

Surface Water-Level Sensor Selection Guide

Radar Level Sensor



Non-contact water level measurement, ideal for measuring flood stages

- Measures the distance from the water surface to the bottom of the radar sensor
- Flat sensor design – significantly reduces maintenance requirements and frequency
- Uses standard communication protocols like SDI-12
- Smart sensor, diagnostic data available with every measurement

Bubble Level Sensors



Measures the pressure of air in a measuring tube and calculates the difference of pressure in the tube compared to atmospheric pressure to calculate water level

- Indirect pressure measurement with no electrical components installed in water
- Drift-free measurement principle with auto-zero function to eliminate barometric pressure influences
- Uses standard communication protocols like SDI-12

Shaft Encoders



Continuous Measurement of water level using float-operated shaft encoder

- Available with an integrated datalogger or sensor-only for use with external datalogger
- Rating Table: Compute discharge using a rating table with up to 50 points using the Stage Discharge Recorder (SDR) with a shaft encoder.
- Ideal for level measurement of streams, rivers, channel, canals, or groundwater wells.

Pressure Level Sensors



Vented pressure probe for measuring pressure, water level, temperature, and conductivity (optional)

- For monitoring water level, depth to water, pressure, temperature, and conductivity (PLS-C)
- Simple integration into almost any datalogger or data collection platform
- Uses standard communication protocols like SDI-12
- Ceramic pressure measuring cell for long-term stability and resistance to mechanical damage (5X burst pressure rating)

Pressure Level Logger



Self-contained, level logger for instrumenting simple surface water stations and groundwater wells

- For monitoring water level, depth to water, and temperature
- Available with high accuracy temperature or conductivity measurement
- Integrated batteries and datalogger for storing up to 500,000 measurement values.

Pressure Level Solution with Remote Communication



Self-contained, all-in-one level logger with mobile transmission

- For remote transmission of water level, depth to water and temperature
- Conductivity measurement available with ecoLog 800
- Integrated battery, programmable datalogger and modem for remote transmission
- Support data transmission via cellular communication using FTP, HTTP, HTTPS, SMS or e-mail (SMTP)

Sensor Selection Table Part 1

		OTT RLS	OTT CBS	Sutron CF Bubbler	OTT SE 200	Sutron SDR	OTT PLS	OTT PLS-C	OTT ecoLog 1000	OTT ecoLog 800	OTT Orpheus Mini	OTT CTD
Parameters	Water Level/Depth	x	x	x	x	x	x	x	x	x	x	x
	Conductivity							x		x		x
	Temperature			Optional		Optional	x (not with 4...20mA)	x	x	x	x	x
Logging	Integrated datalogger			x		x			x	x	x	x
Remote Communication	Cellular								x	x		
Output	SDI-12	x	x	x	x	x	x	x				
	RS485 using SDI-12	x	x				x	x				
	4...20mA	x	x		x	x	x					
	Local Wireless Communication (IrDA)								x	x	x	x
	GSM/GPRS (FTP, HTTP, SMTP, SMS)								x	x		
Applications	Snow/Ice cover and flows	-	+	+	o	o	+	+	+	+	+	+
	Large debris in water	+	o	o	o	o	o	o	o	o	o	o
	Flash Floods	+	o	o	+	o	o	o	o	o	o	o
	Migrating Channels	o	+	+	o	o	o	o	o	o	o	o
	Unstable banks	+	-	-	-	-	-	-	-	-	-	-
	Stilling Well	-	o	o	+	+	+	+	+	+	+	+
	Bridge	+	+	+	+	+	+	+	+	+	+	+
	Weir/Flume	o	+	+	+	+	+	+	+	+	+	+
	Lightening prone sites/ areas	+	+	+	+	+	o	o	o	o	o	o
	Brackish water	+	+	+	+	+	+	+	+	+	+	+
	Corrosive conditions	+	+	+	+	+	+	+	+	+	+	+
	Salt-water intrusion detection	-	-	-	-	-	-	+	-	+	-	+
	Water pollution detection	-	-	-	-	-	-	+	-	+	-	+
High concentration of suspended sediments	+	o	+	+	+	o	o	o	o	o	o	

Symbols: - not suitable o suitable x highly suitable

Sensor Selection Table Part 2

		OTT RLS	OTT CBS	Sutron CF Bubbler	OTT SE 200	Sutron SDR	OTT PLS	OTT PLS-C	OTT ecoLog 1000	OTT ecoLog 800	OTT Orpheus Mini	OTT CTD	
Type of Measurement		Non-contact (distance to water and water level)	Indirect pressure measurement	Indirect pressure measurement	Float-cable-counterweight system	Stage/Level measurements, Internal Temp, Battery. Note: a second stage can be measured via SDI-12 or via optional analog interface.	Gauge Pressure, Temperature	Gauge Pressure, Temperature, Conductivity	Gauge Pressure, Temperature	Gauge Pressure, Temperature, Conductivity	Gauge Pressure, Temperature	Gauge Pressure, Temperature, Conductivity	
	Sensor Type	Radar Level Sensor	Pneumatic Bubble	Constant Flow Bubble	Shaft Encoder	Stage Discharge Recorder	Ceramic pressure cell	Ceramic pressure cell & 4-graphite electrode conductivity cell	Ceramic pressure cell	Ceramic pressure cell & 4-graphite electrode conductivity cell	Ceramic pressure cell	Ceramic pressure cell & 4-graphite electrode conductivity cell	
Measuring Range		Level	0-15 m (0-50 ft) 0-30 m (0-100 ft)	0 to 17.5 m (0 to 57.5 ft)	±30 m (98ft)		0-4 m (0-13 ft) 0-10 m (0-33 ft) 0-20 m (0-66 ft) 0-40 m (0-130 ft) 0-100m (0-328ft)	0-4 m (0-13 ft) 0-10 m (0-33 ft) 0-20 m (0-66 ft) 0-40 m (0-130 ft) 0-100m (0-328ft)	0-4 m (0-13 ft) 0-10 m (0-33 ft) 0-20 m (0-66 ft) 0-40 m (0-130 ft) 0-100m (0-328ft)	0-4 m (0-13 ft) 0-10 m (0-33 ft) 0-20 m (0-66 ft) 0-40 m (0-130 ft) 0-100m (0-328ft)	0-4 m (0-13 ft) 0-10 m (0-33 ft) 0-20 m (0-66 ft) 0-40 m (0-130 ft) 0-100m (0-328ft)	0-4 m (0-13 ft) 0-10 m (0-33 ft) 0-20 m (0-66 ft) 0-40 m (0-130 ft) 0-100m (0-328ft)	
		Temp.		Internal Temp,		-40° C to +60° C	-25° to 70°C (-13° to 158°F)	-25° to 70°C (-13° to 158°F)	-25° to 70°C (-13° to 158°F)	-25° to 70°C (-13° to 158°F)	-25° to 70°C (-13° to 158°F)	-25° to 70°C (-13° to 158°F)	
		Conductivity							0 to 2000 µS/cm 0.1 to 100 mS/cm		0 to 2000 µS/cm 0.1 to 100 mS/cm		0 to 2000 µS/cm 0.1 to 100 mS/cm
Accuracy		Level	SDI-12: 0.8-2.0m:±10mm 2.0-30m: ±3 mm 30-35m: ±10 mm 4...20mA: ±0.1 % full scale	Standard: ± 0.5mm USGS specification: 0-15 ft: ± 0.1ft 15-50 ft: ± 0.2ft	25 psi version (standard): 0-20 ft.: ±0.01 ft. 20-57.5 ft.: ±0.05% 50 psi version (optional): ± 0.1% FS	SDI-12: ±0.003% of measurement range 4...20mA: ±0.1% of measurement range	SINGLE ENDED INPUTS Accuracy @25° C: 0.02% FS DIFFERENTIAL INPUTS: Accuracy @25° C <.01% ratiometric	SDI-12: ± 0.05% FS 4...20mA: ± 0.1% FS	SDI-12: ± 0.05% FS 4...20mA: ± 0.1% FS	± 0.05% FS	± 0.05% FS	± 0.05% FS	
		Temp.						± 0.5°C	0.1°C	± 0.5°C (±0.1°C optional)	0.1°C	±0.5°C (±0.1°C optional)	± 0.1°C
		Conductivity							0 - 2000 µS/cm: ± 1 µS/cm 0.1 - 100 mS/cm: ± 0.01mS/cm		0 - 2000 µS/cm: ± 1 µS/cm 0.1 - 100 mS/cm: ± 0.01mS/cm		0 - 2000 µS/cm: ± 1 µS/cm 0.1 - 100 mS/cm: ± 0.01mS/cm
Power Consumption / Estimated Battery Life		1 hr. sample interval with Lithium:	Measurement operation: < 140 mW (<12 mA at 12 V)	Sample interval: 1 min. Typ. 320mAh/day	Max. Current 4 amps for 25 psi unit	SDI-12: Active: < 2.0 mA Sleep: < 400 µA	SDI-12: Active: < 3.6mA Sleep: < 600µA	SDI-12: Active: < 20 mA Sleep: < 20 µA	Approx. 10 year (one transmission per week)	Approx. 10 year (one transmission per week)	min. 5 yrs.	min. 5 yrs.	
		1 hr. sample interval with Alkaline:	Rest mode: < 1mW (<0.05mA at 12V)	Sample interval: 15 min. Typ. 25mAh/day					Approx. 2 years (one transmission per week)	Approx. 1 years (one transmission per week)	min. 1.5 yrs.	min. 1.5 yrs.	
Installation		Placement	Bridge or mounting arm	Measuring tube and bubble chamber installed in the water	Measuring tube and bubble chamber installed in the water	Stilling well or pipe	Stilling well	Pressure probe installed in the water	Pressure probe installed in the water	Pressure probe installed in the water	Pressure probe installed in the water	Pressure probe installed in the water	
		Well Diameter	Not for use in wells	≥1"	≥1"	≥4"	≥4"	≥1"	≥1"	≥2"	≥2"	≥1"	≥1"

Sensors



OTT RLS

- High Performance—Measurements are unaffected by air temperature, humidity, flood events, floating debris, or contaminated water; reduces the likelihood of missing data and reduces data post processing
- Low Maintenance—Flat antenna design eliminates nesting areas for insects and periodic maintenance requirement



OTT SE200

- Easily mounts into a 4, 5 or 6-inch pipe with optional pipe mount kit
- SDI-12 available 4 ... 20 mA signal or serial data interface



OTT ecoLog 1000/800

- Remote data transmission - receive data, status messages, and low power warnings from the office via SMS, FTP, HTTP, and e-mail, eliminating field visits for data download and troubleshooting
- Complete in-well solution - all components are inserted into the groundwater well, eliminating the possibility of instrument vandalism



OTT CBS

- Accurate—Meets and exceeds USGS guidelines for water level accuracy, and will not drift over time
- Complete Solution—Combining the CBS with an EPS-50 bubble chamber reduces the influence of wave action and prevents unnecessary noise in your data



Sutron SDR

- Dual Sensor: Setup SDR to measure a second stage using an analog or SDI-12 sensor
- Rating Table: Compute discharge using a rating table with up to 50 points



OTT Orpheus Mini

- Accurate—Ceramic pressure cell, unlike membrane technology, will not deform over time providing long-term measurement stability
- High Performance—Mechanical resistance to pressure overload and corrosive waters



Sutron Compact CF Bubbler

- Self-contained system- Only external power and tubing/orifice is required
- Accurate water level measurements with fast track mode, adjustable bubble rate and auto zero function



OTT PLS/PLS-C

- The robust ceramic pressure cell offers industry-leading accuracy and does not deform over time like membrane technology, providing long-term measurement stability
- Rugged design - Ceramic pressure cell resistant to physical force (5 x burst pressure) and enclosure made of high-quality saltwater resistant steel for use in coastal environments



OTT CTD

- Outputs for conductivity include specific conductivity, salinity, and total dissolved solids
- Ceramic pressure cell provides industry-leading accuracy