



FLOW MONITORING

HOSKIN

SCIENTIFIC

INSTRUMENTATION FOR IRRIGATION
APPLICATIONS



hoskin.ca

Supplying Testing & Monitoring Instruments Since 1946

ABOUT HOSKIN

For over seventy years, Hoskin Scientific has been a supplier of testing and monitoring instrumentation to the Canadian market. With offices in Vancouver, Edmonton, Oakville and Montréal our customers are able to receive local sales and technical support in our three major departments.

Our Environmental Department provides solutions for monitoring and sampling biological and chemical parameters in the environment. Our team of environmental sales representatives and diverse product range guarantee that you will find the right products for your application. Specific areas include: water quality, water quantity, soil moisture, plant science, weather stations, indoor air quality, aquatic sampling, and oceanography.

Our Materials Testing Department offers testing equipment for soil, asphalt, petroleum, concrete and cement. Our qualified sales associates focus on providing a sophisticated range of testing equipment complying with the various test methods, ensuring that accurate and consistent test results are always obtained.

Our Instrumentation Department focuses on a wide range of products including optical camera systems, transducers and transmitters, data acquisitions and loggers, signal conditioners and indicators, automation sensors and measurement systems. We have technical sales associates that are trained in various areas and willing to help you with your instrumentation requirements.

RENTALS

We offer high quality, proven equipment that will provide the user with valuable data as well as numerous ways of retrieving, filtering and viewing that data. We carry a wide range of instrumentation, including: water quality, portable gas monitors, soil sampling instruments and more.

Rental Equipment:

- Single and multi-parameter instruments that can be setup for spot checks or extended deployment/data logging
- Water sampling instruments
- Water velocity and stream profiling instruments
- Soil sampling instruments
- Soil vapour sampling instruments
- Portable gas monitoring instruments

Customer satisfaction is our goal and we make an effort to ensure that all our customers are satisfied with their rental. All rental instruments are cleaned and calibrated before being sent to the user (please note that we also require equipment to be returned clean). If a rental instrument requires recalibration, please return the instrument to us and we will recalibrate at no charge. Any instrument not functioning properly can be exchanged at no cost.

Hoskin Scientific offers technical support over the phone and can also provide hands on demonstrations.

We are constantly expanding and looking for new equipment to add to the rental inventory and welcome all suggestions.

Check our website www.hoskin.ca for current offerings.

Daily, weekly and monthly rental rates available – please call for a quote.

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SonTek-IQ™ Series Standard, Plus and Pipe

FLOW, TOTAL VOLUME, LEVEL AND VELOCITY



SonTek-IQ Standard: Big Quality for Small Budgets

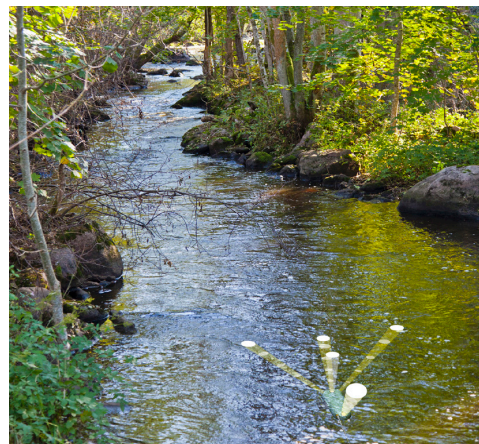
The SonTek-IQ Standard version is a “no frills” option for the budget-minded operator. But with the SonTek-IQ Standard, low budgets do not mean low quality data! Using the same powerful SmartPulse^{HD} technology that is used in the SonTek-IQ Plus system, you won’t be sacrificing quality while monitoring your flow.

The Standard version allows measurement for depths up to 1.5 m in open-channels only, and basic data parameters output for display or export based on a dynamic, single integrated velocity cell.

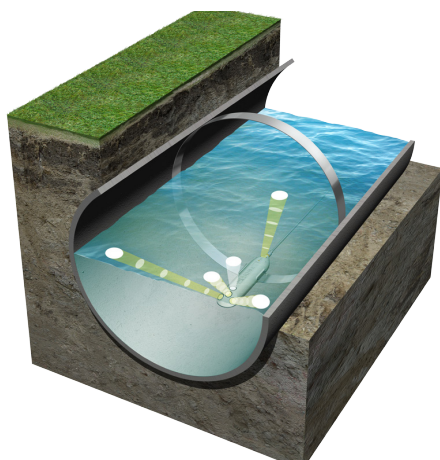
SonTek-IQ Plus: Monitoring in Complex Environments

The SonTek-IQ Plus version offers a flow monitoring solution for larger canals and natural environments with depths up to 5 m. With the ability to collect velocity profiling data in cells as small as 2 cm across a channel horizontally and vertically, this version offers the user complete flexibility in applications and detailed flow velocity parameters for those times when “just flow” isn’t enough.

The SonTek-IQ Plus is capable of handling not just regular trapezoidal canals, but any irregular/naturally-shaped channel, up to 5 m deep, where flow, velocity and/or level need to be measured. And with the flexibility of the SonTek-IQ software, the opportunities are endless.



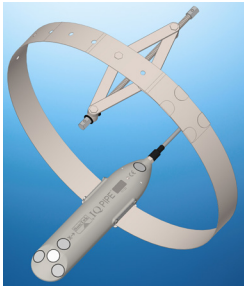
SonTek-IQ Pipe: Accurate Flow in Totally or Partially Full Pipes



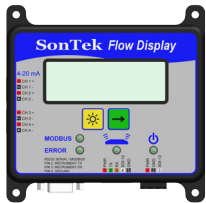
The SonTek-IQ Pipe is intended as either a bottom or top mounted flow meter that can be used in most industrial or agricultural applications. Unlike many other flow meters available today, the SonTek-IQ Pipe automatically determines if the pipe is full or partially full, and identifies the best technique to use to measure the velocity of the water. This information is then used to compute flow, along with accurate water level data provided by the vertical beam and/or pressure sensor. All this without additional configuration.

With a special form factor, the SonTek-IQ Pipe can provide accurate flow values in pipes from 0.5 all the way to 5.0 m, independent of whether these pipes are full or have only a few inches of water in them.

SonTek-IQ ACCESSORIES AND SPECIFICATIONS

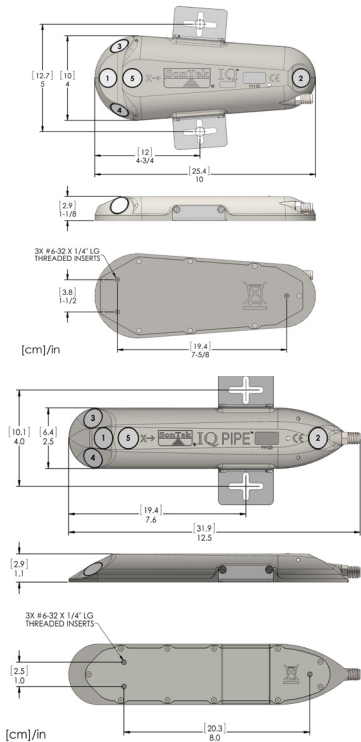


Custom-fit for the IQ Pipe, this easy to use mounting ring will make system installation a breeze. Fits pipe diameters from 16 in (41 cm) to 72 in (183 cm).



With the press of a single button, data is yours with the SonTek-IQ Flow Display. No PC required!

Product Dimensions



Specifications	SonTek-IQ Standard	SonTek-IQ Plus	SonTek-IQ Pipe
Application	Regular Canals	All Open Channels	Pipes & Culverts
Velocity Measurement			
-Sampling Range	0.05 - 1.5 m (0.16 - 5 ft)	0.05- 5.0 m (0.16 - 16 ft)	0.05 - 5.0 m (0.16 - 16 ft)
-Number of Cells	1	Up to 100	Up to 100
-Cell Size	Dynamically integrated	2 cm - 10 cm (0.8 - 4 in)	2 cm - 10 cm (0.8 - 4 in)
Advanced Data Reprocessing	N/A	✓	✓
Increased Number of Data Fields	N/A	✓	✓

Velocity Measurement	
-Velocity Range	±5 m/s (16 ft/s)
-Resolution	0.0001 m/s (0.0003 ft/s)
-Accuracy	±1% of measured velocity, ±0.5 cm/s (0.2 in/s)
Water Level	
-Vertical Beam Range	0.05 - 1.5 m (0.2 - 5 ft) (Standard); 0.05 - 5.0 m (0.2 - 16 ft) (Plus/Pipe)
-Water Level Accuracy	0.1% of measured depth or ±0.003 m (0.01 ft) whichever is greater
-Pressure Sensor Range ¹	30 m (98 ft; 42 psi)
-Pressure Sensor Accuracy	0.1% of full scale
Acoustics	
-Acoustic Frequency	3.0 MHz
-(-2) Along Axis Beams	25° off vertical axis, along axis of channel
-(-2) Skew Beams	60° off vertical and 60° off center axis of channel (Standard/Plus); 37° off vertical and 45° off center axis of channel (Pipe)
Communications	RS232, SDI-12, Modbus, Analog (via optional Flow Display)
Data Storage	4 GB (approximately 1 year)
Operating/Storage Temperature	-5 to 60° C (23 - 140° F)
Temperature Sensor	Accuracy ± 0.2° C; Resolution ± 0.01° C
Tilt Sensor	Accuracy ± 1.0°
SmartPulse^{HD}	Yes
Power	
-Input	9-15 VDC
-Consumption	0.5 - 1.0 W (0.02 when idle)

¹For use in pressurized pipes. Housing rated to 42 psi.



FlowTracker²

WADING DISCHARGE MEASUREMENT INSTRUMENT



Portable. Precise. Practical.

The new FlowTracker2 (FT2) hand held Acoustic Doppler Velocimeter (ADV[®]) has all the technology you have grown to know and trust with the original FlowTracker, but now comes with functional, modernized features (Bluetooth, GPS and large color screen, to name only a few) based on the evaluation and feedback from hydrologists, researchers and scientists who have made the FlowTracker their instrument of choice.

FlowTracker2 ACCESSORIES AND SPECIFICATIONS

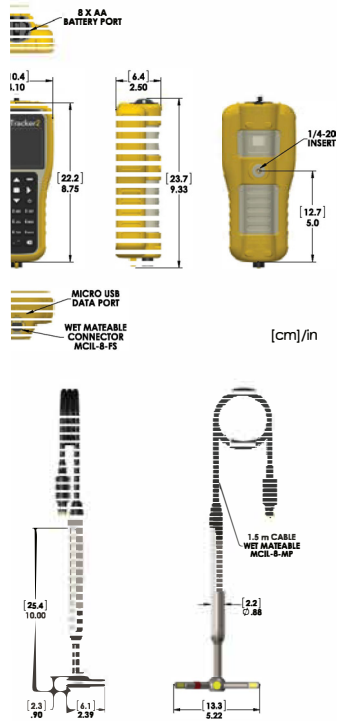


The SonTek deluxe wading rod, featuring a sturdy grip and bubble level



Rugged case provided standard with instrument

Product Dimensions



Part I: Probe

Velocity Range	±0.001 to 4.0 m/s (0.003 to 13 ft/s)
Velocity Resolution	0.0001 m/s (0.0003 ft/s)
Velocity Accuracy	±1% of measured velocity + 0.25 cm/s
Acoustic Frequency	10.0 MHz
Sampling Volume Location	10 cm (3.93 in) from the center transducer
Minimum Depth	0.02 m (0.79 in)
Depth Measurement Range	0 to 10m (0 to 32.81ft)
Depth Measurement Resolution	0.001m (0.003ft)
Depth Sensor Accuracy	+/- 0.1% of FS (temperature compensated over full operating range) +/- 0.05% Static (steady-state at 25°C) Additionally compensated for real-time water velocity, temperature, salinity, and altitude.
Temperature Sensor	Resolution: 0.01° C, Accuracy: 0.1° C
Tilt Sensor	Accuracy: 1.0°
Communication Protocol	RS-232
Operating/Storage Temperature	-20° C to 50° C (-4° F to 122° F)
Physical Specifications	
-Probe Head Dimensions	(L)13.3 cm (5.22 in); (W) 6.1 cm (2.39 in); (H) 2.3 cm (0.90 in)
-Standard Cable Length	1.5 m (4.92 ft)
-Weight in Air	0.90 kg (1.98 lbs)
-Weight in Water	0.30 kg (0.66 lbs)

Part II: Handheld

Power	
-Input Battery Voltage	8 - 12 VDC
-Power Supply	8 X AA Batteries
-Battery Life	15 hours continuous use, typical settings ¹
-Power Consumption	1 W (Average)
GPS	
-H. Position Accuracy	Up to 2.5 m (8.2 ft) nominal ²
-Frequency	L1 (1.575 MHz), SBAS compensation (WAAS, EGNOS, MSAS, GAGAN)
LCD	
-Resolution	320 X 240 TFT Transmissive
Bluetooth	Class 2, Range = 10 m (33 ft) nominal
USB	Micro USB, IP-67
Probe Interface	
-Battery Power to Probe	8 - 12 VDC
-Data Transfer	RS-232
-Data Storage	16 GB. Up to 10k discharge measurements. Up to 10 million velocity samples
Operating Temperature	Alkaline Batteries: -20° to 45°C (-4°F to 113°F) NiMH: -20° to 50°C (-4°F to 122°F)
Storage Temperature	-22° to 70°C (-22° F to 158°F) ³
Physical Specifications	
-Waterproof Rating	IP-67 (1m submersible)
-Handheld Dimensions	(L)10.4 cm (4.1 in); (W) 6.4 cm (2.5 in); (H) 23.7cm (9.3 in)
-Weight in Air	0.75 kg (1.65 lbs)
-Weight in Water	-0.25 kg (-0.55 lbs)

¹Defined as power on with screen on at 100% brightness, ADV sensor pinging 50% of the time, GPS off, and no sleep periods. Actual battery life will vary depending on FT2 settings, manner of use and brand of battery.

²Ideal conditions and settings. GPS data are intended for approximate georeferencing and site ID.

³Remove batteries from FlowTracker2 handheld if storage temperatures exceeds operating temperature of Alkaline and NiMH batteries as stipulated above.

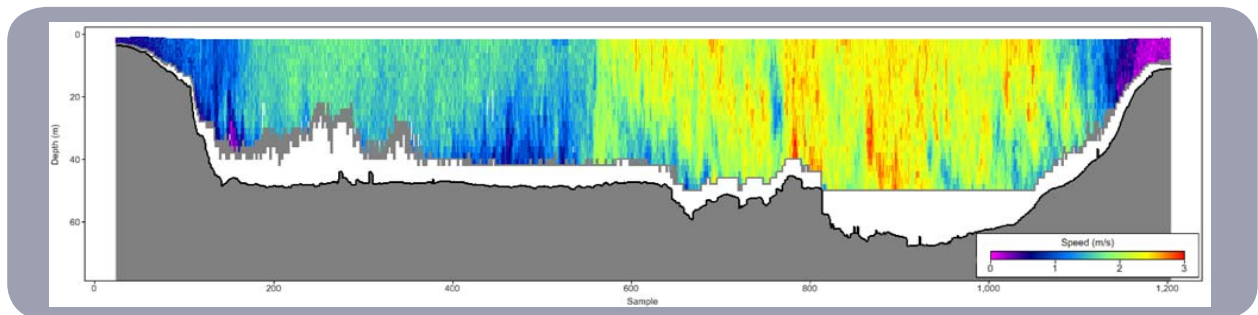
Founded in 1992 and advancing environmental science globally, SonTek manufactures acoustic Doppler instrumentation for water velocity measurement in oceans, rivers, lakes, harbors, canals, estuaries, industrial pipes and laboratories. SonTek's sophisticated and proprietary technology serves as the foundation for some of the industry's most trusted flow data collection systems. SonTek is headquartered in San Diego, California, and is a brand of Xylem Inc.

River Surveyor S5/M9



Taken to Incredible Extremes.

The RiverSurveyor S5/M9 is a river discharge measurement system without the traditional limitations. Small, portable and easy to use, the patented and award-winning RiverSurveyor measures in extreme flood or drought situations within a single instrument, and without changing user settings. The results speak for themselves - the RiverSurveyor S5/M9 has revolutionized the way discharge is measured in rivers and canals.



“Meeting of the Waters” Amazon River near Manaus, Brazil

It’s a SonTek exclusive - multiple acoustic frequencies with SmartPulseHD® make for the most robust and continuous shallow-to-deep measurements ever. An array of four deterministic microcontrollers expertly apportion the proper acoustics, pulse scheme, and cell size so you can focus on the measurement - not the instrument setup. The system even has a vertical beam for accurate channel definition and it’s all designed to work intuitively. Slow to fast, shallow to deep, the RiverSurveyor S5/M9 handles it all on the fly.

Microprocessor comp	pulse-coherent, broadband, and incoherent techniques. High-def cell sizes down to 2 cm. All discharge computations are simultaneously done both within the S5 or M9, and on the host computer. No lost data if communications drop out.
Standard 360° compa	Compensates for vessel motion due to surface conditions.
Reverberation control with ping rates to 70Hz	High ping rates ensure extremely robust data collection.
Bottom-tracking	Acoustically track vessel speed over ground independent of DGPS. Also supplies redundant depth measurement.
RTK GPS (optional)	Ultra precise positioning as an alternative to bottom tracking in moving bed or other difficult situations.

¹RiverSurveyor technology patent number 8,125,849

²RiverSurveyor technology patent number 8,411,530

³Patent Pending

RiverSurveyor ACCESSORIES AND SPECIFICATIONS



Handheld Tablet:
Running on a tablet available from SonTek, RiverSurveyor Live software makes one-man system operation simple.
(Model subject to change.)



Power/Communications:
The Power/Communications Module (PCM) for the S5/M9 operates on standard AA batteries⁵. It can be factory-configured with 2.4 GHz telemetry, SBAS-GPS, or RTK GPS.



RTK GPS:
The optional SonTek RTK GPS³ solution is easy to use and offers an incredibly precise, fully integrated boat speed solution to augment, or be an alternative to, bottom tracking.



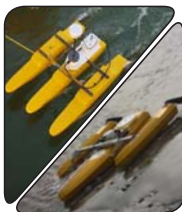
SonTek HydroBoard II:
All-in-one, rugged and easy to transport, this dive-resistant design allows the RiverSurveyor to be used in challenging flow conditions.



HydroBoard II Bags:
Ready to go where you are, these rugged bags are outfitted with shoulder straps and offer the perfect storage protection for the HydroBoard II.



Boat Mount:
Delrin/aluminum fixture that is custom designed for the M9 or S5 to facilitate mounting over the side of a boat. (Attachment to boat not included.)



Trimaran:
Contact SonTek for trimaran solutions to fit special applications.

	RiverSurveyor S5	RiverSurveyor M9
Velocity Measurement		
Profiling Range (Distance)	0.06m to 5m	0.06m to 40m
Profiling Range ¹ (Velocity)	+/- 20 m/s	+/- 20 m/s
Accuracy ¹	Up to +/- 0.25% of measured velocity; +/- 0.2cm/s	Up to +/- 0.25% of measured velocity; +/- 0.2cm/s
Resolution	0.001 m/s	0.001 m/s
Number of Cells	Up to 128	Up to 128
Cell Size	0.02m to 0.5m	0.02m to 4m
Transducer Configuration		
	Five (5) Transducers;	Nine (9) Transducers;
	4-beam 3.0 MHz Janus at 25° Slant Angle;	Dual 4-Beam 3.0 MHz/1.0 MHz Janus at 25° Slant Angle;
	1.0 MHz Vertical Beam Echosounder	0.5 MHz Vertical Beam Echosounder
Depth Measurement		
Range	0.20m to 15m	0.20m to 80m
Accuracy	1%	1%
Resolution	0.001m	0.001m
Discharge Measurement		
Range with Bottom-Track	0.3m to 5m	0.3m to 40m
Range with RTK GPS or DGPS	0.3m to 15m	0.3m to 80m
Computations	Internal	Internal

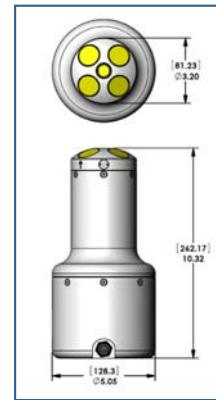
S5/M9 Additional Specifications

- Temperature Sensor
 - Resolution: $\pm 0.01^\circ\text{C}$
 - Accuracy: $\pm 0.1^\circ\text{C}$
- Compass/Tilt (Solid State Type)
 - Range: 360°
 - Heading Accuracy: $\pm 2^\circ$
 - Pitch/Roll: $\pm 1^\circ$
- Internal Recorder Size: 8GB
- Power/Communications
 - 12 - 18v DC
 - RS232 Communications
 - RS232 Serial GPS Input
 - Max Data Output Rate: 2 Hz
 - Internal Sampling Rate: Up to 70 Hz
- Physical/Environmental
 - Depth Rating: 50m
 - Operating Temperature: -5°C to 45°C
 - Storage Temperature: -20°C to 70°C

Power Communications Module

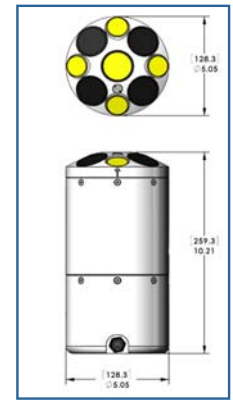
- Batteries
 - Type: Standard AA batteries⁵
 - Average duration: 8 hours of continuous operation (6 hours with RTK GPS enabled)
- GPS Options
 - SBAS GPS Horizontal Accuracy²: $<1.0\text{m}$
 - RTK GPS Horizontal Accuracy²: $<0.02\text{m}$;
 - Vertical Accuracy $<0.04\text{m}^{2,3}$

	Range (Std.; 10 dBm) ⁴	Range (High; 22dBm) ⁴
• Base to Rover	1000 m	3000 m
• PC to Rover	450 m	1500 m
• Bridge to Rover	200 m	400 m



RiverSurveyor-S5

- Weight in Air: 1.1 kg (2.5 lb)
- Weight in Water: -0.3 kg (-0.7 lb)



RiverSurveyor-M9

- Weight in Air: 2.3 kg (5.0 lb)
- Weight in Water: -0.6 kg (-1.3 lb)

¹Please contact SonTek for accuracies better than 1%, or velocities $>10\text{ m/s}$.

²Depends on multipath environment, antenna selection, number of satellites in view, satellite geometry, and ionospheric activity.

³Requires absolute RTK solution. Only available with HydroSurveyor.

⁴High power may not be available in all countries; all ranges with default 2 dBi antenna and line-of-sight.

⁵Standard AA batteries are defined as alkaline or NiMH rechargeables, with a diameter up to 14.5mm.

SQ-Series

Non-contact monitoring



Innovative radar measurement technology as key

The flow meters of the SQ-series capture continuously and contact-free the flow rate of sewer systems, ducts, semi-filled pipes and other technical channels in the fields of wastewater and industrial effluents. The discharge calculation of the sensor, which is very easy to install and to set up, is based on a hydraulic model. Non-contact level and flow velocity measurement is achieved using up-to-date radar technology, whereby the level is measured by means of ultrasonic or alternatively by radar technology.

The series consists of the different types SQ-3, SQ-6 and SQ-15 according to the level to be measured.

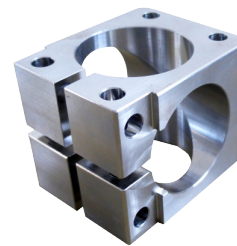


SQ in technical channels

Process water, shafts, semi-filled pipes etc.

Broad field of application

The SQ can be used for various different applications due to its compact design, its housing, which is water-proof and resistant against aggressive liquids, and its convenient and simple installation solutions. Open channels, semi-filled pipes, shafts, ducts and other technical bodies of water are possible applications for the measurement of process, waste and industrial water with the SQ.



Mounting cube: vertical / horizontal variable fixation



- › No construction in the water
- › Simple installation and integration in existing monitoring and control systems
- › Data output via multiple interfaces: SDI-12, RS 485, Modbus, analog (4 ... 20 mA), pulse signal
- › Optional: non-contact measurement of water surface temperature

Measuring range of the SQ

The mounting height above the lowest water level and hence the maximum measurement range for the level equals to 3, 6 or 15 meters (depending on the sensor serial type). The measurement range for the flow velocity is between 0,10 and 15 m/s. An accurate discharge measurement is even possible despite high turbidity or solid contents in the water which commonly is the case in sewage.

Technical details

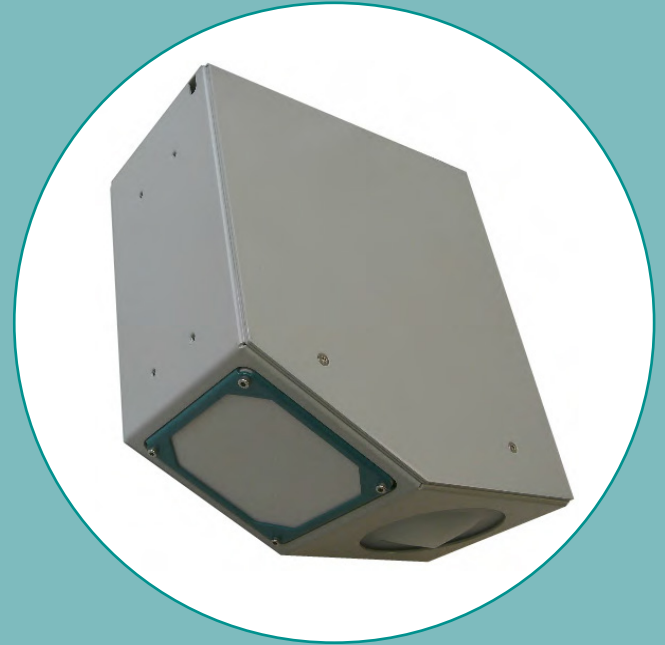
General			
Dimensions (mm)	276 x 148 x 143 mm 1 bracket for pipe with \varnothing 30 mm		
Total weight	1.55 kg		
Protection	IP 68		
Power supply	6 ... 30 V		
Consumption at 12 V	standby approx. 1 mA / active measurement approx. 175 mA		
Operation temperature	-35° ... 60° C		
Storage temperature	-40° ... 60° C		
Lightning Protection	integrated lightning protection		
Level measurement			
Serial type	SQ-3	SQ-6	SQ-15
Measuring technology	ultrasonic	ultrasonic	radar
Level range	0 ... 3 m	0 ... 6 m	0 ... 15 m
Resolution	2 mm		
Accuracy	+/- 0.25 % FS	+/- 0.25 % FS	+/- 2mm
Frequency	26 GHz (K-Band)		
Opening angle	15°	12°	10°
Velocity measurement			
Detectable measurement range	0.10 ... 15 m/s (depending on flow conditions)		
Accuracy	+/- 0.01 m/s; +/- 1 % FS		
Resolution	1 mm/s		
Direction recognition	+/-		
Measurement duration	5 ... 240 sec.		
Measurement interval	8 sec. ... 5 hrs		
Measurement frequency	24 GHz (K-Band)		
Radar opening angle	12°		
Distance to water surface	0.10 ... 35.0 m		
Necessary minimum wave height	3 mm		
Automatical vertical angle compensation			
Accuracy	+/- 1°		
Resolution	+/- 0.1°		
Interface			
Analog output (SQ-analog)	2 x 4 ... 20 mA (for level and discharge)		
Digital interface	1 x SDI-12 1 x RS 485 or Modbus Transfer rate: 1.2 to 115,2 kBd Protocol: various ASCII-protocols Output: discharge, flow velocity, level, quality parameters		
Pulse signal	Quantity per pulse adjustable		

RQ-30

Contact free discharge measurement for channels and open rivers using radar technology



sommer
MESSTECHNIK



Properties and benefits

- » Maintenance free
- » No need for a structure in the water
- » Fully operating even in flood water situations
- » Solar powered due to low power consumption
- » Detection of flow direction
- » Velocity range of 0.30 to 15 m/s
- » Recognition of hysteresis effects
- » Measures in a back water situation
- » Also measures vegetal invasion
- » Measures in tide influenced rivers
- » Automatic installation angle correction
- » Optional: analog outputs 4 to 20 mA

Technical Data

General	
Dimension in mm	338 x 333 x 154 mm 2 brackets for pipe Ø 34 - 48 mm
Total weight	5.4 kg
Protection	IP 67
Power supply	6 ... 30 V
Consumption at 12 V	Standby appr. 1 mA active measurement about 140 mA
Operation temperature	- 35° ... 60° C
Storage temperature	- 40° ... 60° C
Lightning protection	integrated lightning protection
Level measurement	
Level range	<ul style="list-style-type: none"> • 0 ... 15 m - Standard version • 0 ... 35 m - Extended measuring range (optional)
Resolution	1 mm
Accuracy	+/- 2 mm
Radar frequency	26 GHz (K-Band)
Radar opening angle	10°
Velocity measurement	
Detectable measurement range	0.30 ... 15 m/s
Accuracy	+/- 0.02 m/s; +/- 1 %
Resolution	1 mm/s
Direction recognition	+/-
Measurement duration	5 ... 240 sec.
Measurement interval	8 sec. ... 5 h
Measurement frequency	24 GHz (K-Band)
Radar opening angle	12°
Distance to water surface	0.50 ... 35 m
Necessary minimum wave height	3 mm
Automatical vertical angle compensation	
Accuracy	+/- 1°
Resolution	+/- 0.1 °
Interface	
Analog Output (RQ-30 a)	3 x outputs 4 - 20 mA for level, velocity and discharge
Interface	Interface: 1x SDI-12 1x RS 485 Transfer rate: 1.2 to 19.2 kBd Protocol: various ASCII-Protocols, discharge, flow velocity, level, quality parameter



AgriFlo XCi

The AgriFlo XCi can be used to monitor vital farm equipment and on-farm sensors. Use the versatility of AgriFlo XCi to monitor inputs as diverse as: irrigation flows; farm wastewater flows; water quality; dam levels; soil moisture; pump and engine management systems.

AgriFlo XCi is easy to install, easy to use and virtually maintenance free. Utilizing state of the art MACE Doppler ultrasonic velocity sensors, AgriFlo has no moving parts and provides minimal obstruction to the flow. MACE Doppler ultrasonic velocity sensors excel in trash laden water and animal waste which means that the meter stays in service longer without time-consuming repairs.

AgriFlo XCi Specifications

GENERAL

Weight	Approx. 5 kg (11 lbs)
Dimensions	365 mm (H) x 260 mm (W) x 170 mm (D) 14.4 in. (H) x 10.2 in. (W) x 6.7 in. (D)
Enclosure rating	IP66
Enclosure material	UV stabilized polycarbonate
Operating temperature (with internal battery installed)	-15 to +50° C (5 to 122° F)
Operating temperature (with internal battery removed and external power used)	-20 to +65° C (-4 to 150° F)
Backlit display	16 character x 2 line alphanumeric LCD
Program memory	2 Mb flash (sufficient for 600,000 discrete readings)
Power	Internal 12Volt 7.2Ah battery with external solar panel or mains charger
Units of measure	User definable (metric/US)
Application software	FloCom+ PC software for system configuration, data downloading and velocity profile testing. Minimum system requirements - Windows® XP
Factory backup	24 months - parts and labour guarantee

DEPTH MEASUREMENT

Method	Ceramic pressure transducer with large flat sensing diaphragm which allows straight, undeflected flow over the sensing area to reduce drawdown effects at high stream velocities and provides for self cleaning with an impervious Alumina ceramic surface.
Full scale range	4 m (13 ft.) above the transducer face
Accuracy	0.2% of full scale at constant temperature in a static stream. 1% of full scale over a stream 5 to 55° C (41 to 130° F)
Resolution	1 mm (0.04 in.)
Overrange	60 m (200 ft.) without damage
Min. operating depth	20 mm (0.79 in.)

VELOCITY MEASUREMENT

Method	Submerged Ultrasonic Doppler
Range	±0.025 to ± 8.0 m/s (±0.08 to ± 26 ft/s)
Resolution	1 mm at 1.0 m/s (0.04 in. at 3.3 ft/s)
Accuracy	±1% up to 3.0 m/s (±1% up to 10 ft/s)
Urethane sensor cable	9 mm (D) up to 50 m (L) (0.35 in. (D) up to 164 ft. (L))
Min. operating depth	40 mm (1.57 in.)
Max. operating temperature	60° C (140° F)



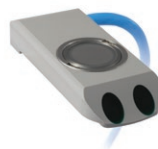
DOPPLER INSERT VELOCITY SENSOR

For use in full pipes or partially full pipes (when used in conjunction with an EchoFlo depth sensor)

Pipe size	0.1 to 2.54 m (4 in. to 100 in.) diameter
Process fitting	2" BSP or 2" NPT
Max. process fitting pressure ¹	1034 kPa (150psi)
Max. operating pressure ²	253kPa (37psi)
Shaft dimensions	330 mm (L) x 20 mm (D) 13 in. (L) x 0.8 in. (D)
Head dimensions	45 mm (D) x 25 mm (H) 1.8 in. (D) x 1 in. (H)
Wetted materials	Nickel plated brass and epoxy
Pipe intrusion area	11.25 cm ² (1.74 in ²)

¹ The pipe **must be de-pressurized** prior to insertion or removal

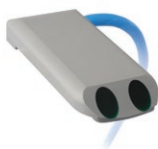
² The stream flow may be suitable for Doppler ultrasonic flow measurement in pressures >253kPa (37psi) if it contains **at least** 100 parts per million of suspended solids that are >75 microns in size.



DOPPLER AREA/VELOCITY SENSOR

ZX SnapStrap mounted, combined velocity and depth sensor for use in partially full pipes or open channels

Pipe size	0.15 to 2.54 m (6 in. to 100 in.) diameter
Max. channel width *	3 m (10 ft.)
Dimensions	125 mm (L) x 50 mm (W) x 20 mm (H) 5 in. (L) x 2 in. (W) x 0.79 in. (H)
Wetted materials	PVC, Alumina ceramic and epoxy
Pipe intrusion area	8.6 cm ² (1.33 in ²)



DOPPLER VELOCITY SENSOR

ZX SnapStrap mounted, velocity sensor for use in full pipes or open channels (when used in conjunction with a depth sensor)

Pipe size	0.15 to 2.54 m (6 in. to 100 in.) diameter
Max. channel width *	3 m (10 ft.)
Dimensions	125 mm (L) x 50 mm (W) x 17 mm (H) 5 in. (L) x 2 in. (W) x 0.67 in. (H)
Wetted materials	PVC and epoxy
Pipe intrusion area	8 cm ² (1.24 in ²)

Note to end users: These specifications are subject to change at any time without notice. MACE takes no responsibility for the use of these figures. Please consult MACE for the latest specifications before using them in contract submittals or third party quotes etc. MACE reserves the right to change specifications without prior warning. All quoted figures are based on test conditions and are subject to variation due to site conditions.

* MACE Doppler ultrasonic sensors **will** operate in wider channels, but a reliable stream gauging **must** be performed for best system accuracy.

FloPro XCi



The FloPro XCi can be used to monitor just about any water quantity and quality sensor together with vital mining, municipal and industrial equipment and assets. Whether you need to measure flow as well as conductivity, pH and rainfall or utilize a downward looking ultrasonic depth sensor to measure pond levels the FloPro is fully expandable to your needs. Furthermore, FloPro is easily interfaced to SCADA/telemetry systems.

FloPro XCi is easy to install, easy to use and virtually maintenance free. Utilizing state of the art MACE Doppler ultrasonic velocity sensors, FloPro has no moving parts and provides minimal obstruction to the flow. MACE Doppler ultrasonic velocity sensors produce superior results under a wide range of hydraulic operating conditions such as those encountered in wastewater and stormwater flows. Even when the pipe slope is unknown, in surcharge, or flowing in reverse, the FloPro produces accurate repeatable data every time.

FloPro XCi Specifications

GENERAL

Weight	Approx. 5 kg (11 lbs)
Dimensions	365 mm (H) x 260 mm (W) x 170 mm (D) 14.4 in. (H) x 10.2 in. (W) x 6.7 in. (D)
Enclosure rating	IP66
Enclosure material	UV stabilized polycarbonate
Operating temperature (with internal battery installed)	-15 to +50° C (5 to 122° F)
Operating temperature (with internal battery removed and external power used)	-20 to +65° C (-4 to 150° F)
Backlit display	16 character x 2 line alphanumeric LCD
Program memory	2 Mb flash (sufficient for 600,000 discrete readings)
Power	Internal 12Volt 7.2Ah battery with external solar panel or mains charger
Units of measure	User definable (metric/US)
Application software	FloCom+ PC software for system configuration, data downloading and velocity profile testing. Minimum system requirements - Windows® XP
Factory backup	24 months - parts and labour guarantee

DEPTH MEASUREMENT

Method	Ceramic pressure transducer with large flat sensing diaphragm which allows straight, undeflected flow over the sensing area to reduce drawdown effects at high stream velocities and provides for self cleaning with an impervious Alumina ceramic surface.
Full scale range	4 m (13 ft.) above the transducer face
Accuracy	0.2% of full scale at constant temperature in a static stream. 1% of full scale over a stream 5 to 55° C (41 to 130° F)
Resolution	1 mm (0.04 in.)
Overrange	60 m (200 ft.) without damage
Min. operating depth	20 mm (0.79 in.)

VELOCITY MEASUREMENT

Method	Submerged Ultrasonic Doppler
Range	±0.025 to ± 8.0 m/s (±0.08 to ± 26 ft/s)
Resolution	1 mm at 1.0 m/s (0.04 in. at 3.3 ft/s)
Accuracy	±1% up to 3.0 m/s (±1% up to 10 ft/s)
Urethane sensor cable	9 mm (D) up to 50 m (L) (0.35 in. (D) up to 164 ft. (L))
Min. operating depth	40 mm (1.57 in.)
Max. operating temperature	60° C (140° F)



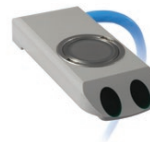
DOPPLER INSERT VELOCITY SENSOR

**For use in full pipes or partially full pipes
(when used in conjunction with an EchoFlo depth sensor)**

Pipe size	0.1 to 2.54 m (4 in. to 100 in.) diameter
Process fitting	2" BSP or 2" NPT
Max. process fitting pressure ¹	1034 kPa (150psi)
Max. operating pressure ²	253kPa (37psi)
Shaft dimensions	330 mm (L) x 20 mm (D) 13 in. (L) x 0.8 in. (D)
Head dimensions	45 mm (D) x 25 mm (H) 1.8 in. (D) x 1 in. (H)
Wetted materials	Nickel plated brass and epoxy
Pipe intrusion area	11.25 cm ² (1.74 in ²)

¹ The pipe **must be de-pressurized** prior to insertion or removal

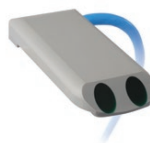
² The stream flow may be suitable for Doppler ultrasonic flow
measurement in pressures >253kPa (37psi) if it contains **at least**
100 parts per million of suspended solids that are >75 microns in size.



DOPPLER AREA/VELOCITY SENSOR

**ZX SnapStrap mounted, combined velocity and depth sensor
for use in partially full pipes or open channels**

Pipe size	0.15 to 2.54 m (6 in. to 100 in.) diameter
Max. channel width *	3 m (10 ft.)
Dimensions	125 mm (L) x 50 mm (W) x 20 mm (H) 5 in. (L) x 2 in. (W) x 0.79 in. (H)
Wetted materials	PVC, Alumina ceramic and epoxy
Pipe intrusion area	8.6 cm ² (1.33 in ²)



DOPPLER VELOCITY SENSOR

**ZX SnapStrap mounted, velocity sensor for use in full pipes or
open channels (when used in conjunction with a depth sensor)**

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Wetted materials	PVC and epoxy
Pipe intrusion area	8 cm ² (1.24 in ²)

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* MACE Doppler ultrasonic sensors **will** operate in wider channels, but a reliable stream gauging **must** be performed for best system accuracy.

ULTRAFLO U1000MKII-FM



Industries:

- n Building Services
- n Energy Management
- n Water Treatment
- n Chemical
- n Pharmaceutical
- n Petrochemical
- n Food

Recommended for:

- n Hot water < 85°C (185°F)
- n Chilled water
- n Potable water
- n Demineralized water
- n Chilled Water with Glycol

Application/use:

- n Hot water metering and flow measurement
- n Flow measurement for heat metering
- n Chilled water metering and flow measurement
- n Flow measurement for chilled water energy metering
- n Potable water metering and flow measurement
- n Process water metering and flow measurement
- n Ultrapure water measurement

U1000MKII-FM – Fixed Ultrasonic Flow Meter

SPECIFICATION

Measurement Technique: Ultrasonic transit time method for flow measurement.

Turn Down Ratio: 200:1

Accuracy: +/- 1% – 3% of flow reading for >0.3m/s (1 ft/s).

Flow Velocity Range: 0.1m/s – 10m/s (0.3 ft/s – 32 ft/s).

Pipe Range: Available in 2 options. ¾" – 4" Sch 40 and >4" - 6"
Note Pipe size is dependent on pipe material and internal diameter.

Water Temp Range: 0°C – 85°C (32°F – 185°F).

Pulse Output: Pulse or Frequency.

Pulse for Volume flow and Alarms.

Frequency for flow rate.

The pulse output can be configured as a loss of signal or low flow alarm.

4-20mA Output: Optional 4-20mA flow proportional output

Modbus Communication: Optional Modbus RTU slave, RS485 serial link hardware layer. Modbus connection cable is 1m.

External Power Supply: 12V – 24V +/- 10% AC/DC at 7 watts per unit.
Optional plug in 12V power supply.

Electronics Enclosure: IP54.

Input/Output Cable: 5m x 6 core for power in, 4-20mA and pulse out.

Dimensions: 250mm x 48mm x 90mm (10" x 2" x 4")
(electronics + guide rail).



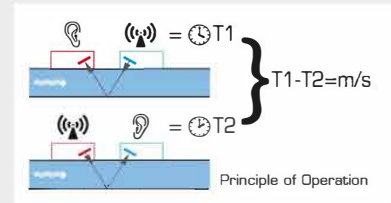
U1000MKII-FM Flow Reading Screen

U1000MKII-FM Product Features and Benefits

- Factory configured – minimal site configuration
- Adjustable guide rail & sensor assembly – simple installation
- Clamp-on – non-invasive & low install cost
- LCD with backlight – install & service information
- Integral pulse or optional modbus and 4-20mA outputs – aM&T & BEM's compatible

How does it work?

The Ultraflo is a transit time ultrasonic flow meter designed to work with clamp-on transducers, to provide accurate measurement of liquid flowing within a closed pipe, without the need for any mechanical parts to be inserted through the pipe wall or to protrude into the flow system. It takes just a few minutes to install and there is no need to shut down flow or drain the system!



When ultrasound is transmitted between the transducers, the speed at which the sound travels through the liquid is accelerated slightly by the velocity of the liquid through the pipe. When ultrasound is transmitted in the opposite direction, the flow of the liquid causes the transmitted sound to decelerate. The subsequent time difference is directly proportional to the flow velocity in the pipe. Having measured the flow velocity and knowing the pipe cross-sectional area, the volumetric flow can be easily calculated.

Simple steps for locating U1000MKII-FM on pipe



1 Guide rail and sensor assembly showing gel pads applied



2 Clamp guide rail and sensor assembly to pipe and release sensor locking screws



3 Connect power and sensors to electronic assembly



4 Click electronic assembly onto guide rail and sensor assembly





Portaflow PF330/PF220

The new portable range of clamp-on flow meters from Micronics, for simple, accurate flow measurement from outside the pipe!

The Portaflow range brings simplicity to the non-invasive measurement of liquid flow. Portaflow offers the user quick and accurate flow measurement with its easy to follow menu and simple set up. Results can be achieved within minutes of opening the case!

Compact, rugged and reliable, the Portaflow range has been designed to provide sustained performance in industrial environments.



- DSP measurement technique
- Reynolds number correction
- Easy to install
- Simple to follow programming menu
- Clamp-on sensors



micronics
Through measurement comes control



INDUSTRIES:

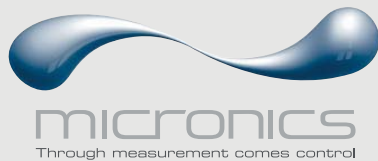
- Water
- Building Services
- Energy Management
- Power Generation
- Chemical
- Pharmaceutical
- Petrochemical
- Food

RECOMMENDED FOR:

- Potable water
- River water
- Cooling water
- Demineralised water
- Water/glycol solutions
- Hydraulic oil
- Diesel and fuel oils
- Chemicals
- Petroleum products

APPLICATION/USE:

- HVAC and energy system audits
- Check system meters
- Pump verification
- Boiler testing
- Leak detection
- Filter sizing
- Ultrapure water measurement
- Heavy fuel oil metering
- Condensate measurement
- Balancing systems
- Clean in place evaluation
- Fire system testing
- Hydraulic system testing



PF330 - Portable Ultrasonic Liquid Flow Meter



PF330 Specification

Carry Case: – The PF330 is supplied in a hard wearing IP67 carry case.

'A' Transducers: – 13mm DN to 115mm DN pipes.

'B' Transducers: – 50mm DN to 2000mm DN pipes.

Optional Transducers: – 'D' for pipes > 1500mm up to 5000mm.

Transducer Operating Temp: – 'A&B' -20°C to +135°C. 'D' -20°C to +80°C.

Optional Hi-Temp: – -20°C to +200°C.

Outputs: – Opto Isolated 0/4 -20mA; RS 232/USB Programmable Pulse – 2ms-500ms

Data Logging: – 200,000 data points. Up to 20 named recording blocks. Data displayed locally in text or graph format. Real time or stored. Can be downloaded via RS232 or USB port to Windows based PC. Flow rate and totals can be logged.

Portagraph Software for data download.





Portaflow PF330/PF220

PF220 - Portable Ultrasonic Liquid Flow Meter



PF220 Specification

Carry Case: - Polypropylene case, with foam insert and double wall for extra strength.

PF220A with 'A' Transducers: - 13mm DN to 115mm DN pipes.

OR

PF220B with 'B' Transducers: - 50mm DN to 1000mm DN pipes.

Transducer Operating Temp: - 'A' & 'B' -20°C to +135°C.

Outputs: - Opto Isolated 0/4 -20mA; Programmable Pulse - 2ms-500ms or frequency.

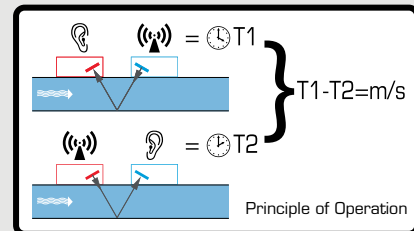


PF330 and PF220 Product Features

- Flow Range - 0.1m/sec to 20m/sec bi-directional depending on pipe size
- Display - 64 x 240 pixels graphic display
- Programming via 16 key control panel
- Battery or mains operation
- Rechargeable battery
- Battery Life - 20 hours from fully charged, depending on load
- Power - 110 - 240VAC +/-10% supply via PSU
- 10 user selectable languages including English, German, French, Spanish and Russian!
- Accuracy +/-0.5% to +/-3% depending on pipe size for flow rate >0.2m/s
- CE approved

HOW DOES IT WORK?

The Portaflow 330/220 is a transit time ultrasonic flow meter designed to work with clamp-on transducers, to provide accurate measurement of liquid flowing within a closed pipe, without the need for any mechanical parts to be inserted through the pipe wall or to protrude into the flow system. It takes just a few minutes to install and there is no need to shut down flow or drain the system!



When ultrasound is transmitted between the transducers, the speed at which the sound travels through the liquid is accelerated slightly by the velocity of the liquid through the pipe. When ultrasound is transmitted in the opposite direction, the flow of the liquid causes the transmitted sound to decelerate. The subsequent time difference is directly proportional to the flow velocity in the pipe. Having measured the flow velocity and knowing the pipe cross-sectional area, the volumetric flow can be easily calculated.



PS9800 Submersible Pressure Transmitter

(4-20 mA)



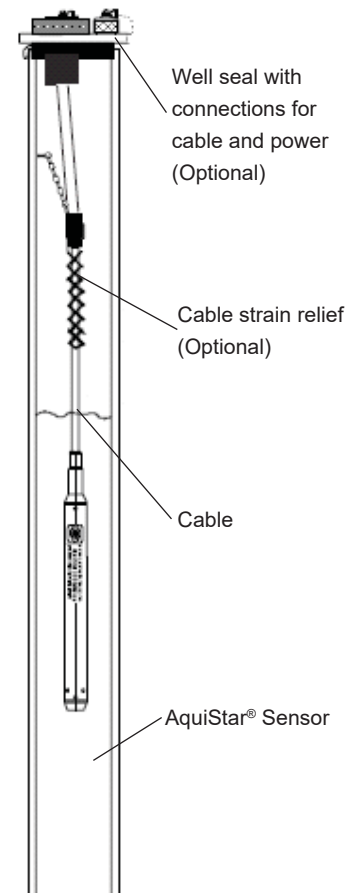
APPLICATIONS

Pump and slug tests
River, stream, reservoir gauging
Stormwater runoff monitoring
Wetland monitoring
Well, tank, tidal levels
Flow monitoring
Water resource management
Landfill leachate levels
Control applications

Rugged and accurate with great noise immunity, transient protection, and thermal performance

Features

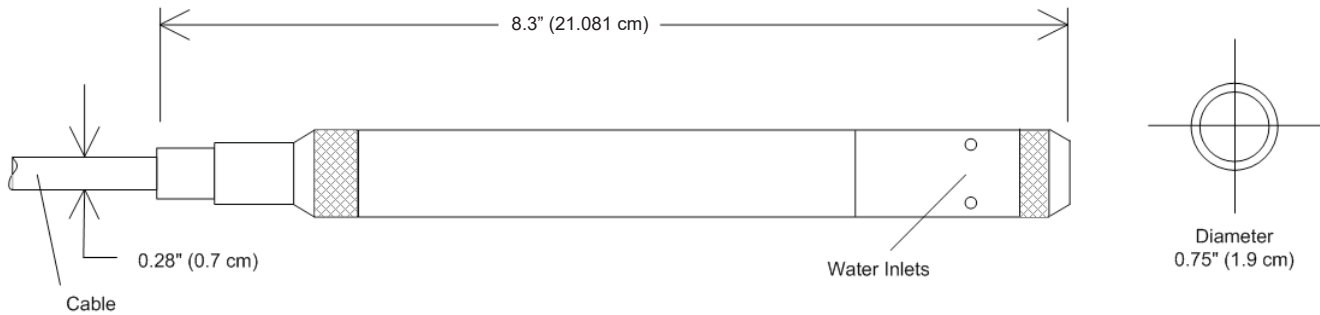
- Pressure and optionally temperature
- Industry standard, 2-wire, 4-20 mA configuration
- Thermally compensated — *great where water temperatures vary*
- $\pm 0.1\%$ FSO accuracy
- Low power (9 - 24 VDC)
- Small diameter — 0.75" (1.9 cm)
- Reverse polarity protection
- Under- and over- current limitation
- Built-in transient protection
- Thermally stable
 - 2% ver 50 degrees standard
 - 0.2% ver 40 degrees with enhanced calibration option
- 1/4" NPT end cone adapter option
- Calibrated with patented calibration procedures and NIST traceable equipment



TYPICAL INSTALLATION



PS9800 Submersible Pressure Transmitter (4-20 mA)



GENERAL

Length	8.3" (21.081 cm)
Diameter	0.75" (1.9 cm)
Weight	0.75 lb. (0.3 kg)
Body Material	Acetal & 316 stainless steel or titanium
Wire Seal Material	Fluoropolymer and PTFE
Submersible Cable	Polyurethane, polyethylene, or ETFE available
Desiccant	1-3 mm indicating silica gel (high or standard capacity)
Terminating Connector	Available
Output	4-20 mA
Operating Temp. Range	-5° C to 70° C

POWER

Transmitter Voltage	9-24VDC (100 ms warmup)
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¹ Higher pressure ratings available upon request

² Approx. 650 feet or 200 meters

³ Depth range for absolute sensors has 14.7 PSI subtracted to give actual depth allowed.

⁴ ± 0.25% FSO (maximum) at this range

TEMPERATURE

Element Type	Thermistor
Accuracy	± 0.3° C (typical) ± 0.75° C (maximum)
Range	-5° C to 70° C

PRESSURE

Transducer Type	Silicon strain gauge
Transducer Material	316 stainless steel or titanium
Pressure Ranges¹	
<i>Gauge</i>	
PSI	1 ⁴ , 5, 15, 30, 50, 100, 300
FtH ₂ O	2.3 ⁴ , 12, 35, 69, 115, 231, 692
mH ₂ O	0.7 ⁴ , 3.5, 10.5, 21, 35, 70, 210
<i>Absolute³</i>	
PSI	30, 50, 100, 300
FtH ₂ O	35, 81, 196, 658
mH ₂ O	10, 24, 59, 200
Static Accuracy (B.F.S.L. 20° C)	± 0.1% FSO (maximum)
Maximum Operating Pressure	1.1 x FS
Over Range Protection	3x FS (for > 300psi, contact INW) ²
Burst Pressure	1000 psi (approx. 2000 feet or 600 meters)
Compensated Range	0° C to 50° C

INW **PT2X Smart Sensor**
PRESSURE/TEMPERATURE
WITH DATA LOGGING



APPLICATIONS

- Pump and slug tests
- Stormwater runoff monitoring
- Well, tank, tidal levels
- River, stream, reservoir gauging
- Wetland monitoring
- Resource administration

Features

- Measures & records pressure/level and temperature
- Low power
- Modbus® RTU (RS485) and SDI-12
- ±0.05% FSO typical accuracy
- Thermally compensated
- Small diameter — 0.75" (1.9 cm)
- 520,000 records in non-volatile memory
- Barometric compensation utility for use with absolute sensors
- Wireless connectivity
- Free, easy-to-use software

The **INW** PT2X Smart Sensor is an integrated data logger and pressure/temperature sensor and is ideal for monitoring groundwater, well, tank, and tidal levels, as well as for pump and slug testing. This sensor networks with all of the INW Smart Sensor family. Its compatibility with INW's Wireless Data Collection technology makes it ideal for remote monitoring.

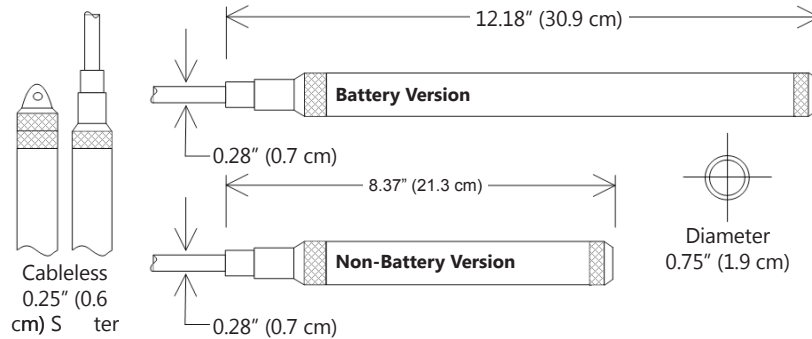
This industry standard digital RS485 interface device records up to 520,000 records of pressure/level, temperature, and time data, operates with low power, and features easy-to-use software with powerful features. Constructed with 316 stainless steel or titanium, PTFE, and fluoropolymer, this sensor provides high-accuracy readings in rugged and corrosive field conditions.

Two internal AA batteries power the PT2X. (Auxiliary power supplies are available for data intensive applications.) The unit is programmed using INW's easy-to-use Aqua4Plus or Aqua4Plus Lite control software. Once programmed the unit will measure and collect data on a variety of time intervals.

Several PT2Xs, or a combination of PT2Xs and other INW Smart Sensors, can be networked together and controlled from one location, either directly from a single computer or via INW's Wireless Data Collection System.

While most will use the PT2X with our free, easy-to-use Aqua4Plus Lite or Aqua4Plus software, it is by no means limited to that software. You can use your own Modbus® RTU or SDI-12 software or logging equipment to read measurements, thus tying into your existing systems and data bases.

Dimensions



Specifications*

Housing & Cable	Weight	0.8 lb. (0.4 kg)	
	Body Material	Acetal & 316 stainless or titanium	
	Wire Seal Material	Fluoropolymer and PTFE	
	Cable	Submersible: polyurethane, polyethylene, or ETFE (4 lb./100 ft., 1.8 kg/30 m)	
	Desiccant	1-3 mm indicating silica gel	
	Field Connector	Standard	
Temperature	Operating Range	Recommended: -15° to 55°C (5° to 131°F) Requires freeze protection kit if using pressure option in water below freezing.	
	Storage Range	Without batteries: -40° to 80°C (-40° to 176°F)	
Power	Internal Battery	Two lithium 'AA' batteries - Expected battery life: 18 months at 15 min. polling interval (may vary do to environmental factors)	
	Auxiliary	12 Vdc - Nominal, 6-16 Vdc - range	
Communication	Modbus®	RS485 Modbus® RTU, output=32bit IEEE floating point	
	SDI-12	SDI-12 (ver. 1.3) - ASCII	
Logging	Memory	4MB - 520,000 records	
	Logging Types	Variable, user-defined, profiled	
	Logging Rates	8x/sec maximum, no minimum	
	Baud Rates	9600, 19200, 38400	
	Software	Complimentary Aqua4Plus and Aqua4Plus Lite	
	Networking	32 available addresses per junction (Address range: 1 to 255)	
	File Formats	.a4d and .csv (also .xls in Windows 8 and earlier)	
Output Channels	Temperature	Temperature	Depth/Level¹
	Element	Digital IC on board	Silicon strain gauge transducer, 316 stainless or Hastelloy
	Accuracy	±0.5°C — 0° to 55°C (32° to 131°F) ±2.0°C — below 0°C (32°F)	±0.05% FSO (typical, static) ±0.1% FSO (maximum, static) (B.F.S.L. 20°C)
	Resolution	0.1°C	0.0034% FS (typical)
	Units	Celsius, Fahrenheit, Kelvin	PSI, FtH ₂ O, inH ₂ O, mmH ₂ O, mH ₂ O, inH ₂ O, cmHg, mmHg, Bars, Bars, kPa
	Range	-15° to 55°C (5° to 131°F)	Gauge PSI: 1 ² , 5, 15, 30, 50, 100, 300 FtH ₂ O: 2.3 ² , 12, 35, 69, 115, 231, 692 mH ₂ O: 0.7 ² , 3.5, 10.5, 21, 35, 70, 210 Absolute ³ PSI: 30, 50, 100, 300 FtH ₂ O: 35, 81, 196, 658 mH ₂ O: 10, 24, 59, 200
	Compensated	---	0° to 40°C (32° to 104°F)
	Max operating pressure	1.1 x full scale	
Over pressure protection	3x full scale up to 300psi - for > 300psi (650 ft or 200 m) contact factory		
Burst pressure	1000 psi (approx. 2000 ft or 600 m)		
Environmental	IP68, NEMA 6P		

*Specifications subject to change. Please consult our web site for the most current data (inwusa.com). Modbus is a registered trademark of Schneider Electric.

1 Higher pressure ranges available upon request

2 ±0.25% accuracy FSO (max) at this range

3 Depth range for absolute sensors has 14.7 PSI subtracted to give actual depth allowed.

PT12

SUBMERSIBLE PRESSURE/TEMPERATURE SMART SENSOR



APPLICATIONS

Rugged construction can replace analog sensors

Monitor groundwater, well, tank, and tidal levels

Pump testing

Flow monitoring

Features

- Modbus® RTU (RS485) and SDI-12 v1.3 interfaces
- Small diameter — 0.75" (1.9 cm)
- Pressure and temperature
- 316 stainless steel, fluoropolymer, and PTFE construction (titanium optional)
- Polyethylene, polyurethane, and ETFE cable options
- End code interchangeable with a 1/4" NPT inlet
- Specification per OSW Technical Memo 96.05 is an option on the 15 psig (10.5 mH₂O) and 30 psig (21 mH₂O) units

The **Seametrics PT12** Pressure/Temperature Sensor has been designed to provide trouble-free submersible operation in liquid environments. This sensor communicates via SDI-12 (v1.3) or Modbus® RTU (RS485) protocol.

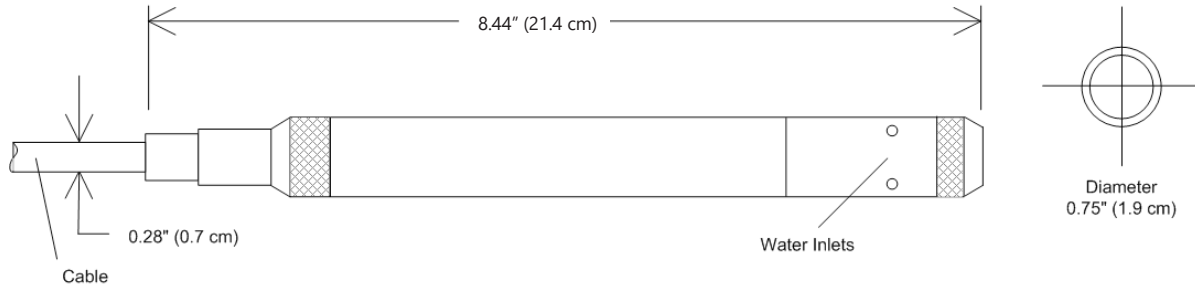
Pressure/level is measured with an extremely rugged and stable piezo-electric, media isolated pressure element and compensated for temperature using our proprietary calibration methodology. Temperature is measured using an on-board digital chip.

Seametrics also carries a special version of the PT12 designed to measure barometric pressure in reference to absolute pressure. If you are using an absolute PT12, contact your representative for details on how our PT12-BV can facilitate obtaining barometrically compensated pressure/level.

PT12
SUBMERSIBLE PRESSURE/TEMPERATURE
SMART SENSOR



Dimensions



Specifications*

Housing & Cable	Weight	0.8 lb. (0.4 kg)		
	Body Material	316 stainless or titanium		
	Wire Seal Material	Fluoropolymer and PTFE		
	Cable	Submersible: polyurethane, polyethylene, or ETFE; 4 lb./100 ft., 1.8 kg/30 m; 2000 ft max for Modbus®		
	Desiccant	1-3 mm indicating silica gel		
	Field Connector	Available as an option		
Temperature	Operating Range	Recommended: -15° to 55°C (5° to 131°F) Requires freeze protection kit if using pressure option in water below freezing.		
	Storage Range	-40° to 80°C (-40° to 176°F)		
Power	Voltage	9-16Vdc, 24Vdc over voltage protection, electromagnetic & transient protection IEC-61000 - 4-3, 4-4, 4-5, 4-6		
	Supply Current	Active 3mA average/ 10mA peak; sleep 150 µA		
Communication	Modbus®	RS485 Modbus® RTU, output=32bit IEEE floating point		
	SDI-12	SDI-12 (ver. 1.3) - ASCII		
Output Channels	Temperature	Depth/Level¹		
	Element	Digital IC on board	Silicon strain gauge transducer, 316 stainless or Hastelloy	
	Accuracy	±0.5°C — 0° to 55°C (32° to 131°F) ±2.0°C — below 0°C (32°F)	±0.05% FSO (typical, static) ±0.1% FSO (maximum, static) (B.F.S.L. 20°C)	
	Resolution	0.06°C	0.0034% FS (typical)	
	Range	-15° to 55°C (5° to 131°F)	Gauge	PSI: 1 ² , 5, 7, 15, 30, 50, 100, 300 FtH ₂ O: 2.3 ² , 12, 35, 69, 115, 231, 692 mH ₂ O: 0.7 ² , 3.5, 5, 10.5, 21, 35, 70, 210
			Absolute ³	PSI: 30, 50, 100, 300 FtH ₂ O: 35, 81, 196, 658 mH ₂ O: 10, 24, 59, 200
Compensated	---	0° to 40°C (32° to 104°F)		
Max operating pressure	1.1 x full scale			
Over pressure protection	3x full scale up to 300psi - for > 300psi (650 ft or 200 m) contact factory			
Burst pressure	1000 psi (approx. 2000 ft or 600 m)			
Environmental	IP68, NEMA 6P			

*Specifications subject to change. Please consult our web site for the most current data (seametrics.com). Modbus is a registered trademark of Schneider Electric.

¹ Higher pressure ranges available upon request

² ±0.25% accuracy FSO (max) at this range

³ Depth range for absolute sensors has 14.7 PSI subtracted to give actual depth allowed.

LMK 382



Stainless Steel Probe

Ceramic Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 40 cmH₂O up to 0 ... 200 mH₂O

Output signals

2-wire: 4 ... 20 mA
3-wire: 0 ... 10 V
others on request

Special characteristics

- ▶ diameter 39.5 mm
- ▶ especially for sewage, viscous and pasty media

Optional versions

- ▶ IS-protection zone 0
- ▶ mounting with stainless steel pipe
- ▶ flange version
- ▶ diaphragm 99.9 % Al₂O₃
- ▶ different kinds of cables
- ▶ different kinds of elastomers

The stainless steel probe LMK 382 has been designed for continuous level measurement in waste water, waste and higher viscosity media.

Basic element is a robust and high overpressure capable capacitive ceramic sensor e.g. for low levels easily.

Preferred areas of use are



Water

drinking water abstraction



Sewage

waste water treatment
water recycling



Fuel / Oil

level monitoring in open tanks
with low filling heights
fuel storage
tank farms / biogas plants



LMK 382

Technical Data

Input pressure range																
Nominal pressure gauge	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH ₂ O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V _S = 9 ... 32 V _{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC}
Option 3-wire	3-wire: 0 ... 10 V / V _S = 12.5 ... 32 V _{DC}

Performance	
Accuracy ¹	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO
Permissible load	$R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year
Turn-on time	700 msec
Mean response time	< 200 msec
Max. response time	380 msec
¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	

Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range 0 ... 70 °C

Permissible temperatures	
Permissible temperatures	medium: -25 ... 125 °C electronics / environment: -25 ... 125 °C storage: -25 ... 125 °C

Electrical protection ²	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
² additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	

Electrical connection (only for 4 ... 20 mA / 2-wire)	
Cable with sheath material ³	PVC (-5 ... 70 °C) grey PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 125 °C) blue
³ shielded cable with integrated air tube for atmospheric pressure reference	

Materials (media wetted)	
Housing	stainless steel 1.4404 (316 L)
Seals	FKM FFKM EPDM others on request
Diaphragm	standard: ceramics Al ₂ O ₃ 96 % Option: ceramics Al ₂ O ₃ 99.9 %
Nose cone	POM

Explosion protection	
Approval DX14-LMK 382	zone 0 ⁴ : II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex iaD 20 T 85°C
Safety technical maximum values	U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 27 nF, L _i = 5 μH
Permissible media temperature	in zone 0: -10 ... 60 °C with p _{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -10 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μH/m
⁴ for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)	

Miscellaneous	
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

LMP 307

Stainless Steel Probe

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % / 0.1 % FSO



Nominal pressure

from 0 ... 1 mH₂O up to 0 ... 250 mH₂O

Output signals

2-wire: 4 ... 20

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

Special characteristics

- ▶ diameter 27 mm
- ▶ small thermal effect
- ▶ excellent accuracy
- ▶ excellent long term stability

Optional versions

- ▶ IS-protection zone 0
- ▶ SIL 2 (Safety Integrity Level)
- ▶ cable protection via corrugated pipe
- ▶ different kinds of cables
- ▶ different kinds of seal materials

The stainless steel probe LMP 307 is designed for continuous level measurement in water and clean or waste fluids.

Basic element is a high quality stainless steel sensor with high requirements for exact measurement with excellent long term stability.

Preferred areas of use are

Water / filtrated sewage

drinking water system



ground water level measurement

rain spillway basin

pump and booster stations

level measurement in container

water treatment plants

water recycling



Fuel / Oil

fuel storage

tank farm



LMP 307

Technical Data

Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH ₂ O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure \geq	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / $V_S = 8 \dots 32 V_{DC}$
Option Ex-protection	2-wire: 4 ... 20 mA / $V_S = 10 \dots 28 V_{DC}$
Options 3-wire	3-wire: 0 ... 20 mA / $V_S = 14 \dots 30 V_{DC}$ 0 ... 10 V / $V_S = 14 \dots 30 V_{DC}$

Performance	
Accuracy	standard: nominal pressure < 0.4 bar: $\leq \pm 0.5\%$ FSO nominal pressure ≥ 0.4 bar: $\leq \pm 0.35\%$ FSO option 1: nominal pressure ≥ 0.4 bar: $\leq \pm 0.25\%$ FSO option 2: for all nominal pressures: $\leq \pm 0.1\%$ FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_S \text{ min}) / 0.02 \text{ A}] \Omega$ current 3-wire: $R_{max} = 500 \Omega$ voltage 3-wire: $R_{min} = 10 \text{ k}\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k Ω
Long term stability	$\leq \pm 0.1\%$ FSO / year
Response time	2-wire: ≤ 10 msec; 3-wire: ≤ 3 msec

¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)		
Nominal pressure P_N	[bar]	< 0.40 ≥ 0.40
Tolerance band	[% FSO]	$\leq \pm 1$ $\leq \pm 0.75$
in compensated range	[°C]	0 ... 70

Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C

Electrical protection ²	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

² additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection			
Cable with sheath material ³	PVC (-5 ... 70 °C) grey	PUR (-10 ... 70 °C) black	FEP (-10 ... 70 °C) black

³ cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM others on request
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-LMP 307	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C_i \approx 0 \text{ nF}$, $L_i \approx 0 \mu\text{H}$, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible media temperature	in zone 0: -10 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -10 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 $\mu\text{H}/\text{m}$

Miscellaneous	
Option SIL ⁴ 2 application	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA / signal output voltage: max. 7 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC
ATEX Directive	94/4/EG

⁴ not in combination with the accuracy 0.1%, only for 4...20mA / 2-wire

OTT PLS

Ceramic capacitive pressure probe



OTT PLS – reliable, precise, and consistent

Features and benefits

- Relative pressure probe with air capillary used to compensate for changes in barometric pressure
- Compared with piezo-resistive standard measuring cells using sensitive metallic membranes, this ceramic measuring cell provides significant benefits because of its high accuracy, ruggedness, and long-term stability
- Built-in microcontroller – compensates for temperature effects and takes into account specific correction values, e.g. gravitational acceleration or water density
- Robust probe lead with Kevlar core for length stabilization and internal compensating capillary
- Rugged design: waterproof molded electronics (IP68 rated) and enclosure made of high-quality saltwater resistant steel
- Optimized resolution is achieved by assigning the 4 ... 20 mA to that part of the measuring range that is actually required
- Water temperature output in addition to water level (for SDI-12 output)

Applications

Measuring water level in ground and surface waters, including:

- Stations with sloping bottom, e.g. banks
- Small diameter pipes or holes (from 1" Ø)
- Dams, weirs
- Irrigation systems
- Waterways that are occasionally iced over
- Brackish water, saltwater
- Waterways that do not contain water throughout the year (e.g. retaining basins or wadis)



OTT PLS



Ceramic measuring cell

Technical Data

Water level measurement (pressure)

- Measuring range: 0 ... 4 m, 0 ... 10 m, 0 ... 20 m, 0 ... 40 m, 0 ... 100 m water column
- Resolution (SDI-12): 0.001 m; 0.1 cm; 0.01 ft; 0.1 mbar; 0.001 psi
- Accuracy (linearity and hysteresis)
SDI-12: $\leq \pm 0.05$ % FS
4 ... 20 mA: $\leq \pm 0.1$ % FS
10 ppm/°C at 20 °C
- Long-term stability (linearity and hysteresis): $\leq \pm 0,1$ % /year FS
- Zero point drift: $\leq \pm 0.1$ % FS
- Temperature-compensated operating range: -5 °C ... +45 °C (ice-free)
- Units: cm, m, ft, mbar, psi

Temperature measurement

- Measuring range: -25 °C ... +70 °C
- Resolution: 0.1 °C / 0.1 °F
- Accuracy: ± 0.5 °C / ± 0.9 °F
- Units: °C, °F

Pressure sensor

- (capacitive pressure sensor)
- Ceramic
- Temperature compensated
- Overload safe for up to 5 times the measuring range without permanent mechanical damage

Temperature sensor

NTC temperature sensor

Available interfaces (use as required)

4 ... 20 mA, SDI-12, RS-485 (via SDI-12 protocol)

Supply voltage

+9.6 ... +28 V DC, typ. 12/24 V DC

Power consumption (SDI-12)

- Sleep: < 600 µA
- Active: < 4 mA

Reaction time

After power-on, the measured value is steady and ready for output <1s

Dimensions and weight

- Dimensions L x Ø: 195 mm x 22 mm
- Weight: approx. 0.3 kg

Interface cable lengths

- SDI-12: 1 ... 100 m
- SDI-12 via RS-485: 1 ... 1000 m
- 4 ... 20 mA: 1 ... 1000 m

Environmental conditions

- Operating temperature: -25 °C ... +70 °C
- Storage temperature: -40 °C ... +85 °C

Materials

- Housing: POM, Stainless steel 1.4539 (904L), resistant to sea water
- Seals: Viton
- Cable jacket: PUR

Protection type

IP68

Mechanical strength

Meets the mechanical shock tests of IEC 68-2-32

EMC limits

RL-15/35

Contact-free radar sensor to measure the water level



sommer
MESSTECHNIK



Properties and benefits

- » Maintenance free
- » Measurement range from 15 m / 35 m
- » Near blanking zone 0.5 m
- » High accuracy +/-2 mm
- » Compact design
- » Independent of environmental influences
- » Easy integration in existing systems
- » Vandalism secure as design does not attract attention

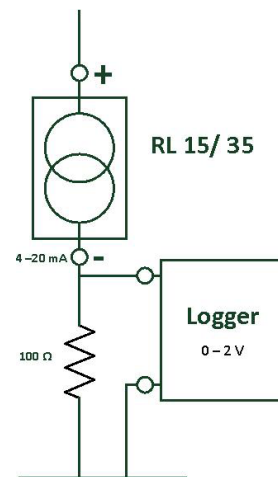
Description

Radar sensor

The RL is a high accuracy measuring device to measure the surface water level without direct contact to the medium.

Measurement principle

The so-called pulse procedure sends a short microwave impulse to the water surface. Afterwards the sensor remains in standby for a short time. Within this time the water reflects the pulses to the integrated evaluation system. The run time of the impulses corresponds directly to the distance to the current surface water level.



Technical Data

General	
Dimensions	153 x 325 x 200 mm 2 brackets for pipe Ø 34 - 48 mm
Operating temperature	-40 ... +80°C
Power supply	9.6 ... 36 VDC
Measurement frequency	26 GHz (K-Band)
Total weight	3 kg
Level measurement	
Measurement range	0 ... 15 m / 0 ... 35 m
Resolution	1 mm
Accuracy	+/- 2 mm
Near blanking zone	0.5 m
Holdback time	60 s (after power on)
Step response time	< 3 s (time after a sudden change in the measured distance to max. 0.5 m)
Output	4 ... 20 mA = 0 ... 15 m / 0 ... 35 m

HOBO® RX3000 Remote Monitoring System



Real-time access to data from any web browser

The HOBO RX3000 is a research-grade data logging station that combines greater measurement flexibility and an on-board LCD display in a rugged, easy-to-deploy package.



Supported Measurements:

Indoor Environmental: Temperature, Relative Humidity, Dew Point, CO2, Air Velocity, VOC

Energy/Power: 4-20mA, AC Current, AC Voltage, Amp Hour, Amps, Compressed Air Flow, DC Current, DC Voltage, Differential, Pressure, Gauge Pressure, kW, kWh, Power Factor, Pulse Input, Volt-Amp Reactive, Volt-Amp Reactive Hour, Volt-Amps, Volts, Water Flow, Watt Hours, Watts

Outdoor Environmental: Temperature, Relative Humidity, Dew Point, Solar Radiation, PAR, Rainfall, Wind Speed, Wind Direction, Soil Moisture, Barometric Pressure, Leaf Wetness, 4-20mA, Voltage Input, Pulse Input

Key Advantages:

- Cloud-based data access
- Plug-and-play operation
- Flexible support for a broad range of sensors
- LCD display for easy field deployment
- Alarm notifications via text, email
- Rugged double-weatherproof enclosure
- Cellular, WiFi and Ethernet communications

Minimum System Requirements:



Part number	RX3001-00-01 (ETH)	RX3002-00-01 (WiFi)	RX3003-00-01 (3G)
Smart Sensor Connectors	10 (up to 15 data channels; some sensors use more than one data channel)		
Maximum Number of Sensors	18 (when 2 Analog Modules are configured in the station)		
Smart Sensor Cable Length	100 m (328 ft) maximum		
Module Slots	2 (for optional Analog or Relay module; see manual for detailed module specification)		
Fastest Logging Rate	1 second	1 second	1 minute
Memory	32 MB, 2 million measurements		
Alarm notification latency	Logging interval plus 2-4 minutes, typical		
Environmental Rating	Weatherproof enclosure, NEMA 4X		
Operating Range	-40° to 60°C (-40° to 140°F)		
Power	Onset solar panel, AC charger or user-provided external power supply is required		
Battery Life	Typical 3-5 years; 4 Volt, 10 Ahr, rechargeable sealed lead-acid		
Size	18.6 x 18.1 x 11.8 cm (7.3 x 7.1 x 4.7 in.)		
Weight	2.2 kg (4.85 lb)		
Communications	Ethernet RJ45/100BaseT	WiFi IEEE 802.11 b/g/n	Cellular GSM/GPRS/EDGE: Quad band 850/900/1800/1900 MHz, UMTS/HSPA+: Five band 800/850/900/1900/2100 MHz
CE Compliant	Yes		

Sutron XLink 100/500

Logger/Transmitter
with Cellular or IRIDIUM Communications

New on the XLink

- Plug and Play Modem
- Custom programming with Python scripting (available with XLink 500)
- Up to 32 independent measurements
- Expanded log up to 1,000,000 readings
- Plug-in USB flash drive (Type A Host)
- High resolution analog and digital measurements
- Support for internet protocols HTTP, TCP/IP and FTP
- HTTPS and FTPS capability added to Cellular-Mod-5 modems
- Secure communication using TLS 1.2 ciphers
- Independent RS-232 and RS-485
- Switchable SDI-12 power

Applications

- Remote and urban environmental monitoring
- Surface water stream gaging
- Water quality monitoring
- Basic meteorological stations

Product Feature Comparison

	XLINK 500	XLINK 100
Pluggable Cellular or Iridium	✓	✓
Wi-Fi	✓	✓
NEMA-4 Fiberglass Enclosure	✓	✓
Base Unit Metal Enclosure	✓	✓
Removable PowerTerminals	✓	✓
Python Scripting	✓	✗
Solar Regulator	✓	✗
Lightning Protection	✓	✗
Analog Inputs (SE, Diff, 4–20 mA)	✓	✗
Digital Input/Output	✓	✓
Protected +12 V	✓	✗
RS-485	✓	✓
RS-232 (DB9)	✓	✓
SDI-12	✓	✓
USB Host	✓	✓
USB Device	✓	✓
Diagnostics LEDs	✓	✓
Expansion Port	✓	✓



LinkComm software and mobile app



XLink 100 and XLink 500

Features/Benefits

Plug and Play Modem Card

- Reduce modem setup time with automatic modem recognition
- Field exchangeable, easily move from one telemetry type or service carrier to another
- Keep up with fast moving cellular/telecom technologies (e.g., 3G to 4G)

Custom Programming with Python Scripts (available with XLink 500)

- Supports applications beyond standard configuration, including custom measurements, transmission formats and user defined computations
- Modern, easy to learn scripting language with strong and growing developer community



XLink 100 with exchangeable Iridium or Cellular modem card

Save time and reduce field visits with remote two-way communication

Features/Benefits

Two-way communication and remote configuration

- All datalogger features and configuration options available remotely via cell
- Reduce time and cost of visiting field station to check, change, or download configuration or turn on/off instruments
- Improve data access and ask for missing data if transmissions are missed
- Complete network management is possible – move from single station management

Simple and intuitive software

- LinkComm software used with all Sutron XLink and SatLink 3 dataloggers
- Common software reduces training requirements
- Simple setup over Wi-Fi using a smart phone, tablet or PC
- Pair with Hydromet Cloud, web-hosted software, to access and manage real-time data and alerts

USB flash drive

- Quickly modify configuration or upgrade firmware
- Automatically download data, diagnostics and events
- Load Python scripts

Collect more data more often while in alarm

- Reduce transmission costs by sending data more frequently only when data is needed at a faster interval
- User definable alarm thresholds and adaptable intervals

Secure communication

- Send encrypted data over secure HTTPS
- HTTP(S), FTP(S) and Socket (TCP/IP) transmission protocols

Small foot print datalogger

- Reduce enclosure costs with smaller footprint datalogger
- Easy to conceal small datalogger and enclosure

Supports multiple interfaces and protocols

- Use with wide range of sensors, incl. SDI-12, RS-232, RS-485
- Simple configuration of SDI-12, SDI-12 over RS-485 and ModBus (Master or Slave; RTU or ASCII) sensors
- Easily connect external modems or displays
- Supports common formats, including: ASCII, CSV, SHEF, Pseudobinary, OTT MIS



CELLULAR-MOD-5 and IRIDIUM-MOD card

Ordering Part Numbers

Part #	Description
BASIC (Logger only)	
XLINK100-1	XLink 100 no modem
XLINK100-1E	XLink 100 no modem, NEMA 4-box
XLINK500-1	XLink 500 no modem
XLINK500-1E	XLink 500 no modem, NEMA 4-box
GLOBAL HSPA (3G)	
XLINK100-C5-1	XLink 100, HSPA
XLINK100-C5-1E	XLink 100, HSPA, NEMA-4 box, internal antenna
XLINK100-C5-1C	XLink 100, HSPA, NEMA-4 box, external antenna
XLINK500-C5-1	XLink 500, HSPA
XLINK500-C5-1E	XLink 500, HSPA, NEMA-4 box, internal antenna
XLINK500-C5-1C	XLink 500, HSPA, NEMA-4 box, external antenna
VERIZON LTE (US ONLY)	
XLINK100-C1-1	XLink 100, Verizon LTE
XLINK100-C1-1E	XLink 100, Verizon LTE, NEMA-4 box, internal antenna
XLINK100-C1-1C	XLink 100, Verizon LTE, NEMA-4 box, external antenna
XLINK500-C1-1	XLink 500, Verizon LTE
XLINK500-C1-1E	XLink 500, Verizon LTE, NEMA-4 box, internal antenna
XLINK500-C1-1C	XLink 500, Verizon LTE, NEMA-4 box, external antenna
IRIDIUM	
XLINK100-IR-1	XLink 100, IRIDIUM
XLINK100-IR-1E	XLink 100, IRIDIUM, NEMA-4 box, internal antenna
XLINK100-IR-1C	XLink 100, IRIDIUM, NEMA-4 box, external antenna
XLINK500-IR-1	XLink 500, IRIDIUM
XLINK500-IR-1E	XLink 500, IRIDIUM, NEMA-4 box, internal antenna
XLINK500-IR-1C	XLink 500, IRIDIUM, NEMA-4 box, external antenna
IRIDIUM DOD (RESTRICTED) (US ONLY)	
XLINK100-IRD-1	XLink 100, IRIDIUM DOD
XLINK100-IRD-1E	XLink 100, IRIDIUM DOD, NEMA-4 box, internal antenna
XLINK100-IRD-1C	XLink 100, IRIDIUM DOD, NEMA-4 box,
XLINK500-IRD-1	XLink 500, IRIDIUM DOD, NEMA-4 box, external antenna
XLINK500-IRD-1E	XLink 500, IRIDIUM DOD, NEMA-4 box, internal antenna
XLINK500-IRD-1C	LINK100-IRD-1

Accessories

PLUGGABLE OPTIONS CARDS	
IRIDIUM-MOD-1	Iridium telemetry pluggable modem card
IRIDIUM-MOD-1D (US ONLY)	Iridium DOD (restricted) telemetry pluggable modem card
CELLULAR-MOD-1 (US ONLY)	Verizon LTE telemetry pluggable modem card
CELLULAR-MOD-5	HSPA (3G) telemetry pluggable modem card
OTHER	
8111-1113-1	Externally mounted RF coaxial lightning arrester to be used on a NEMA-4 enclosure variant (3 ft type N male – N male cable included)

NOTE:

1. Sutron is an authorized Iridium value Added Reseller providing global services and applications.
2. All option cards have RF output port of female SMA type

Technical Data @ 25°C

(Specifications subject to change without notice)

GENERAL INFORMATION

Dimensions

XLink 500-1, XLink 100-1

Inches: 4.5 x 6.2 x 1.6

cm: 11.4 x 15.8 x 4.1

NEMA-4

Inches: 7.3 x 9.5 x 5.2

cm: 18.5 x 24.2 x 13.2

Weight (XLink 500-1)

1 lbs. (0.5 Kg)

IP rating

IP66 (NEMA variants)

Operating temperature

-40 °C to +70 °C (-40 °F to +158 °F)

Compliance

CE, FCC, ISED

POWER REQUIREMENTS

Voltage

9–20 VDC; 10–16 VDC for SDI-12

Compliance

Quiescent

< 1 mA typ. @12.5 VDC

SDI-12 (DEDICATED INTERFACE)

Compliance

V1.3 data recorder

Power

500 mA, short-circuit protected

ANALOG – SINGLE ENDED (XLINK 500 ONLY)

Number of inputs

2

Range*

0–5 V

Accuracy @ 25 °C

0.04 % typ. FS

Resolution

0.3 µV

ANALOG – DIFFERENTIAL (XLINK 500 ONLY)

Number of Inputs

2

Range*

±39 mV, ±312 mV, ±2.5 V

Accuracy @ 25°C

0.04 % typ. FS over 2.5 V

Resolution

0.3 µV @ ±2.5 V scale

ANALOG – 4–20 MA (XLINK 500 ONLY)

Number of inputs

1

Range

0–22 mA

Accuracy @ 25°C

0.14 % FS

Load

Internal 200 ohms

DIGITAL INPUTS / OUTPUTS

Number of inputs

2

Input type

0–15 V, optional low-level input Status, counter, frequency

Max input frequency

10 KHz, optional debouncing, internal pull

Number of outputs

1

Output types

On/off/pulse

Open collector w/100 ohm limiting resistor.

100 mA, 15 V max

OTHER INPUTS / OUTPUTS

Precision analog reference

(XLink 500 only)

2 terminals, 2.5 V, 10.0 mA (total)

Switch 12V

1A, 1 port, overloaded protected

Protected 12 V (XLink 500 only)

0.75 A, 1 port

RS-485

1 port; SDI-12, ModBus, custom communications with Python

RS-232

DB9; terminal interface, User interface, ModBus, custom communications with Python

USB Device (Micro B)

1 port; PC/MAC communication using Sutron's LinkCOMM

USB Host (Type A)

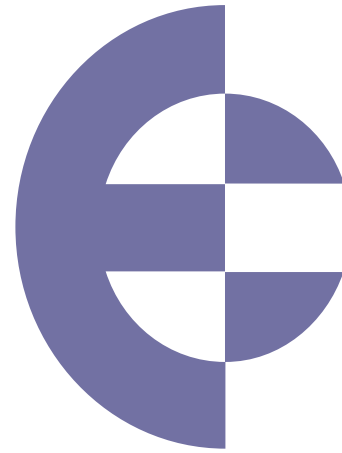
1 port; setup, firmware update, log download using a USB flash drive

NOTE:

Sutron RECOMMENDS installing XLINK500-1 or XLINK100-1 in a NEMA-4 enclosure for all applications requiring outdoor exposure. Sutron recommends the internally mounted lightning protection kit 6661-1353-1 for the -1E or -1C models or an externally mounted lightning protection module such as the Sutron 8111-1113-1 to protect the telemetry RF output.

* Nominal. Guaranteed Analog Input Range Over Temperature Is 0–4.98 V, ± 2.49 V, ±311 mV, ±38.9 mV.

ELPRO 905U



ELPRO 905U

The ELPRO 905U range of wireless I/O provides a low cost alternative to expensive signal wire installations, over short or long distances. Transducer and control signals connected at one module (input signals) are transmitted to other modules where the signals are re-created as output signals, or passed via a data bus to a host device such as a PLC, DCS or SCADA system.

Easy to Use

The ELPRO 905U wireless I/O range is easy to use and simple to install. The modules are completely integrated, including micro controller, input/output (I/O) circuits, radio transceiver, RS485/232 serial port and power supply with battery backup facilities.

Each module is housed in an industrial strength extruded aluminum case, with plug-in terminal strips for ease of wiring connection and maintenance.

905U Wireless I/O Modules

The 905U modules provide a wireless radio link for discrete (switch contact), pulse/counter and analog signals. The 905U also has a RS485 multidrop serial port, for communications to I/O expansion modules.

105S Serial I/O Modules

The 105S serial I/O modules communicate via RS485 multidrop. RS485 is a method of transmitting between many devices using a common twisted pair wire. The maximum length of the wire is typically 4000 feet (1200 m). 105S modules can be used as a dedicated twisted-pair I/O system, or as I/O expansion for 905U modules. Each 905U can connect to up to 31 serial modules. This combination of wireless and serial I/O provides a powerful I/O network for factory automation and process instrumentation.

Two-way Communications

The 905U internal radio is a transceiver - a transmitter and receiver. Because the 905U can communicate in both directions, each module is capable of both input and output signals. Both monitoring (input) and control (output) functions are provided on 905U and 105S modules.

Simple, Reliable and Secure!

The ELPRO 905U system uses a very reliable transmission protocol designed for secure communications. Because 905U modules use two-way transceivers, modules are able to communicate with each other to control the flow of information. By using "listen before transmit" technology, error-checking, handshake acknowledgments and auto re-transmissions,

the 905U achieves an extremely high level of reliability even in the presence of external radio interference.

The 905U uses exception-reporting messaging, transmitting when an input signal changes - that is, when a discrete (switch contact) input turns off or on, or when the value of an analog input changes by a user-configurable amount. The 905U provides immediate real-time communications with low radio band usage, which polling or time-scan systems can not achieve.

There are also regular self-checking update transmissions to check I/O values and to check the integrity of the communication path. Communication failure alarms can be configured for transmission-failure or fail-to-receive events.

Networking

The I/O network can comprise up to hundreds of modules, using peer-to-peer communications. There is no network master, and any module can communicate with every other module. Any input can be linked to any output using a simple network configuration program, provided with each module. Each input can be configured to several outputs at different remote modules.

I/O modules are configured with a system address and a unit address. Only modules with the same system address will communicate within the same system. Multiple systems can operate within the same radio range without "cross-talk" or malfunction.

The wireless alternative to expensive wiring...

Security Encryption

The 905U uses high security data encryption and frequency encoding algorithms to protect against theft of wireless data (industrial espionage) or malicious wireless attack ("hacking").

Only other 905U modules with the correct security keys can understand the wireless messages.

Variety of I/O Configurations

There are four I/O versions available in the 905U and 105S modules. All modules in the ELPRO range use the same flexible and reliable operating protocol. Different I/O versions will operate together in the one system, and different 105S versions can connect to each 905U version.

Modules provide different combinations of the following I/O :

- discrete inputs for switch devices such as limit switches, level switches, security sensors, motor starters, pushbuttons
- analog inputs (mA or voltage) for connecting transducers which measure parameters such as level, flow, pressure, temperature, vibration
- discrete outputs (relay contacts or transistor) for controlling devices such as motor drives, indicating lights, alarms
- analog outputs (mA or voltage) for connection to meters or indicators to display measured parameters.
- pulse/counter inputs and outputs for transmitting totalization signals from flowmeters, energy meters etc.

Analog I/O

The 905U-1 module has two inputs which will accept 4-20mA analog signals. The first of these inputs has adjustable setpoints. The -1 module also has two 4-20mA outputs.

The 905U-2 module has six inputs which will accept 0-20V/0-10/4-20 mA or 0-5V signals. The first four analog inputs have adjustable setpoints. The 905U-3 module provides eight analog outputs with a range of 0-20mA or 0-5V. These outputs will reflect the same value as the analog input linked by the configuration program.

Analog Setpoints

High and low setpoints can be configured for the analog inputs to control a remote discrete output. The discrete output will set ("on") when the analog input value drops below the low setpoint and will reset ("off") when the analog value exceeds the high setpoint. The high and low setpoints can be the same value such that the discrete output sets and resets at the same setpoint value.

Pulse I/O

The 905U modules can be configured to count a pulse input and transmit the accumulated count to a remote module. At the destination module the pulse signal is recreated - the accumulated value is used to ensure that all input pulses are output accurately. The 905U can also transmit the pulse input rate as a separate analog value and the rate signal is output as an analog value at the destination module.

Pulse I/O will operate up to 100Hz. One pulse input (DI1) on the 905U-2 module will operate to 1000Hz, with a configurable 1/10 divider.

Fail-Safe Outputs

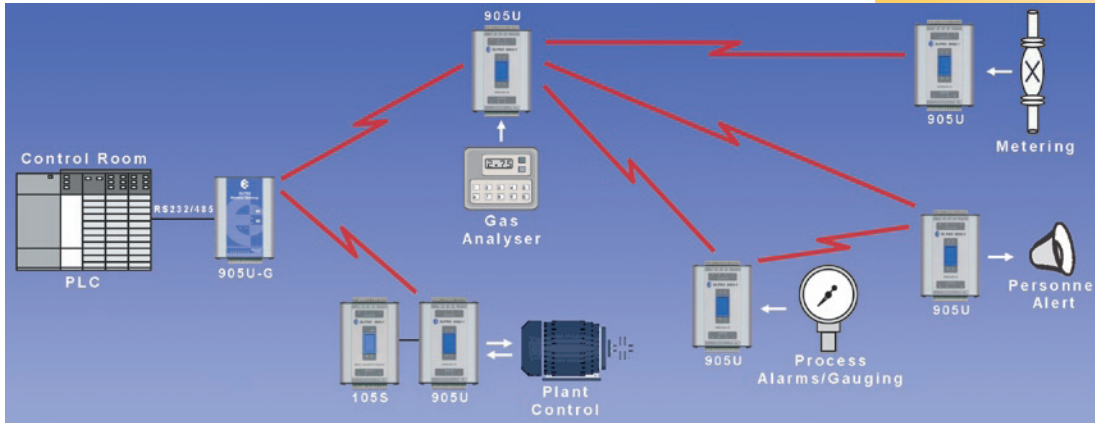
Discrete and analog outputs can be configured to individually reset if communications has failed to the module. The user can configure a "comms-fail" timeout - if no communications is received for this time period, the configured output will reset.

	905U-1	105S-1	905U-2	105S-2	905U-3	105S-3	905U-4	105S-4
Radio Port								
Serial Port								
Digital inputs		4		4		0		4 - 16
Digital outputs		4		1		8		4 - 16
Analog inputs		2		6		0		0
Analog outputs		2		0		8		0
Pulse inputs		1		4		0		4
Pulse outputs		1		0		4		4

Pulse and digital I/O are same.
The 105-4 has 4 fixed inputs and 4 fixed outputs and 12 which may be either input or output.

...Low cost, easy to use and secure!

Industrial Automation



Interfacing to Other Systems

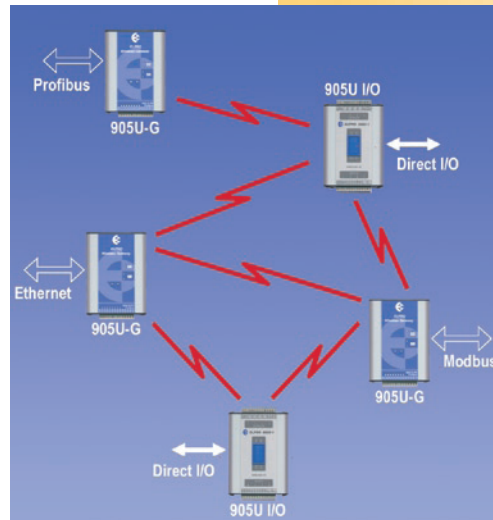
A 905U network can include 905U-G Wireless Gateways - these modules interface to a wide variety of data buses such as Ethernet, Profibus, Modbus and Devicenet. A network comprising wireless I/O and wireless gateways is called a "WIB".

The ELPRO WIB

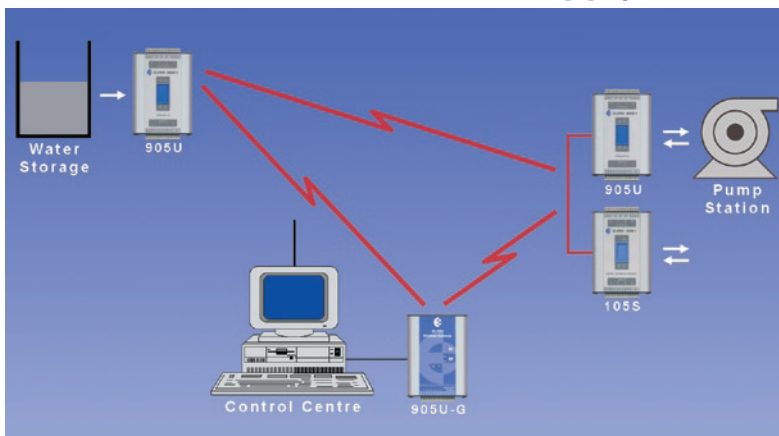
The ELPRO WIB, or Wireless Instrumentation Backbone, provides wireless inter-connectivity for different data buses and direct I/O. By using ELPRO's neutral radio protocol, different data buses in various plant areas can be linked, without wiring. Direct I/O signals can be incorporated using the 905U wireless I/O modules.

The ELPRO WIB removes the largest cost component of collecting plant information - wiring; and solves the largest constraint to sharing plant information - data bus compatibility.

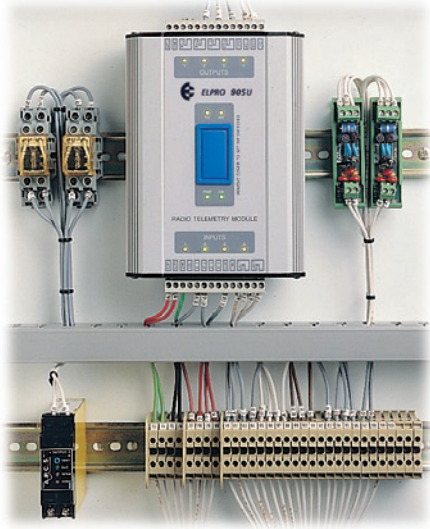
WIB Networking



Water Supply Utilities



ELPRO 905U Wireless I/O



Radio Communications

The ELPRO 905U uses frequency hopping spread spectrum and operates in the license-free 900MHz radio band. These products can be used without a radio license.

Radio Range

Typical line-of-sight radio distances are:
20 miles in USA/Canada (4W ERP)
20 km in Australia/NZ (1W ERP)

The actual operating distance depends on many factors such as obstructions in the radio path, height of antennas and the type of antennas used. Line-of-sight is not necessary for short distances, as the radio signal will penetrate obstacles or reflect from surfaces. Typical distance in plant and factory environments is 3000 feet (1 km).

The 905U provides a measurement of both background radio noise and radio signal strength to assist with installation and testing.

Repeater Functionality

Each 905U module also provides a repeater function. If a reliable radio path cannot be established between two modules, the radio message can be passed via another 905U module working as a repeater. The repeater module acts as an intermediate module between the two ends of the radio link. Messages

can be repeated up to five times by intermediate repeater units, allowing very long radio paths to be achieved. Repeaters are not dedicated units - they are normal modules with their own I/O.

Configuration

The 905U modules are easy to configure, using a Windows-based configuration program, supplied with each module. The configuration file can be downloaded or uploaded by connecting to the module RS232 serial port.

Configuration files can be password protected for secure archival.

Diagnostics & Testing

The 905U provides diagnostic and test functions via the configuration software. I/O and communication functions can be tested and verified.

The diagnostics features include radio signal measurement, allowing radio paths to be easily tested without any additional test equipment.

Power Supply

The ELPRO 905U includes a switch-mode power supply which will accept a variety of voltage sources. The 905U will operate from a DC supply of 11 to 30 volts or an AC supply of 15 to 24 volts. Connection to 110/240V power is made via a small transformer adaptor. The internal power supply includes a battery charger for battery backup, allowing the 905U to be powered from non-secure power circuits. The power supply also includes a solar regulator for direct connection of solar panels.

The power supply is intelligent and will automatically alarm on loss of normal supply, loss of solar charging or low battery voltage. These alarm signals can be transmitted to remote modules as discrete status signals; the battery voltage value can be transmitted as an analog value for remote trending.

Each module generates a 24V regulated supply (150mA) for analog loop power. The 24V is available for the full range of input supply voltage.

WHAT IS WIRELESS I/O?

Wireless I/O, or Radio Telemetry, is a method of transmitting information by radio. Signals such as switch status or analog signals can be transmitted to a remote location, and the signals "re-created".

APPLICATIONS

- Process plants
- Factories
- Warehouses
- Agriculture
- Mining
- Irrigation
- Security
- Overhead cranes
- Manufacturing plants
- Marine and ports
- Water and sewerage
- Tank farms
- Building management
- Lighting control
- PLC interconnection
- Mobile vehicles
- Rotating machinery
- ... anywhere you need a wire to carry a signal.



Specifications

General

Temperature -40 to 140 degF (-40 to 60 degC)
Humidity 0 - 99 %RH
EMC FCC Part 15, AS3548
Housing - extruded aluminum case, 5.1" x 7.3" x 2.4"
(130 x 185 x 60mm) with DIN rail mounting
Removable terminals up to 12 gauge (2.5sqmm) wiring
LED indication for power supply, OK status, digital I/O

Inputs and Outputs

Discrete Inputs

suitable for voltage free contacts or NPN transistor, contact wetting current 5mA, "debounce" delay configurable 0.1 - 8 sec
905-1 four inputs
905-2 four inputs
905-4 up to 16 inputs (4 fixed + 12 selectable)

Discrete Outputs

905-1 four relay contacts, Form A
AC 50V 5A, DC 30V, 2A
905-2 one FET output 30VDC 500mA
905-3 eight FET outputs 30VDC 500mA
905-4 up to 16 FET output (4 fixed + 12 selectable)

Analog Inputs

"floating" differential inputs, common mode voltage 27V, loop power 24V provided, filtering configurable 0.1 - 8 sec.
905-1 two 4-20mA, resolution 15 bit, accuracy 0.1%
905-2 six 0-20mA (0-5V factory option), resolution 12 bit, accuracy 0.1%

Analog Outputs

current sink to common, max loop voltage 27V, max loop resistance 1000 ohms
905-1 two 4-20mA, resolution 15 bit, accuracy 0.1%
905-3 eight 0-20mA (0-5V factory option), resolution 12 bit, accuracy 0.1%

Pulse Inputs

Pulse inputs use discrete input channels
Max pulse rate 100Hz, pulse width min 5msec
905-1 one input (DI1)
905-2 four inputs (DI1-4); first PI (DI1) max 1KHz using configurable 1/10 multiplier
905-4 four inputs (DI1-4); first PI (DI1) max 1KHz using configurable 1/10 multiplier

Pulse Outputs

FET 30VDC 500mA max 100Hz
905-1 one dedicated PO
905-3 four (DO1-4)
905-4 four (DO1-4)

Power Supply

Battery supply 11.5-15.0 VDC
Normal supply 12-24 VAC or 15-30 VDC, overvoltage and reverse power protected
110-250 VAC supply available via transformer adapter
Battery charging circuit included for 1.2-12 Ahr sealed battery
Solar regulator for direct connection of solar panel (up to 30W) and solar battery (100Ahr)
Internal monitoring of normal supply fail, solar charge status, and battery voltage. These values may be transmitted to remote modules for monitoring.
An internal DC/DC converter provides 24VDC 150mA for analog loop supply.

Radio Transceiver

Frequency hopping spread spectrum
USA/Canada 902-928 MHz
Australia 915-928 MHz
New Zealand 921-928 MHz
Approved to FCC Part 15.247, RS210
Transmit power 1W
Line-of-sight range, dependant on local conditions
USA/Canada, 4W ERP, 20 miles
Australia/NZ, 1W ERP, 20 km
Typical range in industrial plants/factories 3000 feet (1 km)
Range may be extended by using up to five intermediate 905U modules as repeater units
Antenna connector is SMA coaxial

Serial Port

RS232/RS485 9600 baud, 8 bits, no parity, 1 stop bit
RS232 9pin DB9 male connector
RS485 terminal connector, max distance 4000' (1.2 km)

Data Transmission

Data transmission uses exception reporting plus integrity update transmissions. The period for update transmissions is user-configurable.
Radio protocol includes 64 bit security encryption, system and unit addressing, peer-to-peer I/O mapping, 16 bit CRC error checking, acknowledgement of error-free transmissions and automatic retries.
Communications failure status may be configured as a discrete output. Resetting of outputs on communications failure is configurable.
Transmission rates Radio 19200 baud Serial 9600 baud
Typical radio message transmission time 36 msec

Area Approval

USA/Canada Class 1 Div 2 Groups A, B, C, D Temp T6

Hoskin Scientific Limited has been supplying testing and monitoring instruments since 1946. Although our range is broad, we focus on three major markets including:

Geotechnical & Materials Testing
Environmental Monitoring
Test & Measurement Instrumentation

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