

YFYB6 智能型一体化变电站

Intelligent integrated transformer substation



概述 General

本智能型一体化变电站是伊发公司推出的国产化美式箱变。该产品作为电缆化配电网中重要的供电单元，集高压控制、保护、变电、以及配电设备于一体的成套预装产品，广泛应用于城乡配电网之中。该产品将高压负荷开关、高压熔断器置于变压器油中，具有与变压器身共箱或分箱两种结构形式。油箱采用全密封结构，配有油温表、油位表、压力表、压力释放阀、放油阀等元件监测变压器运行状况。该产品分为环网型、终端型及电源型供电方式。为了使此种产品更适合于我国电网的实际要求，伊发公司又推出了插拔型干式熔断器，熔丝的熔断不影响变压器油的性能。根据低压馈出要求的复杂程度，此产品分为标准型、加强型和综合型三种外壳形式，使用户和设计单位在选型时，做到更灵活、更经济。

This intelligent integrated transformer substation is a nationalized type American box substation developed by Yifa Company. As an important power supply unit in the cable distribution network, it is an integrated prefabricated product of high voltage control, protection, power transformation and power distribution, which is widely used in the urban and rural distribution network.

The high voltage load switch and high voltage fuse are put into the transformer oil, so this product has two structure forms of one box and divided box with the transformer body. The oil box is of full-sealed structure with oil temperature indicator, oil level gauge, pressure gauge, pressure relief valve and oil drain valve to monitor the operation condition of the transformer.

This kind of products has three types of power supply modes - ring network type, terminal type and power type. In order to make the product meet the actual demands of the power grid in China better, Yifa Company promotes plug-pull dry type fuse and the fusing of the fuse wire has no effect to the performance of transformer oil. According to the complicated degree of low voltage outgoing demands, this product has three types of enclosure - standard type, reinforced type and integrated type, as a result, the clients and design agents have more choices.

产品型号及含义 Product type and meaning



使用环境条件 Environmental condition

1. 环境温度：最高气温 +40℃，最低气温 -30℃；
2. 海拔：≤ 1000m；
3. 风速：相当 34m/s(不大于 700Pa)
4. 湿度：日相对湿度平均值不大于 95%，
月相对湿度平均值不大于 90%；
5. 防震：水平加速不大于 0.4m/s²；垂直加速不大于 0.15m/s²；
6. 安装地点倾斜度：不大于 3°；
7. 安装环境：周围空气不受腐蚀性，可燃性气体等明显污染，安装地点无剧烈震动；
8. 订购本产品超出上述条件的规定时，可与本公司协商。

1. Ambient temperature: maximum +40℃, minimum -30℃;
2. Altitude: ≤ 1000m
3. Wind speed: About 34m/s (≤ 700Pa);
4. Humidity: Average daily relative humidity ≤ 95%
Average monthly relative humidity ≤ 90%
5. Shake-roof: Level acceleration ≤ 0.4m/s²; vertical acceleration ≤ 0.15m/s²;
6. Gradient of installation position: ≤ 3°
7. Installing environment: ambient air has not been obviously polluted by corrosive or flammable gas, and there is no strong feeling of shock.
8. Please negotiate with the company when the purchased product is beyond above stipulated conditions.



产品额定参数 Rated parameter of product

额定电压 Rated voltage	10kV/0.4kV
高压侧额定电压 Rated voltage of high-voltage side	10kV
高压侧最高电压 Max. voltage of high-voltage side	12kV
低压侧额定电压 Rated voltage of low-voltage side	0.4kV
额定频率 Rated frequency	50Hz
高压开关热稳定容量 Thermal stability capacity of high-voltage switchgear	20kA/2S
低压主回路开关额定短路分断能力 Rated short-circuit breaking capacity of low-voltage main circuit switch	35kA
低压配出回路开关额定短路分断能力 Rated short-circuit breaking capacity of low-voltage branch circuit switch	35kA
高压负荷开关转移电流 Transferred current of high-voltage load switch	>1500A
噪音水平 Noise level	<50dB
箱壳防护等级 Protective class of case	不低于 IP3X Not less than IP3X

绝缘水平 Insulation level

额定电压 (kV)	10			0.4
Rated voltage	变压器 Transformer	开关对地及相间 Switch to earth and interphase	开关隔离断口间 Switch isolating inter-fracture	
工频耐压 (kV) Power frequency withstand voltage	35	42	48	2.5
冲击耐压峰值 (kV) Peak impulse withstand value	75	75	85	-

结构特点 Structure character

箱壳骨架结构采用槽钢及角钢制造，有较高的机械强度，外壳采用铝合金板等材料制造，表面光滑平整，产品美观大方，且具有较好的防腐性能。箱体的基座高出地基 300~600mm。柜壳所有的门均向外开，开启角度大于 90°，且设定位置。并装有把手。暗门和能防雨、防堵、防锈的暗锁。箱体均为全密封防盗结构；为保证在一般周围空气温度下运行时，所有的电气设备的温度不超过其最大允许温度，箱体有足够的自然通风口和隔热措施。预装式变电站的箱体设有专用接地导体，该接地导体上设有与接地网相连的固定连接端子，其数量为两个以上，有明显的接地标志。接地端子为直径不小于 12mm 有铜质螺栓。接地导体采用铜带，其电流密度不大于 200A/mm² 截面不小于 30mm²，并保证流过最大短路电流时不发生过热和影响周围物体的安全。专用接地导体所承受的动、热稳定电流应与高压配电装置的接地方式相配合。

The framework structure of the box enclosure is made of channel steel and angle steel with higher mechanical strength. the enclosure is made of aluminum alloy plate with smooth surface, beautiful outline and better anticorrosion performance. the base of the box body is 300~600mm higher than the ground. All the doors of the box enclosure are open to outside, and the opening angle is larger than 90° and is set with location device, handles, secret door, as well as built-in locks which have the functions of rain protection, anti-blockage and rust protection. the box bodies are of the full-sealed theft-proof structure. to assure the operation under the normal ambient air temperature, the temperature of all the electrical equipment can't exceed the maximum allowable temperature, and the box body has enough natural ventilation openings and heat insulation measures. the box body of the prefabricated substation is designed with special grounding conductor, on which there are more than 2 fixed connecting terminals connected to the grounding network and on which there are obvious grounding marks. the grounding terminal is the copper bolt, the diameter of which is not less than 12mm. the grounding conductor is made from copper strip, the current density of which is not higher than 200A/mm² and the cross section of which is not less than 30mm². and it is guaranteed that there is no overheat and there is no bad effect to the safety of the surrounding objects when the maximum short circuit current passes. the dynamic and thermal stability current that the special grounding conductor endures must be combined with the grounding mode of high voltage power distribution device.

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变压器性能参数 Performance parameter of transformer

10kV 预装式变电站用 S9、S10、S11 系列油浸式变压器性能水平

For 10KV prefabricated substation performance level of S9, S10, S11 series oil-immersed transformer

序号 No	额定容量 (kVA) Rated capacity	额定电压 Rated voltage		调压范围 (%) Voltage tapping range	连接组标号 Connection group mark	空载电流 (%) No-load current		损耗 (W) Loss			阻抗电压 (%) Impedance voltage	噪音 (dB) Noise	温升 Temperature rise		
		高压 (kV) High-voltage	低压 (kV) low-voltage			S9	S10/S11	空载 No-load	负载 On-load	S9				S10	S11
1	30	6 6.3 10	0.4 (0.69)	± 5 (± 2 × 2.5)	Yyn0 Dyn11	2.2	2.0	130			600	4	55	顶层油温 60° 线圈 65° Oil temperature of top layer 线圈 65° coil 65°	
2	50					2.0	1.8	170			870				
3	63					1.9	1.5	200			1040				
4	80					1.7	1.2	250			1250				
5	100					1.6	1.1	290			1500				
6	125					1.5	1.0	340	270	1800					
7	160					1.4	1.0	400	310	2200					
8	200					1.4	0.8	480	375	2600					
9	250					1.2	0.8	560	455	400	3050				3000
10	315					1.1	0.7	670	540	475	3650				3600
11	400					1.0	0.7	800	650	570	4300				4200
12	500					1.0	0.6	960	775	680	5100				5000
13	630					0.9	0.6	1200	920	800	6200				6000
14	800					0.8	0.6	1400	1120	980	7500				7400
15	1000					0.7	0.5	1700	1320	1150	10300				9860
16	1250					0.6	0.5	1950	1560	1360	12800				12000
17	1600					0.6	0.5	2400	1880	1640	14500				14000

注: a. 根据顾客要求变压器的高压分接范围可设计为 $\pm 2 \times 2.5\%$ 。 b. 根据顾客要求变压器的低压可设计为 0.69kV。
a. The high-voltage tapping range can be designed to $\pm 2 \times 2.5\%$ according to customer's requirement.
b. The low voltage of transformer can be designed to 0.69kV according to customer's requirement.

负荷开关性能参数 Performance parameter of load switch

额定电流 (A) Rated current	额定电压 (kV) Rated voltage	冲击耐压 (kV) Impulse withstand voltage	工频耐受电压 (1min kV) Power frequency withstand voltage	额定短时耐受电流 (kA/s) Rated short-time withstand current	短路关合电流 (kA) Short-circuit making current	额定峰值耐受电流 (kA) Rated peak withstand current	负荷操作次数 (kA) Number of load operation	机械操作次数 Number of mechanical operation
315	12	75	42	12.5/2	31.5	31.5	100	2000
630	12	75	42	16/4	40	40	100	3000

主回路方案图 Schematic diagram of main circuit

编号 No	01	02	03	04
系统方案 System scheme				
FYN-12 负荷开关 Charge switch	用于终端 For terminal use 315A/630A	环网供电 Ring network power supply 315A/630A	高压计量 High voltage metering 315A/630A	双电源供电 Dual power supply 315A/630A

注: a. 插入式熔断器与后备限流熔断器的额定值由生产厂家按变压器容量确定。 b. 进线可加装高压带电指示器或故障指示器。 c. 根据需要可加装高压计量装置。
a. The rated values of plug-in type fuse and backup current limiting fuse are subject to transformer's capacity by manufacturer.
b. High-voltage charged indicator or fault indicator can be extra installed for incoming line.
c. High-voltage metering device can be extra installed according to requirement.