Vaisala MHT410 Moisture, Hydrogen, and Temperature Transmitter provides reliable online monitoring of insulating oil in power transformers.

**Real-Time Measurement**
Vaisala Moisture, Hydrogen, and Temperature Transmitter MHT410 provides an accurate real-time measurement result for critical parameters measured in oil, enabling reliable conclusions on the transformer’s condition without delay. With its unique probe design, MHT410 delivers accurate measurement and trend data about the health of the transformer in real time.

**Enabling Proactive Maintenance Decisions**
All of the transmitter’s measured parameters are available through digital and analog outputs, providing information on transformer fault situations and enabling timely, proactive maintenance decisions to minimize expensive service shutdowns and outages.

**Robust and Maintenance-Free Design**
MHT410 is designed for ease of use in demanding environments. It has undergone extensive testing to ensure it withstands wide temperature changes, vibration and harsh outdoor conditions. The transmitter has no consumables or moving parts that could break, and is encased in an IP66-rated metal housing equipped with a weather shield. Every unit is individually tested for a pressure of at least 10 bar and also withstands vacuum conditions. Special attention has also been given to EMC tolerance: for example, all electrical connections are isolated. MHT410 can also tolerate short-term power outages.

**Features and Benefits**
- Measures moisture and hydrogen directly in representative oil
- Compatible with mineral oil, natural ester oil, and synthetic ester oil
- Monitors health of the transformer in real time
- Real-time warning on transformer faults
- Unique probe design, robust and easy to install
- 5-year standard warranty
- Reliable device operation, no false alarms
- Maintenance-free design
- No cross-sensitivity to other gases

**Dimensions**

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Vaisala MHT410 Moisture, Hydrogen, and Temperature Transmitter MHT410 For Online Transformer Condition Monitoring
## Technical Data

### Measurement Performance

**Hydrogen**

- **Measurement range (in oil)**: 0 ... 5000 ppm,
- **Accuracy (in oil temperature range -20 ... +60 °C (-4 ... +140 °F))** ¹: ±20 % of reading or ±25 ppm ( whichever is greater)
- **Repeatability**: ±10 % of reading or ±15 ppm ( whichever is greater)
- **Minimum detection limit**: 25 ppm,
- **Typical long-term stability**: 3 % of reading / year
- **Cross sensitivity to other gases (< 2 %) (CO₂, C₃H₆, C₆H₆, CO)
- **Warm-up time**: 2 h, 12 h for full specification
- **Sensor**:
  - HUMICAP™ 180L2
  - Accuracy (including non-linearity, hysteresis, and repeatability):
    - 0 ... 90 %RS ±2 %RS (±0.02)
    - 90 ... 100 %RS ±3 %RS (±0.03)
- **Temperature**:
  - **Measurement range**: -40 ... +120 °C (-40 ... +248 °F)
  - **Accuracy at +20 °C (+68 °F)**: ±0.2 °C (0.36 °F)
- **Sensor**:
  - Pt1000 RTD Class F0.1 IEC 60751
- **Response time (90 % of full response at 40 ... 120 °C (-40 ... +248 °F))**: 90 % of full response: 17 h

**Moisture in Oil**

- **Measurement range (in oil)**: 0 ... 100 %RS / a
- **Response time (90 % of full response at +20 °C (+68 °F) in still oil)**: 10 min
- **Sensor**:
  - Catalytic palladium-nickel alloy
- **Warm-up time**: 2 h, 12 h for full specification
- **Accuracy (including non-linearity, hysteresis, and repeatability):**
  - 0 ... 90 %RS ±3 %RS (±0.03)
  - 90 ... 100 %RS ±2 %RS (±0.02)
- **Response time 63 % of full response**: 2.5 h (when sensor is not in reference cycle)

### Mechanical Specifications

- **Mechanical connection on transmitter**: 1.5 in NPT (male)
- **Cable bushing (optional)**: M20 × 1.5 for cable diameter 8 ... 11 mm (0.31 ... 0.43 in)
- **Conduit fitting (optional)**: 1/2 in NPT
- **Interface cable (optional, pre-assembled)**: 5 m (16 ft 5 in), 9.2 mm (0.36 in) outer diameter
- **Housing material**: AISI 10 Mg
- **IP rating**: IP66
- **Transmitter weight without cables**: 4.1 kg (9.04 lb)
- **Self-diagnostics indication**: Status LEDs, analog output, Modbus
- **Integrated data logging capabilities**: Non-volatile memory, up to 44 years’ storage with default logging
- **Individual functional test reports**: Calibration test reports for moisture, hydrogen, and temperature; probe leak test report (5 bara nominal)
- **Factory warranty**: 5 years

### Operating Environment

- **Oil type**: Mineral oil / Natural ester oil / Synthetic ester oil
- **Operating temperature (electronics)**: 0 ... +100 °C (-40 ... +212 °F)
- **Storage temperature**: -40 ... +60 °C (-40 ... +140 °F)
- **Operating humidity**: 0 ... 100 %RH, condensing
- **Pressure tolerance (probe, short-term)**: Max. 10 bara
- **Pressure tolerance (probe, continuous)**: Max. 4 bara
- **Temperature tolerance, sensor head**: -40 ... +120 °C (-40 ... +248 °F)
- **Integrated protection for short power outages**: > 3 s
- **EMC standard**: EN61326-1, Industrial environment; CISPR22 class B emission limits when DC powered
- **Fulfills the requirements of IEC 61000-6-5 in the following tests:**
  - IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, IEC 61000-4-12, IEC 61000-4-16, IEC 61000-4-17.

### Display with Relays (External Option)

- **Pre-configured range for hydrogen**: 0 ... 5000 ppm,
- **Pre-configured alarm relays (user-reconfigurable)**:
  - Relay 1 trigger limit 200 ppm, (hi)
  - Relay 2 trigger limit 1500 ppm, (hihi)
- **Input**: 4 ... 20 mA, loop-powered
- **Accuracy**: 0.05 % of span (-10 ... +60 °C (-14 ... +140 °F))
- **Relays**: 2 × solid state (SSR)
  - Max. 250 VAC, 150 mA
- **Display**: 4-digit red LED, 14.5 mm
- **Dimensions (H × W × D)**: 100 × 100 × 57 mm (3.94 × 3.94 × 2.24 in)
- **Case protection**: IP65
- **Case material and color**: ABS plastic, grey
- **Cable glands**: 2 × M6×1.5

### Inputs And Outputs

- **Operating voltage**: 15 ... 30 VDC, 24 VAC (±15 %) (power supply input is galvanically isolated) ¹
- **Power consumption**: Typical 4 W, maximum 12 W
- **Analog Output (Current) ¹**
  - Channels: 3 isolated 4 ... 20 mA (loop powering)
  - External load: Max. 500 Ω
  - Error status indication in case of device error: 3.5 mA default, user-configurable for each channel
  - mA output accuracy at +20 °C (+68 °F): ±0.025 % full scale
  - Temperature dependence of the analog outputs: ±0.006 % / °C full scale
- **Digital Outputs ¹**
  - Interfaces: RS-485 half-duplex, RS-485 (Service Port, non-isolated)
  - Protocols: Modbus RTU, DNP3, serial ASCII
  - Screw terminals: Wire size AWG 22-14, Single wire (solid) 1.5 mm², Stranded wire (flex.) 10 mm², Recommended wire torque 0.4 Nm

¹) Max. isolation voltage 154 V/DC.

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