

Transformer Protection Relay MCHD





OIL TEMPERATURE

- Monitors the internal oil temperature within the transformer.
- Utilizes a bimetallic mechanism for temperature sensing, featuring an oil temperature range calibrated from **0°C to 140°C**.
- Equipped with two configurable (min./max.) limit switches, adjustable between **20°C and 120°C**.
- Includes a peak-temperature indicator that can be reset as needed.

OIL LEVEL

- Provides continuous monitoring of oil level fluctuations, indicating status between defined minimum and maximum thresholds.
- Utilizes a reed switch mechanism for precise oil level sensing.

GAS FORMATION

- Detects and signals the accumulation of gases within the system.
- Incorporates a reed switch for gas buildup identification.
- The alarm contact is triggered upon reaching a maximum gas collection volume of **170 cm³**.

PRESSURE

- Activates upon reaching a predetermined internal pressure limit.
- Offers an adjustable pressure setting range between **10 kPa and 50 kPa**.



Transformer Protection Relay MCHD Overview



Transformer Protection Relay MCHD

Functions in Detail

OVERVIEW

The Multi-Control Device (ACD) is engineered for application in oil-immersed distribution transformers. It serves as a comprehensive protection system designed to isolate the transformer under critical fault conditions, including gradual gas accumulation, oil level depletion, thermal overload, and rapid internal pressure surges, all in compliance with the **EN 50216-3** standard.

OPERATIONAL MECHANICS

The device integrates multiple specialized sensing components to ensure reliable monitoring:

- **Gas & Level Monitoring:** Utilizes magnetic reed switches for high-precision detection of gas formation and oil level fluctuations.
- **Pressure Monitoring:** Employs dedicated pressure-sensitive switches to detect critical internal pressure changes.
- **Thermal Monitoring:** Features a bimetallic thermometer assembly for continuous oil temperature tracking.

TECHNICAL LIMITS

The system is designed for a maximum continuous operating pressure threshold of **50 kPa**.

RELAY CLASSIFICATION

In accordance with the **EN 50216-3** standard, two distinct relay configurations are defined, each corresponding to the specific functional requirements outlined in Table 1 below:

Function	Relay Type 1	Relay type 2
Gas and leakage detection	1 contact	1 contact
Overpressure detection	1 contact	1 contact
Over temperature detection	621 A	2 contacts (alarm/tripping)
Temperature indicator	Yes	Yes
Visual leakage control	Yes	Yes
NOTE: The two functions gas and leakage detection are usually actuated by one contact in common.		

Electromagnetic Interference (EMI) Immunity

- **Magnetic Field Tolerance:** The relay is engineered to maintain operational integrity when exposed to a D.C. magnetic field of up to **25 mT**, regardless of field orientation or polarity.
- **Operational Advisory:** Transformers and reactors generate significant magnetic fields during normal service and fault conditions. Users should be aware that such environments may cause unintended actuation in devices utilizing reed-type magnetic contacts.

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Functional Characteristics

- **Contact Specifications:** The output contacts are strictly potential-free.
- **Thermal Resilience:** All internal components and materials are constructed to withstand sustained operating temperatures of up to **115°C**.
- **Maintenance Features:** The relay assembly is designed to facilitate the partial replenishment of transformer insulating fluid. Furthermore, the design ensures that the internal liquid level remains clearly observable at all times.

Electrical Specifications

- **Compliance Standard:** The device design and testing are in full accordance with the **EN 60947-5-1** standard.

Current Ratings

- **Operational Current:** The nominal rated current is defined as **2 A (r.m.s.)**.
- **Inrush/Short-Time Capability:** The device supports a short-time current rating of **10 A (r.m.s.)** for a duration of **30 ms**.

Switching Capacity

- **Performance Metrics:** Refer to **Table 2** below for the detailed breaking and making capacity specifications applicable to both Normally Open (NO) and Normally Closed (NC) contacts.

Voltage	Current	Breaking Capacity	
48 V d.c. to 127V d.c.	2A	250W	L/R<40 ms
230V a.c.	2A	400VA	Cos f->0,5

Contact Durability and Reliability

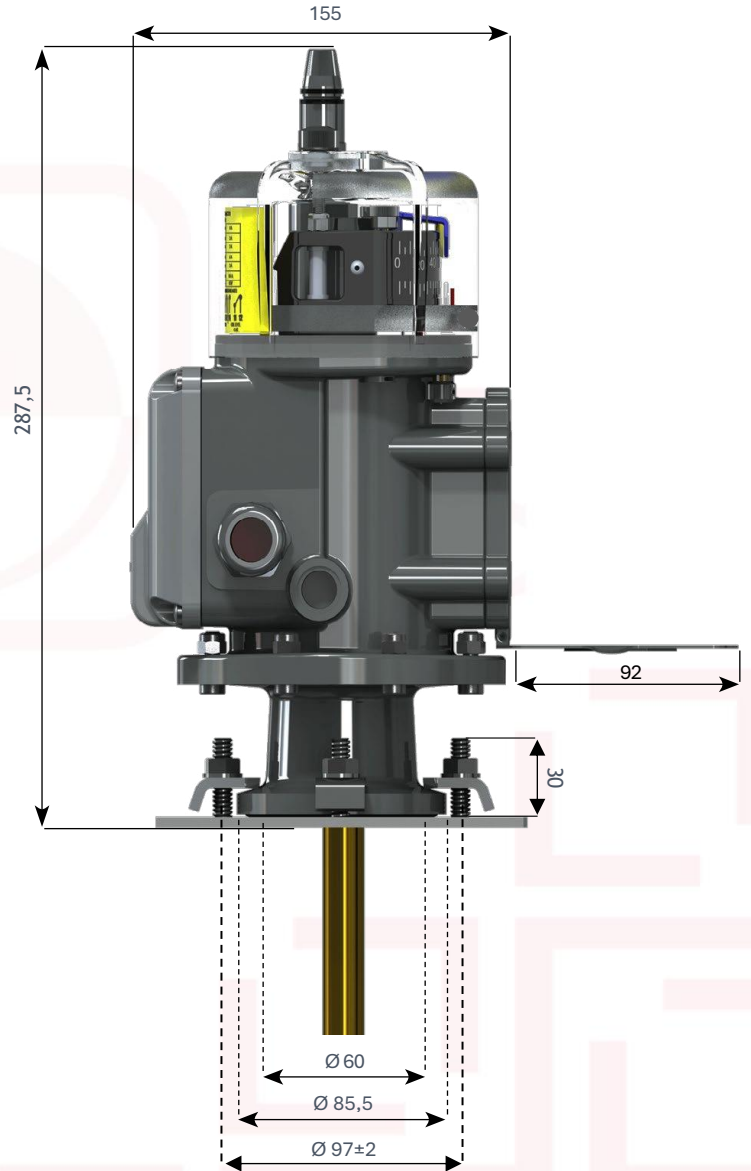
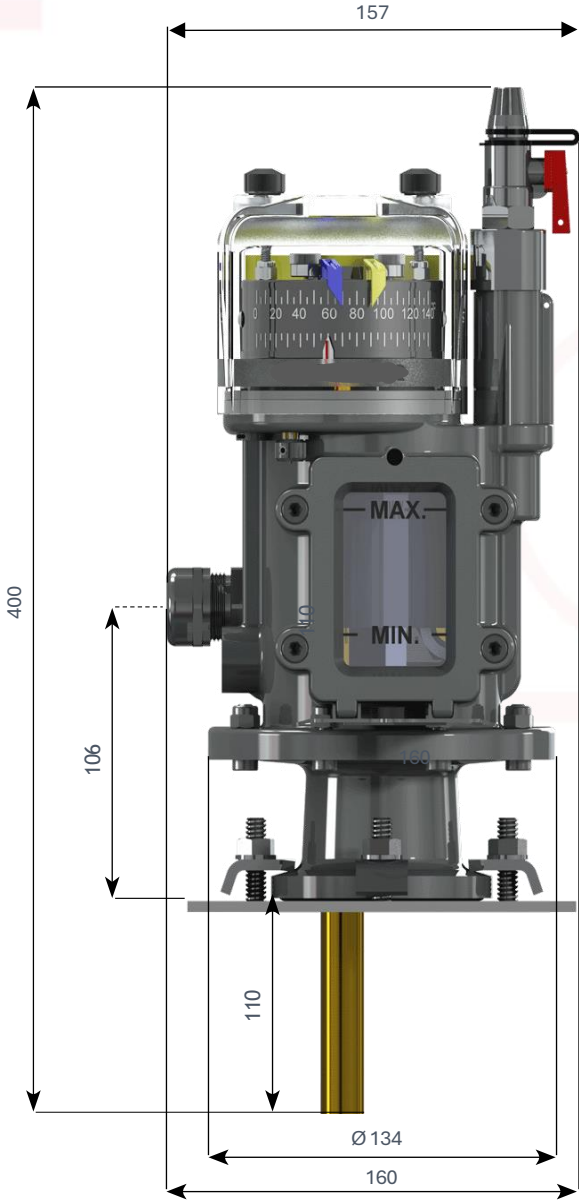
- **Operational Longevity:** The minimum service life for all contacts is rated at **1,000 cycles**.
- **Low-Current Reliability:** The switching mechanism is engineered to reliably handle low-current loads as minimal as **10 mA** across all voltage ranges specified in **Table 2**, ensuring consistent performance even following extended periods of inactivity (up to one year).

Response Time

- **Switching Latency:** The contact response time is guaranteed to be **0.5 seconds or less** under operational conditions.

Transformer Protection Relay MCHD

Dimensions

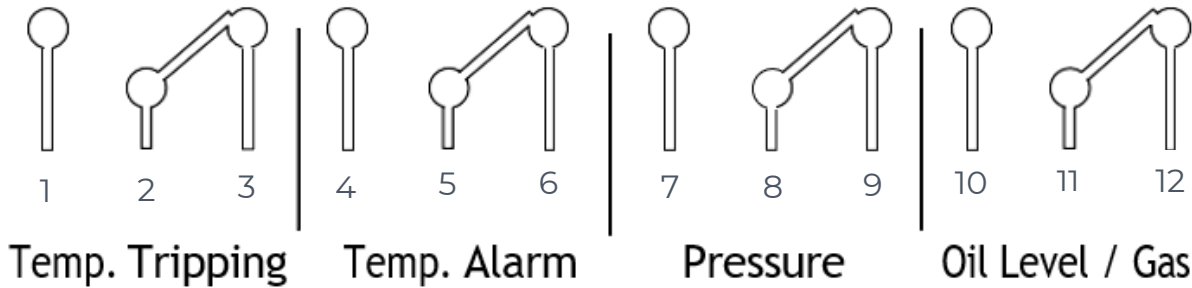


Transformer Protection Relay MCHD

Technical Specifications

General Features	Degree of Protection	IP 55 (EN 60529)	
	Shock Resistance	IK 07 (EN 50102)	
	Cable Gland	M 25 x 1.5 (10 - 17 mm)	
	Wire Section	1.5 - 2.5 mm ²	
	Minimum Load	3 W; 125 mA / 24 V DC	
	Contact Rating max.	100 W / VA	
	Operation Time	< 0.5 s	
	View Dome	UV resistant Lexan	
	Operating Temperature	-30 °C - +120 °C	
	Corrosion Resistance	C5-M (EN 12944)	
	UV Resistance	audited in accordance with DIN EN 75220, Z-Out / 25 days	
	Media Resistance	Mineral Oil / synthetic and organic esters	
Temp Tripping Alarm	240 V 50 Hz	6 A	Cos>0.5
	24V 48 V DC	4 A	L/R<40 ms
	220 V DC	500 Ma	L/R<40 ms
Pressure Gas	240 V 50 Hz	6 A	Cos>0.5
	24 V 48 V DC	2 A	L/R<40 ms
	220 V DC	200 Ma	L/R<40 ms
	240 V 48 V DC	1 A	Cos>0.5
	24 V 48 V DC	1 A	L/R<40 ms
	220 V DC	100 mA	L/R<40 ms
Protection	IP 56	IK 07	ACD 2013 TURKEY

Electrical Scheme (EN 50005)



MECHANICAL REQUIREMENTS

Terminal Box

- **Configuration:** Includes three terminals per function, plus a dedicated M4 earthing terminal that is clearly identified.
- **Cable Compatibility:** Engineered to accommodate conductors with a cross-sectional area ranging from **1.5 mm² to 2.5 mm²**.
- **Cable Entry:** Designed to be equipped with a **Pg 21** cable gland.
- **Protection Standards:** The terminal box cover complies with **IP 55** (per EN 60529) and features a sealable, tamper-proof fastening mechanism.
- **Impact Resistance:** Rated at **IK 07** mechanical impact protection in accordance with EN 50102.

Testing Facilities

- **Operation Verification:** Allows for full functional testing of all contacts and their operating mechanisms without risk of damage.

Gas Sampling

- **Sampling Port:** Features an accessible petcock for gas extraction.
- **Connection & Security:** Designed for **3.17 mm (1/8")** tubing connections and includes a sealing provision to prevent unauthorized or accidental operation.

Gas Monitoring

- **Visual Inspection:** The relay housing design allows for clear visual detection of gas accumulation from a minimum of three distinct angles.

Nameplate

- **Information Specifications:** The identification plate includes the following mandatory details:
 - Unique serial number.
 - Applicable standard reference and year of publication.
 - Relay model/type designation.
 - Wiring/Connection schematic.
 - Seismic withstand rating.

Testing Procedures

1. Temperature Switch Verification

- **Methodology:**
 - Begin by detaching the thermometer housing cover.
 - Carefully slacken the knurled fasteners on the limit switches.
 - Manually shift the min./max. limit markers across the current oil temperature pointer position.
 - Successful operation is confirmed by an audible mechanical click from the changeover contact.
- **Safety Warning:** Under no circumstances should the oil temperature pointer be manipulated toward the limit switches during this process.

2. Reed Switch Inspection (Oil Level & Gas Accumulation)

- **Magnetic Actuation Method:**
 - Start by uncovering the terminal box.
 - Bring a rod magnet into proximity with the earthing symbol; this should trigger the magnetic switching of the reed changeover contact.
 - The contact must return to its original state once the magnet is withdrawn.
- **Pneumatic/Pressure Simulation Method:**
 - Alternatively, open the 1/8" ball valve and induce a drop in oil level by applying controlled pressure to the unit.
- **Mandatory Protocol:** Never remove the ball valve seal without explicit authorization and guidance from the transformer manufacturer.

3. Pressure Switch Calibration and Testing

- **Methodology:**
 - Gain access by removing the terminal box cover.
 - Configure the pressure threshold to the base setting of 10 kPa.
 - Utilize an air pump connected to the 1/8" ball valve to introduce pressure exceeding 10 kPa, ensuring the switch actuates as intended.
- **Mandatory Protocol:** The ball valve seal must remain intact unless prior approval has been granted by the transformer manufacturer.

Production tests are conducted in strict compliance with the EN 60076-1 standard.

Prior to shipment, the device undergoes the aforementioned type tests in addition to the mandatory assessments outlined in EN 50216-1.

