WOBBE Index Calorimeter BTU Analyser

Measures Wobbe Index, Combustion Air Requirement (CARI) and Calorific Value of Natural Gas and Fuel Gases



hobré instruments process analysis solutions



- Fast response (T90 < 5 sec)
- High accuracy and repeatability
- Automatic calibration
- Insensitive to ambient temperature fluctuations
- Suitable for outdoor installation
- Effective measuring range 0-100% FS
- Output in MJ/Nm3, kcal/Nm3 and BTU/SCF
- Minimal maintenance
- Suitable for corrosive and dirty applications
- Flameless analyser
- Residual oxygen content principle
- Epoxy coated stainless steel enclosure
- Rugged design
- Suitable for high sulphur applications
- Suitable for installation in EX environment DEKRA 11ATEX0277X and IECEx DEK 11.0057X CSA Class 1, Div.2
 - Zero emission option
- Optional remote operation by TCP/IP
- Optional MODBUS RTU (RS485)
- Optional specific gravity output



INTRODUCTION

The WIM COMPAS[™] series is the latest addition to the Hobré Instruments portfolio of process analysers for Wobbe Index, Heating Value/BTU and Combustion Air Requirement Index. Designed and manufactured in our factory in The Netherlands the WIM COMPAS[™] builds on more than 20 years of success of the WIROX, WIM 9600 and WIM 9900 series. Offering unmatched reliability, speed of response, accuracy and supported by profound application knowledge the WIM COMPAS[™] is the best choice for measuring gas combustion parameters.

PRINCIPLE OF OPERATION

Sample gas is continuously mixed with combustion air under controlled conditions followed by catalytic combustion in an electrically heated furnace. The residual oxygen content in the flue gas is measured with an accurate and reliable zirconium oxide sensor. In the control unit following combustion parameters are calculated from the oxygen signal and the (optional) density signal: Wobbe Index, Combustion Air Requirement Index (CARI), Calorific Value (or BTU) and specific gravity.



TYPICAL APPLICATIONS

Natural gas blending and storage. The speed of response and the high accuracy and repeatability of the WIM COMPASTM are providing many customers with a perfect signal for the feed forward control of gas blending operations as well as monitoring the quality of gas delivered to the grid including LNG regasification.

Fired heaters. Besides speed of response the availability of the CARI signal is a key benefit of the WIM series. Whereas the Wobbe Index is an excellent indication for the thermal load of a furnace, for air/fuel ratio control the CARI is a much better parameter. This is particularly the case when hydrogen, carbon monoxide and olefins are present in the fuel gas.

Gas turbine control. Gas turbines are sensitive to rapid changes in gas composition; besides poor fuel economy and a reduced lifetime,

improper control also results in higher CO and NOx emissions. The WIM provides the Wobbe Index, Heating Value and Specific Gravity in seconds. Optionally also CO2, N2 and Heat Ratio are available.

Steel industry and biogas. Dirty and wet gases are common in steel and biogas monitoring applications.

The WIM COMPAS[™] sample handling system is kept at elevated temperature to prevent condensation and the hot section is resistant to significant sulfur levels.

Flare gas and sour gas monitoring. A special version of the WIM measures flare gas in accordance with USA Rule 1118 and is capable of dealing with very high sulfur levels. The method closely follows ASTM-4891 and complies with expected new EPA Flare Emissions 40 CFR regulations.



The WIM COMPAS[™] **F** has a full-color graphical user interface.

The **BASIC** version offers an ethernet connection to view the graphical user interface on a remote computer.

WIM COMPAS[™] is available in **BASIC** and **F** version. Please consult factory for other applications and options including outputs for hydrogen and total sulfur in fuel gas, CO₂ emission from fuel gas and the integrated gas chromatograph option.



Specifications Service Measuring principle Sample wetted parts Installation options	Natural Gas, Fuel Gas, Flare Gas, Biogas, BFG, COG, etc. Residual Oxygen Method SS316, Inconel and Platinum - Non Ex - 🚱 II 3G Ex px [ib] IIC T3 Gb - 🚱 II 2G Ex px [ib] IIC T3 Gb - Class 1, Div. 2, Group B, C, D T3 - IECEx Ex px [ib] IIC T3 Gb
Measuring ranges Wobbe Index Accuracy Repeatability Drift Response time	50 MJ/Nm ³ span in 0 – 100 MJ/Nm ³ range \pm 0,4% of full scale for natural gas \pm 0,05% of measured value or \pm 30 kJ (which ever is higher) $< \pm$ 0,05% or \pm 30 kJ per day (which ever is higher) T90 < 5 seconds (includes lag time and rise time)
CARI * Calorific Value (SG cell option) **	span of 15 in 0 – 25 range span of 50 MJ/Nm³ in 0 – 120 MJ/Nm³ range
Specific Gravity cell (SGU option) SG range SG accuracy Response time CV signal	Updated signal (every 10 seconds, Hobré SG cell) 0 – 3 < ± 0,5% of Full scale < 20 seconds to T90
Specific Gravity cell (SGC option) SG range SG accuracy Response time CV signal	Continuous measurement (oscillation principle SG cell) 0 – 3 < ± 0,5% of reading < 5 seconds to T90
 * CARI = Combustion Air Requirement Index ** Response time CV signal depends on type SG cell 	
Outputs Local HMI Analogue outputs Digital outputs Digital input Communication options	 8,4" full colour display with touchpad (all functions) 2 off isolated 0 / 4 - 20 mA (optionally up to 4) - 2 off relay SPST for malfunction, calibration status, etc. - 8 off 24 VDC / 1 A or potential free relays (optional) Start calibration, start validation, etc. - Remote control via TCP/IP or optical fiber incl. software for
	remote operation - MODBUS RTU via RS485, TCP/IP or optical fiber
Utilities Power supply Power consumption Instrument air	115/230 VAC, 50/60 Hz 1.000-2.250 VA max; depending on configuration - 15 NI/min at 4 barG minimum, 10 barG maximum - 50 NI/min for Ex purge option ATEX* - 80 NI/min for Ex purge option IECEx* Sample flow + 1 NI/min
Sample pressure	1,5 - 5 barG for standard version 0 - 1,5 barG requires pump option

* Pre-purge: total flush volume 500 litre, pre-purge flow 70 NI/min. (80 NI/min for IECEx)

Installation

Mounting Dimensions (HxWxD) Weight Enclosure protection Ambient temperature range Wall mounting 1000 x 800 x 400 mm (non-Ex version) 80 – 250 kg, depending on version IP65 design *(outdoor installation: protected against direct sunlight and rain)* Non Ex and 🖾 II 3G: +5..+40°C (Optional -20..+55°C*) Cl.1 Div.2 : +5..+40°C (Optional -20..+55°C*) 🐼 II 2G and IECEx: +5..+40°C (Optional -20..+55°C*)

* Note: Instrument air temperature should not exceed max. ambient temperature.





Order Code	WIM Compas™ F
Р	P version (sample pressure > 1,5 barg)
LP	LP version with one pump, incl. fast loop (sample pressure < 1,5 barg)
С	Continuous measurement principle
D	High sulphur version with continuous measurement and dilution system
I	High sulphur version with Injection system
115	Power supply 115 VAC, 50/60 Hz
230	Power supply 230 VAC, 50/60 Hz
0	No specific gravity meter
SGC	Oscillation type specific gravity cell
SGU	Hobré specific gravity cell
0	No sample pressure monitoring
SPM	Sample pressure monitoring
OFA	Oven flow alarm
FPM	Oven flow alarm + Sample pressure monitoring
0	Non Ex version
1	🐼 II 2G Ex px [ib] IIC T3 Gb version (Zone 1, excluding back-up purge)
2	II 2G Ex px [ib] IIC T3 Gb version (Zone 1, including back-up purge and freestanding frame)
3	II 3G Ex px [ib] IIC T3 Gb version (Zone 2) *
Z	Class 1, Div. 2, Group B, C, D T3 version
E1	Ex px [ib] IIC T3 Gb version (IEC Ex certified, excluding back-up purge)
E2	Ex px [ib] IIC T3 Gb version (IEC Ex certified, including back-up purge and freestanding frame)
2	2 analog outputs
4	4 analog outputs
0	No serial communication
R	Remote operation via TCP/IP (incl. software for communication)
RM	Modbus and/or remote operation via TCP/IP (incl. software for communication)
RO	Remote operation via optical fiber (incl. software for communication)
RMO	Modbus and/or remote operation via optical fiber (incl. software for communication)
Μ	Modbus RTU via RS485
MO	Modbus RTU via optical fiber
0	No extra isolated relais added
R	8 off extra isolated relais added (already included in 🔄 II 2G version)
0	No additional fast loop inside the analyser
F	Fast loop installed inside analyser
FA	Fast loop with alarm installed inside analyser
0	Standard ambient temperature range +5 up to +40°C
Н	Heated electronics for low ambient temperature (down to -20°C)
С	Cooling for high ambient temperature (up to +55°C)
HC	Version for ambient temperature range of -20 up to +55°C
1	No additional frame included
2	Analyser mounted on free standing frame (SS304)
3	Analyser mounted on free standing frame with sunroof
*	In case of pures foilure the englycer has to be switched off

In case of purge failure the analyser has to be switched off



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