

Training on ProSwap Logger & EXO Shorty Sondes

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3RD OF OCTOBER

Environmental
Monitoring
Workshop '22



ProSwap Logger



ProSwap Logger

- Single-port monitoring sonde based on proven YSI technology
- Flexible sensor and deployment options
- Affordably expand water quality monitoring network



ProSwap Logger – Single Port Sonde

- Built-in Temperature & Depth Sensors
- Compatible with any ProDSS Sensor
- Optional Onboard Power
 - Without Internal Battery (requires external power)
 - With Internal, Rechargeable Li-Ion Battery
- Integrated Cable Lengths:
 - 1, 4, 10, 20, 30, 50 & 100 m

Shallow Depth (vented or non) Medium Depth (non-vented)



ProSwap Logger – Value Propositions



Proven Data Quality



Swappable Sensors



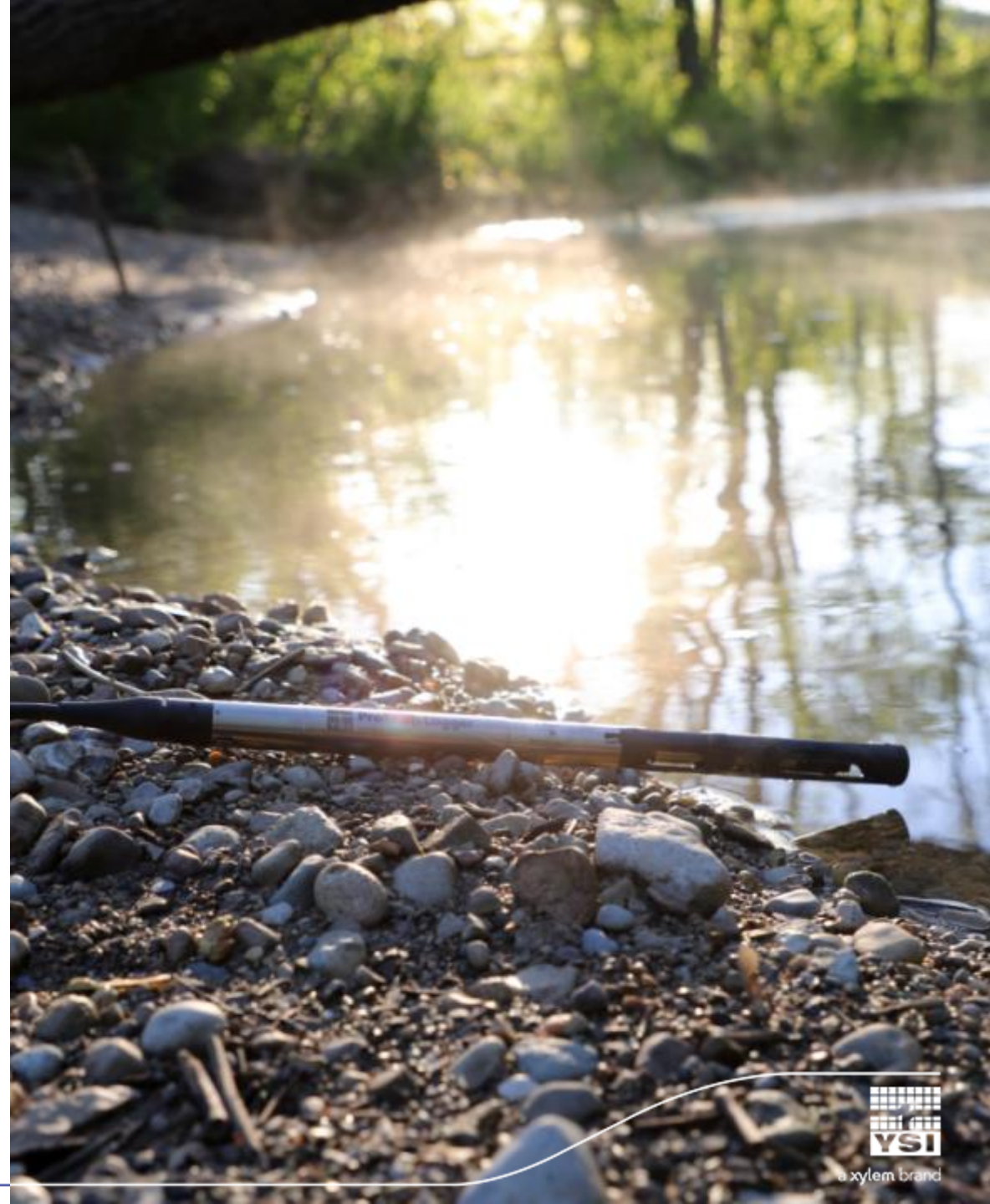
Autonomous Logging



Ultimate Durability



User-Friendly Interface



ProSwap Logger – Value Propositions



- Proven Data Quality – Industry-leading smart sensor technology with on-board monitoring for improved calibration and performance



ProSwap Logger – Value Propositions



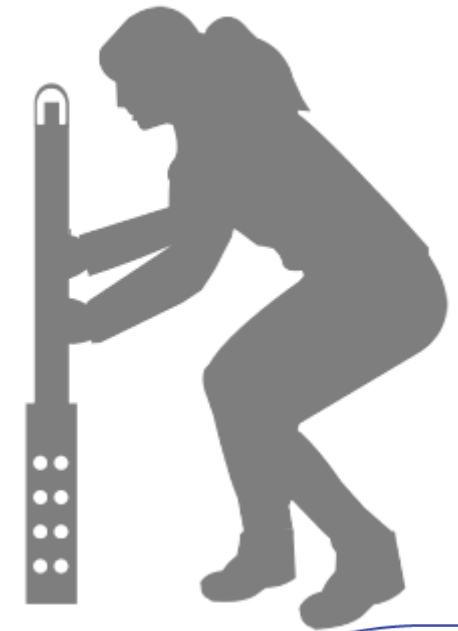
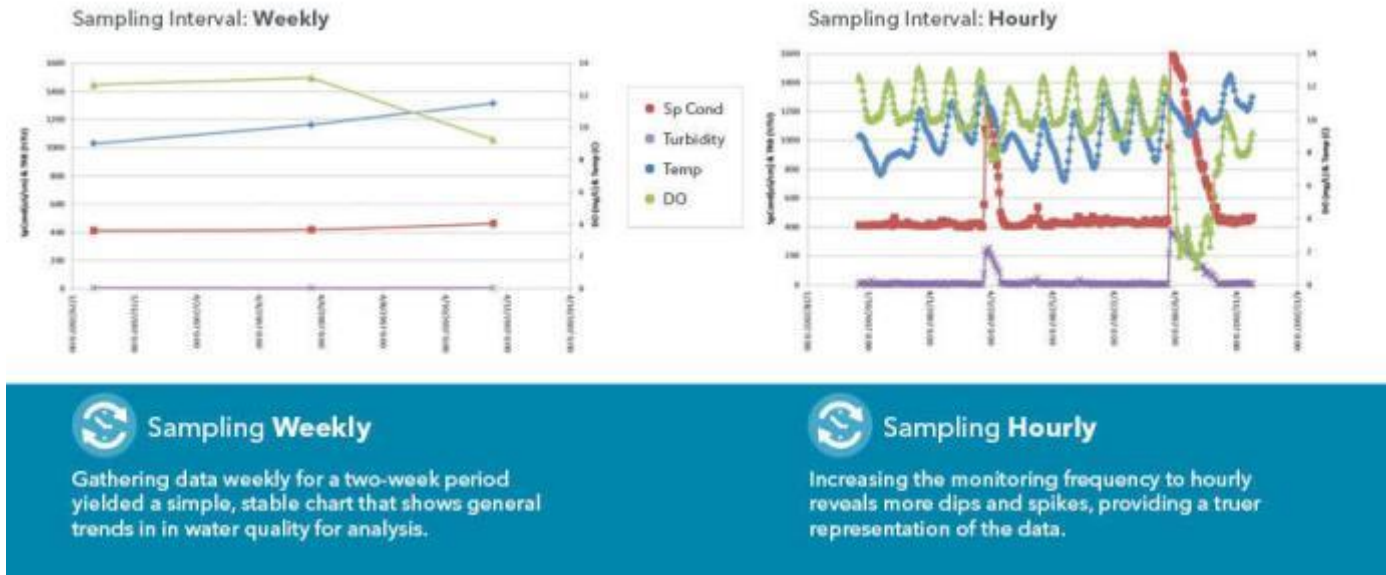
- Swappable Sensors – Customize your system with user-replaceable water quality sensors alongside built-in temperature and depth
 - Conductivity
 - Optical Dissolved Oxygen
 - pH or pH/ORP
 - Ammonium ISE
 - Chloride ISE
 - Nitrate ISE
 - Turbidity
 - Total Algae-PC or PE



ProSwap Logger – Value Propositions



- Autonomous Logging – Elevate your data collection with continuous monitoring and unattended deployments



ProSwap Logger – Value Propositions



- Ultimate Durability – Titanium housing and waterproof connections guarantee operation well into the future



ProSwap Logger – Value Propositions

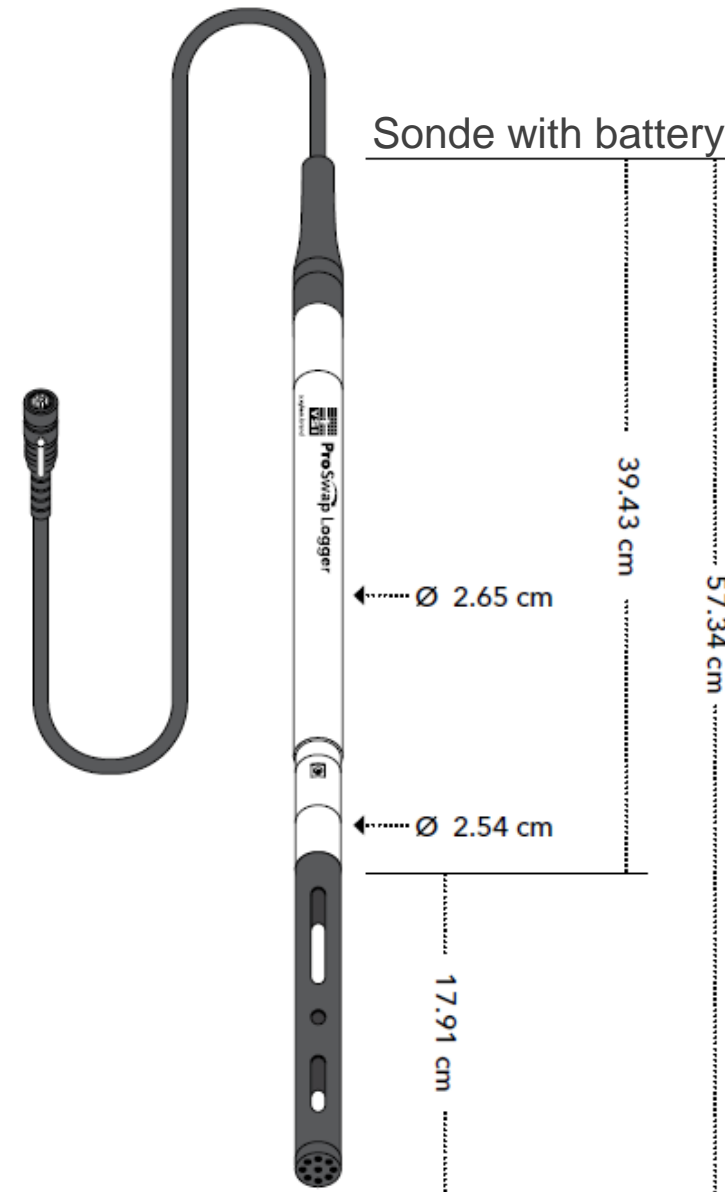


- User-Friendly Interface – Simplify fieldwork with quick setup, direct system integration, and intuitive data management



ProSwap Logger – Specifications

ProSwap Logger	
Material	Titanium
Internal Logging Memory Capacity	12 MB, >100,000 data sets (includes date, time, site, parameters)
Software	Kor Software
Communications	Sonde: YSIP, SDI-12, Modbus* Adapters: USB, Flying-Lead
Power	External: Powering: 5.4 – 16 V Charging: 9 – 16 V Internal: Rechargeable Li-Ion battery
Temperature	Operating: -5 to 50°C (23 to 122°F) Storage: -20 to 50°C (-4 to 122°F)
Depth Rating	0 to 100 m (0 to 328')
Battery Life	≥ 90 days at 15 min log interval
Sampling Rate	1 per second (fastest) to 1 per day (slowest)
Sonde Dimensions	Diameter: 2.65 cm (1.05") Length: (with guard) Without battery: 49.70 cm (19.57") With battery: 57.35 cm (22.58")
Sonde Weight**	With battery: 0.57 kg (1.25 lbs) Without battery: 0.45 kg (0.99 lbs)
Warranty	2 years



*Modbus output configurable with post-launch update.

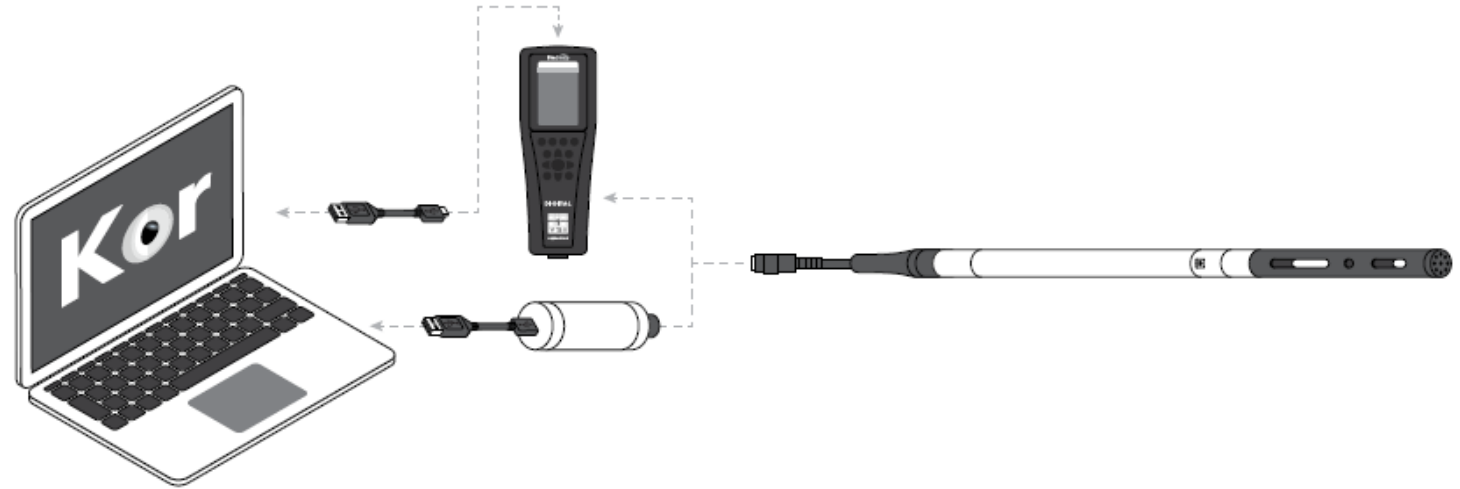
**Total weight will depend on cable length.

ProSwap Logger – Communications

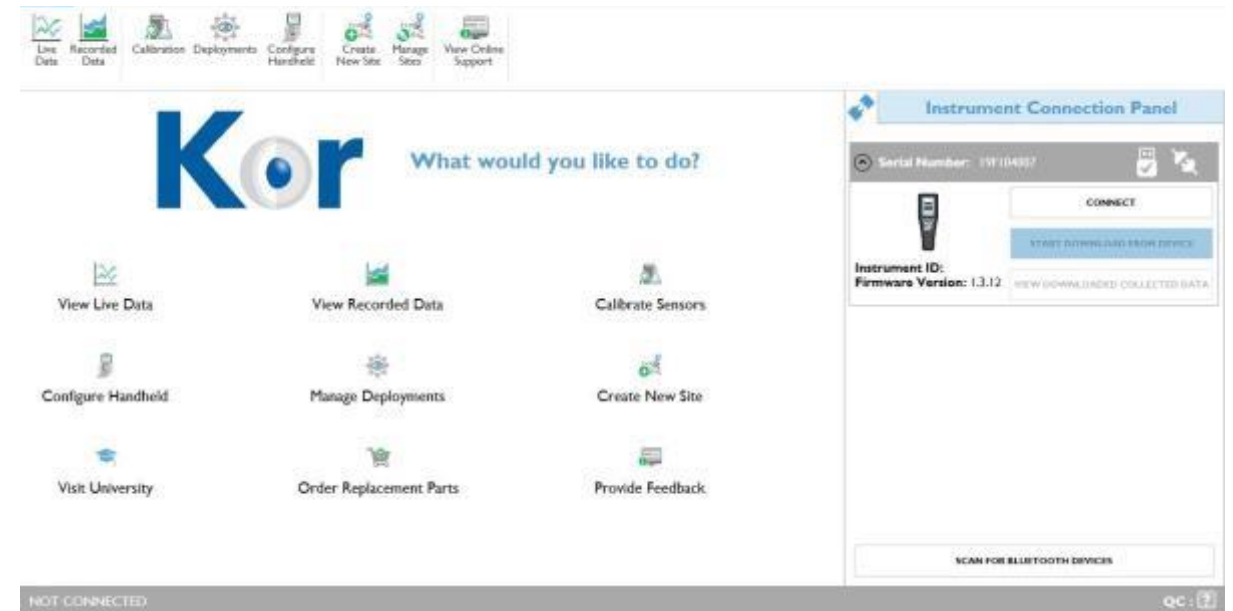


ProSwap Logger – Kor Software Interface

- Same familiar software as EXO
 - Calibrate Sensors
 - Adjust Settings
 - Configure Deployment
 - Download & View Data



- Direct connection via USB Adapter



ProSwap Logger – Handheld Interface

ProSwap & ProDSS

- Dedicated mobile interface
 - Calibrate Sensors
 - Adjust Settings
 - Configure Deployment
 - Download & View Data
- Ergonomic, Rugged Handheld
- Color Display
- Onboard Memory (>100,000 data sets)
- Data export directly to USB flash drive
- Optional GPS



ProDIGITAL Handheld - Specifications

ProSwap Handheld Specifications	
Dimensions	8.3 cm width x 21.6 cm length x 5.6 cm depth; 567 g (with battery)
Power	Rechargeable lithium-ion battery pack provides ~48 hours with the handheld only; Battery recharge time is ~ 9 hours with the AC power adapter; The instrument can also be powered via AC or external power through the USB port
Operating Temperature	0 to 50°C
Storage Temperature	0 to 45°C with battery installed; 0 to 60°C without battery installed
Display	Color, LCD graphic display; 3.9 cm width x 6.5 cm height
Memory	>100,000 data sets
Barometer Units: mmHg, inHg, mbar, psi, kPa, atm	Range: 375 to 825 mmHg; Accuracy: ± 1.5 mmHg from 0 to 50°C; Resolution: 0.1 mmHg;
Sites and Data ID	100 user-defined sites and 100 user-defined data ID tags; Site pictures can be sent to the handheld via KorDSS Software
Calibration Records	400 detailed calibration records can be stored and are available to view, download, and print (printing only available via KorDSS Software)
Languages	English, Spanish, German, French, Italian, Norwegian, Portuguese, Japanese, Chinese (Simplified & Traditional), Korean, Thai
Certifications	CEC, CE; RoHS; IP-67; WEEE; FCC; UN Part III, Section 38.3, Test methods for lithium-ion batteries (Class 9)
Warranty	3 years on handheld



Digital Smart Sensors

- Same sensors that are currently available for ProDSS:
 - Conductivity/Temperature
 - Optical Dissolved Oxygen
 - pH and pH/ORP
 - Nitrate ISE
 - Ammonium ISE
 - Chloride ISE
 - Turbidity*
 - Total algae sensor, PC*
 - Total algae sensor, PE*

*Requires Extended Probe Guard [626740]



ProDSS Sensor - Specifications

Sensor Specifications			
Sensor / Parameter	Range	Resolution	Accuracy
Temperature (DSS Sensor)	-5 to 70 °C (23 to 158°F)	0.1 °C or 0.1 °F	±0.2 °C
Temperature (ProSwap Logger)	-5 to 50 °C (23 to 122°F)	0.1 °C or 0.1 °F	±0.15 °C
pH	0 to 14 pH units	0.01 pH units	±0.2 pH units
ORP	-1999 to 1999 mV	0.1 mV	±20 mV
Dissolved Oxygen	0 to 500%, 0 to 50 mg/L	0.01 mg/L and 0.1%, or 0.1 mg/L and 1%	0 to 200%: ±1% of reading or 1% saturation, whichever is greater 200 to 500%: ±8% of reading 0 to 20 mg/L: ±0.1 mg/L or 1% of reading, whichever is greater 20 to 50 mg/L: ±8% of reading
Conductivity	0 to 200 mS/cm	0.001, 0.01 or 0.1 mS/cm (range dependent)	0 - 100 mS/cm: ±0.5% of reading or .001 mS/cm, whichever is greater 100 - 200 mS/cm: ±1.0% of reading
Specific Conductance*	0 to 200 mS/cm	0.001, 0.01, 0.1 mS/cm	0 - 100 mS/cm: ±0.5% of reading or .001 mS/cm, whichever is greater 100 - 200 mS/cm: ±1.0% of reading. User selectable reference temperature (15 to 25 °C; default 25 °C) and compensation coefficient (0 to 4%/°C; default 1.91%)
Salinity*	0 to 70 ppt	0.01 ppt	±1.0% of reading or ±0.1 ppt, whichever is greater
Total Dissolved Solids (TDS)*	0 to 100 g/L	0.001, 0.01, 0.1 g/L	Calculated from specific conductance and a user-selectable TDS multiplier (0.30 to 1.00; default 0.65)
Resistivity*	0 to 2 Mohms	0.001, 0.01, 0.1 ohms	±0.1% Full Scale
Seawater Density*	0.0 to 50.0 sigma, sigma T	0.1 sigma or sigma T	-
Turbidity	0 to 4000 FNU	0.1 FNU	0 to 999 FNU: 0.3 FNU or ±2% of reading, whichever is greater 1000 to 4000 FNU: ±5% of reading
TAL-Chlorophyll	0 to 100 RFU or 0 to 400 µg/L chl		
TAL-Phycocyanin	0 to 100 RFU or 0 to 400 µg/L PC	0.01 RFU or 0.01 µg/L	Linearity: $r^2 \geq 0.999$ for Rhodamine WT across full range.
TAL-Phycocerythrin	0 to 100 RFU or 0 to 400 µg/L PE		
Ammonium**	0 to 200 mg/L NH ₄ -N	0.01 mg/L	±10% of reading or 2 mg/L, whichever is greater
Chloride**	0 to 18000 mg/L Cl	0.01 mg/L	±15% of reading or 5 mg/L, whichever is greater
Nitrate**	0 to 200 mg/L NO ₃ -N	0.01 mg/L	±10% of reading or 2 mg/L, whichever is greater
Depth	0 to 100 m (0 to 328 feet)	0.001 m or 0.001 ft	±0.004 m for 1, 4, and 10 m cables ±0.04 m for cables 20 m and longer
Vented Level	0 to 10 m (0 to 32.8 feet)	0.001 m or 0.001 ft	0.003 m (±0.01 ft)

*Derived/calculated parameter

**ISEs for freshwater only; 20-meter maximum depth



ProSwap Logger Connections

Cable Connector

Vent Tube

Top-side connector

ProSwap Handheld



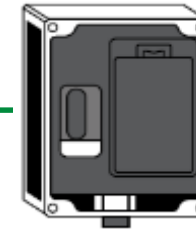
Calibrate, Configure, and Collect Data

Connector Cap [No Connection]



Autonomous Deployment [Internal Battery]

Power Pack



Autonomous Deployment [No Battery]

Flying Lead Adapter



SDI-12 Output to Data Logger

USB Adapter

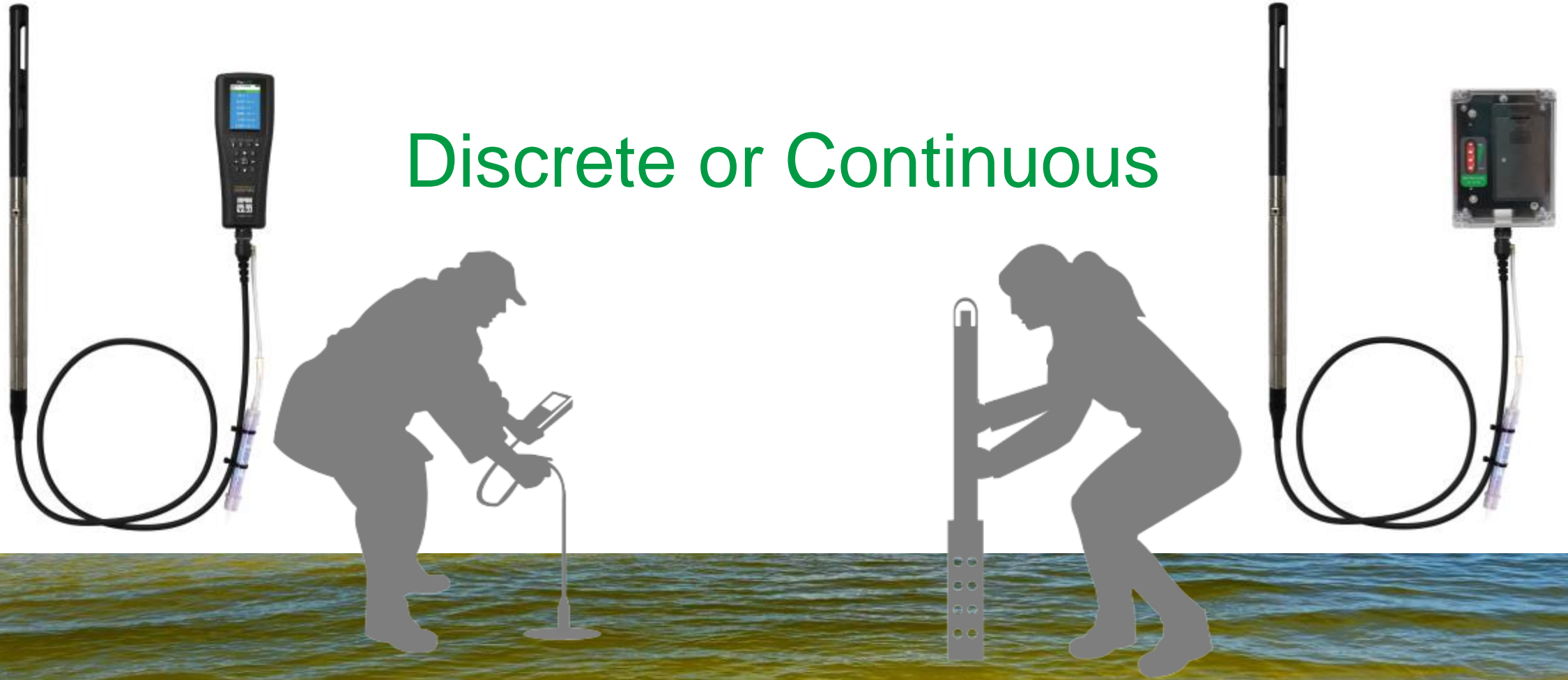


Connection to Kor Software



Water Quality Measurement

Discrete or Continuous



Discrete Sampling

ProDIGITAL Handheld

- Use a ProSwap or ProDSS Handheld Meter for spot sampling
- Readings saved directly on the handheld
- Handheld memory with storage capacity for over 100,000 data sets
- Data export directly to USB flash drive



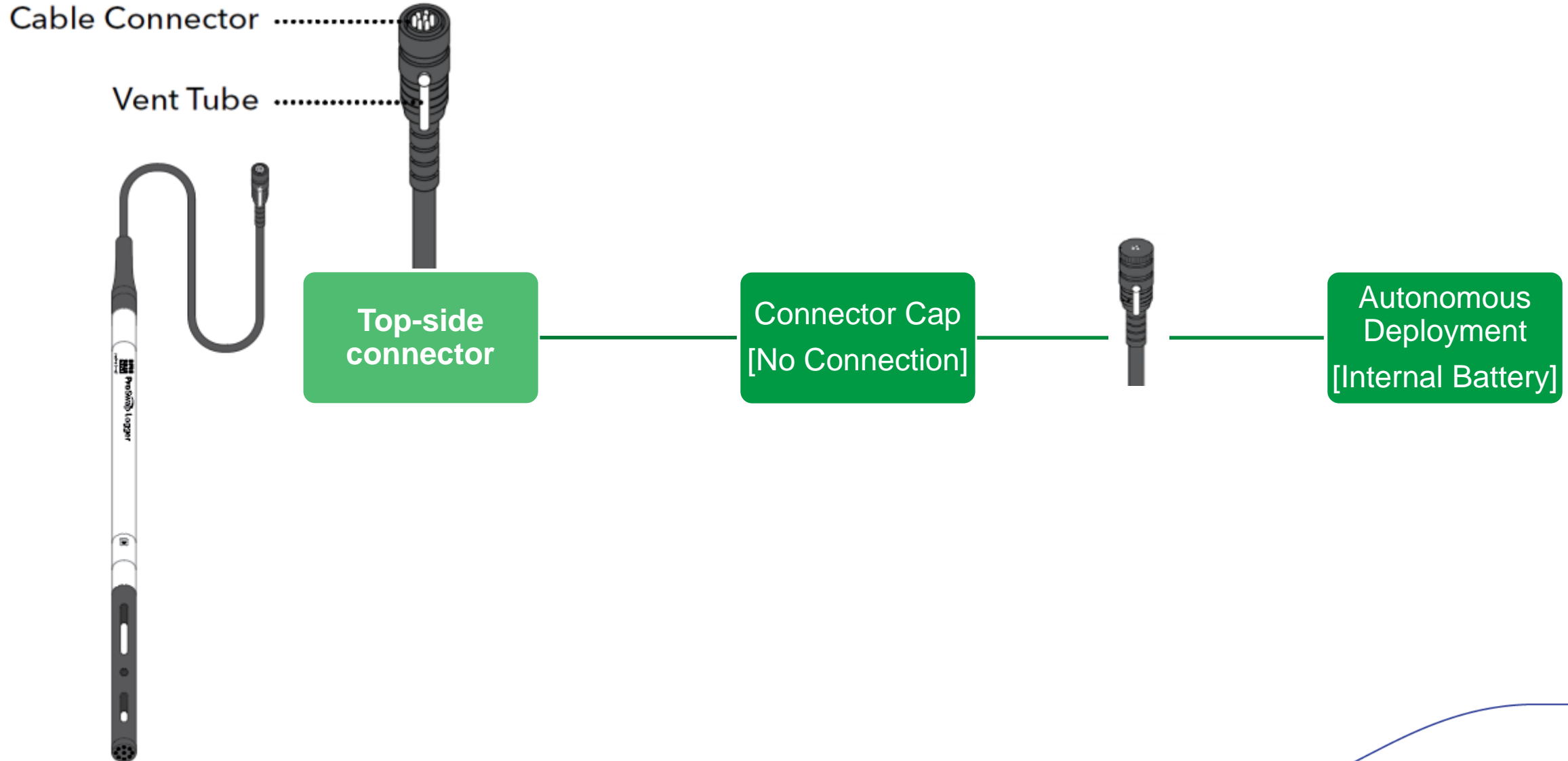
Continuous Monitoring

Unattended Logging

- Autonomous Deployment
 - PSL with Internal Battery (capped)
 - PSL connected to Power Pack
- Data Output
 - SDI-12 to DCP



Autonomous Deployment (PSL with Internal Battery)



Autonomous Deployment (PSL with Internal Battery)

Capped Connector Application

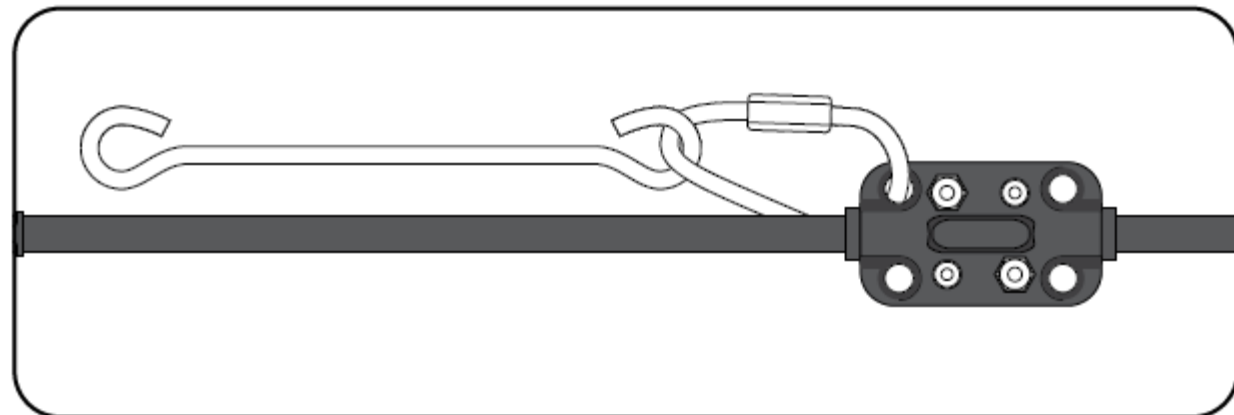
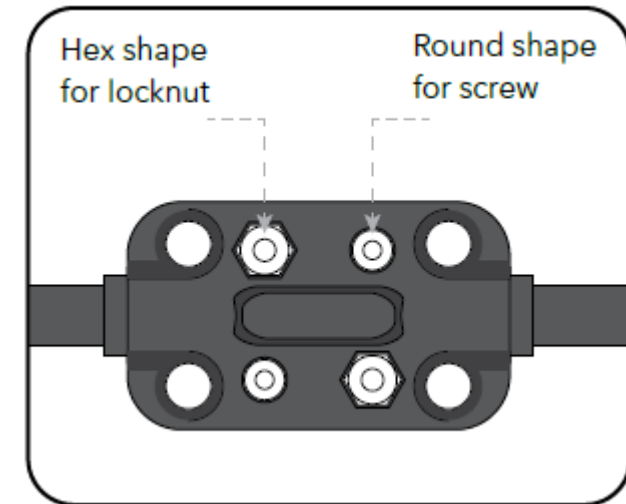
- Cap the Cable Connector
 - Install the connector cap (included)
- Suspend the Cable
 - Install the cable grip (Cable Grip Kit included)



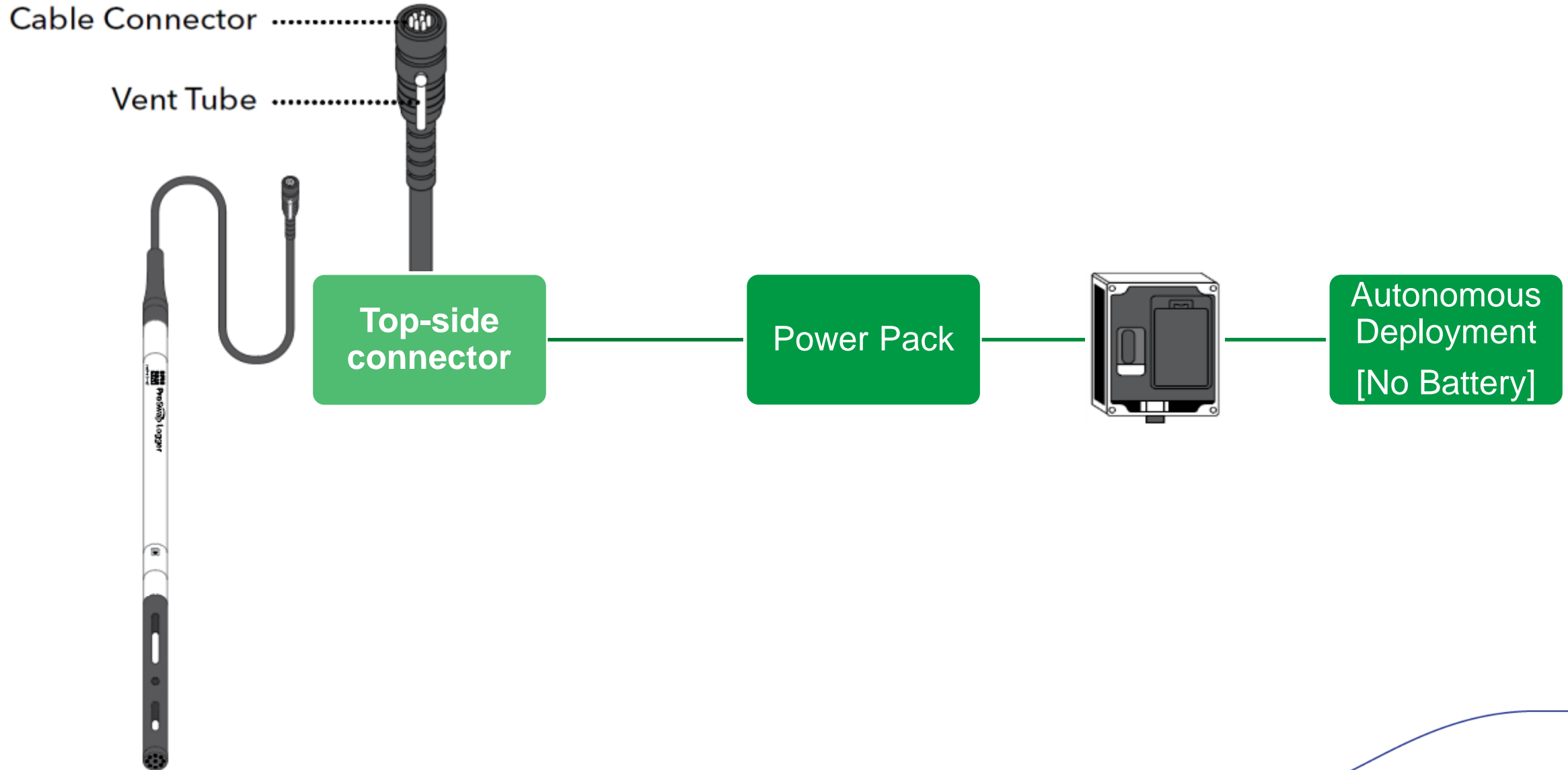
Cable Grip Installation

The cable grip provides a point of suspension or mounting for the ProSwap Logger. By attaching near the connector, the grip may secure the cable for standalone applications.

- Position the grip where you want it clamped
- Install the screws
- Install the quick links for suspension



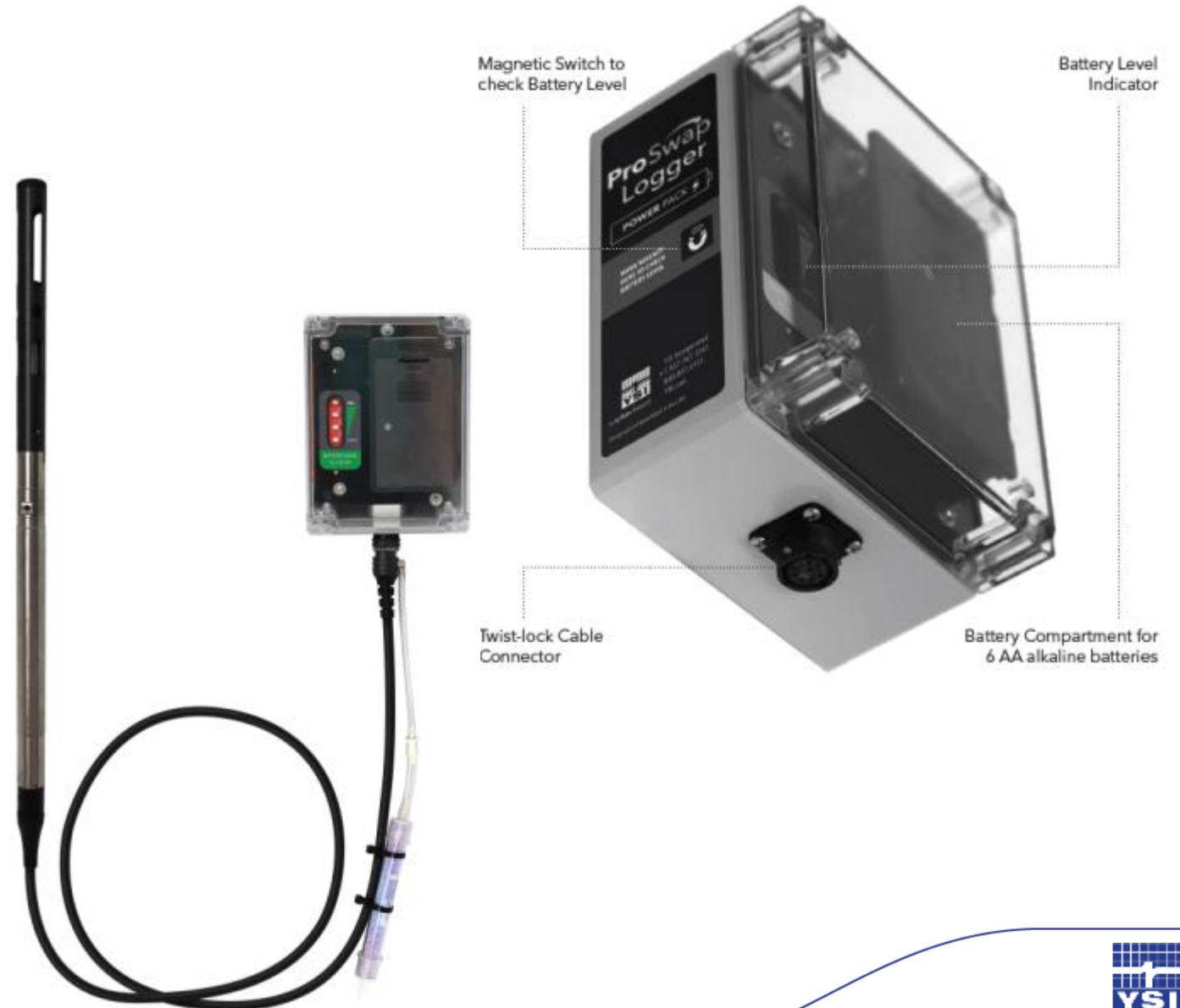
Autonomous Deployment (PSL without Internal Battery)



Autonomous Deployment (PSL without Internal Battery)

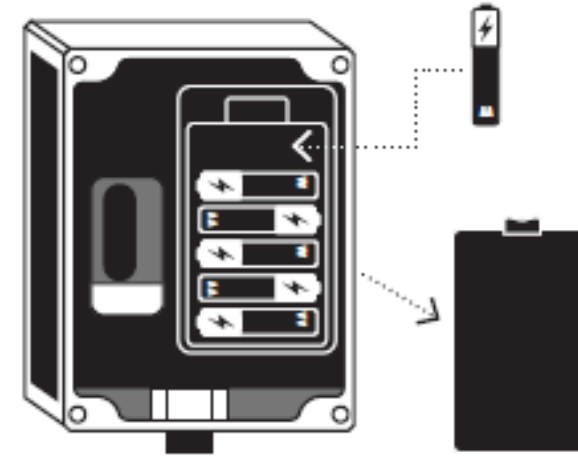
External Power Pack Application

- Supplies Top-Side Power to the ProSwap Logger
- IP67 Enclosure
- User-Replaceable AA Batteries
- Battery Level Indicator activated by magnet



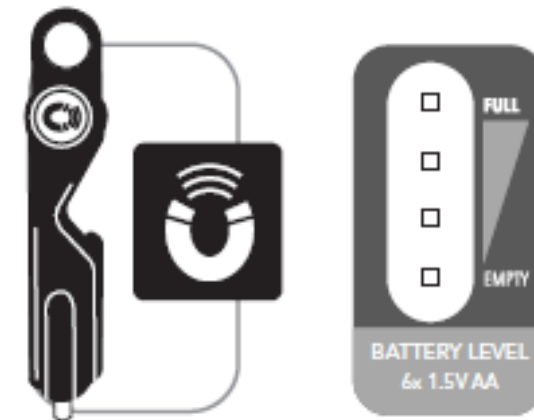
ProSwap Logger Power Pack

The Power Pack provides power to the ProSwap Logger using six AA alkaline batteries.

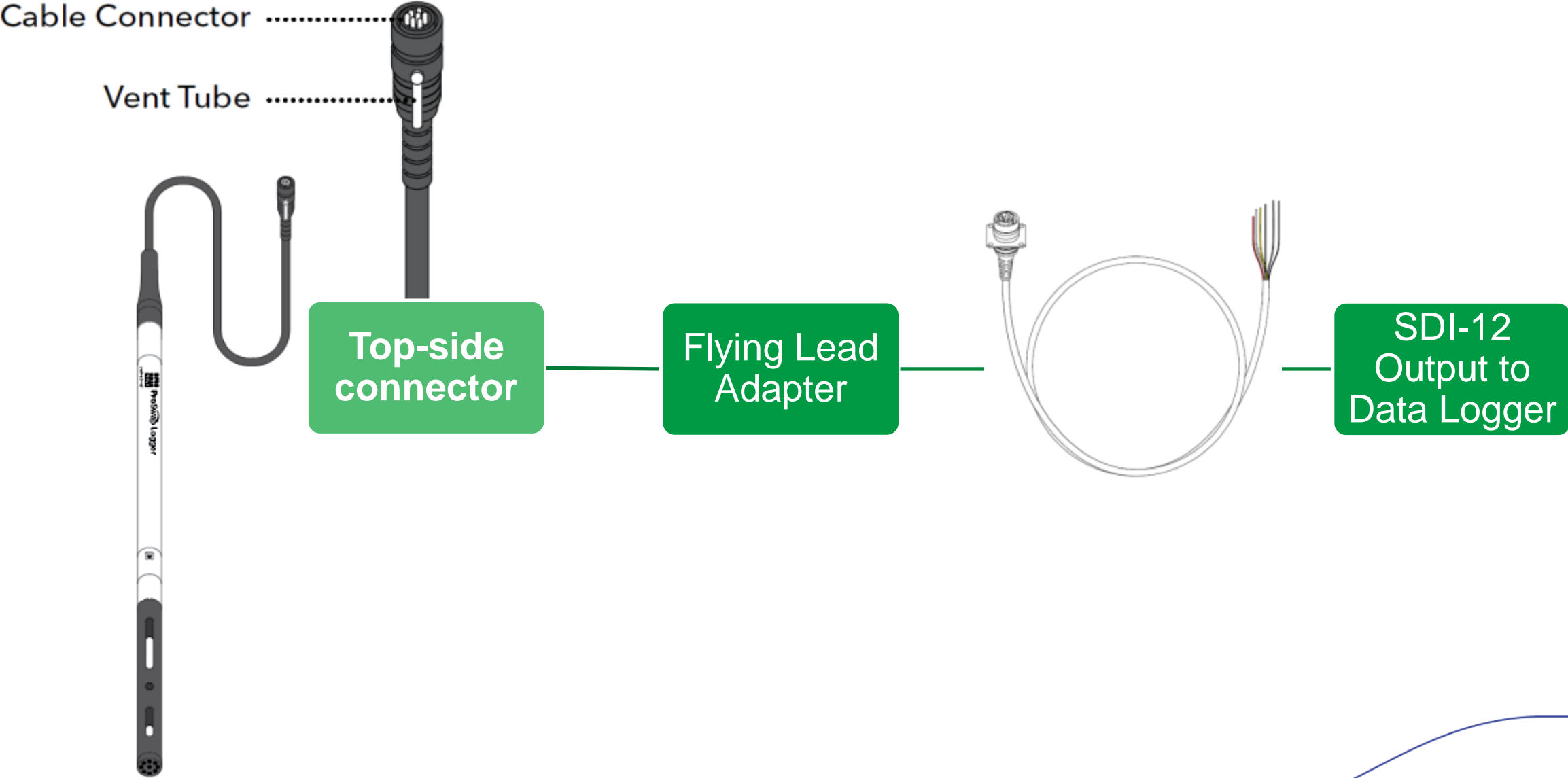


Wave the magnet to check the battery level:

- 100% charge — 4 Solid LED's
- 75% charge — 3 Solid LED's
- 50% charge — 2 Solid LED's
- 25% charge — 1 Solid LED
- 0% charge — 4 Flashing LED's



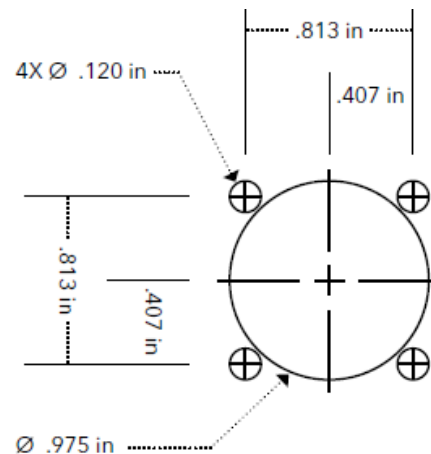
Data Output – Communication with Data Collection Platform (DCP)



Data Output – Communication with Data Collection Platform (DCP)

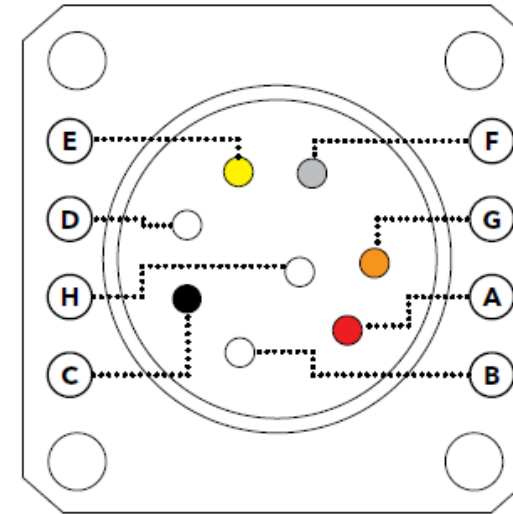
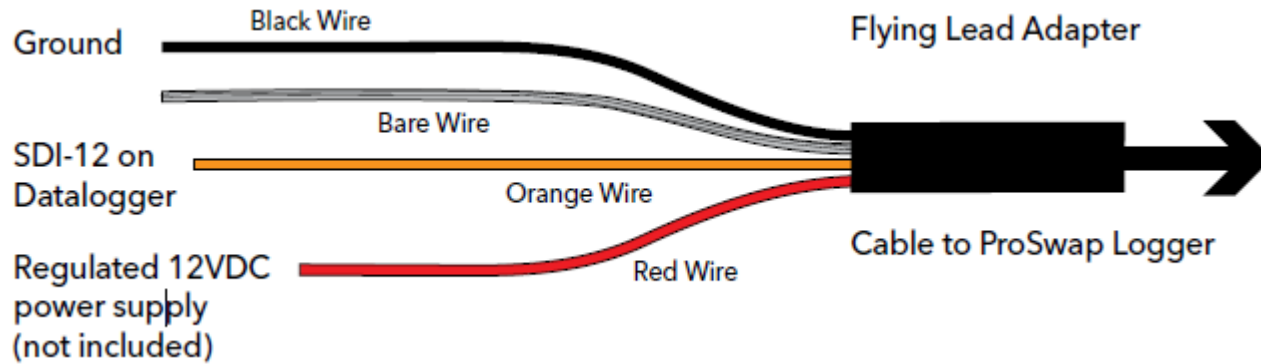
Flying Lead Adapter

- Quick connection between ProSwap Logger and a DCP for SDI-12 communication
- Supplies external power (5.4-16 V)
- Mounts to an enclosure



Flying Lead Adapter – Wiring Diagram

ProSwap Logger includes native SDI-12 output for streamlined connection to a data collection platform using the Flying Lead Adapter.



Receptacle Rear View (Wire Side)

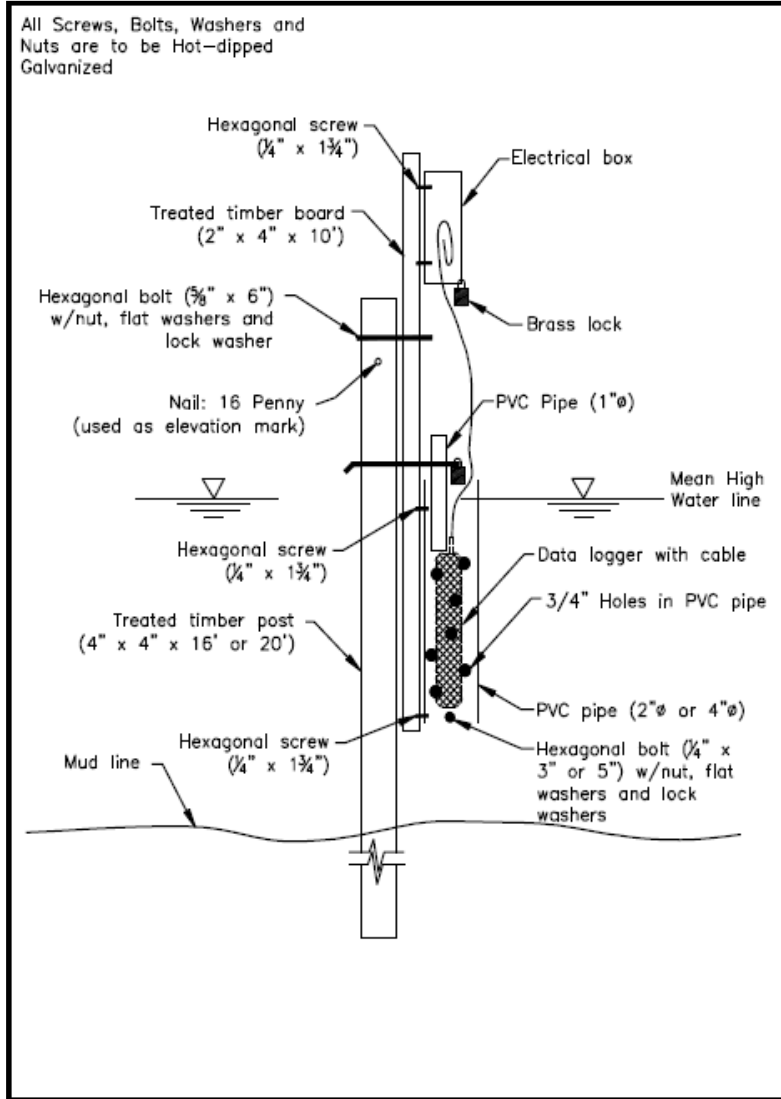
Cable Conductor	Connector Pin Number	Description
Red	A	Sensor Power (12V)
-	B	-
Black	C	Ground
White	D	Com (B)
Yellow	E	Com (A)
Bare	F	Shield/Drain
Orange	G	SDI-12
-	H	-

ProSwap Logger – Application Info

- Vented Level Monitoring
- Stormwater Monitoring
- Groundwater Applications
- Saltwater Intrusion
- Pollutant Monitoring



ProSwap Logger – Example Application



Deployment



Data Retrieval



ProSwap Logger – Target Customers

- Replace Outdated Hardware
 - 600LS Sonde Replacement
 - CTD Sonde (vented level)
- Upgrade from Sampling to Monitoring
 - Target ProDIGITAL (ProDSS) Customers
- Target Organizations
 - Environmental Consultants
 - Coastal State Agencies
 - Water Management Districts
 - Department of Water Resources



YSI 600LS CTD Sonde
Discontinuation 2021 Year-End



ProSwap Logger – System Configuration



Step 1: Power

ProSwap Logger is designed to fit your application. Options are available with or without an internal rechargeable lithium-ion battery.

- No Battery (external power required)
- Internal Battery

Step 2: Depth

All instruments include an integral depth sensor. Options are available for different depth ranges and options for venting.

- Shallow Vented (1 m, 4 m, 10 m cables)
- Shallow Non-Vented (1 m, 4 m, 10 m cables)
- Medium Non-Vented (20 m, 30 m, 50 m, 100 m cables)

Step 3: Smart Sensor

An individual ProDSS sensor can be added along with the built-in temperature and depth sensors.

- 626900**: Optical dissolved oxygen (ODO) with pre-installed sensor cap
- 626901**: Turbidity (requires Extended Guard Kit [626740])
- 626902**: Conductivity and temperature
- 626903**: pH sensor with pre-installed sensor module
- 626904**: pH/ORP sensor with pre-installed sensor module
- 626905**: Nitrate sensor with pre-installed sensor module
- 626906**: Ammonium sensor with pre-installed sensor module
- 626907**: Chloride sensor with pre-installed sensor module
- 626210**: Total algae sensor, PC (requires Extended Guard Kit [626740])
- 626211**: Total algae sensor, PE (requires Extended Guard Kit [626740])

Step 4: Accessories

There are many ways to use the ProSwap Logger; see which options are best for you.

- 610175**: Top Side Power Pack for ProSwap Logger, includes 6x AA batteries
- 610195**: Flying Lead Adapter for ProSwap Logger
- 006108**: Desiccant Cartridge Kit, includes 2x desiccant cartridges
- 627195**: Graduated Cylinder for Calibration, 250mL
- 626740**: ProSwap Logger Extended Guard Kit (for use with optical sensors)
- 696162**: Soft-Sided Carrying Case
- 626700-1**: ProSwap Handheld, No GPS
- 626700-2**: ProSwap Handheld with GPS



Optical Dissolved Oxygen Sensor



Turbidity Sensor



Conductivity/Temperature Sensor



ProSwap Handheld



Top Side Power Pack

EXO-S Sondes





It's your world. **Protect it.**

- About EXO-S Sondes
- Value Propositions
- EXO2^S – Old vs. New
- Existing Instruments
- Competitive Instruments
- Application Success Story
- Additional Features



EXO-S Sondes

Expanding the EXO Product Line!

- 3 New Sonde Models:
 - EXO1^S
 - EXO2^S
 - EXO3^S
- Lower Price Point
- Smaller Footprint
- Same Payload & Performance
- External Power Required

**Available to
order now!**



EXO-S Sonde Models



- 577501-00** EXO1^S Sonde, No Battery, No Depth
- 577501-01** EXO1^S Sonde, No Battery, 10-meter Depth
- 577501-02** EXO1^S Sonde, No Battery, 100-meter Depth
- 577501-03** EXO1^S Sonde, No Battery, 250-meter Depth



- 577502-00** EXO2^S Sonde, No Battery, No Depth
- 577502-01** EXO2^S Sonde, No Battery, 10-meter Depth
- 577502-02** EXO2^S Sonde, No Battery, 100-meter Depth
- 577502-03** EXO2^S Sonde, No Battery, 250-meter Depth

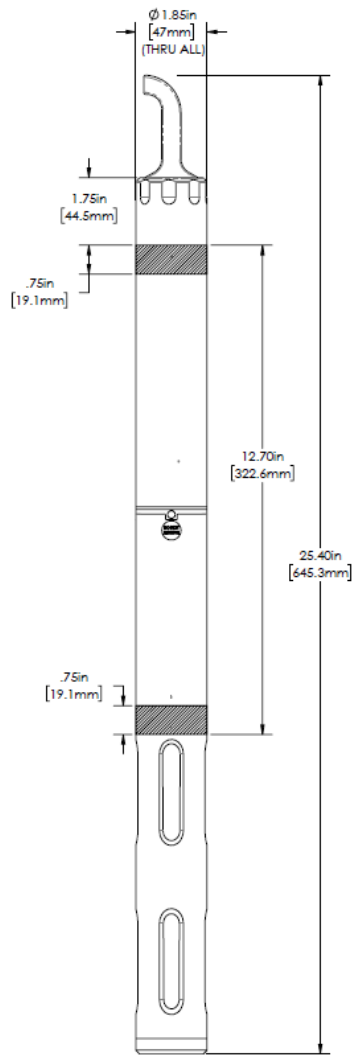


- 577503-00** EXO3^S Sonde, No Battery, No Depth
- 577503-01** EXO3^S Sonde, No Battery, 10-meter Depth
- 577503-02** EXO3^S Sonde, No Battery, 100-meter Depth
- 577503-03** EXO3^S Sonde, No Battery, 250-meter Depth

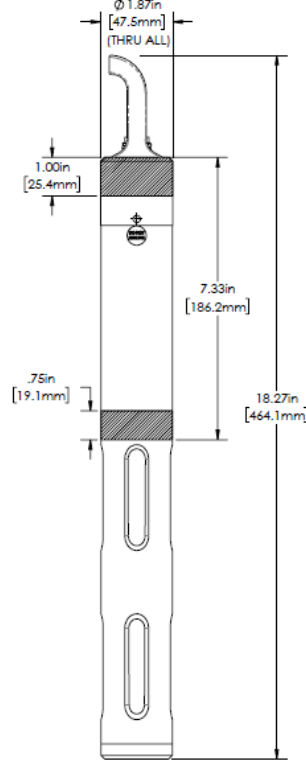


EXO-S Sonde Dimensions

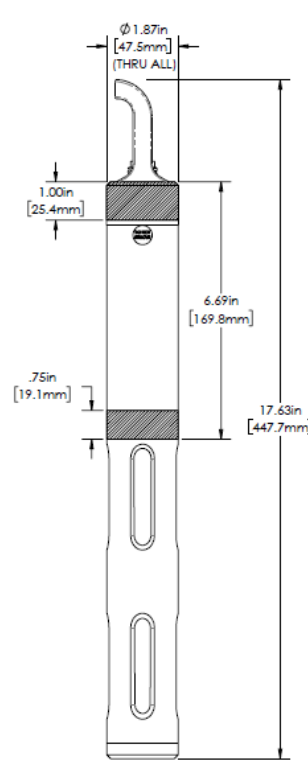
599501 EXO1:



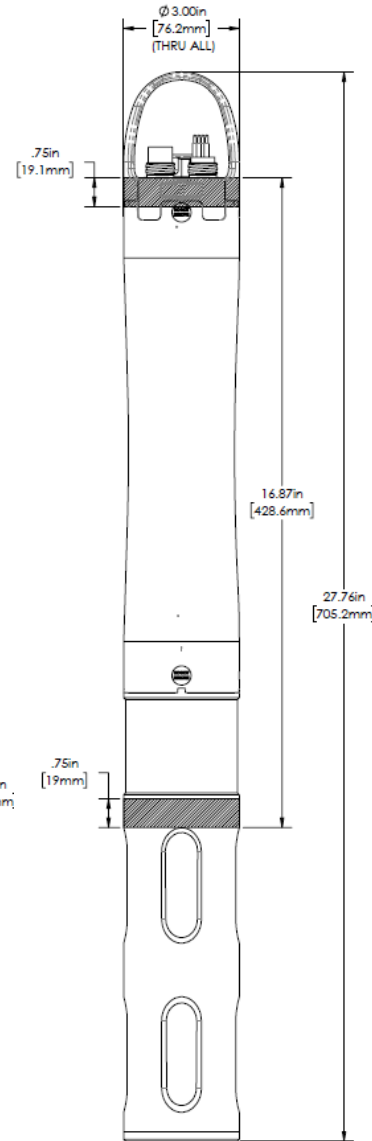
577501 EXO1S
(W/ DEPTH):



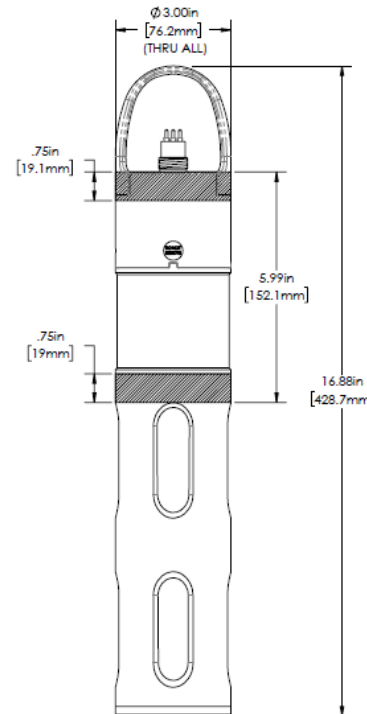
577501 EXO1S
(W/O DEPTH):



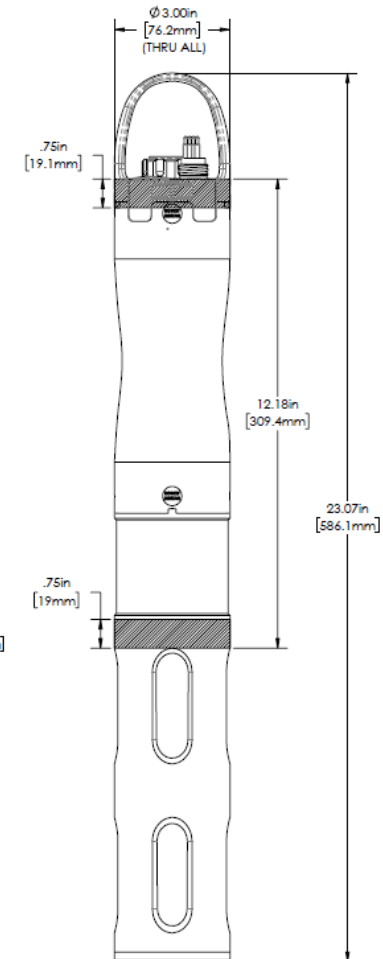
599502 EXO2:



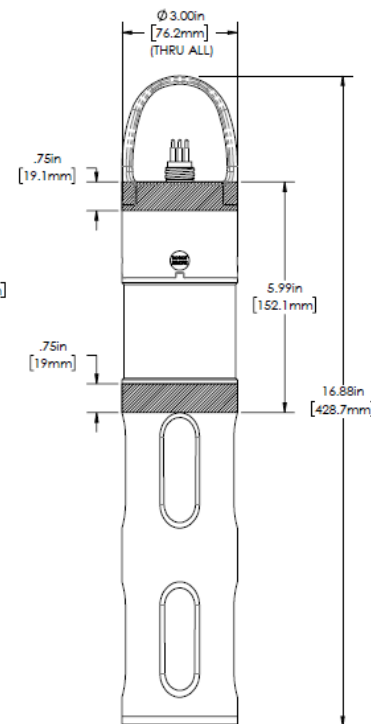
577502 EXO2S:



599503 EXO3:



577503 EXO3S:



EXO Selection Guide



	EXO1	EXO1 ^S	EXO2	EXO2 ^S	EXO3	EXO3 ^S
Smart Ports	4	4	7	7	5	5
Battery Type	2 D-Cell	External Power	4 D-Cell	External Power	2 D-Cell	External Power
Battery Life	90 Days*	N/A	90 Days*	N/A	60 Days*	N/A
Dimensions	Length: 64.53 cm Diameter: 4.70 cm	Length: 46.41 cm (with depth) 44.77 cm (w/o depth) Diameter: 4.75 cm	Length: 70.52 cm Diameter: 7.62 cm	Length: 42.87 cm Diameter: 7.62 cm	Length: 58.61 cm Diameter: 7.62 cm	Length: 42.87 cm Diameter: 7.62 cm
Weight	1.42 kg	0.56 kg (with depth) 0.48 kg (w/o depth)	3.60 kg	1.06 kg	2.00 kg	1.06 kg
SDI-12	With Adapter	With Adapter	With Adapter	With Adapter	Integral	Integral
Vented Level	✓		✓			
Wiper			✓	✓	✓	✓
Auxiliary Port			✓	✓		

*Battery life will depend on the type of sensors and measurement frequency. Specifications indicate typical performance and are subject to change.

EXO-S Value Propositions

Same Benefits as Standard EXO



Highest Data Quality
SmartQC verifies sensor operation



Multiparameter Monitoring
Universal ports with real wet-mate connectors allow for any combination of smart sensors



Industry-leading Anti-fouling
Best-in-class wiper technology



Titanium Components
The toughest grade parts guarantee operation well into the future



Seamless Integration
EXO can plug and play into water monitoring systems



EXO-S Value Propositions

Unique to EXO-S



Smaller Footprint

- 33% reduction in length
- Fit into tight spaces
- Hide more easily



Lighten Your Load

- 30% reduction in weight
- Reduced strain on users
- Reduced strain on vehicles



EXO-S Value Propositions

Unique to EXO-S



Better Integration with Vehicles

- Autonomous Underwater Vehicles
- Remote Surface Vehicles
- Drones



Expand Your Monitoring Network

- Perfect for integrated systems
- Leverage external power
- Maximize limited space



EXO-S Value Propositions

Unique to EXO-S



Affordable Solutions

- Most cost-effective EXO available!
- Lower price point for NitraLED!



Sustainable Solutions

- Lose the Alkalines!
- No risk of battery leaks
- Save on maintenance



a xylem brand

2

Upgrades



EXO2^S – Old vs New

- **Product Design**

- Old version featured a 6-Series style bail and the same logo as the standard EXO2
- New version uses the same EXO2 bail and features a unique EXO2^S logo

- **Production**

- Old version was a custom service; 2 part numbers
- New version is a production item; 1 part number

- **Price**

- New version is cheaper than the old one



EXO-S – Replacing 6-Series



EXO1^s Universal sensor ports 4 user-replaceable sensors Optical sensors (including ODO)	← Non-Wiped Up to 4 sensors Smaller diameter	600R Dedicated pH reference port 3 non-user-replaceable sensors Polarographic DO (instead of optical)	600XL Dedicated ports for CT, pH, and DO 3 user replaceable sensors: Polarographic DO (instead of optical)
EXO3^s Universal sensor ports 4 user-replaceable sensors Optical sensors (including ODO) Central Wiper for all sensors	← Wiped Up to 4 sensors Larger diameter	600OMS Optical sensor port 1 user replaceable sensors + built-in CT Any one optical sensor (including ODO) Wiper for the optical sensor only	6820 V2 2 Optical sensor ports + CT + pH + ISE ports 5 user replaceable sensors Any two optical sensors (including ODO) Wiper for the optical sensors only
EXO2^s Universal sensor ports 6 user-replaceable sensors Optical sensors (including ODO) Central Wiper for all sensors	← Wiped Up to 6 sensors Larger diameter	6600 V2-4 (includes battery) 4 Optical sensor ports + CT + pH ports 6 user replaceable sensors Any four optical sensors (including ODO) Wiper for the optical sensors only	



3

Application Success Story



Application Success Story – Environment Agency (UK)

National Water Quality Instrumentation Service (NWQIS)

- National program for real-time monitoring of England's rivers
- Parameters
 - Temperature
 - Conductivity
 - pH
 - Dissolved Oxygen
 - Turbidity
 - Ammonium



Final Effluent Monitoring *in-situ* to Cloud

Application Success Story – Environment Agency (UK)

- Monitoring the impacts of
 - Diffuse Pollution
 - Combined Sewer Overflow
 - Final Effluent



Cabinet Monitoring System with pump



Temporary River Monitoring In-Situ Solution



River Monitoring Pumped Solution inc WTW NOx

Application Success Story – Environment Agency (UK)

- Largest user of EXO Sondes in Europe
- Purchased over **140 EXO2^s Sondes**



Application Success Story – Environment Agency (UK)

Why EXO2^S?

- Proven EXO data quality & support
- 100% of EXO Sondes connected to telemetry so no requirement for additional battery
- Easier to handle for calibration, lighter and better stability (won't tip over)
- Compact so easier to fit into cabinet systems
- Reducing shipping costs using smaller transportation cases around England



4

Additional Features



Applications

Discrete Sampling

- Use with EXO GO or Handheld to provide power for a full day of sampling
- Lighter and easier to carry
- Possible upsell to ProDSS
 - More sensor port and parameter options
 - Detachable cable for flexible length options



Applications

Continuous Monitoring

- Integrate into field stations, buoys, turnkey solutions (anywhere external power can be supplied)
- Take up less space
- Huge memory (over 1,000,000 logged readings, 512 MB total memory)
- Same ultra-rugged materials and 3-year warranty



Communication

Works with:

- Kor Software
- Kor Mobile
- EXO Handheld
- EXO GO
- EXO Signal Output Adapters



EXO3^S has SDI-12 output just like the standard EXO3!



Digital Smart Sensors

- Same sensors as standard EXO Sondes:
 - Conductivity/Temperature (wiped and non-wiped)
 - Optical Dissolved Oxygen
 - fDOM
 - pH and pH/ORP (guarded and unguarded)
 - ISEs (Ammonium, Chloride, Nitrate)
 - NitraLED (UV Nitrate)
 - Rhodamine
 - Turbidity
 - Total Algae (combination Chlorophyll + Phycocyanin or Phycoerythrin)



EXO-S Resources

- [Updated landing page](#)
- [Specification sheet](#)
- [Overview video](#)
- [Unboxing video](#)
- [Email campaign](#)
- [Newsletter](#)



EXO-S
Minimal size, maximum options

EXO-S Series Sondes provide the same payload and capabilities of their full-size counterparts, but in a compact design to go more places. These batteryless sondes deliver high-quality data and reliable performance in smaller spaces and applications where external power is available. Lighten your load for spot sampling or integration with drones, AUVs, and buoys.

EXO1[®] EXO2[®] EXO3[®]

Support | Tutorials | How-To

SUPPORT | TUTORIALS | HOW-TO
EXO2s Sonde Unboxing & Overview
219 views November 09, 2021

Water Quality Continuous Monitoring

WATER QUALITY CONTINUOUS MONITORING
YSI EXO-S Series Overview
199 views January 12, 2022

Questions?

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**Environmental
Monitoring
Workshop**

