TECHNICAL DATA SHEET

ecom-J2KNpro Tech

MOBILE FLUE GAS ANALYSIS

The mobile emission measuring device with physical measuring methods for industrial applications

The ecom-J2KNpro Tech is designed for demanding emission measurements and the monitoring of thermal processes in medium to large capacity systems. Depending on the application, it combines physical and electrochemical measuring methods to cover both highly accurate long-term measurements and additional measured variables with good practical suitability.

Fully equipped, up to 10 measurement components can be recorded. The sampling system is selected flexibly according to the application - depending on the area of use.

Dimensions: approx. 525 x 845 x 270 mm (W x H x D)
Weight: depending on equipment from / to approx. 23-32 kg

Technical data

Measured values	Range	Resolution	Accuracy*= Higher value prevails	
√ = Standard; ● = Optional EC; ● = Optional NDIR; ● = Optional Pellistor; ● = Optional CLD/PAS; ● = Optional NDUV				
Maximum number of measurable gas components				10
O_2	0...21 %	0,01 vol. %	± 0,3 vol. %	√
CO (H_2-comp.)	0...2.500 ppm (10.000 ppm)	1 ppm	± 20 ppm / 5 % of measured value*	·
CO (n. H_2-comp.)	0...20.000 ppm	1 ppm	± 40 ppm / 10 % of measured value*	·
CO (Advanced)	0...1.000 ppm	1 ppm	± 2 % of the measuring range end value	·
CO%	0...63.000 ppm	5 ppm	± 100 ppm / 10 % of measured value*	·
CO% (Standard)	0...10 vol. %	0,001 vol. %	± 0,02 vol. % / 3 % of measured value*	·
CO_2 (1)	0...100 vol. %	0,01 vol. %	up to 5 % of the measuring range end value	·
CO_2 (Advanced)	0...20 vol. %	0,01 vol. %	± 2 % of the measuring range end value	·
CO_2 (Standard)	0...20 vol. %	0,01 vol. %	± 0,3 vol. % / 3 % of measured value*	·
NO	0...5.000 ppm	1 ppm	± 5 ppm / 5 % of measured value*	·
$NO_{ExtraLow}$	0...300 ppm	0,1 ppm	± 2 ppm / 5 % of measured value*	·
NO	0...1.000 ppm	0,1 ppm	± 2 % of the measuring range end value	·
NO	See technical data UV module			·
NO_2	0...1.000 ppm	1 ppm	± 5 ppm / 5 % of measured value*	·
$NO_{2\ Low}$	0...100 ppm	0,1 ppm	± 5 ppm / 5 % of measured value*	·
NO_2	0...200 ppm	0,1 ppm	± 2 % of the measuring range end value	·
NO_2	See technical data UV module			·
NO_2	See technical data UV module			·
SO_2	0...5.000 ppm	1 ppm	± 10 ppm / 5 % of measured value*	·
$SO_{2\ (Low\ CO)}$	0...5.000 ppm	1 ppm	± 10 ppm / 5 % of measured value*	·
$SO_{2\ Low}$	0...100 ppm	0,1 ppm	± 5 ppm / 5 % of measured value*	·
SO_2 (Advanced)	0...1.000 ppm	1 ppm	± 2 % of the measuring rang end value	·
SO_2	See technical data UV module			·
H_2	0...20.000 ppm	1 ppm	± 100 ppm / 5 % of measured value*	·
H_2S	0...1.000 ppm	1 ppm	± 10 ppm / 5 % of measured value*	·
CH_4	0...5 vol. %	0,01 vol. %	± ,2 vol. % / 5 % of measured value*	·
C_xH_y (methan)	0...4 vol. %	0,01 vol. %		·
C_xH_y (methan)	0...3 vol. %	0,001 %	± 0,005 vol. % / 3 % of measured value*	·
C_xH_y (propan)	0...2.000 ppm	1 ppm	± 4 ppm / 3 % of measured value*	·

(1) IR sensor cannot be combined with C_xH_y sensor or NDIR bench
(2) Via converter (conversion of NO_2 to NO + measurement), no original NO_2 measurement possible via CLD.

Equipment

Gas sampling	
Heated sampling probe Ø 10 mm	·
Sampling head with hot gas filter(PTFE)	·
NO_x tubing with PTFE inner coating	·
Heated tubing (in conjunction with heated system)	·
Fixing cone with heat protection shield	·
Measurement gas preparation	
Electronic condensate monitoring	√
Automatic condensation evacuation	√
Electronic sample gas cooler	√
Combustion air temperature measurement	
T-room sensor with cable, cone and magnet	√
T-room stick	√
Operation safety	
Temperature display for stream core search	√
Automatic self-test in the calibration phase	√
CO switch-off by concentration overload	√
Fresh air purge by CO exceeding	√
Fresh air purge after measuring operation	√
Flow meter for pump performance check	√
Pollutant filter for CO sensor	√
Special PTFE filter for IR bench	√
Data processing	
Integrated high-speed thermal printer	√
External memory via SD card	√
Wireless data interface (BLE)	√
WiFi interface (instead of BLE)	·
USB interface	√
Transport	
Aluminium-framed case with 4 rolls and stop lock	√
Upper case for sampling system stowage	·
Comfort trolley	·

ecom GmbH
Am Großen Teich 2
58640 Iserlohn
info@ecom.de

ecom® Measurement Technology

Technical data UV modul [1]

	NO	SO_2	NO_2
Measurement range	0...300 ppm	0...100 (2.000) ppm	0...100 (2.000) ppm
Lifetime UV radiation source	> 8.000 hours (EDL) [2]	> 20.000 hours	> 20.000 hours
Warm-up time	≤ 60 minutes [3]	≤ 60 minutes [3]	≤ 60 minutes[3]
Response time (t_{90})	≤ 6 seconds	≤ 6 seconds	≤ 6 seconds
Detection limit (3•σ) [4]	≤ 1 ppm	≤ 1 ppm	≤ 1 ppm
Linearity error	≤ ± 1 % of the measuring range end value	≤ ± 1 % of the measuring range end value	≤ ± 1 % of the measuring range end value
Repeatability	± 0,5 % of the measuring range end value / 3 ppm*	± 0,5 % of the measuring range end value / 3 ppm*	± 0,5 % of the measuring range end value / 3 ppm*
Long term stability (zero point)	< 5 ppm [7] / 6 hours < 1 % of the measuring range end value [3] / 24 hours	< 5 ppm [7] / 6 hours < 2 % of the measuring range end value [3] / 24 hours	< 8 ppm [7] / 6 hours < 2 % of the measuring range end value [3] / 24 hours
Long term stability (reference point)	< 1 % of measuring range end value / month	< 1 % of measuring range end value/ month	< 1 % of measuring range end value / month
Temperature influence (zero point)	< 1 % of measuring range end value / 10 kelvin	< 1 % of measuring range end value / 10 kelvin	< 1 % of measuring range end value/ 10 kelvin
Temperature influence (reference point)	< 1 % of measuring range end value / 10 kelvin	< 1 % of measuring range end value / 10 kelvin	< 1 % of measuring range end value / 10 kelvin
Cross sensitivity [5]	@ 100 ppm SO_2 : < 2 ppm @ 500 ppm NO_2 : < 2 ppm @ 20 °C Dew point. H_2O : < 5 ppm @ 100 ppm N_2O : < 10 ppm	@ 500 ppm NO_2 : < 5 ppm @ 20 °C Dew point H_2O : < 5 ppm @ 100 ppm N_2O : < 10 ppm	@ 100 ppm SO_2 : < 5 ppm @ 20 °C Dew point H_2O : < 5 ppm @ 100 ppm N_2O : < 10 ppm
Pressure influence	< 0,1 % / 10 hPa of measured value[6]	< 0,1 % / 10 hPa of measured value[[6]	< 0,1 % / 10 hPa of measured value[[6]

* = Higher value prevails
[1] Related to Pa = 1.020hPa; Ta = 25 °C; flow 0 1 l / min.
[2] EDL: 50 % intensity drop
[3] Full specification after 6 hours, depends on environmental conditions
[4] At zero point
[5] To each calibrated gas channel
[6] With pressure compensation
[7] First 6 hours after warm-up

Measuring method of the ecom-J2KNpro *Tech*

Electrochemical measuring method (EC)

An EC sensor consists of at least two electrodes (measuring and counter electrode), which are connected via an electrolyte and an external circuit. The electrodes are matched to the gas to be measured and specifically promote chemical reactions. Two-electrode sensors are inexpensive, but can provide inaccurate signals at high gas concentrations. By using a third electrode - the reference electrode with a constant potential - the voltage is continuously monitored and corrected. This significantly improves the measurement accuracy, particularly with regard to linearity and selectivity.

Combustible gas sensor (PEL)

Two platinum coils are each embedded in a ceramic layer and electrically connected via a bridge circuit. The surface of one platinum coil is activated with a catalyst that promotes oxidation - the surface of the other platinum coil is inactivated. Current flows through the coils and heats them to approx. 500°C. The oxygen in the air reacts with the combustible gas on the surface of the active coil. This increases the temperature and resistance in the active platinum coil. The bridge becomes unbalanced and is a measure of the presence of flammable substances.

Chemiluminescence (CLD)

In chemiluminescence, light is produced by a chemical reaction. In gas analysis, this is used to measure nitrogen monoxide (NO): NO reacts with ozone (O_3) to form excited NO_2, which emits light. This light is amplified and measured using a photomultiplier. To determine the total NO_x concentration (NO + NO_2), the gas is first passed through a catalyser, which reduces NO_2 to NO. This step is omitted for pure NO measurement.

Photoacoustic spectroscopy (PAS)

The PAS utilises the photoacoustic effect for gas analysis. The gas is irradiated with modulated light of a specific wavelength. The gas absorbs part of the light and converts the energy into acoustic signals, which are recorded by a microphone. The signal strength increases with the gas concentration. Infrared laser diodes are usually used as the light source, as many target gases absorb in the infrared range. The light is modulated electronically or mechanically (e.g. using a chopper). PAS enables sensitive, selective gas measurement.

Non-dispersive infrared sensor (NDIR)

NDIR sensors measure gases such as CO, CO_2 or hydrocarbons in a non-contact and wear-free manner. They consist of an infrared emitter, cuvette, wavelength filter and detector. The sample gas partially absorbs infrared light selectively, the rest reaches the detector filtered. Cross-sensitivities caused by other gases can be minimised by suitable frequency selection or compensation. NDIR is the standard method for detecting over 100 gases in the ppm to per cent range.

Non-dispersive UV sensor (NDUV)

The NDUV method measures gases such as SO_2, NO_2, benzene or O_3 via their absorption of UV radiation in the 200-450 nm range. The method is insensitive to water vapour. A special UV LED (AlGaN technology) serves as the radiation source. The set-up is based on the Lambert-Beer law and includes a photometer with a measurement and reference path. A reference detector compensates for LED ageing and temperature effects. The absorbed UV radiation is converted into a measurement voltage at the end of the cuvette, which reflects the gas concentration.