Vaisala Moisture, Hydrogen and Temperature Transmitter MHT410 for Online Transformer Condition Monitoring

The Vaisala MHT410 Moisture, Hydrogen and Temperature Transmitter provides reliable online monitoring of insulating oil in power transformers. With its unique probe design, the MHT410 delivers accurate measurement and trend data about the health of the transformer in real time.

- Information on transformer fault situations
- Enables timely, proactive maintenance decisions to minimize expensive service shutdowns and outages

### Technical Data

#### Measurement Performance

**HYDROGEN MEASUREMENT**
- Measurement range (in oil) 0 ... 5000 ppm
- Accuracy (in oil temp. range -20 ... +60 °C (-4 ... +140 °F)) ±20% of reading or ±25 ppm (whichever is greater)
- Repeatability ±10% of reading or ±15 ppm (whichever is greater)
- Min. detection limit 20 ppm
- Typical long-term stability 3% of reading / year
- Cross sensitivity to other gases < 2% (CO₂, C₃H₈, C₂H₄, CO)
- Response time 63%: 2.5 hours, 90%: 17 hours
- Warm-up time 2 hours, 12 hours for full specification
- Sensor Catalytic palladium-nickel alloy film solid-state sensor

**MOISTURE IN OIL MEASUREMENT**
- Measurement range (in oil) 0 ... 100 %RS / aw 0 ... 1
- Accuracy (in oil temp. range 0 ... +60 °C (+32 ... +140 °F))
  - Including non-linearity, hysteresis and repeatability
  - 0 ... 90 %RS (a₂ ± 0.9) ±2 %RS (a₂ ± 0.02)
  - 90 ... 100 %RS (a₂ ± 0.9 ... 1.0) ±3 %RS (a₂ ± 0.03)
- Sensor HUMICAP® 180L2
- Response time 10 min
- Sensor response time (90%, at +20 °C (+68 °F) in still oil)

**TEMPERATURE MEASUREMENT**
- Measurement range -40 ... +120 °C (-40 ... +248 °F)
- Accuracy at +20 °C (+68 °F) ±0.2 °C (0.36 °F)
- Sensor Pt100 RTD Class F0.1 IEC 60751

### Features/Benefits

- Online monitoring of insulating oil transformer
- Measures directly from oil without a need of pumps, membranes etc.
- Moisture and hydrogen sensors are in direct contact with representative oil in the transformer
- Monitors health of the transformer in real time
- Information on transformer fault situations
- Unique probe design, robust and easy to install
- Compact size
- 5 year standard warranty
- Isolated inputs and outputs, EMC tolerant device with IP66 metal housing
- Adjustable probe installation depth fits in a variety of transformers

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**Dimensions**

Dimensions in mm
### Technical Data

#### Operating Environment
- **Oil type**: Mineral oil
- **Operating humidity range**: 0...100 %RH, condensing
- **Operating temperature range**:
  - (electronics): -40...+60 °C (-40...140 °F)
  - (storage): -40...+60 °C (-40...140 °F)
- **Pressure tolerance (probe, short-term)**: Vacuum...10 bara
- **Pressure tolerance (probe, continuous)**: Max. 4 bara
- **Integrated protection for short power outages**: > 3 seconds
- **Electromagnetic compatibility**:
  - Complies with EMC standard EN61326-1, Industrial environment
  - Complies with CISPR22 class B emission limits when DC powered
- **Fulfills the requirements of IEC 61000-6-5 in the following tests**:
  - IEC 61000-4-2
  - IEC 61000-4-3
  - IEC 61000-4-4
  - IEC 61000-4-5
  - IEC 61000-4-6
  - IEC 61000-4-8
  - IEC 61000-4-9
  - IEC 61000-4-10
  - IEC 61000-4-11
  - IEC 61000-4-12
  - IEC 61000-4-13
  - IEC 61000-4-14
  - IEC 61000-4-15
  - IEC 61000-4-16
  - IEC 61000-4-17

#### Connections and Outputs
- **Operating voltage**:
  - 15...30 VDC, 24 VAC (±15%)
  - (power supply input is galvanically isolated)
- **Power consumption**:
  - 4 W, typical
  - 12 W max.
- **Analog output (current)**:
  - Three isolated 4...20 mA, loop powering required
- **External load**: Max. 500 Ohm
- **Error status indication in case of device error**: 3.5 mA default, user configurable for each channel
- **Accuracy of analog outputs at +20 °C**:
  - ± 1.25 % full scale
- **Temperature dependence of the analog outputs**:
  - ± 0.006 %/°C full scale
- **Digital outputs**:
  - Isolated RS-485 half-duplex, RS-485 (Service Port, non-isolated)
- **Protocols**: MODBUS RTU, serial ASCII commands
- **Screw terminals**:
  - Wire size AWG 22-14
  - Single wire (solid) 1.5 mm²
  - Stranded wire (flex.) 1.0 mm²
  - Recommended wire torque 0.4 Nm

*Max. isolation voltage 1.5 kV DC

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#### Mechanics
- **Mechanical connection on transmitter**: 1.5” NPT (male)
- **Cable bushing (optional)**: M20x1.5 for cable diameter 8...11 mm/0.31...0.43”
- **Conduit fitting (optional)**: 1/2” NPT
- **Interface cable** (optional, pre-assembled):
  - 5 meters, 9.2 mm outer diameter
- **Housing material**: AISI 10 Mg
- **Housing classification**: IP66
- **Transmitter weight without cables**: 4.1 kg
- **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 (20 bara)
- **Factory warranty**: 5 years

#### Display with Relays (External Option 242003)
- **Pre-configured range for hydrogen**: 0...5000 ppm
- **Pre-configured alarm relays** (user re-configurable):
  - 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)
- **Relays**:
  - 2 x solid state (SSR)
  - max. 250 VAC, 150 mA
- **Display**:
  - 4-digit red LED, 14.5 mm
- **Dimensions**:
  - 100 x 100 x 57 mm (WHD)
- **Case Protection**: IP65
- **Case material and color**: ABS-plastic, grey
- **Cable glands**: 2 x M16x1.5

#### Spare Parts and Accessories
- **USB cable for PC connection**: 219690
- **External din rail power**: 100...240 Vac to 24 Vdc 242422
- **5 meter shielded PUR cable**: CBL210392-5MSP
- **10 meter shielded PUR cable**: CBL210392-10MSP
- **Cable gland**: 214728SP
- **Detachable screw terminal block**: 236620SP
- **Loop-powered external display, Nokeval 302** (with alarm relays): 242003
- **MI70 connection cable**: 219980
- **Conduit fitting**: 214780SP
- **1.5” NPT ball valve with welding fitting**: BALLVALVE-3SET

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