Model 4675LV

Vibrating Wire Weir Monitor

Applications

The Model 4675LV is used for the precision water level measurement and monitoring of...

- **Weirs**
- **Tanks**
- **Stream levels**
- **Reservoir levels**

The Model 4675LV with cutaway revealing its internal components: a cylindrical weight suspended from the vibrating wire force transducer.

Operating principle

The Model 4675LV is a precision water level monitoring system that uses a vibrating wire force transducer to provide a highly stable and sensitive means of monitoring water levels.

The main component is a cylindrical weight suspended from the vibrating wire force transducer. The cylinder hangs partially in the water whose level is to be monitored. As the water level changes, the changing buoyancy force on the cylinder acts directly on the vibrating wire transducer altering its tension and hence its resonant frequency.

In operation the vessel containing the Weir Monitor is connected hydraulically to the water whose level is to be measured. The vessel is positioned so that the bottom of the hanging cylinder is slightly below the bottom of the V-notch or flume.

Advantages and Limitations

The main advantage of the 4675LV system lies in it's high sensitivity and stability, which allows water level changes of as little as 0.1 mm to be measured accurately.

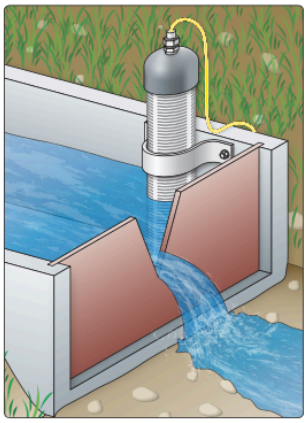
The force transducer is immune to zero drift and has a very low response to temperature changes.

As with all vibrating wire sensors, because the output is a frequency, it is not affected by changes of cable resistance and hence long signal cables are not a problem.

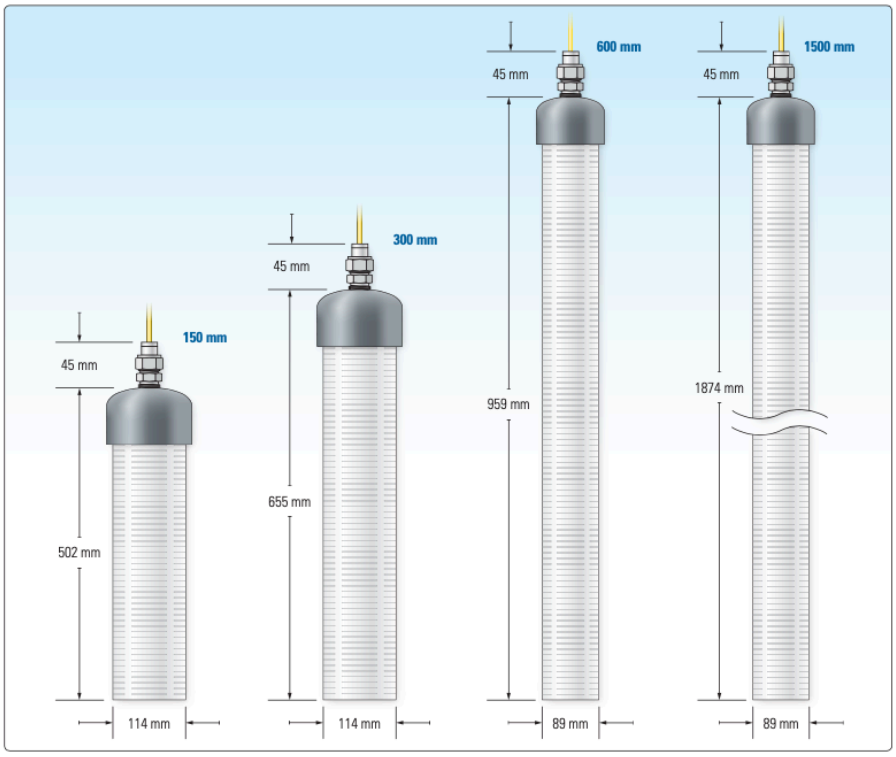
The frequency is measured by either a portable readout or datalogger.

4 to 20 mA or 0 to 5 V outputs can be obtained using the Model 8020-59 VW Frequency to Analog Converter.

+56 34 243 6500 www.gmgeomonitoring.com Av. Argentina Ote.17 Of 403, Los Andes Chile



Typical Model 4675LV installation.



Nominal lengths and diameters of the Model 4675LV standard ranges.

System Components

The cylinder and force transducer are contained within a housing made from slotted PVC pipe. This pipe can be positioned within the weir or tank or it can be installed in a Stilling Well connected hydraulically to the tank or weir. The vibrating wire transducer is vented to the atmosphere so that barometric fluctuations are compensated for automatically. The vent line terminates in a moisture trap which requires periodic maintenance to replace the desiccant.

Technical Specifications

Standard Ranges[1]	150, 300, 600, 1500 mm
Resolution	0.025% F.S. (minimum)
Accuracy[2]	±0.1% F.S.
Linearity	0.25% to 0.75%F.S.
Stability	±0.05% F.S. per year
Temperature Range[3]	–20 °C to +80 °C
Dimensions (L × ø)	165 × 25 mm *(transducer)*

[1]*Other ranges available on request.*
[2]*Accuracy established under laboratory conditions.*
[3]*Using anti-freeze solution can extend the range below 0 °C.*

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Solinst®

Point Source Bailer

Model 429 Data Sheet

Point Source Bailer
Model 429

Point source sampling is ideal for obtaining high quality, representative samples of groundwater from specific depths. It allows the collection of water that has just flowed into a well at the desired sampling point. This can avoid purging and disposal of purged water.

The Point Source Bailer can be used to profile an open borehole or screened well, collecting samples from distinct levels or points of inflow. Sample biases due to mixing of the sample with water from different levels in the well is minimized.

For point source sampling, Solinst also manufactures the Model 425 Discrete Interval Sampler which is pressurized before lowering into the well. This prevents water from entering the sampler until the desired depth has been reached. (See Model 425 Data Sheet.)

Point Source Bailer Design

The Solinst Point Source Bailer has dual ball valves, top and bottom. It is a simple and cost effective device for aquifer profiling. It needs no costly or hard to transport ancillary equipment, making it ideal for point source sampling in hard to access locations.

The miniature 0.5" (12.7 mm) diameter model is ideal for use in narrow tubes and direct push devices.

Bailer Capacity

O.D. inch	Capacity US oz	O.D. mm	Capacity ml
2 ft. Length			
0.5	1.7	12.7	50
1.0	7	25.4	210
1.5	13	38.1	390
2.0	29	50.8	850
3 ft. Length			
0.5	2.7	12.7	80
1.0	11	25.4	330
1.5	23	38.1	680
2.0	47	50.8	1390
4 ft. Length			
0.5	3.7	12.7	110
1.0	15	25.4	450
1.5	33	38.1	970
2.0	65	50.8	1930

Point Source Bailers come in standard lengths of 2 ft. (610 mm), 3 ft. (910 mm), or 4 ft. (1220 mm)

Method of Operation

The bailer is lowered slowly to the desired sample depth on a support line. As the bailer is being lowered, both ball valves open, allowing water to flow through the sampler.

On reaching the sampling depth, the bailer is raised slowly and steadily. The weight of water and upward movement of the bailer keep both ball valves closed. The top ball valve prevents the sample in the bailer from mixing with water at higher levels in the borehole. The bottom valve prevents the sample from leaking out of the bailer.

Once at the surface, the bailer is emptied by opening the top vent, and allowing the water to drain slowly through the sample release device into a sample container.

The Point Source Bailer can then be decontaminated before taking the next sample.

Specifications

The Solinst Point Source Bailer is constructed of 316 stainless steel with PTFE ball valves, and o-rings. The sampler comes complete with a stainless steel sample release device to minimize loss of volatiles during transfer to the sample container.

The Solinst Model 103 Tag Line is recommended as a support line for the Point Source Bailer. There is the option of laser marked cable (marked every 1/4 ft. or 5 cm) or laser marked flat tape (marked every 1/100 ft. or each mm), mounted on an easy to use reel. (See Model 103 Data Sheet.)

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For further information contact: Solinst Canada Ltd.
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Web Site: www.solinst.com E-mail: instruments@solinst.com

Solinst®

Solinst® Point Source Bailer Instructions

Model 429 1.5", 1" & 0.5" diameter

Sampling

1. Attach enough support cable to the top of the bailer to allow lowering to the maximum depth required. (Use stainless steel cable or Teflon® coated stainless steel cable). Make sure that the cable connection is secure.
2. Slowly lower bailer on the support cable to the desired sampling depth.
3. Raise the bailer to the surface using an steady rate of retrieval.

> **Note:** When storing the point source bailer for a long period of time, lubricate all o-rings. However do not lubricate the Bottom Check Valve O-rings prior to use.

Sample Retrieval

1. Hold the Point Source Bailer vertical and insert the Sample Retrieval Device into the bottom of the bailer, to displace the Lower Check Ball.
2. Direct the outlet of the Sample Retrieval Device into the sample container.
3. Push the trigger on the Top Check Ball in any direction to allow the sample to drain from the bailer.

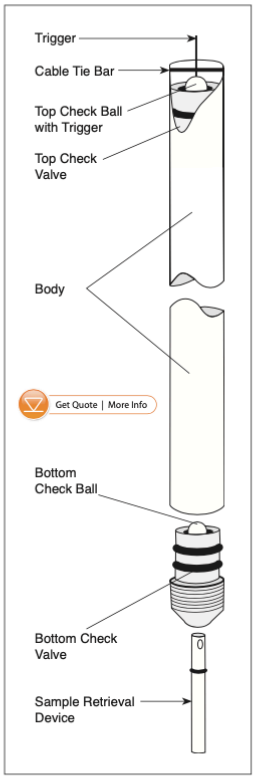
> **Note:** Adjusting the amount of movement on the Trigger allows sample flow from the bailer to be regulated.

Cleaning the Bailer

1. Disassemble bailer, as described overleaf.
2. Clean all components with a non-phosphate soap followed by a deionized water rinse.

> **Note:** Further cleaning of all components except the o-rings can be achieved by using hexane or similar solvent followed by 2 or 3 rinses with deionized water. Strong cleaning solutions may damage the o-rings.

3. Re-assemble bailer, as described overleaf.



Bailer Disassembly

1. Holding the bailer upside down, remove Bottom Check Valve by twisting and pulling. If very tight, use vise grips over a cloth to avoid damage.
2. Remove the Bottom Check Ball by turning the bailer right side up, allowing the ball to roll out.
3. Use 2' long wooden dowel to push the Top Check Valve out through the top of the bailer.
4. Remove o-rings from Top and Bottom Check Valves

Re-Assembly

1. Replace any damaged o-rings on both Top and Bottom check valves.

> **Note:** Do not lubricate the Bottom Check Valve O-rings prior to use.

2. Push Top Check Ball with Trigger into the bailer with the trigger toward the top.
3. Use the insertion tool or dowel to push the Top Check Valve into the bailer so that the trigger extends about 1/2" above the top of the bailer body.
4. Insert the Bottom Check Ball into the bailer.
5. Push the Bottom Check Valve firmly onto the bailer.

> **Note:** Do not use bailer until Bottom Check Valve is properly locked in place.

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Solinst®

TeleScoop es un variado sistema de muestreo con herramientas intercambiables para las aplicaciones más diversas. Las herramientas (vasos angulares, vasos pendulares, portabotellas, vasos de acero inoxidable y redes) se acoplan a la pértiga telescópica con una práctica conexión rápida.
Ideal para muestreo de cuencas, depósitos, pozos, aguas abiertas, etc. Las varillas telescópicas de aluminio permiten llegar a profundidades de muestreo de hasta 6 m.

- Para industria y tratamiento de aguas

② Vaso angular de cuchara
El vaso se adapta a las más diversas geometrías de recipiente gracias al ángulo de inclinación de ajuste variable (hasta 90°).

- Polipropileno

③ Vaso pendular de PP
Este vaso balancea automáticamente en el plano horizontal. No puede derramarse nada. Apropiado asimismo para pozos profundos y angostos (diámetro 150 mm).

- Polipropileno

④ Vaso pendular de V2A
Este vaso balancea automáticamente en el plano horizontal. No puede derramarse nada. Apropiado asimismo para pozos profundos y angostos (diámetro 130 mm).

- Acero inoxidable V2A (1.4301)

① Pértiga telescópica
En la pértiga telescópica se pueden montar diversas herramientas (conexión rápida). Cada una de las pértigas está provista de un tope. De este modo, una pértiga no puede sacarse de la otra por descuido.
Las pértigas telescópicas no se pueden girar de forma radial, lo que permite un manejo aún mejor.
Pértiga telescópica 5355-0280, acabado extremadamente corto y aún así extraíble hasta los 280 cm. Cabe en cualquier maletero

- Mayor rigidez de las pértigas telescópicas gracias al perfil laminado en frío
- Resortes de acero inoxidable

⑤ **Portabotellas**

Sujeta todas las botellas hasta 88 mm de diámetro. De este modo, las botellas de plástico, vidrio o metal pueden llenarse de modo seguro. Ángulo de inclinación variable con progresión continua de hasta 90°.

- Con presilla universal de sujeción rápida
- Polipropileno/PA

⑥ **Vaso de acero inoxidable**

Vaso con borde de raspado, contenido 1000 ml. Ideal para polvo, granulados, masas, fangos.

- Esterilizable
- Acero inoxidable V2A (1.4301)

⑦ **Red de superficie**

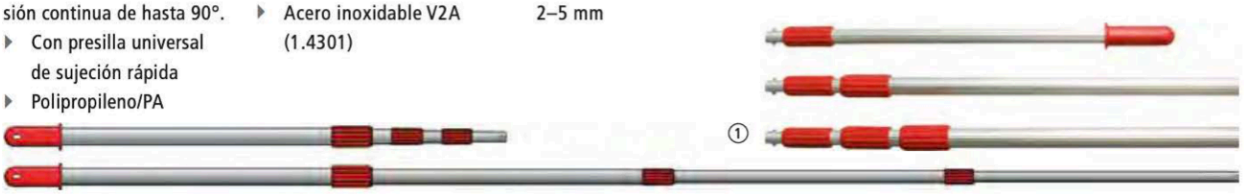
Red para la toma de muestras de sustancias sólidas y organismos en aguas.

- PVC/PA azul
- L 310 x A 280 mm
- Abertura de mallas 2–5 mm

⑧ **Red de profundidad**

Red para la toma de muestras de sustancias sólidas y organismos en aguas.

- PP/PA azul
- L 190 x A 430 mm
- Profundidad de red 250 mm
- Abertura de mallas 2–5 mm



①

Aqua TROLL® 400 Multiparameter Probe

CONFIGURING YOUR INSTRUMENT CAN BE TIME-CONSUMING, FRUSTRATING, AND EXPENSIVE. THE COMPACT AQUA TROLL 400 MULTIPARAMETER PROCESS PROBE SIMPLIFIES DECISION MAKING BY OFFERING A STANDARD SUITE OF SIX WATER QUALITY SENSORS, HOUSED IN A SUB-2 INCH UNIT.

This all-in-one, durable probe continuously measures 12 parameters from six sensors:

1. Actual and specific conductivity, salinity, total dissolved solids, resistivity, and density
2. Dissolved oxygen (optical RDO®)
3. ORP
4. pH
5. Temperature
6. Water level and water pressure (absolute)

Leveraging proven technologies, like the patented, EPA-approved optical RDO® Sensor, the Aqua TROLL 400 decreases setup, calibration, and maintenance time. Ideal for long-term groundwater and surface water monitoring projects, you can deploy the probe for months of unattended operation. Partner with In-Situ to meet the challenges of reduced manpower and 24/7 demand.

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1-970-498-1500 (U.S.A. and international)

CONFIDENCE IN YOUR DATA

- Field-tested sensor technologies lower your total cost of ownership and provide stable, accurate results.
- Receive 3D factory calibrated sensors that are validated with NIST®-traceable standards (where applicable).
- DO readings are automatically compensated for salinity. With the Con TROLL® PRO System, DO and level readings are automatically compensated for barometric pressure.

GREATER EFFICIENCY AND FLEXIBILITY

- Easy installation reduces errors and training time, while increasing productivity.
- With open communication protocols, the instrument easily interfaces with your current system. Access data anytime with a radio, controller, data logger, sampler, telemetry system, SCADA/PLC system, or HydroVu™ Data Services.
- Long-lasting calibrations reduce site visits.
- The narrow-diameter instrument operates in fresh, marine, and process waters.

TOTAL FIELD SUPPORT

- Application and deployment guidance
- 24/7 technical support is always just a phone call away
- Seven-day service for maintenance and calibration (U.S.A. only)

Applications:

- **LONG-TERM GROUNDWATER AND SURFACE WATER MONITORING**
- **COASTAL DEPLOYMENTS–ESTUARIES AND WETLANDS**
- **REAL-TIME WATER QUALITY MONITORING NETWORKS**
- **REMEDIATION AND MINING**
- **STORMWATER MANAGEMENT**

GEO MONITORING
Tecnología del Futuro

In-Situ
YOUR EYES IN THE FIELD

Aqua TROLL® 400 Multiparameter Probe

GENERAL	AQUA TROLL 400 MULTIPARAMETER PROBE						
OPERATING TEMP.	-5 to 50° C (23 to 122° F)						
STORAGE TEMP.	-40 to 65° C (-40 to 140° F)						
DIMENSIONS AND WEIGHT	**Dimensions:** 4.7 cm (1.85 in.) OD x 26.9 cm (10.6 in.) with restrictor installed (does not include cable connector). **Weight:** 694 g (1.53 lbs)						
WETTED MATERIALS	PVC, 316 stainless steel, titanium, Acetal, Viton®, PC/PMMA						
ENVIRONMENTAL RATING	IP68 with all sensors and cable attached. IP67 with sensors removed or cable detached.						
MAX. PRESSURE RATING	112 m (368 ft); 160 psi						
OUTPUT OPTIONS	Modbus/RS485 and SDI-12						
PROBE READING RATE	1 reading every 5 seconds (no internal logging)						
POWER	Required: 8-36 VDC (no internal battery). Measurement current: 16 mA @ 24 VDC. Sleep current: 40 µA @ 24 VDC						
INTERFACE	In-Situ Con TROLL PRO System; Vulink Telemetry System; SCADA/PLC; HydroVu Data Services, and third-party data loggers, samplers, controllers, and telemetry systems.						
CABLE	Customizable, non-vented (absolute) RuggedCable® System is available in either Tefzel® or polyurethane.						
STANDARD SENSORS	**ACCURACY**	**RANGE**	**RESOLUTION**	**SENSOR TYPE**	**RESPONSE TIME**	**UNITS OF MEASURE**	**METHODOLOGY**
LEVEL, DEPTH, PRESSURE	Typical ±0.1% FS @ 15° C; ±0.3% FS max. from 0 to 50° C	76 m (250 ft); absolute (non-vented)	±0.01% FS or better	Fixed	Instantaneous in thermal equilibrium	Pressure: psi, kPa, bar, mbar, mmHg Level: mm, cm, m, in., ft	Piezoresistive; ceramic
CONDUCTIVITY	Typical ±0.5% + 1 µS/cm; ±1% max.	5 to 100,000 µS/cm	0.1 µS/cm	Fixed	Instantaneous in thermal equilibrium	Actual conductivity (µS/cm, mS/cm) Specific conductivity (µS/cm, mS/cm) Salinity (PSU) Total dissolved solids (ppt, ppm) Resistivity (Ohms-cm) Density (g/cm3)	Std. Methods 2510 EPA 120.1
DISSOLVED OXYGEN OPTICAL RDO-X CAP	±0.1 mg/L ±2% of reading	0 to 20 mg/L 20 to 60 mg/L Full operating range: 0 to 60 mg/L	0.01 mg/L	Fixed with replaceable RDO Sensor Cap. Supports Classic, Fast, and RDO-X caps. Ships with RDO-X cap.	T90: <45 sec. T95: <60 sec.	mg/L, % saturation, ppm, ppO2	EPA-approved In-Situ Methods 1002-8-2009 1003-8-2009 1004-8-2009
	Interferences: Alcohols >5%; hydrogen peroxide >3%; sodium hypochlorite (commercial bleach) >3%; gaseous sulfur dioxide; gaseous chlorine. Organic solvents and certain petroleum-based hydrocarbons may swell the sensing element and destroy it. Examples include, but are not limited to, acetone, chloroform, methylene chloride, and BTEX compounds.						
ORP	±5.0 mV	±1400 mV	0.1 mV	Replaceable pH/ORP combo sensor	<15 sec.	mV	Std. Methods 2580
pH	±0.1 pH unit	0 to 14 pH units	0.01 pH unit	Replaceable pH/ORP combo sensor	<15 sec., pH 7 to pH 4	pH units, mV	Std. Methods 4500-H+ EPA 150.2
TEMPERATURE*	±0.1° C	-5 to 50° C (23 to 122° F)	0.01° C or better	Fixed	<30 sec.	Celsius, Fahrenheit	EPA 170.1
WARRANTY	2 years						

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*Temperature response only. System response time depends on site conditions.

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Innovations in Water Monitoring | Spec Sheet

Level TROLL® 400, 500 & 700 Data Loggers

Get water level data the way you want it, when you want it with industry-leading water level/pressure and temperature data loggers. By partnering with In-Situ, you receive durable Level TROLL® Data Loggers that provide years of service, accurate results, intuitive software, and real-time functionality. Use the VuSitu™ Mobile App to manage your data on your smartphone or tablet.

Be Effective

- **Increase productivity:** Reduce training and installation time with In-Situ's intuitive software platform and integrated components. Patented twist-lock connectors, included on Level TROLL Data Loggers and RuggedCable® Systems, ensure error-free deployments.
- **Streamline data management:** Use the VuSitu Mobile App to consolidate all site information on your smartphone, and tag data with site photos and GPS coordinates. Simply connect the instrument to a Wireless TROLL Com or power pack, launch the mobile app, and start reading results. The mobile app guides you through instrument and log setup, and data management. Log data to your smartphone and download results in a standard .csv file format.
- **Set up real-time networks:** Access data 24/7 and receive event notifications when you connect data loggers to Tube and Cube Telemetry Systems, HydroVu Data Services, or other third-party data collection platforms.

Be Reliable

- **Deploy in all environments:** Install loggers in fresh water, saltwater, and contaminated waters. Solid titanium and sealed construction outperforms and outlasts specially coated data loggers.
- **Log accurate data:** Get optimal accuracy under all operating conditions. Sensors undergo NIST®-traceable factory calibration across the full pressure and temperature range. For applications requiring the highest levels of accuracy, use a vented (gauged) system.
- **Get long-lasting operation:** Reduce trips to the field with low-power loggers that typically operate for 10 years.

Be In-Situ

- **Receive 24/7 technical support and online resources.**
- **Order data loggers and accessories from the In-Situ website.**
- **Get guaranteed 7-day service for maintenance (U.S.A. only).**

Applications

- **Aquifer characterization: slug tests & pumping tests**
- **Coastal: tide/harbor levels & wetland/estuary research**
- **Hydrologic events: crest stage gages, storm surge monitoring, & flood control systems**
- **Long-term, real-time groundwater & surface water monitoring**
- **Mining & remediation**

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In-Situ

Innovations in Water Monitoring

Spec Sheet

General	Level TROLL 400	Level TROLL 500	Level TROLL 700	Level BaroTROLL
Temperature ranges [1]	Operational: -20 to 80° C (-4 to 176° F) Storage: -40 to 80° C (-40 to 176° F) Calibrated: -5 to 50° C (23 to 122° F)	Operational: -20 to 80° C (-4 to 176° F) Storage: -40 to 80° C (-40 to 176° F) Calibrated: -5 to 50° C (23 to 122° F)	Operational: -20 to 80° C (-4 to 176° F) Storage: -40 to 80° C (-40 to 176° F) Calibrated: -5 to 50° C (23 to 122° F)	Operational: -20 to 80° C (-4 to 176° F) Storage: -40 to 80° C (-40 to 176° F) Calibrated: -5 to 50° C (23 to 122° F)
Diameter	1.83 cm (0.72 in.)	1.83 cm (0.72 in.)	1.83 cm (0.72 in.)	1.83 cm (0.72 in.)
Length	21.6 cm (8.5 in.)	21.6 cm (8.5 in.)	21.6 cm (8.5 in.)	21.6 cm (8.5 in.)
Weight	124 g (0.27 lb)	124 g (0.27 lb)	124 g (0.27 lb)	124 g (0.27 lb)
Materials	Titanium body; Delrin® nose cone	Titanium body; Delrin nose cone	Titanium body; Delrin nose cone	Titanium body; Delrin nose cone
Output options	Modbus/RS485, SDI-12, 4 to 20 mA	Modbus/RS485, SDI-12, 4 to 20 mA	Modbus/RS485, SDI-12, 4 to 20 mA	Modbus/RS485, SDI-12, 4 to 20 mA
Battery type & life [2]	3.6V lithium; 10 years or 2M readings	3.6V lithium; 10 years or 2M readings	3.6V lithium; 10 years or 2M readings	3.6V lithium; 10 years or 2M readings
External power	8 to 36 VDC	8 to 36 VDC	8 to 36 VDC	8 to 36 VDC
Memory Data records [3] Data logs	2.0 MB 120,000 50 logs	2.0 MB 120,000 50 logs	4.0 MB 250,000 50 logs	1.0 MB 60,000 2 logs
Fastest logging rate	2 per second	2 per second	4 per second	1 per minute
Fastest output rate	Modbus: 2 per second SDI-12 & 4 to 20 mA: 1 per second	Modbus: 2 per second SDI-12 & 4 to 20 mA: 1 per second	Modbus: 2 per second SDI-12 & 4 to 20 mA: 1 per second	Modbus: 2 per second SDI-12 & 4 to 20 mA: 1 per second
Log types	Linear, Fast Linear, and Event	Linear, Fast Linear, and Event	Linear, Fast Linear, Linear Average, Event, Step Linear, True Logarithmic	Linear
Sensor Type/Material	**Piezoresistive; titanium**	**Piezoresistive; titanium**	**Piezoresistive; titanium**	**Piezoresistive; titanium**
Range	Absolute (non-vented) 30 psia: 11 m (35 ft) 100 psia: 60 m (197 ft) 300 psia: 200 m (658 ft) 500 psia: 341 m (1120 ft)	Gauged (vented) 5 psig: 3.5 m (11.5 ft) 15 psig: 11 m (35 ft) 30 psig: 21 m (69 ft) 100 psig: 70 m (231 ft) 300 psig: 210 m (692 ft) 500 psig: 351 m (1153 ft)	Absolute (non-vented) 30 psia: 11 m (35 ft) 100 psia: 60 m (197 ft) 300 psia: 200 m (658 ft) 500 psia: 341 m (1120 ft) 1000 psia: 693 m (2273 ft) Gauged (vented) 5 psig: 3.5 m (11.5 ft) 15 psig: 11 m (35 ft) 30 psig: 21 m (69 ft) 100 psig: 70 m (231 ft) 300 psig: 210 m (692 ft) 500 psig: 351 m (1153 ft)	30 psia (usable up to 16.5 psi; 1.14 bar)
Burst Pressure	Max. 2x range; burst > 3x range	Max. 2x range; burst > 3x range	Max. 2x range; burst > 3x range	Vacuum/over-pressure above 16.5 psi damages sensor
Accuracy (FS) [4]	±0.05%	±0.05%	±0.05%	±0.05%
Long-Term Stability [5]	<0.1% FS	<0.1% FS	<0.1% FS	<0.1% FS
Resolution	±0.005% FS or better	±0.005% FS or better	±0.005% FS or better	±0.005% FS or better
Units of measure	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH20, inH20 Level: in., ft, mm, cm, m	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH20, inH20 Level: in., ft, mm, cm, m	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH20, inH20 Level: in., ft, mm, cm, m	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH20, inH20
Temperature Sensor	**Silicon**	**Silicon**	**Silicon**	**Silicon**
Accuracy	±0.1° C	±0.1° C	±0.1° C	±0.1° C
Resolution	0.01° C or better	0.01° C or better	0.01° C or better	0.01° C or better
Units of measure	Celsius or Fahrenheit	Celsius or Fahrenheit	Celsius or Fahrenheit	Celsius or Fahrenheit
Warranty [6]	**3 years**	**3 years**	**3 years**	**3 years**
Notes	[1] Temperature range for non-freezing liquids. [2] Typical battery life when used within the factory-calibrated temperature range. [3] 1 data record = date/time plus 2 parameters logged for a total of 360,000, 750,000, and 180,000 data points. (No wrapping) [4] Across factory-calibrated pressure and temperature ranges. [5] Includes linearity and hysteresis over 1 year. [6] Up to 5-year (total) extended warranties are available for all sensors. Delrin is a registered trademark of E.I. du Pont de Nemours and Company. Specifications are subject to change without notice.			

Every Application & Budget

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CTD-Diver datalogger

Schlumberger WATER SERVICES

Applications

- Aquifer recharge projects
- Saltwater intrusion projects
- Surveillance against (illegal) discharges
- Surveillance on waste disposal sites
- Monitoring groundwater or surface water quality

CTD-Diver: reliable in all conditions

Where there is a need to monitor not only groundwater levels but also salinization, salt-water intrusion or contamination in the case of (illegal) discharges and landfill sites, the CTD-Diver is the instrument of choice. Besides a pressure and temperature sensor, the CTD-Diver has a four-electrode conductivity sensor for determining conductivity across a substantial measurement range (0-80 mS/cm). For each measurement, the date and time, groundwater level, temperature and conductivity are recorded. There are two options for conductivity measurement: display the measured conductivity or a specific conductivity at 25 °C. The CTD-Diver is accommodated in a ceramic casing which is resistant to corrosive conditions. The CTD-Diver has a memory with a maximum storage capacity of 16,000 measurement data per parameter.

Highlights:

- 3 year warranty
- Long-term and frequent measurements
- Various measurement methods:
  - fixed
  - event dependent
  - pumping tests
- Simple calibration
- Temperature corrected measurement
- Reliable and accurate measurement data
- Compact size
- Robust construction:
  - ceramic
  - corrosion resistant
- Measures three parameters:
  - conductivity
  - temperature
  - pressure

Specifications:

Dimensions	Ø22 mm x 183 mm
Memory	16,000 measurements (non-volatile)
Sample rate *	0.5 sec to 99 hours
Housing material	ceramic (ZrO_2)
Temperature range	-20 °C to 80 °C
- accuracy	±0.1 °C
- resolution	0.01 °C
Conductivity:	
- range	0 to 80 mS/cm
- accuracy	±1% of reading
- resolution	0.1% of reading
Battery life	10 years (depending on use)
Weight	150 grams

CTD-Diver® Technical specifications (pressure)

Type	DI 261	DI 263	DI 265	DI 500 (Baro)
Range	10 m H_2O	30 m H_2O	100 m H_2O	1.5 m H_2O
- accuracy**	1 cm H_2O	3 cm H_2O	10 cm H_2O	0.5 cm H_2O
- resolution	0.2 cm H_2O	0.6 cm H_2O	2 cm H_2O	0.1 cm H_2O

* various measuring methods available (fixed, event based and pumping tests)

** within temperature compensated range (0°C to 40°C)

Mini-Diver datalogger

Schlumberger WATER SERVICES

Applications:

- Monitoring projects
- Groundwatermonitoring network automation

Mini-Diver: the proven concept

The Mini-Diver is based on an ingenious and proven concept and is acknowledged as the most reliable instrument for the autonomous measuring and recording of groundwater level and temperature. Its internal memory of 24,000 measurements per parameter provides sufficient capacity to perform nearly one measurement every ten minutes for six months. For each measurement, the Diver registers the date and time, groundwater level and temperature. The built-in battery has an expected lifespan of 10 years. Its compact dimensions (Ø22 mm, length 90 mm) mean that the Mini-Diver will fit into virtually any monitoring well.

Highlights:

- 3 year warranty
- Long-term and frequent measurements
- Temperature corrected measurement
- Reliable and accurate measurement data
- Non-volatile memory
- Compact size
- Hermetically sealed in stainless steel housing
- Free of maintenance

Specifications:

Dimensions	Ø22 mm x 90 mm
Memory	24,000 measurements (non-volatile)
Sample rate	0.5 sec to 99 hours
Housing material	RVS 316L
Pressure sensor material	ceramic (Al_2O_3)
Temperature range	-20 °C to 80 °C
- accuracy	±0.1 °C
- resolution	0.01 °C
- compensated range	0 °C to 40 °C
Battery life	10 years (depending on use)
Weight	70 grams

Mini-Diver® Technical specifications (pressure)

Type	DI 501	DI 502	DI 505	DI 510	DI 500 (Baro)
Range	10 m H_2O	20 m H_2O	50 m H_2O	100 m H_2O	1.5 m H_2O
- accuracy**	0.5 cm H_2O	1 cm H_2O	2.5 cm H_2O	5 cm H_2O	0.5 cm H_2O
- resolution	0.2 cm H_2O	0.4 cm H_2O	1 cm H_2O	2 cm H_2O	0.1 cm H_2O

** within temperature compensated range

Micro-Diver datalogger

Schlumberger WATER SERVICES

Applications:

- Monitoring projects
- Groundwatermonitoring network automation
- Pumping tests

Micro-Diver: small in size, great in performance

With its length of 90 mm and diameter of only 18 mm, the Micro-Diver is the smallest Diver that is capable of recording groundwater levels and groundwater temperatures with extreme accuracy. The Micro-Diver is specifically designed for monitoring wells too small to accommodate larger data loggers. In spite of its small size, the Micro-Diver possesses a memory capacity of 48,000 measurements per parameter, sufficient to enable it to perform almost one measurement every ten minutes for a whole year. The built-in battery has a lifespan of about 10 years. With its range of measuring functions, the Micro-Diver can be used both for fixed, event-dependent and averaging as well as pumptest measurements.

Highlights:

- 3 year warranty
- Long-term and frequent measurements
- Various measurement methods:
  - fixed
  - event dependent
  - averaging
  - pumping tests
- Temperature corrected measurement
- Reliable and accurate measurement data
- Large memory capacity (non-volatile)
- Compact size
- Suitable for 19 mm monitoring wells
- Hermetically sealed in stainless steel housing
- Free of maintenance

Specifications:

Dimensions	Ø18 mm x 90 mm
Memory	48,000 measurements (non-volatile)
Sample rate *	0.5 sec to 99 hours
Housing material	RVS 316L
Pressure sensor material	ceramic (Al_2O_3)
Temperature range	-20 °C to 80 °C
- accuracy	±0.1 °C
- resolution	0.01 °C
- compensated range	0 °C to 40 °C
Battery life	10 years (depending on use)
Weight	60 grams

Micro-Diver® Technical specifications (pressure)

Type	DI 601	DI 602	DI 605	DI 610	DI 500 (Baro)
Range	10 m H_2O	20 m H_2O	50 m H_2O	100 m H_2O	1.5 m H_2O
- accuracy**	1 cm H_2O	2 cm H_2O	5 cm H_2O	10 cm H_2O	0.5 cm H_2O
- resolution	0.2 cm H_2O	0.4 cm H_2O	1 cm H_2O	2 cm H_2O	0.1 cm H_2O

* various measuring methods available (fixed, event based, averaging and pumping tests)

** within temperature compensated range

Cera-Diver datalogger

Applications:

- Monitoring projects
- Groundwatermonitoring network automation
- Pumping tests

Cera-Diver: at home in any environment

To monitor groundwater under potentially corrosive conditions, as brackish water and seawater, requires a robust and durable datalogger. The ceramic Cera-Diver is designed specifically for such environments. Therefore the Cera-Diver can be perfectly used in projects together with the CTD-Diver. This highly reliable and compact Diver measures groundwater levels with an accuracy of 0.05% (FS). The Cera-Diver is equipped with a memory for 48,000 measurements per parameter, sufficient to enable it to perform nearly one measurement every ten minutes for a whole year. The built-in battery has a lifespan of approximately 10 years.

Highlights:

- 3 year warranty
- Long-term and frequent measurements
- Various measurement methods:
  - fixed
  - event dependent
  - averaging
  - pumping tests
- Temperature corrected measurement
- Reliable and accurate measurement data
- Large memory capacity (non-volatile)
- Compact size
- Robust construction:
  - ceramic
  - corrosion resistant
- Free of maintenance

Specifications:

Dimensions	Ø22 mm x 90 mm
Memory	48,000 measurements (non-volatile)
Sample rate *	0.5 sec to 99 hours
Housing material	ceramic (ZrO_2)
Pressure sensor material	ceramic (Al_2O_3)
Temperature range	-20 °C to 80 °C
- accuracy	±0.1 °C
- resolution	0.01 °C
- compensated range	0 °C tot 40 °C
Battery life	10 years (depending on use)
Weight	55 grams

Cera-Diver® Technical specifications (pressure)

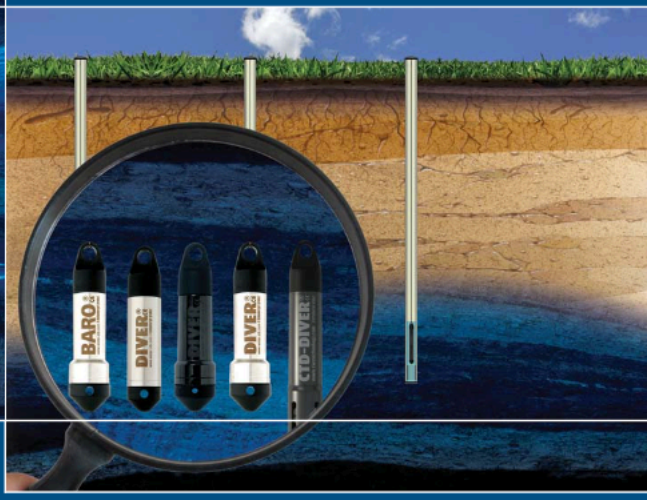
Type	DI 701	DI 702	DI 705	DI 710	DI 500 (Baro)
Range	10 m H_2O	20 m H_2O	50 m H_2O	100 m H_2O	1.5 m H_2O
- accuracy**	0.5 cm H_2O	1 cm H_2O	2.5 cm H_2O	5 cm H_2O	0.5 cm H_2O
- resolution	0.2 cm H_2O	0.4 cm H_2O	1 cm H_2O	2 cm H_2O	0.1 cm H_2O

* various measuring methods available (fixed, event based, averaging and pumping tests)

** within temperature compensated range

Schlumberger
WATER SERVICES

Diver-Suite



Reliable, accurate groundwater Diver dataloggers and software

Diver-Suite

SMART MONITORING TECHNOLOGY

Diver-Suite*, from Schlumberger Water Services, provides groundwater and environmental professionals with state-of-the-art instrumentation technology for monitoring groundwater networks.

Available in several models, this robust line of Diver* dataloggers accurately measures and records fluctuations in groundwater levels, temperature and conductivity[1].

SUITABLE FOR ANY ENVIRONMENT

From the technologically advanced Micro-Diver* to the corrosion resistant CTD-Diver*, Diver dataloggers are hermetically sealed to external effects, so moisture and/or electrical influences cannot affect measurement results. With an extended battery life, this translates to long-term uninterrupted service. All Divers are calibrated to operate from 0 °C to 50 °C.

WIDE RANGE OF APPLICATIONS

- Long-term water level monitoring
- Groundwater monitoring network automation
- Pumping and slug tests
- Watershed, drainage basin and recharge areas
- Stream gauging, lake levels and reservoirs
- Harbour and tidal fluctuation monitoring
- Wetlands and stormwater run-off monitoring
- Aquifer storage and recovery projects
- Saltwater intrusion projects
- Discharge monitoring
- Monitoring landfill sites
- Monitoring groundwater and surface water interactions

ACCURATE MEASUREMENTS

Divers monitor groundwater level and temperature with a typical accuracy of up to ±0.05% FS (Full Scale). In addition, the CTD-Diver is equipped with a four-electrode sensor for accurately recording conductivity.

From the Field to the Office

Field Advantage
Achieve precise measurements of groundwater levels, temperature, and conductivity in the field. Diver-Suite is part of a full range of products designed to streamline your monitoring workflow.

Office Integration
Program multiple Diver dataloggers, download measurements onto your PC, and export data to a spreadsheet or modeling program - Diver-VisiONE* is a flexible "project-based" data management application designed for exchanging critical Diver information.

Mini-Diver

Highlights:
- hermetically sealed in stainless steel housing
- fixed measurements
- suitable for small diameter wells

A proven concept

The Mini-Diver* is based on an ingenious and proven concept and is acknowledged as the most reliable instrument for the autonomous measuring and recording of groundwater level and temperature. Its internal memory of 24000 measurements per parameter provides sufficient capacity to perform nearly one measurement every ten minutes for six months. For each measurement, the Diver registers the date and time, groundwater level, and temperature.

General Specifications

Dimensions	ø18-22 mm × 90 mm
Memory	24000 measurements
Wetted parts	
housing	stainless steel (316L)
o-rings	fluorocarbon rubber (FKM)
pressure sensor	ceramic (Al_2O_3)
cap / nose cone	Akulon (PAG 30%)
Battery life	Dependant on usage
Sample interval	0.5 second to 99 hours
Mass	70 grams

Temperature specifications

range / compensated	-20 °C to 80 °C / 0 °C to 50 °C
accuracy[+]	±0.1 °C
resolution	0.01 °C

Pressure specifications

Type	DI 501	DI 502	DI 505	DI 510
Range	10 mH_2O	20 mH_2O	50 mH_2O	100 mH_2O
- accuracy[+]	±0.5 cmH_2O	±1.0 cmH_2O	±2.5 cmH_2O	±5.0 cmH_2O
- resolution	0.2 cmH_2O	0.4 cmH_2O	1.0 cmH_2O	2.0 cmH_2O

[+] typical accuracy

[1]Only available with CTD-Diver.

For more information email sws-diver@slb.com

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Micro-Diver

Highlights:
- hermetically sealed in stainless steel housing
- various measurement methods: fixed, event dependent, averaging, and pumping test
- suitable for 19 mm monitoring wells

Small in size, great in performance

Measuring only 88 mm in length and 18 mm in diameter, the Micro-Diver is the smallest Diver capable of accurately recording groundwater levels and temperature. Micro-Diver is specifically designed for monitoring wells too small to accommodate larger data loggers. In addition to its compact size, the Micro-Diver's memory capacity can store up to 48000 measurements per parameter - almost one measurement every ten minutes for an entire year.

General Specifications

Dimensions	ø18 mm × 88 mm
Memory	48000 measurements
Wetted parts	
housing	stainless steel (316L)
o-rings	fluorocarbon rubber (FKM)
pressure sensor	ceramic (Al_2O_3)
cap / nose cone	Akulon (PAG 30%)
Battery life	Dependant on usage
Sample interval	0.5 second to 99 hours
Mass	60 grams

Temperature specifications

range / compensated -20 °C to 80 °C / 0 °C to 50 °C

accuracy[+]	±0.1 °C
resolution	0.01 °C

Pressure specifications

Type	DI 601	DI 602	DI 605	DI 610
Range	10 mH_2O	20 mH_2O	50 mH_2O	100 mH_2O
- accuracy[+]	±1.0 cmH_2O	±2.0 cmH_2O	±5.0 cmH_2O	±10.0 cmH_2O
- resolution	0.2 cmH_2O	0.4 cmH_2O	1.0 cmH_2O	2.0 cmH_2O

[+] typical accuracy

Cera-Diver

Highlights:
- hermetically sealed in ceramic housing
- various measurement methods: fixed, event dependent, averaging, and pumping test
- robust corrosion resistant housing

At home in any environment

Monitoring groundwater under potentially corrosive conditions, such as brackish water and seawater, requires a robust and durable datalogger. The ceramic-shelled Cera-Diver* is designed specifically for such environments. This highly reliable and compact Diver measures groundwater levels with a typical accuracy of ±0.05% (FS). The Cera-Diver is equipped with a memory for 48000 measurements per parameter.

General Specifications

Dimensions	ø18-22 mm × 90 mm
Memory	48000 measurements
Wetted parts	
housing	ceramic (ZrO_2)
o-rings	fluorocarbon rubber (FKM)
pressure sensor	ceramic (Al_2O_3)
cap / nose cone	Akulon (PAG 30%)
Battery life	Dependant on usage
Sample interval	0.5 second to 99 hours
Mass	55 grams

Temperature specifications

range / compensated -20 °C to 80 °C / 0 °C to 50 °C

accuracy[+]	±0.1 °C
resolution	0.01 °C

Pressure specifications

Type	DI 701	DI 702	DI 705	DI 710
Range	10 mH_2O	20 mH_2O	50 mH_2O	100 mH_2O
- accuracy[+]	±0.5 cmH_2O	±1.0 cmH_2O	±2.5 cmH_2O	±5.0 cmH_2O
- resolution	0.2 cmH_2O	0.4 cmH_2O	1.0 cmH_2O	2.0 cmH_2O

[+] typical accuracy

CTD-Diver

Highlights:
- Hermetically sealed in ceramic housing
- Various measurement methods: fixed, event-dependent, averaging, and pumping test
- Robust corrosion resistant sensor and housing

Reliable in all conditions

Where there is a need to monitor not only groundwater levels but also saltwater intrusion, injected wastewater, or contamination from chemical discharges and landfill sites, the ceramic-casing on the CTD-Diver is the instrument of choice. In addition to the pressure and temperature sensor, the CTD-Diver has a four-electrode conductivity sensor for reading conductivity across an expanded measurement range (0-120 mS/cm). There are two options for measuring conductivity: displaying measured conductivity or specific conductivity at 25 °C.

The CTD-Diver accurately records up to 48000 measurements of groundwater levels, temperature, and conductivity with corresponding date and time.

General Specifications

Dimensions	ø18-22 mm × 135 mm
Memory	48000 measurements
Wetted parts	
housing	ceramic (ZrO_2)
conductivity sensor housing	ceramic (ZrO_2)
conductivity sensor	platinum electrodes on ceramic (Al_2O_3) carrier
o-rings	fluorocarbon rubber (FKM)
pressure sensor	ceramic (Al_2O_3)
cap / nose cone	Akulon (PAG 30%)
Battery life	Dependant on usage
Sample interval	1 second to 99 hours
Mass	95 grams

Temperature specifications

range / compensated	-20 °C to 80 °C / 0 °C to 50 °C
accuracy+	±0.1 °C
resolution	0.01 °C

Conductivity specifications

user adjustable range	10 µS/cm to 120 mS/cm
accuracy+	± 1 % of reading
resolution	± 0.1 % of reading

Pressure specifications

Type	DI 271	DI 272	DI 273
Range	10 mH_2O	50 mH_2O	100 mH_2O
- accuracy+	±0.5 cmH_2O	±2.5 cmH_2O	±5.0 cmH_2O
- resolution	0.2 cmH_2O	1.0 cmH_2O	2.0 cmH_2O

+ typical accuracy

Baro-Diver

Highlights:
- measures atmospheric pressure for accurate barometric compensation of Divers
- hermetically sealed in stainless steel housing

Compensate barometric pressure

The Baro-Diver* ensures that you accurately capture changes in atmospheric pressure. Conveniently priced and easy to adjust, one Baro-Diver covers a radius of up to 15 km, depending on the topography.

Based on proven, innovative technology, the Baro-Diver has an internal memory capable of storing 24000 measurements per parameter.

For each measurement, the Baro-Diver simultaneously registers barometric pressure, air temperature, date and time.

General Specifications

Dimensions	ø18-22 mm × 90 mm
Memory	24000 measurements
Wetted parts	
housing	stainless steel (316L)
o-rings	fluorocarbon rubber (FKM)
pressure sensor	ceramic (Al_2O_3)
cap / nose cone	Akulon (PAG 30%)
Battery life	Dependant on usage
Sample interval	0.5 second to 99 hours
Mass	70 grams

Temperature specifications

range / compensated	-20 °C to 80 °C / -10 °C to 50°C
accuracy+	±0.1 °C
resolution	0.01 °C

Pressure specifications

Type	DI 500
Range	1.5 mH_2O
- accuracy+	±0.5 cmH_2O
- resolution	0.2 cmH_2O

+ typical accuracy

For more information please visit www.swstechnology.com

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Diver data management software

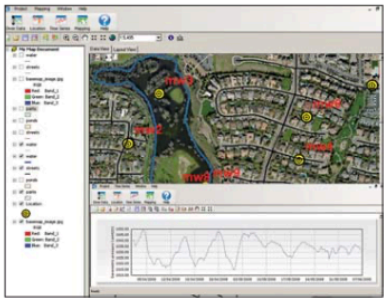
User-friendly applications for your Desktop or Handheld PC

Diver-VisiONE®

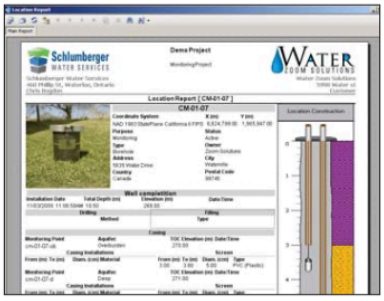
The Diver-VisiONE* software provides users with a full range of graphical tools for management of well location details, displaying borehole lithology and well construction, plotting time-varying Diver data (groundwater water elevation, temperature, conductivity), and mapping capabilities in a seamlessly integrated groundwater software package.

- **Monitoring Well Data Management** - Create, modify, and display X, Y, Z location data, borehole lithology, well construction design, and time-series.
- **Mapping -** View and label your monitoring well data over a map and display attribute data at each point using the power of the built in ESRI ArcGIS® Engine†
- **Expanded Data Options** - Capture a full range of environmental variables affecting groundwater recharge including precipitation, evaporation, discharge, and manual measurements.
- **QA/QC and Statistics** - Identify data anomalies, understand spatial and temporal trends, and gain confidence in the data assessments.
- **Reporting Automation** - Quickly create customized reports that incorporate logo and company details, site photos, well completion and lithology profiles, monitoring data, sampling dates, and other information.
- **Data Flexibility** - Export location profiles to an image, import/export time-series to MS Excel™ and import from MS Access™, export maps to Google® Earth™ or as ESRI Shapefile† format.

MS Excel and MS Access are trademarks of Microsoft Corp



Map monitoring wells and plot time-series



Report on well construction and lithology

Diver-Pocket Reader

Built for your Handheld PC or PDA, the Diver-Pocket Reader* software reads data stored in Diver dataloggers, displays time-series plots, and exports data to various formats. Download a complimentary version from our website www.swstechnology.com

Diver-Pocket Manager

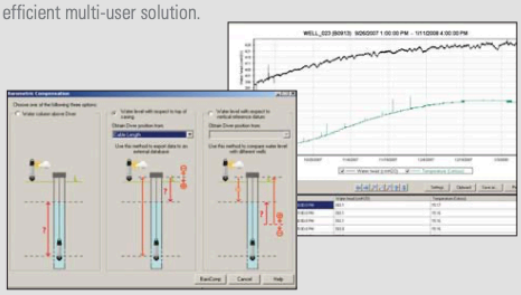
The Diver-Pocket Manager* software extends the features of Diver-Pocket Reader, with the added capability to program Divers, including the measurement method, frequency, and the start date/time.

Diver-Office

Use the Diver-Office* desktop application to calibrate, read, and program all Divers in the Diver-Suite. Download measurements onto your PC, view time series data in a plot or tabular form, and export data to a spreadsheet or groundwater modeling program. Download a complimentary version from our website www.swstechnology.com

Diver-Office Network

Diver-Office Network* extends the features of Diver-Office, with the added capability to share your database over a network, providing an efficient multi-user solution.



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