



产 品 说 明 书

Product Operation Manual

BP2型金属波纹(外油)密封式储油柜

Model BP2 Metal Bellows(Outer Oil)Sealed Oil Conservator

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Our company has passed ISO9001:2008

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一. 产品概述

BP2-Wb型外油式金属波纹密封式储油柜适用于各种油浸式变压器类型电力设备。其底部有主油管连接于变压器瓦斯继电器。内部采用高柔韧性不锈钢一体成型波纹节作为补偿元件，在变压器油发生膨胀或缩小时通过波纹节的伸展收缩改变储油柜内的油腔大小，从而达到对变压器油体积变化的补偿，工作状态中变压器油完全与空气彻底隔离，可有效保证变压油不受污染变质以及变压设备的可靠运行。其结构简单可靠，产品全密封，免维护，寿命长，是目前使用的隔膜、胶囊式储油柜更理想更新换代产品，已经广泛应用于各电压等级变压器设备当中。

I .Product Overview

Model BP2-Wb Outer Oil Type Metal Bellows Sealed Oil Conservator is suitable for various types of oil immersed transformer power equipment. The main oil pipe of its base is connected with gas relay of the transformer. The interior adopts integral forming corrugated joints with high flexibility and toughness stainless steel as the compensation component, the size of the oil chamber is changed by the expansion and shrinkage of oil conservator when the transformer oil occurs expansion or contraction, so as to achieve the compensation for the volume changes of the transformer oil, the transformer oil is completely isolated from the air in the working state, which can effectively ensure that the transformer oil is not contaminated and the reliable operation of voltage transformation equipment. Its structure is simple and reliable, the product is completely sealed with maintenance free and long life, it is more ideal updating product for diaphragm and capsule type oil conservator used, and it has been widely used in various voltage levels of transformer equipment.

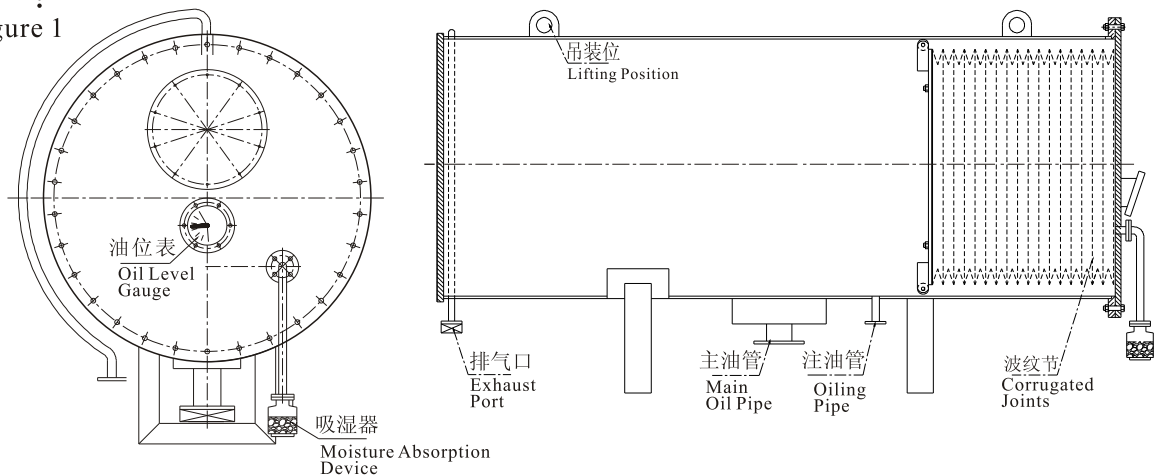
二. 产品结构特点

储油柜内由不锈钢波纹节芯体组成，芯体的前段固定在端面法兰上，另一端可在储油腔内随着变压油体积的变化自由伸缩。变压器油储存于波纹芯体和储油柜体之间，通过底部的主油管于变压器的瓦斯继电器相连。注油初始储油柜内空气通过尾部排气口完全排除，保证变压油不与空气接触，排气口保持常闭状态，波纹芯体内腔通过吸湿器于外界大气连通。油位表准确反应储油柜腔内油容积的变化。

II . Product Structure Characteristics

The interior of oil conservator is made of stainless steel corrugated core body, the front section of the core body is fixed on the end face flange, and the other end can be freely telescopic with the volume change of transformer oil in the oil storage chamber. The transformer oil is stored at the position between the corrugated core body and the oil conservator, which is connected with the gas relay of the transformer through main oil pipe in the base. The air in the initial oil conservator for oiling is completely discharged through the tail exhaust port, it should be ensured that the transformer oil does not contact with the air, the exhaust outlet should keep normally closed state, the inner chamber of corrugated core body is connected with the outside air through the moisture absorption device. The oil level gauge accurately reflects the change of oil volume in the chamber of oil conservator.

图一：
Figure 1



外油式金属波纹密封式储油柜主要结构示意图
Main Structure Diagram of Outer Oil Type Metal Bellows Sealed Oil Conservator

三. 主要性能参数

- 储油柜可适用于运行在不同环境下10KV至1000KV各种类型油浸式变压器电力设备；
- 波纹芯体可靠往复运行不小于20000次，储油柜使用寿命大于30年；
- 储油柜内金属波纹节可承受低于100Pa的真空值；
- 金属波纹芯体极限工作状态时对变压器内油体反力≤0.005MPa, 确保主变保护装置稳定运行；
- 储油柜提供高低油位报警输出信号，接点电源：DA/AC 220V 0.3A
- 与主变相关的具体型号、结构、环境变量、连接尺寸.

III. Main Performance Parameters

- The oil conservator can be applied to various types of oil immersed transformer power equipment which run in different environments of 10KV to 1000KV;
- The reliable reciprocating movements of the corrugated core body are not less than 20000 times, and the service life of the oil conservator is more than 30 years;
- The metal corrugated joints in the oil conservator can withstand the vacuum value of less than 100Pa;
- The counterforce against oil body in the transformer should be less than or equal to 0.005MPa when the metal corrugated core body is in limiting operation state, to ensure stable operation of the main transformer protection device;
- The oil conservator provides high and low oil level alarm output signal, contact power supply: DA/AC 220V 0.3A
- Specific model, structure, environment variable, connection size related to the main transformer.

四. 产品特点

- 不锈钢材质全密封结构，保证油质稳定；
- 结构确保无凝露产生，储油柜实现免维护；
- 储油柜设计合理简单可靠，动作灵敏，确保长时间安全运行；
- 可配备压力释放阀，多重保障设备安全.

IV. Product Features

- Fully sealed structure with stainless steel material is adopted to guarantee the stability of oil quality;
- The structure ensures no condensation, and the oil conservator achieves maintenance free;
- The design of the oil conservator is reasonable, simple and reliable, with sensitive operation, which ensures safe operation for a long time;
- The pressure relief valve can be equipped, with the safety of multiple security equipment.

五. 产品型号、选型表、验收、运输

1. 产品型号:

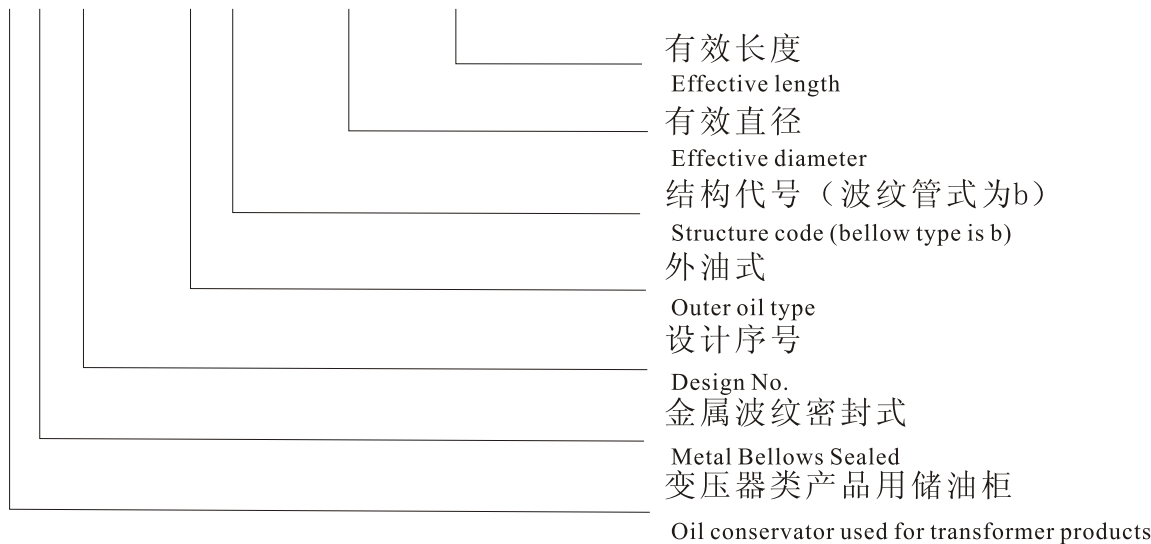
根据JB/T 6484-2005《变压器用储油柜》（外油式）金属波纹储油柜的型号说明如下：

V. Product Model, Selection Table, Acceptance and Transportation

1.Product Model:

According to JB/T 6484-2005 Oil Conservator Used for Transformer, the model explanation of (outer oil type) metal bellows oil conservator is as follows:

BP □ — W □ — □ × □



示例：设计序号为2，有效直径750mm，有效长度为2800mm的外油式金属波纹储油柜产品所对应的型号为：

BP2-Wb-750×2800

Example: When the design no. is 2, effective diameter is 750mm and effective length is 2800mm, the corresponding model of outer oil type metal bellows oil conservator is:

BP2-Wb-750X2800

2. 产品选型（产品系列参数表）

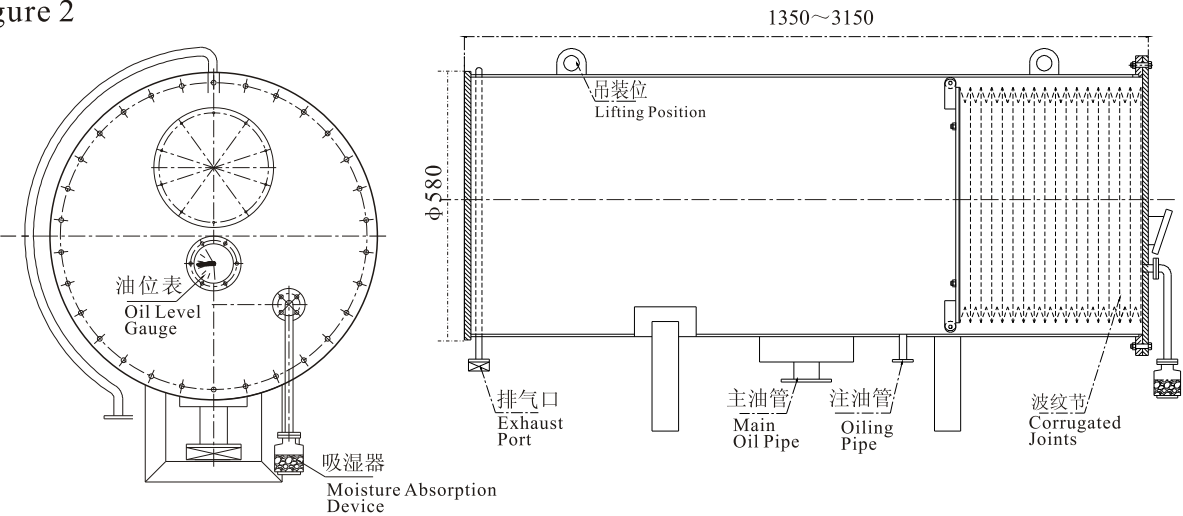
根据变压器油重大小的不同、安装方式的区别、使用环境的差异以及实际安全距离等多方面因素，可以选用不同型号、规格的储油柜产品，具体选型指南如下：

2.Product Selection (Product Series Parameter Table)

According to the difference of oil weight, installation method and use environment of the transformer and actual safety distance, the oil conservator products with different models and specifications can be selected, the specific selection guide is as follows:

图二

Figure 2



BP2-WB-500型：适用于油重为 1830 Kg -- 4550 Kg 变压器

油位表型号：YZS-200

Model BP2-WB-500: Be suitable for the transformer with 1830Kg-4550Kg.

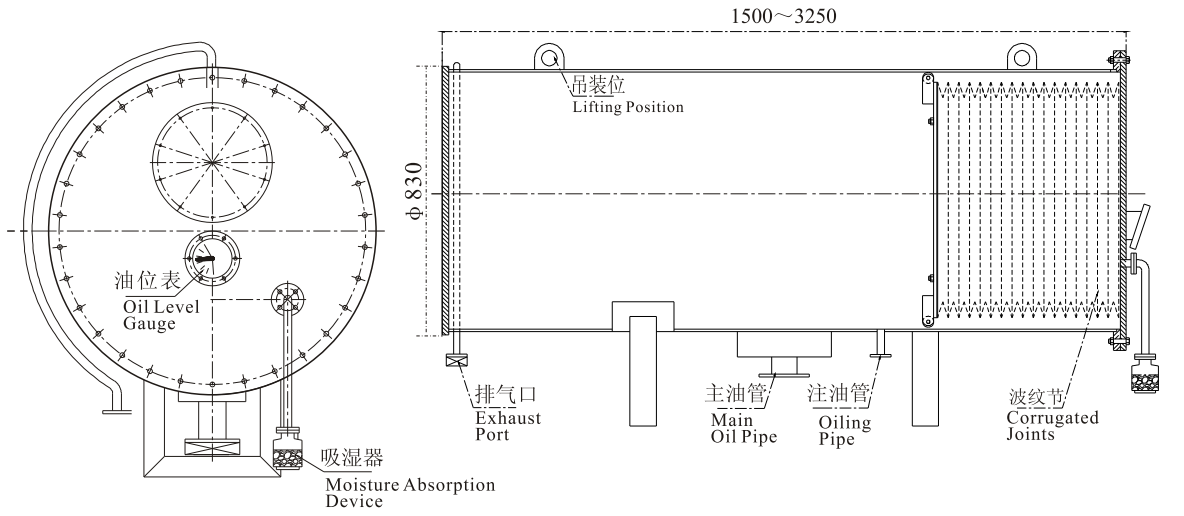
表一：

Table 1:

产品型号 ProductModel	D 外径 OuterDiameter (mm)	L 长度 Length (mm)	有效容积 Effective Volume (L)	20℃ 时 油重 Oil Weight at 20℃ (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformer (kg)
BP2-WB-500×1350	580	1350	153	122	320	1830
BP2-WB-500×1650	580	1650	191	151	364	2290
BP2-WB-500×1950	580	1950	229	180	403	2750
BP2-WB-500×2250	580	2250	268	210	451	3210
BP2-WB-500×2550	580	2550	306	239	500	3670
BP2-WB-500×2850	580	2850	344	272	549	4120
BP2-WB-500×3150	580	3150	382	297	607	4550

图三

Figure 3



BP2-WB-750型：适用于油重为 4550 Kg -- 11125 Kg 变压器

油位表型号：YZS-200

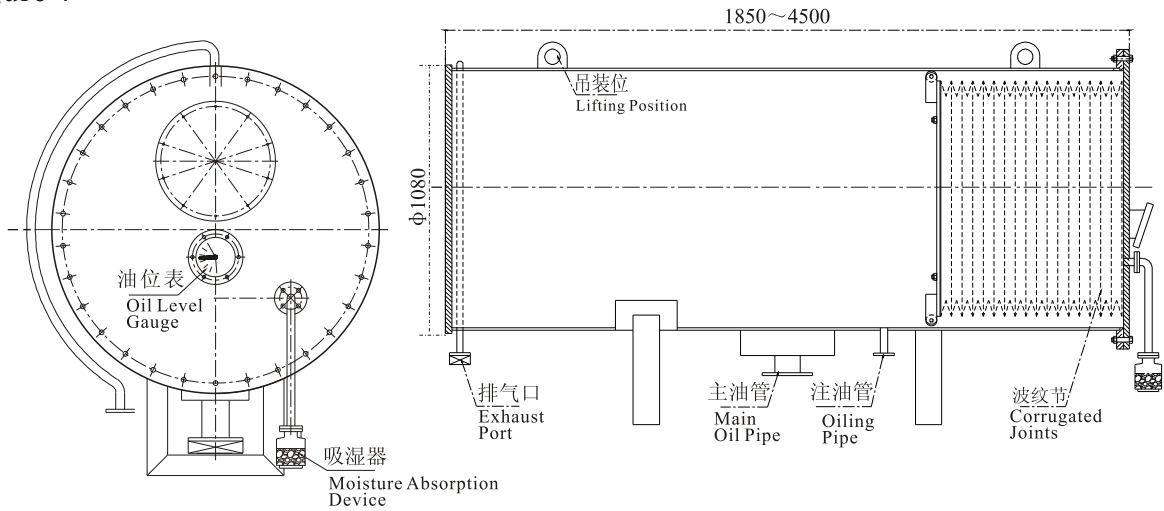
Model BP2-WB-500: Be suitable for the transformer with 1830Kg-4550Kg.

表二：

Table 2:

产品型号 ProductModel	D 外径 OuterDiameter (mm)	L 长度 Length (mm)	有效容积 Effective Volume (L)	20℃ 时 油重 Oil Weight at 20℃ (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformer (kg)
BP2-WB-750×1500	830	1500	400	260	636	4550
BP2-WB-750×1700	830	1700	450	290	655	5516
BP2-WB-750×1800	830	1800	500	320	664	5890
BP2-WB-750×2050	830	2000	550	360	683	6638
BP2-WB-750×2250	830	2200	600	400	701	7386
BP2-WB-750×2450	830	2400	650	440	720	8134
BP2-WB-750×2650	830	2600	700	480	739	8882
BP2-WB-750×2850	830	2800	750	520	757	9630
BP2-WB-750×3050	830	3000	800	560	776	10378
BP2-WB-750×3250	830	3200	850	600	795	11125

图四
Figure 4

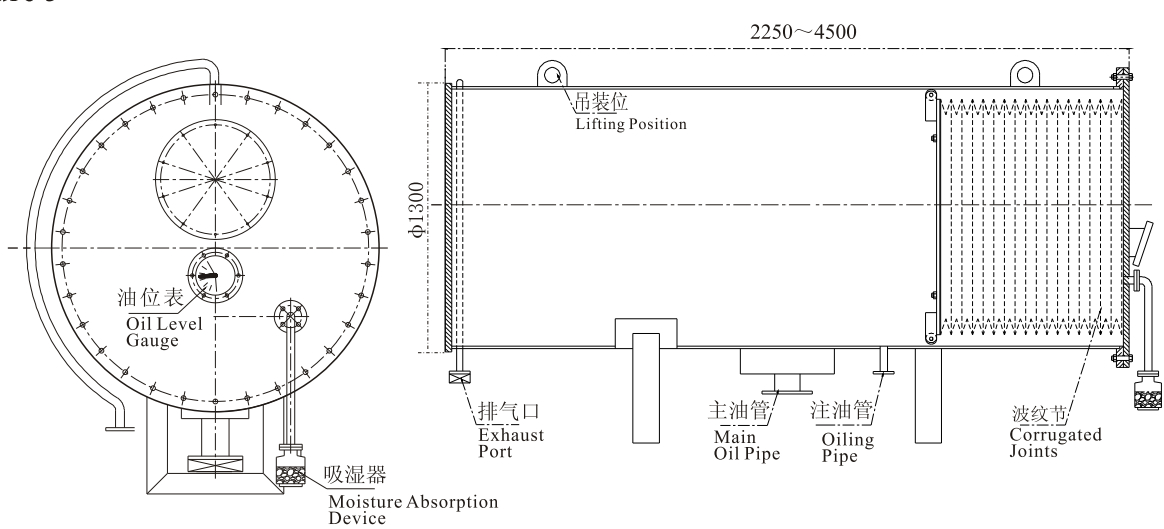


BP2-WB-1000型：适用于油重为 11125 Kg -- 29500 Kg 变压器
油位表型号：YZS-250
Model BP2-WB-1000: Be suitable for the transformer with 11125Kg-29500Kg.

表三：
Table 3:

产品型号 ProductModel	D 外径 OuterDiameter (mm)	L 长度 Length (mm)	有效容积 Effective Volume (L)	20℃时 油重 Oil Weight at 20℃ (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformer (kg)
BP2-WB-1000×1850	1080	1850	922	610	724	11125
BP2-WB-1000×2050	1080	2050	1014	662	749	12168
BP2-WB-1000×2250	1080	2250	1106	702	774	13272
BP2-WB-1000×2500	1080	2500	1198	735	805	14376
BP2-WB-1000×2700	1080	2700	1290	781	830	15480
BP2-WB-1000×2900	1080	2900	1383	840	854	16596
BP2-WB-1000×3100	1080	3100	1475	909	879	17700
BP2-WB-1000×3300	1080	3300	1567	988	906	18804
BP2-WB-1000×3450	1080	3550	1659	1070	935	19908
BP2-WB-1000×3600	1080	3750	1751	1156	960	21012
BP2-WB-1000×3750	1080	3950	1843	1260	984	22116
BP2-WB-1000×4150	1080	4150	2028	1450	1020	27040
BP2-WB-1000×4500	1080	4500	2212	1650	1080	29500

图五
Figure 5

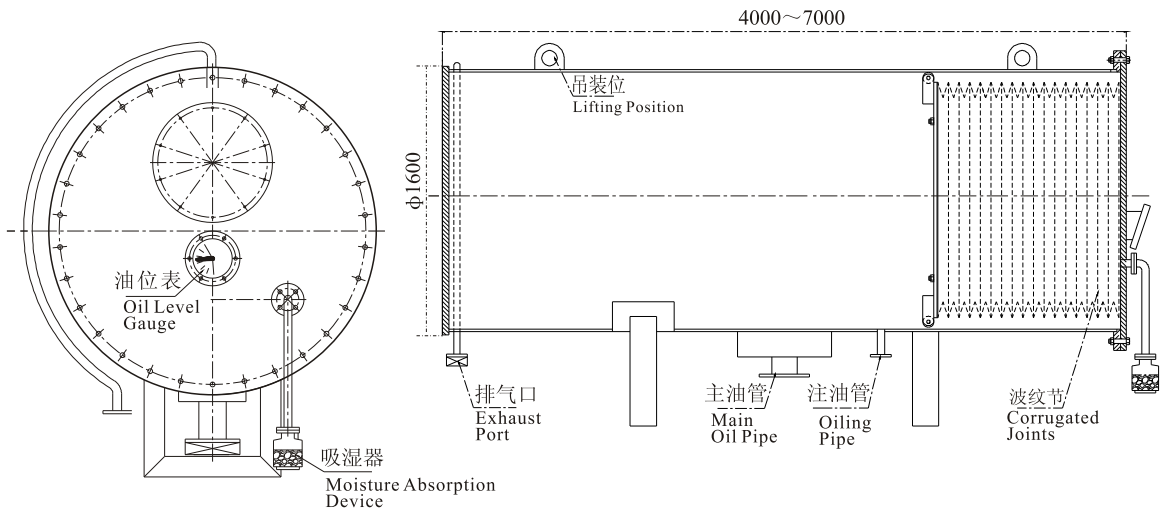


BP2-WB-1300型：适用于油重为 29500 Kg -- 55000 Kg 变压器
油位表型号：YZS-250
Model BP2-WB-1300: Be suitable for the transformer with 29500Kg-55000Kg

表四：
Table 4:

产品型号 ProductModel	D 外径 OuterDiameter (mm)	L 长度 Length (mm)	有效容积 Effective Volume (L)	20℃时 油重 Oil Weight at 20℃ (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformer (kg)
BP2-WB-1300×2250	1300	2250	2089	1253	855	29500
BP2-WB-1300×2500	1300	2500	2347	1462	895	29343
BP2-WB-1300×2700	1300	2700	2554	1532	927	31923
BP2-WB-1300×2900	1300	2900	2760	1656	959	34502
BP2-WB-1300×3100	1300	3100	2967	1776	991	37082
BP2-WB-1300×3300	1300	3300	3173	1882	1024	39661
BP2 WB 1300×3450	1300	3550	3430	2058	1064	42886
BP2-WB-1300×3600	1300	3750	3637	2182	1096	45465
BP2-WB-1300×3750	1300	3950	3844	2307	1128	48045
BP2 WB 1300×4150	1300	4150	4050	2430	1160	50625
BP2-WB-1300×4500	1300	4500	4411	2646	1216	55000

图六
Figure 6



BP2-WB-1600型：适用于油重为 50000 Kg -- 120000 Kg 变压器
油位表型号：YZS-250
Model BP2-WB-1600: Be suitable for the transformer with 50000Kg-120000Kg

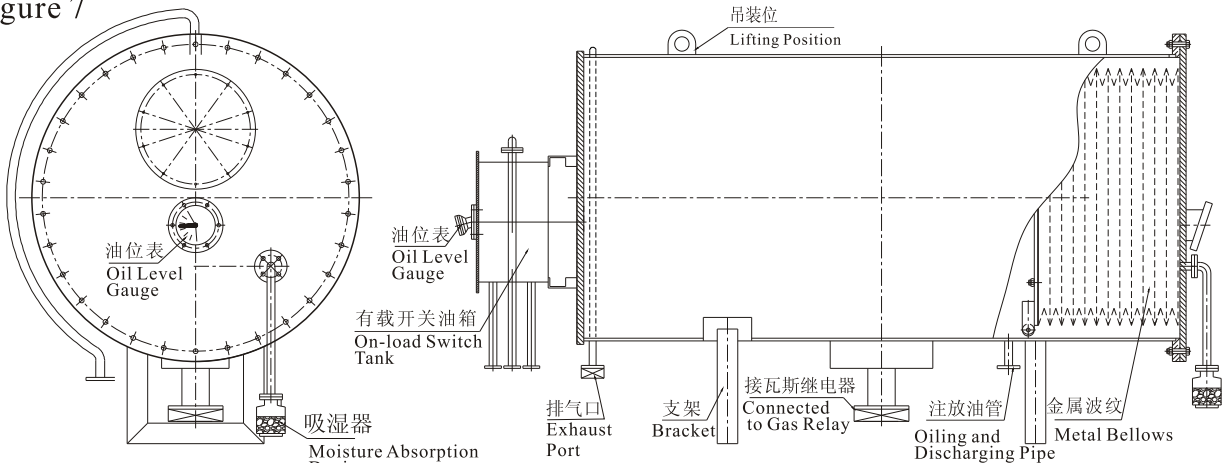
表五：
Table 5:

产品型号 ProductModel	D 外径 OuterDiameter (mm)	L 长度 Length (mm)	有效容积 Effective Volume (L)	20℃ 时 油重 Oil Weight at 20℃ (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformer (kg)
BP2-WB-1600×4000	1600	4000	4290	909	1200	50000
BP2-WB-1600×4700	1600	4700	5148	975	1334	68640
BP2-WB-1600×5450	1600	5450	6006	1030	1469	80080
BP2-WB-1600×6300	1600	6300	6864	1110	1621	91520
BP2-WB-1600×7000	1600	7000	7722	1195	1746	102960
BP2-WB-1600×7000	1600	7700	8600	1280	1880	120000

注：以上列表仅标示常用规格油重选型指南，若有特殊要求或列表以外规格需要，技术部门可根据实际要求另行设计制定。

Note: The above tables are only selection guide used for common specifications of oil weight, if there are special requirements or specifications outside the tables, Technical Department can design and develop according to actual requirements.

图七
Figure 7



带有载开关油箱的外油式金属波纹密封式储油柜
Outer Oil Type Metal Bellows Sealed Oil Conservator with On-load Switch Tank

外油式金属波纹密封式储油柜有很好的适用性，特有的外挂式有载开关油箱可灵活配备于任意规格型号的储油柜之上，满足不同用户需求。

Outer Oil Type Metal Bellows Sealed Oil Conservator has a good applicability, the unique outer-hanging type on-load switch tank can be flexibly equipped on any specification model of oil conservators in order to meet the needs of different users.

3. 产品验收

- ☐ 检验储油表面油漆是否完整，漆膜厚度是否达标；
- ☐ 查验储油柜体有无凹痕，碰撞痕迹；
- ☐ 配套文件及附件箱中零件、资料是否齐全；
- ☐ 油位表指针是否指示在最高油位刻度位置。

3.Product Acceptance

- ☐ Inspect whether the surface paint of oil conservator is complete and the film thickness is up to standard;
- ☐ Check whether there is the dent and trace of collision on the oil conservator;
- ☐ Whether the supporting documents and the parts and information in the accessory case are complete;
- ☐ Whether the pointer of oil level gauge indicates the scale position of highest level.

4. 产品运输(附图八)

BP2-Wb型金属波纹储油柜因内部主要元件为波纹不锈钢结构，本身具有一定的伸缩弹性，为避免产品在运输或转移过程中由于路途坑洼、车辆颠簸对波纹节造成拉伤，运输前必须向储油柜内充入干燥气体或氮气使波纹节处于压合状态。操作过程如下：

- ☐ 关闭储油柜排气口，主油口阀门，保持前段连接吸湿器管道畅通；
- ☐ 从注油口向储油柜充入干燥气体或氮气，当压力达到约0.05MPa左右时停止充压，迅速关闭主油口阀门；
- ☐ 此时油位表刻度应指示在最高油位位置；

□ 二次运输时请同样严格执行此操作对储油柜充压运输，直至到安装现场（请保留充气阀门及压力指针表）；

4.Product Transportation

Because main internal components are corrugated stainless steel structure, Model BP2-Wb Metal Bellows Oil Conservator has certain flexibility itself, in order to avoid that the corrugated joints cause injury in the course of transporting or transferring the product due to potholes on the road and vehicle bumps, the dry air or nitrogen must be filled into the oil conservator to make the corrugated joints be in pressure state. The operation process is as follows:

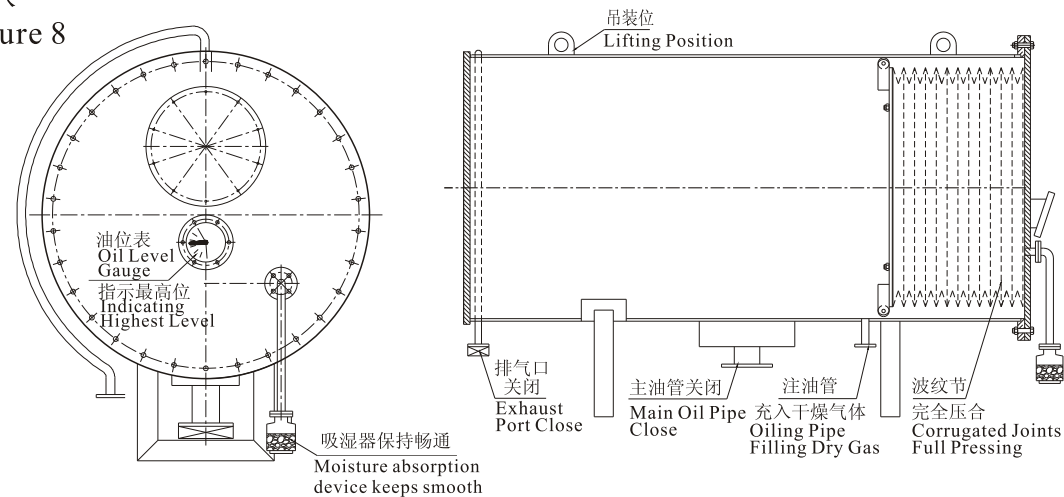
□ Close the exhaust port of oil conservator, main oil port valve, and maintain the smooth of front pipe connecting to the moisture absorption device;

□ Fill dry air or nitrogen into oil conservator from oiling port, stop pressurizing when the pressure reaches about 0.05MPa, close main oil port valve rapidly;

□ At this moment, the scale of oil level gauge should indicate highest oil level;

□ When carrying out second transportation, please also strictly implement this operation to pressurize the oil conservator, until transporting to the installation site (please keep the air valve and pressure gauge);

图八
Figure 8



储油柜运输准备操作流程
Transportation Preparation Operation Process of Oil Conservator

六. 产品安装

安装准备:

- 1.检查整理安装相关的管道、螺栓、阀门、密封件；配备吊装设备、滤油机、气源及常用工具；
- 2.打开排气口、吸湿器接口，释放储油柜内部压力，达到自然状态；
- 3.从吸湿器接口充入干燥空气，使波纹管节完成一次伸展收缩的往复运动，检查机械灵活性，注意充压时油位刻度不应低于O刻度位置。

VI. Product Installation

Installation preparation:

1.Check and arrange related installation piping, bolts, valves and seals; equip with lifting equipment, oil filter, gas source and common tools;

2.Open the exhaust port, the moisture absorption device interface, release internal pressure of oil conservator, and reach the natural state;

3.Fill the dry air from the moisture absorption device interface to make the corrugated joints complete one reciprocating motion with the extension and compression, check the mechanical flexibility, and it should be noted that the oil level scale shall not be less than 0 scale position when pressurizing.

安装、注油:

- 1.将储油柜安装在设定位置，连接各相关管道，并可靠密封；
- 2.关闭注油管阀门，打开主油管、排气口阀门，将气源和吸湿器接口阀门连接；
- 3.向波纹管节内腔充入气体至油位表指针达到预定的油位高度，停止充气，关闭吸湿器接口阀门；
- 4.从变压器本体注油口或储油柜注油口注油，直至排气口连续出油时，停止注油，关闭排气口阀门；
- 5.打开吸湿器接口阀门，连接好吸湿器；
- 6.注油完成后，储油柜各部分状态应处于：主油管、吸湿器接口阀门常开，注油口、排气口阀门关闭并完全密封。

Installation and oiling:

- 1.Install the oil conservator in the setting position, connect the relevant piping, and carry out reliable seal;
- 2.Close the valve of oiling pipe, open the valve of main oil pipe and exhaust port, and connect the air supply and the valve of the moisture absorption device interface;
- 3.Fill the air into the inner chamber to the pointer of oil level gauge, and it should reach the predetermined level height, stop filling the air, and close the valves of the moisture absorption device interface;
- 4.Carry out oiling from the oiling port of the transformer body or the oiling port of the oil conservator, until the oil discharges from the exhaust port continuously, stop oiling, and close the exhaust port valve;
- 5.Open the valve of the moisture absorption device interface, and connect the moisture absorption device;
- 6.After oiling is completed, the parts status of oil conservator should be as follows: the valves of main oil pipe and the moisture absorption device interface open normally, the valves of oiling port and exhaust port close and are sealed completely.

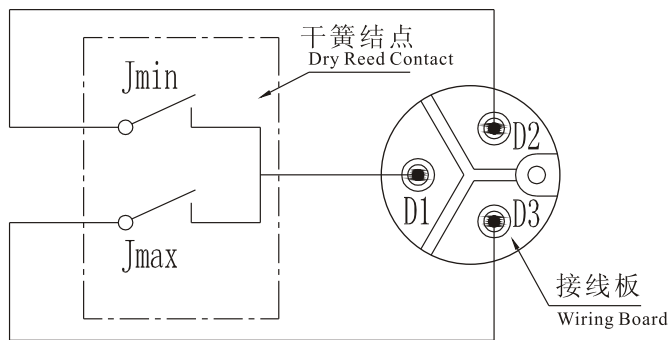
报警装置连接

- 1.油位报警装置可实现高、低油位报警输出；
- 2.报警装置适用环境温度-40℃至50℃，周边无剧烈震荡和颠簸的场所；
- 3.装置可实现远程传输功能，提供4-20mA信号模拟量，连接到微机控制。

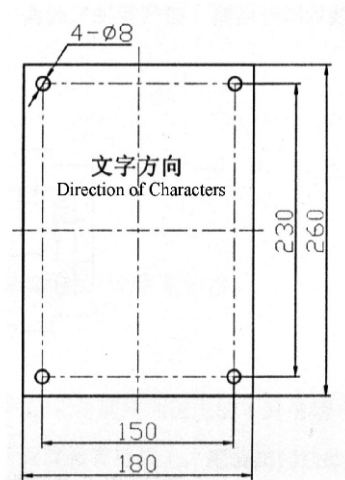
Alarm connection device

- 1.Oil level alarm device can realize alarm output of high and low oil level;
- 2.Alarm device is applicable to the environment temperature of -40℃ to 50℃ , and there is no severe turbulence and bump at the surrounding areas;

3.The device can realize the remote transmission function, and provide the analog quantity of 4-20mA signal, which is connected to the computer control.



油位指示报警接线原理图
WiringDiagramofOilLevelAlarm



油温指示牌底板尺寸(此曲线牌作为加油参考)
BasePlateSizeofOilTemperatureIndicator
(Thiscurveplateisusedasareferenceforoiling)

七. 定货须知

- 1. 需方提供变压器型号、总油重、安装方式(垂直安装或平行安装)。
- 2. 选用储油柜时，储油柜制造商考虑变压器安装的结构形式、 变压器套管与储油柜带电距离等技术参数；根据外油式金属波纹储油柜选型表进行选型，如选型表所列的结构形式参数无法满足需方要求时，双方协商设计方案。
- 3. 提供与储油柜联接处的气体继电器型号，联接法兰尺寸。
- 4. 储油柜与有载调压开关油箱一体化时，提供油箱联接法兰尺寸。
- 5. 提供变压器的使用地区及环境最高、最低温度。
- 6. 提供柜脚安装尺寸、变压器有关联接尺寸。

VI. Ordering Information

- 1.The purchaser shall provide the transformer model, total oil weight, installation mode (vertical installation or parallel installation).
- 2.When the oil conservator is selected, the manufacturer of oil conservator should consider the technical parameters such as the structural form of the transformer installation, the transformer casing and electrified distance of oil conservator; the model selection should be carried out according to the selection table of Outer Oil Type Metal Bellows Oil Conservator, if the structure mode cannot meet the requirements of the purchaser, the two parties shall consult the design scheme.
- 3.The gas relay model at the connecting position of oil conservator and the size of coupling flange.
- 4.The highest and lowest temperature of use region and environment of the transformer should be provided.
- 5.The mounting dimensions of conservator foot and relevant connection dimensions of the transformer should be provided.