

TECHNICAL GUIDE

eDOC: Oil diagnostic device for smart transformers



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Technical data

Type

| | |
|-----------|---|
| eDOC – H | Hydrogen in oil detector, data aggregator for eDevices and third-party devices, Embedded Web Interface |
| eDOC – HM | Hydrogen and moisture in oil detector, data aggregator for eDevices and third-party devices, Embedded Web Interface |

Mechanical Features

| | | | |
|---|---|---|--|
| Material | All the external part are resistant to transformer oils, salt fog and UV rays – Aluminum and stainless steel ⁽¹⁾ | | |
| Four types of installation environment | Indoor/Outdoor/Tropical proof Offshore | Corrosion class: C5-Medium (Std) Corrosion class: C5-High / CX | |
| Ambient temperature | From -40 °C to 80 °C (from -40 °F to 176 °F) | | |
| Operational oil temperature | From -40°C to +120°C (From -40°F to +248°F) | | |
| Degree of protection | IP66/IP67 according to EN 60529 | | |
| Cable glands | Minimum 4 Cable glands M25 | | |
| Functional Test | Standard | | |
| Overvoltage protection | Standard (replaceable Varistor and Fuse) | | |
| Ground | External mechanical ground | | |
| Interface to transformer^{(2) (3)} | Standard: 1.5 NPT male thread (verify the market requirements) Options: 1"NPT; EN flanges, Customize | | |
| Dimensions | 162 x 255 x 355 mm | | |
| Weight | 8,5 Kg | | |

(1) For critical environmental conditions, please contact us: customerservice@it.comem.com

(2) For Customize interface please contact us: customerservice@it.comem.com

(3) Transformer side: Maximum length= 400 mm/ Minimum diameter= 1 inch

Mechanical Tests⁽⁴⁾

| | |
|----------------------------------|--|
| Sinusoidal (EN 60721-3-4) | cl.4M6: 2-9 Hz (14 mm peak to peak), 9 – 200 Hz (2 g) – All axis |
| Shock | cl.4M4: 10 g (11 ms) in all the directions (EN60721-3-4) cl.4M6: 20g vertical axis (Spectrum I in agreement with EN 60721-3-4) |
| Seismic | EN60068-3-3 (cl.0, level II) |
| Pressure | 0 to 1000 kPa / 0 to 10 bar / 0 to 145 psi |

Power Supply⁽⁴⁾

| | |
|-----------------------------------|--|
| Rated Voltage | 115 V or 230 V ac/dc ± 10% 50/60 Hz |
| Current consumption | Max 100 mA (during normal operation) Maximum current during oil circulation < 1 A |
| Heating element insulation | 2.0 kV 50/60 Hz, 1 min |
| External protection | Automatic circuit breaker 4 A – 6 A, characteristic: C – K – Z |

Signal Contacts⁽⁴⁾

| Braking capacity (relays on the electronic card) | Voltage | Current | Braking capacity | |
|--|---|------------------|------------------|----------|
| | 230V AC | 2A | 500 VA | cosΦ>0,5 |
| | 30/110/220V DC | 0,83/0,23/0,11 A | 500 VA | L/R |
| Dielectric strength of contacts | Between contacts and ground: 2kV (60 sec) | | | |
| Heating element insulation | Between contacts in open position: 1kV (60 sec) | | | |

Input

| | |
|-------------|------------------|
| 4-20 mA | N°3 x 4 - 20 mA, |
| PT100 (RTD) | N°1 |
| RS485 | N°1 |
| USB | N°1 type A |
| Protocols | Modbus RTU |

| Output | eDOC-H | eDOC-HM |
|-------------------|---|--|
| USB | N°1 type A | N°1 type A |
| Dry Contacts | N°2 x dry contacts (H2, malfunctioning) | N°3 x Dry contacts (H2, H2O, malfunctioning) |
| 4-20 mA | N°2 x 4 -20 mA (H2, Temperature) | N°3 x 4 - 20 mA (H2, H2O, Temperature) |
| RS485 | N°1 | N°1 |
| Ethernet | 2 x RJ45a (Service and SCADA) | 2 x RJ45a (Service and SCADA) |
| Fiber Optic | N°1 | N°1 |
| Visual Indication | LED and display | LED and display |
| Protocols | Modbus RTU; Modbus TCP/IP; DNP3.0; IEC 61850 (Option) | |

Recommended Wires ⁽⁴⁾

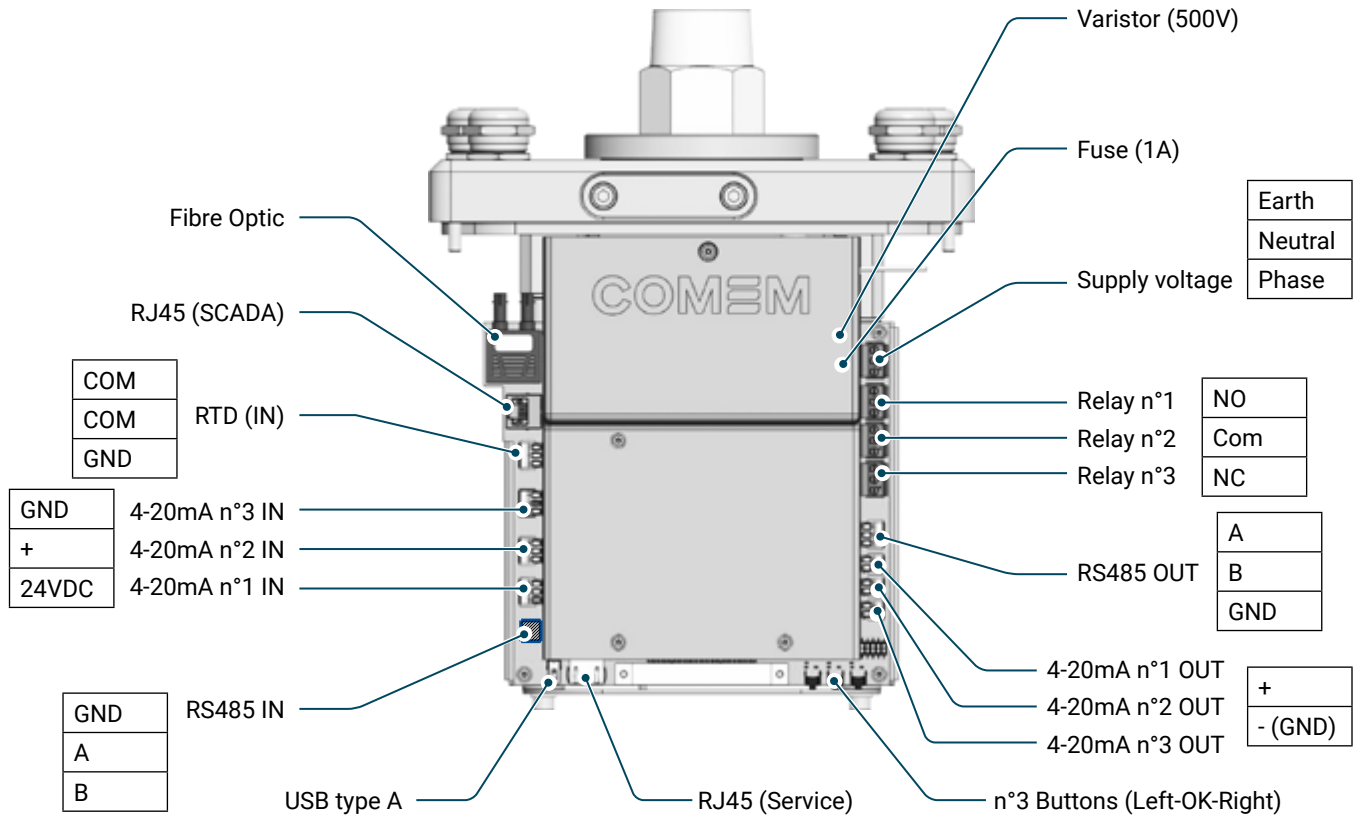
| | |
|---------------|-------------------------------------|
| Power supply | 14 AWG |
| Relay | 18 AWG |
| 4-20 mA | 2 x 18 AWG (shielded twisted cable) |
| Modbus RTU | 2 x 18 AWG (shielded twisted cable) |
| Modbus TCP/IP | Category 5e straight cable |

(4) For more information contact us: customerservice@it.comem.com

Sensors

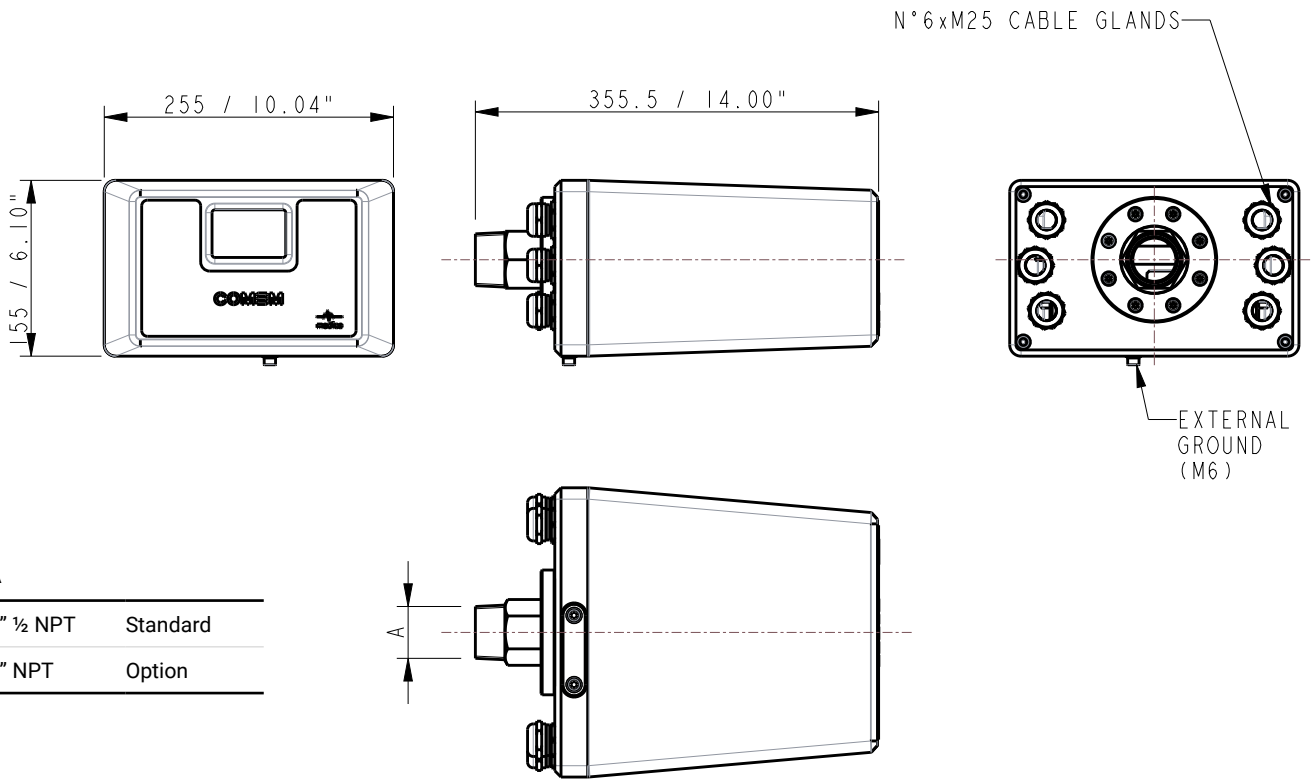
| Measure | Range | Accuracy | DL: Detection limit |
|----------|------------------------------|----------|---------------------|
| Hydrogen | DL – 5000 ppm | ±25 ppm | 25 ppm |
| Moisture | DL – 100% DL – 100000 ppm | ±2% | 0 % 0 ppm |

Electrical Scheme and Status Indicators



| | |
|--|---|
| | Idle - Green |
| | Electronic board failure - Red |
| | Heater failure - Red |
| | Overcame the hydrogen threshold - Yellow Hydrogen sensor failure - Red |
| | Overcame the humidity threshold - Orange Humidity sensor failure - Red |
| | USB active - Blue |
| | 4G module activated - Blue |
| | eDevices or third part devices threshold reached - YELLOW |
| | Sensors Reading - White |

Dimensions



| A | |
|----------|----------|
| 1" ½ NPT | Standard |
| 1" NPT | Option |

Order sheet

| | |
|--------------------|--|
| Date | |
| Rev. | |
| Customer reference | |

Type

| | |
|--------------------------|--|
| <input type="checkbox"/> | eDOC - H (Hydrogen Detector) |
| <input type="checkbox"/> | eDOC - HM (Hydrogen / Moisture Detector) |

Flange

| | |
|--------------------------|----------------------------|
| <input type="checkbox"/> | 1" ½ NPT (Standard) |
| <input type="checkbox"/> | 1" NPT |
| <input type="checkbox"/> | Special (Customer Drawing) |

Oil

| | | |
|--------------------------|--------------------|---------------------------|
| <input type="checkbox"/> | Mineral (Standard) | |
| <input type="checkbox"/> | Natural Ester | Type <input type="text"/> |
| <input type="checkbox"/> | Synthetic Ester | Type <input type="text"/> |

Communication Protocol

| | |
|--------------------------|--------------------------------|
| <input type="checkbox"/> | MODBUS TCP/IP - RTU (Standard) |
| <input type="checkbox"/> | DNP 3.0 |
| <input type="checkbox"/> | IEC 61850 |

Supply Voltage

| | |
|--------------------------|-----------------------|
| <input type="checkbox"/> | 230 VAC/DC (Standard) |
| <input type="checkbox"/> | 115 VAC/DC |

Communication Port

| | |
|--------------------------|-----------------------------|
| <input type="checkbox"/> | Ethernet / RS485 (Standard) |
| <input type="checkbox"/> | Fiber Optic |

Corrosion Class

| | |
|--------------------------|----------------------|
| <input type="checkbox"/> | C5-Medium (Standard) |
| <input type="checkbox"/> | C5-High / CX |

Connectivity (Data aggregator & storage for eDevices and third-party devices)

| | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | Not Available (Standard) |
| <input type="checkbox"/> | Available |



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