



# OFS 2000R™ For Steam Line Applications



## OFS-2000R™ Advantages

- Full path measurement = increased accuracy.
- Non-interfering - nothing in flow path.
- Easy installation and optical alignment.
- Reduced upstream/downstream diameters
- Ultra low maintenance design.
- Rugged; designed for harsh environments.
- Built in continuous self-test & diagnostics.
- Measurement unaffected by media pressure, moisture, temperature & opacity.
- No flow media high temperature limits.
- NIST - tested and unbeatable combination of advanced technology, high performance and proven reliability!

## OFS 2000R for Steam-Assisted Flare Stacks

In December of 2015, EPA finalized the Petroleum Refinery Sector Risk and New Source Performance Standards. EPA MACT RSR 40 CFR 63.670 requiring 96.5% combustion efficiency or 98% destruction efficiency on all flares. It mandates that, if steam or air assist are used, the operator must account for the flows of these gases to measure and report the dilution in the combustion zone.

Precisely measuring the proper amount of steam to achieve maximum combustion efficiency has proven to be a difficult task and trying to calculate it is unreliable.

OFS 2000 sensors offer a pro-active, real-time-data approach to monitoring/controlling air and steam assisted flare lines to avoid over-steaming, excess aeration, and flame lift off - all of which cause compliance to go up in smoke.

The OFS-2000R can “see” through steam in the vapor phase, delivering accurate, quick-responding control signals which enable the operator to match the steam flow exactly to the flare output. OFS 2000R has a 5000:1 turndown ratio. It will not create a pressure drop, and is easily mounted on a steam line.

All OFS-2000 flow sensors are immune to the effects of temperature, pressure, humidity, density, path length, turbulent flow, or gas composition. OFS-2000R - series sensors are able to report velocities from 0.03 m/sec to 40 m/sec with +/- 2% accuracy. Response time of 0.3 seconds with 3 second updating, combined with full-path averaging make OFS 2000R the ideal sensor for steam line monitoring.

With added temperature and pressure inputs, OFS 2000R is capable of delivering moment-by-moment mass flow data, taking any guesswork out of tailoring fuel/air mix for optimum combustion.

In addition, the OFS 2000 scintillation measurement process is essentially drift-free. Calibration is not required. Continuous internal self-diagnostics assure the operator of accurate reporting day in, day out, 24/7/365.

All OFS 2000 models are equipped with

- Dual 4-20mA inputs and outputs
- MODBUS RTU over RS-232C serial
- Contact closures for alarms / warnings

Limited Distance Modems, ethernet adaptors and Fiber Optic connectivity assure easy interface with PC, PLC, DAS, CEM - almost any data collection device.

OFS systems are assembled per individual customer order. OSI offers an array of options to meet customer requests. Since the OFS 2000R is intended primarily for measuring steam flow lines we offer a variety of adapters and sight glasses to match ANSI 150 and 300 flanges (3” and 4”). Flange adapters and equipment enclosures are available in powder – coated aluminum or 316 Stainless Steel.



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# OFS2000R™ Specifications

| Flow Performance  |  |   |
|---|--|---|
| Technique   | Optical scintillation  |   |
| Velocity Range  | 0.03 to 40 m/s velocity  |   |
| Accuracy  | 2% of reading  |   |
| Resolution  | 0.1 m/s  |   |
| Response Time   | User selectable: 3 sec to 600 sec  |   |
| Long Term Drift   | <1% per year   |   |
| Steam Pipe Diameter   | 4 to 24 inches Consult factory for other diameters.  |   |
| Media Temperature   | No upper limit   |   |
| Light Source  | 670 nm red LED   |   |
| Beam Divergence   | 5 degrees  |   |
| Maintenance   |  |   |
| Calibration check   | Automatic 2- or 3-point calibration check once per day or as requested by External Calibration Check Request               |   |
| Diagnostics   | Continuous monitoring of sensor status including power supply voltage check, performance check, optics contamination, etc. |   |
| Indicators  | TX Optical Unit - LEDs indicating power ON & correct operation   |   |
|   | RX Optical Unit - LEDs indicating power ON & correct operation   |   |
|   | Control Unit - LEDs indicating correct operation   |   |
| Operational Environment (Outdoor components: TX/RX Heads, NEMA 4/4X Control Unit) |  |   |
| Ambient Temperature   | -40 to 60 C  |   |
| Dust / Water Intrusion  | NEMA4X / IP65  |   |
| Moisture  | 0-100% condensing  |   |
| Data Output   |  |   |
| Current Loop  | Two 4-20 ma optically isolated outputs --<br>Loop 1: Velocity : (Scalable). Loop 2: Volumetric Flow                        |   |
| Dry Contact Relay   | Two relays: one for fault, one for calibration check indication  |   |
| Serial Data   | RS-232 ASCII, fixed data string or MODBUS RTU format   |   |
| Command/Control Interface   | User-Selectable with Integral Key Pad & Display including:   |   |
|   | Sensor ID, Baud rate (9600 standard), Averaging Time, Units of Measure   |   |
| Connectivity  | Direct wire / Limited Distance Modem / Fiber Optic Modem / Ethernet  |   |
| Power Requirements (Note all power connections fuse, surge, & EMI protected)      |  |   |
| Transmitter Unit  | Universal 100-240 VAC, 50/60 Hz, 12 VA   |   |
| Control Unit  | Universal 100-240 VAC, 50/60 Hz, 40 VA   |   |
| Physical Characteristics  |  |   |
| Weight (Alum.)  | TX & RX Optical Units  | 5 kg ea.                                  |
|   | Control Unit (NEMA-4),   | 7 kg                                      |
|   | Control Unit (rack mount),   | 6 kg                                      |
|   | Flange Adapter (spool piece) (2)   | 3 kg ea.                                  |
| Dimensions  | TX & RX Optical Units  | 15 x 15 x 14 cm ea                        |
|   | Control Unit (NEMA-4),   | 30 x 40 x 25 cm                           |
|   | Control Unit (rack mount),   | 13 x 43 x 51 cm                           |
| Materials   | TX & RX Optical Units  | Powder-coated Aluminum or Stainless Steel |
|   | NEMA -4 Control Unit   | Powder-coated Aluminum or Stainless Steel |
|   | Rack Mount Control Unit  | Steel and Aluminum (rack mount)           |
|   | Flange Adapter(s)  | Powder-coated Aluminum or Stainless Steel |

Specifications are subject to change without notice.



OSi is ISO-9001 certified

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