

Gas and On-Line Analyzers



Product Name	Part No.
7866/7872 Gas Analyzer	70-82-03-46
	70-82-03-19
Sodium Analyzer	70-82-03-60
	70-82-03-61
Silica, Phosphate, Hydrazine Analyzers	70-82-03-62
	70-82-03-63
Hydrazine Analyzers	70-82-03-64
	70-82-03-65

Product Summary

Gas and On-Line Analyzers

Series 7866/7872 Gas Analyzer

Pre-packaged sampling system providing a complete pre-engineered panel. Designed for hydrogen-cooled generator applications in utility plants, paper mills and other co-generation applications. Allows easy, convenient calibration of all three ranges.

Series 2131 Sodium Analyzer

Advanced online instrument intended for use in continuous measurement and determination of sodium ion concentration. Common application points in a boiler system for online sodium measurement include make-up water, condensate, boiler feedwater and saturated steam/main steam. Operates automatically and comes complete with true, fully automatic calibration.

Silica, Phosphate & Hydrazine Analyzers

Colorimetric analyzers based on the new, patented Loop Flow Analysis (LFA) cycle. LFA analysis technology involves isolating, manipulating and testing a known volume of sample in a closed-loop system. Powerful programmable microprocessor allows for customized program cycles, ensuring accuracy and reliability with every application.

Series 2171 Hydrazine Analyzer

Intended for use in continuous measurement and determination of hydrazine concentration in boiler feedwater. Common application points in a boiler system for online hydrazine measurement include deaerator, condensate system, and boiler feed water. Operates automatically and comes complete with true, fully automatic calibration.

7866 Digital Thermal Conductivity Analyzer for Binary Gas Mixtures Specifications

70-82-03-46 October 2006



Overview

The Honeywell 7866 Thermal Conductivity Analyzer is designed to provide a highly sensitive and accurate analysis of a binary (2-component) mixture of gases. The analyzer can also be calibrated to measure a single component of a multicomponent gas mixture, providing the background gases constitute a stable mixture (such as air), or have approximately the same thermal conductivity.

The 7866 analyzer uses the principles of thermal conductivity, to determine the concentration of a sample gas through the measurement of thermal losses from two highly stable, matched thermistor probes inserted in a stainless steel block.



Figure 1 — Digital 7866 Analyzer

Features

- Easy to use prompts
- Security code protected
- Reliable solid state design
- High speed of response
- High sensitivity
- Excellent stability
- Low maintenance requirement
- Low installation costs through optional remote mounting capability of the sensing unit (transmitter)
- Explosion-proof housing on the sensing unit available
- Signal transmission from the sensing unit up to 1000 feet over unshielded leadwires
- Panel-mounted 1/4 DIN control unit (receiver) with easy-to-read display
- Current output signal from the control unit representing measured PV
- Two alarms

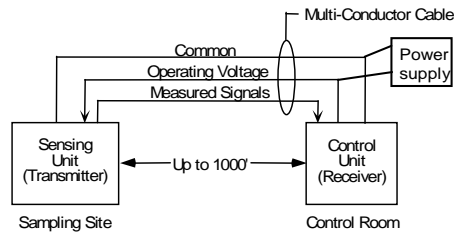
- A triple range analyzer for hydrogen-cooled generator applications is available
- Triple range analyzer control unit has available a second current output used to retransmit ranging data to optional indicator model
- Optional Modbus 485 or Ethernet communications supports configuration and data acquisition

Description

The analyzer consists of three basic components: the sensing unit (transmitter), the control unit (receiver) and a power supply.

The sensing unit receives a continuous flow of the binary or multi-component gas mixture, measures the concentration of the sample gas and transmits an electrical signal to the control unit.

The sensing unit is ruggedly constructed to meet most environmental conditions and is designed to be mounted up to 1,000 feet from the control unit with only a single multi-conductor non-shielded cable connecting the two, resulting in greater flexibility and lower installation costs.



The control unit receives the output signal from the sensing unit at the sampling site by way of the inter-connecting cable.

The control unit is designed for simplified panel-mounting either at the sampling site, if environmental conditions permit, or in a control room. The unit provides a current output signal to a remote device for monitoring or recording purposes.

The control unit is supplied with two alarms. When there is no "alarm" condition, the relay is energized, so the NO contacts are closed and the NC contacts are open. When an alarm condition occurs, the relay de-energizes, so the NO contact falls open, and the NC contact falls closed.

This is a normal "FAILSAFE" contact operation. If you lose power, the relays obviously DEENERGIZE, so the relays fall to their ALARM condition, providing "failsafe" indication that the controller is not operating.

An indicator model, which provides a continuous readout of the concentration of the gas under analysis, is available with the triple range 7866 analyzer. The indicator input is connected to the controller's current output. The indicator has no direct connection to the sensing unit.

Some common applications of the 7866 Thermal Conductivity Analyzer are:

- *Electric Power Industry Power Plants* – Accurate monitoring of hydrogen purity in hydrogen-cooled generators. The triple range analyzer also monitors carbon dioxide in air and carbon dioxide in hydrogen insuring safe execution of the purge cycles.
- *Chemical Industry* – Measurement of hydrogen in ammonia or nitrogen for dissociated ammonia applications. Also, measurement of hydrogen in oxygen, carbon dioxide, and methane.
- *Petroleum Industry* – Measurement of hydrogen in certain hydrocarbon streams.

Equipment

Sensing Unit – The 7866 Thermal Conductivity analyzer's sensor assembly is supplied with an optional explosion proof housing. The housing consists of a rugged cast aluminum construction that permits reliable operation under adverse ambient conditions.

The sensor assembly consists of two sections – the cell block assembly and the electronic assembly.

The cell block assembly is of stainless steel construction with two identical internal cells, the measuring cell and the reference cell. The highly stable thermistor is mounted in each cell. These matched thermistors form the active arms of a bridge circuit. The unbalanced current of the bridge provides the means of measuring the relative ability of the sample and reference gases to conduct the heat away from their respective thermistors to the cell wall, which is held at a constant temperature. The reference gas chamber, with inlet and outlet openings drilled into the chamber from the base, can be opened or sealed. All zero-based standard ranges and the 20% to 50% H₂ range have air-filled, sealed reference cells. For hydrogen ranges starting above 50% as well as the 90-100% oxygen range, a flowing reference is used. The measuring chamber is open to the continuous sample gas flow.

The cells in which the thermistors are mounted are dead-ended so the sample gas enters only by diffusion, minimizing the effect of sample flow variations. In addition, the entire cell-block assembly is maintained at a constant optimum temperature through two heaters and a control thermistor that are located in the cell block assembly.

The sensing unit's electronics assembly incorporates solid state electrical circuits. These circuits include:

- *Current Regulator* which supplies the constant current to the thermistor cell bridge circuit.
- *Proportional Action Temperature Controller* which maintains the entire cell block at a constant temperature.
- *Voltage to Current Converter/ Amplifier* whose current output is transmitted to the analyzer's Control Unit.

Control Unit – The control unit houses the remaining measuring circuits in a 1/4 DIN standard case. In addition, the control unit has a digital display (4 digit display of Process Variable as well as range indication and alarm status) with keypad and a menu structure to enable easy configuration and calibration. It provides 4-20mA output and 2 form C relay contacts for Alarms.

Digital Display on the Control Unit – Provides a continuous readout of the concentration (0-100 %) of the gas under analysis.

Alarms – Two alarms are available for high and low alarms. Each alarm can be individually set. An alarm hysteresis which sets the deactivation range for both alarms is also available. The alarms include numeric indication on the display, as well as, an external relay contact for external communication. The relay output can also service an external shutdown device.

Optional Communications – Allows the controller to be connected to a host computer via the Modbus 485 protocol or Ethernet communication.

WARNING

When measuring flammable gas mixture that contains oxygen, the maximum oxygen concentration must not exceed 21%.

Operator Interface



Figure 2 – 7866 Control Unit Operator Interface and Key Functions

Display Indicators			
	Upper display with 4 larger digits shows Process Variable value (normal operation) and special annunciator features. During Configuration, the upper display provides guidance for the operator through prompts (7 – characters)		Control Relay 1 through 4 annunciations.
	During normal operation, the lower display shows key-selected operating parameters such as Output, Setpoints, Inputs, Deviation, active Tuning Parameter Set, Timer Status, or minutes remaining in a setpoint ramp (4 digits). During configuration, the lower display provides guidance for the operator through prompts (8-characters).		Indicates either degrees Fahrenheit or Centigrade.
	Alarm 1 through 4 annunciations.		Indicates either Manual or Auto mode.
	Digital Input 1 through 4 annunciations.		Indicates Local Setpoint #1. The lower display also shows other control information and other setpoints. A bar is lighted next to the lower display when the setpoint currently being used is shown on the lower display.
Keys and Functions			
	Selects functions within each configuration group. Switches between Loop Displays for Two Loop and Cascade units.		Selects Manual or Auto mode.
	Scrolls through the configuration groups.		Hold key down to cycle through configured setpoints.
	Returns Controller to normal display from Set Up mode. Toggles various operating parameters for display.		Enables Run/Hold of the SP Ramp or Program plus Timer start.
	Increases setpoint or output value. Increases the configuration values or changes functions in Configuration mode groups.		Decreases setpoint or output value. Decreases the configuration values or changes functions in Configuration mode groups.
	Infrared transceiver		NEMA4X and IP66 screw attachment (each corner)

Ethernet Communications

Widely used by manufacturers, the Ethernet connection, which uses Modbus TCP/IP, allows the controller to connect to other Ethernet networks and exchange data with computers or devices on that network for monitoring or managing your process from almost any location. The Ethernet cable can be connected to a hub (using a straight through cable) or directly to a PC (using a crossed cable or straight through cable reconfigured at the controller terminals)

The controller can be configured via the P.I.E. software. This software allows the user to configure all of the parameters included in the instrument and to monitor various parameters in the controller.

The controller can be configured to send an Email when an alarm condition has been encountered. The Email address and gateway are configured using the P.I.E. software.

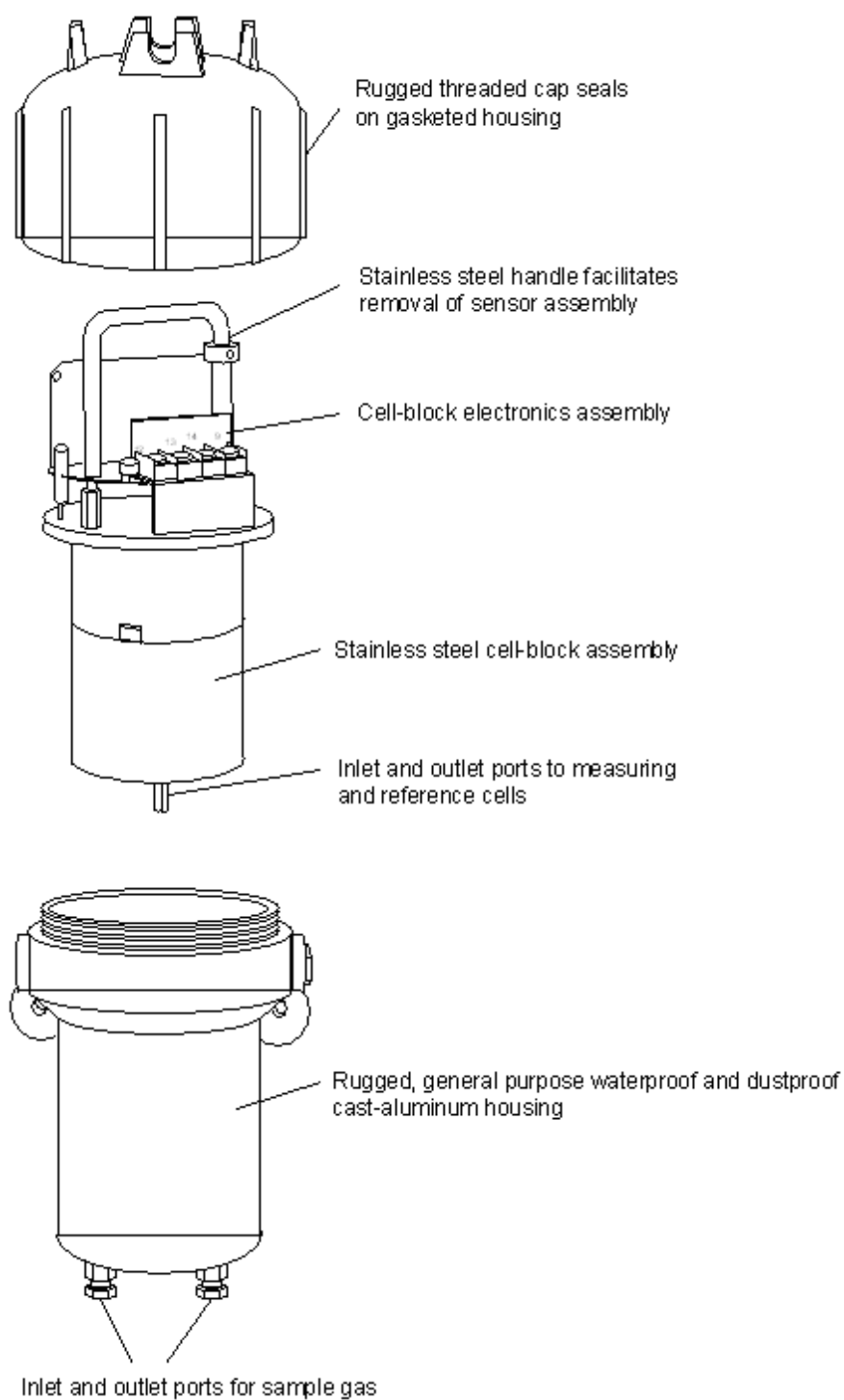


Figure 3 — 7866 Sensor Assembly

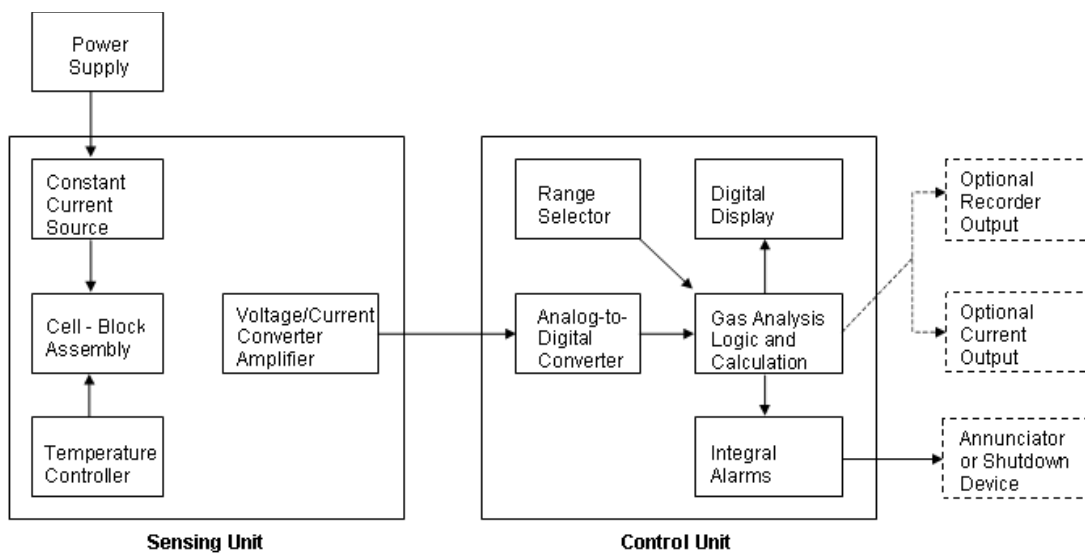


Figure 4 – Block Diagram of 7866 Digital Thermal Conductivity Analyzer

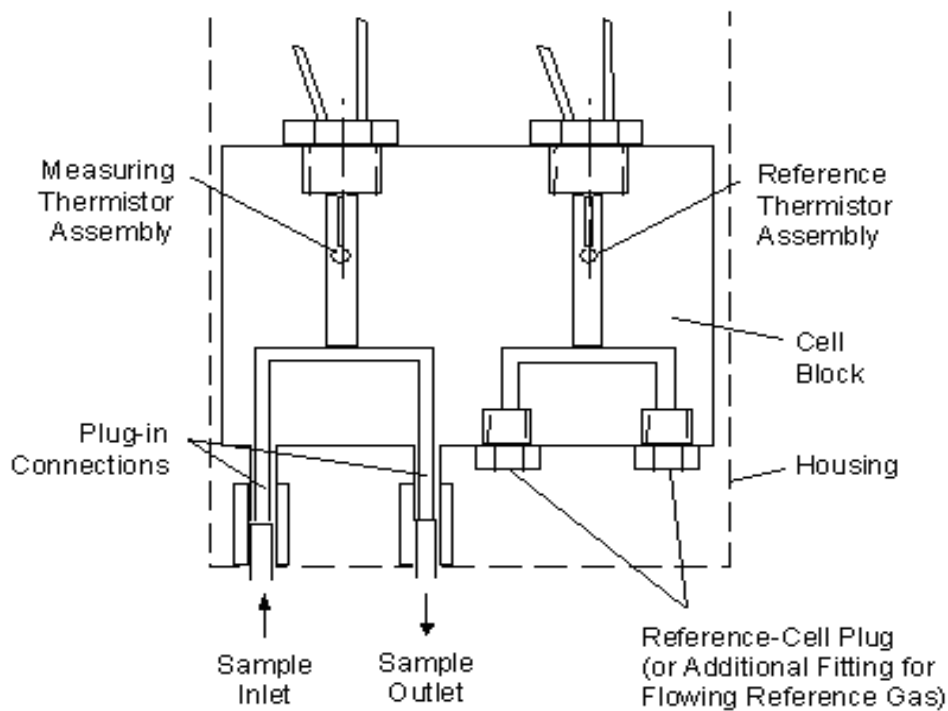



Figure 5 — Cross-Section of 7866 Sensing Unit

Specifications

Performance	
Accuracy	± 2 % of span (output signal) at reference conditions for binary gas mixtures
Linearity	Within ± 2 % of span for most standard ranges. If linearity exceeds ± 2 % a correction curve is supplied with the analyzer.
Meter	<i>Accuracy:</i> ± 2 % of span <i>Digital Indication:</i> ± 0.1 %
Repeatability	Short term: ± 0.3 % of span
Reproducibility	24 hour: ± 1 % of span
Response Time	Maximum, for 4 cfh (2000 cc/min.) flow: For H ₂ ; initial, less than 1 second; 63 %: 13 seconds 90 %: 23 seconds 99 %: 40 seconds For CO ₂ ; Initial, less than 2 seconds; 63 %: 24 seconds 90 %: 45 seconds 99 %: 80 seconds
Maximum Drift	<i>Zero:</i> ± 2 % of span per week maximum <i>Span:</i> ± 2 % of span per week maximum
Ambient Temperature Influence	<i>At sensing unit:</i> Depends on range; typically less than 1 % F.S. over entire temperature range
Atmospheric Pressure Influence	± 0.01 % of span per inch H ₂ O (± 0.05 % of span per mm Hg)
Sample Flow Rate Influence	Less than ± 0.5 % of span over flow range of 0.2 to 4 cfh (100 to 2000 cc/min)
Line Voltage Influence	Maximum 0.02 % of span for each 1 % change of line voltage
Operating	
Measuring Range	Triple Range Analyzer Three ranges—Range 1 measures CO ₂ in Air, Range 2 measures H ₂ in CO ₂ , and Range 3 measures H ₂ in Air Single Range Analyzer One range, as specified. For standard ranges, see Selection Guide Table in the Model Selection Guide. Explosion Proof Applications  WARNING When measuring flammable gas mixture that contains oxygen, the maximum oxygen concentration must not exceed 21%.
Output Ranges	0-20 mA maximum load: 800 ohm 4-20 mA maximum load: 800 ohm
0/4-20 mA Output	Triple Range Analyzer <i>Range 1:</i> 0 to 100 % CO ₂ in Air <i>Range 2:</i> 0 to 100 % H ₂ in CO ₂ <i>Range 3:</i> 0 to 100 % H ₂ in Air Single Range Analyzer 0/4 mA at low range limit 20 mA at high range limit

Performance	
Alarm Outputs	One or two alarms are available; each uses an SPDT electromechanical relay. Alarm Relay Contacts Rating <i>Resistive Load: 5 amps @ 24 Vdc or 120 Vac or 240 Vac</i> <i>Inductive Load: 50 VA</i>
Outputs	Single Range: Two relay outputs for Alarm 1 and Alarm 2 One current output to transmit PV information Triple Range: Two relay outputs for Alarm 1 and Alarm 2 Two current outputs to transmit PV and range information <i>Remote Indicator:</i> Two relay outputs for Alarm 1 and Alarm 2
Sample Requirements	Sample Temperature: -10 °C to +50 °C (14 °F to 122 °F) Sample Flow: 0.2 to 4.2 cfh (100 cc/min to 2000 cc/min) Sample Pressure: 37 mm Hg (20" H ₂ O) minimum (with filter and flowmeter) Sensor outlets must vent to atmospheric pressure.
Reference Gas Requirements	Triple Range Analyzer The triple range H ₂ and CO ₂ analyzer requires flowing air as the reference gas, 0.02 – 0.2cfh (10 – 100cc/min), 2 psig (13.79kPA) max. Sensor outlets must vent to atmospheric pressure. Single Range Analyzer None required, except for ranges: 080000, 095000, 098000, 506000, and 516000; these require pure hydrogen reference gas flow 103000 and 510000; these require air reference flow Gas Flow Rate: 0.02-0.2 cfh (10-100 cc/min), 2 psig (13.79kPA) max. Sensor outlets must vent to atmospheric pressure.
Ambient Requirements	<i>Relative Humidity:</i> 90 % maximum <i>Temperature Range:</i> -10 °C to +50 °C (14 °F to 122 °F) <i>Storage Temperature:</i> 70 °C maximum (158 °F)
Power Requirements	<i>Control Unit only:</i> Universal supply 90 Vac to 264 Vac (consumption 18 VA maximum) or 24 Vac/dc (consumption 12 VA maximum); 50 Hz to 60 Hz
Materials Contacting Sample Gas	Sample contacts 316 stainless steel, Buna N, Teflon, glass and Viton
Connections	<i>Sample inlet and outlet:</i> 1/4" OD tubing (compression fittings supplied) <i>Reference gas inlet and outlet:</i> 1/4" OD tubing (compression fittings supplied) <i>Electrical power inlet:</i> Opening for 1/2" conduit (control unit only) <i>Sensing unit power inlet (24 Vdc from control unit):</i> 1/2" NPT (female conduit)
Communications:	RS422/485 Modbus RTU Communications Interface (Optional) <i>Baud Rate:</i> 4800, 9600, 19,200 or 38,400 baud selectable <i>Data Format:</i> Floating point or integer <i>Length of Link:</i> 2000 ft (600 m) max. with Belden 9271 Twinax Cable and 120 ohm termination resistors 4000 ft. (1200 m) max. with Belden 8227 Twinax Cable and 100 ohm termination resistors <i>Link Characteristics:</i> Two-wire (half-duplex),

Performance	
	<p>multi-drop Modbus RTU protocol, 15 drops maximum or up to 31 drops for shorter link length.</p>
	<p>Ethernet TCP/IP Communications Interface (Optional)</p> <p><i>Type:</i> 10Base-T <i>Length of Link:</i> 330 ft. (100 m) maximum. Use Shielded twisted-pair, Category 5 (STP CAT5) Ethernet cable. <i>Link Characteristics:</i> Four-wire plus shield, single drop, five hops maximum <i>IP Address:</i> IP Address is 10.0.0.2 as shipped from the Factory <i>Recommended network configuration:</i> Use Switch rather than Hub in order to maximize UDC Ethernet performance <i>Configuration:</i> Ethernet parameters are configured via the Process Instrument Explorer. <i>Email:</i> The capacity to send two Emails is provided. These must be configured via the Process Instrument Explorer. It is recommended that the Real Time Clock option be purchased for any instrument that needs to send Email. Ethernet Communications is mutually exclusive with the Second Current Output.</p>
	<p>Infrared Communications (Standard)</p> <p><i>Type:</i> Serial Infrared (SIR) <i>Length of Link:</i> 3 ft. (1 m) maximum for IrDA 1.0 compliant devices <i>Baud Rate:</i> 19,200 or 38,400 baud selectable</p>
Physical Specifications	<p>Sensing Unit: <i>Weight:</i> 8.5 kg (18-3/4 lb.) <i>Dimensions:</i> Approximately 150 mm x 150 mm x 325 mm (6 in. x 6 in. x 12-3/4 in.)</p> <p>Control Unit: <i>Weight:</i> 1.3 kg (3 lb.) <i>Dimensions:</i> Bezel: 96 mm H x 96 mm W (3.78" H x 3.78" W) Case: 92 mm H x 92 mm W x 192 mm D (3.62" H x 3.62" W x 7.55" D)</p>
Standards – Sensing Unit	<p>FM*: Class 1, Div. 1, Groups A,B,C,D Class II, Div. 1, Groups E,F,G Class III, Div.1 T6 @ T_A = 50°C; Enclosure Type 4 Note: All conduits must be sealed within 18 inches</p> <p>CSA*: Class 1, Div. 1, Groups A,B,C,D Class II, Div. 1, Groups E,F,G Class III, Div.1 T6 @ T_A = 50°C; Enclosure Type 4 Note: All conduits must be sealed within 18 inches</p> <p>ATEX**: II2G, Ex d IIC T6 (-10°C ≤ T_a ≤ +50°C) Note: Not for Carbon Disulfide Gas</p> <p>*: Approvals standard on Triple Range units, optional on Single Range units.</p>

Performance			
	<p>**: Only available on Triple Range units See Model Selection Guide for details.</p>		
Standards – Control Unit	<p>This product is in conformity with the protection requirements of the following European Council Directives: 73/23/EEC, the Low Voltage Directive, and 89/336/EEC, the EMC Directive. Conformity of this product with any other “CE Mark” Directive(s) shall not be assumed.</p>		
	<table border="1"> <tr> <td><i>Product Classification:</i></td> <td>Class I: Permanently connected, panel-mounted Industrial Control Equipment with protective earthing (grounding).</td> </tr> </table>	<i>Product Classification:</i>	Class I: Permanently connected, panel-mounted Industrial Control Equipment with protective earthing (grounding).
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Miscellaneous	<p><i>Analyzer temperature:</i> Sensing unit thermostated at 50 °C (122 °F)</p>		

Dimensions

The controller is housed in a 5.8-inch (148 mm) deep, black plastic case with a dark gray elastomer bezel that can be panel mounted in a 1/4 DIN cutout. The plug-in chassis allows easy access to the controller board and its various option boards. All power, input, and output wiring are connected to screw terminals on the rear panel. (See Figure 5.)

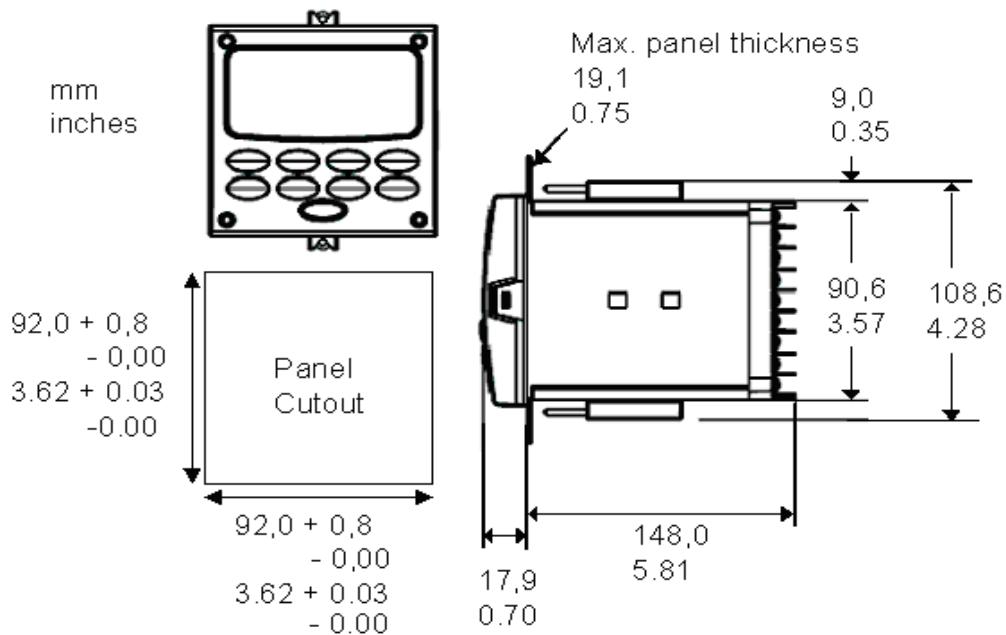


Figure 6 — 7866 Control Unit/Indicator Mounting Dimensions

Dimensions

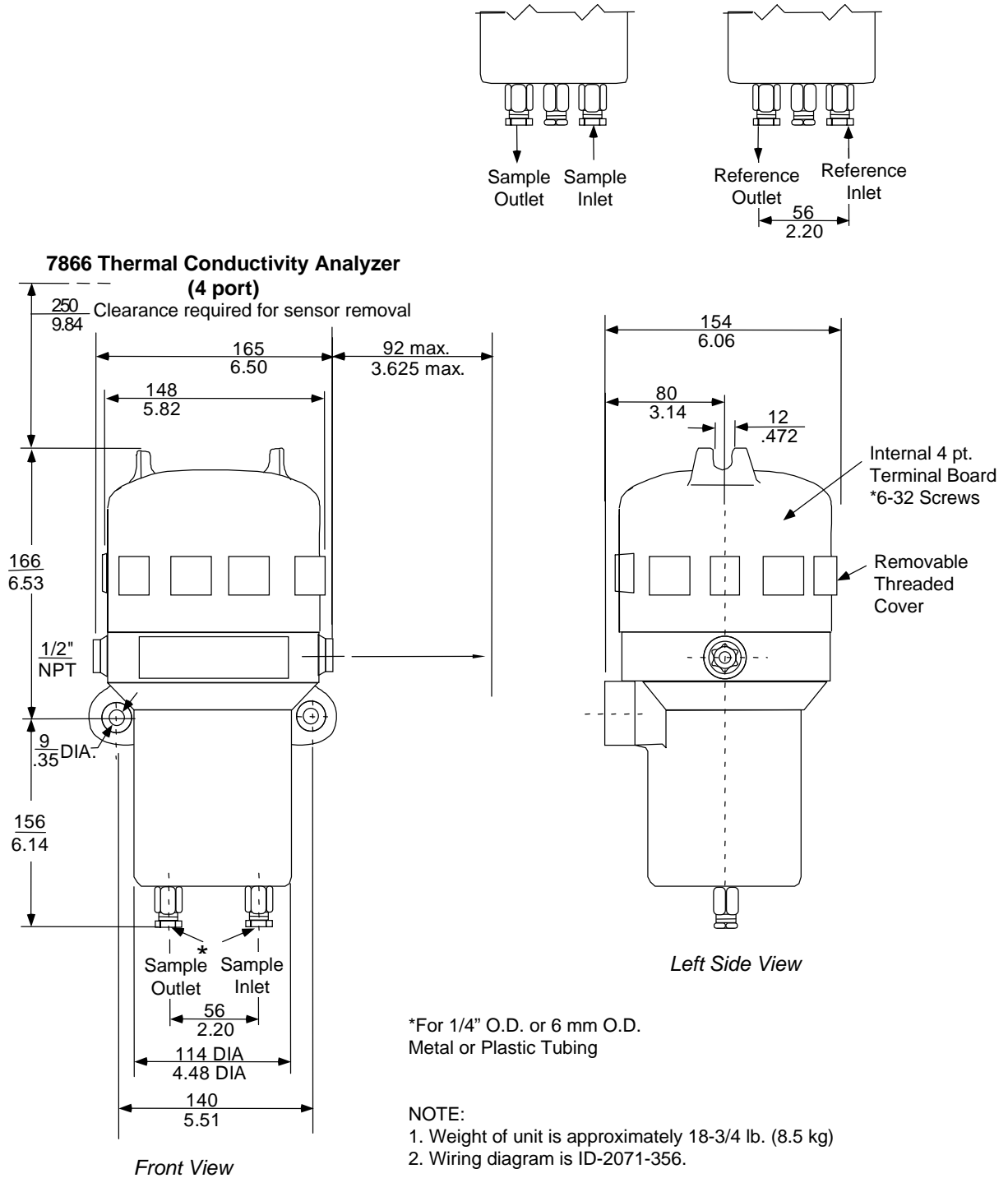


Figure 7 — 7866 Sensing Unit Mounting Dimensions

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.** Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For More Information

Learn more about how Honeywell's 7866 Digital Thermal Conductivity Analyzer for Binary Gas Mixtures can provide accurate analysis of binary component, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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Phoenix, Arizona 85027
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70-82-03-46
October 2006
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The Honeywell logo, consisting of the word "Honeywell" in a bold, red, sans-serif font.

7872 Gas Sampling System Specifications

70-82-03-19 November 2007



Overview

The pre-packaged 7872 sampling system provides a complete pre-engineered panel designed specifically for hydrogen cooled generator applications in utility, paper mills and other co-generation applications. The sampling system allows easy, convenient calibration of all three ranges.

Equipment Description

The 7872 sample panel is an optional part of the 7866 analyzer and includes all components mounted on a single steel panel.

Components of the sampling system include:

- Flow Control Module
- Calibration Module and Bypass Module
- Pressure Regulator
- Air Filter
- Rugged stainless steel tubing, valves and fittings.

All components are panel mounted and piped together. It is recommended that a sample panel be part of each 7866 installation.

Specification

7872 Sampling System

Sample Requirements	
Particulate Load	Up to 229 mg/m ³
Temperature	Up to 220 °F (104 °C)
Pressure	1 psig to 100 psig (0.07 kg/cm ² to 7 kg/cm ²)
Water Vapor Content	Dry or dew point not above ambient temperature.
Utility Requirements	
Reference Air	250 cc/min to 1000 cc/min, instrument quality (clean and dry).
Calibrating Gases	CO ₂ (100 %) and H ₂ (100 %). It is also recommended that a tank of 75 % H ₂ in N ₂ be available to span calibrate the third range (H ₂ in Air).
Construction	12-gauge steel, gray enamel finish, with components mounted, piped and tested.
Dimensions	30" (w) x 30" (h) x 51" (d) (52 cm x 76 cm x 115 cm)
Weight	Approximately 50 lb. (22.5 kg)

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For More Information

Learn more about how Honeywell's 7872 Gas Sampling System is specifically designed for hydrogen cooled generator applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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70-82-03-19
November 2007
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Honeywell

Sodium Analyzer Series 2131 Specifications

70-82-03-60 September 2009



Introduction

The 2131 is the most advanced online instrument specifically developed for use in continuous measurement and determination of sodium ion concentration. Common application points in a boiler system for online sodium measurement include: make-up water, condensate, boiler feedwater and saturated steam/main steam. The 2131 sodium analyzer operates automatically and comes complete with true fully automatic calibration.

Features

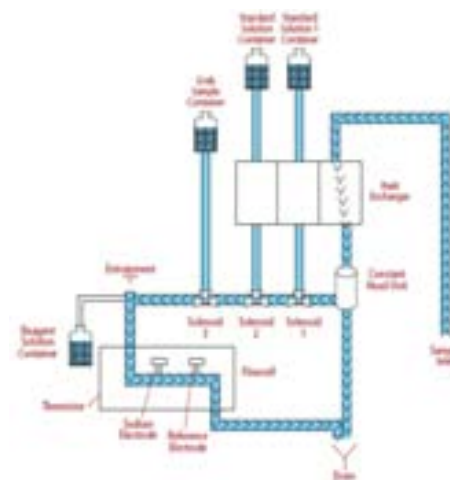
- Wide Analysis Range (0.01 PPB - 10 PPM)
- True fully automatic single or 2-point calibration
- Low maintenance : no change of standards for up to two months (one month for reagent)
- Grab sample capability
- No change of diffusion tubing
- Automatic Range Selection
- Process calibration-calibrate to sample
- Two 4-20mA isolated current outputs
- Protection of electrodes from "Hot sample"
- Automatic temperature compensation
- Automatically stores last 10 calibrations and alarm logs
- No use of highly toxic reagents such as monoethylamine or di-isopropylamine



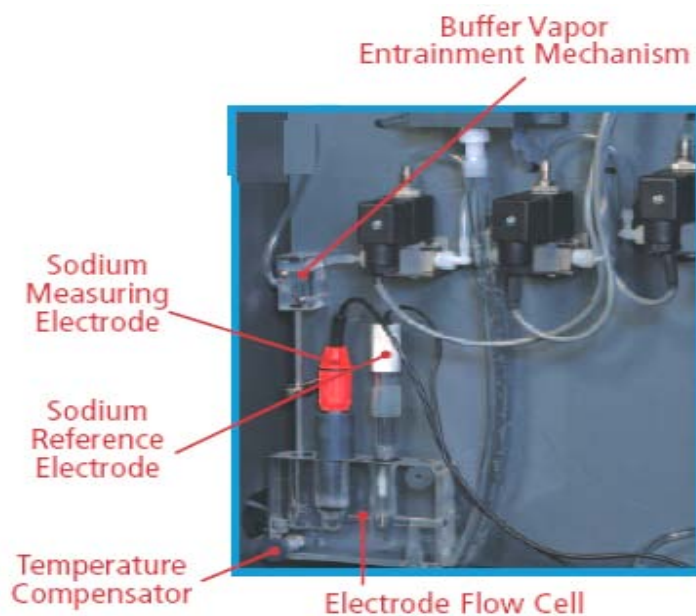
Standard/grab sample liquid is brought into system via the three 3-way solenoid valves. A thermistor is housed in the flowcell and is used to detect the temperature of the sample/standard/ grab sample.

2131 Sensor Unit

The sample flows through the heat exchanger, passes through constant head (used to stabilize minor changes in flow rate) and through the three solenoid valves. A vapor entrainment mechanism adds alkaline buffer vapor to the sample before it enters the sodium measuring flow cell and flows to drain. Calibration and grab sample are controlled automatically by the analyzer.



Sensor flow diagram



Sensor Parts

General Specifications

Performance	
Range	0.01 ppb - 10 ppm.
Accuracy	$\pm 5\%$ of reading or ± 0.1 ppb (whichever is greater) within $\pm 5^\circ\text{C}$ of calibration temperature.
Reproducibility	$\pm 5\%$ of reading or ± 0.1 ppb (whichever is greater) at constant temperature.
Response Time	90% of 1-10 ppb step: less than 4 minutes 90% of 100-1 ppb step: less than 6 minutes
Temperature Compensation	Automatic.
pH Compensation	Alkaline vapor buffer: 0.88 SG (35% W/V) ammonia above 0.1 ppb sodium. 50% diethyl amine solution below 0.1 ppb sodium.
Single or 2-point calibration	Manual and fully automatic calibration. Manual initiated by operator, automatic with programmable frequency in days. No manual changes of standards during calibration.
Current Outputs	Two isolated 4-20 mA current (analog) outputs.
Digital Outputs	Communication interface via RS-232 & RS-485 using MODBUS RTU protocol
Alarms	Three voltage-free contacts, alarm points set from transmitter rated at 2A, 250VAC (non-inductive)
Power	Wide range of input power supply 90VAC – 250VAC
CE Certification (on request)	Meets low voltage and low electromagnetic compatibility directives

General Specifications

Operating Conditions	
Sample	Temperature: 41 – 131 °F (5 - 55°C); Flow 150 - 400 ml/min.
Ambient Temperature	32 - 131 °F (0 - 55°C).
Pressure	5 – 30 psig (0.35 – 2.07 bar)
Composition	Sample should be filtered to 60 micron, free of film forming compounds.
Mechanical	
Construction	Transmitter – high strength ABS, IP65 (NEMA 4x) Wet section – high strength ABS and sheet metal, all wetted parts stainless steel or PVC, IP55 (NEMA 4)
Dimensions	Height=31”(78.74 cm) including drain Width=22”(55.88 cm) Depth=8.5”(21.59 cm)
Mounting	Four key-style holes: Height=0.86”(2.18 cm), Top Width=0.281”(0.714 cm), Radius=0.280”(0.711 cm) Horizontal: 14.7”(37.34 cm), Vertical: 11”(27.94 cm)
Weight	40 lbs. (18.14 kg)
Wiring	Eight (8) conduit knockouts
Piping	Sample Inlet: 1/4”(0.635 cm) OD Swagelok® Drain: 3/8”(0.953 cm) OD tube
Finish	Corrosion resistant.
Distance	Up to 325 feet (100 meters) on request

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.** Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's 2131C Sodium Analyzer can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

1860 West Rose Garden Lane
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70-82-03-60
September 2009
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Sodium Analyzer Series 2131C Specifications

70-82-03-61 September 2009



Introduction

The 2131C is the most advanced online instrument specifically developed for use in continuous measurement and determination of sodium ion concentration. Common application points in a boiler system for online sodium measurement include: make-up water, condensate, boiler feedwater and saturated steam/main steam.

Features

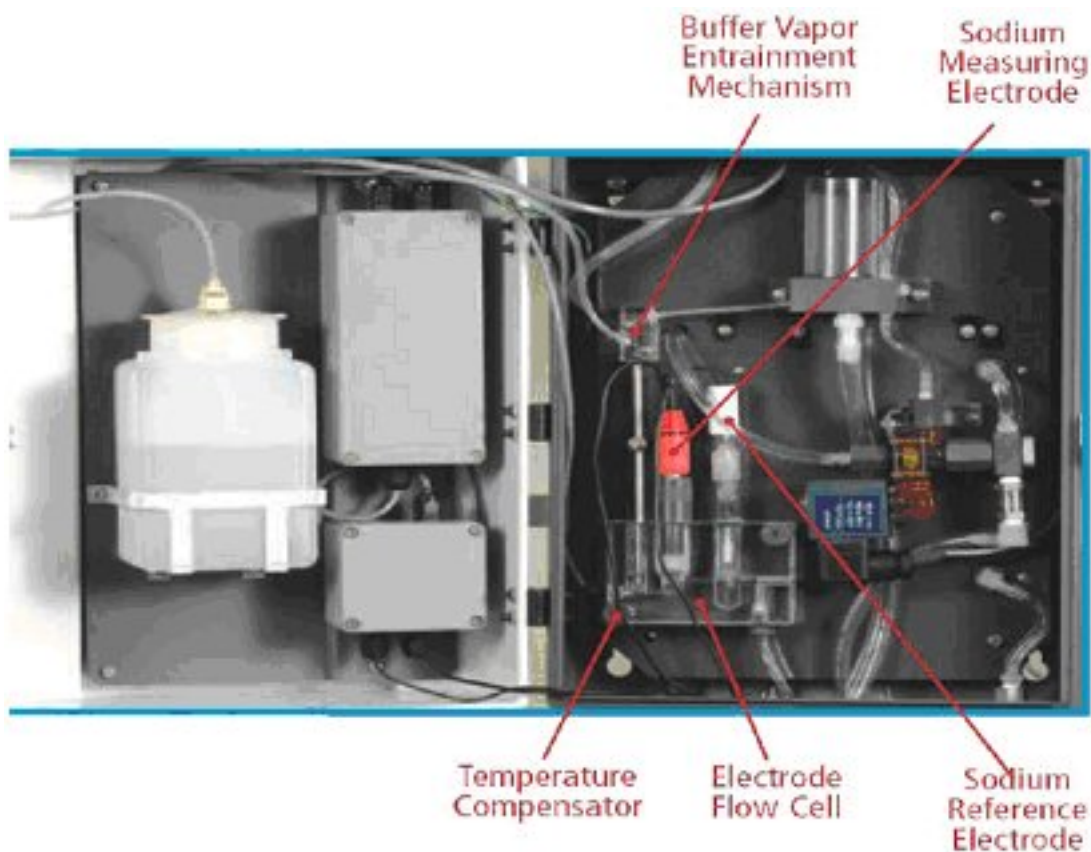
- Wide Analysis Range (0.01 PPB - 10 PPM)
- Low maintenance
- Very low reagent & standard consumption
- No change of diffusion tubing
- Automatic Range Selection
- Process calibration-calibrate to sample
- Two 4-20mA isolated current outputs
- Protection of electrodes from "Hot sample"
- Automatic temperature compensation
- Automatically stores last 10 calibrations and alarm logs
- No use of highly toxic reagents such as monoethylamine or diisopropylamine



Sodium Analyzer

2131C Sensor Unit

During calibration the 3-way valve is activated, a standard of known sodium concentration passes through a heat exchanger to equilibrate the solution's temperature to that of the sample. The standard then enters the constant head unit where flow is stabilized. Alkaline buffer vapor is added via a vapor entrainment mechanism before the standard enters the sodium measuring flow cell and flows to drain. During normal operating conditions the standard solution is replaced by the sample.



Sensor Parts

General Specifications

Performance	
Range	0.01 ppb - 10 ppm.
Accuracy	$\pm 5\%$ of reading or ± 0.1 ppb (whichever is greater) within $\pm 5^\circ\text{C}$ of calibration temperature
Reproducibility	$\pm 5\%$ of reading or ± 0.1 ppb (whichever is greater) at constant temperature
Response Time	90% of 1-10 ppb step: less than 4 minutes 90% of 100-1 ppb step: less than 6 minutes
Temperature Compensation	Automatic
pH Compensation	Alkaline vapor buffer: 0.88 SG (35% W/V) ammonia above 0.1 ppb sodium 50% diethylamine solution below 0.1 ppb sodium
Single or 2-point calibration	Manual calibration
Current Outputs	Two isolated 4-20 mA current (analog) outputs
Digital Outputs	Communication interface via RS-232 & RS-485 using MODBUS RTU protocol
Alarms	Three voltage-free contacts, alarm points set from transmitter rated at 2A, 250VAC (non-inductive)
Power	Wide range of input power supply 90VAC – 250VAC
CE Certification (on request)	Meets low voltage and low electromagnetic compatibility directives

General Specifications

Operating Conditions	
Sample	Temperature: 41 – 131 °F (5 - 55°C); Flow 150 - 400 ml/min
Ambient Temperature	32 - 131 °F (0 - 55°C)
Pressure	5 – 30 psig (0.35 – 2.07 bar)
Composition	Filter to 60 micron, free of film forming compounds
Mechanical	
Construction	Transmitter – high strength ABS, IP65 (NEMA 4x) Wet section – high strength ABS and sheet metal, all wetted parts stainless steel or PVC, IP55 (NEMA 4)
Dimensions	Transmitter Height=10.92"(27.74 cm) Width=7"(17.78 cm) Depth=3.54"(8.99 cm) Wet section Height=18.25"(46.36 cm) Width=11.25"(28.58 cm) Depth=7.63"(19.38 cm)
Mounting	Four key-style holes: Height=0.86"(2.18 cm), Top Width=0.281"(0.714 cm), Radius=0.280"(0.711 cm) Horizontal: 14.7"(37.34 cm), Vertical: 11"(27.94 cm)
Weight	23 lbs. (10.44 kg)
Wiring	Eight (8) conduit knockouts
Piping	Sample Inlet: 1/4"(0.635 cm) OD Swagelok® Drain: 3/8"(0.953 cm) OD tube
Finish	Corrosion resistant.
Distance	Up to 325 feet (100 meters) on request

Warranty/Remedy

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Specifications are subject to change without notice.

Swagelok is a registered product of Swagelok Co.

For More Information

Learn more about how Honeywell's 2131C Sodium Analyzer can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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70-82-03-61
September 2009
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Silica, Phosphate, Hydrazine Analyzers Series 2140 Specifications

70-82-03-62 September 2009



Introduction

REVOLUTIONARY PATENTED TECHNOLOGY

Our Colorimetric Analyzers are based on the new patented Loop Flow Analysis (LFA) cycle. LFA analysis technology involves isolating, manipulating and testing a known volume of sample in a closed loop system. A unique, powerful programmable microprocessor allows for customized program cycles, ensuring accuracy and reliability with every application.

Features

- No reagent pumps or external compressed air requirements
- Exclusive Loop-Flow Analysis Technology (LFA)
- Wide-range analysis (eg: color SiO_2 : 0.1 ppb to 200ppm)
- Ultra-low reagent consumption (1 Liter each per month)
- Fully programmable measurement cycle and calibration frequency.
- Adjustable cycle frequency (1 to 8 cycles per hour)
- Customizable cycles and output contacts
- Auto calibration, priming and cleaning
- Sample flow turns analyzer on and off



General Specifications

General Description	
Sensor Classification	Colormetric dual beam with silicon detector
Application	Demineralized, boiler, potable, surface and waste water
General Specifications	
Power Requirements	12V
Power Supply	110-120V or 220-240V 50/60 Hz, 100 VA
Humidity	Up to 90% not condensable
Ambient Temperature Range	10-45° C analyzer (50-113° F)
Range	Silica:0-1000ppb,0-5000ppb,0-200ppm* Phosphate: 0-2.4ppm, 0-7ppm, 0-20ppm, 0-200ppm * Hydrazine:0-100ppb,0-1ppm* *By Auto Dilution
Accuracy	Silica: +/- 1ppb or +/- 2% of reading whichever is greater Phosphate, Hydrazine: +/- 2% of reading
Unit Dimensions	31.5"H x 15.54"L x 10.83"D
Atmospheric Pressure Range	No Limits
Effect of Electromagnetic Fields	EMC tested according to CE compliance
Tolerance to Electrostatic Discharges	EMC tested according to CE compliance
PC Specifications O/S	PC 104 industrial standard under MS-DOS O/S
Positioning and installation details	Wall or panel mounting analyzer, installed aprox 39" from the ground, maximum 13ft from sampling point
Response Time	As low as 8 minutes, adjustable
Alarms	Concentration, cal error, out of service/sample
Reproducibility	Silica: +/- 1ppb or +/- 2% of reading which ever is greater Phosphate, Hydrazine, Ammonia, Copper: +/- 2% of reading
Degree of Protection	IP55
Required Maintenance	Once a month replenish reagents, once a year replace tubing
Reagent Consumption	1 liter each per month
Reactor Volume	10ml
Materials in Contact with Sample	Glass, Silicone, Plexiglass, Stainless Steel AISI 316
CE Compliance	Yes
General Hazards	Only chemical, for details see specific chemistries

General Description	
Sample Conditioning Requirements	Filtering between 10 and 60 micron, depending on the matrix, needed only to avoid clogging. Internal disposable filters supplied (60 micron)
Sample Delivery Operating Ranges	
Temperature Range	5-55°C (41-131° F)
Flow	Min: 50ml/min
Turbidity	Not applicable; sample blank correction
Color	Not applicable; sample blank correction
PH	3-12
Signal Outputs	
4-20 mA, Voltage 0-5	4-20mA (galvanic isolator module available as option) or 0-5V
Printer Options	Optional, serial output RS232 or 485
Radio or Modem Links	Available as option
Grounding Details	Not applicable, 12V power device
Serial I/O for Signals	Serial data output RS232 or 485 available as option
Operational Calibration	
Frequency/Intervals	Recommended.: 24 hours
Single/Multi Point	Multi point: 0 and top of range
Matrix Corrections	Yes, sample blank correction
Manual/Automatic	Both

Warranty/Remedy

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Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's 2140 Silica / Phosphate / Hydrazine Analyzers can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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September 2009
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Silica, Phosphate and Hydrazine Portable Analyzer Series 2140P Specifications

70-82-03-63 September 2009



Introduction

The Portable Analyzer

Our Portable Colorimetric Analyzers are based on the new patented Loop Flow Analysis (LFA) cycle. LFA analysis technology involves isolating, manipulating and testing a known volume of sample in a closed loop system. A unique, powerful programmable microprocessor allows for customized program cycles, ensuring accuracy and reliability with every application.

Features

- No reagent pumps or external compressed air requirements
- Exclusive Loop-Flow Analysis Technology (LFA)
- Wide-range analysis (eg: color SiO_2 : 0.1 ppb to 200ppm)
- Ultra-low reagent consumption (1 Liter each per month)
- Fully programmable measurement cycle and calibration frequency.
- Adjustable cycle frequency (1 to 8 cycles per hour)
- Customizable cycles and output contacts
- Auto calibration, priming and cleaning



General Specifications

General Description	
Sensor Classification	Colorimetric dual beam with silicon detector
Application	Demineralized, boiler, potable, surface and waste water
General Specifications	
Power Requirements	12V
Power Supply	110-120V or 220-240V 50/60 Hz, 100 VA
Humidity	Up to 90% not condensable
Ambient Temperature Range	10-50° C analyzer (50-122° F)
Range	Silica:0-500ppb,0-5000ppb,0-200ppm* Phosphate: 0-2.4ppm, 0-7ppm, 0-20ppm, 0-200ppm * Hydrazine:0-100ppb,0-1ppm* *By Auto Dilution
Accuracy	Silica: +/- 1ppb or +/- 2% of reading whichever is greater Phosphate, Hydrazine: +/- 2% of reading
Unit Dimensions	15"H x 21"L x 6"D
Weight	31 lbs
Atmospheric Pressure Range	No Limits
Effect of Electromagnetic Fields	EMC tested according to CE compliance
Tolerance to Electrostatic Discharges	EMC tested according to CE compliance
PC Specifications O/S	PC 104 industrial standard under MS-DOS O/S
Positioning and installation details	Wall or panel mounting analyzer, installed aprox 39" from the ground, maximum 13ft from sampling point
Response Time	As low as 8 minutes, adjustable
Alarms	Concentration, cal error, out of service/sample
Reproducibility	Silica: +/- 1ppb or +/- 2% of reading which ever is greater Phosphate, Hydrazine: +/- 2% of reading
Degree of Protection	IP55
Required Maintenance	Once a month replenish reagents, once a year replace tubing
Reagent Consumption	1 liter each per month
Reactor Volume	10ml
Materials in Contact with Sample	Glass, Silicone, Plexiglass, Stainless Steel AISI 316
CE Compliance	Yes, CE Certified

General Hazards	Only chemical, for details see specific chemistries
Sample Conditioning Requirements	Filtering between 10 and 60 micron, depending on the matrix, needed only to avoid clogging. Internal disposable filters supplied (60 micron)
Sample Delivery Operating Ranges	
Temperature Range	5-55°C (41-131° F)
Flow	Min: 50ml/min
Turbidity	Not applicable; sample blank correction
Color	Not applicable; sample blank correction
PH	3-12
Signal Outputs	
4-20 mA, Voltage 0-5	4-20mA (galvanic isolator module available as option) or 0-5V
Printer Options	Optional, serial output RS232 or 485 available as option
Radio or Modem Links	Available as option
Grounding Details	Not applicable, 12V power device
Serial I/O for Signals	Serial data output RS232 or 485 available as option
Operational Calibration	
Frequency/Intervals	Recommended.: 24 hours
Single/Multi Point	Multi point: 0 and top of range
Matrix Corrections	Yes, sample blank correction
Manual/Automatic	Both

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.** Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's Portable Analyzer Series 2140P can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

1860 West Rose Garden Lane
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70-82-03-63
September 2009
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Hydrazine Analyzer Series 2171 Specifications

70-82-03-64 November 2009



Introduction

The 2171 is the most advanced hydrazine instrument specifically developed for use in continuous measurement and determination of hydrazine concentration in boiler feedwater. Common application points in a boiler system for online hydrazine measurement include: deaerator, condensate system and boiler feedwater. The 2171 hydrazine analyzer operates automatically and comes complete with **true fully automatic calibration**.

Features

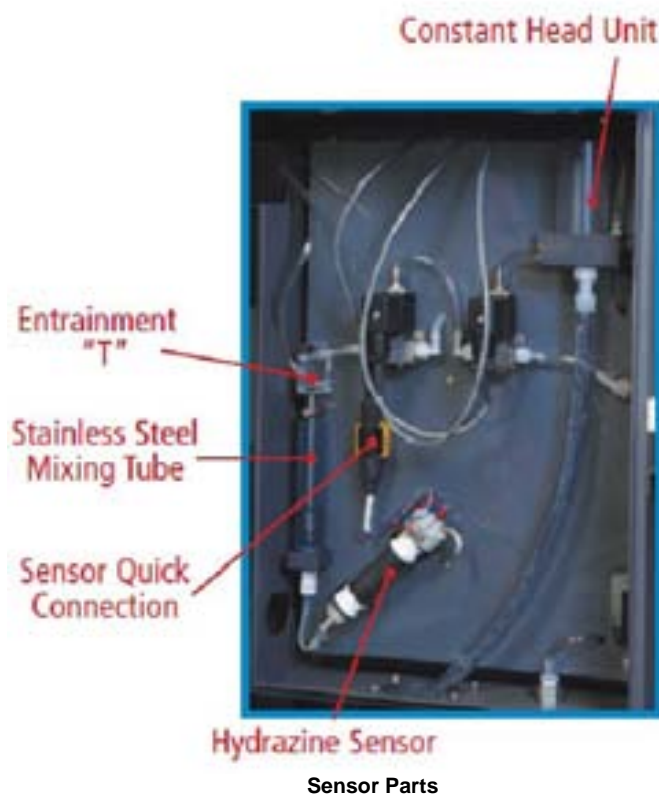
- Wide Analysis Range (0.01 PPB - 10 PPM)
- The fully automatic 1-point calibration Low maintenance : Autonomous nstrument for up to two months
- Grab sample capability
- No change of diffusion tubing
- Automatic Range Selection
- Process calibration-calibrate to sample
- Two 4-20mA isolated current outputs
- Protection of sensor from "Hot sample"
- Automatic temperature compensation
- Automatically stores last 10 calibrations and alarm logs
- Rechargeable hydrazine cell



2171 Sensor Unit

The sample flows through the heat exchanger, passes through constant head (used to stabilize minor changes in flow rate) and through the three solenoid valves. A vapor entrainment mechanism adds alkaline buffer vapor to the sample before it enters the sodium measuring flow cell and flows to drain. Calibration and grab sample are controller automatically by the analyzer.

Standard/grab sample liquid is brought into system via the three 3-way solenoid valves. A thermistor is housed in the flowcell and is used to detect the temperature of the sample/standard/ grab sample.



General Specifications

Performance	
Range	0.01 ppb - 10 ppm.
Accuracy	$\pm 5\%$ of reading or ± 0.1 ppb (whichever is greater) within $\pm 5^\circ\text{C}$ of calibration temperature
Reproducibility	$\pm 5\%$ of reading or ± 0.1 ppb (whichever is greater) at constant temperature
Response Time	90% of 1-10 ppb step: less than 4 minutes 90% of 100-1 ppb step: less than 6 minutes
Temperature Compensation	Automatic
pH Compensation	Alkaline vapor buffer: 0.88 SG (35% W/V) ammonia above 0.1 ppb sodium 50% diethylamine solution below 0.1 ppb sodium
Single or 2-point calibration	Manual and fully automatic calibration. Manual initiated by operator, automatic with programmable frequency in days. No manual changes of standards during calibration.
Current Outputs	Two isolated 4-20 mA current (analog) outputs
Digital Outputs	Communication interface via RS-232 & RS-485 using MODBUS RTU protocol
Alarms	Three voltage-free contacts, alarm points set from transmitter rated at 2A, 250VAC (non-inductive)
Power	Wide range of input power supply 90VAC – 250VAC
CE Certification (on request)	Meets low voltage and low electromagnetic compatibility directives

General Specifications

Operating Conditions	
Sample	Temperature: 41 – 131 °F (5 - 55°C); Flow 150 - 400 ml/min
Ambient Temperature	32 - 131 °F (0 - 55°C)
Pressure	5 – 30 psig (0.35 – 2.07 bar)
Composition	Filter to 60 micron, free of film forming compounds
Mechanical	
Construction	Transmitter – high strength ABS, IP65 (NEMA 4x) Wet section – high strength ABS and sheet metal, all wetted parts stainless steel or PVC, IP55 (NEMA 4)
Dimensions	Height=31”(78.74 cm) including drain Width=22”(55.88 cm) Depth=8.5”(21.59 cm)
Mounting	Four key-style holes: Height=0.86”(2.18 cm), Top Width=0.281”(0.714 cm), Radius=0.280”(0.711 cm) Horizontal: 14.7”(37.34 cm), Vertical: 11”(27.94 cm)
Weight	40 lbs. (18.14 kg)
Wiring	Eight (8) conduit knockouts
Piping	Sample Inlet: 1/4”(0.635 cm) OD Swagelok® Drain: 3/8”(0.953 cm) OD tube
Finish	Corrosion resistant
Distance	Up to 325 feet (100 meters) on request

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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Swagelok is a registered product of Swagelok Co.

Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's 2131C Sodium Analyzer can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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70-82-03-64
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Hydrazine Analyzer Series 2171C Specifications

70-82-03-65 September 2009



Introduction

The 2171C is the most advanced hydrazine instrument specifically developed for use in continuous measurement and determination of hydrazine concentration in boiler feedwater.

Features

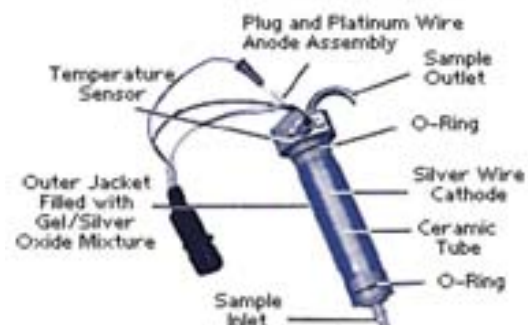
- Wide Analysis Range (0.01 PPB - 10 PPM)
- Low maintenance
- Very low reagent and standard consumption to be changed only every two months
- Self diagnostics
- Stable pH through vapor buffering
- No change of diffusion tubing
- Automatic Range Selection
- Process calibration-calibrate to sample
- Two 4-20mA isolated current outputs
- 3 relay contacts for high, low and general alarm
- Large, easy-to-read 128 x 64 pixel graphic LCD display
- Internal diagnostics to show probe status
- Protection of electrodes from "Hot sample"
- Communication interface via RS-232 & RS-485 using MODBUS RTU protocol
- User-configurable settings for recorder outputs and alarm set points
- Automatically stores last 10 calibrations and alarm logs
- Wide range of input power supply: 90VAC – 250VAC
- Rechargeable hydrazine cell



Hydrazine Analyzer

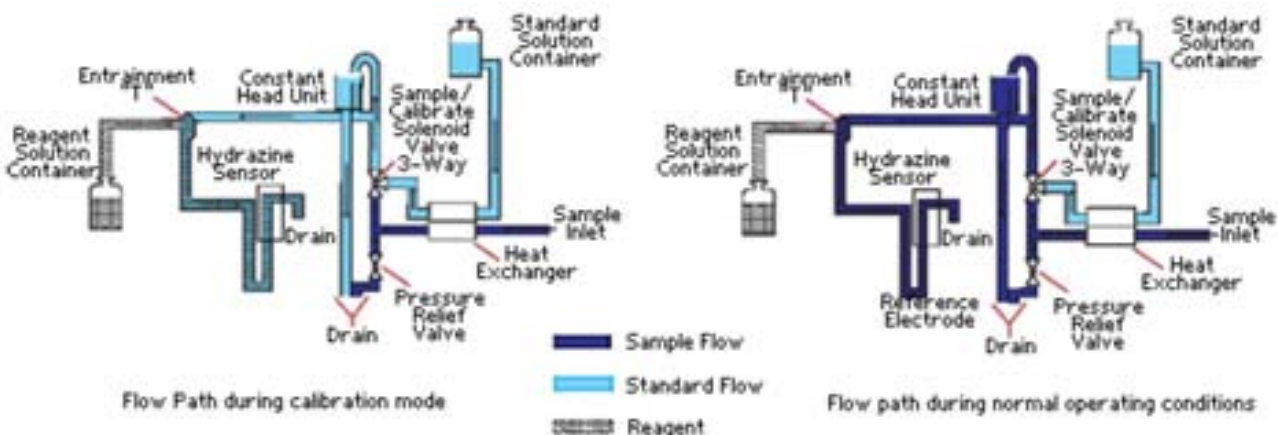
2171C Sensor Unit

During calibration the 3-way valve is activated, a standard of known hydrazine concentration passes through a heat exchanger to equilibrate the solution's temperature to that of the sample. The standard then enters the constant head unit where flow is stabilized. Alkaline buffer vapor is added via a vapor entrainment mechanism before the standard enters the hydrazine cell and flows to drain. During normal operating conditions the standard solution is replaced by the sample.



Sensor Parts

Flow path during calibration mode and normal operating conditions



General Specifications

Performance	
Range	0.01 ppb - 1ppm.
Accuracy	± 5% of reading or ± 2ppb, whichever is greater for concentrations up to 500ppb. Less than 10% for concentrations above 500ppb.
Stability	± 5% of reading or ± 02 ppb, whichever is greater
Response Time	90% of a step change in less than 3 minutes
Temperature Compensation	Automatic, reduces sample temperature error to less than 0.5% or reading per degree C.
pH Compensation	Buffer continuously included into sample flow – Ammonium Hydroxide 0.88 SG (35% NH ₃)
Calibration	Manual calibration.
Current Outputs	Two isolated 4-20 mA current (analog) outputs.
Alarms	Three voltage-free contacts, alarm points set from transmitter rated at 2A, 250VAC (non-inductive)
Power	Wide range of input power supply 90VAC – 250VAC
Operating Conditions	
Sample	Temperature: 41 – 131 °F (5 - 55°C); Flow 150 - 400 ml/min.
Ambient Temperature	32 - 131 °F (0 - 55°C).
Pressure	5 – 30 psig (0.35 – 2.07 bar)
Composition	Sample should be filtered to 60 micron, free of film forming compounds.

General Specifications

Mechanical	
Construction	Transmitter: High strength ABS Wet section: Combination ABS and sheet metal. All wetted parts stainless steel or PVC
Dimensions	Transmitter: Height = 9.45" (24.00 cm), Width = 6.3"(16.00 cm), Depth = 3.54" (9.00 cm) Wet Section: Height = 18" (45.72 cm), Width =11" (27.94 cm), Depth = 7" (0.583)
Mounting	Four key-style holes: Height = 0.86"(2.18 cm), Top Width = 0.281"(0.714 cm), Radius = 0.280"(0.711 cm) Horizontal: 12.875" (32.70 cm), Vertical: 9" (22.86 cm)
Weight	23 lbs. (10.44 kg)
Wiring	Eight (8) conduit knockouts
Piping	Sample Inlet: 1/4"(0.635 cm) OD Swagelok® Drain: 3/8"(0.953 cm) OD tube
Finish	Corrosion resistant.
Distance	325 feet (100 meters)

Warranty/Remedy

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Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's Hydrazine Analyzer Series 2171C can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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September 2009
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