Technical Information

SS1000

TDLAS Gas Analyzer

A lightweight, easy to handle, battery-powered H_2O analyzer, used to verify measurements and for spot-checking when other methods provide questionable results.

Application

- H_2O in natural gas
- H_2O measurement ranges up to 2110 ppmv (100 lbs/MMSCF)

Key features

- Virtually maintenance free
- No interference from glycol, methanol or amine
- Accurate, real-time measurements
- No wet-up or dry-down delays
- Short term payback; no consumables
- NIST-traceable calibration

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Table of Contents

1 Introduction

Product overview

The **SS1000** portable analyzer is a lightweight, easy to handle, battery-powered H_2O analyzer, used to verify measurements and for spot-checking when other methods provide questionable results.

In natural gas pipe applications, poor quality measurement results are extremely costly. Additional processing or dehydration costs, upset conditions, shut-ins and inconsistent process results may be caused by sensors that do not perform properly. The SS1000 reveals poorly performing sensors, pinpoints high moisture and can be used as a standard for measurement validation.

Rapid response time: The SS1000 analyzer allows for fast, simple operation. The analyzer's laser and detector take measurements 4 times per second and average the results. These real-time measurements are not hampered by wet-up (absorption) or dry-down (desorption) as with surfaced-based sensors.

Reliable: Using state-of-the-art laser technology developed by NASA, the SS1000 analyzer is more reliable, with greater repeatability than surface based sensors and is not subject to the interpretation errors of a chilled mirror.

No interference: The SS1000 combines a patented laser with control electronics and "smart" software. The analyzer's sensor heads are not subjected to corrosives or contaminants in the gas because the sensor is isolated from the sample gas stream.

The result is an analyzer which does not suffer from contamination or drift due to vapor impurities such as glycol, methanol, amines, hydrogen sulfide, or mercaptans.

Payback: The SS1000 very quickly pays for itself by eliminating the cost of consumables, extra sensor heads, factory calibrations, labor, and overhead associated with excessive maintenance. Expensive problems caused by unreliable gas measurements, such as added processing steps and poor gas quality, can be eliminated

Standard documentation

All documentation is available on the:

- Endress+Hauser website: www.endress.com

Each analyzer shipped from the factory is packaged with documents specific to the model that was purchased. This Technical Information document is an integral part of the complete document package, which also includes:

Part Number	Document Type	Description
BA02186CEN	Operating Instruction	This manual contains a comprehensive overview of the analyzer and step-by-step installation instructions (SS1000).
GP01181CEN	Description of Device Parameters, HC12	This document provides the user with an overview of the HC12 firmware functionality.
BA02184CEN	Operating Instruction, Sample Conditioning System Remote Panel	This manual provides an overview of the Sample Conditioning System (SCS) Remote Panel along with instructions for installation and operation.

Registered trademarks

Modbus®
Registered trademark of SCHNEIDER AUTOMATION, INC.

Manufacturer address

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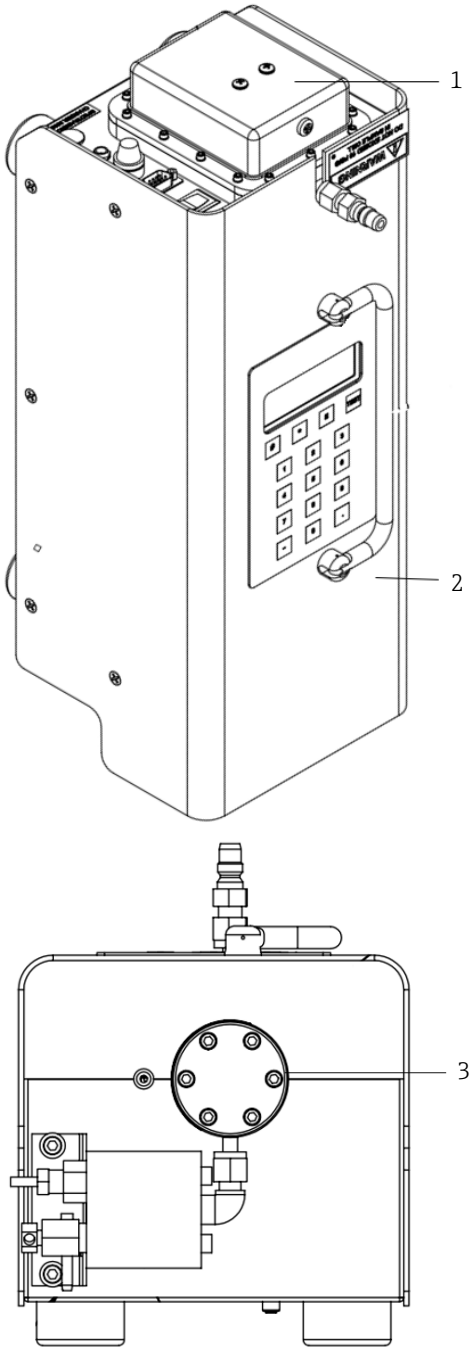
www.endress.com

2 System design

Measuring system

SS1000 TDLAS Gas Analyzer



The base analyzer consists of:

1. Optical head

   Contains the laser, laser temperature control, detector, window, pressure and temperature sensors, optical head electronics.

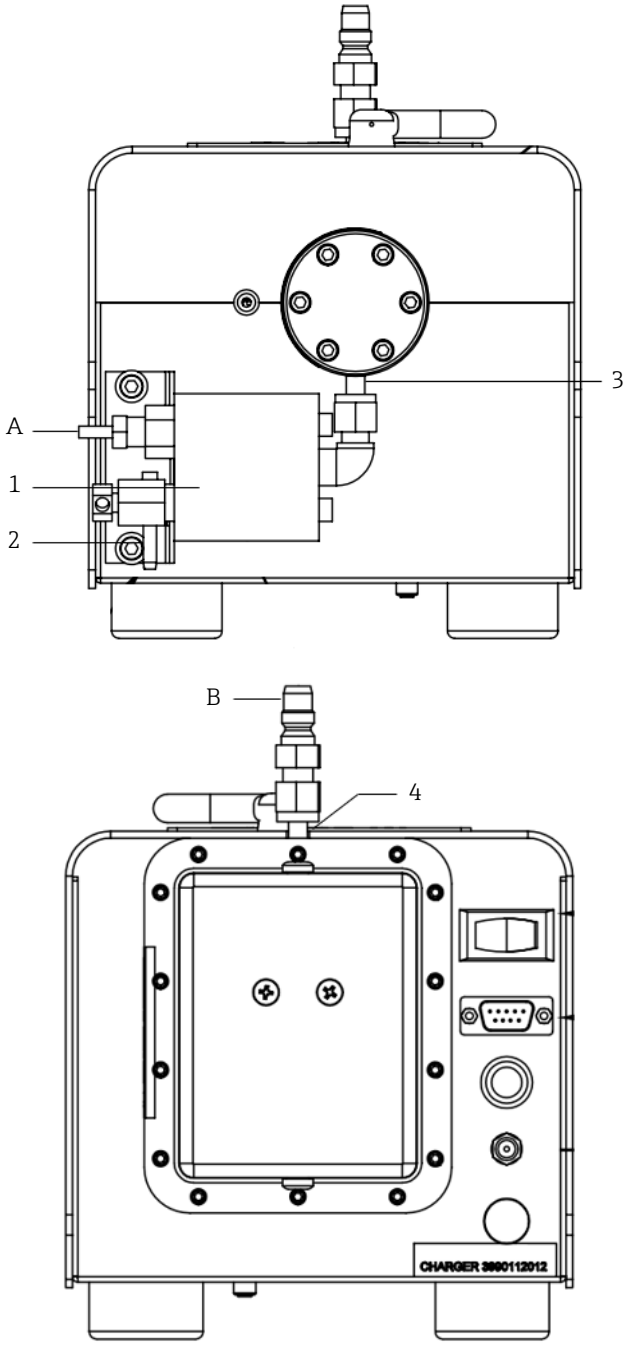
2. Controller

   Contains the power supply, HMI (LCD display and keypad), communications and measurement control electronics.

3. Sample cell and mirror

   Sample gas flows through the cell via an inlet and outlet port. The laser beam passes through the cell, reflecting from the mirror on the bottom.

Equipment architecture



1 Membrane separator
2 Bypass valve
3 *Cell inlet port*
4 *Cell outlet port*

A Sample in, 140 to 310 kPa (20 to 45 psi)
B Sample vent, to safe area

3 Ordering information

Order codes

Refer to the website (www.endress.com) to locate your local sales channel for more information.

Feature number	Order code	Description
Housing (choose one)		
010	5	Portable
Measurement range (choose one)		
020	W	H_2O range 0.5 to 250 lbs/MMSCF (10 to 5275 ppmv) Table 1 background only
	X	Other H_2O range (min 0.5 lbs/MMSCF, max 100 lbs/MMSCF)
	0	H_2O range 2 to 20 lbs/MMSCF (42 to 422 ppmv)
	1	H_2O range 0.5 to 20 lbs/MMSCF (10 to 422 ppmv)
	5	H_2O range 0.5 to 50 lbs/MMSCF (10 to 1055 ppmv)
	6	H_2O range 0.5 to 50 lbs/MMSCF (10 to 1055 ppmv)
	8	H_2O range 0.5 to 100 lbs/MMSCF (10 to 2110 ppmv)
	9	H_2O range 2 to 100 lbs/MMSCF (42 to 2110 ppmv)
Measurement range 2 (choose one)		
030	1	N/A
Gas Inlet (Choose one)		
040	1	N/A
Background gas (choose one)		
050	X	Other
	1	Natural gas, standard (Table 1)
	2	Natural gas, alternative (Table 2) Must submit composition
	4	Air
Signal output (choose one)		
060	1	RS232
	5	RS232 and single 4-20mA analog output
Tag option (choose one)		
895	T1	Stainless steel tag (up to 2 lines of text)

Gas specifications

Component name	Abbreviation	Allowable component range[1]		
		Natural gas	Rich natural gas	Rich natural gas/pure CO_2
		Table 1	Table 2	Table 3
Methane	C_1	90 to 100%	50 to 100%	0 to 50%
Ethane	C_2	0 to 7%	0 to 20%	0 to 20%
Propane	C_3	0 to 2%	0 to 15%	0 to 15%
Butanes	C_4	0 to 1%	0 to 5%	0 to 5%
Pentanes	C_5	0 to 0.2%	0 to 2%	0 to 2%
Hexanes and heavier	C_6+	0 to 0.2%	0 to 2%	0 to 2%
Carbon dioxide	CO_2	0 to 3%	0 to 20%	50 to 100%
Nitrogen and other inerts	N_2	0 to 10%	0 to 20%	0 to 20%
Hydrogen sulfide	H_2S	0 to 300 ppmv	0 to 5%	0 to 5%
Water	H_2O	0 to 5000 ppmv	0 to 5000 ppmv	0 to 5000 ppmv

1. *For Table 2 and Table 3, stream composition must be supplied at the time of order placement.*

Technical data

Measurement data	
Target components	H_2O in natural gas
Principle of measurement	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Measurement ranges	0 to 20, 0 to 50, 0 to 100, 0 to 250 lbs/MMscf 0 to 422, 0 to 1055, 0 to 2110, 0 to 5275 ppmv
Repeatability	±1 ppmv or ±1% of reading (whichever is greater)
Accuracy	±2 ppmv plus 2% of reading
Application data	
Ambient temperature range	-20 °C to 50 °C (-4 °F to 122 °F)
Sample cell pressure range	700 to 1400 mbara
Sample cell temperature range	-20 °C to 50 °C (-4 °F to 122 °F)
Maximum cell pressure	70 kPag (10 psig)
Sample flow rate	0.5 to 1.0 L/min (1 to 2 scfh)
Bypass flow rate	1 L/min (2 scfh)
Electrical and communication	
Voltage	100 to 240 VAC, 50/60 Hz 12-Volt, sealed lead-acid battery Approximately 8 hours usage time per charge
Max current	0.5 amp maximum at 120 VAC
Controller to cell cable length	1m standard (3m, 5m and 10m optional)
Communication	Analog: One or two 4-20mA isolated, 1200 ohms at 24 VDC max load (optional) Serial: RS232C Protocol: Modbus Gould RTU or Daniel RTU or ASCII
LCD display	Concentration, cell pressure and temperature, diagnostics
Physical	
Dimensions	Nominal 200mm H x 175mm W x 450mm D (8 x 7 x 18 inches)
Weight approximate	6.8 kg (15 lbs)
Sample cell dimensions	438 mm H x 108 mm W (17.3 x 4.3 inches)
Sample cell construction	316L series polished stainless steel
Number of sample cells	1
Area classification	
Certification	Non-hazardous (certified) locations – general purpose

TI01643C/66/EN/01.21

www.addresses.endress.com

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