QYW-3 系列变压器用多功能保护器

一、产品介绍 Product Introduction



QYW-3 系列变压器多功能保护器，是专为全密封油浸式变压器研发的一体化专用保护继电器。具备瓦斯保护、压力超限保护、油位可视且自带输出接点、油温可视且带双路输出接点；

适用范围广泛，可配套油浸式电力变压器、油浸电抗器、油浸式电力电容器等充油电气设备使用，是全密封配电变压器、箱式变电站的标配安全保护组件。

The QYW-3 series multi-function transformer protectors are integrated dedicated protective relays developed specifically for fully-sealed oil-immersed transformers. They integrate gas protection, overpressure protection, visual oil level monitoring with built-in output contacts, and visual oil temperature monitoring equipped with dual-channel output contacts.

Boasting a wide range of applicable scenarios, the devices can be matched with oil-immersed power transformers, oil-immersed reactors, oil-immersed power capacitors and other oil-filled electrical equipment. They serve as the standard safety protection assemblies for fully-sealed distribution transformers and box-type substations.

二、产品型号及规格 Product Model & Specifications

QYW-3 型多功能保护器命名规则如下：**The naming specification for Model QYW-3 multi-function protector is defined as follows:**

QYW—□/ □-□-□-□TH

- 超温度报警值（℃）Over-temperature Alarm Value (℃)
- 温度报警值（℃） Temperature Alarm Value (℃)
- 低油位报警（mL）Low Oil Level Alarm Volume (mL)
- 压力继电器报警值(kPa)Pressure Relay Alarm Setting(kPa)
- 设计代号 Design Code
- 轻瓦斯、压力（重瓦斯）、温度 Light Gas, Pressure (Heavy Gas), Temperature

标注实例：QYW-3/30-170-80-90TH 表示压力继电器报警值(重瓦斯)为 30kPa，轻瓦斯气体容积超过 **170mL** 以上时将会触发报警，变压器油高温报警阈值为 80℃，变压器油超温跳闸阈值为 90℃。

Marking Example: The designation QYW-3/30-170-80-90TH indicates that the pressure relay alarm value (heavy gas protection) is 30 kPa. An alarm will be triggered when the gas volume of light gas exceeds 170 mL. The high oil temperature alarm threshold of the transformer is 80℃, and the

over-temperature trip threshold of transformer oil is 90 ℃.

三、技术特征 **Technical Features**

引用标准 Reference Standards IEC 60076-22-1 、EN 50216-3

项目参数说明 Item Parameter Description	**技术指标** Technical Index
IEC 60529/GB/T 4208-2017 防护等级 IEC 60529/GB/T 4208-2017Protection Class	IP56
IEC 62262/GB/T 20138-2023 冲击防护等级 IEC 62262/GB/T 20138-2023Impact Resistance	IK10
最大相对压力 Max. Relative Pressure	+3 Bar
环境温度范围 Ambient Temperature Range	-40℃ < T < +70℃
最高油温 Max. Oil Temperature	+120℃
压力调节范围 Pressure Adjustment Range	100 ~ 500 mbar
报警温度调节范围 Alarm Temperature Adjustment Range	+30℃ ~ 120℃
跳闸温度调节范围 Trip Temperature Adjustment Range	+30℃ ~ 120℃
气体、油位固定跳闸阈值 Fixed Trip Threshold for Gas & Oil Level	轻瓦斯气体容积超过 170mL 以上时 Trip when light gas volume exceeds 170mL
气候条件 IEC60721-3-4 Climatic Conditions IEC60721-3-4	4K26
特殊气候条件 IEC60721-3-4 Special Climatic Conditions IEC60721-3-4	4Z2+4Z4+4Z14
机械活性物质 IEC60721-3-4 Mechanically Active Substances IEC60721-3-4	4S13
耐候性测试 ISO4892-2 循环 84 /D27 1389 Weathering Test ISO4892-2 Cycle 84 / D27	1695 小时
盐雾测试 ISO12944-6 Salt Spray Test ISO12944-6	1440 小时
相对湿度: Relative Humidity	当空气温度为 20℃时，湿度不大于 95% Humidity not more than 95% at an air temperature of 20℃

电气特性 Electrical Characteristics:

电气触点 Electrical Contacts	**电压** Voltage **(V)**	**开关电流** Switching Current (A)	**自恢复电气条件** Self-reset Electrical Conditions	**最大电流** Max. Current (mA)	**最小触点寿命** Minimum Contact Life
报警与跳闸温控开关 Temperature control switches for	240V 50/60Hz	6	Cosφ>0.5	2000	1000
	24-48VDC	4	L/R<40ms	2000	1000
	220VDC	0.5	L/R<40ms	2000	1000
压力开关 Pressure switch	240V 50/60Hz	6	Cosφ>0.5	2000	1000
	24-48VDC	2	L/R<40ms	2000	1000
	220VDC	0.2	L/R<40ms	2000	1000
气体/油位开关 Gas / oil level switch	240V 50/60Hz	1	Cosφ>0.5	2000	1000
	24-48VDC	1	L/R<40ms	2000	1000
	220VDC	0.1	L/R<40ms	2000	1000

绝缘耐压 Dielectric Withstand Voltage：

触点介电强度 Dielectric Strength of Contacts	**额定短时耐受电压** Rated Short-time Withstand Voltage
触点与接地 Contacts to Earth	2.5 kV
触点间 Between Contacts	1kV

特殊结构设计

油位 / 液位触点在最高 25 mT 外部磁场环境中，工作状态不受干扰；

储油室三面视窗，透明抗紫外线注油管，油位全方位可视。

Special Structural Design The oil level / liquid level contacts can operate without interference under an external magnetic field up to 25 mT. The oil storage chamber is equipped with three-side viewing windows and UV-resistant transparent oil filling tube, enabling full-range visibility of oil level.

四、用途及特点 Applications and Features

4.1 压力保护功能：内部集成带单刀双掷（SPDT）压力开关，实时监测变压器油箱内部压力，构成油箱压力超限电气保护单元；当油箱内部压力上升至预设报警阈值时，压力开关迅速动作并输出报警信号。 **出厂默认整定压力值为 250mbar，可根据客户需求，在 100~500mbar 调节区间内定制预设出厂压力参数。**

Pressure Protection Function： A single-pole double-throw (SPDT) pressure switch is integrated internally to monitor the internal pressure of the transformer oil tank in real time, forming an electrical protection unit against excessive tank pressure. When the internal tank pressure rises to the preset alarm threshold, the pressure switch actuates rapidly and outputs an alarm signal. The factory default set pressure value is 250 mbar. The preset factory pressure parameters can be customized within the adjustment range of 100~500 mbar according to customer requirements.

压力控制 **Pressure Control**	**设置示例:** **25mbar** **Setting Example:** **25mbar**



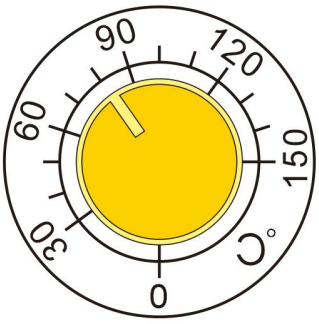




4.2 超温保护功能：装置内置两组独立可调的单刀双掷（SPDT）温度开关，分别用于设定变压器油温预警报警阈值与油温超温跳闸阈值；温度探头安装于浸入变压器油中的保护器测温套管内，实现油温实时监测与分级温控保护。**出厂默认预设报警温度 80℃，跳闸温度 90℃，可根据客户需求，在 80-120℃区间内定制预设出厂参数。**

Over-temperature Protection Function： Two groups of independent adjustable single-pole double-throw (SPDT) temperature switches are built into the device, which are respectively used to set the early warning alarm threshold and over-temperature trip threshold of transformer oil temperature. The temperature probe is installed inside the temperature measuring sleeve of the protector immersed in transformer oil to realize real-time oil temperature monitoring and graded temperature control protection. The factory default preset alarm temperature is 80℃ and trip temperature is 90℃. The factory preset parameters can be customized within the range of 80–120℃ according to customer requirements.

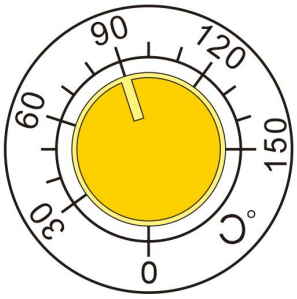
报警温度 **Alarm Temperature**	**设置示例:** **80℃** **Setting Example:** **80℃**

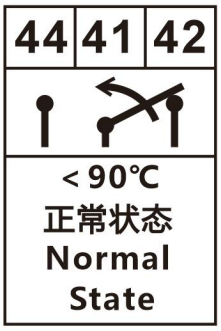






跳闸温度 Trip Temperature	设置示例: Setting Example:	90℃ 90℃

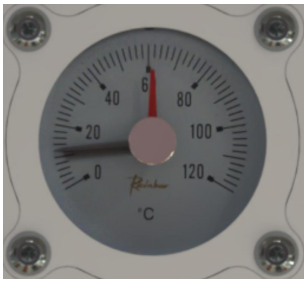






4.3 **可视油温表**：装置内部配置温度表，依托温包式传感器浸入绝缘油中采集油温；测温表盘自带可视刻度面板与温度记忆指针，既可就地直观读取实时油温数值，还可留存最高温度记录，便于运维人员追溯变压器过往最高温升工况。

油温表
Temperature Gauge



Visual Oil Temperature Gauge: A temperature gauge is installed inside the device. It adopts a bulb-type temperature sensor immersed in insulating oil to collect oil temperature data. The temperature dial is equipped with a visible graduated panel and a temperature memory pointer. It enables on-site direct reading of real-time oil temperature values and retains the maximum temperature records, facilitating operation and maintenance personnel to trace the historical maximum temperature rise conditions of the transformer.

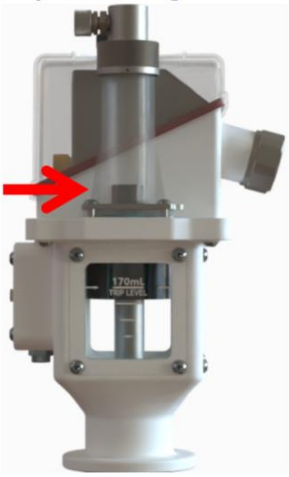
4.4 油位监测功能：配备管路浮子，可直观目视观察油位变化；油位大幅下降时，能够通过主油仓视窗观测主浮子位移。当油位下降容积达到 170mL 时，内置磁环驱动干簧管单刀双掷（SPDT）触点动作，输出低油位报警信号。

Oil Level Monitoring Function: Equipped with pipeline floats to visually observe oil level variations. Displacement of the main float can be viewed through the main oil tank sight window when the oil level drops significantly. When the oil volume reduction reaches 170 mL, the built-in magnetic ring actuates the SPDT (Single-Pole Double-Throw) reed switch contacts to output a low oil level alarm signal.

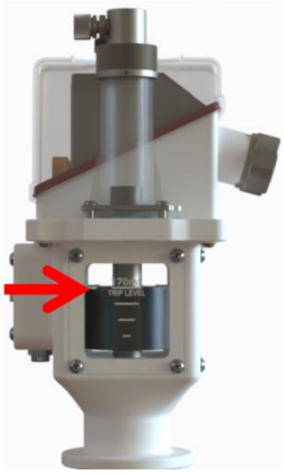
满油状态
Full Oil Level Condition



油位下降
Oil Level Drop / Declining Oil Level



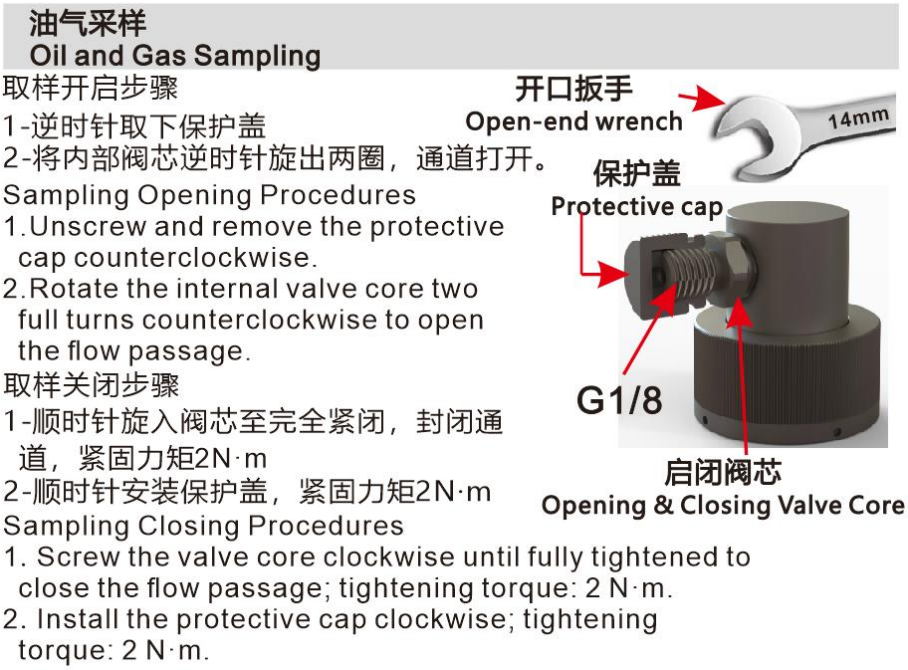
触发报警时的油位
Oil Level at Alarm Trigger Point



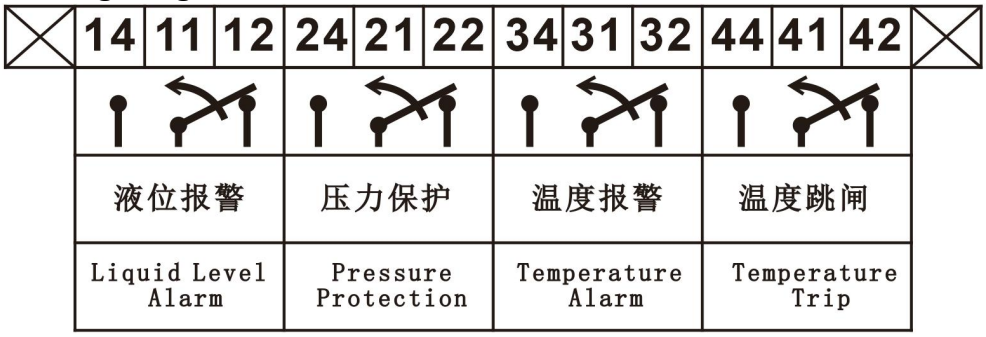


4.5 多功能可视注油管功能：装置集成多功能可视注油管，既可直观目视监测油位下降变化，同时集成补油、泄压、取样接口。

Multi-Functional Visual Oil Filling Pipe Function： The device is integrated with a multi-functional visual oil filling pipe, which can visually monitor the drop of oil level, and is integrated with interfaces for oil replenishment, pressure relief and oil sampling.



五.接线图 Wiring Diagram



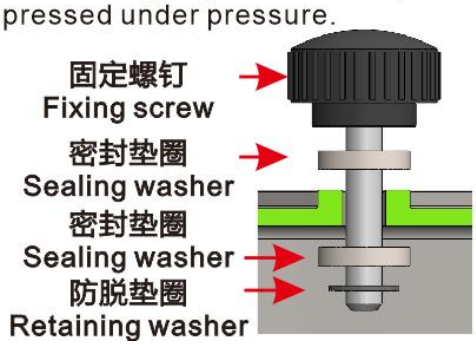
六．打开/关闭接线盒盖 Open / Close Terminal Box Cover

注意:关闭外壳前，请确保壳体内部干燥
Note: Ensure the interior of the housing is dry before closing the outer cover.

打开:
1-左旋松开固定螺丝
2-将盖子向上拉
3-取下盖子
Opening Procedures
1.Loosen the fixing screws counterclockwise.
2.Pull the cover upward.
3.Remove the cover.

关闭:
1-盖上盖子
2-按压盖子使其贴合在主体密封圈上
3-右旋拧紧固定螺钉直至密封圈在压力下适度压缩
Closing Procedures
1.Fit the cover in place.
2.Press the cover to make it closely attach to the main body sealing ring.
3.Tighten the fixing screws clockwise until the sealing ring is moderately compressed under pressure.

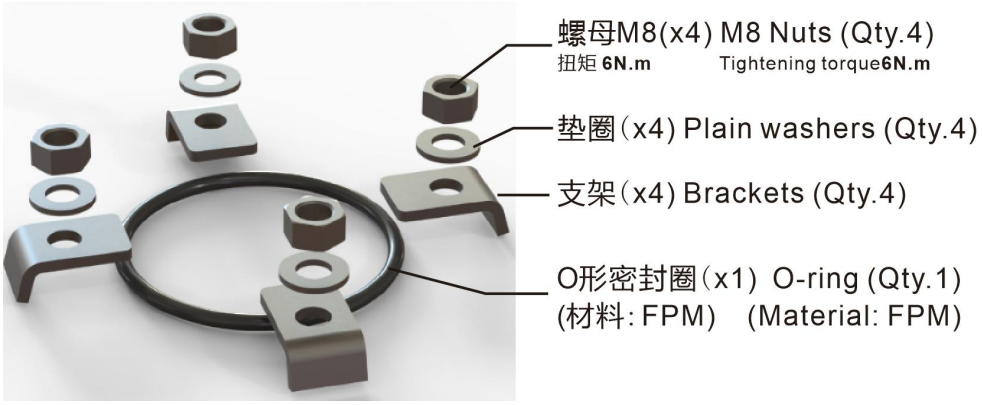




七．安装套件 Installation Kit

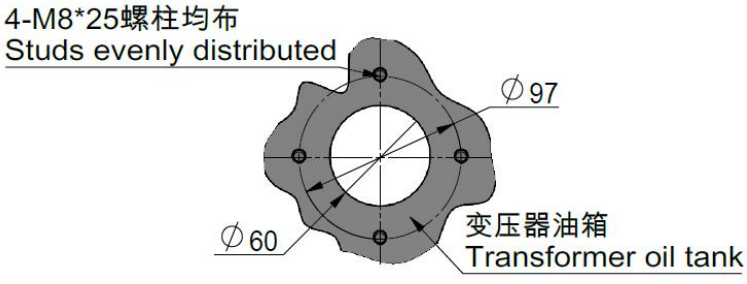
随保护器配套四个安装用固定支架和一个 O 形密封圈。（**注：以下 M8 螺母、平垫用户自备，非厂家提供。**M8 螺母拧紧力矩 6N·m）

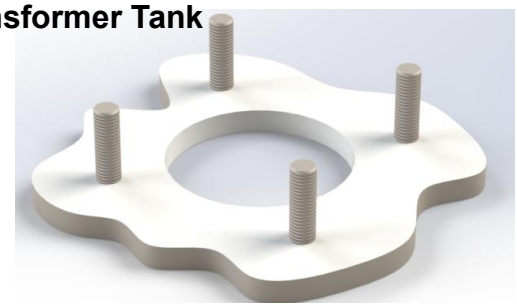
Four fixing brackets for installation and one O-ring seal are supplied together with the protector. (**Note: M8 nuts and plain washers mentioned below shall be prepared by users and not provided by the manufacturer**. Tightening torque for M8 nuts: 6 N·m)



八.变压器油箱安装法兰示意图

Schematic Diagram of Mounting Flange on Transformer Tank





法兰螺杆示意图

九.安装使用 Installation and Operation

8.1 变压器油箱盖安装法兰开孔尺寸为φ60mm；

8.2 通过联结法兰对变压器进行注油，直至油面接近油箱上盖，将气体继电器安装在联结法兰上（法兰上表面应清洁，无划伤、划痕）；

8.3 将继电器上的放气塞（或取样阀）拧下，取出小浮子，经注油管注油至高低压套管及继电器均充满油，放入浮子，将注油管上的放气塞（或取样阀）拧紧；

8.4 我公司产品在出厂前已整定合格，用户不可随意拆装。

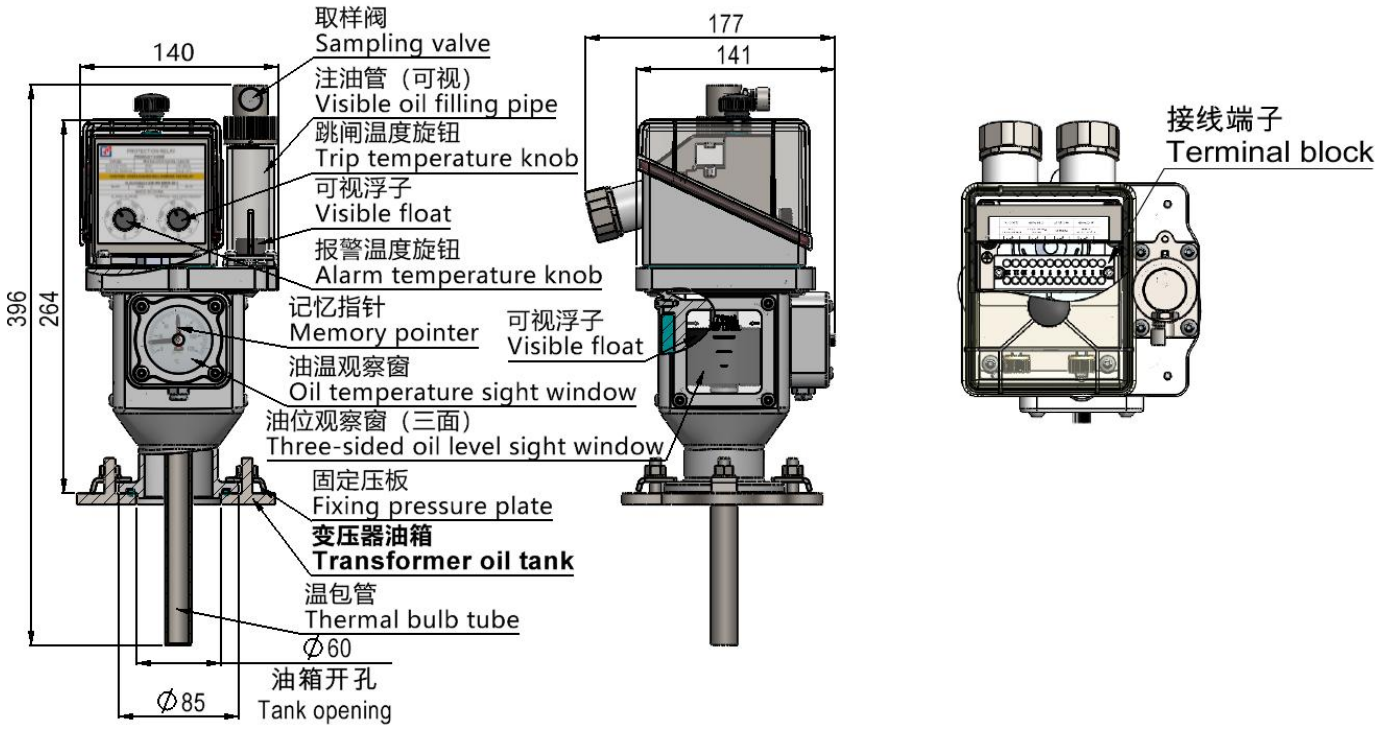
8.1 The opening size of the mounting flange on the transformer tank cover is φ60 mm.

8.2 Fill oil into the transformer via the connecting flange until the oil level approaches the tank top cover, then mount the gas relay onto the connecting flange. The upper surface of the flange shall be clean without scratches or abrasions.

8.3 Unscrew the air vent plug (or sampling valve) on the relay and take out the small float. Inject oil through the oil filling pipe until the high-low voltage bushings and the relay are fully filled with oil. Replace the float, then tighten the air vent plug (or sampling valve) on the oil filling pipe.

8.4 Our products have been calibrated and qualified before delivery. Users shall not disassemble or assemble them arbitrarily.

十、外形尺寸图 Overall Dimension Drawing



沈阳德广电气科技有限公司
Shenyang Deguang Electricity Technology Co., Ltd.
地　址：沈阳市浑南新区祥瑞工业园 2 号
Add: No.2 Xiangrui Industrial Park,Hunnan New District,Shenyang City
邮　编 Postcode：110168　　**邮　箱 E-mail：info_dgdq@126.com**
电　话 Tel：024-23825580　　**传　真 Fax：024-23825590**