DECAGON DEVICES
2365 NE Hopkins Ct / Pullman, WA 99163 USA

CTD Sensor

Water Depth, Electrical Conductivity, and Temperature

APPLICATIONS

- Aquifer recharge and recovery.
- Saltwater intrusion, desalination, and wastewater.
- Wetland monitoring.
- Groundwater contamination monitoring.
  Surface water monitoring.

ADVANTAGES

- Digital sensor communicates three measurements over a serial interface.
- Precision pressure transducer for water depth measurements.
- Accurate 4-probe EC measurement.
- Robust thermistor for accurate temperature measurements.
- Low input voltage requirements.
- Low power design supports battery-operated data loggers.
- Robust marine-grade epoxy encapsulation to resist corrosive environments.
- Stainless steel cover improves durability
- Supports SDI-12 or DDI-Serial 1-wire serial communications protocols.
- Modern design optimized for low-cost sensing.
- Differential pressure measurement is referenced to atmospheric pressure so no external pressure sensor is needed.

DESCRIPTION

The Decagon CTD sensor is a low-cost, accurate tool for monitoring water level, electrical conductivity, and temperature in both groundwater and surface water. The sensor employs a precision pressure transducer to sense water levels between 0 and 3.5 meters. The sensor cable is vented to remove the effects of barometric pressure changes. The integrated 4-probe electrical conductivity transducer accurately senses EC up to 120 mS/cm. The sensor also features an precision thermistor to measure temperature. The CTD has a compact 3.4 cm diameter body made of rugged Delrin. The electronic circuitry is encapsulated in a marine-grade epoxy to protect the sensor in corrosive environments.

AUDIENCE

Decagon provides the information in this integrators guide to help CTD customer establish communication between these sensors and their data acquisition equipment or field data loggers. Customers using data loggers that support SDI-12 sensor communications should consult the user's manual for their data logger. These sensors are fully integrated into Decagon's system of plug-and-play sensors, cellular-enabled data loggers, and data analysis software.

MEASUREMENT SPECIFICATIONS

	Depth @ 20°C	Temperature	Bulk Electrical Conductivity
Accuracy	±0.2% of full scale	±1°C	±0.01mS/cm or ±10% (whichever is greater)
Resolution	1 mm	0.1°C	0.001 mS/cm
Range	0 to 3.5 m	-40°C to +50°C	0 – 120 mS/cm (bulk)

PHYSICAL CHARACTERISTICS

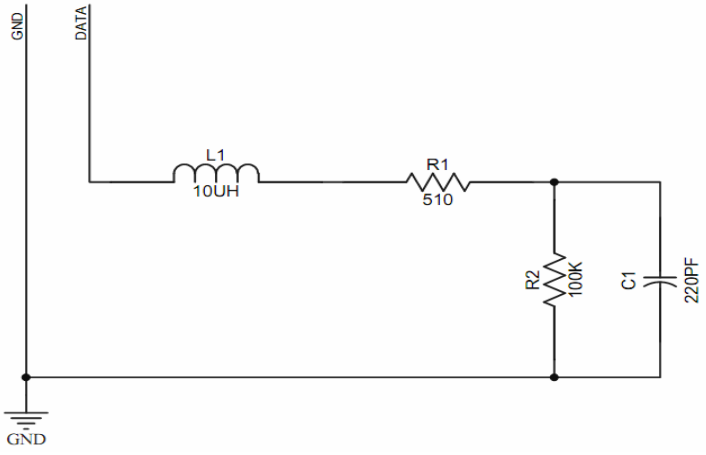
SENSOR IMAGE	
SENSOR NAME	CTD Sensor
DIMENSIONS	9 cm X 3.4 cm
CABLE LENGTH*	5 meters

* Custom cable lengths are available for an additional cost.

ELECTRICAL AND TIMING CHARACTERISTICS

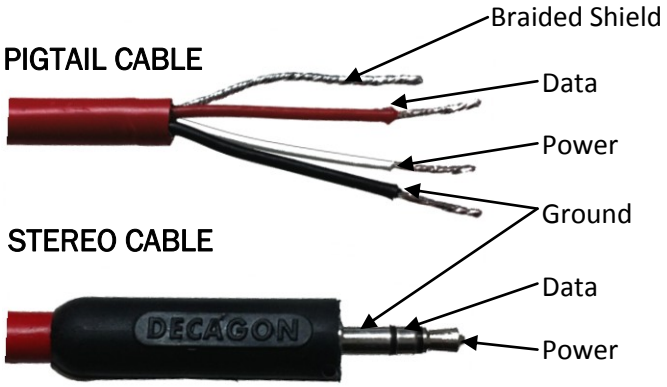
PARAMETER	MIN	TYP	MAX	UNITS
Supply Voltage (VCC) to GND	3.6		15	V
Digital Input Voltage (logic high)	2.6	3	3.9	V
Digital Input Voltage (logic low)	-0.3	0	0.75	V
Current Drain (during measurement)	0.5	0.5	1	mA
Current Drain (while asleep)		0.03		mA
Operating Temperature Range	-40		50	°C
Power Up Time (DDI-Serial)			100	mS
Power Up Time (SDI-12)	100	250	300	mS
Measurement duration		250	300	mS
Cable Capacitance / meter		147		pF
Cable Resistance / meter		34		mΩ

EQUIVALENT CIRCUIT DIAGRAM



NOTE: This is a low impedance variant of the recommended SDI-12 Specification. This allows up to 62 sensors to be maintained on a bus.

CONNECTION TYPES



NOTE: The stereo cable option connects the braided shield to the ground line. On the pigtail cable option, the braided shield and ground line are disconnected. They can be connected together if crosstalk is an issue.