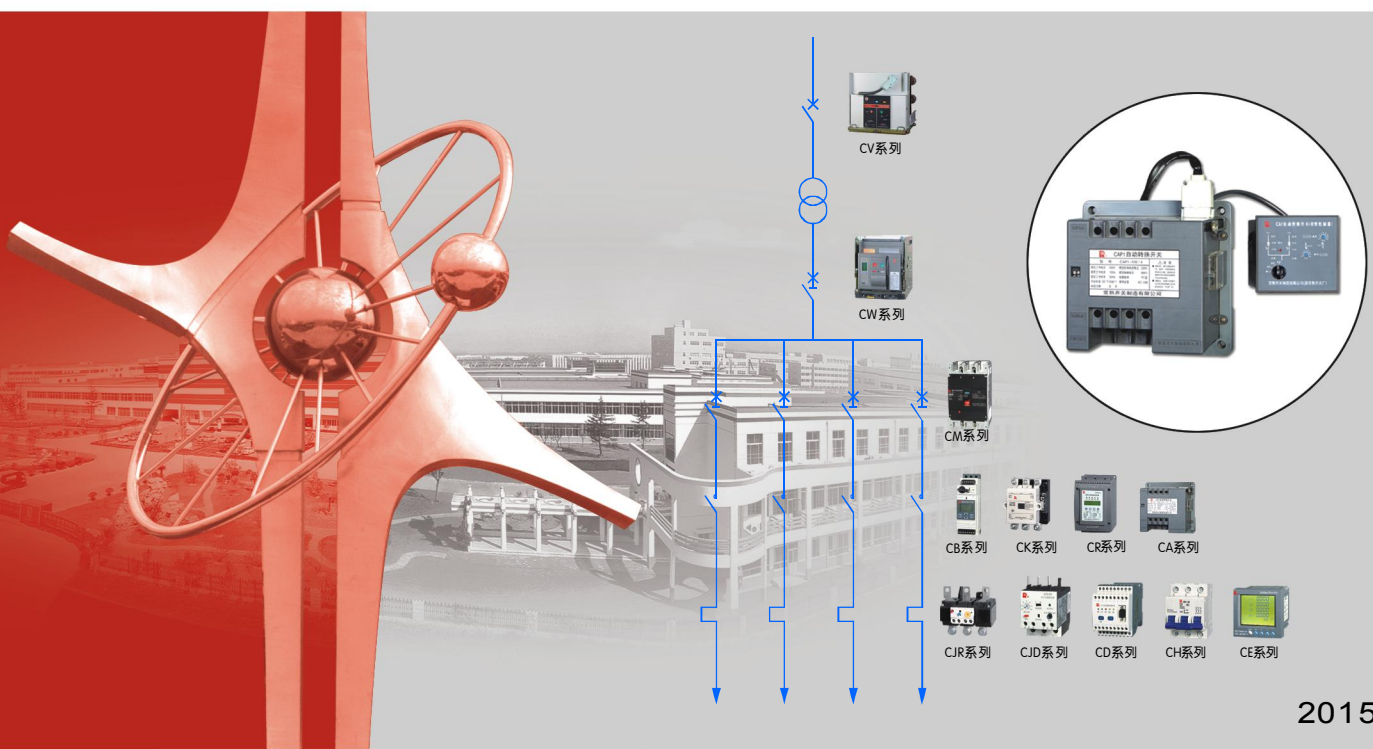




CAP1 系列自动转换开关

CAP1 SERIES AUTOMATIC TRANSFER SWITCH



2015年版

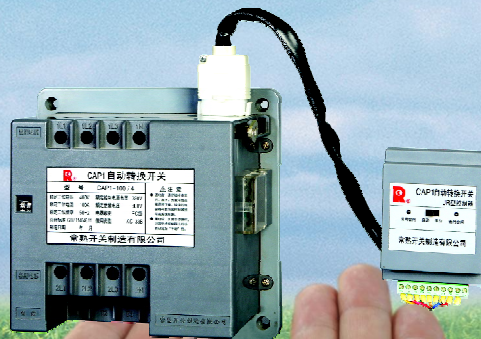
常熟开关制造有限公司
(原常熟开关厂)

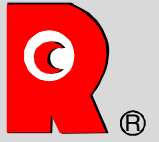
CHANGSHU SWITCHGEAR MFG. CO.,LTD.
(FORMER CHANGSHU SWITCHGEAR PLANT)



优秀特色

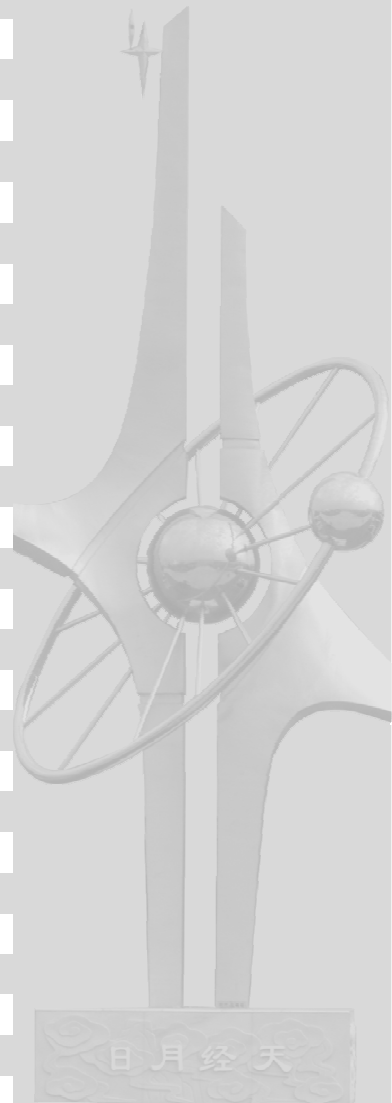
- 触头系统为单刀双掷二位置结构，确保两路电源间联锁，满足消防设备电源转换的要求
- 电磁铁操作机构，简单、快速，机构动作时间小于100ms
- 适用于电网-电网、电网-发电机等不同电源间的转换
- 具有手动、自投自复、自投不自复、强制等不同转换模式
- 基本型、电子型、智能型、智能通信型等多种控制器，可满足用户不同的要求
- 具有欠/过压保护、延时设定等功能
- 电器级别为PC级
- 产品符合GB/T 14048.11-2008，使用类别AC-33B，达到10倍额定工作电流接通和分断要求
- CAP1系列是基于Modbus-RTU协议的通信产品，通过本公司的CN1DP适配器、CN1EG以太网适配器可应用于Modbus、Profibus、Devicenet、CAN总线和以太网通信网络，方便用户进行多种协议的应用管理





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概述 OUTLINE

CAP1系列自动转换开关（以下简称为装置），适用于额定工作电压AC400V 50Hz、额定工作电流32A至630A的两路中性点接地的电源系统（常用电源和备用电源或常用电源和发电电源）中，因一路电源发生异常而进行电源之间的切换，保证其供电的可靠性和安全性。

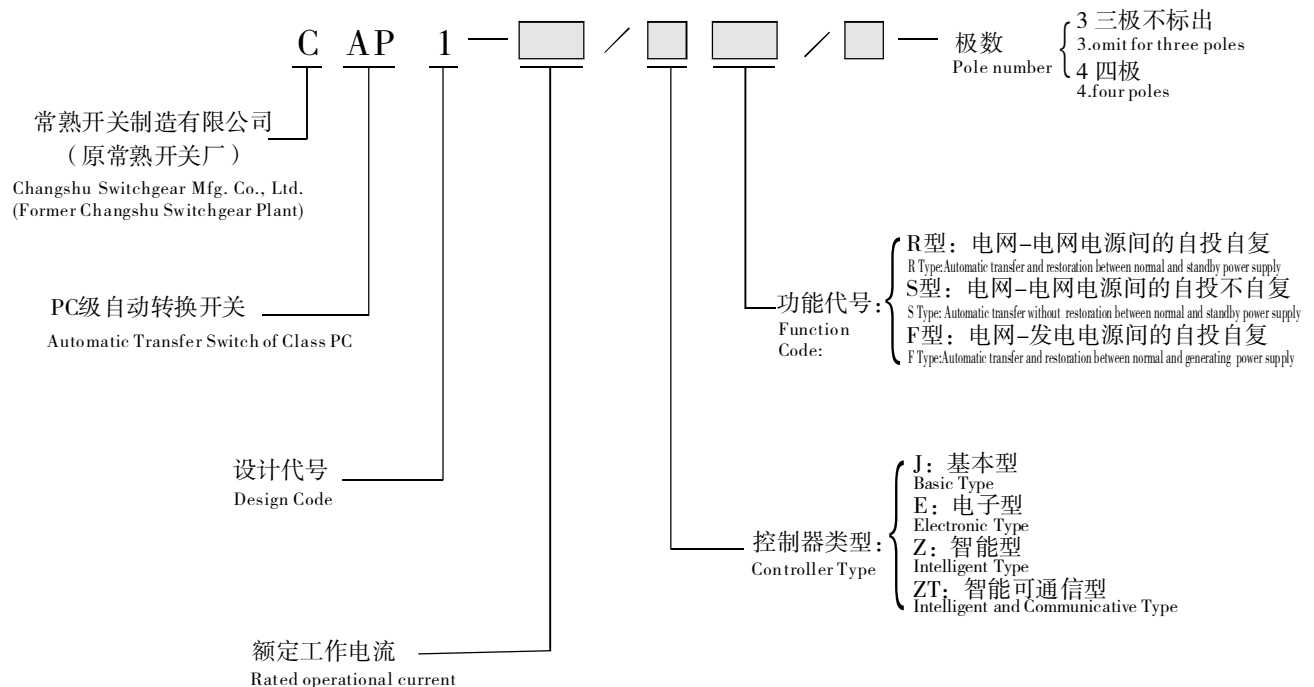
- 本装置符合标准 GB/T14048.11-2008和 IEC60947-6-1:2005 低压开关设备和控制设备 第6-1部分：多功能电器 转换开关电器。
- 本装置使用类别为AC-33B，级别为PC级。
- 本装置获国家强制性产品认证“CCC”标志。

CAP1 SERIES ATS (hereinafter short as switch) is used to shift from the abnormal power supply to the normal power supply in case of one line of abnormal power supply (normal power supply and standby power supply or normal power supply and generating power supply), both of which have the rated operational voltage of AC400V, 50Hz, rated current of 32A to 630A and their neutral poles are grounded. So that reliability and safety are ensured.

- This switch performs the standards of GB/T 14048.11-2008 and IEC 60947-6-1 2005 Low-voltage switchgear and controlgear Part 6-1: Multiple function equipment- transfer switching equipment.
- The category of utilisation and class of this switch are AC-33B and PC.
- The switching equipment is permitted to use the CCC marking of CQC.



型号及含义 TYPE AND MEANING





周围空气温度为 $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$ ；且24h的平均值不超过 $+35^{\circ}\text{C}$ ；

安装地点的海拔不超过2000m；

安装地点的空气相对湿度在最高温度为 $+40^{\circ}\text{C}$ 时不超过50%，在较低温度下可以有较高的相对湿度，例如 20°C 时达90%。对由于温度变化偶尔产生的凝露应采取特殊的措施；

污染等级为3；

安装类别为Ⅲ类；

适用于电磁环境A。

The ambient temperature is $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$ and the average value within 24 hours isn't above $+35^{\circ}\text{C}$.

The elevation isn't above 2000m.

The relative humidity of the air isn't above 50% at the max. temperature of $+40^{\circ}\text{C}$, it may be higher at the lower temperature. For example, it can be up to 90% at 20°C . Dew on the switch due to temperature alteration should be removed.

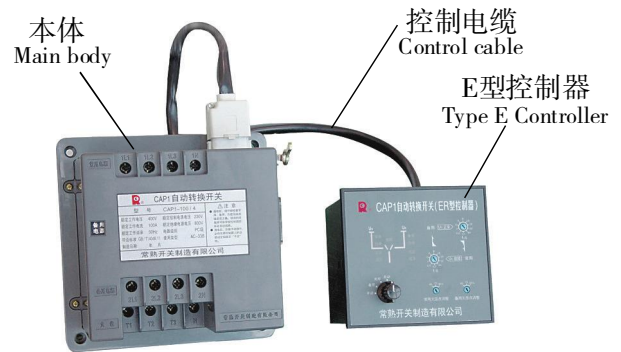
Pollution protection: grade 3.

Installing category: Ⅲ.

Be suitable in electromagnetic environment A.



J型（基本型）控制器的CAP1自动转换开关
CAP1 Automatic Transfer Switch Type J (Basic Type) Controller



E型（电子型）控制器的CAP1自动转换开关
CAP1 Automatic Transfer Switch Type E (Electronic Type) Controller



Z型（智能型）控制器的CAP1自动转换开关
CAP1 Automatic Transfer Switch Type Z (Intelligent Type) Controller

CAP1系列自动转换开关装置外形如上图，结构分本体和控制器两部分。本体有100、225、400、630四个壳架，100壳架中有32A、63A、100A三种额定工作电流，225壳架中有125A、140A、160A、200A、225A五种额定工作电流，400壳架中有250A、315A、350A、400A四种额定工作电流；630壳架中有500A、630A二种额定工作电流；控制器有基本型（J型）、电子型（E型）、智能型（Z型）、智能可通信型（ZT型）四大类，用户根据需要选择相应额定工作电流的开关本体及相应功能的控制器。本体和控制器两者用1.8m电缆（J型控制器为0.5m电缆）连接（电缆长度超过，用户在订货时注明）。

装置本体配置手动操作手柄,紧急情况时可将控制器功能设定至“手动”状态进行手动操作。

In the embodiment of Top Fig, CAP1 Automatic Transfer Switch is divided into two parts: the main body and the controller unit. The main body has four frame currents:100、225、400、630. At the same time ,the frame current of 100 has three rated operational currents:32A、63A、100A, also, the frame current of 225:125A、140A、160A、200A、225A; the frame current of 400:250A、315A、350A、400A.The frame current of 630: 500A、630A. The controller has four types: Basic Type (Type J)、Electronic Type (Type E)、Intelligent Type (Type Z)、Intelligent and Communicative Type (Type ZT). Customer chooses the main body of corresponding rated operational current and the controller of corresponding function according to the demands. The cable of 1.8 meters (the cable of 0.5 meters for Type J) at length is used to link the main body with the controller.

The main body installs handle operation device. In the urgent time ,it can be manual operated when the controller's function is “manual” .



基本参数 BASIC PARAMETERS

壳架代号 Frame Type	型号 Type	极数 Poles	额定工作电流 Rated Operational current I_e (A)	额定工作电压 Rated Operational Voltage U_e (V)	额定绝缘电压 Rated Insulation Voltage U_i (V)	额定冲击 耐受电压 Rated Impulse Withstand Voltage U_{imp} (V)	额定限制 短路电流 Rated Limited Short-Circuit Current (kA)	额定接通与 分断能力 Rated Making and Breaking Capacity (A)
100	CAP1-32	3、4	32	AC50Hz/400	800	8000	10	320
	CAP1-63		63					630
	CAP1-100		100					1000
225	CAP1-125		125					1250
	CAP1-140		140					1400
	CAP1-160		160					1600
	CAP1-200		200					2000
	CAP1-225		225					2250
400	CAP1-250		250					2500
	CAP1-315		315					3150
	CAP1-350	350	3500					
	CAP1-400	400	4000					
630	CAP1-500	3、4	500			50	5000	
	CAP1-630		630				6300	



CAP1系列自动转换开关主要性能、控制功能、装置的外形及安装尺寸、电气原理图见下表：

The main performance、control function、outline、mounting dimensions and electrical principle diagram of the equipment see the following table.

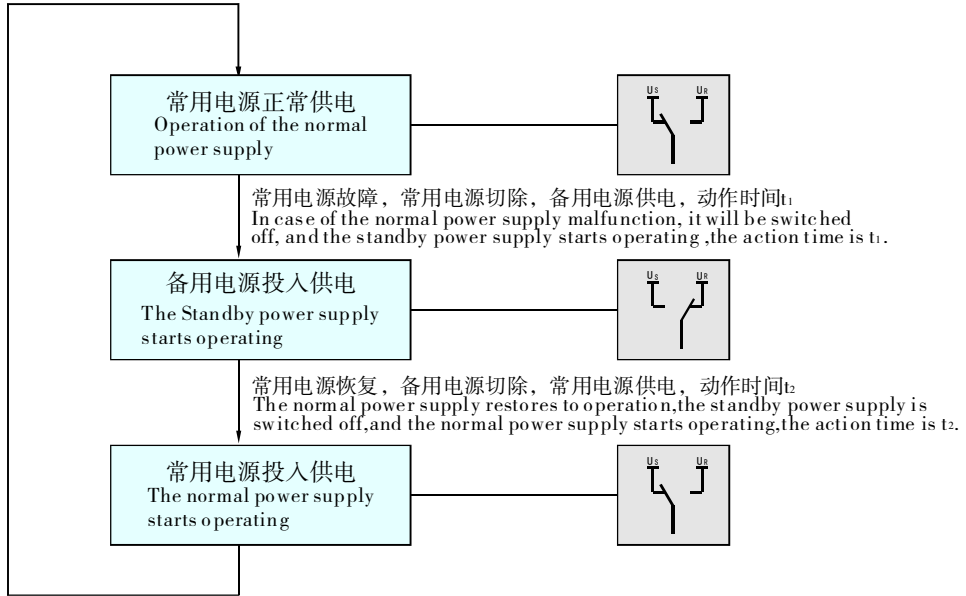
控制器型号 Controller Type	基本型 Basic Type		电子型 Electronic Type		
	JR型 JR Type	JS型 JS Type	ER型 ER Type	ES型 ES Type	EF型 EF Type
主要性能 Main performance	对常用电源、备用电源的A相电压进行检测，若A相缺相或电源断电则动作。 Check the voltage value of any A phase of the two ways of power supply i.e. normal power supply and standby power supply. In case of it's A phase loss or power shortage, the switch will operate.		对常用电源的各相电压、备用（或发电）电源的A相电压进行检测，若被检测相发生过电压、欠电压、缺相或电源断电则动作。 Check A phase of any one of the two ways of power supply i.e. normal power supply and standby power supply (or generating power supply). In case of over-voltage、under-voltage、phase loss or power shortage for any detected phases, the switch will operate.		
设定工作状态 Working state	a. “自动”操作 b. 强制 “手动” a. “Automatic” operation b. “Manual”		a. “自动”操作 b. 强制在 “常用” 电源 c. 强制在 “备用” 电源(或发电电源) d. 强制 “手动”	a. “Automatic” operation b. “Normal” power supply c. “Standby” power supply (or generating power supply) d. “Manual”	
状态指示 (LED显示) State indication(LED display)	故障 malfunction		合闸、故障、欠压、过压 Turn-on、malfunction、under-voltage and over-voltage		
欠电压 Under-voltage	-		65%、75%、85% 额定工作电压，用户可调 65%、75%、85% rated operational voltage value, adjusted by users		
过电压 Over-voltage	-		115% 额定工作电压 115% rated operational voltage value		
控制功能 Control function	常用-备用间的自投自复 Automatic transfer and restoration between normal and standby power supply	常用-备用间的自投不自复 Automatic transfer without restoration between normal and standby power supply	常用-备用间的自投自复 Automatic transfer and restoration between normal and standby power supply	常用-备用间的自投不自复 Automatic transfer without restoration between normal and standby power supply	常用-发电电源间的自投自复 Automatic transfer and restoration between normal and generating power supply
控制特性 Control feature	t ₁ 、t ₂ 固定 t ₁ 、t ₂ are fixed		t ₁ 、t ₂ 用户可调 t ₁ 、t ₂ are adjustable for users		t ₁ 、t ₂ 、t ₃ 、t ₄ 、t ₅ 、t ₆ 用户可调 t ₁ 、t ₂ 、t ₃ 、t ₄ 、t ₅ 、t ₆ are adjustable for users

控制器型号 Controller Type	智能型（智能可通信型） Intelligent Type (Intelligent and communicative type)		
	ZR(ZTR)型 ZR(ZTR) Type	ZS(ZTS)型 ZS(ZTS) Type	ZF(ZTF)型 ZF(ZTF) Type
主要性能 Main performance	对常用电源的各相电压、备用（或发电）电源的A相电压进行检测，若被检测相发生过电压、欠电压、缺相或电源断电则动作。 Check A phase of any one of the two ways of power supply i.e. normal power supply and standby power supply (or generating power supply). In case of over-voltage、under-voltage、phase loss or power shortage for any detected phases, the switch will operate.		
设定工作状态 Working state	a. “自动”操作 b. 强制在 “常用” 电源 c. 强制在 “备用” 电源（或发电电源） d. 强制 “手动”	a. “Automatic” operation b. “Normal” power supply c. “Standby” power supply (or generating power supply) d. “Manual”	
状态指示 (LCD显示) State indication(LCD display)	合闸、故障、欠压、过压 Turn-on、malfunction、under-voltage and over-voltage		
欠电压 Under-voltage	65%、75%、85% 额定工作电压，用户可调 65%、75%、85% rated operational voltage value, adjusted by users		
过电压 Over-voltage	115% 额定工作电压 115% rated operational voltage value		
控制功能 Control function	常用-备用间的自投自复 Automatic transfer and restoration between normal and standby power supply	常用-备用间的自投不自复 Automatic transfer without restoration between normal and standby power supply	常用-发电电源间的自投自复 Automatic transfer and restoration between normal and generating power supply
控制特性 Control feature	t ₁ 、t ₂ 用户可调 t ₁ 、t ₂ are adjustable for users		t ₁ 、t ₂ 、t ₃ 、t ₄ 、t ₅ 、t ₆ 用户可调 t ₁ 、t ₂ 、t ₃ 、t ₄ 、t ₅ 、t ₆ are adjustable for users



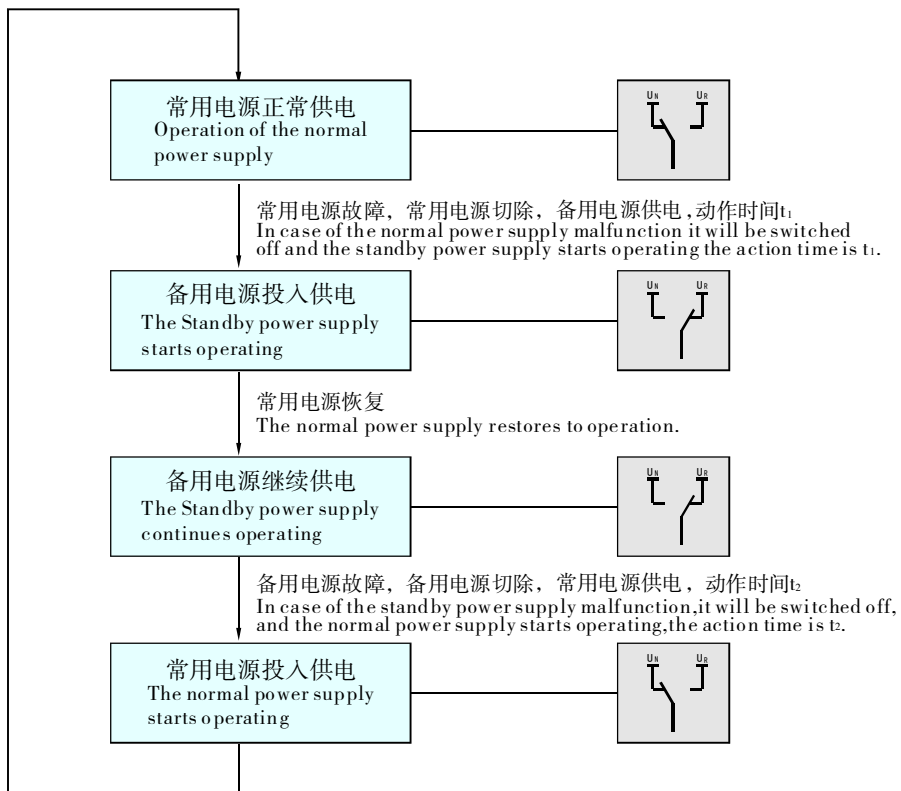
● 常用-备用间的自投自复 (JR型、ER型、ZR型、ZTR型)

Automatic transfer and restoration between the normal and standby power supply (Type JR, ER, ZR, ZTR)



● 常用-备用间的自投不自复 (JS型、ES型、ZS型、ZTS型)

Automatic transfer without restoration between normal and standby power supply (Type JS, ES, ZS, ZTS)



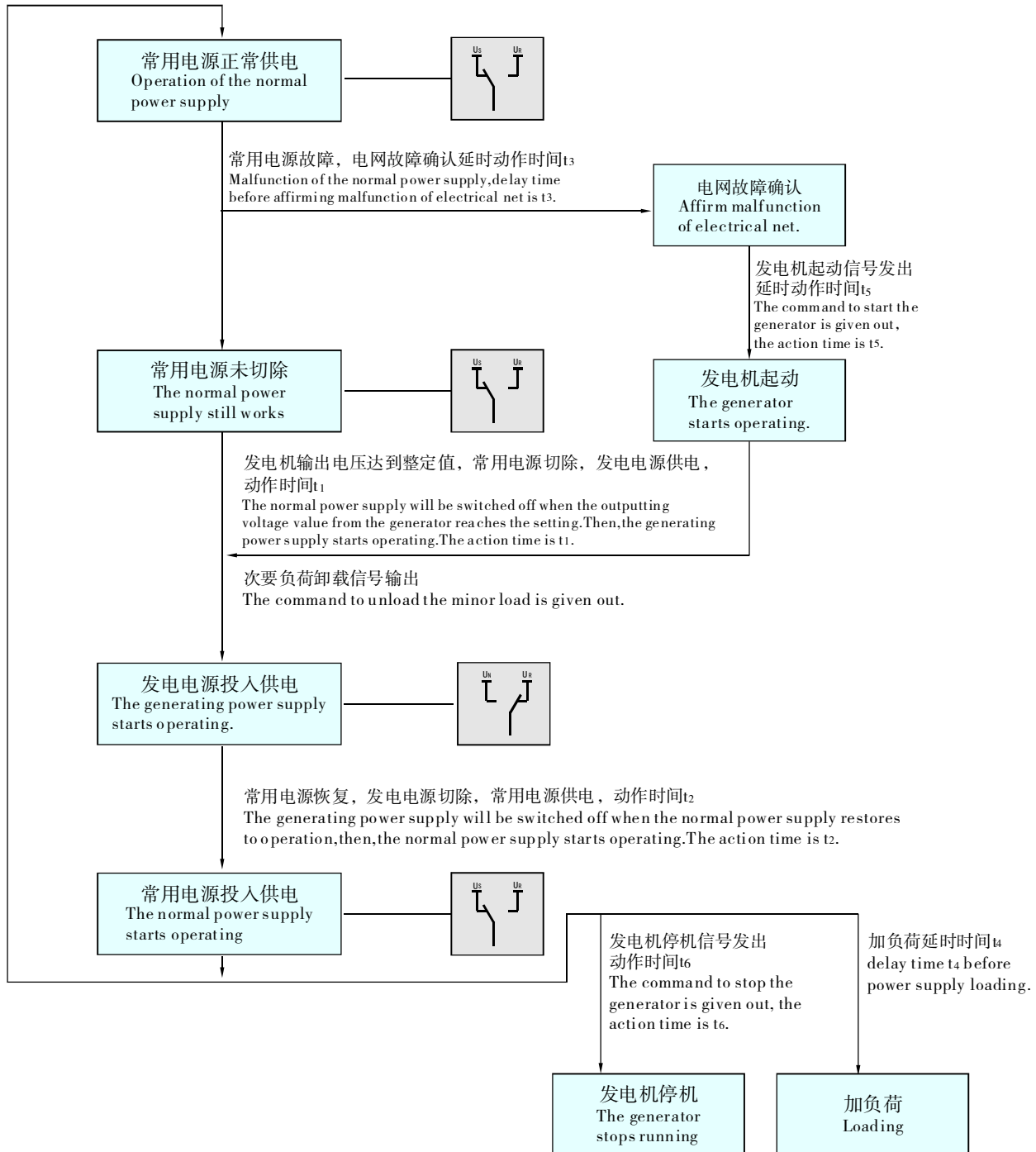


控制器R型、S型、F型三种“自动”控制功能逻辑图

Logic chart control function of type R, S and F automatic control unit of the controller

● 常用-发电电源间的自投自复 (EF型、ZF型、ZTF型)

Automatic transfer and restoration between normal and generating power supply (Type EF, ZF, ZTF)



常用-发电型必须为控制器提供一个稳定、不间断的DC24V直流电源,其容量不小于6W。当此直流电源缺失时,系统具有R型(自投自复型)的全部功能。

As for the normal and generating power supply, an interrupted power supply of DC24V with the power no less than 6W is required. In case the D.C. supply is switched off, the control unit will have the same function as that of type R (automatic transfer and restoration).



控制器R型、S型、F型三种“自动”控制功能逻辑图

Logic chart control function of type R、S and F automatic control unit of the controller

● 控制器控制特性 Control feature of controller

控制器型号 Controller type	额定控制电源电压 Rated power supply Us(V)	转换动作延时时间 Delay time before power supply switching action t1(s)	返回动作延时时间 Delay time before power supply restoring action t2(s)	电网故障确认延时时间 Delay time before affirming malfunction of electricalnet t3(s)	加负荷前延时时间 Delay time before power supply loading t4(s)	发电指令延时时间 Delay time before giving out of the command of power generation t5(s)	发电停机指令延时时间 Delay time before giving out of the command to stop the generator t6(s)
JR型 JS型	AC230	0.5	0.5				
ER型 ZR型 ZTR型		0.1 ~ 64 用户可调 adjusted by users	0.1 ~ 64 用户可调 adjusted by users				
ES型 ZS型 ZTS型							
EF型 ZF型 ZTF型			0.1 ~ 240 用户可调 adjusted by users	0.5 ~ 32 用户可调 adjusted by users	0.5 ~ 32 用户可调 adjusted by users	1 ~ 180 用户可调 adjusted by users	32 ~ 600 用户可调 adjusted by users



自动转换开关操作性能 OPERATION FUNCTION OF AUTOMATIC TRANSFER SWITCH

型号 Type	通电流(次) With current(times)	不通电流(次) Without current(times)	总计(次) Total(times)
CAP1-32 CAP1-63 CAP1-100	1500	4500	6000
CAP1-125 CAP1-140 CAP1-160 CAP1-200 CAP1-225 CAP1-250	1000	5000	6000
CAP1-315 CAP1-350 CAP1-400	1000	3000	4000
CAP1-500 CAP1-630	1000	5000	6000

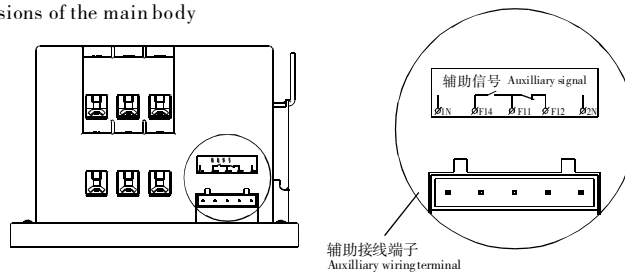


自动转换开关型号 Type of Automatic transfer Switch	配用500V/120kA熔断器或400V/50kA断路器 Fuse of 500V/120kA or 400V/50kA breaker
CAP1-32	NT0-35
CAP1-63	NT0-80
CAP1-100	NT2-125
CAP1-125	NT2-160
CAP1-140	NT2-160
CAP1-160	NT2-200
CAP1-200	NT2-250
CAP1-225	NT2-300
CAP1-250	NT2-300
CAP1-315	NT2-355
CAP1-350	NT2-400
CAP1-400	NT2-500
CAP1-500	CM5-630L/500A
CAP1-630	CM5-630L/630A

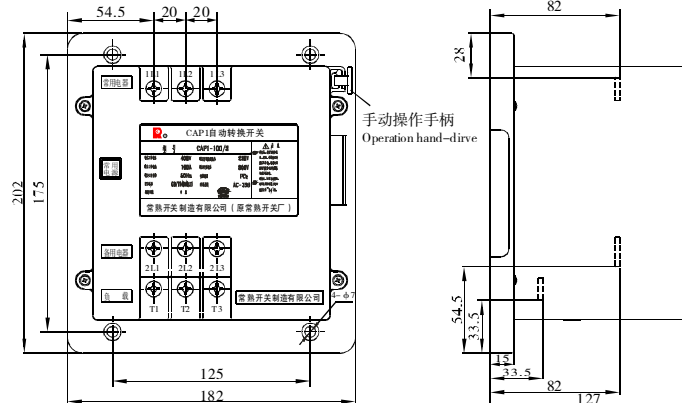


外形及安装尺寸 OUTLINE AND MOUNTING DIMENSIONS

- 装置本体的外形和安装尺寸
Outline and mounting dimensions of the main body



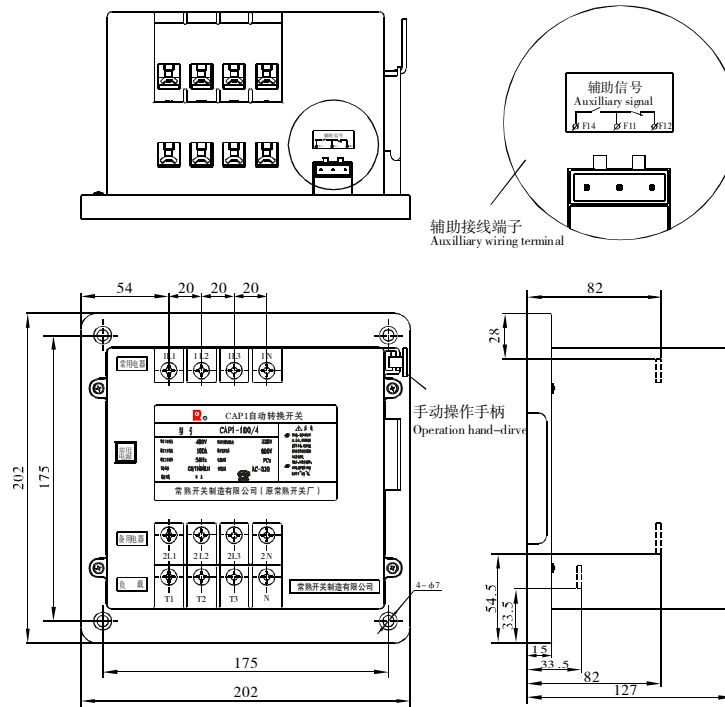
注：1N/2N为常用/备用中性线接入端，三极时需接入，以获得控制器额定控制电源电压。
Note: 1N/2N is normal/standby power supply neutral line wiring terminal



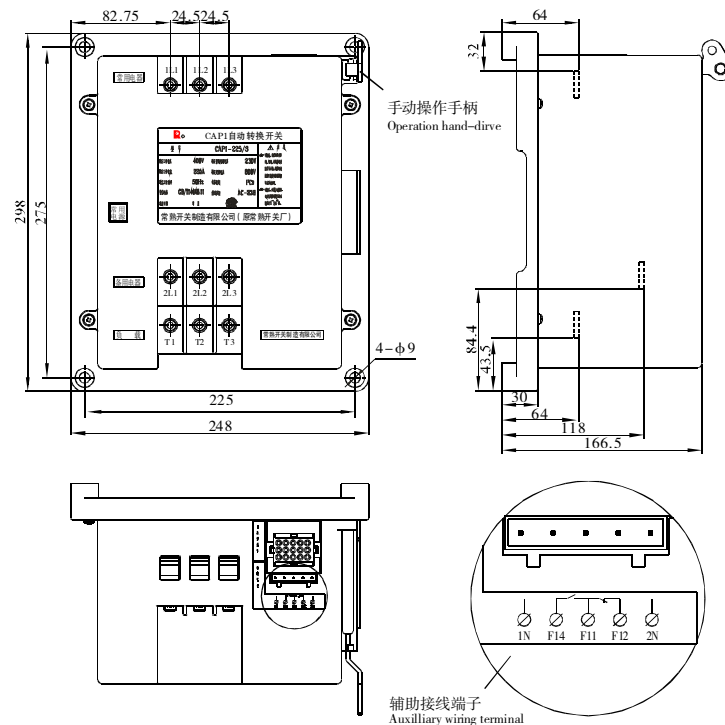
CAP1-32~100三极本体外形及安装尺寸
Outline and mounting dimensions of CAP1-32~100 (three poles)



外形及安装尺寸 OUTLINE AND MOUNTING DIMENSIONS



CAP1-32~100四极本体外形及安装尺寸
Outline and mounting dimensions of CAP1-32~100 (four poles)

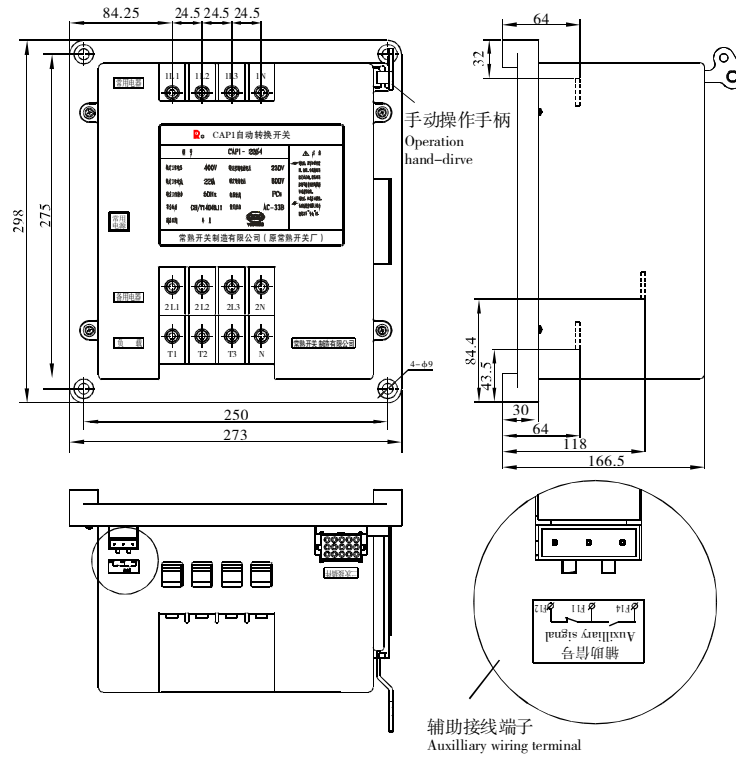


CAP1-125~225三极本体外形及安装尺寸
Outline and mounting dimensions of CAP1-125~225 (three poles)

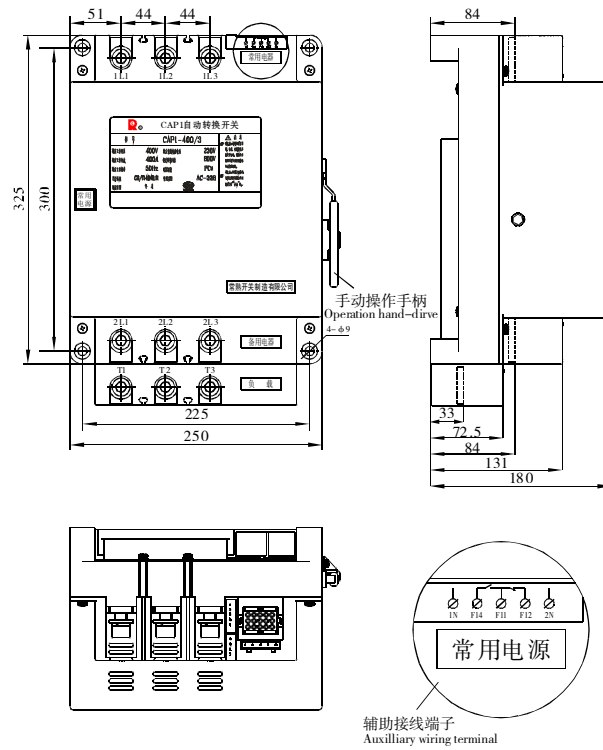
注：1N/2N为常用/备用中性线接入端，三极时需接入，以获得控制器额定控制电源电压。
Note: 1N/2N is normal/standby power supply neutral line wiring terminal



外形及安装尺寸 OUTLINE AND MOUNTING DIMENSIONS



CAP1-125~225四极本体外形及安装尺寸
Outline and mounting dimensions of CAP1-125~225 (four poles)

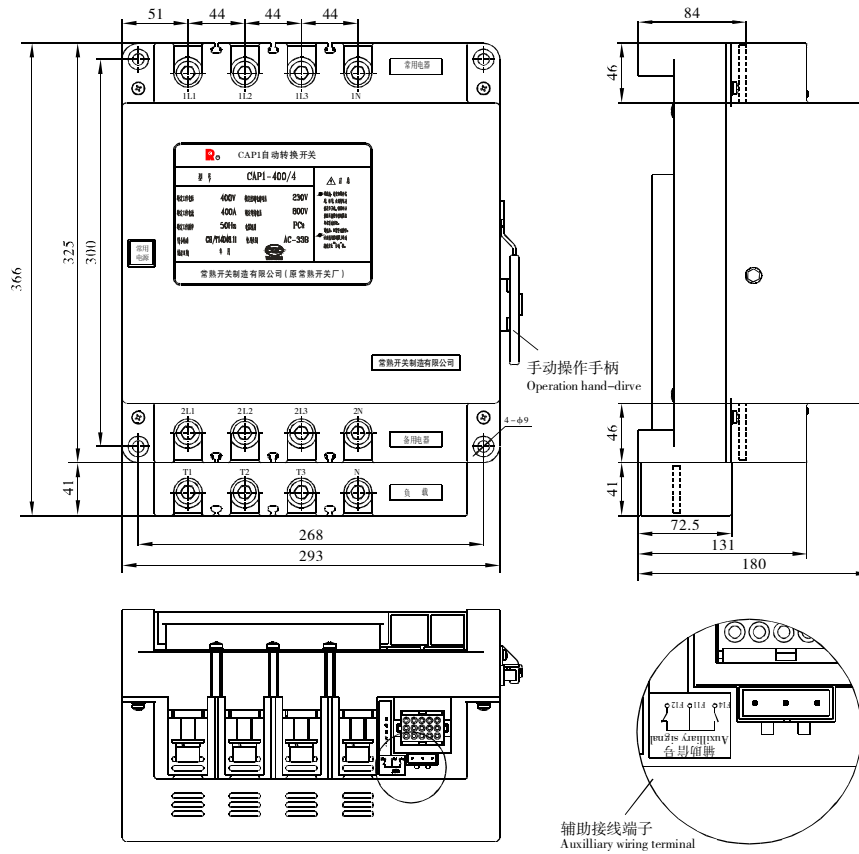


注：1N/2N为常用/备用中性线接入端，三极时需接入，以获得控制器额定控制电源电压。
Note: 1N/2N is normal/standby power supply neutral line wiring terminal

CAP1-250~630三极本体外形及安装尺寸
Outline and mounting dimensions of CAP1-250~630 (three poles)



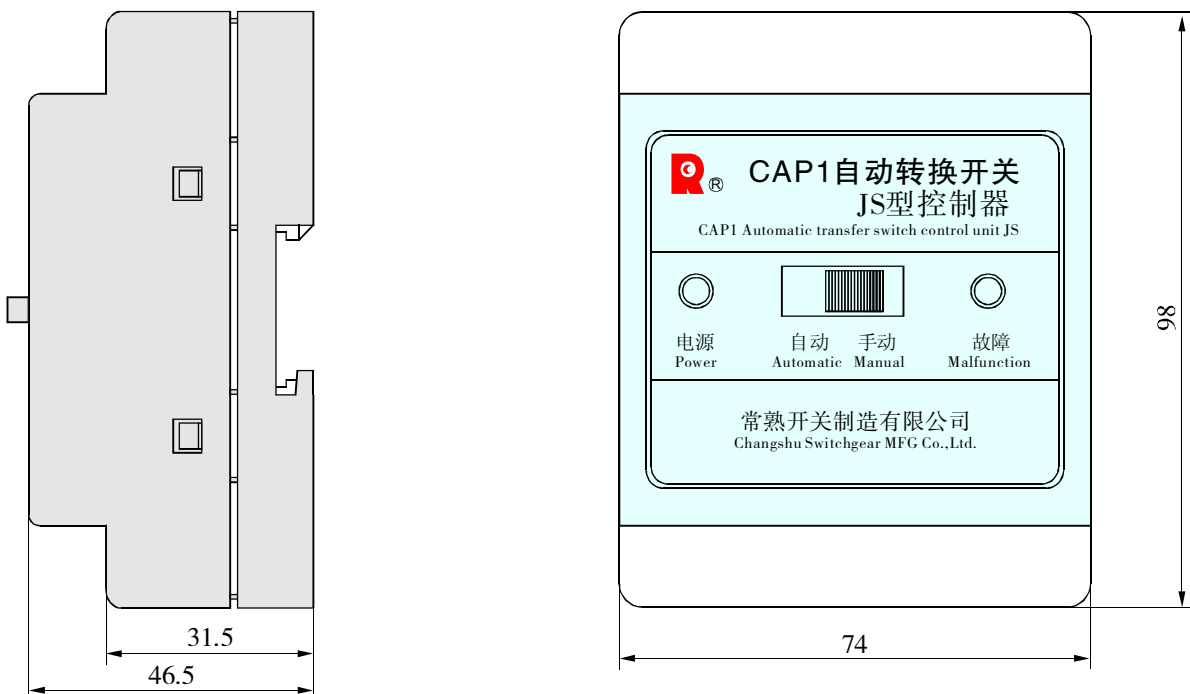
外形及安装尺寸 OUTLINE AND MOUNTING DIMENSIONS



CAP1-250~630四极本体外形及安装尺寸
Outline and mounting dimensions of CAP1-250~630 (four poles)

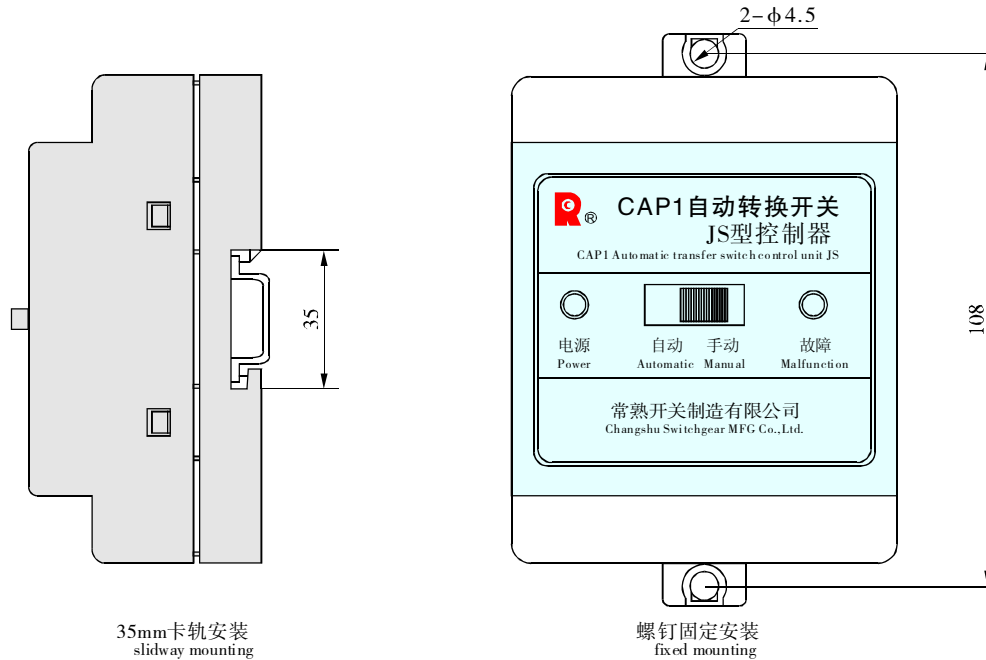
● JR/JS型控制器外形尺寸

Outline dimensions of JR/JS controller



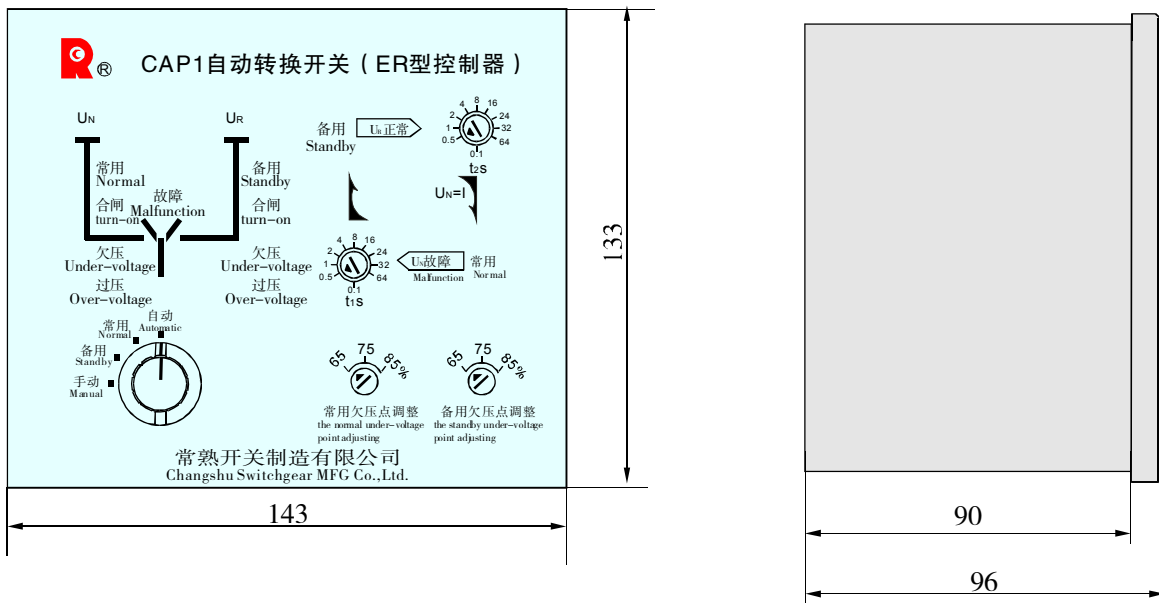


外形及安装尺寸 OUTLINE AND MOUNTING DIMENSIONS



安装方式
Mounting type

● ER型、ES型控制器的外形及安装尺寸
Outline and mounting dimensions of ER and ES Controller



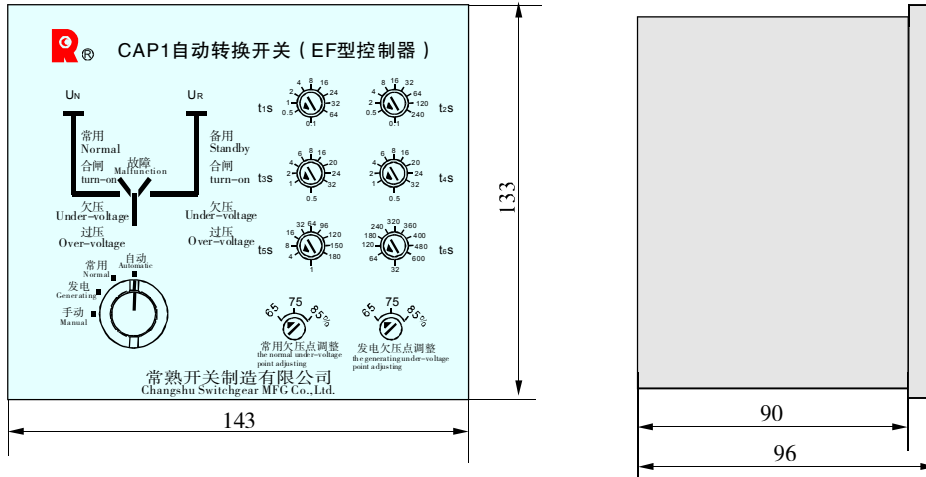
注：本控制器采用独特的字符动态显示方式，即各种状态用中文字符的方式高亮显示，方便直观。

Notice: The dynamic character indication is used on the surface of the control unit. i.e. different chinese characters indicate a different working status.



外形及安装尺寸 OUTLINE AND MOUNTING DIMENSIONS

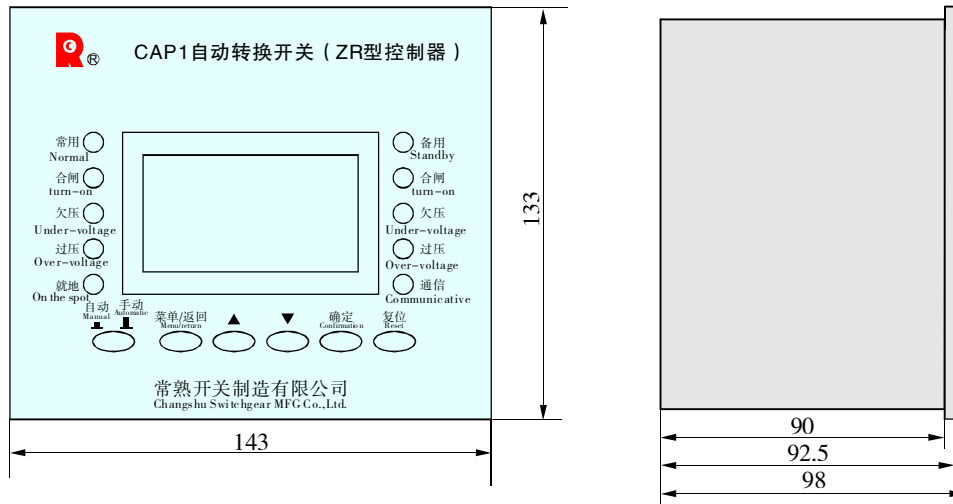
- EF型控制器的外形及安装尺寸
Outline and mounting dimensions of EF Controller



注：本控制器采用独特的字符动态显示方式，即各种状态用中文字符的方式高亮显示，方便直观。

Notice: The dynamic character indication is used on the surface of the control unit. i.e. different chinese characters indicate a different working status.

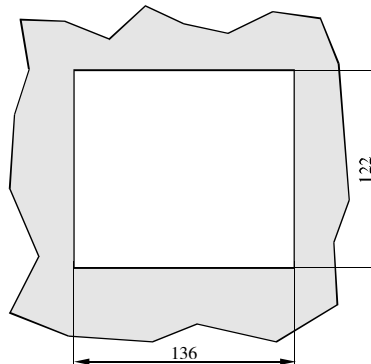
- ZR (ZTR) 型、ZS (ZTS) 型、ZF (ZTF) 型控制器的外形及安装尺寸
Outline and mounting dimensions of ZR(ZTR), ZS(ZTS) and ZF(ZTF)



注：本控制器状态液晶显示，参数菜单设定。

Notice: LCD indication of state of the controller, parameters can be set on menu.

- E型、Z型、ZT型控制器安装开孔尺寸
Aperture dimensions of E, Z and ZT type

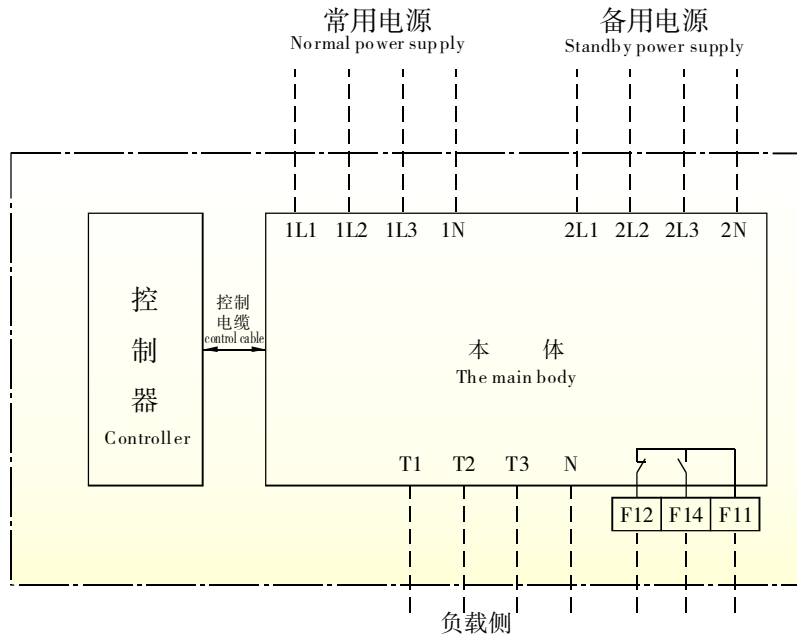




以下电气原理图图示转换开关为四极，三极时辅助接线端子1N/2N需接入常用/备用电源中性线，以获得控制器额定控制电源电压。

● 控制器为JR型、JS型、ER型、ES型、ZR型、ZS型自动转换开关电气原理图

Electrical principle diagram of type JR、JS、ER、ZR and ZS controller of the automatic transfer switch.



- 注：1.虚线由用户连接；2. E型、Z型、ZT型控制器与本体用1.8m电缆连接，超过1.8m请在订货时注明；
3.J型控制器与本体用0.5m电缆连接，超过0.5m请在订货时注明；
4.图中辅助触头状态对应装置处于常用电源位置时的状态。

Notice:1.Wiring for the dotted lines should be completed by users.

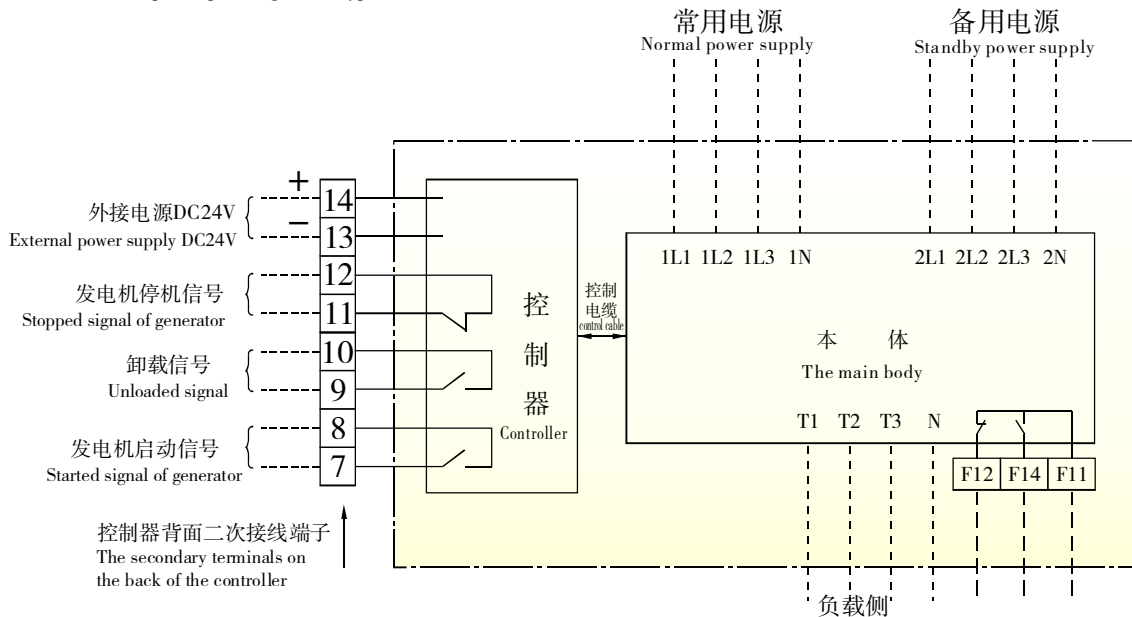
2.The type E、Z and ZT controller connects with the main body via a cable 1.8 meters at length. In case of the cable over 1.8 meters,please notice while making order.

3.The type J controller connects with the main body via a cable 0.5 meters at length. in case of the cable over 0.5 meters,please notice while making order.

4.The statu of auxiliary contact is for normal power supply position of switch.

● 控制器为EF型、ZF型自动转换开关电气原理图

Electrical principle diagram of type EF and ZF controller of the automatic transfer switch.



- 注：1.虚线由用户连接；2. 控制器与本体用1.8m电缆连接，超过1.8m请在订货时注明；3.图中辅助触头状态对应装置处于常用电源位置时的状态。

Notice:1.Wiring for the dotted lines should be completed by users.

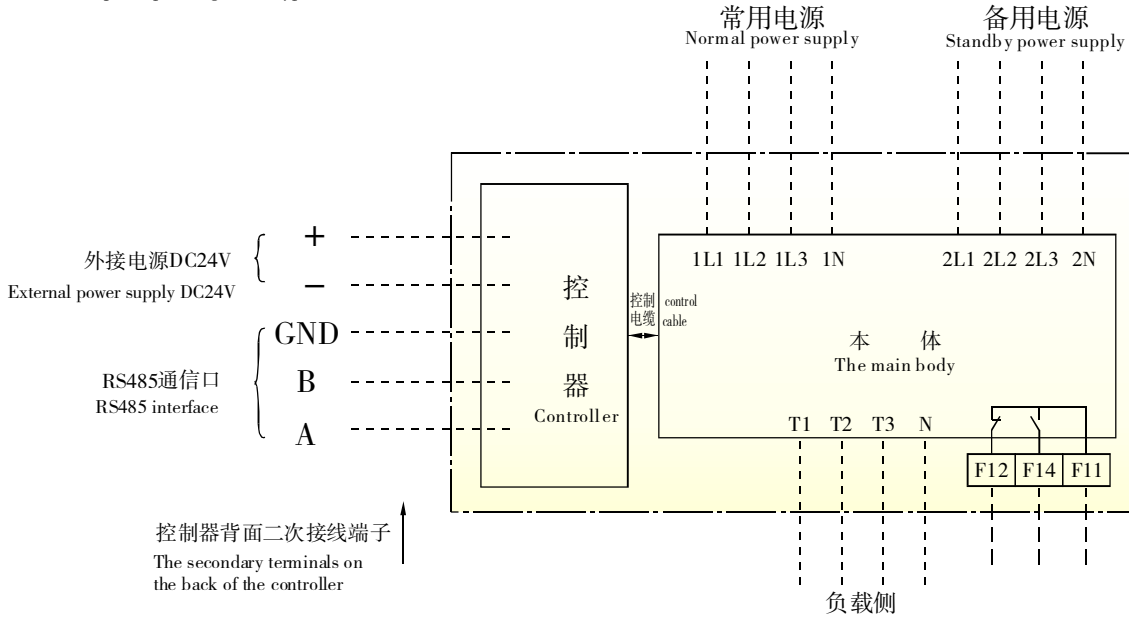
2.The Controller connects with the main body via a cable 1.8 meters at length. In case of the cable over 1.8 meters,please notice while making order.

3.The statu of auxiliary contact is for normal power supply position of switch.



● 控制器为ZTR、ZTS型自动转换开关电气原理图

Electrical principle diagram of type ZTR and ZTS controller of the automatic transfer switch

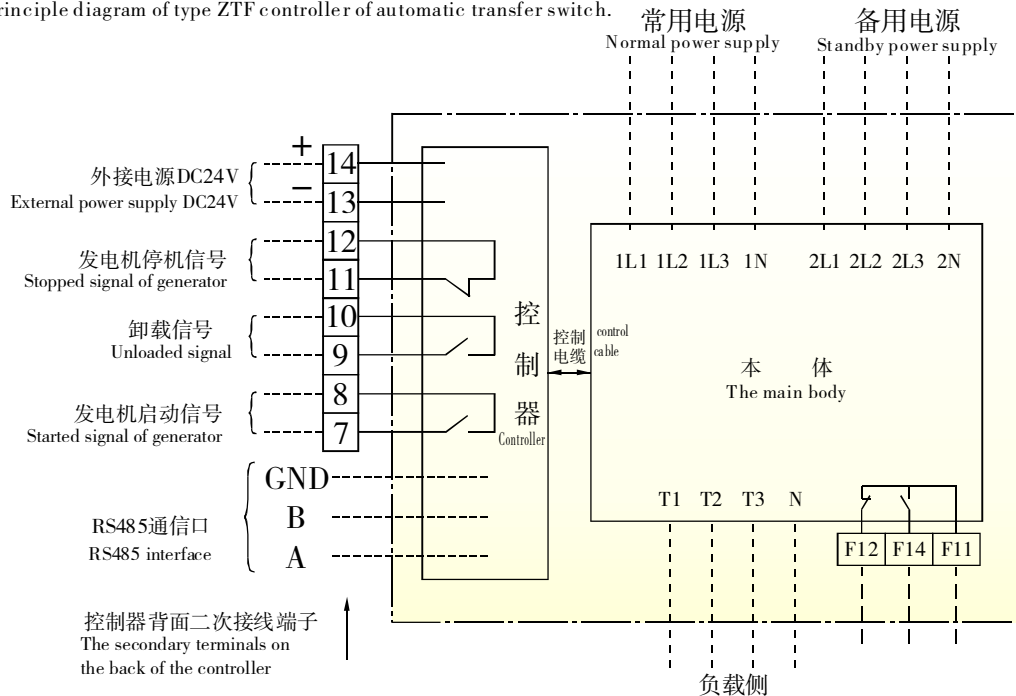


注：1.虚线由用户连接；2.控制器与本体用1.8m电缆连接，超过1.8m请在订货时注明；
3.图中辅助触头状态对应装置处于常用电源位置时的状态。

Notice:1.Wiring for the dotted lines should be completed by users.
2.The Controller connects with the main body via a cable 1.8 meters at length. In case of the cable over 1.8 meters,please notice while making order.
3.The statu of auxiliary contact is for normal power supply position of switch.

● 控制器为ZTF型自动转换开关电气原理图

Electrical principle diagram of type ZTF controller of automatic transfer switch.



注：1.虚线由用户连接；2.控制器与本体用1.8m电缆连接，超过1.8m请在订货时注明；
3.图中辅助触头状态对应装置处于常用电源位置时的状态。

Notice:1.Wiring for the dotted lines should be completed by users.
2.The Controller connects with the main body via a cable 1.8 meters at length. In case of the cable over 1.8 meters,please notice while making order.
3.The statu of auxiliary contact is for normal power supply position of switch.



电气原理接线图 ELECTRICAL PRINCIPLE DIAGRAM

装置位置 position of switch	辅助触头状态 status of auxiliary	
	F11、F12	F11、F14
常用电源位置 normal power supply	闭合 close	断开 open
备用电源位置 stand by power supply	断开 open	闭合 close



连接导体参考截面及接线端子拧紧力矩

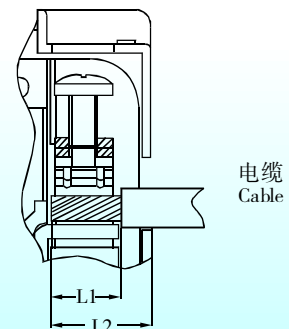
CROSS-SECTIONAL AREA OF CONNECTING CONDUCTOR AND TIGHTENING TORQUES OF TERMINALS

方位 item	型号 type	连接导体 connecting conductor		接线端子 terminal		
		根数 number	截面(mm ²) cross-section	螺纹直径mm screw-type	拧紧力矩(N·m) tightening torques	形式 type
主电路 main circuit	CAP1-32	1	6	6	2.5	
	CAP1-63	1	16			
	CAP1-100	1	35			
	CAP1-125	1	50	10	10	
	CAP1-140	1	50			
	CAP1-160	1	70			
	CAP1-200	1	95			
	CAP1-225	1	95			
	CAP1-250	1	120			
	CAP1-315	1	185			
	CAP1-350	1	185			
	CAP1-400	1	240			
	CAP1-500	2	150			
	CAP1-630	2	185			
辅助电路 auxiliary circuit	CAP1-32~630	1	1.5	3	0.5	

CAP1-32~225主电路电缆接线如图所示，L1、L2按照下表。
Connected cables of main circuit by under table

型号 Type	L1(mm)	L2(mm)
CAP1-32~100	>15	25
CAP1-125~225	25	35

注：若采用接线端子或铜排接线，接线要求参照电缆接线。
Note: if using terminal or bar connected, connecting wire demand is for cable connected.





项目 Item	设定值 Setting value						
	基本型 Basic	电子型 Electronic		智能型 Intelligent		智能可通信 Intelligent and communicate	
	JR、JS	ER、ES	EF	ZR、ZS	ZF	ZTR、ZTS	ZTF
转换动作延时时间 t_1 (s) Delay time before power supply switching action	0.5	2	2	2	2	2	2
返回动作延时时间 t_2 (s) Delay time before power supply restoring action	0.5	2	2	2	2	2	2
电网故障确认延时时间 t_3 (s) Delay time before affirming malfunction of electricalnet	-	-	2	-	2	-	2
加负荷前延时时间 t_4 (s) Delay time befor power supply loading	-	-	2	-	2	-	2
发电指令延时时间 t_5 (s) Delay time before giving out of the commond of power generation	-	-	4	-	2	-	2
发电停机指令延时时间 t_6 (s) Delay time before giving out of the commond to stop the generator	-	-	32	-	32	-	32
欠电压值 Under-voltage	-	65%U _e	65%U _e	65%U _e	65%U _e	65%U _e	65%U _e
过电压值 Over-voltage	-	115%U _e	115%U _e	115%U _e	115%U _e	115%U _e	115%U _e
工作状态 Working state	-	自动 Automatic	自动 Automatic	自动 Automatic	自动 Automatic	自动 Automatic	自动 Automatic
通信模式 Communicating module	-	-	-	-	-	本地 Locate	本地 Locate



用户在订货时，应注明装置的型号。

- 订CAP1自动转换开关，额定工作电流为400A，电子型控制器，自投自复，四极，即写为CAP1-400/ER/4。

Please indicate the type of the switch while making order.

- Suppose if ordering a CAP1 Series ATS, which has the rated operational current of 400A, the electronic controller with automatic transfer and restoration and four poles, it should be written as "CAP1-400/ER/4".

常熟开关 持续超越

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