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KNOWLEDGE IN ACTION

Introduction to our new Multigas NDIR analyzer The MIR 9000e

MIR 9000e Introduction

New NDIR analyzer dedicated to combustion applications

- Boilers markets
- Power Plants, Gaz Turbines
- Industrial Furnaces
- Process Monitoring

Up to 8 parameters simultaneously

SO2 / NOx / CO for standard applications

O2 (Zr or Paramagnetic)

Greenhouse gases CO2, N2O, CH4

Residual H2O (included as standard)

MIR 9000e **Measurement Ranges**

TÜVRheinland® CERTIFIED

Tested AMS Regular Surveillance

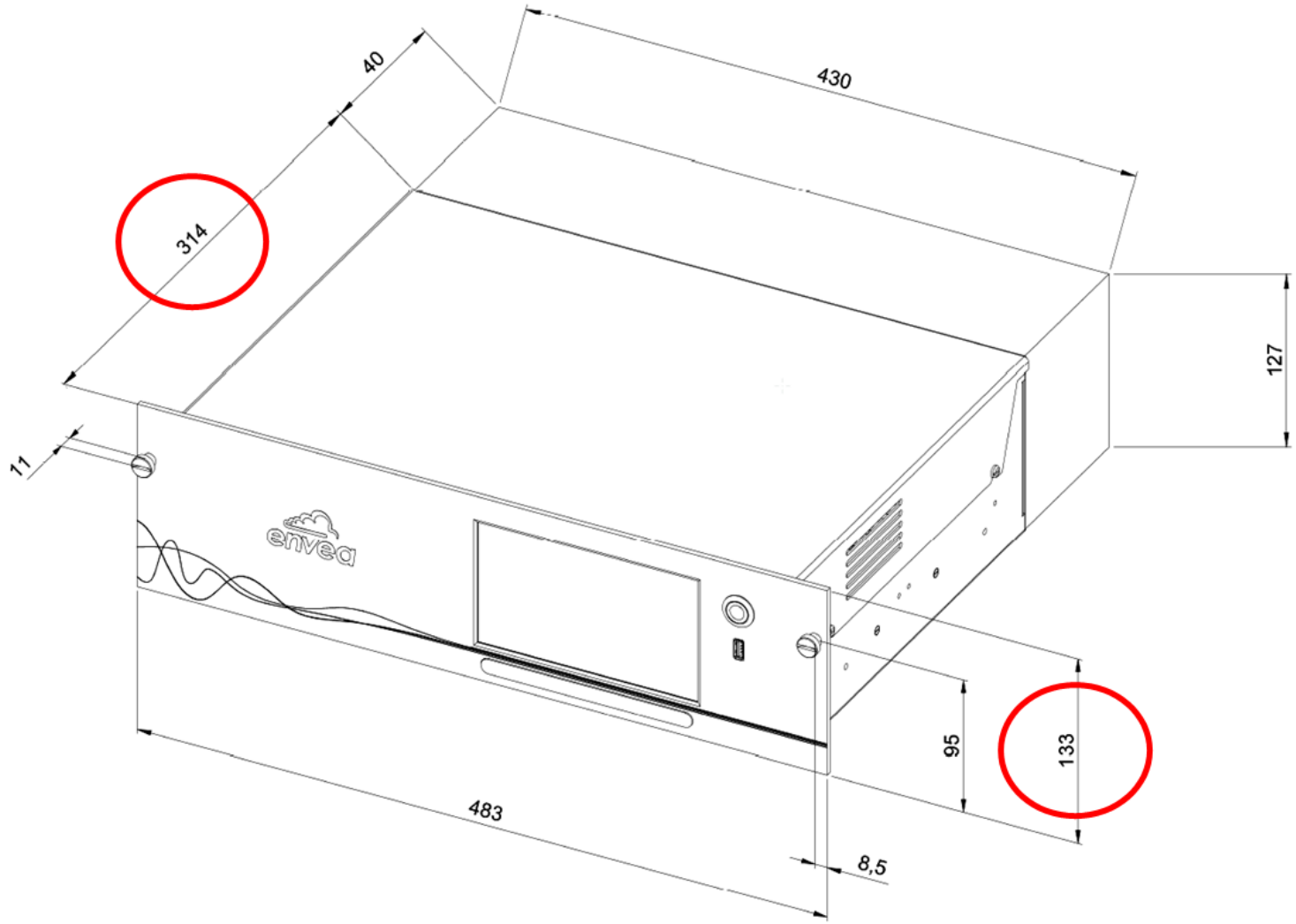
www.tuv.com
ID 0000074621

Component	Certification range	Supplementary ranges		Unit	Extended ranges
CO	0 - 75	0 - 3000	-	mg/m³	12500
NOx as NO_2	0 - 100	0 - 1500	-	mg/m³	5000
N_2O	0 - 50	0 - 100	0 - 200	mg/m³	1000
SO_2	0 - 75	0 - 1500	-	mg/m³	7500
CH_4	0 - 50	0 - 100	0 - 200	mg/m³	1000
O_2	0 - 25	-	-	Vol.-%	-
CO_2	0 - 20	0 - 30	-	Vol.-%	-

MIR 9000e **Conditions of use**

- Analysis room, shelter or **ordinary room**
- Ambient temperature: **+5 - +40 °C** (indoor conditions)
- Stable operation **without air conditioning**
- Dry sample, dew point ≤ 5°C
- Operates with **any type of sampling and drying system**
- Operation is possible **without compressed air**
- Compact: **3U**
  - ✓ Fits in 60 x 60 cm rack cabinets even if back panel is full
- Native MODBUS TCP (Modbus RTU available with USB/RS485 conv.)

MIR 9000e **Ultra compact 19’’ 3U**



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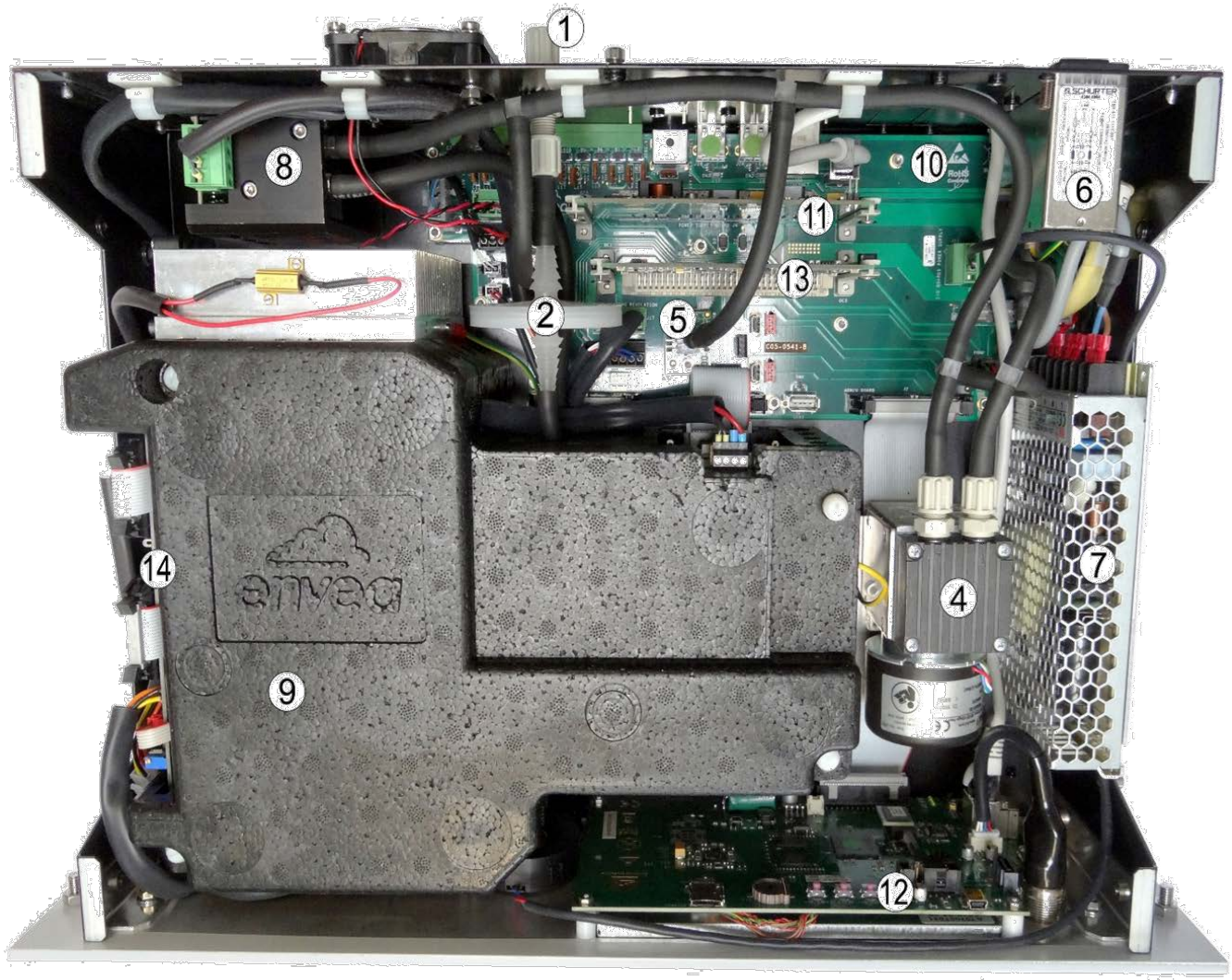
MIR 9000e **Operation Principle**

- **IR Module:**
  - ✓ Same principle as our previousMIR 9000, but with new design
  - ✓ NDIR with advanced digital signal processing
  - ✓ 8 m optical path (20 cm length) / 50°C regulated / Correlation wheel with 12 position / 1500 rpm with brushless motor.
  - ✓ Detector cooled to -35°C by 3 stage Peltier cooler, 0,5 l/h flow.
  - ✓ Enclosed in a **single foam block (T° stability)**
- **Oxygen Measurement**: **2 Options**
  - ✓ **Zirconium** → QAL1 => the standard recommended solution
  - ✓ **Paramagnetic** → Alternative solution

MIR 9000e **Inside view**



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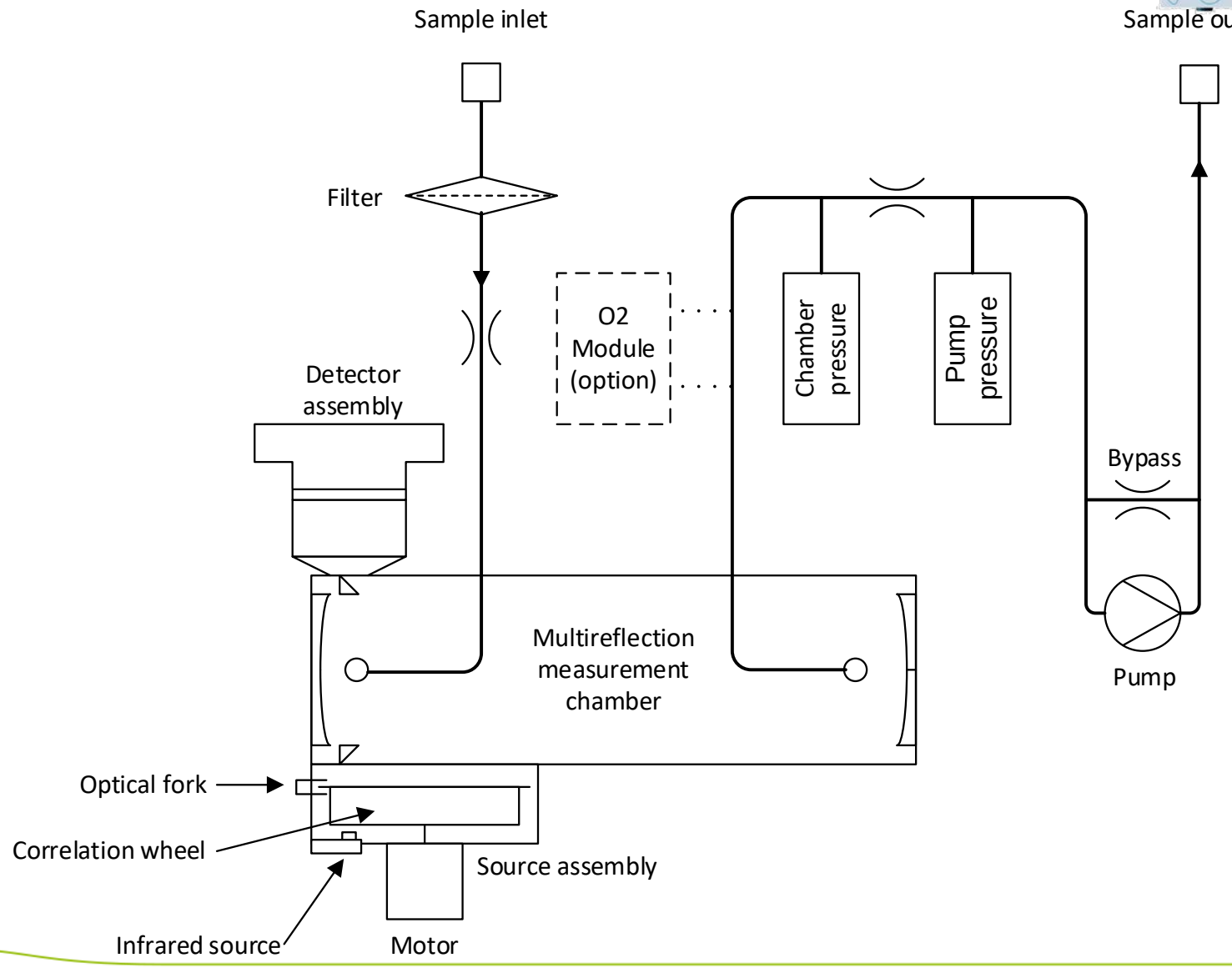
MIR 9000e **fluid circuit**

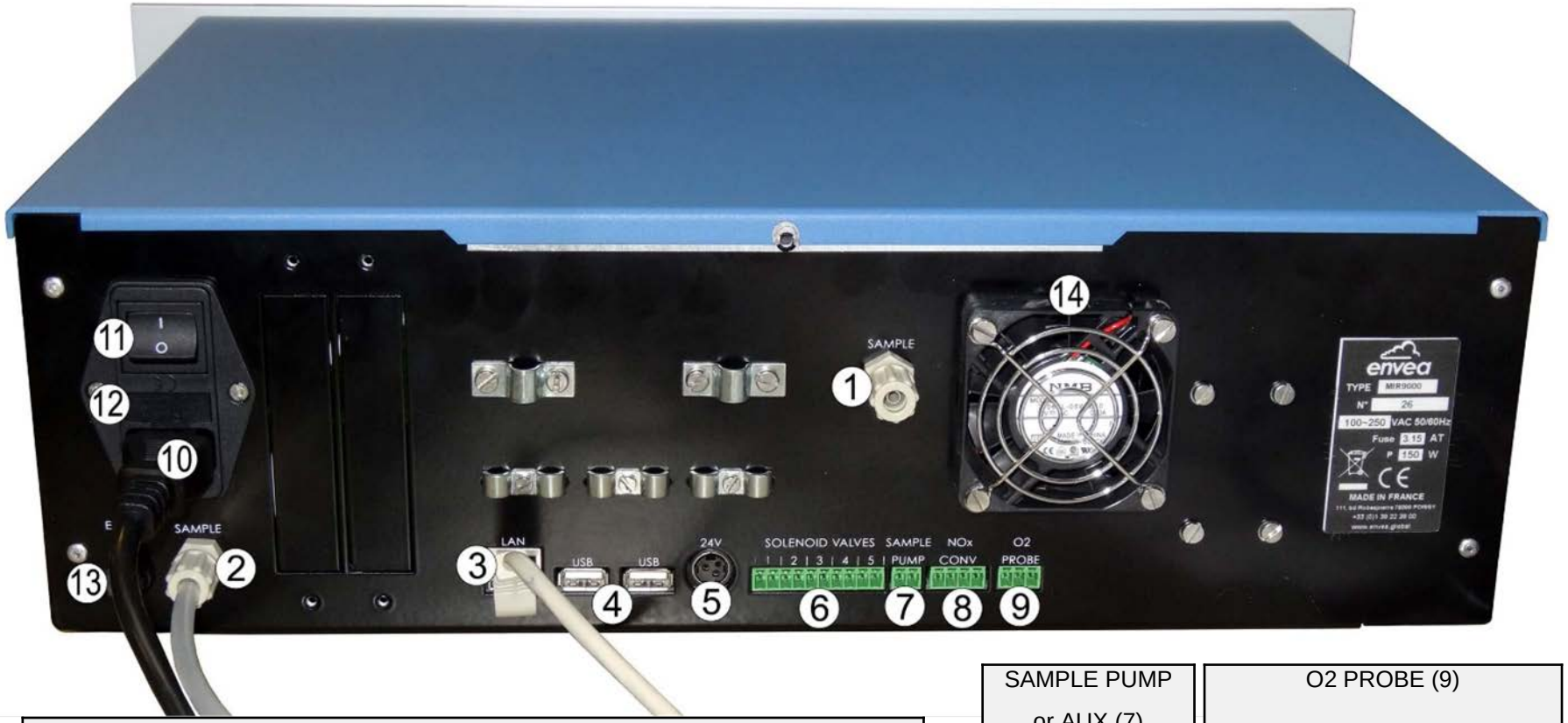


MIR 9000e Simplified Manufacturing Process

Versions
ONE REFERENCE: MIR9E-R001
One NDIR standard measurement module with SO2 / NO / CO ; CO2 / N2O / CH4 ; residual H2O
230 V / 115 V: **same version**
Labels: MIR 9000e or MIR 9000
Inputs / outputs: Ethernet / MODBUS TCP / Mode4 3 USB ports (1 on front panel, 2 on rear panel) 5 24V outputs to drive external SV 1 AUX 24V output to drive an external pump, a 6th SV, or something else 1 interface connector for our dedicated NOx converter 1 analog input for an external O2 probe

Objective = Very short lead time (4 to maximum 6 weeks)

MIR 9000e **Rear Panel**



SOLENOID VALVES (6)									
SV1 (Zero SV)		SV2 (Span SV)		SV3 (Span 1 SV)		SV4 (Span 2 SV)		SV5 (Probe SV)	
+24V	GND / open	+24V	GND / open	+24V	GND / open	+24V	GND / open	+24V	GND / open

SAMPLE PUMP or AUX (7)	
+24V	GND / open

O2 PROBE (9)		
0-10V	0-20 mA	GND

NOx CONV.(8)			
PT100	PT100	GND / open	+24V

MIR 9000e **Options**

Options	References
Internal Options:	
Zirconium O2 Measurement	P10-2481-*
Paramagnetic O2 Measurement	MIR9E-O2P
External Options:	
24V 2 way SV (wired)	MIR9E-2EV-24V-E
24V 3 way SV (wired)	MIR9E-3EV-24V-E
24V External Sampling Pump	P10-2544-A
Special cartridge for ambient air reference zeros	F05-0434-A
Dedicated NOx Converter	NOX-CONV-230 NOX-CONV-115
Estel I/O Module (2 max)	P10-2239-A
USB to RS232 Converter	D02-USB-DB9-A
USB to RS485 Converter (→ MODBUS RTU)	D02-USB-RS485-A
USB WIFI module (becoming standard)	*E42-0112-A*

MIR 9000e Light Maintenance

PREVENTIVE MAINTENANCE SCHEDULE

Nature of operations	**Periodicity**	**Sheet N°**
Replacement of the sample inlet safety filter	1 year	4.3.1
Pump maintenance	1 year	4.3.2
Infrared source replacement	3 to 5 years	4.3.3
Motor replacement	5 years	4.3.4
Fan replacement	5 years	4.3.5
O2 ZR oxygen sensor replacement	Depending on need	4.3.6

MIR 9000e Light Maintenance Annual Kit & RSP

MIR9E-K1

	Reference	Designation	Qty
1	F05-0422	0.45µm Filter, PTFE, 50mm	1
2	V04-0005	Pump Membrane Kit	1

Big filter => long lifetime

MIR9E-RSP

	Reference	Designation	Qty
1	P10-2435	Infrared Source	1
2	V01-0018	24V Brushless Motor	1
3	V03-0025	24V Fan	1
4	V03-0042	24V 40x40 Fan	1
5	V03-0045	24V Centrifugal Fan	1
6	G10-1554	Double Sided Adhesive Pad	1
7	M01-0172	O2 ZR Module (if option is present)	1

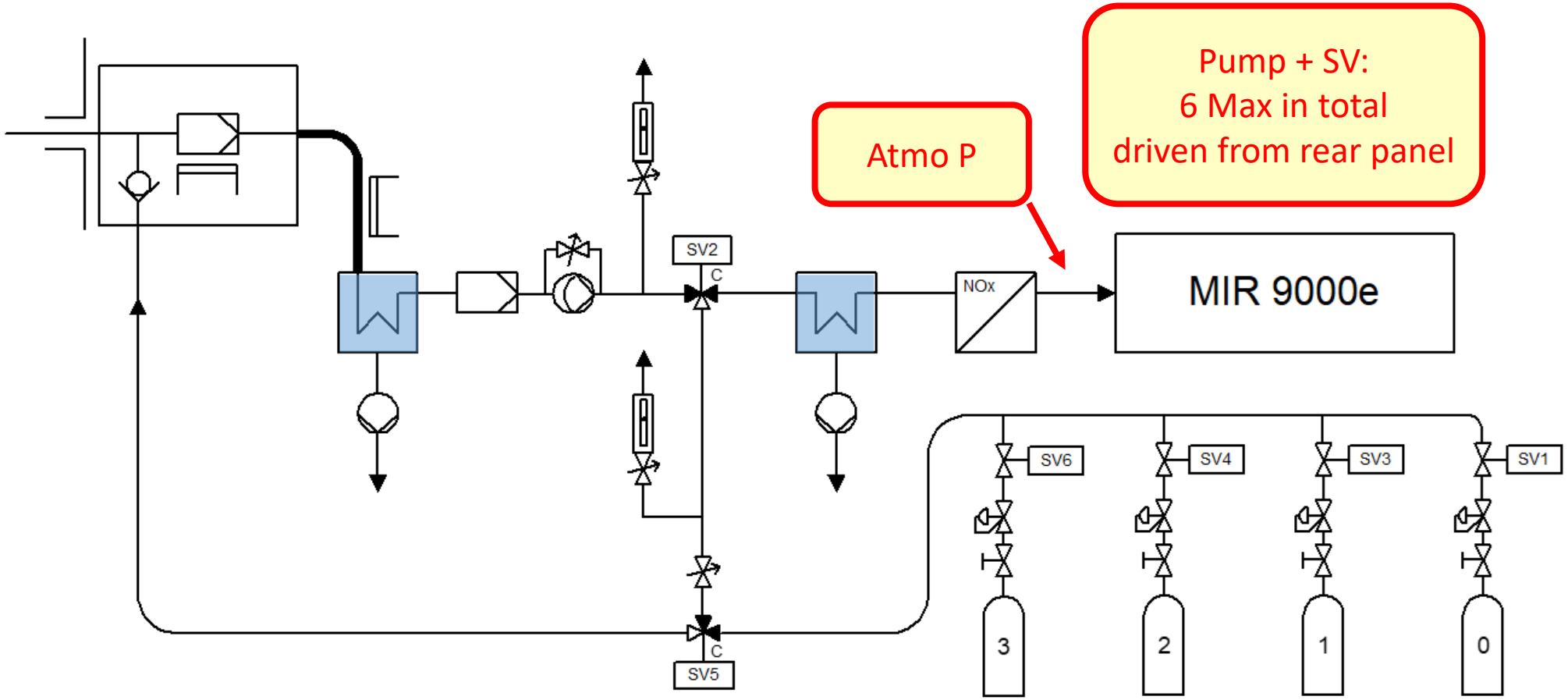
Lifetime = 3 to 5 years

Lifetime = 5 years

Lifetime = 5 years

MIR 9000e **Typical AMS**

AMS complete system – Type A = Gas cooler + Reference zéro with N2



MIR 9000e Integration (AMS)

AMS complete system – Type B = Gas cooler + Reference zero with AA

Heated « T »

Pump + SV:
6 Max in total
driven from rear panel

Atmo P

Need to be supplied with H2/He & Instrument air

GR52M

SV1

SV2

SV5

SV6

SV4

SV3

NOx

MIR 9000e

3

2

1

F05-0434-A
CO2 cartridge

MIR 9000e **IHM – Main display**

MIR 9000e IHM

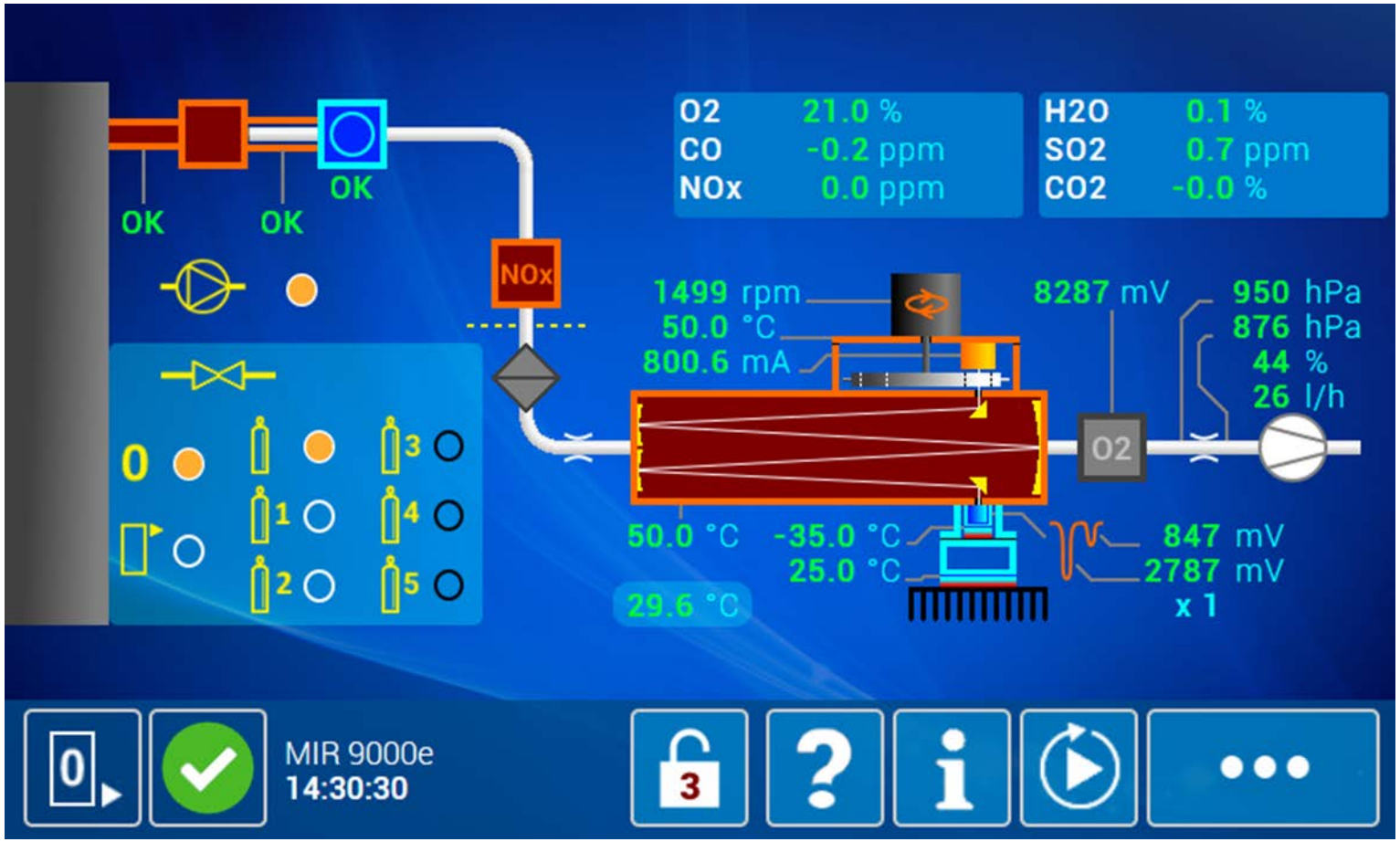
Analyzer display

Distant computer

Smartphone or digital tablet

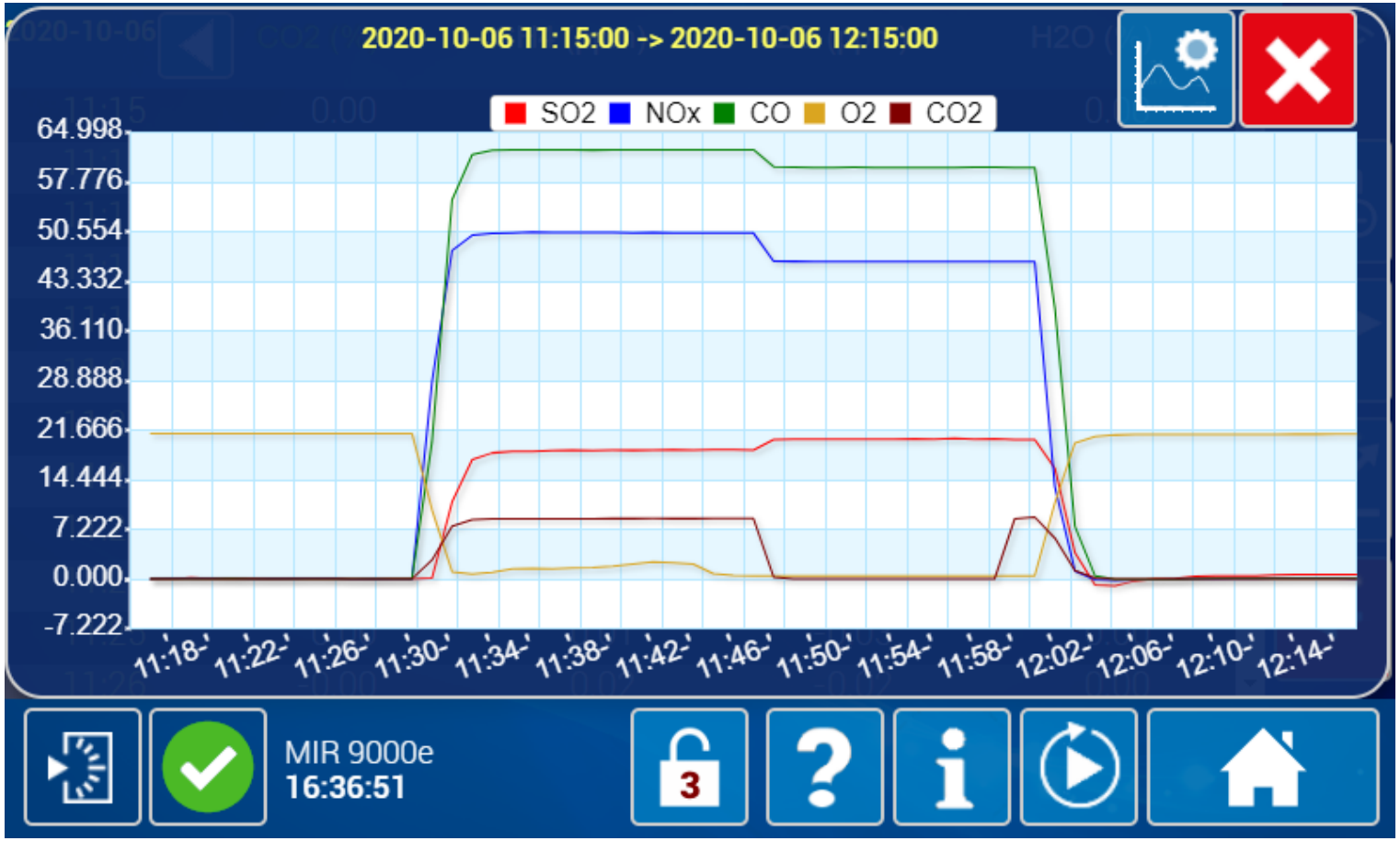
= SAME INTERFACE

MIR 9000e **IHM – Synoptic view**



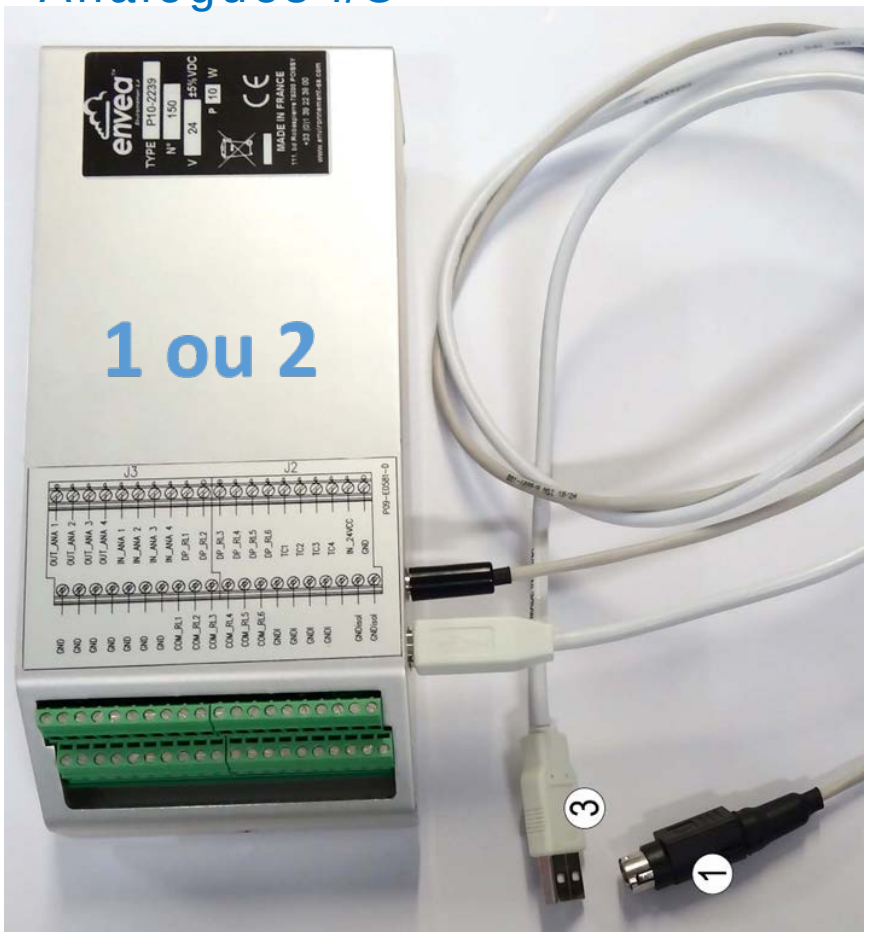
MIR 9000e IHM – Diagnostic menu

MIR 9000e **IHM – Graphic view**



MIR 9000e I/O available signals

Analogues I/O



- **EXTERNAL ESTEL MODULE (DIN rail mounted)**
  - ✓ 4 digital inputs
  - ✓ 6 digital Outputs
  - ✓ 4 analog outputs
  - ✓ 4 analog inputs
- **When 2 modules are used together:**
  - The 24V power supply coming from the analyser rear panel (5) can be daisy-chained using the module terminal blocks
  - 2 USB connectors must be used. If only one is abailable, a USB hub should be added.

MIR 9000e I/O available signals

Outputs

Status and Cycle			
Disabled (default value)	Zero	Zero cycle	Reference Zero
Preheating	Span 1	Span 1 cycle	Auto Span 1
Measurement	Span 2	Span 2 cycle	Auto Span 2
Standby	Span 3	Span 3 cycle	Auto Span 3
Maintenance	Span 4	Span 4 cycle	Auto Span 4
Probe	Span 5	Span 5 cycle	Auto Span 5

Alarm		
General Alarm	Pressure Alarm	NOx converter Alarm
Flow Alarm	Dryer Alarm	Analog Output Range Overflow
Humidity Alarm	Probe Alarm	Compound X : range overflow
Temperature Alarm	Heated Line Alarm	

MIR 9000e I/O available signals

Inputs

Remote Control			
Disabled (default value)	Zero	Zero cycle	Reference Zero
Measurement	Span 1	Span 1 cycle	Auto Span 1
Maintenance	Span 2	Span 2 cycle	Auto Span 2
Standby	Span 3	Span 3 cycle	Auto Span 3
Probe	Span 4	Span 4 cycle	Auto Span 4
	Span 5	Span 5 cycle	Auto Span 5

Alarm		
Dryer Alarm	NOx converter Alarm	Probe Air Pressure Alarm
Probe Temperature Alarm	Instrument Air Alarm	Heated Line Alarm

MIR 9000e **Strengths / Summarize**

FLEXIBILITY REGARDING INSTALLATION/INTEGRATION :

- Analyzer room, shelter or **ordinary room**
- Ambient temperature: **+5 - +40 °C**
  - ✓ => Stable operation **without air conditioning**
- Operates with **any type of sampling and drying system**
- Operation is possible **without compressed air**
- Compact: **3U**, 19’ Rack unit (483 x 133 x 314 mm – L x H x D)
  - ✓ **=> Retrofit compatibility SICK / SIEMENS / FUJI or ABB units**

MIR 9000e **Strengths / Summarize**

EFFECTIVE AND INTUITIVE:

- **Measurement stability**
- AMS control capabilities => **Can replace a « small » PLC**
- **ZERO & SPAN Self-calibration** functions
- Up-to-date, intuitive HMI with **touchscreen display**
- **HTML pages « in » => no need of dedicated software**
- Advanced self-diagnostic functions
- Low power consumption: 50W once preheated
- Ultra Low maintenance / long maintenance interval

MIR 9000e **Strengths / Summarize**

UPGRADEABLE & ADAPTATIVE

- **Ready for future upgrade if needed:**
  - ✓ Customer purchases required compounds when and as needed
  - ✓ **Additional compounds can be added w/o hardware upgrade**
- **Very high dynamic range**,
  - ✓ Without changing any module or recalibrating the analyzer
  - ✓ Application measurement ranges can be changed by the user
  - ✓ Double ranges can be applied on analogue outputs

Thank you!