

ATA SA-7 系列

全数字交流电机软起动器

操作手册

ATA SA-7 Series AC motor Soft Starter Instructions



技术优秀

产品优质

管理优化

服务优良

产品技术标准：Q/ADYS001-2019

质量体系标准：ISO9001/GB19001

注 意 事 项

Notes

感谢您选择奥托 ATA SA-7 系列智能化软起动产品，我们将以优异的产品性能回报您的厚爱！您在进行安装、操作、维护之前，必须注意以下事项。

Thanks for your choice of the ATA SA-7 intelligent Soft-starter of ATA,we will respond your choice with excellence product performance.Before installation, operation, and maintenance, pay attention to the following precautions.

- 安装前请务必仔细阅读本操作守则。
Please read this operation manual before installation.
- 有专业技术人员允许安装本软起动器。
Only professional technical staff allowed to install this soft-starter.
- 必须让电动机的规格与本软起动器相匹配。
Make sure this soft-starter matches the specification(U,V,W)of the soft-starter.
- 严禁在软起动器输出端 (U、V、W) 接电容器。
Capacitor can't be connected to output terminal(U,V,W).
- 严禁将输入端 (R、S、T) 接到输出端 (U,V,W)。
The input terminal(R、S、T)can't be connected to output terminal(U,V,W).
- 软起动器安装后将输入和输出端的裸露部分用绝缘胶带包好。
The bareness part of input and output terminal must be enwrapped by insulating tape after the soft-starter installation.
- 软起动器应牢固接地。
The soft-starter must be earthed hard.
- 设备维修时必须切断输入电源。
The input power must be shut when the equipment be maintained.
- 不得私自拆装、改装、维修本产品。
Prohibit to install, modify or repair the soft-starter without our permission.
- 产品报废时，请作为工业废弃物进行处理。
When the soft-starter is discard as useless,please handle as industrial castoff.
- 严禁用兆欧表测试软起动器主回路和控制回路。
Prohibit to test the main circuit and control circuit of the soft-starter with meg-ohmmeter.

其他注意事项

Others

- 当搬运产品时请正确使用搬运工具以防止损坏。
Use the handling tools correctly to prevent damage when handling the product.
- 软起动器堆叠层数不要高于 5 层以上。
The number of soft starter stacks should not be higher than 5.
- 请不要在产品上堆放重物。
Please do not stack heavy objects on the product.
- 检查软起动器安装方向是否正确。
Inspect that the soft starter is installed in the correct direction.
- 装配过程中防止螺丝、电缆碎片等其他导电物体及油类可燃物体进入软起动器。
During the assembly process, other conductive object and oil combustible bodies such as screws and cable fragments are prevented from entering the soft starter.

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1 概述

Introduction

ATA SA-7 系列智能型电机软起动器是融合了电力电子技术、双 CPU 技术和最新的电机控制理论的新型设备。可广泛应用于风机、水泵、压缩机及球磨机等负载，是早期用于电动机起动的星 / 三角转换、自耦降压、磁控降压等降压起动设备的理想替代产品。其性能不是其它普通软起动器能比拟的。

ATA SA-7 series intelligent soft-starter is a new generation equipment with electric power technology, double-CPU technology and new motor control theory, which can be widely applied to different loads such as fans, water pumps, compressors, ball mills and etc. This soft-starter is a ideal alternative for the traditional start equipment such as Y- Δ , step-down autotransformer, magnetron soft-starter and etc.

1.1 ATA SA-7 系列软起动器的主要作用

1.1 Main functions of ATA SA-7 soft starter

第一：有效降低了电动机的起动电流；可减少配电容量，避免电网增容投资。

First: Efficiently reduce the start current of the motor, can reduce the distribution capacity and the investment for additional capacity of power grid.

第二：减小了电动机及负载设备的起动应力；延长了电动机及相关设备的使用寿命。

Second: Reduce the start-up stress of the motor, prolong the life of the motor and related equipment.

第三：自适用的起动模式；自动调节起动曲线以适用复杂的电机和负载情况，达到完美的起动效果。

Third: Self-adapting start mode: can self adjust the start curve for different motors and loads.

第四：具有完善可靠的保护功能；有效地保护了电动机及相关生产设备的使用安全。

Fourth: Reliable protection: can efficiently protect the motor and related product equipment.

第五：先进的电子技术使该产品完全智能化，网络化，经济化。

Fifth: Advanced electronic technology to make the product fully intelligent, network-based, economy-based.

1.2 ATA SA-7 系列软起动器的主要特点

1.2 Main Features of ATA Soft Starter

第一：双 CPU 结构，相互冗余的可靠性设计，是传统的单 CPU 结构无法比拟的。

First: Double-CPU configuration,with reliable redundancy design,must better than traditional single-CPU configuration.

第二：起动过程采用自适应智能化控制，避免了烦琐的曲线选择，自动控制电机达到最佳起动性能。

Second: Adopt self-adapting intelligent control in start process,avoid complete selection of curves,to make the motor achieve the perfect start performance.

第三：对输入电源无相序要求。

Third:There is no phase request for input power.

第四：完善可靠的保护功能：过热、缺相、欠压、起动过流、运行过载、三相不平衡等保护。

Fourth:Perfect and reliable protection: overheat, phase lack, under voltage, overload, 3-phase imbalance and etc.

第五：独特的紧凑内部结构设计，特别方便用户集成到已有系统中，为用户节约了旁路接触器的费用。

Fifth: The unique compact internal structure is designed to facilitate user integration into existing systems, The cost of bypass contactor is saved.

2- 开箱检查 Unpacking inspection

2 开箱检查 Unpacking inspection

每台 ATA SA-7 软起动器在出厂前均进行了严格的检验和性能测试。用户在收到产品并拆封后，请按下列步骤检查，如发现有问题，请及时与供货商联系。

All the soft-starter have been tested strictly before leaving factory. When users receive the product, please follow the steps to check it after unpacking, if find any problem, please contact us immediately.

2.1 开箱检查步骤

2.1 Unpacking inspection steps

(1) 检查产品型号。

Check the product model

(2) 核对产品外壳上的规格标牌，确认您收到的货物与您订购的产品相符。

Identify the specification label in curst, make sure that the product is what you have order.

ATA SA - 7 -

功率规格 Power Specification

8

11

15

.....

700

800

设计序列号 Design Serial Number

异步电机半导体软起动控制器 (简称软起动器)

Ac motor soft starter (Abbreviated as soft starter)

中文名称: 电机软起动器

产品型号: ATA SA-7-**

使用类型: *****

额定电流: **A

产品编号: *****

生产日期: 20**年**月

使用标准: GB/T 14048.6-2016

输入电压: 三相 50/60Hz/AC380V

输出电压: 三相 50/60Hz/AC380V

输出功率: **kW

长沙奥托自动化技术有限公司

网 址: www.atawindow.com

3- 使用环境及安装 Use condition & installation

NAME: SOFT STARTER	STANDARD: GB/T 14048.6-2016
MODEL: ATA SA-7.**	INPUT VOLTAGE: 3. PHAES 50/60Hz/AC380V
USE TYPE: *****	OUTPUT VOLTAGE: 3. PHAES 50/60Hz/AC380V
RATED CURRENT: **A	OUTPUT POWER: **kW
S N: *****	CHANGSHA ATA AUTOMATION CO.,LTD.
DARE: 20**Y**M	URL: www.atawindow.com

3 使用环境及安装**Use condition & installation****3.1 使用环境****3.1 Use condition**

使用条件对软起动器的正常使用及寿命有显著影响，因此请将软起动器安装在符合下列使用条件的场所。

The use condition have the marked infection for the natural using, please install the soft-starter in the adapted location for the follow conditions.

3.1.1 本产品的使用条件**3.1.1 Use environment**

主回路电源：三相 AC 380V $\pm 15\%$ ，50Hz/60Hz

Power for main circuit power: 3 phase AC380V $\pm 15\%$, 50Hz or 60Hz

适配电机：鼠笼式异步电动机（其他电机请标明）

Adapt motor: Squirrel-cage asynchronous motor (please note for other motors)

控制回路电源：AC 220V (+10%、-15%)，50/60Hz

Power for control circuit: AC 220V (+10%、-15%)，50/60Hz.

工作方式：短时工作制

Work mode: Short-term work system

冷却方式：自然冷却

Cooling method: natural cooling

防护等级：IP20

Protection level: IP20

环境条件：环境温度：-25~+40°C

Environmental conditions: Ambient temperature: -25~+40°C

3- 使用环境及安装 Use condition & installation

相对湿度: 90%RH 以下, 不结露

Relative humidity: $\leq 90\%RH$, Non-condensing.

海拔高度: $\leq 2000m$ (大于 2000 米可降容选型)

Altitude: Suitable for operating at an altitude of less than 2000m; otherwise, the power grade of its adapted motor should be degraded.

安装场所: 柜内安装 (无导电尘埃、无易燃、易爆、易腐蚀性气体, 震动小于 0.5G 的场所)。

Installation sites: Install in cabinet (without conductive, flammability, explosive, causticity dust, shaking under 0.5G).

3.2 安装要求

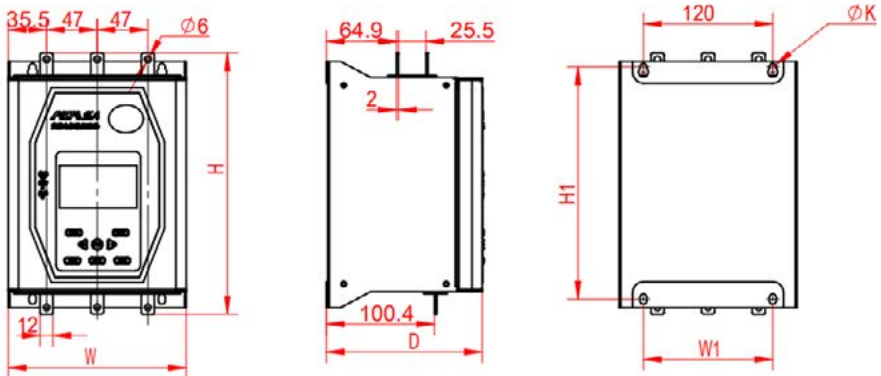
3.2 Installation requirements

ATA SA-7 系列软起动器的安装方式为壁挂式。冷却方式为自然冷却方式, 为了有利于设备的通风及散热, 软起动器应垂直安装, 并在设备上留有足够的散热空间。

ATA SA-7 series soft-starter is wall-mounted. Cause of the natural cooling method, it should be installed perpendicularly for aeration and cooling.

3.3 外型与安装尺寸

3.3 dimension



3- 使用环境及安装 Use condition & installation

ATA SA-7 系列软起动器 ATA SA-7 series soft-starter		安装尺寸 Installation dimension		外形尺寸 Outline size			安装孔 Mounting hole
外型 Appearance	功率 Power	H1	W1	H	W	D	K
A	8-55	213	120	241	165	144.7	6

图 3.1

标准型软起动器电气规格。

The electric specification of ATA SA-7 standard type soft-starter.

项 目 Item		技 术 指 标 Technical Parameter
主回路 Main Circuit	功率器件 Power component	可控硅模块 / 普通可控硅 SCR module/SCR
	主回路电源 Main circuit power	三相 380V+10%-15%, 50/60Hz 3-phase AC380V+10%~-15%,50/60Hz
	主回路功耗 Main circuit consume Power	< 每相每安培 2W < 2W/A in single phase
	功率器件电压 Voltage of Power component	≥ 1400V
	dv/dt 保护 dv/dt protection	阻容滤波回路, 压敏电阻 RC Plter circuit, varistor
控制回路 Control circuit	控制回路电压 Control voltage	AC 220V (+10%、-15%), 50/60Hz
	控制回路功耗 Consume power of control circuit	5W
	起动指令 Start indication	无源触点, 键盘, 计算机指令 Passive contact, keyboard, PC indication
起动参数 Start parameter	起动方式 Start mode	斜坡起动, 突跳起动, 恒流起动 Current slope, current-limit, voltage slope
	起始电压 Initial voltage	30%~90%(系统电压) 30%~90%(system voltage)
	起动时间 Start time	5~120s
	突跳时间 Snap-jump time	0~3s
停车 Stop	自由停车 Natural stop	
故障保护 Protection	电源故障保护 Protection for power supply	缺相、欠压、过压 Phase lack, under voltage, over voltage
	设备故障保护 Protection for equipment	过热、电机过载、电机缺相、起动超时等 Overheat, overload, over current, overtime of starting and etc.

3- 使用环境及安装 Use condition & installation

项 目 Item		技术 指标 Technical Parameter	
在线监测 Online monitoring	显示 Display	起动、运行状态和起动、运行电流及电压 Start, run status and start, running current and voltage	
辅助输出 Assistant output terminal	故障输出 Fault output	常开继电器触点, AC250V/2A NO contact	
	运行输出 Running output	常开继电器触点, AC250V/2A	
	电流输出 Current signal output	4~20mA 或 0~20mA 标准信号 4~20mA or 0~20mA, standard signal	
辅助输入 Assistant input terminal	公共端子 COM	无源触点接入或短接, 不能直接引入外部电源。 Passive contact access or short connection, can not be directly introduced into the external power supply.	
	逻辑输入 1 LI1		
	逻辑输入 2 LI2		
	起动端子 START 停止端子 STOP		
可编程逻辑输出 Programmable logical output	LO+	电源逻辑输出 Power logic output	连接至 +24V 或 +12V 50mA Connect to +24V or +12V 50mA 可根据需要定义不同状态 Can be defined with different requirement.
	LO1	可编程逻辑输出 1 Programmable logic output 1	
	LO2	可编程逻辑输出 2 Programmable logic output 2	
数字通讯 Communication	通讯接口 Communication terminal	RS485	
环境条件 Environment condition	运行温度 Running temperature	-5~+40°C	
	储存温度 Memory temperature	-25~+55°C	
	相对湿度 Relative humidity	20~90%, 不结露 Non condensation	
	海拔高度 Height above sea level	<2 000m, 额定值不变 <2 000m, rated value >2 000m, 额定值 -5%/100m >2 000m, increase capacity 5% per 100m	
其他 Others	外壳防护等级 Defend level of crust	IP20	
	产品技术标准 Technical standard	GB 14048.6-2016	

4- 工作原理及接线 Working principle & connecting

ATA SA-7 软起动器的额定功率消耗

Rated power consumption for the ATA SA-7 soft starter.

功率规格 kW Power specification	8	15	22	30	37	45	55
额定电流 A Rated current	15	30	44	60	74	90	110
功率消耗 W Power consumption	68	135	200	270	330	400	500

4 工作原理及接线

Working principle & connecting

4.1 ATA SA-7 软起动器的工作原理

4.1 Working principle of ATA SA-7 soft starter

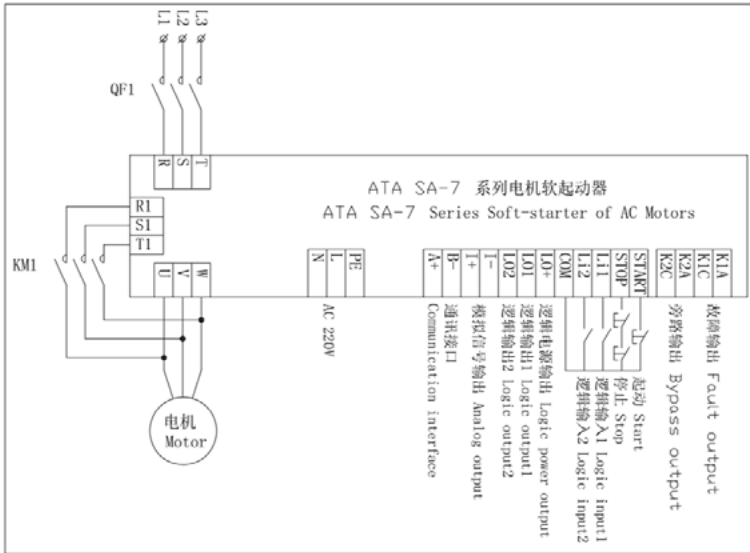
ATA SA-7 电动机软起动器采用两对反并联的晶闸管串接于交流电动机的定子回路上。利用晶闸管的电子开关作用，通过微处理器控制其触发角的变化来改变晶闸管的开通程度，由此来改变电动机输入电压大小，以达到控制电动机软起动目的。当起动完成后，软起动输出达到额定电压。这时将自动控制旁路继电器吸合，将电动机投入电网运行。

The ATA SA-7 soft-starter has 2 pairs of inverted shunt-wound SCR which connected to the stator circuit of the AC motors. By controlling the switching on of SCR trigger gate changes the input voltage of motors. When soft-starter finished soft starting, its output voltage is reaching its rated value, and bypass contactor automatically closed, then motor is running.

4- 工作原理及接线 Working principle & connecting

4.2 ATA SA-7 软起动器的基本接线图例

4.2 connection diagram of ATA SA-7 soft starter



端子说明 External terminal information

端子编号 Terminal No	端子名称 Terminal Name	说明 Explanation	
主回路 Main circuit	R、S、T	交流电源输入 AC Power input 由断路器 (QF) 接三相交流电源 Connect Breaker with 3 Phase AC Power	
	R1、S1、T1	交流电源输出 AC Power output 接至三相交流接触器 Connect to 3. Phase AC contactor	
	U、V、W	交流电源输出 AC Power output 接至三相交流异步电动机 Connect to 3. Phase AC asynchronous motor	
控制回路 Control loops	故障输出 (无源触点) Failure state output(potential-freecontact)	K1A	常开触点 NO contact 故障时, K1A、K1C 触点闭合 触点容量为: 5A/250V AC Terminal Power: 5A/250V AC.
		K1C	
	运行输出 (无源触点) Running state output(potential-freecontact)	K2A	常开触点 NO contact 运行时, K2A、K2C 触点闭合 触点容量为: 5A/250V AC Terminal Power: 5A/250V AC.
		K2C	

4- 工作原理及接线 Working principle & connecting

控制回路 Control loops	可编程逻辑输出 Programmable logical output	LO+	电源逻辑输出 Power logic output	连接至 +24V 或 +12V 50mA Connect to +24V or +12V 50mA 可根据需要定义不同状态 Can be dePned with different requirement.
		LO1	可编程逻辑输出 1 Programmable logic output 1	
		LO2	可编程逻辑输出 2 Programmable logic output 2	
	起停控制 (有源触点) Starting/Stopping control (active contact)	START	起动 START	COM、START 触点: 起动 Terminal COM、START : Start COM、STOP 触点: 瞬停
		STOP	停止 STOP	
		LI1	逻辑输入 1 Logic input 1	Terminal COM、STOP : Instant-stop 无源触点闭合或断开, 不能直接引入外部电源。 The passive contact is closed or disconnected and cannot be directly connected to the external power supply.
		LI2	逻辑输入 2 Logic input 2	
	模拟信号输出 Analog signal output	COM	公共端 COM	0 ~ 20mA 或 4 ~ 20mA 模拟信号输出 0 ~ 20mA or 4 ~ 20mA Analog signal output
		I+	信号输出 IOUT	
	通信接口 (RS-485) Communication interface (RS-485)	I-	地线 GND	RS-485 接口 RS-485
通信接口 Communication terminal				

4.3 ATA SA-7 软起动器的输出特性

4.3 Output characteristic of ATA SA-7 soft starter

- 起始电压 U_s Initial voltage U_s

初始阶段软起动对电机所加电压。在起动过程中, 电机的输出力矩随电压增加。当软起动器的输出电压较小时, 电机力矩小于负载的静摩擦力矩, 不能使负载转动。随着输出电压的不断增大, 电机力矩克服了负载的静摩擦力矩和惯量, 使负载开始转动。

The voltage is added to motor by soft-starter during initial status. During the process of starting, the output torque of the motor become bigger and bigger as the input voltage rises. The torque of the motor is smaller than the load s static friction moment and cannot drive the load running when the output voltage of the soft starter is small at the beginning. With the increasing of the output voltage of the starter, the output torque of the motor overcomes the static friction moment and inertia, and then the load begins to running.

ATA SA-7 软起动器在起动时提供一个起始电压 U_s , 将 U_s 调节到合适的值, 可在起动时使负载立即开始转动。

The ATA SA-7 soft-start provides a initial voltage U_s . The load can run immediately at the start time if the setup of U_s is suitable.

4- 工作原理及接线 Working principle & connecting

起始电压 U_s 由参数设置。

The initial voltage U_s can be set by parameters.

- 达速电压 Voltage up to speed

输出电压从 U_s 开始按一定的斜率上升，电机不断加速。当输出电压达到 U_R 时，电机也基本达到额定转速， U_R 就称为达速电压。

The output voltage of the soft-starter with a certain slope from U_s , and the motor accelerates continuously. When the output voltage of the soft-starter reaches U_R , the rotational speed of the motor almost reaches its rated value. U_R is called accelerating voltage. During the process of soft starting.

ATA SA-7 软起动器在起动过程中自动监测达速电压，当电机达到额定转速时切换到运行状态。对于不同的负载，达速电压的数值可能不同。

The ATA SA-7 soft-starter monitors the accelerating speed voltage automatically. As soon as the output voltage reaches U_R , the starter switches to the running status. U_R probably has different values according to different loads.

- 起动时间 T_s Start time

起动时间 T_s 指输出电压从 0V 上升到 380V 所需的时间，也即输出电压在 U_s 与 U_R 之间的斜率。电机的实际起动时间与负载大小有关，正常情况下应小于起动时间 T_s 。

The start time denotes the required time that output voltage rises from 0V to 380V, and also means the output voltage slope between U_s and U_R . The actual start time of the motor is decided on load, while commonly shorter than the T_s .

起动时间 T_s 由键盘设置。

Starting time is set by keyboard.

- 突跳时间 T_{JSnap} jump time

对于高转矩负载，软起动器在初始起动阶段提供一个时间为 T_J 的全导通阶段，输出额定电压，使电机能迅速克服负载的静摩擦力矩和惯量开始转动，称为突跳起动。

For large-torque load, the soft-starter provides an all-conduct connecting stage what needs time T_J . In the stage, the soft-starter outputs a rated voltage. Thus the motor can overcome the static friction moment and inertia of the load easily, and begins to running quickly. This start status is called snap jump start.

4- 工作原理及接线 Working principle & connecting

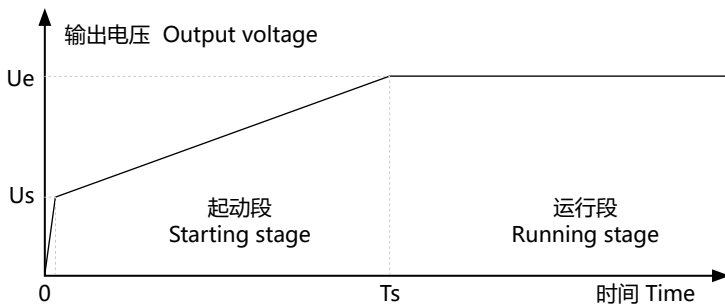
突跳时间 T_J 由键盘设置。

The snap jump time T_J can be by keyboard.

- 控制方式 Work mode

电压斜坡模式：电压斜坡控制由二个基本参数起始电压 U_S 和起动时间 T_S 组成，当电机起动时，软起动器开始输出起始电压 U_S ，此后电压沿一给定斜率，经过给定的起动时间 T_S （根据负载大小，自动调节起动过程），到达额定电压 U_e 。

The voltage slope is composed of two parameters: initial voltage U_S and Start time T_S ; When the motor starts working, soft-starter outputs initial voltage U_S , according to the load power, and along with a set slope, initial voltage U_S adjusts the starting process automatically, the reaches a rated voltage U_e via a set Start time T_S .

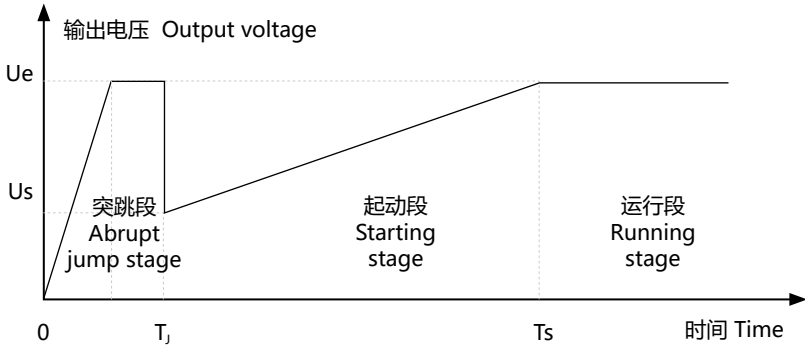


- 突跳 + 电压斜坡模式 Snap jump with voltage slop mode

对于高转矩负载，软起动器在初始起动阶段提供一个时间为 T_J 的全导通阶段，再输出起始电压 U_S ，此后电压沿一给定斜率，经过给定的起动时间 T_S （根据负载大小，自动调节起动过程），到达额定电压。

For large-torque load, the soft-starter outputs initial voltage U_S after provides an all-conduct connecting stage what needs time T_J , according to the load the load power, and along with a set slop, initial voltage U_S adjusts the starting process automatically, then reaches a rated voltage U_e via a set Starting time T_S .

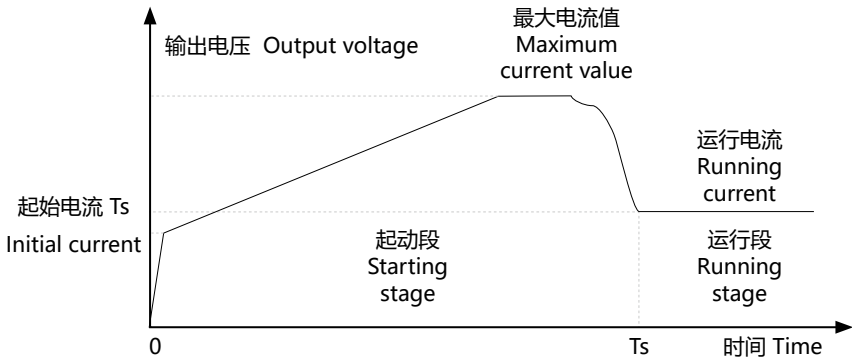
4- 工作原理及接线 Working principle & connecting



- 电流斜坡模式 Current slope mode

电流斜坡控制由二个基本参数起始电压 U_s 和起动时间 T_s 组成, 当电机起动时, 软起动器开始输出起始电压 U_s , 电机获得起始电流 I_s , 此后电流沿一给定斜率, 经过给定的起动时间 T_s (根据负载大小, 自动调节起动过程), 到达电机运行电流。

The current slope is composed of two parameters: initial voltage U_s and Start time T_s : When the motor starts working, soft-starter outputs initial voltage U_s , and motor is provided with initial current I_s . According to the load power, and along with a set slope, initial current adjusts the starting process automatically, and then reaches running current of motor via a set Start time T_s .

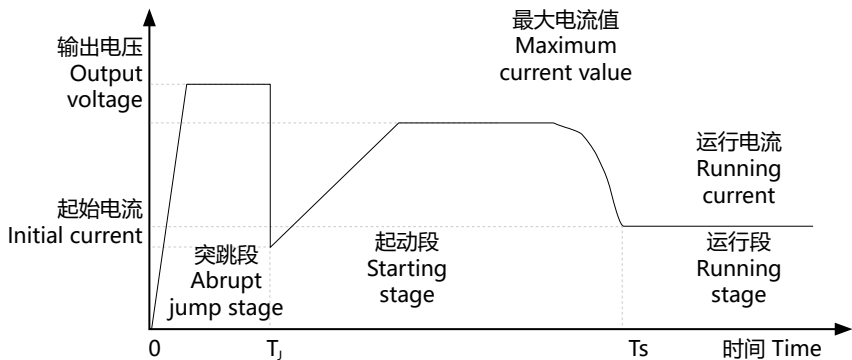


4- 工作原理及接线 Working principle & connecting

- 突跳 + 电流斜坡模式 Snap jump with current slope mode

对于高转矩负载，软起动器在初始起动阶段提供一个时间为 T_J 的全导通阶段，再输出起始电压 U_S ，获得起始电流 I_S ，此后电压沿一给定斜率，经过给定的起动时间 T_S ，根据负载大小，自动调节起动过程，到达电机运行电流。

For large-torque load, the soft-starter output initial voltage U_S after provides an all-conduct connecting stage what needs time T_J , and motor is provided with initial current I_S . According to the load power, and along with a set slop, initial current adjusts the starting process automatically, and then reaches running current of motor via a set Start time T_S .

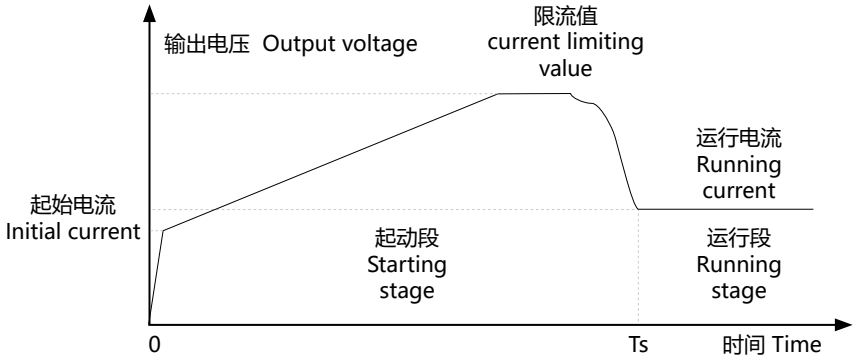


- 限流斜坡模式 Current-limit slope mode

电流斜坡控制由二个基本参数起始电压 U_S 和起动时间 T_S 组成，当电机起动时，软起动器开始输出起始电压 U_S ，电机获得起始电流 I_S ，此后电流沿一给定斜率，到达限流值后，不再上升，经过给定的起动时间 T_s （根据负载大小，自动调节起动过程），电机达速，进入运行状态。

The current-limit slope is composed of two parameters: initial voltage U_S and Start time T_s ; When the motor starts working, soft-starter outputs initial voltage U_S , and motor is provided with initial current I_S . The initial current rises with a set slop until it reaches a current-limited value. According to the load power, initial current adjusts the starting process automatically, and then motor accelerates speed and begins to running via a set Start time T_s .

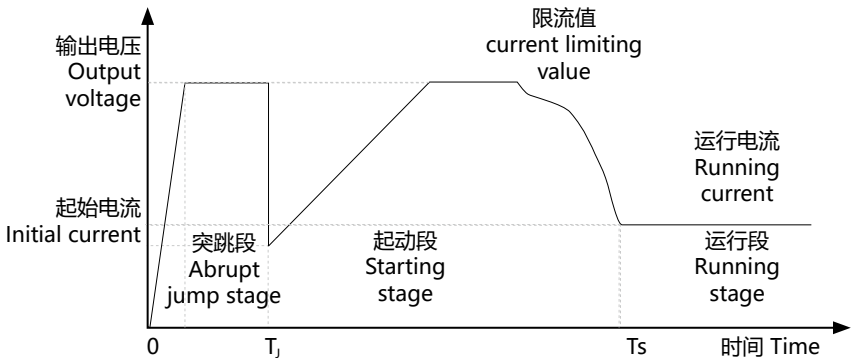
4- 工作原理及接线 Working principle & connecting



- 突跳 + 限流斜坡模式 Snap jump with current-limit slope mode

对于高转矩负载，又要限制电流的严格场所，软起动器在初始起动阶段提供一个时间为 T_J 的电流值，给电机一个允许的电流最大值，再输出起始电压 U_S ，获得起始电流 I_S ，此后电流沿一给定斜率，到达限流值后，不再上升，经过给定的起动时间 T_s （根据负载大小，自动调节起动过程），电机达速，进入运行状态。

For large-torque load and current-limit site, the soft-starter provides a current value what needs time T_J during initial start status, and gives motor the max current value. The soft-starter outputs initial voltage U_S , and motor is provided with initial current I_S . The initial current rises with a set slope until it reaches a current-limited value. According to the load power, initial current adjusts the starting process automatically, and then motor accelerates speed and begins to running via a set Start time T_s .



注意

需要指出的是, 电动机的电磁转矩与其绕阻所加电压的平方成正比, 当起始电压 US 降低时, 其电磁转矩也会降低, 起始电压 US 设置需要提供克服静摩擦转矩的起始启动转矩。

Note:

What needs to be pointed out is that The electromagnetic torque of a motor is proportional to the square of the voltage applied to it, When the initial voltage US decreases, the electromagnetic torque will also decrease, starting voltage US setting needs to provide the starting torque to overcome the static friction torque.

5 操作与显示**Operation and display****5.1 显示屏**

5.1 Viewing screen

表 5-1 指示灯 Indicator

名称 Name	颜色 Color	说明 Explanation
起动 Start	黄 Yellow	ATA SA-7 软起动器处于起动状态 ATA SA-7 soft-starter is starting
运行 Run	绿 Green	ATA SA-7 软起动器处于运行状态 ATA SA-7 soft-starter is running
故障 Fault	红 Red	ATA SA-7 软起动器处于故障保护状态 ATA SA-7 soft-starter is in the status of fault protection

表 5-2 操作按键 Operation pane

按键名称 Key	说明 Information
启动	软起动器就绪时, 按此键进入起动状态 Press this key to start a motor in panel control mode
停止	软起动器停车 Soft-start stop
设置	进入操作菜单 Enter into operating menu
OK	保存参数后返回上级菜单 Save the parameters and then return to the previous menu
取消	进入上级菜单或不保存参数返回上级菜单 Go to previous menu or return to previous menu without saving parameters

5- 操作与显示 Operation and display

按键名称 Key	说明 Information
+	转上一参数或增加参数值 Go to pervious parameter or increase the parameter value
-	转下一参数或减少参数值 Go to the next parameter or decrease the parameter value
移位	选择参数的某一位 Function Key

表 5-3 ATA SA-7 系列软起动器工作时将自动显示工作状态。

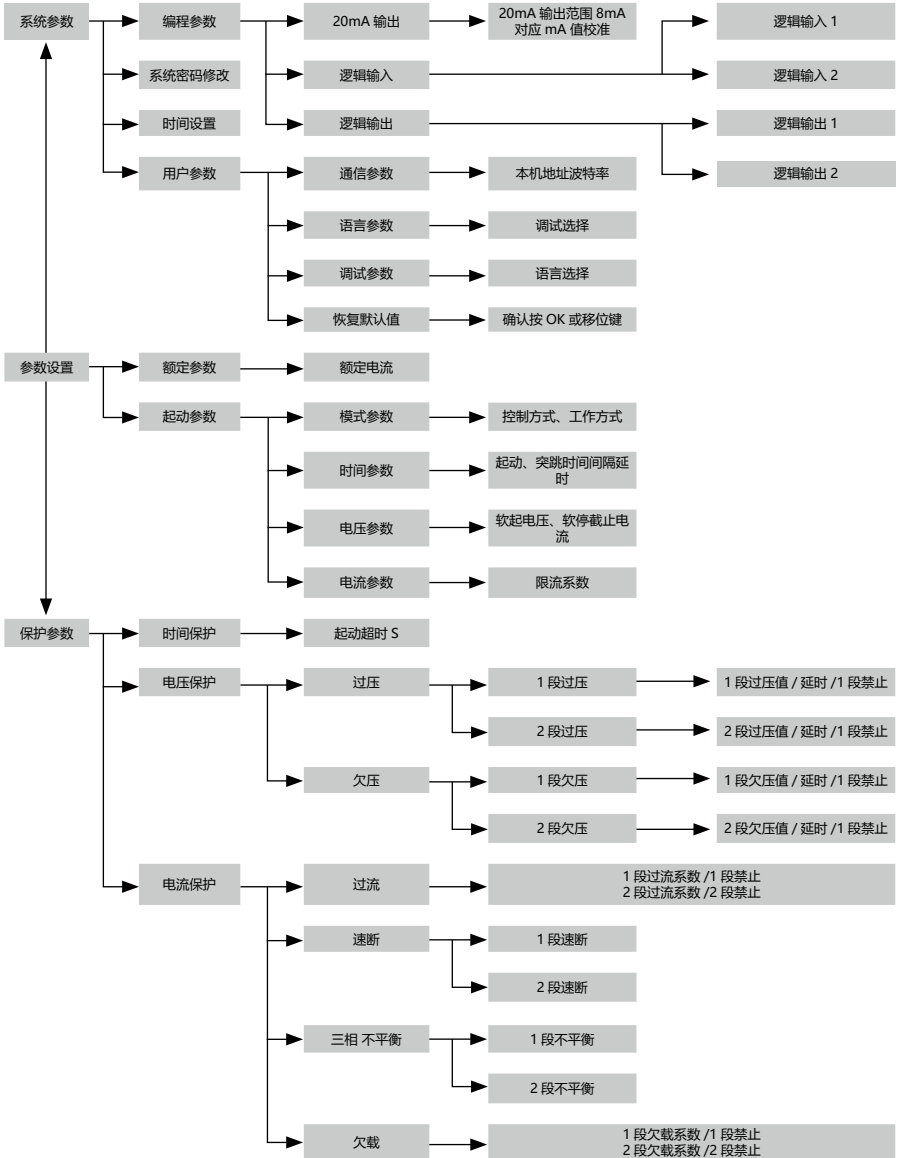
ATA SA-7 soft-starter can display its working status automatically during running

状态 Status	显示 Display	说明 Explanation
初始化 Initialization	欢迎使用 交流软起动器 Welcome to using ATA SA-7 motor soft starter	上电自检, 参数初始化 The power of soft-starter is switched on and self-checking, initializing the parameter
待机 Ready	待机状态 ×××× The soft-starter is ready 系统电压 ×××V System voltage 系统电流 ×××A System current XX-XX-XXXX XX:XX	待机状态 The soft-starter is ready
起动 Starting	正在软起 ×××S The soft-starter is starting 系统电压 ×××V System voltage 系统电流 ×××A System current XX-XX-XXXX XX:XX	正在起动 The soft-starter is starting
运行 Running	正在运行 ××: ××: ××S The soft-starter is running 系统电压 ×××V System voltage 系统电流 ×××A System current XX-XX-XXXX XX:XX	正在运行 The soft-starter is running

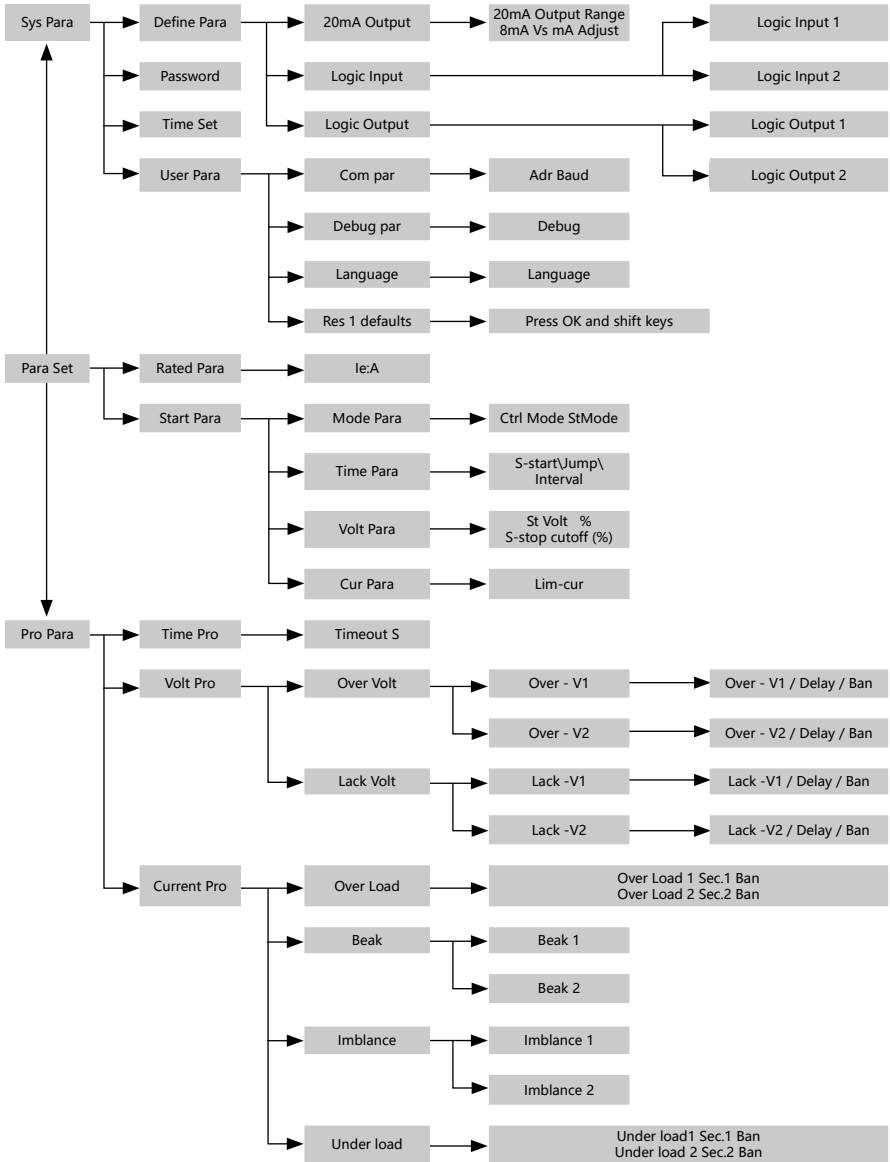
5- 操作与显示 Operation and display

5.2 参数设置

5.2 Parameters setup



5- 操作与显示 Operation and display



5.3 可编程继电器输出功能

5.3 The output function of programming relay

逻辑输入 1 Logical input 1		强制自由停车 Forced free parking
<p>逻辑输入可以定义为以下功能： Logical input can be defined as:</p> <p>无定义 No definition</p> <p>强制自由停车：一旦接收到一个 STOP 命令即进行强制自由停车。它将强制使用自由停车，但不会对停车进行控制。 Forced free parking: In case a STOP command is received, namely, to force the free parking. It will enforce the use of free parking, but will not control the parking.</p> <p>外部故障：允许起动器检测外部用户故障（水位、压力等）。电机进行自动停车且起动器显示外部故障。 External faults: Allow the starter to detect the external user faults (water level, pressure, etc.). The motor stops automatically and the starter displays the external faults.</p> <p>强制本地控制：软起动器转为端子控制。 Forced local control: The soft starter is transferred to the terminal control.</p> <p>复位电机热故障：当选择此功能时，软起过热故障复位。 Reset motor thermal fault: when this function is selected, reset the soft start overheating fault.</p> <p>复位故障：复位可以被复位的故障。 Reset failure: a failure where the reset can be reset.</p>		

逻辑输入 2 Logical input 2		强制本地控制 Forced local control
<p>逻辑输入 2 可以定义为以下功能： Logical input 2 can be defined as the following functions:</p> <p>无定义 No definition</p> <p>强制自由停车：一旦接收到一个 STOP 命令即进行强制自由停车。它将强制使用自由停车，但不会对停车进行控制。 Forced free parking: Once a STOP command is received to enforce the free parking. It will enforce the use of free parking, but will not control the parking.</p> <p>外部故障：允许起动器检测外部用户故障（水位、压力等）。电机进行自动停车且起动器显示外部故障。 External faults: Allow the starter to detect the external user faults (water level, pressure, etc.). The motor stops automatically and the starter displays the external faults.</p> <p>强制本地控制：软起动器转为端子控制。 Forced local control: The soft starter is changed to the terminal control.</p> <p>复位电机热故障：当选择此功能时，软起过热故障复位。 Reset motor thermal fault: when this function is selected, reset the soft start overheating fault.</p> <p>复位故障：复位可以被复位的故障。 Reset failure: Reset a failure which can be reset.</p>		

5- 操作与显示 Operation and display

逻辑输出 1 Logical output 1		热报警电机 Thermal alarm motor
<p>未分配 Unassigned</p> <p>电机热报警：电机过流保护时相应的逻辑输出端口动作。 Motor thermal alarm: the corresponding logic output port action when the motor overcurrent protection.</p> <p>电机已通电：电机中可能有电流。 Motor energized: there may be current in the motor.</p> <p>电机电流报警：电机电流速断保护时相应的逻辑输出端口动作。 Motor current alarm: the corresponding logic output port action in the case of the motor current quick break protection.</p> <p>PTC 传感器报警：电机温度通过 PTC 传感器传到软起动器控制板，如果温度超过保护值，相应的逻辑输出端口动作，与 PTC 报警禁止与否无关。 PTC sensor alarm: the motor temperature is transmitted to the control panel of the soft starter through the PTC sensor, if the temperature exceeds the protection value, the corresponding logical output port action has nothing to do with whether the PTC alarm is forbidden or not.</p> <p>电机参数 2 激活：电机使用第二套参数时此端口动作。 Motor parameter 2 activation: this port action when the motor uses the second set of parameters.</p> <p>旁路输出：软起动器运行状态时此端口动作。 Bypass output: This port operates while the soft starter is running.</p>		

逻辑输出 2 Logical output2		电机已通电 Motor energized
<p>未分配 Unassigned</p> <p>电机热报警：电机过流保护时相应的逻辑输出端口动作。 Motor thermal alarm: the corresponding logic output port action when the motor overcurrent protection.</p> <p>电机已通电：电机中可能有电流。 Motor energized: there may be current in the motor.</p> <p>电机电流报警：电机电流速断保护时相应的逻辑输出端口动作。 Motor current alarm: the corresponding logic output port action in the case of the motor current quick break protection.</p> <p>PTC 传感器报警：电机温度通过 PTC 传感器传到软起动器控制板，如果温度超过保护值，相应的逻辑输出端口动作，与 PTC 报警禁止与否无关。 PTC sensor alarm: the motor temperature is transmitted to the control panel of the soft starter through the PTC sensor, if the temperature exceeds the protection value, the corresponding logical output port action has nothing to do with whether the PTC alarm is forbidden or not.</p> <p>电机参数 2 激活：电机使用第二套参数时此端口动作。 Motor parameter 2 activation: this port action when the motor uses the second set of parameters.</p> <p>旁路输出：软起动器运行状态时此端口动作。 Bypass output: This port operates while the soft starter is running.</p>		

6 试运行与应用

Trial run and application

- 通电运行前应按下下列条款仔细检查
Make sure the conditions meet following lists before soft-starting running.
- 软起动器额定功率是否与电机相匹配。
Make sure the rated power of soft-starter matches the motor's.
- 电动机绝缘性能是否符合要求
Make sure the insulating property of motor meets requirements.
- 输入输出主回路接线是否正确
Make sure the output connection of main circuit is proper.
- 所有接线端子的螺丝是否拧紧
Make sure the screws of connection terminal are fast.

6.1 通电试运行

6.1 Trial Run

- ▶ 上电时显示待机状态，且准备状态指示灯亮，此时按起键可起动电机。
If the power of soft-starter switches on, soft-starter displays Ready and ready indicator light is working, then starts motor after pressing start key.
- ▶ 按电机标牌上的额定电流数值输入设置项额定电流。
Setting current is in line with the rated current on the motor signs.
- ▶ 起动后检查电机转动方向是否正确，运转是否正常，若不正常，可按停止键停机或必要时切断电源。
Make sure the direction of motor rotation is proper, and running is normal. Otherwise, presses stop key to stop motor or cut off power in need.
- ▶ 若电机起动力矩不够，可改变起始电压，提高电动机起动转矩。
Initial voltage can be changed in case of short motor start torque of.
- ▶ 软起动器通电后，请勿打开上盖，以免触电。
Because of being electric shock hazard, prohibit to opening the soft-starter's crust when soft-starter switches on.
- ▶ 在通电试运行过程中，如发现异常现象，如异常声音、冒烟或异味等，应迅速切断电源并查清原因。
During trial run process, some abnormal status occur, such as abnormal noise, smoking or abnormal smell and etc,

6- 试运行与应用 Trial run and application

► 同时按▲和▼按钮可复位故障状态。
Fault can be reset by pressing ▲ and ▼ .

- 注意 1：当软起动器起动电机成功时，面板中间的运行状态指示灯点亮，表示已处于旁路运行状态。若此时旁路接触器未吸合导致电机停止运行时，应检查旁路接触器及相关接线是否有误或接触不良。
- Note1: When the motor is droved successfully by soft-starter, the running indicator light is working, and soft-starter is in bypass running status. At the moment, make sure the connection of bypass contactor is proper or well contact in case of motor stops running which is caused by bypass contactor failed to close.
- 注意 2：当环境温度低于 -10°C或高于 40°C时，应采取措施待环境温度达到正常范围后再起动。
- Note2: The condition temperature is abnormal, the soft-starter shall not start until temperature keeps the range of -25°C ~40°C .

6.2 应用举例

6.2 Applications

各种不同负载情况下的参数设置举例如表，表中数据仅供参考，应根据实际情况作相应调整。

Please refer to following table for parameters setup with different load. All data within this table are for illustration purpose only.



6- 试运行与应用 Trial run and application

负载类型 Load	起动时间 (秒) Start time	起始电压 Initial voltage	突跳时间 (秒) Snap jump time
水泵 Water pump	30	40%	0
风机 Fan	50	50%	0
皮带机 Belt machine	50	50%	0
压缩机 Compressor	50	40%	0
搅拌机 Stirring mill	60	50%	0
破碎机 Crusher	60	50%	0
球磨机 Ball mill	60	60%	0
轻载电机 light-load motor	30	30%	0

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