

IT系统绝缘监测

故障定位装置及 监控系统

IT System

Insulation Monitoring Device
And Fault Location System

安科瑞电气股份有限公司
ACREL CO.,LTD



选型
手册

Selection
Guide



Address: No.253 Yu Lv Road Jiading District, Shanghai, China

Postcode: 201801

TEL: 0086-21-69158338 0086-21-69156052 0086-21-69156392 0086-21-69156971

Web-site: www.acrel-electric.com

Email: acrel008@vip.163.com

2020.01

一、医用隔离电源及其监控系统[Medical Isolated Power Supply and Monitoring System]

1.概述[Overview]	1
2.医用隔离电源监控系统[Medical Isolated Power Supply Monitoring System]	1
3.医疗场所的供电解决方案[Power Supply Solutions in Medical Locations]	5
4.产品介绍[Introduction]	12
5.应用方案[Application Schemes]	27

二、医用剩余电流监测产品[Medical Residual Current Monitoring Products]

1.概述[Overview]	33
2.产品介绍[Introduction]	33
3.应用方案[Application Schemes]	38

三、工业用绝缘监测产品[Insulation Monitor Device for Industry]

1.概述[Overview]	41
2.产品介绍[Introduction]	41
3.应用方案[Application Schemes]	43
4.典型接线图[Typical Connection Diagram]	45

四、附录 Appendix

1.IT/TT/TN系统介绍[IT/TT/TN System Introduction]	46
2.医疗场所安全设施的类别和级别划分示例 [Classifications and Rankings of Safety Facilities in Medical Places]	49
3.国家标准对医疗场所电气装置的要求 [National Standards for Electrical Devices in Medical Places]	51

五、典型业绩[Main Achievements] 54

六、资质证书[Certifications] 56

一、医用隔离电源及其监控系统[Medical Isolated Power Supply and Monitoring System]

1.概述[Overview]

随着电子医疗设备在医院领域的广泛应用，漏电流对病人构成的威胁也越来越大，尤其是那些生命攸关的场所，病人在手术中或麻醉状态下，各种电极、传感器直接插入人体内，微小的漏电流都有可能对病人造成致命伤害。另外有些医疗设备用于维持重症病人的生命，一旦设备停电，也会对病人的生命构成威胁。因此，对于医院这一特殊场所的电气设计，应严格按照国家标准和规范要求，采用IT系统供电。

安科瑞医用IT系统绝缘监测故障定位装置及系统适用于医院的手术室、ICU(CCU)监护病房等重要场所，能为这类场所提供安全、连续、可靠的供电解决方案。

With electronic medical equipments widely used in hospitals, leakage current threats to patients are also growing, especially at those living related sites. When patients in operation or anesthesia, various electrodes, sensors are directly into human bodies. Small leakage current can lead death to patients. In addition, some medical equipment are used for keeping patients' lives, once the devices are out of power, it'll threat patients' lives. Therefore, the electrical design for special places like hospitals should be strictly in line with national standards, And adopt IT systems for power supply.

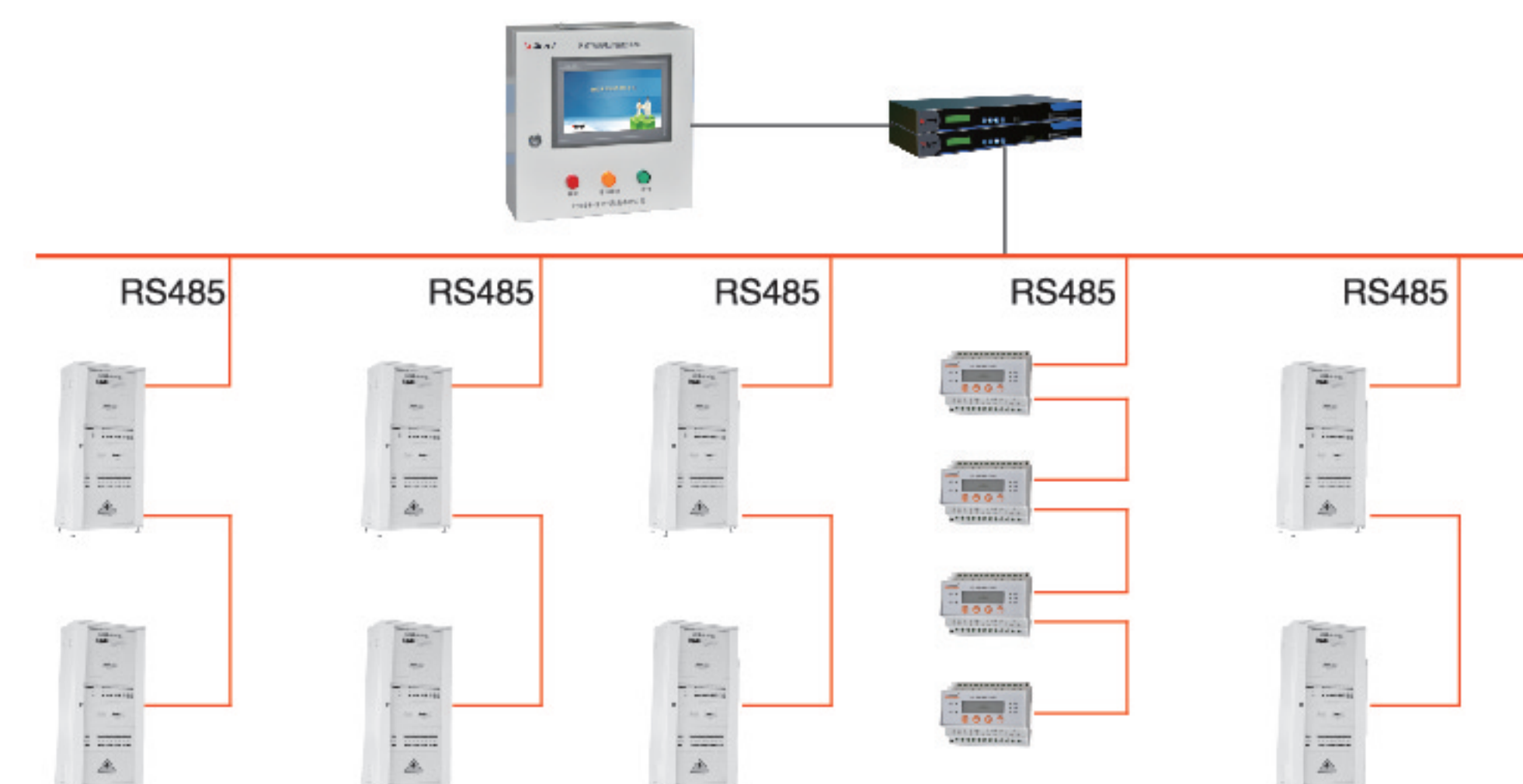
Acrel medical IT system insulation monitoring device and fault location system are suitable for operating rooms, ICU(CCU) and other medical places. It can provide a safe, continuous, reliable power solutions for these sites.

2.医用隔离电源监控系统[Medical Isolation Power Supply Monitoring System]

医用隔离电源监控系统用于集中监控医疗大楼内所有医疗2类场所医疗IT系统的运行状况。这种集中监控系统可以设置在医院电气运行和维护人员的值班室内，也可以集成在其它电力监控系统中，由专业的电气人员进行监控，一旦某套IT系统出现故障，电气维护人员可以在第一时间内做出判断，并根据现场情况进行处理。

Medical isolation power supply monitoring system is used to centrally monitor the operation of medical IT systems in all medical buildings. This centralized monitoring system can be set up in the duty room for hospital electrical operation and maintenance personnel, or integrated in other power monitoring systems. It can be monitored by professional electrical personnel. Once a set of IT system fails, the electrical maintenance personnel can make a judgement in the first time and deal with it according to the situation on the spot.

2.1 系统拓扑图[System Topology]



2.2 软件功能[Software Function]

安科瑞医用隔离电源监控系统是基于触摸屏软件设计，软件具有远程测量、远程参数设置和远程自检等多种功能，为医院2类场所隔离电源系统的集中监控提供了强大的系统集成工具。软件的主要功能如下：

ACREL medical isolation power monitoring system is based on touch-screen software design. The software has remote measurement, remote parameter setting and remote self-test and other functions and provides a powerful system integrated tools for isolated power centralized monitoring system of all medical group II places. The main functions of the software are as follows:



■ 一次图和现场分布显示[Primary connection diagram and field distribution display]

系统具有一次图及现场分布图显示功能，能直观的了解并及时地发现IT供电系统的报警地点或区域，从而方便专业人员及时到达现场进行故障排查；

The system has the display function of primary connection diagram and field distribution. We can intuitively know and promptly find alarm location/region of IT power supply system from it, which allows professionals to reach the scene in time to solve problem.

■ 实时数据采集与显示[Real-time data acquisition and display]

利用安装于各隔离电源系统中绝缘监测仪表和绝缘故障定位仪表，采集各隔离电源系统的参数。采集到的数据实时显示在监控系统界面，这些监测参量含IT系统对地绝缘电阻、变压器负荷电流、变压器绕组温度及绝缘故障回路等；

Insulation monitoring meters and insulation fault location meters installed at isolated power systems are used to collect the parameters of the isolated power system. Monitoring system interface displays the collected data in real time. These monitoring parameters include IT system insulation resistance, transformer load current, the transformer winding temperature and insulation fault circuit and other parameters;



■ 故障报警[Fault Alarm]

将各医用隔离电源系统出现的各类故障，如绝缘故障、过载故障、超温故障以及接线断线故障等信息进行统一处理和记录，并可直接在显示界面上弹出显示故障类型、监测值、故障地点以及故障发生时间等信息。同时启动监控系统的声光报警系统，及时提醒相关人员，进行故障处理。其中，声音报警信号可被手动消除。

The system can process and record various medical isolated power system faults such as insulation, overload, over temperature and wiring disconnection, and it can display fault type, monitoring values, fault location and failure time, etc. Meanwhile it starts the audible and light alarm of the monitoring system, reminding the relevant personnel to solve the problem in time. In addition, the audible alarm signal can be manually removed.

■ 远程参数设置和查询[Remote parameter setting and inquiry]

通过系统，可根据要求远程调整和设置各医用隔离电源系统中绝缘监测仪的各类报警参数阈值，也可以任意查看这些报警参数值。参数包括绝缘报警值、负载电流报警值和隔离变压器温度报警值等。

Through the system, all kinds of alarm parameters threshold of insulation monitors in each medical isolated power system can be checked, adjusted and set up according to requirements. Parameters include insulation alarm values, the load current alarm values and isolation transformer temperature alarm values, etc.



■ 图形显示功能[Graphic display]

系统可以以曲线的形式，显示各套隔离电源系统的绝缘状况、负载状况，以及隔离变压器的温升状况，以及它们的变化趋势，以便于分管理人员了解和各电源系统的运行变化情况，有针对性的对某些系统进行维护和保养。

The system can display the status and change trends of insulation, load and isolation transformer temperature conditions by curve, which can help managers understand and analyze operational changes in each power system, then they can aimly maintain and repair the system.

2.3 医用隔离电源监控器[Medical Isolated Power Supply Monitor]

● 适用环境[Application Environment]

- 工作温度：-10℃ ~ +55℃
- Operating temperature: -10℃ ~ +55℃
- 储存温度：-20℃ ~ +70℃
- Storage temperature: -20℃ ~ +70℃

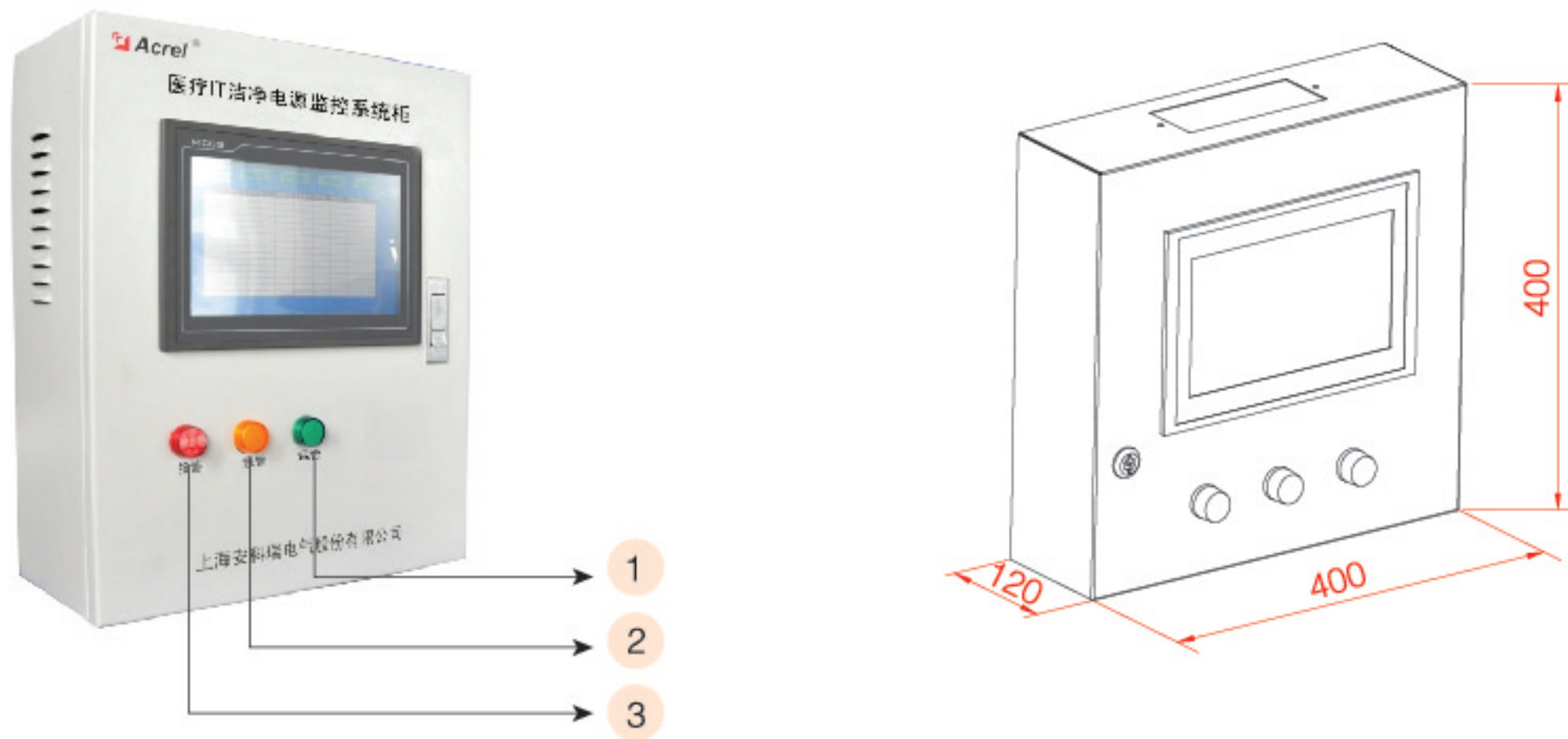
- 相对湿度：≤95%不结露
—Relative humidity: ≤ 95% No condensation
- 海拔高度：≤2500m
—Altitude: ≤2500m
- 污染等级：Ⅲ 级
—Pollution Levels: Level Ⅲ
- 安装类别：Ⅲ 级
—Installation category: Level Ⅲ

● 主要组成部件[The main components]

安科瑞医用隔离电源监控器柜主要功能及组成部件见下表。
The following tables lists the main functions of ACREL Medical isolation power monitor cabinet:

详细参数Parameters		柜体名称Cabinet Name	医用隔离电源监控器柜 Medical Isolation Power Supply Monitor Cabinet
外形尺寸Dimensions(mm)			500 (H) × 400 (W) × 190 (D)
主要组成部件 main components	计算机Computer		10 inches TFT彩色触摸屏10 inches TFT Color touch screen
	输入输出模块I/O modules		内置远程智能I/O Built-in remote intelligent I/O modules
	电源模块Power Modules		开关电源Switching Power Supply
	指示灯Lights		红 (报警) 黄 (预警) 绿 (正常) Red (warning) Yellow (Early Warning) Green (normal)

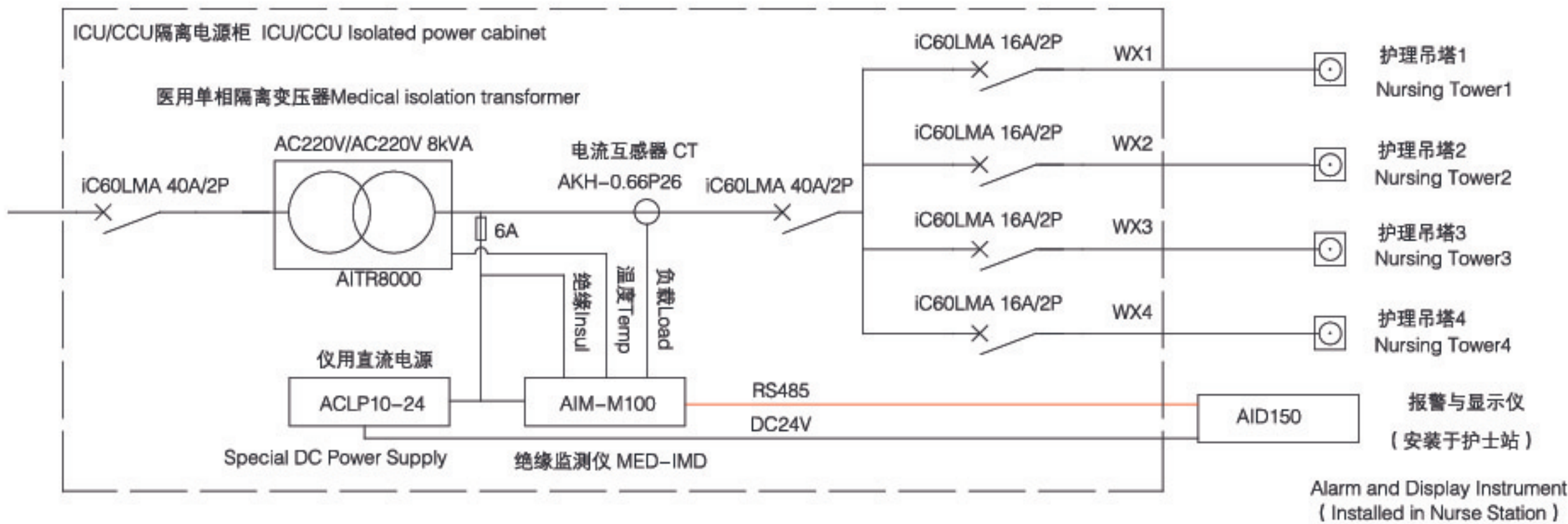
● 实体结构图[Entity structure diagram]



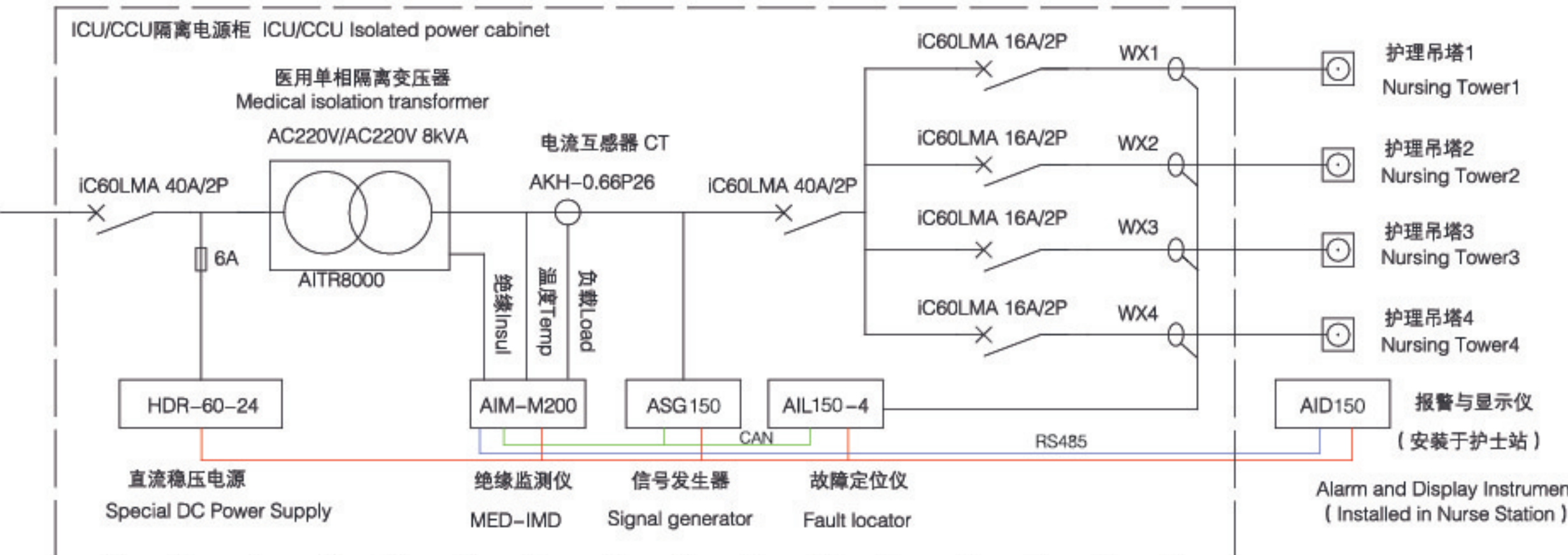
- 1: 运行指示灯 (绿色) ，系统正常运行时指示灯点亮。
Operation indicator (green), the indicator light indicates the system is operating normally.
- 2: 通讯故障指示灯 (黄色) ，系统接收到预警信号时指示灯点亮。
Communication fault indicator (yellow), lights indicate the system receives the warning signal.
- 3: 报警指示灯 (红色) ，系统接收到监控报警信号时指示灯点亮。
Alarm indicator (red), lights indicate that monitoring system receives the alarm signal.

3.医疗场所供电解决方案[Power Supply Solution for Medical Places]

3.1 ICU、CCU病房配电解决方案 (以GGF-I8G隔离配电柜系统图为例)
ICU, CCU Ward Power Distribution Solutions (e.g. GGF-I8G isolate electrical cabinet system diagram)



方案一 不带绝缘故障定位功能
Option I solution without fault location function



方案二 带绝缘故障定位功能
Option II solution with fault location function

注：在重症监护室的配电解决方案中，AID系列集中报警与显示仪应该安装在护士站内，由护士站的医务人员来监视各隔离电源系统的运行状况。

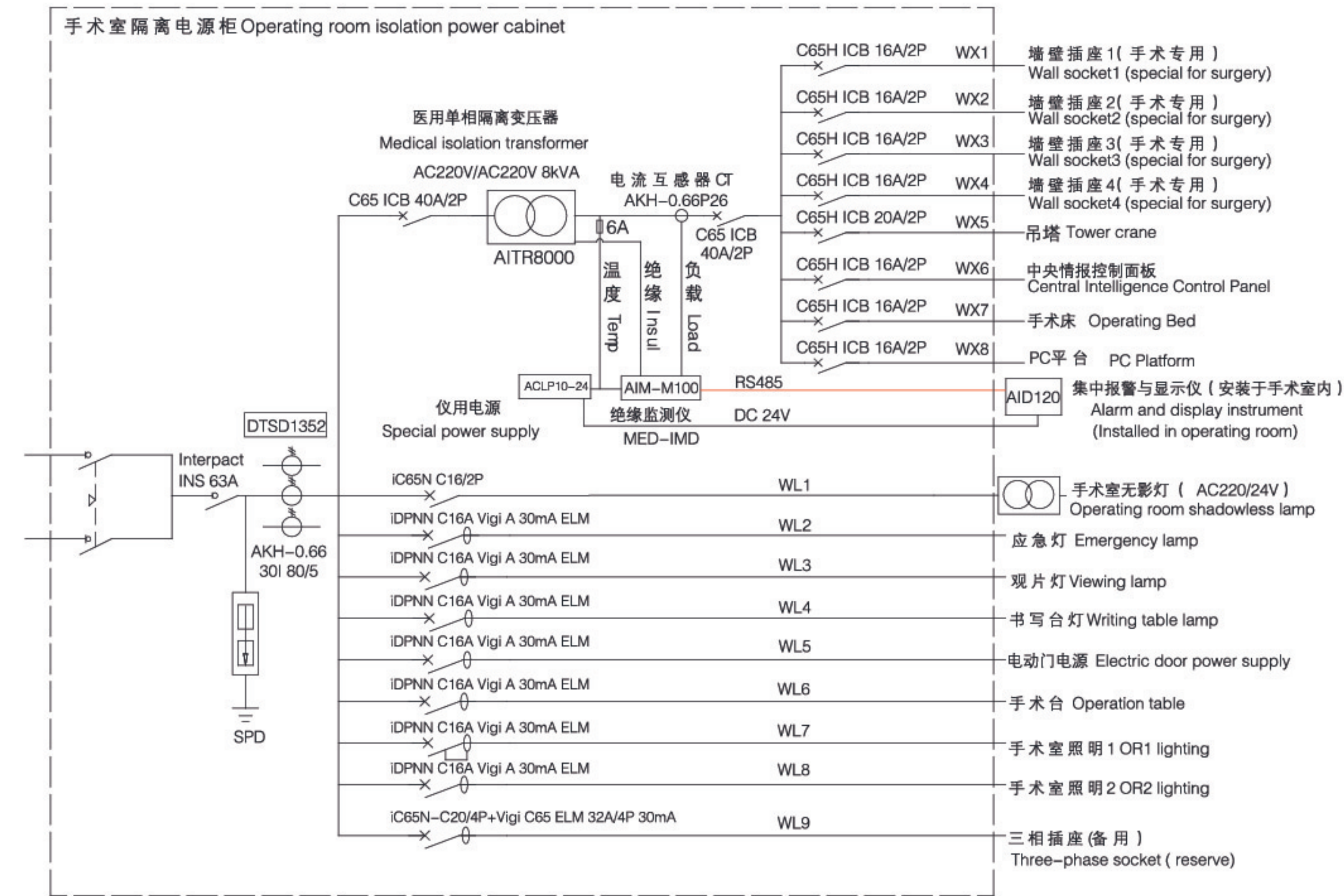
Note: In the power distribution solutions of ICU, AID series centralized alarm and display device should be installed in the nurses 'station, the hospital staff of nurses' station monitor the operating status of each isolated power system.

● 手术室解决方案配置表[Operating room solution configuration table]

配置Configuration	规格Model	GGF-I6X	GGF-I8X	GGF-I6XL	GGF-I8XL
隔离变压器 Isolation Transformer		AITR6300	AITR8000	AITR6300	AITR8000
绝缘监测仪 Insulation monitors		AIM-M100 (或AIM-M10)		AIM-M200	
直流稳压电源 DC power supply		ACL10-24		HDR-60-24	
测试信号发生器 Test signal generator		—		ASG150	

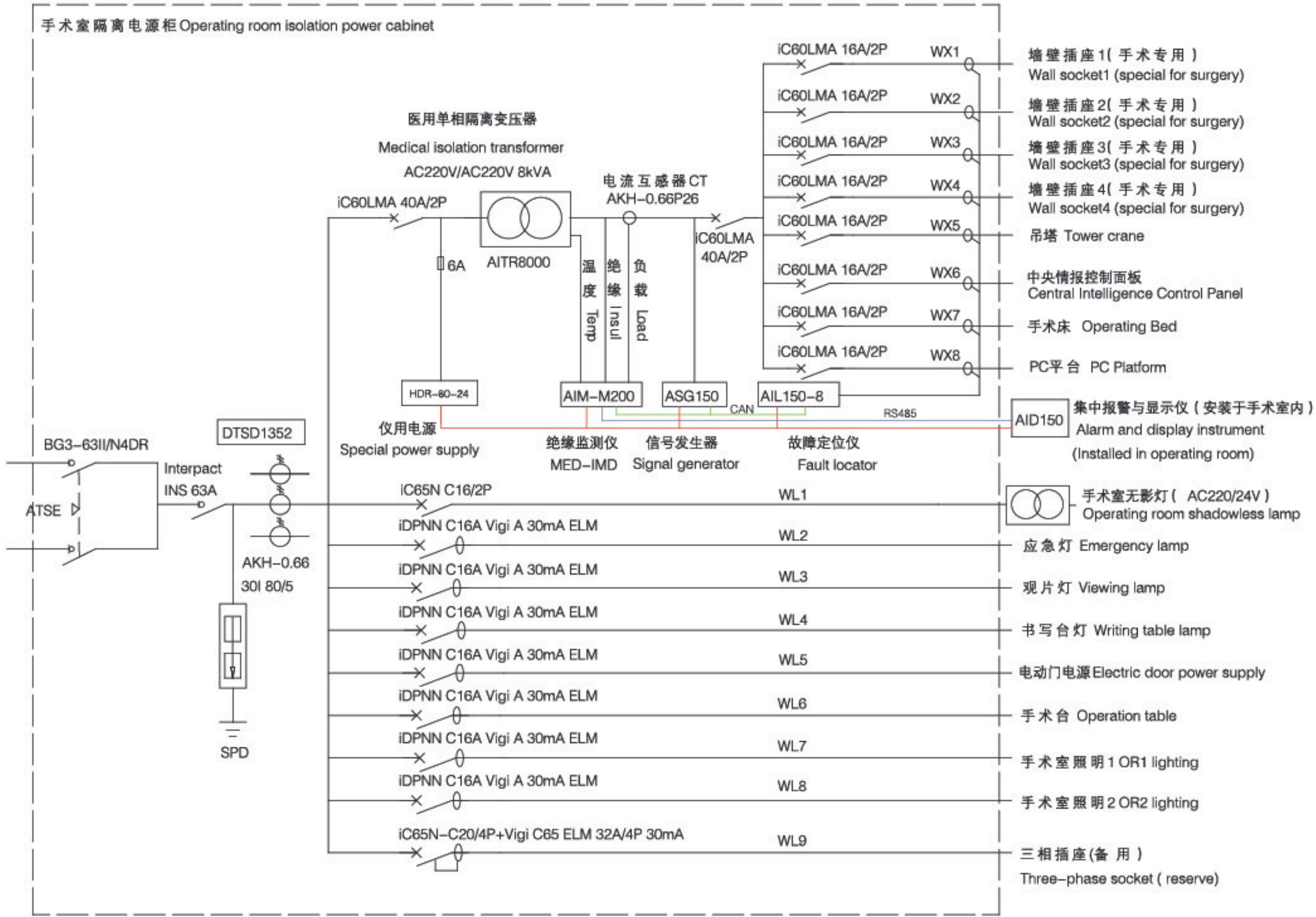
规格Model	GGF-I6X	GGF-I8X	GGF-I6XL	GGF-I8XL
配置Configuration				
绝缘故障定位仪 Insulation fault locator	AITR6300	AITR8000	AITR6300	AITR8000
输出回路 Output circuit	IT系统：4路、8路等（可根据实际需求定制） IT Systems: 4, 8 channels, etc. (can be customized according to the actual needs)			
电流互感器 Current Transformer	AKH-0.66P26			
断路器 Circuit Breaker	iC60LMA 16A 2P、iC60LMA 40A 2P			
报警与显示仪 Alarm and display instrument	AID150（单套或多套集中监控） AID 150 (single set or multiple sets of centralized monitoring)			

3.2 手术室配电解决方案（以GGF-O8G隔离配电柜系统图为例）
Operating Room Power Distribution Solutions (e.g. GGF-O8G isolate electrical cabinet system diagram)



方案一 不带绝缘故障定位功能

Option I solution without insulation fault location function



方案二 带绝缘故障定位功能
Option II solution with insulation fault location function

注：1.在手术室的配电解决方案中，AID系列外接报警与显示仪应安装于手术室内部情报面板上，或情报面板的旁边（嵌墙安装）。

在手术过程中，由医务人员来监视隔离电源系统的运行状况。

2.带绝缘故障定位功能的方案中，如果需定位回路超过8路，可采用两套AIL150定位仪来实现，其组合可以是AIL150-8型+AIL150-4型(最多定位12路)，或AIL150-8型+AIL150-8型（最多定位16路）。

Notes: 1. In the operating room power distribution solutions, AID series external alarm and display device should be installed on the intelligence panel inside the operating room, or next to the intelligence panel (in-wall installation).During surgery, the statue of isolated power system is monitored by the medical staff.

2. In the option II, two sets AIL150 fault locator can be used to locate over 8 channels circuits. The combination can be AIL150-8type+AIL150-4 type (up to 12 channels location), or AIL150-8 and AIL150-8 type (up to 16 channels location).

● 手术室解决方案配置表[Operating room solution configuration table]

配置Configuration	规格Model	GGF-O6X	GGF-O8X	GGF-O6XL	GGF-O8XL	备注 Remark
隔离变压器 Isolation Transformer		AITR6300	AITR8000	AITR6300	AITR8000	
双电源切换装置 Dual power supply switching device	可选配置Optional Configuration					
绝缘监测仪 Insulation monitors	AIM-M100 (AIM-M10)			AIM-M200		
测试信号发生器 Test signal generator	—			ASG150		
绝缘故障定位仪 Insulation fault locator	—			AIL150-8		
直流稳压电源 DC power supply	ACLP10-24			HDR-60-24		
电流互感器 Current Transformer	AKH-0.66 40I 75/5、AKH-0.66P26					
断路器Circuit Breaker	iC60LMA 40A/2P、iC60LMA 16A/2P、iC60LMA 20A/2P					
报警与显示仪 Alarm and display instrument	AID120 (AIM-M100) /AID10 (AIM-M10) (安装于情报面板旁) (installed next to the intelligence panel)			AID150 (安装于情报面板旁) (installed next to the intelligence panel)		
馈电回路Feeder circuits	8 × AC220V					TN系统 TN systems
	1 × AC380V、8 × AC220V					
浪涌保护器Surge Protector	PR20 20KA 3P+N					
多功能仪表Multifunction Meter	DTSF1352					
剩余电流动作保护器 Residual current operated protector	动作电流≤30mA (A型) Operating current ≤ 30mA (Type A)					

3.3 医用隔离电源柜[Medical isolation power supply cabinet]

医用隔离电源柜是针对医疗2类场所的供电需求而设计的具有局部IT系统的配电柜，IT系统装设绝缘监测装置来监测系统的绝缘状况，各输出回路采用了只具有短路保护功能的断路器；TN-S系统输出回路则采用了具有漏电保护功能的断路器。产品根据输入电压相数的不同分为GGF-O系列三相隔离电源柜、GGF-I系列单相隔离电源柜，这些产品能够很好的满足各类手术室和重症监护室对电源安全性和可靠性的要求，并符合GB16895.24-2005/IEC60364-7-710:2002《建筑物电气装置第7-710部分：特殊装置或场所的要求—医疗场所》和GB7251.12-2013/IEC 61439-2:2011《低压成套开关设备和控制设备第2部分：成套电力开关和控制设备》等标准。

Medical isolation power distribution cabinet is a cabinet with a local IT systems designed for medical group II power supply requirements. Insulation monitoring device installed in IT system monitor insulation condition of the system. Each output circuit has a circuit breaker with short circuit protection function, the output circuit in TN-S system has a circuit breaker with leakage protection. Products are divided into GGF-O series three-phase isolated power cabinet, and GGF-I series single-phase isolated power supply cabinet. According to the number of input voltage phases, these products can satisfy the power safety and reliability requirements of various operating room and intensive care unit ,and the products meet GB16895.24-2005/IEC60364-7-710:2002 and GB7251.12-2013/IEC 61439-2:2011.

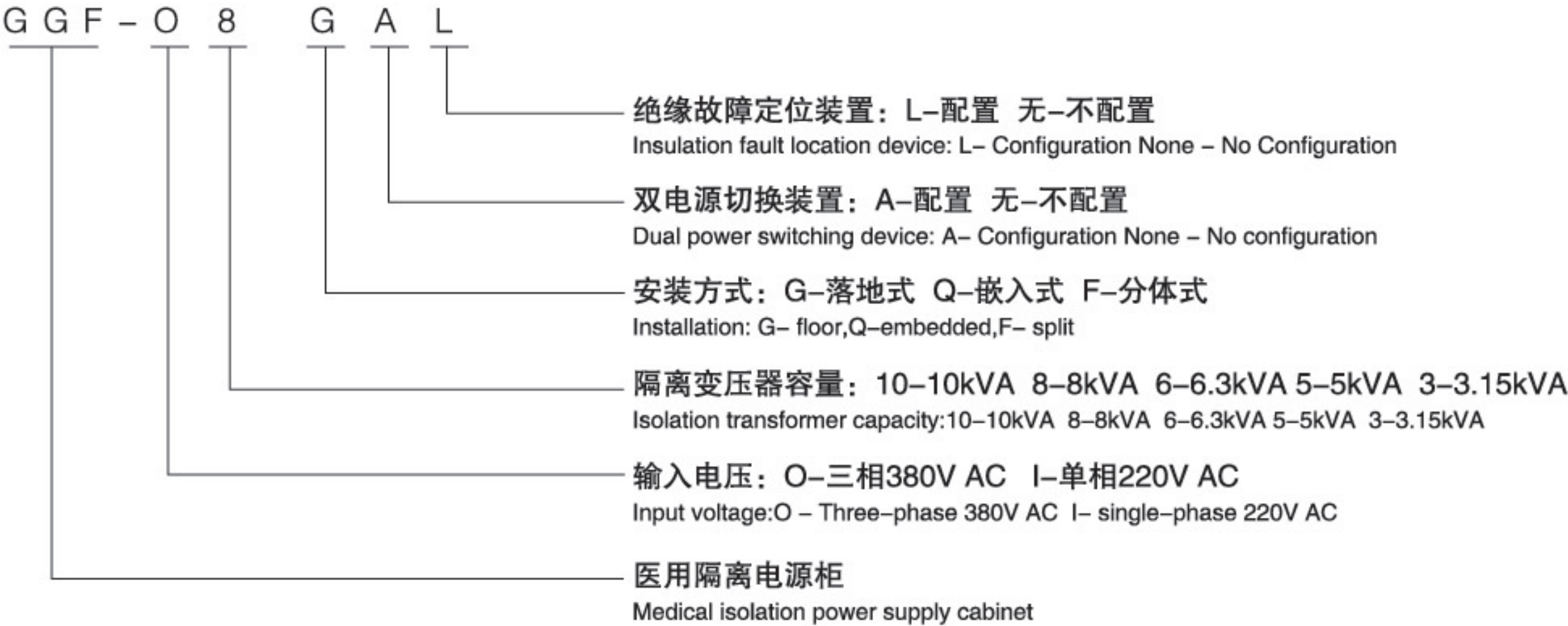


● 技术参数[Technical Parameters]

技术参数 Technical Parameters	GGF-IXG	GGF-IXQ	GGF-IXF	GGF-OXG	GGF-OXQ	GGF-OXF
额定电压 Rated voltage	220V AC			380V/220V AC		
额定容量（kVA） Rated Capacity	3.15/5/6.3/8/10		—	3.15/5/6.3/8/10		—
额定频率 Rated frequency	50/60Hz					
配电回路 Distribution circuit	IT系统：4/5路AC220V(可根据实际需求定制) IT Systems: 4 or 5 channels AC220V (can be customized)			IT系统：8路AC220V(可根据实际需求定制) IT Systems: 8channels AC220V (can be customized)		
	—			TN-S系统：1路AC380V，8路AC220V TN-S Systems: 1 AC380V，8 AC220V		
防护等级 IP Level	IP31	IP34D		IP31	IP34D	
安装方式 Installation	落地安装 Grounded	嵌入式安装 Embedded		落地安装 Grounded	嵌入式安装 Embedded	
进出线方式 Inlet and Outlet Line	底部进线，底部出线 Bottom Inlet and Bottom Outlet	底部和顶部均有进出线 Both bottom and top have access lines		底部进线，底部出线 Bottom Inlet and Bottom Outlet	底部和顶部均有进出线 Both bottom and top have access lines	
通讯方式 Communication	RS485接口，Modbus-RTU协议 RS485 interface, Modbus-RTU protocol					

注：1.GGF-IXF和GGF-OXF型为分体式安装的配电柜，其隔离变压器外置。
2.为了满足不同场所安装条件的特殊要求，安科瑞可以定制多套（2~4套）隔离电源系统一体的柜型，其柜型尺寸为800(W)×500(D)×1800(H)或800(W)×800(D)×1800(H)。
Notes: 1.GGF-IXF and GGF-OXF types are separated installation of power distribution cabinet, the isolation transformer is external installed.
2. In order to meet the special requirements of install conditions in different places, ACREL can customize cabinet with multiple sets(2-4 sets) isolated power system , the size is 800 (W) × 500 (D) × 1800 (H) or 800 (W) × 800 (D) × 1800 (H).

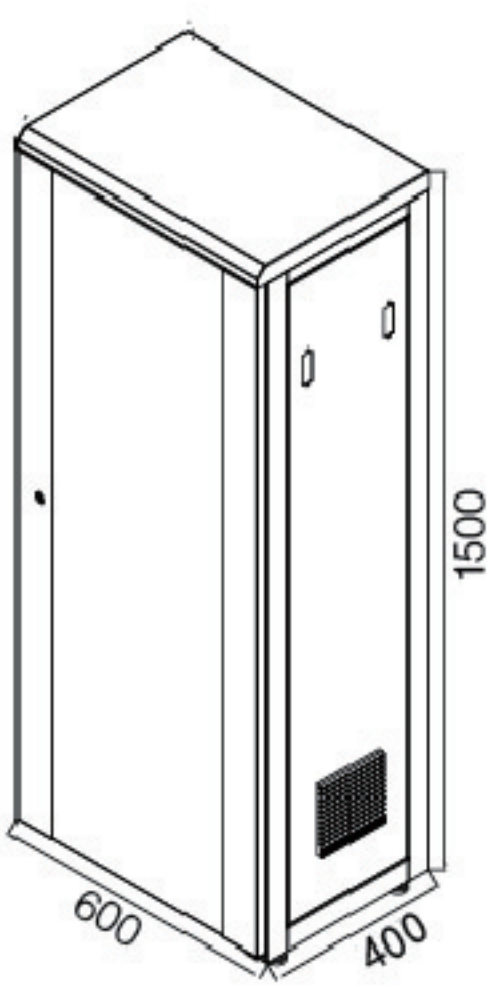
命名规则[Naming Rules]



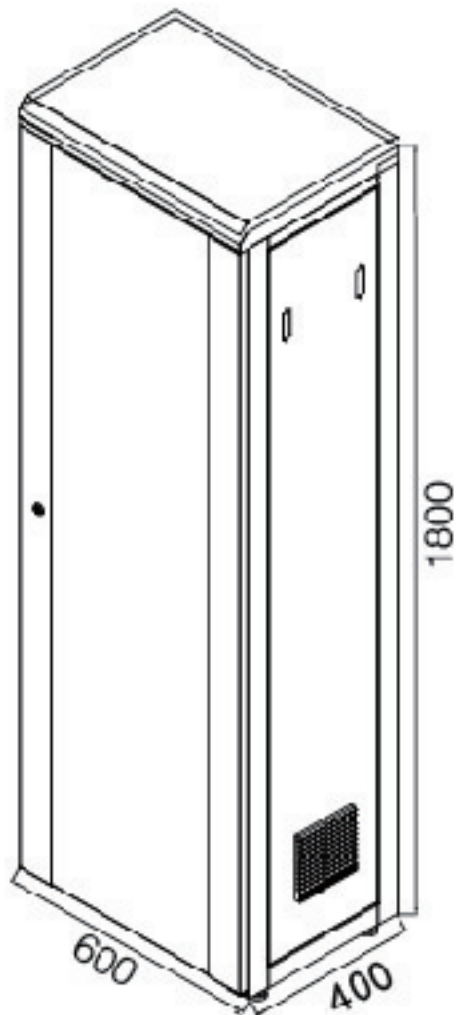
定货信息[Ordering Information]

订货号 Order number	单进线 Single line	双进线自动切换装置 Dual-line automatic switching device	故障定位 Fault location
单相电源柜 Single-phase power supply cabinet	GGF-IXG	■	
	GGF-IXGA	■	
	GGF-IXGL	■	■
	GGF-IXGAL	■	■
	GGF-IXF	■	
	GGF-IXFL	■	■
	GGF-IXQ	■	
	GGF-IXQL	■	■
三相电源柜 Three Phase Power supply cabinet	GGF-OXG	■	
	GGF-OXGA	■	
	GGF-OXGL	■	■
	GGF-OXGAL	■	■
	GGF-OXF	■	
	GGF-OXFL	■	■
	GGF-OXQ	■	
	GGF-OXQL	■	■

产品外形尺寸（单位：mm）[Product Dimensions (unit: mm)]



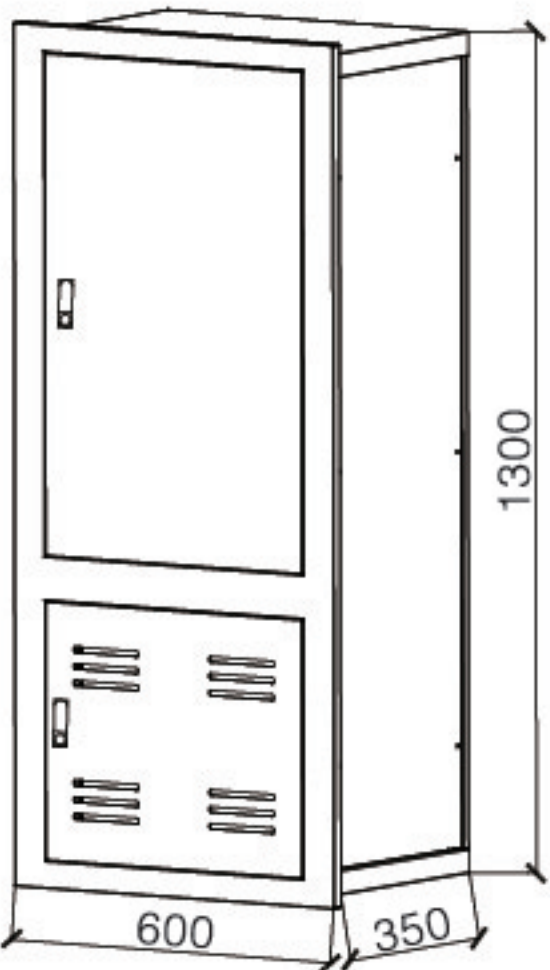
GGF-IXG系列外形尺寸图
GGF-IXG Series Dimensions



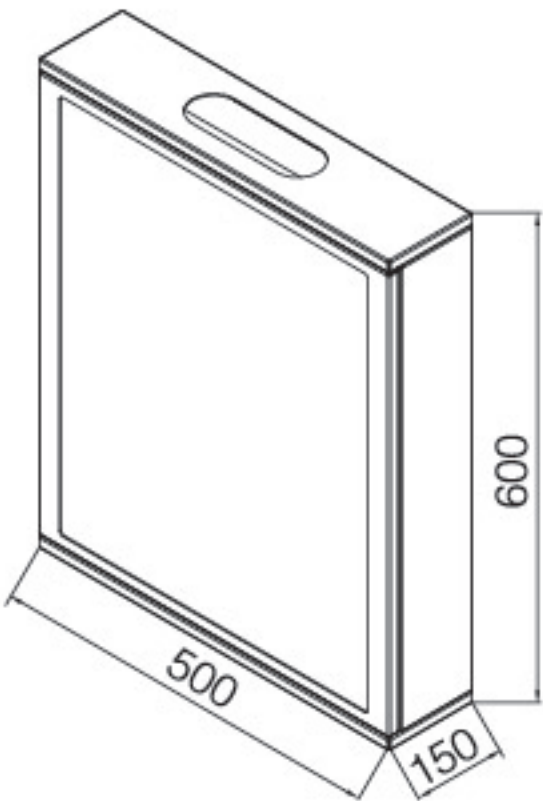
GGF-OXGA/GGF-OXG系列外形尺寸图
GGF-OXGA/GGF-OXG Series Dimensions



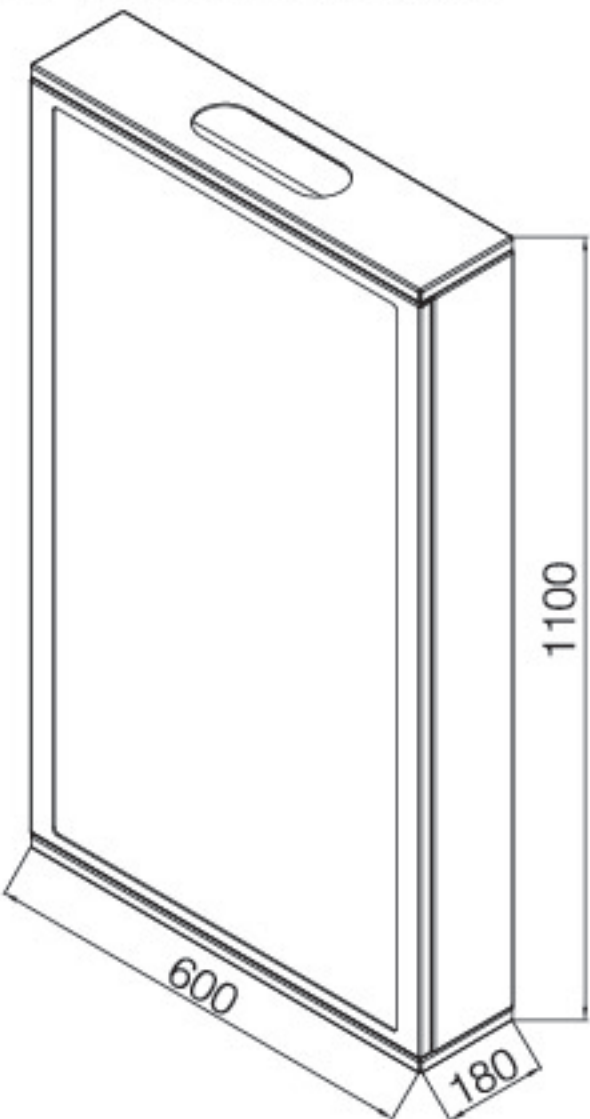
GGF-IXQ系列外形尺寸图
GGF-IXQ Series Dimensions



GGF-OXQ系列外形尺寸图
GGF-OXQ Series Dimensions



GGF-IXF系列外形尺寸图
GGF-IXF Series Dimensions



GGF-OXF系列外形尺寸图
GGF-OXF Series Dimensions

4. 产品介绍 [Introduction]

4.1 AITR系列隔离变压器[AITR Series isolation transformer]

AITR系列隔离变压器专门用于医疗IT系统，产品铁芯采用日本进口的硅钢片叠加而成，损耗很小。绕组与绕组之间采用了双重绝缘处理，并设计了静电屏蔽层，减少了两绕组之间的电磁干扰。绕组内安装了PT100温度传感器，可用于监测绕组温度。变压器整体采用真空浸漆处理，增加了机械强度并具有抗腐蚀作用。另外，产品还采用了低温升和低噪声设计，使其具有很好的温升性能和很低的噪声。

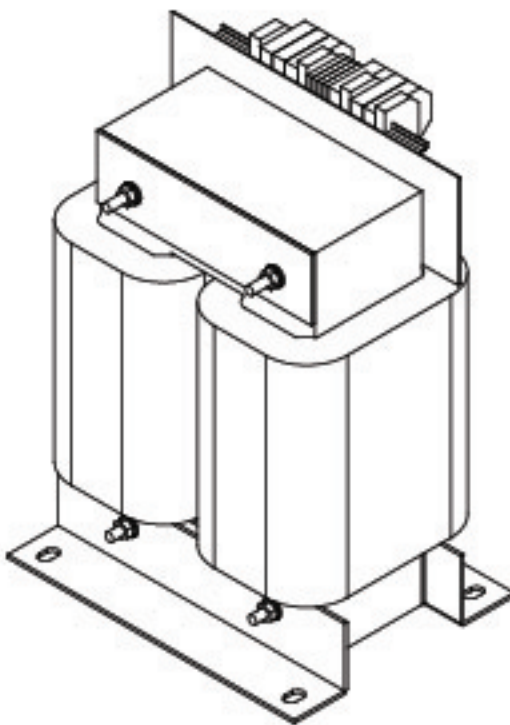
AITR series isolation transformer is specially used in medical IT system. The core of the product is made of silicon steel sheet imported from Japan, and the loss is very small. Double insulation treatment is adopted between two windings, and an electrostatic shielding layer is designed to reduce the electromagnetic interference between the two windings. PT100 temperature sensor is installed in the winding, which can be used to monitor the winding temperature. The transformer is treated by vacuum impregnation, which increases the mechanical strength and has anti-corrosion effect. In addition, the product also uses low temperature rise and low noise design, so that it has good temperature rise performance and low noise.

命名规则[Naming rules]

AITR — XXXX

变压器容量[Transformer capacity]:
10000:10kVA、8000: 8kVA、6300:6.3kVA、5000:5kVA

企业产品代号[Enterprise Product Code]

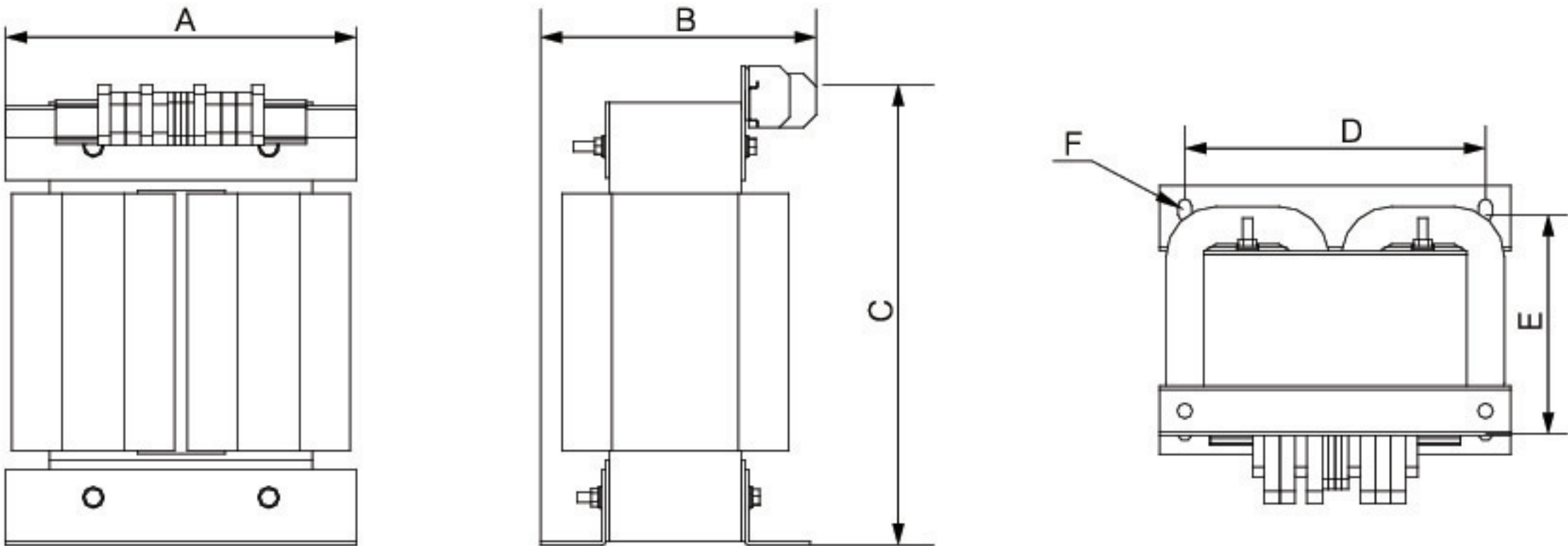


符合标准[Standard]

- ◆ GB 19212.1-2016/IEC 61558-1:2009 变压器、电抗器、电源装置及其组合的安全 第1部分：通用要求和试验
GB 19212.1-2016/IEC 61558-1:2009 Safety of transformers, reactors, power supply units and combinations thereof—Part 1: General requirements and tests
- ◆ GB 19212.16-2017/IEC 61558-2-15:2011 变压器、电抗器、电源装置及其组合的安全 第16部分：医疗场所供电用隔离变压器的特殊要求和试验
GB 19212.16-2017/IEC 61558-2-15:2011 Safety of transformers, reactors, power supply units and combinations thereof—Part 16: Particular requirements and tests for isolating transformers for the supply of medical locations
- ◆ GB 16895.24-2005/IEC60364-7-710:2002 建筑物电气装置 第7-710部分：特殊装置或场所的要求 医疗场所
GB16895.24-2005/IEC60364-7-710:2002 Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations

外形尺寸及选型Dimensions and model selection

型号Model	容量 (VA) Capacity	外形尺寸 (mm) Dimensions						总重量 (Kg) Weight
		A	B	C	D	E	F	
AITR10000	10000	280	275	427	240	190	φ 11	92
AITR8000	8000	280	265	427	240	190	φ 11	90
AITR6300	6300	280	255	427	240	175	φ 11	75
AITR5000	5000	280	255	427	240	175	φ 11	73
AITR3150	3150	280	225	427	240	175	φ 11	53



隔离变压器外形尺寸
Isolating transformer Dimensions

技术参数Technical Parameters

额定容量Rated Capacity	3.15kVA/5kVA/6.3kVA/8kVA/10kVA
频率Frequency	50/60Hz
额定输入电压Rated input voltage	230V
输出电压The output voltage	230V/115V
冲击电流 (IE) Inrush current	<12In
泄漏电流Leakage Current	<200uA
空载输出电压 (UO) No-load output voltage	<235V
空载输出电流 (IO) No-load output current	<3% In
短路电压Short-circuit voltage	<3% Un
效率Efficiency	>96%
最高环境温度Maximum ambient temperature	<40℃
空载温升No-load temperature rise	<33℃
满负荷温升Full load temperature rise	<76℃
耐压Withstand voltage	4200V/Min
绝缘等级Insulation Class	H
噪声等级Noise Level	<40dB (A)

选型说明Model Selection Description

任何隔离变压器在启动时均会产生冲击电流，因此对于采用医用隔离变压器和绝缘监测产品组成的医疗IT系统，在选择隔离变压器进线回路的断路器时，应按国标GB16895.24-2005的要求，采用带短路保护，不带过载保护的断路器（即单磁式断路器）。如选用普通断路器，应选择符合国标GB14048.2-2008的C、D脱扣曲线的断路器，且其额定电流应根据隔离变压器容量按如下关系确定：10kVA – 63A,8kVA – 50A, 6.3/5kVA – 40A,3.15kVA – 20A，以防止在给隔离变压器上电或双电源动作时，冲击电流造成断路器投切困难或安全电源投入时跳闸，导致严重医疗事故。

Any isolation transformer will generate inrush current when starting. Therefore, for the medical IT systems consisting of the medical isolation transformer and insulation monitoring products, in selecting the circuit breaker which is installed in the line circuit into an isolation transformer, it shall meet the requirements of GB16895.24-2005 and has short-circuit protection and without overload protection (i.e. single magnetic circuit breaker). The ordinary breaker should be selected in line with GB14048.2-2008 of C, D circuit breaker tripping curves, and the rated current should be determined according to the following relationship with isolation transformer capacity: 10kVA-63A, 8kVA-50A, 6.3/5kVA-40A, 3.15kVA-20A. The purpose is to prevent the impact of the current circuit breaker switching difficulties or safety-power tripping, resulting in serious medical malpractice when isolation transformer to power or dual power operation.

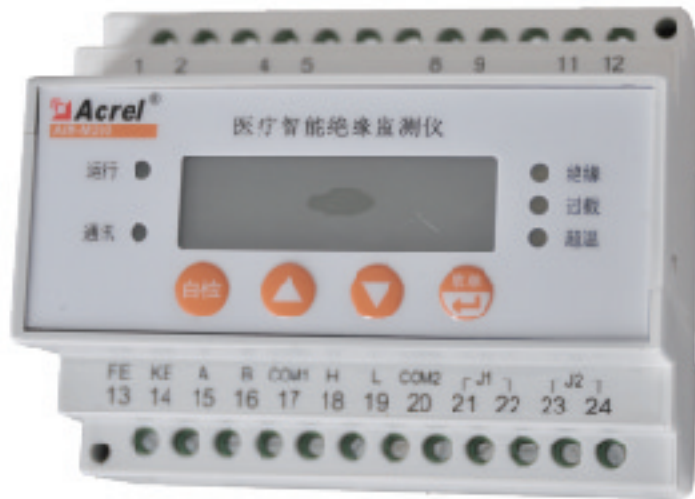
4.2 AIM-M系列绝缘监测仪AIM-M Series insulation monitor



AIM-M10



AIM-M100



AIM-M200

AIM-M系列绝缘监测仪是一款高性能的绝缘监测装置，专用于医疗IT系统中，用于监测IT系统对地的绝缘状态，当系统出现绝缘故障时，能够及时发出报警信号，提醒工作人员根据实际情况进行处理。产品具有丰富的显示与报警指示功能，界面友好，操作方便。

AIM-M Series insulation monitor is a high-performance insulation monitoring device, and is dedicated to medical IT systems. It is used to monitor the state of the ground insulation. When the system has an insulation fault, it can send out alarm signals in time. It helps staff to deal with the actual situation. The product is with extensive display and alarm indication function, user-friendly, and easy to operate.

● 产品功能Product Features

- ◆ 具有对被监测IT系统对地绝缘电阻、变压器负荷电流、变压器绕组温度实时监测与故障报警功能；
Products can monitor the insulation resistance, load current and the transformer winding temperature of IT systems in real time and have fault alarm function;
- ◆ 能实时监测与被测系统连线断线故障、温度传感器断线故障以及功能接地线断线故障，并在故障发生时给出报警指示；
Products can monitor the test system wiring disconnection fault, the temperature sensor break fault and functional ground wire disconnection fault and alarm indication is given when a fault occurs;
- ◆ 继电器报警输出、LED报警指示等多种故障指示功能；
Product can output relay alarm, LED alarm indication and other fault indication ;
- ◆ 采用先进的现场总线通讯技术，与外接报警和显示仪、上位机管理软件通讯，可以实时监控IT系统的运行状况；
Products communicate with external alarm and display device, PC management software by using advanced fieldbus technology, can monitor status of IT systems in real-time ;
- ◆ 具有事件记录功能，能够记录报警发生的时间和故障类型，方便操作人员分析系统运行状况，及时消除故障。
Products have event logging function which can record the time and type of fault alarm , it is convenient for the operator to analyze system health and timely manner to eliminate fault.
- ◆ 支持绝缘故障定位功能（ AIM-M200具有此功能 ），能与绝缘故障定位装置共同实现故障定位，并显示定位结果。
Products have insulation fault location function (AIM-M200 has this feature), and can achieve fault location and display positioning result with the insulation fault location device.

● 符合标准Standard

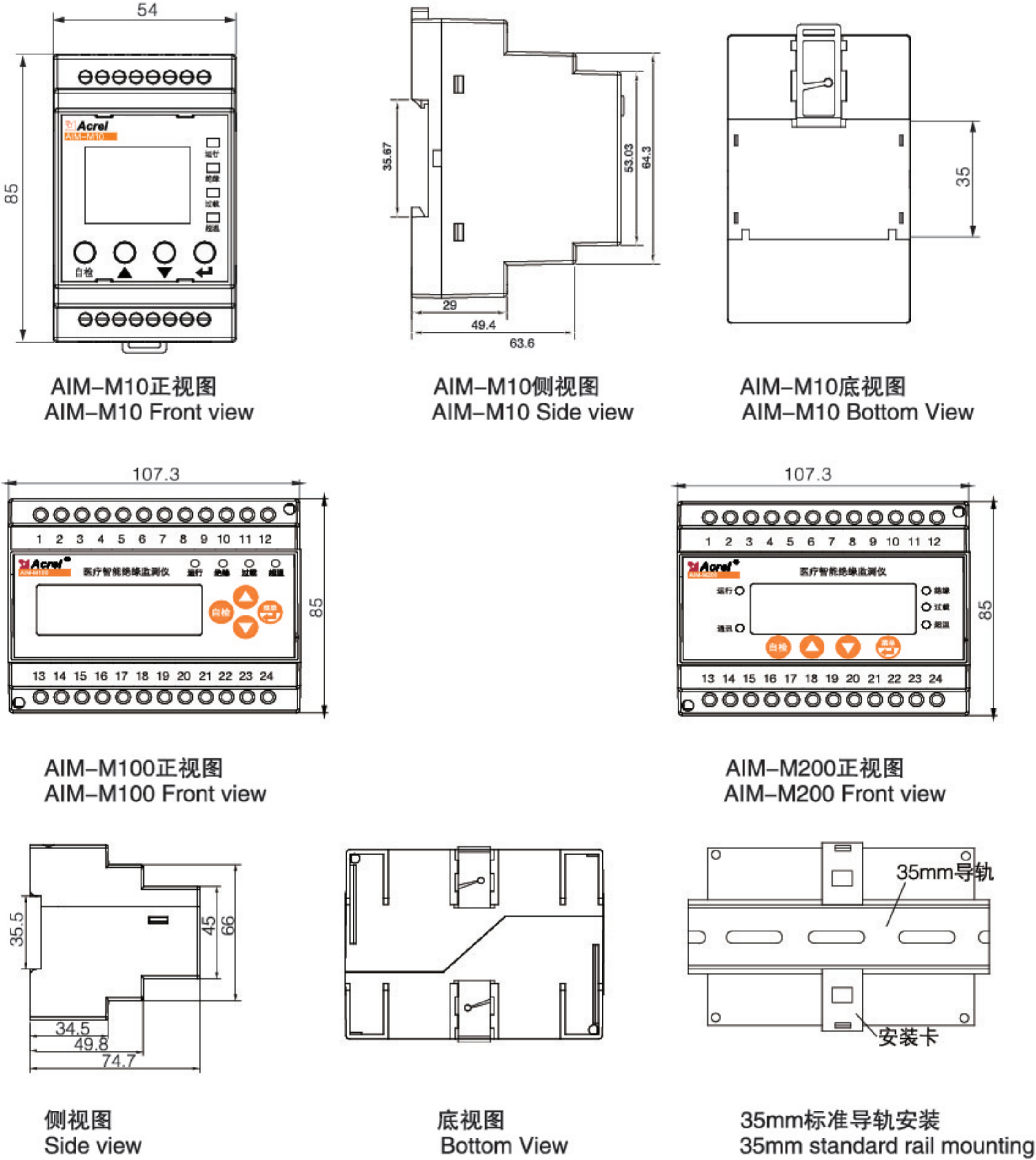
- ◆ GB16895.24-2005/IEC60364-7-710:2002《建筑物电气装置第7-710部分：特殊装置或场所的要求—医疗场所》；
GB16895.24-2005/IEC60364-7-710:2002 Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations
- ◆ IEC 61557-8-2007《交流1000V和直流1500V以下低压配电系统电气安全 防护检测的试验、测量或监控设备 第8部分：IT系统用绝缘监测装置》。
IEC 61557-8-2007 Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c.—Equipment for testing, measuring or monitoring of protective measures — Part 8: Insulation monitoring devices for IT systems

● 技术参数Technical Parameters

参数		型号	AIM-M10	AIM-M100	AIM-M200
辅助电源	电压	AC220V（可波动范围±10%）			DC24V（可波动范围±25%）
	频率	50/60Hz			—
	最大功耗	<5VA	<8VA		<3VA
绝缘监测	绝缘电阻测量范围	10～999kΩ			
	相对百分比误差	0～±10%			
	报警值范围	50～999kΩ			
	响应时间	<2s			
	测量电压	<12V			
	测量电流	<50uA			
电流监测	测量范围	2.1～50A			
	报警值可设范围	5～50A			
	测量精度	5级			
	显示方式	数值显示	百分比显示		数值和百分比显示
温度监测	热敏电阻	PT100			
	测量范围	-50～+200℃			
	报警值范围	0～+200℃			
电源输出	直流24V电源	2W	无		
报警输出	输出方式	1路继电器输出	2路继电器输出（可编程）	2路继电器输出（不可编程）	
	触点容量	AC 250V/3A DC 30V/3A			
通讯		1路RS485接口， Modbus-RTU协议	2路RS485接口， Modbus-RTU协议	1路RS485接口，Modbus-RTU协议 1路CAN接口，自定义协议	
环境	工作温度	-10～+50℃			
	存储温度	-20～+70℃			
	相对湿度	5%-95%，不结露			
	海拔高度	≤2500m			
额定冲击电压/污染等级		4KV/3			
EMC电磁兼容和电磁辐射		符合IEC61326-2-4			

Model		Parameters		AIM-M10	AIM-M100	AIM-M200
Auxiliary power	Voltage	AC220V(± 10%)			DC24V(± 25%)	
	Frequency	50/60Hz			—	
	The maximum power consumption	<5VA	< 8VA		<3VA	
Insulation monitoring	Insulation resistance measurement range	10 ~ 999k Ω				
	Percentage relative error	0 ~ ± 10%				
	Alarm value range	50 ~ 999k Ω				
	Response time	<2s				
	Measuring voltage	<12V				
	Measuring current	<50uA				
Current Monitoring	Measuring range	2.1 ~ 50A				
	Alarm value range	5 ~ 50A				
	Measurement accuracy	5%				
	Display method	Value display	percentage display		Value and percentage display	
Temperature Monitoring	Thermistor	PT100				
	Measuring range	-50 ~ +200℃				
	Alarm value range	0 ~ +200℃				
Alarm Output	Output	1 relay outputs	2 relay outputs (programmable)		2 relay outputs (not programmable)	
	Contact Capacity	AC 250V/3A DC 30V/3A				
Communications		1 RS485 , Modbus-RTU	2 RS485 , Modbus-RTU		1 RS485, Modbus-RTU	
					1 CAN, custom protocol	
environment	Operating temperature	-10 ~ +50℃				
	Storage temperature	-20 ~ +70℃				
	Relative humidity	5%-95%, No condensation				
	Altitude	≤2500m				
Rated impulse voltage / pollution degree		4KV/3				
EMC & EMR		IEC61326-2-4				

● 外形及安装尺寸(单位: mm) Overall and installation dimensions(unit: mm)



● 选型说明Model Selection Description

AIM-M10、AIM-M100的辅助电源为AC220V，产品不具有绝缘故障定位功能。AIM-M200的辅助电源为DC24V，产品除了具有AIM-M10和AIM-M100的所有监测功能外，还支持绝缘故障定位功能。如需绝缘故障定位功能，请选用AIM-M200型，其支持定位功能也可通过菜单设置来关闭。此外AIM-M10内置DC24V电源输出，可直接为AID系列外接报警与显示装置供电。

AIM-M100 auxiliary power supply is AC220V, the product does not have insulation fault location.AIM-M200 auxiliary power is DC 24V. It has all the monitoring functions of AIM-M10 and AIM-M100 products ,it also supports the insulation fault location.If you need insulation fault location, please choose AIM-M200. The positioning function can also be turned off through the menu .

4.3 AID系列报警与显示仪 AID Series alarm and display device



AID系列报警与显示仪是一款采用先进的现场总线通信技术的远程显示和声光报警装置。能够实时显示AIM-M系列医疗智能绝缘监测仪当前绝缘电阻、变压器负荷率等监测数据，并在系统出现故障时发出声光报警信号。也可以通过AID系列报警与显示仪远程设置AIM-M系列医疗智能绝缘监测仪的报警阈值。AID系列报警与显示仪根据安装方式和显示方式的不同共有AID10、AID120、AID150三个型号。该装置可安装于手术室或重症监护室的信息控制面板上，以便于医护人员了解隔离电源系统的运行状况，以及系统出现故障时的故障类型。

AID Series alarm and display device is a remote display and sound and light alarm device by using advanced fieldbus communications technology . Products can display the current insulation resistance, transformer load rate data and other monitoring data of AIM-M series medical intelligent insulation monitoring device in real-time. Products emit sound and light alarm signal when system failure occurs. You can also set the AIM-M series medical intelligent insulation monitoring device alarm values by AID Series alarm and display device remotely. AID Series alarm and display device have three models :AID10, AID120, AID150 . Products are classified according to the installation method and display.The device can be installed on the operating room or information control panel of intensive care unit , the medical staff can easily know the status of medical isolated power systems, and the type of fault when the system fails.

● 产品功能Product Features

- ◆ 通过总线通讯技术，可实时读取并显示绝缘监测仪的监测数据和报警信息；
Products can read and display monitoring data and alarm information of insulation monitor in real-time by bus communication technology.
- ◆ 可远程设置绝缘监测仪的报警参数；
You can set the alarm parameters of insulation monitor remotely.
- ◆ 系统出现故障时可以声光报警，按下消音键后，声音关闭，相应的故障指示灯不会熄灭，直到故障解除为止。
When the system fails, products can generate sound and light alarm, if you press the mute button, the sound can be turned off, but the corresponding fault indicator does not go out until the fault is removed so far.

● 符合标准Standard

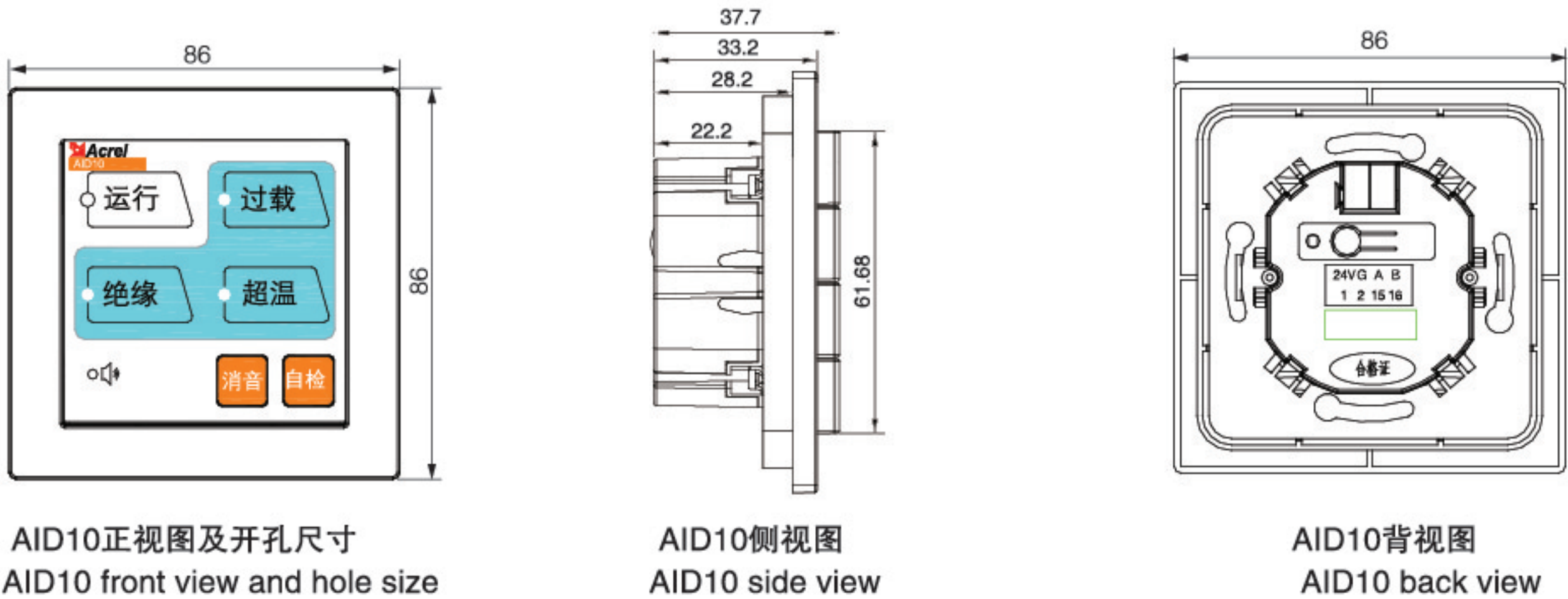
- ◆ GB16895.24-2005/IEC60364-7-710:2002《建筑物电气装置 第7-710部分：特殊装置或场所的要求 医疗场所》。
Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations
- ◆ IEC 61557-8-2007《交流1000V和直流1500V以下低压配电系统电气安全 防护检测的试验、测量或监控设备 第8部分：IT系统用绝缘监测装置》。
Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c.—Equipment for testing, measuring or monitoring of protective measures — Part 8: Insulation monitoring devices for IT systems

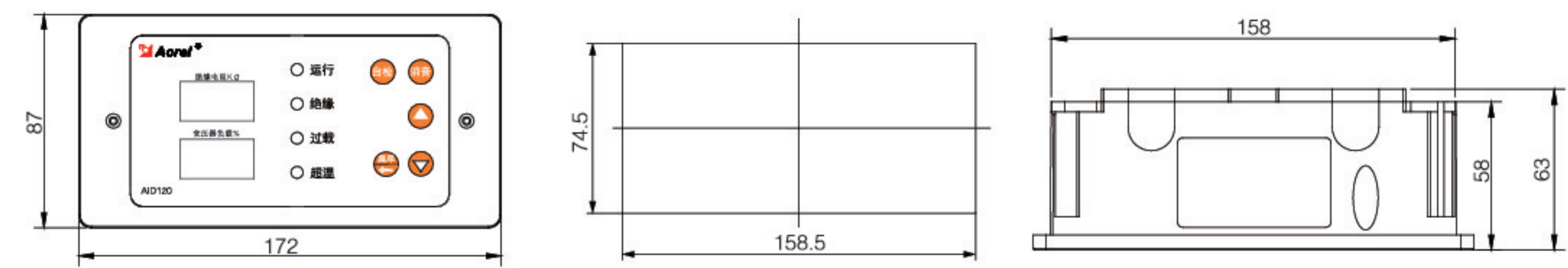
● 技术参数Technical Parameters

参数		型号	AID10	AID120	AID150
辅助电源	电压		DC 24V		
	功耗		< 0.6W		
绝缘电阻显示范围			—	0—999k Ω	—
绝缘报警范围			50—999k Ω		
变压器负载率显示			—	百分比显示	—
负载电流报警设置			14A、18A、22A、28A、35A、45A		
温度报警设置范围			0~+200℃		
报警方式			声光报警		
报警类型			绝缘故障、过负荷、超温、设备故障		
通讯方式			RS485接口 MODBUS-RTU协议		
显示方式			无	数码管显示	128 × 32点阵液晶显示

Parameters		Model	AID10	AID120	AID150
Auxiliary power	Voltage		DC 24V		
	Power consumption		< 0.6W		
Insulation resistance measurement range			—	0—999k Ω	—
Insulation alarm value range			50—999k Ω		
Transformer load rate display			—	percentage display	—
Load current alarm settings			14A、18A、22A、28A、35A、45A		
Temperature alarm value range			0—+200℃		
Alarm			sound and light alarm		
Alarm Type			Insulation fault, overload, over-temperature, equipment failure		
Communication			RS485 interface, MODBUS-RTU protocol		
Display method			—	LED Display	128*32 LCD

● 外形及安装尺寸(单位: mm) Overall and installation dimensions(unit: mm)

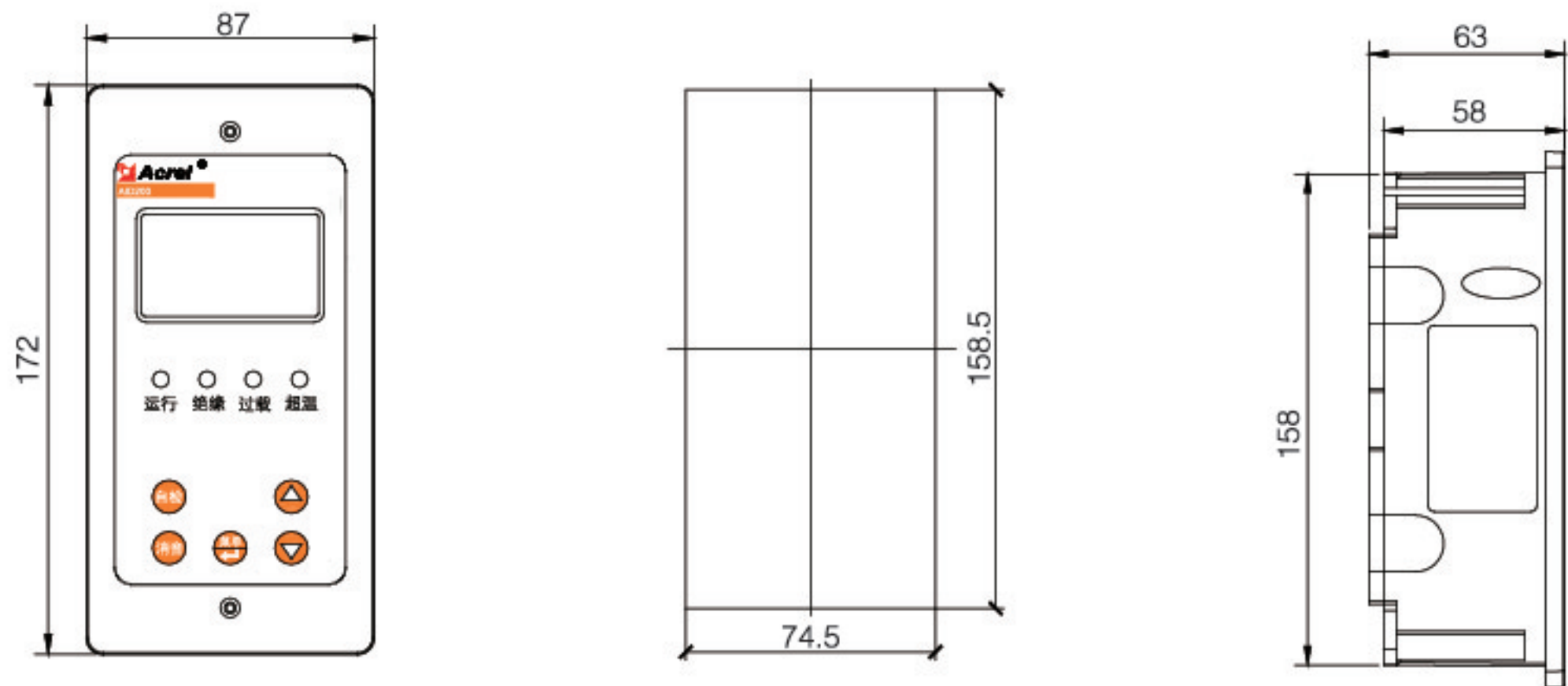




AID120正视图
AID120 front view

AID120面板开孔尺寸
AID120 panel hole size

AID120侧视图
AID120 side view



AID150正视图
AID150 front view

AID150面板开孔尺寸
AID150 panel hole size

AID150侧视图
AID150 side view

● 选型说明Model Selection Description

型号Model	选用说明Selection Description
AID10	可监控1台AIM-M10, 采用标准86*86标准开关盒嵌墙安装 Can monitor one AIM-M10, it is only suitable for embedded cabinet installation
AID120	可监控1台AIM-M100, 嵌入墙体安装, 适用于手术室或仅使用单套隔离电源的重症监护室的监控 Can monitor one AIM-M100, embedded in the wall installation, it is suitable for operating room or just a single set of isolated power monitor ICU
AID150	最多可监控16台AIM-M100或AIM-R100, 嵌入墙体安装, 适用于最多16套隔离电源供电或剩余电流监测系统的集中监控 Can monitor up to 16 AIM-M100, embedded in the wall installation, it is suitable for centralized monitoring of up to 16 sets of isolated power supply or residual current monitoring system

4.4 直流稳压电源DC power supply

4.4.1 ACLP10-24直流稳压电源 ACLP10-24 DC power supply



仪表专用的直流稳压模块, 采用完全隔离的线性变压器。具有输出电压稳定, 纹波小、耐压等级高等特点, 并带有电源上电指示功能。模块采用标准导轨安装的方式, 可以和绝缘监测仪安装在同一导轨上, 安装方便。

DC power module is used specifically for the instrument. It uses fully isolated linear transformer with output voltage stability, low ripple and high pressure levels. And it comes with the power supply indicator. Module uses standard rail mounting. It can be installed on the same rail as insulation monitors, it is easy to be installed.

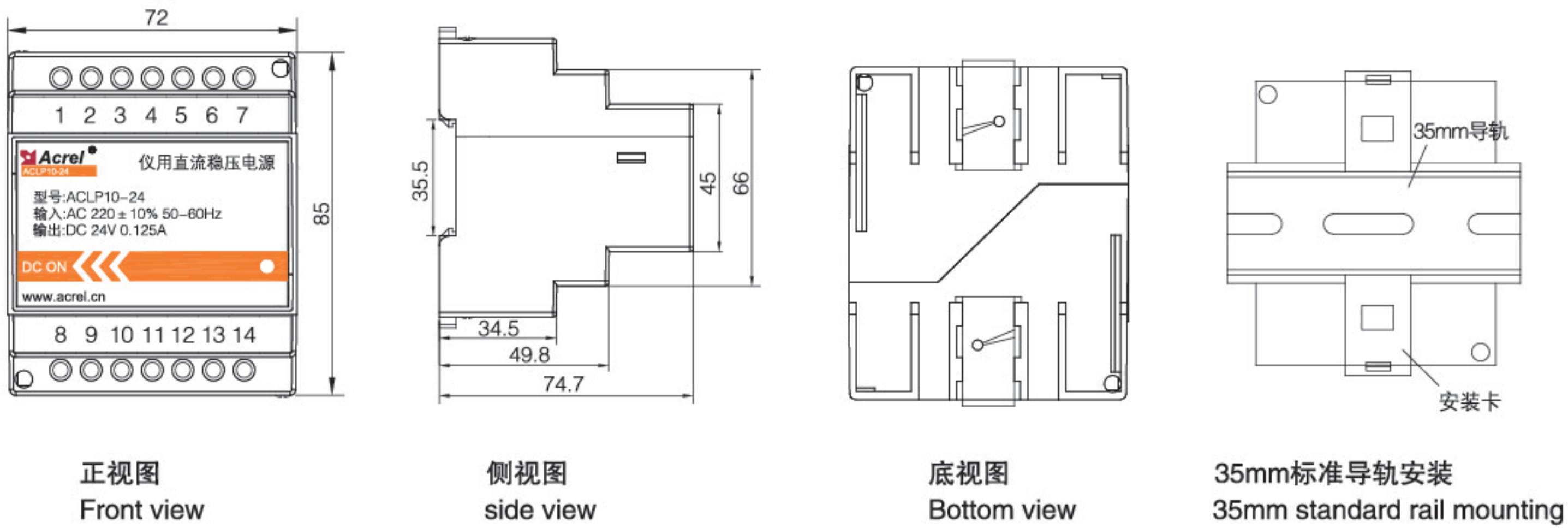
● 符合标准Standard

- ◆ GB19212.1-2016/IEC 61558-1: 2009《电力变压器、电源、电抗器和类似产品的安全 第1部分: 通用要求和试验》;
GB19212.1-2016/IEC 61558-1: 2009 Safety of transformers, reactors, power supply units and combinations thereof—Part 1: General requirements and tests

● 技术参数Technical Parameters

输入电压Input voltage	AC 220V (± 10%)
频率Frequency	50/60Hz
功率Power	3W
输出电压Output voltage	DC 24V ± 5%
电压调整率Voltage Regulation	≤30%
温升Temperature Rise	≤20℃
抗电强度withstand voltage	4000V AC/Min

● 外形及安装尺寸(单位: mm) Overall and installation dimensions(unit: mm)



正视图
Front view

侧视图
side view

底视图
Bottom view

35mm标准导轨安装
35mm standard rail mounting

4.4.2 HDR-60-24直流稳压电源 HDR-60-24 DC power supply



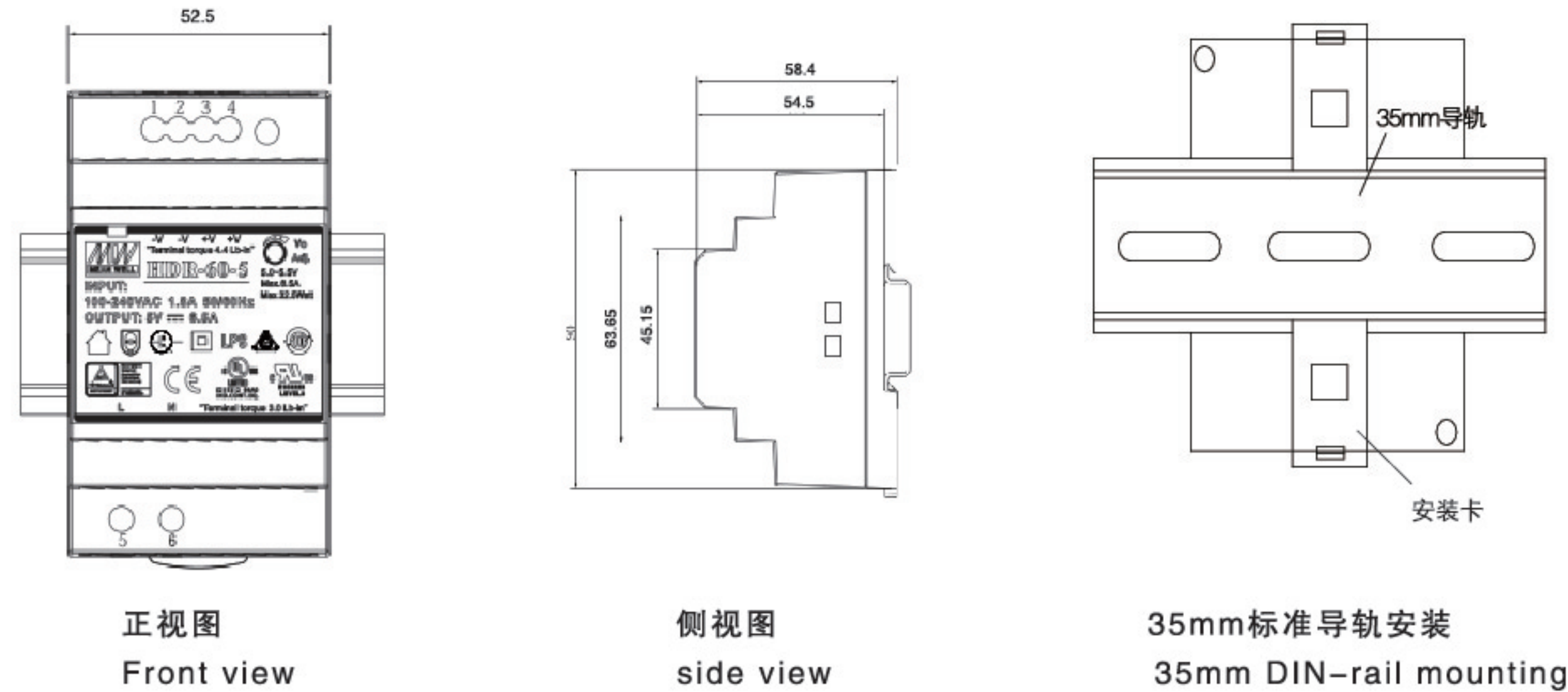
HDR-60-24直流稳压电源可同时为AIM-M200医用智能绝缘监测仪、ASG150测试信号发生器、AIL150系列绝缘故障定位仪和AID150集中报警与显示仪等仪表提供直流24V电源。该电源功率大、电压输出稳定、安装方便，可满足上述仪表的供电要求，是推荐的电源产品。

HDR-60-24 DC power supply can provide 24V DC power supply for the AIM-M200 Medical intelligent insulation monitoring device, ASG150 test signal generator, AIL150 series insulation fault locators and AID150 centralized alarm and display and other instruments.The power supply has a high output power, stable voltage output, easy installation features. It can meet the power requirements of the meter,and is the recommended power supply products.

● 技术参数Technical Parameters

型号Model	输入Input	输出Output	安装方式Installation
HDR-60-24	100-240VAC 1.8A	24VDC 2.5A	35mm导轨安装 35mm rail mounting

● 外形及安装尺寸 (单位: mm) Overall and installation dimensions(unit: mm)



4.4.3 选型说明Model Selection Description

ACLP10-24型直流电源为线性电源，其输入端可直接接在隔离变压器二次侧，输出功率为3W，仅适合为单台的AID150、AID120或AID150提供24V直流电源。HDR-60-24型为开关电源，输出功率为60W，通常和AIM-M200等绝缘监测和故障定位产品配套使用，为这些产品提供24V直流电源。

ACLP10-24 DC power supply is a linear power supply. Its input can be directly connected to the secondary side of the isolation transformer, the output power is 3W.It can only provide 24V DC power supply for a single AID150, AID120 or AID150. HDR-60-24 is switching power supply,the output power is 60W,it is usually used in conjunction with AIM-M200 and other insulation monitoring and fault localization products, it provides 24V DC power supply for these products.

4.5 ASG100测试信号发生器 ASG150 test signal generator



ASG150测试信号发生器采用32位微处理器芯片和高精度的信号产生电路，实现特定测试信号的产生。当被监测的IT系统出现绝缘故障时，能及时启动并产生测试信号，配合绝缘故障定位仪实现绝缘故障定位。

ASG150 test signal generator uses a 32-bit microprocessor chip and a high-precision signal generation circuit,It can generate a specific test signal.When the monitored IT system insulation fault occurs , It start and generate a test signal timely ,and it work with insulation fault locator to achieve insulation fault location.

● 符合标准Standard

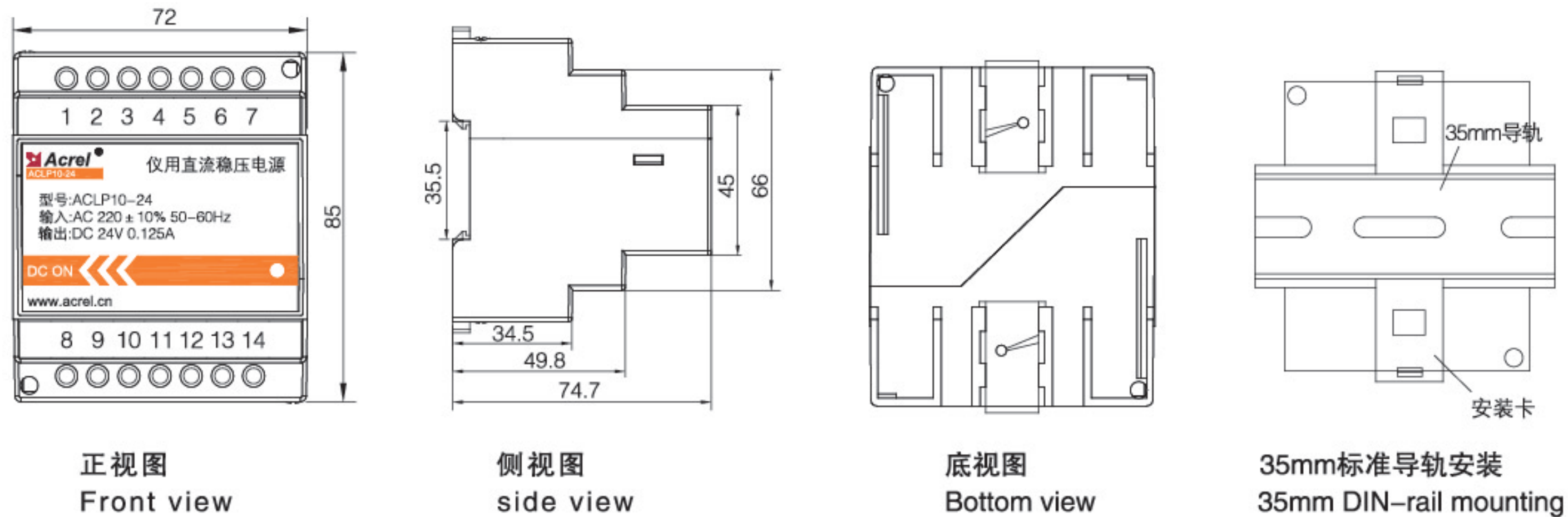
IEC 61557-9-2007《交流1000V和直流1500V以下低压配电系统电气安全 防护检测的试验、测量或监控设备 第9部分：IT系统用绝缘故障定位装置》

IEC 61557-9-2007 Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c.—Equipment for testing, measuring or monitoring of protective measures — Part 9: Equipment for insulation fault location in IT systems.

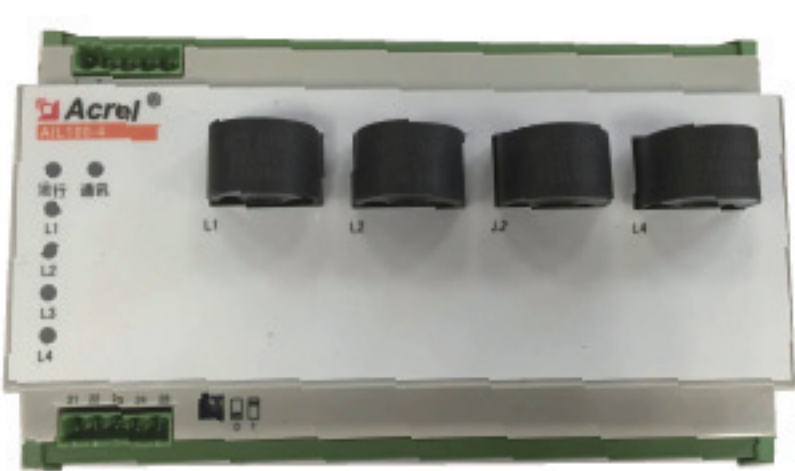
● 技术参数Technical Parameters

辅助电源 Auxiliary power	电压Voltage	DC24V(± 25%)
	最大功耗 The maximum power consumption	≤ 2VA
被监测系统 system be monitored	额定电压Rated voltage	0~ 242V AC
	额定频率Rated frequency	45 ~ 60Hz
定位信号 Location signals	定位电压Location voltage	<25V
	定位电流Location Current	<1mA
通讯 Communications	方式Bus	CAN
	协议Protocol	自定义协议Custom protocol

● 外形及安装尺寸 (单位: mm) Overall and installation dimensions(unit: mm)



4.6 AIL150系列绝缘故障定位仪 AIL150 Series insulation fault locator



AIL150-4



AIL150-8

AIL150-4/AIL150-8绝缘故障定位仪采用高灵敏度互感器配合高精度的信号检测电路，检测ASG150测试信号发生器注入系统中的信号，准确定位绝缘故障所在的回路。其中AIL150-4绝缘故障定位仪能定位4个回路的绝缘故障，AIL150-8绝缘故障定位仪能定位8个回路的绝缘故障。

AIL150-4/AIL150-8 insulation fault locator uses high-precision signal detection circuit with high sensitivity transformer,It detects ASG150 test signal generator' s signal which is injected into the system,It can accurately locate the insulation fault circuit. Among them, AIL150-4 insulation fault locator can locate insulation faults of four loops,AIL150-8 insulation fault locator can locate insulation faults of eight loops.

● 符合标准Standard

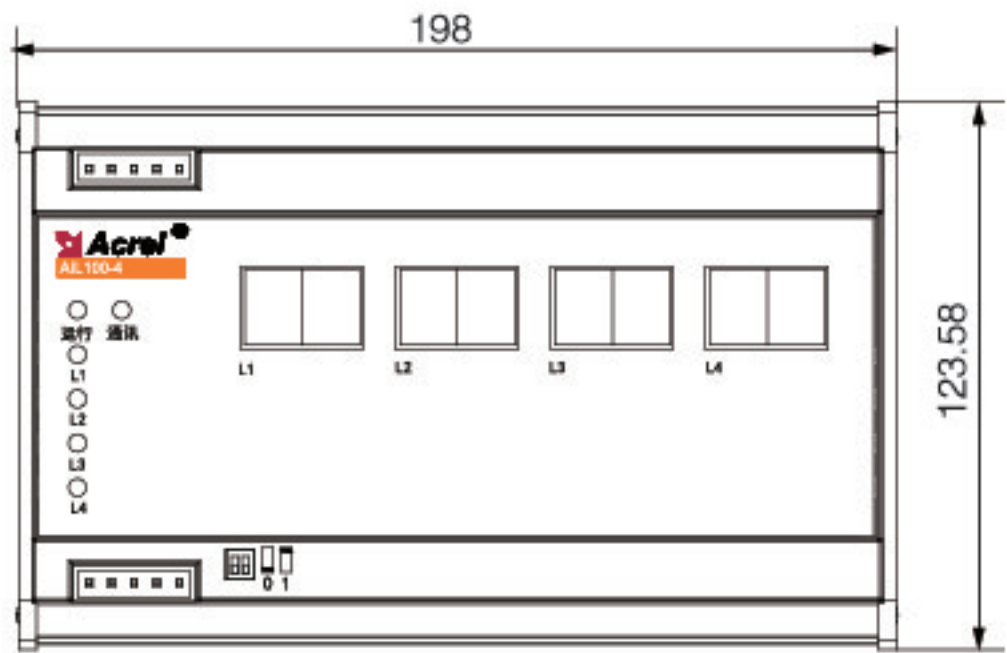
IEC 61557-9-2007《交流1000V和直流1500V以下低压配电系统电气安全 防护检测的试验、测量或监控设备 第9部分：IT系统用绝缘故障定位装置》。

IEC 61557-9-2007 Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c.—Equipment for testing, measuring or monitoring of protective measures — Part 9: Equipment for insulation fault location in IT systems

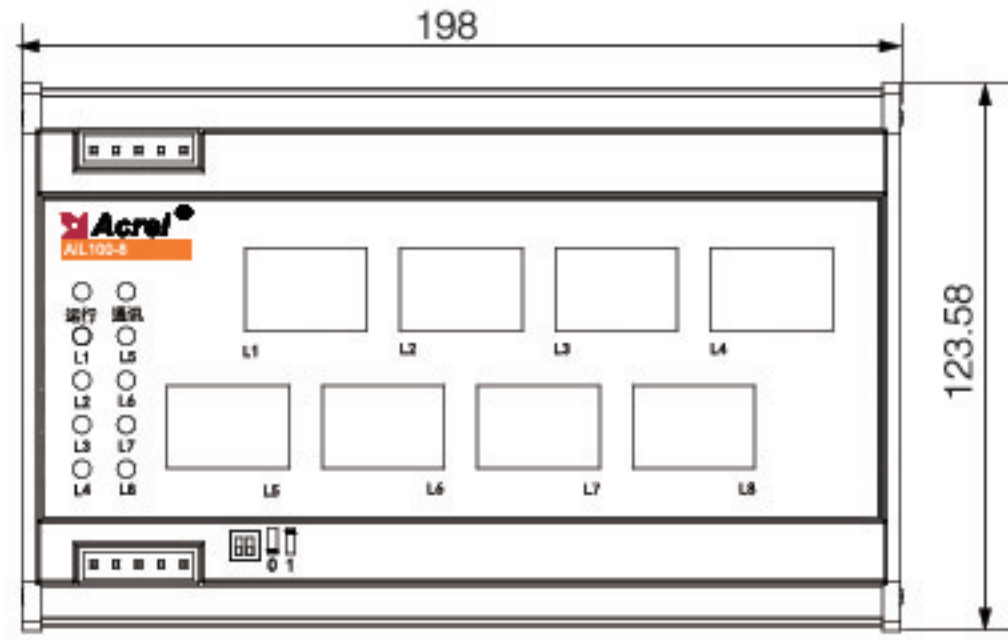
● 技术参数Technical Parameters

参数Parameters		Values	
		AIL150-4	AIL150-8
辅助电源 Auxiliary power	电压Voltage	DC24V(±25%)	
	最大功耗The maximum power consumption	≤2VA	
被监测系统 Monitored system	额定电压Rated voltage	0~242V AC	
	频率Frequency	45 ~ 60Hz	
定位信号 Location signals	定位电压Location voltage	<25V	
	定位电流Location current	<1mA	
故障定位 Fault location	最大回路数The maximum number of loops	4	8
	响应时间Response time	<2s	
通讯 Communications	方式Bus	CAN	
	协议Protocol	自定义协议Custom protocol	

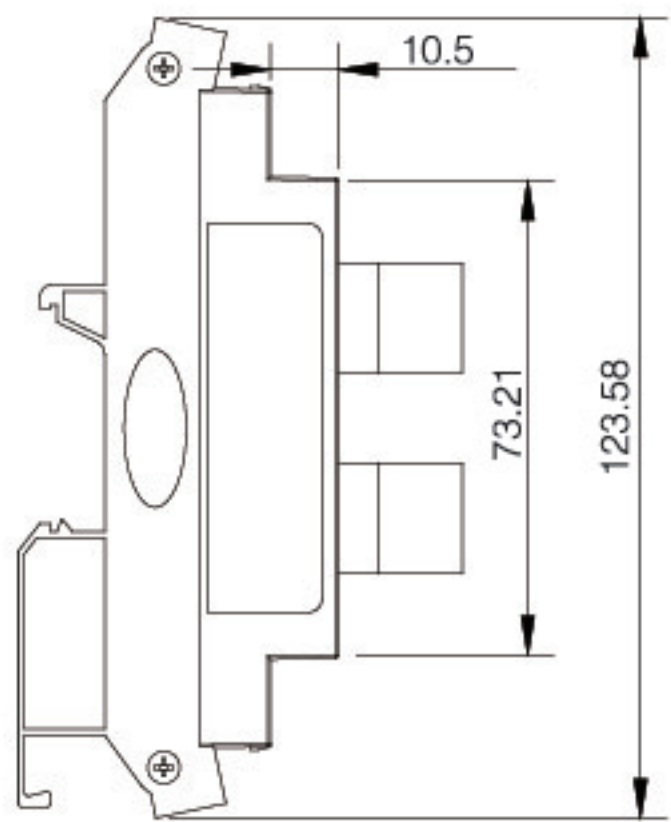
● 外形及安装尺寸 (单位: mm) Overall and installation dimensions(unit: mm)



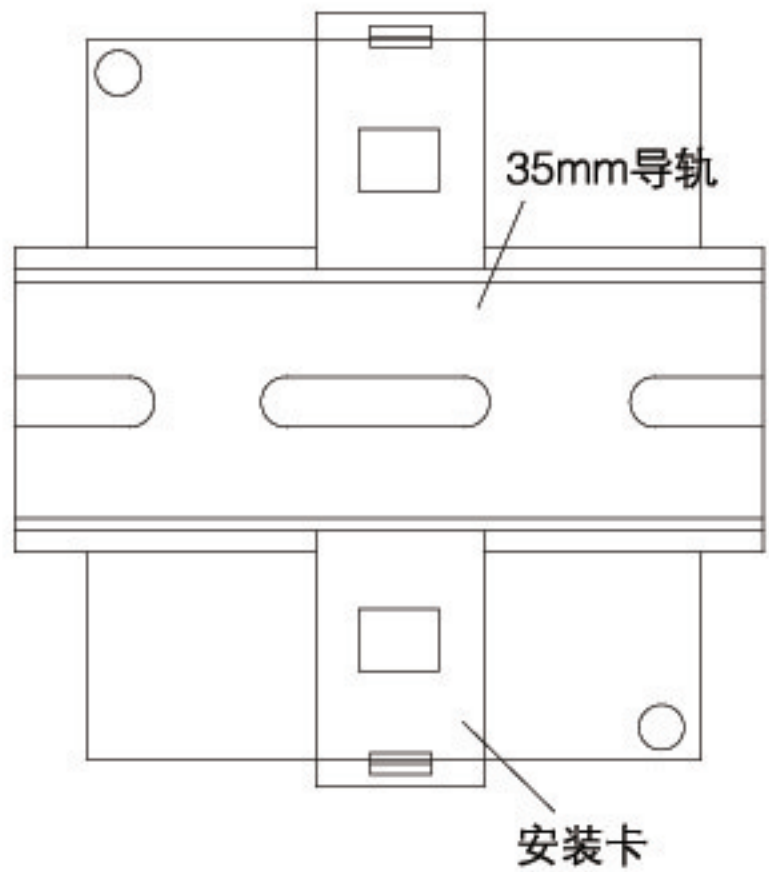
AIL100-4正视图
AIL100-4 front view



AIL100-8正视图
AIL100-8 front view



侧视图
Side view



35mm标准导轨安装
35mm DIN-rail mounting

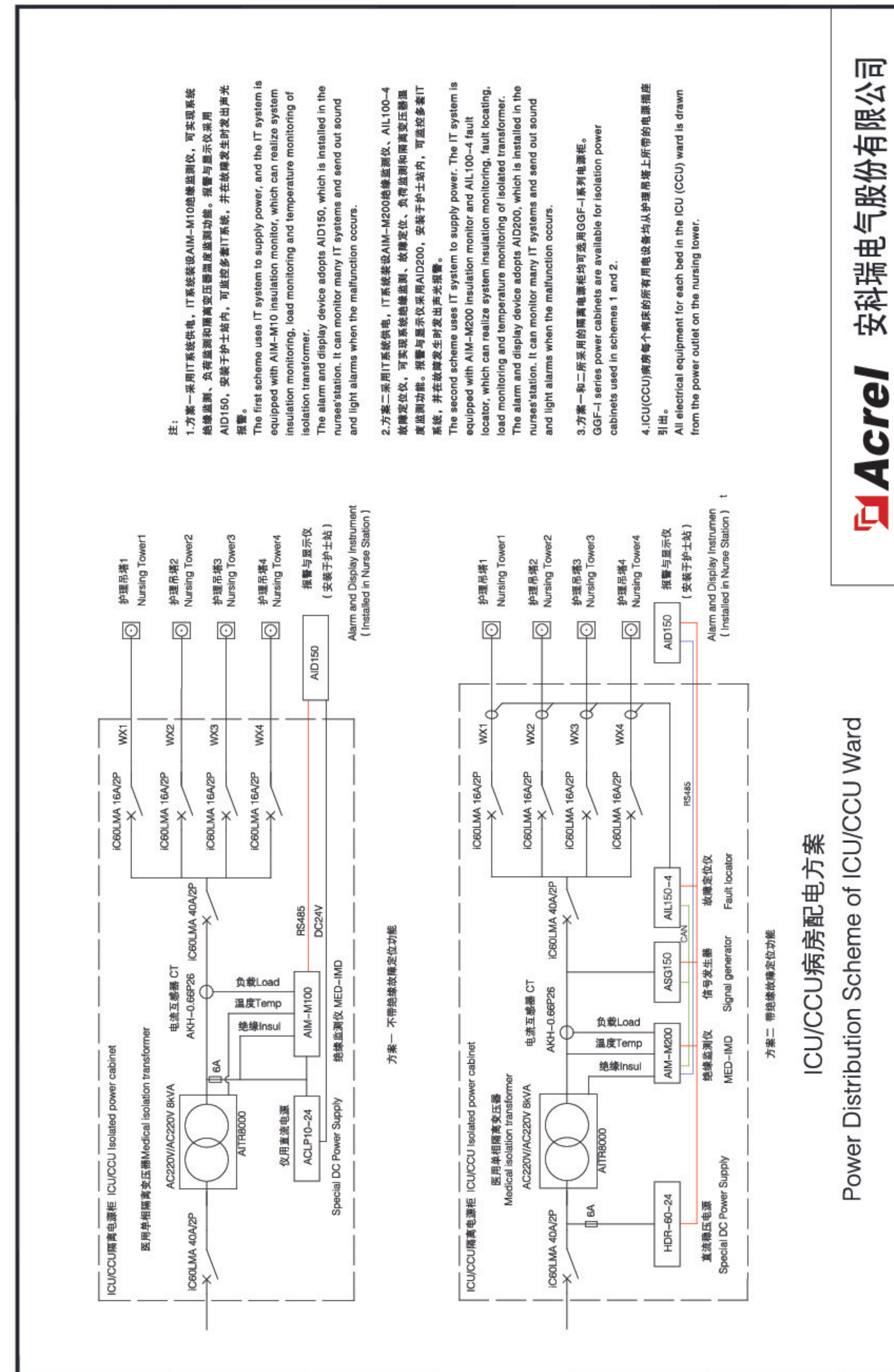
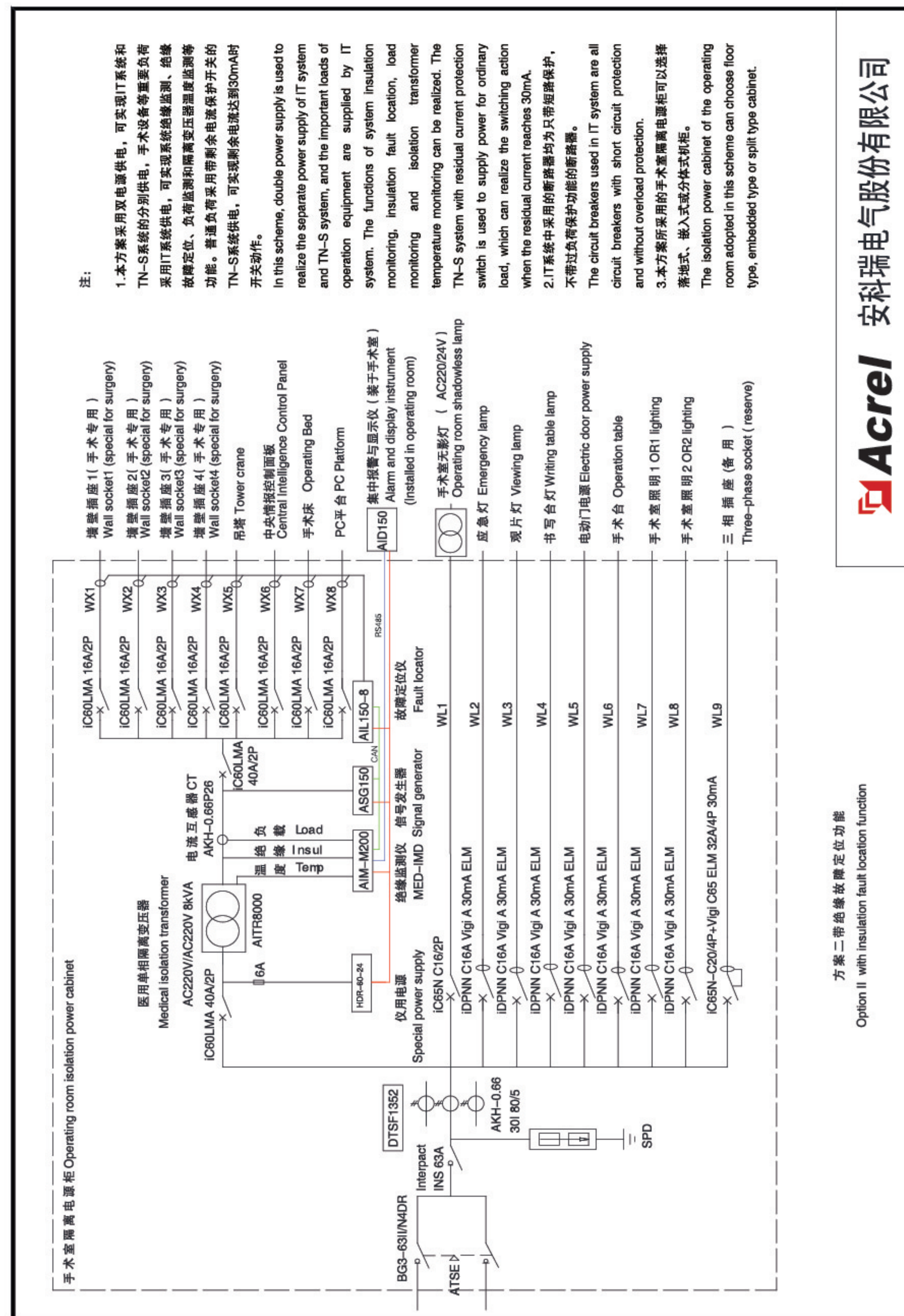
4.7 保护型电流互感器 Protective current transformer



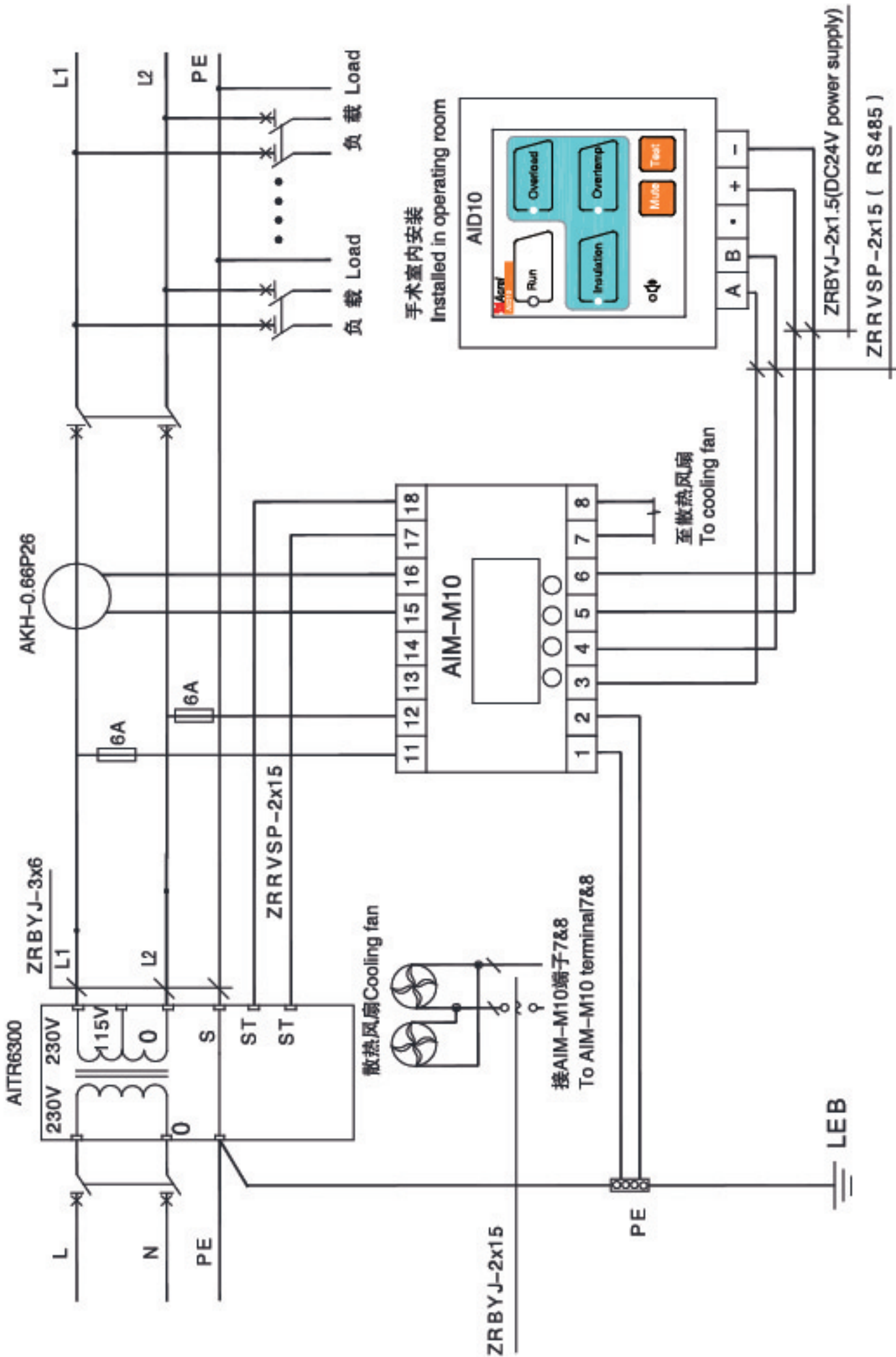
AKH-0.66P26型电流互感器是与AIM-M系列绝缘监测仪配套使用的保护型电流互感器，最大可测电流为50A，变比是2000：1，电流互感器采用螺丝直接固定的方式装于机柜内部，二次侧通过接线柱引出，安装和使用方便。

AKH-0.66P26 type current transformers are protective current transformer and which is supporting the use of AIM-M series insulation monitor. Its maximum measurable current is 50A, the transformation ratio is 2000: 1.Current transformers can screw directly installed in a fixed manner inside the cabinet. Its leading way of secondary side is terminal, it is easy to install and use.

5.2 ICU/CCU隔离电源设计图 ICU/CCU isolated power supply design chart



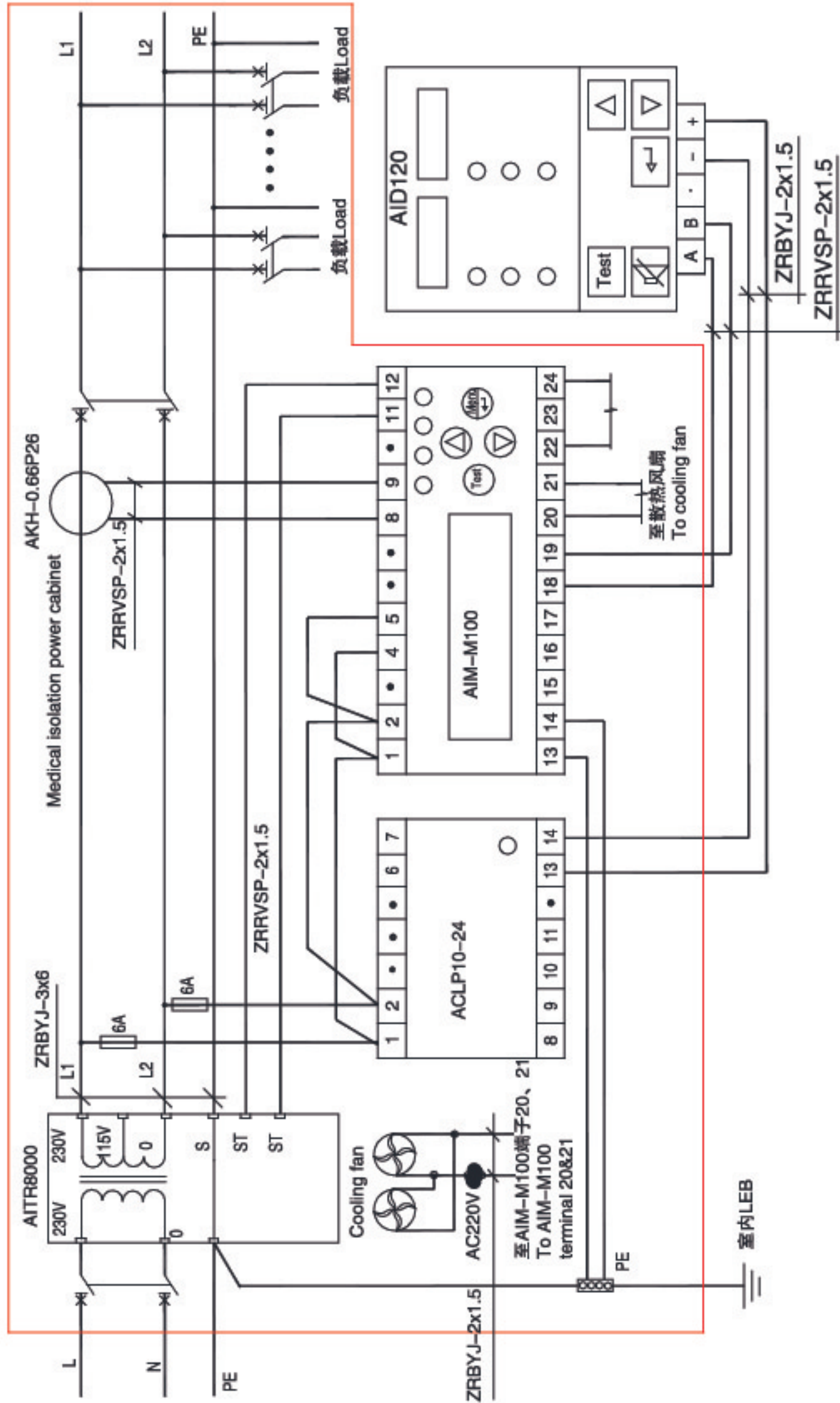
5.3 医用隔离电源系统接线图Medical isolated power system wiring diagram



注：1.本图主要体现一体式结构中IT隔离电源系统主要设备之间的
接线关系。
This figure mainly reflects the connection relationship between
the main equipment of the IT isolation power supply system in the
integrated structure.
2、IT隔离电源外引出线的型号规格及敷设方式由设计人员确定。
The model specifications and laying methods of the external
lead-out wires of IT isolation power supply are determined by the
designers.

AIM-M10系列产品接线图（简约型）
Connection Diagram of AIM-M10 Series Products (Simple Type)

Acrel 安科瑞电气股份有限公司



注：1.本图主要体现一体式结构中IT隔离电源系统主要设
备之间的接线关系。
This figure mainly reflects the connection
relationship between the main equipment of the IT
isolation power supply system in the integrated
structure.
2、IT隔离电源外引出线的型号规格及敷设方式由设计人
员确定。
The model specifications and laying methods of the
external lead-out wires of IT isolation power
supply are determined by the designers.

AIM-M100系列产品接线图
AIM-M100 Series Wiring Diagram

Acrel 安科瑞电气股份有限公司

二、医用剩余电流监测产品Medical residual current monitoring Devices

1.概述[Overview]

医院的一些医疗1类、2类场所如抢救室、产房、透析中心等，虽然未强制采用局部IT系统供电，但因其场所特殊性，对配电系统的安全性要求仍然很高。安科瑞医用剩余电流监测装置，专门为此类场所的漏电监测而开发，可以监测毫安级的漏电电流，从而能提供更精密的漏电安全监控，为这类场所电气设备安全运行保驾护航。

Although the local IT system is not mandatory for power supply in some hospitals, such as rescue rooms, delivery rooms and dialysis centers, the safety requirements of distribution system are still very high because of the particularity of the hospital. ACREL Medical Residual Current Monitoring Device is specially developed for leakage current monitoring in such places. It can monitor leakage current at micro-ampere level, thus providing more precise leakage safety monitoring and escorting the safe operation of electrical equipment in such places.

2.产品介绍Introduction

医用剩余电流监测产品主要用于监测医疗场所内TN-S配电系统干线及支路的剩余电流状况。当剩余电流值超过预先设定阈值(此处阈值低于30mA漏电动作保护电流，通常为6~10mA)时，系统发出报警信号，提示工作人员及时处理，以便消除因绝缘老化、断线等引起的电气火灾、漏电触电等安全隐患，为设备提供清洁、安全、连续的供电电源。

医用剩余电流监测产品主要包括AIM-R100剩余电流监测仪、AKH-0.66/L-20剩余电流互感器、AID150集中报警与显示仪和ACLP10-24 直流稳压电源等。

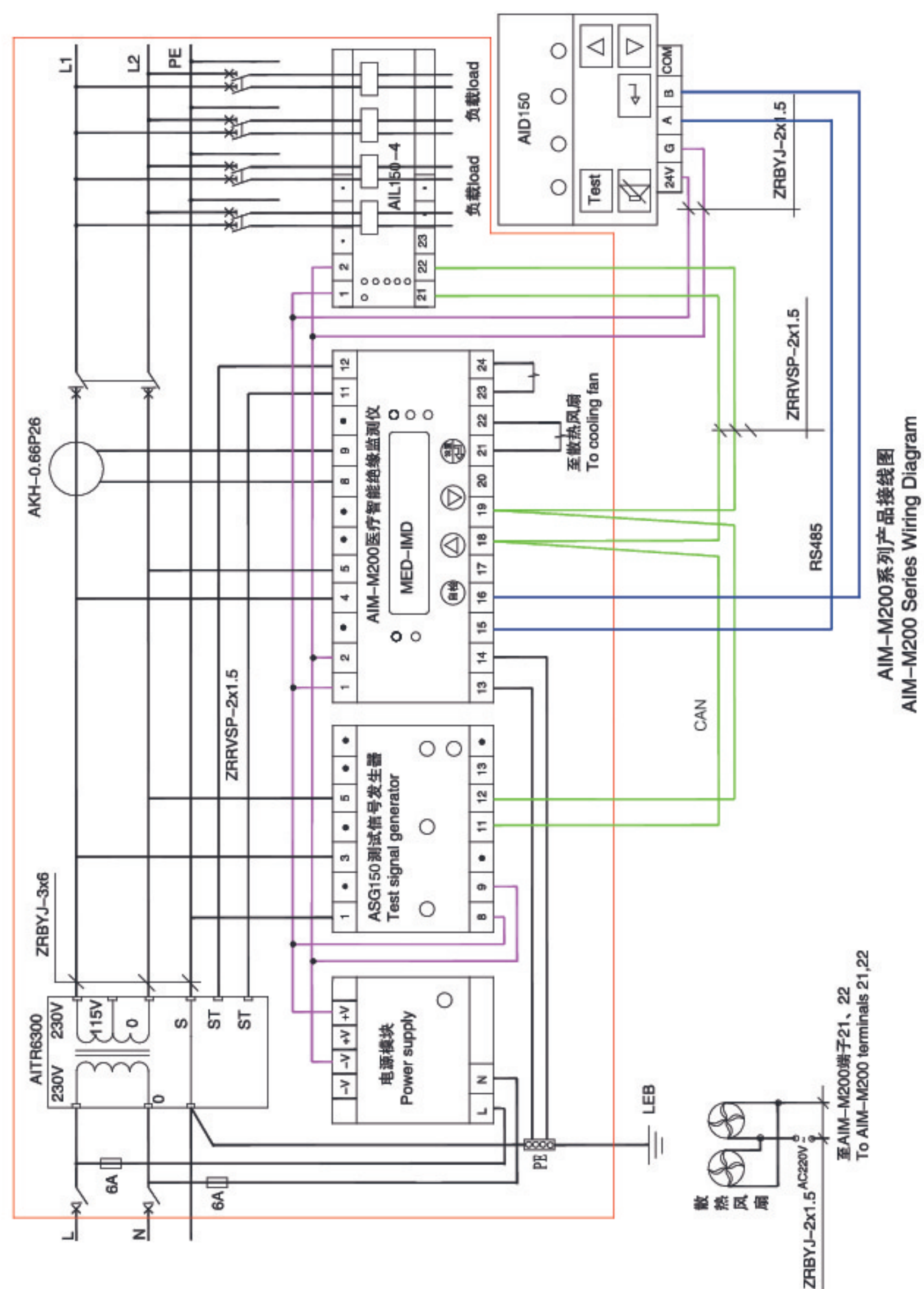
Medical residual current monitoring products are mainly used to monitor the residual current status of the trunk and branch of TN-S distribution system in medical places. When the residual current exceeds the pre-set threshold (where the threshold is less than 30 mA for leakage protection current, usually 6~10 mA), the system sends an alarm signal to prompt the staff to deal with it in time so as to eliminate the potential safety hazards such as electrical fire, leakage and shock caused by insulation aging, break-line, etc., and to provide clean, safe and continuous power supply for the equipment.

Medical residual current monitoring products mainly include AIM-R100 residual current monitor, AKH-0.66/L-20 residual current transformer, AID150 centralized alarm and display instrument and ACLP10-24 DC regulated power supply, etc.

2.1 AIM-R100医用剩余电流监测仪AIM-R100 Medical Residual Current Monitor

AIM-R100医用剩余电流监测仪采用先进的微控制器技术，集成度高，体积小，安装方便，集智能化、数字化、网络化于一身，是医疗1类及2类场所剩余电流监测的首选产品。

AIM-R100 Medical Residual Current Monitor adopts advanced micro-controller technology with high integration, compact size, convenient installation, intellectualization, digitalization and networking. It is the preferred product for residual current monitoring in medical group 1 and group 2.



产品功能Product functions

- 实时监测与显示被监测TN-S系统的剩余电流；**
 Real-time monitoring and display of residual current in monitored TN-S system;
- 实时监测剩余电流互感器连线短路、断线故障，并在故障发生时给出报警信号；**
 Real-time monitoring of residual current transformer connection short-circuit, break-line fault, and send out alarm signal when the fault occurs;
- 继电器报警输出、LED 报警指示等多种故障指示功能；**
 Relay alarm output, LED alarm indication and other fault indication functions;
- 先进的现场总线通讯技术，与集中报警与显示仪通讯，可以实时监控系统的运行状况；**
 Advanced fieldbus communication technology, communication with centralized alarm and display device, can real-time monitor and control the operation of the system;
- 具有事件记录功能，能够记录报警发生的时间和故障类型，方便操作人员分析系统运行状况，及时消除故障；**
 With event recording function, it can record the time of alarm occurrence and the type of fault. It is convenient for operators to analyze the operation status of the system and eliminate the fault in time.
- 一键自检功能，通过该功能检验装置剩余电流检测的功能；**
 One-button self-checking function, through which the residual current detection function of the device is checked.
- 远程复位功能，可远程复位剩余电流监测仪，消除报警信息。**
 With remote reset function, the residual current monitor can be reset remotely to eliminate alarm information.

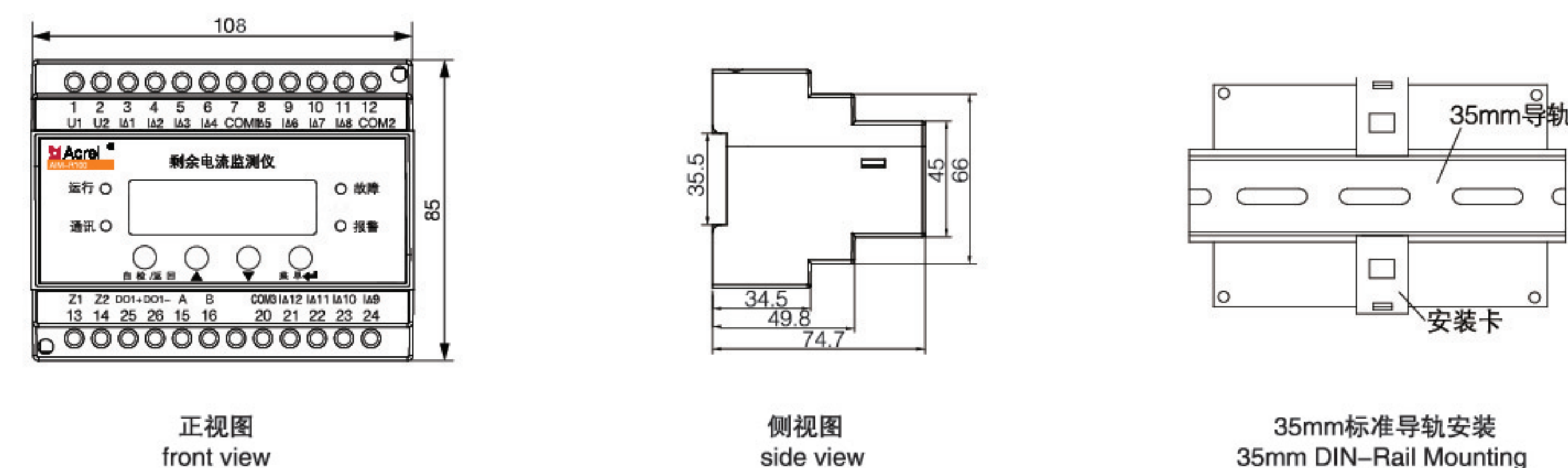
符合标准Standard

- GB 16895.24-2005/IEC 60364-7-710:2002《建筑物电气装置第 7-710 部分：特殊装置或场所的要求—医疗场所》；**
 GB 16895.24-2005/IEC 60364-7-710:2002 Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations
- GB19214-2008/IEC62020：2003《电器附件 家用和类似用途剩余电流监视器》**
 GB19214-2008/IEC62020：2003 Electrical accessories—Residual current monitors (RCM) for household and similar uses
- JGJ 16-2008《民用建筑电气设计规范》**
 JGJ 16-2008 Code for electrical design of civil buildings

技术参数Technical Parameters

参数Parameters		指标Values
辅助电源 Auxiliary Power Supply	电压Voltage	AC220V ± 10%
	最大功耗Maximum power consumption	≤3VA
剩余电流监测 Residual Current Monitoring	支路数Loops	12
	测量范围measuring range	0~5000mA
	报警值设置范围Setting range of alarm value	6~1000mA
	频率Frequency	50Hz ± 5Hz
报警输出 Alarm output	输出方式Output mode	1路继电器 1 Relay
	触点容量contact rating	AC250V/3A DC30V/3A
通讯 communication	通讯接口interface	RS485
	通讯协议Protocol	Modbus-RTU
平均无故障工作时间Average trouble-free working hours		≥50000小时Hours

外形及安装尺寸Overall and installation dimensions(unit: mm)



2.2剩余电流互感器Residual Current Transformer



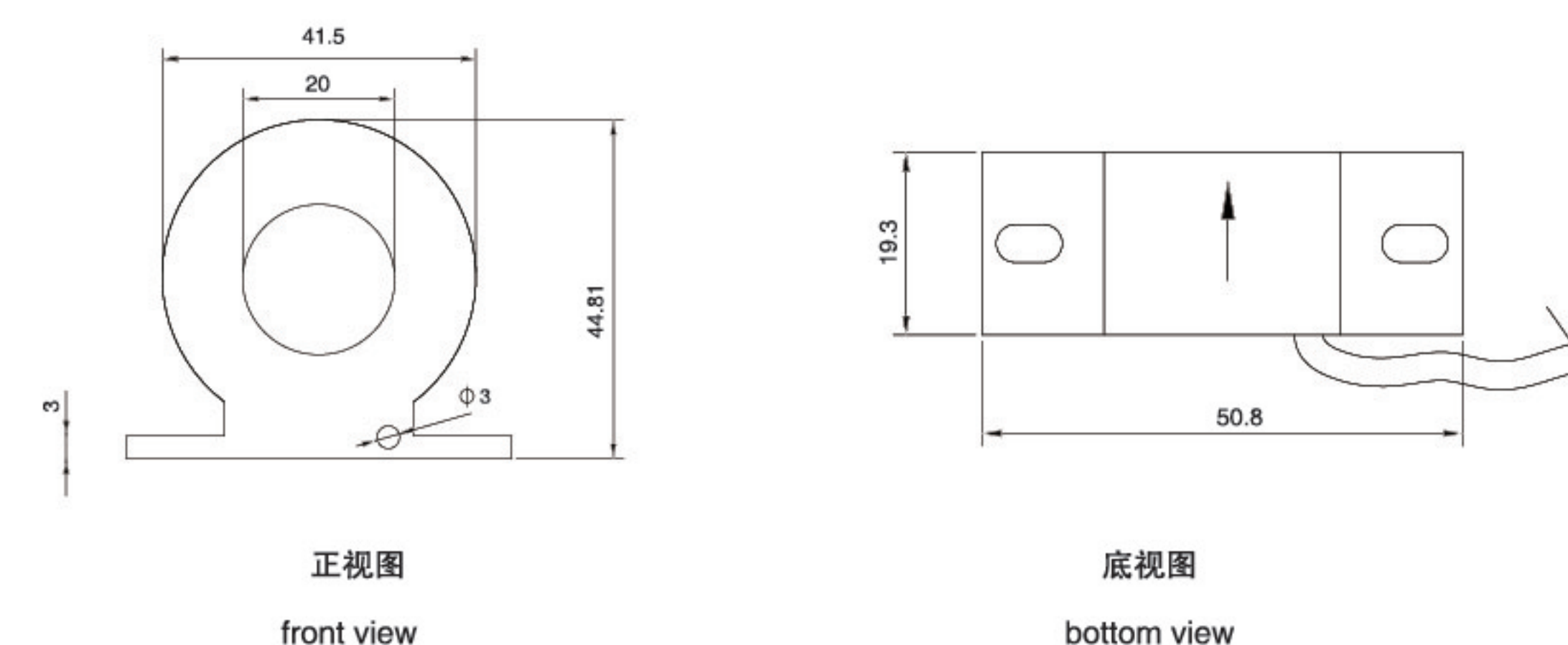
AKH-0.66/L-20剩余电流互感器是与AIM-R100配套使用的特制剩余电流互感器，用于监测各回路的剩余电流状态，变比为2000:1，其安装采用螺丝直接固定于机柜内部，二次侧自带引线引出，安装和使用方便。

AKH-0.66/L-20 Residual Current Transformer is a special residual current transformer matched with AIM-R100. It is used to monitor the residual current status of each circuit with a ratio of 2000:1. The installation of AKH-0.66/L-20 Residual Current Transformer uses screw to fix directly in the cabinet, and the secondary side is fed with lead, so it is easy to install and use.

技术参数Technical Parameters

名称Name	AKH0.66/L-20
等级Level	0.2
变比Ratio	2000:1
额定电流（二次）Rated current (secondary)	50mA
互感器二次输出Secondary output of CT	自带引线Self-contained lead

外形及安装尺寸（单位：mm）Overall and installation dimensions(unit: mm)



2.3智能插座箱Intelligent socket box

AMIS系列智能插座箱是安科瑞电气凭借丰富的产品设计经验，严格参照相关标准，精心开发的智能产品。该产品主要用于医疗场所、生物实验室及净化室等场所的TN-S供电系统，作为这些场所的墙壁插座箱，当插座或负载漏电超标时，插座箱会发出报警信号，提醒工作人员及时查看处理，以消除因漏电而引起的人身触电、电气火灾等安全隐患，从而为设备提供安全、可靠的供电。

AMIS series intelligent socket box is an intelligent product developed meticulously by ACREL with rich product design experience and strict reference to relevant standards. This product is mainly used for TN-S power supply system in medical places, biological laboratories and purification rooms. As wall socket boxes in these places, when the leakage of sockets or loads exceeds the standard, the socket box will send out alarm signals to remind the staff to check and deal with them in time so as to eliminate potential safety hazards such as personal shock and electrical fire caused by leakage, so as to provide safety and feasibility of power supply for the equipment.



AMIS100-J3



AMIS10-J4

产品功能Product function

- 漏电故障报警功能。能实时监测插座箱主回路以及多个支路插座的漏电流，监视插接负载漏电故障，并在故障时发出报警信号。
Leakage fault alarm function. It can monitor the leakage current of the main circuit of the socket box and several branch sockets in real time, monitor the leakage fault of the socket load, and send out alarm signal when the fault occurs.
- 设备故障报警功能。设有设备运行正常与设备系统故障指示灯，指示系统工作状态。
Equipment failure alarm function. Equipped with equipment running normally and equipment system failure indicator lamp, indicating the working state of the system.
- 现场总线通讯技术。插座箱带有1路基于Modbus-RTU协议的RS485通讯接口，支持组网及与外接报警与显示仪通讯，可以通过外接报警与显示仪实时监控多套智能插座箱的运行状况；
Fieldbus communication technology. The socket box has a RS485 communication interface based on Modbus-RTU protocol, which supports networking and communication with external alarm and display devices. It can monitor the operation status of multiple sets of intelligent socket boxes through external alarm and display devices in real time.
- 声光报警功能。故障时提供声音报警、LED报警等多种报警模式，其中声音报警可手动短按消音按钮消除，声音报警功能亦可关闭（长按3秒至提示音响，即关闭该功能），而LED报警则无法人为取消直至故障解除。

Acousto-optic alarm function. When the fault occurs, various alarm modes are provided, such as sound alarm, LED alarm and so on. The sound alarm can be eliminated manually by pressing the muffler button, and the sound alarm function can also be turned off (3 seconds to the alarm sound for a long time, that is to say, the function can be turned off), while the LED alarm can not be artificially canceled until the fault is removed.

- 断电故障报警功能。AMIS100-J3/B款智能插座箱还内置蓄电池模块，当插座箱失电后，监控系统仍可发出报警信号，指示插座箱已断电。

Power failure alarm function. The AMIS 100-J3/B intelligent socket box also has built-in battery module. When the socket box loses power, the monitoring system can still send an alarm signal indicating that the socket box has been cut off.

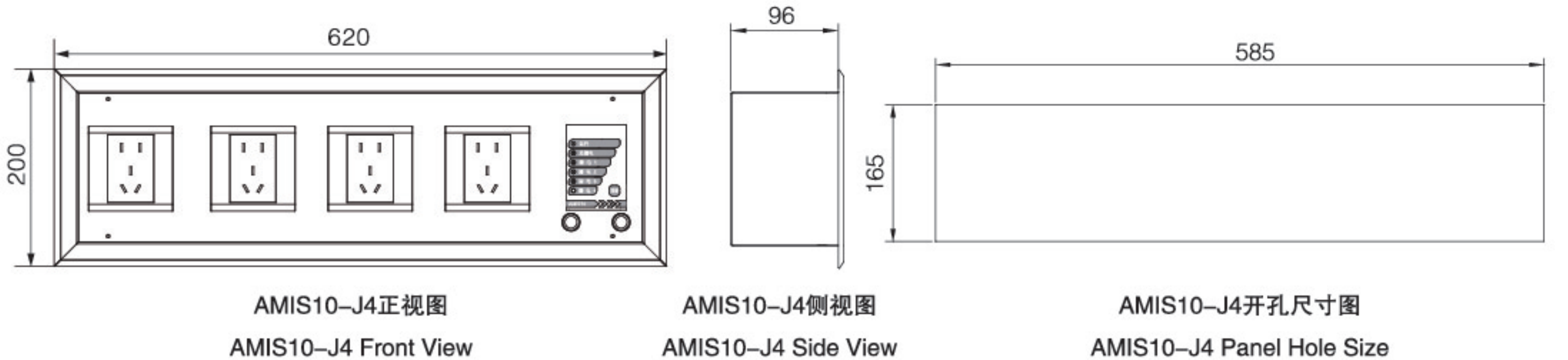
符合标准Standard

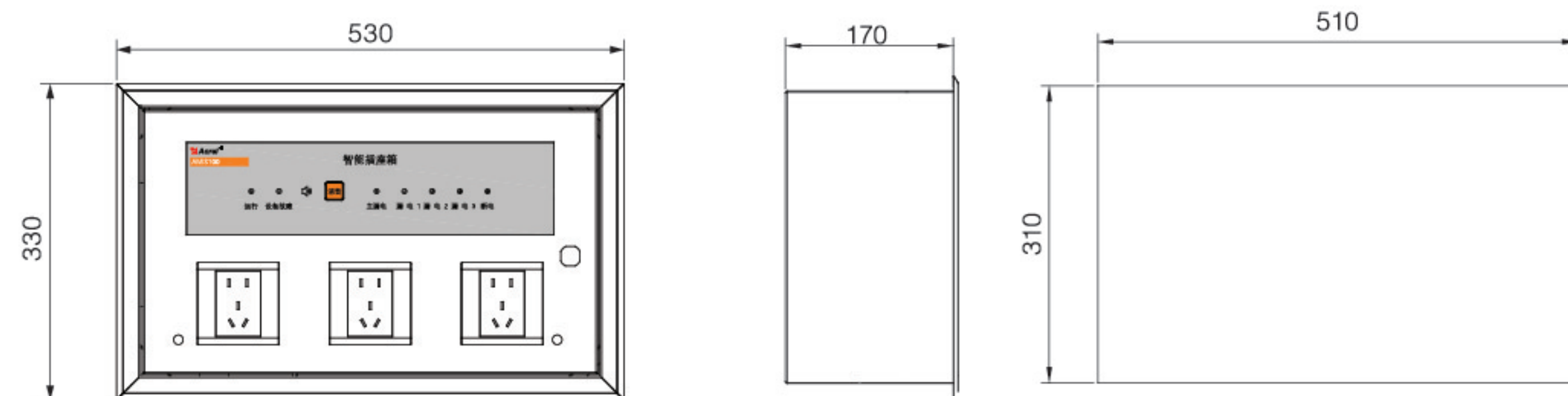
- GB 16895.24-2005/IEC 60364-7-710:2002《建筑物电气装置第7-710部分：特殊装置或场所的要求—医疗场所》；
GB 16895.24-2005 Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations
- GB19214-2008/IEC62020：2003《电器附件 家用和类似用途剩余电流监视器》
GB19214-2008/IEC62020：2003 Electrical accessories—Residual current monitors (RCM) for household and similar uses
- JGJ 16-2008《民用建筑电气设计规范》
JGJ 16-2008 Code for electrical design of civil buildings
- GB50333-2013《医院洁净手术部建筑技术规范》
GB50333-2013 Architectural technical code for hospital clean operating department

技术参数Technical Parameters

参数 Parameters		AMIS100-J3/B	AMIS100-J3	AMIS10-J4
辅助电源 AUX POWER	电压voltage	AC220V		
	功耗 Power consumption	10W		
剩余电流监测 Residual current monitoring	回路数 Loop Number	4路（1主回路，3支路） 4 (1 main, 3 branches)		5路（1主回路，4支路） 5 (1 main, 4 branches)
	剩余电流测量范围 Measurement range	0-1000mA		
	剩余电流报警值 Alarm value	6-1000mA(默认为10mA) 6-1000mA(Default is 10mA)		
	测量误差 Measurement accuracy	± 5%		
	报警输出 Alarm output	4路声光报警指示（且声音可消除，可关闭） 4-way acousto-optic warning instructions (and the sound can be eliminated, can be turned off)		5路声光报警指示 (且声音可消除，可关闭) 5-way acousto-optic warning instructions (and the sound can be eliminated, can be turned off)
通讯 Communication		1 RS485, Modbus-RTU		
外形尺寸 Dimension		510(W) × 310(H) × 170(D)(mm)		585(W) × 165(H) × 100(D)(mm)
其他功能Other functions		故障记录、断电检测、断电报警和断电记录 Fault record, power failure detection, power failure alarm and power failure record		故障记录 Fault record
包含模块 Containment module		监测模块、消防电源、蓄电池、漏电流互感器、插座 Monitoring module, fire power supply, battery, residual current transformer, socket		监测模块、漏电流互感器、插座 Monitoring module, residual current transformer, socket

外形及安装尺寸（单位：mm）Overall and installation dimensions(unit: mm)





AMIS100-J3正视图

AMIS100-J3 Front View

AMIS100-J3侧视图

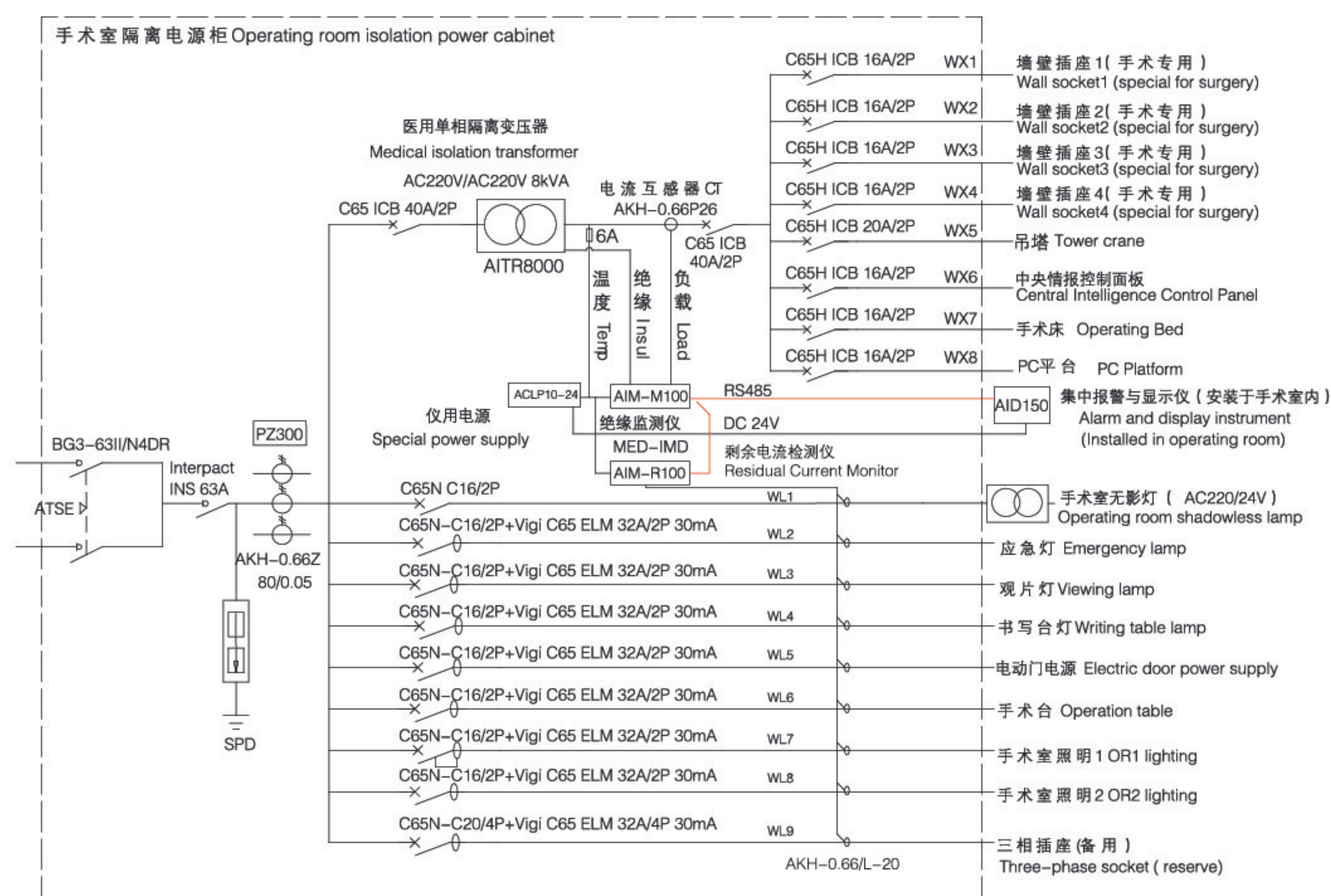
AMIS100-J3 Side View

AMIS100-J3开孔尺寸图

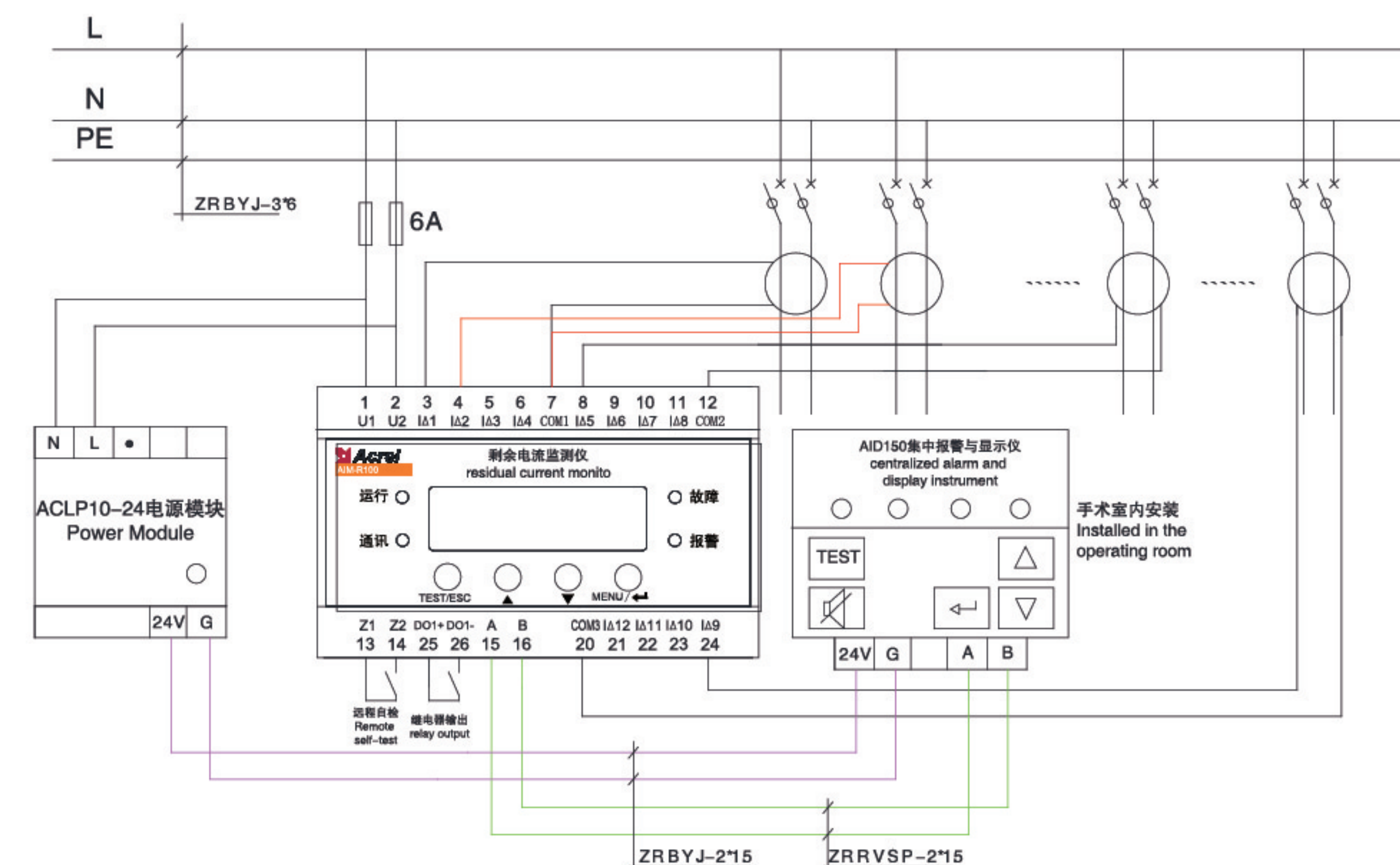
AMIS100-J3 Panel Hole Size

3.应用方案Application Schemes

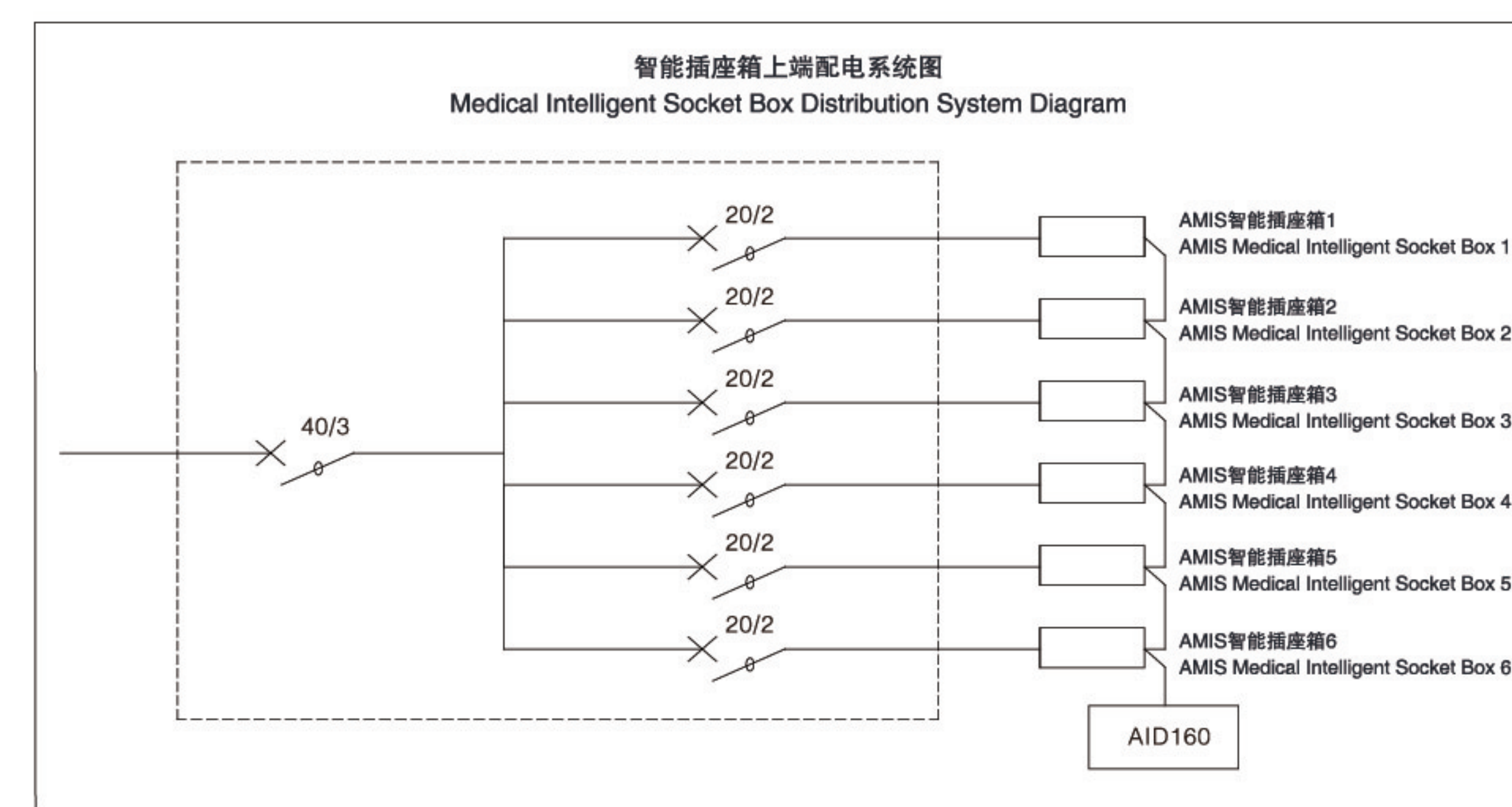
3.1手术室剩余电流监测设计图Design of residual current monitoring in operating room



3.2医用剩余电流监测仪接线图Connection Diagram of Medical Residual Current Monitor



3.3智能插座箱常规设计图



三、工业用绝缘监测产品 Industrial insulation monitoring products

1.概述[Overview]

随着工业科技的发展，漏电流对工业生产安全构成了很大的威胁。为了提高供电的连续性和可靠性，许多重要生产场所采用了不接地供电系统。安科瑞AIM-T系列工业用绝缘监测仪主要应用于工业领域如矿井、玻璃厂、电炉和试验设备、冶金厂、化工厂、爆炸危险场所、计算机中心及应急电源等的交流不接地系统中，用来实时监测系统对地的绝缘状况，当系统出现接地故障时，及时报警，提醒相关人员排查故障。产品的设计严格按照国家标准和规范进行。

With the development of industrial technology, leakage current poses a great threat to the safety of industrial production. In order to improve the continuity and reliability of power supply, ungrounded power supply system is adopted in many important production sites. AIM-T series industrial insulation monitor is mainly used in AC ungrounded system in industrial fields such as mine, glass plant, electric furnace and test equipment, metallurgical plant, chemical plant, explosion dangerous place, computer center and emergency power supply. It is used to real-time monitor the insulation condition of the system to the ground. When the grounding fault occurs in the system, It will alarm in time to remind the relevant person to troubleshoot. The design of products is strictly in accordance with national standards and norms.

2.产品介绍Introduction

2.1 AIM-T系列工业用绝缘监测仪AIM-T series industrial insulation monitor



AIM-T300



AIM-T500

AIM-T系列绝缘监测仪主要应用在工业场所IT配电系统中，产品主要包括AIM-T300、AIM-T500两大系列，其中两款绝缘监测装置除了适用电压等级不同以外，均适用于纯交流、纯直流以及交直流混合的系统。

AIM-T series insulation monitors are mainly used in IT distribution system of industrial sites. The products mainly include AIM-T300 and AIM-T500 series. The two insulation monitors are suitable for pure AC, pure DC and AC-DC hybrid systems except for different voltage levels.

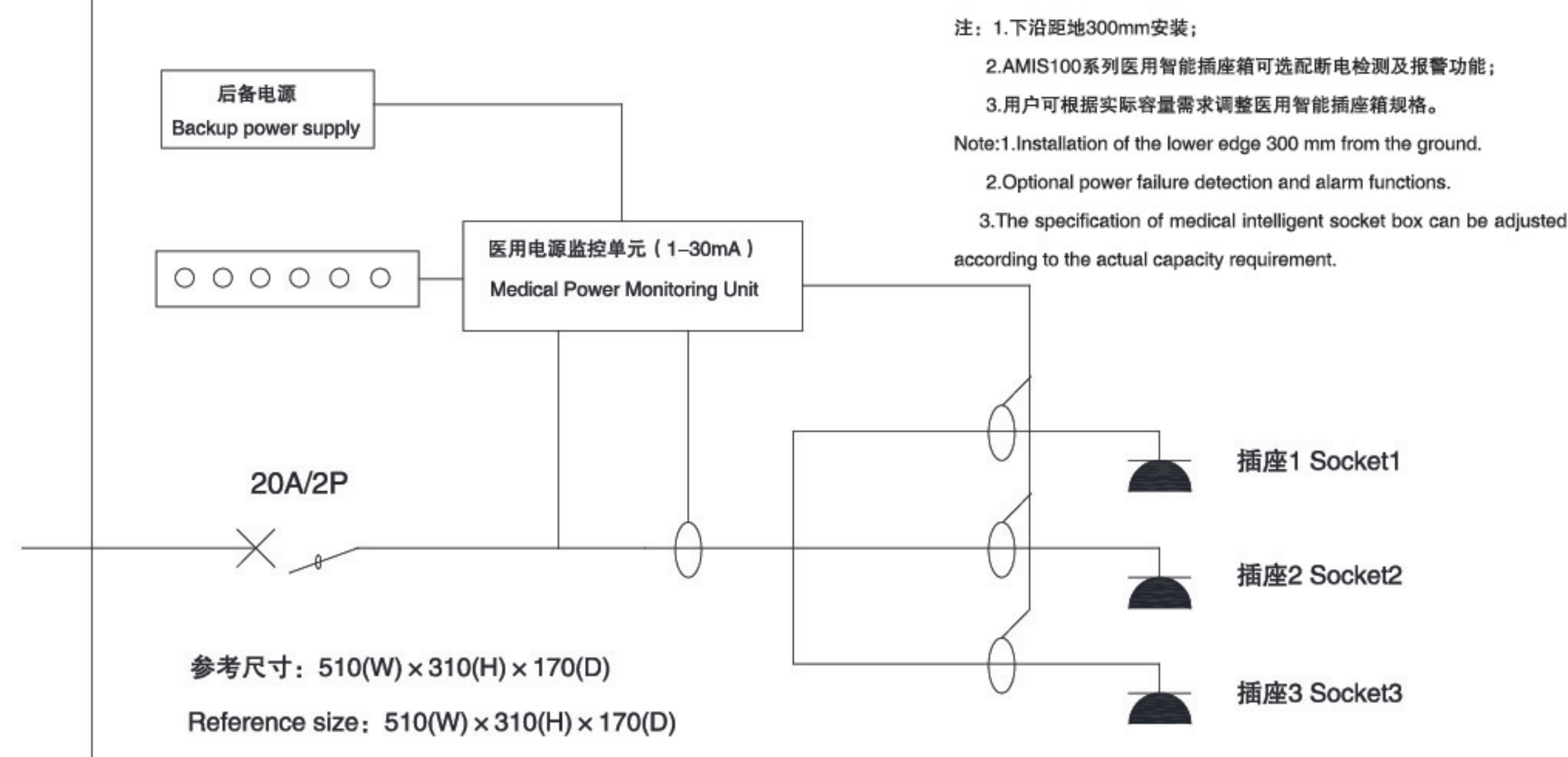
2.2 符合标准Standard

◆ IEC 61557-8-2007 《交流1000V和直流1500V以下低压配电系统电气安全防护检测的试验、测量或监控设备 第8部分：IT系统中的绝缘监控装置》

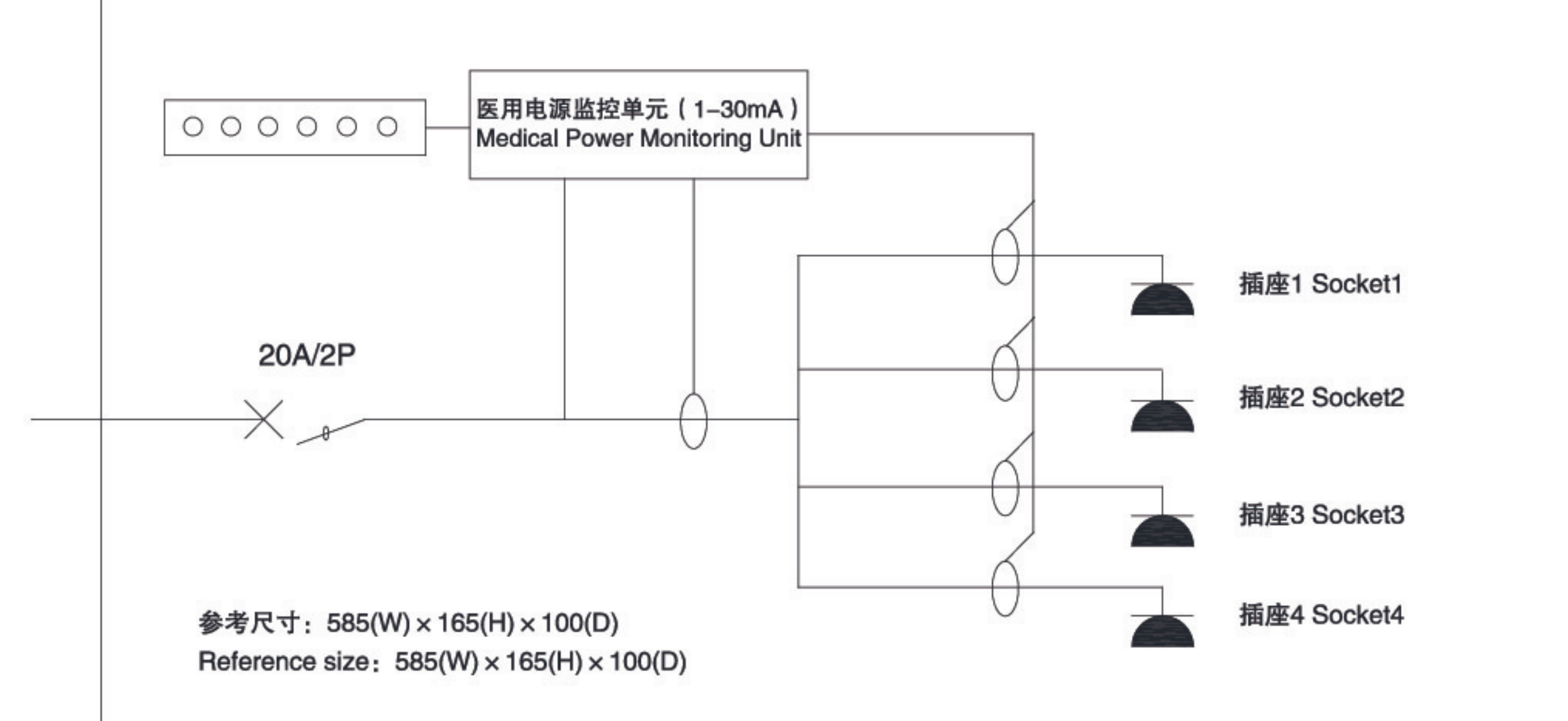
IEC 61557-8-2007 Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c.—Equipment for testing, measuring or monitoring of protective measures — Part 8: Insulation monitoring devices for IT systems

◆ GB/T 18268.24-2010 《测量、控制和试验室用的电气设备 电磁兼容性要求 第24部分：特殊要求 符合IEC61557-8的绝缘监控装置和符合IEC 61557-9的绝缘故障定位设备的试验配置、工作条件和性能判据》

AMIS100-J3/B系列医用智能插座箱系统图
System Diagram of AMIS100-J3/B Series Medical Intelligent Socket Box



AMIS10-J4医用智能插座箱系统图
System Diagram of AMIS10-J4 Medical Intelligent Socket Box



GB/T 18268.24-2010 Electrical equipment for measurement, control and laboratory use—EMC requirements—Part 24: Particular requirements—Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9

2.3 命名规则Naming Rules

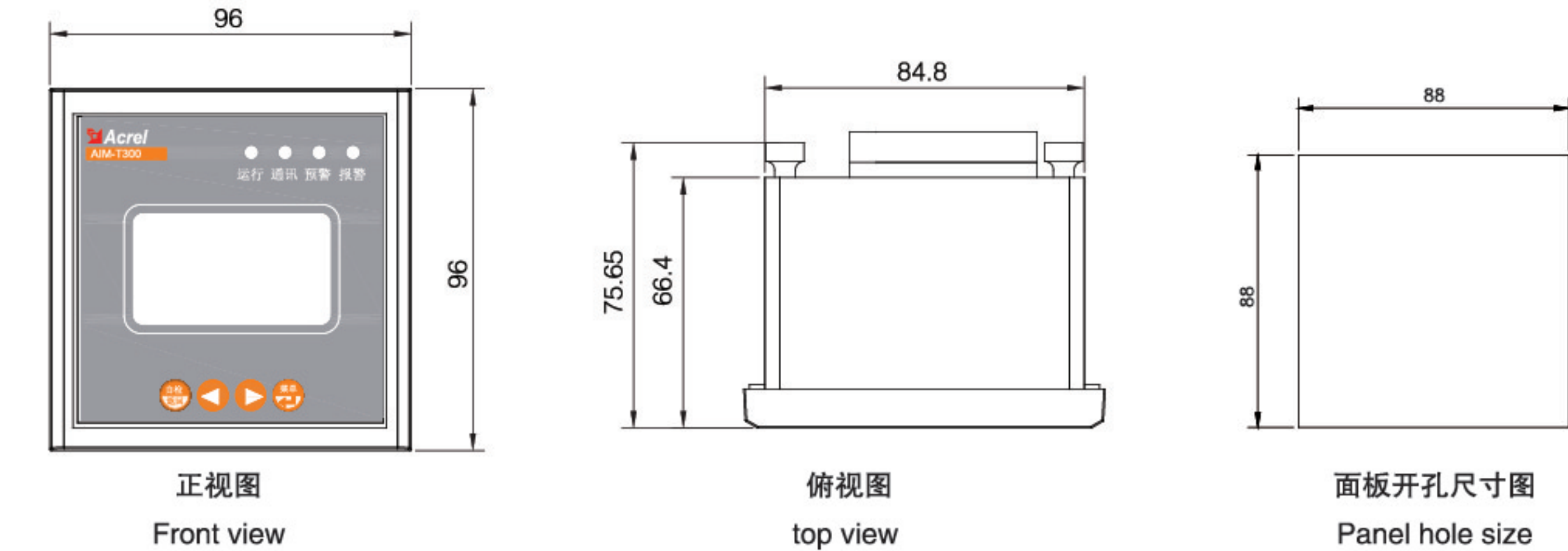


2.4 技术参数Technical Parameters

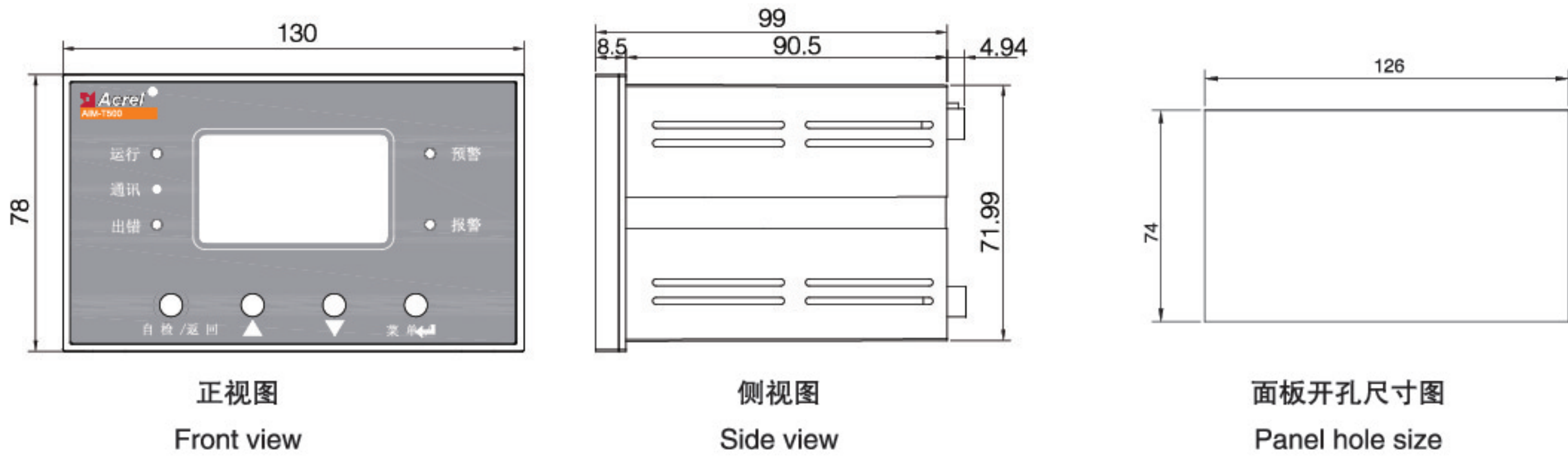
型号type		AIM-T300	AIM-T500
技术指标Specifications	辅助电源		
	AUX POWER		
	电压Voltage	AC85…265V	AC85…265V
	功耗Power consumption	< 8W	< 8W
被监测IT系统			
	Monitored IT system		
	电压Voltage	450V以下的交流、直流以及交直流混合系统 Up to 450V (AC、DC、AC&DC)	800V以下的交流、直流以及交直流混合系统 Up to 800V (AC、DC、AC&DC)
	频率Frequency	40~60Hz	40~60Hz
绝缘监测			
	Insulation Monitoring		
	测量范围measuring range	1kΩ-5MΩ	1kΩ-10MΩ
	报警值范围Alarm range	10kΩ-5MΩ	10kΩ-10MΩ
	相对误差Relative uncertainty	1…10k; 10k; 10k…5M: ± 10%	1…10k; 10k; 10k…10M: ± 10%
	允许系统泄露电容Permissible system leakage capacitance	<150uF	<500uF
	响应时间Response time	<6s	<5s
通讯Communication		RS485, Modbus-RTU	RS485, Modbus-RTU
内部参数			
	Internal parameters		
	测量电流Measuring current	<170uA	<270uA
	电磁兼容/电磁辐射EMC/EMR	IEC61326-2-4	IEC61326-2-4
	额定冲击电压/污染等级 Rated impulse voltage /pollution degree	8kV/Ⅲ	8kV/Ⅲ
	内部直流电阻 Internal DC resistance	≥ 120kΩ	≥ 180kΩ
输出output		继电器输出Pollution grade	预警、报警Early warning, alarm
环境			
	Environment		
	工作温度Operation temperature	-20—+60℃	-15—+55℃
	存储温度Storage temperature	-20—+70℃	-20—+70℃
	相对湿度Relative humidity	5%-95%，不结露5%-95%，No condensation	5%-90%，不结露5%-95%，No condensation
	海拔高度Altitude	≤2500m	≤2500m

2.5 外形及安装尺寸 (单位：mm) Overall and installation dimensions(unit: mm)

● AIM-T300



● AIM-T500



3.产品应用Application Schemes

3.1 AIM-T系列应用示意图Application schematic diagram of AIM-T series

AIM-T300绝缘监测仪适用于450V以下交流、直流以及交直流混合的不接地系统中，AIM-T500绝缘监测仪适用于800V以下交流、直流以及交直流混合的不接地系统中，实时监测IT系统对地的绝缘状况。同时AIM-T500支持双套IT系统母线互联功能，即当两套IT系统通过母联合为一套IT系统时，只有1台绝缘监测仪工作，另一台在检测到母联开关闭合后，自动停止绝缘监测功能。绝缘监测装置在主配电系统中的应用示意图如下所示。

AIM-T300 Insulation Monitor is suitable for AC, DC and AC-DC hybrid ungrounded systems up to 450V. AIM-T500 Insulation Monitor is suitable for AC, DC and AC-DC hybrid ungrounded systems up to 800V. It can real-time monitor the insulation status of IT system to the ground. At the same time, AIM-T500 supports the bus interconnection function of two IT systems, It mains, when two IT systems are combined into one through the bus, only one insulation monitor works, and the other automatically stops the insulation monitoring function after the bus switch closes. The application schematic diagram of the insulation monitor in the main distribution system is shown below.



4.典型接线图Typical Connection Diagram



四、附录 Appendix

1. IT/TN/TT接地系统介绍IT / TN / TT Grounding System Introduction

根据现行的国家标准《电压配电设计规范》，低压配电系统有三种接地形式，即IT系统、TT系统、TN系统。

第一个字母表示电源端与地关系：

- T – 电源端有一点直接接地
- I – 电源端所有带电部分与地绝缘，或有一点经高阻接地

第二个字母表示电气装置外漏可导电部分对地关系：

- T – 电气装置外漏可导电部分直接对地电气连接，此接地点在电气上独立于电源端的接地点
- N – 电气装置的外露可导电部分与电源端接地点有直接电气连接

后面还有字母时，这些字母表示中性线与保护线的组合：

- S – 中性线和保护线是分开的
- C – 中性线和保护线是合一的

According to the current national standard "Code for design of low voltage electrical installations", low-voltage distribution system has three ground forms,:IT system, TT system and TN systems.

The first letter indicates the relationship between power and ground:

- T – the power source has one point directly connected to the ground;
- I – the power source is insulated with the ground or one point is grounded through impedance.

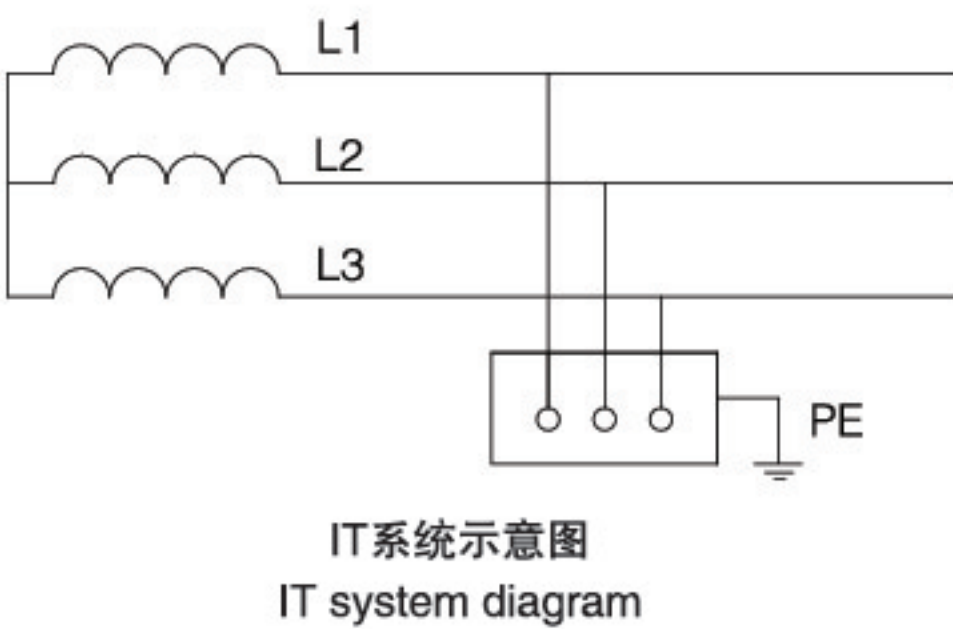
The second letter indicates the relationship between the leakage of electrical installations conductive part and the land :

- T – the grounded pole connected with exposed conductible part of the load side electrical installation and the power source grounded pole has no electrical relation;
- N – The exposed conductive parts of electrical equipment and power supply termination sites have a direct electrical connection.

When there are other letters, these letters represent a combination of neutral and protective wire:

- S – Neutral line and the protection line are separated;
- C – Neutral line and the protection line are unity.

1.1 IT系统IT System



接地方式Earthing mode

电源中性点不接地或经高阻抗接地，而电气装置的外露可导电部分和外界可导电部分直接接地。

The power source is insulated with the ground or one point is grounded through impedance,and the exposed conductible part of the electrical appliance is grounded.

保护技术Protection Technology

- ◆ IT系统中的所有用电设备的外露导电部分互相连通并可靠接地；

All exposed conductive parts of electrical equipment in the IT system are connected to each other and grounded;

◆ IT系统中装设绝缘监测装置，当系统出现第一次绝缘故障（如三相IT系统中的某相接地，或单相IT系统中某一根线接地）时，绝缘监测仪能发出绝缘故障报警。此时IT系统变为TN – S系统，仍可继续运行；

Insulation monitoring device is installed in IT systems, when the system first insulation fault occurs(one phase in the three-phase IT system is grounded, or a wire in single-phase IT systems is grounded), insulation monitors can produce insulation fault alarm.At this time ,the IT system becomes TN–S system,and it can continue to run;

◆ 系统装用过电流保护器（断路器或熔断器）在发生第二次故障（如三相IT系统的两相接地或单相IT系统的两根线都接地）时切断电源。

System which is installed over current protection device (circuit breaker or fuse) cut off power supply in the event of a second failure (such as two phases in the three-phase IT systems or two wires in single-phase IT systems are grounded) .

主要特征Main features

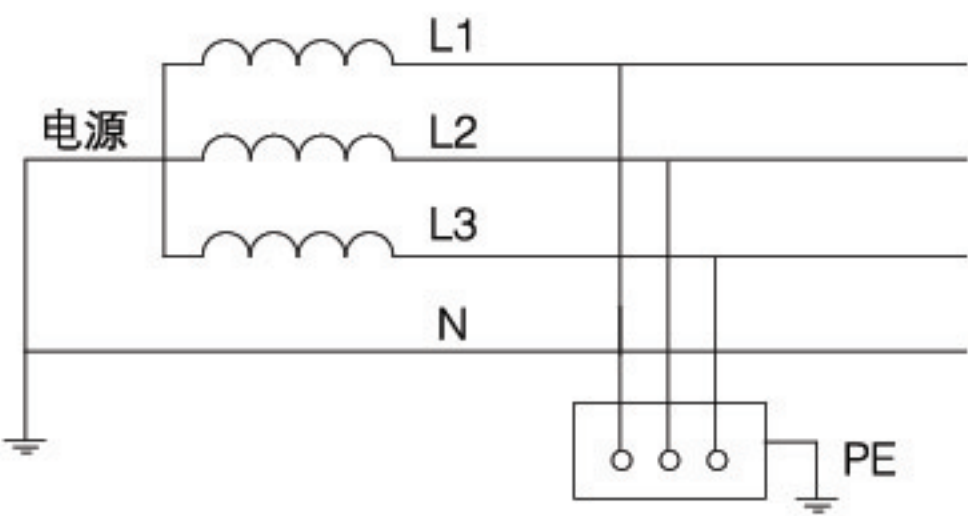
- ◆ 系统供电连续性最好，供电系统内部一旦出现第一个对地漏电故障，不会导致断路器或熔断器动作；

The system has the best continuity of supply, once the first earth leakage fault occurs in internal power supply system, it will not cause a circuit breaker or fuse action;

- ◆ 供电安全性最高，由于系统不接地，漏电流被大大降低，避免人身触电危险，也提高了防火安全性。

Because the system is not grounded,system has the highest security of supply. Leakage current is greatly reduced to avoid personal shock hazard and improve the fire safety.

1.2 TT系统TT System



接地方式Earthing mode

电源的中性点直接接地，电气装置所有的外露可导电部分和外界可导电部分亦直接接地，且与电源中性点的接地无关。

The neutral point of the power is directly connected to ground,and the grounded pole connected with exposed conductible part of the load side electrical installation and the power source grounded pole have no electrical relation

保护技术Protection Technology

将所有用电设备外露可导电部分接地并在系统中安装剩余电流动作保护器(RCD)。为保证人身安全，RCD的额定漏电动作电流应不大于30mA（人体安全电流值）。

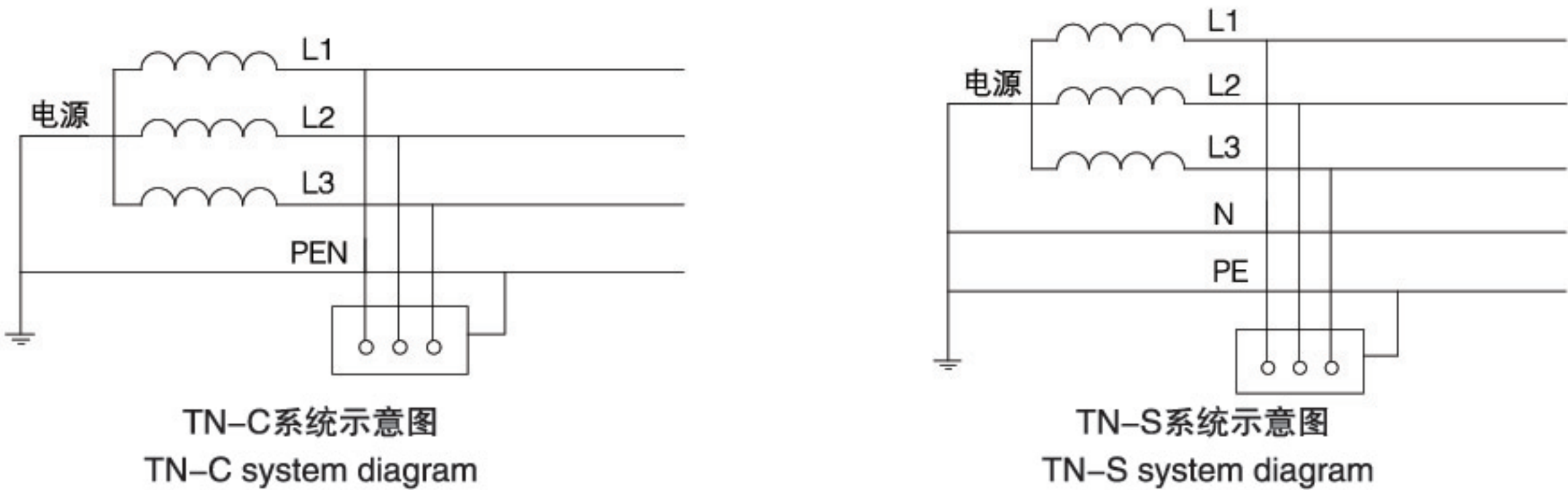
All exposed conductive parts of electrical equipment are connected to the ground and residual current operated protective device (RCD) is installed in the system.To ensure personal safety, RCD's rated residual operating current should be less than 30mA (human safety current value).

主要特征Main features

每一次绝缘故障即切断电源。但由于各回路装设RCD，可以切换漏电大的回路（即出现绝缘故障的回路），所以供电的中断仅限于故障回路。

When every insulation fault occurs, the system immediately cut off the power. But because RCD which is installed in each circuit, you can switch the leakage large circuit (the circuit which insulation failure occurs), so the power supply interruption is limited to the faulty circuit.

1.3TN,TN-S,TN-C及TN-C-S系统TN,TN-S,TN-C and TN-C-S System



接地方式Earthing mode

电源的中性点直接接地，电气装置所有的外露可导电部分和外界可导电部分都与中性线连通。TN-S系统的中性线(N线)和保护线（PE线）是分开的。TN-C系统的中性线（N线）和保护线（PE线）合并为一根导线(PEN线)。TN-C与TN-S用于同一系统，为TN-C-S系统，但TN-C不得位于TN-S下游。

The neutral point of the power is directly connected to ground. All exposed conductive parts of electrical equipment and external conductive parts are connected to the neutral line. Neutral line (N line) and the protection line (PE line) in TN-S systems are separated. Neutral line (N line) and protection line (PE line) in TN-C system merge into one line(PEN line).If the TN-C and TN-S are used in the same system, that is TN-C-S system, however, TN-C system can not be in the next level of TN-S system.

保护技术Protection Technology

- ◆ TN系统强制性要求将外露导电部分和中性点连通并接地;

Exposed conductive parts and the neutral line are connected and grounded ,this is mandatory requirements in TN system.

- ◆ 系统装设过电流动作保护器(RCD)，在第一次绝缘故障时切断电源。

Over current device (RCD) is installed in the system, and it cuts off the power in the first insulation fault .

主要特征Main features

- ◆ 系统一旦发生绝缘故障即切断电源，但由于各回路装设RCD，可以切换漏电大的回路（即出现绝缘故障的回路），所以供电的中断仅限于故障回路；

When every insulation fault occurs, the system immediately cut off the power. But because RCD which is installed in each circuit, you can switch the leakage large circuit (the circuit which insulation failure occurs), so the power supply interruption is limited to the faulty circuit;

- ◆ 发生绝缘故障时将产生较大的短路电流，具有很大的火灾危险性。

When an insulation failure occurs, the system will have a greater short-circuit current, with a great fire risk.

2. 医疗场所安全设施的类别和级别划分示例

Classifications and Rankings of Safety Facilities in Medical Places

2.1概述Introdction

根据《建筑物电气装置第7-710部分：特殊装置或场所的要求 医疗场所》（GB16895.24-2005/IEC 60364-7-710:2002）将医疗场所按使用接触部件所接触的部位及场所分为了0类、1类和2类。具体如下表所示：

Health facilities are divided into group 0, group 1 and group 2 by the use of the contact member in contact with the site and place according to 《Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations》(GB16895.24-2005/IEC 60364-7-710:2002).Specifically the following table:

医疗场所安全设施的类别和级别划分示例

Examples of Classification and Ranking of Safety Facilities in Medical Locations

医疗场所及设备 Medical location	医疗场所类别Group			电源自动切换时间 Automatic switching time of power supply		IT设置要求 IT setup requirements
	0	1	2	t≤0.5s	0.5s<t≤15s	
1.按摩室Massage room	X	X			X	
2.普通病房Bedrooms		X			X	
3.产房Delivery room		X		X①	X	宜设suggested
4.心电图室（ECG），脑电图室（EEG），子宫电图室（EHG）		X			X	
5.内窥镜室Endoscopic room		X②			X②	宜设suggested
6.检查或治疗室Examination or treatment room		X			X	
7.泌尿科诊疗室Urology room		X②			X②	
8.放射诊断及治疗室（不包括第21项所列内容）Radiological diagnostic and therapy room, other than mentioned under 21		X			X	
9.水疗室Hydrotherapy room		X			X	
10.理疗室Physiotherapy room		X			X	
11.麻醉室Anaesthetic room			X	X①	X	应设Should
12.手术室Operating theatre			X	X①	X	应设Should
13.手术预备室Operating preparation room		X	X	X①	X	应设Should
14.上石膏室Operating plaster room		X	X	X①	X	应设Should
15.手术苏醒室Operating recovery room		X	X	X①	X	应设Should
16.心导管室Heart catheterization room			X	X①	X	应设Should
17.重症监护室（ICU）Intensive care room			X	X①	X	应设Should
18.血管造影室Angiographic examination room			X	X①	X	应设Should
19.血液透析室Haemodialysis room		X			X	
20.磁共振成像（MRI）室Magnetic resonance imaging (MRI) room		X			X	
21.核医学室Nuclear medicine		X			X	
22.早产婴儿室Premature baby room			X	X①	X	应设Should

X:表示有此项目。①：指需要在0.5s内或更短的时间内回复供电的照明器和维持生命用的电气设备。②：并非指手术室。
X: Indicates the project.①： Luminaries and life-support medical electrical equipment which needs power supply within 0,5 s or less.②： Not being an operating theatre.

注：

1.医疗场所类别说明：

0类医疗场所为不使用接触部件的医疗场所。

1类医疗场所为以下列方式使用接触部件的场所：接触部件接触躯体外部；除2类医疗场所外，接触部件侵入躯体的任何部分。

2类医疗场所接触部件用于诸如心内诊疗室，手术室以及断电（故障）将危及生命的重要医疗场所。接触部件为医疗电气设备的部件，它在正常使用中为设备发挥其功能需与患者有躯体上的接触，或可取来将其与患者接触，或需被患者触摸。

2.本表所列电源电动切换时间要求外医院内还有一些特殊的场所和电气设备也需在15s内恢复供电的不间断电要求，其事故电源应保持24h的供电周期，若医疗的要求和医疗所及设备的使用，包括所有治疗过程能在3h内结束，并且建筑物内人员能在不到24h以内很快提前疏散完毕，供电周期可减至不少于3h。

3.此表引自国家标准《建筑物电气装置 第7-710部分：特殊装置或场所的要求-医疗场所》GB 16895.24-2005，并增加了IT设置要求。

Note：

1. Medical locations Category Description:

Group 0 :medical location where no applied parts are intended to be used

Group 1:medical location where applied parts are intended to be used as follows:

- externally;

- invasively to any part of the body, except where group 2 applies

Group 2:medical location where applied parts are intended to be used in applications such as intracardiac procedures, operating theatres and vital treatment where discontinuity (failure) of the supply can cause danger to life.

In addition to electric power switching time requirements listed in this table, the duration of 24 h can be reduced to a minimum of 3 h if the medical requirements and the use of the location, including any treatment, can be concluded and if the building can be evacuated in a time which is well within 24 h.

This table is taken from 《Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations》(GB16895.24-2005/IEC 60364-7-710:2002),and add the IT setup requirements.

2.2不同场所的电源选择Power select in different places

在0类和1类医疗场所，由于无医疗设备使用，或相关设备仅使用在人体一些非致命性部位，所以可使用普通建筑物的电源设备和漏电保护措施。一般采用TN系统或TT系统，并配备剩余电流保护设备RCD，当发生漏电流超过30mA的漏电事故时，RCD动作，分断故障回路。这样即使造成医疗设备断电，也不会对患者造成重大影响，医生的诊断或治疗也可重新开始。

在2类场所的患者，往往处于无行为能力的状态，必须依靠某些医疗设备维持生命，或者处于手术状态，任何有关医疗设备上的电气故障都将给患者带来生命危险，所以，在电气上必须保证医疗设备电源系统的可靠性，既保证设备对病人的直接漏电流不超过10 μ A，同时又要保证在漏电流或过电流状态下，有不间断供电的可靠保证。鉴于上述两方面因素，IEC60364-7-710:2001标准规定在2类场所必须采用IT供电系统。我国在《民用建筑电气设计规范》(JGJ 16-2008)第12.8.6条规定：在2类医疗场所内，用于维持生命、外科手术和其它位于“患者区域”内的医用电气设备和系统供电回路，均应采用医疗IT系统。

Because there is no medical equipment used in group 0 and group 1 medical facilities,or associated equipment is only used in non-lethal part of the body, it is possible to use the power devices and leakage current protection of ordinary buildings.TN systems or TT systems are generally used in these places, and are equipped with residual current protection device RCD. When a leakage accident in which the leakage current exceeds 30 mA occurs, the RCD operates to break the fault circuit. This will not have a major impact on the patient even if the medical device is powered off, and the doctor's diagnosis or treatment can be restarted.

Patients in group 2, often in a state of incapacity, they must rely on some medical equipment to sustain life, or in operation state, any electrical failure of medical

devices will give patients to bring about life-threatening. Therefore, we must ensure the reliability of the electric power system of medical equipment. Both to ensure the

device directly to the patient leakage current is less than 10 μ A, and ensuring at the drain current or over current state, a reliable guarantee uninterrupted power supply is

working.Given the above two factors, IT supply system must be used in group 2 according to IEC60364-7-710: 2001.In the "civil electrical design specifications" (JGJ

16-2008) Section 12.8.6 : in group 2 medical facilities, power supply circuit which is to sustain life, surgery and other medical electrical equipment and system in "patient

area" should be used of medical IT systems.

3.国家标准GB16895.24-2005/IEC 60364-7-710：2002 对医疗场所电气装置的要求

National Standards for Electrical Devices in Medical Places

《GB16895.24-2005/IEC 60364-7-710：2002 建筑物电气装置 第7-710部分：特殊装置或场所的要求 医疗场所》条款如下：

Terms are as follows in GB16895.24-2005/IEC 60364-7-710:2002 Electrical installations of buildings—Part 7-710: Requirements for special installations or locations—Medical locations.

710.312.2系统接地的型式Types of system earthing

TN_C系统绝不允许用于由自主配电盘出线回路供电的医疗场所以及医疗建筑物。

The TN-C system is not allowed in medical locations and medical buildings downstream of the main distribution board.

710.413.1自动切换电源保护Automatic disconnection of supply

710.413.1.3 TN系统TN systems

在1类医疗场所中额定电流不大于32A的终端回路，应采用最大剩余动作电流为30mA的剩余电流动作保护器（作为附加防护）。

在2类医疗场所，如采用额定剩余动作电流不超过30mA的剩余电流动作保护(RCD)作为自动切断电源的措施，应只用于下列回路：

◆手术台驱动机构的供电回路；

◆X光机的回路。

注：此要求主要用于挪入2类场所的移动式X光机。

◆额定功率大于5kVA的大型设备的回路；

◆不重要的电气设备（不是用于维持生命的）回路。应注意确保同时使用同一回路的多台这些设备时，不会引起剩余电流动作保护器(RCD)误动作。在1类和2类医疗场所内，根据本条的要求装用剩余电流动作保护器(RCD)时，应按可能产生的故障电流的特性选用A型或B型的剩余电流动作保护器(RCD)。

注：建议对TN-S系统进行监测，以确保所有带电导体足够的绝缘水平。

In final circuits of group 1 rated up to 32 A residual current devices with a maximum residual operating current of 30 mA shall be used (additional protection).

In medical locations of group 2, protection by automatic disconnection of supply by means of residual current protective devices with the rated residual-operating-current not exceeding 30 mA shall only be used on the following circuits:

- circuits for the supply of operating tables;

- circuits for X-ray units;

NOTE The requirement is mainly applicable to mobile X-ray units brought into group 2 locations.

- circuits for large equipment with a rated power greater than 5 kVA;

- circuits for non-critical electrical equipment (non life support).

Care shall be taken to ensure that simultaneous use of many items of such equipment connected to the same circuit cannot cause unwanted tripping of the

residual current protective device (RCD).

In medical locations of group 1 and group 2, where RCDs are required by this subclause, only type A or type B shall be selected, depending on the possible fault–current arising.

NOTE It is recommended that TN–S systems are monitored to ensure the insulation level of all live conductors.

710.413.1.4TT系统TT Systems

在1类或2类医疗场所内，对于TN系统的要求（见710.413.1.3）也运用于TT系统，而且在所有情况下都应采用剩余电流动作保护器(RCD)。

In medical locations of group 1 and group 2, the requirements of TN systems (see 710.413.1.3)apply and in all cases residual current protective devices shall be used.

710.413.1.5医疗IT系统Medical IT system

注1：在美国，这种系统称作“隔离电源系统”。

NOTE 1: In the United States such a system is identified as an “Isolated Power System” .

在2类医疗场所内，医疗IT系统应该用于维持生命的、外科手术的和其他位于“患者区域”内的医疗电气设备和系统的供电回路，但710.413.1.3所列的设备除外。

In group 2 medical locations, the medical IT system shall be used for circuits supplying medical electrical equipment and systems intended for life support, surgical applications and other electrical equipment located in the "patient environment", excluding equipment listed in 713.413.1.3.

用途相同相毗邻的几个房间内，至少需设置一回独立的医疗IT系统。医疗IT系统应配置一个符合IEC 61557–8并满足下列规定要求的绝缘监测器：

For each group of rooms serving the same function, at least one separate medical IT system is necessary. The medical IT system shall be equipped with an insulation monitoring device in accordance with IEC 61557–8 with the following specific requirements:

◆ 交流内阻抗应至少为100kΩ；

The a.c. internal impedance shall be at least 100 kΩ；

◆ 测试电压不应大于直流25V；

The test voltage shall not be greater than 25 V d.c.；

◆ 即使在故障情况下，其注入电流的峰值不应大于1mA；

The injected current, even under fault conditions, shall not be greater than 1 mA peak；

◆ 最迟在绝缘电阻障至50kΩ时，应发出信号。应配置试验此功能的器具。

Indication shall take place at the latest when the insulation resistance has decreased to 50 kΩ . A test device shall be provided；

注2：在德国，要求在绝缘监测器的接地中断或电气线路中断时发出信号。

NOTE 2 In Germany, an indication is required if the earth or wiring connection is lost.

注3：上述绝缘监测器(IMD)的附加要求现在尚未编入现行设备标准IEC 61557–8中。当编入有关设备标准后，上述要求将从本部分删去。

NOTE 3 The necessary additional requirements on IMDs given above are at this time not covered in the equipment standard IEC 61557–8. They will be removed from this publication as soon as they have been treated in the relevant equipment standard.

对于每个医疗IT系统，配备有下列组件的声光报警系统应装设在适当的地方以便医务人员可以经常监视（声光信号）：

For each medical IT system, an acoustic and visual alarm system incorporating the following components shall be arranged at a suitable place so that it can be permanently monitored(audible and visual signals) by the medical staff:

◆一只绿灯亮表示正常工作；

A green signal lamp indicates normal operation；

◆当绝缘电阻下降到最小整定值时，一只黄灯亮。应不能消除或断开这个亮灯指示；

A yellow signal lamp which lights when the minimum value set for the insulation resistance is reached. It shall not be possible for this light to be canceled or disconnected；

◆当绝缘电阻下降到最小整定值时，音响报警动作。该音响报警可以解除；

An audible alarm which sounds when the minimum value set for the insulation resistance is reached. This audible alarm may be silenced.

◆当故障被清除恢复正常后，黄色信号灯应熄灭。

The yellow signal shall go out on removal of the fault and when the normal condition is restored.

◆当只有一台设备由单台专用的IT变压器供电时，该变压器可不装设绝缘监测器。要求监测医疗IT变压器的过负荷和过热。

When only one device is powered by a dedicated IT transformer, the transformer may not be equipped with an insulation monitor. Monitoring of overload and high temperature for the medical IT transformer is required.

710.512.1.1医疗IT系统的变压器Transformers for medical IT systems

◆变压器应紧靠医疗场所安装，可在其内或其外，而且要安装在柜内或外护物内以免被无意地接触其带电部分。

Transformers shall be installed in close proximity to, inside or outside, the medical location and placed in cabinets or enclosures to prevent unintentional contact with live parts.

◆变压器的二次侧额定电压Un不应超过交流250V。

The rated voltage Un on the secondary side of transformers shall not exceed 250 V a.c.

710.512.1.6用于2类医疗场所的医疗IT系统Medical IT systems for group 2 medical locations

◆IEC 61558–2–15及下列附加要求：

Transformers shall be in accordance with IEC 61558–2–15, with the following additional requirements:

◆当变压器以额定电压和额定频率供电，空载时出线绕组测得的对地泄漏电流和外护物的泄漏电流均不应超过0.5mA。

The leakage current of the output winding to earth and the leakage current of the enclosure, when measured in no–load condition and the transformer supplied at rated voltage and rated frequency, shall not exceed 0.5 mA.

◆用于移动式 and 固定式设备的医疗IT系统应采用单相变压器，其额定输出容量不应小于0.5kVA。 但不应超过10kVA。

Single–phase transformers shall be used to form the medical IT systems for portable and fixed equipment and the rated output shall not be less than 0,5 kVA and shall not exceed 10 kVA.

◆如果也需要通过IT系统供电给三相负荷，则应采用单独的三相变压器供电，其输出线电压不应超过250V。

If the supply of three–phase loads via an IT system is also required, a separate three–phase transformer shall be provided for this purpose with output line–to–line voltage not exceeding 250 V..

710.516.5.2.2对安全供电设施的具体要求Specific Requirements for Safe Power Supply Facilities

710.516.5.2.2.1切换时间小于或等于0.5s的供电电源Power supply with switching time less than or equal to 0.5s

在配电盘的一根或一根以上线导体发生电压故障时，专用的安全供电电源应维持手术台照明器和其他重要照明器的供电，例如内窥镜的灯至少能够维持3h。恢复供电的切换时间不应超过0.5s。

When a voltage failure occurs in one or more conductors of the distribution panel, the dedicated safe power supply shall maintain the power supply of the operating table illuminator and other important illuminators, such as the endoscope lamp, for at least 3 hours. The switching time for restoring power supply should not exceed 0.5s.

五、典型业绩 Main Achievements

解放军第301医院

首都医科大学附属北京友谊医院

北京海军总医院

北京怀柔医院

北京中日友好医院

北京大学第一医院

首钢医院

北京中医医院怀柔医院

北京协和医院

重庆医科大学永川第二人民医院

解放军324医院

重庆市安康医院

重庆市永川区人民医院

云阳县人民医院

福州孟超肝胆医院

厦门市集美二院

福建省妇幼保健院

宁德市医院

福鼎百盛新院中医院

泉州市儿童医院

福州协和医院

厦门市儿童医院

漳州第五医院

张掖市人民医院

秦安县人民医院

兰州新区中川人民医院

广州市黄陂医院

梅州市人民医院

恒大医学美容院

江门市中心医院

希玛眼科医院

广西柳州市中医院

来宾市人民医院

广西医科大学第二附属医院

贵港市人民医院

遵义第一人民医院

赤水市人民医院

贵黔国际医院

301 Hospital of PLA

Beijing Friendship Hospital Affiliated to Capital Medical University

Beijing Naval General Hospital

Beijing Huairou Hospital

Beijing Sino-Japanese Friendship Hospital

Peking University First Hospital

Shougang Hospital

Huairou Hospital, Beijing Hospital of Traditional Chinese Medicine

Peking Union Medical College Hospital

Yongchuan 2nd People's Hospital of Chongqing Medical University

324 Hospital of PLA

Chongqing Ankang Hospital

Chongqing Yongchuan District People's Hospital

Yunyang County People's Hospital

Fuzhou Mengchao Hepatobiliary Hospital

Xiamen Jimei Second Hospital

Fujian Maternal and Child Health Hospital

Ningde Hospital

Fuding Baisheng New Hospital of Traditional Chinese Medicine

Quanzhou Children's Hospital

Fuzhou Union Medical College Hospital

Xiamen Children's Hospital

Zhangzhou Fifth Hospital

Zhangye People's Hospital

Qin' an County People's Hospital

Zhongchuan People's Hospital in Lanzhou New District

Guangzhou Huangpi Hospital

Meizhou People's Hospital

Hengda Medical Beauty Salon

Jiangmen Central Hospital

Hima Ophthalmological Hospital

Guangxi Liuzhou Hospital of Traditional Chinese Medicine

Laibin People's Hospital

Second Affiliated Hospital of Guangxi Medical University

Guigang People's Hospital

Zunyi first People's Hospital

Chishui People's Hospital

Guizhou International Hospital

信阳市第三人民医院

鹤壁市人民医院

安钢职工总医院

漯河市第六人民医院

平顶山第一人民医院

解放军211医院

大庆油田总医院

虎林市人民医院

哈尔滨肿瘤医院

湖北省中医院

黄冈市妇幼保健院

荆门市石化医院

武汉紫荆医院

三亚市妇幼保健院

四平市中心医院

南昌市第三医院

苏州市高新区人民医院

解放军第100医院

泰州市第二人民医院

宿迁市妇产医院

常州市金陵骨科医院

南京江北新区医疗中心

包头医学院第二附属医院

乌拉特中旗人民医院

山东省肿瘤医院

青岛大学医学附属医院

济南儿童医院

威海市妇幼保健院

汉中市人民医院

西北妇幼保健院

上海市第十人民医院

复旦大学附属上海市第五人民医院

解放军第411医院

尼日利亚医院

菲律宾慈济医院

安哥拉罗安达总医院

孟加拉国医院

吉尔吉斯斯坦奥什外科医院

Xinyang Third People's Hospital

Hebi People's Hospital

General Hospital of Staff and Workers of Anyang Iron and Steel Co.

Luohe sixth People's Hospital

Pingdingshan First People's Hospital

PLA 211 Hospital

Daqing Oilfield General Hospital

Hulin People's Hospital

Harbin Cancer Hospital

Hubei Provincial Hospital of Traditional Chinese Medicine

Huanggang Maternal and Child Health Hospital

Jingmen Petrochemical Industry Hospital

Wuhan Zijing Hospital

Sanya Maternal and Child Health Hospital

Siping Central Hospital

Nanchang Third Hospital

People's Hospital of Suzhou High-tech District

PLA 211 Hospital

Taizhou Second People's Hospital

Suqian Obstetrics and Gynecology Hospital

Changzhou Jinling Orthopaedic Hospital

Nanjing Jiangbei New District Medical Center

Second Affiliated Hospital of Baotou Medical College

Ulat Zhongqi People's Hospital

Shandong Cancer Hospital

Medical Affiliated Hospital of Qingdao University

Jinan Children's Hospital

Weihai Maternal and Child Health Hospital

Hanzhong People's Hospital

Northwest Maternal and Child Health Hospital

Shanghai Tenth People's Hospital

Shanghai Fifth People's Hospital Affiliated to Fudan University

PLA 411 Hospital

Nigerian Hospital

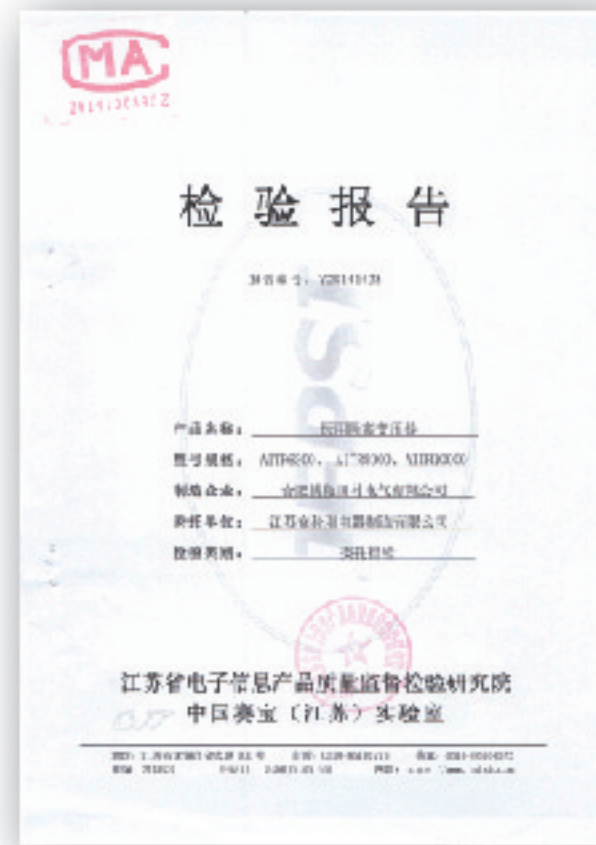
Tzu Chi Hospital, Philippines

Luanda General Hospital, Angola

Bangladeshi Hospital

Osh Surgical Hospital, Kyrgyzstan

六、资质证书Certifications



● AITR医用隔离变压器检验报告

Inspection Report of AITR Medical Isolation Transformer



● AIM医疗绝缘监测仪检验报告

Inspection Report of AIM Medical Insulation Monitor



● AIM工业绝缘监测仪检验报告

Inspection Report of AIM Industrial Insulation Monitor



● GGF隔离电源柜CCC认证证书

CCC Certificate of GGF Isolated Power Cabinet

备忘录

Memorandum