ANALYTICAL SYSTEMS

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Lesman handles instruments for your process that run from the most simple to the most advanced. Look here for assistance finding the exact model to meet your process needs: approval certifications for your environment, materials that offer chemical resistance and long life, configuration and mounting styles that meet your mechanical requirements.

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AquaMetrix by Water Analytics pH/ORP Replacement Probes

Low cost, drop-in replacements for Great Lakes pH probes!

AquaMetrix pH probes plug right in, to replace your GLI/Hach pH sensors!

Get an easy, drop-in pH sensor, with the same performance specifications as the Great Lakes probes you're currently using, and save time, money, and hassles on every order!

Plus, you'll save on inventory costs. Just look below: One AquaMetrix pH probe model and one AquaMetrix ORP sensor replace 16 different Great Lakes sensor models. So, you only have to stock one or two part numbers for quick, easy replacements in your applications!

If you're having problems getting delivery of Great Lakes probes, we have great news! Lesman stocks the most popular models of AquaMetrix probes — so you can have replacement probes as soon as the next business day. Just place your order before 3 pm Central Time, and your in-stock probes will ship the same day.

Features

- Accurate differential measurement
- Eliminates ground loop interference
- Built-in preamplifier
- Replaceable salt bridge
- Temperature compensation device built into all sensors

The P60C8 pH and the R60C8 ORP probe are dependable industrial grade sensors designed to provide accurate measurement and longer service life under the most demanding conditions.

The 60C8 incorporates all the benefits of three-electrode differential measurement. The domed glass process electrode is designed for use in tough applications. The second electrode is immersed in a pH 7 buffer that is fully encapsulated in the probe. This second electrode is protected from the process by a double junction salt bridge.

The resulting true differential measurement has several advantages over conventional probes: ground loop problems are virtually eliminated, and the salt bridge is easy to replace. If the internal solution becomes contaminated, the probe can be rejuvenated by replacing the salt bridge and reference solution.

A thermistor at the probe's tip performs automatic temperature compensation. This placement provides rapid response for process temperature variations.

The encapsulated preamp provides an output signal that can be transmitted 3000 feet. Another version encapsulates a blind 4 to 20 mA two-wire transmitter that can transmit a virtually unlimited distance over a twisted pair cable.

Specifications

Measuring Range: *pH:* 0 to 14.00 pH (consult factory for applications below α 2 and above α 12); *ORP:* -2000 mV to 2000 mV

Flow Rate: 10 ft/sec max (3 meters/sec).

Wetted Materials: CPVC, ceramic/kynar, glass, titanium palladium alloy and EPDM (platinum for ORP probe)

Transmission Distance: 3000 feet max

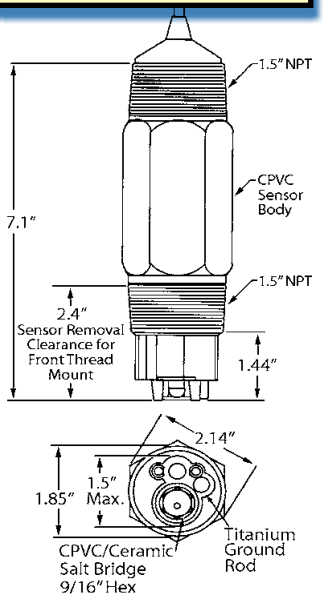
Sensitivity: *pH:* <0.005 pH; *ORP:* 0.5 mV

Stability: 0.03 pH/day, non-cumulative

Automatic Temperature Compensation: Within temperature limits 23° to 203° F

Pressure Limit: 100 PSIG at 149° F max

Temperature Limits: *CPVC:* 23° to 203° F



Model Selection Guide

Description		Catalog Number	Price
60 Series Differential pH Sensor		P	$595.00
60 Series Differential ORP Sensors		R	595.00
Electronics	Standard 5-Wire Sensor	60	0.00
	Two-Wire Transmitter, 4-20 mA Output	65	100.00
Body	1.5" NPT Threaded (GLI Replacement Sensor)	R8	0.00
Options	Hardened Glass Electrode	H	100.00
	Flat Faced Glass Electrode (Sanitary Body)	F	100.00
	Gold Electrode for ORP Sensors	G	100.00
Cable*	Extended Cable Length (in Feet)	XXX	+2.00/ft
Mounting Hardware and Accessories			
Salt Bridge kit, Ceramic Outer Junction, 3-Pack for -8 Body Type (GLI Replacement Sensors)		AM-SBK-8	95.00
Union Tee with Adapter for -8 Body Type		AM-TEE-8	250.00
Submersion Hardware		AM-ARM-8	125.00

* For standard cable length (15 feet) leave XXX in the cable selection. Otherwise, change the XXX to your desired length in feet, and add $2.00 per foot to the price.

Quick GLI to AquaMetrix Part Number Crossover

pH Sensors		*ORP Sensors*	
GLI Part Number	**AquaMetrix Part Number**	**GLI Part Number**	**AquaMetrix Part Number**
6020P0	P60R8	2020R0	R60R8
6021P0	P60R8	2021R0	R60R8
6022P0	P60R8	2022R0	R60R8
6026P0	P60R8	2026R0	R60R8
6028P0	P60R8	2028R0	R60R8
6052P0	P60R8	2052R0	R60R8
6056P0	P60R8	2056R0	R60R8
6058P0	P60R8	2058R0	R60R8

Normally Available from Lesman Stock! ***P60C8*** ***P60C8H***

AquaMetrix by WR Water Analytics Multichannel Controllers, Transmitters and Analyzers

Loop-powered transmitters

Features

- Measures pH, ORP, conductivity, and flow out of the box — no extra cards needed!
- 1/4 DIN enclosures
- SharkTX and SharkTXP transmitters feature 4-20 mA + 24 VDC loop power, 2 x 16 character LCD display; NEMA 4X enclosure or front panel
- Shark-120 analyzer/controllers feature 4-digit LED with colored bargraph, relay cycle on/off timers; two control relays and high/low alarm relay, two 4-20 mA outputs, snap-on terminal connectors

Full-function analyzer

Specifications

	pH	ORP	Conductivity	Flow
Measuring Range	*pH:* 0.01 to 14.00; *Temp:* 32° to 212° F/0° to 100° C	*ORP:* -1999 to 1999mV; *Temp:* 32° to 212° F/0° to 100° C	uS/cm: 0 to 2.000/20.00/200.0/2000; mS/cm: 0 to 20.00/200.0; MΩ/cm: 0 to 19.99; Temp: 32° to 212° F	Flow: 0 to 9999, selectable flow rate units (gal, ft³, liters, m³, custom); Volume: 0 to 9999, auto range: Time units: Hrs, min, sec
Sensor Distance	Differential: 3000 ft; Combination: 10 ft		300 ft	2000 ft

Analog Output: *SharkTX/TXP:* One 4-20 mA Isolated Output, Range expand 0–100% full scale (min segment 10% FS), max. load 800Ω; *Shark-120:* Two 4-20 mA isolated outputs, Range expand 0–100% full scale (min 10% FS), max. load 800Ω

Relay Outputs (Shark-120 Only): *Two Control Relays:* 10A/NO, 5A/NC @ 240 VAC or 28 VDC. Mode: Process control, Adjustable parameters: process direction, (rising or falling) On/Off setpoints, (0–100% FS), cycle timer (on/off, 0–600 sec), failsafe (on/off). *One Alarm Relay:* 10A/NO, 5A/NC @ 240 VAC or 28 VDC. Mode: High/low alarm, Adjustable parameters: High/Low on/off setpoints (0–100% FS).

Display: *SharkTX/SharkTXP:* 2 x 16 alphanumeric LCD; *Shark-120:* 4 x 7 segment 1/2" LED, 1 LED indicator online, 7 LED front panel bargraph, 2 x 16 alphanumeric LCD inside panel

Ambient Conditions: *Temperature:* -4° to 140° F; *Humidity:* 0 to 90% RH

Enclosure: NEMA 4X polycarbonate, ; *SharkTX:* Two 1/2" conduit holes, surface/pipe/panel mount; *SharkTXP:* 1/4 DIN, panel/DIN rail mount; *Shark-120:* Four 1/2" conduit holes, surface/pipe/panel mount.

Power Requirements: *SharkTX/SharkTXP:* 4-20 mA loop powered, 16 to 32 VDC; *Shark-120:* 120 VAC 50/60Hz (<12 VA) or 240 VAC 50/60 Hz (<12 VA)

Model Selection Guide

Description	Catalog No	Price
Multiparameter Transmitter, Panel/Pipe/Surface Mt	SharkTX	Call
Multiparameter Transmitter, Panel/DIN Rail Mount	SharkTXP	Call
Multiparameter Controller/Analyzer, 120V Power	Shark-120	Call

See pages 160 and 173 for pH and conductivity sensors.

AquaMetrix 2300 1/4 DIN Web-Enabled Multi-Input Controller

- Comes standard with four 4-20 mA sensor and three frequency/pulse counter inputs: Any combination: pH, ORP, conductivity, flow, on/off signals, and more
- Four programmable relay outputs
- Alarm notifications by e-mail, text, and/or display for each input
- Perform differential measurement from two analog inputs
- Log data to SD card, download via web
- Web enabled for setup, data collection, and remote viewing with password protection
- 1/4 DIN panel mount enclosure standard; Add NEMA 4X adapter for wall mounting

Functionality of a PLC and SCADA at the price of a transmitter!

Specifications

Inputs: *Analog:* Four 4-20 mA standard; *Frequency:* Two optically isolated, up to 24 VDC or 120 VAC; *Counter:* One accumulator for tracking equipment on time

Outputs: *Relays:* Four 120V/240V @ 10A/5A; *Alarms:* Configurable as E-mails or texts for alarms, alerts, or reminders; *Digital output:* Modbus RTU over RS485 or Modbus TCP over TCP/IP*

Web: Remote programming and viewing with a browser on a computer, tablet, or smartphone; Secure password login required.

Datalogging: Logs CSV files to micro SD card

Mounting: 1/4 DIN panel mount or wall mount

Protection: NEMA 4X

* One expansion slot is available to add inputs or relay or digital outputs

Model Selection Guide

Description	Catalog Number	Price
Multi-Input Universal Controller	2300	$2295.00
NEMA 4X Wall-Mount Enclosure Kit	2300-WALL-ENCL	195.00
Expansion Cards (One Slot Available)		
Add Four 4-20 mA Inputs	2300-CARD-420-IN	500.00
Add Four 4-20 mA Outputs	2300-CARD-420-OUT	400.00
Add Six 240V 5Amp Relay Outputs	2300-CARD-RELAY-OUT	400.00

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Choosing the Right pH/ORP Analysis System

pH/ORP Analysis, Control, and Monitoring Devices

	DirectLine™ Model DL421 with Durafet II Sensor	APT2000/4000 pH Transmitter/Analyzer	UDA2182 Analyzer/Controller
Measurement	pH	pH/ORP	pH/ORP
Case	Plastic Polycelfoam enclosure, IP66, H 4.84" x W 1.89" x D 1.81"	Plastic enclosure made of PBT NEMA 4X, IP65 rating	GE Valox® 357 plastic CSA Type 4X/NEMA 4X rating
Display	LCD 4-digit, 7-segment	7-segment LCD display	Backlit LCD, 128x64 pixels
Display Accuracy	pH: ±0.02; temperature: ±0.1° C/F	pH: ±0.02; Temp ±0.01° C/F	±0.5% reading
Control Capabilities/ Advanced Features	Integral electronics/sensor design, one or two point calibration, Auto Buffer Recognition	Electronics sensor and diagnostics, Auto Buffer Recognition, HART Communications option	PID, duplex, On/Off control AccuTune II, fuzzy logic overshoot Auto Buffer Recognition (US, NIST, Euro)
Operating Conditions	-4° to 185° F (-20° to 85° C)	-4 to 131° F (-20° to 55° C)	32° to 140° F (0° to 60° C)
Operating Voltage	16 to 42 VDC	2000: 14 to 40 VDC; 4000: 20 to 253 VAC/DC	90-264 VAC
Analog Outputs	One 4 to 20 mA	One 4 to 20 mA	Up to three 0 or 4 to 20 mA
Relays	N/A	2000: N/A; 4000: Hi/lo alarm relays	Up to 4 SPDT (Form C) relays
Mountings	Integral: no electronics mounting needed; Remote: pipe, wall or DIN rail	Pipe, wall or panel	Pipe, wall or panel
Approvals	CE; General purpose: UL; CSA; FM Class 1, Div 1, Groups A-D (1.5); FM Class I, Div 2, Groups A-D (N.I. Field Wiring)	CE; FM Class I, Div 2; FM Class 1, Div 1 IS & CENELEC	CE, UL/CSA General Purpose FM Class I, Div 2

pH/ORP Sensors

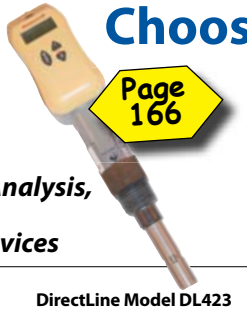
	Durafet ® III Glass-free unbreakable electrode	Meredian II for pH and ORP Glass electrode for general service	HB Series for pH/ORP Glass electrode for harsh conditions	HPW7000 Hi-pHurity System
Measurement Range	0 to 14 pH	0 to 14 pH, 1999 to 1999 mV (ORP)	0 to 14 pH	4 to 10 pH
Temperature Range	14° to 266° F (-10° to 130° C)	32° to 230° F (0° to 110° C)	Good to 284° F (140° C)	-4 to 302° F (-20° to 150° C)
Materials	Ryton body, silicon ISFET die electrode, ceramic reference junction, Viton media seal, EPDM reference seal	Ryton body, glass electrode, EPDM seals ORP model has gold/platinum electrode	CPVC, Polypropylene or Ryton body Viton or EPDM O-rings, glass (pH) or platinum (ORP) electrode, Teflon junction	136L SS
Special Features	Response time 10 times faster than glass, replaceable reference junction		Axial ion path technology eliminates leak pathways and breakage	0.1 pH accuracy in process with conductivity <10µS/cm

Mountings

Style	7773 Mounting	7774 Mounting	7777DVP Mounting	7794DVP Mounting	7758 Mounting
Measurement Range	0 to 14 pH; ±1600 mV ORP	0 to 14 pH; ±1600 mV ORP	0 to 14 pH	0 to 14 pH	0 to 14 pH; ±1600 mV ORP
Pressure and Temperature Ratings	*Immersion:* Polypropylene: 100 psig at 140° F, 316 SS: 100 psig at 176° F, *Flowthrough:* Polypropylene: 100 psig at 140° F, 316 SS: 150 psig at 176° F	316 SS: Determined by electrode; CPVC: 100 psig at 122° F (689 kPa at 50° C)	100 psig at 122° F (Up to 689 kPa at 50° C)	100 psig at 212° F (Up to 689 kPa at 100° C)	316 SS: 150 psig at 212° F (1034 kPa at 100° C) Polypropylene: 100 psig at 95° F (689 kPa at 35° C)
Materials	Polypropylene, Ryton or 316 SS	Ball valve, mounting nipple, extension tube, 316 SS or CPVC O-rings: EPDM & Viton	Durafet III electrode bodies: Ryton, silicone ISFET die	Body: Polysulfone	316 SS cover, wetted 316 SS or polypropylene bushings, Viton o-rings
Special Features	Allows separate measuring and reference electrodes in one mounting	Insertion/removal under pressure without interrupting process	Non-glass electrode with Vario pin quick-disconnect, FM approved IS	Sanitary 3-A approval for food and dairy applications	Allows variable immersion depths in pipe
Mountings	Immersion or flow-through	1 1/4" NPT (316 SS) or 1 1/2" NPT (CPVC) pipe nipple through ball valve	Immersion or in-line tee (3/4" NPT fitting)	1 1/2", 2", or 3" tri-clamp flange mounting	3/4" NPT bushing

Need help? Fill out a Honeywell analytical instruments datasheet at www.Lesman.com/datasheets and fax it to Lesman.

Choosing the Right Conductivity Analysis System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Conductivity Analysis, Control, and Monitoring Devices

	DirectLine Model DL423	UDA2182 Dual Input Analyzer/Controller	APT2000/4000CC Contacting Conductivity Transmitter	APT2000/4000TC Toroidal Conductivity
Case	Plastic Polycelfoam enclosure, IP66, H 4.84" x W 1.89" D 1.81"	GE Valox® 357 plastic CSA Type 4X/NEMA 4X rating	Plastic enclosure made of PBT NEMA 4X, IP65 rating	Plastic enclosure made of PBT NEMA 4X, IP65 rating
Display	LCD 4-digit, 7 segment	LCD dot matrix, 128x64 dpi,	7-segment LCD display	7-segment LCD display
Display Accuracy	Conductivity/resistivity: greater of ±2 counts or ±0.5% of reading Concentration: ±0.5% of reading Temperature: ±0.1%C from 14 to 210° F, ±1° F from 212 to 284° F	0.5% of reading	Conductivity: 1% of measured value or ± (-0.4 µ/cm* cell constant)	Conductivity: (1% of measured value) ±(0.2 µ/cm ±1 Significant digit)
Advanced Control Capabilities/ Features	Integral electronics/sensor design; trim valve or 1 pt solution calibration	PID, duplex, on/off control, AccuTune II, fuzzy logic overshoot suppression, USP26 alarm, solution temperature compensation	Measures conductivity, resistivity or salinity, electronics & sensor diagnostics, HART comm. option	Measures conductivity or chemical concentration; electronics & sensor diagnostics, HART comm. option
Operating Con.	-4° to 185° F (-20° to 85° C)	32° to 140° F (0° to 60° C)	-4 to 131° F (-20° to 55° C)	-4 to 131° F (-20° to 55° C)
Operating Voltage	16-42 VDC	90-264 VAC	2000: 14-42 VDC; 4000: 20-253 VAC/VDC	2000: 14-42 VDC; 4000: 20-253 VAC/VDC
Analog Inputs	One 4 to 20 mA	Up to three 0 or 4 to 20 mA	One 4 to 20 mA	One 4 to 20 mA
Relays	None	Up to 4 SPDT (Form C) relays	2000: N/A; 4000: Hi/lo alarm relays	2000: N/A; 4000: Hi/lo alarm relays
Mountings	Integral, no electronics mounting; Remote: pipe, wall or DIN rail	Pipe, wall or panel	Pipe, wall or panel	Pipe, wall or panel
Approvals	Industrial: CE ; General: UL/CSA, FM	CE, UL/CSA General; FM Class I, Div 2	CE, FM Class 1, Div 2; FM Class 1, Div 1	CE, FM Class 1, Div


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Conductivity Cell Assemblies and Sensors

	4973 Contacting	4974 Contacting	4905 Contacting	4909 Contacting	5000 TC Toroidal
Measurement Range	0.01, 0.1, 1.0, 10.0 cell constants		0.01, 0.1, 10.0, 25 & 50 cell constants		0.2 to 2000 µ/cm
Pressure & Temp Ratings	250 PSI at 284° F	150 PSI at 257° F	250 PSI at 284° F	SS: 50 PSI at 284° F (3.45 bar at 140° C) CPVC: 30 PSI at 284° F (2.07 bar at 140° C)	*see note
Materials	Titanium or graphite	Titanium or graphite with food-grade silicone rubber and polished 316 SS	Nickel or platinum	Nickel or platinum	Polypropylene, PVDF PEEK, PFA teflon
Mounting	3/4" NPT thread fitting	1 1/2" or 2" Tri-clover clamp	1" NPT threaded fitting	CPVC or SS; allows insertion/ removal of cell without stopping process	Immersion, union, sanitary 2" flange or insertion/removal

* Polypropylene: 100 PSI at 212° F (6.9 bar at 100° C) PVDF: 100 PSI at 248° F (6.9 bar at 120° C) PEEK: 200 PSI at 302° F (13.8 bar at 150° C) PFA Teflon: 200 PSI at 302° F (13.8 bar at 150° C)

Choosing Your Dissolved Oxygen Analysis System


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	DL424 ppm, DL425 ppb	UDA2182 Analyzer/Controller
Case	DIN size aluminum, NEMA 4X/IP65	DIN size, GE Valox® case, NEMA 4X
Display	Backlit dot matrix LCD	Backlit LCD 128x64 pixels
Display Accuracy	0.01 ppm; 0.1 ppb in 0-20 ppb range, 1.0 ppb in 0-200 ppb range	±0.5% reading
Operating Conditions	-4° to 185° F (-20° to 60° C)	32° to 140° F (0° to 60° C)
Control Capabilities/ Advanced Features	Integral electronics/sensor design	PID, duplex, on/off control, AccuTune II, automatic altitude and salinity compensation
Operating Voltage	16-42 VDC	90-264 VAC
Analog Outputs	One 4 to 20 mA	Up to three 0 or 4 to 20 mA
Relays	N/A	Up to four SPDT (Form C) relays
Mountings	Pipe, wall and panel	Pipe, wall and panel
Approvals	UL and CSA general purpose	CE, UL/CSA General; FM Class I, Div 2,

DL5000 Equilibrium probes for ppm or ppb applications	
Materials	316 SS or CVC housing
Measurement Range	0 to 25,000 ppb or 0 to 25 ppm
Temperature Range	35.6° to 140° F (2° to 60° C)
Pressure Ratings	316 SS: 50 PSI (345 kPa) CPPVC: 30 PSI (207 kPa)
Special Features	No internal probe maintenance
Mountings	Immersion, in-line or sample flow chamber
Dimensions	1" NPT pipe, 20 ft waterproof cable

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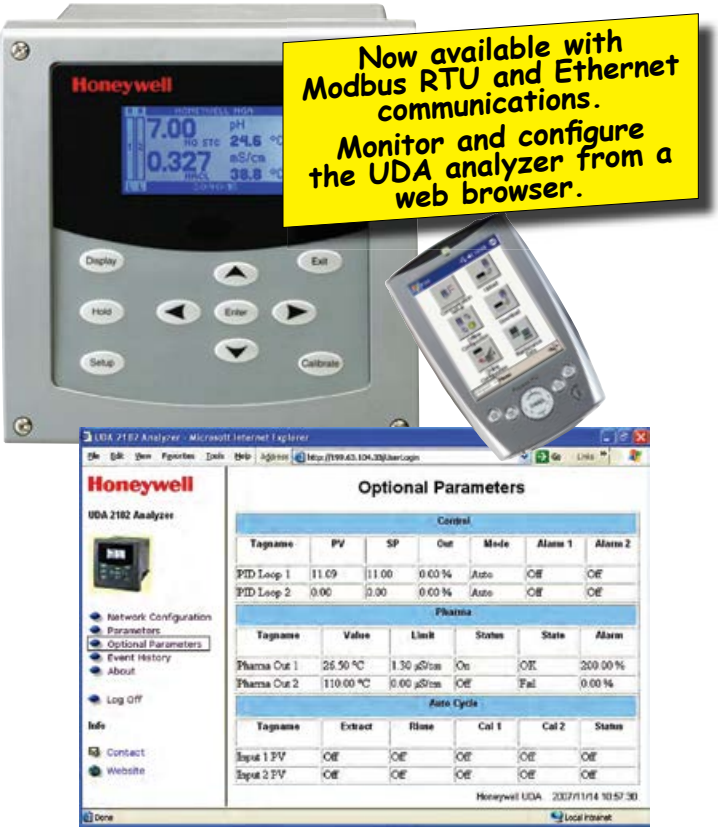
UDA2182 Single or Dual Loop Mixed Input Analyzer

Honeywell



Features

- Modbus/Ethernet option includes web server for monitoring analyzer from up to 10 different clients, e-mail support for alarm status updates, and DHCP configuration for dynamic Ethernet IP addressing
- Single or dual inputs — Dual input model accepts any combination of pH, ORP, conductivity, and dissolved oxygen
- Versatile, backlit graphical display
- Isolated inputs and outputs — Up to three analog outputs and four relays for monitoring and control
- Infrared port for PC and Pocket PC configuration, RS485 serial for Modbus RTU, and Ethernet for Modbus TCP
- Full DIN size — Fits panel cutouts of 7082 and 9782 analyzers
- CSA Type 4X (NEMA 4) enclosure with panel, wall, or pipe mounting — Easy access through hinged front door

The UDA2182 analyzer can accept single or dual inputs from Honeywell pH, ORP, contacting conductivity and dissolved oxygen sensors.

The graphical backlit LED can display two PV values and their engineering units simultaneously. Looking at the display, you'll also see the process temperature of both PVs, the analog output full scale percent, and the state of the relays. The display can show tags for each input, time/date information, and status messages.

Like the Honeywell UDC controllers, you can configure the UDA2182 with a PC or with a Pocket PC, using the embedded infrared communication port. There's absolutely no need to get access to the back of the unit to download or upload a brand new configuration!

With the UDA's mix-and-match design, analytical measurements of pH, conductivity and dissolved oxygen (ppm or ppb) can all be done in one analyzer. By upgrading, you'll be able to reduce inventory and add flexibility to your systems. Input boards are easy to replace. And you can add relays or an analog output with a single board. Board changes are fast and easy with front-hinged access to the analyzer.

The UDA2182 controller can be configured for On-Off, Current Adjusting Type (CAT), Pulse Frequency Type (PFT), Duration Adjusting Type (DAT), and PID. Each control loop has Honeywell's performance proven AccuTune III tuning algorithm. A selectable "Fuzzy Logic" algorithm is also provided for each loop to suppress unwanted process setpoint overshoot.

Two or four alarm relays are field-selectable for activating external equipment at alarm setpoints. Each alarm setpoint can be either a high or low alarm. Relays can also be assigned to temperature or diagnostics. They can also be configured to alarm on conductivity values.

Added Features

Realtime Clock: The realtime clock supports time/date stamps for events and calibrations. Date/time stamps can be selected as tag names so they appear at the top of the display.

Auto Clean/Cal: Using the realtime clock, the UDA2182 can be configured to run a periodic cycle to clean and calibrate sensors.

Event/Calibration Histories: The UDA stores up to 256 time/date stamped events and up to 128 calibration events. Event (excluding calibration) data can be uploaded to a PC for reporting.

pH Measurement from Differential Conductivity: If you're measuring specific and cation conductivity, the UDA can calculate the pH level of your high purity water.

CO2 Measurement: UDA can calculate the concentration of CO2 (ppm) through cation and de-gassed conductivity levels.

USP26 Conformance for High Purity Water: The UDA2182 meets USP26 standards for alarming on increased conductivity.

Protection: CSA Type 4X (NEMA 4X) rating for front and case permits use in applications where it may be subjected to moisture, dust, or hose-down conditions.

Approval: General Purpose CSA certification and UL listing and FM Class I, Div. 2 is standard.

Data Security: Keyboard security protects configuration and calibration data, accessed by a configurable 4-digit code. Nonvolatile EEPROM memory assures data integrity during loss of power.

Diagnostic/Failsafe Outputs: Continuous diagnostic routines detect failure modes, trigger a failsafe output value and identify the failure to minimize troubleshooting time.

High Noise Immunity: Provides reliable, error-free performance in industrial environments that affect noise-sensitive digital equipment.

pH Auto Buffer Calibration: The unit can be set up to recognize NIST, US, and Euro buffers and automatically select the standardize and slope values at the calibration temperature

Solution Temperature Compensation (high-purity water): You can select preset compensations or configure custom values.

Computed Variables: For two-cell conductivity measurements, computed values of %Rejection/Passage, Difference, or Ratio can be displayed and assigned to the outputs or alarms.

Dissolved Oxygen: Auto-ranging of display and outputs with relays to indicate range, specialized probe bias diagnostics.

Specifications

Ranges: *pH:* 0 to 14 pH; *ORP:* -1600 to 1600 mV; *Conductivity:* 0.01 Cell: 0 to 2 uS/cm; 0.1 Cell: 0 to 20 uS/cm or 0 to 2 mS/cm, 0 to 20 megohm-cm, 0 to 2,000 ppm TDS, 0 to 2,000 ppb TDS; 1.0 Cell: 0 to 200 uS/cm or 0 to 20 mS/cm; 10 Cell: 0 to 2,000 uS/cm or 0 to 200 mS/cm, 0 to 200 ppt TDS; 50 Cell: 0 to 20,000 uS/cm or 0 to 1,000 mS/cm, 0-20% Concentration; *Temperature:* 14° to 284° F (-10° to 140° C); *Dissolved Oxygen:* 0 to 200 ppm; 0 to 20 ppb; 0 to 200 ppb; 0 to 2000 ppb; Temperature: 35.6° to 104° F, must not freeze

Accuracy: 0.5% reading; *Output:* ±0.01 mA; *Repeatability:* 0.05%

Temperature Accuracy: *pH/Conductivity Thermistor:* ±0.1° F from 14° to 212° F, ±1.0° F from 214° to 284° F; *pH 1000Ω RTD:* ±0.4° F; *Dissolved Oxygen Thermistor:* ±0.1° F from 35° to 140° F

pH Auto Buffer Recognition: NIST, US, Euro buffers, user-selectable

Conductivity Compensations: NaCl, HCl, H_2SO_4, PO_4, NaOH, NH_3, Morpholine, Pure Water, Custom (User Selectable)

Dissolved Oxygen: *Max flow rate (probe):* 950 ml/min with flow chamber; no dependence on stirring or flow rate; *Atmospheric pressure:* 500-800 mm Hg with internal sensor; Calibration with either air or sample

Analog Output: *Standard:* Two 0/4-20 mA DC, 750Ω max., isolated from inputs, ground, and each other, independently field-assignable to any parameters and ranges. *Optional:* One 0/4-20 mA DC, 750Ω max., isolated from inputs, ground, and each other.

Alarm/ Control Relays: (2 Standard, 2 Optional) SPDT (Form C) Relays; Resistive Load: 4A, 120/240 VAC

Alarm/Control Settings: *Alarm/on-off control delay:* 0 to 100 sec.; *Deadbands:* Individually set from 1 count to full scale for pH, ORP, and temp.; *On/off cycle period:* 0 to 1000 sec.; *On/off Percent ON time:* 0 to 100%, 1% resolution; *Setpoint/proportional band limits:* ±19.99 pH, ±1999 mV, 14° to 266° F, 1 count resolution; *DAT cycle:* 1 to 1999 sec.; *PFT frequency:* 1 to 200 pulse/minute max.; *PFT pulse width:* 50 ms, for electronic pulse-type metering pumps.

Power Requirements: 90–264 VAC, 47-63 Hz, 15 VA.

Keypad: 10-button membrane switch, UV/Solvent/Abrasion resistant

Wireless Interface: Infrared (IrDA); 0–1 meter link length, 0°–15° offset, 9600 baud, Modbus protocol

Control Loops (Optional): Control Loops: Two (one for each PV); current, pulse frequency, or time proportional; Types: PID, Duplex, On/Off Auto-tuning: AccuTune II, fuzzy logic overshoot suppression

Communications (Optional): *RS422/RS485 Modbus RTU slave:* Two-wire multidrop, 31 drops max, baud rates to 115200; *Ethernet TCP/IP:* 10/100-BaseT; *Modbus TCP/IP:* Monitor output, status, alarms, and variables; Web server with multiple client support; E-mail alarm notification to up to eight addresses

Display: Graphical LCD (128 x 64 pixels) with white LED Backlight

Case: GE Valox® 357; CSA Type 4X/NEMA 4X

Approval: CE compliant, UL/CSA general purpose, FM approval Class I, Div 2

Dimensions: *Case:* 6.14" X 6.14" X 5.91"; *Panel cutout:* 5.45" square; *Panel thickness:* 0.06" min, 0.38" max

Operating Conditions: *Ambient Temperature:* 32° to 140° F; RH: 5 to 90% max. Non-condensing up to 104° F. *Vibration:* 5-15 Hz disp 8 mm pk to pk 15-200 Hz accel 2 G

One Analyzer to Measure Them All!

pH/ORP

- **Inputs**
  - Durafet III ISFET electrodes
  - Meredian I and II electrodes (pH and ORP)
  - HPW7000 high purity water systems
- **pH-Specific Features**
  - Calibration options: Manual, automatic buffer recognition, and sample cal
  - Diagnostics: Zero offset, and percent theoretical slope (PTS)
  - High purity water solution temperature compensation

Conductivity

- **Inputs**
  - Contacting conductivity only (no toroidal sensors)
- **Conductivity-Specific Features**
  - USP26 alarm capability
  - Solution temperature compensation
  - Percent rejection/passage
  - Difference and ratio

Dissolved Oxygen

- **Input**
  - DL5000 dissolved oxygen probes
- **DO-Specific Features**
  - Automatic altitude (pressure) compensation
  - 60-minute power backup
  - Automatic salinity compensations
  - Display of probe bias curves

See page 207 for more on Process Instrument Explorer configuration software

Ordering Instructions

Make one selection from each table section below. A finished catalog number looks like this: UDA2182-_ _ _ - _ _ _ - _ _ - _ - _ E _ _.

Model Selection Guide

Description		Catalog Number	Price
Two 4-20 mA outputs, two alarm relays, panel mount hardware, and IrDA port			
UDA2182 Analytical Analyzer		UDA2182-	$961.00
Channel 1 Input	pH/ORP	PH1-	317.00
	pH from Preamp	PA1-	391.00
	Conductivity	CC1-	391.00
	Dissolved Oxygen ppm	DM1-	304.00
	Dissolved Oxygen ppb	DB1-	2608.00
Channel 2 Input	None	NN2-	0.00
	pH/ORP	PH2-	317.00
	pH from Preamp	PA2-	391.00
	Conductivity	CC2-	391.00
	Dissolved Oxygen ppm	DM2-	304.00
	Dissolved Oxygen ppb	DB2-	2602.00
Outputs and Relays	None	NN-	0.00
	+(1) 0/4-20 mA Output + 2 Relays	C3-	294.00
Communi-cations	None	N-	0.00
	Serial Input: Ethernet/Modbus	E-	327.00
Mounting Hardware	None (Panel Mount Only)	0 _ _ _	0.00
	Pipe and Wall Mount	P _ _ _	72.00
Manual	Printed Instruction Manual	_ E _ _	52.00
Certificates	None	_ _ 0 _	0.00
	Calibration and Conformance	_ _ C _	72.00
PID Control	None	_ _ _ 0	0.00
	Yes (See Note)	_ _ _ C	392.00
Accessories			
Process Instrument Explorer Software		L 50001619-001	194.00
Actisys Serial to Infrared Adapter for PCs		L ACT-IR220L+	95.00
Bezel Assembly		51453518-502	406.00
Input Card: pH/ORP Measurement		51453313-501	323.00
Input Card: pH from Preamp		50009551-501	399.00
Input Card: Contacting Conductivity		51453316-501	399.00

Note: *Includes Auto Clean/Cal, USP26 Pure Water Functionality and pH Level/CO2 Concentration from Differential Conductivity.*

Don't see the input card you need? Call 800-953-7626.

Illinois, Indiana, Missouri, and Iowa
Phone: 800-953-7626 • 630-595-8400
Fax: 630-595-2386

Lesman Instrument Company
www.lesman.com
sales@lesman.com

Wisconsin, and Upper Peninsula Michigan
Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

DirectLine™ Two-Wire Transmitter with Flexible Mounting

Features

- One third the cost of traditional analyzer/cable/sensor configurations!!!
- Local display and keypad for easy setup, calibration, and use
- Built-in diagnostics reduce troubleshooting time
- Plug-in modular design lets you safely remove and replace the probe without cycling power on the module
- Sampling and auto buffer options reduce calibration time
- Direct 4-20 mA output eliminates need for dedicated analyzers or transmitters, simplifying installation, start-up, operation, and maintenance tasks
- Integral electronics with local user interface simplifies installation and shortens calibration times
- Modular plug-in design simplifies electrode replacement
- Playing card-sized guide helps ensure simple, correct, and consistent calibration and configuration

Flexibility Saves Installation Time and Costs

Honeywell's DirectLine architecture includes an electronics module integral to the electrode, eliminating the additional time and cost of installing an analyzer or transmitter, a separate preamp, and special cable! The electronics module provides a direct 4-20 mA output proportional to pH, ORP, DO, or conductivity.

The electronics module provides display, configuration, and calibration capabilities in a weatherproof and corrosion-resistant enclosure. You can order the sensors with a universal mounting kit, so the modules can be mounted on a wall, surface, or a pipe, or clipped to a DIN rail.

The DirectLine module continuously performs self-diagnostics on both the electronics and sensor. If a problem arises with the electronics or the sensor, the software prioritizes the problem type and displays only the highest priority error diagnostic. Once the problem is corrected, the error code disappears from the display.

Calibration Was Never So Quick and Easy

Location, location, location! The DirectLine eliminates the extra time required to travel back and forth between the analyzer/transmitter and the sensor while you're performing a calibration. If applicable, take advantage of the auto buffer recognition calibration option to further reduce the time and cost of your calibrations. Forgot how to calibrate the pH/ORP electrode? The other side of the configuration guide quickly steps you through an electrode calibration.

Measuring Conductivity

- EEPROM memory provides all cell info (cell constant and calibration factor), saves setup time and reduces errors
- Trim value or one-point solution calibration options reduce calibration time
- DL423 module can be used for conductivity, resistivity, TDS, and concentration
- Polyethersulfone cell bodies provide excellent corrosion resistance. Cell constants for processes from ultrapure water to acid/base concentrations

Measuring Dissolved Oxygen

- Better accuracy with equilibrium probe — sensor readings independent of fouling and flow
- No internal probe maintenance — no electrolytes or electrodes to replace!
- No recalibrating after cleaning probes!
- No membrane replacement!

Condensed Specifications

Engineering Units: pH; mV; ° F; ° C

Displayed Accuracy: *pH:* ±0.02; *ORP:* ±1 mV; *DO:* ±0.2 ppm after stabilization, greater of ±2 ppb or 5% reading after stabilization; *Conductivity/Resistivity:* Greater of ±2 counts or ±0.5% reading; *Concentration:* ±0.5% reading; *Temperature:* ±0.1° F from 14° to 212° F, ±1° F from 212° to 284° F

Displayed Process Variable: *pH:* 0-14; *ORP:* –1600 to 1600 mV; *Conductivity:* 0-2000 µS/cm, 0-20.00 mS/cm, 0-1000 mS/cm; *Resistivity:* 0-20.00 MΩ/cm; *TDS:* 0-2000 ppm/ppb, 0-200 ppt; *%Concentration:* 0-20.00% *DO:* 0-20 ppm in 1 ppm increments or 0-200 ppb in 1 and 10 ppb increments

Displayed Temperature Range: *pH:* 14° to 230° F; *DO:* 35.6° to 140° F; *Conductivity:* 14° to 284° F

Sensor Survivable Temperature Range: 14° to 266° F

Electronics Module Ambient Temperature: -4° to 185° F

Temperature Compensation: 0.00pH/50° F; -0.16pH/50° F; 0.32 pH/50° F

Output: 4-20 mA, 2-wire loop powered; *Calibration:* 4-20 mA

Sensor Mating Connector Rating: Submersible to 20 feet

Output Cable: Shielded twisted pair; *Termination:* Tinned leads; *Output:* 20' or 50'; *Sensor:* Durafet: 20' or 50'; Meredian: 12' or 20'

Power: 16-42 VDC; *Max Load:* 250Ω @ 16 VDC; 600Ω @ 24 VDC; 1400Ω @ 42 VDC

Local Display and Buttons: 4-digit, 7-segment LCD

Calibration Options: 1-point or 2-point sample; *Auto Buffer Recognition:* Selections: US, NIST, EURO

Case: Weatherproof, corrosion-resistant plastic housing

Diagnostics: Sensor and electronics

Remote Mounting: Pipe, wall, or DIN rail

Approvals: CE Mark for Industrial Applications; UL and CSA General Purpose; FM Class I, Div. 1, Groups C-D and Class I, Zone 0, A Ex ia IIB (I.S.); FM Class I, Div. 2, Groups C-D; Class I, Zone 2, Groups IIB (non-incendive field wiring)

Honeywell

Learn more about DirectLine at Lesman.com

Ordering Instructions

Make a selection from each table. Follow the arrows down to be sure the unit you want is available. Complete catalog numbers look like this:

Module: DL4_ _ - _ - _ - _ - _ _ _ _
Electrode Mounting: DL1 _ _ _ - _ _ _ _

Step 1. Select your electronics
Step 2. Select the probe and mounting
Step 3. Place your order with Lesman!

Electronics modules, probes, and mountings must be specified as separate line items.

Improved Enclosure

- 1/2" NPT conduit connection provides increased protection and noise immunity for output cable. Available on all DirectLine sensor modules.
- IP68 watertight output cable connection
- Protective PC sleeve on probe/module connections
- Captive stainless steel screw, thicker wall

Step 1: Select Your Electronics Module

Description	Catalog Number	Avail-ability			Price
DirectLine Sensor Electronics Module					
For Use with Durafet III, Meredian II, and HPW7000 pH Electrodes	DL421	↓			Call
For Use with Contacting Conductivity Cells	DL423		↓		Call
For Use with Dissolved Oxygen ppm Prob					Call
Output Cable					
Cordset: 19.7					70.00
Field Wiring C					34.00
Sensor Cable					
No Cable Required, Integral Mount	0	•	•	•	0.00
No Cable: Conductivity Remote Mount	5		e		192.00
No Cable: Dissolved Oxygen Remote Mount	6			e	201.00
Output Cable: Durafet III Remote, 20 Feet	7	f			299.00
Output Cable: Durafet III Remote, 50 Feet	8	f			388.00
Remote Mounting Options					
None	A	•	•	•	0.00
2" Pipe Mount Bracket, Wall Mount, DIN-Rail Clip	B	•	•	•	90.00
Options					
No ID Tag, No Certificates	0000	•	•	•	0.00

Honeywell has discontinued these products. Please call Lesman for more information.

Restrictions

e For remote mount models only.
f For remote mount models only. Requires Durafet III electrode with Vario Pin connector.

DirectLine models also available for ORP and PPB dissolved oxygen. Call for pricing.

Accessories and Replacement Parts

Description	Catalog Number	Price
Field Wiring Cable — 20 Feet	51500270-501	239.00
Field Wiring Cable — 50 Feet	51500270-502	285.00

Call for pricing on 20 foot and 50 foot remote electrode mounting cables.

Not sure DirectLine is right for you? Fill out a Honeywell analytical instruments datasheet at www.Lesman.com/datasheets and fax it to Lesman for engineering review.

Step 2: DL421 with Durafet III Electrodes

Description		Catalog Number	Price
Electrode Mounting for Durafet III pH Electrode		**DL1-**	**$0.00**
Insertion/ Removal (7774)	CPVC Ball Valve Assembly	741	1425.00
	316SS Ball Valve Assembly	742	2230.00
Inline (7777) for 3/4" Pipe Tee	1" Electrode, Remote DL421 Mount	771	452.00
	1" Electrode, Integral DL421 Mount	772	452.00
	1" Electrode, Remote, Vario Pin Mount	774	544.00
Immersion (7777)	1" Electrode, Remote DL421 Mount	773	452.00
	1" Electrode, Remote DL421 Vario Pin	775	544.00
Options	No ID Tag, No Certificates	0000	0.00

Need a sanitary mount pH electrode? Call Lesman for pricing and availability.

Step 2: DL423 for Contacting Conductivity

Description		Catalog Number	Price
Electrode Mount for Contacting Conductivity Probes		**DL4-**	**$0.00**
Remote Mount 3/4" NPT Compression Fittings			
Cell Constant 0.1	Graphite Construction	SX1	165.00
Cell Constant 1.0	Graphite Construction	SX2	165.00
Cell Constant 10.0	Platinum Construction	SX3	186.00
Factory Use and Special Construction Codes		000-0000	0.00

Note: Remote cells are supplied with an integral 20-foot sensor cable that must be wired to the DL423 remote connector.

Step 2: DL424 for Dissolved Oxygen

Description		Catalog Number	Price	
DL5000 Probe - Parts per Billion		**DL5PPB**	**$0.00**	
DL5000 Probe - Parts per Million		**DL5PPM**		**0.00**
Probe Material/ Mount (See Note)	PVC, Integral Mt, No Cable	100	1269.00	1297.00
	PVC, Remote Mt, 20 Ft Cable	300	1269.00	1297.00
	PVC, Remote Mt, 100 Ft Cable	700	1361.00	1433.00
	316 SS, Integral Mt, No Cable	200	1704.00	1704.00
	316 SS, Remote Mt, 20 Ft Cable	400	1704.00	1704.00
Tagging	None	00_ _	0.00	0.00
	Stainless Steel ID Tag*	SS_ _	47.00	47.00
Warranty	Standard Warranty	_ _00	0.00	0.00
	1 Year Extended Warranty	_ _W2	200.00	200.00
	2 Years Extended Warranty	_ _W3	322.00	322.00

Note: Remote mounted 316SS probe available ONLY on DL5PPB models.
*3 Lines, 22 Char/Line)

Illinois, Indiana, Missouri, and Iowa
Phone: 800-953-7626 • 630-595-8400
Fax: 630-595-2386

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Wisconsin, and Upper Peninsula Michigan
Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

Two-Wire and Four-Wire Analytical Process Transmitters

Features

- Large display with easy-to-read 3/4" measured value
- Simple operator interface with basic pictographs
- Continuous diagnostics for monitoring calibration, cell health, and transmitter self-test
- Manual loopback check for integrity of 4-20 mA output
- Wall, pipe, or panel mount NEMA 4X/IP65 plastic enclosure
- Quick response time (less than five seconds per step change)

Features Unique to APT2000

- HART® bidirectional communications protocol
- Application in hazardous and safe areas
- Optical alarm signaling by blinking red LED
- Integrated current source for checking peripheral devices

Features Unique to APT4000

- Applications in Class I, Div 2 or General Purpose areas
- USP24 software with UPS control limit capabilities
- Remote "Hold Last Measured Value" capability
- Second parameter set programmable
- Optical alarm with relay contact
- Two current outputs available. Output 2 for temperature
- PID (pulse length and pulse frequency) software installed

Need more sophisticated analysis and control? Looking for one device to handle pH, ORP, Conductivity, and Dissolved Oxygen? See the UDA2182 on page 164.

Condensed Specifications

pH/mV Input

Range: *pH value:* 0.00 to 14.00 pH; *ORP value:* -1500 to +1500 mV

Accuracy: *pH:* <0.02; *Tc:* 0.0021 *pH/K mV:* <1 mV *Tc:* 0.1 mV/K

Conductivity Input (Contacting)

Range: *Contacting:* 0000 to 9999 (0, 1, 2, or 3 decimal) µS/cm; 0000 to 9999 (1, 2, or 3 decimal) mS/cm; 0000 to 9999 (1, 2, or 3 decimal) MΩ-cm; *Toroidal:* 00.00 to 99.99, 000.0 to 999.9, or 0000 to 1999 mS/cm

Accuracy: *Contacting:* Greater of <1% measured value or ±0.4 µS/cm cell constant; *Toroidal:* 1% measured value ± 0.02 mS/cm ± 1 LDS

Diagnostics

Sensocheck: Polarization detection and monitoring of cable capacitance

Sensor Standardization: Entry of cell calibration factor with display of conductivity and temperature; Temperature probe adjustment

Sensoface: Monitors asymmetry potential, slope, calibration response time

Temperature Input

Range: *8550 Ω Thermistor:* -14° to 266° F; *Pt100/1000 Ω RTD:* 4° to 302° F

Accuracy: < 0.5 K; **Resolution:** 0.1° C or 1° F

Temperature Compensation: Automatic or manual adjust

Supply/Output

Current Source: 3.80 mA to 22.0 mA; *Overrange:* 22 mA for error messages; *Error:* <0.3 % of current value + 0.05 mA

Specifications Unique to APT2000

Area Certifications / Compliances

General Purpose: Zone 2 (USA) *FM:* NI, Class I, Div 2, Groups A–D, T4

Intrinsically Safe: Zone 1 (USA) *FM:* IS, Class I, Div 1, Groups A–D, T4 Zone 1 (Europe); *CENELEC:* II 2G EEx ib [ia] IIC T6

APT2000TC: FM Class 1, Div. 2, Groups A–D

Need a HART® handheld communicator? See page 95.

Specifications Unique to APT4000

PID Function: Relay assignable for PID Control, (pulse length/frequency)

Alarm Relay Contacts: *Min/max:* SPST N/O (Hysteresis 0.2% range); *Diagnostic:* SPST N/C; *Wash:* SPST N/O

Supply Voltage: 20 to 253 VAC/DC, 45 Hz to 65 Hz, 2 VA/1.5 W

USP24 Software: Software for on-line water conductivity monitoring

Supply Output Current: 0 or 4 to 20 mA current loop, 10 V floating; Output #1 for PV, Output #2 for Temperature

Output Minimum Span: *Linear:* 5% selected range. *Logarithmic:* 1 decade

Max Current/Voltage: *AC:* <250V/<3A/<750 VA *DC:* < 30 V/ < 3A / < 90 W

Approvals: *Area Certification:* Zone 2 (USA) *FM:* NI, Class I, Division 2, Groups A-D, T4; *APT4000TC:* FM Class 1, Div. 2, Groups A-D

Ordering Instructions

Make one selection from each table section below. A finished catalog number looks like this: APT2000_ _-H -_ _ - E00 or APT4000_ _-E00

Model Selection Guide

Description		Catalog Number	Availability			Price Each
APT2000 Two-Wire Analytical Process Transmitter, HART® Communication						
Model	Conductivity Toroidal Conductivity	APT2000CC-H- APT2000TC-H-	↓	↓		1910.00 1975.00
Approval	General Purpose: FM/CSA Intrinsically Safe: FM/CSA	00- IS-	• •	•		0.00 193.00
English User's Manual		E00	•	•	•	0.00
APT4000 Four-Wire Analyzer/Transmitter/Controller						
Model	pH/ORP Conductivity Toroidal Conductivity	APT4000PH- APT4000CC- APT4000TC-			↓ ↓ ↓	1877.00 1927.00 1967.00
English User's Manual		E00	•	•	•	0.00
Mounting Hardware	Panel Mount Kit Pipe/Wall Mount Kit	51205990-001 51205988-001	• •	• •	• •	45.00 97.00

Honeywell

Replacement Electrodes for pH and ORP Use

Measure	Electrode Type	Connection/Leads	Temperature Range	Catalog Number	Fits Enclosure 77__ 58	73	74	77	Price
pH	Durafet II	3/4", 1-1/4" or 1-1/2" NPT, Quick Disconnect	-10° to 110° C	L 51204976-501	x	x	x		$461.00
pH	Durafet II	3/4" NPT, Quick Disconnect	-10° to 110° C	51204976-502	x	x			418.00
pH	Durafet II	1-1/4" or 1-1/2" NPT, 12 Ft. Integral	-10° to 110° C	51204976-503			x		627.00
pH	Durafet II	1-1/4" or 1-1/2" NPT, 20 Ft. Integral	-10° to 110° C	51204976-504			x		656.00
pH	Durafet II	3/4" NPT, Quick Disconnect	-10° to 110° C	L 51205554-501				x	468.00
pH	Durafet II	3/4", 1-1/4" or 1-1/2" NPT, Quick Disconnect	-10° to 110° C	L 51205554-502			x	x	468.00
pH	Durafet II	3/4" NPT, 12 Ft. Integral	-10° to 110° C	51205554-503				x	634.00
pH	Durafet II	3/4" NPT, 20 Ft. Integral	-10° to 110° C	51205554-504				x	707.00
pH	Durafet II	3/4" NPT, 50 Ft. Integral	-10° to 110° C	51205554-505				x	820.00
pH	Durafet II	3/4" NPT, 50 Ft. Integral	-10° to 110° C	51205554-512			x	x	482.00
pH	Glass Measuring	3/4" NPT, Screw Cap	10° to 80° C	31117390-501	x	x			249.00
pH	Glass Measuring (Antimony)	3/4" NPT	5° to 75° C	31117399-501	x	x			630.00
pH	Glass Combination + ATC	1.25" or 1.5" NPT, 12 Ft. Tinned, Coax, Conductors	10° to 80° C	L 31050381-501	x		x		504.00
pH	Glass Combination	3/4" NPT, Screw Cap w/ 6" Spade Lug	10° to 100° C	31117486-501	x	x			397.00
pH	Glass Combination	1-1/4" or 1-1/2" NPT		31117495-501	x		x		440.00
pH	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	0° to 80° C	31117489-501		x	x		397.00
pH	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Quick Disconnect	0° to 80° C	L 31074387-501			x	x	460.00
pH	Glass Combination	3/4" NPT, 16" Quick Disconnect	0° to 80° C	31074397-501				x	490.00
pH	Glass Combination	3/4" NPT, 12 Ft. Quick Disconnect	0° to 80° C	31074399-501				x	468.00
ORP	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	-5° to 130° C	31020751-501	x	x	x		411.00
ORP	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	-5° to 100° C	51451341-503			x	x	722.00
ORP	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	-5° to 110° C	51451340-503			x	x	739.00
Reference	Single Junction	Gel Filled, Ryton Body, 3/4" NPT		31117481-501		x			264.00
Automatic Temperature Compensation		3/4" NPT		31022289-501		x			205.00
Automatic Temperature Compensation		3/4" NPT		31152137-501		x			264.00
Cap Adapter for Durafet II Electrodes		20 Ft. Cable		L 51205965-502	x	x	x	x	438.00

Durafet II to Durafet III Cross Reference

Use the cross reference table to change existing Durafet II Installations to a Durafet III Installation. Both electrode and cable have to be changed.

Notes:

1 Use 20 foot Durafet III cables for these shorter lengths.

2 Use 50 foot Durafet III cables for these shorter lengths.

Description			Durafet II	Durafet III	Price
Industrial Electrode	In-Line w/o Tip Guard, 8550 Thermistor		51205554-001	51453503-501	$561.00
	In-Line w/o Tip Guard, 1000 ohm RTD		51205554-009	51453503-502	586.00
	Immersion w/Tip Guard, 8550 Thermistor		51205554-002	51453503-505	561.00
	Immersion w/Tip Guard, 1000 ohm RTD		51205554-010	51453503-506	586.00
Sanitary Durafet	1.5" flange, shallow insertion		51450948-001	51453535-501	772.00
	1.5" flange, deep insertion		51450948-002	51453535-502	772.00
	2" flange, shallow insertion		51450948-003	51453535-503	805.00
	2" flange, deep insertion		51450948-004	51453535-504	772.00
	3" flange, shallow insertion		51450948-005	51453535-505	772.00
	3" flange, deep insertion		51450948-006	51453535-506	772.00
Preamp Cable	4 foot Length	(Note 1)	51204782-006	50001623-501	323.00
	8 foot Length	(Note 1)	51204782-007	50001623-501	323.00
	12 foot Length	(Note 1)	51204782-001	50001623-501	323.00
	20 foot Length		51204782-002	50001623-501	323.00
	30 foot Length	(Note 2)	51204782-003	50001623-502	500.00
	40 foot Length	(Note 2)	51204782-004	50001623-502	500.00
	50 foot Length		51204782-005	50001623-502	500.00
Cap Adapter Cable	4 foot Length	(Note 1)	51205965-006	51453388-501	531.00
	8 foot Length	(Note 1)	51205965-007	51453388-501	531.00
	12 foot Length	(Note 1)	51205965-001	51453388-501	531.00
	20 foot Length		51205965-002	51453388-501	531.00
	50 foot Length		51205965-005	51453388-502	691.00
DirectLine Remote Cable	20 foot Length		51500270-001	51453225-501	285.00
	50 foot Length		51500270-002	51453225-502	406.00

Accessories			
	pH Buffer Solution 4.01	31103001-501	$43.00
	pH Buffer Solution 6.86	31103002-501	43.00
	pH Buffer Solution 9.18	31103003-501	43.00

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Phone: 800-953-7626 • 630-595-8400
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Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

HB Series Rugged pH/ORP Glass Electrodes

Honeywell

HB546 Electrode (Left): For in-line and submersion use; mount in any position. Rugged, quick-change, quick-clean electrode.

HB547 Electrode (Center): For use with ball valve assemblies. Insertion-retraction device.

HB551 Electrode (Right): Great for sample lines and valve side-streams, and quick-change in-line applications

Features

- One electrode for entire pH and temperature ranges
- Great for high temperature and high pressure applications
- Chemically resistant CPVC, Kynar or Polypropylene body
- Integral automatic temperature compensator
- Compatible with most industrial transmitters and analyzers

Axial Ion Path Technology

- Eliminates glass breakage and leak pathways at manufacture — no more DOA sensors
- Complete filling of reference body allows extreme temperature and pressure tolerance
- Non-polymerized electrolyte ensures chemical compatibility
- Large-area, liquid junction slows the buildup of coatings and reduces sensor drift

Specifications

Operating Range: 0-14 pH

Pressure and Temperature Rating: *CPVC and Polypropylene:* 100 psig, 212° F; *Kynar:* 150 psig, 284° F; (High Pressure Insertion System: 300 psig)

HB546 Mounting: *Threaded in-line:* 3/4" NPTM threaded nose. *Submerged:* 3/4"NPTM threaded top connects to 3/4"NPTF coupling and extension pipe. *Ball-valve insertion:* High-pressure system, 1-1/4" or 1-1/2" full port valve

HB547 Mounting: *Ball-valve insertion:* 1" NPTM Wrench-tite, or 1-1/4" NPTM Hand-tite compression fitting. Requires 1-1/4" or larger full port ball valve.

HB551 Mounting: *Quick-change in-line:* 1" NPTM threaded adapter, nut-loc retainer. *Submerged:* 3/4" NPTM threaded top for connection to 3/4" NPTF coupling and extension pipe.

Construction: *Body:* Kynar, CPVC, Polypropylene; *Wetted Materials:* Gr.2 Titanium, 316 SS, porous Teflon, Viton, EPDM, Kalrez, Nickel, Wood and Glass

Looking for an HB series electrode for ORP? Call Lesman inside sales for pricing and availability.

Ordering Instructions

Make one selection from each table section below. A finished catalog number looks like this: HB5_ _-_ _ _ _-_ _ _ _-_ _ _ _-_ _ _ _ - 000

Description			Catalog Number	Availability			Price
In-Line or Submersible pH Sensor			HB546-	↓			$0.00
pH Sensor for Ball Valve Insertion Assemblies			HB547-		↓		0.00
Quick-Change In-Line pH Sensor			HB551-			↓	0.00
Body Material	CPVC (100 PSIG Max)		C _ _ _-	•	•	•	342.00
	Polypropylene (100 PSIG Max)		P _ _ _-	•	•	•	371.00
	Kynar		B _ _ _-	•	•	•	595.00
O-Ring Material	Viton		_ VS _-	•	•	•	27.00
	EPDM		_ ES _-	•	•	•	27.00
Measuring Electrode	Hemi Glass		_ _ _ R-	d	d	d	133.00
	Flat Glass		_ _ _ F-	e	e	e	147.00
Sensor Tip Configuration	Flush Teflon Junction		T _ _ _-	•	•	•	50.00
	Recessed Teflon Junction		S _ _ _-	•	•	•	50.00
	Dual Notch Teflon Junction		D _ _ _-	•	•	•	98.00
Temperature Compensation Sensor	Honeywell 8550 Ohm		_ H _ _-	g	g	g	196.00
	Pt100 RTD Capillary		_ C _ _-	•	•	•	118.00
	Pt1000 RTD		_ K _ _-	2	2	2	91.00
Insertion Depth	Standard Configuration		_ _ SN-	•	•	•	0.00
	1.5"		_ _ S1-	•			20.00
	100 mm		_ _ SX-			•	98.00
Cable Configuration	6" Pigtail		TT _ _-	h	h	h	0.00
	5' Cable, Standard		05 _ _-	•	•	•	0.00
	15' Cable		15 _ _-	•	•	•	112.00
	30' Cable		30 _ _-	•	•	•	139.00
Lead Configuration	pH	Temperature Compensation					
	Tinned	Tinned	_ _ ST-	•	•	•	20.00
	BNC	Tinned	_ _ BT-	•	•	•	20.00
	BNC	2-Pin Connector	_ _ B2-	•	•	•	20.00
	Pin Lugs	Pin Lugs	_ _ PP-	•	•	•	43.00
Future Use			000	•	•	•	0.00
Extension Cable	10'		50027414-001	•	•	•	199.00
	20'		50027414-002	•	•	•	257.00
Hot Tap Assembly	316SS, Viton O-Rings, Ball Valve		50027419-001	•			2636.00
	316SS, Kalrez O-Rings, Ball Valve		50027419-002	•			2675.00
Wrench-Tite-Ball Valve	Assembly for Wrench-Tite Fitting		50027636-001		•		650.00
	316SS Wrench-Tite Fitting		50027406-001		•		357.00
	316SS Clean/Cal/Purge Fitting		50027412-003		•		384.00
Hand-Tite Ball Valve	Assembly for Hand-Tite Fitting		50027636-003		•		647.00
	316SS Hand-Tite Fitting		50027418-001		•		598.00
Sheath Sets	16" Titanium		50027425-001		•		332.00
	20" Titanium		50027425-002		•		375.00
	24" Titanium		50027425-003		•		448.00
Adapter Nut-Loc 1" NPT Male	CPVC Adapter		50027407-001			•	157.00
	Kynar Adapter		50027407-002			•	206.00
	316 Stainless Steel Adapter		50027407-003			•	192.00
	Kynar Adapter, 316SS Hex Nut		50027407-004			•	357.00
	316SS Adapter and Hex Nut		50027407-005			•	341.00
CPVC Ball Valve Assembly			50022247-501	•			1271.00
Insertion Collar Stop (for 20" or 24" Sheath)			50027421-001		•		81.00

Notes and Restrictions

d Available only with recessed or dual notch Teflon junction tips

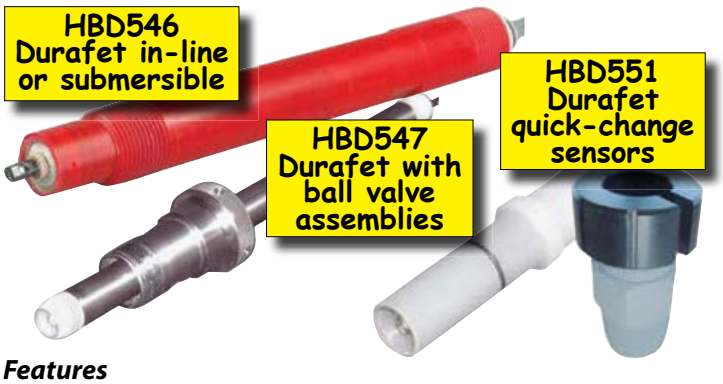
e Available only with flush Teflon junction

g Available only with Hemi glass measuring electrode

h Requires lead termination option B2

2 Please use capillary option (temperature compensation option T) for process temperatures >185° F

HBD Series Rugged pH/ORP Durafet Non-Glass Electrodes



Features

- Non-glass Durafet electrode for entire pH range
- Great for high temperature and high pressure applications
- Combination pH electrode with measuring and reference electrode and temperature sensor
- One-piece chemically resistant Kynar body
- Compatible with most industrial transmitters and analyzers

HBD546 Electrode (Left): For threaded in-line and submersible use. The HBD546 has two 3/4" NPTM threads. Once can be used to thread the electrode into a pipe tee for in-line mounting. The other can be used with a pipe coupling and support pipe for submersion mounting.

HBD547 Electrode (Center): For use with ball valve assemblies. Designed to be used with 1" NPTM Wrench-tite or 1.25" NPTM hand-tite compression fittings. HBD547 electrodes require a 1.25" or larger full port valve. Insertion depth is user-selectable.

HBD551 Electrode (Right): For sample lines and valve side-streams. These electrodes are designed for quick-change in-line operations, with a 1" NPTM threaded adapter and nut-loc retainer for quick removal and replacement.

Honeywell Patented Unique Reference Cell Technology

- Extreme temperature and pressure tolerance
- For long life in low and high pH applications
- Prevents sensor poisoning
- Prevents internal leaks and plugs

Like other rugged semi-solid state references, the HBD reference is formed by a series of wood segments impregnated with KCL. But instead of the standard epoxy or impermeable barrier between wood segments, the HBD uses a pair of formed discs.

When the two disc faces are positioned adjacent to each other, they form a tortuous path, filled with electrolyte, between each of the segments. This path provides a more complete transition of KCl ions between the wood segments forward, and creates a difficult and longer distance for poison traveling back into the reference from the specimen fluid.

The Teflon reference junction acts as an interface between the process fluid and the reference electrode. This porous surface passes ions between the reference and measurement fluid, to allow very small amounts of KCl to leach from the reference, and provide the millivolts necessary for pH measurement. It also helps maintain a barrier between the measurement fluid and the reference, so the measured fluid doesn't rapidly poison or foul the reference.

Specifications

Operating Range: 0-14 pH

Pressure and Temperature Rating: 50 psig, 212° F; 100 psig, 122°F

Wetted Materials: Kynar, porous Teflon, Viton, Ryton, EPDM, and Silicone

Temperature Sensor: 8550Ω thermistor, Pt1000 RTD

HBD546 Mounting: *Threaded in-line:* 3/4" NPTM threaded nose. *Submerged:* 3/4" NPTM threaded top connects to 3/4" NPTF coupling and extension pipe.

HBD547 Mounting: *Ball-valve insertion:* 1" NPTM wrench-tite, or 1.25" NPTM hand-tite compression fitting. Requires 1.25" or larger full port ball valve.

HB551 Mounting: *Quick-change in-line:* 1" NPTM threaded adapter, nut-loc retainer for quick removal and replacement.

Ordering Instructions

Make q selection from each table section below. A finished catalog number looks like this: HBD54_-B _ SD - T _ _ _- _ _ _ _- 000

Description		Catalog Number	Availability			Price
In-Line or Submersible pH Sensor		HBD546-	↓			$1076.00
Ball Valve Insertion pH Assemblies		HBD547-		↓		1145.00
Quick-Change In-Line pH Sensor		HBD551-			↓	1283.00
Material	Durafet, Kynar Body, Viton O-Ring	BVSD-	•	•	•	0.00
	Durafet, Kynar Body, EPDM O-Ring	BESD-	•	•	•	0.00
Temp Sensor	Honeywell 8550 Ohm	TH _ _-	•	•	•	239.00
	Pt100 RTD	TC _ _-	•	•	•	239.00
	Pt1000 RTD	TK _ _-	•	•	•	239.00
Insertion Depth/ Length	0.9" Insertion Depth (Standard)	_ _ SN-	•	•		0.00
	1.9" Insertion Depth	_ _ S1-	•			0.00
	1.2" Insertion Length (Standard)	_ _ SN-			•	0.00
	2.5" Insertion Length	_ _ S1-			•	127.00
Cable	10" Pigtail (for Junction Box)	TT_ _-	a		a	251.00
	Pigtail for 16" Sheath Set	J2_ _-		a		264.00
	Pigtail for 20" Sheath Set	J3_ _-		a		295.00
	Pigtail for 24" Sheath Set	J4_ _-		a		378.00
	20-Foot Cable	20_ _-	•	•	•	0.00
	50-Foot Cable	50_ _-	•	•	•	207.00
Lead	All Tinned Leads	_ _ ST-	d	d	d	0.00
	Vario Pin for Extension Cables	_ _ VP-	e	e	e	0.00
Options	For Future Use	000	•	•	•	0.00
Extension Cable	20' Direct Connection to UDA2182	50001391-501				337.00
	50' Direct Connection to UDA2182	50001391-502				494.00
	20' Cap Adapter Cable	51453388-501				531.00
	50' Cap Adapter Cable	51453388-502				691.00
Wrench-Tite Ball Valve	1.25" 316SS Ball Valve Assembly	50027636-001				650.00
	316SS Wrench-Tite Fitting	50027406-001				357.00
	316SS Clean/Cal/Purge Fitting	50027412-003				384.00
Hand-Tite Ball Valve	1.25" 316SS Ball Valve Assembly	50027363-003				492.00
	316SS Hand-Tite Fitting	50027418-001				598.00
	316SS Clean/Cal/Purge Fitting	50027412-001				415.00
Sheath Sets	16" Titanium Sheath Set for HB547	50027425-001				332.00
	20" Titanium Sheath Set for HB547	50027425-002				375.00
	24" Titanium Sheath Set for HB547	50027425-003				448.00
HBD551 Adapter Nut-Loc	1" NPT Male, CPVC	50027407-001				157.00
	1" NPT Male, Kynar	50027407-002				206.00
	1" NPT Male, 316 SS	50027407-003				192.00
	1" NPT Male, Kynar, 316SS Hex Nut	50027407-004				357.00
	1" NPT Male, 316SS, 316SS Hex Nut	50027407-005				341.00
Insertion Collar Stop (for 20"/24" Sheaths Sets)		50027421-001				81.00
Junction Box (Order with New Installations)		50072803-501				102.00
Tip Protector for HB546		31075715-501				151.00

Notes and Restrictions

a For new installations, order extension cable and junction box.
d Requires 20-foot or 50-foot cables.
e Requires 10" pigtail for use with junction box.

Illinois, Indiana, Missouri, and Iowa
Phone: 800-953-7626 • 630-595-8400
Fax: 630-595-2386

Lesman Instrument Company
www.lesman.com
sales@lesman.com

Wisconsin, and Upper Peninsula Michigan
Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

pH Electrodes and Mountings

7777DVP Durafet III pH Electrode Mounting with Vario Pin Connector

- Durafet III ISFET technology for exceptionally fast response
- Virtually unbreakable, solid state design
- Vario Pin quick disconnect IP68 waterproof cable for easy electrode installation and replacement
- FM Approved intrinsically safe mounting for Class I, Div 1, Groups A-D areas
- Rugged combination electrodes with fast-responding integral automatic temperature compensator

Honeywell's 7777 style electrode mounting enables users to interface Durafet® III pH electrodes to a process by either submersing the electrode or mounting it into a 3/4" threaded connection.

Durafet III electrodes provide fast, accurate, dependable pH measurement in the most demanding industrial applications.

Specifications

Operating Range: 0-14 pH; *Electrode:* 14° to 230° F; *Cap Adapter Cable:* 32° to 158° F

Mounting: Immersion or inline (3/4" NPT)

Materials: *Electrode body:* Ryton body, silicon ISFET die, ceramic reference junction, Viton media seal, nickel-plated brass, EPM reference frit seals; Cables: PVC, nickel-plated brass, and Viton

Pressure/Temperature Rating: Up to 100 PSIG at 122° F

Ordering Instructions

Make one selection from each table section below. A finished catalog number looks like this: 07777DVP - _ _ - _ _ _ _

Model Selection Guide

Description		Catalog Number	Price
7777DVP Durafet® III ISFET Electrode and Mounting		07777DVP-	$ 0.00
Immersion (w/ Tip Guard)	With 8550Ω Thermistor	01-	530.00
	With 1000Ω RTD	02-	530.00
In-Line Mount (No Tip Guard)	With 8550Ω Thermistor	03-	530.00
	With 1000Ω RTD	04-	530.00
Cable Length	None	00-	0.00
	UDA2182, 20 Feet (6,10 Meters)	01-	332.00
	UDA2182, 50 Feet (15,24 Meters)	02-	464.00
	Cap Adapter, 20 Feet (6,10 Meters)	04-	523.00
	Cap Adapter, 50 Feet (15,24 Meters)	05-	649.00
Customer ID Tag	None	00 _ _	0.00
	Stainless Steel (3 Lines x 22 Char Ea.)	SS _ _	45.00
Certificates	None	_ _ 00	0.00
	Certificate of Calibration	_ _ CC	71.00
Accessories	Smooth Electrode Tip, In-Line Mount	51204993-501	17.72
	Guarded Tip, Immersion Mount	51204992-501	18.46
	CPVC Pipe Tee for In-Line Mounting	31120167-501	91.00

7794DVP 3A Sanitary Durafet III pH Electrode

- 3A sanitary approved
- "No Epoxy" packaging for greater reliability
- Remote mount option for DirectLine® sensor
- Uses ISFET, solid-state sensor instead of conventional glass membrane
- Vario Pin quick disconnect IP68 waterproof cable for easy installation and replacement
- Reference electrode and compensating temperature sensor integral with electrode

Honeywell's sanitary Durafet III is designed for direct insertion into production equipment without fear of contamination. Measurement can be online and continuous — no time-consuming grab sampling.

Specifications

Operating Range: 0-14 pH; 14° to 230° F (-10° to 110° C)

Sterilization Conditions: 266° F maximum at 50 PSIG

Maximum Process Pressure: 0 to 690 kPa from 14° to 212° F; 0 to 345 kPa at >212° F; 0 to 100 PSIG from 14° to 212° F; 0 to 50 PSIG at >212° F

Electrode Body: FDA-compliant Fortron® and polysulphone, ceramic reference junction, silicon ISFET measuring sensor, and a viton sensor seal

Mounting: Mounts to standard CIP fittings, Tri-Clamp or equivalent

Ordering Instructions

Make one selection from each table section below. A finished catalog number looks like this: 07794DVP - _ _ - _ _ -0000

Model Selection Guide

Description		Catalog Number	Price
7794 Sanitary Mounting for Durafet III ISFET Electrodes		07794DVP-	$0.00
1.5" Flange, Immersion Style	1.5" Flange, Shallow Immersion (2.29")	01-	695.00
	Deep Immersion (2.91")		695.00
			695.00
			695.00
			695.00
			695.00
Cable Length			0.00
		01-	300.00
	UDA2182, 50 Feet (15,24 Meters)	02-	419.00
	Cap Adapter, 20 Feet (6,10 Meters)	04-	472.00
	Cap Adapter, 50 Feet (15,24 Meters)	05-	586.00

Accessories			
	pH Buffer Solution 4.01	31103001-501	$43.00
	pH Buffer Solution 6.86	31103002-501	43.00
	pH Buffer Solution 9.18	31103003-501	43.00

Honeywell has discontinued this product. Please call Lesman for information on its replacement.

AquaMetrix by Water Analytics

AS General Service Conductivity Cells

AS conductivity sensors starting at $250.00!

- Cell constants from 0.01 to 50
- Choice of 316 SS or graphite electrodes
- Noryl shell with epoxy body
- 3/4" NPT CPVC or SS compression fitting
- Automatic temperature compensation with your choice of thermistor or RTD
- Hot tap versions available

Aquametrix AS conductivity probes feature a choice of 316 stainless steel or graphite electrodes in Noryl shells to satisfy just about any industrial, power plant or lab application. Six cell constants from 0.1 to 50 are available to cover any water sample between pure water and brine.

A compression fitting allows for adjustable insertion length in 3/4"NPT piping or in the side of a tank. Reverse the direction of the compression fitting for submersion mounting. A ball valve ("hot-tap") types permit removal of the cell from process piping or from tanks without shutting down the system. All cell types are designed with a safety stop shoulder on the cell.

ES Toroidal Conductivity Sensors

- Choice of voltage output probe or 4 to 20 mA direct output probes
- Polypropylene (ES-1), Kynar or CPVC (ES-5) wetted materials
- Convertible style fitting
- Temperature compensation: PT1000 RTD (ES-1), PT100 RTD (ES-5)
- 20 foot cable standard
- Two year limited warranty

ES toroidal sensors starting at $675.00!

Aquametrix ES series electrodeless conductivity sensors are used in processes where conventional contacting sensors may become fouled or corroded. Each sensor can be mounted in flow-through applications or submersion mounted in tanks or open vessels.

The ES-1 provides a raw signal that requires a third party analyzer for power and signal processing. We recommend the Knick line for this purpose. The ES-5 is loop powered and directly outputs a 4-20 mA signal.

New! **Conductivity Cells**

AM Stainless Steel Conductivity Cells

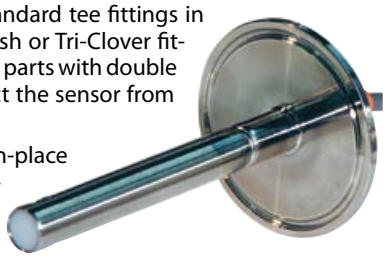
AM conductivity sensors starting at $375.00!

- Cell constants from 0.01 to 50
- Stainless Steel electrodes and body with Teflon Insulators
- PVDF or SS compression fitting
- Automatic temperature compensation
- Adjustable or fixed insertion styles available
- General service, sanitary, and high temperature versions available

Aquametrix AM3422 general service conductivity cells fit into 3/4" to 1" process lines with standard pipe fittings. They're designed for durability in process applications, and their stainless steel and Teflon materials protect them from harm in corrosive chemical applications. The built-in temperature compensation helps ensure high accuracy.

The AM3444 conductivity cell is designed for high pressure and high temperature conductivity measurements, and is ideal for boiler control applications.

The AM3444 electrode is made of 316 stainless steel, with PEEK and EPDM o-rings for maximum reliability. The seals are designed to bear the brunt of chemical attack and hot water damage for long sensor life with low maintenance. The AM3444 is good for process temperatures up to 302° F.



The AM3455 conductivity cells are welded to blind flanges, so they can be inserted into standard tee fittings in sanitary applications using Ladish or Tri-Clover fittings. 316L stainless steel wetted parts with double redundant EPDM o-rings protect the sensor from chemical attack.

The AM3455 is built for clean-in-place service, with FDA-compliant materials, and can be ordered with USP Class VI approval.

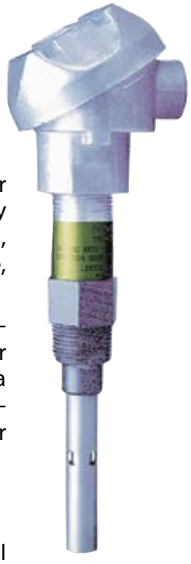
Illinois, Indiana, Missouri, and Iowa
Phone: 800-953-7626 • 630-595-8400
Fax: 630-595-2386

Lesman Instrument Company
www.lesman.com
sales@lesman.com

Wisconsin, and Upper Peninsula Michigan
Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

Conductivity Cells and Assemblies

4973 Conductivity Cells



- Insertion Mountings
- Great for Pure Water Processes
- Corrosion-Resistant Body

Honeywell 4973 conductivity cells are ideal for pure water applications, giving you the accuracy you demand. Polyethersulfone (PES) construction, with electrodes of titanium or high-density graphite, increase resistance to corrosion.

These cells are flexible, designed for insertion, flow-through, direct installation into a process stream, or for use with a PES or stainless steel flow chamber in a bypass stream. For sanitary clean-in-place (CIP) piping systems, the 4794 cells include standard 1 1/2" or 2" CIP fittings.

Specifications

Cell Constants: 0.01, 0.1, 1.0 and 10 cm^{-1} with individual calibration factors

Temperature: *4973:* 284° F max. at rated pressure

Pressure: *4973:* 250 PSIG max. at rated temperature

Automatic Temperature Compensation: Insertion available on all cells. *4973:* 3/4" NPT male thread for schedule 40 and 80 pipe

Insertion Depth: 3 1/2" for 1, 10, and 0.01 constants from solution end of 3/4" NPT male thread; 2 1/2" for 0.1 constant

Wetted Parts: U.S. Food & Drug Administration compliant

Cell: *Body:* PES; *Electrodes:* 0.01 and 0.1 constant, titanium; 1.0 and 10.0 constant, high-density graphite with Teflon guard.

Electrical Connections: Integral PVC-covered non-shielded 18-gauge 4-conductor cable, 7' or 20', as specified.

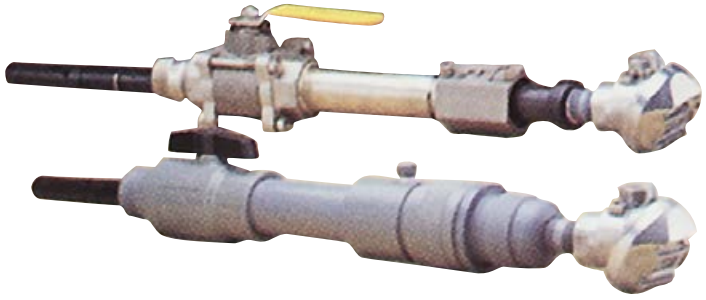
Ordering Instructions

Select the key number and options you need. Follow the arrows to be sure the unit is available. A finished catalog number looks like this:
04973-_ _ _-_ _ _-_ _-_ _-_ _ _

Model Selection Guide

Description		Catalog Number	Avail-ability	Price
4973 Conductivity Cell		04973-	↓	$ 0.00
Cell Constant	0.01	001-	•	96.00
	0.10	X01-	•	96.00
	1.00	XX1-	•	0.00
	10.00	X10-	•	0.00
Insertion	Automatic Temperature Compensator	333-	•	494.00
Leadwire Length	20 Ft. Leadwire	20-	•	0.00
	Junction Box Head, Aluminum	X1-	•	110.00
Tagging	None	00-0 _ _	•	0.00
	Stainless Steel ID Tag (3 Line x 22 Char)	00-S _ _	•	45.00
No Documentation (Download from Lesman.com)		_ 00	•	0.00

Assemblies and Replacement Cells



- 316 Stainless Steel or CPVC Plastic
- Insertion Device Avoids Process Interruption

Honeywell 4909 conductivity assemblies let you insert or remove cells without interrupting your critical process. A restraining mechanism and an internal safety stop provide protection for safe removal at pressures to 50 PSIG. The plastic removal device uses a purge port to flush out accumulated debris.

Specifications

Cell Constants: 0.01, 0.1, 5.0, and 10, 20, 25, and 50 cm^{-1}

Leadwire: 4 leads; Tefzel-covered; 18-gauge cable, 7' or 20'

Pressure: 200 PSIG max. at 284° F. *Removal or insertion:* 50 PSIG max.

Temperature: 284° F max. at 200 PSIG

Process Connection: 1 1/4" NPT male Stainless Steel, 1 1/2" NPT male CPVC

Length: *Insertion:* 4.5 to 6.9"; *Overall:* Process to connection, 16.6,"; 20.5" with junction box; *Total for Cell Removal:* 44.5"; 50.5" with junction box

Wetted Parts: 316 SS ball valve, Viton and Teflon internal sealing materials. *Body:* PES electrode, nickel or platinum

Ordering Instructions

Select the key number and options you need. A finished catalog number will look like this: 04909-_ _ _-_ _-_ _ _-_ _-_ _-_ _ _-_ _ _-_ _

Model Selection Guide

Description		Catalog No.	Price
4909 Complete Conductivity Cell Assembly		04909-	$ 0.00
4908 Replacement Cell Only		04908-	0.00
Cell Constant	0.01	001-	474.00
	0.10	X01-	474.00
	1.00	XX1-	467.00
	10.00	X10-	467.00
	50.00	X50-	467.00
Electrode Material	Nickel	33-	0.00
	Platinum	44-	1279.00
Insertion	Automatic Temp. Compensator	333-	253.00
Leadwire Length	20 Ft. Leadwire	20-	0.00
	Junction Box Head, Aluminum	X1-	110.00
Valve/Cell Material	4909 Valve Assembly, Stainless Steel	02-	1230.00
	4909 Valve Assembly, CVPC	03-	714.00
	4908 Replacement Cell (for SS Valve)	02-	0.00
	4908 Replacement Cell (for CPVC)	03-	0.00
Special Insertion Length	None	000-	0.00
	4.4" Extra Length (for SS Valves Only)	910-	158.00
	4909 SS Support Tube/PES Cell	930-	693.00
	4908 SS Support Tube/PES Cell	930-	0.00
Tagging 22 Char/Ln	None	0 _ _	0.00
	Stainless Steel ID Tag (3 Line x 22 Char)	S _ _	45.00
No Documentation (Download from Lesman.com)		_ 00	0.00

Honeywell

Conductivity Cells and Assemblies

4905 Series

- Wide Range of Cell Constants
- Insertion or Immersion Mountings
- High Temperature and Pressure Limits

Made of corrosion-resistant PES, 4905 cells can be used with either nickel or platinum electrodes for continuous, reliable readings.

For insertion applications, the 1" NPT male thread allows installation in a pipe or tank. For flow applications, install the cell directly into a process stream or use with a separate flow chamber in a bypass stream. For immersion applications, 1/2" rigid or flexible plastic pipe is threaded into the top of the cell — up to 6' for 7' cable, up to 19' for 20' cable.

Specifications

Cell Constants: 0.01, 0.1, 5.0, and 10, 20, 25, and 50 cm^{-1}

Temperature: 284° F max. at rated pressure

Pressure: 250 PSIG max. at rated temperature

Leadwire: 4 leads; Tefzel-covered; 18-gauge cable, 7' or 20'

Mounting: 1" NPT male lead

Length: *Insertion Depth:* 4.5" to 6.9", depends on cell constant; *Overall:* Approx. 6" to 8" (10 to 12 1/4" with junction head).

Wetted Parts: *Cell:* Polyethersulfone; *Electrodes:* Nickel or platinum

Ordering Instructions

Select the key number and options you need. A finished catalog number will look like this: 04905-_ _ _-_ _-_ _ _-_ _-_ _ _-_ _ _

Model Selection Guide

Description		Catalog Number	Price
4905 PES Corrosion-Resistant Conductivity Cell		04905-	$ 0.00
Cell Constant	0.01	001-	317.00
	0.10	X01-	317.00
	1.00	XX1-	309.00
	10.00	X10-	309.00
	50.00	X50-	309.00
Electrode Material	Nickel	33-	0.00
	Platinum (for Acid/Base Applications)	44-	1279.00
Insertion	Automatic Temp. Compensator	333-	234.00
Leadwire Length	20' Leadwire	20-	0.00
	Universal Head Aluminum	X1-	110.00
Special Insertion	None	000-	0.00
	4.4" Extra Length	910-	158.00
Tagging 22 Char/Ln	None	0_ _	0.00
	Stainless Steel I.D. Tag (3 Line x 22 Char)	S_ _	45.00
No Documentation (Download from Lesman.com)		_ 00	0.00
Accessories	PES Flow Chamber	276127	155.00

Visit our website for complete specifications.

Toroidal (Electrodeless) Sensors

- Immersion, Union, Insertion/Removal, or Sanitary Mounting
- PEEK, PFA, Teflon®, PVDF, or Polypropylene
- Pt1000Ω RTD Temperature Compensation

Honeywell's 5000TC sensor is designed for tough applications where coating, fouling, corrosion, or extreme conditions are a concern. The 1.5" diameter bore reduces rough surfaces for low flow impedance.

Specifications

Wetted Materials: *PFA Teflon, polypropylene, PVDF, or PEEK:* Brass, CPVC, Teflon valve seats, Viton O-ring seals; *Stainless steel:* 316 SS, Teflon valve seats, Viton O-ring seals

Maximum Flow Rate: 10 feet per second

Measuring Range: 0.2 to 2000 millisiemens/cm

Sensor Cable: 20-ft. long, 5-conductor (plus 2 isolated shields) cable with polyethylene jacket; rated to 302° F

Bore Size: 1.5" diameter, 0.4" hole

Operating Temperature Range: 14° to 257° F (10° to 125° C); *Mounting Temperature Limits: Plastic:* 23° to 176° F, 23° to 203° F when supported with bracket; *Stainless steel:* 23° to 203° F

Pressure/Temperature Limits: Sensor only. *Polypropylene:* 100 PSI at 212° F; *PVDF:* 100 PSI at 248° F; *PEEK/PFA Teflon:* 200 PSI at 302° F; *Mounting: Plastic:* 50 PSI at 194° F; *Stainless steel:* 100 PSI at 194° F

Ordering Instructions

Select the key number and options you need. A finished catalog number looks like this: 5000TC-_ _-_- 000

Model Selection Guide

Description		Catalog Number	Availability	Price
Toroidal (Electrodeless) Conductivity Probe		5000TC	↓	$0.00
Mount Material	No Mounting Assembly	00	•	0.00
	CPVC Pipe, PVC Junction Box	11	•	339.00
	CPVC Union Adapter, Standard 2" Tee	23	•	372.00
	CPVC Union Adapter Only	24	•	272.00
	CPVC Insertion/Removal Device	42	•	1364.00
	PVDF Pipe, PVC Junction Box	12	•	790.00
	PVDF Union Adapter, Standard 2" Tee	25	•	969.00
	316SS Union Adapter, Standard 2" Tee	21	•	1374.00
	316SS Union Adapter Only	22	•	1076.00
	316SS Insertion/Removal Device	41	•	3159.00
Sensor Material	No Sensor	0	•	0.00
	Polypropylene	1	a	1359.00
	PVDF	2	a	1611.00
	PEEK	3	a	1714.00
	PFA Teflon	4	a	1919.00
	Sanitary Polypropylene Sensor	5	b	1467.00
	Sanitary PFA Sensor	7	b	1997.00
Other	For Future Use	000	•	0.00
Accessories	6-Conductor Interconnect Cable	51451255-001		6.87/ft.
	5000TC Product Manual	70-82-25-98		Call

a Not available with sanitary mount. b Available only with sanitary mount.

Illinois, Indiana, Missouri, and Iowa
Phone: 800-953-7626 • 630-595-8400
Fax: 630-595-2386

Lesman Instrument Company
www.lesman.com
sales@lesman.com

Wisconsin, and Upper Peninsula Michigan
Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

K-PATENTS PROCESS INSTRUMENTS

Process Refractometers for In-Line Concentration

See Page 177

See Page 178

See Page 179

K-Patents Process Refractometers Fit Any Process

K-Patents' new PR-23 process refractometers are an affordable choice for a variety of processes. A new dual connectivity feature lets any two PR-23 sensors be connected to a single model DTR indicating transmitter.

Sanitary compact refractometer PR-23-AC

A compact 3A approved refractometer for pipelines especially suitable for food and beverage processes.

Sanitary probe refractometer PR-23-AP

The K-Patents Sanitary probe refractometer PR-23-AP-RSS/TSS provides an accurate on-line BRIX measurement in tanks and vessels.

Sanitary flush mounted refractometer PR-23-APP

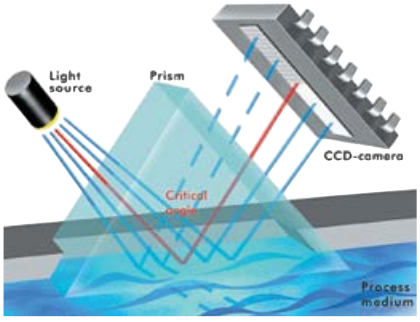
The K-Patents Sanitary flush mounted refractometer PR-23-APP provides an accurate on-line BRIX measurement in cookers and tanks. The sensor is flush mounted in the side wall, which allows the use of scrapers. It is also easily installed through a steam jacket.

Process probe refractometer PR-23-GP

The K-Patents Probe process refractometer PR-23-GP provides an accurate on-line concentration measurement in large pipes and various tanks and vessels.

Teflon body refractometer PR-23-M

An instrument with a specially designed flow cell (of Teflon® or Kevlar®) for measuring chemically aggressive solutions that corrode, foul or otherwise destroy metal parts, as well as for ultra-pure fine chemical processes where metal parts cannot be used.



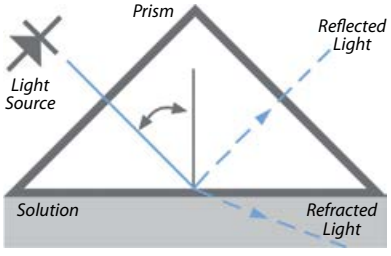
Is a process refractometer right for you? Get a K-Patents application datasheet from www.Lesman.com/datasheets and send it to Lesman for engineering review. We'll help you get the system that best fits your needs.

Need a Brix table or the refractive index of a common material? See page 489.

Saunders body refractometer PR-23-W

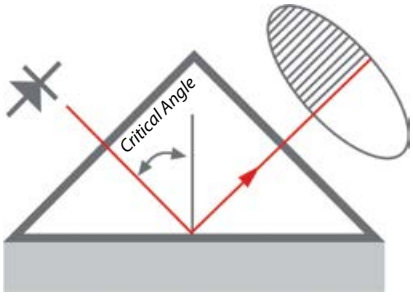
A heavy-duty instrument specially designed for measuring concentrations of chemically aggressive liquids in large-scale production and in large pipelines (diameter 50, 80 or 100 mm/2", 3" or 4"). Also for HF applications and other solutions that corrode or foul metal parts, as well as for ultra-pure fine chemical processes where metal parts cannot be used.

Measurement Principle



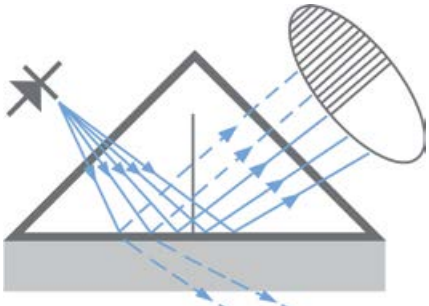
The light source sends light against the interface between a prism and the process solution, where the rays meet the surface at different angles.

Depending on the angle, some rays are totally reflected. Some rays are only partially reflected, and most of the light is refracted into the process solution. This creates an optical image with a dark sector and a light sector.



The angle corresponding to the shadow line is called the critical angle of total reflection. This angle is a function of the refractive index (the concentration of the solution.)

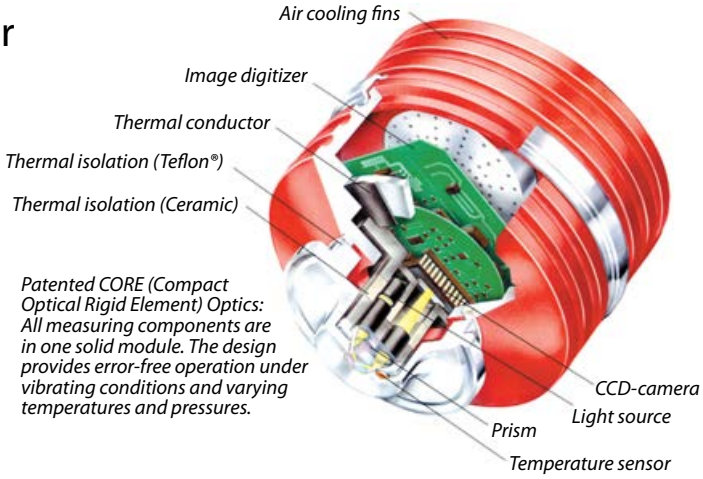
A digital CCD-camera detects the optical image and the shadow line. The camera transforms the optical image point-by-point to an electrical signal. The exact shadow line position is located, and the refractive index is determined.



A built-in temperature sensor measures the temperature (T) on the surface of the process liquid. The indicating transmitter converts the refractive index and temperature to concentration units.

The diagnostics program ensures that the measurement is reliable.

Sanitary In-Line Process Refractometers for Brix and Concentration Measurement



Features

There's a K-Patents sanitary refractometer designed for installation in just about any configuration you need — in a pipe bend, large pipe or vessel, flush mount in a cooker.

- Full measurement range of 0–100 Brix
- Accuracy ±0.0002 refractive index, corresponding to ±0.1% by weight; unaffected by particles, bubbles, or color changes
- Fast (5-second) temperature measurement and automatic temperature compensation by mathematical curve.
- All sensor optics in a rigid patented CORE-optics module with no mechanical adjustments.
- Once the sensor is calibrated to the desired range, there's no need to recalibrate.
- Effective heat transfer and isolation using Teflon® and ceramics in the sensor provide safe operation in higher process temperatures (to 302° F).
- Meets the 3-A sanitary standard requirement.
- Connect one or two sensors to the transmitter module. Sensors are independent, with their own parameter sets and usable in different applications. Two current outputs configurable independently to indicate process concentration or temperature of either sensor.

Ordering Information: Sensor type and process connection, desired scale, properties of process solution, process temperature and pressure ranges, length of interconnection cable, supply voltage and frequency, options and accessories needed.

See the application datasheet at www.Lesman.com/datasheets.

Specifications

Refractive Index Range Standard: Full range 1.3100 to 1.5400 (corresponds to hot water 100 Brix) with spinal prism

Accuracy: R.I. ±0.0002 (typically ±0.1% by weight)

Speed of Response: 1 second undamped

Damping Time Constant: Selectable up to 5 minutes

Calibration: With Cargille standard R.I. liquids over full range

Digital Image Detector: 3648 pixel CCD-element

Light Source: Light emitting diode (LED)

Temperature Measurement: Built-in Pt1000Ω sensor

Temperature Compensation: Automatic by mathematical curve

Ambient Temperature: *Sensor:* -4° to 113° F (-20° to 45° C)

Sensors

Sensor PR-23-A: *PR-23-AC:* Compact sensor model for small pipe lines, *PR-23-AP:* Probe sensor model for large pipe lines and vessels

Sensor: *Wetted Parts, Standard:* AISI 316L stainless steel, prism gaskets teflon, prism spinel; *Option:* Hastelloy C/ASTM C276, titanium/ASTM B348 GR2, nickel 200, tantalum, zirconium/Zr702

Process Connection: *PR-23-AC:* Sanitary 3A-clamp 2.5", Varivent® inline access unit clamp or via elbow flow cell, *PR-23-AP:* Sanitary 3A-clamp 2.5" or 4", or MT4 DN 25/1T APV tank bottom flange

Process Pressure: Sanitary clamp max. 200 psi at 70° F, 125 psi at 250° F

Process Temperature: *PR-23-AC:* -4° to 266° F (-20° to 130° C); *PR-23-AP:* -4° to 302° F (-20° to 150° C)

Sensor Protection Class: IP67, NEMA 4X

Indicating Transmitter DTR

Hazardous Area Classification: Zone 2 IIC T4 (KEMA No. EX-00.Y.1153); *Explosion-proof:* By purging

Display: 320 x 240 pixels graphic liquid crystal (LCD)

Keypad: 18 membrane keys

Current Output: Two independent current sources, 4-20 mA, max load 1000Ω. Galvanic isolation 1500 VDC or VAC (peak), hold function during prism wash

Power: AC input 100–240 VAC/50–60 Hz, optional 24 VDC

Alarms/Wash Relays: Two built-in signal relays, max. 250V/3A

Transmitter Protection Class: Enclosure IP66, NEMA 4X

Ethernet Connection: 10/100 Mbps, data acquisition over UDP/IP protocol with K-Patents PR-11111 datalogging software (included on request)

Interconnecting Cable: Standard 33 ft. (20 m), max. 660 ft. (200 m)

Options: Stainless steel sensor housing, prism wash, cable fittings to the indicating transmitter, European cable glands M20x1.5 or US conduit hubs

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Fax: 262-923-1797

K-PATENTS PROCESS INSTRUMENTS

In-Line Process Refractometers for Liquids

Mounts in pipes or vessels for measurement in chemical, plastics, pulp and paper, and compound applications.

Refractometer for In-Line Concentration Measurement of Liquids in Process Applications

Features

- Full measurement range of 1.32 to 1.53 DI (0–100 Brix)
- Accuracy ±0.0002 refractive index, corresponding to ±0.1% by weight; accuracy unaffected by particles, bubbles, or color changes
- Fast (6-second) temperature measurement and automatic temperature compensation by mathematical curve.
- All sensor optics in a rigid patented CORE-optics module with no mechanical adjustments.
- Once the sensor is calibrated to the desired range, there's no need to recalibrate.
- Effective heat transfer and isolation using Teflon® and ceramics in the sensor provide safe operation in higher process temperatures (to 302° F).
- Dual connectivity: One or two sensors can be connected to the transmitter module. Sensors are independent, with their own parameter sets and usable in different applications. Two current outputs configurable independently to indicate process concentration or temperature of either sensor.
- Ethernet-based communications solution for real-time measurement data and diagnostics on your plant network. All you need is a cross-over cable and K-Patents' ready-to-install Java-based data acquisition software.

Specifications

Refractive Index Range Standard: Full range 1.3200 to 1.5300 (corresponds to hot water 100 Brix)

Accuracy: R.I. ±0.0002 (corresponds typically to ±0.1% by weight); Repeatability and stability correspond to accuracy

Speed of Response: 1 second undamped

Damping Time Constant: Selectable up to 5 minutes

Calibration: With Cargille standard R.I. liquids over full range

Digital Image Detector: 3648 pixel CCD-element

Light Source: LED, 589 nm wavelength, sodium D-line

Temperature Measurement: Built-in Pt-1000Ω sensor, linearization per IEC 751

CORE-Optics: No mechanical adjustments

Temperature Compensation: Automatic by mathematical curve, digital compensation

Ambient Temperature: *Sensor:* -4° to 113° F (-20° to 45° C); *Indicating transmitter:* 32° to 122° F (0° to 50° C)

Sensor (PR-23-GP)

Process Connection: Sandvik L clamp 88 mm/DIN-flange 2656, PN40 DN80/ANSI-flange, 150lb, 3" JIS flange, 10K 80A/line sizes less than 2" via pipe flow cell

Process Temperature: -4° to 302° F (-20° to 150° C)

Process Pressure: Up to 350 psi (25 bar)

Wetted Parts: AISI 316L stainless steel, prism gaskets PTFE Teflon®

Sensor Protection Class: IP67, NEMA 4X

Indicating Transmitter DTR

Display: 320 x 240 pixels graphic liquid crystal (LCD)

Keypad: 18 membrane keys

Current Output: Two independent current sources, 4-20 mA, max load 1000Ω. Galvanic isolation 1500 VDC or VAC (peak), hold function during prism wash

Ethernet Connection: 10/100 Mbps, data acquisition over UDP/IP protocol with K-Patents PR-11111 datalogging software

Power: AC input 100–240 VAC/50–60 Hz, optional 24 VDC

Alarms/Wash Relays: Two built-in signal relays, max. 250V/3A

Transmitter Protection Class: Enclosure IP66, NEMA 4X

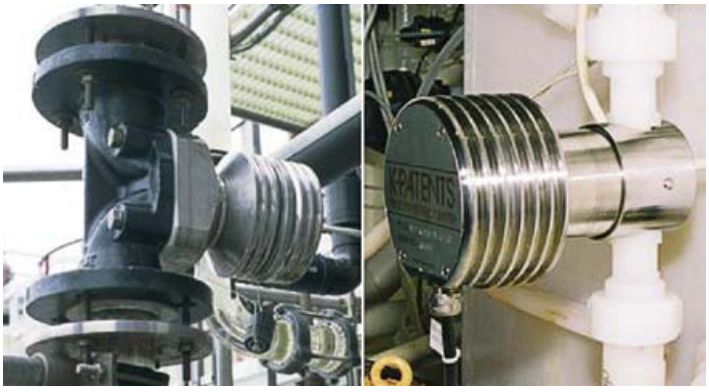
Interconnecting Cable: Standard 33 ft. (20 m), max. 660 ft. (200 m)

Options: Stainless steel sensor housing, prism wash, cable fittings to the indicating transmitter, European cable glands M20x1.5 or US conduit hubs

Ordering Information: Sensor type and process connection, desired scale, properties of process solution, process temperature and pressure ranges, length of interconnection cable, supply voltage and frequency, options and accessories needed.

Ready to order a K-Patents process refractometer? Complete the application datasheet from www.Lesman.com/datasheets/ and send it to Lesman for engineering review. We'll make sure you get the best system to fit your needs.

Process Refractometers for In-Line Concentration Measurement of Chemically Aggressive Liquids



These K-Patents models provide accurate means for measuring liquid concentrations in chemically aggressive solutions that corrode, foul, or otherwise destroy metal parts. The work equally well in ultra-pure fine chemical processes where metal parts can't be used.

K-Patents Teflon body refractometer PR-23-M is designed for small pipe sizes. The sensor wetted parts — Teflon, Kynar, Sapphire, Kalrez, and Spinel — are carefully selected because they have high chemical and mechanical resistance.

The AISI 316L sensor cover and polyamid 6.6 electrical connector withstand chemically aggressive gases and splashes of the process liquid..

The Saunders (diaphragm) valve body refractometer PR-23-W is designed for use in chemically aggressive solutions and ultra-pure fine chemical processes in large-scale production, and in large pipelines (2", 3", or 4" diameters).

It can be mounted in either a vertical or horizontal pipe. The Saunders body material is graphite cast iron, which provides a solid mechanical base for the sensor installation. The cast iron is lined with 3 mm PFA fluoroplastic that gives the body its high chemical resistance. The sensor wetted parts are Teflon, PTFE, Spinel, and Sapphire. The sensor cover is AISI 316L stainless steel.

K-Patents' PR-23-W/M include an Ethernet-based communications solution that allows connection to computer networks (LAN) and the internet, to obtain real-time measurement data and diagnostic information. It also acts as a valuable service tool for parameter changes and software updates. All you need is a cross-over cable and K-Patents' java-based data acquisition software.

Like other models in the PR-23 series, the W/M models allow you to connect two sensors to a single indicating transmitter unit. Each sensor comes with a calibration certificate, comparing a set of standard liquids to the actual sensor output. The calibration and accuracy can be easily verified on-site with certified refractive index liquids and K-Patents' documented verification procedure.

Need a Brix table or the refractive index of a common material? See page 489.

Specifications

Refractive Index Range: *Standard:* Full range 1.3200 to 1.5300 (corresponds to 0–100% b.w.,) spinel prism; *Optional:* 1.2600 to 1.5000, sapphire prism

Accuracy: R.I. ±0.0002 (corresponds typically to ±0.1% by weight); Repeatability and stability correspond to accuracy

Speed of Response: 1 second undamped; *Damping Time Constant:* Selectable up to 5 minutes

Calibration: With Cargille standard R.I. liquids over full range

Digital Image Detector: 3648 pixel CCD-element

Light Source: LED, 589 nm wavelength, sodium D-line

Temperature Measurement: Built-in Pt1000Ω sensor, linearization per IEC 751; *Temperature Compensation:* Automatic, digital compensation

CORE-Optics: No mechanical adjustments

Ambient Temperature: *Sensor:* -4° to 113° F (-20° to 45° C); *Indicating transmitter:* 32° to 122° F (0° to 50° C)

Sensors

Process Connection: *PR-23-W:* Threaded G1/2" or 1/2" NPTF; *PR-23-M:* ANSI 2", 3", or 4" 150 lb flange; DIN DN50, DN80, or DN100 PN 16 flange

Wetted Parts: Teflon® PTFE prism gasket, spinel or sapphire prism, Kalrez O-ring, sapphire adapter

Process Pressure: 145 psi (10 bar) max.

Sensor Protection Class: IP67, NEMA 4X

Indicating Transmitter DTR

Display: 320 x 240 pixels graphic liquid crystal (LCD) with LED backlight and 8 membrane keys

Current Output: Two independent 4–20 mA sources, max load 1000Ω. Galvanic isolation 1500 VDC or VAC (peak), hold function during prism wash

Ethernet Connection: 10/100 Mbps, data acquisition over UDP/IP protocol with K-Patents PR-11111 datalogging software

Power: AC input 100–240 VAC/50–60 Hz, optional 24 VDC

Alarms/Wash Relays: Two built-in signal relays, max. 250V/3A

Transmitter Protection Class: Enclosure IP66, NEMA 4X

Interconnecting Cable: Standard 33 ft. (20 m), max. 660 ft. (200 m)

Options: Stainless steel sensor housing, prism wash, cable fittings to the indicating transmitter, European cable glands M20x1.5 or US conduit hubs

Ordering Information: Sensor type and process connection, desired scale, properties of process solution, process temperature and pressure ranges, length of interconnection cable, supply voltage and frequency, options and accessories needed.

See the application datasheet at www.Lesman.com/datasheets.

Illinois, Indiana, Missouri, and Iowa
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Wisconsin, and Upper Peninsula Michigan
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Fax: 262-923-1797

HygroFlex3 Industrial Humidity/Temperature Transmitter

Features

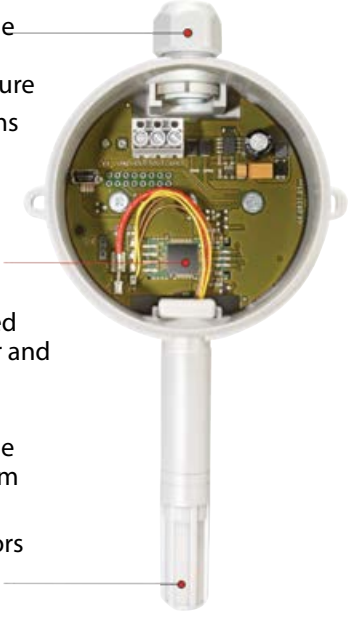
- Duct or wall mount
- Relative humidity, temperature measurement, and dew-point calculation
- Outstanding accuracy and repeatability
- Built-in Hygromer® IN-1 humidity sensor
- Auto-diagnostics and automatic correction

Rotronic's HygroFlex3 HVAC transmitters measure relative humidity, temperature, and dewpoint. In combination with advanced sensor technology and integration, the HF3 provides superb precision and state-of-the-art functionality.

The HF3 is ideal for applications where exact measurement of humidity and temperature is of decisive importance. Transmitters can be used for heating, ventilation, and air conditioning applications, greenhouses, museums, warehouses, and for climate control in office buildings. The duct-mount HF3 is great for use in ventilation shafts. The HF3 wall-mount version is best suited to technical equipment rooms.

The high flexibility of the HF3 series lets you freely select the output parameters and scale each output. All you need to do is enter the desired settings into HW4 software.

Up to 2,000 measurement values can be stored in the HF3 transmitter. Using HW4 software, you can configure the measurement interval, set alarm limits, scale the output signal, and download data for analysis and reporting.



- One or two selectable, scalable analog outputs, assignable to relative humidity or temperature
- Two-wire or three-wire systems
- AirChip3000 technology compensates humidity and temperature over 30,000 reference points
- 2,000 data point memory
- Application-Specific Integrated Circuit (ASIC) micro-controller and EEPROM in a single chip
- Thermal response improved significantly by decoupling the Pt100 temperature sensor from the probe
- Use of Pt100 1/3 Class B sensors for maximum accuracy

Specifications

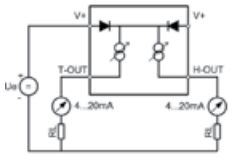
Humidity: *Sensor:* ROTRONIC Hygromer® IN-1; *Measuring Range:* 0 to 100 %RH; *Accuracy:* ±2.0 %RH @ 73° F; *Adjustment:* 10%, 35%, 80% RH; *Long-term stability:*<1 %RH/year; *Response time:* <15 s; *Scale Limits:* -999 to 9999 units; *Wind Velocity:* 20 m/s maximum with filter

Temperature: *Sensor:* Pt100 Class A; *Measuring Range:* -40° to 140° F; *Accuracy:* ±0.3 K @ 73° F; *Adjustment points:* 1; *Long-term stability:* <32°F/year; *Response time:* <15 s; *Scale Limits:* -999 to 9999 units

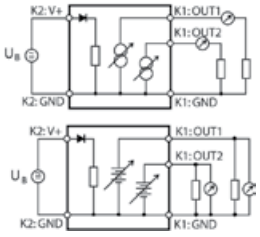
Calculated Parameters: Dewpoint, frost point

	HF320	HF332
Analog Outputs (Qty=2)	4–20 mA	0–1, 0–5, or 0–10 V 0–20 or 4–20 mA Can be rescaled with HW4 software.
Supply Voltage	10–28 VDC	15–40 VDC, 12–28 VAC
Maximum Load:	2x500 Ω	≤2x500 Ω (current output) ≥1 kΩ/V (voltage output)

HF32



HF33



HW4 Software: For firmware upgrades, select and scale outputs, configure datalogging and download data to PC for analysis and reporting

Service Interface Cable: Universal Asynchronous Receiver Transmitter (UART) interface cable AC3006; To power transmitter during configuration, use cable AC3009

Environmental Range (Housing/Electronics): -40° to 140° F, 0 to 100% RH

CE / EMC Compatibility: EMC Directive 2004/108/EC

Fire Protection Class: Corresponds to UL94-HB

FDA/GMP Conformity: Conforms to 21 CFR Part 11 and GAMP5

Construction: *Housing:* IP65-rated ABS plastic; *Probe:* Polycarbonate (fixed, not interchangeable); *Filter:* Polyethylene; *Electrical Connections:* Screw terminals inside, M16 cable gland

Ordering Instructions

Select the key number and options you need. A finished catalog number will look like this: HF3 _ _ - _ _ - _ _ X.

Model Selection Guide

	Description	Catalog Number	Price
Power/ Output	2-Wire Loop Powered/ 10–28 VDC / 4–20 mA 3-Wire / 15–40 VDC or 12–28 VAC / 4–20 mA	HF320- HF332-	$470.00 470.00
Mount	Duct Mount (Through-Wall), Probe: 0.6" x 9.2" Wall Mount, Visible, Probe: 0.6" x 3.3"	D _ _ _ _ W _ _ _ _	0.00 0.00
Type	Humidity and Temperature Humidity Only	_ B _ _ _ _ H _ _ _	90.00 0.00
Output	Dewpoint or Frost Point in °F Temperature: 0° to 50° C Temperature 0° to 100° F	_ _ MEX _ _ 1XX _ _ 6XX	0.00 0.00 0.00
Accessories	Software, Single-User License Service Cable, Mini-USB to USB-A Converter Active Service Cable (Powers Transmitter) Duct Mounting Flange (max 212° F)	HW4-E AC3006 AC3009 AC5005	330.00 145.00 145.00 15.00

HygroFlex5 Industrial Humidity/Temperature Transmitter

Rotronic's HygroFlex5 transmitters measure humidity, temperature, and dewpoint. HygroFlex5 is ideal for all applications where exact measurement of humidity and temperature is critical.

The HF5 series is compatible with HygroClip2 probes with integrated AirChip3000 technology for unparalleled accuracy. HygroFlex HF5 transmitters take humidity and temperature measurement to a whole new level of performance (<0.02 %rH) and reliability (<0.8 %rH and <0.1 K).

A HygroFlex5 transmitter can be programmed with limits to generate an alarm that becomes available when the transmitter is communicating with a PC or compatible Rotronic device. In the event of a major sensor failure, the analog outputs can be set to a fixed value to indicate the alarm state. So, the HygroFlex5 can be integrated in any application.

Specifications

Models: *HF52:* Two-wire: *HF53:* Three- or four-wire; *HF55:* Digital

Probe Type: HygroClip2. See page xx for full details.

Probe Cable Extension: Passive: max. 5 m, active 100 m

Accuracy at 73 ±5 ° F: ±0.8 %rh / 0.2 K

Response Time: 3-12 s, depending on probe type

Startup: *HF52:* 10 seconds ; *HF53, HF55:* Typically 3 seconds

Measuring Range: -100° to 392° F, 0 to 100 %rH, probe dependent

Electronics Operating Range: -40° to 140° F / 0 to 100 %rH (14° to 140° F with LCD)

Display: Optional Graphic display with trend indicator, backlit with configurable parameters; *HF52:* No backlight

Alarm Functions: Programmable, open or shorted sensor

Output Signals: Scalable, 0 to 1, 0 to 5, or 0 to 10 V; 0/4 to 20 mA

Digital Outputs: Optional Ethernet (LAN, WLAN), USB, RS485

Power Supply: *HF52:* 10 to 28 VDC: 10 V + (0.02 x load); *HF53/55:* 15 to 40 VDC / 12 to 28 VAC

Power Consumption: *HF52:* 40 mA max; *HF53:* <100 mA; *HF55:* <300 mA

Min/Max Load: V-signal: ≥1kW/V / mA signal: ≤500W with load compensation

Firmware Update: Via service connector, requires HW4 software

Sensor Diagnostics: Drift, state; Programmable, default: off

Air Velocity: 20 m/sec max at probe

Adjustments: *Humidity:* With keypad / software: multipoint; *Temperature:* With keypad; 1 point, by software: 2 points

Datalogging: External, 2000 data point memory

Psychrometric Calculations: All selectable

PC Interface: With service connector cable

Data Processing by HW4: Graphs, statistics, analysis, qualification

Construction: IP65-rated ABS plastic housing, compliant to UL94-HB; One x M16 x 1.5 cable connections on terminals

Standards: CE compliant, 2007/108/EG

Audit Trail, Electronic Records: FDA CFR21 Part 11 and GAMP compliant

Features

- Relative humidity and temperature measurement with dewpoint and other psychrometric calculations
- Two freely selectable and scalable analog outputs
- Digital output option for integration on a network via RS485 or Ethernet – wired or wireless
- Easy-to-read backlit LCD shows measured values and trends
- Compatible with all HygroClip2 probes; Uses probe simulators allows easy process validation
- Auto-diagnostics and automatic correction; Compensates humidity and temperature over 30,000 reference points

Ordering Instructions

Select the key number and options you need. A finished catalog number will look like this: HF5 _ _ - _ _ _ _ _ _ X X.

Probes are ordered separately. See page 184 for full probe specifications.

Model Selection Guide

Description		Catalog Number	Price
Circuit and Output	2-Wire Loop Power, 4-20 mA Output	HF520-	$360.00
	3-Wire, Line Power, 0-20 mA Output	HF531-	360.00
	3-Wire, Line Power, 4-20 mA Output	HF532-	360.00
	3-Wire, Line Power, 0-1V Output	HF533-	360.00
	3-Wire, Line Power, 0-5V Output	HF534-	360.00
	3-Wire, Line Power, 0-10V Output	HF535-	360.00
Mount	Duct, Probe: 208 mm x 15 mm Diameter	D _ _ _ _ _ _ _	0.00
	Wall, Probe: 85 mm x 15 mm Diameter	W _ _ _ _ _ _ _	0.00
Analog Output	Humidity and Temperature	_ B _ _ _ _ _ _	0.00
	Humidity Only	_ H _ _ _ _ _ _	0.00
Temp Output	0° to 100° F	_ _ 6 X _ _ _ _	0.00
	0° to 200° F	_ _ 7 X _ _ _ _	0.00
	0° to 300° F	_ _ 8 X _ _ _ _	0.00
	-50° to 200° F	_ _ 9 X _ _ _ _	0.00
Options	Keypad and Display	_ _ _ _ D _ _ _	175.00
	No Keypad or Display (Blind Transmitter)	_ _ _ _ X _ _ _	0.00
Analog Signal Cable Fittings	One M16 Cable Gland for Supply/Signal	_ _ _ _ _ 1 _ _	0.00
	One M16 Cable Gland, Vertical Mount	_ _ _ _ _ 2 _ _	0.00
	Conduit Adapter for Supply/Signal	_ _ _ _ _ 3 _ _	0.00
	Conduit Adapter, Vertical Mount	_ _ _ _ _ 4 _ _	0.00
Comms Signals Links	RS485 Link, M16 Cable Gland, +1 Item	_ _ _ _ _ 5 X X	100.00
	RS485 Link for Conduit Adapters	_ _ _ _ _ 6 X X	100.00
	USB, RS485, M16 Cable Gland, Horiz Mt	_ _ _ _ _ 7 X X	100.00
	USB, RS485 for Conduit, Horizontal Mt	_ _ _ _ _ 8 X X	100.00
Accessories to Order as Separate Line Items			
Standard Probe,-40° to 212° Range		HC2-S	395.00
PPS Barrel, 250 mm Length, -148° to 392°, 2M Cable		HC2-IC302	1095.00
SS Barrel, 250 mm Length, -148° to 392°, 2M Cable		HC2-IM302	1305.00
DIN-Rail Mounting Kit (DIN Rail Not Included)		AC5002	25.00
Duct Mounting Flange, Max 212° F		AC5005	15.00
Standard Filter, Polyethylene Insert		NSP-PCB-PE	30.00
Filter, Wire Mesh Insert (Faster Response Time)		NSP-PCB-WM	30.00
Filter, Teflon Insert (High Humidity, Low Air Flow)		NSP-PCB-TF	60.00
2M Data Extension Cable		E2-02A	140.00
5M Data Extension Cable		E2-05A	160.00
Active UART to USB Converter Cable		AC3001	245.00
Service Cable, Mini-USB to USB-A Converter		AC3006	145.00
HW4 Software CD-ROM, Single User License		HW4-E	330.00

Need dewpoint or wet bulb temperature output? Call Lesman.
Looking for a different probe or NIST calibration? See page 184.

Illinois, Indiana, Missouri, and Iowa
Phone: 800-953-7626 • 630-595-8400
Fax: 630-595-2386

Lesman Instrument Company
www.lesman.com
sales@lesman.com

Wisconsin, and Upper Peninsula Michigan
Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

New! Humidity and Temperature Dataloggers

rotronic
LEADING IN HUMIDITY MEASUREMENT

HygroLog HL20 Humidity/ Temperature Datalogger

Features

- Accuracy at 0.8% RH and 0.2° C
- Outstanding long-term stability
- Psychometric calculation of dewpoint and frost point
- Temperature compensates humidity with more than 30,000 reference points
- Holds up to 20,000 temperature/humidity value pairs in memory with date and time stamps
- Freely selectable logging interval, 5 seconds to 1 hour
- Integrated clock with time stamp for every measurement
- FDA 21 CFR Part 11 and GAMP 4 compliant
- Programmable alarm limits, with active alarming
- Visible alarms can be programmed for out-of-limit values, communication loss with probe, sensor failure, or sensor drift
- Clear backlit graphic display shows battery charge, plus measured and calculated data to two-decimal resolution
- Average 13-month battery life (with LC display)
- Interface (UART) for connection to PC

The long term recording of humidity and temperature conditions is critical in the pharmaceutical industry, production processes, storage, and test facilities. This provides valuable information on conditions that can have an influence on people and product quality.

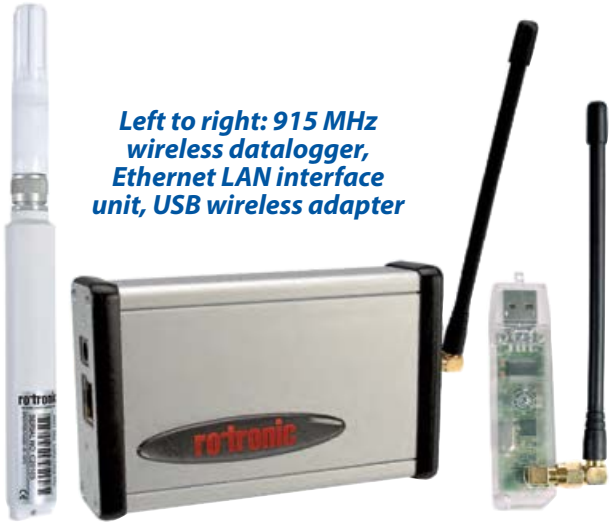
The compact datalogger for humidity and temperature measurement offers high precision and reliability at an economical price. The HL20 series is easy to use and suitable for a wide range of applications. Thanks to its integrated batteries, the HL20 provides hours of operation and offers its users maximum flexibility.

Rotronic HL20 dataloggers completely fulfill the requirements of 21 CFR Part 11 and GAMP5. They are extremely accurate and easy to use. Data can be read and analyzed easily on a PC with HW4 software. The data can be saved either in tamper-proof LOG mode or in easily accessible Excel compatible files.

Model Selection Guide

If this is your first HL-20 datalogger, or if you already own the HW4 software and service cable, purchase the HL-20D set.

Description	Catalog Number	Price
HL-20D Relative Humidity and Temperature Data Logger with Display, plus AC3006 Service Cable and HW4-E Software	HL-20D Set	$420.00
Relative Humidity/Temperature Data Logger	HL-20D	340.00



Left to right: 915 MHz wireless datalogger, Ethernet LAN interface unit, USB wireless adapter

LOG HC2 915 MHz Wireless Temperature/Humidity Dataloggers

Features

- Interchangeable probes (HC2-S3)
- 915 MHz radio frequency for optimum penetration through brickwork and walls
- Stores up to 500,000 measured values with serial number, time and date
- Long-term recording up to 6 years
- Transmits data up to 100m with USB wireless adapter
- Data security: PIN (for activation and data access)
- Temperature range: -40° to 185° F
- Plastic housing, white, IP65
- Flash memory for data security in the case of power failures

Wireless data loggers for a wide range of humidity and temperature monitoring tasks. Wireless transmission means you can save on the wiring costs and data can be sent from inaccessible locations. Thanks to the advanced data logging function, the data is not lost in the event of an interruption in wireless transmission and can be retrieved at any time.

The USB wireless adapter serves as interface to a PC for maintenance applications, so you can program dataloggers and download the data via HW4 software.

Using the Rotronics LAN interface and your existing Ethernet infrastructure, remote data loggers can be accessed from any networked PC. The interface is capable of managing up to 100 digital wireless dataloggers over a 100 Mbps connection. The LAN interface supports the same standard SMA connector for an external 915 MHz antenna, and comes standard with an aluminum housing.

Model Selection Guide

Description	Catalog Number	Price
915 MHz Wireless Datalogger with Humidity and Temperature Probe	LOG-HC2-S3	$625.00
USB Wireless Adapter, 915 MHz SMA-Antenna	LOG-DS-EXT-US	310.00
LAN-Interface, 915 MHz SMA-Antenna	LAN-INTERFACE-US	1360.00
Software, Single-User License	HW4-E	330.00

HygroPalm Portable Humidity/Temperature Indicators

HP22-A Features

- Compatible with all ROTRONIC HC2 probes
- Relative humidity, temperature, and dewpoint measurement
- All psychometric calculations available
- 2,000 data point memory
- Sensor automatic diagnostics and correction
- Clear backlit display for easy reading
- Humidity and temperature compensated over 30,000 reference points
- Active alarming and information
- Display hold function freezes measured value

See compatible HygroClip2 probes on page 184.

HP23-A Features

- Two probe connections for all ROTRONIC HC2 probes or analog third-party probes
- Data recording function up to 10,000 data records (with date, time, batch number) per probe
- Data capture of 250 data points each for up to eight defined locations
- All psychometric calculations available
- Integrated real time clock
- Probe adjustment direct to dewpoint reference
- Unit display saves momentary state (capture logging) and allows readout of all values
- Display resolution to three decimal places
- Compatible with all HygroFlex transmitters for adjustment with service cable and HW4 software

The HygroPalm series is the latest in handheld measuring instruments for relative humidity, temperature, and dewpoint. Based on proven AirChip 3000 technology, this indicator achieves a degree of accuracy unparalleled in today's market.

Built-in sensor diagnostics keep your readings reliable. If the sensors deviate from factory-defined parameters, the measured values are compensated automatically. The HP22-A will automatically trigger a digital alarm if this happens. On the HP23-A, you can choose to have the alarm or not.

Compatible HygroClip2 sensors include three different factory adjustment profiles, to match accuracy to your specific application. The sensor's custom adjustment profile consists of 20 humidity values at three temperatures, to ensure optimum performance over the working range. Data is stored on the instrument's AirChip, and can be retrieved later for audit purposes.

The HP22-A can store up to 2,000 measurement values in the HygroClip2 probe. Using the companion HW4 software, you'll be able to configure the measurement interval, set alarm limits, scale the output signal, and download data to a PC for analysis and record-keeping. The HP23-A lets you record up to 250 data points at each of eight different locations. The data, including time stamp, can be called up individually, providing the ideal solution for room surveillance.

Specifications

	HP22	HP23
Probes	One HygroClip 2	Two HygroClip 2 or analog probes
Datalogging	2,000 data point memory in probe	20,000 data points (2 x 10,000 data point pairs)

Humidity and Temperature Sensors: Depends on probe

Psychometric Calculations: Dewpoint, wet bulb temperature, ratio of mixture, enthalpy, water vapor content, water vapor density

Sensor: *Resolution:* <0.02%RH/0.00K; *Long-term stability:* <1% RH/year

Startup Time: Typically 3 seconds

Measurement Range: -58° to 392° F

Display: Backlit graphic display with configurable parameters, trend indicator, low battery indicator

Sensor Diagnostics: Programmable for drift and state

PC Interface: Via Rotronic AC3006 interface cable

Data Processing: Via HW4 software, for graphs, satistics, analysis, and qualification; FDA CFR 21 Part 11 and GAMP compliant audit trails and electronic records

Housing: IP40 ABS plastic, compliant to UL94-HB fire protection rating

Exclusive to HP23 Model

Features: Real-time clock with battery backup, battery voltage power for third-party probes, event logging

Humidity/Temperature Adjustment: *Via keyboard:* One-point or multipoint; *Via dewpoint reference:* Two-point temperature, humidity 100 points max.

Model Selection Guide

Description	Catalog Number	Price
HygroPalm22-A Humidity/Temperature/Psychrometric Calc. with Backlit LCD and One Interchangeable Probe	HP22-A	$500.00
HygroPalm23-A Humidity/Temperature/Psychrometric Calc. with Backlit LCD, Two Interchangeable Probes, Data Logging and Calibrator for HF Series Transmitters	HP23-A	710.00
Accessories		
100–240 VAC / 5 VDC Power Adapter, Mini USB	AC1212	65.00
Extension Cable HygroClip2 to Instrument, 2M Length	E2-02A	140.00
Software, Single-User License	HW4-E	330.00
Service Cable (Required with HW4-E software)	AC3006	145.00
Desktop Stand for HygroPalm Meters	DESK-HP	75.00

Illinois, Indiana, Missouri, and Iowa
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Fax: 630-595-2386

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Phone: 800-837-1700 • 262-923-1790
Fax: 262-923-1797

HygroClip2 Digital Humidity Probes

rotronic
LEADING IN HUMIDITY MEASUREMENT

Features

- For relative humidity, temperature measurement and dew-point calculation
- Outstanding accuracy and repeatability
- Integrated data acquisition and calibration history — 2000-point data memory
- Sensor auto-diagnostics with automatic correction and error compensation; Compensates humidity and temperature over 30,000 reference points
- Programmable alarm functions with active alarming
- Advanced easy-to-use calibration features
- 100% field interchangeable without adjustment

When it comes to measuring humidity with the highest accuracy(<0.8 % rh / 0.1°K), Rotronic's HygroClip2 probe is in a class of its own. Whether you need a simple climate probe for measuring ambient conditions, or a more sophisticated cable probe for high temperature or other special applications, Rotronic has a HygroClip2 probe to suit your needs.

Every HygroClip2 probe can be individually calibrated and adjusted to maximize measurement precision where you need it the most. Three different adjustment profiles are available from the factory, so measurement accuracy can be matched to your application need. Calibration data is stored in the probe and can be retrieved later for audit purposes.

To rescale HygroClip2 to a different range, connect it to a PC with HW4 software. You can also assign the internally calculated dew or frost point value to an output, converting the HygroClip2 into a dewpoint probe.

If the RH sensor deviates from factory defined parameters (e.g., due to chemical contamination), measurement values can be automatically compensated and a digital alarm triggered. Using Rotronic's HW4 software, you can program HygroClip2 to generate an alarm as an analog output signal in the event of a problem with either the RH or temperature sensor.

Up to 2000 measurement values can be stored in the HygroClip2 probe. Using Rotronic HW4 software, you can configure the measurement interval, set alarm limits, scale the output signal and download data. The HygroClip2 probe can be programmed with set limits to generate an alarm that is available when the probe is communicating with a PC or compatible Rotronic device.

Specifications

Measuring Range: 0 to 100 %rH, -148° to 392° F (depending on probe)

Sensors: *Humidity:* Hygromer® IN-1; *Temperature:* Pt100 1/3 Class B

Accuracy at 163° F: *Standard profile:* 10, 35, 80 %rH ±0.8 %rH / ±.01K; *High precision profile:* 10, 20, 30, 40, 50, 60, 70, 80, 90 %rH ±0.5 %rH / 0.1K; *Custom profile:* Three selectable temperatures from 14° to 158° F and 20 freely selectable %rH values (10 to 90 %rH) ±0.5 %rH /0.1K

Resolution: Typically 0.02 %rH, 0.01 K

Long-Term Stability: <1 %rH, 32° F/year

Humidity Response Time: 3 to 12 seconds (depending on probe)

Electronics Operating Range: -58° to 212° F and 0 to 100 %rH

Analog Output Signals: User scalable, 0–1V = 0–100 %rH or -40° to 140° F

PC Interface: UART standard with Rotronic interface cable

Sensor Diagnostics: Programmable, factory default = off)

Alarm Function: Analog and digital, programmable

Power Supply and Consumption: 3.2 to 5 VDC±0% / typically 4 mA

Materials: *Housing/probe:* Polycarbonate or stainless steel (depends on probe type); *Filter:* Polyethylene insert, polycarbonate cage

Audit Trail and Electronic Records: FDA 21CFR Part 11, GAMP compliant

Standards: CE-compliant 2007 / 1085 / EG

Model Selection Guide — HC2 Probes

Probe Style	Range (° F)	Probe Diam.	Probe Length	Cable Length	Catalog Number	Price
Standard Probe	-40° to 212°	15 mm	85 mm	—	HC2-S	$395.00
Miniature Probe	-40° to 185° -40° to 185°	4 mm 5 mm	57 mm 51 mm	2M 2M	HC2-C04 * HC2-C05	1255.00 1150.00
High Temp Probe	-40° to 302° -40° to 392°	15 mm 15 mm	250 mm 400 mm	2M 2M	HC2-HK25 HC2-HK40	1150.00 1255.00
Mini Insertion Probe Insertion Probe	-40° to 185° -40° to 185°	5 mm 10 mm	200 mm 280 mm	2M 2M	HC2-P05 HC2-HP28	1150.00 1255.00
Sword Probe	-40° to 185°	4 mm	280 mm	2M	HC2-HS28	1255.00
PPS Barrel Probe	-148° to 392° -148° to 392° -148° to 392°	15 mm 15 mm 15 mm	117 mm 250 mm 400 mm	2M 2M 2M	HC2-IC102 HC2-IC302 HC2-IC402-A	1045.00 1095.00 1095.00
SS Barrel Probe	-148° to 392° -148° to 392°	15 mm 15 mm	100 mm 250 mm	2M 2M	HC2-IM102 HC2-IM302	1200.00 1305.00

* With Penetrating Tip

Accessories Model Selection Guide

Description		Catalog Number	Price
15 mm Probe Mounting Flange		AC5005	$15.00
2M Data Extension Cable 5M Data Extension Cable HW4 Software CD, Single-User License		E2-02A E2-05A HW4-E	140.00 160.00 330.00
NIST Calibration Certificates	2-Point (35-80% rH) 3-Point (35-80-0% rH) 3-Point (35-80-10% rH) 4-Point (35-80-10-0% rH)	2PT-RHCERT 3PT-RHCERT-0 3PT-RHCERT-10 4PT-RHCERT	155.00 180.00 180.00 205.00