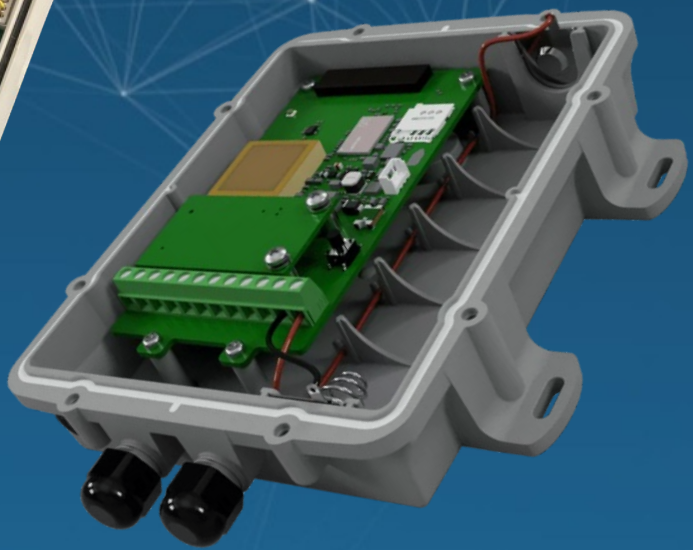
HydroTerra

Environmental Monitoring Specialists

Stygo 1

Groundwater Cellular Battery Powered IoT Sensor Hub with Integrated Sensor Options

Stygo 1 is a groundwater **cellular battery** powered IoT sensor hub with multiple integrated sensor options for groundwater level, electrical conductivity and temperature monitoring. Various mounting options includes bracket/pole and direct install to groundwater monuments/standpipe covers. There are also options for installing under a number of monitoring well cover models.



Overview

Ultra-low power consumption only requires D cell batteries. Connectivity is provided via Telstra's Cellular LTE-M/NB-IoT Network. With a selection of integrated sensors, you can monitor groundwater water level, electrical conductivity and temperature for a number of applications. The hubs are waterproof with an ultra-rugged IP68 housing and bespoke lightweight aluminum brackets. Depending on your requirements other bespoke options can include a feature-rich array of 9 inputs/outputs and multiple sensor connectivity.

- Up to 9 inputs/outputs and multiple sensor connectivity
- Weatherproof and ultra-rugged IP68 housing with compact and ergonomic design
- Ultra low power with battery life of up to 10 years
- Cellular connectivity via Telstra's Cellular LTE-M/NB-IoT Network covering over 4 million sq km.
- Small enclosure that can fit in a groundwater monument or under a well cover (80mm wide x 70mm deep x 124mm long)

DataStream™

by HydroTerra

Stygo 1

Integrated Level & EC Sensors

Seametrics

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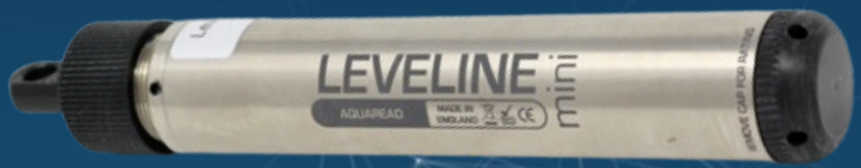
water monitoring instruments



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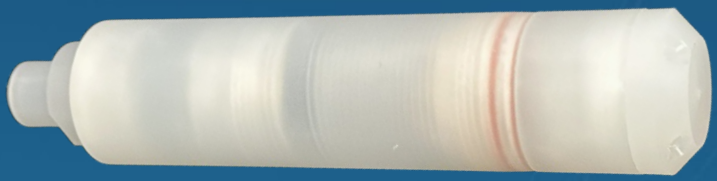


SMARTS

Configurable Alerts	Configure email and sms alerts based on levels & WQ remotely from our cloud-based device management system.
Adjustable Sampling Rate	Adjustable sampling rate from once per day to every 30 minutes (Default = 6 Hours)
Integration	Third-Party Integration Webhook, TCP or HTTPS

TECHNICAL SPECIFICATIONS

Power

Cellular 1	Internal 13.0 Ah Lithium Thionyl providing up to 10 years maintenance free operation. 20µA max (Low power operation), 2 mA (AI sampling w/o sensors), ~50mA (Alarm messaging).
Cellular 2	Choice of 3500mAh LiPo rechargeable battery with solar panel or 2 x D Cell LTC batteries for a completely self-powered solution. Input Voltage 6-28V DC (max).

Input & Output Options

Cellular 1	Digital input/counter, 1 analog input, internal 3-axis digital accelerometer (optional), Built in battery monitoring, SDI-12 and MODBUS sensor data acquisition.
Cellular 2	Flexible I/O Card Architecture caters for plug-in cards that define the 9 inputs/outputs, offering limitless options for interfacing to sensors such as SDI-12, I^2C, 1-Wire, iButton, 4-20mA, RS-485, RS-232*, Analog Inputs, Digital Inputs, Pulse Counting, Digital Outputs, Switched Power, and more.

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 mH_2O) and 30 psig (21 mH_2O) 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.

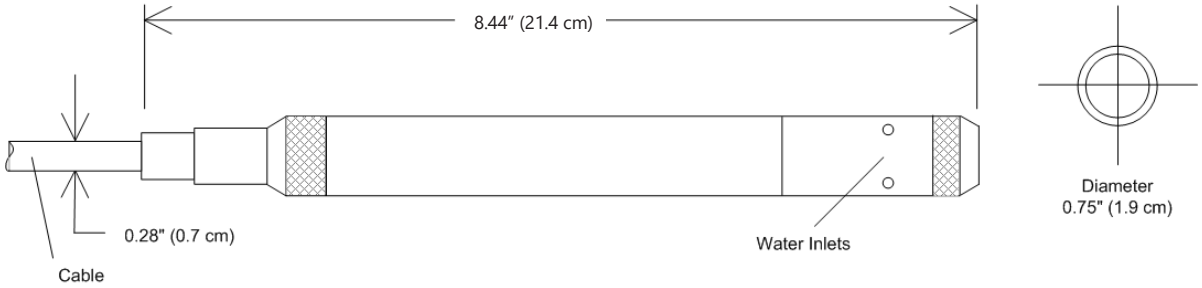
Pressure/level is measured with an extremely rugged and stable piezo-electric, media isolated pressure element and compensated for temperature using our proprietary calibration methodology. Temperature is measured using an on-board digital chip.

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.

Contact Your Supplier

PT12
SUBMERSIBLE PRESSURE/TEMPERATURE SMART SENSOR

Dimensions



Specifications*

Size	**Weight**	0.8 lb. (0.4 kg)		
	Length	8.44" (21.4 cm)		
	Diameter	0.75" (1.9 cm)		
Wetted Materials	**Body Material**	316 stainless or titanium, Viton, Acetal		
Cable	**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**	9-15Vdc, 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/Level**	
	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[1], 5, 7, 15, 30, 50, 100, 300 FtH_2O: 2.3[1], 12, 35, 69, 115, 231, 692 mH_2O: 0.7[1], 3.5, 5, 10.5, 21, 35, 70, 210
			Absolute[2]	PSI: 30, 50, 100, 300 FtH_2O: 35, 81, 196, 658 mH_2O: 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		
Burst pressure		1000 psi (approx. 2000 ft or 600 m)		
Environmental		IP68, NEMA 6P		

**Specifications subject to change. Please consult out web site for the most current data (seametrics.com). Modbus is a registered trademark of Schneider Electric.*
1 ±0.25% accuracy FSO (max) at this range
2 Depth range for absolute sensors has 14.7 PSI subtracted to give actual depth allowed.

User is responsible for reviewing end use application with their supplier for product suitability.

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CT2X Smart Sensor

CONDUCTIVITY/TEMPERATURE WITH DEPTH/LEVEL OPTION

APPLICATIONS

Wetland surveys

Saltwater intrusion monitoring

Agricultural runoff studies

Discharge monitoring

Features

- Measures/Records conductivity, temperature, salinity, and TDS with a depth/level option
- Low power
- Modbus® RTU (RS485) and SDI-12
- 0-300,000 µS/cm
- Linear and nLFn temperature compensation
- Small diameter — 0.75" (1.9 cm)
- 349,000 records in non-volatile memory
- Free, easy-to-use, new upgraded Aqua4Plus 2.0 software

Contact Your Supplier

The **Seametrics CT2X** Smart Sensor is a microprocessor-based submersible conductivity/temperature sensor with built-in data logging. This device stores thousands of records of conductivity, temperature, salinity, and total dissolved solids (TDS). The CT2X is also available with a depth/level option giving added functionality in the same sensor housing.

The CT2X incorporates 4-pole electrode cell measurement technology for conductivity, salinity, and TDS. This technology reduces fringe field interference errors, lessens inaccuracy caused by polarization effects, and lowers contact resistance problems. Four-pole electrode technology also allows users to work with one electrode over a wide range of conductivity. The conductivity element is constructed of epoxy/graphite, making it extremely durable for use in rugged field conditions. To clean, simply scrub with a small brush.

Depth and 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 epoxy bead thermistor.

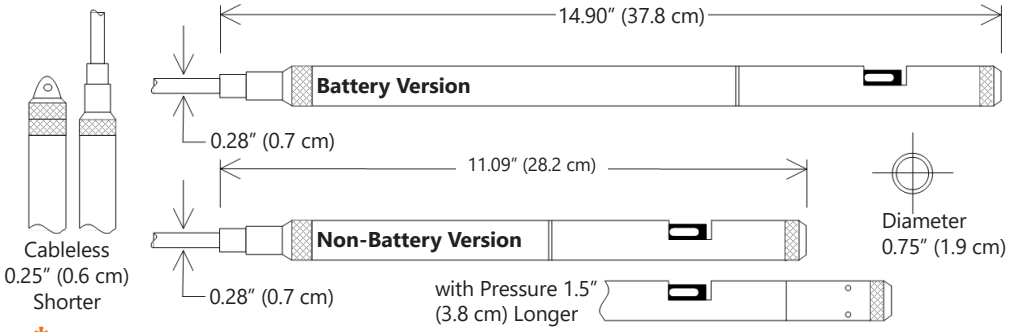
The CT2X is powered internally with two replaceable AA batteries. Alternately it can be powered with an external auxiliary power supply for data intensive applications. Several CT2Xs, or a combination of CT2Xs and other Smart Sensors, can be networked together and controlled directly from a single computer.

While most will use the CT2X with our free, easy-to-use Seametrics Aqua4Plus 2.0 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 telemetry and control systems.

CT2X Smart Sensor

CONDUCTIVITY/TEMPERATURE WITH DEPTH/LEVEL OPTION

Dimensions



Specifications*

Wetted Materials	**Weight**	1.0 lb. (0.5 kg)		
	Body Material	Acetal, Viton® & 316 stainless or titanium		
	Cable	Submersible: polyurethane, polyethylene, or ETFE (4 lb./100 ft., 1.8 kg/30 m)		
	Desiccant	1-3 mm indicating silica gel (PSIG sensors only)		
	Field Connector	Standard		
Temperature	**Operating Range**	Recommended: -5˚ to 40˚C (23˚ to 104˚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 replaceable lithium 'AA' batteries - Battery life: 12 months at 15 min. polling interval (may vary do to environmental factors)		
	Auxiliary	12 Vdc - Nominal, 9-15 Vdc - range		
Communication		RS485 Modbus® RTU (output = 32-bit IEEE floating point), SDI-12 (ver. 1.3) - ASCII		
Logging	**Memory**	4MB - 349,000 records		
	Logging Types	Variable, user-defined, profiled		
	Logging Rates	4x/sec maximum, no minimum		
	Baud Rates	9600, 19200, 38400		
	Software	Complimentary Aqua4Plus 2.0		
	Networking	32 available addresses per junction (Address range: 1 to 255)		
	File Formats	.a4d and .csv		
Output Channels		**Temperature**	**Depth/Level**	**Conductivity**
	Element	30K ohm thermistor, Epoxy bead/external housing, Pyrex® glass	Silicon strain gauge transducer 316 stainless or Hastelloy	Epoxy/Graphite - 4-pole
	Accuracy	±0.25˚C	±0.05% FSO (typical, static) ±0.1% FSO (maximum, static) (B.F.S.L. 20˚C)	Static: ±0.5% of measured value (0 - 100,000 µS/cm)
	Resolution	0.1˚C	0.0034% FS (typical)	(32 bit internal) 0.1 µS/cm, 0.001 mS/cm, 0.1 mg/L (TDS), 0.001 PSU
	Units	Celsius, Fahrenheit, Kelvin	PSI, FtH_2O, inH_2O, mmH_2O, mH_2O, inH_2O, cmHg, mmHg, Bars, Bars, kPa	µS/cm, mS/cm, mg/L, PSU
	Range	-5˚ to 40˚C (23˚ to 104˚F)	Gauge: PSI: 1[2],5,7,15,30,50,100,300 FtH_2O: 2.3[2],12,35,69,115,231,692 mH_2O: 0.7[2],3.5,5,10.5,21,35,70,210 Absolute[3]: PSI: 30, 50, 100, 300 FtH_2O: 35, 81, 196, 658 mH_2O: 10, 24, 59, 200	Conductivity[1]: 0-300,000 µS/cm TDS: 4.9-147,000 mg/L Salinity: 2-42 PSU
	Compensated	---	0˚ to 40˚C (32˚ to 104˚F)	Thermal: None, Linear, or nLFn
	Warmup Time	---	---	200 msec
Max operating pressure		1.1 x full scale		
Over pressure protection		3x full scale up to 300psi		
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. Pyrex is a registered trademark of Corning Incorporated.
1 Accuracy reduced at levels <10 µS/cm and >100,000 µS/cm
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.

User is responsible for reviewing end use application with their supplier for product suitability.

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water monitoring instruments

LeveLine-MINI
Water Level sensors

The LeveLine-Mini is a highly accurate water level and temperature sensor. It can be used in a wide range of groundwater and surface water applications. Housed inside the sealed body is a temperature and level sensor.

The LeveLine-Mini Absolute uses a piezoresistive ceramic pressure sensor to provide excellent durability and long-term stability whilst delivering an impressive accuracy of 0.05% FS. A variety of level ranges are available and all of them are temperature compensated across a scale of -20 to 80 deg. C. A wide variety of cable configurations are available as well as an absolute or gauge option.

Across the range of LeveLine water level loggers we use an all Titanium body. Titanium is widely regarded as the best material to use in any water level logger but especially important when deploying into harsh or saline environments ensuring dependable long-term deployment.

Features

- 0.05% FS accuracy.
- Titanium body.
- 2 year warranty.
- SDI-12, RS485/MODBUS direct out communications.
- Vented option available
- LeveLine Mini-CTD version available for salinity and EC measurements.

Applications

- Groundwater level monitoring, pump tests, slug tests etc.
- Stream, lake and reservoir water level measurement.
- Wetland and flood water monitoring.
- Coastal monitoring.
- Tank level measurement.
- Long term continuous monitoring in boreholes, surface water and seawater applications.
- Process applications.
- Flood warning systems.

Deployment and Communication

The LeveLine-Mini is a transducer so it outputs level and temperature readings automatically once connected to a suitable data logger, display or other controller which utilises SDI-12, MODBUS/RS485 protocols.

Absolute and gauge versions are available along with vented and non vented cable options.

LeveLine Mini – CTD

The LeveLine-Mini can be purchased with a conductivity sensor included to give level, temperature, conductivity and salinity readings. This sensor comes with a connector on the back end of the probe so it can be connected to the Leveline PC kit for calibration using the LeveLink PC software.

The LeveLine-Mini-CTD uses the same 4 ring stainless steel conductivity as our multiparameter water quality probes for robust EC and salinity measurements.

LeveLine-Mini Water Level sensor Specifications

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water monitoring instruments

		LeveLine-Mini	LeveLine-Mini-CTD
GENERAL	Temperature ranges	Operational: -20-80° C (-4-176° F) Storage: -40-80° C (-40-176° F) Compensated: -20-80° C (-4-176° F)	Operational: -20-80° C (-4-176° F) Storage: -40-80° C (-40-176° F) Compensated: -20-80° C (-4-176° F)
	Diameter	22mm	22mm
	Length	87mm	146mm
	Weight	120g	210g
	Materials	Titanium body, Delrin nose cone	Titanium body, Delrin nose cone
	Output options	Modbus/RS485, SDI-12, Aquaread proprietary	Modbus/RS485, SDI-12, Aquaread proprietary
	Battery type & life	3.6V lithium; up to 10 years (see note 1)	N/A
	External power	6 - 24 VDC	6 - 24 VDC
MEMORY	Size	N/A	N/A
	Data records	N/A	N/A
	Log types	N/A	N/A
	Fastest logging rate & Modbus rate	10 per second	1 per second
	Fastest SDI-12 output rate	1 per second	1 per second
	Real-time clock	N/A	N/A
SENSOR	Type / Material	Piezoresistive; ceramic	Piezoresistive; ceramic
	Range (Gauge & Absolute)	10.0M (32.8 ft) 50.0M (164 ft), 20.0M (65.6 ft), 100M (326 ft)	10.0M (32.8 ft) 50.0M (164 ft), 20.0M (65.6 ft), 100M (326 ft)
	Maximum pressure	Max 2x range, Burst 2.5x range	Max 2x range, Burst 2.5x range
	Accuracy @ 15° C (note 2)	±0.05% FS	±0.05% FS
	Accuracy (FS) (note 3)	±0.1% FS	±0.1% FS
	Resolution	0.002% FS or 1mm whichever is greater	0.002% FS or 1mm whichever is greater
	Units of measure	Pressure: mbar (psi, kPa, bar, mbar, mmHg, inHg, cmH2O, inH2O, Level: in, ft, mm, cm and m available in LeveLink	Pressure: mbar (psi, kPa, bar, mbar, mmHg, inHg, cmH2O, inH2O, Level: in, ft, mm, cm and m available in LeveLink
Electrical Conductivity	Range	NA	0 - 200mS/cm (0 - 200,000µS/cm)
	Resolution	NA	1µS
	Accuracy	NA	± 1% reading or ±1µS whichever is greater (see note 5)
Salinity (note 4)	Range	NA	0 - 70 PSU / 0 - 70 ppt (g/Kg)
	Resolution	NA	0.01PSU / 0.01 ppt
	Accuracy	NA	±1% reading or ± 0.1 unit if greater
Temperature sensor	Accuracy & resolution	±0.1° C; 0.01° C	±0.1° C; 0.01° C
	Units of measure	Celsius (fahrenheit available in LeveLink)	Celsius (fahrenheit available in LeveLink)
Warranty	Standard	2 years on all LeveLine-Mini versions	2 years on all LeveLine-Mini versions
	Extended	Options Available	Options Available

Notes: 1) Dependent on logging rate. 2) Across factory-calibrated pressure range at a constant temperature. 3) Across factory-calibrated pressure and temperature ranges. 4) Readings calculated from EC and temperature values. 5) At the calibration point at 25°C

Submersible Pressure Transducers - Level

High performance, accurate and stable submersible hydrostatic pressure transmitter. Multiple material options for housing and cable depending on the water characteristics (salty, corrosive, mineralised) and type of liquid (water, diesel, gasoline, kerosene).

TECHNICAL SPECIFICATIONS

Level Accuracy

Level 0.2% FS

Stability

Level 0.25% FS/year

Pressure Reference

Vented Gauge

Temperature

-20 ~ 85 °C

Cable Length

5m Standard
10m to 200m Optional

Materials

Housing
Stainless Steel 304 (Standard Option)
Stainless Steel 316 (Saline Water)
Polypropylene (Corrosive and Acidic Water)
Cable
Polyvinyl Fluoride (Standard Option)
PTFE (Corrosive Medium)

IP Rating

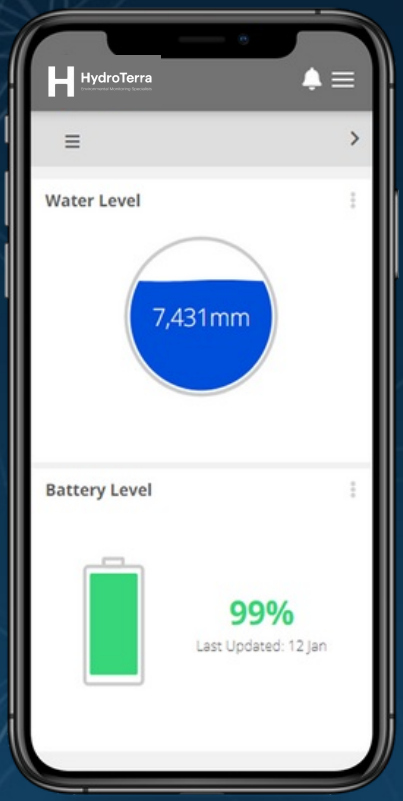
IP68

Dimensions

Standard - 110mm L x 23 mm diameter
Sludge Head - 116mm L x 47.5mm diameter

FEATURES

HydroTerra Platform



FEATURES

- Monitor environmental sensors and device locations and parameters
- Configure sample rates, device outputs and variable alerts
- Control device outputs such as pumps, valves and gates
- Receive SMS or email alerts based on variable thresholds
- Download device data as csv files and images

OVERVIEW

Sensors are remotely monitored with our custom cloud based platform. Interrogate volume and level trends, change sampling intervals and set SMS and email alerts. Our platform is flexible and modular meaning we can set it up the way you like from our library of maps, charts, gauges and controls.

OTHER SERVICES

- Integrate other sensors to our platform
- White label the platform with your company branding
- Send your sensor data to third party platforms

DataStream™
by HydroTerra