



## EQUIPMENT CATALOG

# MBR

MEMBRANE / BAG  
RUPTURE RELAY



**Treotech**



# Membrane / Bag Rupture Relay – MBR



The **Membrane/Bag Rupture Relay – MBR** is a device capable of detecting the rupture of the rubber membrane or bag used in oil preservation systems on power transformers and reactors.

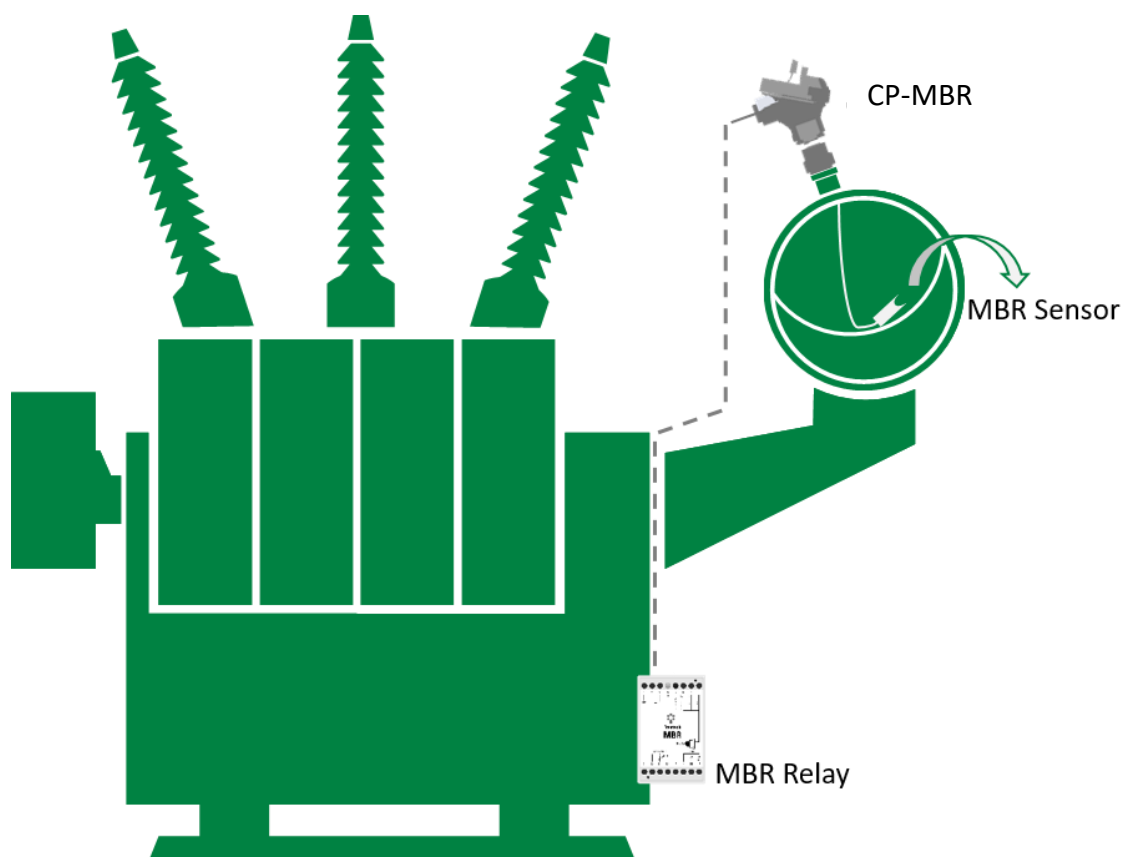
**MBR** is comprised of an optical sensor that must be mounted on the membrane or inside the rubber bag (on the air side), and a control unit located in the transformer control cabinet. The sensor is provided with a polysulfone capsule containing an emitting LED and a trigger circuit. The control unit has a reversible contact and two LED's, one to signal the membrane or bag rupture, and another to signal the on status.

**MBR** operation is based on the principle of light reflection. When there is no oil present, the light produced by the emitting-LED is completely reflected internally by the capsule dome and captured by the optical receiver. If the oil covers the capsule, the reflection effect on the dome limits change. The rupture causes part of the emitted light to disperse in the oil, and the amount of light that reaches the optical receiver is reduced. This change in light reflection causes the unbalancing of the coupling circuits and the actuation of the signal contact. The output contact is reversible, and its operation mode (operate or return to rest mode in case of membrane failure) is selected by means of an external jumper.

The auxiliary supply voltage to the **MBR** can be in the range 38 to 265 Vac/Vdc, 50/60 Hz, covering all auxiliary voltages commonly found in power plants. Electrical insulation is provided between input, output and auxiliary supply circuits.



## Basic topology





## Technical data

### Relay

| Feature               | Interval / Description                  |
|-----------------------|---|
| Power supply          | 38...265 Vac/Vcc, 50/60 Hz              |
| Consumption           |   |
| Operating temperature | - 10...+ 70 °C                          |
| Protection degree     | IP20                                    |
| Wire size             | 0,3...2,5 mm <sup>2</sup> , 22...12 AWG |
| Mounting              | DIN 35 mm rail                          |

| Input        |
|--------------|
| 1 MBR sensor |

| Output                    |                                   |
|---------------------------|-----------------------------------|
| 1 reversible contact      |                                   |
| Maximum switching power   | 60 W / 62,5 VA                    |
| Maximum switching voltage | 220 Vdc / 250 Vac (non-inductive) |
| Maximum switching current | 2 A                               |

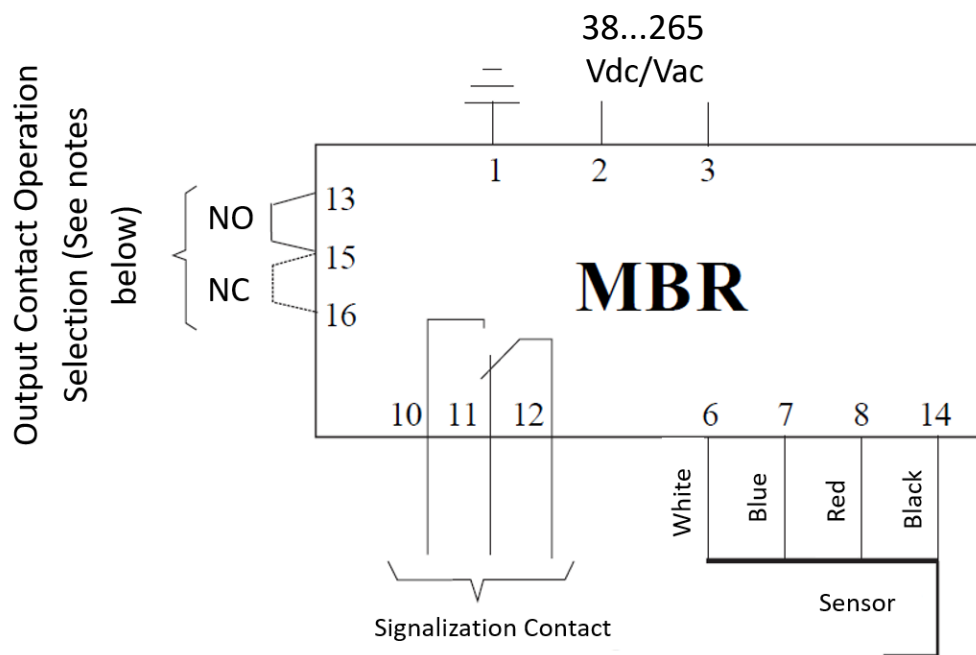
| LEDs  |                        |
|-------|------------------------|
| Green | On                     |
| Red   | Membrane / bag rupture |

### Sensor

| Feature               | Interval / Description           |
|-----------------------|----------------------------------|
| Operating temperature | - 40...+ 100 °C                  |
| Protection degree     | IP67                             |
| Cable                 | 4 x 0,5 mm <sup>2</sup> , 200 °C |



## Connection Diagram



### Notes:

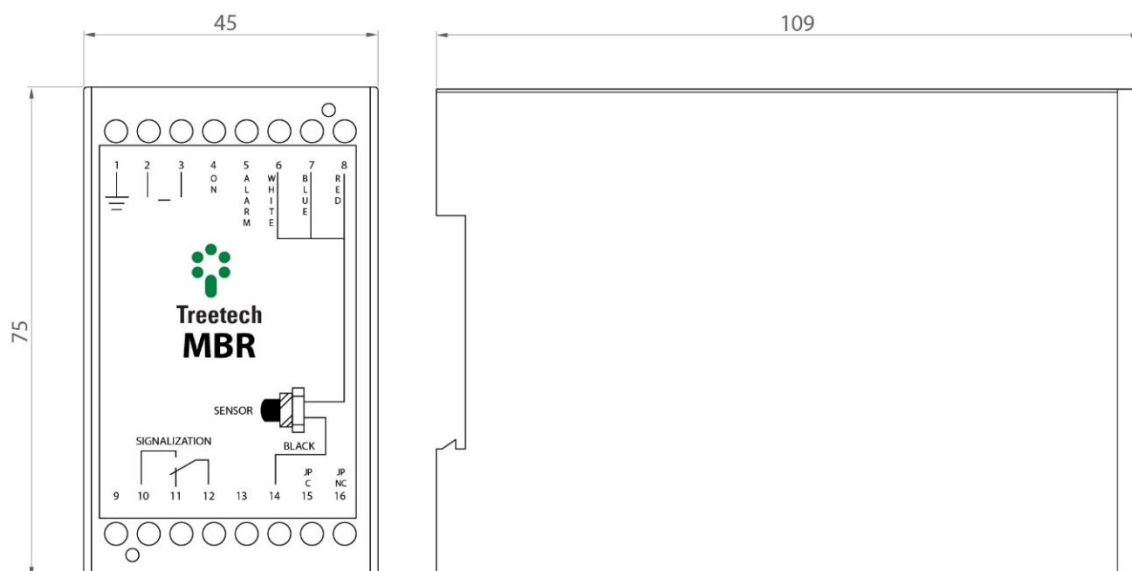
- 1) Output contact is shown with MBR de-energized;
- 2) Connect a jumper wire between terminals 13-15 if the output contact is to operate (close 10-12) in case of alarm and return to normal position if there is no alarm (close 11-12);
- 3) Connect a jumper wire between terminals 15-16 if the output contact is to return to normal position (close 11-12) in case of alarm and to operate if there is no alarm (close 10-12);
- 4) One of the above jumper wires must be installed. Otherwise the output contact will never change state.

| Jumper connection<br>(13-15/15-16) | Conditions | Contact<br>10-12 | Contact<br>11-12 | Red Status<br>Led |
|------------------------------------|------------|------------------|------------------|-------------------|
| 13-15                              | Air        | Open             | Closed           | Off               |
| 13-15                              | Oil/Water  | Closed           | Open             | On                |
| 15-16                              | Air        | Closed           | Open             | Off               |
| 15-16                              | Oil/Water  | Open             | Closed           | On                |



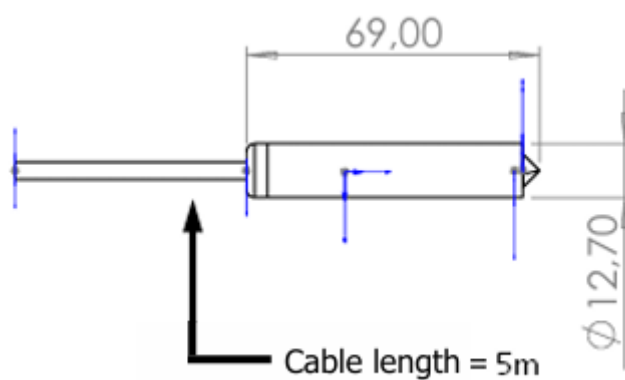
## Dimensions

### Relay



Dimensions in mm

### Sensor



Dimensions in mm



## Type tests

**Immunity to Electrical transients (IEC 60255-4 / 60255-6)**

1st cycle peak value 2,5 kV

Frequency 1,1 MHz

Time and repetition rate 2 s, 400 surges/s

Decay at 50% 5 cycles

**Voltage impulse (IEC 60255-5):**Wave shape 1,2/50  $\mu$ s

Amplitude and energy 5 kV

Number of pulses 3 negative and 3 positive, 5 s interval

**Applied voltage (IEC 60255-5)**

Industrial frequency withstand voltage 2 kV 60 Hz 1 min against ground

## Required accessory

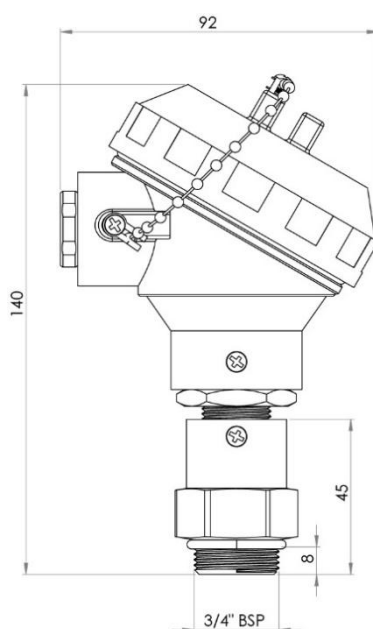
### Connection box CP-MBR

CP-MBR is a signal connection box which main purpose is to provide the passage of the Membrane / Bag Rupture Sensor signal from the expansion / conservator tank interior to the MBR Relay.

Generally, CP-MBR is installed in an access point, pre-existing valves or threaded holes can be found in conservator. If using these points is not an option, you will need to create a threaded hole.



| Feature              | Interval / Description                 |
|----------------------|--|
| Head                 | Cast aluminum, KNC painted             |
| Cable gland          | Nickel plated brass – thread 1/2" BSP  |
| Thread connection    | 3/4" BSP (NPT optional)                |
| Chain                | Nickel plated brass or stainless steel |
| Screws               | Nickel plated brass or stainless steel |
| Adapter              | Nickel plated brass or stainless steel |
| Supportable pressure | 1 bar                                  |



Dimensions in mm





## Ordering information

In order to purchase the Membrane / Bag Rupture Relay – MBR it is necessary to specify the following items:

### 1 – RELAY

#### 1.1 – QUANTITY

The number of **relay** units must be specified. The relay, the MBR sensor and the connection box (CP-MBR) are sold separately.

### 2 – MBR SENSOR

#### 2.1 – QUANTITY

The number of **MBR sensor** units must be specified.

#### 2.2 – CABLE LENGTH

The default is 5 meters.

### 3 – ACCESSORY

#### 3.1 – QUANTITY

The number of **connection box (CP-MBR)** units must be specified.

#### 3.2 – THREAD

**Thread option:** Default 3/4" BSP (British Standard Pipe) or optional 3/4" NPT (National Pipe Thread).



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