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Gearing Up for Fieldwork

8 WAYS TO KEEP YOUR INSTRUMENTS SAFE

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Gearing Up for Fieldwork

Expert tips to prepare you and your equipment for fieldwork

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Overview

1. Choosing the right instrument
2. Inspecting and preparing your sensors
3. Maintaining your instrument connections
4. Checking batteries and power supply
5. Updating firmware and software
6. Properly calibrating prior to data collection
7. Finalizing your equipment settings
8. Prepare a field “Survival Kit”

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1

Choose the Right Instrument

Choosing the Right Instrument

Spot Sampling vs. Continuous Monitoring

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Water Quality: Spot Sampling

A snapshot of data at a single point in time

Examples when discrete sampling is ideal:

- Spills
- Bacteria levels in recreational areas
- Algae bloom spread in reservoirs
- Groundwater wells with lengthy residence times

Best instrument choice:

ProDSS

Water Quality: Continuous Monitoring

A compilation of snapshots to provide a broad picture over time

Examples when continuous monitoring is ideal:

- When daily/annual loads need to be computed
- Oxygen levels in a wastewater facility
- Turbidity levels in dredging operations
- Groundwater wells used for drinking water

Best instrument choice:

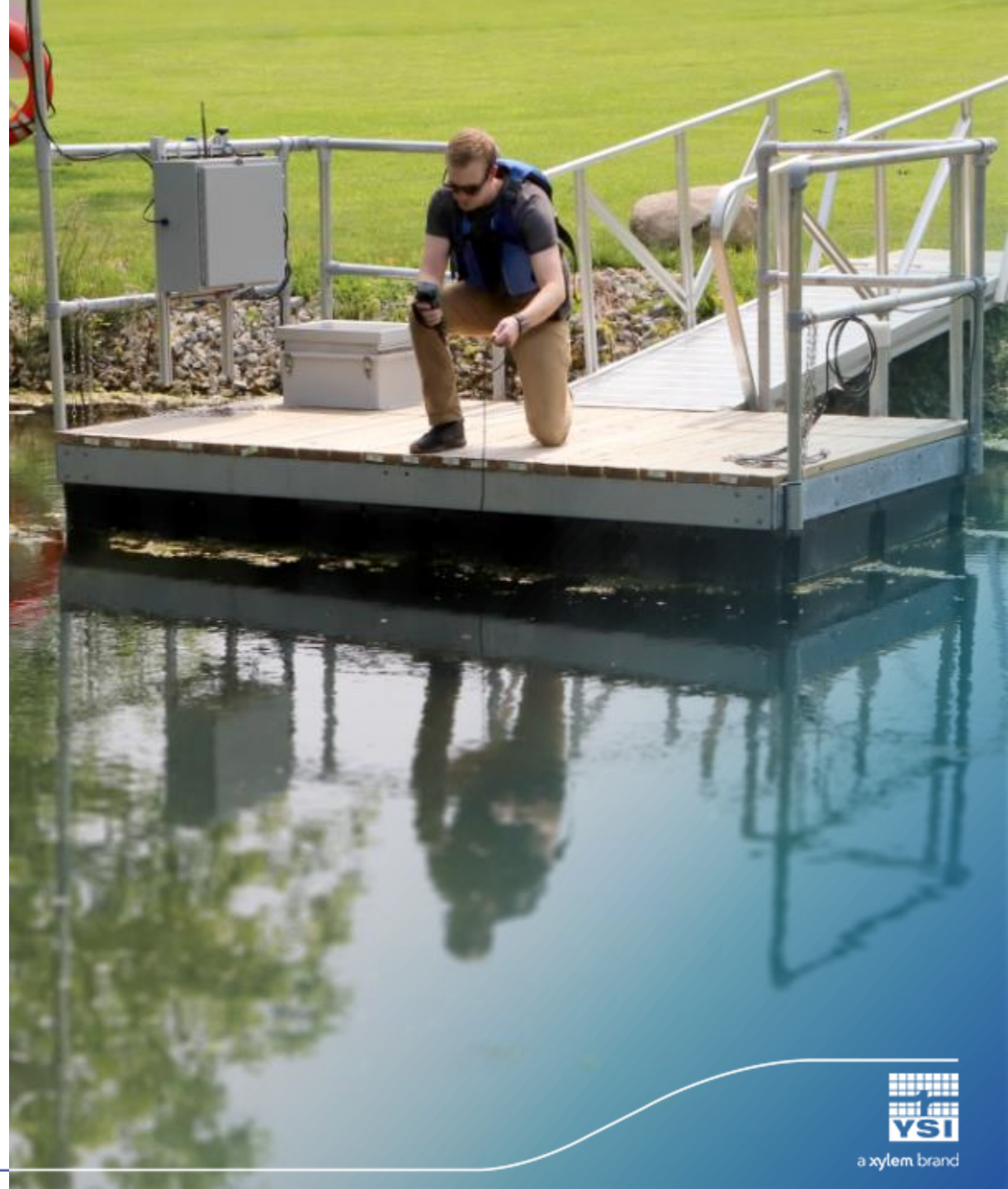
exo™

Other Water Quality Instruments

Are you using:

- ProQuatro
- Pro Plus
- ProSolo
- ProODO
- ProSwap
- Or other Pro Series?

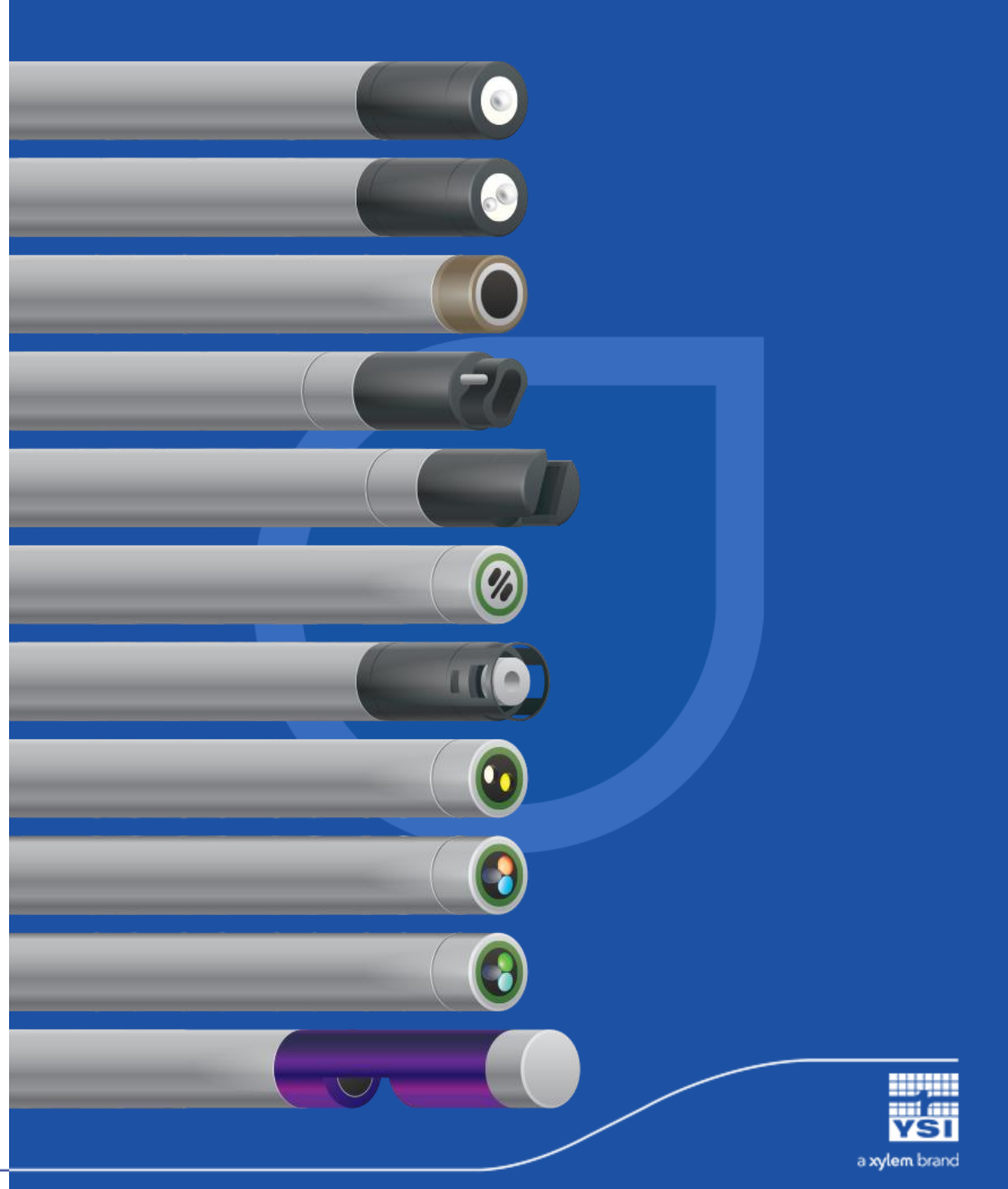
These tips are still for you!



Environmental Sensors

Choose sensors that ***tell your story***.

- Harmful Algal Blooms:
  - TAL-PC, Temperature/Conductivity, Dissolved Oxygen, pH, NitraLED, Turbidity
- Sourcewater:
  - Temperature/Conductivity, Dissolved Oxygen, pH/ORP, Turbidity
- Wastewater Discharge:
  - Temperature/Conductivity, fDOM, Turbidity, Dissolved Oxygen, NitraLED
- Estuary Health:
  - Temperature/Salinity, fDOM, Dissolved Oxygen, pH



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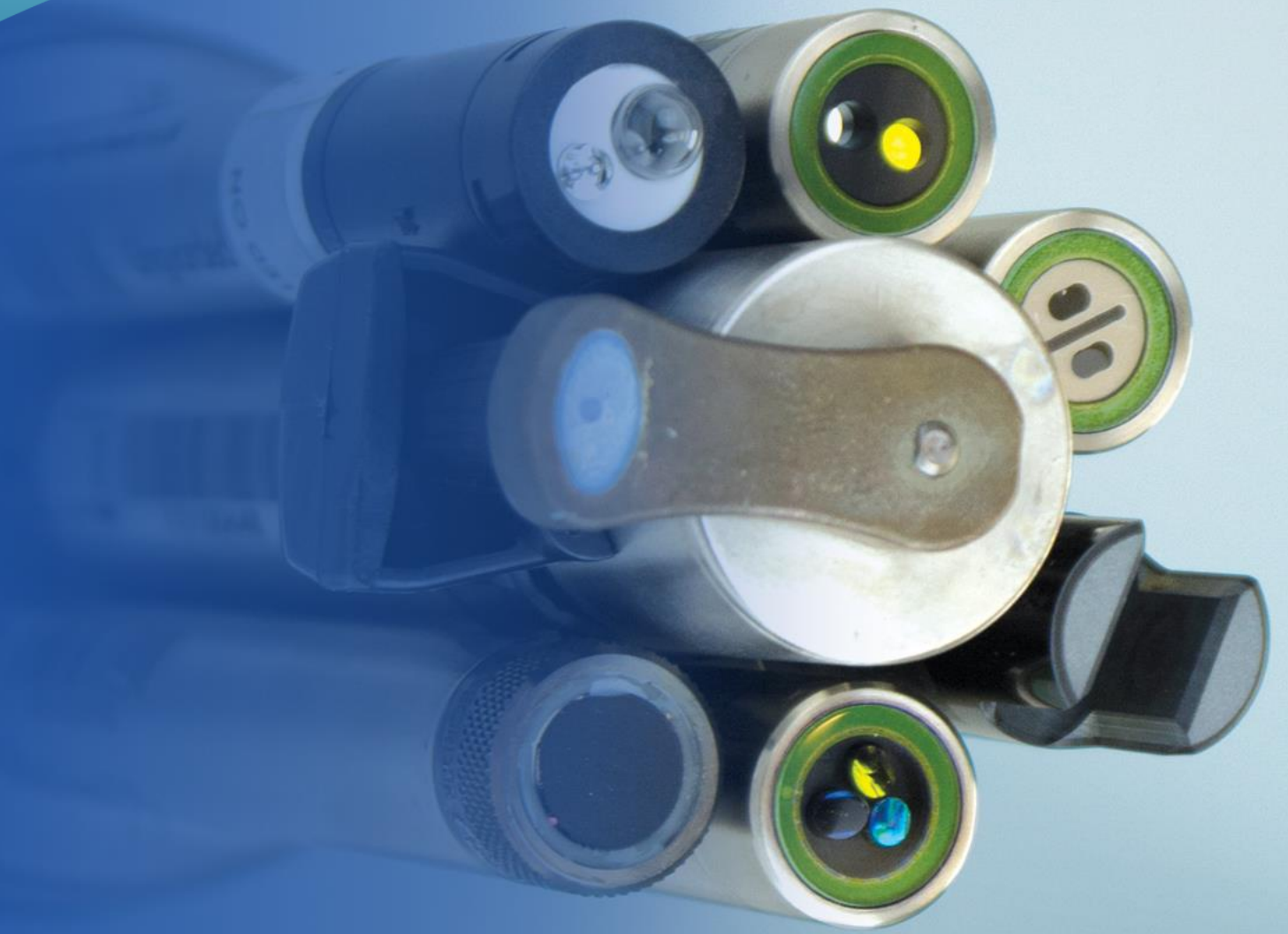
Inspect Your Sensors



Sensor Storage

Stored wet or dry:

- Turbidity
- Total Algae (Phycocyanin/Phycoerythrin + Chlorophyll)
- Conductivity / Temperature
- NitraLED (UV Nitrate)
- Rhodamine
- Ion Selective Electrodes (Ammonium, Chloride, Nitrate)

Must be stored wet:

- Dissolved Oxygen
- pH
- pH / ORP

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Sensor Condition – Dried Out Sensors

Visual inspection of sensors may not show anything wrong

- Storage conditions can give a heads up!

Can you tell which pH probe was properly stored wet, and which one has dried out?

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Sensor Condition – Dried Out Sensors

Rehydrating sensors can help save them…

- But it's not always a guaranteed fix!

- Soak a pH sensor in pH 4 buffer for a few hours or overnight

Only the module will need to be replaced

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Sensor Condition – Dried Out Sensors

Three levels of cleaning pH sensors

- Swish sensor in water / dish soap mix
- Soak in 1 Molar HCl solution
  - Vinegar can be used in place of HCl
- Soak in 1:1 Tap water / Bleach solution

Be sure to rinse between HCl and Bleach!

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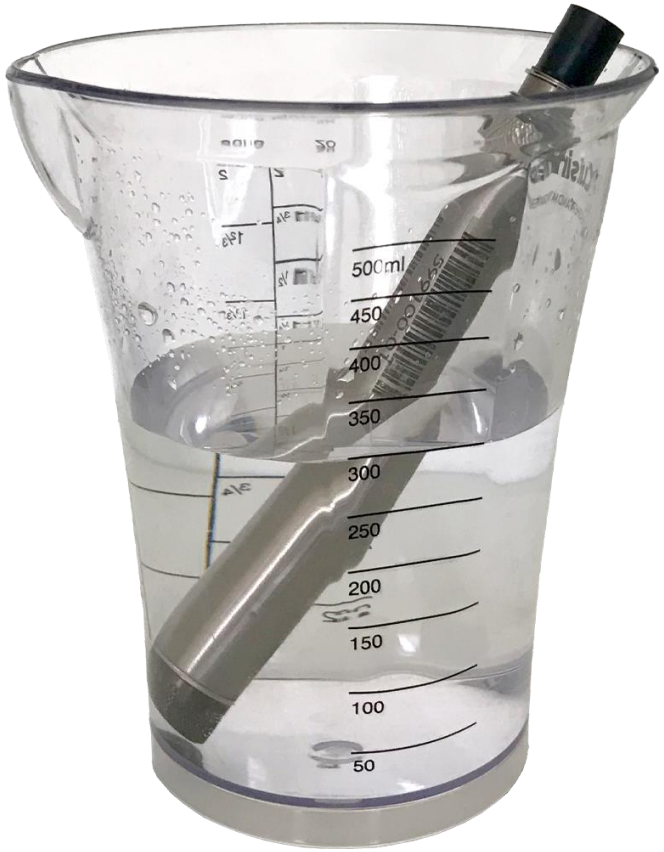
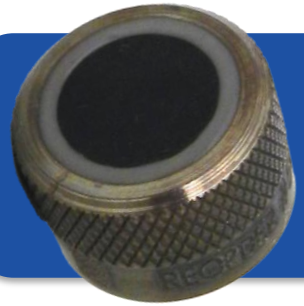
Sensor Condition – Dried Out Sensors

If a DO sensor dries out…

- Soak in tap water for several hours or overnight

- Run your sonde and sensor in an aerated bucket overnight





Only the module will need to be replaced

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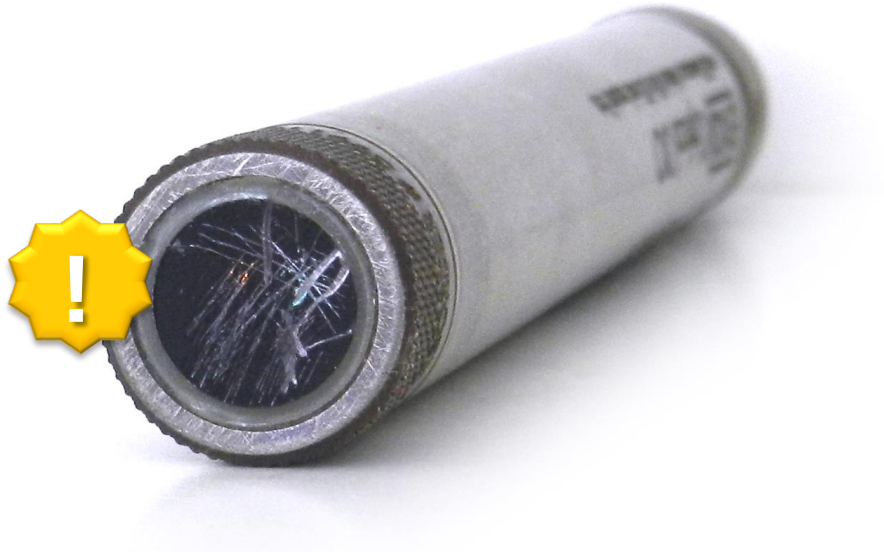
Sensor Condition – DO Caps

Check your optical dissolved oxygen membrane caps for build up or paint loss

- Bio-film can be gently wiped
  - Never use alcohol or harsh cleaner

- If paint layer is scratched or missing, replace the cap
  - Remember to update coefficients



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Sensor Condition – Age

Check the serial numbers

YSI Serial Number Conventions:

- For instruments and sensors:
  - First two numbers indicate year of manufacture
  - Letter indicates the month
  - A is for January, B is February, and so on…
  - We skip the letter “I” and use “M” for December
- For pH Modules
  - YYMMDD format is used

Examples:

- 21D = April 2021
- 18A = January 2018
- 14C = March 2014
- 210117 = January 17, 2021

Sensor Condition – Biofouling

EXO Central Wiper is the best tool available

- Keeps all sensors faces clean
- Inspect bristles for splay
- Cleaning can prolong life of brush

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Sensor Condition – Biofouling

EXO Central Wiper is the best tool available

- Inspect “Parking Garage”
- Periodic maintenance on o-rings, seals, etc.
- Also consider sonde sleeves, copper tape and sensor guards

Watch for our upcoming webinar on Anti-fouling!

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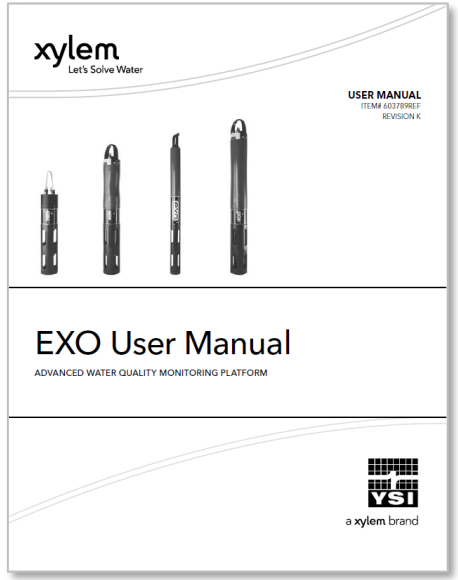
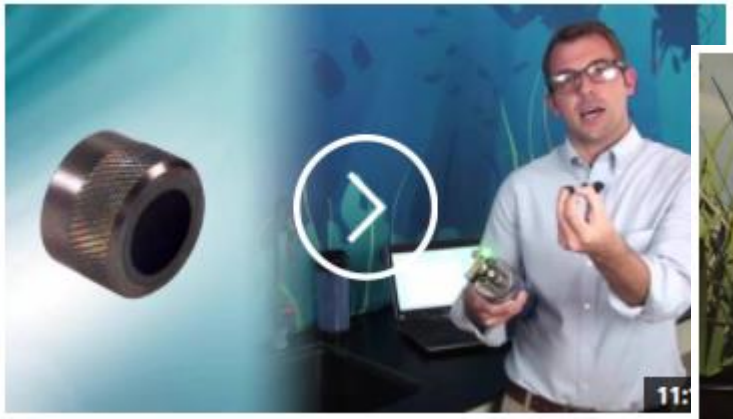
Inspecting Your Sensors

Check the User Manual for proper handling and storage recommendations

- YSI.com > Support > Resource Library
- video.YSI.com





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Quick Recap

- Equipment Selection
- Sensor Storage
- Sensor Conditions
- Biofouling

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Properly Maintain Connections

Instrument Sensor Connections

Pro Series Connectors

- Clean and dry sensor connections
- Allow time for pins to completely dry

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Instrument Sensor Connections

EXO Connectors

- Allows for swaps in wet conditions, while the smart ports shut down if there are any problems with a sensor
- Bulkhead of sondes, ends of cables, sensors, EXO GO, handheld, USB SOA

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Sensor Connections

O-Ring Inspection

- Inspect and replace any damaged or missing O-rings
- Do NOT add more O-rings
- Add a little O-ring grease – enough to make it shiny
- More grease is NOT better

Need more info? Watch our video on proper Krytox application!

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Check Batteries and Power Supply

Check Batteries and Power Supply

Golden Rule #1

Always check your batteries.

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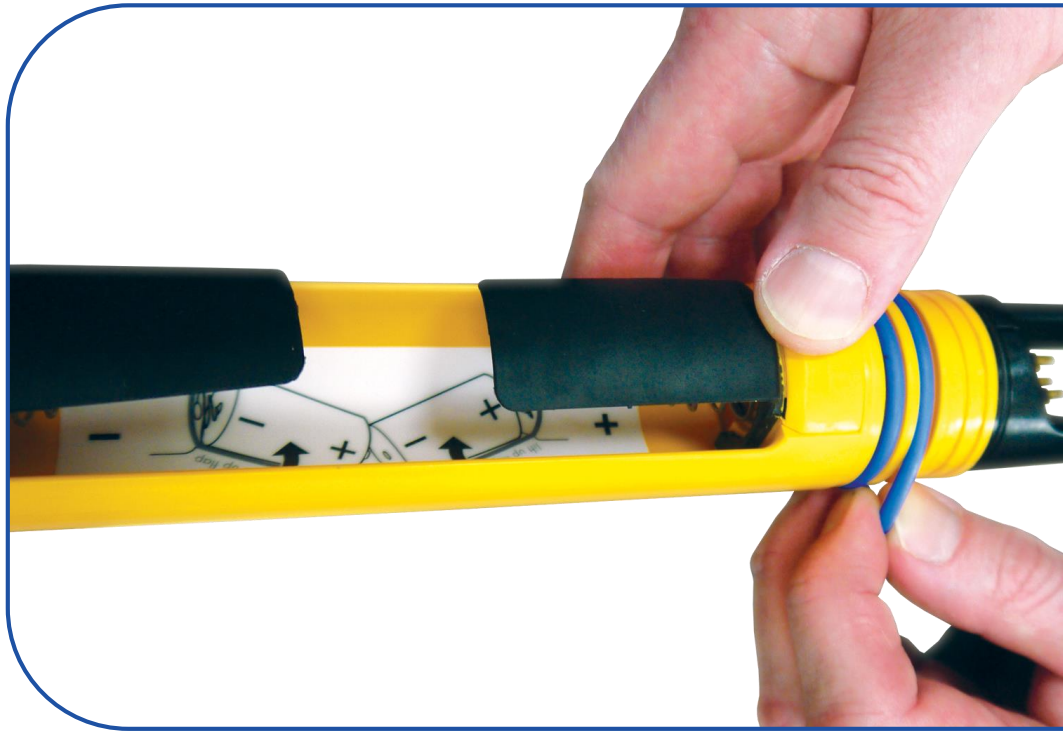
Check Battery and Power Supply

Check the battery compartment for corrosion and other damage.

Prolonged exposure to battery fluids can damage internal compartments of equipment



Treat light corrosion with a mixture of DI water and baking soda.

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Powering Supply

DO NOT USE

- Lithium batteries
- Nickel-cadmium (NiCd)

DO USE

- Standard Alkaline batteries
- NiMH D-batteries (10,000 mAH)

HANDHELD CAVEAT
Both the EXO and ProDSS handhelds use Lithium-ion rechargeable batteries

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Lithium-ion Batteries

Do not store these in a dead state!

- Charge batteries before storing them

Periodically check batteries.

- If they stay dead too long, they may need replaced

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Update Firmware and Software

Update Firmware and Software

Golden Rule #2

Make sure your equipment is up to date.

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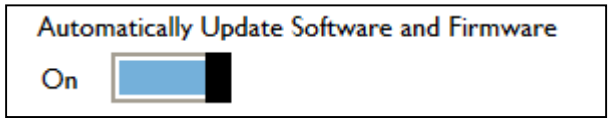
Update Firmware and Software

Kor Software

- Turn on Automatic Updates
  - Internet connection
  - Administrative rights



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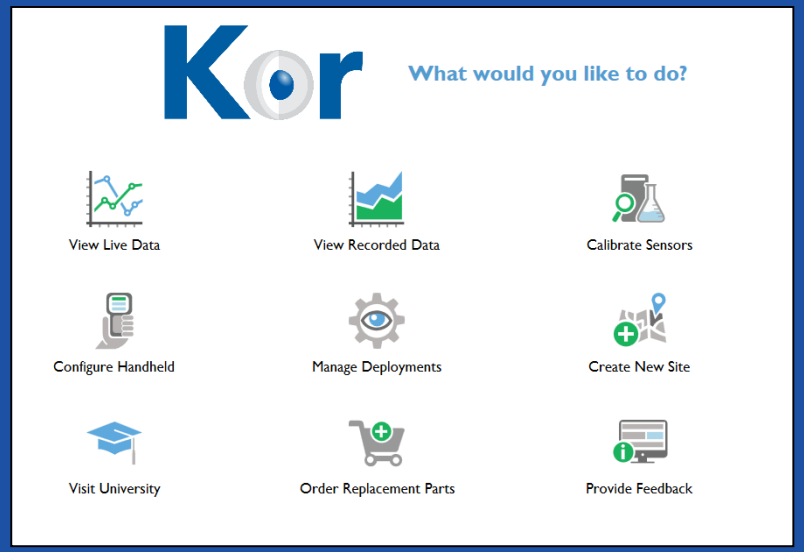
Quick Recap

- Instrument and sensor connections
- Checking batteries and power supply
- Updating firmware and software



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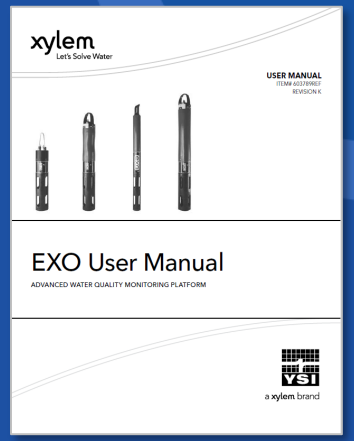
Proper Calibration Prior to Data Collection

Proper Calibration Prior to Data Collection

Consult the User Manual for full calibration procedures



Properly Calibrate All Your Sensors Prior to Data Collection

Temperature is MOST IMPORTANT

- NIST Traceable Thermistor
  - Can’t calibrate with a bad temperature sensor
  - Check your User Manual for temperature sensor specs
  - Perform regular recertification on thermistor

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Properly Calibrate All Your Sensors Prior to Data Collection

Check standard expiration dates

- Conductivity:
  - Unopened – glass quarts — 1 year
  - Unopened – plastic pints — 18 months
  - Opened — 1 month
- Turbidity
  - Unopened — 1 year
  - Opened — 6 months
- pH
  - Unopened — 2 years
  - Opened — 6 months
- Confidence Solutions
  - Unopened — 1 year
  - Opened — 3 months

REMEMBER:
The data you collect is only as good as the calibration you perform.

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Properly Calibrate All Your Sensors Prior to Data Collection

Stretch the use of your standards

- “For rinse only”
- Date opened
- “R” on the cap reminder

REMEMBER:
You can reuse standards for rinsing only.

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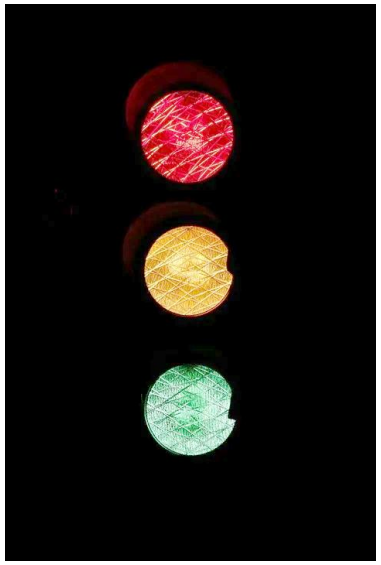
Calibrating Sensors

During Calibration:

- Take note of response times
- Allow enough time for stabilization
- You can expect similar performance issues when trying to collect data



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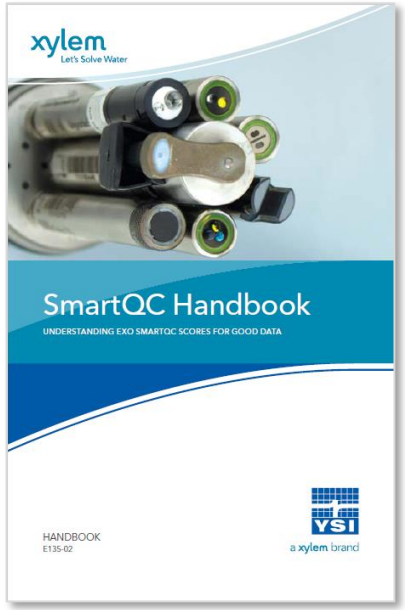
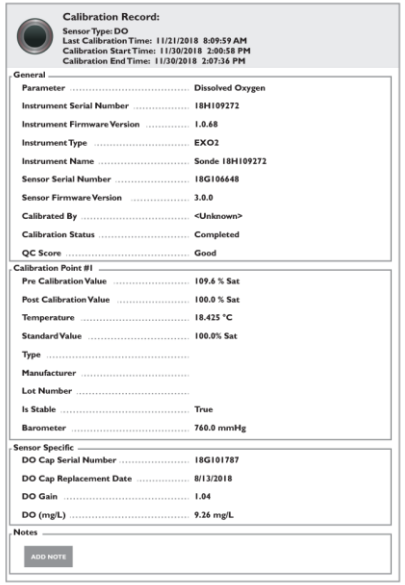
After Calibration

Make note of indicators like:

- Conductivity cell constant
- pH millivolt slope
- DO gain
- SmartQC Score

Don’t force a bad calibration!





SmartQC and Calibration Reports inform you of problems and ensure better calibration

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After Calibration

Properly dispose of your calibration standards

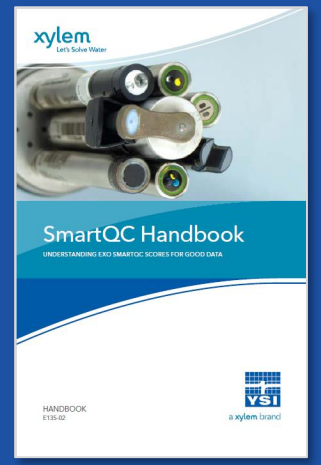
Consider regional requirements

- Varies in different locations
- Contact local water authorities

After Calibration

Calibration Tips

- Always verify your temperature sensor
- Always use fresh calibration standards
- Depend on your SOP and User Manuals for full calibration processes
- Pay attention to the QC score



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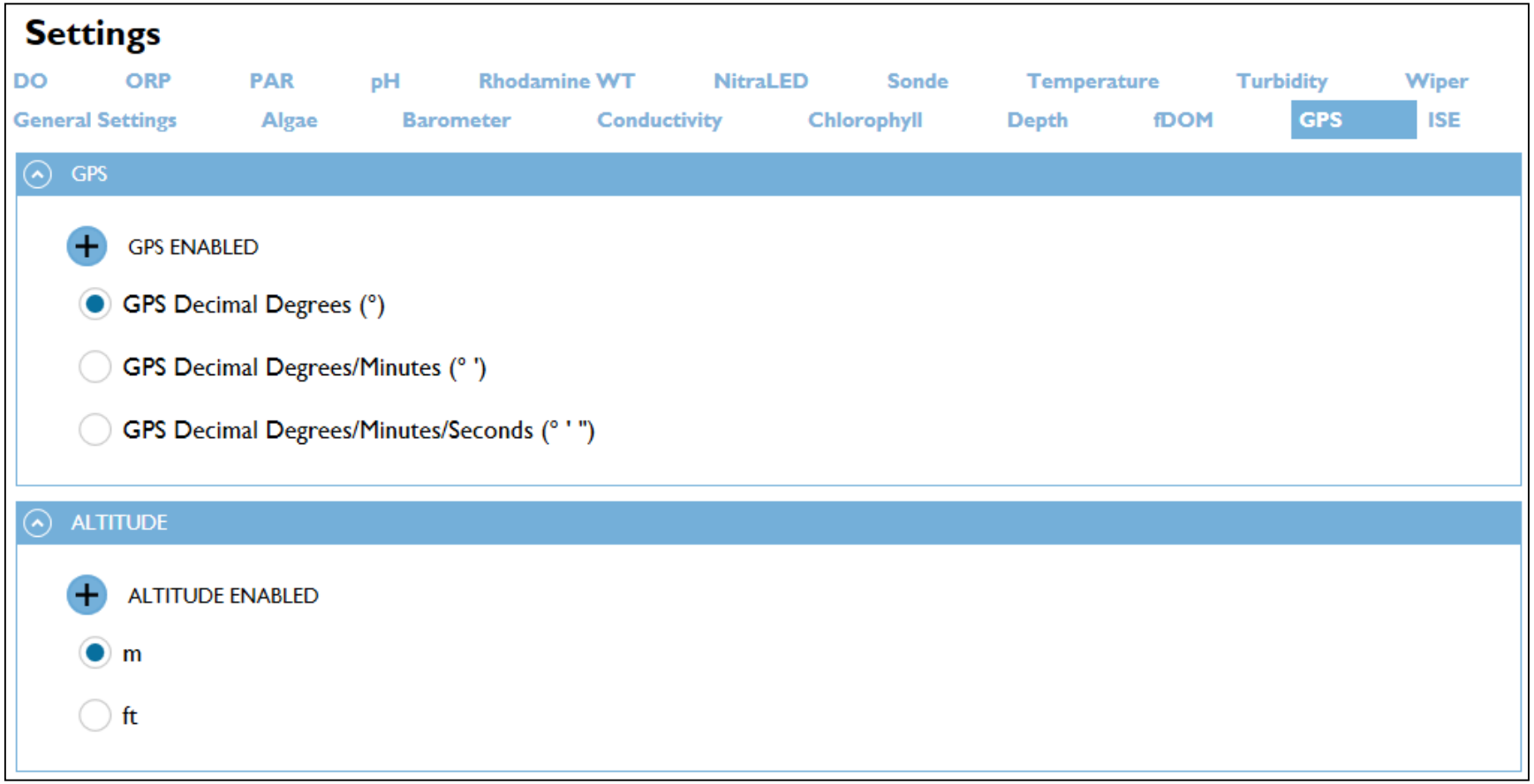
Finalize Your Equipment Settings

Finalize Your Equipment Settings

For all monitors:

- GPS Coordinates



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Finalize Your Equipment Settings

For all monitors:

- GPS Coordinates
- Site Setup

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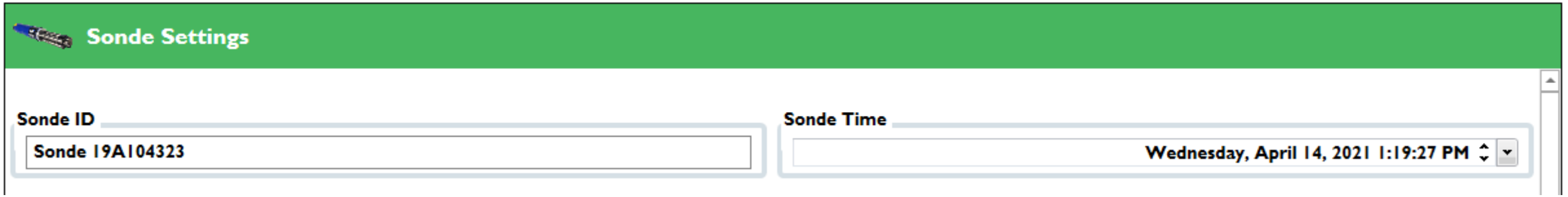
Finalize Your Equipment Settings

For all monitors:

- GPS Coordinates
- Site Setup
- System Clock



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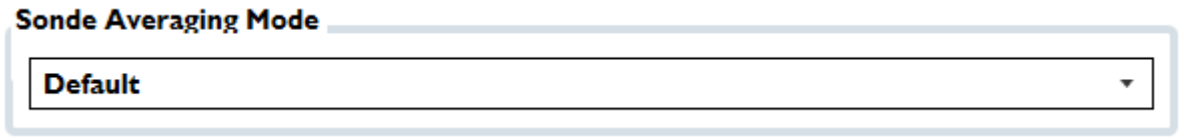
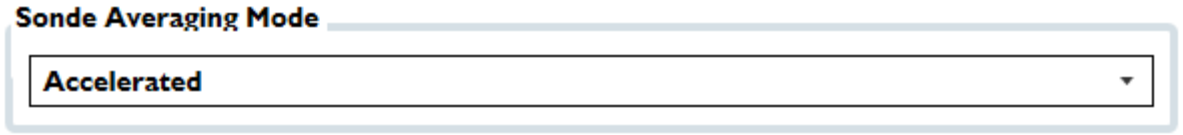
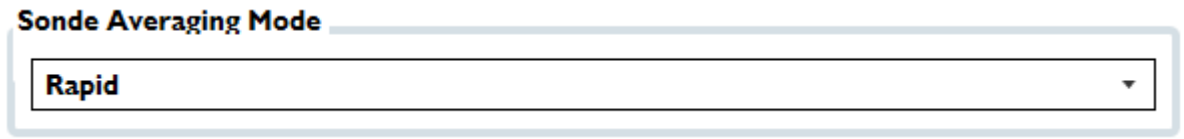
Finalize Your Equipment Settings

For all monitors:

- GPS Coordinates
- Site Setup
- System Clock
- Data Averaging







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Finalize Your Equipment Settings

For continuous monitoring:

- SDI-12 or RS-232 Setup

Deployment Template Configuration

BASIC DEPLOYMENT SETTINGS

Deployment Template Name: Really Awesome Template

Logging Interval Time

0 hour(s) | 15 minute(s) | 0 second(s) | 0 ms

File Name Prefix: Yay

Site Name: Thundervalley River

User Name: Your Name

DCP ADAPTER OUTPUT

SDI-12 Address: 0

Available SDI-12 Parameters	Selected SDI-12 Parameters
Cond (mS/cm)	Depth (ft)
Cond (µS/cm)	Turbidity (FNU)
Sp Cond (mS/cm)	NitraLED (mg/L)
Sp Cond (µS/cm)	
TDS (g/L)	
Sal (psu)	
pH (mV)	
pH	
ORP (mV)	
Pressure (psi a)	
Pressure (psi g)	

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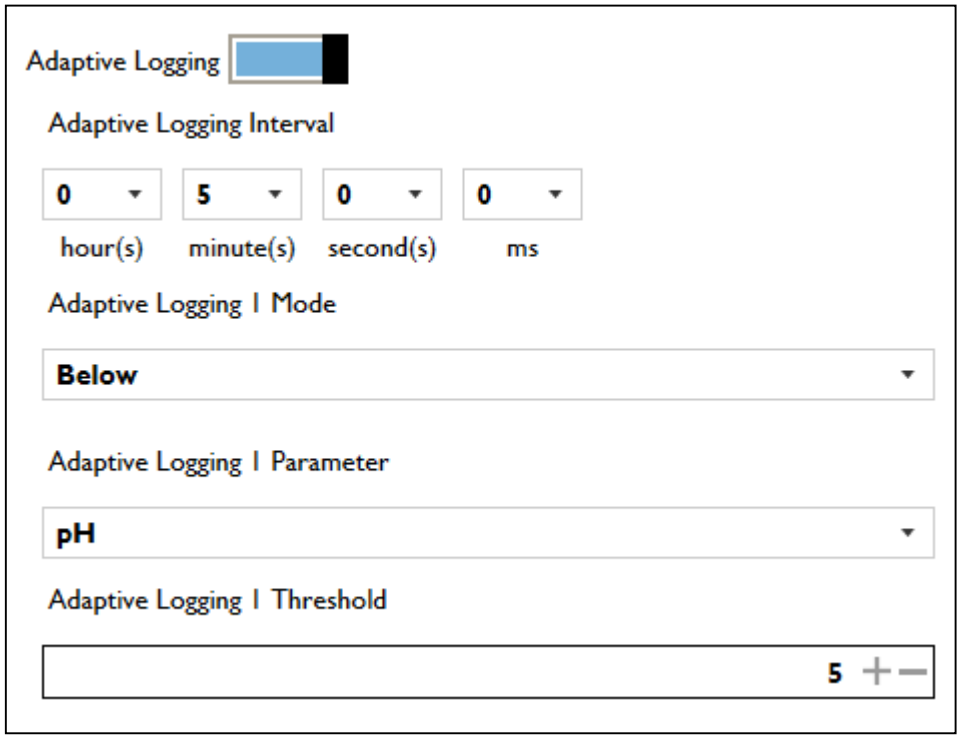
Finalize Your Equipment Settings

For continuous monitoring:

- SDI-12 or RS-232 Setup
- Adaptive Logging



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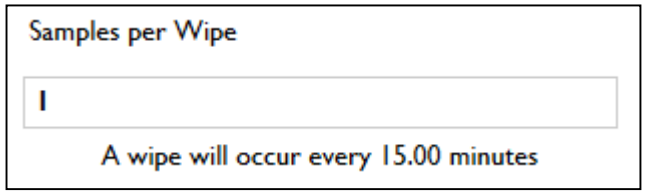
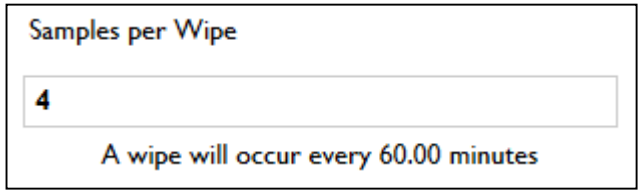
Finalize Your Equipment Settings

For continuous monitoring:

- SDI-12 or RS-232 Setup
- Adaptive Logging
- Wipe Interval





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Prepare a Field "Survival Kit"

Bring a “Survival Kit”

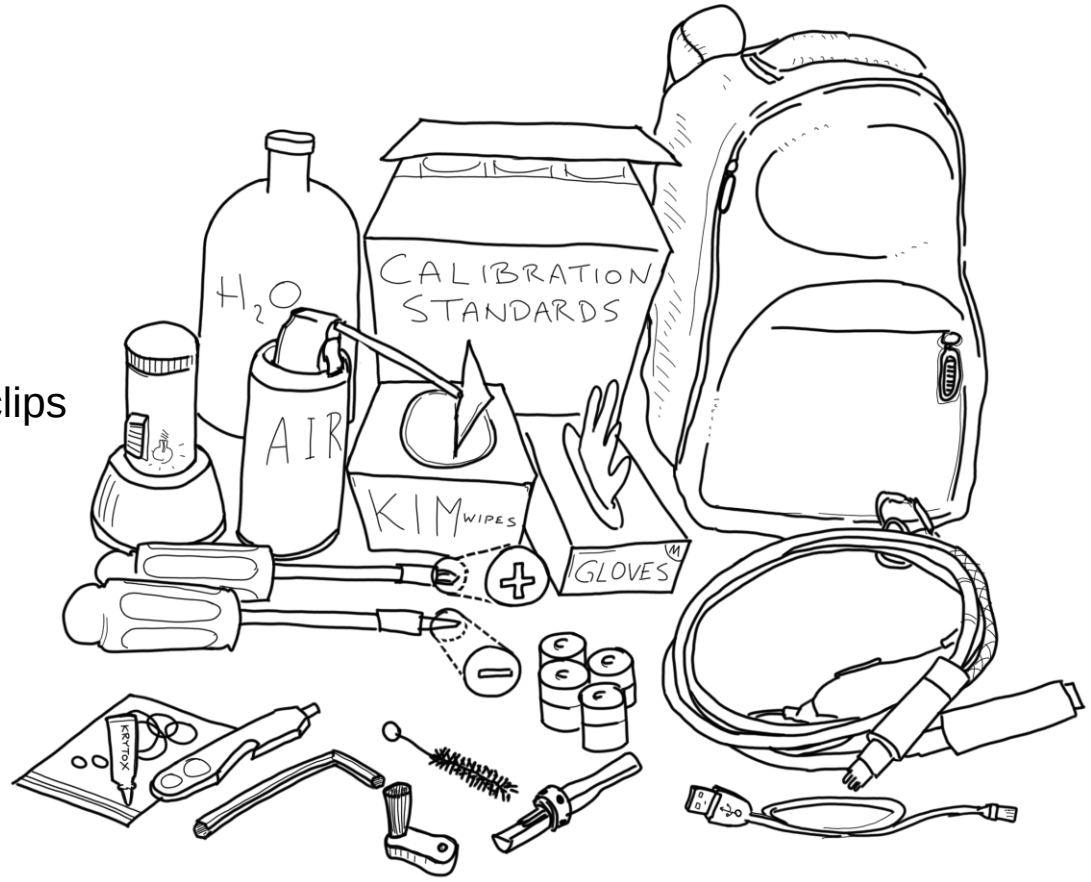
For fouling, troubleshooting, and routine maintenance, have a SURVIVIAL KIT at the ready!

But what do you put in it?

Survival Kit

Make sure you have all the tools to be successful:

- Sensor removal tool
- Wiper brush hex key
- Battery compartment tool
- Extra O-rings
- Krytox grease
- Phillips screwdriver
- Flathead screwdriver
- Small flashlight
- Can of compressed air
- Extra wiper brush
- Lint free cloths
- DI water
- Calibration standards
- Extra cables/sensors
- Gloves
- Port plugs
- Spare batteries
- Conductance sensor brush
- Data cable and USB
- Sensor Wiper retaining nuts/clips



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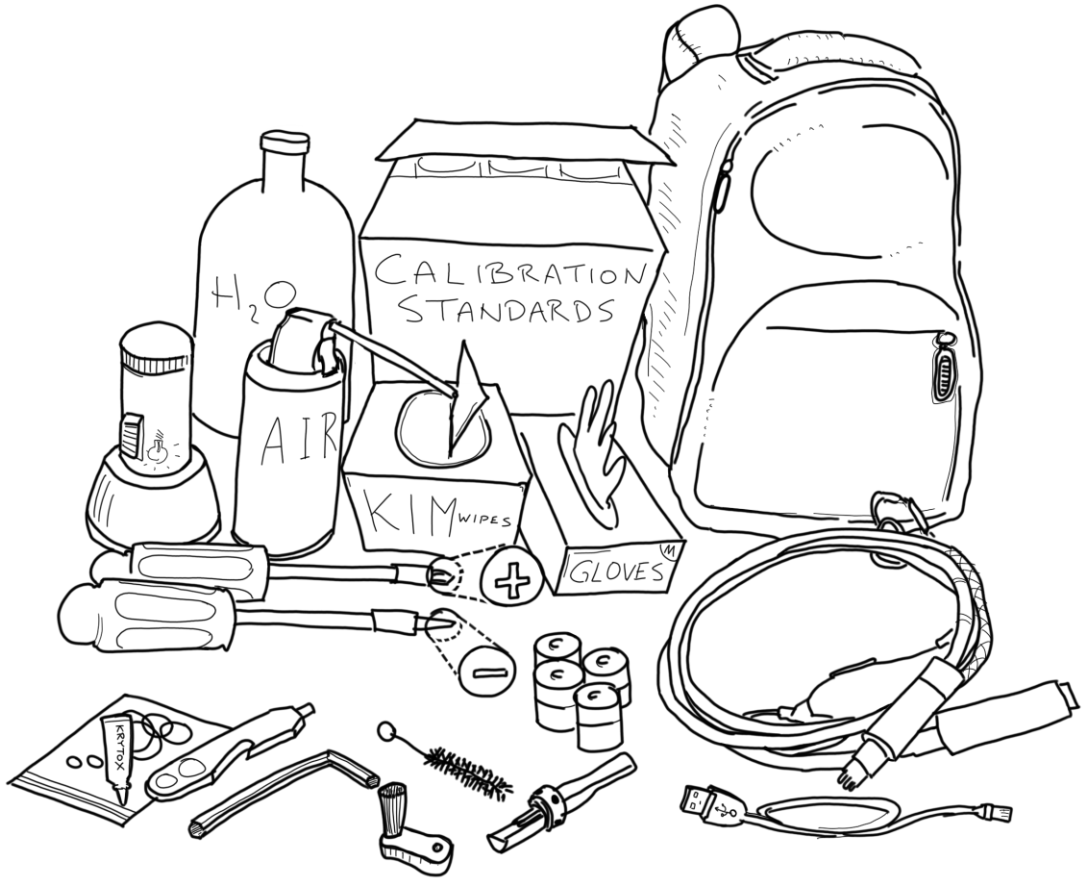
Survival Kit

Optional but recommended:

- Toilet bowl brush for sensor guard
- Stiff bristle brush
- Scrapers for hard growth
- Sensor and sonde shrink sleeves
- Duct tape
- Copper tape
- Magic Erasers
- Simple Green or other cleaner
- Cotton swabs



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Quick Recap

1. Choosing the right instrument
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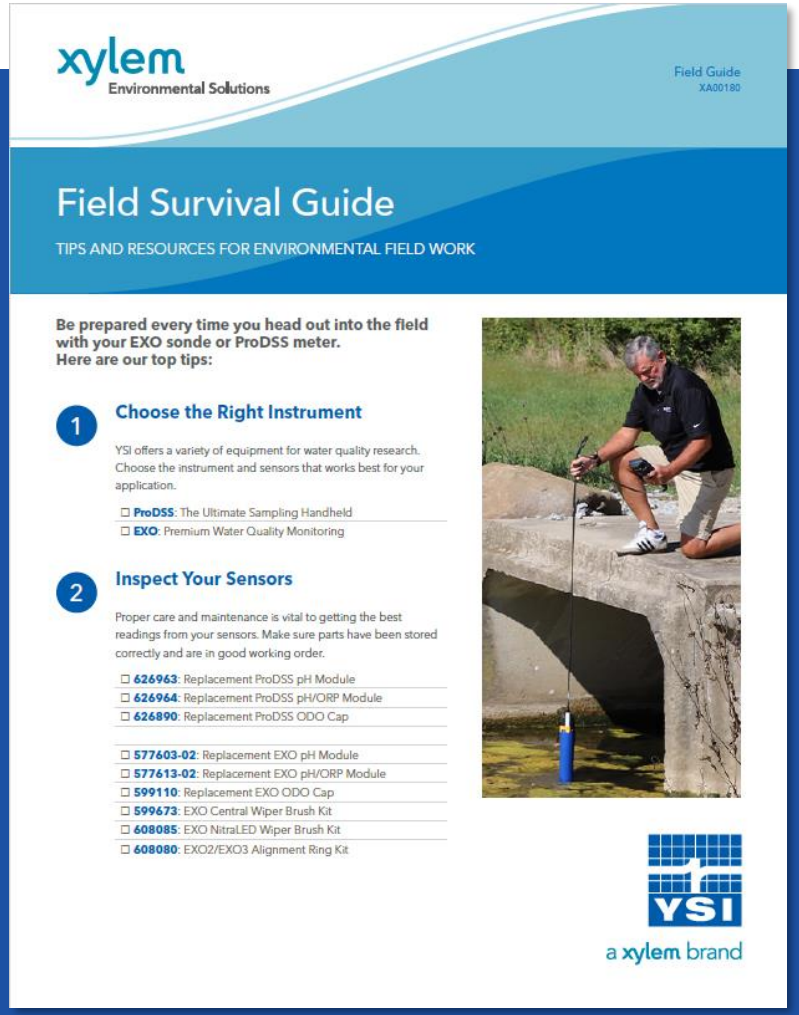

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Environmental Solutions

Field Guide
XA00180

Field Survival Guide

TIPS AND RESOURCES FOR ENVIRONMENTAL FIELD WORK

Be prepared every time you head out into the field with your EXO sonde or ProDSS meter. Here are our top tips:

1 Choose the Right Instrument

YSI offers a variety of equipment for water quality research. Choose the instrument and sensors that works best for your application.

- ☐ **ProDSS**: The Ultimate Sampling Handheld
- ☐ **EXO**: Premium Water Quality Monitoring

2 Inspect Your Sensors

Proper care and maintenance is vital to getting the best readings from your sensors. Make sure parts have been stored correctly and are in good working order.

- ☐ **626963**: Replacement ProDSS pH Module
- ☐ **626964**: Replacement ProDSS pH/ORP Module
- ☐ **626890**: Replacement ProDSS ODO Cap

- ☐ **577603-02**: Replacement EXO pH Module
- ☐ **577613-02**: Replacement EXO pH/ORP Module
- ☐ **599110**: Replacement EXO ODO Cap
- ☐ **599673**: EXO Central Wiper Brush Kit
- ☐ **608085**: EXO NitraLED Wiper Brush Kit
- ☐ **608080**: EXO2/EXO3 Alignment Ring Kit

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On-Demand Webinars

Webinars

- Technology Reveal: EXO NitraLED UV Nitrate Sensor
- Why Collect Water Quality Data When All You Need is Flow?

Trainings / Tutorials

- EXO University
- ProDSS University

video.YSI.com

YSI Webinar | EXO NitraLED Technology Reveal

Webinar | Why Collect Water Quality Data When All You Need is Flow (or Vise Versa!)

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Questions?

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