MHT410 Moisture, Hydrogen and Temperature Transmitter
For online transformer condition monitoring

**Features and benefits**
- Measures moisture and hydrogen directly in transformer oil
- Compatible with mineral oil, natural ester oil, synthetic ester oil, and silicone oil
- Easy to install
- Provides early warning on potential transformer faults
- Unique probe design allows for direct measurement in oil
- 5-year standard warranty
- Robust design providing reliable operation and no false alarms
- Maintenance-free operation
- No cross-sensitivity to other gases
- Indigo520 compatible, with easy access to measurement data

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. 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.

MHT410 is also compatible with the Vaisala Indigo500 series transmitters. With its local graphical display, Indigo520 is a great addition to MHT410. It helps you to identify data trends at the site, as well as power the MHT410 with a single-wire solution.

**Robust and maintenance-free operation**
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 been given to EMC tolerance: for example, all electrical connections are isolated. MHT410 can also tolerate short-term power outages.
## Technical data

### Measurement performance

#### Hydrogen
- **Measurement range (in oil):** 0 ... 5000 ppm
- **Accuracy:** ±10 % of reading or ±15 ppm
- **Repeatability:** ±10 % of reading or ±15 ppm
- **Minimum detection limit:** 15 ppm
- **Typical long-term stability:** 3 % of reading / year
- **Cross sensitivity to other gases:** May be affected, for example, by variation in hydrogen solubility (partition coefficients) between different mineral oils.

#### Moisture in oil
- **Measurement range (in oil):** 0 ... 100 %RH / a<sub>v</sub>
- **Response time:** (90 % of full response at +20 °C (+68 °F) in still oil)
- **Sensor:** HUMICAP® 180L2

#### 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

1) The accuracy specified is the accuracy during calibration against gas in oil standard. Field performance may be affected, for example, by variation in hydrogen solubility (partition coefficients) between different mineral oils.

2) The accuracy specified is applicable in the oil temperature specified (~20 ... +75 °C (~4 ... +167 °F)).

### Mechanical specifications

#### Mechanical connection on transmitter
- **Cable gland (optional, for use with Indigo520):** M20×1.5 for cable diameter 5 ... 9 mm (0.20 ... 0.35 in)
- **Cable gland (optional):** M20×1.5 for cable diameter 8 ... 11 mm (0.31 ... 0.43 in)
- **Cable gland (optional):** M20×1.5 for cable diameter 11 ... 14.5 mm (0.43 ... 0.57 in)
- **Conduit fitting (optional):** 1/2" NPT

#### Interface cable (optional, pre-assembled)
- **Interface cable (optional):** 10 m (33 ft), 9.2 mm (0.36 in) outer diameter
- **Interface cable (optional, for use with Indigo520):** 10 m (33 ft), 6.2 mm (0.24 in) outer diameter

#### Housing material
- **Nylon 66, black (optional):** A1S 10 Mg

#### volts (optional)
- **IP rating:** IP66

#### Transmitter weight without cables
- **Max. 4 bara**

#### Oil temperature
- **Oil temperature:** -20 ... +75 °C (~4 ... +167 °F)

#### Operating temperature (electronics)
- **Operating temperature:** -40 ... +60 °C (~40 ... +140 °F)

#### Storage temperature
- **Storage temperature:** -40 ... +60 °C (~40 ... +140 °F)

#### Operating humidity
- **Operating humidity:** 0 ... 100 %RH, condensing

#### Pressure tolerance (probe, short-term)
- **Pressure tolerance (probe, short-term):** Max. 10 bara

#### Pressure tolerance (probe, continuous)
- **Pressure tolerance (probe, continuous):** Max. 4 bara

#### Temperature tolerance, sensor head
- **Temperature tolerance, sensor head:** -40 ... +120 °C (~40 ... +248 °F)

#### Integrated protection for short power outages
- **Integrated protection for short power outages:** > 3 s

### Inputs and outputs

#### Operating voltage
- 1S ... 30 VDC, 24 VAC (±15 %) (power supply input is galvanically isolated)
- **Power consumption:** Typical 4 W, maximum 12 W

#### Analog output (current)
- **Channels:** 3 isolated 4 ... 20 mA (loop-powering)
- **External load:** Max. 500 Ω
- **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
- **Interfaces:** Isolated RS-485 half-duplex, RS-485 (Service Port, non-isolated)
- **Protocols:** Modbus<sup>®</sup> RTU, DNP3, serial ASCII
- **Screw terminals:** Wire size AWG 22-14

### Compliance

#### EU directives
- **EMC, RoHS**

#### EMC compatibility
- **EMC compatibility:** CISPR 32 / EN 55032, Class B (when DC powered)

#### Electrical safety
- **EN 50581:2012**
- **EN 61000-6-1,** industrial environment
- **EN 61000-6-2,** EN 61000-6-4 1-4, EN 61000-6-3, EN 61000-6-5 in the following tests:
  - EN 61000-4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-8, 4-11, 4-12, 4-16, 61000-4-17
- **EN 61000-4-11,** industrial environment
- **EN 61000-4-12,** industrial environment
- **EN 61000-4-16,** industrial environment
- **WEEE**

### Published by Vaisala | B211484EN-G © Vaisala 2021

All rights reserved. Any logos and/or product names are trademarks of Vaisala or its individual partners. Any reproduction, transfer, distribution or storage of information contained in this document is strictly prohibited. All specifications — technical included — are subject to change without notice.