



Sensonic IR-1

CHARACTERISTIC | FEATURES | TECHNICAL DATA | SENSORS | EQUIPMENT | APPEARANCE

Sensonic IR-1 is a portable gas analyser utilising our most advanced technological developments. It is designed to operate with non-dispersive infrared sensors but other types like electrochemical, PID and TCD are also supported. Colour LCD with touch-screen and ergonomic interface simplifies the usage of the analyser. Wide range of available sensors and their measurement ranges allows to build a portable system which will meet any needs. Results from the analyser can be transmitted further via analogue outputs and read by the analyser using analogue inputs expanding the measurement channels by additional external parameters. Analyser is for applications which require high accuracy and performance.

Sensonic IR-1

CHARACTERISTIC

FEATURES

TECHNICAL DATA

SENSORS

EQUIPMENT

APPEARANCE

- Double thermal stabilisation (of entire casing and of each NDIR sensor separately)
 - Thermal stabilisation the accuracy of up to 0.01°C
 - Reduced short warm-up time (30 min ÷ 60 min)
 - Improved accuracy of the NDIR sensors
- Up to 6 NDIR sensors, up to 3 electrochemical cells
- NEW Thermal Conductivity Detector (TCD) for H₂
- NEW Photoionization Detector (PID) for VOC (Volatile Organic Compound)
- Work with Sensonic D-2 gas conditioner
- 6,4" VGA colourful touch screen (640 * 480)
- PC-104 industrial class computer with Windows CE
- Software controlling analyser's work (warming up, compensation of cross-sensitivity values, response time)
- Measurement of temperatures (ambient, gas), pressures (atmospheric, differential), flow velocity (with help of Pitot tube), through-device flow measurement
- Calculating combustion parameters, like: stack loss, combustion efficiency, excess air coefficient, dew point temperature
- Communication with PC computer via RS232C and Ethernet interface
- 2x USB port for connecting peripherals (mice, keyboards) and Sensonic IR-1 add-ons (analogue outputs / inputs)
- Optional Martel MCP-8810 thermal printer
- Optional analogue output (8 channels) and analogue input (8 channels) modules
- Storage of the measurement results in built-in database presenting measurements sessions in graphical form
- Creating measurement reports, exporting data to csv files
- Database for customers and object information

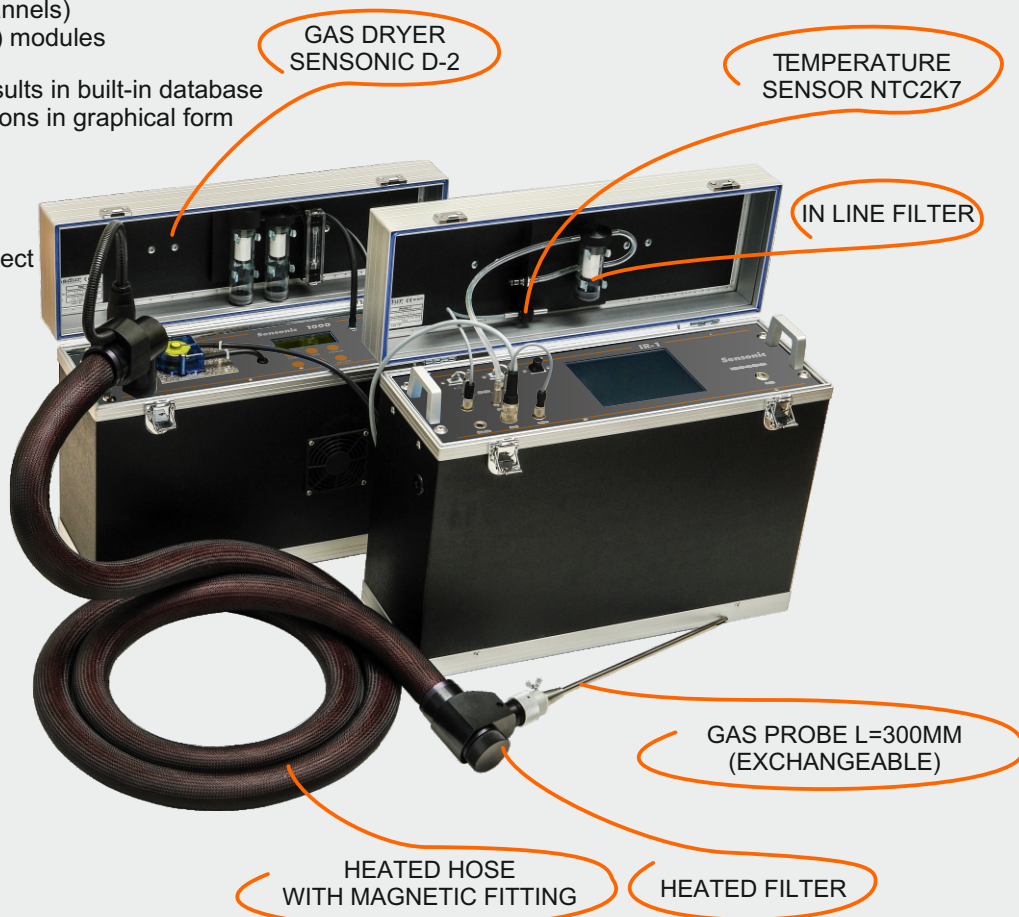
RS232C CABLE



SOFTWARE & DOCUMENTS CD



SOOT MEASUREMENT SCALE



Sensonic IR-1

CHARACTERISTIC	FEATURES	TECHNICAL DATA	SENSORS	EQUIPMENT	APPEARANCE
Dimensions (W * H * D)					500 mm * 395 mm * 173 mm
Weight					14 kg ÷ 18 kg
Casing material					Plywood covered with aluminium
Operating conditions					T: 10°C÷50°C RH: 5%÷90% (non-condensing)
Storing temperature					-20°C ÷ +55°C
Power supply input					115 or 230 VAC
Maximal power consumption					150 W
Operating system					Windows CE 5.0
Display					6,4" VGA (640 * 480)
Data storage: type capacity					Compact Flash card max. 4 GB
Interface for external devices (USB disk, mouse, keyboard)					2 x USB
Communication interface with PC					RS-232C, RJ45 (Ethernet)
Warming-up time					90 min maximum
Warming-up temperature					About 18°C above ambient temperature
Maximum outside temperature drift (not affecting warm-up temperature)					±5°C
MEASUREMENTS					
Variable	Method	Range Resolution	Accuracy	Time (T ₉₀)	
T _{gas} - gas temperature	K-type thermocouple	-10 ÷ 1000°C 0,1°C	± 2°C	10 sec	
T _{gas} - gas temperature	S-type thermocouple	-10 ÷ 1500°C 0,1°C	± 2°C	10 sec	
T _{amb} - boiler intake air temperature	PT500 resistive sensor	-10 ÷ 100°C 0,1°C	± 2°C	10 sec	
Differential pressure	Silicon piezoresistive pressure sensor	-25 hPa ÷ +25 hPa 1 Pa (0,01hPa)	± 2Pa abs. or 5% rel.	10 sec	
Gas flow velocity	Indirect, with Pitot tube & pressure sensor	1 ÷ 50 m/s 0,1 m/s	0,3 m/s abs. or 5% rel.	10 sec	
Lambda λ - excess air number	Calculated	1 ÷ 10 0,01	± 5°C	10 sec	
qA - stack loss	Calculated	0 ÷ 100% 0,1%	± 5°C	10 sec	
Eta - η combustion efficiency	Calculated	0 ÷ 120% 0,1%	± 5°C	10 sec	
IL - incomplete combustion	Calculated	0 ÷ 100% 0,1%	± 5°C	10 sec	

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Method		Range Resolution	Accuracy	Time (T ₉₀)	Conformity
O₂ - OXYGEN					
Electrochemical		20,95% 0,01%	± 0,2% abs. or 5% rel.	45 sec	ISO 12039; CTM-030
Electrochemical, partial pressure		20,95% 0,01%	± 0,2% abs. or 5% rel.	45 sec	ISO 12039; CTM-030
Electrochemical, partial pressure		25,00% 0,01%	± 0,2% abs. or 5% rel.	45 sec	ISO 12039; CTM-030
Electrochemical, partial pressure		100,00% 0,1%	± 0,2% abs. or 5% rel.	45 sec	ISO 12039; CTM-030
Paramagnetic		25,00% 0,01%	± 0,1% abs. or 3% rel.	45 sec	EN 14789; OTM-13
Paramagnetic		100,00% 0,1%	± 0,1% abs. or 3% rel.	45 sec	EN 14789; OTM-13
CO - CARBON MONOXIDE					
NDIR		20 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	EN 15058; METHOD 10
NDIR		10% 0,01%	± 0,03% abs. or 3% rel.	45 sec	EN 15058; METHOD 10
NDIR		100% 0,1%	± 0,3% abs. or 3% rel.	45 sec	EN 15058; METHOD 10
CO₂ - CARBON DIOXIDE					
NDIR		5% 0,01%	± 0,03% abs. or 3% rel.	45 sec	ISO 12039; OTM-13
NDIR		25% 0,01%	± 0,03% abs. or 3% rel.	45 sec	ISO 12039; OTM-13
NDIR		100% 0,1%	± 0,3% abs. or 3% rel.	45 sec	ISO 12039; OTM-13
CH₄ – METHANE					
NDIR		5% 0,01%	± 0,03% abs. or 3% rel.	45 sec	
NDIR		25% 0,01%	± 0,03% abs. or 3% rel.	45 sec	
NDIR		100% 0,1%	± 0,3% abs. or 3% rel.	45 sec	
NO - NITRIC OXIDE					
NDIR		1 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	ISO 10849; METHOD 7E
NDIR		5 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	ISO 10849; METHOD 7E
NO₂ - NITROGEN DIOXIDE					
NDIR		1 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	ISO 10849; METHOD 7E
Electrochemical		1 000 ppm 1 ppm	± 5ppm abs. or 5% rel.	60 sec	CTM-022

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Method		Range Resolution	Accuracy	Time (T₉₀)	Conformity
SO₂ - SULPHUR DIOXIDE					
NDIR		1 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	ISO 7935; METHOD 6C
NDIR		5 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	ISO 7935; METHOD 6C
H₂S- HYDROGEN SULPHIDE					
Electrochemical		1 000 ppm 1 ppm	± 5 ppm abs. or 5% rel.	70 sec	
H₂ - HYDROGEN					
Electrochemical		2 000 ppm 1 ppm	± 10 ppm abs. or 5% rel.	50 sec	
Electrochemical		20 000 ppm 1 ppm	± 10 ppm abs. or 5% rel.	70 sec	
Thermal Conductivity Detector		10% 0,1%	± 0,5% abs. or 5% rel.	45 sec	
Thermal Conductivity Detector		25% 0,1%	± 0,5% abs. or 5% rel.	45 sec	
Thermal Conductivity Detector		50% 0,1%	± 0,5% abs. or 5% rel.	45 sec	
Thermal Conductivity Detector		100% 0,1%	± 0,5% abs. or 5% rel.	45 sec	
N₂O - NITROUS OXIDE					
NDIR		2 000 ppm 1 ppm	± 3 ppm abs. or 3% rel.	45 sec	ISO 21258
CHF₃ - FLUOROFORM (REFRIGERANT R23)					
NDIR		2,5% 0,01%	± 0,03% abs. or 3% rel.	45 sec	
VOC - VOLATILE ORGANIC COMPOUNDS					
PIT - Photoionization Detector		100 ppm 1 ppm	± 5ppm abs. or 5% rel.	120 sec	METHOD 21
PIT - Photoionization Detector		1 000 ppm 1 ppm	± 5ppm abs. or 5% rel.	120 sec	METHOD 21

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STANDARD EQUIPMENT

SUPPLIED ALONG WITH THE DEVICE

- 3m mains cable (with selectable plug type)
- Single gas filter with condensate trap and filter insert (pore size 5µm)
- 2.5m RS-232C communication cable with DB9 female connector
- Software CD with programmes and manuals, also a pendrive for data storage
- Laser pointer which can also be used a regular pen and a pen for the touchscreen
- Ambient temperature sensor with 300mm cable

This NTC2k7 temperature sensor with a 300mm cable is used for measuring the ambient air temperature. It helps to set the optimal target temperature for Sensonic IR-1 thermal stabilisation.

ordering code:

sensor NTC2k7 with 300mm long cable (grey) - ZPH2-SENS-NTC



- Sensonic IR-1 — Sensonic D-2 electric communication cable

2.5m communication cable for connecting the Sensonic D-2 gas dryer to the Sensonic IR-1 analyser. Spare part for Sensonic IR-1 - also available separately.

ordering code:

ZMPH-KAB-RS232



- Sensonic IR-1 — Sensonic D-2 gas hose connection

2.5m long gas hose for connecting the Sensonic D-2 gas dryer to the Sensonic IR-1 analyser. Quick couplers on both ends. Spare part for Sensonic IR-1 - also available separately.

ordering code:

Z10-GAS-CON-02



ADDITIONAL EQUIPMENT

NECESSARY FOR THE ANALYSER TO WORK

- Sensonic D-2 gas conditioner

D-2 is a powerful gas conditioner necessary to prepare gas sample before further analysis. It removes most particles from the gas and keeps stable level of the humidity during whole measurements.



- Heated hose

Heated hose is designed to transport the gas from the measurement point to the gas conditioner without any moisture condensation on the way. Built-in heated filter catches dust particles and prevents from merging them with water.



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- Gas probe pipe

Gas probe is immersed in the gas duct and is supposed to extract the gas sample and to measure its temperature.

Exchangeable probes are easily connected to probe holders (with M30x1 fastening) and to heated hoses. They have thermocouple type K (in some configurations type S) for measurement of gas temperature and a threaded fixing cone.

There are many probe pipes available. They differ in length and working temperature.

For work efficiency it is advised to own different probe pipes to be able to adjust to the measurement place.



OPTIONAL EQUIPMENT & SPARE PARTS

- Boiler's inlet air temperature sensor

Ambient air temperature (or rather boiler's intake air temperature) is a parameter used for calculation of many combustion parameters. This PT500 temperature sensor on a 3m cable is used for measurement of the aforesaid temperature. It is optional equipment. The sensor has to be connected to the Temp. Amb. socket. If this sensor is not connected Sensonic IR-1 assumes the boiler's inlet air temperature to be equal to the temperature measured with the NTC2k7 sensor installed in the device's lid.

ordering code:

Z40P-SENS-TEMP



- Pitot tube

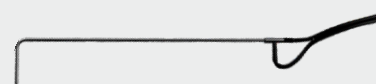
Pitot tube is an accessory that allows to perform measurement of the flow velocity of the gas stream. The measurement is performed indirectly – Pitot tube is connected to analyser's differential pressure sensor. Analyser recalculates the differential pressure on the Pitot tube's outlets to velocity.

A few length of tubes are available. Pitot tube has 2m gas tubings to connect it with the analyser.

ordering codes:

pitot tube 800mm - Z00-PITOT-8002

pitot tube 500mm - Z00-PITOT-5002



- Analogue outputs module

Optional module with 8 current and 8 voltage galvanically separated outputs. Installed into the device's lid. Connected to the USB Sensonic IR-1 socket.

ordering code:

ZPH2-ANA-OUT

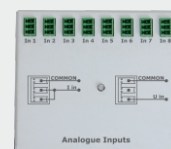


- Analogue inputs module

Optional module with 8 current and 8 voltage galvanically separated inputs. Installed into the device's lid. Connected to the USB socket of Sensonic IR-1.

ordering code:

ZPH2-ANA-IN



- Martel portable printer with USB cable

Sensonic IR-1 can be equipped with portable printer - Martel MCP8810 with RS232C communication protocol (converted to USB port). Small, portable, battery operated printer. Must be connected to Sensonic IR-1 USB socket.

ordering codes:

Martel MCP-8810, thermal printer with USB interface - MPH-PRINT1

USB cable for connecting the printer to analyser - ZPH2-PRINTER-USB-KAB



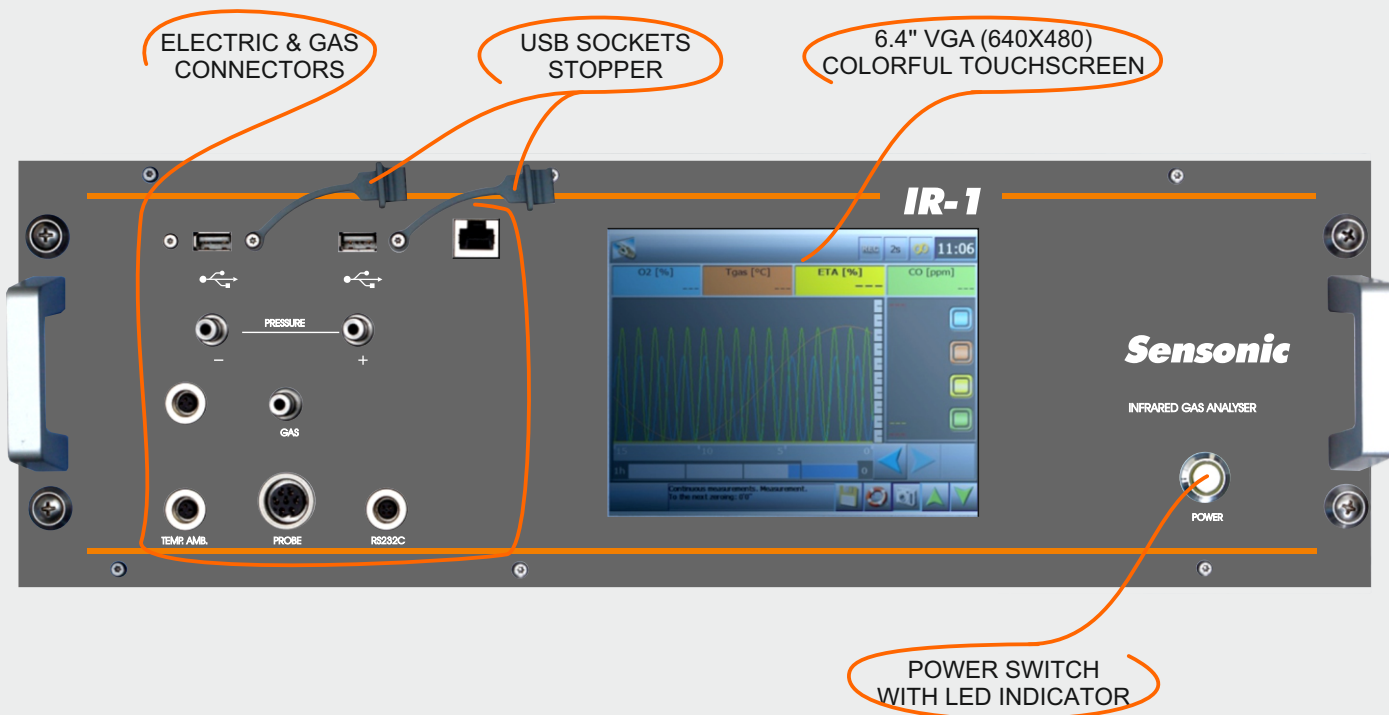
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CHARACTERISTIC FEATURES TECHNICAL DATA SENSORS EQUIPMENT APPEARANCE

FRONT PANEL

WITH LCD AND SOCKETBOARD



EXAMPLE PRINTSCREENS

RESULTS GRAPH

