

Prices Start at See Page

Concentration Percentage/Brix/Refractive Index

K-Patents Process Refractometers for Concentration Measurement Call 176

Conductivity/Total Dissolved Solids (TDS)

Aquametrix Conductivity Cells	\$195.00	173
AquaMetrix Multivariable Transmitters, Analyzers, and Controllers	\$495.00	161
Honeywell Conductivity Cell Assemblies	\$235.00	174
Honeywell APT2000/APT4000 Analytical Process Transmitters	\$1594.00	168
Honeywell DirectLine™ DL423 Analytical System for Conductivity	\$667.00	166
Honeywell UDA2182 Multiparameter Analyzer Controller	\$830.00	164

Dissolved Oxygen

Honeywell DirectLine DL424/425 Analytical System for Dissolved Oxygen	\$811.00	166
Honeywell DL5000 Equilibrium Probe for Dissolved Oxygen	\$992.00	166
Honeywell UDA2182 Multiparameter Analyzer Controller	\$830.00	164

Humidity and Temperature

Rotronic HygroClip2 Humidity Probes	\$375.00	184
Rotronic HygroFlex3 Industrial Humidity/Temperature Transmitter	\$445.00	180
Rotronic HygroFlex5 Industrial Humidity/Temperature Transmitter	\$345.00	181
Rotronic HygroPalm Portable Humidity/Temperature Indicators	\$475.00	183
Rotronic Temperature/Humidity Datalogger	\$595.00	182

pH/Oxygen Reduction Potential (ORP)

AquaMetrix Differential Measurement pH/ORP Replacement Probes	\$585.00	160
AquaMetrix Multivariable Transmitters, Analyzers, and Controllers	\$495.00	161
Honeywell APT2000/APT4000 Analytical Process Transmitters	\$1594.00	168
Honeywell DirectLine DL421/422 Analytical System for pH/ORP	\$606.00	166
Honeywell HB Series Rugged Glass pH/ORP Electrodes	\$281.00	170
Honeywell HBD Series Rugged Glass-Free pH/ORP Electrodes	\$898.00	171
Honeywell pH Electrode Mountings	\$442.00	172
Honeywell Replacement Electrodes for pH/ORP Measurement	\$204.00	169
Honeywell UDA2182 Multiparameter Analyzer Controller	\$830.00	164



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Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

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pH/ORP Replacement Probes



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

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

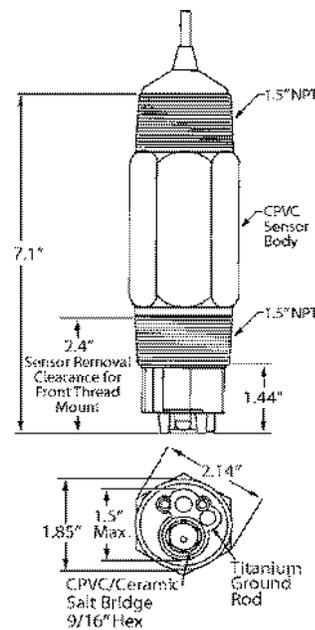
Sensitivity: pH: <0.005 pH; ORP: 0.5 mV

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	\$585.00
60 Series Differential ORP Sensors		R	585.00
Elec- tronics	Standard 5-Wire Sensor	60C	0.00
	Two-Wire Transmitter, 4-20 mA Output	65C	125.00
Body	1.5" NPT Threaded (GLI Replacement Sensor)	8	0.00
	GLI 605IPO Replacement (Sensor Only)	4	0.00
	Fixed Insertion, Sanitary 2.5" Tri-Clover Fitting	S	175.00
Options	Hardened Glass Electrode	H	75.00
	Flat Faced Glass Electrode (Sanitary Body)	F	75.00
	Gold Electrode for ORP Sensors	G	75.00
Cable*	Extended Cable Length (in Feet)	XXX	+1.50/ft
Mounting Hardware and Accessories			
Salt Bridge kit, Ceramic Outer Junction, 3-Pack for -8 Body Type (GLI Replacement Sensors)		AM60-9765	95.00
Union Tee with Adapter for -8 Body Type		AM-MH538N9A	195.00
Submersion Hardware		STC60L	125.00
Salt Bridge Kit, Ceramic Outer Junction, 3-Pack		C35-17	95.00

* For standard cable length (15 feet) leave XXX in the cable selection. Otherwise, change the XXX to your desired length in feet, and add \$1.50 per foot to the price.

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Multichannel Controllers, Transmitters and Analyzers



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



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, ft ³ , liters, m ³ , 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 4-20mA 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, 2x 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	\$535.00
Multiparameter Transmitter, Panel/DIN Rail Mount	SharkTXP	495.00
Multiparameter Controller/Analyzer, 120V Power	Shark-120	945.00

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

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*

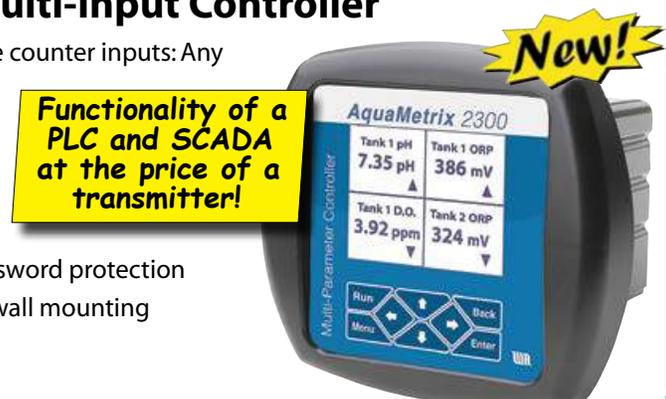
Web: Remote programming and viewing with a browser on a computer, tablet, or smartphone; Secure password login required.

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	\$1950.00
NEMA 4X Wall-Mount Enclosure Kit	2300-WALL-ENCL	95.00
Expansion Cards (One Slot Available)		
Add Four 4-20 mA Inputs	2300-CARD-420-IN	380.00
Add Four 4-20 mA Outputs	2300-CARD-420-OUT	300.00
Add Six 240V 5Amp Relay Outputs	2300-CARD-RELAY-OUT	250.00
Add Modbus TCP/Modbus RTY	2300-MODBUS	200.00
Add Three Pulse Inputs and Four 5A Relay Outputs	2300-CARD-PULSE-IN-RELAY-OUT	250.00

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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



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pH/ORP Sensors

	Durafet® III Glass-free unbreakable electrode	Meridian 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



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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	<i>Immersion:</i> Polypropylene: 100 psig at 140° F, 316 SS: 100 psig at 176° F, <i>Flowthrough:</i> 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

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Conductivity Analysis, Control, and Monitoring Devices



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	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

Conductivity Cell Assemblies and Sensors



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	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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Pressure Transmitter

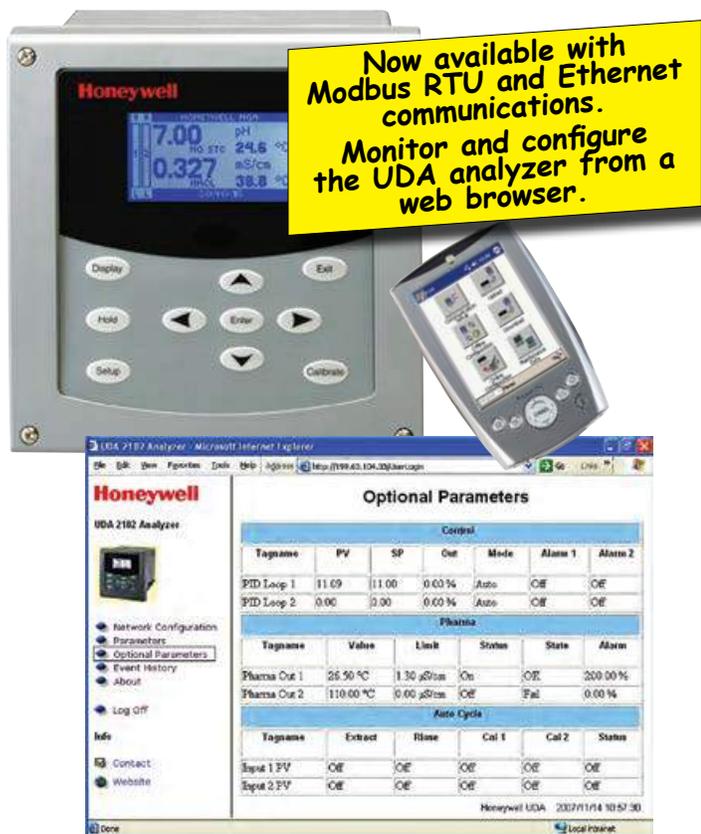
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UDA2182 Single or Dual Loop Mixed Input Analyzer

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.

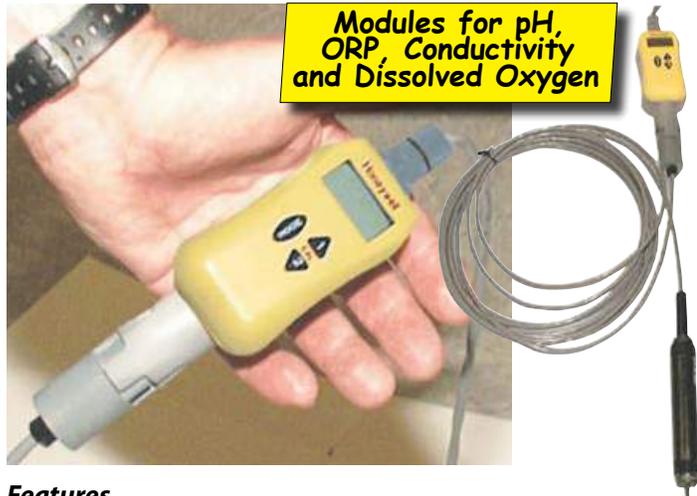
The UDA2182 controller can be configured for On-Off, Current Adjusting Type (CAT), Pulse Frequency Type (PFT), Duration Adjusting Type (DAT), and PID. Each control loop has Honeywell's performance proven AccuTune III tuning algorithm. A selectable "Fuzzy Logic" algorithm is also provided for each loop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

DirectLine™ Two-Wire Transmitter with Flexible Mounting



Modules for pH,
ORP, Conductivity
and Dissolved Oxygen

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 $\pm 0.5\%$ reading; Concentration: $\pm 0.5\%$ reading; Temperature: $\pm 0.1^\circ$ F from 14° to 212° F, $\pm 1^\circ$ F from 212° to 284° F

Displayed Process Variable: pH: 0-14; ORP: -1600 to 1600 mV; Conductivity: 0-2000 μ S/cm, 0-20.00 mS/cm, 0-1000 mS/cm; Resistivity: 0-20.00 M Ω /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: 250 Ω @ 16 VDC; 600 Ω @ 24 VDC; 1400 Ω @ 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

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

Level Measurement
InstrumentsFlow Measurement
Instruments

Pressure Transmitter

Temperature Sensors
and TransmittersWireless Sensing and
CommunicationsAnalytical Instruments
and Systems

Step 1: Select Your Electronics Module

Description	Catalog Number	Availability	Price
DirectLine Sensor Electronics Module			
For Use with Durafet III, Meredian II, and HPW7000 pH Electrodes	DL421	↓	\$606.00
For Use with Contacting Conductivity Cells	DL423	↓	667.00
For Use with Dissolved Oxygen ppm Probes	DL424	↓	811.00
Output Cable for Integral or Remote Mounting			
Cordset: 19.7 Ft (6 m) w/ Connector, Cable	E	• • •	61.00
Field Wiring Connector Only	F	• • •	30.00
Sensor Cable for Remote Mounting			
No Cable Required, Integral Mount	0	• • •	0.00
No Cable: Conductivity Remote Mount	5	e	174.00
No Cable: Dissolved Oxygen Remote Mount	6	e	174.00
Output Cable: Durafet III Remote, 20 Feet	7	f	259.00
Output Cable: Durafet III Remote, 50 Feet	8	f	336.00
Remote Mounting Options			
None	A	• • •	0.00
2" Pipe Mount Bracket, Wall Mount, DIN-Rail Clip	B	• • •	78.00
Options			
No ID Tag, No Certificates	0000	• • •	0.00

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
DirectLine Replacement Sensor Module for pH	51452682-501	579.00
Field Wiring Cable — 20 Feet	51500270-501	212.00
Field Wiring Cable — 50 Feet	51500270-502	247.00

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

Step 2: DL421 with Durafet III Electrodes

Description	Catalog Number	Price	
Electrode Mounting for Durafet III pH Electrode			
Insertion/ Removal (7774)	CPVC Ball Valve Assembly	741	1190.00
	316SS Ball Valve Assembly	742	1862.00
Inline (7777)	1" Electrode, Remote DL421 Mount	771	377.00
for 3/4"	1" Electrode, Integral DL421 Mount	772	377.00
Pipe Tee	1" Electrode, Remote, Vario Pin Mount	774	454.00
Immersion (7777)	1" Electrode, Remote DL421 Mount	773	377.00
	1" Electrode, Remote DL421 Vario Pin	775	454.00
Options	No ID Tag, No Certificates	0000	0.00

Step 2: DL423 for Contacting Conductivity

Description	Catalog Number	Price	
Electrode Mount for Contacting Conductivity Probes			
Remote Mount 3/4" NPT Compression Fittings			
Cell Constant 0.1	Graphite Construction	SX1	135.00
Cell Constant 1.0	Graphite Construction	SX2	135.00
Cell Constant 10.0	Platinum Construction	SX3	152.00
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: DL424/425 for Dissolved Oxygen

Description	Catalog Number	Price	
DL5000 Dissolved Oxygen Probe - Parts per Billion			
DL5000 Dissolved Oxygen Probe - Parts per Million			
Probe	PVC Probe, Integral Mount, No Cable	100	992.00
Material/ Mount	PVC Probe, Remote Mount, 20 Ft Cable	300	992.00
	PVC Probe, Remote Mount, 100 Ft Cable	700	1064.00
(See Note)	316 SS Probe, Integral Mount, No Cable	200	1332.00
	316 SS Probe, Remote Mount, 20 Ft Cable	400	1332.00
Tagging	None	00__	0.00
	Stainless Steel ID Tag (3 Lines, 22 Char/Line)	SS__	37.00
Warranty	Standard Warranty	__00	0.00
	1 Year Extended Warranty	__W2	156.00
	2 Years Extended Warranty	__W3	251.00

Note: Remote mounted 316SS probe available ONLY on DL5PPB models.

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)

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

- Sensecheck:** 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



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.



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	pH/ORP	APT2000PH-H-	↓	\$1594.00
	Conductivity	APT2000CC-H-	↓	1594.00
	Toroidal Conductivity	APT2000TC-H-	↓	1617.00
Approval	General Purpose: FM/CSA	00-	•	0.00
	Intrinsically Safe: FM/CSA	IS-	•	161.00
	English User's Manual	E00	• • •	0.00
APT4000 Four-Wire Analyzer/Transmitter/Controller				
Model	pH/ORP	APT4000PH-	↓	1536.00
	Conductivity	APT4000CC-	↓	1610.00
	Toroidal Conductivity	APT4000TC-	↓	1610.00
	English User's Manual	E00	• • •	0.00
Mounting Hardware	Panel Mount Kit	51205990-001	• • •	37.00
	Pipe/Wall Mount Kit	51205988-001	• • •	78.00

Need a HART® handheld communicator? See page 95.

Level Measurement Instruments

Flow Measurement Instruments

Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems

Honeywell Replacement Electrodes for pH and ORP Use



Measure	Electrode Type	Connection/Leads	Temperature Range	Catalog Number	Fits Enclosure 77__				Price
					58	73	74	77	
pH	Durafet II	3/4", 1-1/4" or 1-1/2" NPT, Quick Disconnect	-10° to 110° C	51204976-501	x	x	x		\$384.00
pH	Durafet II	3/4" NPT, Quick Disconnect	-10° to 110° C	51204976-502	x	x			348.00
pH	Durafet II	1-1/4" or 1-1/2" NPT, 12 Ft. Integral	-10° to 110° C	51204976-503			x		523.00
pH	Durafet II	1-1/4" or 1-1/2" NPT, 20 Ft. Integral	-10° to 110° C	51204976-504			x		547.00
pH	Durafet II	3/4" NPT, Quick Disconnect	-10° to 110° C	51205554-501				x	391.00
pH	Durafet II	3/4", 1-1/4" or 1-1/2" NPT, Quick Disconnect	-10° to 110° C	51205554-502			x	x	391.00
pH	Durafet II	3/4" NPT, 12 Ft. Integral	-10° to 110° C	51205554-503				x	529.00
pH	Durafet II	3/4" NPT, 20 Ft. Integral	-10° to 110° C	51205554-504				x	553.00
pH	Durafet II	3/4" NPT, 50 Ft. Integral	-10° to 110° C	51205554-505				x	685.00
pH	Durafet II	3/4" NPT, 50 Ft. Integral	-10° to 110° C	51205554-512			x	x	385.00
pH	Glass Measuring	3/4" NPT, Screw Cap	10° to 80° C	31117390-501	x	x			204.00
pH	Glass Measuring (Antimony)	3/4" NPT	5° to 75° C	31117399-501	x	x			517.00
pH	Glass Combination + ATC	1.25" or 1.5" NPT, 12 Ft. Tinned, Coax, Conductors	10° to 80° C	31050381-501	x		x		403.00
pH	Glass Combination	3/4" NPT, Screw Cap w/ 6" Spade Lug	10° to 100° C	31117486-501	x	x			324.00
pH	Glass Combination	1-1/4" or 1-1/2" NPT		31117495-501	x		x		360.00
pH	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	0° to 80° C	31117489-501		x	x		324.00
pH	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Quick Disconnect	0° to 80° C	31074387-501			x	x	384.00
pH	Glass Combination	3/4" NPT, 16" Quick Disconnect	0° to 80° C	31074397-501				x	401.00
pH	Glass Combination	3/4" NPT, 12 Ft. Quick Disconnect	0° to 80° C	31074399-501				x	384.00
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		336.00
ORP	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	-5° to 100° C	51451341-503			x	x	590.00
ORP	Glass Combination	3/4", 1-1/4" or 1-1/2" NPT, 12 Ft. Tinned	-5° to 110° C	51451340-503			x	x	590.00
Reference	Single Junction	Gel Filled, Ryton Body, 3/4" NPT		31117481-501		x			216.00
Automatic Temperature Compensation		3/4" NPT		31022289-501		x			168.00
Automatic Temperature Compensation		3/4" NPT		31152137-501		x			211.00
Cap Adapter for Durafet II Electrodes		20 Ft. Cable		51205965-502	x	x	x	x	350.00

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.

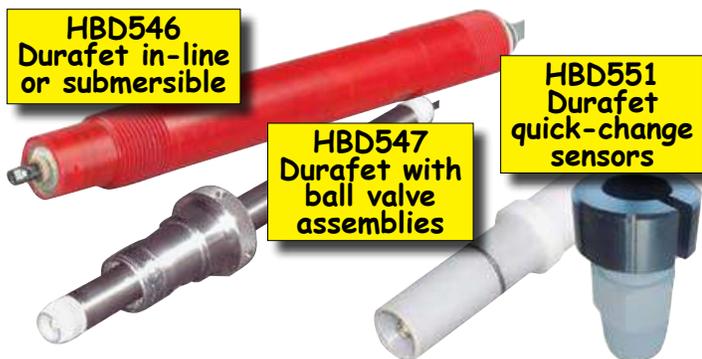
Notes:

- 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	\$468.00
	In-Line w/o Tip Guard, 1000 ohm RTD	51205554-009	51453503-502	468.00
	Immersion w/Tip Guard, 8550 Thermistor	51205554-002	51453503-505	468.00
	Immersion w/Tip Guard, 1000 ohm RTD	51205554-010	51453503-506	468.00
Sanitary Durafet	1.5" flange, shallow insertion	51450948-001	51453535-501	679.00
	1.5" flange, deep insertion	51450948-002	51453535-502	679.00
	2" flange, shallow insertion	51450948-003	51453535-503	679.00
	2" flange, deep insertion	51450948-004	51453535-504	679.00
	3" flange, shallow insertion	51450948-005	51453535-505	679.00
	3" flange, deep insertion	51450948-006	51453535-506	679.00
Preamp Cable	4 foot Length (Note 1)	51204782-006	50001623-501	258.00
	8 foot Length (Note 1)	51204782-007	50001623-501	258.00
	12 foot Length (Note 1)	51204782-001	50001623-501	258.00
	20 foot Length	51204782-002	50001623-501	258.00
	30 foot Length (Note 2)	51204782-003	50001623-502	400.00
	40 foot Length (Note 2)	51204782-004	50001623-502	400.00
Cap Adapter Cable	4 foot Length (Note 1)	51205965-006	51453388-501	424.00
	8 foot Length (Note 1)	51205965-007	51453388-501	424.00
	12 foot Length (Note 1)	51205965-001	51453388-501	424.00
	20 foot Length	51205965-002	51453388-501	424.00
	50 foot Length	51205965-005	51453388-502	553.00
DirectLine Remote Cable	20 foot Length	51500270-001	51453225-501	247.00
	50 foot Length	51500270-002	51453225-502	352.00

Accessories			
	pH Buffer Solution 4.01	31103001-501	\$34.00
	pH Buffer Solution 6.86	31103002-501	34.00
	pH Buffer Solution 9.18	31103003-501	32.00

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.

HBD551 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-	↓		\$898.00
Ball Valve Insertion pH Assemblies		HBD547-		↓	956.00
Quick-Change In-Line pH Sensor		HBD551-		↓	1071.00
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__	•	•	200.00
	Pt100 RTD	TC__	•	•	200.00
	Pt1000 RTD	TK__	•	•	200.00
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-		•	0.00
Cable	10" Pigtail (for Junction Box)	TT__	a	a	210.00
	Pigtail for 16" Sheath Set	J2__	a		221.00
	Pigtail for 20" Sheath Set	J3__	a		247.00
	Pigtail for 24" Sheath Set	J4__	a		315.00
	20-Foot Cable	20__	•	•	0.00
	50-Foot Cable	50__	•	•	173.00
Lead	All Tinned Leads	__ST-	d	d	0.00
	Vario Pin for Extension Cables	__VP-	e	e	0.00
Options	For Future Use	000	•	•	0.00
Extension Cable	20' Direct Connection to UDA2182	50001391-501			269.00
	50' Direct Connection to UDA2182	50001391-502			395.00
	20' Cap Adapter Cable	51453388-501			424.00
	50' Cap Adapter Cable	51453388-502			553.00
Wrench-Tite Ball Valve	1.25" 316SS Ball Valve Assembly	50027636-001			532.00
	316SS Wrench-Tite Fitting	50027406-001			292.00
	316SS Clean/Cal/Purge Fitting (Opt.)	50027412-003			307.00
Hand-Tite Ball Valve	1.25" 316SS Ball Valve Assembly	50027363-003			492.00
	316SS Hand-Tite Fitting	50027418-001			478.00
	316SS Clean/Cal/Purge Fitting (Opt.)	50027412-001			331.00
Sheath Sets	16" Titanium Sheath Set for HB547	50027425-001			266.00
	20" Titanium Sheath Set for HB547	50027425-002			306.00
	24" Titanium Sheath Set for HB547	50027425-003			359.00
HBD551 Adapter Nut-Loc	1" NPT Male, CPVC	50027407-001			126.00
	1" NPT Male, Kynar	50027407-002			165.00
	1" NPT Male, 316 SS	50027407-003			154.00
	1" NPT Male, Kynar, 316SS Hex Nut	50027407-004			286.00
	1" NPT Male, 316SS, 316SS Hex Nut	50027407-005			273.00
Insertion Collar Stop (for 20"/24" Sheaths Sets)	Junction Box (Order with New Installations)	50027421-001			67.00
		50072803-501			82.00
	Tip Protector for HB546	31075715-501			120.00

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.

Level Measurement Instruments

Flow Measurement Instruments

Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems

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 With 1000Ω RTD	01- 442.00 02- 442.00
In-Line Mount (No Tip Guard)	With 8550Ω Thermistor With 1000Ω RTD	03- 442.00 04- 442.00
Cable Length	None	00- 0.00
	UDA2182, 20 Feet (6,10 Meters)	01- 277.00
	UDA2182, 50 Feet (15,24 Meters)	02- 388.00
	Cap Adapter, 20 Feet (6,10 Meters)	04- 436.00
	Cap Adapter, 50 Feet (15,24 Meters)	05- 542.00
Customer ID Tag	None Stainless Steel (3 Lines x 22 Char Ea.)	00 __ 0.00 SS __ 47.00
Certificates	None Certificate of Calibration	__ 00 0.00 __ CC 59.00
Accessories	Smooth Electrode Tip, In-Line Mount	51204993-501 14.17
	Guarded Tip, Immersion Mount	51204992-501 14.76
	CPVC Pipe Tee for In-Line Mounting	31120167-501 75.00

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
Immersion Style	1.5" Flange, Shallow Immersion (2.29")	01- 643.00
	1.5" Flange, Deep Immersion (2.91")	02- 643.00
	2" Flange, Shallow Immersion (2.83")	03- 643.00
	2" Flange, Deep Immersion (3.72")	04- 643.00
	3" Flange, Shallow Immersion (2.53")	05- 643.00
	3" Flange, Deep Immersion (3.72")	06- 643.00
Cable Length	None	00- 0.00
	UDA2182, 20 Feet (6,10 Meters)	01- 277.00
	UDA2182, 50 Feet (15,24 Meters)	02- 388.00
	Cap Adapter, 20 Feet (6,10 Meters)	04- 436.00
	Cap Adapter, 50 Feet (15,24 Meters)	05- 542.00
Accessories	pH Buffer Solution 4.01	31103001-501 \$34.00
	pH Buffer Solution 6.86	31103002-501 34.00
	pH Buffer Solution 9.18	31103003-501 32.00



Level Measurement Instruments

Flow Measurement Instruments

Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems

AquaMetric
by **WWR** Water Analytics



AS General Service Conductivity Cells

- 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

Aquamatrix 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.

AS conductivity sensors starting at \$195.00!

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 \$495.00!

Aquamatrix 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.



See Aquamatrix Shark series transmitters and analyzers on page 161

New! Conductivity Cells



AM Stainless Steel Conductivity Cells

- 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

AM conductivity sensors starting at \$325.00!

Aquamatrix 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.



Conductivity Cells and Assemblies

4973 and 4974 Conductivity Cells

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

The 4973 and 4974 cells are ideal for pure water applications, giving you the accuracy you demand. Polyether-sulfone (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 4974 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; 4974: 266° F max.

Pressure: 4973: 250 PSIG max. at rated temperature; 4974: 150 PSIG max.

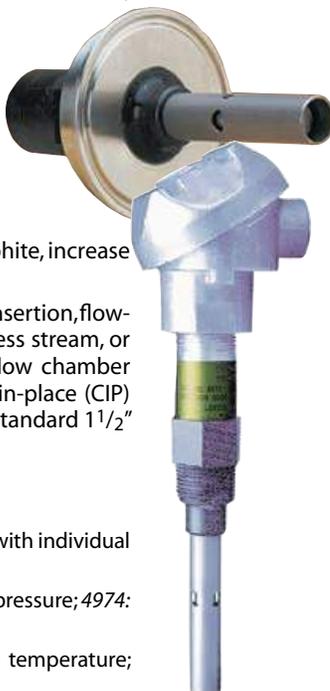
Automatic Temperature Compensation: Insertion available on all cells. 4973: 3/4" NPT male thread for schedule 40 and 80 pipe; 4974: 1 1/2" or 2" sanitary CIP fitting

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

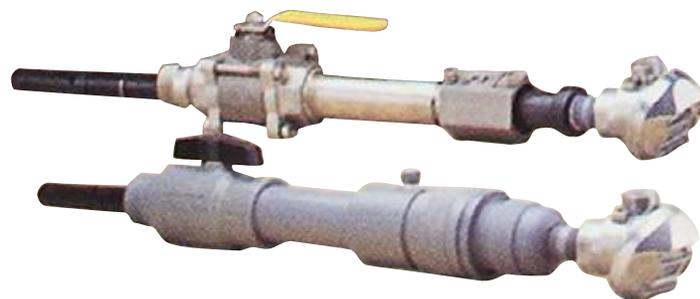
Wetted Parts: U.S. Food & Drug Administration compliant

Cell: Body: PES; Electrodes: 0.01 and 0.1 constant, titanium; 1.0 and 10.0 constant, high-density graphite with Teflon guard. 4974 also includes food-grade silicone rubber and polished 316 SS

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



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-	395.00
	0.10	X01-	395.00
	1.00	XX1-	390.00
	10.00	X10-	390.00
	50.00	X50-	390.00
Electrode Material	Nickel	33-	0.00
	Platinum	44-	1067.00
Insertion	Automatic Temp. Compensator	333-	212.00
Leadwire Length	20 Ft. Leadwire	20-	0.00
	Junction Box Head, Aluminum	X1-	92.00
Valve/Cell Material	4909 Valve Assembly, Stainless Steel	02-	1026.00
	4909 Valve Assembly, CVPC	03-	596.00
	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-	132.00
	4909 SS Support Tube/PES Cell	930-	579.00
	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 __	38.00
No Documentation (Download from Lesman.com)		_ 00	0.00

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	Availability	Price
4973 Conductivity Cell	04973-	↓	\$ 0.00
4974 Sanitary Conductivity Cell	04974-	↓	0.00
Cell Constant	0.01	001-	• • 81.00
	0.10	X01-	• • 81.00
	1.00	XX1-	• • 0.00
	10.00	X10-	• • 0.00
	Automatic Temperature Compensator	333-	• • 413.00
Leadwire Length	20 Ft. Leadwire	20-	• • 0.00
	Junction Box Head, Aluminum	X1-	• • 92.00
CIP	None	00-	• • 0.00
Sanitary Fittings	1.5" Clean-in-Place Fitting	15-	• • 385.00
	2.0" Clean-in-Place Fitting	20-	• • 465.00
Tagging 22 Char/Ln	None	0 __	• • 0.00
	Stainless Steel ID Tag (3 Line x 22 Char)	S __	• • 38.00
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-	264.00
	0.10	X01-	264.00
	1.00	XX1-	258.00
	10.00	X10-	258.00
	50.00	X50-	258.00
Electrode Material	Nickel	33-	0.00
	Platinum (for Acid/Base Applications)	44-	1067.00
Insertion	Automatic Temp. Compensator	333-	195.00
Leadwire Length	20' Leadwire	20-	0.00
	Universal Head Aluminum	X1-	92.00
Special Insertion	None	000-	0.00
	4.4" Extra Length	910-	132.00
Tagging	None	0__	0.00
	22 Char/Ln Stainless Steel I.D. Tag (3 Line x 22 Char)	S__	38.00
		_00	0.00
Accessories	PES Flow Chamber	276127	113.00

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	•	293.00
	CPVC Union Adapter, Standard 2" Tee	23	•	321.00
	CPVC Union Adapter Only	24	•	235.00
	CPVC Insertion/Removal Device	42	•	1256.00
	PVDF Pipe, PVC Junction Box	12	•	683.00
	PVDF Union Adapter, Standard 2" Tee	25	•	838.00
	PVDF Union Adapter Only	26	•	614.00
	316SS Union Adapter, Standard 2" Tee	21	•	1187.00
	316SS Union Adapter Only	22	•	929.00
	316SS Insertion/Removal Device	41	•	281.00
	304SS Sanitary 2" Tee, Heavy-Duty Clamp	31	•	797.00
	Sensor Material	No Sensor	0	•
Polypropylene		1	a	1113.00
PVDF		2	a	1319.00
PEEK		3	a	1404.00
PFA Teflon		4	a	1571.00
Sanitary Polypropylene Sensor		5	b	1267.00
Sanitary PFA Sensor		7	b	1725.00
Other	For Future Use	000	•	0.00
Accessories	6-Conductor Interconnect Cable	51451255-001		5.49/ft.
	5000TC Product Manual	70-82-25-98		16.00

a Not available with sanitary mount.

b Available only with sanitary mount.

Visit our website for complete specifications.

K-PATENTS Process Refractometers for In-Line Concentration



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

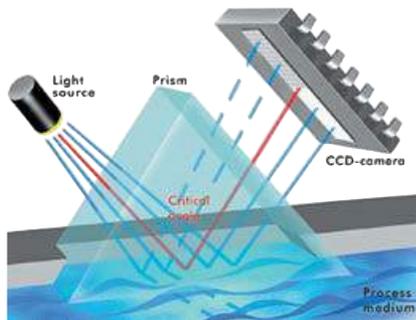
The K-Patents Probe process refractometer PR-23-GP provides an accurate on-line concentration measurement in large pipes and various tanks and vessels.

Teflon body refractometer PR-23-M

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

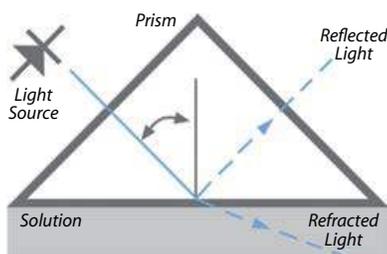
Saunders body refractometer PR-23-W

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.



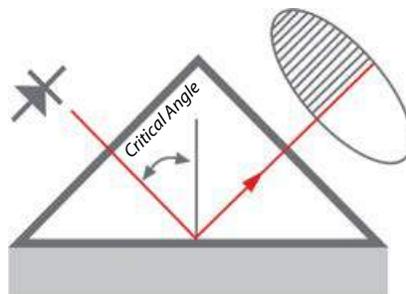
Need a Brix table or the refractive index of a common material? See page 489.

Measurement Principle



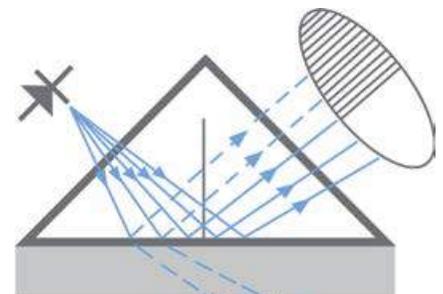
The light source sends light against the interface between a prism and the process solution, where the rays meet the surface at different angles.

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.

Level Measurement Instruments

Flow Measurement Instruments

Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems

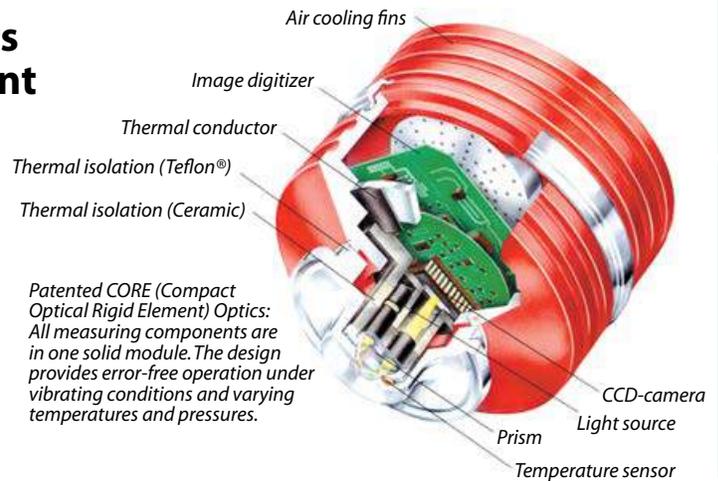
Sanitary In-Line Process Refractometers for Brix and Concentration Measurement



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 $\pm 0.1\%$ 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.



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 $\pm 0.1\%$ 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 Pt1000 Ω 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 1000 Ω . Galvanic isolation 1500VDC 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

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

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

Features

- Full measurement range of 1.32 to 1.53 DI (0–100 Brix)
- Accuracy ± 0.0002 refractive index, corresponding to $\pm 0.1\%$ 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 $\pm 0.1\%$ 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-1000 Ω 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, 10K80A/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 1000 Ω . Galvanic isolation 1500VDC 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.

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



Specifications

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

Accuracy: R.I. ± 0.0002 (corresponds typically to $\pm 0.1\%$ 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 Pt1000 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 1000 Ω . 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.

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.

HygroFlex3 Industrial Humidity/Temperature Transmitter

Features

- Duct or wall mount
- Relative humidity, temperature measurement, and dewpoint 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



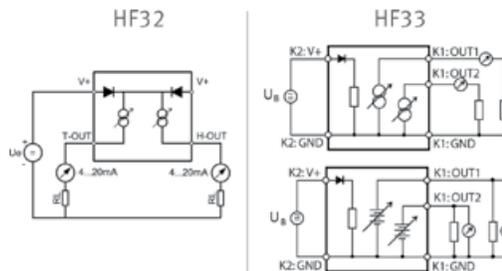
Specifications

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)



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	HF320-	\$445.00
	3-Wire / 15–40 VDC or 12–28 VAC / 4–20 mA	HF332-	445.00
Mount	Duct Mount (Through-Wall), Probe: 0.6" x 9.2"	D ____	0.00
	Wall Mount, Visible, Probe: 0.6" x 3.3"	W ____	0.00
Type	Humidity and Temperature	_ B _ _ _	90.00
	Humidity Only	_ H _ _ _	0.00
Output	Dewpoint or Frost Point in °F	_ _ MEX	0.00
	Temperature: 0° to 50° C	_ _ 1XX	0.00
	Temperature 0° to 100° F	_ _ 6XX	0.00
Accessories	Software, Single-User License	HW4-E	315.00
	Service Cable, Mini-USB to USB-A Converter	AC3006	140.00
	Active Service Cable (Powers Transmitter)	AC3009	140.00
	Duct Mounting Flange (max 212° F)	AC5005	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: ≤ 500 W 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-	\$345.00
	3-Wire, Line Power, 0-20 mA Output	HF531-	345.00
	3-Wire, Line Power, 4-20 mA Output	HF532-	345.00
	3-Wire, Line Power, 0-1V Output	HF533-	345.00
	3-Wire, Line Power, 0-5V Output	HF534-	345.00
	3-Wire, Line Power, 0-10V Output	HF535-	345.00
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	375.00
PPS Barrel, 250 mm Length, -148° to 392°, 2M Cable		HC2-IC302	1045.00
SS Barrel, 250 mm Length, -148° to 392°, 2M Cable		HC2-IM302	1245.00
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	55.00
2M Data Extension Cable		E2-02A	135.00
5M Data Extension Cable		E2-05A	150.00
Active UART to USB Converter Cable		AC3001	235.00
Service Cable, Mini-USB to USB-A Converter		AC3006	140.00
HW4 Software CD-ROM, Single User License		HW4-E	315.00

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
- Psychrometric 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	\$595.00
Relative Humidity/Temperature Data Logger	HL-20D	325.00



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	\$795.00
USB Wireless Adapter, 915 MHz SMA-Antenna	LOG-DS-EXT-US	295.00
LAN-Interface, 915 MHz SMA-Antenna	LAN-INTERFACE-US	1295.00
Software, Single-User License	HW4-E	315.00

HygroPalm Portable Humidity/Temperature Indicators



HP22-A Features

- Compatible with all ROTRONIC HC2 probes
- Relative humidity, temperature, and dewpoint measurement
- All psychrometric 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 psychrometric 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

Psychrometric 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, statistics, 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	\$475.00
HygroPalm23-A Humidity/Temperature/Psychrometric Calc. with Backlit LCD, Two Interchangeable Probes, Data Logging and Calibrator for HF Series Transmitters	HP23-A	675.00
Accessories		
100-240 VAC / 5 VDC Power Adapter, Mini USB	AC1212	60.00
Extension Cable HygroClip2 to Instrument, 2M Length	E2-02A	135.00
Software, Single-User License	HW4-E	315.00
Service Cable (Required with HW4-E software)	AC3006	140.00
Desktop Stand for HygroPalm Meters	DESK-HP	75.00



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	\$375.00
Miniature Probe	-40° to 185°	4 mm	57 mm	2M	HC2-C04 *	1195.00
		5 mm	51 mm	2M	HC2-C05	1095.00
High Temp Probe	-40° to 302°	15 mm	250 mm	2M	HC2-HK25	1095.00
		15 mm	400 mm	2M	HC2-HK40	1195.00
Mini Insertion Probe	-40° to 185°	5 mm	200 mm	2M	HC2-P05	1095.00
		10 mm	280 mm	2M	HC2-HP28	1195.00
Sword Probe	-40° to 185°	4 mm	280 mm	2M	HC2-HS28	1195.00
PPS Barrel Probe	-148° to 392°	15 mm	117 mm	2M	HC2-IC102	995.00
		15 mm	250 mm	2M	HC2-IC302	1045.00
		15 mm	400 mm	2M	HC2-IC402-A	1045.00
SS Barrel Probe	-148° to 392°	15 mm	100 mm	2M	HC2-IM102	1145.00
		15 mm	250 mm	2M	HC2-IM302	1245.00

* With Penetrating Tip

Accessories Model Selection Guide

Description	Catalog Number	Price	
15 mm Probe Mounting Flange	AC5005	\$15.00	
2M Data Extension Cable	E2-02A	135.00	
5M Data Extension Cable	E2-05A	150.00	
HW4 Software CD, Single-User License	HW4-E	315.00	
NIST Calibration Certificates	2-Point (35-80% rH)	2PT-RHCERT	155.00
	3-Point (35-80-0% rH)	3PT-RHCERT-0	180.00
	3-Point (35-80-10% rH)	3PT-RHCERT-10	180.00
	4-Point (35-80-10-0% rH)	4PT-RHCERT	205.00