The OM2-DR breaker monitor using patented technology provides continuous monitoring of breakers providing:

1) Automation of SF₆ Emission Reporting
2) Improved Reliability
3) Life Extension
4) Reduced O&M Expense

The OM2-DR monitors every breaker operation and SF₆ gas density providing precise information used by utilities seeking to implement Condition Based Maintenance (CBM) programs to reduce maintenance costs and increase system reliability.

Features & Benefits

- **SF₆ Emission Reporting:**
  The system can automate EPA or IPCC reporting with totalized gas emissions feature. The system separates handling losses from fugitive equipment emissions allowing management to identify how they can improve their SF₆ emissions.

- **Improved Reliability:**
  On-line 24-7 monitoring, facilitates fleet assessment and Condition Based Maintenance (CBM) strategies which have proven to provide an increased level of reliability while also reducing O&M expenses. Local data processing combined with extensive communication options ensure the right information can be delivered to the right people in an actionable format.

- **Life Extension:**
  Moisture can enter equipment even if it is under positive pressure. If gas is leaking out, moisture will also be getting in. By monitoring and identifying gas leaks, moisture related damage can be avoided. The heater monitor option provides detection of failed tank heaters to avoid liquefaction of SF₆ thereby maintaining dielectric performance.

- **Reduced O&M Expense:**
  The system predicts days-to-lockout on a low gas alarm allowing maintenance to be conducted on a proactive maintenance schedule and avoiding unscheduled overtime call-outs. The use of in-service performance metrics allow utilities to identify the condition of the breaker fleet and to focus their maintenance on those assets which are in need.

**Design Advantages**

The product is designed for use on any type of breaker including SF₆, air, oil or vacuum.

The product can be installed at the breaker manufacturer on new breakers or retrofit onto any brand of existing breaker.

The sensors, installation accessories and PCS communication features allow the product to be installed with data flowing into the control building quickly and easily.
Applications

- Breaker Monitoring
  - Generation, Transmission and Distribution Breakers
- SF₆ Gas Density Monitoring

Monitoring Improves Reliability

The OM2-DR monitors circuit breaker performance and gas density. Mechanism wear may lead to serious problems showing themselves as an unwanted increase in breaker operation time from:

- Poor trip coil action
- Sticking in the latch
- Binding of components
- Bearing wear or seizure
- Lack of lubrication
- Problems with stored energy systems (springs or pneumatics)

Monitoring Provides Precise Breaker Performance Information

The OM2-DR monitors arc duration time to aid in determining the condition of the dielectric quality within the arc chamber predicting when maintenance is needed. OM2-DR monitors the following parameters accurately timing:

- Mechanism travel time
- Trip time
- Arc Duration
- Cumulative i²T or IT on the main contacts (phase segregated) from arcing
- Restrike occurrence & total operations count
- Elapsed time since last operation
- Clearing time

These measurements provide a method of quantifying problems resulting from:

- Contaminated oil
- Poor lubrication
- Contaminated gas
- Nozzle ablation

Local, Wired and Remote Connectivity and Communication Solutions

Communications access includes local, wired or network based communications for monitor setup, breaker/gas status and alarming 24 x 7. Performance data may be exported in comma separated variable (CSV) format for storing, organizing, review and automating of environmental reporting.

Local Data Access

- LEDs
  Display monitor health, SF₆ density reading, remaining contact life and open/closed breaker status in simple RED-YELLOW-GREEN format
- USB Port
  Useful for cloning, batch programming of OM2-DR’s, the retrieval of historical performance data and users can reset parameters after breaker servicing
- Dry Contacts
  Dry contact outputs are useful for RTU and other legacy system applications

Wired Access

- Ethernet Port
- RS-232, RS-485 (DNP 3.0) Ports
- Powerline Communication System (PCS)
  - PCS is the utility industry’s most secure, reliable and economical alternative to installing new wires of fiber
  - PCS installs in 15-30 minutes
  - PCS is 5% to 50% less cost than fiber

Wireless & Remote Access

- Web & Radio Access
  - WEB server functionality makes 24 x 7 data access a powerful tool with no software to maintain
  - Use TCP/IP or RS-485 to access setup libraries or create application specific programs with simple drop-down menus
**Simple Field Setup**

Breaker templates allow rapid configuration. Simply choose a breaker model USB memory stick and plug it in. The configuration automatically loads. No PC required.

Clone templates may be used to create a copy of an existing configuration for loading onto other similar breakers.

**Maintenance Forecasting and Emission Reporting is Made Easy**

- **Visualize** $\text{SF}_6$ Gas Density Trending
- **Forecast** Refilling & Service
- **Report** $\text{SF}_6$ Emissions

**Complete Product Line Delivers Maximum ROI**

The OM2-DR, gas density sensor, installation accessories and options (shown below) feature rugged utility grade construction for long-life and care-free operation. The monitor and sensors install in less than 3 hours, leading to rapid ROI.

- Pre-Engineered gas plumbing kits
- Snap-on transducer - no tools
- MAG-DR Magnetic Mounting
- Universal Power Status Monitor

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**Images:**
- Breaker setup diagram
- Gas density sensor
- Installation accessories
- Product line icons
**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Power Supply:</th>
<th>Input Voltage:</th>
<th>110 to 264 V AC/DC, 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Transducers:</td>
<td>Models below:</td>
<td>0-20 thru 160 amps, full scale</td>
</tr>
<tr>
<td></td>
<td>Accuracy:</td>
<td>+/- 1% of full scale</td>
</tr>
<tr>
<td>Control Signal Inputs:</td>
<td>Auxiliary Control Signal:</td>
<td>48 to 250 Volts DC</td>
</tr>
<tr>
<td></td>
<td>Impedance:</td>
<td>500 K Ohms</td>
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<tr>
<td>Current Data Acquisition:</td>
<td>Breaker Event Duration:</td>
<td>10 Cycles</td>
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<tr>
<td></td>
<td>Line Frequency:</td>
<td>50/60 Hz Programmable</td>
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<tr>
<td></td>
<td>Sampling Rate Per Phase:</td>
<td>32 times per line cycle</td>
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<tr>
<td>Sulfur Hexafluoride (SF(_6)) Density Sensor:</td>
<td>Sensor Type:</td>
<td>GDS-DR a Digital Sensor</td>
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<tr>
<td></td>
<td>Sensor Power:</td>
<td>20 VDC (provided)</td>
</tr>
<tr>
<td></td>
<td>Measurement Range:</td>
<td>0-60 grams/liter, -40˚ C to 80˚ C / -40˚ F to 176˚ F</td>
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<tr>
<td>Relay Outputs:</td>
<td>Two, Form C:</td>
<td>3 A at 250 VAC or 30 VDC</td>
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<tr>
<td></td>
<td>One, Form A:</td>
<td>3 A at 250 VAC or 30 VDC</td>
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<tr>
<td>Surge Withstand:</td>
<td>Exceeds:</td>
<td>IEEE 472-1972 and ANSI 37.90a</td>
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<tr>
<td>User Interface:</td>
<td>LED Panel Indicators:</td>
<td>Power, Breaker Position, Alarms, Contact Life Remaining, Gas Density / Pressure</td>
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<tr>
<td></td>
<td>Communication Ports:</td>
<td>RS-232, RS-485 Full Duplex, Ethernet, USB</td>
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<tr>
<td>Operating Environment:</td>
<td>Temperature:</td>
<td>-40˚ C to 65˚ C / -40˚ F to 149˚ F</td>
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<td></td>
<td>Humidity:</td>
<td>85% non-condensing, maximum</td>
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</table>

**OPTImizer\(^2\) — ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part#</th>
<th>Description</th>
<th>Dimensions W x D x H cm/in.</th>
<th>Weight kg/lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM2-DR</td>
<td>OPTImizer(^2) Circuit Breaker Performance and SF(_6) Density Monitor</td>
<td>22 x 14 x 8 (cm) 8.7 x 5.6 x 3 (in.)</td>
<td>1.8 (kg) 3.95 (lbs.)</td>
</tr>
</tbody>
</table>

**GAS DENSITY SENSORS & ACCESSORIES — ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part#</th>
<th>Description and ordering notes</th>
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<tbody>
<tr>
<td>CX-DR-xxx *</td>
<td>Current Transducers are ordered by rating. Select one model where xxx = 20 (1-20 Amps), 30 (1-30 Amps), 50 (1-50 Amps), 100 (1-100 Amps), 160 (1-160 Amps).</td>
</tr>
<tr>
<td>GDS-DR **</td>
<td>Gas Density Sensor with G 3/8” Male British Standard Parallel mounting thread and an O-ring seal. The sensors output provides input to the OPTImizer(^2), model OM2-DR only.</td>
</tr>
<tr>
<td>OM2-CLONER</td>
<td>USB drive used to clone a configured monitor to a non-configured monitor.</td>
</tr>
<tr>
<td>OM2-LIB</td>
<td>A USB drives kit with pre-configured monitor setup files.</td>
</tr>
<tr>
<td>MAG-DR</td>
<td>High-strength magnetic mounting kit for use with the OM2-DR Monitor.</td>
</tr>
<tr>
<td>PM-A-DR</td>
<td>GDS-DR Sensor Adaptor. It is a pre-formed pipe with a TEE fitting.</td>
</tr>
<tr>
<td>PM-U-DR</td>
<td>Universal SF(_6) Gas Density Sensor Kit.</td>
</tr>
<tr>
<td>UPSM-DR</td>
<td>Universal Power Status Monitor. Monitors the AC current draw of a circuit breaker tank or cabinet heaters whose output connects to the OM2-DR.</td>
</tr>
</tbody>
</table>

* Current transducers are sold in sets of 3. (One set is required per OM2-DR).
** One GDS-DR SF\(_6\) Gas Density & Temperature Sensor is required for each containment vessel.