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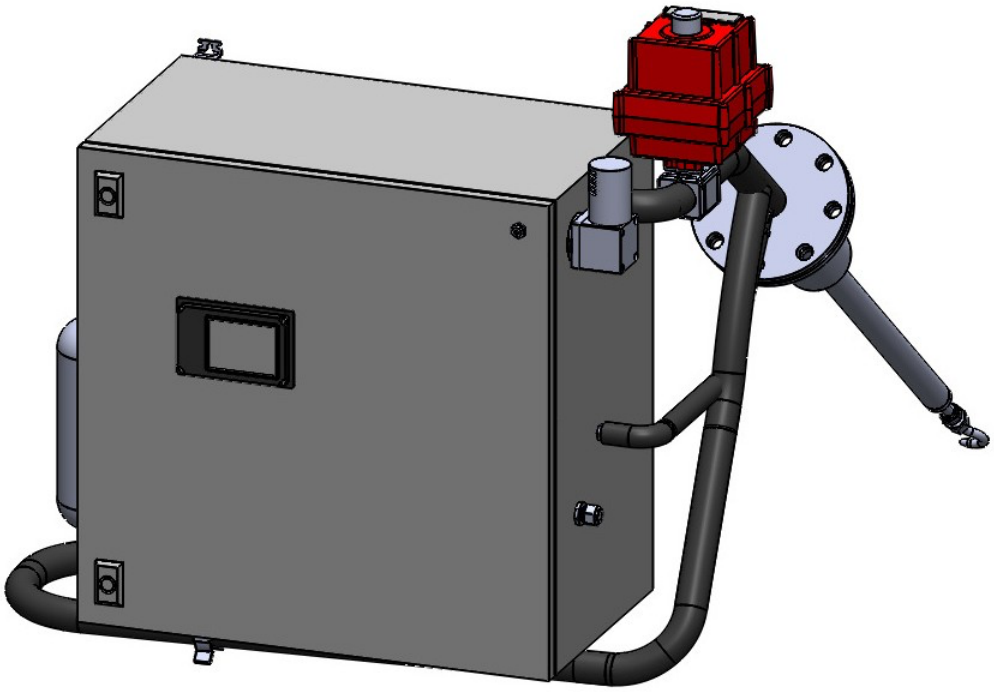
All-in-one dust, moisture and gas composition measurement for ATEX applications MARV 2Ex IR



WWW MARVILON

MARVILON LLC
Kyiv city, Ukraine
+380 50 1680880
tovmarvilon@gmail.com
https://www.marv2ex.com

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WE CAN MEASURE YOUR PROCESS

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Description of the MARV 2EX IR system

All-in-one Extractive, Isokinetic and Temperature controlled continuous measurement for any processes in explosive atmosphere

The system is designed to continuously measure concentration of the dust particles, moisture and gas composition inside industrial stacks. It is an ideal solution for gas process concentration monitoring in dry/wet conditions.

MARV 2EX IR can measure dust, moisture and gas composition in one instrument in applications with explosive atmosphere according to ATEX requirements (Zone 1/2).

In order be used in explosive atmospheres, MARV 2EX dust monitor is using special configuration:

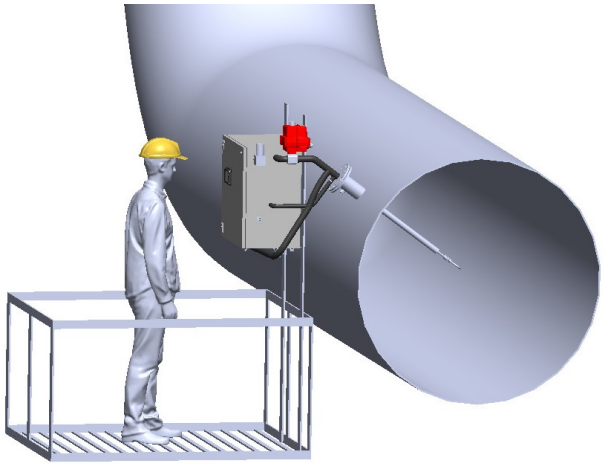
- a nitrogen (N2) heated sampling probe,
- a N2 purged optical sensor module,
- and an integrated PLC,

which are housed in a weather-proof powder coated steel enclosure, where a protective gas, N2, maintained at a pressure above that of the external atmosphere is used to guard against the formation of an explosive gas atmosphere.

In a complete installation the probe is inserted inside a stack perpendicular to the process flow using a flange. An internal sample pump ejects at the end of the sampling line and draws flue gas through the internal piping of the device and ejects it back into the stack.

During operation, the probe continuously extracts a gas sample, which is heated by continuous heated N2 flow through the probe to vaporize any moisture. Dried sample gasis directed through the measurement chamber of the optical sensor module.

Inside the module there are two sensors for consecutive measurement of dust in visible range and gas composition and moisture in the infrared range. The underlying methods are called “optical forward scattering” for dust measuremnt and “infrared absorption” for moisture and gas composition measurement.



Features:

- Isokinetic sampling in variable flow conditions
- Sample stream isolated with N2 curtain to keep the optics clean -> long maintenance interval
- Dust filter for pump protection with automatic back purge
- PLC visualization software, local HMI (option) and WEB HMI for easy parametrization
- IR and visible LED light sources and sensors to cover ranges from 200 nm up to 20 000 nm

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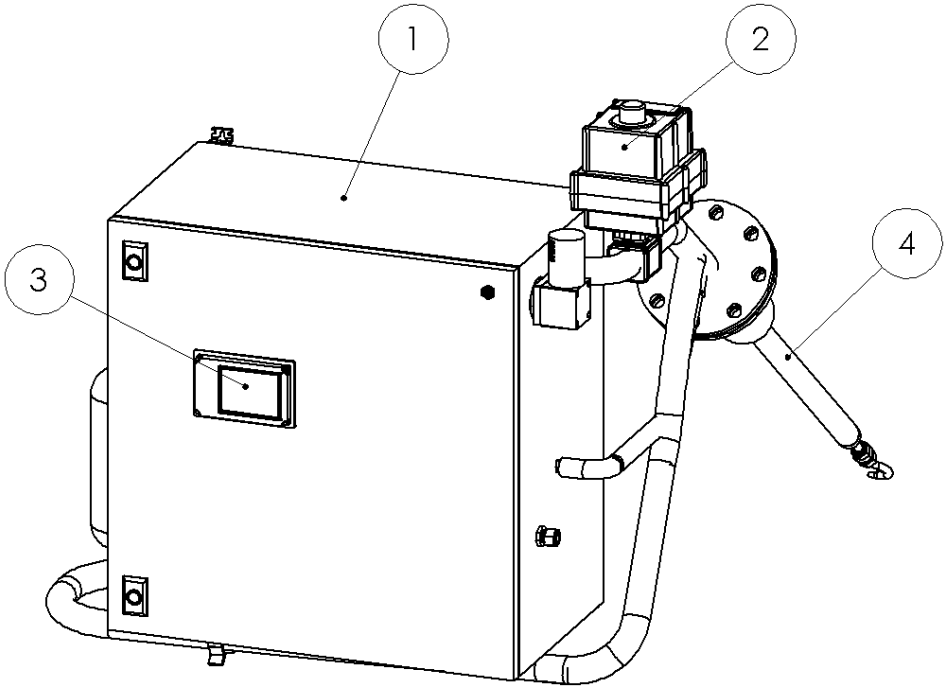
System description



①	Analyzer enclosure	③	N2 purge controller, Ex-proof, Zone 2
②	Cut off ball valve, Ex-proof, Zone 1/2	④	Sample gas probe

Applications

BFG (Blast Furnace Gas)

Measurement of the dust, moisture, CO/CO2/CH4 concentrations before re-use in blast-furnace-gas (BFG) fired gas turbine – process monitoring application.

The typical blast furnace gas composition in volume:

- CO = 20 to 30%,
- CO2 = 12 to 20%,
- H2 = 1 to 4%,
- CH4 up to 0,5%
- balanced with N2.

Gas temperature: 80 °C (in flue)
Relative humidity: 100% (in flue)

BOF (Basic Oxygen Furnace) and Linz-Donawitz process

Measurement of the dust, moisture, CO/CO2 concentrations for continuous emission monitoring – CEM application.

Typical composition of the flue gas of the basic oxygen converter by volume:

- CO – 55 % to 60 %,
- CO2 – 12 % to 18 %,
- O2 – 0.1 % to 0.3 % and
- balanced with N2.

Gas temperature: 70 °C (in flue)
Gas pressure: 0,95 – 1,023 Bar abs
Gas velocity: 5-30 m/s
Relative humidity: 100% (in flue)

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Specification

General information:

Product name:	MARV 2Ex IR
Measured objects:	Total suspended particles (TSP), moisture, CO/CO2/CH4/etc.
Measurement principle:	Optical forward scattering and Infrared absorption
Measurement range:	Dust - up to 300 mg/m3 Moisture – up to 40% CO – up to 70% CO2 – up to 30% CH4 – up to 10% Other gases - on request
Power consumption:	230 V AC / 16 A, 50 Hz

Input/output signals:

Input signals:	4-20 mA input (process pressure, temperature, velocity, spare)
Output signals:	Digital output, 24 V DC / 0.5 A (common alarm) Isolated active 4 ... 20 mA output loop (concentrations) Ethernet TCP/IP for remote control, USB for data logging

Physical properties:

Enclosure:	600 x 600 x 300 mm (HxWxD), powder coated steel, IP65
Probe length:	Approx. 1 m (3.28 ft) (depends on application)
Probe material:	Stainless steel (316L), Hastelloy, etc.

Process conditions:

Max. temperature:	200 °C
Process gas speed:	5 ... 35 m/s
Pressure:	depends on application

Type of protection from explosive atmosphere:

According to requirements of IEC 60079-2:	II (1) 2G Ex px IIC T3 Gb II (2) 2G Ex pz IIC T3 Gc

Ambient conditions

Ambient temperature:	-40 … 60 °C

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