



泰时电气

产 品 说 明 书

Product Operation Manual

BP1型金属波纹（内油）密封式储油柜

Model BP₁ Metal Bellows (Inner Oil) Sealed Oil Conservator

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本厂产品符合JB/T 6484-2016机械行业标准
The products of our factory conform to JB/T 6484-2016 machinery industry standard
本企业通过ISO9001: 2015国际质量体系认证
The company passed ISO9001:2015 international quality system certification

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一. 用途

I. Application

BP1型金属波纹（内油）密封式储油柜（简称储油柜）适用于各种油浸式电力变压器及其它油浸式电力设备。其结构新颖，不锈钢立式内油式，全密封，免维护，工作运行与变压器及其它油浸式电力设备同寿命，补偿量大，动作灵敏，储油过程可靠平稳，油位指示清晰直观。油温发生变化时，上下升降正常，无卡滞，无假油位。是目前使用的隔膜、胶囊式储油柜的比较理想的更新替代产品。

Model BP1 metal bellows (inner oil) sealed oil conservator (called oil conservator for short) is applicable for various oil-immersed power transformers and other oil-immersed power equipment. With novel construction, stainless steel vertical inner oil type, totally sealed, free of maintenance, service life as long as transformer and other oil-immersed power equipment, large compensation, sensitive action, reliable and smooth action of conservator core, legible and easy-to-read oil level mark. When the oil temperature varies, the conservator core rises and falls normally, no seizure and no false oil level. It is the ideal replacement for nowadays-used diaphragm and bladder oil conservator.

该产品获得了国家专利，专利号：ZL95232536.5和ZL98239365.2。

The product has obtained patent from the People's Republic of China with patent number of ZL95232536.5 & ZL98239365.2.

二. 产品结构特点

II. Product Structural Features

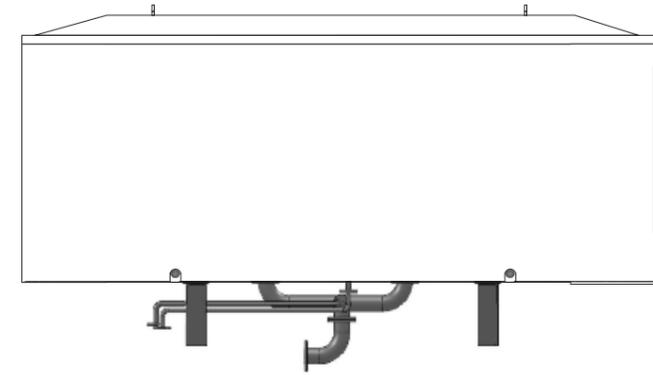
(一). 结构

(1) Structure

BP1型金属波纹（内油）密封式储油柜由储油柜芯体、外防护罩、抽真空排气管路和注油管路、油位指示板、软接管及柜脚（支架）等组成后，即构成BP1型金属波纹（内油）密封式储油柜。

Model BP1 metal bellows (inner oil) sealed oil conservator consists of conservator core, enclosure, vacuum-pumping & drain pipeline and oil filling pipeline, oil level indicator panel, flexible connection pipe and conservator legs (supports).

图1:
Figure 1



BP1型金属波纹（内油）密封式储油柜
Model BP1 Metal Bellows (Inner Oil) Sealed Oil Conservator

(二). 特点

(2) Features

1. 本产品外型与芯体均为跑道形状，芯体采用进口优质不锈钢（0Cr18Ni9Ti，俗称304不锈钢）薄板制成，在储油柜外防护罩一端配置有304材质的视察窗，罩壁上标有油温标定线，当变压器内部油温发生变化时，油的体积随之变化，油位指示板随着储油柜芯体——不锈钢芯体伸缩而上下运动，通过视察窗可观察到油位的变化情况。罩壁上装有高低油位报警装置（行程开关）及储油柜底部装有接线端子（图2），当油位达到最高油温标定线或最低油温标定线时（即上限和下限标志），发出信号。并能根据用户需要提供4~20mA远程信号输出。

1. The outer and core of the product are all runway shape, and the core is made of imported high quality stainless steel (0Cr18Ni9Ti: 304 stainless steel) sheet. The inspection window of 304 material is arranged at one end of the protective cover outside the oil storage cabinet. The wall of the cover is marked with oil temperature standard. When the oil temperature changes in the inner transformer, the oil volume changes with the oil. The position indicator board can move up and down with the expansion of the stainless steel core, and the change of oil level can be observed through the inspection window. The wall equipped with high and low oil level alarm device (stroke switch) and the bottom of the oil storage cabinet are equipped with terminal terminals (Figure 2). When the oil level reaches the highest oil temperature calibration line or the minimum oil temperature calibration line (the upper and lower limit marks), the signal is sent out. And can provide 4 to 20mA remote signal output according to user needs.

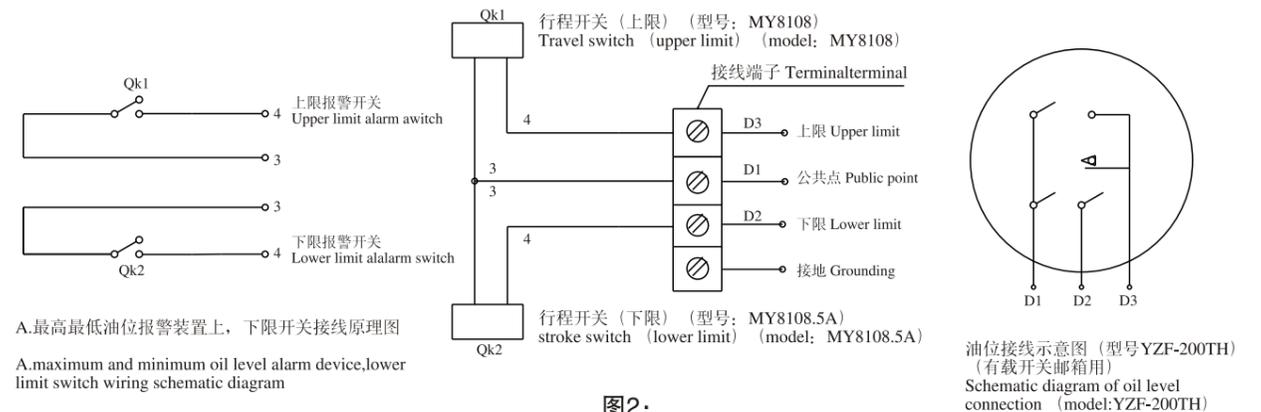


图2:
Figure 2

2.储油柜芯体下有两条管路: 1) 主油联管一端联接储油柜芯体内腔, 一端通过蝶阀.波纹软联管与气体继电器相联。2) 另一条为注补油管路, 注补油时用。可延伸至离地面1~1.5米高度, 配截止阀(活门), 方便补油。

2. There are two pipelines underneath the conservator core, one is main supply and the other is oil filling/adding pipeline. For main supply, one end connects the inner part of oil conservator, and the other end connects the Buchholz relay through butterfly valve and flexible bellows. The oil filling/adding pipeline could be extended to be above the ground 1~1.5m and fitted with cut-off valve to facilitate oil adding.

3. 在储油柜内装有从芯体顶部引出的采用304材质制成的波纹管, 用于抽真空和排气, 它能随油位变化自由升降。用户从法兰处联接延伸至离地面1~1.5米, 配截止阀(活门), 以方便排空气直至排出油后关闭(也可以放油取油样)。

3. A bellows made of 304 material, which is drawn from the top of the core body in the oil storage tank, is used for vacuuming and exhausting. It can move freely with the change of the oil level. The user is connected from the flange to 1 to 1.5 meters from the ground, with the cut-off valve (valve), which is convenient to discharge the air until the oil is discharged (and the oil can be taken out of the oil sample).

4. BP1型金属波纹(内油)密封式储油柜可做到与变压器内油的平均温度在“-40℃”时, 也不出现负压, 故在长期运行中即使个别密封部位破损, 也只会发生储油柜有油渗出, 而不致进空气或受潮。在芯体内腔装有压力保护装置阻尼器, 它能延缓由于瞬间变压器内油压突然增大对储油柜芯体造成的冲击, 能保证储油柜继续正常运行。当储油柜超越上限运行时, 会迫使芯体保护阀启动——自动放油至上线(80℃或100℃)。

4. For Model BP1 metal bellows (inner oil) sealed oil conservator, minus pressure will not appear even when the average oil temperature inside the transformer is under -40℃, so during long term operations, air or moisture will not let in even individual sealing part damaged, oil leakage may occur in the transformer. Pressure protection device---damper is mounted inside the conservator core to delay the impact caused by instant uprising of transformer oil pressure and assure the normal operation of oil conservator. When the oil conservator exceeds the upper limit, the core protection valve will be forced to start---automatically drain the oil to the upper limit (80℃ or 100℃).

5. BP1型金属波纹(内油)密封式储油柜芯体能耐受两万次以上往复膨胀的寿命试验, 芯体材质为不锈钢(0Cr18Ni9Ti俗称304)具有耐大气腐蚀和耐高温的能力, 芯体(膨胀节)的材料厚度, 决定本产品的使用寿命, 故本结构与变压器和其它组件具有同等寿命。

5. BP1 type metal corrugated (internal oil) sealed tank core can tolerate more than twenty thousand times of reciprocating expansion life test. The core material is stainless steel with corrosion resistance and high temperature resistance. The material thickness of the core (expansion joint) determines the service life of the product, so the structure and pressure change of the core. The apparatus and other components have the same life span.

三、产品型号、规格、主要技术参数、选用方法、选型表

III、Product Model、Specification、Main Technical Parameter、Selection Method、Selection Table、Curve

1. 产品型号

1. Product Model:

根据JB/T 6484-2016《变压器用储油柜》(内油式)金属波纹储油柜的型号说明如下:

According to JB/T 6484-2016 《Transformer Storage Tank》(internal oil type) metal corrugated storage cabinet model description as follows:



示例: 1、设计序号为1, 有效宽度920mm, 有效长度为3300的内油式金属波纹储油柜产品所对应的型号为: BP1-N-920×3300

Example: The type of internal oil corrugated oil storage cabinet with 1 effective serial number, 920mm effective width and 3300 effective length is the corresponding model: BP1-N-920×3300

2、储油柜的型号.外型尺寸.有效容积.适用变压器油重(见表1)

Type of oil storage cabinet. Outer size. effective volume. Application of transformer oil weight (see Table 1)

表1:
Table 1:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	适应变压器油重 Applicable to Oil Weight of Transformer (Kg)
BP1-N-660×1400	660	1400	1050~1560	200~350	2000~3500
BP1-N-820×1700	820	1700	1050~1560	330~580	3400~6000
BP1-N-920×1800	920	1800	1085~1595	460~845	5200~9500
BP1-N-1050×2100	1050	2100	1105~1615	700~1240	6500~11500
BP1-N-820×3000	820	3000	1050~1560	895~1560	9500~16500
BP1-N-920×3300	920	3300	1085~1595	1060~1845	11500~20000
BP1-N-1100×3900	1100	3900	1105~1615	1600~2755	18000~31000
BP1-N-1180×4400	1180	4400	1305~1815	2185~3460	24000~38000
BP1-N-1180×6580	1180	6580	1305~1815	3190~5195	35000~57000
BP1-N-1380×5300	1380	5300	1440~1995	3535~5730	37000~60000
BP1-N-1380×7800	1380	7800	1440~1995	5255~8410	55000~88000
BP1-N-1580×9000	1580	9000	1420~1975	7110~11555	80000~130000

注: 储油柜外形尺寸中柜高尺寸由变压器总油重、补偿量的多少确定。

Note: In the outline dimensions, height of the oil conservator is determined by the total transformer oil weight and the compensation amount.

3.技术参数见表2

For main technical parameters,see Table 2

表2:
Table 2:

产品型号 Product Model	单节有效值 Effective Value of Single Turn		
	膨胀高度 mm Expansion Height	容积 L Volume L	工作压力 Kpa Working Pressure Kpa
BP1-N-660×1400	34	10.01	≤13
BP1-N-820×1700	34	16.38	≤11
BP1-N-920×1800	34	23.66	≤9
BP1-N-1050×2100	34	34.58	≤8
BP1-N-820×3000	34	44.72	≤8
BP1-N-920×3300	34	52.78	≤8
BP1-N-1100×3900	34	79.3	≤8
BP1-N-1180×4400	34	43.16	≤7
BP1-N-1180×6580	34	43.16	≤7
BP1-N-1380×5300	37	70.18	≤7
BP1-N-1380×7800	37	70.18	≤7
BP1-N-1580×9000	37	96.28	≤10

4. 储油柜的选用方法

Selecting Method of Oil Conservator

储油柜的补偿容积是根据该变压器的总油重及使用地区的最高、最低环境温度的多少来计算的。即:

Compensation volume of the oil conservator is calculated based on the total transformer oil weight and the max.and min.environment temperatures of the location where the transformer is used,that is:

$$V = \frac{f \times G}{g}$$

V——储油柜的补偿容积(L)

Compensation volume (L) of the oil conservator

G——变压器的总油重(kg)

Total transformer oil weight (kg);

g——变压器油的密度 0.9(kg/L)

Density of the transformer oil 0.9(kg/L)

f——变压器油体积补偿参数 $f=a(\Delta t+t)$

Expansion factor of the transformer oil volume $f=a(\Delta t+t)$

a——变压器油体积膨胀系数 $a=0.0007$

Transformer volume expansion factor $a=0.0007$

Δt ——变压器使用地区最高和最低环境温差值

Highest and lowest environment temperature difference of the location where the transformer is used.

t——变压器平均温升(40)

Average temperature increasing of the transformer

例: 一台 110KV 容量为 31500KVA 的变压器总油重为 14 吨, 使用地区最高温度为+35℃, 最低温度为-30℃, 选何型号的储油柜?

$$f=a(\Delta t+t)=0.0007 \times [35-(-30)+40]=7.35\%$$

$$V = \frac{f \times G}{g} = \frac{7.35\% \times 14000}{0.9} = 1143.3 \text{ (L)}$$

查表1, 有效容积1143.3L对应的型号为BP1-N-1050×2100型或BP1-N-820×3000型或BP1-N-920×3300。

Check Table 1, effective volume 1143.3L corresponds to Mod1 BP1-N-1050×2100 or Mod1 BP1-N-820×3000 or Mod1 BP1-N-920×3300.

注: 同一油重的变压器可选用两种以上的BP1型波纹膨胀储油柜, 可根据变压器的结构、绝缘距离、比例等因素任选一种。

Note: Transformers with the same oil weight can select two or more types of BP1 bellows expansion oil conservators. Select any type based on the transformer structure, insulation distance and scale.

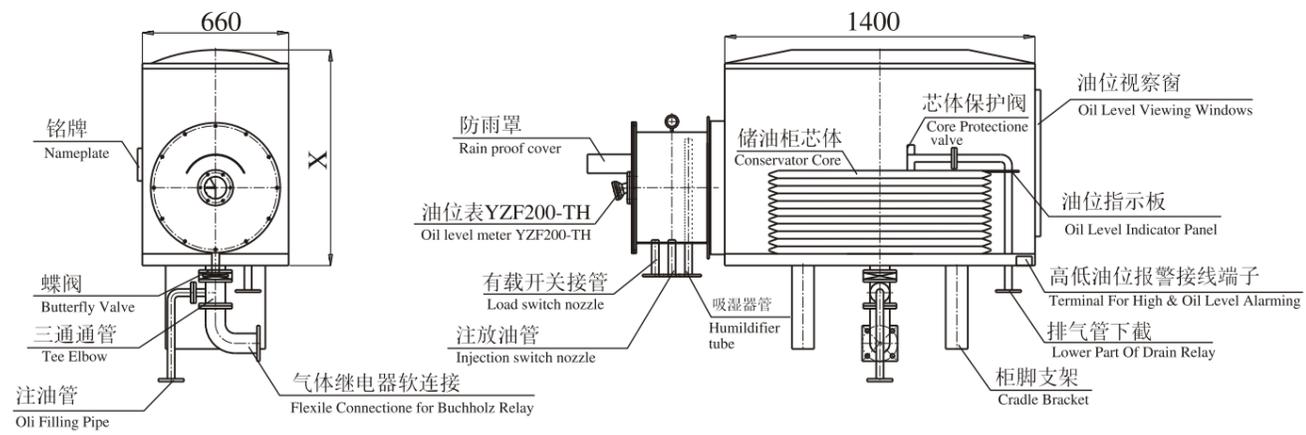
5.产品选型 (产品系列参数表)

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:

5.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3:
Figure 3

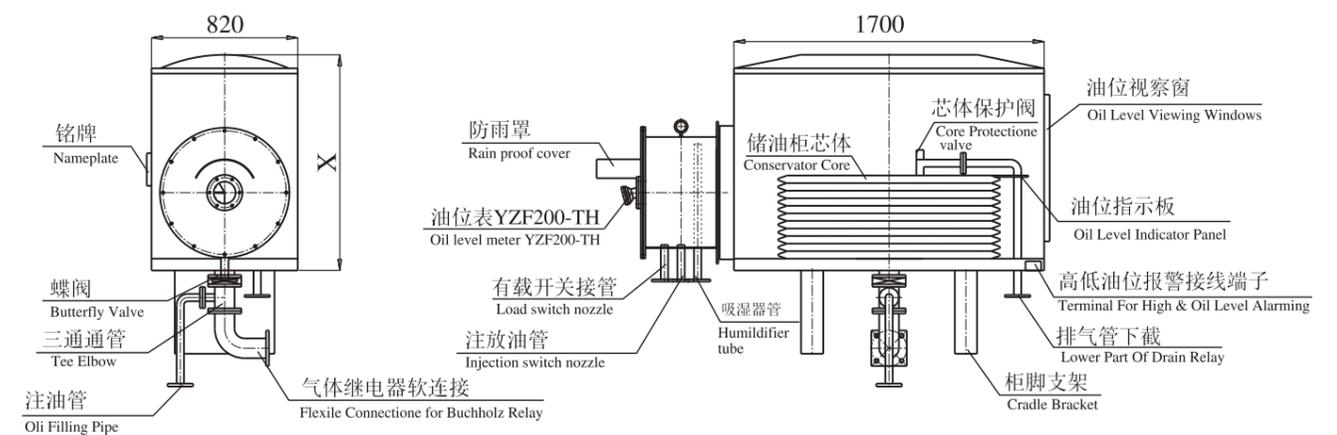


BP1-N-660×1400型: 适用于油重为2000Kg--3500Kg 变压器
Model BP1-N-660×1400: Be suitable for the transformer with 2000Kg—3500Kg

表3:
Table 3:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-660×1400	660	1400	1050	200	100	270	2000
BP1-N-660×1400	660	1400	1220	250	125	320	2500
BP1-N-660×1400	660	1400	1390	300	150	370	3000
BP1-N-660×1400	660	1400	1560	350	175	420	3500

图4:
Figure 4

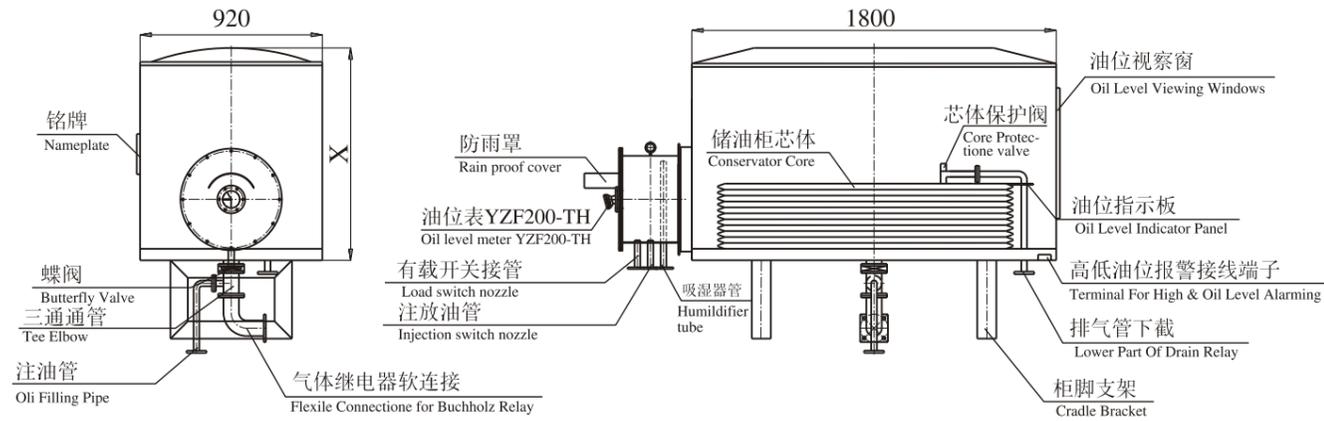


BP1-N-820×1700型: 适用于油重为3400Kg --6000Kg 变压器
Model BP1-N-820×1700: Be suitable for the transformer with 3400Kg --6000KgKg

表4:
Table 4:

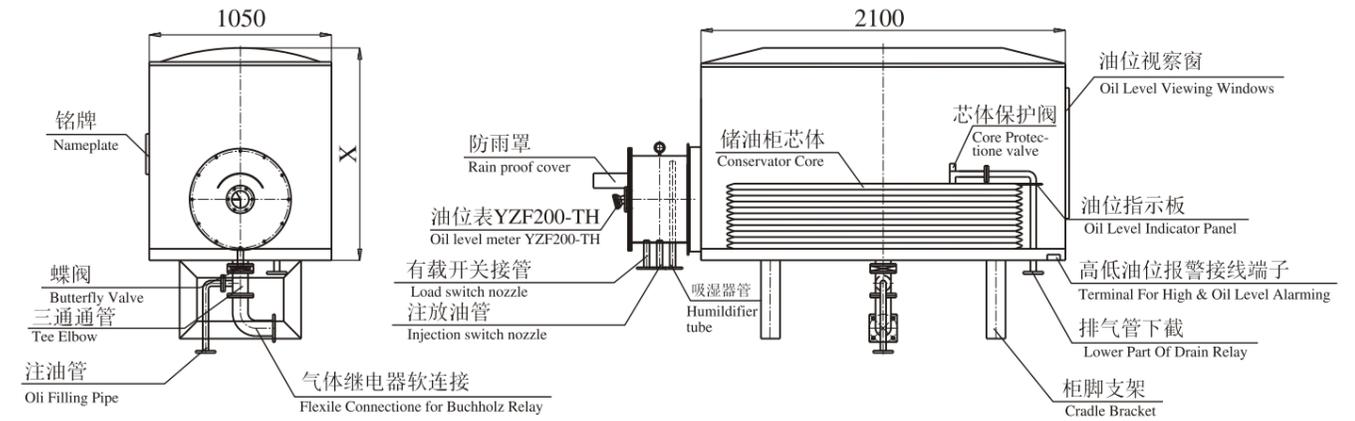
产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-820×1700	820	1700	1050	330	165	345	3400
BP1-N-820×1700	820	1700	1220	405	200	420	4200
BP1-N-820×1700	820	1700	1390	485	240	500	5000
BP1-N-820×1700	820	1700	1560	580	290	595	6000

图5:
Figure 5



BP1-N-920×1800型: 适用于油重为 5200Kg --9500Kg 变压器
Model BP1-N-920×1800: Be suitable for the transformer with 5200Kg --9500Kg

图6:
Figure 6:



BP1-N-1050×2100型: 适用于油重为 6500Kg --11500Kg 变压器
Model BP1-N-1050×2100: Be suitable for the transformer with 6500Kg --11500Kg

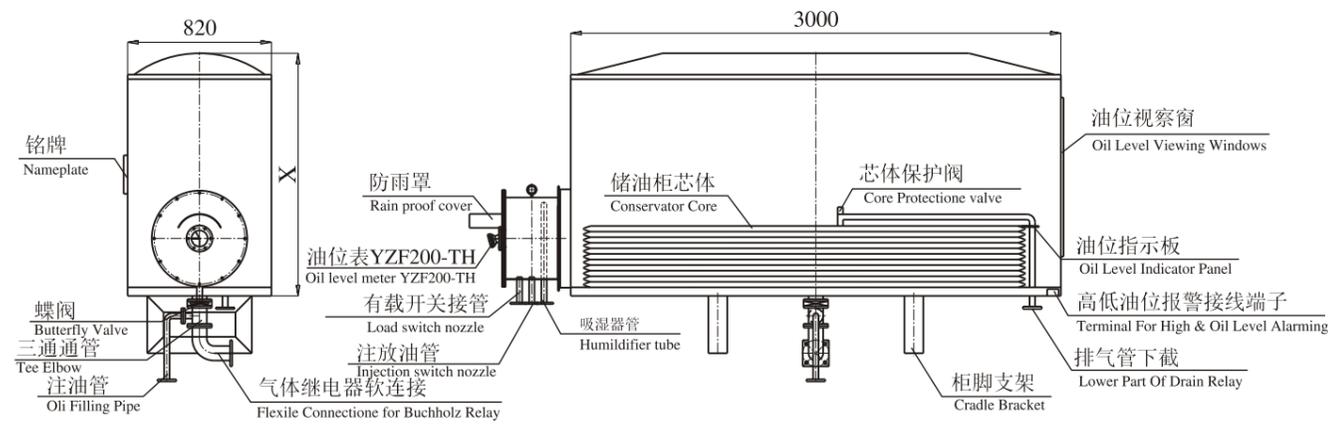
表5:
Table 5

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-920×1800	920	1800	1085	460	230	520	5200
BP1-N-920×1800	920	1800	1255	595	295	535	6700
BP1-N-920×1800	920	1800	1425	710	355	650	8000
BP1-N-920×1800	920	1800	1595	845	420	785	9500

表6:
Table 6

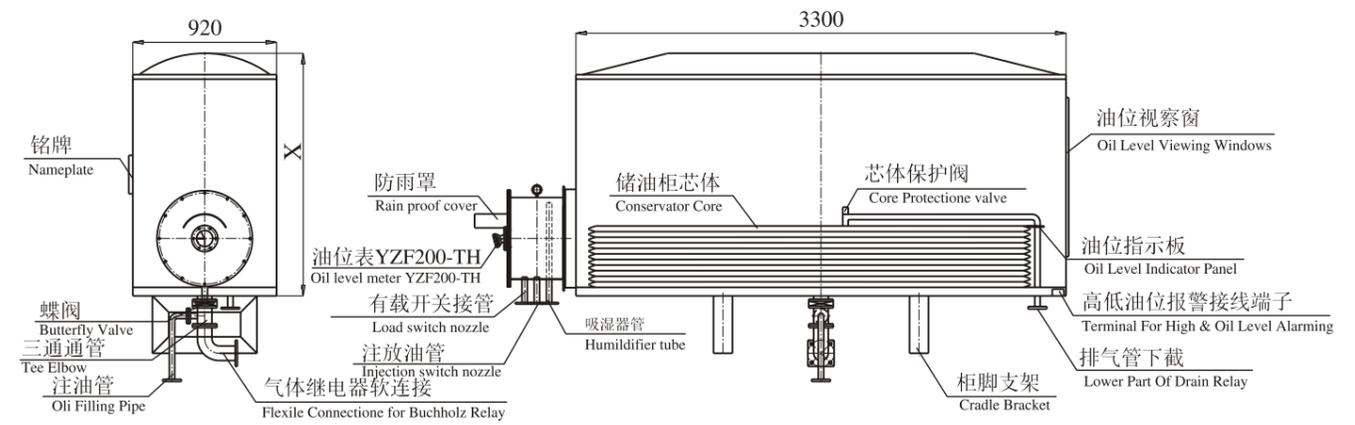
产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1050×2100	1050	2100	1105	700	350	460	6500
BP1-N-1050×2100	1050	2100	1275	860	430	620	8000
BP1-N-1050×2100	1050	2100	1445	1025	510	785	9500
BP1-N-1050×2100	1050	2100	1615	1240	620	1000	11500

图7:
Figure 7:



BP1-N-820×3000型: 适用于油重为 9500Kg --16500Kg 变压器
Model BP1-N-820×3000: Be suitable for the transformer with 9500Kg—16500Kg

图8:
Figure 8



BP1-N-920×3300型: 适用于油重为 11500Kg --20000Kg 变压器
Model BP1-N-920×3300: Be suitable for the transformer with 11500Kg --20000Kg Kg

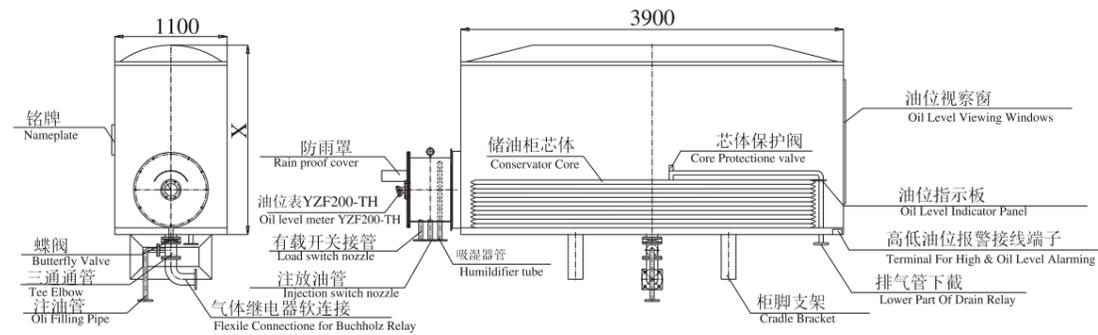
表7:
Table 7:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-820×3000	820	3000	1050	895	445	745	9500
BP1-N-820×3000	820	3000	1220	1130	565	980	12000
BP1-N-820×3000	820	3000	1390	1320	660	1170	14000
BP1-N-820×3000	820	3000	1560	1560	780	1410	16500

表8:
Table 8:

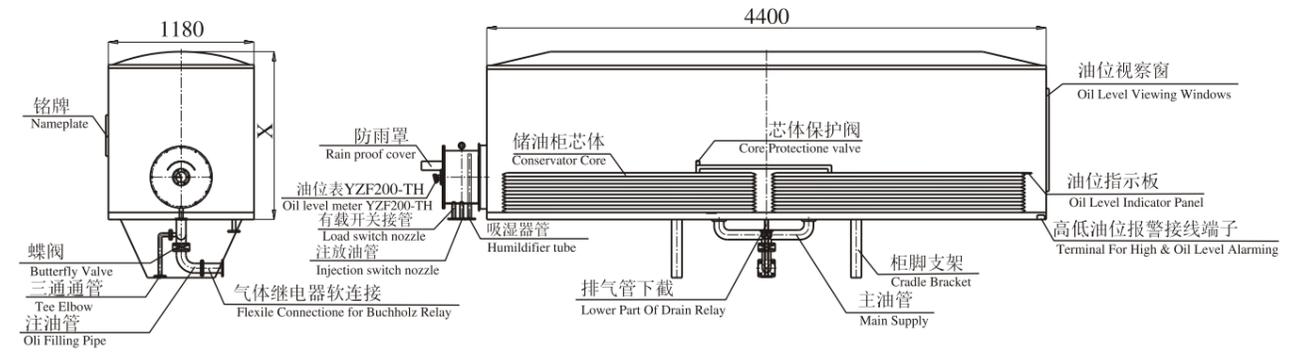
产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-920×3300	920	3300	1085	1060	530	840	11500
BP1-N-920×3300	920	3300	1255	1290	645	1035	14000
BP1-N-920×3300	920	3300	1425	1570	785	1350	17000
BP1-N-920×3300	920	3300	1595	1845	920	1375	20000

图9:
Figure 9:



BP1-N-1100×3900型: 适用于油重为18000Kg --31000Kg 变压器
Model BP1-N-1100×3900: Be suitable for the transformer with 18000Kg --31000Kg

图10:
Figure 10:



BP1-N-1180×4400型: 适用于油重为 24000Kg --38000Kg 变压器
Model BP1-N-1180×4400: Be suitable for the transformer with 24000Kg ——38000Kg

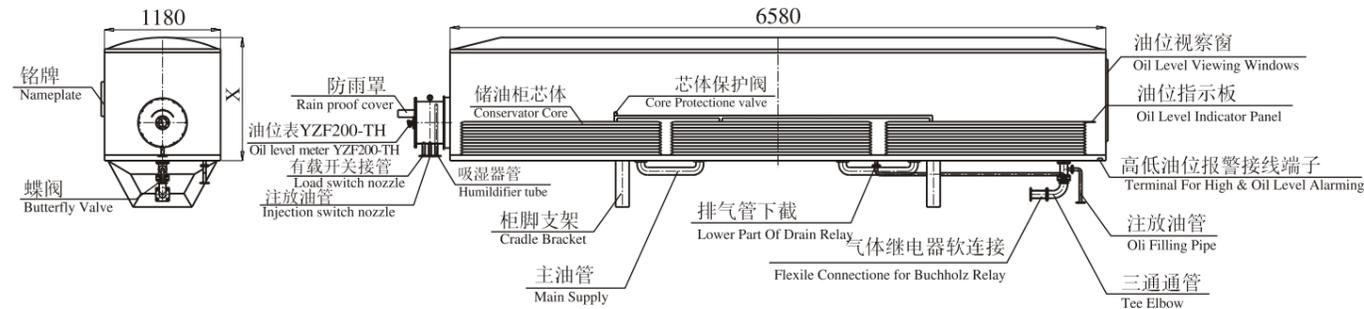
表9:
Table 9:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1050×3900	1100	3900	1105	1600	800	1190	18000
BP1-N-1050×3900	1100	3900	1275	1955	975	1460	22000
BP1-N-1050×3900	1100	3900	1445	2400	1200	1785	27000
BP1-N-1050×3900	1100	3900	1615	2755	1375	1975	31000

表10:
Table 10:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1180×4400	1180	4400	1305	2185	1090	1015	24000
BP1-N-1180×4400	1180	4400	1475	2550	1275	1335	28000
BP1-N-1180×4400	1180	4400	1645	3005	1500	1530	33000
BP1-N-1180×4400	1180	4400	1815	3460	1730	1800	38000

图11:
Figure 11:

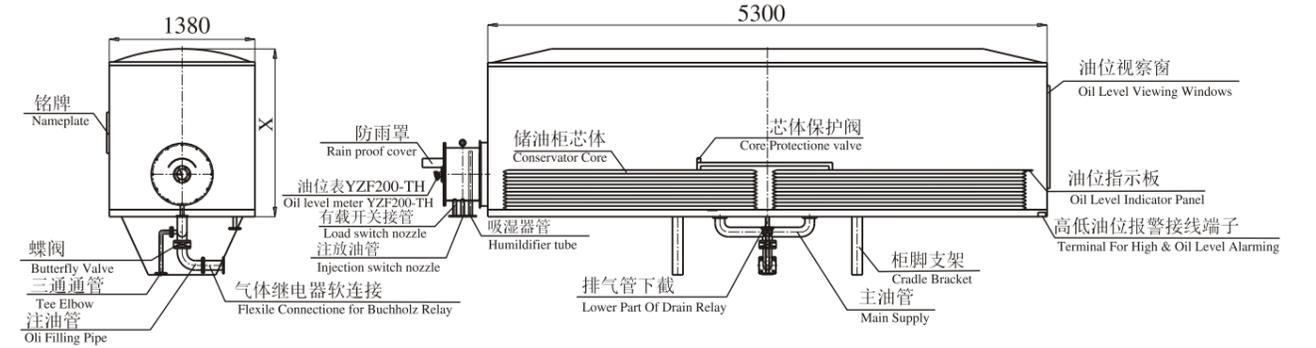


BP1-N-1180×6580型: 适用于油重为35000Kg --57000Kg 变压器
Model BP1-N-1180×6580:Be suitable for the transformer with 35000Kg --57000Kg

表11:
Table 11:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1180×6580	1180	6580	1305	3190	1595	2080	35000
BP1-N-1180×6580	1180	6580	1475	3825	1910	2715	42000
BP1-N-1180×6580	1180	6580	1645	4555	2275	3045	50000
BP1-N-1180×6580	1180	6580	1815	5195	2595	3375	57000

图12:
Figure 12:

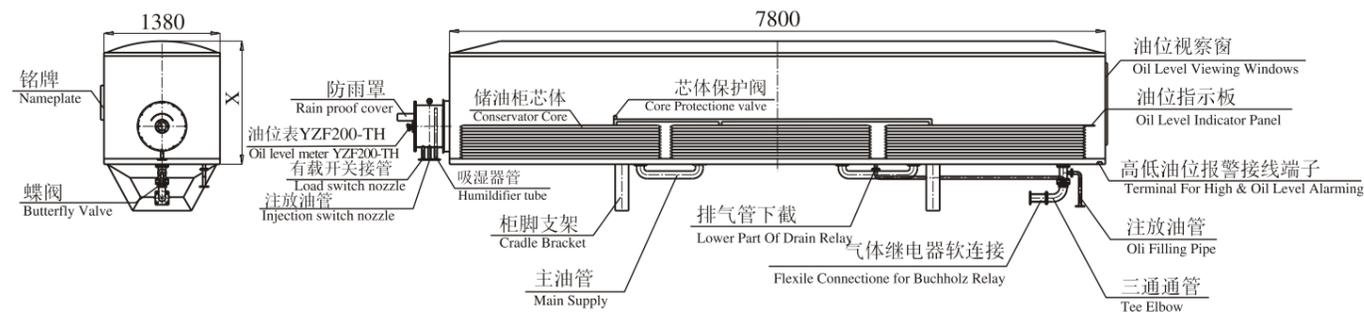


BP1-N-1380×5300型: 适用于油重为 37000Kg --60000Kg 变压器
Model BP1-N-1380×5300:Be suitable for the transformer with 37000Kg——60000Kg

表12:
Table 12:

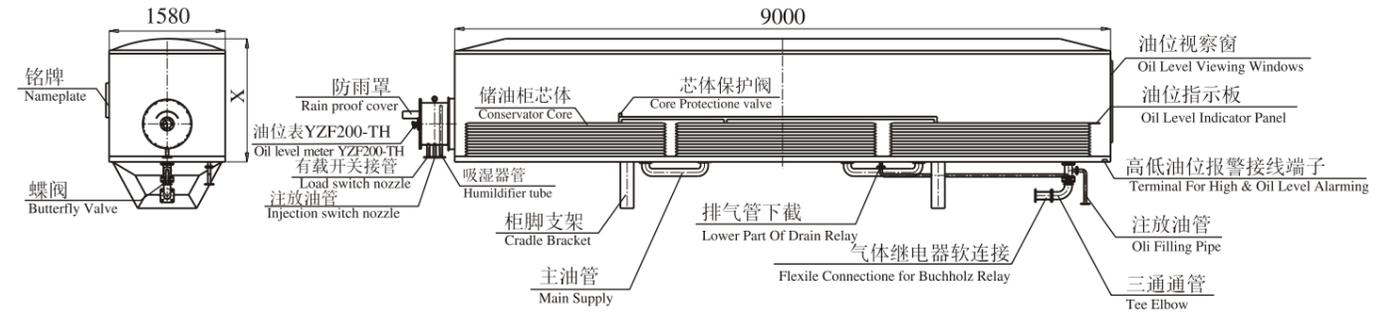
产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1380×5300	1380	5300	1440	3535	1530	2015	37000
BP1-N-1380×5300	1380	5300	1625	4205	1865	1815	44000
BP1-N-1380×5300	1380	5300	1810	4970	2245	2330	52000
BP1-N-1380×5300	1380	5300	1995	5730	2625	2870	60000

图13:
Figure 13:



BP1-N-1380×7800型: 适用于油重为 55000Kg --88000Kg 变压器
Model BP1-N-1380×7800: Be suitable for the transformer with 55000Kg—88000Kg

图14:
Figure 14:



BP1-N-1580×9000型: 适用于油重为 80000Kg --130000Kg 变压器
Model BP1-N-1580×9000: Be suitable for the transformer with 80000Kg—130000Kg

表13:
Table 13:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1380×7800	1380	7800	1440	5255	2355	2685	55000
BP1-N-1380×7800	1380	7800	1625	6305	2880	3095	66000
BP1-N-1380×7800	1380	7800	1810	7360	3410	3765	77000
BP1-N-1380×7800	1380	7800	1995	8410	3935	4435	88000

表14:
Table 14:

产品型号 Product Model	宽度 Width (mm)	长度 Length (mm)	高度 Height (mm)	有效容积 Effective Volume (L)	20°C时油重 Oil Weight at 20°C (kg)	储油柜净重 Net Weight of Oil Conservator (kg)	适应变压器油重 Applicable to Oil Weight of Transformr (kg)
BP1-N-1580×9000	1580	9000	1420	7110	3155	2030	80000
BP1-N-1580×9000	1580	9000	1605	8710	3955	3060	98000
BP1-N-1580×9000	1580	9000	1790	10220	4710	4455	115000
BP1-N-1580×9000	1580	9000	1975	11555	5380	5305	130000

四.安装使用

IV.Installation & Operation

1.储油柜附有由用户提供尺寸的柜脚（支架），吊装时切记吊底座两侧上的4只吊柄（切勿吊其它部位），对正柜脚安装孔，拧紧螺栓。然后将所有联接管路接上，配装阀门后即可注油。注油时，要打开排气阀门，使储油柜芯体内空气顺利排出，直至排气管内流出的油内没有气泡后，将阀门关闭。注油可从注补油管处注油，也可从变压器本体注油口注油，由用户视具体情况自行决定。

1.The oil conservator is supplied with legs (supports)whose dimensions are given by the user.During installation,do remember to hang the 4 lift handles on both sides of the chassis(don't hang other positions).Align the legs with relevant installation holes,tighten the bolts.Connect the pipelines,fit and assembly the valves and conduct oil filling.When filling the oil,the air bleeder shall be turned on so as to exhaust the air inside the oil conservator.The air bleeder shall not be turned off until the oil in the air bleeder has no air bubble.The oil filling can be done either from the oil filling and adding pipe or the oil-filling opening of transformer core,the end-users can make their own decisions depending on specific conditions.

2.附件箱中零件的安装：拆去底部下接管的盲板，各零部件按图所示各就各位。联接主油管、蝶阀、三通及注油管，注意排气管下截末端的密封装置暂不要拆（再次运输抽真空用），同时不要随意转动，以免损坏波纹管。试装后应将注油管和排气管下截延伸至距地面1~1.5米处并由用户自己配截止阀（活门）。

2.Installation of Parts and Components in the accessory case:Remove the blind flange of lower nozzle,every part and component shall be in its right position as shown in the drawing.Connect the main supply,butterfly valve,tee,and oil filling pipe,pay attention not to dismount the sealing device of the end of the drain pipe lower part at this moment(used for vacuum-pumping during next transportation),even rotation is prohibited to avoid breaking the bellows.After trial assembly,the lower part of oil filling pipe shall be extended to the height of 1~1.5m above the ground and fitted with cut-off valves(valves)by the user.

3.与变压器联接后整体检验：储油柜出厂时，已经过气密性检验，出厂时呈负压状态，无须再检。当变压器本体打正压检测时，务必关闭储油柜底部蝶阀，以免冲破波纹管芯体。

3.Integrity inspection after connection with transformer:Before delivery,all the oil conservators have been air tightness tested and under minus pressure condition,so there is no need to reexamine them.When the transformer core is examined under plus pressure,remember to turn off the butterfly valve on the bottom of oil conservator to avoid damage the core of bellows expansion joint.

4.与变压器本体联接加油：当变压器与储油柜联接后加油时，须将排气管截止阀(活门)打开，使芯体内的空气顺利排出，直至空气排净，再将截止阀（活门）关闭。继续加油，可观察到波纹芯体在膨胀，红色指示板也在-30℃.0℃.+20℃逐渐升高，视当时油温决定加油量，加到所需油温为止。

4.Trial oil filling after connection with transformer core:When the oil conservator is connected with the transformer for oil filling,it is necessary to open the cut-off valve of the air bleed to allow the air in the core to discharge smoothly and completely.Then close the cut-off valve(valve),and continue to fill oil.It can be seen that the bellows core is expanding,and the red indicator panel also increases gradually from -30℃.0℃ to +20℃.The amount of oil to be filled depends on the oil-temperature.Fill the oil until to the required oil temperature.

5.再次运输注意事项

5.Points of Attention for Transportation

(1)严禁储油柜载油运输：储油柜波纹芯体属弹性焊接体，运输过程必须呈负压状态，使之收缩抗震。储油柜芯体内装油，波纹体处于膨胀状态，此状态在运输途中颠簸.摇晃，波纹体内的油将对波纹体侧壁产生冲击，波纹芯体及软联接波纹管会撕裂.折断，将产生渗漏，由此原因造成的一切后果由责任者自负。

(1) Oil conservator transportation with oil is strictly prohibited:The bellows core of oil conservator is an

elastic welded part.During transportation,it must be under minus pressure so as to contract against vibration.In case the conservator is filled with oil,then the bellows core is under expanding condition,the oil inside the bellows core will cause impact on the side walls of the bellows core,the bellows core and flexible connection bellows will break and leak,all the subsequent results caused by this shall be the responsibility of causer.

(2)再次运输时，必须抽真空。首先将储油柜芯体中的油放干净，然后将排气管抽气阀（图）止退螺母松开（注意是左螺纹），在旋松阀芯，插入真空胶管抽真空，当波纹芯体的波距逐渐缩小直到并拢（抽真空至-0.5~-0.6Mpa），左右。然后将阀芯与止退螺母旋紧，包装后即可运输（排气管抽气阀属一次性用品，切勿作截止阀【活门】使用）。

(2) During transportation,vacuumization must be done.Firstly,drain the oil inside the conservator completeil,then loosen locking nut of the air bleeder(left hand thread)(Figure),then loosen the valve core,insert vacuum rubber pipe for vacuum-pumping till the pitch of bellows core reduced and combined together(Evacuated to -0.5 ~-0.6Mpa).Then tighten the valve body and the locking nut.The oil conservator could be delivered after package(Air bleeder for drain pipe can be used only once.Don't use it as a cut-off valve 【valve】).

- 1.密封胶圈: Sealing Ring 2.抽气阀体: Air Exhaust Valve Body 3.O型密封胶圈: O-ring
4.止退螺母: Locking Nut 5.抽气阀芯: Air Exhaust Valve Core

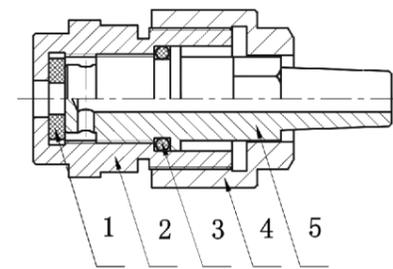


图15: 排气管抽气阀
Fig 15: Air Bleeder for Drain Pipe

注意事项:

Points fou Attention:

1. 储油柜底部两侧配有4只吊柄，以备装吊使用，切勿吊其它部位，否则将有可能对储油柜其它部件造成伤害。

1.There are 4 lift handles on both sides of the bottom of the oil conservator for lifting.Don't lift other positions.Otherwise,other parts of the oil conservator may be damaged.

2.注油时必须打开排气管下截密封用的截止阀（活门），直到排气管流出的油内空气已经放尽（没有气泡）时关闭截止阀继续注油。待油位指示超过所需油位刻度后，再放油至所需刻度并停止注油。

2.The cut-off valve(valve)on the lower part of drnin pipe used for air tightness must be opened during oil filling until the air in the oil flowing out from the drain pipe has been completely discharged(no air bubble).Then,close the cut-off valve and continue to fill oil.When the oil level exceeds the required scale,drain the oil until to the required scale and stop oil filling.

3.如果初始注油油位偏高，主变运行时温度升高而储油柜油位指示已到（或接近）上限，需要及时放油。放油至油位刻度50℃（上限为80℃或100℃）即可。

3.If the oil level is high during initial oil filling,the temperature raises during the running of the main transformer and the oil level of the oil conservator is up to(or near)the upper limit,drain the oil in time.Drain the oil to the level scale 50℃(Upper level 80℃ or 100℃).

如果没能及时放油，使储油柜超越上限（80℃或100℃），此时芯体所受压力迫使芯体保护阀启动——自动放油至上限（80℃或100℃）。发现芯体保护阀泄油，值守人员应及时将油位调整到相应的位置。芯体保护阀能反复使用。

If the oil is not drained in time,making the oil conservator exceeds the upper limit(80℃ or 100℃).At this time,pressure received by the core forces the core protection valve to start——automatically drain the oil to the upper limit(80℃ or 100℃).If oil drainage is found on the core protection valve,the person on duty should adjust the oil level to the corresponding position.Core protection valve can be used repeatedly.

注：芯体保护阀的排油口安装在储油柜下面，使用单位应及时了解。

Note:Oil drainage opening is installed below the core protection valve,the unit using it should know this timely.

五.定货须知

VI.Instructions to Order

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）。

1.The Buyer shall provide the transformer model,total oil weight,Installation method(vertical installation or parallel installation).

2.选用储油柜时，储油柜制造商是根据（1）项进行补偿参数计算，如对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进行选型，如图3～图14的结构形式无法满足需方要求时，双方协商设计方案。

The oil conservator manufacturer calculates the compensation parameters in accordance with the above paragraph(1),such as the selection of the construction of transformer installation,creepage distance between transformer bushing to oil conservator,etc.In case all the conditions as shown in Figure 3～Figure 14 could not satisfy the buyer 's requirements,both side discuss to find a design solution.

3.提供与储油柜联接处的气体继电器型号，联接法兰尺寸。

The model of Buchholz relay connected to the oil conservator and the dimensions of attachment flange shall be provided.

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。

When the oil conservator is integrated with the on-load tap-changer tank,the attachment flange dimensions for tank shall be provided.

5.提供变压器的使用地区及环境最高.最低温度。

Provide the highest and lowest temperatures and the humidity of the location where the transformer will be used.

6.提供柜脚安装尺寸.变压器有关联接尺寸，见图 16.17.18。

The installation dimensions of oil conservator legs and relevant transformer connection dimensions(see Figures 17 and 18 and 19)shall be provided.

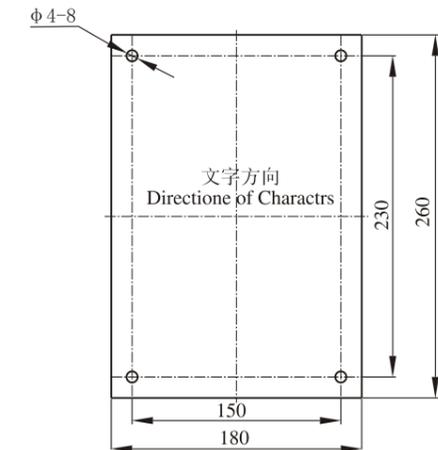
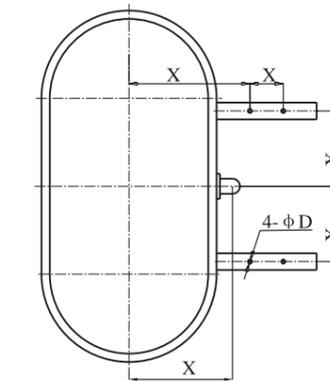
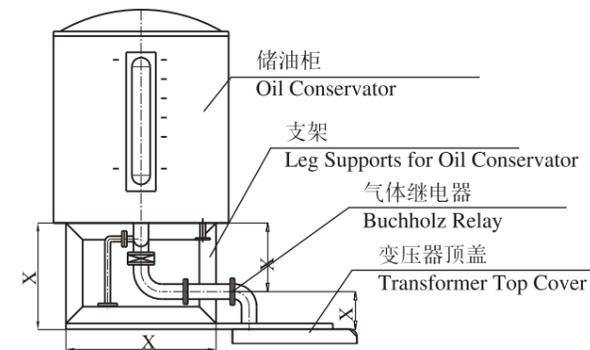


图16 垂直安装储油柜示意图

Fig.16 Schematic Diagram for Oil Conservator Vertical Installation X Dimensions Provided by the User

图17 油温指示牌底板尺寸（此曲线牌作为加油参考）

Fig.17 Dimensions of Oil Temperature Indicator Panel

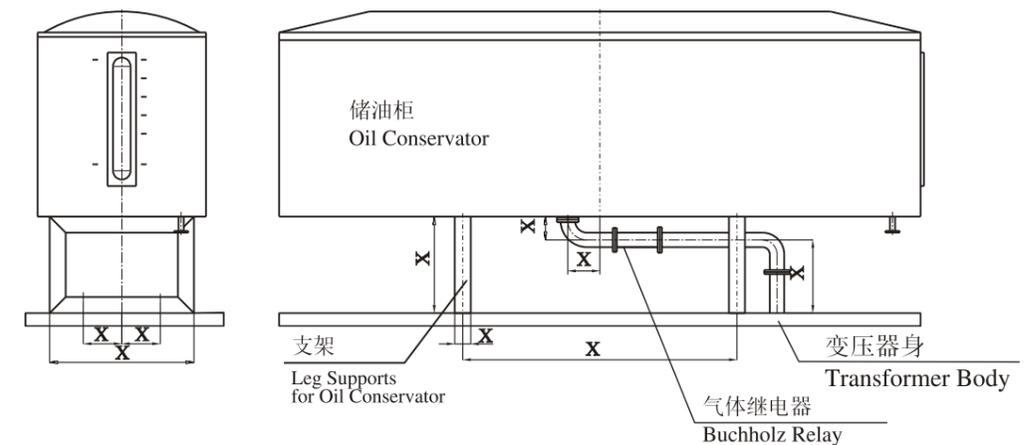


图18 平行安装储油柜示意图：X 处尺寸由用户提供

Fig. 18 schematic diagram of parallel installation of oil conservator: X dimensions are provided by users