecting the digital port and COM terminal and LCD panel shows the emergency stop display interface.

➤ 延时继电器控制输入：当数字口设置为延时继电器控制输入时，相应的可编程继电器输出应设置为可编程延时输出。当数字口闭合时，对应的继电器就会有输出(继电器输出延时时间到)。

➤ Delay relay control input: When the digital port is set to the delay relay control input, the corresponding programmable relay output should be set to programmable delay output. When the digital port is closed, the corresponding relay will have output (relay output delay time expires).

注：闭合接点宏控制、断开接点宏控制与宏控制功能有关，见宏控制功能说明。

Note: Closing the contact macro control and disconnecting the contact macro control relate to macro control function. See description of macro control function for details.

◆ 模拟输入\输出选择参数 C04—C05 Analog input/output selection parameters C04—C05

用户可根据实际需要对模拟输入\输出量的范围及方式进行选择。模拟输出在任何状态下都能按照 C04, C05 设置变送电机电流。

Users can choose the range and mode of the analog input/output according to the actual needs. Analog output in any state can transmit motor's current in accordance with settings of C04, C05.

◆ 宏控制选择参数 C06—C09 Macro control selection parameters C06—C09

用户可以通过对宏的选择来实现对软起动器自动起\停的控制(需通过按面板上的 RUN 键将宏打开)。参数 C06 解析如下:

Users can make the soft starter automatically start and stop through the selection of macro (need to press the RUN key on the panel to open the macro). The parameter C06 is analyzed as follows:

- 无宏控制: 软起动的起动\停止不受宏的控制, 只与参数 C02 的设置及控制端子操作有关。
- No macro control: The soft start's start\stop is not subject to macro and only relates to the setting of parameter C02 and control terminal.
- 数字口接点宏控制: 控制起动器宏起/停(起动命令有效后), 根据参数 C03 的设置: (设置为闭合接点宏控制: 数字口闭合, 且 C07 设置的延时时间到, 软起动器起动。如果在这个过程中数字口断开, 软起动停止, 界面上显示宏停。断开接点宏控制: 数字口断开, 且 C07 设置的延时时间到, 软起动器起动。如果在这个过程中数字口闭合, 软起动停止, 界面上显示宏停。可通过断开数字口进行再次起动)。
- Digital port contact macro control: Control the starter's macro start/stop (after the start command is effective). According to the setting of parameter C03, set as close contact macro control: when the digital port is closed, and the delay time set by C07 runs out, the soft starter starts. If the digital port is disconnected in this process, the soft start stops, and it will display macro stop on the interface. Disconnect the contact macro control: when the digital port is disconnected and the delay time set by C07 runs out, the soft starter starts. If the digital port is closed in this process, the soft start stops, and it will display macro stop on the interface. It is able to start again by disconnecting the digital port.
- 模拟输入宏控制: 使用模拟口宏控制功能, 根据参数 C08、C09 所设置的模拟输入上限值, 模拟输入下限值, 高于上限则宏停车, 低于下限起动(必须在起动命令有效后且 C07 设置的延时时间到。宏条件不满足, 界面上显示宏停)。
- Analog input macro control: Use the analog port macro control function to set the analog input upper limit and lower limit according to the parameters C08, C09. When it is higher than the upper limit, the macro stop is enabled, when lower than the lower limit, the macro start is enabled. (Only when the start command is effective and the delay time set by C07 runs out. When macro conditions are not satisfied, the interface will show the macro stop).

◆ 继电器输出参数 Relay output parameters C12—C16

CMC-HX 软起动器的主控板上有三个继电器, 其中两个为固定功能输出, K1 继电器的输出用来控制旁路接触器, K2 的输出作为故障信号。最后一个为可编程控制继电器, 用户可根据实际需要设置为相应的输出。参数 C10、C11、C12、C13: 用于设置继电器的输出方式及输出延时。

CMC-HX soft starter is provided with three relays on the main control board, two of which are for fixed function output. K1 relay output is used to control the bypass contactor, K2 output is used as a fault signal, and the last one is a programmable control relay. Users can set the corresponding output according to the actual needs. Parameters C10, C11, C12, C13 are used to set the relay's output mode and delay.

- 全压输出: 软起动器输出电压达到额定电压时输出闭合(所设置的延时时间到)。

- Full voltage output: When the soft starter's output voltage reaches the rated voltage, the output closes (the specified delay time runs out).
- 起动过程输出: 软起动器处于起动过程输出闭合(所设置的延时时间到)。如果延时时间未到就已经全压, 则不进行输出。
- Output in the process of start-up: The soft starter is in the start-up process, output closes (the specified the delay time runs out). In case of full voltage when the delay time does not run out, there is no output.
- 软停过程输出: 软起动器处于软停车时输出 (所设置的延时时间到, 且其值必须小于参数 1M08 所设置的停车时间)。
- Output in the process of soft stop: When the soft starter is in soft stop, it outputs. (the specified delay time runs out and its value must be less than the stop time set by parameter 1M08).
- 故障时输出: 软起动器检测到故障时输出闭合(所设置的延时时间到)。
- Output in failure: Output closes when the soft starter detects fault (the specified delay time runs out)
- 刹车时输出: 软起动器处于刹车时输出 (所设置的延时时间到, 且其值必须小于参数 1M10 所设置的刹车时间)。
- Output in braking: It outputs when the soft starter is braking (the specified delay time runs out and its value must be less than the stop time set by parameter 1M10)
- 运行过程输出: 在起动和运行的整个过程输出(所设置的延时时间到, 整个过程包含起动和运行)。
- Output in running: It outputs in the whole process of start and running (the specified delay time runs out. The whole process includes start and stop)
- 可编程延时输出: 参数 C03 必须设置为延时继电器控制输入, 相当于是一个内置延时继电器。
- Programmable delay output: Parameter C03 must be set as delay relay control input, which is equivalent to a built-in delay relay.

◆ 定时停车参数 Timing stop parameter C14

需要设定该参数时, 最小设定量为 0.1h, 指当软起动器运行后, 在指定时间到后按照设定的停车方式进行停车(采用双接点接线控制方式时有效)。

When this parameter is to be set, the minimum setting is 0.1h, that is, when the soft starter is running, it stopped by the preset stopping mode after the specified time runs out (valid when using double contact wiring control mode).

◆ 通信及密码保护参数 Communication and password protection parameters C17—C18, C20

在进行 Modbus RTU 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 C20 进行功能项的密码设置, 实现设置参数的密码保护。

In the Modbus RTU communication, it is allowed to connect 32 devices and check the current communication address through the LCD display. Parameter C20 is for the password setting to achieve the password protection.

◆ 频率选择 C19 Frequency selection C19

当电源频率为 50HZ 时, 请把 C19 设置成 0;

当电源频率为 60HZ 时, 请把 C19 设置成 1;

需要自动检测电源频率, 请把 C19 设置为 2。

When power frequency is 50HZ, please set C19 to zero;

When power frequency is 60HZ, please set C19 to 1;

When automatic detection of power frequency is required, please set C19 to 2.

◆ 电机接线方式 C16 Motor's connection mode C16

当电机外接时，请把 C16 设置成 0；

When the motor is externally connected, please set parameter C16 to zero;

当电机内接时，请把 C16 设置成 1，如果电机内接请依照 4.3 章进行接线。

When the motor is internally connected, please set parameter C16 to 1. If the motor needs to be internally connected, please make connection as per Chapter 4.3.

◆ 通讯控制 Communication control C22-C25, C27

详见第十章通信说明。See Chapter 10 Communication for details.

◆ 模拟输出校正 C26 Analog output calibration C26

停机状态下，进入 C26 参数，调整 C26 的值，使模拟输出等于 20mA ($\pm 5\%$)。

In the shutdown state, enter the parameter C26 and adjust the value of C26 to make the analog output equal to 20mA ($\pm 5\%$).

注：如校准时更改过参数，需要保存参数后新值才生效。

Note: If you change the parameters when calibrating, the new value will take effect only after the parameters are saved.

7.3 显示记录参数项 Parameters for display and record

参数 Parameter	名称 Name	范围 Range	出厂值 Factory default
N00	软起额定电流 Soft starter's rated current	不可修改 Non-modifiable	---
N01	电流测量校正 Current measurement calibration	不可修改 Non-modifiable	---
N02	电流显示精度 Current display accuracy	不可修改 Non-modifiable	---
N03- N18	未定义参数 Undefined parameters	不可修改 Non-modifiable	---
N19	故障次数记录 Record of the number of fault	不可修改 Non-modifiable	---
01-10	故障历史记录 Fault history	不可修改 Non-modifiable	---



显示记录参数项记录软起动器的工作及状态信息，此功能项用户不可修改。

The "Parameters for display and record" item is used to record the operation and status information of the soft starter. This function item cannot be modified by the user.

第八章 故障检测与排除

Chapter 8 Fault detection and Clearing

8.1 故障代码表 Error code table

软起动器有 15 种保护功能，当软起动器保护功能动作时，软起动器立即停机，LCD 液晶显示屏显示当前故障。用户可根据故障内容进行故障分析。

CMC-HX soft starter is provided with 15 types of protection function. When the soft starter's protection function acts, the soft starter immediately shut down and LCD shows the current fault. User can analyze the fault according to the fault information.

故障代码 Code	故障名称 Fault	故障原因 Cause	处理方法 Troubleshooting
01	主电源缺相 Phase loss of main power	在起动或进行中缺相？ Phase loss during start or running	检查三相电源是否可靠 Check three phase power supply to ensure it is reliable
02	相序错误 Phase sequence error	相序接反 Reverse phase sequence	调整相序或设置为不检测相序 Adjust phase sequence or set not to check phase sequence
03	参数丢失 Loss of parameter	设定参数丢失？ Parameter setting is lost	检查各项功能并重新设定 Check functions and reset
04	频率故障 Frequency failure	电源电频率超过范围 Power frequency goes beyond the range	检查输入端三相电输入源频率 Check three-phase input power frequency at input terminal
05	过流保护 Overcurrent protection	负载突然加重？ 负载波动太大？ Load increases suddenly or load fluctuation is too large	调整负载运行状况 查看 1M17 或 1M18 项是否设置过小 Adjust the load running condition or check whether 1M17 or 1M18 are less set
06	起动过频 Frequent start	起动过于频繁 Start is too frequent	起动间隔时间小于设置的起动间隔时间 1M24 The start-up interval is less than the specified start interval 1M24
07	相电流失衡 Phase current imbalance	缺相/相电压不平衡 Phase loss/phase voltage imbalance	调整负载运行状况 检查实际不平衡度是否超过所设置的电流失衡保护 1M15 Adjust load running condition Check whether the actual imbalance exceeds the preset current imbalance protection 1M15
08	晶闸管过热 Thyristor is overheated	内部散热器过热？ Internal radiator is overheated.	检查风机是否可靠工作 降低起动频度 检查控制电源电压是否过低

		机器通风不畅? Poor ventilation	Check whether the fan works normally. Reduce the start frequency and check whether the control power voltage is too low.
09	内部禁止 Inner forbidden	违反操作规程 Violation of operating procedures	立即联系厂家 Contact manufacturer immediately
10	起动超时 Start timeout	负载过重斜坡时间太短? 限流幅制过小? Overloaded and ramp time is too short or current-limiting range is too small	检查斜坡时间 1M05 是否过小 检查限流倍数 1M06 是否过小 Check whether ramp time 1M05 is too short Check whether current-limiting multiple 1M06 is too small
12	电子热过载 Electronic thermal overload	大电流持续时间过长是否超载运行? High current lasts too long, whether it is overloaded	检查电机电流设置是否有误? 是否超载? Check whether the motor current is set incorrectly and overloaded?
13	SCR 异常 SCR abnormal	SCR 工作不正常? 软起动器输出缺相 内接法接线错误 SCR works abnormally Phase loss of soft starter output Internal connection error	检查 SCR 是否损坏? 检查软起动器输入输出是否缺相? Check whether SCR is damaged. Check whether the input and output of the soft starter loses phase
14	欠载保护 Underload protection	电机运行电流低于额定电流 Motor's running current is lower than rated current	检查欠载原因, 并作出更正。 检查设定是否根据运行条件。 Check the cause of underload and make correction. Check whether the setting is based on running condition.
15	电机接线故障 Motor wiring failure	电机接线发生错误 Motor wiring is wrong	电机内接时, 检查电机接线是否正确? 电机接线方式与设定接线方式是否一致? Check to ensure the motor connection is correct when the motor is delta-connected. Check that whether the motor wiring method is consistent with the preset wiring method.

故障检测时间一览表 List of fault detection time

*注: 在那个状态检测在对应的状态用√表示

*Note: Tick in corresponding state which is detected

序号 No.	故障 Fault	初始化 Initializing	停止状态 Stop state	准备启动 Ready to start	启动过程 Start process	运行过程 Running process	条件 Condition
01	主电源缺相 Phase loss of main power			√	√	√	-
02	相序错误 Phase sequence error			√			-
03	参数丢失 Loss of parameter	√					-
04	过载保护 Overload protection					√	-
05	过流保护 Overcurrent protection					√	-
06	欠流保护 Undercurrent protection					√	-
07	相电流不平衡 Phase current imbalance					√	-
08	相电压失衡保护 Phase voltage imbalance protection				√	√	-
09	SCR 异常 SCR abnormal			√			
10	启动超时保护 Start timeout protection				√		-
11	SCR 过热 SCR overheated			√	√	√	-
12	电机温度保护 Motor's temp. protection				√	√	-
13	启动频繁 Frequent start			√			-
14	频率故障			√			-

	Frequency failure						
--	----------------------	--	--	--	--	--	--

8.2 故障记录 Fault records

起动器最多可记录最近 10 次故障，供用户以后分析使用，01-10 依次为最后一次故障—最近发生的第 10 次故障。

CMC-HX soft starter can record up to 10 faults for later use by the user, and the 01-10 is the last fault — the latest 10th fault.

8.3 故障显示 Fault displaying

软起动器处于故障状态时，通过∧键可以浏览记录的故障。序号 E0 代表最新的故障记录，在 LCD 面板上可以显示前三次故障(E0、E1、E2)，历史故障记录可通过显示记录功能项(N20-N29)进行查阅。

User may read fault records by pressing Up key when soft starter is in failure state. Code E0 represents the latest fault. User can read the latest three faults (E0, E1, E2) on LCD panel and read record history through displaying and recording parameter (01-10).

8.4 故障清除 Fault clearing

故障具有记忆性，故在故障排除后，通过液晶提示的复位按键或外接清除故障输入数字口进行复位，使软起动器恢复到起动准备状态。

As CMC-HX soft starter memorizes fault information, user, after fault is cleared, needs to reset fault record through reset key displayed on LCD or external fault clearing input digital port to make the soft starter restore to the state ready to start.

第九章 日常维护

Chapter 9 Daily Maintenance

1、灰尘：如果灰尘太多，将降低软起动器的绝缘等级，可能使软起动器不能正常工作。

1. Dust: Too much dust is likely to reduce insulation level of soft starter and make soft starter unable to properly operate.

(1) 用清洁干燥毛刷轻轻刷去灰尘。

Adopt clean and dry brush to brush over the dust.

(2) 用压缩空气吹去灰尘。

Adopt compressed air to blow dust away.

2、结露：如果结露，将降低软起动器的绝缘等级，可能使软起动器不能正常工作。

2. Dewing: Dewing is likely to reduce insulation level of soft starter and make soft starter unable to properly operate.

(1) 用电吹风或电炉吹干。

Adopt electric drier or electric heater to blow dry.

(2) 配电间去湿。

Dehumidification of distribution room

3、定期检查元器件是否完好，是否能够正常工作。

3. Check the elements so as to confirm whether they are in good condition and whether they are able to properly operate.

4、检查软起动器的冷却通道，确保不被脏物和灰尘堵塞。

4. Check the cooling channel of soft starter to prevent it from being blocked by dirt and dust.

维护检查必须在切断软起动器进线侧所有电源后进行！

Maintenance inspection shall be carried out after all powers on the side of the incoming line of soft starter are cut off!

第十章 通信说明

Chapter 10 Communication

CMC-HX 电机软起动器，提供 RS485 通信接口，采用国际标准的 Modbus RTU 通讯协议进行主从通讯。用户可通过 PC/PLC、控制上位机等实现集中控制，以适应特定的应用要求。可选配以太网/GPRS 通讯，实现网络 Modbus TCP/IP 通信/无线网络通信。

CMC-HX motor soft starter is equipped with RS485 communication port, adopting international standard Modbus communication protocol for master-slave communication. User may implement centralized control by PC/PLC and upper computer control to satisfy requirement of application in special condition. Ethernet/GPRS communication can be chosen to achieve Modbus TCP/IP communication/wireless network communication.

10.1 Modbus 通讯

1. 协议内容 Protocol

该 Modbus 串行通信协议定义了串行通信中异步传输的帧内容及从机应答帧的使用格式，主机组织的帧内容包括：从机地址、执行命令、数据和错误校验等。从机的响应也是采用相同的结构，内容包括：运行确认、返回数据和错误校验等。如果从机在接收帧时发生错误，或不能完成主机要求的动作，它将组织一个故障帧作为响应反馈给主机。

Modbus serial communication protocol defines frame content and slave response frame format of asynchronous transmission in serial communication, frame content of master includes: slave address, command of execution, data and error checkout etc. slave response also adopts the same architecture, including: operational qualification, returning data and error checkout. If slave has an error in receiving frames or fails to complete task required by master, it shall organize an error frame as response and feedback to master.

2. 总线结构 Bus structure

(1) 接口方式 Interface mode

RS485 硬件接口 RS485 hardware interface

(2) 传输方式 Transmission mode

异步串行，半双工传输方式。在同一时刻主机和从机只能有一个发送数据而另一个接收数据。数据在串行异步通信过程中，是以报文的形式，一帧一帧发送。

Asynchronous serial, half-duplex transmission mode: at the same time, one sends data while the other receives data for master and slave machines. Data in serial asynchronous communication shall be transmitted in the form of message frame by frames.

(3) 拓扑结构 Topological structure

单主机多从机系统。从机地址的设定范围为 1~32，网络中的每个从机的地址具有唯一性。这是保证 ModBus 串行通信的基础。

Single-master multi-slave system: Setting range of slave address is from 1 to 32, every slave in network has unique address, which shall be the base for ModBus serial communication.

3. 协议说明 Explanation of protocol

CMC-HX 软起动器通信协议是一种异步串行的主从 ModBus 通信协议，网络中只有一个设备能够建立协议。其它设备只能通过提供数据响应主机的“查询/命令”，或根据主机的“查询/命令”做出相应的动作。主机在此是指个人计算机(PC)，工业控制设备或可编程逻辑控制器(PLC)等。从机是指

CMC-HX 软起动器或其他的具有相同通讯协议的控制设备。

Communication protocol for CMC-HX soft starter is asynchronous serial master-slave ModBus communication protocol. There is only one device able to set up protocol in network. The other devices shall only respond to “Inquiry/order” of master by data or function by “Inquiry/order” of master. Master means personal computer (PC), industrial control equipment or programmable logical control (PLC). Slave means CMC-HX soft starter or other control equipment having the same communication protocol.

4. 通讯帧结构 Communication frame structure

CMC-HX 软起动器的 ModBus 协议通信数据格式为 RTU(远程终端单元)模式。RTU 模式中，每个字节的格式如下：

Data format of ModBus protocol for CMC-LX soft starter is RTU (Remote terminal unit) mode. Each byte in RTU mode is as follows:

编码系统：8 位二进制，十六进制 0—9、A—F，每个 8 位的帧域中，包括两个十六进制字符。

Coding system: 8-digit binary system, hexadecimal system 0—9 and A—F, each 8-digit frame domain contains two hexadecimal characters.

在此模式下，新的总是以至少 3.5 个字节的传输时间静默，作为开始。在以波特率计算传输速率的网络上，3.5 个字节的传输时间可以轻松把握。紧接着传输的数据域依次为：从机地址、操作命令码、数据和 CRC 校验字，每个域传输字节都是十六进制的 0...9, A...F。网络设备始终监视着通讯总线的活动，即使在静默间隔时间内。当接收到第一个域(地址信息)，每个网络设备都对该字节进行确认。随着最后一个字节的传输的完成，又有一段类似的 3.5 个字节的传输时间间隔，用来表示本帧的结束，在此以后，将开始一个新帧的传送。

In this mode, new one is always silent in transmission time of no less than 3.5 bytes as start. In network to calculate transmission rate based on baud rate, it is easy to control in transmission time of 3.5 bytes. The next data domain in transmission: slave address, operating command code, data and CRC check word, byte in transmission in every domain is hexadecimal 0...9, A...F.

Network device is always monitoring the operation of communication bus even in silent interval time. When receiving first domain (Address information), each network device shall affirm the byte, with the completion of the transmission of the last byte, there is a similar transmission time interval of 3.5 bytes to indicate the end of the frame. After this, the transmission of a new frame will begin.

一个帧的信息必须以一个连续的数据流进行传输，如果整个帧传输结束前超过 1.5 个字节以上的间隔时间，接收设备将清除这些不完整的信息。

A frame information shall be transmitted in a continuous data stream, if interval time before completion of entire frame transmission exceeds 1.5 bytes, receiving device shall remove this incomplete information.

5. 软起动器状态控制字说明 Explanation to status control word of soft starter

状态控制字反映了软起动器的状态，由一个字来表示。

Status control word reflects the state of soft starter and it is expressed by a word.

状态字低八位定义：Definition of status word's low 8 bits

位功能 Bit function	主状态 Major state			次状态 Sub-state					说明 Description
	7	6	5	4	3	2	1	0	
停止 Stop	0			0					正常停 Normal stop
				1					急停 Emergency stop
编辑 Edit	1			0					进入编辑 Enter edit(0x20)
				1					用户参数修改允许 User's parameter modification

			allowed
		2	管理参数修改允许 Management parameter modification allowed
运行 Running	2 (0x40)	0	进入起动状态 Enter start state (0x40)
		1	起动延时 Start delay
		3	突跳 Kick
		4	斜坡过程 Ramp process
		5	限流过程 Current-limiting process
		6	起动完成 Start finished
		7	软停 Soft stop
		9	外部制动 External braking
		10	刹车倒计时 Brake countdown
		11	宏停止 Macro stop
		12	自由停 Free stop
		14	泵停 Pump stop
		15	全压(判断起动完成) Full voltage (start judged to be finished)
点动 Inching	3 (0x60)	0	进入点动状态 Enter inching state (0x60)
		0	点动运行 Inching running
故障 Fault	4(0x80)	0	(0x80)
		1	主电源缺相 Phase loss of main power
		2	相序错误 Phase sequence error
		3	参数丢失 Parameter missing
		4	频率故障 Frequency fault
		5	过流保护 Overcurrent protection
		6	起动频繁 Frequent start
		7	相电流不平衡 Phase current imbalance
		8	SCR 过热 SCR overheated
		9	内部禁止 Internally forbidden
		10	起动超时保护 Start timeout protection

		11	电机温度保护 Motor temperature protection
		12	热过载保护 Thermal overload protection
		13	SCR 异常 SCR abnormal
		14	欠载保护 Underload protection
		15	接线错误 Wiring error

状态字高八位定义：Definition of high eight bits of status word

Bit Function	Main state								Description
	7	6	5	4	3	2	1	0	
显示精度 Display accuracy								0	不显示小数点 Do not display decimal
								1	Display decimal 显示小数点
M1\M2 参数 M1\M2 parameter								0	M1 parameter 参数
								1	M2 parameter 参数
通讯状态 Communication state								0	通讯正常 Communication normal
								1	通讯中断 Communication failure
总线 Bus						0			总线允许 Bus allowed
						1			总线禁止 Bus forbidden
键控 Key control				0					键控允许 Key control permitted
				1					键控禁止 Key control forbidden (0x10)
内部禁止 Internal forbidden			0						未禁止 Unforbidden
			1						禁止(解密) (0x20) Forbidden (deciphering)
密码锁定 Password locked		0							锁定 Locked
		1							未锁定 Unlocked

6.地址说明 Address explanation

寄存器地址从 0 开始，所以如果上位机的始地址从 1 开始，则要注意把寄存器地址统一加 1。如果上位机的始地址为 0，则无需加 1。

The register address starts at 0, so if the start address of the host computer starts from 1, it is necessary to note that the register address is incremented by one. If the initial address of the host computer is 0, it is no need to add 1.

基本参数项 1M

Basic parameters 1M

名称 Name	变量类型 Type of variables	寄存器编号 Register No.	数据 Type of data	R/W 特性 R/W feature
应用参数 Application parameter	I/O integer	0000	Uint16	R/W
起动斜坡方式	I/O integer	0001	Uint16	R/W

Start ramp mode				
突跳电压 Step voltage	I/O integer	0002	Uint16	R/W
突跳时间 Step time	I/O integer	0003	Uint16	R/W
起始电压\电流 、 Initial voltage/current	I/O integer	0004	Uint16	R/W
斜坡时间 Ramp time	I/O integer	0005	Uint16	R/W
限流倍数 Current-limiting multiple	I/O integer	0006	Uint16	R/W
停车方式 Stop mode	I/O integer	0007	Uint16	R/W
停车时间 Stop time	I/O integer	0008	Uint16	R/W
停车终止电压 Stop final voltage	I/O integer	0009	Uint16	R/W
刹车(制动)时间 Braking time	I/O integer	0010	Uint16	R/W
二次起动允许 Second start permit	I/O integer	0011	Uint16	R/W
二次限流倍数 Second current-limiting multiple	I/O integer	0012	Uint16	R/W
电机额定电流 Motor's rated current	I/O integer	0013	Uint16	R/W
过载保护级别 Overload protection level	I/O integer	0014	Uint16	R/W
电流失衡保护 Current imbalance protection	I/O integer	0015	Uint16	R/W
电流失衡延时 Current imbalance delay	I/O integer	0016	Uint16	R/W
运行过流保护 Overcurrent protection during running	I/O integer	0017	Uint16	R/W
运行过流时间 Overcurrent time during running	I/O integer	0018	Uint16	R/W
欠载级别 Underload level	I/O integer	0019	Uint16	R/W
欠载时间 Underload time	I/O integer	0020	Uint16	R/W
相序检测 Phase sequence detection	I/O integer	0021	Uint16	R/W
电机温度检测 Motor's temperature detection	I/O integer	0022	Uint16	R/W

电机温度时间 Motor's temperature time	I/O integer	0023	Uint16	R/W
起动间隔时间(单位分) Start interval time (min)	I/O integer	0024	Uint16	R/W
未定义 Undefined	-----	0025~0029	-----	-----

基本参数项 2M

Basic parameters 2M

名称 Name	变量类型 Type of variables	寄存器编号 Register No.	数据 Type of data	R/W 特性 R/W feature
应用参数 Application parameter	I/O integer	0030	Uint16	R/W
起动斜坡方式 Start ramp mode	I/O integer	0031	Uint16	R/W
突跳电压 Step voltage	I/O integer	0032	Uint16	R/W
突跳时间 Step time	I/O integer	0033	Uint16	R/W
起始电压\电流 Initial voltage\current	I/O integer	0034	Uint16	R/W
斜坡时间 Ramp time	I/O integer	0035	Uint16	R/W
限流倍数 Current-limiting multiple	I/O integer	0036	Uint16	R/W
停车方式 Stop mode	I/O integer	0037	Uint16	R/W
停车时间 Stop time	I/O integer	0038	Uint16	R/W
停车终止电压 Stop final voltage	I/O integer	0039	Uint16	R/W
刹车(制动)时间 Braking time	I/O integer	0040	Uint16	R/W
二次起动允许 Second start permit	I/O integer	0041	Uint16	R/W
二次限流倍数 Second current-limiting multiple	I/O integer	0042	Uint16	R/W
电机额定电流 Motor's rated current	I/O integer	0043	Uint16	R/W
过载保护级别 Overload protection level	I/O integer	0044	Uint16	R/W
电流失衡保护 Current imbalance protection	I/O integer	0045	Uint16	R/W
电流失衡延时 Current imbalance delay	I/O integer	0046	Uint16	R/W
运行过流保护 Overcurrent protection	I/O integer	0047	Uint16	R/W

during running				
运行过流时间 Overcurrent time during running	I/O integer	0048	Uint16	R/W
欠载级别 Underload level	I/O integer	0049	Uint16	R/W
欠载时间 Underload time	I/O integer	0050	Uint16	R/W
相序检测 Phase sequence detection	I/O integer	0051	Uint16	R/W
电机温度检测 Motor's temperature detection	I/O integer	0052	Uint16	R/W
电机温度时间 Motor's temperature time	I/O integer	0053	Uint16	R/W
起动间隔时间(单位分) Start interval time (min)	I/O integer	0054	Uint16	R/W
未定义 Undefined	-----	0055~0059	-----	-----

功能参数 C
Functional parameter C

名称 Name	变量类型 Type of variables	寄存器编号 Register No.	数据 Type of data	R/W 特性 R/W feature
语言选择 Language selection	I/O integer	0060	Uint16	R/W
显示选择 Display selection	I/O integer	0061	Uint16	R/W
起停控制方式 Start/stop control mode	I/O integer	0062	Uint16	R/W
数字输入口 Digital input port	I/O integer	0063	Uint16	R/W
模拟输入输出 Analog input/output	I/O integer	0064	Uint16	R/W
模拟输出方式 Analog output mode	I/O integer	0065	Uint16	R/W
宏控制选择功能 Macro control function selection	I/O integer	0066	Uint16	R/W
起动延时 Start delay	I/O integer	0067	Uint16	R/W
模拟输入上限值 Upper limit value of analog input	I/O integer	0068	Uint16	R/W
模拟输入下限值 Lower limit value of analog input	I/O integer	0069	Uint16	R/W

输出继电器 K3 Output relay K3	I/O integer	0070	Uint16	R/W
K1 输出延时 K1 output delay	I/O integer	0071	Uint16	R/W
K2 输出延时 K2 output delay	I/O integer	0072	Uint16	R/W
K3 输出延时 K3 output delay	I/O integer	0073	Uint16	R/W
可编程定时停车时间 Programmable timing stop time	I/O integer	0074	Uint16	R/W
起动时间限制 Starting time limit	I/O integer	0075	Uint16	R/W
电机接线方式 Motor wiring mode	I/O integer	0076	Uint16	R/W
通信地址 Communication address	I/O integer	0077	Uint16	R/W
通信波特率 Communicate baud rate	I/O integer	0078	Uint16	R/W
频率选择 Frequency selection	I/O integer	0079	Uint16	R/W
密码设置 Password setting	I/O integer	0080	Uint16	R/W
未定义参数 Undefined parameter	I/O integer	0081	Uint16	R/W
外部通讯模块选择 External communication module selection	I/O integer	0082	Uint16	R/W
IP 地址 address	I/O integer	0083~0084	Uint32	R/W
子网掩码 Subnet mask	I/O integer	0085~0086	Uint32	R/W
默认网关 Default gateway	I/O integer	0087~0088	Uint32	R/W
模拟输出校正系数 Analog output calibration coefficient	I/O integer	0089	Uint16	R/W
外部通讯控制选择 External communication control selection	I/O integer	0090	Uint16	R/W
未定义参数 Undefined parameter	-----	0091~0099	-----	-----

记录功能项 N

Recording item N

名称 Name	变量类型 Type of variables	寄存器编号 Register No.	数据 Type of data	R/W 特性 R/W feature
------------	---------------------------	-----------------------	--------------------	-----------------------

软起额定电流 Soft start rated current	I/O integer	0100	Uint16	R
电流测量校正 Current measurement calibration	I/O integer	0101	Uint16	R
电流显示精度 Current display accuracy	I/O integer	0102	Uint16	R
未定义参数 Undefined parameter	I/O integer	0103~0118	Uint16	R
故障次数记录 Record of the number of fault	I/O integer	0119	Uint16	R
Fault history 1	I/O integer	0120	Uint16	R
Fault history 2	I/O integer	0121	Uint16	R
Fault history 3	I/O integer	0122	Uint16	R
Fault history 4	I/O integer	0123	Uint16	R
Fault history 5	I/O integer	0124	Uint16	R
Fault history 6	I/O integer	0125	Uint16	R
Fault history 7	I/O integer	0126	Uint16	R
Fault history 8	I/O integer	0127	Uint16	R
Fault history 9	I/O integer	0128	Uint16	R
Fault history10	I/O integer	0129	Uint16	R

实时测量数据

Real-time measured data

名称 Name	变量类型 Type of variables	寄存器编号 Register No.	数据 Type of data	R/W 特性 R/W feature
主控板运行状态 Operation state of main control panel	I/O integer	140	Uint	R
当前故障 1 Current fault 1	I/O integer	141	Uint	R
当前故障 2 Current fault 2	I/O integer	142	Uint	R
当前故障 3 Current fault 3	I/O integer	143	Uint	R
Ie—电机额定电流 Ie—motor's rated current	I/O integer	144	Uint	R
Ip—平均电流 Ip—average current	I/O integer	145	Uint	R
La 相电流 La phase current	I/O integer	146	Uint	R

Lb 相电流 Lb phase current	I/O integer	147	Uint	R
Lc 相电流 Lc phase current	I/O integer	148	Uint	R
模拟输入 Ai% Analog input Ai%	I/O integer	149	Uint	R
输出电压值 Uo% Output voltage Uo%	I/O integer	150	Uint	R
起动倒计时时间 Ss Start countdown time Ss	I/O integer	151	Uint	R
刹车倒计时时间 Bs Braking countdown time Bs	I/O integer	152	Uint	R
起动间隔倒计时时间 Ts Start interval countdown time Ts	I/O integer	153	UintR	R

控制命令数据

Control command data

名称 Item	功能码 (十六进制) Function code (Hexadecimal)	寄存器编号 (十六进制) Register number (Hexadecimal)	数据 Data	R/W 特性 R/W feature
停止 Stop	06	200	129	W
运行 Run	06	202	131	W
复位 Reset	06	203	132	W

注：如果控制命令无效，查看 C02 参数，是否开启通讯控制功能；查看端子 X1/3 和 X1/5 是否短接。

Note: if control command is invalid, check parameter L200, whether communication control function is activated, check whether terminal X1/3 and X1/5 are in short circuit.

7. 功能码概述 Description of function code

(1) 功能码“03”（读多个保持寄存器）

(1) Function code “03”（Read multiple registers）

主机发送数据 Data from the host	字节数 Number of byte	例程 Routine	从机返回数据 Slave return data	字节数 Number of byte	例程 Routine
从机地址 Slave address	1	01	从机地址 Slave address	1	01
功能码	1	03	功能码	1	03

Function code			Function code		
起始地址 Initial address	2	006D	返回字节数 Number of return byte	1	02
数据长度 Data length	2	0001	数据 1 Data	2	4100
CRC	2	15D7	CRC	2	8814

注：每次读取的寄存器个数最多 50 个。

Note: It reads a maximum of 50 registers each time.

(2) 功能码“04”（读多个输入寄存器）

(2) Function code “04” (Read multiple input register)

发送数据 Sending data	字节数 Number of byte	例程 Routine	从机返回数据 Slave return data	字节数 Number of byte	例程 Routine
从机地址 Slave address	1	01	从机地址 Slave address	1	01
功能码 Function code	1	04	功能码 Function code	1	04
起始地址 Initial address	2	006D	返回字节数 Number of return byte	1	02
数据长度 Data length	2	0001	数据 1 Data 1	2	4100
CRC	2	A017	CRC	2	78DD

注：每次读取的寄存器个数最多 50 个。

Note: It reads a maximum of 50 registers each time.

(3) 功能码“06”（写单个寄存器）

(3) Function code “06” (Write single register)

发送数据 Sending data	字节数 Number of byte	例程 Routine	从机返回数据 Slave return data	字节数 Number of byte	例程 Routine
从机地址 Slave address	1	01	从机地址 Slave address	1	01
功能码 Function code	1	06	功能码 Function code	1	06
起始地址 Initial address	2	0001	返回字节数 Number of return byte	2	0001
写入数据 Write data	2	001E	数据 1 Data 1	2	001E
CRC	2	5802	CRC	2	5802

注：用 06 命令对软起动器进行修改参数时软起动器必须是处于停止或者编辑状态，其他状态都不能

修改成功。对某个参数进行修改时，修改的参数必须是说明书规定的范围，如果超出此范围则不能修改成功。

Note: When 06 command is adopted to modify parameter for soft starter, soft starter shall be in stop or edit state, other states are not available for modification. In case of modification of a parameter, the parameter to be modified shall be within the range defined in the specification, parameter beyond the range of specification shall not be modified.

8. 通讯时间间隔 Communication time interval

(1) “03”, “04”命令使用时间间隔: The time interval for using commands "03" and "04":

时间间隔 = $(17 + \text{寄存器个数} * 2) * 8 / \text{波特率} * 1000 * 1.2 \text{ms}$;

Time interval = $(17 + \text{number of register} * 2) * 8 / \text{baud rate} * 1000 * 1.2 \text{ms}$;

例如：9600波特率，读取1个寄存器值，时间间隔 = $(17 + 1 * 2) * 8 / 9600 * 1000 * 1.2 = 19 \text{ms}$ 。

Example: 9600 baud rate, read 1 register value, time interval = $(17 + 1 * 2) * 8 / 9600 * 1000 * 1.2 = 19 \text{ms}$.

(2) “06”命令使用时间间隔: (2) “06” command service time interval:

时间间隔 = $20 * 8 / \text{波特率} * 1000 * 1.2 \text{ms}$;

Time interval = $20 * 8 / \text{baud rate} * 1000 * 1.2 \text{ms}$;

例如：9600 波特率，时间间隔 = $20 * 8 / 9600 * 1000 * 1.2 = 20 \text{ms}$ 。

Example: 9600 baud rate, time interval = $20 * 8 / 9600 * 1000 * 1.2 = 20 \text{ms}$.

9. 注意事项 Notice

(1) 多机通信时，CMC-HX 软起动器的地址具有唯一性，即任何两台软起动器的地址不能相同(通过参数 C17 进行设置)。

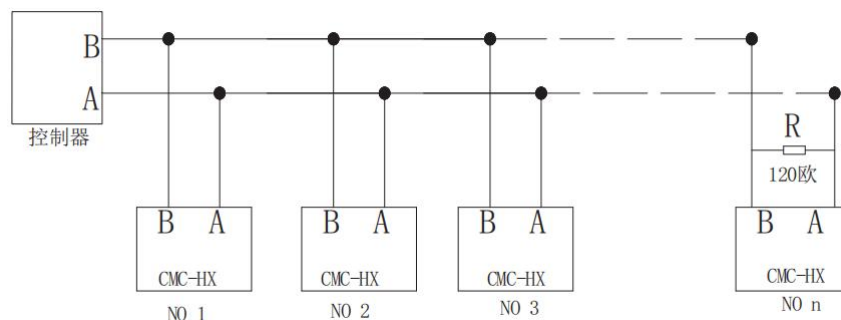
Multi-computer communication, CMC-HX soft starter address is unique, any two soft starters shall not be identical in address (To be set by parameter C17).

(2) CMC-HX 软起动器的通信波特率必须与控制器的波特率相同(通过参数 C18 进行设置)。

Communication baud rate for CMC-HX soft starter shall be identical to that of control (To be set by parameter L205)

(3) 多台 CMC-HX 软起动器通讯时，应该在最末的一台上 AB 两端接 120 欧电阻。

In case of multiple CMC-HX soft starters are in communication, 120 Ω resistor shall be connected to both ends of AB on the final soft starter.



10. 通讯故障代码分析 Analysis of communication fault code

(1) 写地址错误：设备地址+0x86+0x02+CRC

(1) Error in address: device address +0x86+0x02+CRC

①地址超出 140

②不是规定的可写寄存器

③不是在停止或编辑状态

④写控制命令时通讯控制启停没有开启

a. Address is in excess of 140

b. Not a specified writable register

c. Not in stop or edit state

d. Communication control start/stop fails to open in writing control command.

(2) 写数据错误: 设备地址+0x86+0x03+CRC

(2) Error in writing data: Device address +0x86+0x03+CRC

①在规定的可写寄存器写入超出规定的范围

②发送启动命令时命令数据不对

a. Data written in specified writable register is beyond the defined range of data

b. Command data is wrong in sending start command.

(3) 读地址错误: 设备地址+0x83+0x02+CRC

(3) Error in reading address: device address +0x83+0x02+CRC

①读的地址超出 140

a. Read address is in excess of 140.

(4) 功能码错误: 设备地址+(0x80+错误功能码)+0x01+CRC

(4) Function code error: device address +(0x80+incorrect function code)+0x01+CRC

①功能码不是软起动器所规定

a. Function code is not defined by the soft starter.

10.2 以太网通讯 Ethernet communication

1. 协议内容 Protocol content

采用 TCP-IP 协议, 是当今现有局域网采用的最通用的通信协议标准。

The use of TCP-IP protocol is the most common communication protocol standard adopted by existing local area network.

2. 操作方式 Operating method

采用该通讯方式时, 必须选配以太网通讯模块。软起相关设置:

Ethernet communication module shall be selected when this communication mode is adopted. The soft starter's relative setting is as follows:

参数 Parameter	名称 Description	范围 Range	设定值 Set value	出厂值 Factory default
C22	外部通讯模块选择 Selection of external communication module	0、以太网 1、GPRS 1、 0. Ethernet 1.GPRS	0	0
C27	Selection of external	0、关闭 1、开启	1	1

	communication control	0. Disable 1. Enable		
--	-----------------------	----------------------	--	--

IP 地址 C23、子网掩码 C24、默认网关 C25 设置时，应与设备所连局域网一致。例如软起所连设备的 IP 地址为 192.168.1.13，则软起的设置应为 C23=192.168.1.XX($\neq 0$ 、1)，C24=255.255.255.0，C25=192.168.1.1。所连设备软件 IP 应与软起 IP 一致，端口号设置为 502。

IP address C23, subnet mask C24, and default gateway C25 settings should be consistent with the device connected to the local area network. For example, if the IP address of the device connected to the soft starter is 192.168.1.13, the setting of the soft starter should be C23 = 192.168.1.XX ($\neq 0, 1$), C24 = 255.255.255.0, C25 = 192.168.1.1. The connected device software's IP should be consistent with the soft starter's IP, and the port number is set to 502.

10.3 GPRS 通讯 Communication

采用 GPRS 通讯时，必须选配 GPRS 通讯模块。软起相关设置：

GPRS communication module shall be selected when GPRS communication mode is adopted. The soft starter's relative setting is as follows:

参数 Parameter	名称 Description	范围 Range	设定值 Set value	出厂值 Factory default
C22	外部通讯模块选择 Selection of external communication module	2、以太网 1、GPRS 3、0. Ethernet 1.GPRS	0	0
C27	Selection of external communication control	1、关闭 1、开启 0. Disable 1. Enable	1	1

具体使用方法见“DTU 模块使用手册”

See *User's Manual for DTU Module* for usage in details.

第十一章 附表说明

Chapter 11 Appendix

附表一：规格型号及附件选用

Appendix 1: Specification and Accessories Selection

Motor (KW)	Model of soft starter	Rated current (A)	Model of bypass contactor	Specification of primary line (copper line)
7.5	CMC-008-3	18	GSC1-25	4 mm ²
11	CMC-011-3	24	GSC1-32	6 mm ²
15	CMC-015-3	30	GSC1-40	10 mm ²
18.5	CMC-018-3	39	GSC1-50	10 mm ²
22	CMC-022-3	45	GSC1-63	16 mm ²
30	CMC-030-3	60	GSC1-70	25 mm ²
37	CMC-037-3	76	GSC1-95	35 mm ²
45	CMC-045-3	90	GSC2-115F	35 mm ²
55	CMC-055-3	110	GSC2-150F	35 mm ²
75	CMC-075-3	150	GSC2-185F	50 mm ²
90	CMC-090-3	180	GSC2-225F	30×3 copper bar
110	CMC-110-3	218	GSC2-265F	30×3 copper bar
132	CMC-132-3	260	GSC2-330F	30×4 copper bar
160	CMC-160-3	320	GSC2-384F	30×4 copper bar
185	CMC-185-3	370	GSC2-500F	40×4 copper bar
220	CMC-220-3	440	GSC2-550F	40×4 copper bar
250	CMC-250-3	500	GSC2-630F	40×4 copper bar
280	CMC-280-3	560	GSC2-630F	40×4 copper bar
315	CMC-315-3	630	CDC8-800	40×5 copper bar
400	CMC-400-3	780	CDC8-1000	50×5 copper bar
470	CMC-470-3	920	CDC8-1250	50×6 copper bar
530	CMC-530-3	1000	CDC8-1250	50×6 copper bar
630	CMC-630-3	1200	CDC8-1250	50×6 copper bar
710	CMC-710-3	1400	CDC8-1250	50×6 copper bar

附表二：软起标准接线规格型号及附件选用(以 380V 为例)

Appendix 2: Internal Delta Connection Specification and Accessories Selection for Soft Starter (with 380V as an example)

注：标准接线指电机绕组三角型或者星型连接，晶闸管连接在电源与电动机之间。

NOTE: Standard wiring means delta or star connection in motor winding, thyristor is connected between power supply and motor.

内三角接线是指电动机绕组三角形-晶闸管与绕组串联。内三角控制主要的优点是可以降额选用软起动器，内三角接法中流过软起和电机的电流是线电流的 $1/1.732$ 。上表采用余量选用软起动器，按照线电流/1.5 倍的额定电流来选用。用户在选用过程中可按照实际情况进一步降额选用软起动器。

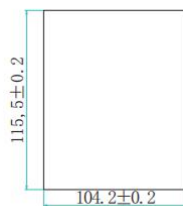
Internal delta connection means the motor winding delta-thyristor and winding are in series in motor winding. The advantage of internal delta control is the ability to derate in selection of soft starter. In internal delta connection, the current flowing through soft starter and motor is $1/1.732$ of line current. Soft starter is selected according to rated current of line current/1.5 times in the above mentioned list. User may further derate in selection of soft starter according to practical situation.

订货须知 Instruction to order

- ◆ 用户在订货时，请将产品型号、规格、负载情况及使用条件通知供货方，以便正确选择产品。
- ◆ To place an order, please provide product model, specification, load and application condition to your supplier;

特殊说明：若客户需要键盘盒外置，需要跟厂家订购外置键盘盒的安装附件。键盘盒外置时需要将‘外置键盘盒固定附件’卡在门板上，门板开孔尺寸是：115.5(高) × 104.2(宽)，如图所示。具体安装步骤请参考附表二。

Special note: If client needs keyboard panel to be externally placed, it is necessary to order the mounting fittings from manufacturer. When keyboard panel is externally placed, it needs to lock the mounting fittings of external keyboard panel onto door panel with its hole size of 115.5(H) × 104.2(W), which is as shown in the following figure. For specific installation steps, please refer to attached table 2.



- ◆ 软起动器标准配置含内置电流互感器,用户无需外接电流互感器。
- ◆ As the standard configuration of soft starter contains built-in current transformer, user does not need to externally connect the both.
- ◆ 上表中的附件仅供参考。
- ◆ Accessories shown in above table are only for reference.

附表三：CMC-HX 附件安装使用说明

Appendix 3: Instructions to Installation of Accessories of CMC-HX Soft Starter

		CMC-HX 软起动器附件安装步骤如下： The steps for mounting accessories of CMC-LX soft starter are as follows: 1、将键盘盒固定附件卡在门板上，如图一所示 1. Lock keyboard panel's fixing accessory onto door panel, as is shown in figure 1. 2、将软起动器上的键盘盒拔下，并将键盘盒背面的对角自攻钉拆下；如图二所示 2. Remove keyboard panel from soft starter and dismount tapping screws at the back of keyboard panel, as shown in figure 2. 3、将键盘盒插入步骤 1 所固定好的键盘盒固定附件内；如图三所示 3. Insert keyboard panel into fixing accessory finished in figure 1, which is shown in figure 3. 4、用 <u>M3X15 自攻钉</u> 在门板背面将键盘对角固定；如图四所示 4. Use M3X15 tapping screws to fix keyboard panel at the back of door panel, as shown in figure 4. 5、将六角螺丝同键盘盒的 DB9 母头连接，固定牢靠；如图五所示 5. Screw hex screws into DB9 female head of keyboard panel, as shown in figure 5. 6、将键盘盒连接线连接到键盘盒的 DB9 母头上；如图六所示 6. Insert connection line of keyboard panel into DB9 female terminal, as shown in figure 6. 7、CMC-LX 软起动器附件安装完成 7. The installation of CMC-LX soft starter's accessories is then completed. 注：用于安装的配件如下： Note: Accessories for installation are as follows: 键盘盒固定附件-1 件/台 十字圆头自攻钉 M3X15-2 件/台 六角螺丝 M3×5+5-2 件/台 外置键盘盒连接线-1 根/台 Fixing base of keyboard panel-1 pc Cross round head tapping screw M3X15—2 pcs Hex screw M3×5+5-2 pcs External keyboard connection line—1 pc 配件均在附件包装袋内，安装时请先核对数量。 All accessories are enclosed in packing bag. Please check the number before installation.
图 1 Figure 1	图 2 Figure 2	
		
图 3 Figure 3	图 4 Figure 4	
		
图 5 Figure 5	图 6 Figure 6	

附表四：不同应用的基本设置(以下设置仅供参考)

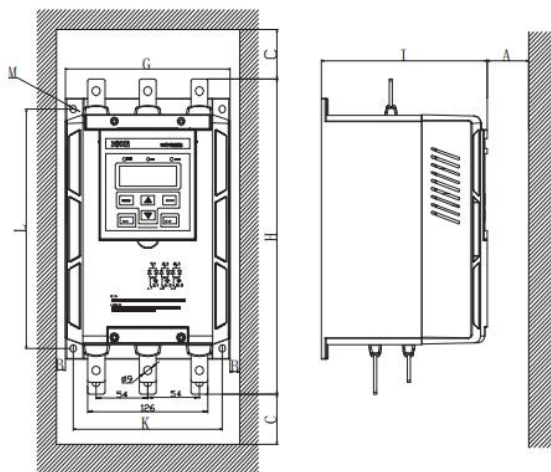
Appendix 4: Basic Setting of Different Applications (for reference)

负载种类 Type of loads	初始电压 Initial voltage (%)	起动斜坡时间 Starting ramp time, s	停止斜坡时间 Stop ramp time s	电流限制 Current limit ILIM
船前推进器 Ship propeller	30	10	0	2.5
离心风机 Centrifugal fan	50	20	0	3.5
离心泵 Centrifugal pump	30	6	6	3
活塞式压缩机 Piston compressor	40	15	0	3
提升机械 Lifting device	30	15	6	3.5
搅拌机 Mixer	40	15	0	3.5
破碎机 Crusher	50	15	6	3.5
螺旋压缩机 Screw compressor	40	15	0	3.5
螺旋传送带 Spiral conveyor belt	40	10	6	3.5
空载电机 Idling motor	25	10	0	2.5
皮带传送带 Belt conveyor	50	15	10	3.5
热泵 Heat pump	30	15	6	3
自动扶梯 Elevator	30	10	0	3
气泵 Gas pump	30	10	0	2.5

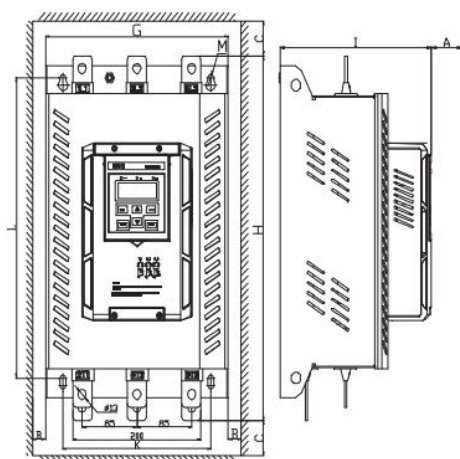
附表五：软起动器外形及开孔尺寸(单位：mm 以 380V 为例)

Appendix 5: Dimensions and Hole Size of Soft Starter (unit: mm, taking 380V as an example)

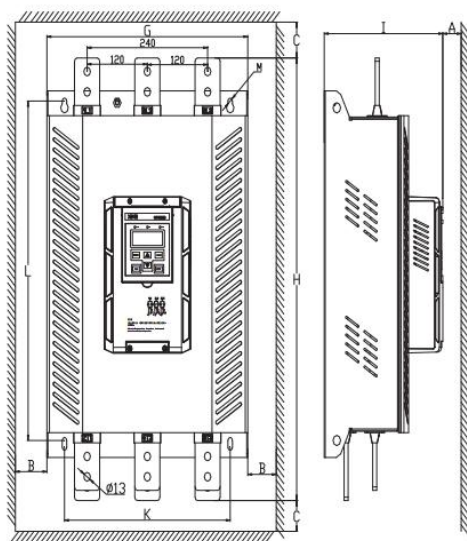
Model	Number	G	H	I	K	L	M	A	B	C	GW (kg)
CMC-008~022/3-HX	F005	172	320	172	156	240	6	20	10	100	4.5
CMC-030~045/3-HX	F005	172	320	172	156	240	6	20	10	100	4.7
CMC-055~075/3-HX	F005	172	320	172	156	240	6	20	10	100	5.1
CMC-090~185/3-HX	F006	285	474	235	230	390	9	20	10	100	20.6
CMC-220~315/3-HX	F007	320	512	235	270	415	9	20	10	100	25.6
CMC-400~710/3-HX	F008	400	647	235	330	495	9	20	10	100	37.6



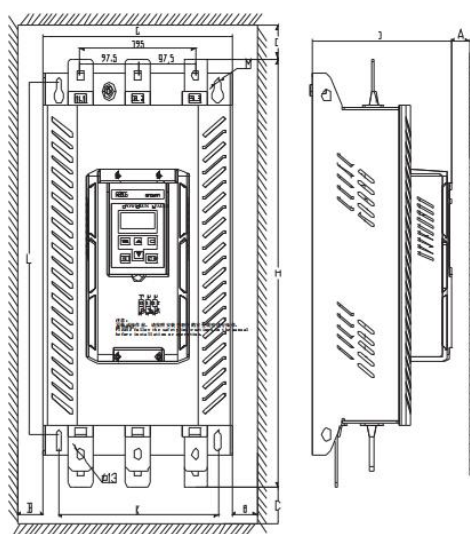
75KW 及以下
Product 75KW and below



90KW-185KW 产品
Product 90KW-185KW



220KW-315KW 产品
Product 220KW-315KW



400KW-710KW 产品
Product 400KW-530KW

附表六：软起动器选型

Appendix 6 Model Selection for Soft Starter

No.	Rated current (A)	380V		660V		1140V	
		Power (KW)	Size(mm)	Power (KW)	Size (mm)	Power (KW)	Size (mm)
1	18	7.5	F005	15	F005	22	F005
2	24	11		22		33	
3	30	15		30		45	
4	39	18.5		37		55	
5	45	22		45		65	
6	60	30		55		90	
7	76	37		75		110	
8	90	45		90		135	
9	110	55		110		165	
10	150	75		132	F006	225	F006
11	180	90	F006	160		280	
12	218	110		200		344	
13	260	132		250		400	F007
14	320	160		300		505	
15	370	185		350		584	
16	440	220	F007	400	F007	695	F008
17	500	250		456		789	
18	560	280		500		884	
19	630	315		560	F008	995	
20	780	400	F008	700			
21	920	470					
22	1000	530					
23	1200	630					
24	1400	710					

注：尺寸 F005:172×320×172、F006:285×474×235、F007:320×512×235、F008:400×647×235(宽×高×厚)

Note: Dimensions F005:172×320×172, F006:285×474×235, F007:320×512×235, F008:400×647×235(W×H×T)

Xi'an Spread Electric Co., Ltd.

Headquarter: 15/F Block B, Xi'an National Digital Publish Base, 996 Tiangu 7th Road, Zhangba Jieban, High-tech Zone, Xi'an

Factory: 2 West Qinling 4th Road, Caotang Science&Technology Industry Base, High-tech Zone, Xi'an

Telephone: (86) 029-89020808/89020707

Hotline: 4000-114-666

Fax: (86) 029-89020899

Website: www.xichi.cn

E-mail: xichi@163.com/xichi@xichi.com

内容有变更，恕不另行通知

Contents are subject to change without prior notice