EATON 辉能

HNQ/HNP3
自动转换开关电器

HNQ &HNP3 Automatic Transfer Switching Equipment

伊顿辉能低压电器（江苏）有限公司
Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd.

公司简介

伊顿辉能低压电器（江苏）有限公司坐落于江苏省镇江新区，是美国伊顿公司和江苏辉能电气有限公司成立的合资公司，专业从事低压电器产品的研发、制造和销售。公司现有员工 300 余人，其中各类专业技术人员约占 30%，中高级职称 40 余人，累计申请产品专利 120 余项。

公司主要产品为万能式断路器、塑料外壳式断路器、隔离电器、小型断路器、自动转换开关电器、接触器等。产品广泛应用于光伏、风电、工业、电网、楼宇等多个领域。

2009 年推出 HNW3 风电、光伏专用智能型万能式断路器，市场占有率稳居行业前列，产品广受用户好评。

2017 年，HNM3TL 系列塑壳漏电断路器推向市场，高度模块化的设计使其与 HNM3 系列热磁、电子系列产品保持了相同的尺寸，满足客户对产品小型化和可替换性的需求。

2018 年，HNM3DC 系列直流塑壳断路器推向市场，产品凭借优异的性能，迅速在多个江苏储能示范项目中得到了大量应用，并获得了客户的一致好评。

2019 年，HNW3GDC 系列直流框架隔离开关，HNM3-5 系列交流电子式框塑产品推向市场，产品适用于储能系统。

2020 年，HNM3-HU 系列高电压塑壳断路器、HNW3-HU 系列高电压框架断路器、HNM3GDC 系列直流塑壳隔离开关、HNW2GDC 系列直流框架隔离开关等一大批应用于光伏、风电、储能等系统的性能优异的产品推向市场。产品一经推出，便获得了众多客户的高度关注，并迅速在新能源市场中得到了大量应用。

2021 年，行业内首个通过 AC1500V 50kA 短路分断试验的框架断路器诞生！ HNW3-HV 系列高电压框架断路器推向市场，产品完美适用于风电、光伏等新能源系统。

历时多年发展，伊顿辉能低压电器（江苏）有限公司产品累计装机容量不断提升。目前，风电和光伏装机量累计突破 200GW。并通过众多的运行实践，在新能源领域积累了大量的研发、生产与服务经验，通过持续地技术革新，新能源专用断路器的产品性能、指标、可靠性、环境适应性不断提升，成为新能源行业断路器的领导品牌。

25,000 m^2
25000 m^2
企业生产研发经营面积
Enterprise Production and R&D Operating Area

120+ 项
Over 120
累计申请专利
Invention Patents

16Yrs
16Yrs
风电光伏研究及应用经验
Wind Power Photovoltaic Research and Application Management

300+
Over 300
企业员工
Enterprise Employees

100GW
100 GW
累计风电装机
Accumulated Wind Power Installations

ACB **25,000** 台
ACB: 25000 sets
年产能
Annual Output

30%
30%
研发人员
R&D Staff

100GW
100 GW
累计光伏装机
Accumulated Photovoltaic Power Installations

MCCB **400,000** 台
MCCB:400000 sets
年产能
Annual Output

Company Brief

Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd., located in Zhenjiang New District, Jiangsu, is a joint venture established by Eaton and Jiangsu PHONO Electric Co., Ltd., specializing in the R&D, manufacturing and sales of low-voltage electrical products. The company has more than 300 employees, among which all kinds of specialized technical personnel account for about 30%, including more than 40 employees with intermediate or senior professional titles. Totally more than 120 product patents have been applied.

Our company's main products include air circuit breaker (ACB), molded case circuit breaker (MCCB), isolator, miniature circuit breaker (MCB), automatic transfer switching equipment (ATSE), contactor, etc., which are widely used in photovoltaic, wind power, industry, power grid, building and other fields.

In 2009, our company launched the HNW3 intelligent air circuit breaker exclusively for photovoltaic and wind power equipment, with its market share ranking the forefront of the industry, receiving a good reputation from customers.

In 2017, the HNM3TL series molded case leakage circuit breaker was introduced to the market. The highly modular design enables it to maintain the same size as the HNM3 series thermomagnetic and electronic products, thereby meeting the customers' demand for product miniaturization and replaceability.

In 2018, the HNM3DC series DC molded case circuit breaker was unveiled. With its excellent performance, the product was quickly applied in many energy storage demonstration projects of Jiangsu, winning unanimous praise from customers.

In 2019, the HNW3GDC series DC frame disconnector and the HNM3-5 series AC electronic frame plastic products came out, being applicable to energy storage systems.

In 2020, a large number of products with excellent performance used in photovoltaic, wind power, energy storage and other systems became available on the market, including HNM3-HU series high-voltage molded case circuit breaker, HNW3-HU series high-voltage frame circuit breaker, HNM3GDC series DC molded case disconnector, HNW2GDC series DC frame disconnector, etc. The products, once launched, have come under the spotlight among customers, and have quickly been widely applied in the new energy market.

In 2021, the industry's first frame circuit breaker that passed the AC1500V 50kA short-circuit breaking test was born! Moreover, the HNW3-HV series high-voltage frame circuit breakers were also introduced to the market, being perfectly suitable for new energy systems such as wind power and photovoltaic ones.

With the development over the years, Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd. continues to refresh the record in its cumulative installed capacity. At present, the installed capacity of wind power and photovoltaic power has exceeded 200GW. Through a large number of operational practices, we have accumulated abundant R&D, production and service experience in the new energy field. Thanks to continuous technical innovation, Eaton Huineng, as one of the leading brands in circuit breakers for the new energy industry, is committed to improving the performance, indicators, reliability and environmental adaptability of circuit breakers for new energy application.

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HNQ 系列 自动转换开关电器

HNQ series automatic transfer switching equipment (ATSE)

- 新一代自动转换开关电器（以下简称ATSE），工艺精良、功能齐备、安全可靠；具有可靠的机械连锁和电气连锁；
- 适用于交流50Hz，额定工作电压400V及以下，额定工作电流800A及以下的TN或TT供电系统；
- 具有测量、诊断、分析和通讯以及精确的选择性保护和电源监测等功能。

- A new generation of automatic transfer switching equipment (hereinafter referred to as "ATSE"), which is of sophisticated technology, full-featured, safe and reliable, with reliable mechanical and electrical interlocking;
- Applicable to TN or TT power supply system (AC 50Hz, rated working voltage ≤ 400V, rated working ≤ 800A);
- Provided with the functions of measurement, diagnosis, analysis and communication, precise selective protection and power supply monitoring.

HNQ Series Automatic Transfer Switching Equipment

HNQ系列自动转换开关电器符合以下标准
HNQ series automatic transfer switching equipment (ATSE) conforms to the following standards:

- IEC 60947-1及GB14048.1 低压开关设备和控制设备 总则
  IEC 60947-1 and GB14048.1 Low-voltage switchgear and controlgear - General rules
- IEC 60947-2及GB14048.2 低压开关设备和控制设备 低压断路器
  IEC 60947-2 and GB14048.2 Low-voltage switchgear and controlgear - Low-voltage circuit-breakers
- IEC 60947-6-1及GB14048.11 低压开关设备和控制设备 自动转换开关电器
  IEC60947-6-1 and GB14048.11 Low-voltage switchgear and controlgear - Automatic transfer switching equipment
- GB50016 建筑设计防火规范
  GB50016 Code of design on building fire protection
- GB50045 高层民用建筑设计防火规范
  GB50045 Code for fire protection design of high-rise civil building

型号及含义
Model and its meaning

HNQ1自动转换开关电器
HNQ1 series automatic transfer switching equipment (ATSE)

HN	Q	1	–	63	CB	63	E	/	4
伊顿辉能低压电器（江苏）有限公司 Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd.	自动转换开关 Automatic transfer switching	设计序号 Design serial No.		壳架等级 Frame size	电器级别 Electrical grade	额定工作电流 Rated working current	经济型 Economic type		极数 Number of poles：2：2P；3：3P；4：4P

HNQ3自动转换开关电器
HNQ3 series automatic transfer switching equipment (ATSE)

HN	Q	3	–	160	CB	63	–	4.1	/	4	R	Y	X
伊顿辉能低压电器（江苏）有限公司 Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd.	自动转换开关 Automatic transfer switching	设计序号 Design serial No.		壳架等级 Frame size	电器级别 Electrical grade	额定工作电流 Rated working current		控制器 Controller：4.1：STU 4.1；4.2：STU 4.2		极数 Number of poles：3：3P；4：4P①	自投自复（电网-电网）R：Automatic charge and automatic recovery (grid-grid)；自投不自复（电网-电网）S：Automatic charge, but non-automatic recovery (grid-grid)；F：电网-发电机 F: Grid-generator	结构代号 Structure code：Y：一体式 Y: Integral-type；无代号：分体式 No code: Split-type	附加功能 Additional function：X：消防联动 X: Fire-control linkage；无代号：无消防联动 No code: Without any fire-control linkage

① 注：4极执行断路器N相的工作模式为：不安装过电流脱扣器，且N相与其他三相一起合分（先合后分）

① Note: For 4P actuation circuit breaker, the working mode of its N-phase is: No over-current releases are installed, and N-phase, together with the other three phases, will be open/ closed (first closed, and then open)

HNQ1系列自动转换开关电器
HNQ1 series automatic transfer switching equipment (ATSE)

主要特征
Main features

- 两台小型断路器具有可靠机械连锁装置和电气连锁保护，杜绝两台断路器同时合闸；
- 工作模式可选；
- 手动、自动完美结合；
- 外观美观，质量可靠，操作简单。

- Two sets of miniature circuit breakers with reliable mechanical interlocking device and electrical interlocking protection, to avoid the simultaneous closing of these two circuit breakers;
- Optional working modes;
- Perfect combination of "Manual" and "Automatic";
- Beautiful appearance, reliable quality, and easy to operation.

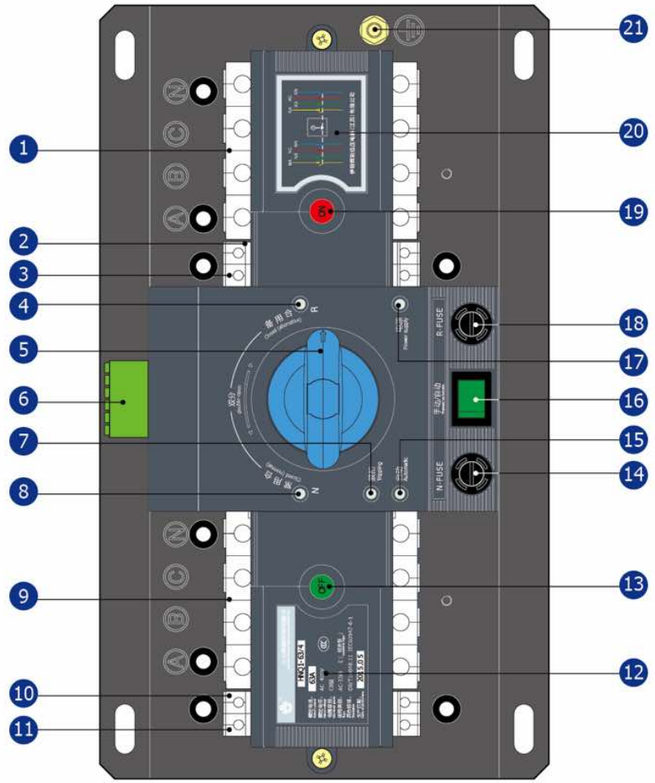
HNQ1-63

- 在80%~110%额定工作电压下可靠工作
- 自投自复
- 手柄转换、自动转换
- 脱扣指示
- 电源指示
- 手动、自动指示
- 常用合闸指示
- 备用合闸指示
- 常用侧、备用侧熔丝保护
- 常用侧任意相采样、备用侧单相采样
- 常用合闸输出（有源AC230V）
- 备用合闸输出（有源AC230V）
- 脱扣输出（有源AC230V）
- 消防输入（DC24V）

- Reliable at 80%-110% of rated working voltage
- Automatic charge and automatic recovery
- Handle transfer, automatic transfer
- Tripping indication
- Power indication
- "Manual" / "Automatic" indication
- Normal closing indication
- Alternative closing indication
- Fuse protection on normal / alternative side
- Arbitrary-phase sampling on normal side, single-phase sampling on alternative side
- Normal closing output (active, AC230V)
- Alternative closing output (active, AC230V)
- Tripping output (active, AC230V)
- Fire-control input (DC24V)

In=1A 2A 3A 4A 6A 10A 16A 20A 25A 32A 40A 50A 63A

HNQ1 结构
Structure of HNQ1 series ATSE

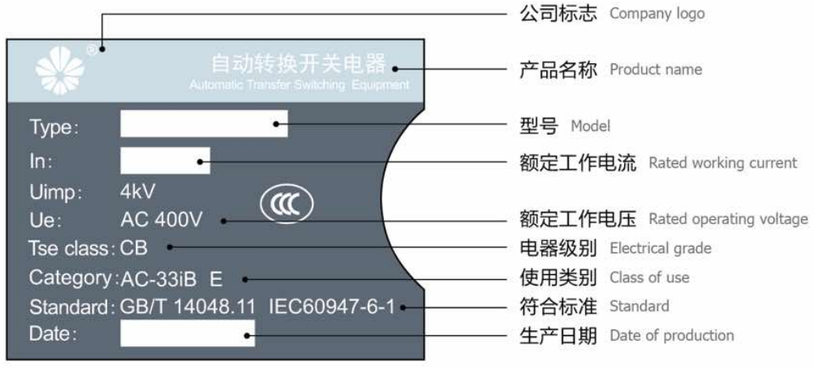


1 备用小型断路器 Alternative miniature circuit breaker
2 备用报警触头 Alternative alarm contact
3 备用辅助触头 Alternative auxiliary contact
4 备用合闸指示灯 Alternative closing indicator
5 转换手柄 Transfer handle
6 外接输出端子 External output terminal
7 脱扣指示灯 Tripping indicator
8 常用合闸指示灯 Normal closing indicator
9 常用小型断路器 Normal miniature circuit breaker
10 常用报警触头 Normal alarm contact
11 常用辅助触头 Normal auxiliary contact
12 左标牌（参数标牌） Left plate (parameter plate)
13 常用状态指示 Indication of normal state
14 常用侧保险丝 Fuse on the normal side
15 自动指示灯 "Automatic" indicator
16 手动/自动按钮 "Manual / automatic" button
17 电源指示灯 Power indicator
18 备用侧保险丝 Fuse on the alternative side
19 备用状态指示 Indication of alternative state
20 右标牌（接线标牌） Right plate (wiring plate)
21 接地螺栓 Grounding bolt

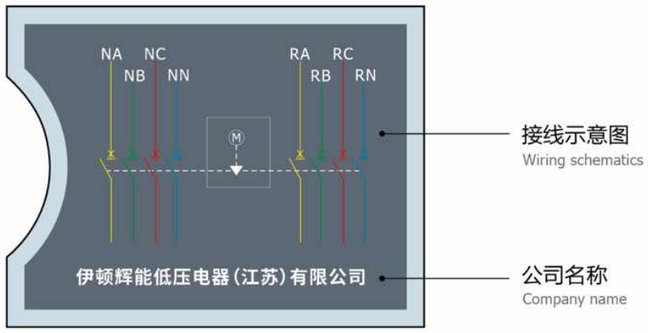
主要特征
Main features

标牌及其含义
Plate and its meaning

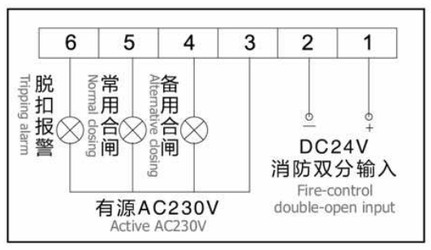
左标牌（参数标牌）
Left plate (parameter plate)



右标牌（接线标牌）
Right plate (wiring plate)



端子标牌
Terminal plate



1-2：消防双分输入（注意区分正负）
1-2: Fire-control double-open input (pay attention to the difference between positive(+) and negative(-))

3：公共端
3: Common terminal

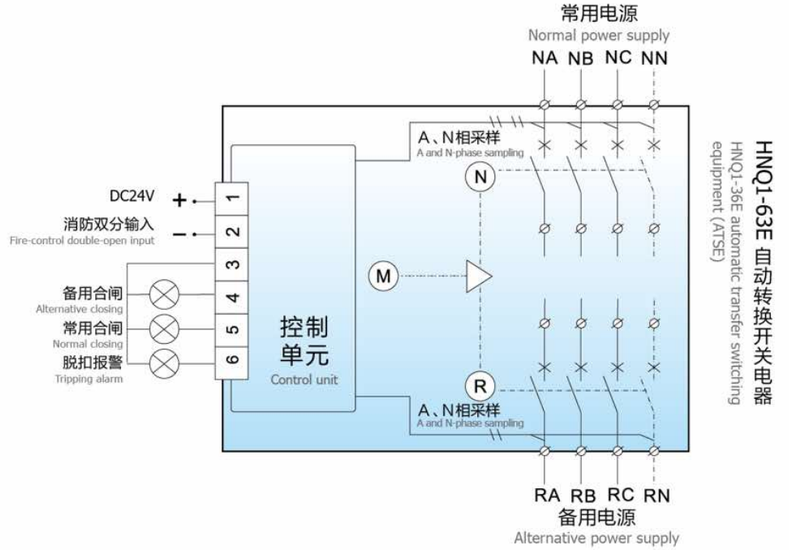
4：备用合闸指示（有源）
4: Alternative closing indication (active)

5：常用合闸指示（有源）
5: Normal closing indication (active)

6：脱扣报警指示（有源）
6: Tripping alarm indication (active)

电气图
Electrical diagram

HNQ1电气图
Electrical diagram of HNQ1 series ATSE



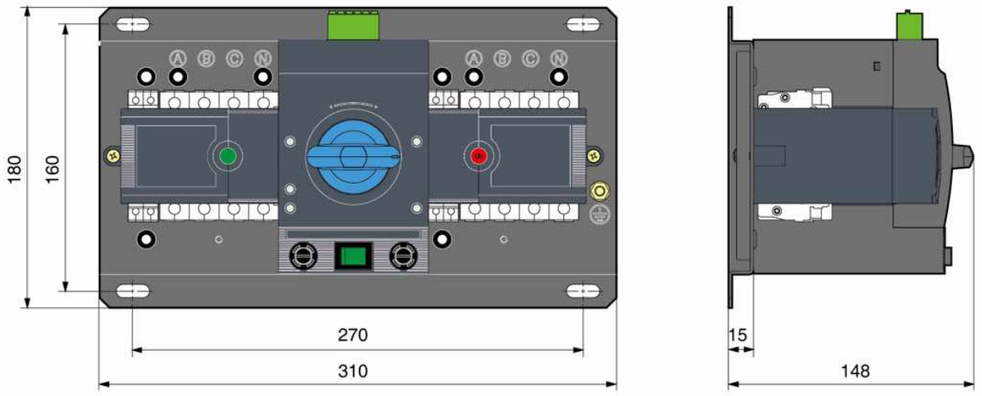
1-2：消防双分输入（注意区分正负）	1-2: Fire-control double-open input (pay attention to the difference between positive (+) and negative (-))
3：公共端	3: Common terminal
4：备用合闸指示（有源）	4: Alternative closing indication (active)
5：常用合闸指示（有源）	5: Normal closing indication (active)
6：脱扣报警指示（有源）	6: Tripping alarm indication (active)

主要技术数据及性能指标
Main technical data and performance indicator

型号 Model	HNQ1-63
	
符合标准 Standards	IEC60947-6-1 及 GB14048.11 IEC60947-6-1 and GB14048.11
使用类别 Class of use	AC-33iB
电气级别 Electrical grade	CB
执行断路器 Actuation circuit breaker	HNB2-63
额定工作电压 Ue（V） Rated working voltage Ue (V)	AC400V 50Hz
额定绝缘电压 Ui（V） Rated insulation voltage Ui (V)	AC690
额定工作电流 In（A） Rated working current In (A)	1、2、3、4、6、10、16、20、25、32、40、50、63
极数 Number of poles	2P 3P 4P
额定短路分断能力 Icn（kA） Rated short-circuit breaking capacity Icn (kA)	5
额定短路接通能力 Icm Rated short-circuit making capacity Icm	1.53 Icn
操作性能 Operation performance — 机械寿命（次） Mechanical life (times)	10000
操作性能 Operation performance — 电气寿命（次） Electrical life (times)	6000
正常工作条件 Normal working condition — 污染等级 Class of pollution	3 级 Level 3
正常工作条件 Normal working condition — 防护等级 Level of protection	IP20
正常工作条件 Normal working condition — 环境温度 Ambient temperature	-5℃～40℃（24h的平均值≤35℃） -5℃to 40℃(average value over a 24-hour period ≤35℃)
正常工作条件 Normal working condition — 海拔（m） Elevation above sea level (m)	≤2000
最短转换动作时间（无延时）s Minimum switching time without any delay (s)	≤2
操作循环次数 /h Operating cycle (times /h)	60
操作电流 A Operating current (A)	0.2
重量 kg Weight (kg)	3.5
安装 Installation — 安装方式 Installation method	螺栓固定 Bolting
安装 Installation — 联接方式 Connection method	板前接线 Front panel connection
操作方式 Mode of operation	手动、自动 Manual and automatic
转换模式 Switch mode	电网-电网自投自复 Grid-grid automatic charge and automatic recovery
消防双分 Fire-control double-open	√
	√

外形及安装尺寸
Overall and installing dimensions

HNQ1尺寸图
Dimensional drawing of HNQ1 series ATSE



HNQ3自动转换开关电器
HNQ3 series automatic transfer switching equipment (ATSE)

主要特征
Main features

- 两台断路器具有可靠机械连锁装置和电气连锁保护，杜绝两台断路器同时合闸；
- 驱动系统具有离合功能，手动操作省心省力；
- 具有手动锁定功能，更安全可靠；
- 外观美观，质量可靠，操作简单。

- Two sets of miniature circuit breakers with reliable mechanical interlocking device and electrical interlocking protection to avoid simultaneous closing of these two circuit breakers;
- A drive system of clutch function, and easy for manual;
- Manual locking, more safe and reliable;
- Beautiful appearance, reliable quality, and easy to operation.

HNQ3-63/125

Icu=50kA Ics=35kA

In=10A 16A 20A 25A 32A 40A 50A 63A 80A 100A 125A

HNQ3-160

Icu=50kA Ics=35kA

In=100A 125A 140A 160A

HNQ3-250

Icu=75kA Ics=50kA

In=100A 125A 140A 160A 180A 200A 225A 250A

HNQ3-400

Icu=75kA Ics=75kA

In=250A 315A 350A 400A

HNQ3-630

Icu=75kA Ics=75kA

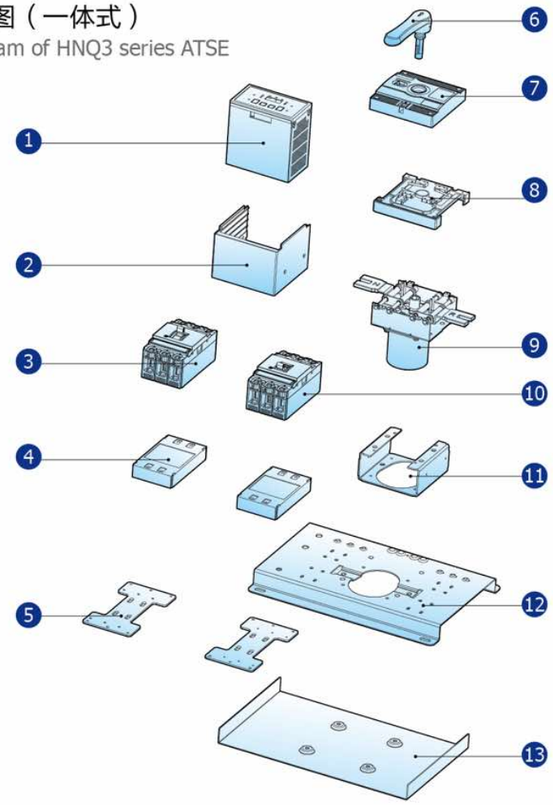
In=400A 500A 630A

HNQ3-800

Icu=75kA Ics=75kA

In=630A 700A 800A

HNQ3 结构图（一体式）
Structure diagram of HNQ3 series ATSE (integral-type)



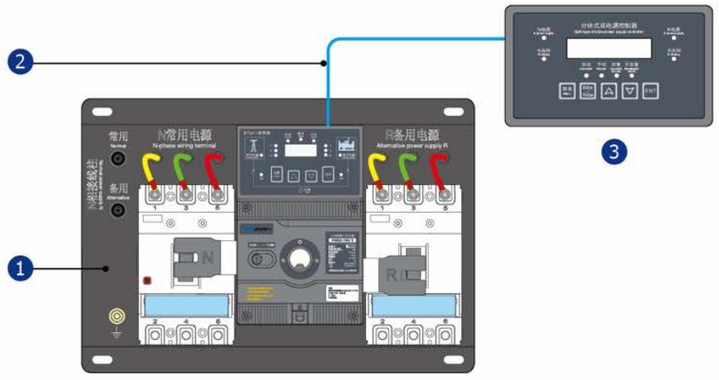
1 控制器 Controller
2 罩 Housing
3 常用电源断路器 Normal power supply circuit breaker
4 垫块 Pad
5 安装板 Mounting plate
6 操作手柄 Operating handle
7 面罩 Cover
8 限位支架 Position limiter
9 操作机构 Operating mechanism
10 备用电源断路器 Alternative power supply circuit breaker
11 支架 Bracket
12 安装底板 Mounting baseplate
13 封底板 Bottom plate

以HNQ3-63、125、160为例
Take HNQ3-63, 125 and 160 as examples

分体式
Split-type

通过并行数据线与电器主体控制器连接，实现分体式安装连接后，电器主体控制器所有操作和显示均处于禁止状态。

Connect the parallel data cable with the controller on ATSE body to realize the split-type installation and connection; at this time, all operations and displays of its controller are in the disabled state.



1 ATSE主体 ATSE body
2 并行数据线 Parallel data cable
3 分体式控制器 Split-type controller

主要技术数据及性能指标
Main technical data and performance indicator

型号 Model		HNQ3-63	HNQ3-125	HNQ3-160	HNQ3-250	HNQ3-400	HNQ3-630	HNQ3-800
								
符合标准 Standards		IEC60947-6-1 GB14048.11	IEC60947-6-1 GB14048.11	IEC60947-6-1 GB14048.11	IEC60947-6-1 GB14048.11	IEC60947-6-1 GB14048.11	IEC60947-6-1 GB14048.11	IEC60947-6-1 GB14048.11
使用类别 Class of use		AC-33iB	AC-33iB	AC-33iB	AC-33iB	AC-33iB	AC-33iB	AC-33iB
电气级别 Electrical grade		CB	CB	CB	CB	CB	CB	CB
执行断路器 Actuation circuit breaker		HNM3-1	HNM3-1	HNM3-1	HNM3-2	HNM3-3	HNM3-3	HNM3-4
额定工作电压 Ue（V） Rated working voltage Ue (V)		AC400V 50Hz	AC400V 50Hz	AC400V 50Hz	AC400V 50Hz	AC400V 50Hz	AC400V 50Hz	AC400V 50Hz
额定绝缘电压 Ui（V） Rated insulation voltage Ui (V)		AC800	AC800	AC800	AC800	AC800	AC800	AC800
额定冲击耐受电压 Uimp Rated impulse withstand voltage Uimp		8kV	8kV	8kV	8kV	8kV	8kV	8kV
额定工作电流 In（A） Rated working current In (A)		10 16 20 25 32 40 50 63	63 80 100 125	100 125 140 160	100 125 140 160 180 200 225 250	250 315 350 400	400 500 630	630 700 800
分断能力 Breaking capacity	额定极限短路分断能力 Icu（kA） Rated ultimate short-circuit breaking capacity Icu (kA)	50	50	50	75	75	75	75
	额定运行短路分断能力 Ics（A） Rated service short-circuit breaking capacity Ics (A)	35	35	35	50	75	75	75
操作性能 Operation performance	机械寿命（次） Mechanical life (times)	8500	8500	8500	7500	6000	6000	5000
	电气寿命（次） Electrical life (times)	4500	3000	2500	2000	1800	1500	1200
	使用总寿命（次） Total service life (times)	13000	11500	11000	9500	7800	7500	6200
总转换动作时间（无延时）s Total switching time without any delay (s)		≤ 3	≤ 3	≤ 3	≤ 3	≤ 5	≤ 5	≤ 5
操作循环次数 /h Operating cycle (times /h)		60	60	60	60	60	60	60
操作电流 A Operating current (A)		0.5	0.5	0.5	0.5	1	1	1
重量 Kg Weight (Kg)		8.6（3P） 9.2（4P）	8.6（3P） 9.2（4P）	8.6（3P） 9.2（4P）	10.5（3P） 11.5（4P）	23.3（3P） 25.3（4P）	23.3（3P） 25.3（4P）	32.1（3P） 34.9（4P）
正常工作条件 Normal working condition	污染等级 Class of pollution	3级 Level 3	3级 Level 3	3级 Level 3	3级 Level 3	3级 Level 3	3级 Level 3	3级 Level 3
	防护等级 Level of protection	IP20	IP20	IP20	IP20	IP20	IP20	IP20
	环境温度 Ambient temperature	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)	-5℃～40℃（24h的平均值≤35℃） (average value over a 24-hour period≤35℃)
	海拔（m） Elevation above sea level (m)	≤2000	≤2000	≤2000	≤2000	≤2000	≤2000	≤2000
控制器 Controller	型号 Model	STU4.1、STU4.2	STU4.1、STU4.2	STU4.1、STU4.2	STU4.1、STU4.2	STU4.1、STU4.2	STU4.1、STU4.2	STU4.1、STU4.2
	结构 Structure	一体式、分体式 Integral-and split-type	一体式、分体式 Integral-and split-type	一体式、分体式 Integral-and split-type	一体式、分体式 Integral-and split-type	一体式、分体式 Integral-and split-type	一体式、分体式 Integral-and split-type	一体式、分体式 Integral-and split-type
安装 Installation	安装方式 Installation method	螺栓固定 Bolting	螺栓固定 Bolting	螺栓固定 Bolting	螺栓固定 Bolting	螺栓固定 Bolting	螺栓固定 Bolting	螺栓固定 Bolting
	联接方式 Connection method	板前接线 Front panel connection	板前接线 Front panel connection	板前接线 Front panel connection	板前接线 Front panel connection	板前接线 Front panel connection	板前接线 Front panel connection	板前接线 Front panel connection

控制器
Controller

特点
Characteristics

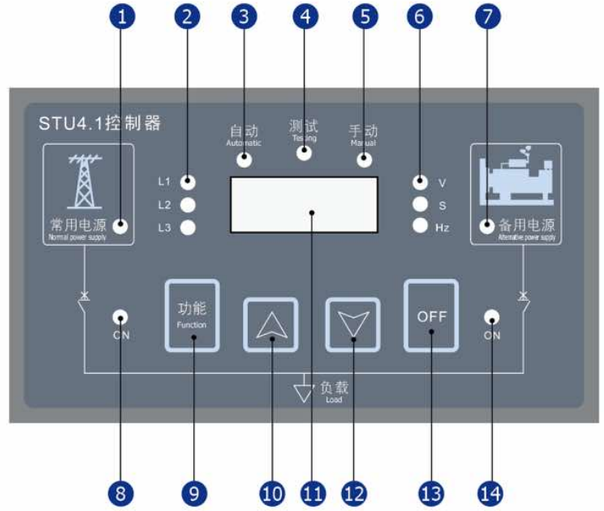
- 智能控制器采用单片机控制，硬件简洁，功能强大，扩展方便，可靠性高；
- 具有过压、欠压、缺相自动切换与智能报警功能；
- 保护参数可在外部自由设定；
- 具有电机智能保护功能；
- 具有消防联动功能；
- 具有通讯功能，配备计算机连网接口，可实现遥控、遥调、遥信、遥测等四遥功能。

- Intelligent controller adopting SCM (single chip microcomputer) control, with simple hardware, powerful functions, high reliability and expandability;
- Over-voltage, under-voltage, and phase failure automatic transfer and intelligent alarm;
- Protection parameters set externally and freely;
- Motor/generator intelligent protection;
- Fire-control linkage;
- Communicatable, and equipped with the computer networking interface to achieve "Four remote" (remote control, remote adjustment, remote communication, and remote measurement).

型号 Model	STU4.1（数码显示 digital display）	STU4.2（液晶显示 LCD）	分体式控制器 Split-type controller
			
电网-发电机 Grid-generator	√	√	
电网-电网自投自复 Grid-grid automatic charge and automatic recovery	√	√	
电网-电网自投不自复 Grid-grid automatic charge, but non-automatic recovery	√	√	
欠压转换可调 Under-voltage switching (adjustable)	√	√	
过压转换可调 Over-voltage switching (adjustable)	√	√	
转换延时（常用→备用） Switching delay (normal →alternative)	√	—	
转换延时（备用→常用） Switching delay (alternative →normal)	√	—	
常用断开延时 Normal-open delay	—	√	与STU4.1、STU4.2配套使用 Matching with STU4.1/ STU4.2 controller
返回断开延时 Returning-to-open delay	—	√	
备用断开延时 Alternative-open delay	—	√	
确认正常延时 Normal-confirming delay	—	√	
发电机控制 Generator control	√	√	
消防联动 Fire-control linkage	√	√	
合闸、分闸、双分指示 Indicator of closing, open, double-open	√	√	
故障脱扣指示 Fault tripping indicator	√	√	
外接指示信号端子 External indicating signal terminal	√	√	
通讯 Communication	可选 Optional	可选 Optional	
安装方式 Installation method	转换开关主体 ATSE body	转换开关主体 ATSE body	开关柜面板 Panel

注：分体式控制器为一个外接的显示模块，用长度为1.5m 的电缆与转换开关主体上的控制相连接。
Note: Split-type controller, an external display module, is connected to the ATSE controller by using a 1.5 m long cable.

控制器面板说明（STU4.1）
Descriptions of controller panel (STU4.1)



1. 常用电源正常指示
   Indicator for the normal state of the normal power supply
2. 相位指示
   Phase-position indicator
3. 自动工作状态指示
   Indicator for automatic working state
4. 测试状态指示
   Indicator for testing state
5. 手动工作状态指示
   Indicator for manual working state
6. 单位指示
   Unit indicator
7. 备用电源正常指示
   Indicator for the normal state of the alternative power supply
8. 常用电源投入指示
   Indicator for the service of the normal power supply
9. 功能按键
   "Function" button
10. 向上按键
    "↑(Up)" button
11. 数码管显示屏
    Digital display screen
12. 向下按键
    "↓(Down)" button
13. OFF按键
    "OFF" button
14. 备用电源投入指示
    Indicator for the service of the alternative power supply

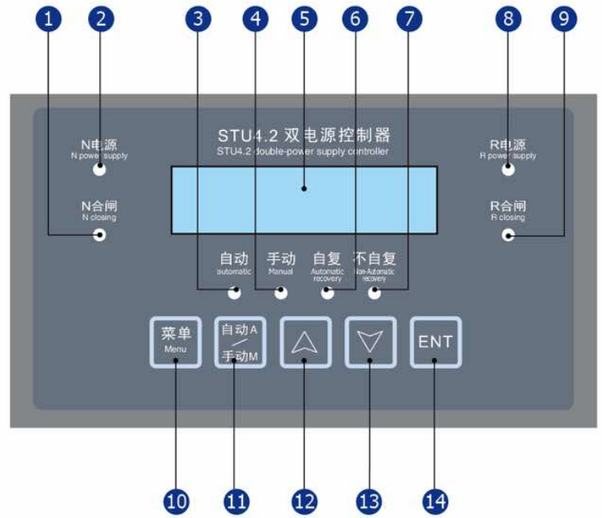
控制器 Controller

指示灯 Indicator		状态 Status	含义 Meaning
常用电源正常指示 Indicator for the normal power supply ①		亮 ON	常用电源各相电压都在控制器所设定电压范围内 Each-phase voltage of normal power supply is within the range of set voltage of the controller
相位指示 Phase-position Indicator ②	L1	亮 ON	数码显示框内显示的数据是A 相的数据 A-phase data is displayed in the digital display box
	L2	亮 ON	数码显示框内显示的数据是B 相的数据 B-phase data is displayed in the digital display box
	L3	亮 ON	数码显示框内显示的数据是C 相的数据 C-phase one data is displayed in the digital display box
自动工作状态指示 Indicator for automatic working state ③		亮 ON	自动转换开关电器处于自动工作状态 ATSE is in the automatic working state
测试状态指示 Indicator for testing state ④		亮 ON	自动转换开关电器处于测试状态 ATSE is in the testing state
手动工作状态指示 Indicator for manual working state ⑤		亮 ON	自动转换开关电器处于手动工作状态 ATSE is in the manual working state
指示灯 Indicator ⑥	V	亮 ON	数码显示框显示的数据为电压，单位V The voltage data is displayed in the digital display box (V)
	s	亮 ON	数码显示框显示的数据为时间，单位s The time data is displayed in the digital display box (s)
	Hz	亮 ON	数码显示框显示的数据为频率，单位Hz The frequency data is displayed in the digital display box (Hz)
备用电源正常指示 Indicator for the normal state of the alternative power supply ⑦		亮 ON	备用电源各相电压都在控制器所设定电压范围内 Each-phase voltage of alternative power supply is within the range of set voltage of the controller
常用电源投入指示 Indicator for service of the normal power supply ⑧		亮 ON	常用电源断路器闭合 The normal power supply circuit breaker is closed
备用电源投入指示 Indicator for service of the alternative power supply ⑭		亮 ON	备用电源断路器闭合 The alternative power supply circuit breaker is closed

按键 button		作用 Functions
功能	⑨	切换工作模式（自动和手动之间的转换） Change the working mode (between "Automatic" and "Manual")
		参数设置时，退出参数设置 Exit "Parameter settings" when setting the parameters.
△	⑩	“手动”模式时，合常用侧断路器 In the "Manual" mode, the circuit breaker at normal side is closed
		参数设置时，增加数值 When setting the parameters, increase the numerical value.
		参数设置时，移动到上一参数 When setting the parameters, move to the previous parameter.
▽	⑫	“手动”模式时，合备用侧断路器 In the "Manual" mode, the circuit breaker at alternative side is closed.
		参数设置时，减小数值 When setting the parameters, decrease the numerical value.
		参数设置时，移动到下一参数 When setting the parameters, move to the next parameter.
OFF	⑬	“手动”模式时，转到双分位置 In the "Manual" mode, switch to the positions of "Double-open".
		长按3s进入参数设置界面 Long-press for 3s to enter the interface of "Parameter settings"
		参数设置时，保存设置的参数 When setting the parameters, save the set parameters

控制器面板说明（STU4.2）

Descriptions of controller panel (STU4.2)



1. 常用电源投入指示
   Indicator for the service of the normal power supply
2. 常用电源正常指示
   Indicator for the normal state of the normal power supply
3. 自动状态指示
   Indicator for automatic state
4. 手动状态指示
   Indicator for manual state
5. 液晶显示窗口
   LCD window
6. 自投自复模式指示
   Indicator of "Automatic charge and automatic recovery" mode
7. 自投不自复模式指示
   Indicator of "Automatic charge, but none-automatic recovery" mode
8. 备用电源正常指示
   Indicator for the normal state of the alternative power supply
9. 备用电源投入指示
   Indicator for the service of the alternative power supply
10. 菜单按键
    "Menu" button
11. 工作方式切换按键
    Working mode switching button
12. 向上按键
    "↑(Up)" button
13. 向下按键
    "↓(Down)" button
14. ENT 按键
    "ENT" button

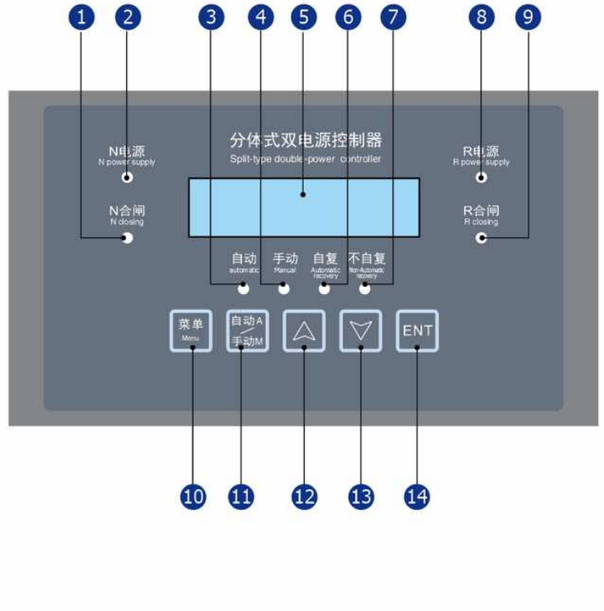
控制器 Controller

指示灯 Indicator		状态 Status	含义 Meaning
常用电源投入指示 Indicator for the service of the normal power supply	1	亮 ON	常用电源断路器闭合 The normal power supply circuit breaker is closed
常用电源正常指示 Indicator for the normal state of the normal power supply.	2	亮 ON	常用电源各相电压都在控制器所设定电压范围内 Each-phase voltage of normal power supply is within the range of set voltage of the controller
自动工作状态指示 Indicator for automatic working state	3	亮 ON	自动转换开关电器处于自动工作状态 ATSE is in the automatic working state.
手动工作状态指示 Indicator for manual working state	4	亮 ON	自动转换开关电器处于手动工作状态 ATSE is in the manual working state
自投自复模式指示 Indicator of "Automatic charge and automatic recovery" mode	6	亮 ON	工作模式为自投自复 The working mode is "Automatic charge and automatic recovery"
自投不自复模式指示 Indicator of "Automatic charge, but none-automatic recovery" mode	7	亮 ON	工作模式为自投不自复 The working mode is "Automatic charge, but none-automatic recovery"
自投自复模式指示 Indicator of "Automatic charge and automatic recovery" mode	6	不亮 Off	工作模式为电网-发电机 The working mode is "Grid-generator"
自投不自复模式指示 Indicator of "Automatic charge, but none-automatic recovery" mode	7		
备用电源正常指示 Indicator for the normal state of the alternative power supply	8	亮 ON	备用电源各相电压都在控制器所设定电压范围内 Each-phase voltage of alternative power supply is within the range of set voltage of the controller
备用电源投入指示 Indicator for the service of the alternative power supply	9	亮 ON	备用电源断路器闭合 The alternative power supply circuit breaker is closed

按键 button		作用 Functions
菜单	10	长按3s进入参数设置界面 Long-press for 3s to enter the interface of "Parameter settings"
自动/手动	11	切换工作模式（自动和手动之间的转换） Change the working mode (between "Automatic" and "Manual")
		参数设置时，退出 Exit when setting the parameters
△	12	“手动”模式时，合常用侧断路器 In the "Manual" mode, the circuit breaker at normal side is closed
		参数设置时，移动数位 When setting the parameters, move the numerical digit
		参数设置时，移动到上一参数 When setting the parameters, move to the previous parameter.
▽	13	“手动”模式时，合备用侧断路器 In the "Manual" mode, the circuit breaker at alternative side is closed.
		参数设置时，改变数值 When setting the parameters, change the value
		参数设置时，移动到下一参数 When setting the parameters, move to the next parameter
ENT	14	“手动”模式时，转到双分位置 In the "Manual" mode, switch to the positions of "Double-open"
		确认密码 Confirm the password
		参数设置时，保存设置的参数 When setting the parameters, save the set parameters

控制器面板说明（分体式）

Description of controller panel (split-type)



1. 常用电源投入指示
   Indicator for the service of the normal power supply
2. 常用电源正常指示
   Indicator for the normal state of the normal power supply
3. 自动状态指示
   Indicator for automatic state
4. 手动状态指示
   Indicator for manual state
5. 液晶显示窗口
   LCD window
6. 自投自复模式指示
   Indicator of "Automatic charge and automatic recovery" mode
7. 自投不自复模式指示
   Indicator of "Automatic charge, but none-automatic recovery" mode
8. 备用电源正常指示
   Indicator for the normal state of the alternative power supply
9. 备用电源投入指示
   Indicator for the service of the alternative power supply
10. 菜单按键
    "Menu" button
11. 工作方式切换按键
    Working mode switching button
12. 向上按键
    "↑(Up)" button
13. 向下按键
    "↓(Down)" button
14. ENT按键
    "ENT" button

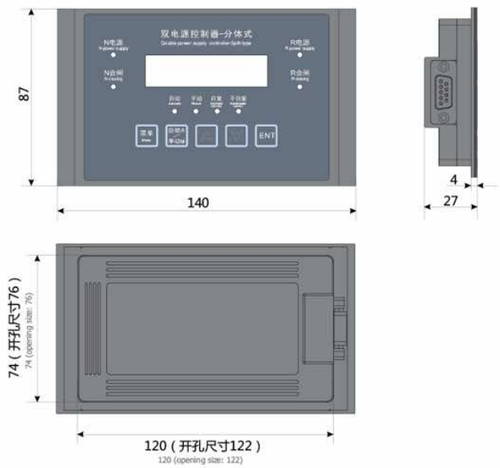
控制器 Controller

指示灯 Indicator		状态 Status	含义 Meaning
常用电源投入指示 Indicator for the service of the normal power supply	1	亮 ON	常用电源断路器闭合 The normal power supply circuit breaker is closed
常用电源正常指示 Indicator for the normal state of the normal power supply.	2	亮 ON	常用电源各相电压都在控制器所设定电压范围内 Each-phase voltage of normal power supply is within the range of set voltage of the controller
自动工作状态指示 Indicator for automatic working state	3	亮 ON	自动转换开关电器处于自动工作状态 ATSE is in the automatic working state.
手动工作状态指示 Indicator for manual working state	4	亮 ON	自动转换开关电器处于手动工作状态 ATSE is in the manual working state
自投自复模式指示 Indicator of "Automatic charge and automatic recovery" mode	6	亮 ON	工作模式为电网-电网自投自复 The working mode is grid-grid automatic charge and automatic recovery one
自投不自复模式指示 Indicator of "Automatic charge, but none-automatic recovery" mode	7	亮 ON	工作模式为电网-电网自投不自复 The working mode is grid-grid automatic charge, but non-automatic recovery one
自投自复模式指示 Indicator of "Automatic charge and automatic recovery" mode	6	不亮 Off	工作模式为电网-发电机 The working mode is "Grid-generator"
自投不自复模式指示 Indicator of "Automatic charge, but none-automatic recovery" mode	7		
备用电源正常指示 Indicator for the normal state of the alternative power supply	8	亮 ON	备用电源各相电压都在控制器所设定电压范围内 Each-phase voltage of alternative power supply is within the range of set voltage of the controller
备用电源投入指示 Indicator for the service of the alternative power supply	9	亮 ON	备用电源断路器闭合 The alternative power supply circuit breaker is closed

按键 button		作用 Functions
菜单 Menu	10	“正常显示-查询菜单-参数设定菜单”循环选择 Cycle selection of "Normal display-'Query' menu- 'Parameter settings' menu"
自动A 手动M	11	切换工作模式（自动和手动之间的转换） Change the working mode (between "Automatic" and "Manual")
		参数设置时，退出 Exit when setting the parameters
△	12	“手动”模式时，合常用侧断路器 In the "Manual" mode, the circuit breaker at normal side is closed
		参数设置时，移动数位 When setting the parameters, move the numerical digit
		参数设置时，移动到上一参数 When setting the parameters, move to the previous parameter
▽	13	“手动”模式时，合备用侧断路器 In the "Manual" mode, the circuit breaker at alternative side is closed.
		参数设置时，改变数值 When setting the parameters, change the value
		参数设置时，移动到下一参数 When setting the parameters, move to the next parameter
ENT	14	“手动”模式时，转到双分位置 In the "Manual" mode, switch to the positions of "Double-open"
		参数设置时，保存设置的参数 When setting the parameters, save the set parameters

分体式控制器外形及开孔尺寸

Appearance and opening size of split-type controller



控制器参数

Controller parameters

控制器 Controller / 型 号 Model		STU4.1	STU4.2
安装方式 Installation method		一体式、分体式 Integral- and split-type	一体式、分体式 Integral- and split-type
动作电压（V） Integral- and split-type	欠压值 Under-voltage value	145V～210V（步长1V） 145V-210V (step:1V)	145V～210V（步长1V） 145V-210V (step:1V)
	过压值 Over-voltage value	230V～300V（步长1V） 230V～300V (step:1V)	230V～300V（步长1V） 230V～300V (step:1V)
	欠压返回值 Under-voltage return value	欠电压 +10V Under-voltage +10V	欠电压 +10V Under-voltage+10V
	过压返回值 Over-voltage return value	过电压 -10V Over-voltage -10V	过电压 -10V Over-voltage-10V
延时时间（s） Delay time (s)	常用→备用延时 t_H(s) Normal →alternative delay	0.5 ～ 90（步长0.1s） 0.5 – 90 (step: 0.1s)	—
	备用→常用延时 t_R(s) Alternative →normal delay	0.5 ～ 90（步长0.1s） 0.5 – 90 (step: 0.1s)	—
	开关转换延时 t_1(s) On-off transfer delay	—	0.0～999.9
	开关返回延时 t_2(s) On-off return delay	—	0.0～999.9
	投入延时 t_3(s) Input delay	—	0.0～999.9
	确认正常延时 t_4(s) Normal–confirming delay	1.0 ～ 50（步长1.0s） 1.0 – 50 (step: 1.0 s)	0.0～999.9
	发电机启动延时 t_5(s) Generator start-up delay	1.0 ～ 50（步长1.0s） 1.0 – 50 (step: 1.0 s)	t_1

控制器参数默认设置

Default parameter settings for controller

参数 Parameters / 型 号 Model	STU4.1（一体式、分体式） STU4.1 (integral-and split-type)	STU4.2（一体式、分体式） STU4.2 (integral-and split-type)
常用电源欠压值 Under-voltage value of normal power supply	160V	160V
常用电源过压值 Over-voltage value of normal power supply	270V	270V
备用电源欠压值 Under-voltage value of alternative power supply	160V	160V
备用电源过压值 Over-voltage value of alternative power supply	270V	270V
常用→备用延时 Normal → alternative delay	0.5s	—
备用→常用延时 Alternative →normal delay	0.5s	—
开关转换延时 On-off switching delay	—	0.5s
开关返回延时 On-off return delay	—	0.5s
投入延时 Input delay	—	0.5s
发电机启动延时 Generator start-up delay	5s	5s
发电机停机延时 Generator shut-down delay	10s	10s
欠压返回值 Under-voltage return value	欠压值+10V Under-voltage+10V	欠压值+10V Under-voltage+10V
过压返回值 Over-voltage return value	过压值-10V Over-voltage-10V	过压值-10V Over-voltage-10V
工作模式 Working mode	电网-电网 自投自复 Grid-grid automatic charge and automatic recovery	电网-电网 自投自复 Grid-grid automatic charge and automatic recovery
消防联动 Fire-control linkage	ON	ON
波特率 Baud rate	9.6	9.6
通讯地址 Communication address	1	1
用户密码 User password	—	0000

STU4.1工作模式

Working mode of STU4.1 controller

自投自复（电网-电网） Automatic charge and automatic recovery (grid-grid)		
常用电源N Normal power supply N	备用电源R Alternative power supply R	工作状态 Working state
正常 Normal	正常 Normal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
正常 Normal	异常 Abnormal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
异常 Abnormal	正常 Normal	经 常用→备用延时 后 Q_N 分，Q_R 合，备用电源 R 供电 After the normal → alternative delay , Q_N: open, and Q_R: closed; the power is supplied by the alternative power supply R
恢复正常 Return to normal	正常 Normal	经 备用→常用延时 后 Q_R 分，Q_N 合，常用电源 N 供电 After the alternative → normal delay , Q_R: open, and Q_N: closed; the power is supplied by the normal power supply N

自投不自复（电网-电网） Automatic charge, but non- automatic recovery (grid-grid)		
常用电源N Normal power supply N	备用电源R Alternative power supply R	工作状态 Working state
正常 Normal	正常 Normal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
正常 Normal	异常 Abnormal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
异常 Abnormal	正常 Normal	经 常用→备用延时 后 Q_N 分，Q_R 合，备用电源 R 供电 After the normal → alternative delay , Q_N: open, and Q_R: closed; the power is supplied by the alternative power supply R
恢复正常 Return to normal	正常 Normal	仍以备用电源 R 供电 The power is still supplied by the alternative power supply R
正常 Normal	异常 Abnormal	经 备用→常用延时 后 Q_R 分，Q_N 合，恢复电源 N 供电 After the alternative → normal delay , Q_R: open, and Q_N: closed; the power is supplied by the normal power supply N

电网-发电机 Grid-generator		
常用电源N Normal power supply N	发电机电源G Generator power supply G	工作状态 Working state
正常 Normal	不发电 Non-power generation	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
异常 Abnormal	开始启动发电机G Start up the generator G	经 发电机启动延时 后 ，发出发电指令，发电机 G 开始启动 After the generator start-up delay , send out the generation instruction, and then start up the generator G
异常 Abnormal	发电机电压正常 The generator voltage is normal	发电机电压正常后，Q_N 分，Q_R 合，发电机 G 供电 After the generator voltage is normal, Q_N: open, and Q_R: closed; the power is supplied by the generator G
恢复正常 Return to normal	正常 Normal	经 备用→常用 后 Q_R 分，Q_N 合，常用电源 N 供电 After the alternative → normal delay , Q_R: open, and Q_N: closed; the power is supplied by the normal power supply N
正常 Normal	停止发电 Shut down the generator	经 发电机停机延时 后 ，发出发电机停止发电指令 After the generator shut-down delay , send out the generation outage instruction

注：控制器显示的电压为相电压有效值。

Note: The voltage displayed on the controller is the effective value of phase voltage.

STU4.2工作模式

Working mode of STU4.2 controller

电网 - 电网自投自复 Grid-grid automatic charge and automatic recovery		
常用电源N Normal power supply N	备用电源R Alternative power supply R	工作状态 Working state
正常 Normal	正常 Normal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
正常 Normal	异常 Abnormal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
异常 Abnormal	正常 Normal	经 开关转换延时 后， Q_N 分，经 投入延时 后，Q_R 合，备用电源 R 供电 After the On-off switching delay , Q_N: open, and after the input delay , Q_R : closed; the power is supplied by the alternative power supply R
恢复正常 Return to normal	正常 Normal	经 开关返回延时 后， Q_R 分，经 投入延时 后，Q_N 合，备用电源 N 供电 After the On-off return delay , Q_R: open, and after the input delay , Q_N : closed; the power is supplied by the normal power supply N

电网 - 电网自投不自复 Grid-grid automatic charge, but non-automatic recovery		
常用电源N Normal power supply N	备用电源R Alternative power supply R	工作状态 Working state
正常 Normal	正常 Normal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
正常 Normal	异常 Abnormal	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
异常 Abnormal	正常 Normal	经 开关转换延时 后， Q_N 分，经 投入延时 后，Q_R 合，备用电源 R 供电 After the On-off switching delay , Q_N: open, and after the input delay , Q_R : closed; the power is supplied by the alternative power supply R
恢复正常 Return to normal	正常 Normal	仍以备用电源 R 供电 The power is still supplied by the alternative power supply R
正常 Normal	异常 Abnormal	经 开关返回延时 后， Q_R 分，经 投入延时 后，Q_N 合，备用电源 N 供电 After the On-off return delay , Q_R: open, and after the input delay , Q_N : closed; the power is supplied by the normal power supply N

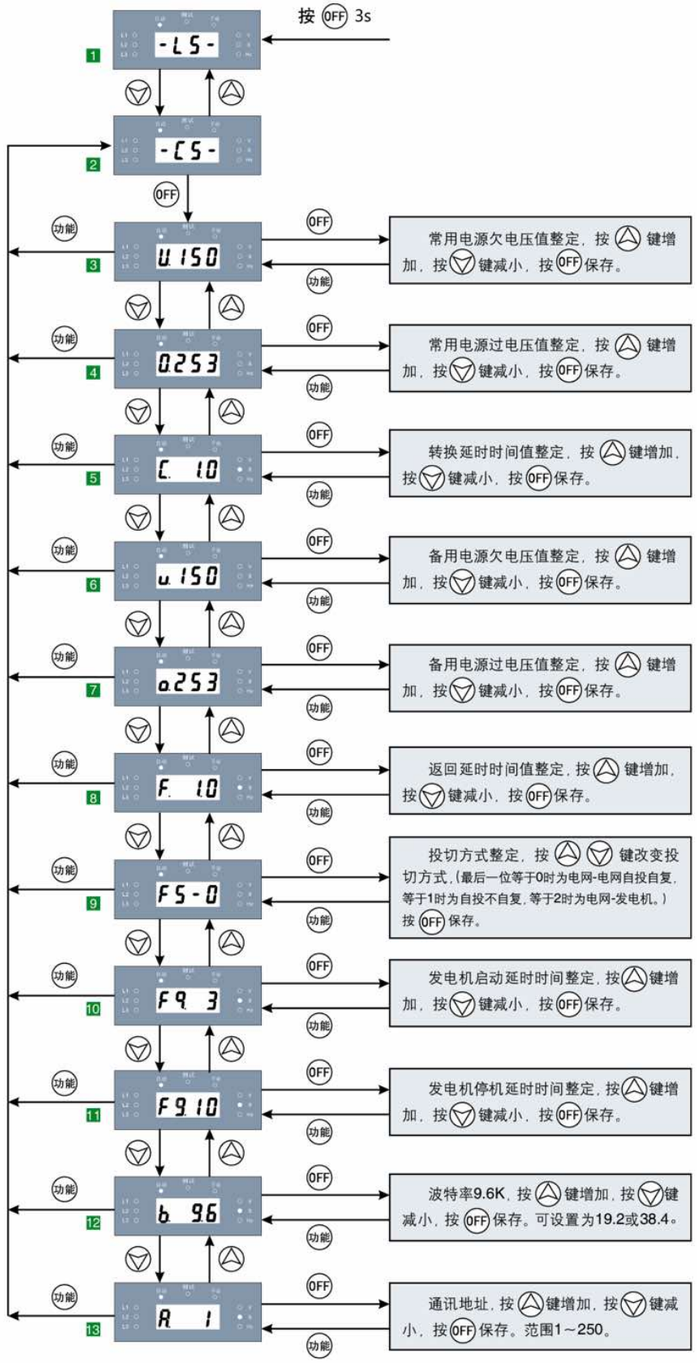
电网-发电机 Grid-generator		
常用电源N Normal power supply N	发电机电源G Generator power supply G	工作状态 Working state
正常 Normal	不发电 Non-power generation	常用电源 N 供电，Q_N 合，Q_R 分 The power is supplied by the normal power supply N; Q_N: closed , and Q_R: open
异常 Abnormal	开始启动发电机G Start up the generator G	经 发电机启动延时 后 ，发出发电指令，发电机 G 开始启动 After the generator start-up delay , send out the generation instruction, and then start up the generator G
异常 Abnormal	发电机电压正常 The generator voltage is normal	发电机电压正常后，经 开关转换延时 后，Q_N分，经 投入延时 后，Q_R合，发电机G供电 When the generator voltage is normal, after the On-off switching delay , Q_N: open, and after the input delay , QR : closed; the power is supplied by the generator G
恢复正常 Return to normal	正常 Normal	经 开关返回延时 后， Q_R 分，经 投入延时 后，Q_N 合，常用电源 N 供电 After the On-off return delay , Q_R: open, and after the input delay , Q_N: closed; the power is supplied by the normal power supply N
正常 Normal	停止发电 Shut down the generator	经 发电机停机延时 后 ，发出停止发电指令 After the generator shut-down delay , send out the generation outage instruction

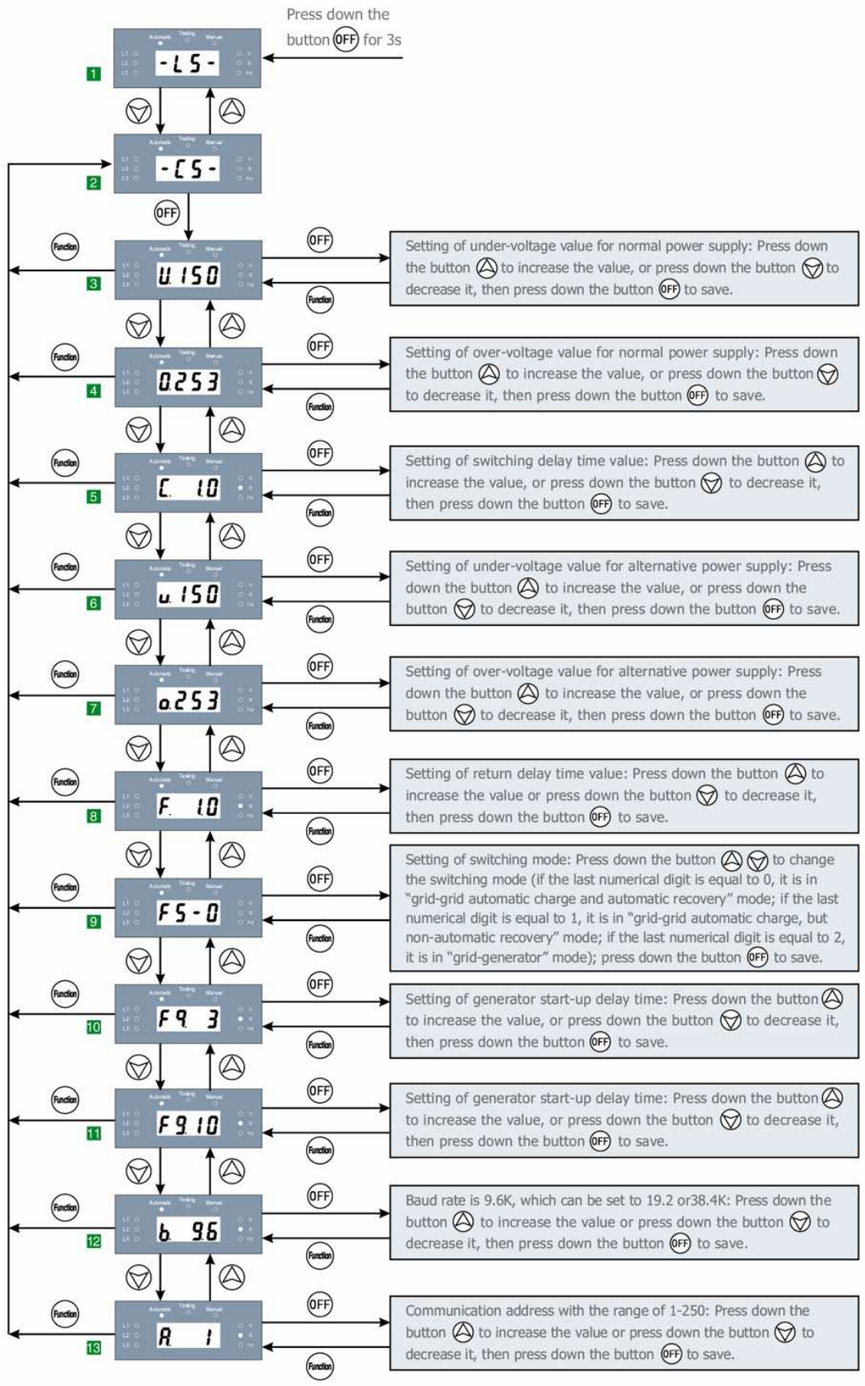
注：控制器显示的电压为相电压有效值。

Note: The voltage displayed on the controller is the effective value of phase voltage.

STU4.1参数设置

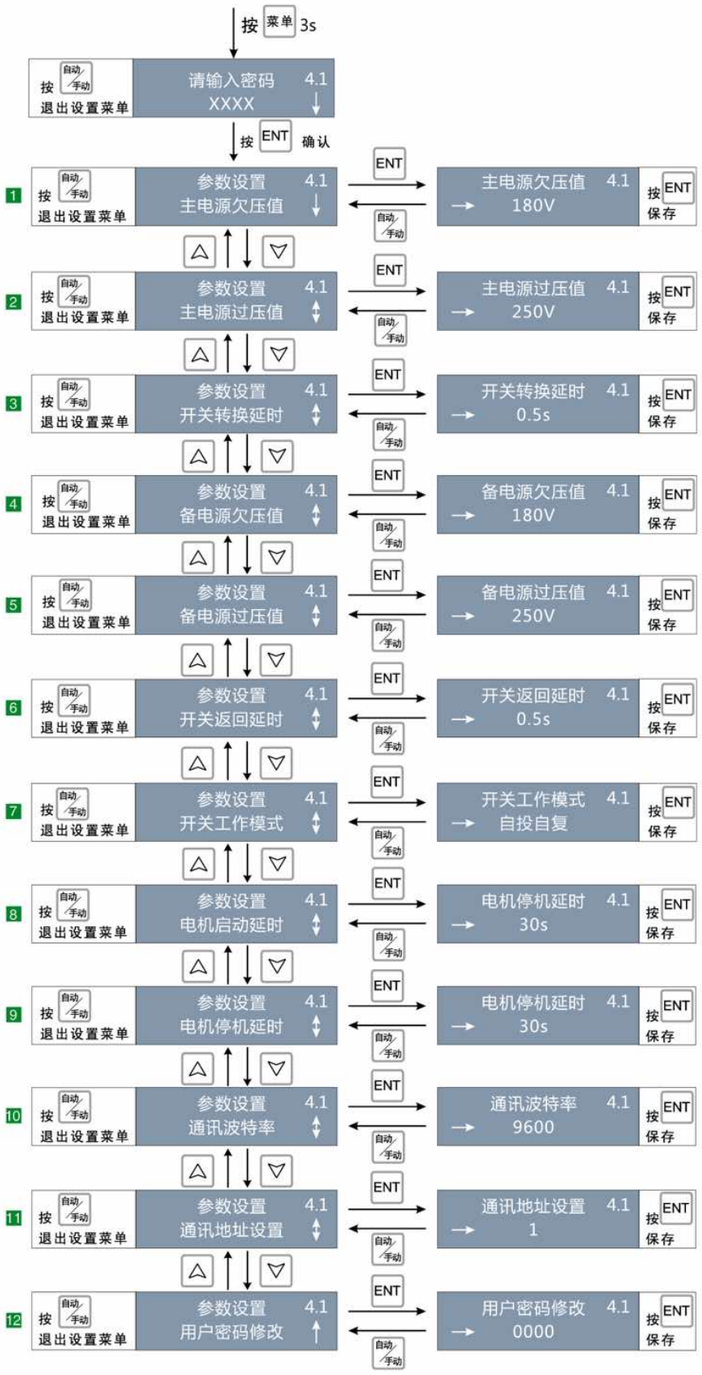
Parameter settings of STU4.1 controller

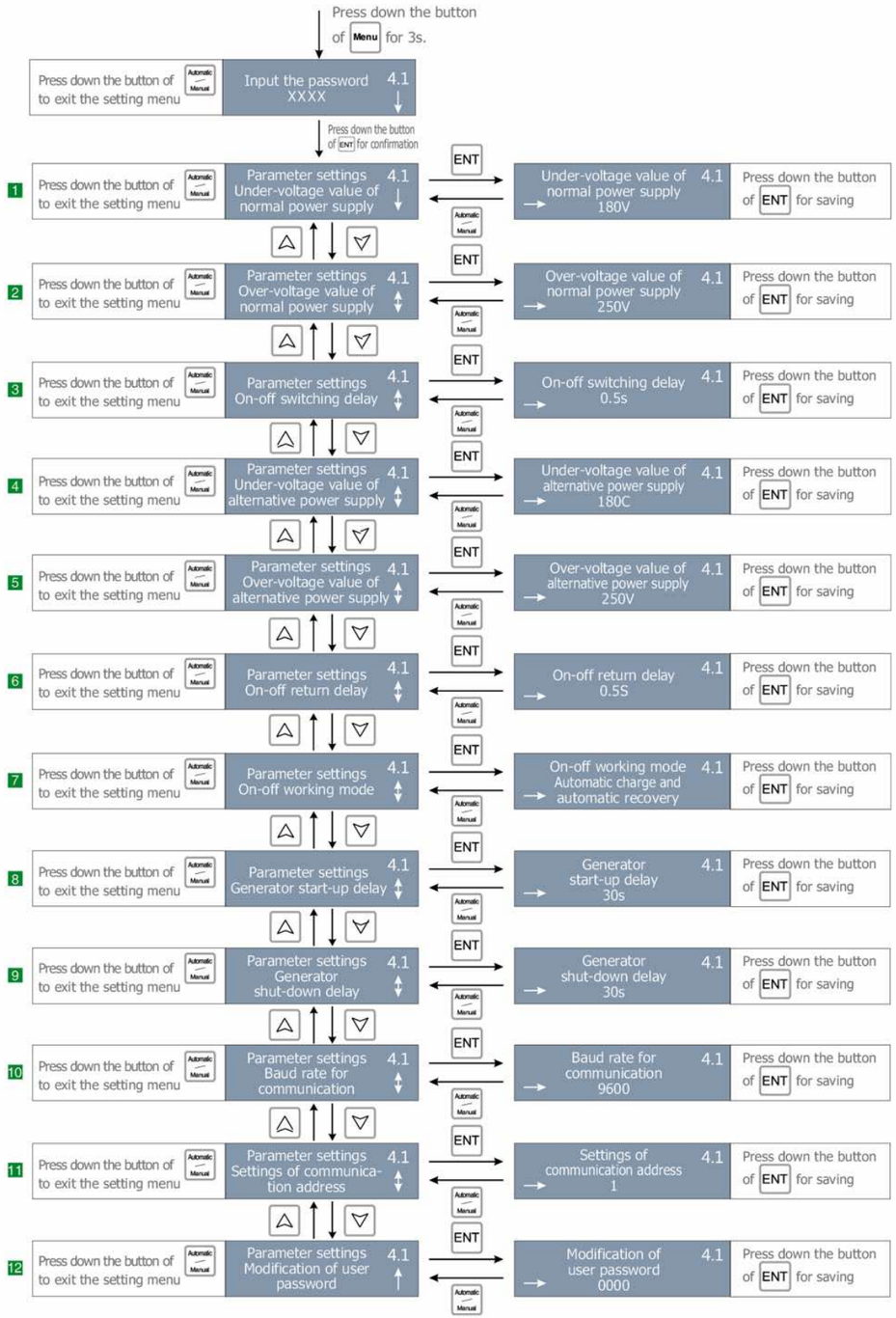




STU4.1分体式参数设置

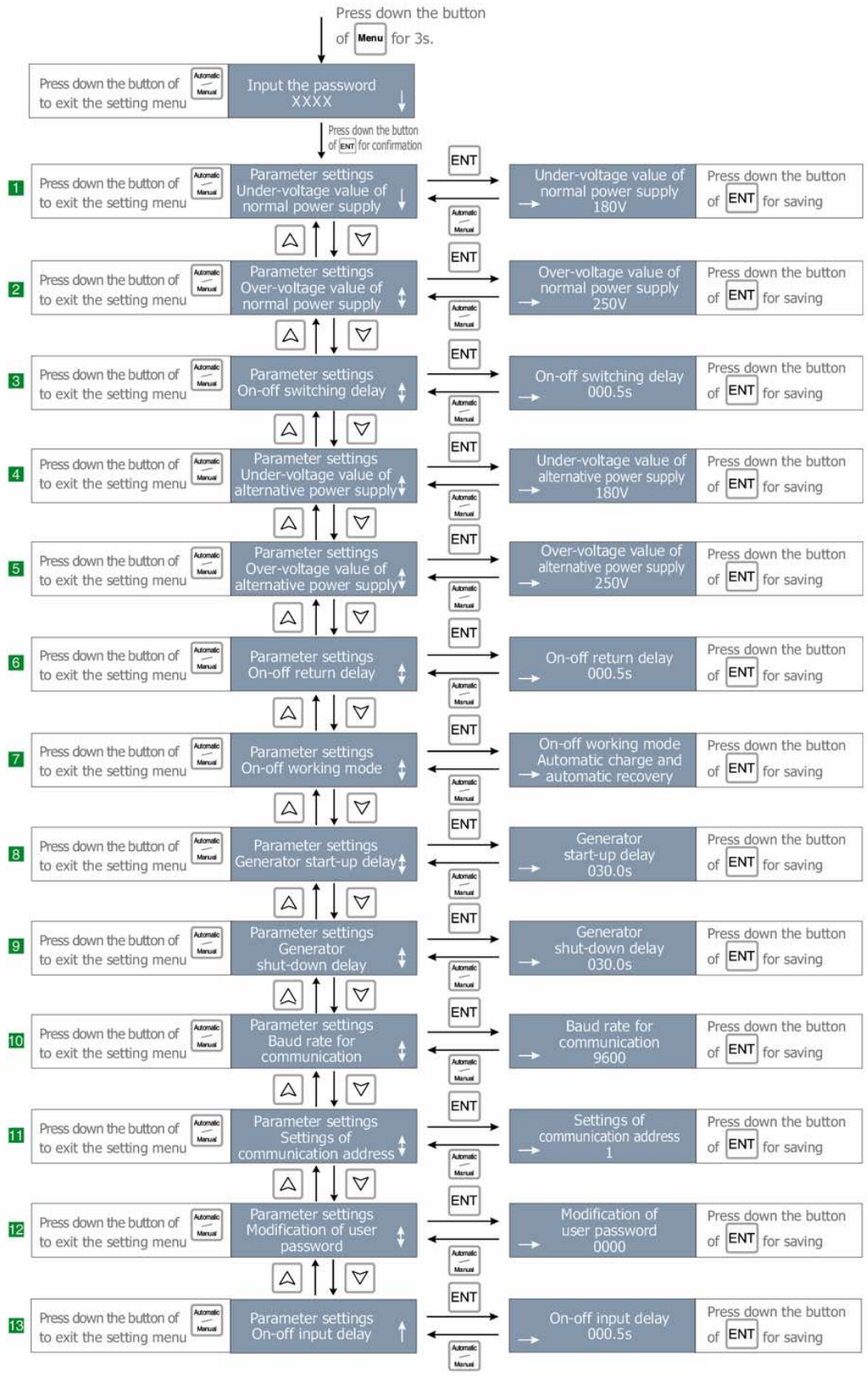
Working mode of STU4.1 controller





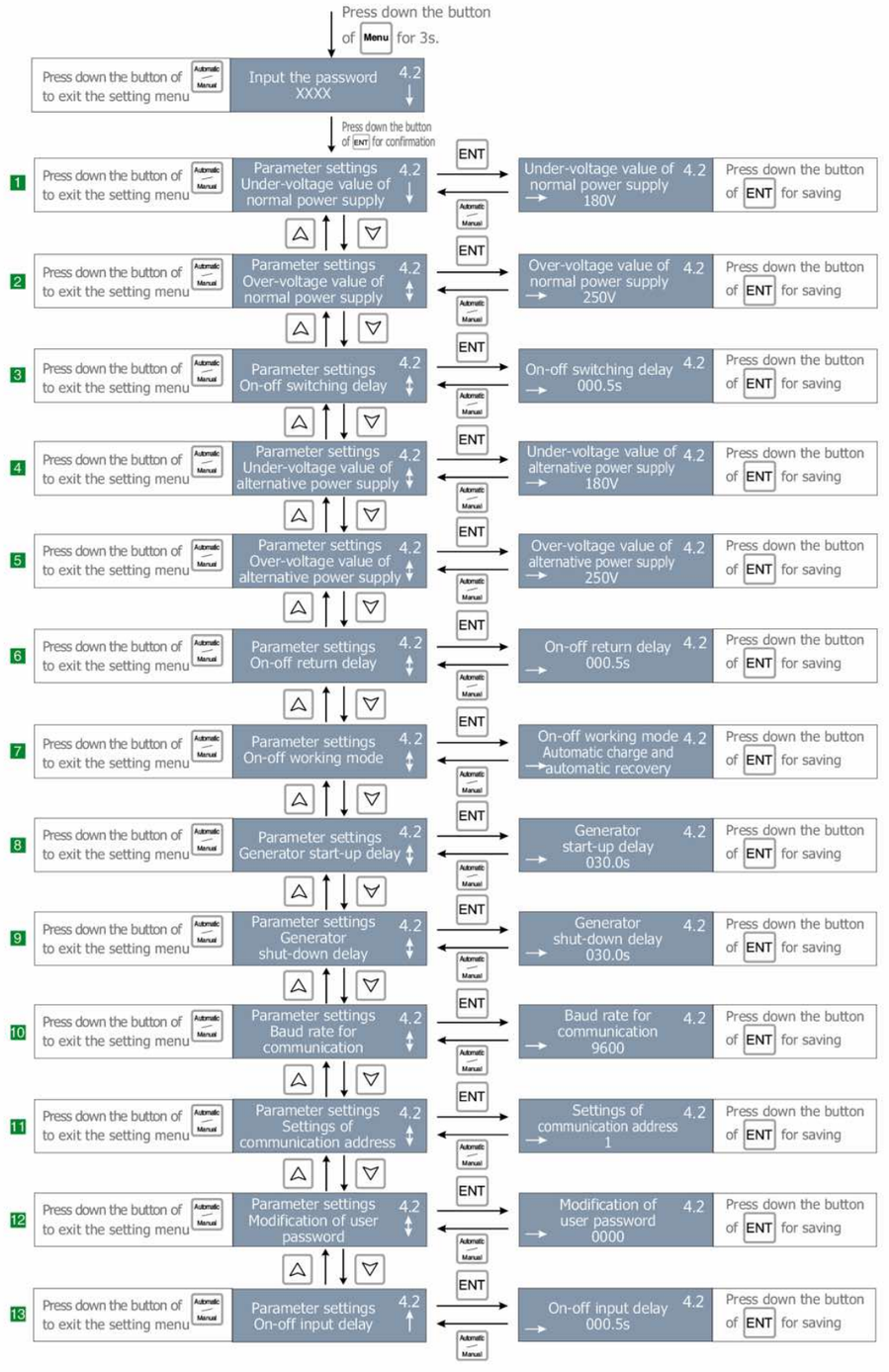
STU4.2 一体式参数设置

Parameter settings of STU4.2 controller (integral-type)

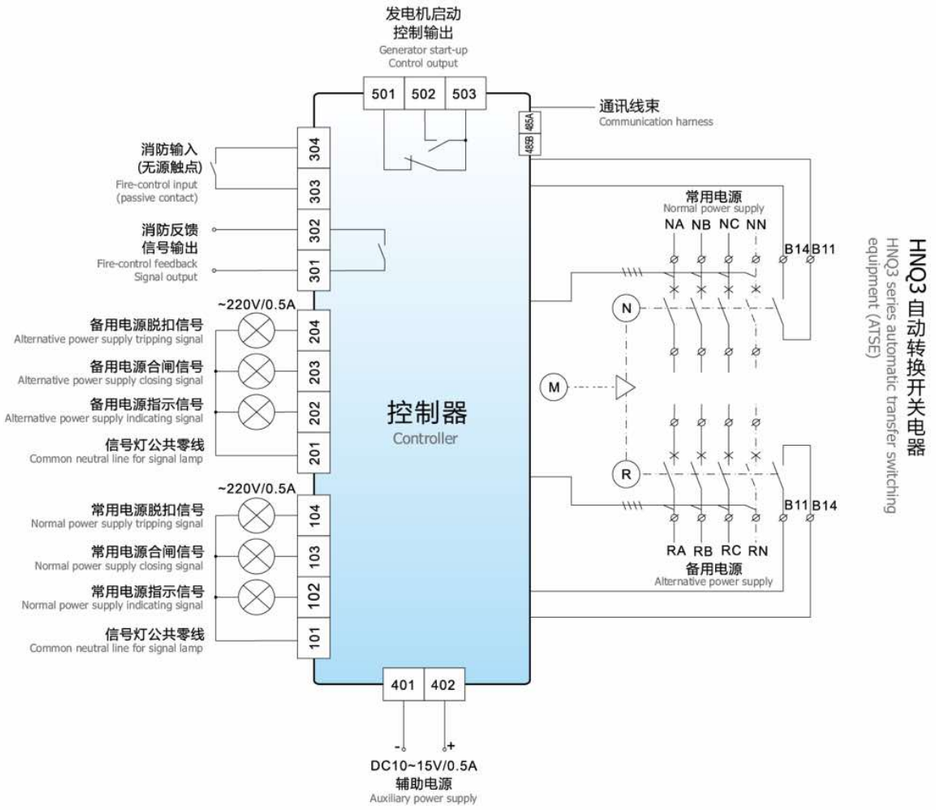


STU4.2 分体式参数设置

Parameter settings of STU4.2 controller (split-type)



电气图
Electrical diagram



①：101~104常用电源外接状态指示灯信号（有源AC220V/0.5A）。

101：信号灯公共零线；

102：常用电源指示信号输出；

103：常用电源合闸信号输出；

104：常用电源脱扣信号输出。

② 101-104: Normal power supply external status indicating signal (active, AC220V/0.5A).

101: Common neutral line for lamp

102: Normal power supply indicating signal output

103: Normal power supply closing signal output

104: Normal power supply tripping signal output

②：201~204备用电源外接状态指示灯信号（有源AC220V/0.5A）。

201：信号灯公共零线；

202：常用电源指示信号输出；

203：常用电源合闸信号输出；

204：常用电源脱扣信号输出。

② 201-204: Alternative power supply external status indicating signal (active, AC220V/0.5A).

201: Common neutral line for signal lamp

202: Normal power supply indicating signal output

203: Normal power supply closing signal output

204: Normal power supply tripping signal output

③：301～304消防联动控制端口：该端口用于在消防设备报警后远程控制本开关切断电源。

303、304：消防联动控制信号输入端、该端口外部只能接一组常开无源触点（若消防设备送出信号为有源信号时，必须先通过一个小型断电器转接后再将继电器常开触点接入控制器，否则会烧毁控制器），当外部触点闭合后控制器立即控制ATSE转换到分闸位置切断负载电源，同时通过301和302端子返回一个信号到消防控制中心。

301、302：内部为一组常开继电器干节点，用于消防动作返回信号之用；端子在正常的时候为常开，当有消防信号送入控制器且ATSE转换到分闸位置时301和302接通。

④：401～402控制器直流辅助电源输入端（DC10V～15V/0.5A）（电网-发电机模式）。

⑤：501~503发电机启动控制信号输出端。

当备用电源是自启动发电机组时，用户可通过501~503端子与发电机控制器连接后完成自动启动发电机功能，501~503内部为一组3A无源继电器干节点，503为继电器公共端，502为继电器常开点、501为常闭点。

电网-发电机工作模式，控制器自动控制：

③ 301-304: Fire-control linkage control terminals: used to cut off the power supply of this ATSE via remote control after the fire-control devices send out alarms.

303, 304: Fire-control linkage control signal input terminals: they can only be connected with one set of normally-open passive contacts externally (if the fire-control device sends out active signals, they must be transited via a miniature circuit breaker, and then connected the normally-open contact of relay to the controller; otherwise the controller will be burnout). When the external contacts are closed, the controller immediately make the ATSE transfer to the open position, and then cuts off the load power supply, meanwhile returns a signal to the fire-control center via both 301 and 302 terminals.

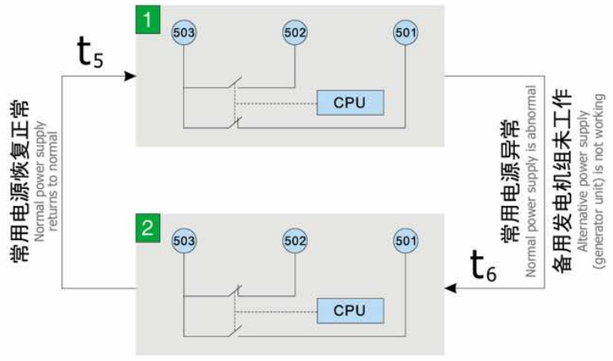
301,302: There is a set of dry contacts of normally-open relay inside, which are used for returning the signals of fire-control action. These terminals are normally open; when the fire-control signals are sent into the controller, and ATSE is transferred to the open position, both 301 and 302 are switched on.

④ 401-402: Controller DC auxiliary power supply input terminals, DC10V to 15V/0.5A ("grid–generator" mode).

⑤ 501-503: Generator start-up control signal output terminals.

When the alternative power supply is a self-starting generator unit, the users can connect the generator controller through 501-503 terminals, so as to achieve the automatically starting of the generator. There is a set of dry contacts of 3A passive relay inside 501-503 (503: common terminal of relay; 502: normally-open contact of relay; 501: normally-closed contact of relay).

In the "grid–generator" working mode, the controller implements the control automatically:



t_6发电机启动延时时间
t_6 Generator start-up delay time

t_5确认正常延时时间
t_5 Normal-confirming delay time

安装与调试
Installation and debugging

安装

一体式ATSE可按外形安装尺寸直接安装在动力控制柜内，分体式ATSE则将本体安装在柜体内，分体式控制器固定在开孔面板上，用专用电缆将本体和控制器连接，注意电缆两端的连接器必须插实扣紧。

ATSE安装完毕，用户可对其接线。

根据ATSE额定电流的大小选用合适的导线将常用电源及备用电源的断路器电源侧（上接线柱），负载侧（下接线柱）接好，并注意常用电源和备用电源相序必须一致（按A、B、C、N相序接线）。

对于三极断路器应采用截面不小于0.75mm^{2}的导线将供电电源中性线N与ATSE本体底板上的“中性线N”接线端子可靠连接，并区分常用电源与备用电源，确保不能交叉错接，否则ATSE不能正常工作；

对于四极断路器，常用电源与备用电源的N极必须分别与断路器N极正确相连；

此外，安装ATSE时应在接地标记处进行可靠接地。

调试

机械联锁的调试必须在ATSE断电的情况下进行。

ATSE采用单电机操作机构，机械联锁调试时，手动操作电动机构的手柄，使常用电源的断路器合闸，备用电源的断路器应受齿轮传动机构的限制而处于分闸状态，反之亦然，此操作机构可防止两台断路器同时合闸，但又能使两台断路器同时处于分闸位置，若操作机构动作灵活可靠，则证明该机构稳定可靠。

Installation

For integral-type ATSE, it can be installed directly in the power control cabinet in accordance with its overall and installing dimensions; for split- type ATSE, its body is installed inside the power control, and the split-type controller is fixed on the opening panel, both of which are connected by using a dedicated cable (Note: the connectors on both ends of the cable must be inserted firmly, and then fastened tightly).

After the ATSE has been installed completely, the users can connect the wiring. According to the rated current of ATSE, select a suitable cable, and then use it to connect the power supply side (upper wiring terminal) with the load side (lower wiring terminal) of normal/ alternative power supply circuit breaker properly(Note: The phase sequence of normal/ alternative power supply must be consistent (A→ B→C→N)).

For 3P circuit breaker, the wire with a cross section of no less than 0.75mm^2 shall be used to reliably connect the neutral line N of power supply to the terminal of "neutral line N" on the baseplate of ATSE; meanwhile, normal/ alternative power supply must be distinguished, so as to make sure that it cannot be wired crosswise and wrongly; otherwise, the ATSE will not work properly;

For 4P circuit breakers, its N-pole must be correctly connected with that of normal/ alternative power supply respectively;

In addition, when installing the ATSE, a reliable grounding shall be made at the position of ground mark.

Debugging

The debugging of mechanical interlocking must be carried out when cutting off the power supply of ATSE.

ATSE adopts a single-motor operating mechanism. During the debugging of mechanical interlocking, manually operate the handle of electrical operating mechanism to make the circuit breaker of normal power supply closed; at this point, the circuit breaker of alternative power supply shall be in the open state due to the restriction of the gear drive mechanism; and vice versa. This operating mechanism not only can prevent two circuit breakers from being closed at the same time, but also can make both circuit breakers in the open position simultaneously. If the operating mechanism acts flexibly and reliably, it proves that this mechanism is stable and reliable.

故障及排除方法
Fault and troubleshooting

序号 S/n	状况描述 Status description	可能采取的措施 Measures possibly taken
1	控制器完全无工作状态 The controller is completely not in operating state	① 用万用表测量常用、备用电源A 相是否有电压 Use a multimeter to measure the A-phase of normal/ alternative power supply for confirming whether there are any voltage ② 检查中性线N 是否接入，是否错接 Check whether the neutral line N is connected, and whether the neutral line N is wired wrongly
2	备用电源投入，不切换到常用电源投入 In the state of "inputting the alternative power supply", it cannot be switched to the state of "inputting the normal power supply"	① 检查控制器是否处于“自动”工作状态，面罩上的“手动/自动”选择是否为“自动” Check whether the controller is in the "automatic" working state, and whether the button of "manual / automatic" on the face cover is selected as "automatic" ② 检查控制器设定的工作模式是否为“自投自复” Check whether the set working mode of controller is "automatic charge and automatic recovery" one ③ 检查常用电源是否异常（过压、欠压、缺相【包括缺中性相N】） Check whether the normal power supply is abnormal (over-voltage, under-voltage, and phase failure【including lack of neutral phase N】) ④ 是否正在转换延时过程中 Check whether it is in the process of switching delay
3	常用电源投入，常用异常，不切换到备用电源投入 In the state of "inputting the normal power supply", the normal power supply is abnormal, and it cannot be switched to the state of "inputting the alternative power supply"	① 检查控制器是否处于“自动”工作状态，面罩上的“手动/自动”选择是否为“自动” Check whether the controller is in the "automatic" working state, and whether the button of "manual / automatic" on the face cover is selected as "automatic" ② 检查备用电源是否异常（过压、欠压、缺相【包括缺中性相N】） Check whether the alternative power supply is abnormal (over-voltage, under-voltage, and phase failure【including lack of neutral phase N】) ③ 是否正在转换延时过程中 Check whether it is in the process of switching delay
4	开关频繁转换 Frequent on-off switching	检查常用侧电网是否波动频繁 Check whether the grid on normal side fluctuates frequently ① 波动频繁可暂时设置“自投不自复”工作模式，尽量使用较为稳定的备用电源 f fluctuating frequently, the working mode of "automatic charge, but non-automatic recovery" can be temporarily set, and a more stable alternative power supply shall be used as far as possible ② 调节“转换延时时间”，延长该时间 Adjust the " switching delay time" to extend it
5	控制器“常用正常指示”或“备用正常指示”不亮 On the controller, indicator for the normal state of the normal power supply or indicator for the normal state of the alternative power supply is not ON	检查常用或备用电源是否异常（过压、欠压、缺相【包括缺中性相N】） Check whether the normal/alternative power supply is abnormal (over-voltage, under-voltage, and phase failure【including lack of neutral phase N】)
6	电网- 发电机模式，发电机启动无延时 In the "grid-generator" mode , the generator starts up without any delay	① 检查是否配置了外接直流辅助电源 Check whether any external DC auxiliary power supply is equipped ② 检查是否设置了延时时间 Check whether any delay time is set
7	电网- 发电机模式，发电机不启动 In the "grid-generator" mode , the generator doesn't start up	① 检查控制器是否设置的工作模式为“电网-发电机” Check whether the controller is set to "grid-generator" mode ② 常用电源正常，发电机不会启动 When the normal power supply is normal, the generator will not start up ③ 检查外部电路 Check the external circuit
8	开关处于双分位置不转换 When ATSE is in the "double-open" position, it cannot be transferred	① 检查控制器是否处于“自动”工作状态，面罩上的“手动/自动”选择是否为“自动” Check whether the controller is in the "automatic" working state, and whether the button of "manual / automatic" on the face cover is selected as "automatic" ② 检查是否有“消防联动”信号输入 Check whether there is any "fire-control linkage" signal input

控制器错误代码
Error code of controller

错误代码 Error code	故障现象 Symptoms	产生原因 Cause
E-1	常用电源侧的断路器脱扣 Tripping of circuit breaker at normal power supply side	先查明负载短路或过载原因并排除故障后，采用手动“控制器按键切换”或“手柄切换”方式使开关切换到双分位置，再回复原来开关转换方式后开关即能正常转换。 Ascertain the cause for short circuit or overload of the load first and after removal of the fault, adopt manual "Controller Button Switching" or "Handle Switching" mode to switch-over the ATSE to double open position, then, the normal transfer of ATSE can be conducted after returning to the original switching mode.
E-2	备用电源侧的断路器脱扣 Tripping of circuit breaker at the alternative power supply side	排除方法同E-1 The method for troubleshooting is as the same in E-1
E-3	电机或机构故障而导致切换不动作或时间过长 Failure of switching or too long switching time resulted from motor or mechanism fault	采用手动“控制器按键切换”或“手柄切换”方式检查电机或机构是否正常，控制器的保险丝是否损坏。 Adopt the manual "Controller Button Switching" or "Handle Switching" mode to check if the motor or mechanism is normal, and the fuse of controller is damaged.
E-4	机构位置检测错误引起的故障 Fault caused due to error detection of mechanism position	采用手动“控制器按键切换”或“手柄切换”方式检查是否正常。 Adopt the manual "Controller Button Switching" or "Handle Switching" mode to check if it is normal.

功率损耗（执行断路器）
Power loss (actuation circuit breaker)

自动转换开关型号 Model of ATSE	执行断路器型号 Model of actuation circuit breaker	额定电流 Rated current（A）	三相总功率损耗（W） Three-phase total power loss	
			板前、板后接线 Wiring before and after panel	插入式、板后接线 Plug-type, rear-panel wiring
HNQ3-63	HNM3-1	63	20	24
HNQ3-125	HNM3-1	125	20	24
HNQ3-160	HNM3-1	160	20	24
HNQ3-250	HNM3-2	250	35	40
HNQ3-400	HNM3-3	400	43	51
HNQ3-630	HNM3-3	630	43	51
HNQ3-800	HNM3-4	800	62	70

断路器热动脱扣器额定工作电流随环境变化的降容系数
The derating factor of the rated operating current for thermal tripper of circuit breaker that varies with the environment

降容系数 Derating factor / 环境温度 Ambient temperature / 断路器型号 Model of circuit breaker	+40℃	+45℃	+50℃	+55℃	+60℃
HNM3-1	1.0In	0.94In	0.88In	0.81In	0.74In
HNM3-2	1.0In	0.96In	0.91In	0.85In	0.78In
HNM3-3	1.0In	0.97In	0.94In	0.90In	0.86In
HNM3-4	1.0In	0.97In	0.94In	0.90In	0.86In

接线
Wiring

电源进线端应接在断路器1、3、5端子上，负载接在2、4、6端子上。连接导线截面积应符合下表的要求。

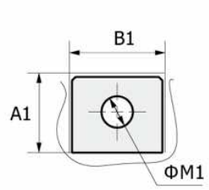
The incoming line terminal at power supply side shall be connected to the circuit breaker terminals 1, 3, 5, and loads shall be connected to terminals 2, 4, 6. Section area of the connecting wire shall conform to the requirements in the table below.

额定电流 Rated current（A）	6	10	16 20	25	32	40 50	63	80	100	125 140	160	180 200 225	250	315 350	400
铜导线截面积 The section area of copper conductor（mm^2）	1	1.5	2.5	4	6	10	16	25	35	50	70	95	120	185	240

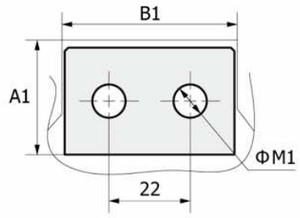
额定电流 Rated current（A）	铜导线 Copper conductor		铜排尺寸 Size of copper bar	
	根数 (s) Piece	每根截面 (mm^2) The section area of each piece	根数 (s) Piece	每根截面 (mm^2) The section area of each piece
500	2	150	2	30×5
630	2	185	2	40×5
700	2	240	2	50×5
800	2	240	2	50×5

端子部分
Terminal part

HNQ3-63～630
HNM3-1～3

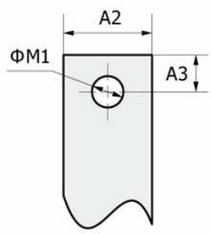


HNQ3-800
HNM3-4

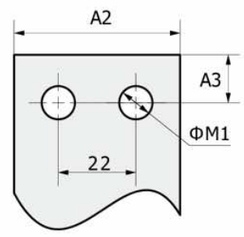


导体部分
Conductor part

HNQ3-63～630
HNM3-1～3



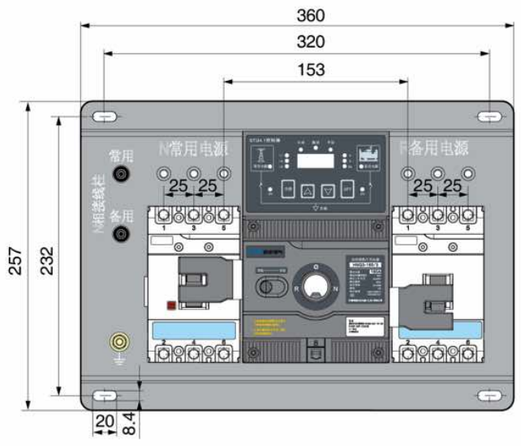
HNQ3-800
HNM3-4

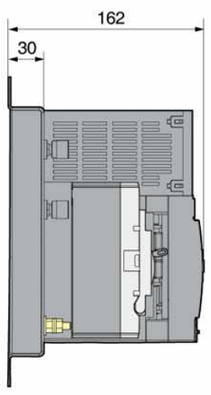


型号 Model	A1	A2	A3	B1	M1
HNM3-1	15.8	13	7	18	6.5
HNM3-2	20.5	24	10	24.5	8.5
HNM3-3	28.5	30	13	32	11
HNM3-4	29	45	13	46	9

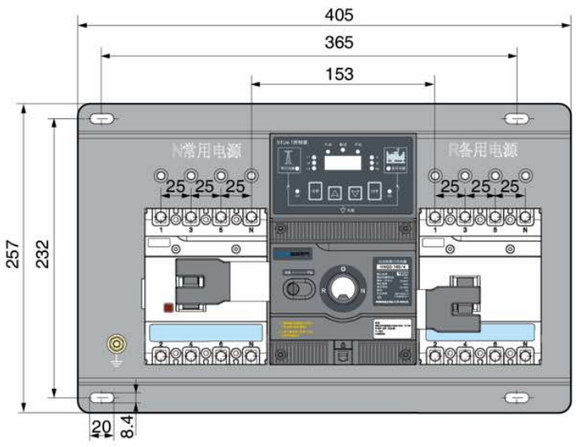
外形及安装尺寸
Overall and installing dimensions

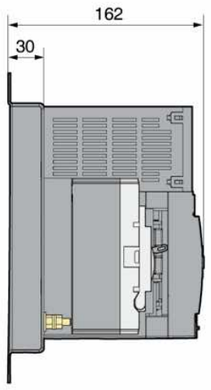
HNQ3-63/3P
HNQ3-125/3P
HNQ3-160/3P



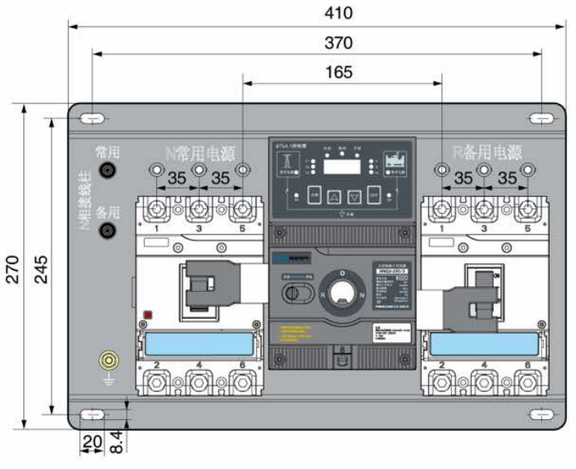


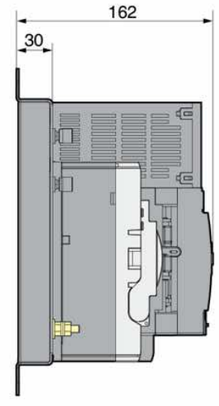
HNQ3-63/4P
HNQ3-125/4P
HNQ3-160/4P





HNQ3-250/3P





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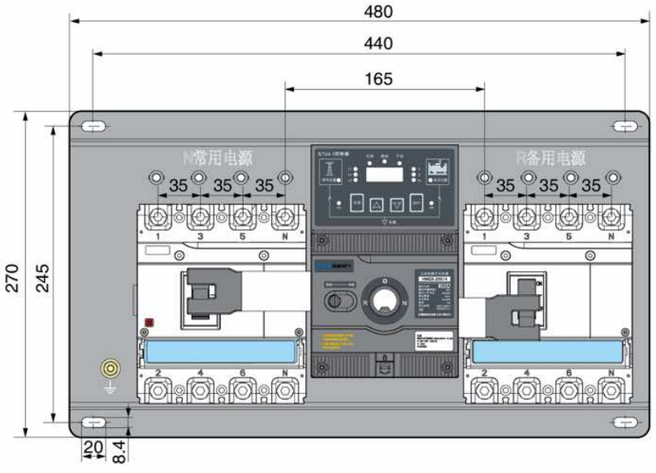
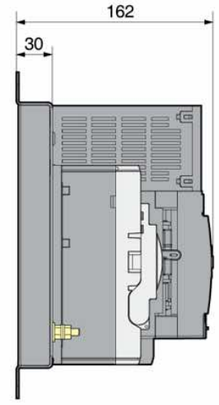
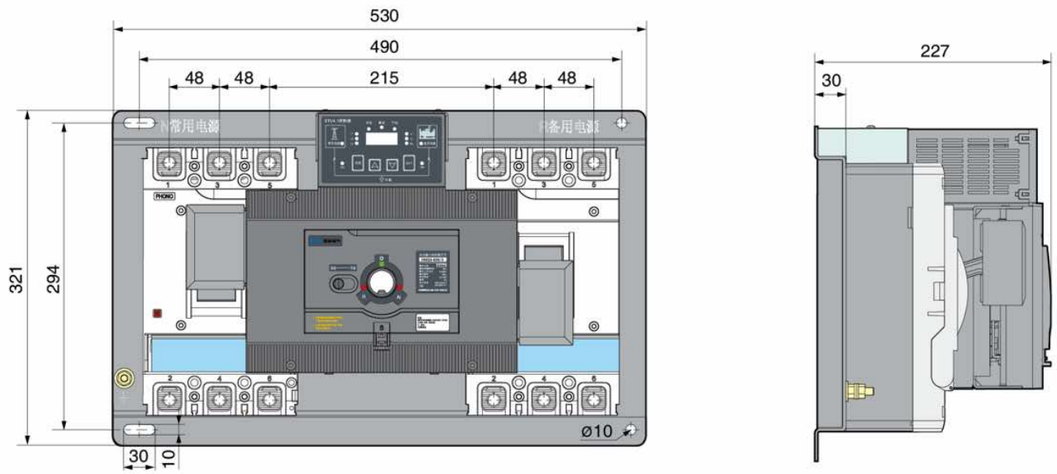


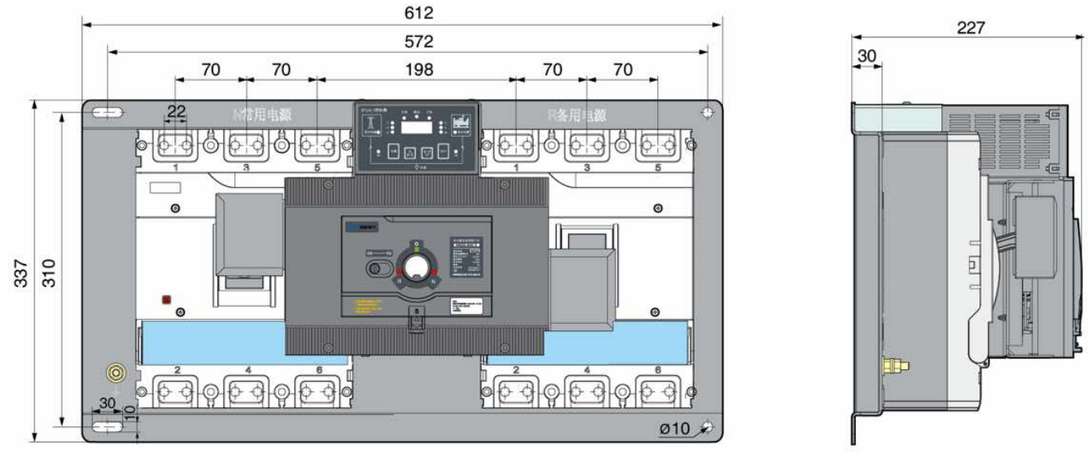


外形及安装尺寸 *Overall and installing dimensions*

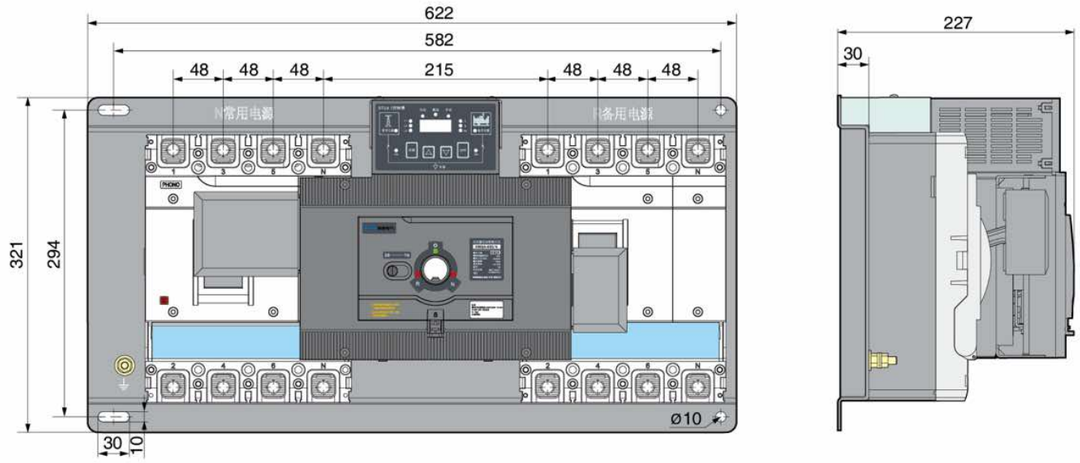
HNQ3-400/3P
HNQ3-630/3P



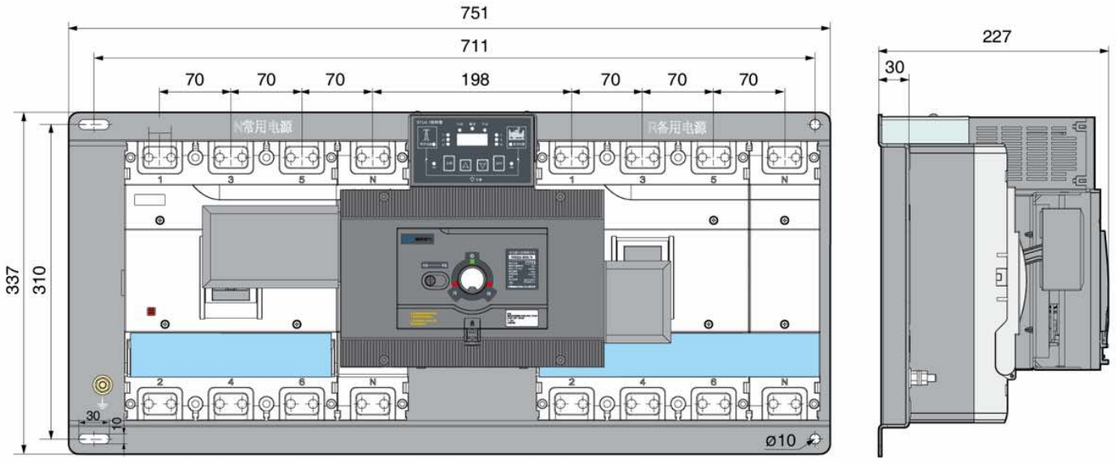
HNQ3-800/3P



HNQ3-400/4P
HNQ3-630/4P



HNQ3-800/4P

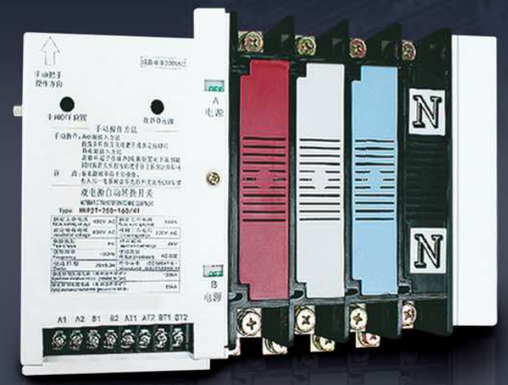


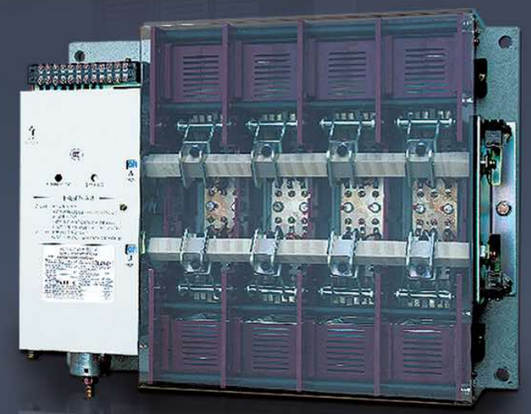
HNP3 双电源自动转换开关电器

HNP3 Series Double Power Supply Automatic Transfer Switching Equipment

- 可靠的机械联锁：独特的偏心选择结构，确保只有一组电源供电，绝无可能两组电源同时接入负载。
- 优良的灭弧性能：可靠熄灭电弧，电弧持续时间短，触头损耗小。
- 多片式主弧触头：提高触头表面接触面积及接触压力，避免产生过热或触头熔焊，延长机械寿命。
- 切换速度快捷：在常用电源和备用电源两组电源间转换迅速，配控制器的开关电器，还可以由用户设定转换延时时间。
- 结构简单体积较小：工作可靠、故障率低，安装、使用、维护方便，维修时用手柄转动缓慢操作，便于查找和排除故障。
- 分体式微处理机控制器：控制精度高，可选配通讯模块，远程监控ATS状态。

- Reliable mechanical interlocking: The unique eccentric structure that guarantees the power is supplied by only one set of power source and it is impossible that the two sets of power source are simultaneously connected to the load.
- Excellent arc-extinguishing performance: Reliable extinction of voltaic arc, with short arc duration and less loss of contact.
- Multi-piece main arc contact: Raise the contact area and contact pressure on the arc contact surface so as to avoid occurrence of overheating or puddle welding of arc contact and lengthen the mechanical life.
- Prompt switching speed: Rapid transfer between the normal power supply and alternative power supply can be realized, for the switch equipment fitted with a controller, users even can set up the switching delay time.
- Simple and compact structure: High operation reliability and low fault rate, easy to install, use and maintain. Rotating with handle for slow operation during maintenance, it will facilitate troubleshooting.
- Split-type microprocessor controller: High control precision and optional with communication module for remote monitoring of the ATS state.





HNP3双电源自动转换开关电器符合以下标准

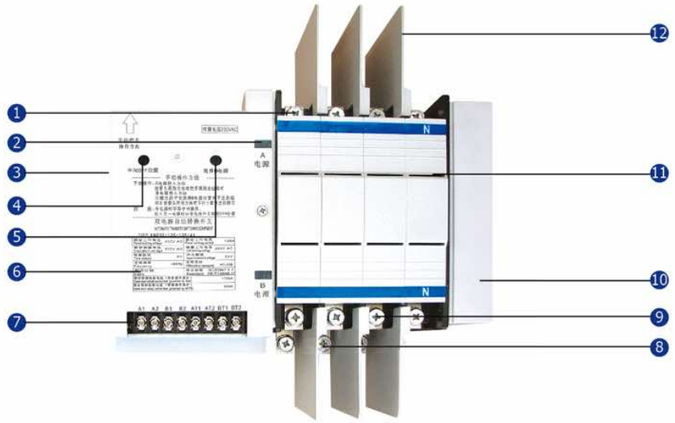
HNP3 series double power supply automatic transfer switching equipment conforms to the following standards

- IEC 60947-1：2001及GB14048.1-2006 低压开关设备和控制设备 总则
  IEC 60947-1: 2001 and GB 14048.1-2006 Low-voltage switchgear and controlgear - General rules
- IEC 60947-6-1：2005及GB14048.11-2008 低压开关设备和控制设备 自动转换开关电器
  IEC 60947-6-1: 2005 and GB 14048.11-2008 Low-voltage switchgear and controlgear - Automatic transfer switching equipment

HNP3 Automatic Transfer Switching Equipment

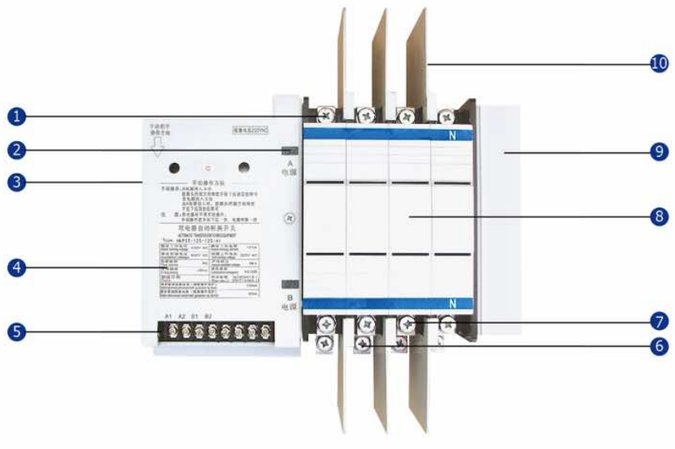
结构
Structure

HNP3S 三段式转换开关（16-2500A）
HNP3S three-station type ATSE （16-2500A）



1. A电源侧主电路端子
   Main circuit terminals at Power Supply A side
2. 电源通断指示窗
   Power On-Off indication window
3. 手动操作方轴
   Manual operation square shaft
4. 脱扣按钮
   Tripping button
5. 选择按钮
   Selector button
6. 铭牌
   Nameplate
7. 控制电源端子
   Control power supply terminal
8. 负荷侧主电路端子
   Main circuit terminal at load side
9. B电源侧主电路端子
   Main circuit terminals at Power Supply B side
10. 辅助触头罩
    Auxiliary arc contact cap
11. 灭弧盖板
    Arc extinguishing cover
12. 相间隔板
    Phase partition

HNP3T 二段式转换开关（20-500A）
HNP3T two-station type ATSE （20-500A）



1. A 电源侧主电路端子
   Main circuit terminals at Power Supply A side
2. 电源通断指示窗
   Power On-Off indication window
3. 手动操作方轴
   Manual operation square shaft
4. 铭牌
   Nameplate
5. 控制电源端子
   Control power supply terminal
6. 负荷侧主电路端子
   Main circuit terminal at load side
7. B 电源侧主电路端子
   Main circuit terminals at Power Supply B side
8. 灭弧盖板
   Arc extinguishing cover
9. 辅助触头罩
   Auxiliary arc contact cap
10. 相间隔板
    Phase partition

型号及含义
Model and its meaning

HN	P	3	S	—	125	—	100	/	4	I

公司名称 Company name	产品代号[1] Product code	设计序列号 Design serial number	段位[2] Station position	壳架电流[3] Frame size current	额定工作电流[4] Rated operating current	极数[5] Number of poles	功能号[6] Function number
伊顿辉能低压电器（江苏）有限公司 Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd.	PC级双电源自动转换开关电器 PC grade double power supply ATSE	第三代 Third generation	T：二段式 T: two-station type S：三段式 S: three-station type	63 125 250 500 800 1250 2500	(16)、20、(25)、(32)、40、(50)、63 80、100、125 160、200、225、250 350、400、500 630、800 1000、1250 1600、2000、2500	2:2P 3:3P 4:4P	I :标准型 I: Standard type II:全自动型 II: Full automatic type

注：

① PC级双电源自动转换开关电器：能接通和承载,但不用于分断短路电流的TSE；

② 三段式主触头位置有3个，分别为常用、备用及不与常用、备用电源接通的断开位置。
二段式主触头位置有2个，分别为常用、备用位置。

③ 壳架电流为500A及以下的TSE为板前接线；500A以上的为板后接线,如有特殊要求请与我公司联系；
二段式壳架电流63A~500A，三段式壳架电流63A~2500A；

④ 二段式没有括号内的额定电流值；

⑤ 2P仅限于壳架等级63A~500A；

⑥ 功能号：
I — 标准型可配置智能控制器STU4.6、STU4.7，简易型控制器STU4.6
简易型控制器STU4.6仅适用于壳架电流500A及以下产品。
II — 二段式均有全自动型
三段式壳架电流63A~1250A有全自动型

Note:

① PC grade double power supply ATSE: Able to switch on and bear the load, but not used for TSE of the breaking short-circuit current;

② The three-station type has three main contact positions, i.e., Normal, Alternative and Off that is not connected to the normal or alternative power source.
The two-station type has two main contact positions, i.e., Normal and Alternative respectively.

③ The TSE with a frame size current of 500A or below is wired before panel; the 500A or above is wired after panel, please contact our company for special need;
The two-station type: frame size current 63A~500A, three-section type: frame size current 63A~2500A;

④ The two-station type does not have the rated current value listed in the brackets;

⑤ The 2P is only limited to frame size 63A~ 500A;

⑥ Function number:
I - standard type, configured with intelligent controllers STU 4.6, STU 4.7, while the simple type configured with controller STU 4.6
The controller STU 4.6 for the simple type only applies to the products of frame current 500A or below.
II - The two-station type may be each equipped with the full automatic controller.
The three-station type of frame current 63 A~1250A may be equipped with the full automatic controller

主要技术数据及性能指标
Main technical data and performance indicator

HNP3S 三段式转换开关参数
Parameters of HNP3S three-station type ATSE

型号 Model		HNP3S-63			HNP3S-125			HNP3S-250		
壳架等级电流（A） Frame size current (A)		63			125			250		
额定工作电流In（A） Rated operating current In (A)		16、20、25、32、40、50、63			80、100、125			160、200、225、250		
额定工作电压（V） Rated operating voltage (V)		AC400			AC400			AC400		
额定绝缘电压（V） Rated insulation voltage (V)		AC800			AC800			AC800		
额定冲击耐受电压（kV） Rated impulse withstand voltage (kV)		8			8			8		
极数 Number of poles		2P	3P	4P	2P	3P	4P	2P	3P	4P
额定短时耐受电流 Rated short time withstand current		10kA			10kA			15kA		
额定限制短路电流（熔断器作保护） Rated limit short-circuit current (protected by fuse)		100kA			100kA			120kA		
额定限制短路电流（断路器作保护） Rated limit short-circuit current (protected by circuit breaker)		50kA			50kA			65kA		
转换时间（无延时） Switching time (without delay)	A源→B源 Power Supply A → Power Supply B	≤0.2s			≤0.2s			≤0.2s		
	B源→A源 Power Supply B → Power Supply A									
操作循环频率 Operating cycle frequency		120次/时 120 cycles/h			120次/时 120 cycles/h			120次/时 120 cycles/h		
操作电流（A） Operating current (A)		3	3	4	3	3	4	5	5	5
跳脱电流（A） Tripping current (A)		1	1	1	1	1	1	1.4	1	1
寿命 Lifetime	电气寿命 Electrical life	6000			6000			6000		
	机械寿命 Mechanical life	20000			20000			20000		
投数 Number of throw		双投 Double-throw			双投 Double-throw			双投 Double-throw		
接线方式 Mode of connection		板前 Before panel			板前 Before panel			板前 Before panel		
辅助开关 Auxiliary switch	A电源侧 Power Supply at A side	2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed		
	B电源侧 Power Supply at B side	2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed		
正常工作条件 Normal working condition	使用类别 Class of use	AC-33B			AC-33B			AC-33B		
	污染等级 Class of pollution	3级 Level 3			3级 Level 3			3级 Level 3		
	安装类别 Installation category	开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II			开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II			开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II		
	环境温度 Ambient temperature	-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃			-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃			-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃		
	海拔 Elevation	≤2000m			≤2000m			≤2000m		
电气级别 Electrical grade		PC级 PC grade			PC级 PC grade			PC级 PC grade		
符合标准 Standards		IEC60947-6-1 GB14048.11			IEC60947-6-1 GB14048.11			IEC60947-6-1 GB14048.11		
重量（kg） Weight (kg)		5.5	5.8	6.4	6	6.5	7.2	11	7.1	7.7

型号 Model		HNP3S-500			HNP3S-800		HNP3S-1250		HNP3S-2500	
壳架等级电流（A） Frame size current (A)		500			800		1250		2500	
额定工作电流In（A） Rated operating current In (A)		350、400、500			630、800		1000、1250		1600、2000、2500	
额定工作电压（V） Rated operating voltage (V)		AC400			AC400		AC400		AC400	
额定绝缘电压（V） Rated insulation voltage (V)		AC800			AC800		AC800		AC800	
额定冲击耐受电压（kV） Rated impulse withstand voltage (kV)		8			8		8		8	
极数 Number of poles		2P	3P	4P	3P	4P	3P	4P	3P	4P
额定短时耐受电流 Rated short time withstand current		20kA			25kA		32kA		50kA	
额定限制短路电流（熔断器作保护） Rated limit short-circuit current (protected by fuse)		120kA			120kA		120kA		120kA	
额定限制短路电流（断路器作保护） Rated limit short-circuit current (protected by circuit breaker)		65kA			50kA		50kA		50kA	
转换时间（无延时） Switching time (without delay)	A源→B源 Power Supply A → Power Supply B	≤0.2s			≤0.2s		≤0.2s		≤0.2s	
	B源→A源 Power Supply B → Power Supply A									
操作循环频率 Operating cycle frequency		120次/时 120 cycles/h			120次/时 120 cycles/h		120次/时 120 cycles/h		120次/时 120 cycles/h	
操作电流（A） Operating current (A)		5	5	6	6	6	6	8	10	12
跳脱电流（A） Tripping current (A)		1.4	1.4	1.4	2	2	2	2	2	2
寿命 Lifetime	电气寿命 Electrical life	6000			6000		6000		6000	
	机械寿命 Mechanical life	20000			10000		10000		10000	
投数 Number of throw		双投 Double-throw			双投 Double-throw		双投 Double-throw		双投 Double-throw	
接线方式 Mode of connection		板前 Before panel			板后 Rear panel		板后 Rear panel		板后 Rear panel	
辅助开关 Auxiliary switch	A电源侧 Power Supply at A side	2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed		2常开、2常闭 2 Normally open, 2 Normally closed		2常开、2常闭 2 Normally open, 2 Normally closed	
	B电源侧 Power Supply at B side	2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed		2常开、2常闭 2 Normally open, 2 Normally closed		2常开、2常闭 2 Normally open, 2 Normally closed	
正常工作条件 Normal working condition	使用类别 Class of use	AC-33B			AC-33B		AC-33B		AC-33B	
	污染等级 Class of pollution	3级 Level 3			3级 Level 3		3级 Level 3		3级 Level 3	
	安装类别 Installation category	开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II			开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II		开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II		开关电器Ⅲ类，控制器Ⅱ类 Switch appliance category III, controller category II	
	环境温度 Ambient temperature	-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃			-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃		-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃		-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃	
	海拔 Elevation	≤2000m			≤2000m		≤2000m		≤2000m	
电气级别 Electrical grade		PC级 PC grade			PC级 PC grade		PC级 PC grade		PC级 PC grade	
符合标准 Standards		IEC60947-6-1 GB14048.11			IEC60947-6-1 GB14048.11		IEC60947-6-1 GB14048.11		IEC60947-6-1 GB14048.11	
重量（kg） Weight (kg)		11	15	17.8	38	43	46	55	115	135

注：辅助开关容量：AC220V3A
Note: Auxiliary switch capacity: AC220V3A

主要技术数据及性能指标
Main technical data and performance indicator

HNP3T 二段式转换开关参数
The parameters of HNP3T two-station type ATSE

型号 Model		HNP3T-63			HNP3T-125			HNP3T-250			HNP3T-500		
壳架等级电流（A） Frame size current (A)		63			125			250			500		
额定工作电流In（A） Rated operating current In (A)		20、43、63			80、100、125			160、200、225、250			350、400、500		
额定工作电压（V） Rated operating voltage (V)		AC400			AC400			AC400			AC400		
额定绝缘电压（V） Rated insulation voltage (V)		AC800			AC800			AC800			AC800		
额定冲击耐受电压（kV） Rated impulse withstand voltage (kV)		8			8			8			8		
极数 Number of poles		2P	3P	4P	2P	3P	4P	2P	3P	4P	2P	3P	4P
额定短时耐受电流 Rated short time withstand current		10kA			10kA			15kA			20kA		
额定限制短路电流(熔断器作保护) Rated limit short-circuit current (protected by fuse)		100kA			100kA			120kA			120kA		
额定限制短路电流(断路器作保护) Rated limit short-circuit current (protected by circuit breaker)		50kA			50kA			65kA			65kA		
转换时间（无延时） Switching time (without delay)	A源→B源 Power Supply A → Power Supply B B源→A源 Power Supply B → Power Supply A	≤0.2s			≤0.2s			≤0.2s			≤0.2s		
操作循环频率 Operating cycle frequency		120次/时 120 cycles/h			120次/时 120 cycles/h			120次/时 120 cycles/h			120次/时 120 cycles/h		
操作电流（A） Operating current (A)		3	3	4	3	3	4	3	4	5	5	5	7
寿命 Lifetime	电气寿命 Electrical life	6000			6000			6000			6000		
	机械寿命 Mechanical life	20000			20000			20000			20000		
投数 Number of throw		双投 Double-throw			双投 Double-throw			双投 Double-throw			双投 Double-throw		
接线方式 Mode of connection		板前 Before panel			板前 Before panel			板前 Before panel			板前 Before panel		
辅助开关 Auxiliary switch	A电源侧 Power Supply at A side	2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed		
	B电源侧 Power Supply at B side	2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed			2常开、2常闭 2 Normally open, 2 Normally closed		
正常工作条件 Normal working condition	使用类别 Class of use	AC-33B			AC-33B			AC-33B			AC-33B		
	污染等级 Class of pollution	3级 Level 3			3级 Level 3			3级 Level 3			3级 Level 3		
	安装类别 Installation category	开关电器III类，控制器II类 Switch appliance category III, controller category II			开关电器III类，控制器II类 Switch appliance category III, controller category II			开关电器III类，控制器II类 Switch appliance category III, controller category II			开关电器III类，控制器II类 Switch appliance category III, controller category II		
	环境温度 Ambient temperature	-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃			-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃			-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃			-5℃≤T≤+40℃ 24小时平均≤+35℃ -5℃≤T≤+40℃ Average in 24 hours≤+35℃		
	海拔 Elevation	≤2000m			≤2000m			≤2000m			≤2000m		
电气级别 Electrical grade		PC级 PC grade			PC级 PC grade			PC级 PC grade			PC级 PC grade		
符合标准 Standards		IEC60947-6-1 GB14048.11			IEC60947-6-1 GB14048.11			IEC60947-6-1 GB14048.11			IEC60947-6-1 GB14048.11		
重量（kg） Weight (kg)		4.5	5	5.5	5	6.3	6.8	6	6.6	7.3	11	15	18

注：辅助开关容量：AC220V3A
Note: Auxiliary switch capacity: AC220V3A

双电源控制器
Main technical data and performance indicator

STU4.6

- ■ 延时功能
- ■ 缺相保护功能
- ■ 电源指示功能
- ■ 远程归零功能
- ■ 自投自复
- ■ 发电机启动功能（自动启动）
- □ 自投不自复
- □ 英文显示
- □ 485通讯接口功能（可选）

- ■ Delay
- ■ Default-phase protection
- ■ Power source indication
- ■ Remote reset
- ■ Automatic charge and automatic recovery
- ■ Generator Start-up (automatic startup)
- □ Automatic charge but non-automatic recovery
- □ Display in English
- □ 485 communication interface (optional)

STU4.7

- ■ 延时功能
- ■ 过压保护功能
- ■ 欠压保护功能
- ■ 缺相保护功能
- ■ 线电压显示功能
- ■ 电源指示功能
- ■ 远程归零功能
- ■ 频率保护功能
- ■ 逆相序保护功能
- ■ 电流过载保护
- ■ 自投自复
- ■ 发电机启动功能（自动启动）
- □ 自投不自复
- □ 英文显示
- □ 485通讯接口功能（可选）

- ■ Delay
- ■ Over-voltage protection
- ■ Under-voltage protection
- ■ Default-phase protection
- ■ Line voltage display
- ■ Power source indication
- ■ Remote reset
- ■ Frequency protection
- ■ Negative phase sequence protection
- ■ Over-current protection
- ■ Automatic charge and automatic recovery
- ■ Generator Start-up (automatic startup)
- □ Automatic charge but non-automatic recovery
- □ Display in English
- □ 485 communication interface (optional)

可设置内容 Contents that can be set

- 自投自复或自投不自复
- 屏幕保护开或关
- A电源→OFF延时时间
- A电源→B电源延时时间
- B电源→A电源延时时间
- OFF→A电源延时时间
- OFF→B电源延时时间
- 断开发电机延时时间
- 发电机启动延时时间
- 通讯地址
- 中文或英文显示
- B电源→OFF延时时间

- Automatic charge and automatic recovery or automatic charge but non-automatic recovery
- Screen protection On or Off
- Power Supply A → OFF delay time
- Power Supply A → Power Source B delay time
- Power Supply B → Power Supply A delay time
- OFF →Power Supply A delay time
- OFF →Power Supply B delay time
- Generator disconnection delay time
- Generator start-up delay time
- Communication address
- Display in Chinese or English
- Power Supply B → OFF delay time

- 自投自复或自投不自复
- 屏幕保护开或关
- 互感器接口设定值
- 过压延时时间
- 欠压延时时间
- A电源→B电源延时时间
- B电源→A电源延时时间
- OFF→A电源延时时间
- OFF→B电源延时时间
- A、B电源欠压值
- A、B电源过压值
- 负载过流值
- 断开发电机延时时间
- 发电机启动延时时间
- 上限频率设定值
- 下限频率设定
- 下限频率设定
- 通讯地址
- 中文或英文显示
- B电源→OFF延时时间

- Automatic charge and automatic recovery or automatic charge but non-automatic recovery
- Screen protection On or Off
- Mutual-inductor interface setting value
- Over-voltage delay time
- Under-voltage delay time
- Power Supply A → Power Source B delay time
- Power Supply B → Power Supply A delay time
- OFF→Power Supply A delay time
- OFF→Power Supply B delay time
- A, Power Supply B under-voltage value
- A, Power Supply B over-voltage value
- load over-current value
- Generator disconnection delay time
- Generator start-up delay time
- Upper limit frequency setting value
- Lower limit frequency settings
- Lower limit frequency settings
- Communication address
- Display in Chinese or English
- Power Supply B → OFF delay time

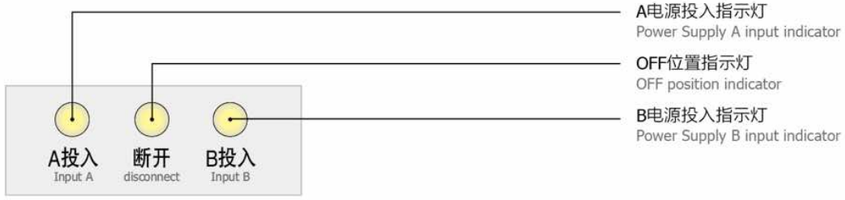
说明：① ■ 表示基本功能；□ 表示可选功能具　②控制器均为分体式控制器
Remarks: ① ■ indicates basic function; □ indicates optional function; ② Controllers all are split-type

STU4.6控制器
STU4.6 controller

面板说明
Panel explanation

1. 控制器名称、型号
   Name and model of controllers
2. A组电源正常指示灯
   Indicator for normal state of Power Supply A
3. 液晶显示窗口
   LCD window
4. B组电源正常指示灯
   Indicator for normal state of Power Supply B
5. 指示灯
   Indicator
6. 参数设置键
   Parameter setting key

6 指示灯
Indicator

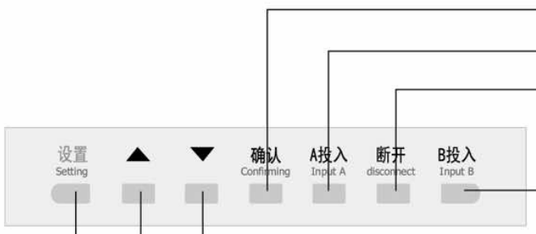


A电源投入指示灯
Power Supply A input indicator

OFF位置指示灯
OFF position indicator

B电源投入指示灯
Power Supply B input indicator

7 参数设置健
Parameter setting key



确认键
OK key

A电源投入键
Power Supply A input key

OFF键
OFF key

B电源投入键
Power Supply B input key

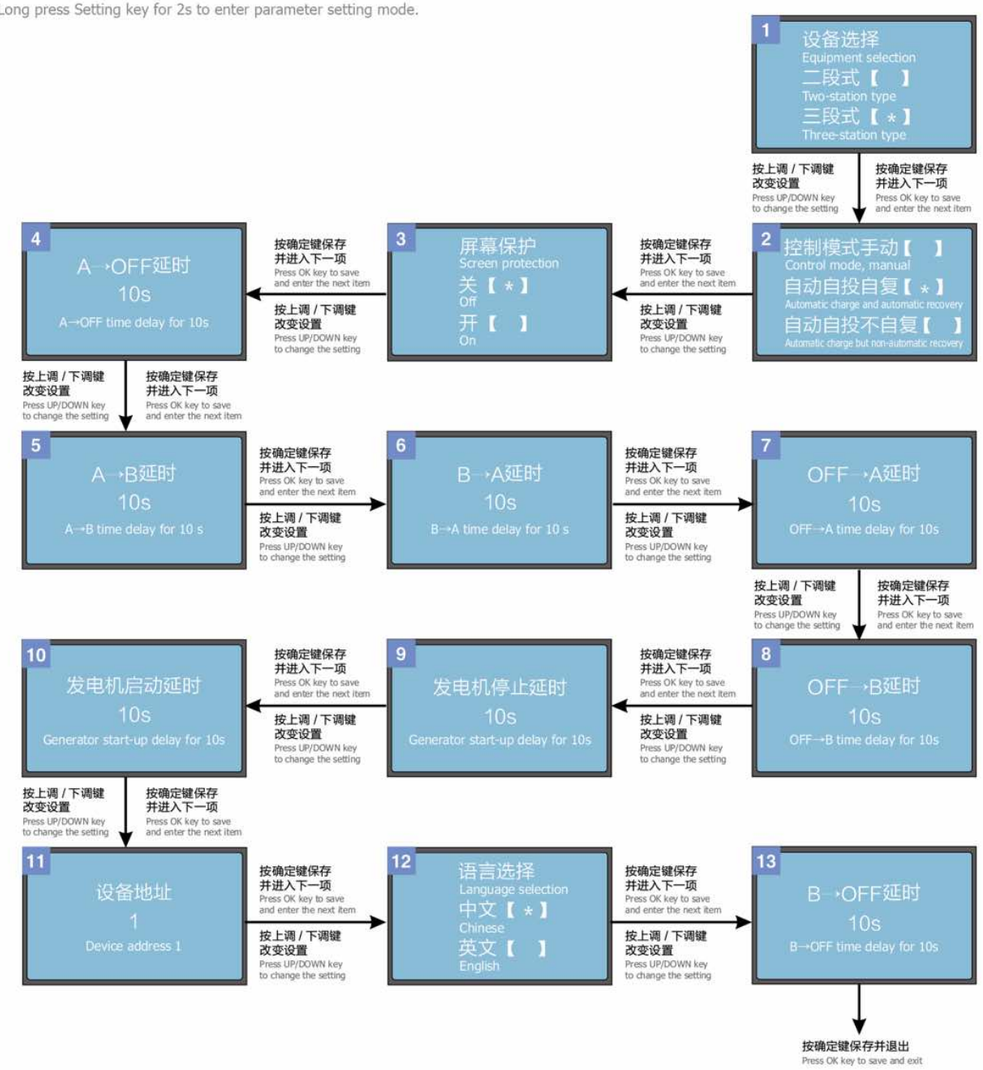
下调键（设置模式中）
DOWN key (in setting mode)

上调键（设置模式中）
UP key (in setting mode)

参数设置键
Parameter setting key

参数设置
Parameter settings

长按设置键2秒进入参数设置模式。
Long press Setting key for 2s to enter parameter setting mode.



附件 Accessories

参数说明
Parameter explanation

序号 S/n	调整项 Adjusting item	默认值 Default	说明 Explanation
1	设备选择 Equipment selection	三段式 Three-station type	依据二段式ATS规格进行设置，才能正常工作。 依据三段式ATS规格进行设置，才能正常工作。 Set based on two-station type ATS specification for normal operations. Set based on three-station type ATS specification for normal operations.
2	工作模式 Working mode	自动自投自复 Automatic charge and automatic recovery	手动模式为手动控制ATS切换。 自投自复时，电网出现异常ATS自动切换，电网恢复正常后自动返回。 自投不自复时，电网出现异常ATS自动切换，电网恢复正常后不自动返回，只有当B电源有异常时才返回。 The manual mode is manual control of ATS switching. At time of automatic charge and automatic recovery, the ATS will automatically switch over in occurrence of power grid abnormity and automatically recover after the power grid returns to normal. At time of automatic charge but non-automatic recovery, the ATS will automatically switch over in occurrence of power grid abnormity and will not automatically recover after the power grid returns to normal state, it recovers only when the Power Supply B is abnormal.
3	屏幕保护 Screen protection	开 On	智能控制器连续工作1小时后，LCD屏幕自动进入休眠状态，节能省电，当电网异常或人为触碰任一按键均会唤醒点亮屏幕； After the intelligent controller continues working for 1hour,the LCD screen automatically enters resting state for energy saving, when power grid is in abnormity or any key is touched artificially, the screen is awaken and light-up;
4	A→OFF延时 A→OFF delay	10s	A→OFF时间延时在自动状态运行下，电网出现异常时，ATS中A电源至OFF位置切换延时时间（0～250s可调） A→OFF time delay: The time delay interval for switching from Power Supply A to OFF position in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable)
5	A→B延时 A→B delay	10s	A→B时间延时在自动状态运行下，电网出现异常时，ATS中A电源至B电源切换延时时间（0～250s可调） A→B time delay: the time delay interval for switching from Power Supply A to Power Supply B in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable)
6	B→A延时 B→A delay	10s	B→A时间延时在自动状态运行下，电网出现异常时，ATS中B电源至A电源切换延时时间（0～250s可调）； B→A time delay: The time delay interval for switching from Power Supply B to Power Supply A in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable);
7	OFF→A延时 OFF →A delay	10s	OFF→A时间延时在自动状态运行下，电网出现异常时，ATS中OFF位置至A电源切换延时时间（0～250s可调）（三段式有效）； OFF →A time delay: The time delay interval for switching from OFF position to Power Supply A in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable) (effective for three-station type);
8	OFF→B延时 OFF →B delay	10s	OFF→B时间延时在自动状态运行下，电网出现异常时，ATS中OFF位置至B电源切换延时时间（0～250s可调）（三段式有效）； OFF →B time delay: The time delay interval for switching from OFF position to Power Supply B in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable) (effective for three-station type);
9	发电机停止延时 Generator stop delay	10s	发电机停止是指ATS中A电源投入运行时，发电机的关闭时间（10～250s可调）； Generator stop means the turn off time of generator in ATS when Power Supply A is put into operation (10~ 250s adjustable);
10	发电机启动延时 Generator start-up delay	10s	发电机启动是指ATS中A电源出现异常时，B电源启动的时间（10～250s可调）； Generator start-up means the startup time of Power Supply B in ATS when abnormity of Power Supply A occurs (10~ 250s, adjustable);
11	设备地址 Device address	1	RS-485远程通讯地址（0～255可调）； RS-485 telecommunication address (0 ~ 255,adjustable);
12	语言选择 Language selection	中文 Chinese	控制器内点阵液晶显示，配备了“中文、英文”语言，根据用户需要进行选择。如需他国特殊语言，可与我公司联系预订购！ The dot matrix LCD in the controller is provided with "Chinese, English" languages that can be selected according to the user needs. Contact our company for special languages of other countries.!
13	B→OFF延时 B→OFF delay	10s	B→OFF时间延时在自动状态运行下，电网出现异常时，ATS中B电源至OFF位置切换延时时间（0～250s可调）； B→OFF time delay: The time delay interval for switching from Power Supply B to OFF position in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s, adjustable);

故障现象
Symptoms

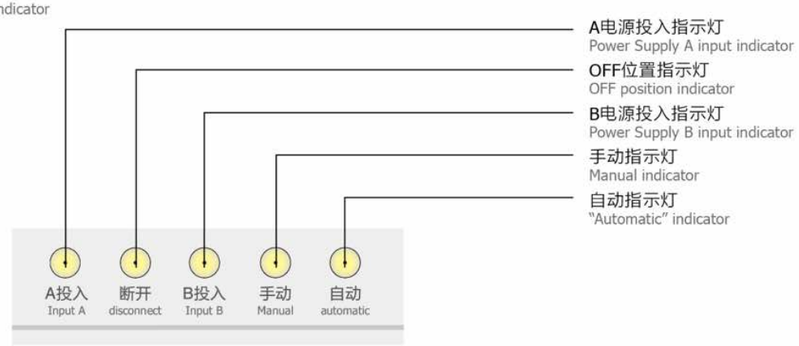
故障现象 Symptoms	可能采取的措施 Measures possibly taken
控制器无反应 No response from controller	检查A路及B路电源接线，检查A路或B路电源保险管，断开电源，打开后盖，保险管置于内壳 Check the wire connection of Line A and Line B power sources, check the protective tubes of Line A and Line B power sources, disconnect the power, open the rear cover, the protective tube is placed inside the inner shell.
控制器显示正常但开关不动作 The display of controller is normal but the switch refuses to actuate	检查ATS机构，检查控制器与ATS之间的连接线 Check the ATS mechanism, check the connecting wire between the controller and ATS.
A路或B路正常灯闪烁 The indicator flickers when Line A or Line B is normal.	检查三相电压是否正常（缺相，包括缺N线） Check if the three-phase voltage is normal (default phase, including lack of N-phase wire)
自动方式下A/B路正常指示灯亮但开关不切换 In automatic mode, the indicator is on when Line A/B is normal, but the ATSE does not switch over	将控制器设为手动方式是否ATS切换，检查设定的延时切换时间值，是否正在延时过程中，检查控制器与ATS之间的连接线信号是否正常接入，检查当前电压是否低于ATS最低切换吸合启动电压 Set the controller to manual mode and check if the ATS switches over, check whether the set switching delay time value is in delay process, check the signal of connecting wire between controller and ATS for normal access, check if the present voltage is lower than the lowest switching- closing trigger voltage.
发动机组不开机 The generator set does not start up	仅当A路电压异常时，发电机组开机信号才输出，检查设定的发电机组开机延时启动时间值，是否正在延时过程中 The starting up signal of the generator set is outputted only when the voltage of Line A is abnormal, check whether the set starting delay time value for generator is in the delay process.

STU4.7控制器
STU4.7 controller

面板说明
Panel explanation

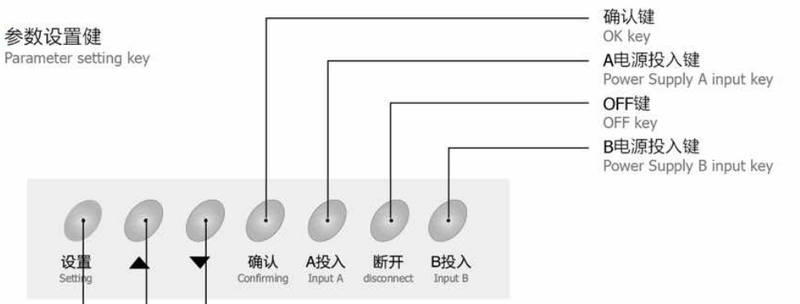
1. 控制器名称、型号
   Name and model of controllers
2. A组电源正常指示灯
   Indicator for normal state of Power Supply A
3. 液晶显示窗口
   LCD window
4. B组电源正常指示灯
   Indicator for normal state of Power Supply B
5. 指示灯
   Indicator
6. 参数设置键
   Parameter setting key

6 指示灯
Indicator



- A电源投入指示灯
  Power Supply A input indicator
- OFF位置指示灯
  OFF position indicator
- B电源投入指示灯
  Power Supply B input indicator
- 手动指示灯
  Manual indicator
- 自动指示灯
  "Automatic" indicator

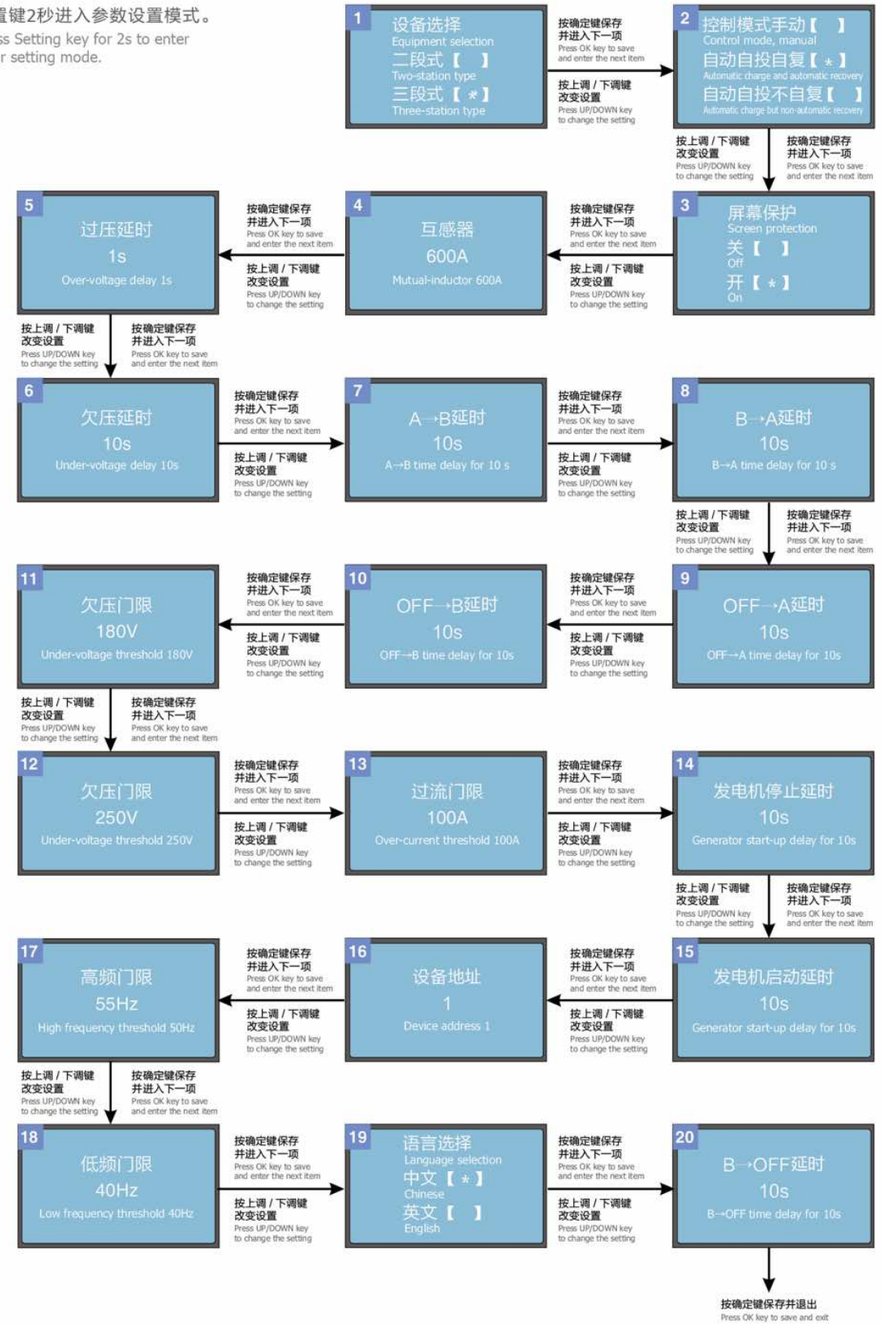
7 参数设置健
Parameter setting key



- 确认键
  OK key
- A电源投入键
  Power Supply A input key
- OFF键
  OFF key
- B电源投入键
  Power Supply B input key
- 下调键（设置模式中）
  DOWN key (in setting mode)
- 上调键（设置模式中）
  UP key (in setting mode)
- 参数设置键
  Parameter setting key

参数设置
Parameter settings

长按设置键2秒进入参数设置模式。
Long press Setting key for 2s to enter parameter setting mode.



参数说明
Parameter explanation

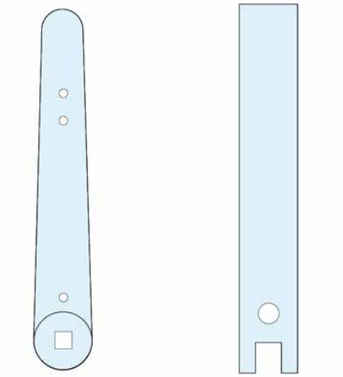
序号 S/n	调整项 Adjusting item	默认值 Default	说明 Explanation
1	设备选择 Equipment selection	三段式 Three-station type	依据二段式ATS规格进行设置，才能正常工作。 依据三段式ATS规格进行设置，才能正常工作。 Set based on two-station type ATS specification for normal operations. Set based on three-station type ATS specification for normal operations.
2	工作模式 Working mode	自动自投自复 Automatic charge and automatic recovery	手动模式为手动控制ATS切换。 自投自复时，电网出现异常ATS自动切换，电网恢复正常后自动返回。 自投不自复时，电网出现异常ATS自动切换，电网恢复正常后不自动返回，只有当B电源有异常时才返回 The manual mode is manual control of ATS switching. At time of automatic charge and automatic recovery, the ATS will automatically switch over when abnormity of power grid occurs and will automatically recover when the power grid returns to normal. At time of automatic charge and non-automatic recovery, the ATS will automatically switch over when abnormity of power grid occurs and will not automatically recover after the power grid returns to normal, it recovers only when the Power Supply B is abnormal.
3	屏幕保护 Screen protection	开 On	智能控制器连续工作1小时后，LCD屏幕自动进入休眠状态，节能省电，当电网异常或人为触碰任一按键均会唤醒点亮屏幕； After the intelligent controller continues working for 1hour,the LCD screen automatically enters resting state for energy saving, when power grid is in abnormity or any key is touched artificially, the screen is awaken and light-up;
4	互感器 Mutual-inductor	600A:5A 用户自备 600A:5A Provided by user	测量负载电流中的电流互感器（63A～5000A，用户自备），依据ATS切换开关功率大小及相关的保护措施选择互感器。变比为：5A； Measure the current transformer in load current (63A~ 5000A, provided by user), select the mutual-inductor according to the power level of the ATS transfer switch and the related protective measures. Transformation ratio: 5A;
5	过压延时 Over-voltage delay	1s	过压延时时间：在自动状态下，出现过压时ATS切换延时时间（0～30s可调）； Over-voltage delay time: The time delay interval for ATS switching in occurrence of over-voltage in automatic state (0 ~ 30 s, adjustable);
6	欠压延时 Under-voltage delay	10s	欠压延时时间：在自动状态下，出现欠压时ATS切换延时时间（0～30s可调）； Under-voltage delay time: The time delay interval for ATS switching in occurrence of under-voltage in automatic state (0 ~ 30 s, adjustable);
7	A→B延时 A→B delay	10s	A→B时间延时在自动状态运行下，电网出现异常时，ATS中A电源至B电源切换延时时间（0～250s可调） A→B time delay: The time delay interval for switching from Power Supply A to Power Supply B in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s, adjustable)
8	B→A延时 B→A delay	10s	B→A时间延时在自动状态运行下，电网出现异常时，ATS中B电源至A电源切换延时时间（0～250s可调）； B→A time delay: The time delay interval for switching from Power Supply B to Power Supply A in ATS when abnormity of power grid occurs in automatic running state(0 ~ 250s, adjustable);
9	OFF→A延时 OFF →A delay	10s	OFF→A时间延时在自动状态运行下，电网出现异常时，ATS中OFF位置至A电源切换延时时间（0～250s可调）（三段式有效）； OFF →A time delay: The time delay interval for switching from OFF position to Power Supply A in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable) (effective for three-station type);
10	OFF→B延时 OFF →B delay	10s	OFF→B时间延时在自动状态运行下，电网出现异常时，ATS中OFF位置至B电源切换延时时间（0～250s可调）（三段式有效）； OFF →B time delay: The time delay interval for switching from OFF position to Power Supply B in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s adjustable) (effective for three-station type);
11	欠压门限 Under-voltage threshold	180V	欠压门限指在自动运行状态下，电压低于设定值时，ATS将自动运行切换至另一电网。（160～210V可调）； Under-voltage threshold means that in automatic running state, when voltage is lower than the setting value, ATS will automatically operate and transfer to another power grid. (160~ 210V, adjustable);
12	过压门限 Over-voltage threshold	250V	过压门限指在自动运行状态下，电压高于设定值时，ATS将自动运行切换至另一电网。（230～280V可调）； Over-voltage threshold means that in automatic running state, when voltage is higher than the setting value, ATS will automatically operate and transfer to another power grid. (230~ 280V, adjustable);
13	过流门限 Over-current threshold	100A	过流门限在自动运行状态下，电流高于设定值时，ATS将自动运行切换至中间OFF位置，进行电网及设备的保护，三段式有效。二段式报警（63A～5000A可调）； Over-current threshold means that in automatic running state, when the current is higher than the setting value, the ATS will automatically operate and transfer to the intermediate OFF position to protect the power grid and equipment, effective for three-station type only. Two-station type alarm (63A~ 5000 A, adjustable);
14	发电机停止延时 Generator stop delay	10s	发电机停止是指ATS中A电源投入运行时，发电机的关闭时间（10～250s可调）； Generator stop means the turn off time of generator in ATS when Power Supply A is put into operation (10~ 250s adjustable);
15	发电机启动延时 Generator start-up delay	10s	发电机启动是指ATS中A电源出现异常时，B电源启动的时间（10～250s可调）； Generator start-up means the startup time of Power Supply B in ATS when abnormity of Power Supply A occurs (10~ 250s, adjustable);
16	设备地址 Device address	1	RS-485远程通讯地址（0～255可调）； RS-485 telecommunication address (0 ~ 255,adjustable);
17	高频门限 High frequency threshold	55Hz	高频门限指在自动运行状态下，频率超过设定值时，ATS会自动切换至另一电网（50Hz～70Hz可调）； High frequency threshold means that in automatic running state, when frequency exceeds the setting value, the ATS will automatically switch to another power grid (50Hz ~ 70Hz, adjustable);
18	低频门限 Low frequency threshold	40Hz	低频门限指在自动运行状态下，频率低过设定值时，ATS会自动切换至另一电网（40Hz～55Hz可调）； Low frequency threshold means that in automatic running state, when frequency is lower than the setting value, the ATS will automatically switch to another power grid (40Hz ~ 55Hz, adjustable);
19	语言选择 Language selection	中文 Chinese	控制器内点阵液晶显示，配备了“中文、英文”语言，根据用户需要进行选择。如需他国特殊语言，可与我公司联系预订购！ The dot matrix LCD in the controller is provided with "Chinese, English" languages that can be selected according to the user's needs. Contact our company for special languages of other countries!
20	B→OFF延时 B→OFF delay	10s	B→OFF时间延时在自动状态运行下，电网出现异常时，ATS中B电源至OFF位置切换延时时间（0～250s可调） B→OFF time delay: The time delay interval for switching from Power Supply B to OFF position in ATS when abnormity of power grid occurs in automatic running state (0 ~ 250s, adjustable);

故障现象
Symptoms

故障现象 Symptoms	可能采取的措施 Measures possibly taken
控制器完全无工作状态 The controller is completely not in operating state	断开电源，检查A路及B路电源接线，检查A路或B路外接电源的保险管 Turn off the power, check the wire connection of Line A and Line B power sources, check the protective tube of the external power source of Line A or Line B.
控制器显示正常但开关不动作 The display of controller is normal but the switch refuses to actuate	检查ATS机构，检查控制器与ATS之间的连接线 Check the ATS mechanism, check the connecting wire between the controller and ATS.
A路电源或B路电源LED灯闪烁 The LED indicator of Line A or Line B power source is flickering	三相电压异常（过压、欠压、缺相）[包括缺N线] The three-phase voltage is abnormal (over-voltage, under-voltage, phase-loss) [including lack of N-phase]
自动方式下A电源/B电源正常，指示灯亮但开关不切换 Power Supply A/B is normal in automatic mode, the indicator is on but the switch does not conduct switching	将控制器设为手动方式测试ATS是否切换，检查电压正常设定的延时切换时间值，是否正在延时过程中，检查控制器与ATS之间的连接线信号是否正常接入，检查当前电压是否低于ATS最低切换启动电压 Set the controller to manual mode and test if the ATS switches over, check whether the set switching delay time value is in delay process, check the signal of connecting wire between controller and ATS for normal access, check if the present voltage is lower than the lowest switching trigger voltage.
A电源投入失败，B电源投入失败 Failure to input Power Supply A, failure to input Power Supply B	请检查ATS至控制器中的所有连接，按确认键控制器将重新进行判断 Check all the connections in ATS to controller, press the OK key and the controller will remake the judgment.
发动机组无启动 No start-up of generator set	仅当A路电压异常时，发电机组开机信号才输出，检查设定的发电机开机延时启动时间值，是否正在延时过程中 The starting up signal of the generator set is outputted only when the voltage of Line A is abnormal, check whether the set starting delay time value for generator is in the delay process.

附件 *Accessories*

操作手柄
Operating handle



63A～500A **630A～2500A**

辅助触头
Auxiliary contact

辅助电路用的辅助触头，其结构在电气上是可分的，为四常开、四常闭。

The auxiliary contact used in auxiliary circuit, whose structure is separable electrically, i.e., 4 normally open and 4 normally closed.

约定发热电流 Ith（A） Conventional thermal current	额定绝缘电压 Ui（V） Rated insulation voltage	额定工作电流 Ie（A） Rated operating current
10	300	3

辅助触头非正常接通与分断能力。

Non-normal making and breaking capacity of auxiliary contact

使用类别 Class of use	接 通 Making			分断 Segmented			操作频率与循环次数 Operating frequency and number of cycles		
	I/Ie	U/Ue	Cosφ或T0.95 Cosφ or T0.95	I/Ie	U/Ue	Cosφ或T0.95 Cosφ or T0.95	循环次数 Number of cycles	操作频率次/分 Operating frequency cycles/min.	通电时间 (s) Energized time (s)
AC-15	10	1.1	0.3	10	1.1	0.3	10	2	≥0.05

注：T0.95的上限≈6Pe≤300ms

Note: The upper limit of T0.95≈6Pe≤300ms

相间隔板
Phase partition

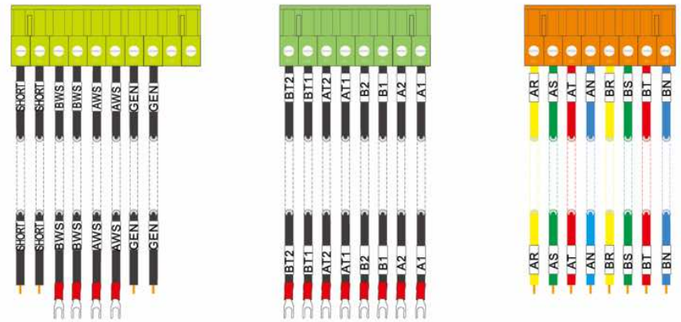
垂直安装于本体接线排之间，加强母排之间的绝缘强度。

Vertically installed between the body line banks so as to strengthen the insulation strength between busbars.

线束
Harness

用于控制器和转换开关之间的连接，为可选附件。线束长度1.8m

Used for connections between the controller and transfer switch, an optional accessory. Length of harness 1.8m



STU4.7控制器线束示意图

Schematic Diagram for STU4.7 Controller Harness

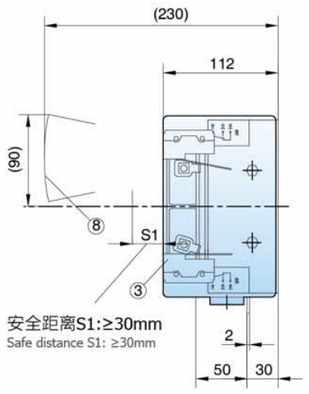
全自动型ATS
Fully automatic type ATS

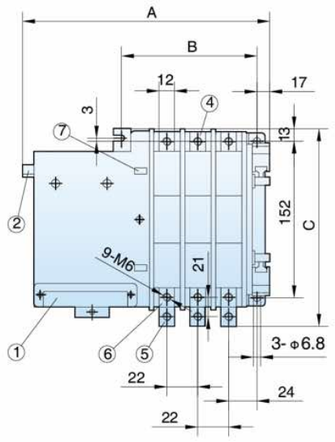
二段式全自动型，操作方式有手柄操作和电动操作两种，仅有自投自复停电转换功能。

Two-station type full automatic type, operation mode falls to handle operation and electric operation, only provided with automatic charge and automatic recovery power failure transfer function.

外形及安装尺寸
Overall and installing dimensions

HNP3T-63
HNP3S-63





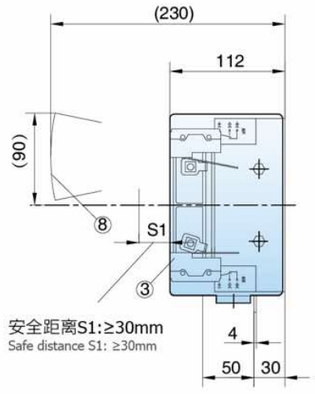
HNP3S-63

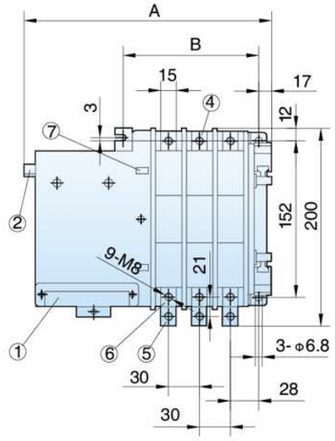
极数 Number of poles / 尺寸 Size	A	B	C
2P	202	88	196
3P	224	110	
4P	246	132	

HNP3T-63

极数 Number of poles / 尺寸 Size	A	B	C
2P	182	88	193
3P	204	110	
4P	226	132	

HNP3T-125
HNP3S-125

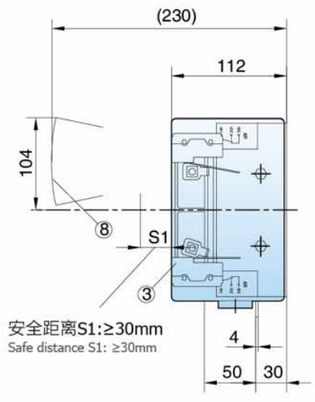


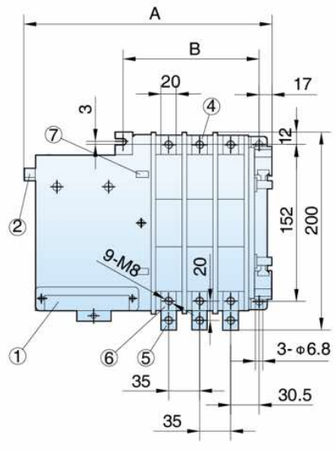


HNP3T-125
HNP3S-125

极数 Number of poles / 尺寸 Size	A	B
2P	218	103
3P	248	133
4P	278	163

HNP3T-250
HNP3S-250

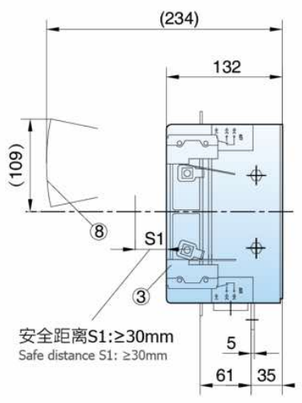


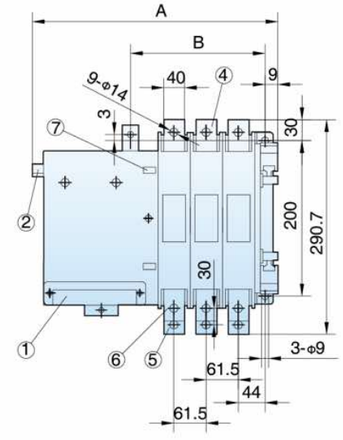


HNP3T-250
HNP3S-250

极数 Number of poles / 尺寸 Size	A	B
2P	228	113
3P	263	148
4P	298	183

HNP3T-500
HNP3S-500

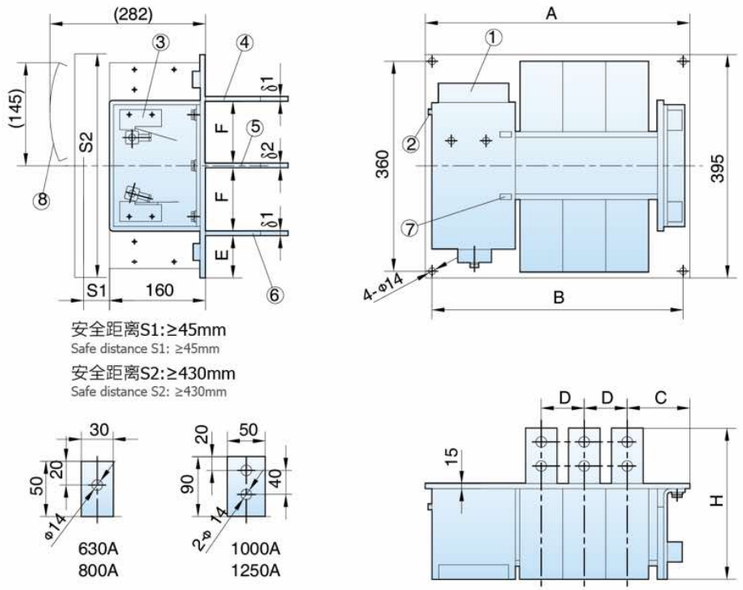




极数 Number of poles / 尺寸 Size	A	B
2P	287	167
3P	348.5	228.5
4P	410	290

外形及安装尺寸 *Overall and installing dimensions*

HNP3S-800/1250



安全距离S1:≥45mm
Safe distance S1: ≥45mm

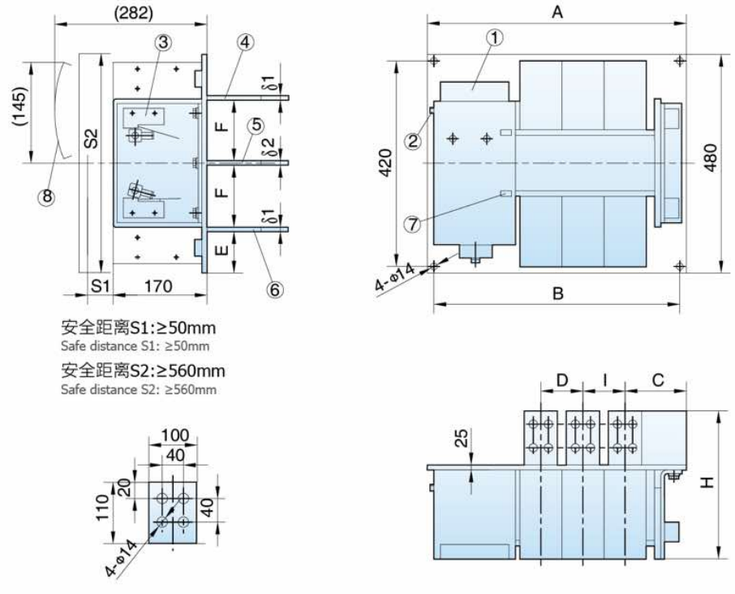
安全距离S2:≥430mm
Safe distance S2: ≥430mm

630A
800A

1000A
1250A

规格 Specifications		630A 800A	1000A 1250A
A	3P	410	455
	4P	475	535
B	3P	375	420
	4P	440	500
C		80	89
D		65	80
E		60	60
F		127	128.5
δ1		10/15	12/15
δ2		15	
H		210	250

HNP3S-2500



安全距离S1:≥50mm
Safe distance S1: ≥50mm

安全距离S2:≥560mm
Safe distance S2: ≥560mm

规格 Specifications		1600A 2000A	2500A
A	3P	685	685
	4P	855	855
B	3P	625	625
	4P	785	785
3P		130	130
4P		152	152
D		145	145
E		102	97
F		116.5	112
δ1		15	20
δ2		15	20
H		280	280
I		160	160

① 控制电路接线端子
Wiring terminal of control circuit

② 手动操作的方轴
Square shaft for manual operation

③ 辅助触头
Auxiliary contact

④ 常用侧主电路端子
Main circuit terminal at normal side

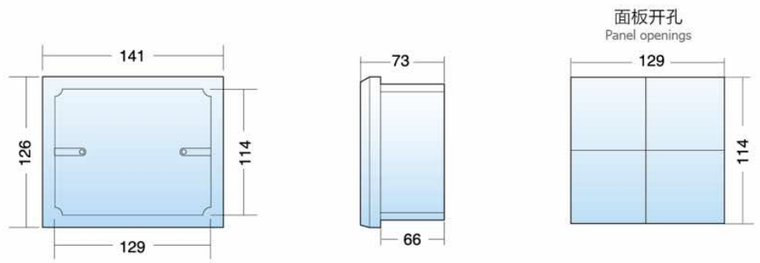
⑤ 负载侧主电路端子
Main circuit terminal at load side

⑥ 备用侧主回路端子
Main circuit terminal at alternative side

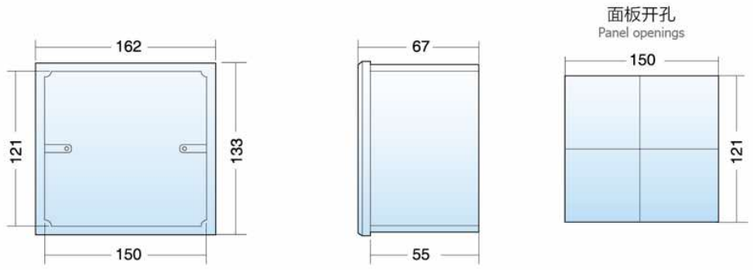
⑦ ON/OFF指示窗口
ON /OFF indication window

⑧ 操作手柄转动范围
Swiveling range of operating handle

STU4.6 控制器
STU4.6 controller

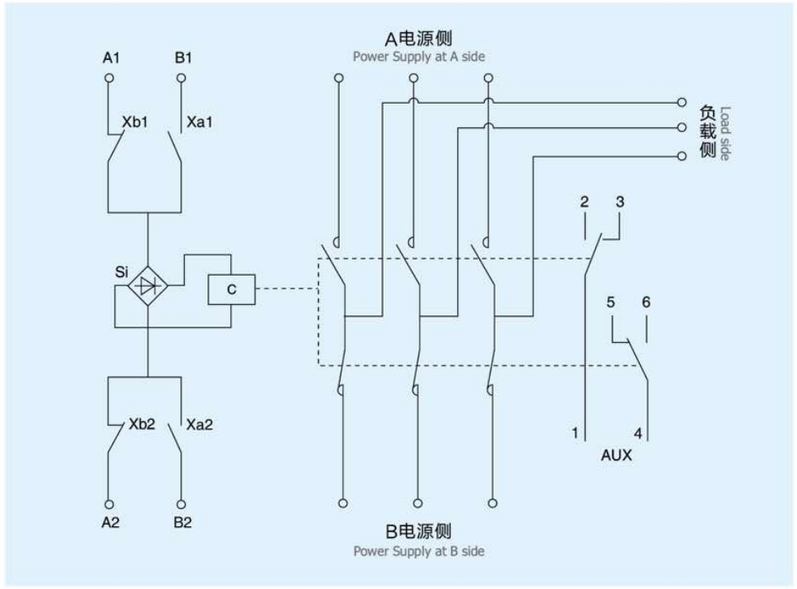


STU4.7 控制器
STU4.7 controller



接线图
Wiring diagram

HNP3T 内部接线图
HNP3T internal wiring diagram



说明：
Explanation:

Xb1、Xb2：内部控制开关
Xb1, Xb2: Internal control switch

Xa1、Xa2：内部控制开关
Xa1, Xa2: Internal control switch

C：投入线圈
C: Input coil

Si：整流器
Si: Rectifier

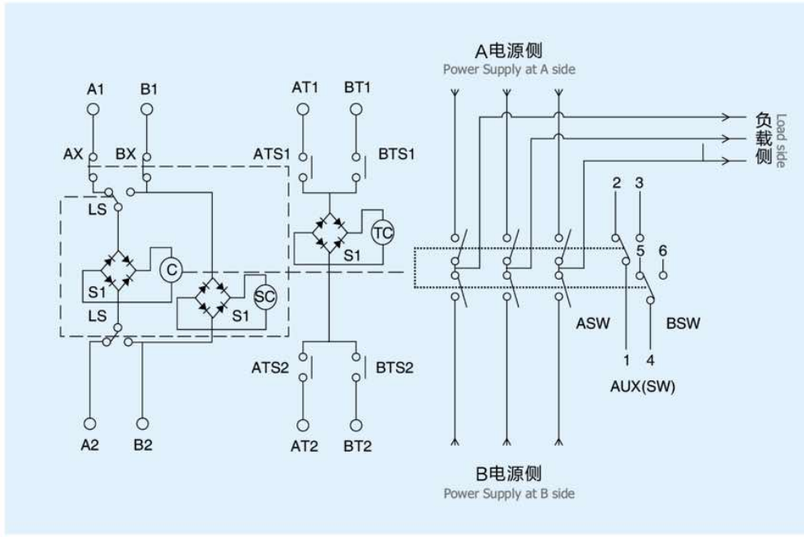
AUX：辅助开关
AUX: Auxiliary switch

A1-A2：A 电源侧投入端子
A1-A2: Input terminal at Power Supply A side

B1-B2：B 电源侧投入端子
B1-B2: Input terminal at Power Input B side

HNP3S 内部接线图
HNP3S internal wiring diagram

两电源OFF 状态
Both power supplies are in OFF state



说明：
Explanation:

C：投入线圈
C: Input coil

SC：选择线圈
SC: Selection coil

TC：跳闸线圈
TC: Tripping coil

S1：整流器
S1: Rectifier

LS：选择开关
LS: Selector switch

ATS1，ATS2：A 电源断开端子
ATS1, ATS2: Off terminal of Power Source A

BTS1，BTS2：B 电源断开端子
BTS1, BTS2: Off terminal of Power Source B

AX，BX：控制开关
AX, BX: Control switch

AUX：辅助开关
AUX: Auxiliary switch

A1-A2：A电源侧投入端子
A1-A2: Input terminal at Power Supply A side

B1-B2：B电源侧投入端子
B1-B2: Input terminal at Power Input B side

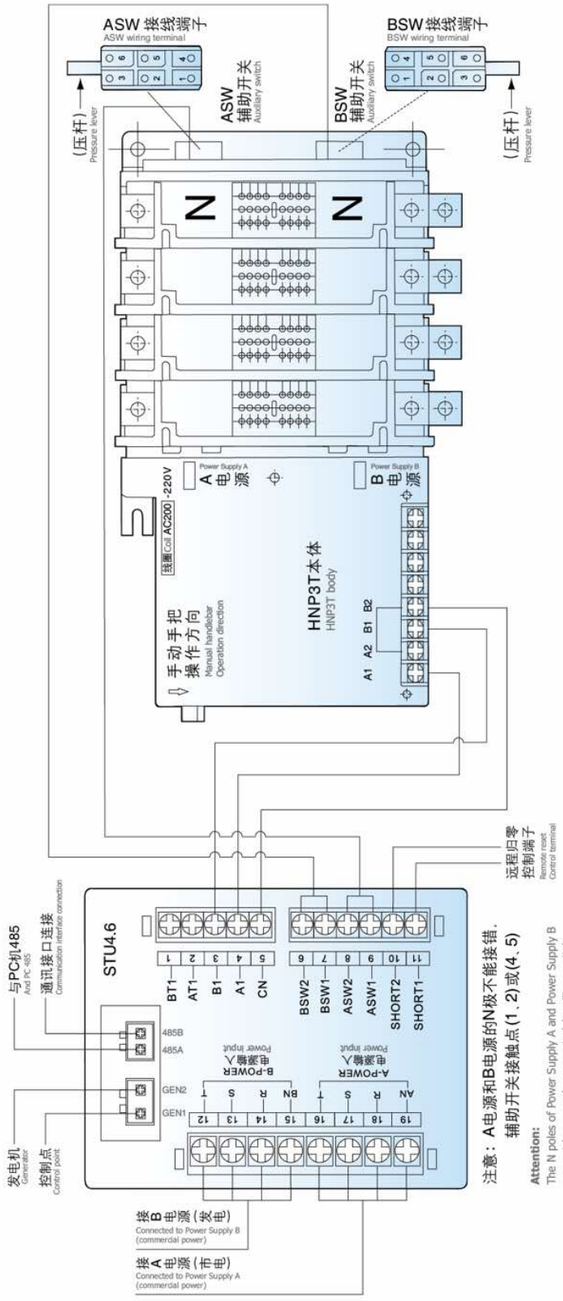
AT1-AT2：A电源侧跳脱端子
AT1-AT2: Tripping terminal at Power Supply A side

BT1-BT2：B电源侧跳脱端子
BT1-BT2: Tripping terminal at Power Supply B side

接线图 *Wiring diagram*

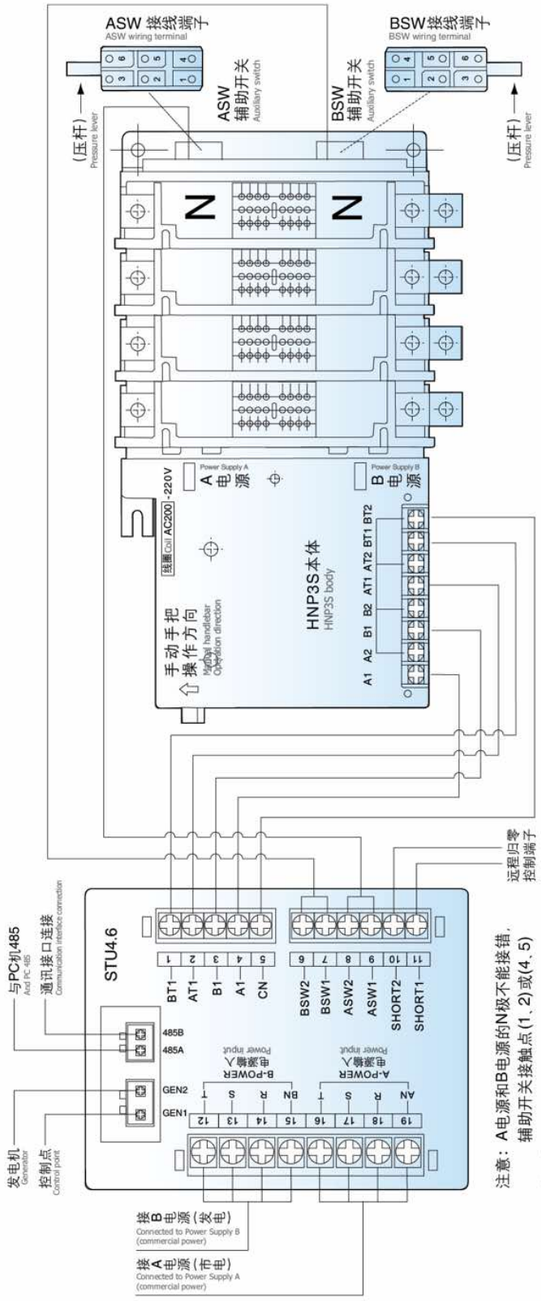
STU4.6控制器与HNP3T接线图

STU4.6 Controller and HNP3T Wiring Diagram



STU4.6控制器与HNP3S接线图

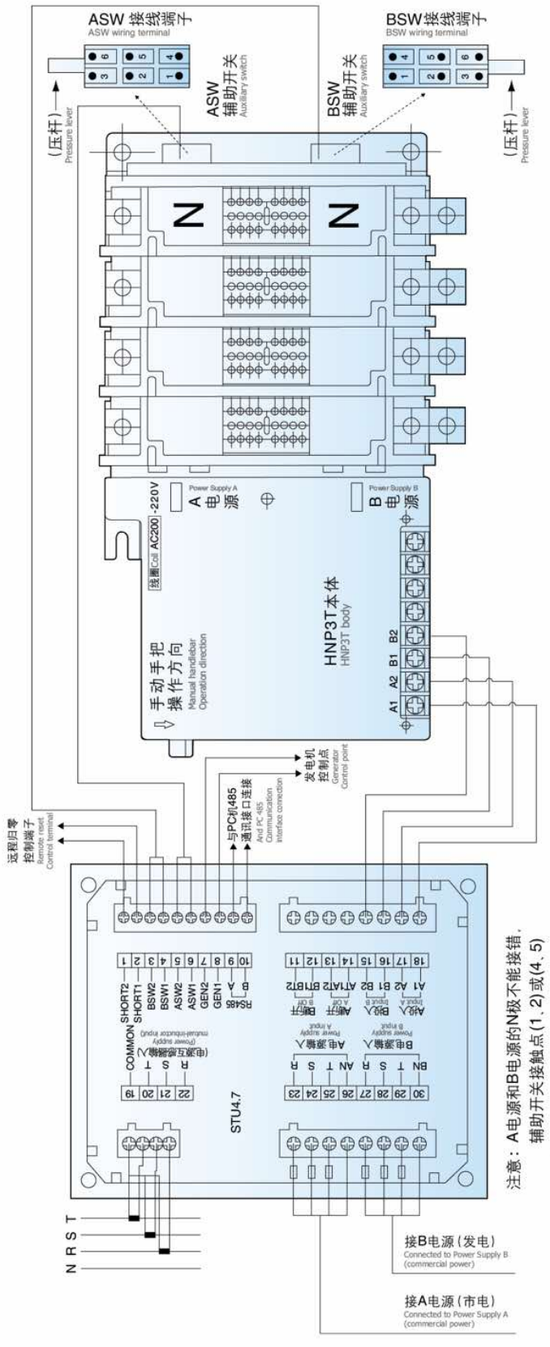
STU4.6 Controller and HNP3S Wiring Diagram



接线图 *Wiring diagram*

STU4.7控制器与HNP3T接线图

STU4.7 Controller and HNP3T Wiring Diagram

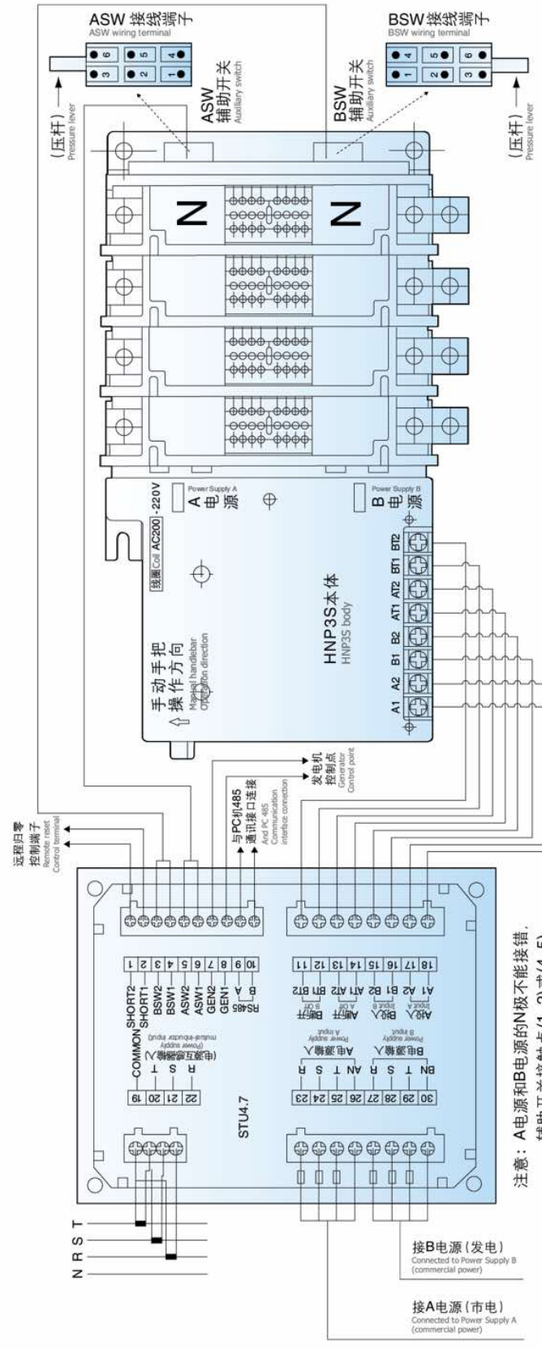


注意：A电源和B电源的N极不能接错，
辅助开关接触点(1, 2)或(4, 5)

Attention:
The N poles of Power Supply A and Power Supply B can not be wrongly connected (auxiliary switch contact point (1, 2) or (4, 5))

STU4.7控制器与HNP3S接线图

STU4.7 Controller and HNP3S Wiring Diagram



注意：A电源和B电源的N极不能接错，
辅助开关接触点(1, 2)或(4, 5)

Attention:
The N poles of Power Supply A and Power Supply B can not be wrongly connected (auxiliary switch contact point (1, 2) or (4, 5))

注意事项
Attentions

人工手动操作方法及注意事项
Manual operation method and attentions

手动操作前必须切断所有电源，手动操作结束务必从转换开关上取下操作手柄！

Disconnect all the power sources before manual operation, make sure to take down the operating handle from the transfer switch after manual operation is finished!

1）人工跳脱方法（仅适用于HNP3S，HNP3T 只能转换不能跳脱）

Manual tripping method (suitable only for HNP3S, for HNP3T, only transfer is available, but tripping is not possible)

取下操作手柄的状态下，以螺丝刀插入左侧TRIP 孔中并往内压即可跳脱。

（请由ON/OFF指示窗口确认开关是否跳脱）

In the state that the operating handle is taken down, insert a screwdriver to TRIP hole at the left side, press inward for tripping.
(Please confirm whether it is tripped via the ON / OFF indication window)

2）A 电源侧投入方法

Method for input at Power Supply A side

HNP3S 需在操作 1）完成后方可进行，而HNP3T 则无须操作1）

For HNP3S, it can be conducted after operation 1）is completed; no operation 1）for HNP3T

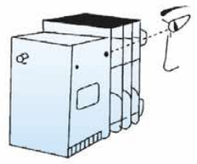
手动操作时把操作手柄前端缺口插入左侧操作方轴。

At time of manual operation, insert the recess at front end of the operating handle into the operation square shaft on the left side.

HNP3S：将手柄往上扳，即可投入。

HNP3T：将手柄往下扳听到“咔”“咔”两声即可。

HNP3S: Turn the handle upward for inputting.
HNP3T: Turn the handle downward till two clicking sounds are heard.



检视ON/OFF指示窗确认投入。

Inspect the ON /OFF indication window to confirm the inputting.

操作后请取下操作手柄。

Take down the operating handle after operation.

3）B 电源侧投入方法

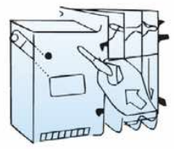
Method for input at Power Supply B side

HNP3S 需在操作1）完成后方可进行，而HNP3T 则无须操作1）

For HNP3S, it can be conducted after operation 1）is completed; no operation 1）for HNP3T

手动操作时把操作手柄前端缺口插入左侧操作方轴。

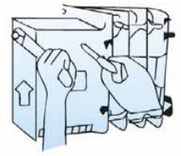
At time of manual operation, insert the recess at front end of the operating handle into the operation square shaft on the left side.



HNP3S：将螺丝刀插入右侧SELECT 孔中并往内压。

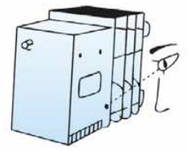
HNP3T：只需再次将手柄往下扳，并听到“咔”“咔”两声即可。

HNP3S: Insert the screwdriver in to the SELECT hole on the right side and press inward.
HNP3T: It is required to turn the handle downward again till two clicking sounds are heard.



HNP3S 保持螺丝刀在压住之位置，同时将手柄往上扳即可投入B 侧开关。

HNP3S: Keep the screwdriver at the pressed position, and in the meantime, turn the handle upward to switch on the switch at Power Supply B side.



检视ON/OFF指示窗确认投入；操作后请取下操作手柄。

Inspect the ON /OFF indication window to confirm the inputting; and please take down the operating handle after operation.

注意事项
Attentions

用户在进行各项调试试验或操作时，还应注意以下事项，以确保安全使用ATSE：

- 中性线N不能接错且须接线可靠，否则ATSE不能正常工作，甚至烧毁控制器及电动机。
- ATSE本体的保护接地须可靠以确保安全。
- 工频耐压试验时（不能对控制器进行耐压试验），须 拔下连接器以隔离控制器和辅助电路。
- ATSE处于“自动控制”状态时，禁止手动操作机构手柄。
- 在供电系统对ATSE供电时，严禁用户在控制器带电时拔插控制器与底板的连接器插头，如果需要拔插连接器插头，必须在ATSE电源侧断电的情况下进行。

When conducting various commissioning tests or operations, users shall also pay attention to the following matters so as to ensure safe handling of ATSE:

- Neutral wire N can not be wrongly connected, and the wire connection must be reliable, otherwise, ATSE can not operate normally, even the controller and motor will be burnt.
- The protective grounding of ATSE body must be reliable so as to ensure safety.
- When conducting power frequency voltage withstand test (voltage withstand test can not be made to the controller), unplug the connector to isolate the controller and auxiliary circuit.
- When the ATSE is in "Automatic Control" state, avoid manual operation of the mechanism handle.
- When power supply system supplies power to the ATSE, strictly prohibit the user to unplug the connector of the controller with the motherboard when the controller is electrified, if it is required to unplug the connector, it must be done with the power-off at ATSE power source side.

订货规范

Order specificatio

HNQ3系列自动转换开关电器

HNQ3 series automatic transfer switching equipment (ATSE)

订货规范

Order specifications

HNQ3 订货规范 / HNQ3 order specification

订货单位 Ordering unit			订货数量 Order Quantity	台 set	订货日期 Date of order		
型号 Model	HNQ3						
	☐ - 3P ☐ - 4P						
壳架等级电流 Frame size current	63	125	160	250	400	630	800
额定工作电流 Rated working current	☐ - 10A ☐ - 16A ☐ - 20A ☐ - 25A ☐ - 32A ☐ - 40A ☐ - 50A ☐ - 63A	☐ - 63A ☐ - 80A ☐ - 100A ☐ - 125A	☐ - 100A ☐ - 125A ☐ - 140A ☐ - 160A	☐ - 100A ☐ - 125A ☐ - 140A ☐ - 160A ☐ - 180A ☐ - 200A ☐ - 225A ☐ - 250A	☐ - 250A ☐ - 315A ☐ - 350A ☐ - 400A	☐ - 400A ☐ - 500A ☐ - 630A	☐ - 630A ☐ - 700A ☐ - 800A
结构形式 Structural form	☐ - 一体式 Integrated type ☐ - 分体式 Split type						
切换方式 Switching mode	☐ - 电网-电网 自投自复 Grid-grid automatic charge and automatic recovery ☐ - 电网-电网 自投不自复 Grid - grid automatic charge but non-automatic recovery ☐ - 电网-发电机 Grid- generator						

控制器型号 Model of controller	☐ - STU4.1	☐ - STU4.2
常用→备用转换延时t_N Normal→Alternative switching delay t_N	_____ s（0.5s ~ 90s，步长0.1s）（0.5s~ 90s, step length 0.1s）	—
备用→常用转换延时t_R Alternative→Normal switching delay t_R	_____ s（0.5s ~ 90s，步长0.1s）（0.5s~ 90s, step length 0.1s）	—
开关转换延时t_1 On-off switching delay t_1	—	_____ s（0.0s~999.9s）
开关返回延时t_2 Switch return delay t_2	—	_____ s（0.0s~999.9s）
投入延时t_3 Inputting delay t_3	—	_____ s（0.0s~999.9s）
确认正常延时t_4 Confirmed normal delay t_4	_____ 1.0s ~ 50s（步长1.0s）(step 1.0s)	_____ s（0.0s~999.9s）
发电机启动延时t_5 Generator start-up delay t_5	_____ 1.0s ~ 50s（步长1.0s）(step 1.0s)	t_1
可选附件 Optional accessories	☐ - 相间隔板 Phase partition ☐ - 挂锁 Padlock	
备注 Remarks		

注：如选择，在☐内标注√ Note: Tick the mark √ in ☐

HNP3系列自动转换开关电器

订货规范

HNP3 PC 级双电源自动转换开关电器订货规范												
订货单位					订货数量				订货日期			
结构		□ - HNP3T（二段式）				□ - HNP3S（三段式）						
壳架等级		□ - 63	□ - 125	□ - 250	□ - 500	□ - 63	□ - 125	□ - 250	□ - 500	□ - 800	□ - 1250	□ - 2500
额定工作电流（单位：A）		□ - 20 □ - 40 □ - 63	□ -80 □ -100 □ -125	□ - 160 □ - 200 □ - 225 □ - 250	□ - 350 □ - 400 □ - 500	□ - 16 □ - 20 □ - 25 □ - 32 □ - 40 □ - 50 □ - 63	□ - 80 □ - 100 □ - 125	□ - 160 □ - 200 □ - 225 □ - 250	□ - 350 □ - 400 □ - 500	□ - 630 □ - 800	□ - 1000 □ - 1250	□ - 1600 □ - 2000 □ - 2500
极数		□-2P □-3P □-4P				□-2P □-3P □-4P				□-3P □-4P		
接线方式		□-板前接线 □-板后接线（特殊订货）				□-板前接线 □-板后接线（特殊订货）				□-板前接线（特殊订货） □-板后接线		
功能号	□- I	□-STU4.6 □-STU4.7				□-STU4.6 □-STU4.7				□-STU4.7		
	□-II	不配置控制器				内置控制单元						/
控制器	型号	功能				参数等设置						
	STU4.6	■-延时 ■-缺相保护 ■-电源指示 ■-远程归零 ■-发电机启动功能 □-485通讯接口功能（可选） ■-工作模式（自投自复或自投不自复）				控制模式：_____； A→OFF延时：____s； B→A延时：____s； OFF→B延时：____s； 发电机停止延时：____s； 通讯地址：_____；				屏幕保护：____； A→B延时：____s； OFF→A延时：____s； B→OFF延时：____s； 发电机启动延时：____s； 语言：_____；		
	STU4.7	■-延时 ■-过压保护 ■-欠压保护 ■-缺相保护 ■-线电压显示 ■-电源指示 ■-远程归零 ■-发电机启动功能 ■-频率显示 ■-负载电流显示 ■-逆相序 ■-频率 ■-电流过载保护（用户自备电流互感器） ■-工作模式（自投自复或自投不自复） □-485通讯接口功能（可选）				控制模式：_____； 互感器设定值：_____； 欠压延时：____s； B→A延时：____s； OFF→B延时：____s； 欠压设定值：____V； 过流设定值：____A； 通讯地址：_____； 下限频率设定：____Hz；				屏幕保护：____； 过压延时：____s； A→B延时：____s； OFF→A延时：____s； B→OFF延时：____s； 过压设定值：____V； 发电机停止延时：____s； 上限频率设定：____Hz； 语言：_____；		
可选附件		□-操作手柄 □-相间隔板 □-线束（ ■-电压采样线 ■-控制信号线 ■-辅助触点接线 □-远程归零线 □-电机启动信号线 ）										
备注												

注：□-增选配置，如选择，在□内标注√

HNP3 series automatic transfer switching equipment (ATSE)

Order specifications

Order Specification for HNP3 PC Grade Double Power Supply ATSE												
Ordering unit					Order Quantity				Date of order			
Structure		□ - HNP3T (two-station type)				□ - HNP3S (three-station type)						
Frame size		□ - 63	□ - 125	□ - 250	□ - 500	□ - 63	□ - 125	□ - 250	□ - 500	□ - 800	□ - 1250	□ - 2500
Rated working current (unit: A)		□ - 20 □ - 40 □ - 63	□ -80 □ -100 □ -125	□ - 160 □ - 200 □ - 225 □ - 250	□ - 350 □ - 400 □ - 500	□ - 16 □ - 20 □ - 25 □ - 32 □ - 40 □ - 50 □ - 63	□ - 80 □ - 100 □ - 125	□ - 160 □ - 200 □ - 225 □ - 250	□ - 350 □ - 400 □ - 500	□ - 630 □ - 800	□ - 1000 □ - 1250	□ - 1600 □ - 2000 □ - 2500
Number of poles		□-2P □-3P □-4P				□-2P □-3P □-4P				□-3P □-4P		
Mode of connection		□- Front panel wiring □- Rear panel wiring (special order)				□- Front panel wiring □- Rear panel wiring (special order)				□- Front panel wiring (special order) □- Rear panel wiring		
Function number	□- I	□- STU4.6 □-STU4.7				□- STU4.6 □-STU4.7				□- STU4.7		
	□-II	Without controller				With built-in control unit						/
Controller	Model	Function				Setting of parameters and etc.						
	STU4.6	■- Delay ■- Default-phase Protection ■- Power indication ■- Remote reset ■- Generator start-up □- 485 communication interface (optional) ■- Operation mode(Automatic charge and automatic recovery or automatic charge but non-automatic recovery)				Control mode：_____； A→OFF delay：____s； B→A delay：____s； OFF →B delay：____s； Generator stop delay：____s； Communication address：_____；				Screen protection：____； A→B delay：____s； OFF →A delay：____s； B→OFF delay：____s； Generator start-up delay：____s； Language：_____；		
	STU4.7	■- Delay ■- Over-voltage protection ■- Under-voltage protection ■- Default-phase protection ■- Line voltage display ■- Power indication ■- Remote reset ■- Generator start-up ■- Frequency display ■- Load current display ■- Frequency ■- Negative phase sequence ■- Over-current protection (Current transformer to be self-provided by the users) ■- Operation mode(Automatic charge and automatic recovery or automatic charge but non-automatic recovery) □-485 communication interface (optional)				Control mode: _____； Setting value of mutual-inductor: ____； Under-voltage delay: ____s； B→A delay: ____s； OFF →B delay: ____s； Under-voltage setting value:____V； Over-current setting value: ____A； Communication address: _____； Lower limit frequency setting: ____Hz；				Screen protection:____； Over-voltage delay: ____s； A→B delay: ____s； OFF →A delay:____s； B→OFF delay: ____s； Over-voltage setting value: ____V； Generator stop delay: ____s； Upper limit frequency setting: ____Hz； Language: _____；		
Optional accessories		□-Operating handle □-Phase partition □-Harness (■-Voltage sampling wire ■-Control signal wire ■-Auxiliary contact wire connection □-Remote reset wire □-Motor start-up signal wire)										
Remarks												

Note: □- Optional, tick the mark √ in □

伊顿辉能低压电器（江苏）有限公司
Eaton Huineng Low-Voltage Electrical (Jiangsu) Co., Ltd.

地址：江苏省镇江新区大港五峰山路97号
邮编：212132
电话：0511-83370758　83370618
传真：0511-83370398

Add：97 Wufengshan Road,
Zhenjiang Development Zone,Jiangsu
P.C：212132
Tel：0511-83370758　83370618
Fax：0511-83370398

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