

ZF4-126 型 SF₆ 封闭式组合电器 / SF₆ GAS INSULATED SWITCHGEARS



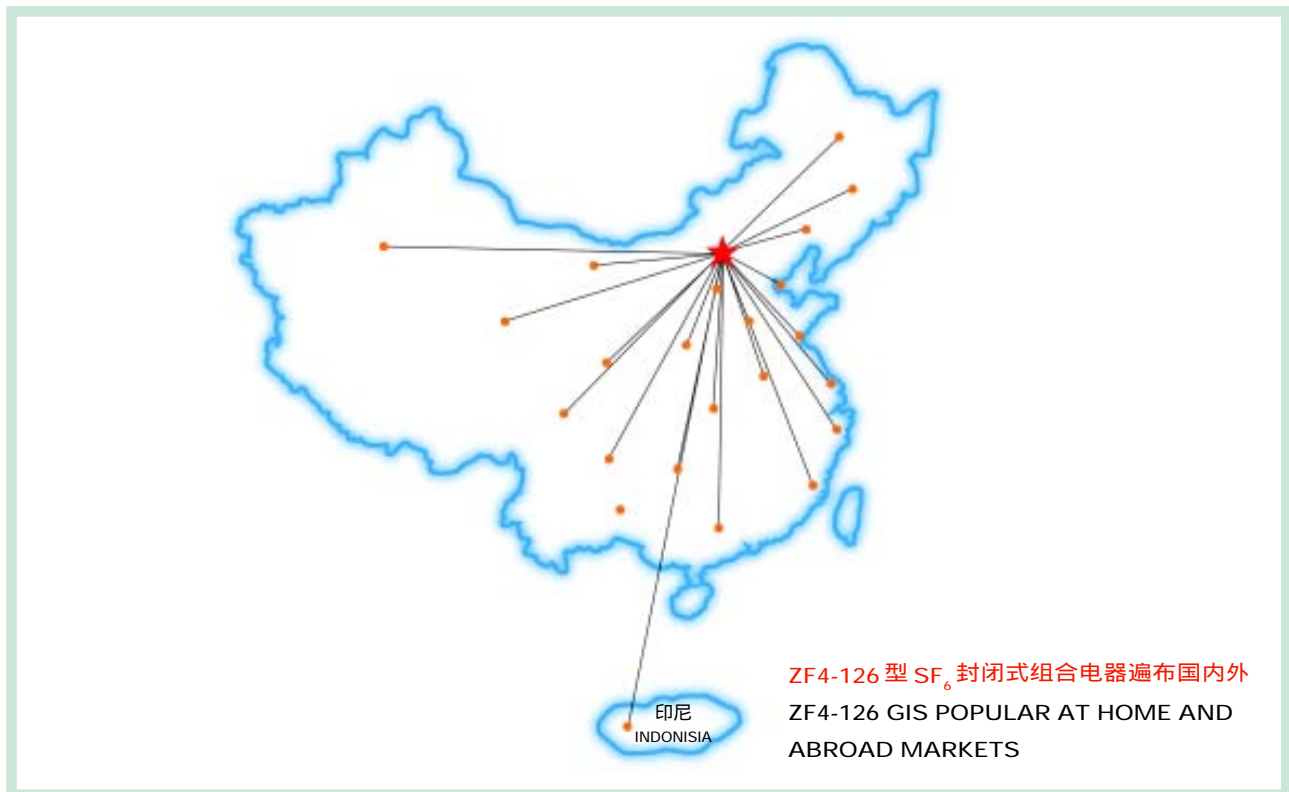
采用国际标准产品标志证书
International Standard Marking Certificate



作为全国首例全面采用国际标准、顺利通过全部型式试验的高压电器产品，于 1985 年 7 月通过了国家机械部鉴定和机械部、水电部联合技术审查。1989 年 11 月通过了两部工业试运行鉴定。

迄今已生产了 1500 余个间隔，装备了约 200 个变电站，并出口印尼，运行量逾 2300 间隔·年。这些数字均高居国内同类产品之首。

As the first example, this high voltage equipment fully comply with the international standard concerned, passed all typical test in Sep. 1984, as well as passed the appraisals of mechanical ministry and the joint-technique examine of mechanical & water-electric ministry in Nov. 1989. By the end of 1999, about 1500 units had been provided for 200substations both in domestic and abroad market, and it's yearly experience is 2300 bays. All these highly above the same products in domestic market.



主要特点:

断路器灭弧室结构分二种:

- 一种配液压结构,采用定开距灭弧结构,电寿命长;
- 一种配弹簧机构,采用热膨胀原理,操作功小;
- 开断容量大,成功开断短路电流为40kA,属国内首创;
- 隔离开关,采用国际最新的球形外壳结构,内部电场均匀,绝缘距离大,保证安全;
- 隔离开关和接地开关均可电动操作(常速和快速),调试、检修时能手动;
- 接地开关的导体与外壳绝缘,便于进行测试工作;
- 电流互感器有高精度小变比产品,其二次线圈额定电流可由用户在1~5A内任选。且每台电流互感器可配四个二次线圈;
- 灵活适用的气路设计,方便了检漏和维修,简单可靠的气体监控系统,有利于现场运行管理;
- 选用指针式密度继电器,既消除了温度的影响,又便于巡视和校验;(亦可供进口密度继电器)
- 采用发光式位置指示器,彻底解决了电磁式位置指示器经常失灵的痼疾;
- 对于电缆进线无法验电的场合,可安装感应式高压带电显示器及闭锁装置,避免了接地开关误合带电线路,确保了安全运行,属国内首创;
- 特殊设计的电缆进线接口结构,便于现场安装和测试;
- 选用符合UL标准的阻燃型屏蔽电缆及阻燃型端子排,辅以新型盒架,达到最好的防火效果,且减少了二次回路对微机保护的干扰;
- 绝缘裕度大,零表压下仍可长期耐受1.5~1.7倍运行电压;
- 额定气压低,因而进线可在-43°C的高寒地区安全运行,是我国唯一适于高寒地区的产品;
- 除主母线外,主回路中其它电气设备均为分相式结构,其突出优点为:
 1. 杜绝了相间和三相短路的可能性;
 2. 由于各电气设备的气室均相互隔离,进一步卓有成效地限制了故障的发生和扩大;
- 便于内部检查和维修,不波及邻相,检修工作量小;
- 低位布置,重心低,抗震性好,便于运输;
- 完善周到的服务:
 1. 代业主培训操作、维修人员;
 2. 专门的现场安装调试队伍,进行现场施工服务;
 3. 可向业主和设计单位提供各种不同的设计方案及计算机设计软盘。

MAIN CHARACTERISTICS:

- Structure of arcextinguishing cell of circuit breaker have two parts:
1. Be fitted with hydraulic mechanism. It is of fixed breaking distance arcextinguishing structure with long electric life.
 2. Be fitted with spring mechanism. It adopt thermal energy principle with small operating power.
- It has high breaking capacities, successfully breaking short-circuit current of 40kA, what is initiated in domestic.
- Isolating switch is of international modern ball structure with uniform internal electric field, large insulation distance ensuring safety.
- Isolating switch and earthing switch can electrically operated (with normal speed and quick speed), and

- manually operated when troubleshooting and inspecting the equipment.
- Conductor of earthing switch is insulated from enclosure in order to test conveniently.
- CT has high accuracy and small ratio, rated current of secondary winding can be selected by customers within 1-5A. Each CT can be fitted with four secondary windings.
- Flexible and applicable gas circuit design is convenient for leak detection and maintenance, simple and reliable gas monitoring system is convenient for commissioning management at site.
- Pointer density relay not only eliminates the temperature effect but also is convenient for monitoring and checking (Import density relay can also be provided).
- Light position indicator completely solves the problem which electromagnetic type position indicator usually fails.
- Induction high voltage charge indicator and latching device are installed at the place where cable incoming line can not be tested so as to avoid earthing switch closing the live circuit faultily and ensure safe operation, which initiates in China.
- Special designing cable incoming interface construction is convenient for installation and test at site. Adopting fire-proof type sheath cable and fire-proof type terminal block which are in line with UL standards and new model case frame, which is the best way to stop fire. What is more, it makes secondary circuit interfere with micro-computer less.
- Large insulating tolerance, withstanding 1.5-1.7 times operating voltage under zero gauge pressure for a long period.
- Low rated pneumatic pressure, incoming line can be operated safely in frigid zone of below zero 43°C. GIS is the only product which can be used in frigid zone in China.
- The electric equipment in main circuit expect for main busbar are of split-phase type construction with the understanding advantages as follows:
1. stop the possibility of short-circuit between phases and three phase short circuit.
 2. Mutual separating of gas chambers of electric equipment further effectively restrict the fault occurring and expanding.
- It is convenient for internal check and maintenance, it will not interfere with neighboring phase with the least maintenance work.
- Low position placement, low center of gravity, good anti-seismic structure and easy for transportation.
- Complete and thoughtful service:
1. training operating and maintenance workers for customers.
 2. Special installation and adjustment teams serving at site.
 3. Providing various of design scheme and disks to customers and design departments.

技术参数 Technical Data

ZF4-126 型 SF₆ 组合电器 ZF4-126 type SF₆ GIS

名称/Items		单位/Units	数据/Parameters
额定电压 /Rated voltage		kV	126, 72
额定电流 /Rated curr.		A	1250/1600/2000
额定频率 /Rated frequency		Hz	50
额定短路开断电流 /Rated short-circuit breaking curr.		kA	31.5
使用地点 /Service site			户内 /indoor
海拔高度 /Altitude above sea-level		M	2500
环境温度 /Surrounding temperature		°C	不低于 -25; 不高于 +40 no less than -25; no more than +40
相对湿度 /Relative humidity		%	日平均不大于 95; 月平均不大于 90 no more than 95 on an average per day; no more than 90 on an average per month.
地震烈度 /Earthquake intensity		deg.	8
年漏气率 /Annual leakage rate		%	1
SF ₆ 气体水份含量(体积比) SF ₆ gas moisture content (volumetric ratio)		PPM	断路器气室 /CB chamber: 150 其他气室 /other chamber: 250
间隔宽度 /Bay width		M	2.2/1.7
间隔重量 /Bay weight		T	5~13/3~11
静载荷 /Dead load		T/M ²	1.5
检修用吊车 Crane for inspection	吊重 /Hook weight	T	1.5~2
	吊钩高 /Hook height	M	5.5
进出设备门 Entrance-exit equipment space	高 /Height	M	3.8
	宽 /Width	M	3.5

ZF4-126 型 SF₆ 断路器 ZF4-126 type SF₆ circuit breaker

名称 /Items		单位 /Units	数据 /Parameters	
			配液压机构 with hydraulic operating mechanism	配弹簧机构 with spring mechanism
额定电流 /Rated curr.		A	1250/1600/2000	2000
额定短路开断电流 /Rated short-circuit breaking curr.		kA	31.5	40
额定短路关合电流(峰值) /Rated short-circuit close curr. (peak)		kA	80	100
额定动稳定电流(峰值) /Rated dynamic stability curr. (peak)		kA	80	100
额定热稳定电流(4秒) /Rated thermal stability curr. (4s)		kA	31.5	40
额定雷电冲击耐受电压(峰值) BIL (peak)	对地、相间 /to earth between phases	kV	450	550
	断口间 /Between breaks		520	630
额定短时工频耐受电压(有效值) Rated power freq. withstand volt. (for 1 min)	对地、相间 /to earth between phases	kV	185	230
	断口间 /Between breaks		250	265
额定短路电流开断次数 /Rated short-circuit breaking times		times	20	20
机械寿命 /Mechanical life		time	2000	3000
额定操作循环 /Rated operation cycle			o-0.3s-co-180s-co	o-0.3s-co-180s-co
合闸时间 /Closing time		S	0.15	0.075
分闸时间 /Opening time		S	0.05	0.038
金属短接时间 /Metal short-circuit time		S	0.11	0.08
自动重合闸无电流间隔时间 /Automatic reclosing currentless spacing interval		S	0.3	0.3
SF ₆ 气体额定表压(20°C) /SF ₆ gas rated gauge pressure		MPa	0.6	0.6
SF ₆ 气体监视表压(20°C) /SF ₆ gas supervision gauge pressure		MPa	0.57	0.57
SF ₆ 气体闭锁表压(20°C) /SF ₆ gas latched gauge pressure		MPa	0.55	0.54

CY3A 型液压操动机构 CY3A type hydraulic operating mechanism

名称 /Items	电压 /Voltage (V)	电流 /Current (A)	功率 /Power (W)
合闸线圈 /Closing coil	-220	2	440
	-110	4	
分闸线圈 /Opening coil	-220	2	440
	-110	4	
油泵电机 /Scavenge motor	~380	3.9	1500
	-220		600
电热器 /Mechanism electroheat	~220		500 (or 500 × 2)

弹簧机构主要技术参数 Main technical data of spring mechanism

名称 /Items	单位 /Units	数据 /Parameters
辅助回路电压 /voltage of auxiliary loop	V	DC220
分、合闸线圈电压 /voltage of opening and closing coil	V	DC220
分、合闸线圈电流 /current of opening and closing coil	A	2
储能电动机 Energy-storing motor	额定电压 /rated voltage	V DC220
	正常工作电压范围 /range of normal working voltage	80%~110% × 220
	功率 /power	W 750
电动机储能时间 /Energy-storing time of motor	s	20
手动储能能力矩 /manually energy-storing	N.M	20
加热器及照明回路电压 /electroheat and lighting return circuit	V	AC220
辅助开关额定电压 /rated voltage of auxiliary switch	V	DC220, AC380
辅助开关额定电流 /rated current of auxiliary switch	A	10
辅助开关接点对数 /Auxiliary switch contact's pairs	对 /pairs	12

ZF4-126M 型母线筒 ZF4-126M type busbar tube

名称 /Items	单位 /Units	数据 /Parameters
额定电流 /Rated curr.	A	1600/2000
额定动稳定电流(峰值) /Rated dynamic stability curr. (peak)	kA	80/100
额定热稳定电流(4秒) /Rated thermal stability curr. (4s)	kA	31.5/40
额定雷电冲击耐受电压(峰值) /BIL (peak)	kV	450/550
额定短时工频耐受电压 /Rated power freq. withstand volt.	kV	185/230
SF ₆ 气体零表压时工频耐压(5分钟)	kV	110/95
SF ₆ 额定表压(20°C) /SF ₆ gas rated gauge pressure	MPa	0.3
SF ₆ 补气表压(20°C) /SF ₆ gas supplementary gas pressure	MPa	0.25

ZF4-126G 型隔离开关 ZF4-126G type disconnector

名称 /Items	单位 /Units	数据 /Parameters
额定电流 /Rated curr.	A	1250/1600/2000
快速接地关合电流(峰值) /Quick earth close curr. (peak)	kA	80/100
额定动稳定电流(峰值) /Rated dynamic stability curr. (peak)	kA	80/100
额定热稳定电流(4秒) /Rated thermal stability curr. (4s)	kA	31.5/40
额定雷电冲击耐受电压(峰值) BIL (peak)	对地、相间 /to earth、 between phases	kV 450/550
	断口间 /Between breaks	kV 520/630
额定短时工频耐受电压(1分钟) Rated power freq. withstand volt. (for 1 min)	对地、相间 /to earth、 between phases	kV 185/230
	断口间 /Between breaks	kV 210/265
零表压工频耐压(5分钟) /Zero gauge pressure power freq. withstand volt. (for 5 min.)	kV	110/95
SF ₆ 气体额定表压(20°C) /SF ₆ gas rated gauge pressure (20°C)	MPa	0.3
SF ₆ 气体补气表压(20°C) /SF ₆ gas supplementary gas pressure (20°C)	MPa	0.25

ZF4-126CMD 型电动机构(配普通隔离开关、接地开关)
ZF4-126CMD type electric mechanism
(disconnector, earthing switch)

名称 Items	单位 Units	数据 Parameters
电动机功率 /Motor power	W	308
操作电压 /Operation volt.	V	=220
辅助接点对数 Auxiliary contact's pairs	对 /pairs	开 6NO 闭 6NC
合、分闸时间 Closing-opening time	S	4.5

ZF4-126CKD 型弹簧机构(配快速隔离开关、接地开关)
ZF4-126CKD type spring mechanism
(match quick disconnector, earthing switch)

名称 Items	单位 Units	数据 Parameters
电动机功率 /Motor power	W	308
操作电压 /Operation volt.	V	=220
合、分闸线圈电压 Closing-opening coil pressure	V	=220
辅助接点对数 Auxiliary contact's pairs	对 /pairs	开 6NO 闭 6NC
储能时间 Energy-storing time	S	4.5
合、分闸时间 Closing-opening time	S	0.15

ZF4-126L 型电流互感器 ZF4-126L type current transformer

额定一次 电流(A)	级次	额定二次负荷		额定额 10% 负荷误差倍数	4S 热稳定电流 (kA)	动稳定电流 评估(kA)	额定绝缘水平
		(VA)	(Ω)				
75	0.5	25	1	/	31.5/40	80/100	一次线圈对二次 线圈及地: 1min 工频耐压 230kV; 雷电冲击(峰值) 550kV; 5min 零表压工频 耐压 126kV。
100	0.2	25	1	/	31.5/40	80/100	
150	0.2	25	1	/	31.5/40	80/100	
	3	50	2	/			
	P	40	1.6	10			
200	0.2	25	1	/	31.5/40	80/100	
	3	50	2	/			
	P	40	1.6	15			
300	0.2	25	1	/	31.5/40	80/100	
	3	50	2	/			
	P	40	1.6	20			
400	0.2	25	1	/	31.5/40	80/100	
	3	50	2	/			
	P	40	1.6	30			
600	0.2	25	1	/	40	100	
	3	50	2	/			
	P	40	1.6	40			
800	0.2	25	1	/	50	125	
	3	50	2	/			
	P	40	1.6	45			
1000	0.2	25	1	/	50	125	
	3	50	2	/			
	P	40	1.6	50			
1250	0.2	25	1	/	50	125	
	3	50	2	/			
	P	40	1.6	55			

注:(1) 根据用户需要,二次线圈电流可在 1-5A 内任选; (2) 可提供 4 个二次线圈的产品。

Y5W 型氧化锌避雷器

产品型号	Y5W-72.5 /224	Y5W-100J /260	Y10W-100J /260
避雷器额定电压(kV, 有效值)	72.5	100	100
系统额定电压(kV, 有效值)	66	110	110
持续运行电压(kV, 有效值)	42	73	73
标称放电电流(kA)	5	5	10
陡坡冲击电流残压(kV, 峰值)	258	299	291
雷电冲击电流残压(kV, 峰值)	224	260	260
操作冲击电流残压(kV, 峰值)	190	221	221
冲击波通流容量 (4/10 μ S, 2次, kA)	40	40	65
2ms 方波通流容量(18次, A)	400	400	600
1分钟工频耐受电压 (kV, 峰值)(不含阀片)	140	185	185
雷电冲击耐受电压 (kV, 峰值)(不含阀片)	325	450	450
直流 1mA 参考电压(kV, 峰值)	122	145	145
局部放电量(PC)	10	10	10
年漏气量	1%	1%	1%

SDFB2-126 型电压互感器

额定一次电压：60000/ $\sqrt{3}$ ；110000/ $\sqrt{3}$

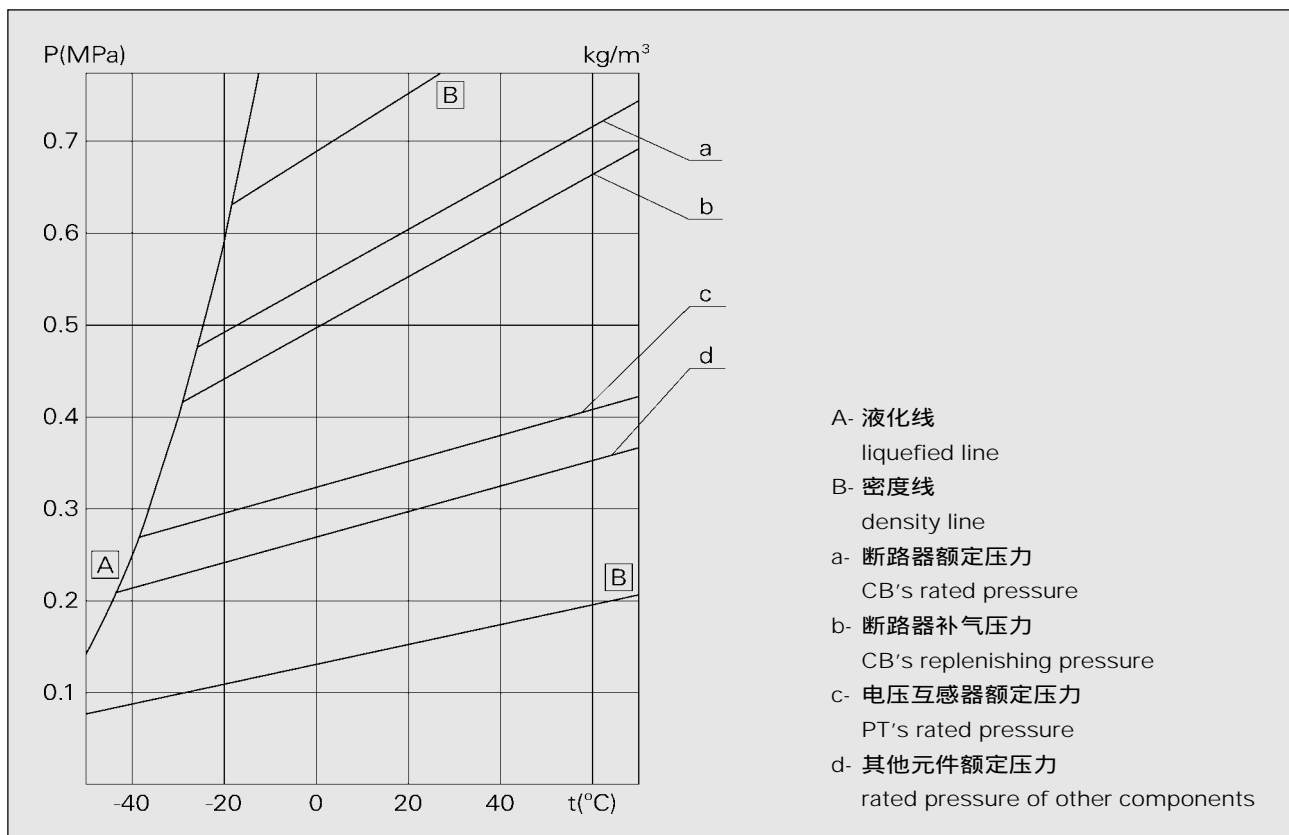
		二次绕组	二次绕组	剩余电压绕组
A	额定电压 V	100/ $\sqrt{3}$	100/ $\sqrt{3}$	100
	准确级	0.2	-	3P
	额定输出 VA	150	-	300
B	额定电压 V	100/ $\sqrt{3}$	100/ $\sqrt{3}$	100
	准确级	0.5	-	3P
	额定输出 VA	300	-	300
C	额定电压 V	100/ $\sqrt{3}$	100/ $\sqrt{3}$	100
	准确级	0.2	0.5	3P
	额定输出 VA	50	150	300
D	额定电压 V	100/ $\sqrt{3}$	100/ $\sqrt{3}$	100
	准确级	0.2	0.5	3P
	额定输出 VA	75	100	300
E	额定电压 V	100/ $\sqrt{3}$	100/ $\sqrt{3}$	100
	准确级	0.5	3P	3P
	额定输出 VA	150	300	300
F	额定电压 V	100/ $\sqrt{3}$	100/ $\sqrt{3}$	100
	准确级	0.2	3P	3P
	额定输出 VA	75	100	300

注：(1) 一般选用“B”或“C”；

(2) 根据用户要求可进行特殊产品设计。

不同密度时，SF₆ 气体的压力 - 温度曲线

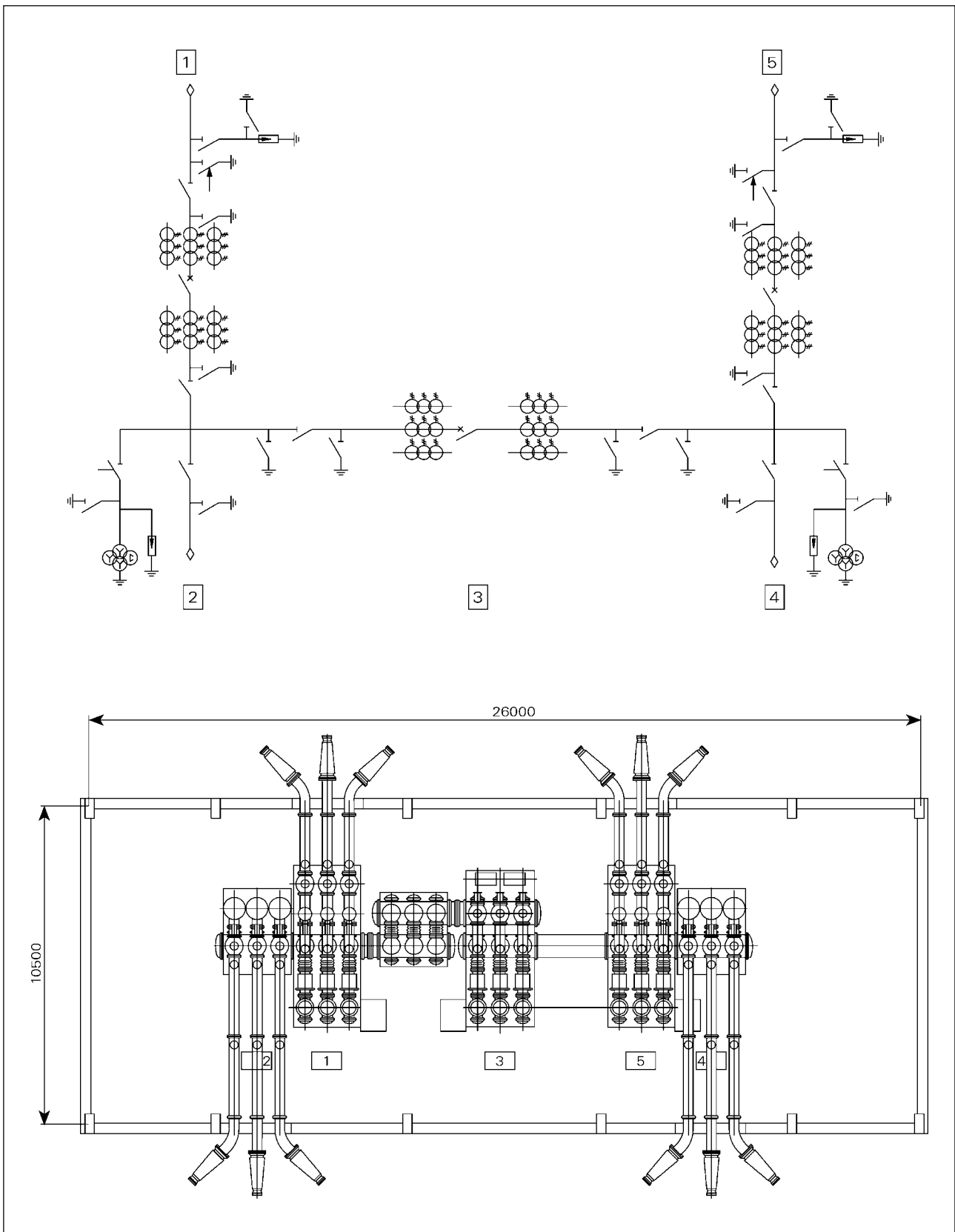
SF₆ gas pressure-temperature curve in density fluctuation

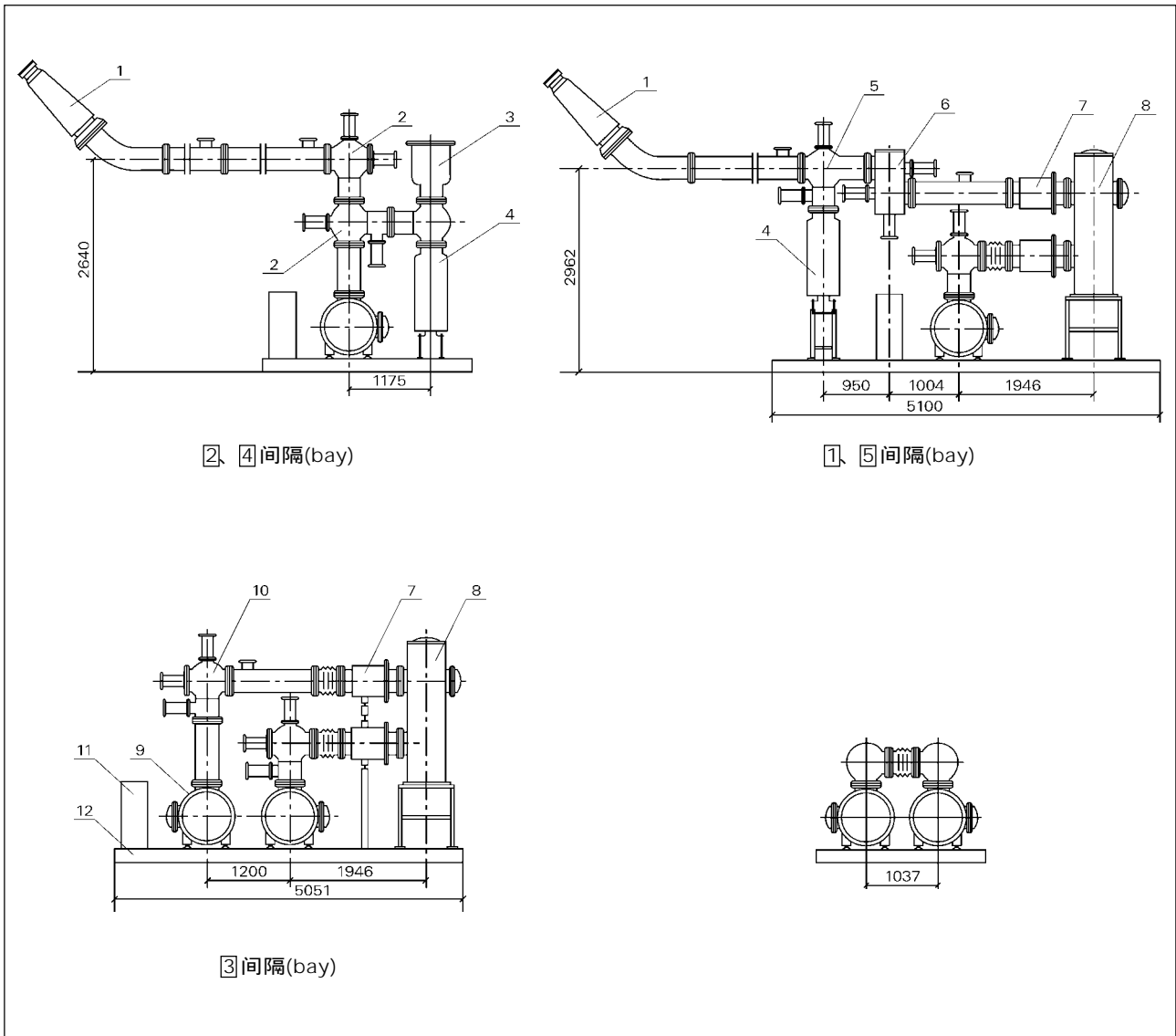


工程实例 Project Example

一、内桥接线方案

inter wiring scheme



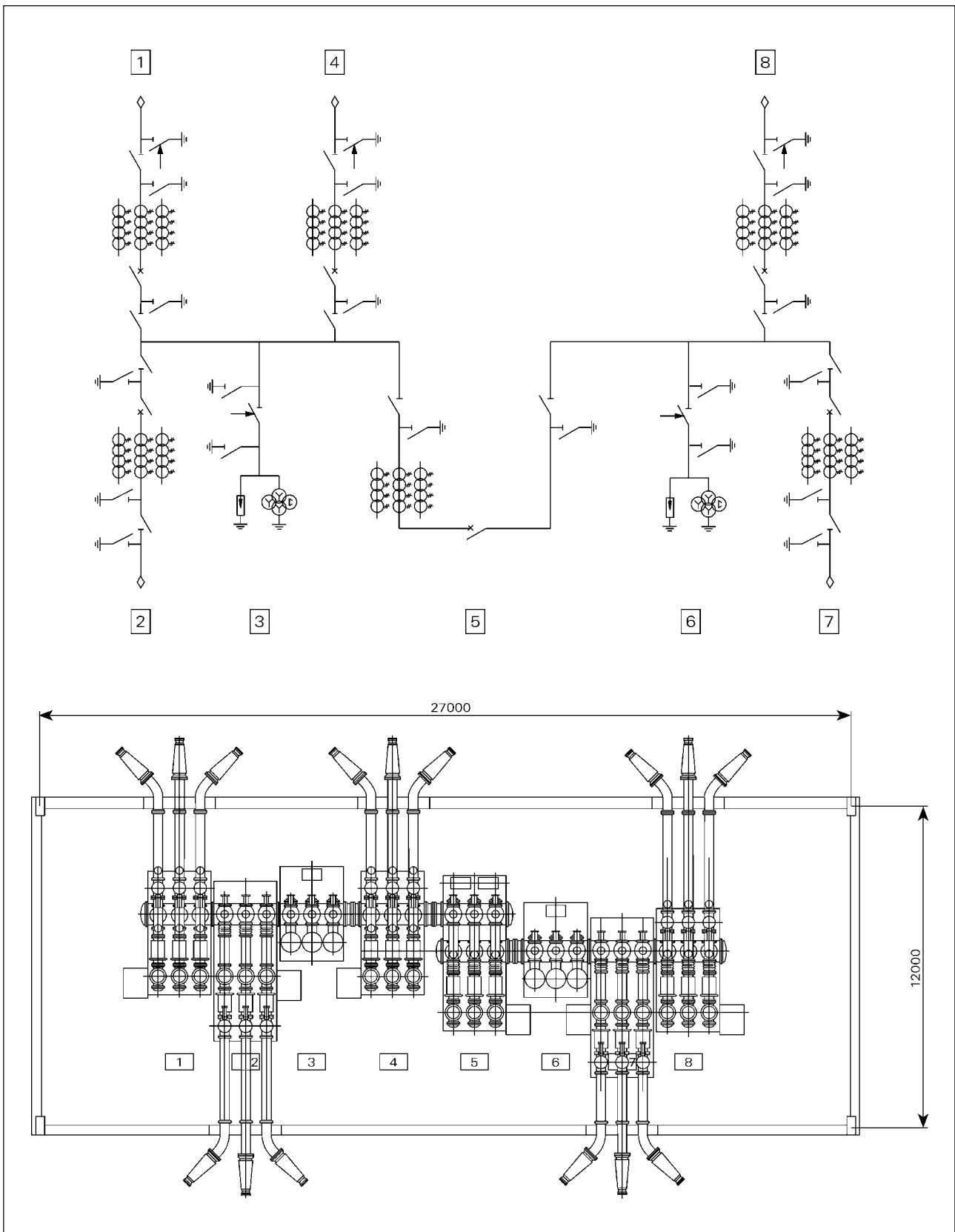


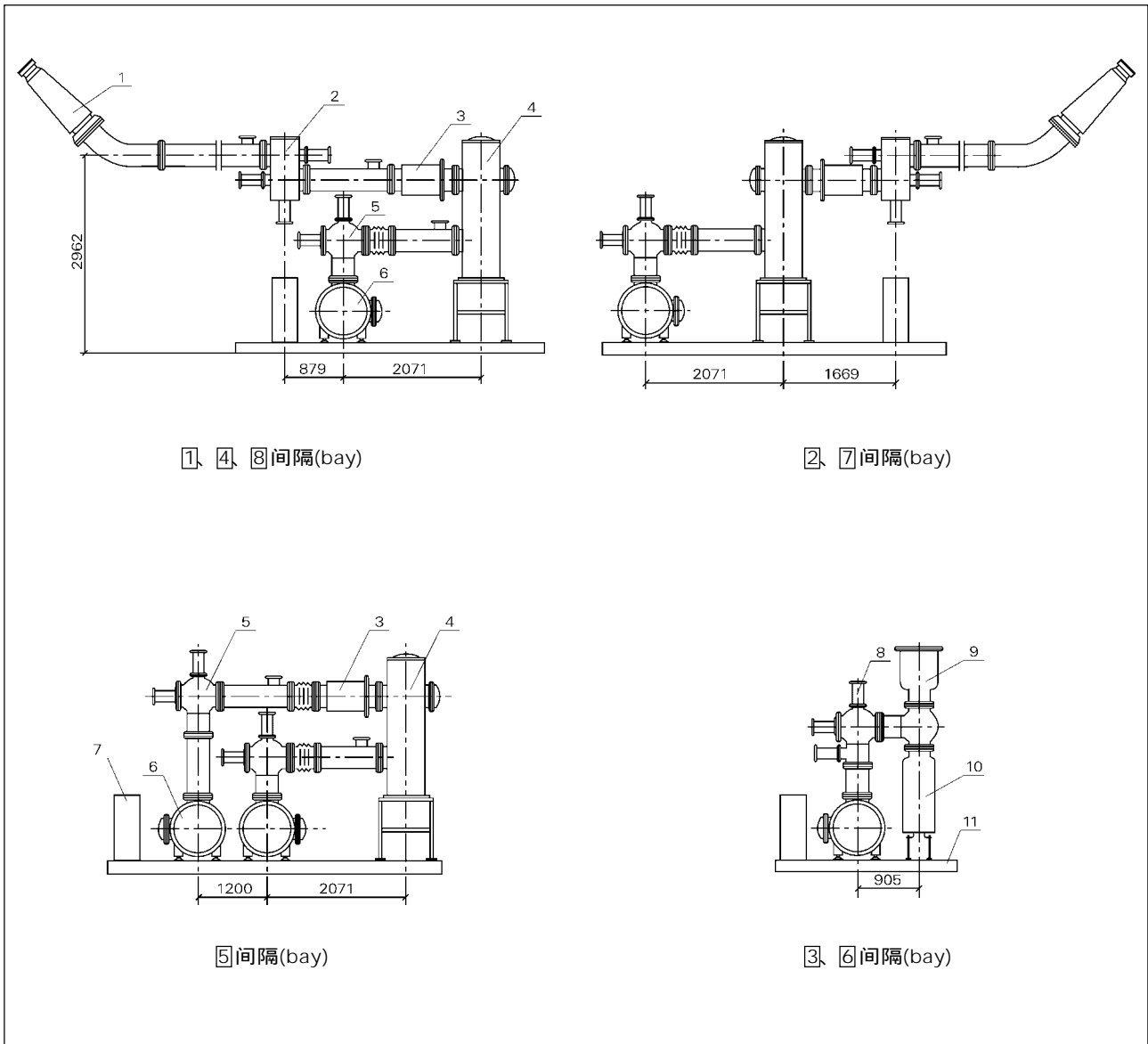
12	底架 /supporter	
11	汇控柜 /middle box	
10	双接地隔离开关 /double-earth disconnector	
9	三相母线筒 /3-phase busbar	
8	断路器 /circuit breaker	
7	电流互感器 /curr. transformer	3 线圈 /3-coil
6	直动隔离开关 /translation disconnector	
5	加长隔离开关 /prolonged disconnector	
4	避雷器 /arrester	
3	电压互感器 /potencial transformer	4 线圈 /4-coil
2	单接地隔离开关 /single-earth disconnector	
1	瓷套管 /ceramic insulator	
序号 /No.	名称 /Name	备注 /Remarks

工程实例 Project Example

二、单母线分段接线方案

single-busbar section wiring scheme



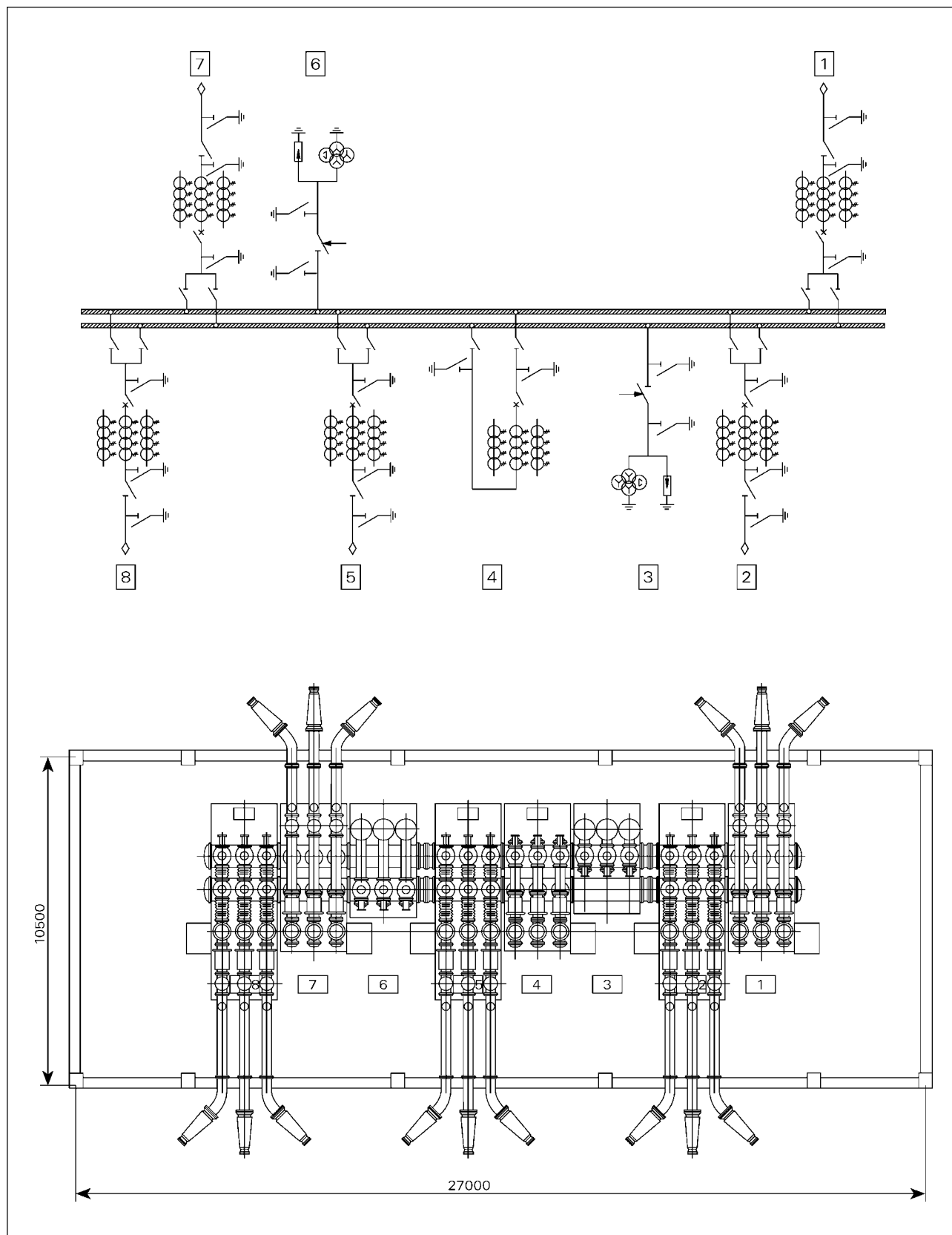


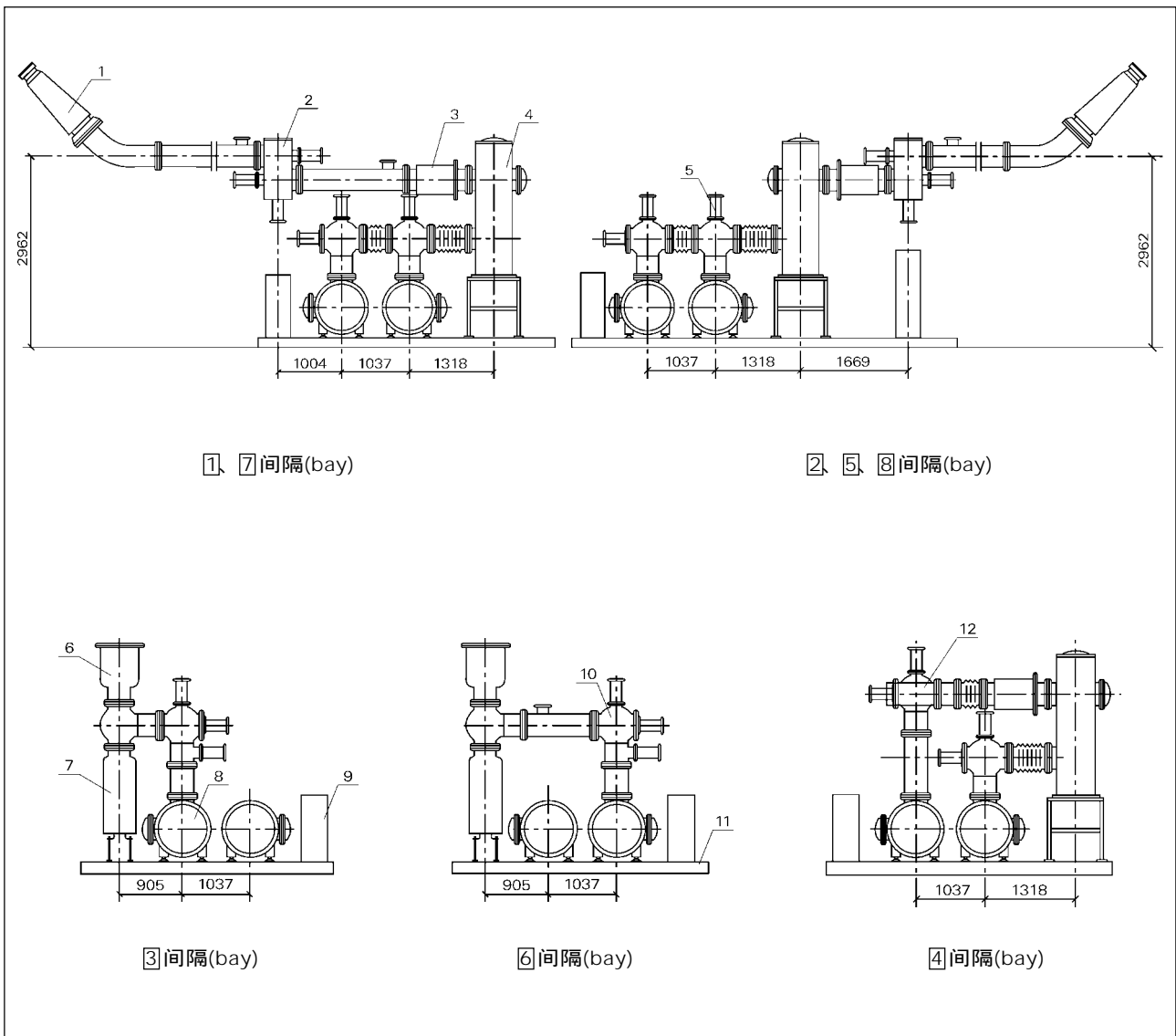
11	底架 /supporter	
10	避雷器 /arrester	
9	电压互感器 /potential transformer	4 线圈 /4-coil
8	双接地隔离开关 /double-earth disconnector	
7	汇控柜 /middle box	
6	三相母线筒 /3-phase busbar	
5	单接地隔离开关 /single-earth disconnector	
4	断路器 /circuit breaker	
3	电流互感器 /curr. transformer	4 线圈 /4-coil
2	直动隔离开关 /translation disconnector	
1	瓷套管 /ceramic insulator	
序号 /No.	名称 /Name	备注 /Remarks

工程实例 Project Example

三、双母线接线方案

double-busbar wiring scheme



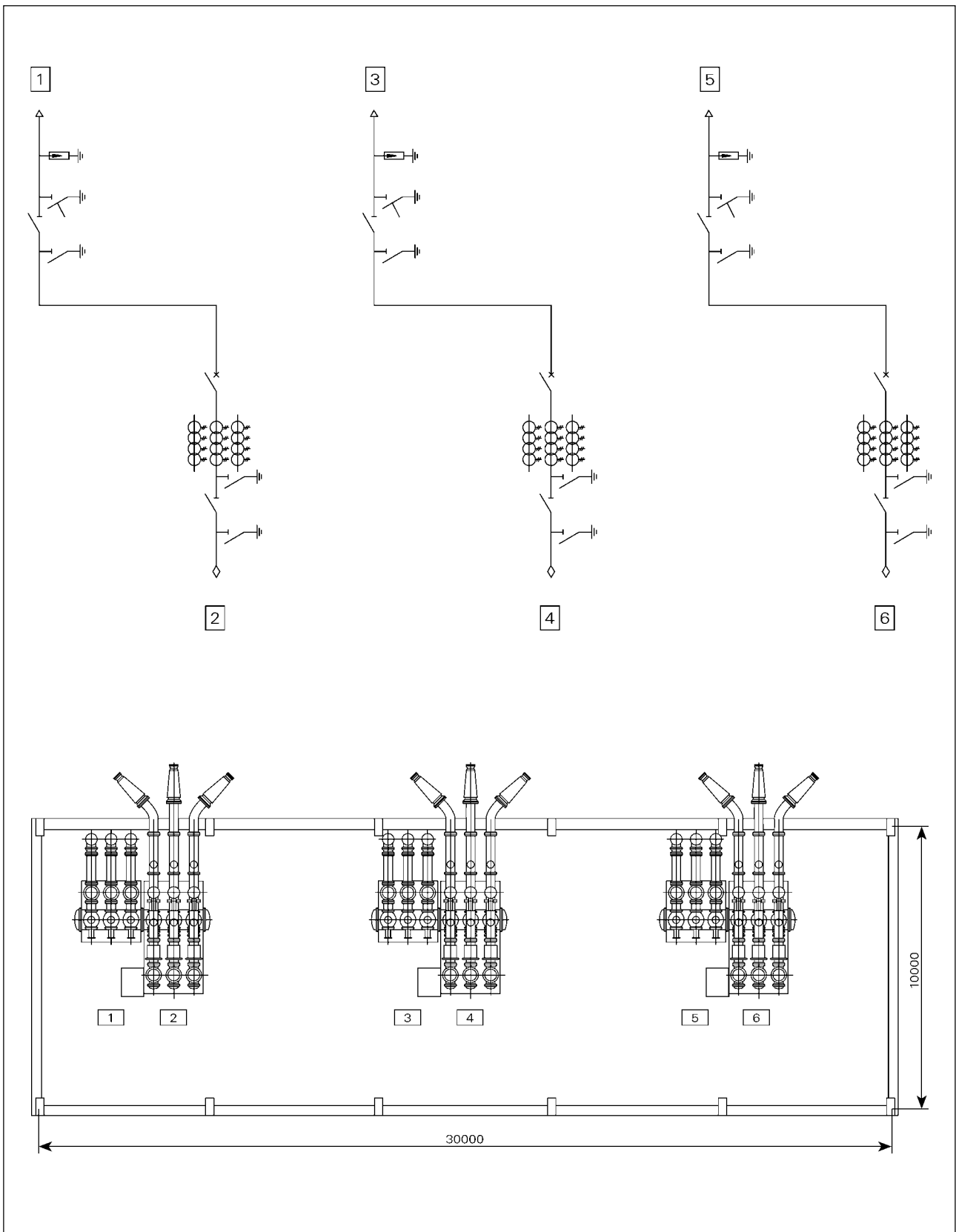


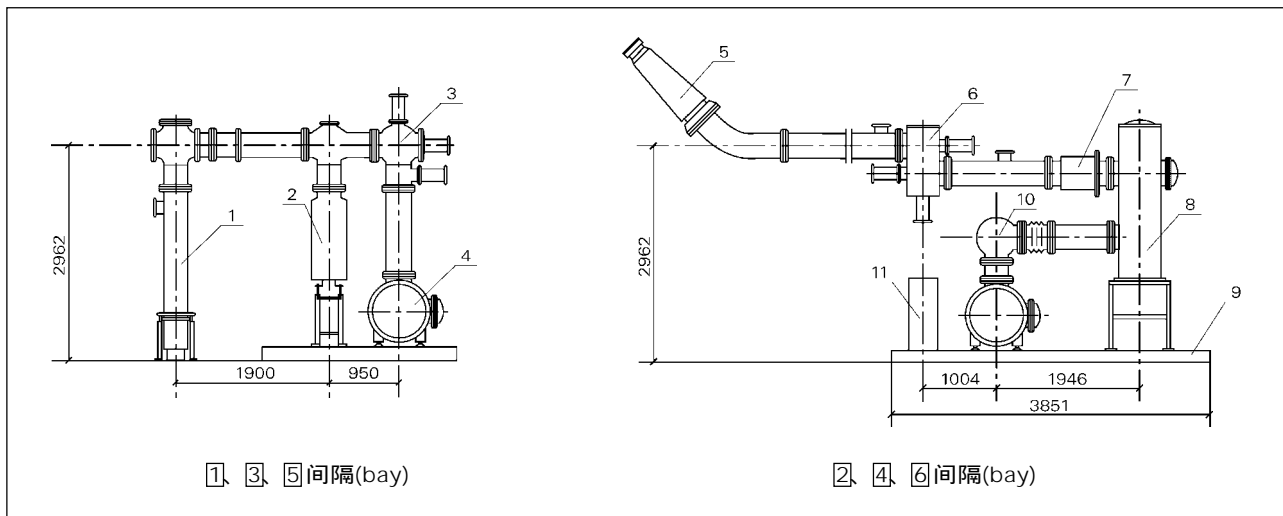
12	单接地隔离开关 /single-earth disconnecter	
11	底架 /supporter	
10	双接地隔离开关 /double-earth disconnecter	
9	汇控柜 /middle box	
8	三相母线筒 /3-phase busbar	
7	避雷器 /arrester	
6	电压互感器 /potencial transformer	4 线圈 /4-coil
5	隔离开关 /disconnecter	
4	断路器 /circuit breaker	
3	电流互感器 /curr. transformer	4 线圈 /4-coil
2	直动隔离开关 /translation disconnecter	
1	瓷套管 /ceramic insulator	
序号 /No.	名称 /Name	备注 /Remarks

工程实例 Project Example

四、线路变压器组

wiring and transformer





11	汇控柜 /middle box	
10	球引线 /wiring	
9	底架 /supporter	
8	断路器 /circuit breaker	
7	电流互感器 /curr. transformer	4 线圈 /4-coil
6	直动隔离开关 /translation disconnector	
5	瓷套管 /ceramic insulator	
4	三相母线筒 /3-phase busbar	
3	双接地隔离开关 /double-earth disconnector	
2	避雷器 /arrester	
1	电缆装配 /cable linking	
序号 /No.	名称 /Name	备注 /Remarks

订货须知

- 客户先提供准确的主结构线图,注明各元件的必要技术参数、进出线方式和相序、进出线间距及各元件的电气连锁表。若有特殊要求,如外壳颜色、操作电源、辅助触点数量等应一并提出。
- 双方进行技术协商,以便就结构、布置等技术问题加以讨论和确认。此后,即可签定合同。
- 签订合同的同时,应一并确定客户所需的辅助设备的品种和数量、设备运输方式及是否需要我厂提供安装技术服务等事项。
- 签合同后,我厂进行方案设计,并向客户提供必需的土建设计资料和二次设计资料,双方确认上述资料后,分别进行施工设计,并及时交换必要的图纸和磋商。双方紧密配合,保证工程的顺利进行。

Note when ordering

- Customers must provide exact primary wiring scheme specified technical data of main components, way of

incoming and outgoing, phases order, distance between incoming and outgoing and the quantity of auxiliary contact points.

- Buyer and seller hold a technique consulting meeting to confirm the instructure, arrangement etc., then the contract can be signed.
- While signing the contract, pay attention to following points: type and quantity of auxiliary equipment, terms of transportation and installation service needed.
- After signature, according to the scheme design, we provide customer necessary construction information and secondary design information. After the confirmation of above documents, construction design will be done, then exchange relative drawings, both parties will have to cooperate closely to complete the project successfully.

提示:注意人身健康与安全,加强环境保护,做好包装物及废弃物的处理!

Notice: Please dispose the package and castoff in right place to keep the environment clean and safe for everyone!