When a transformer’s insulation system is overstressed, the oil and paper undergo chemical degradation producing both hydro-carbon gases and moisture that dissolve into the insulating oil. This increased ageing will shorten the transformer’s life, impact its reliability and in some cases can even lead to catastrophic failures.

The Hydran M2-X is the next generation of the field-proven family of Hydran DGA monitoring solutions. It provides continuous monitoring of gas and moisture levels to alert users of developing faults and minimize the risk of unplanned outages. The M2-X builds on GE’s strong domain expertise to deliver an optimized, low maintenance monitoring device with an extended sensor life.

**Key Benefits**

- Small form factor, no moving parts, low maintenance, and support for APM software analytics, enabling fleet level deployments
- Condition monitoring for a wide range of transformers with mineral insulating oils or ester based fluids (natural and synthetic)
- Extending beyond DGA monitoring, through the connection of sensors, the Hydran M2-X can monitor other parameters such as top oil temperature, load current and through the use of IEEE based mathematical models, can provide further insight on changing transformer conditions
- Providing critical transformer gas behavior data for Asset Performance Management (APM) strategies, facilitating planning of site intervention and maintenance activities
- Supports a wide range of communication methods and protocols to enable easy and secure integration with GE’s digital platforms including Perception™ transformer fleet management software, DS Agile substation HMI, PREDIX™, and other APM software tools, historians and SCADA systems

**Applications**

Advanced, flexible and expandable DGA monitoring solution tailored for utility and industrial transformers.

Easily integrates with Kelman multi-gas DGA devices and the Multilin 845 protection & control relay to provide continuous synchronization of chemical and electrical measurements for enhanced transformer monitoring.

**Proven Technology**

- Field proven solution, delivering online DGA solutions for over 40 years
- Over 50,000 Hydran units sold worldwide
- Estimated sensor life in excess of 10 years*
- 7 year product warranty

**Expandable**

- Compatible with various transformer oil types (standard mineral insulating oils and newer natural and synthetic ester based fluids)
- Available with the traditional Hydran composite gas (H2, CO, C2H2, C2H4) sensor or with a discrete Hydrogen only (H2) sensor
- Easily upgradable in the field to accept analogue signals to monitor other key transformer parameters
- Computation of winding hot spot and other IEEE transformer models for enhanced diagnostics of the transformer’s condition (depending on sensors installed)
- Integrates with Kelman multi-gas DGA devices

**Intuitive**

- Easy to install on a single existing transformer valve, often without an outage required
- Integrated display and keypad for simplified local user interaction and data visualization
- Built-in moisture sensor provides water in oil measurement, critical to identifying paper degradation and leaking gaskets
- Compatible with GE’s acclaimed Perception™ software to download, trend and analyze transformer health data
**Technical Specifications**

### MEASUREMENTS

Fuel cell type sensor behind a gas permeable membrane in contact with transformer insulating oil

- **Range**: 25-2000 ppm (volume/volume H₂ equivalent)
- **Accuracy**: ±10% of reading ±25 ppm
- **Response time**: 10 minutes (90% of step change)

### Composite Gas Sensor

- **Relative sensitivity**: H₂: 100% of concentration
- **Accuracy**: ±10% of reading ±25 ppm

### Discrete H₂ Gas Sensor (Mineral oil only)

- **Relative sensitivity**: H₂: 100% of concentration
- **Accuracy**: ±1% of reading ±25 ppm

### Moisture Sensor

Thin film capacitive type sensor immersed ininsulating oil

- **Range**: 0-100% RH
- **Accuracy**: ±2% RH
- **Repeatability**: ±2% RH

### FEATURES

**Display**

- Backlit LCD, 128 x 64 pixels
- Keypad to setup unit and acknowledge alarms

**Communications**

- Standard RS-232 port (DB-9 connector), for local connection toconfigure opening
- Standard RS-485 (terminal block), isolated to 2000Vac RMS, forremote communication or connection to local Hydran network

**Protocols**

- Optional: Ethernet or Fiber Optic over TCP/IP

**Alarms**

- Gas and Moisture Alert (Hi), Gas and Moisture Alarm (HiHi), System Alarms
- Gas alarms can be set on gas level reached or on hourly or daily trend (gas level rate of change)
- Moisture alarms can be set on level reached or average level

**Manual Sampling**

- Easily accessible external oil sampling port, for use with glass syringe with Luer stopcock

**ENVIRONMENT**

- Operating ambient temperature: 0-95% RH, non-condensing
- Operating ambient humidity: -40°C to +150°C (-40°F to +302°F)
- Oil pressure at valve: 0-700KPa (0-100psi)

**PRODUCT OPTIONS & SENSORS**

- Ambient temperature sensor (4-20mA)
- Split core load CT (4-20mA)
- Oil temperature sensor, magnetic mount, (4-20mA)
- Fiber optic (ST)

**Power Requirements**

- Network Ethernet communication using copper or multimode fiber optic (ST)
- Oil temperature sensor, magnetic mount, (4-20mA)
- Split core load CT (4-20mA)
- Ambient temperature sensor (4-20mA)

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*Fuel cell sensor life projection based on accelerated aging test showing estimated MTTF of 11.5 years

** Accuracy is quoted for the sensors at calibration, for H₂ equivalent performance

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**Enclosure Rating**

- NEMA Type 4X certified, meets requirements of IP56

**Power Requirements**

- 90-132 Vac or 180-264 Vac switch mode universal power supply, 47-63 Hz, 650VA max

**Mechanical**

- Has a 1.5" NPT male thread, can mount on 1.5" NPT valve or greater using optional adapters

**Dimensions**

- 315 x 219 x 196 mm
- 12.4 x 8.6 x 7.72"

**Installed weight**

- 7.5kg (16.6lb)

**Shipping weight**

- 9.0kg (20lb)

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**PRODUCT OPTIONS & SENSORS**

- Finned heat sink adapter (1.5") for use when ambient temp > 40°C (104°F) or oil temp > 90°C (194°F)
- Valve adaptors: 2" to 1.5"
- Transformer models calculations (for mineral oil only)

**Display**

- Keypad to setup unit and acknowledge alarms

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- Standard RS-485 (terminal block), isolated to 2000Vac RMS, for remote communication or connection

**Protocols**

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