



# Advanced Wastewater Monitoring Technologies

# Today's Topics

- ① Xylem Introduction
- ② Process
- ③ Environmental
- ④ Laboratories
- ⑤ Process Monitoring
- ⑥ MJK – Flow and Level Product Range Overview
- ⑦ EXO Platform – Multi Parameter Water Quality Monitoring
- ⑧ EXO's Capabilities – Features you'll only find with YSI
- ⑨ Question & Answer Session

## House Keeping

- We are recording!
- A link to the recording & a pdf version of this presentation will be shared in a follow up email
- Ask your question at any time in the “question” section of your Zoom screen
- All questions will be answered at the end of the webinar

# What is Xylem?



**Xylem (XYL)** is a leading global water technology company committed to developing innovative technology solutions to the world's water challenges.



**\$5.2bn**  
Revenue



**18,000**  
Employees

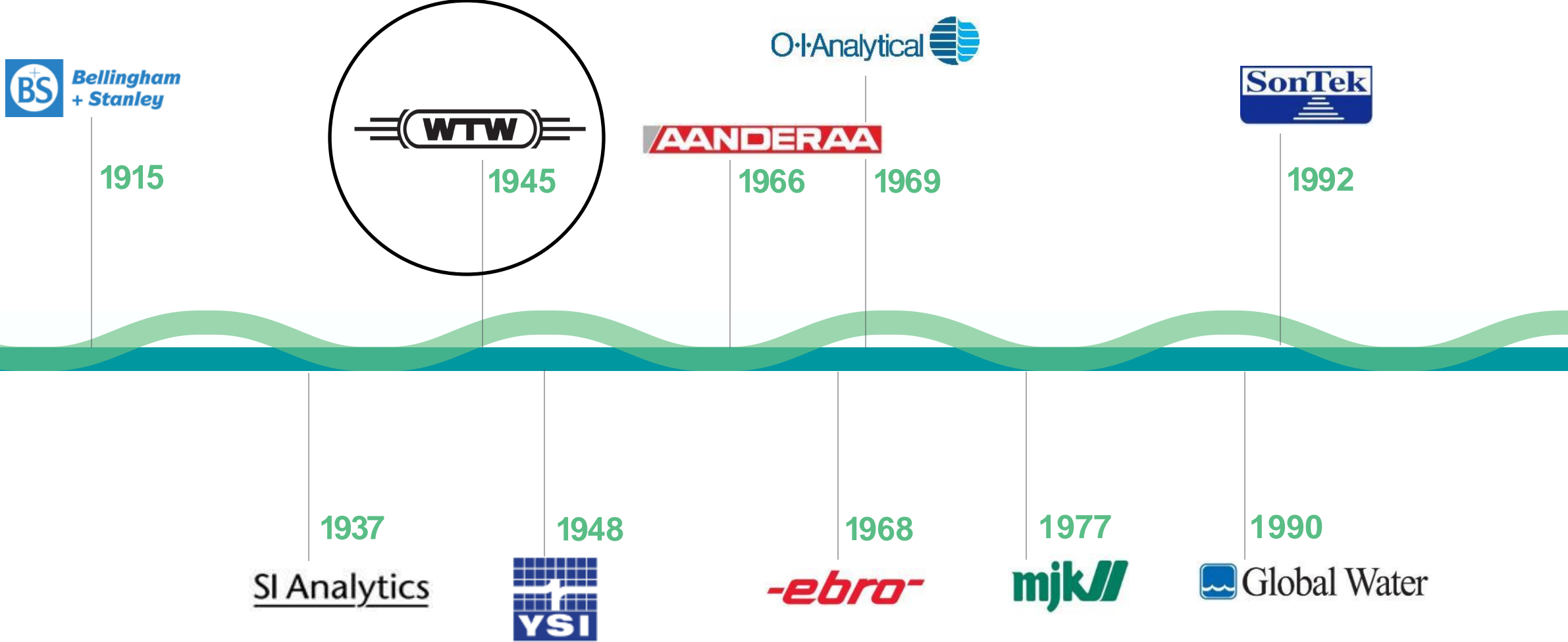


**150**  
Countries



**6**  
Continents

# Bringing together the most progressive Analytics brands



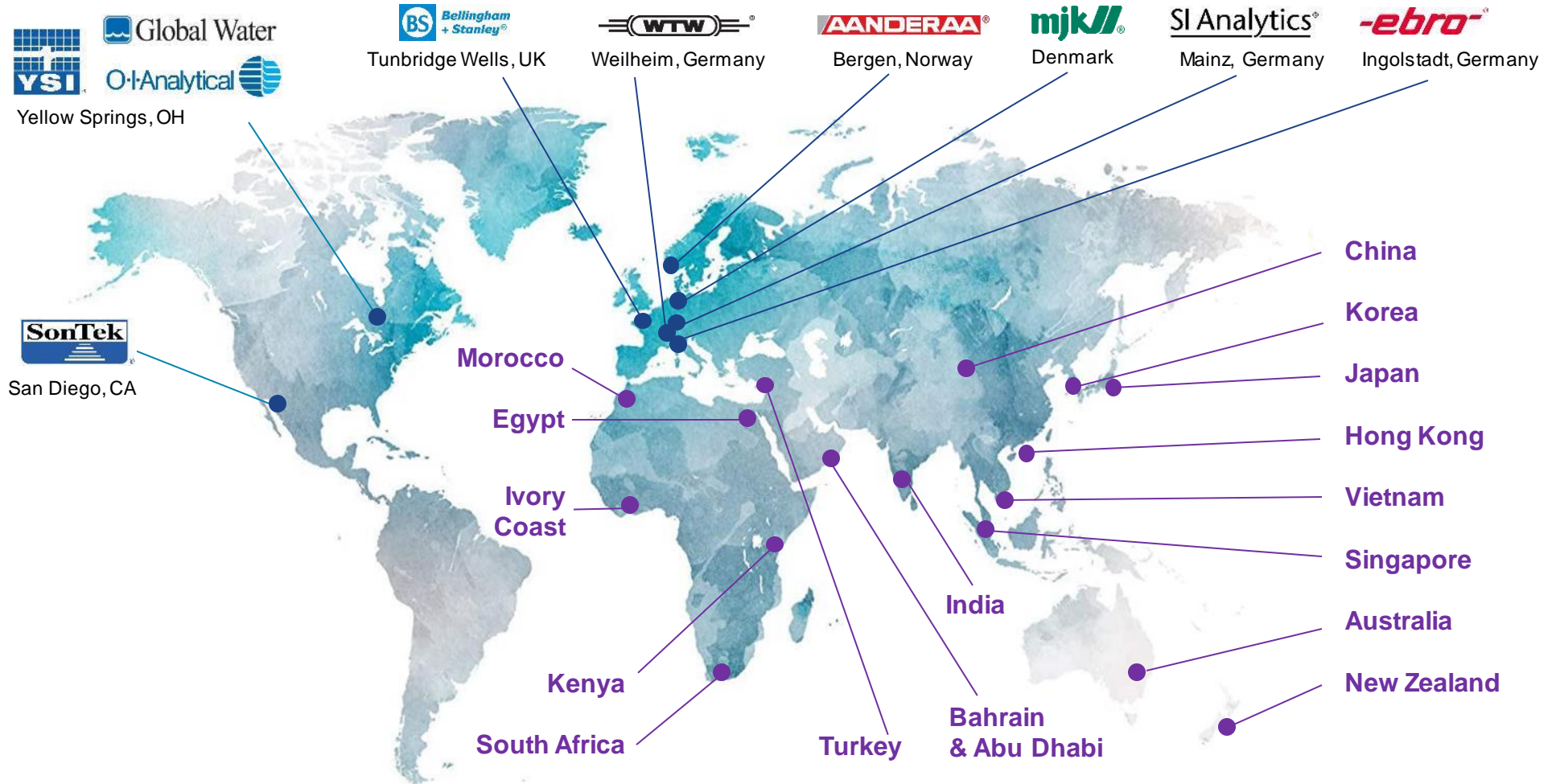
# Factories & EM Regional Offices

**xylem**  
Let's Solve Water

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**Analytics:**

- 60** Facilities
- 23** Companies
- 3300** employees



# Market Segments



## Environmental

- Desalination plants
- Groundwater
- Surface water, rivers, lakes
- Aquaculture
- Ports & harbors



## Laboratory

- QA & QC Lab
- Pharmaceuticals
- Industrial
- Food and beverage

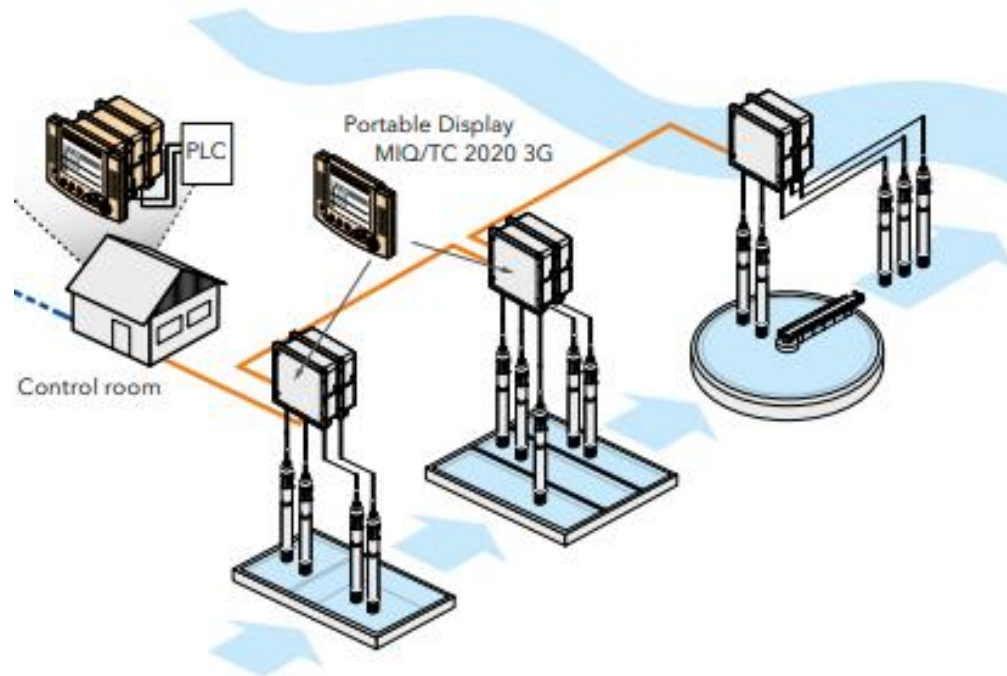


## Process

- Drinking water
- Domestic wastewater
- Industrial wastewater

# WTW - Reliability, Operational Safety and Versatility

## Process / Online



## Laboratory



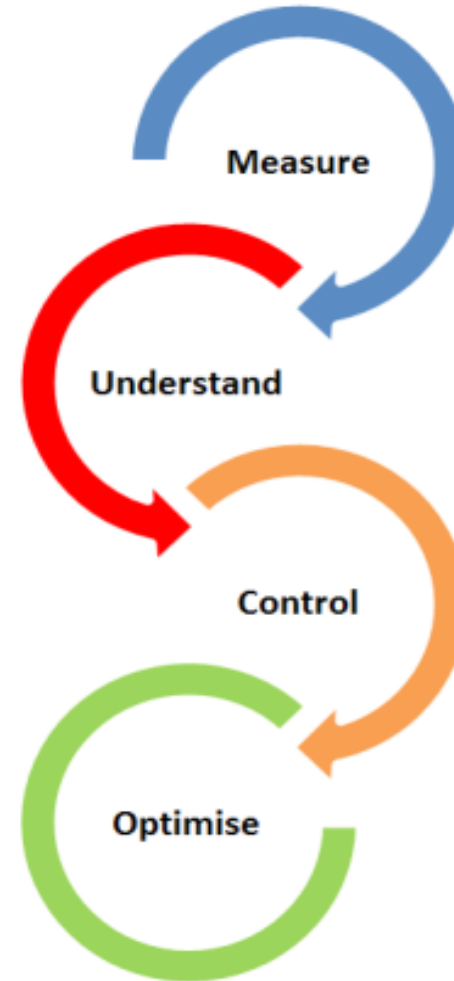
# Principles of Analytics Approach

“Measurement is the first step that leads to control and eventually to improvement.

If you can't measure something, you can't understand it.

If you can't understand it, you can't control it.

If you can't control it, you can't improve it.”



# Process

# 1

# Water Quality Monitoring



# Flow and Level Monitoring



Environmental

2



Dam Surveys

# Surface Water

River Surveys



Water Quality & Met-ocean  
Parameters Monitoring

Lake Monitoring



Wetland Monitoring



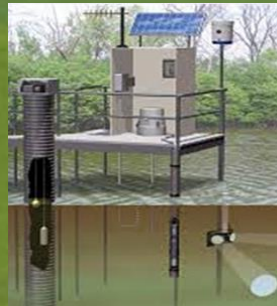
Groundwater  
Monitoring



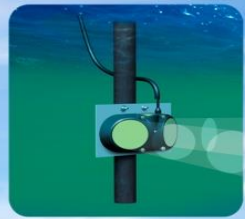
Storm water / Flood  
Monitoring and  
early warning



Digital Water  
Sampling & Flow  
measurements



# Ocean and Coastal



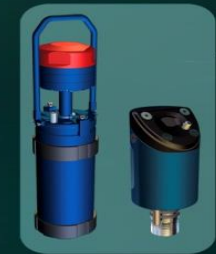
Ports & Harbor  
Monitoring



Bathymetry Surveys



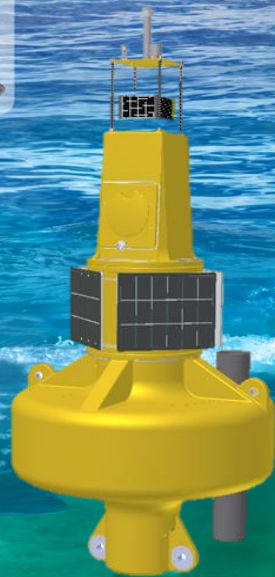
Vertical Profiling  
System



Deep Water  
Monitoring System



Digital Water Sampling  
Measurements



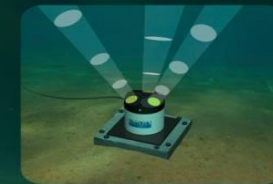
Marine Coastal  
Construction

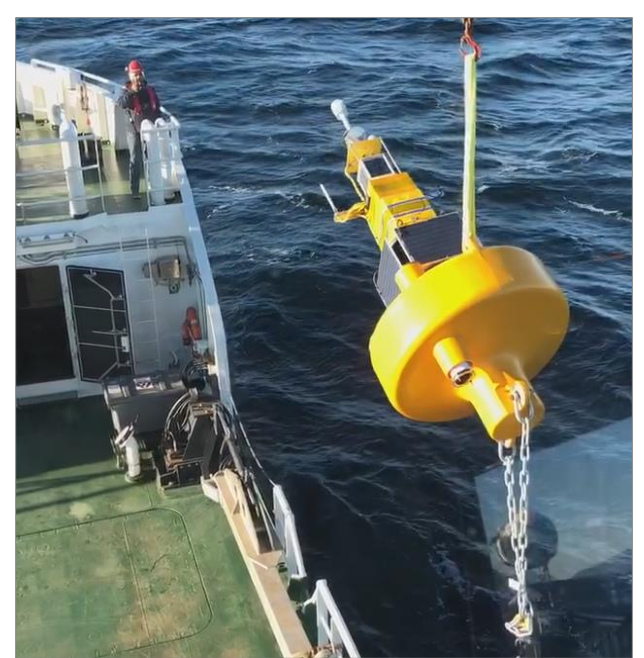
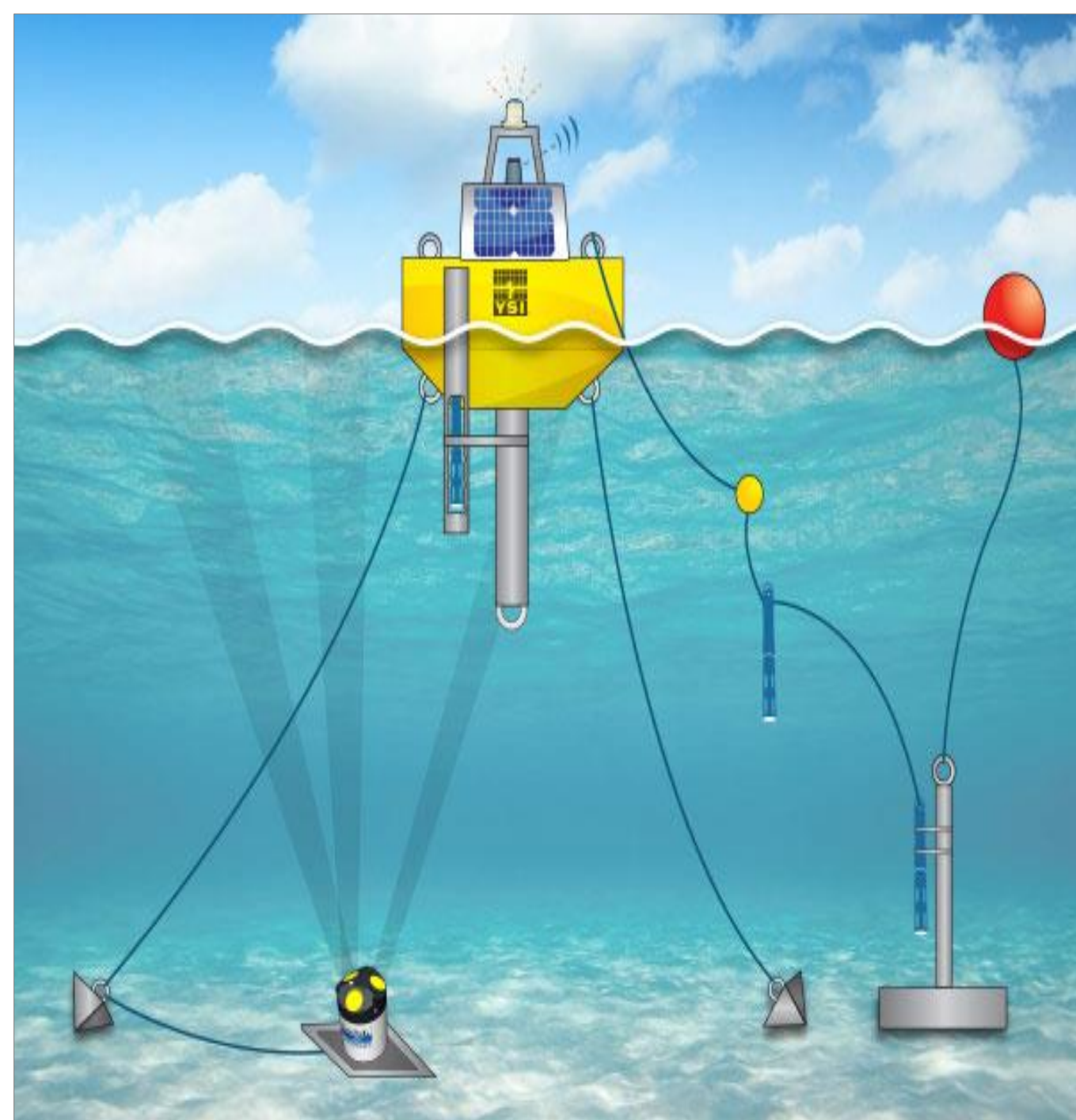


Aquaculture  
Monitoring



Water Quality & Met-ocean  
Parameters Monitoring





# Laboratories

3





## Core product lines

- Titration
- Water quality sensors and monitoring equipment
- Viscometry



## Core product lines

- pH/ORP, ISE, dissolved oxygen, conductivity: Meters and sensors
- UV/Vis, spectrophotometers
- OxiTop® - Respirometers
- Turbidimeters



## Core product lines

- Life Science analyzers
- Water quality sensors and instruments



## Core product lines

- Refractometers
- Polarimeters
- Certified reference materials



## Core product lines

- TOC, Online/Laboratory
- Purge and Trap
- Flow solutions



## Core product lines

- Temperature/Humidity and pressure dataloggers
- Temperature/Humidity and pressure online and handheld

# Process Monitoring

# What does reliable Online instrumentation look like?

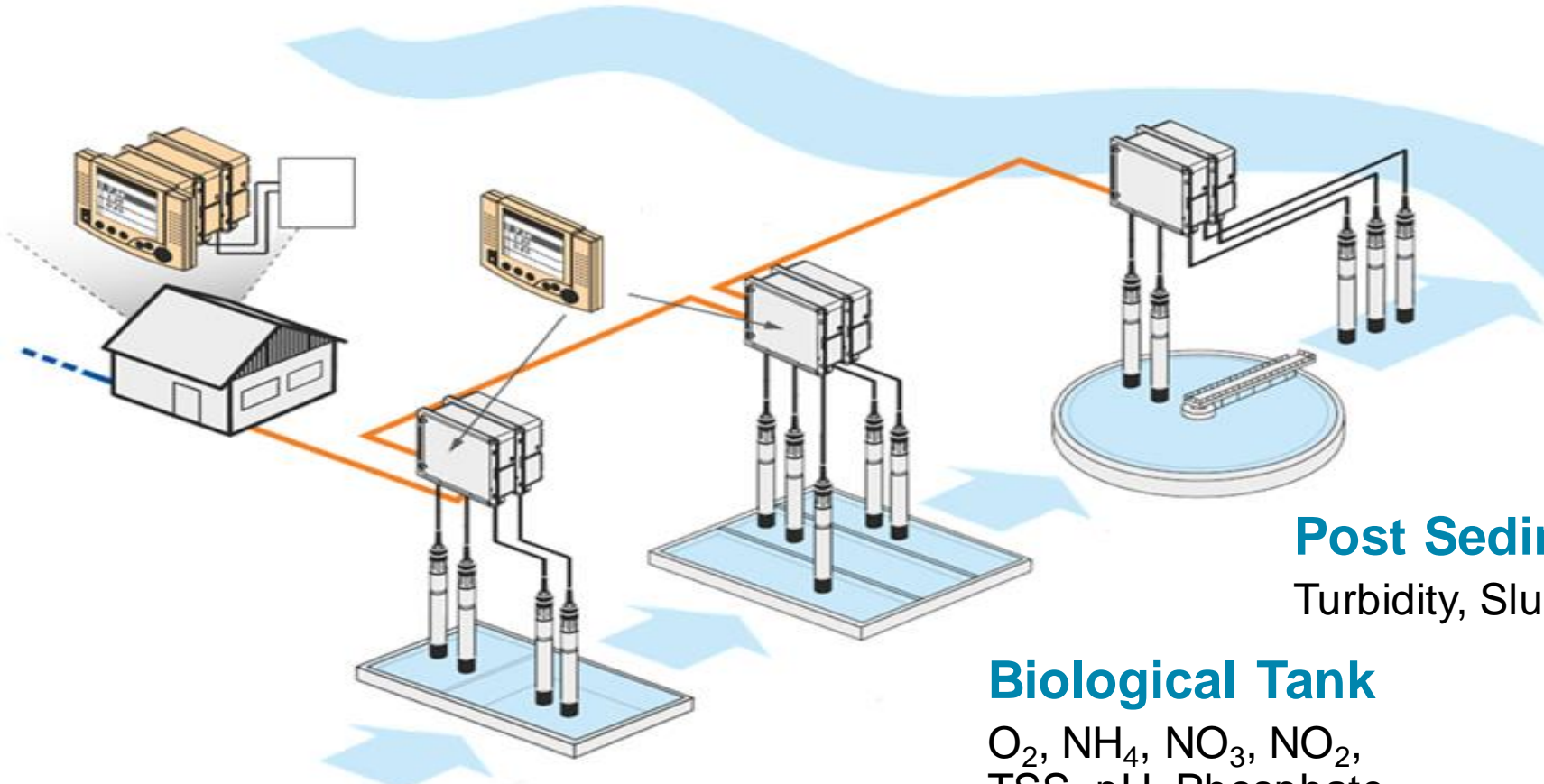
- 
- Smart digital system designed for specific application.
  - Flexible design possibilities for each specific site.
  - Easy, quick and cost effective to install.
  - Simple to use for all operators.
  - Low maintenance cost and minimum calibration requirements.
  - Made of high grade materials to ensure long life time and extended warranty.

A man in a blue jacket and white gloves is adjusting a white IQ Sensor Net device mounted on a metal pole. The device has a screen and buttons. The background is a blurred outdoor setting.

# IQ Sensor Net

Smart Wastewater Quality  
Monitoring System

# The IQ SENSOR NET



## Influent

pH, Cond, NH<sub>4</sub>, NO<sub>3</sub>, NO<sub>2</sub>,  
COD/TOC/BOD/DOC/SAC

## Biological Tank

O<sub>2</sub>, NH<sub>4</sub>, NO<sub>3</sub>, NO<sub>2</sub>,  
TSS, pH, Phosphate

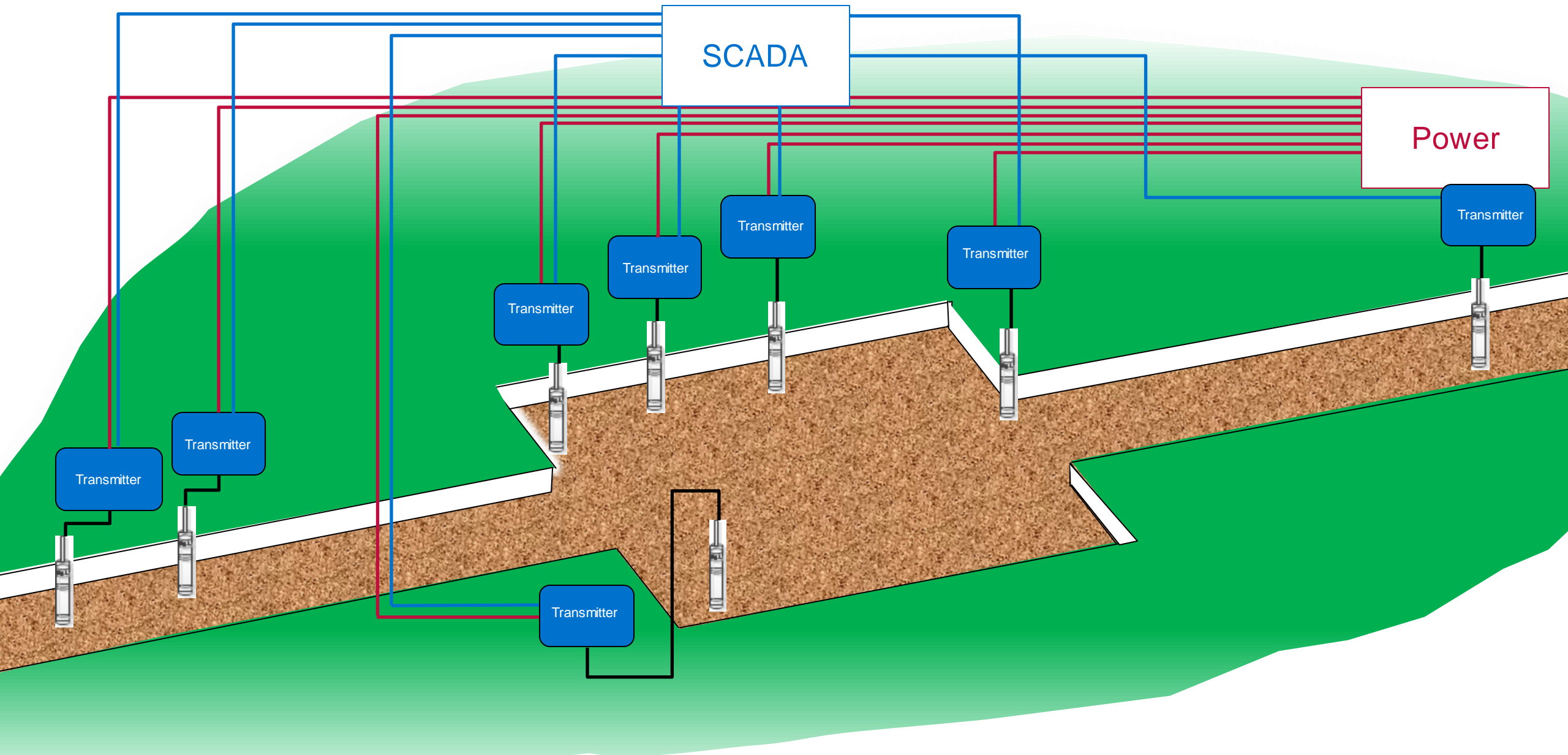
## Post Sedimentation

Turbidity, Sludge-level

## Effluent

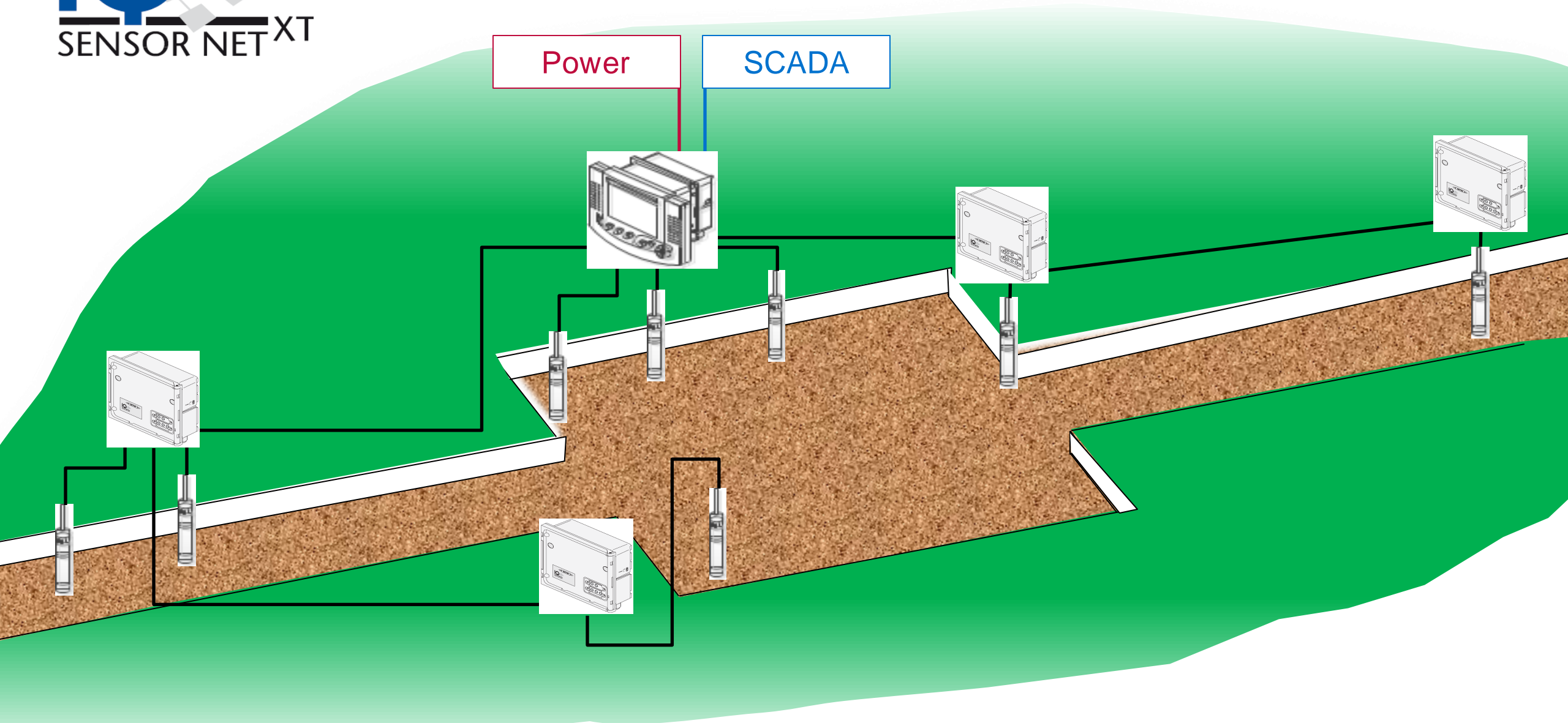
NH<sub>4</sub>, NO<sub>3</sub>, NO<sub>2</sub>, pH,  
Cond, O<sub>2</sub>, Turbidity,  
COD/TOC/BOD/DOC/  
SAC/UVT<sub>254</sub>,  
total Phosphorus

# Typical Measurement Equipment

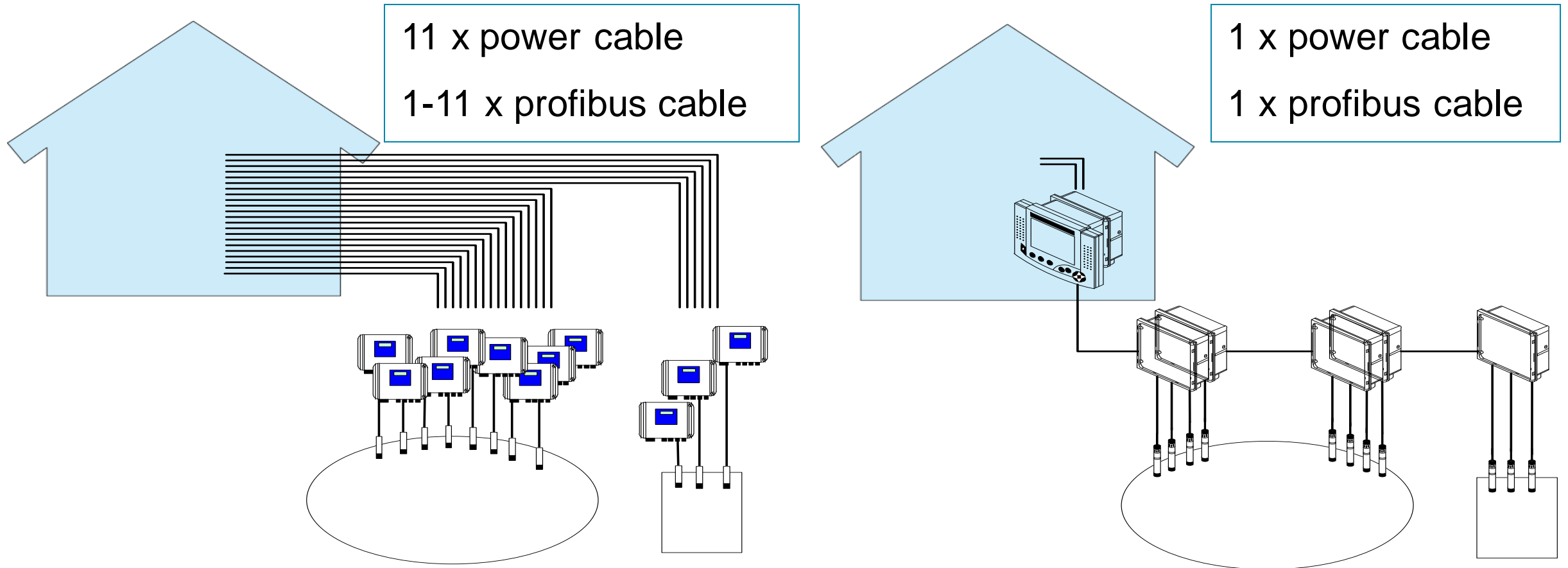


Power


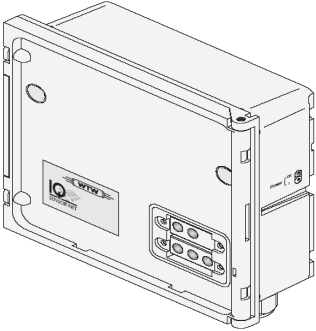
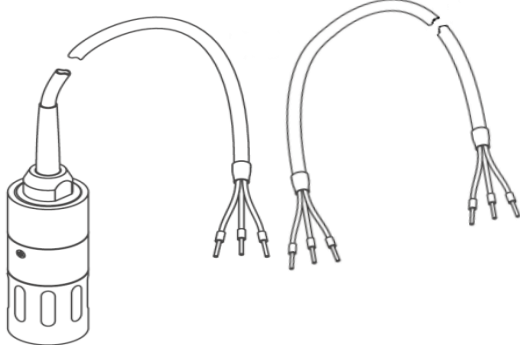

SCADA



# Single Measurement Systems (analog) compared to IQ Sensor Net



# 4 Basic Components

Terminal / Controller	Modules	Cables	Sensors
 A handheld electronic device with a screen and several buttons, used for system control.	 A rectangular metal enclosure housing internal electronic components, likely a power supply or interface module.	 Two types of cables: one with a connector for a sensor and another with multiple individual wires for data or power transmission.	 A cylindrical probe with a sensor tip at one end, used for measuring water quality parameters.

Easy to customize...

Standard dimensions, mix and match

# IQ Sensor Net Controller and Display



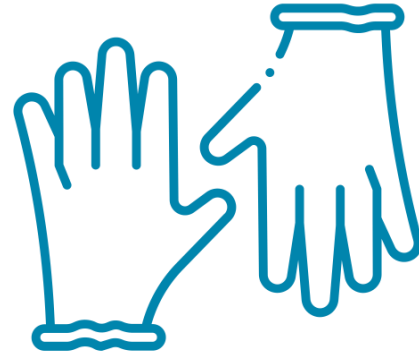
# On-Site Self Calibration



## IP67 USB Interface



# Made for Harsh Environments



- Silicon Buttons
- No touch screen

Can be operated with gloves

Can be operated when wet


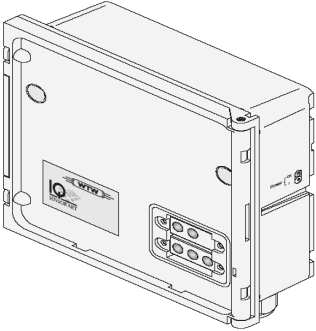
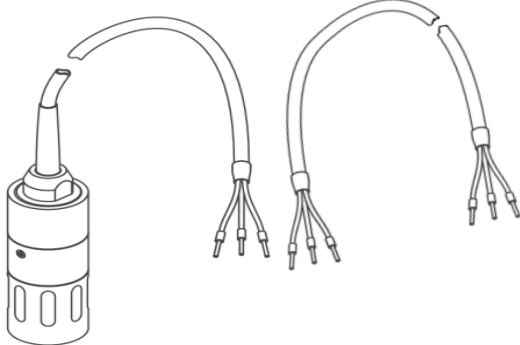

# Easy to Use for Operators (Self Learning)



Intuitive operation for easy handling...

- Self-explaining interface
- Easy to use

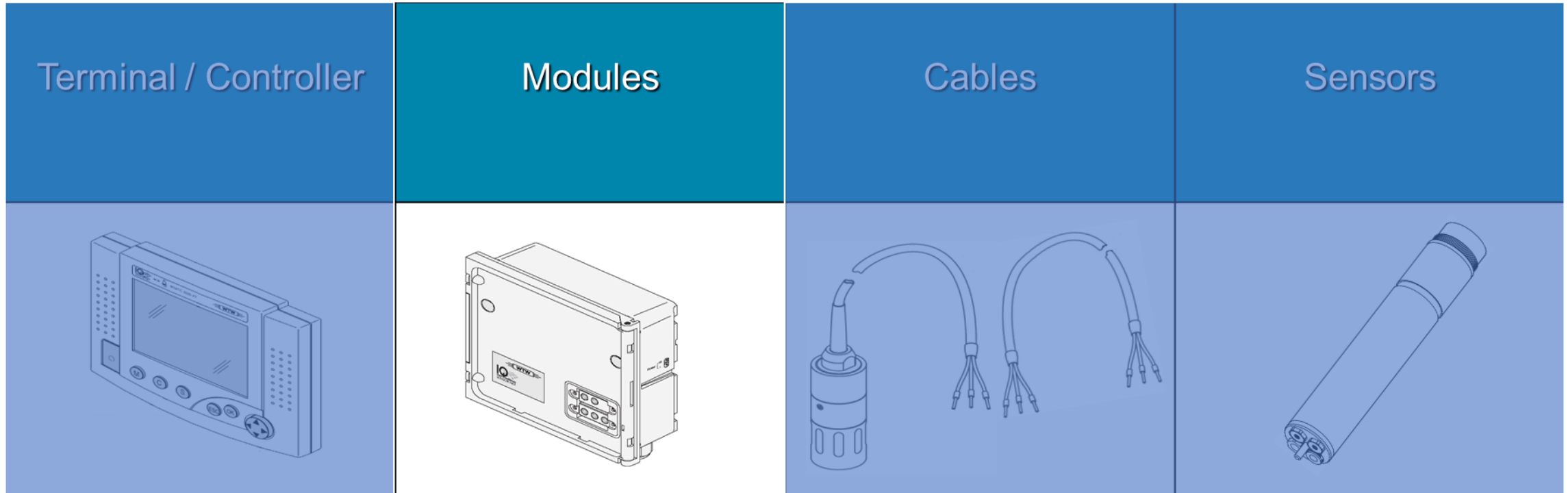
# 4 Basic Components

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 A handheld electronic device with a screen and several buttons, likely used for system control.	 A rectangular metal enclosure with a terminal block on the front, used for housing electronic modules.	 Two types of cables: one with a connector for a sensor and another with multiple individual wires.	 A cylindrical sensor probe with a protective cap and a connector at the bottom.

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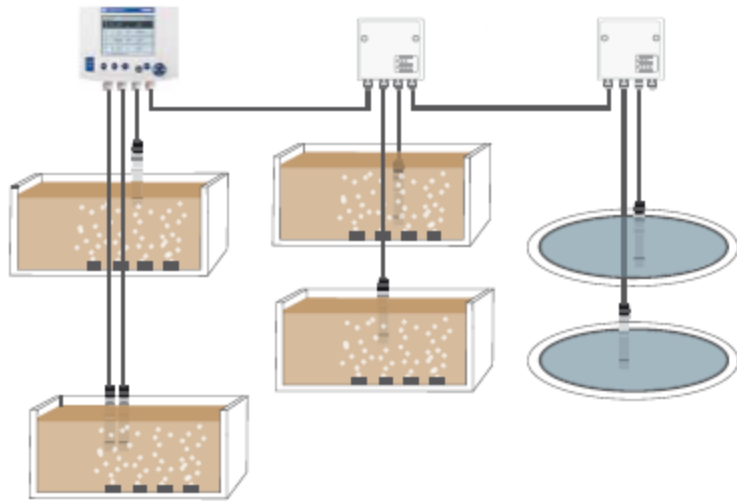
# 4 Basic Components



Easy to customize...

Standard dimensions, mix and match

# Module (Junction Box)



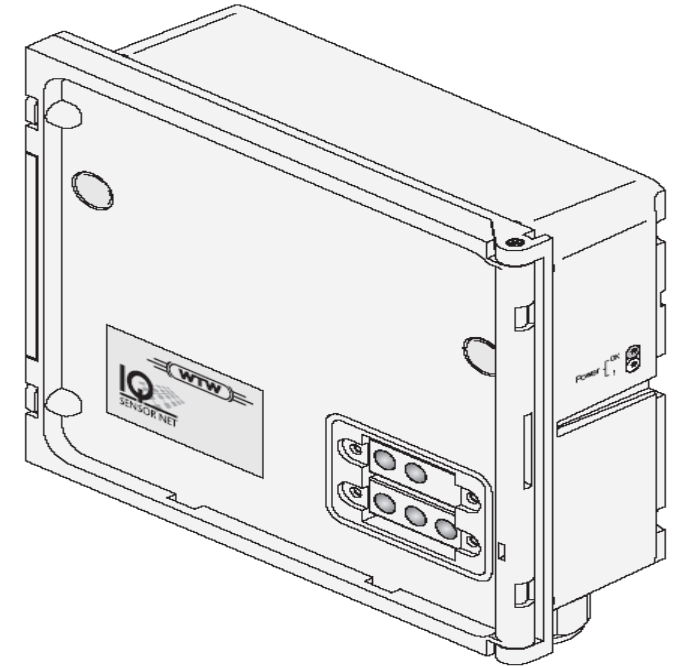
Power supply

Analog and outputs /

Inputs - Interfaces

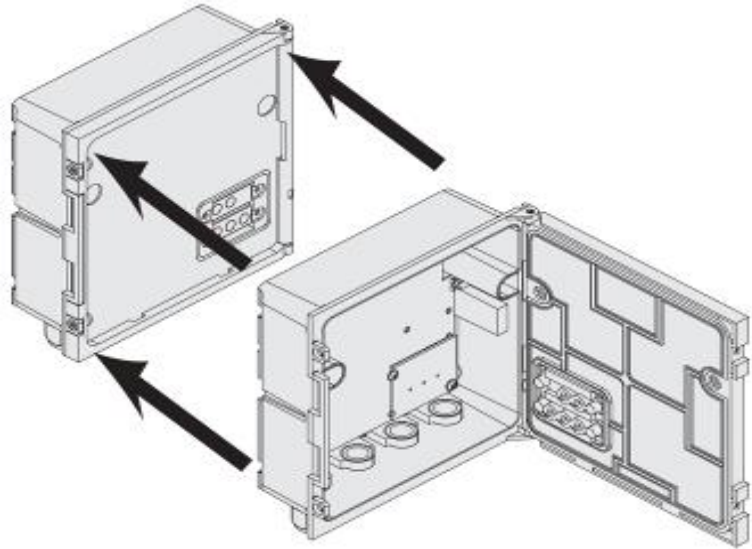
System extension

Controller in a module



# System Extension

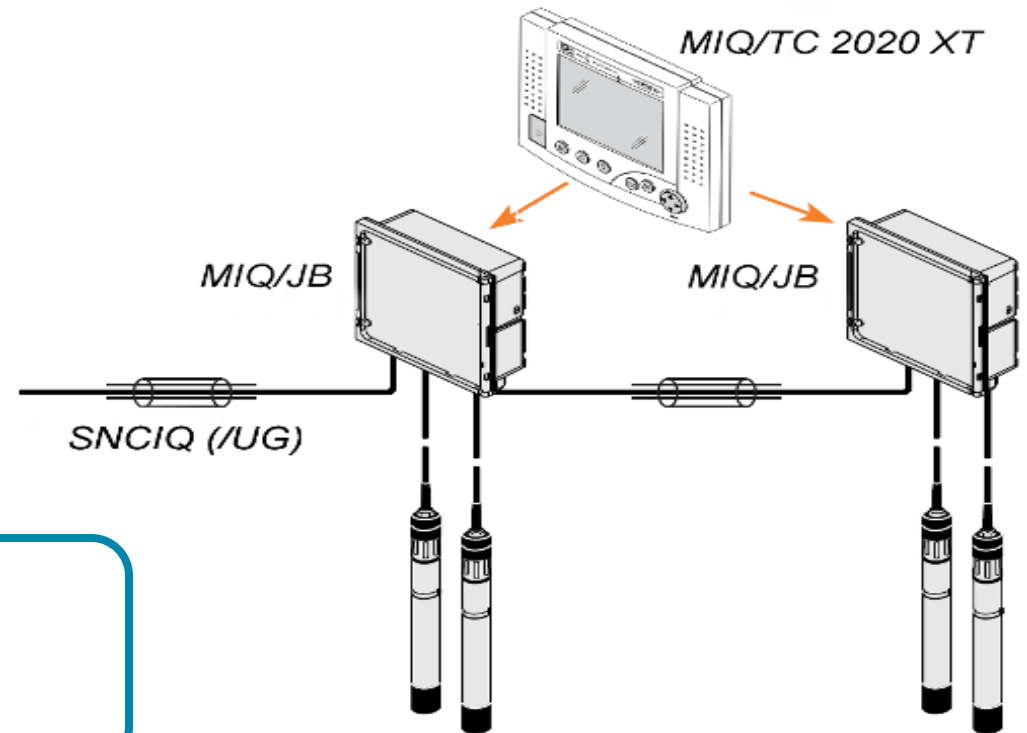
Stack mounting – max. 3 modules



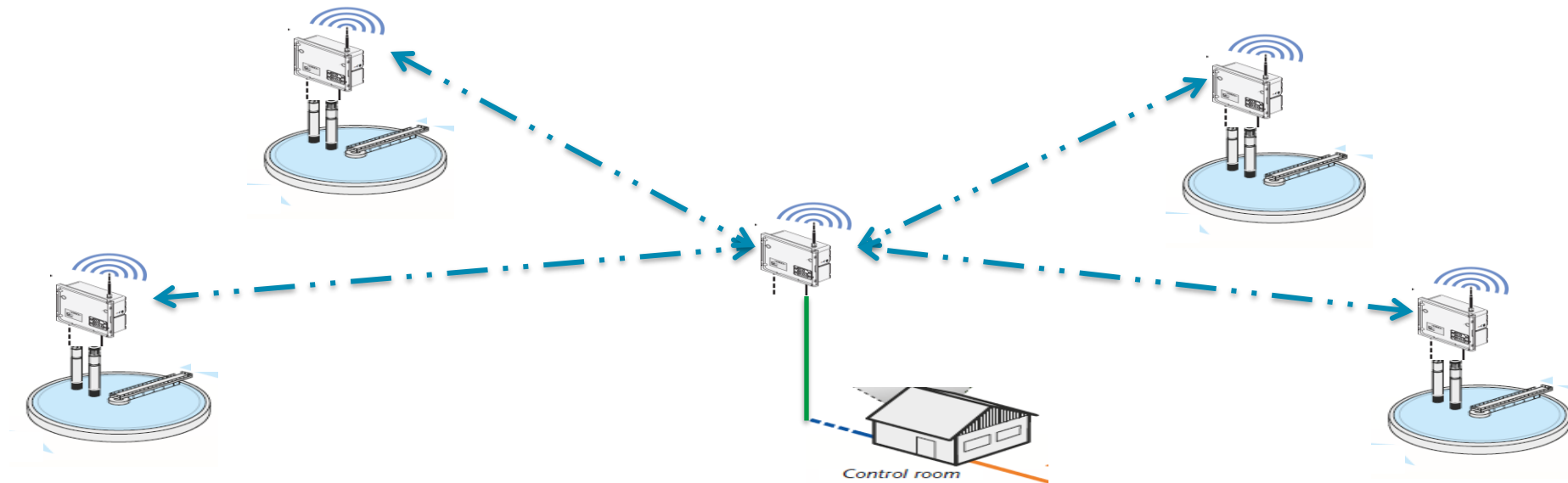
Solve installation...

Stack mounting - smart installation without cables

Distributed mounting



# Multi-Slave Wireless Communication




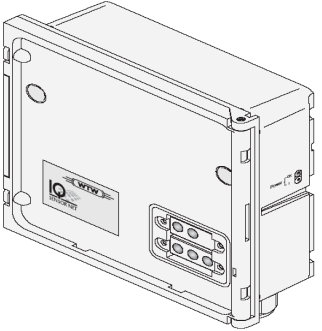
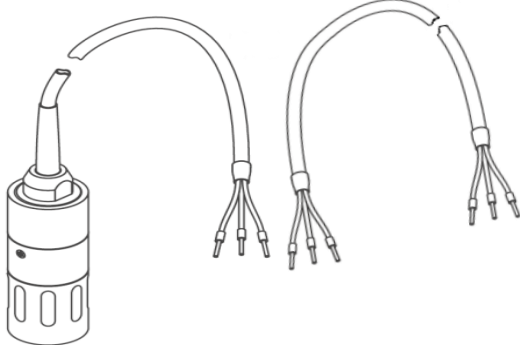

- Single Master
- Multiple Slaves
- Simplify rotating bridge systems
- More flexible = less cables = easier adaption to local needs

# Advanced Communication Protocols

- Single module swap to provide:
  - MODBUS RTU/TCP
  - PROFIBUS
  - PROFINET
  - ETHERNET
  - WIRELESS
- Smart sensors
- Back compatible
- Simple software upgrade
- No need to change the whole network



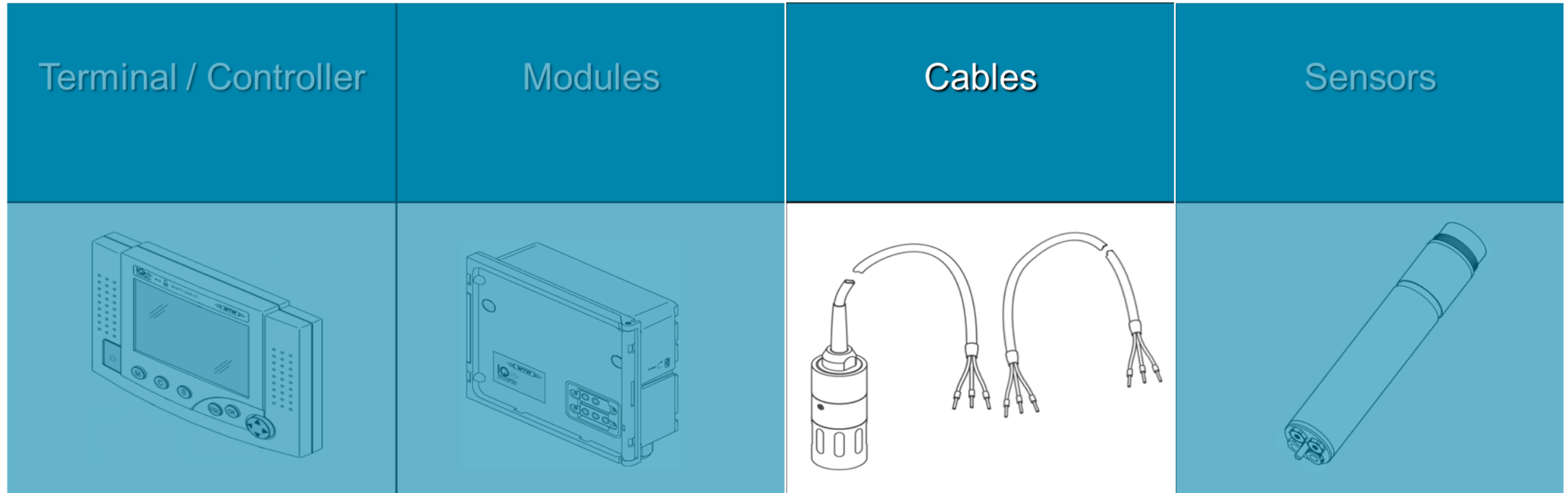
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Easy to customize...

Standard dimensions, mix and match

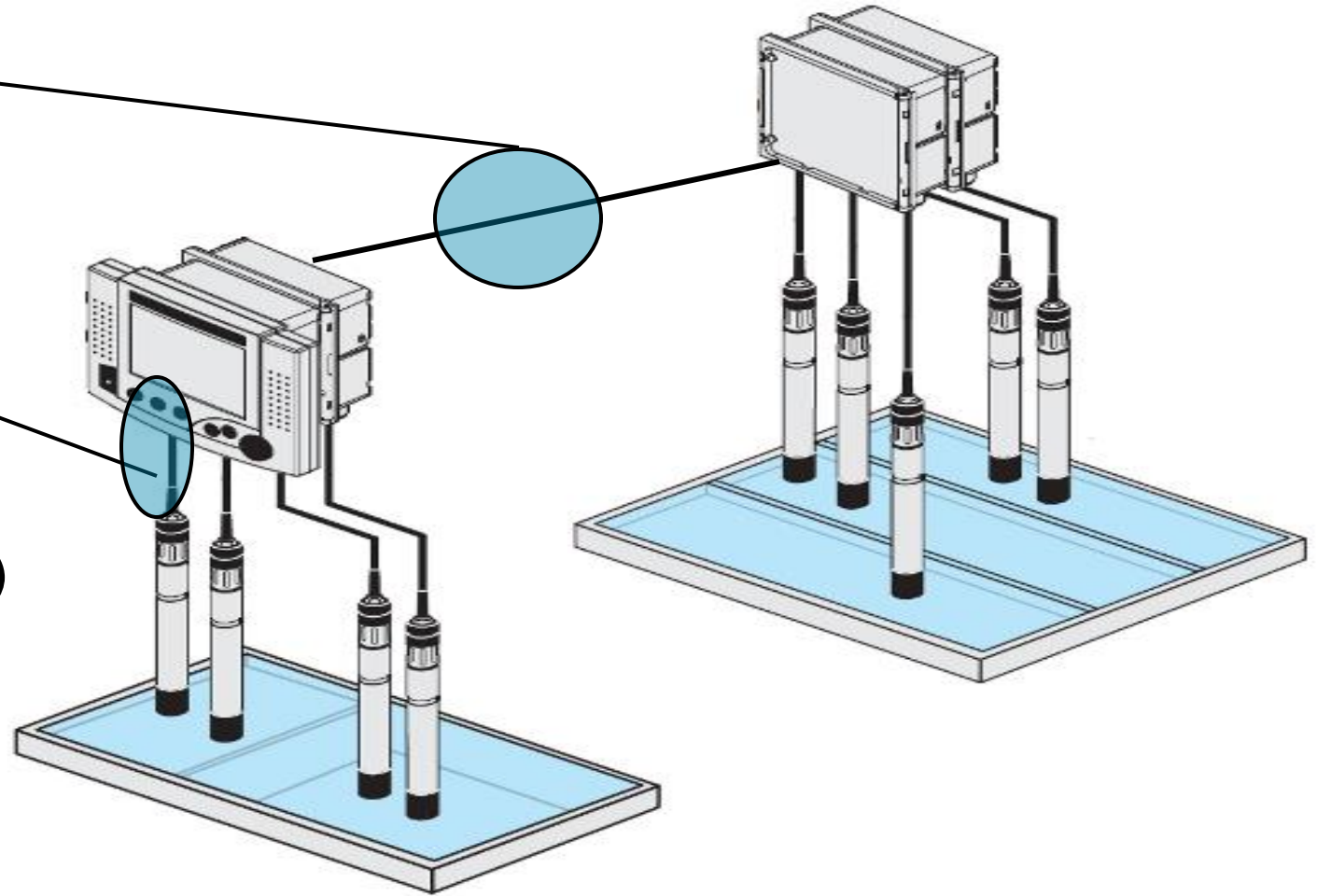
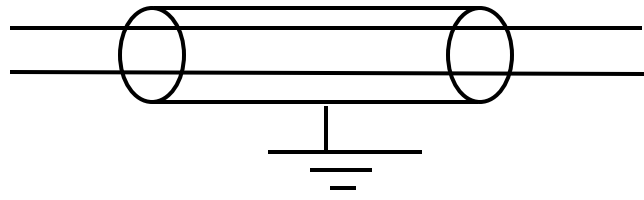
# 4 Basic Components



Easy to customize...

Standard dimensions, mix and match

# Cable Physical Layer

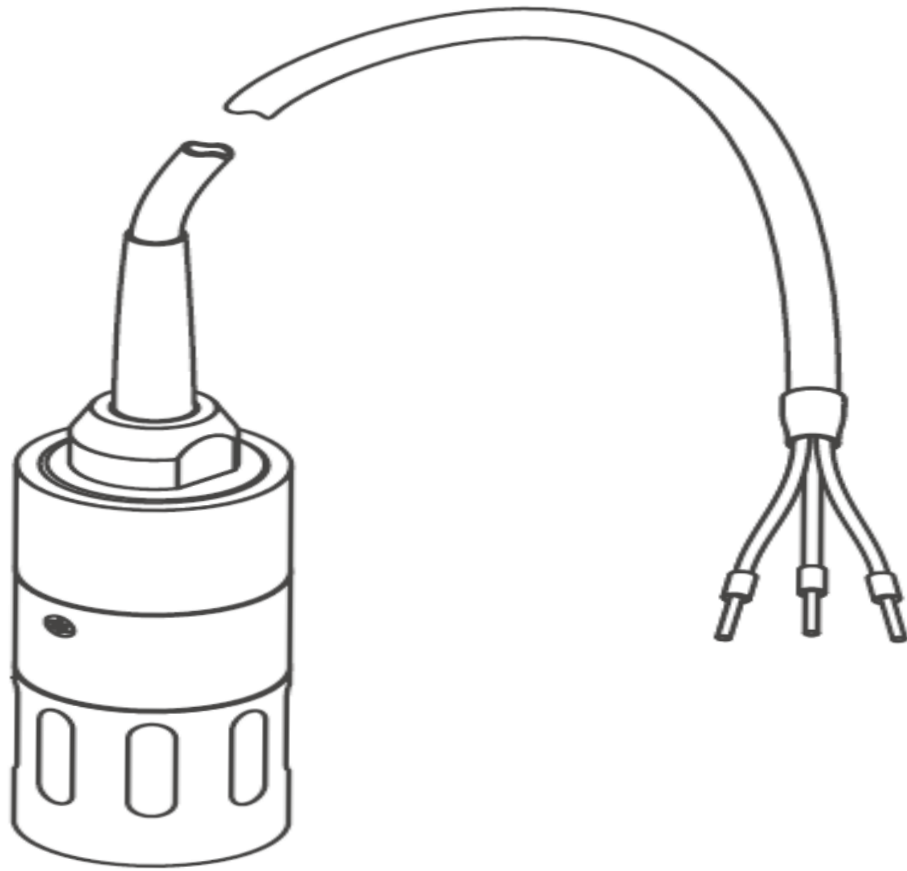


2 wire cable with shield for:

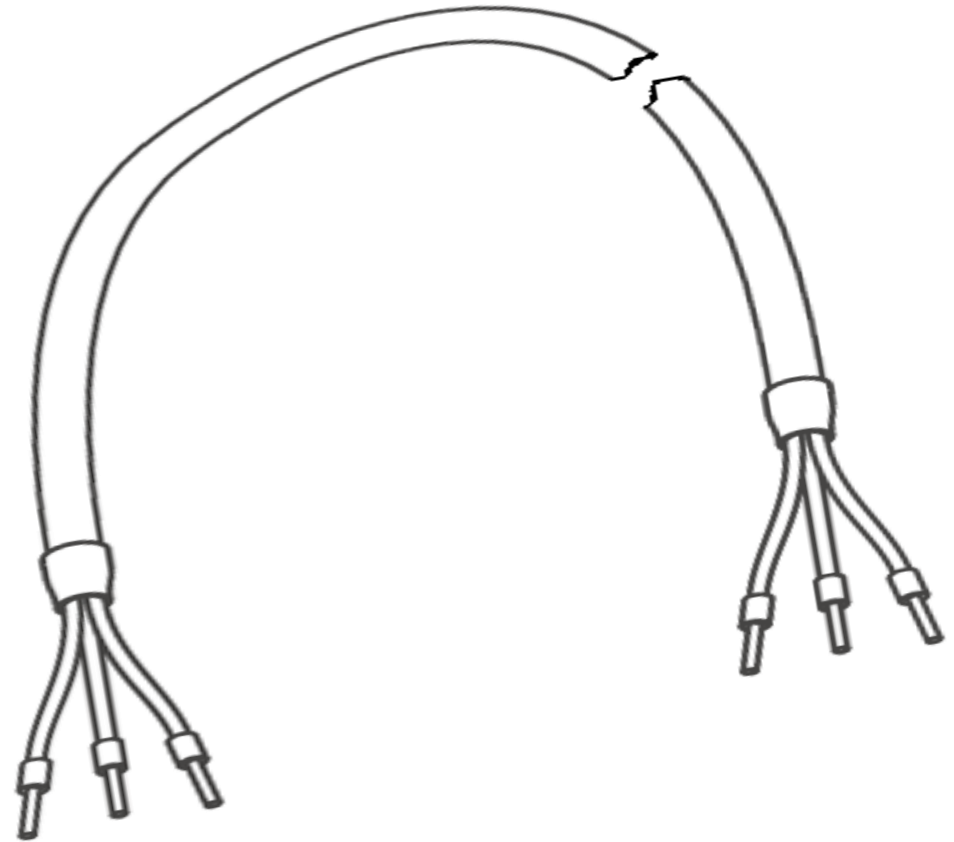
- Power supply (low voltage, 24 V)
- System communication

# Extremely Robust

Sensor connection cable

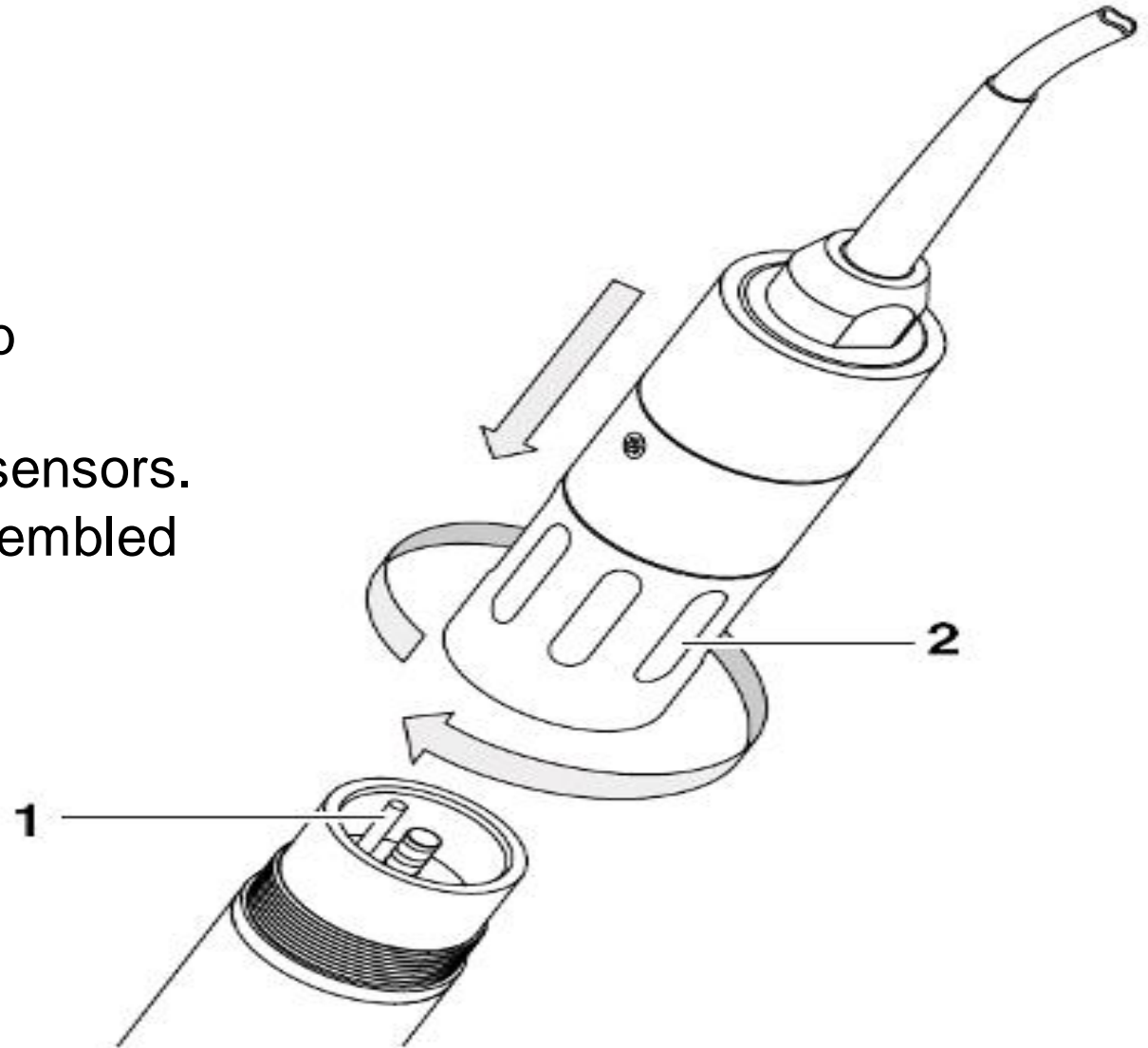


Modules connection cable


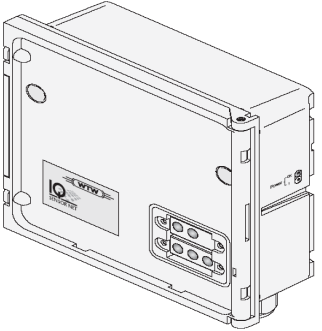
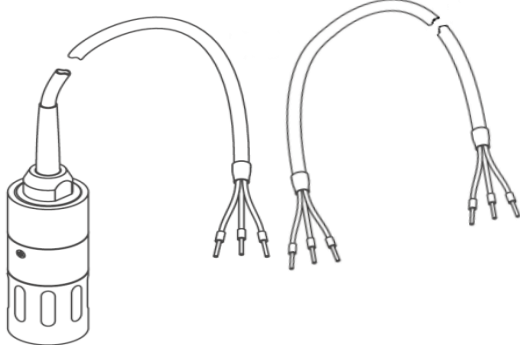



# Universal Connection Cap (Hot Swap)

- Revolutionary design
- Full Plug and Play system
- Enabling to Calibrate sensor in the lab
- Single common cable
- No need for Electricians to swap the sensors.
- Fully waterproof connection once assembled



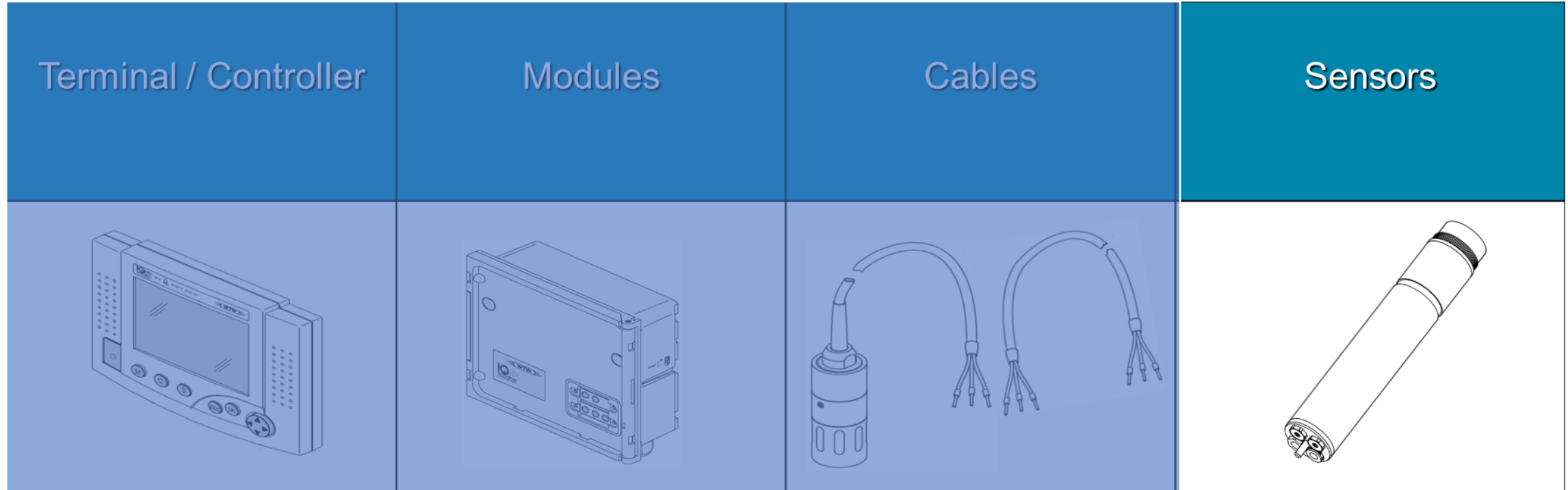
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Easy to customize...

Standard dimensions, mix and match

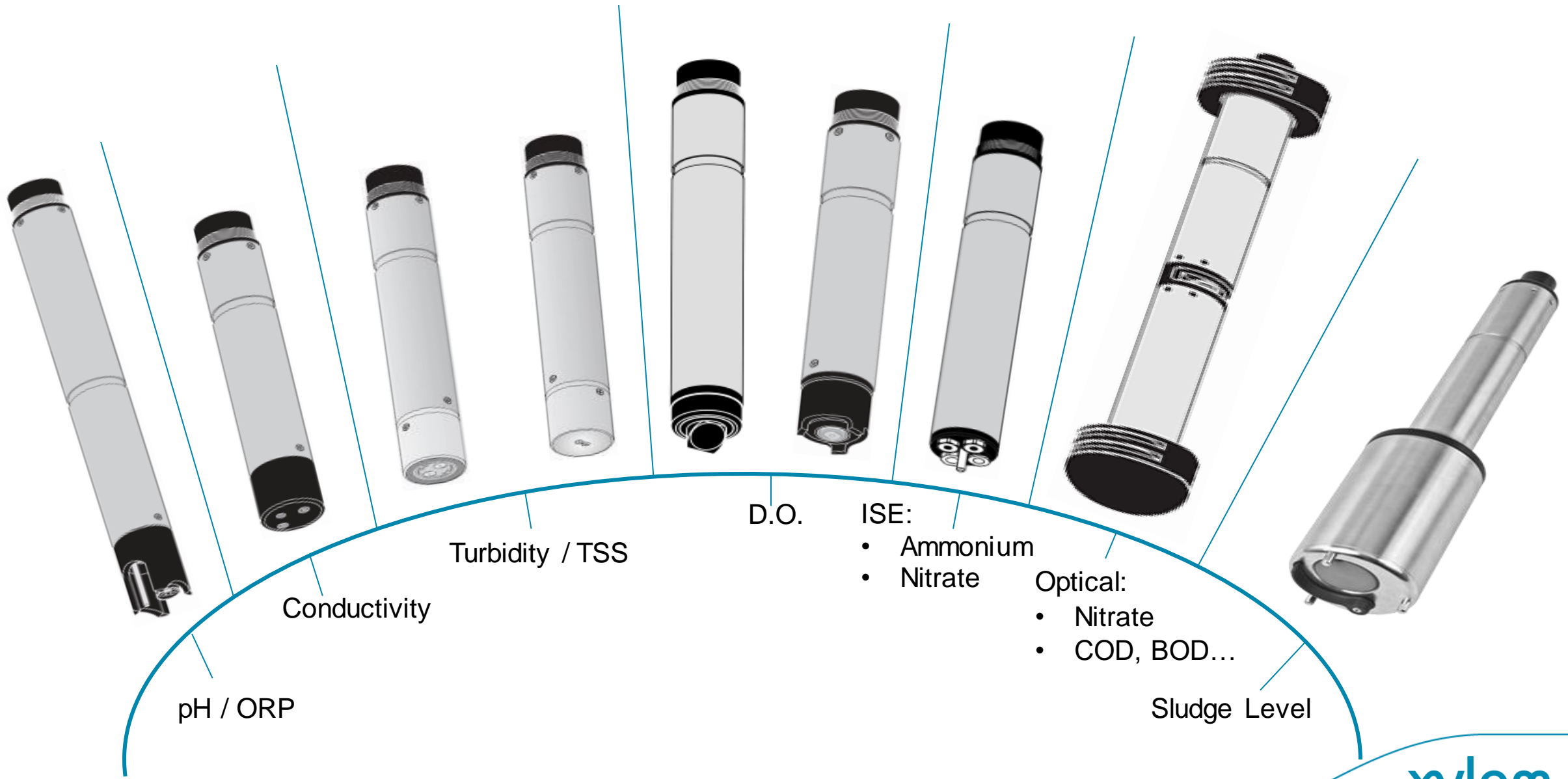
# 4 Basic Components



Easy to customize...

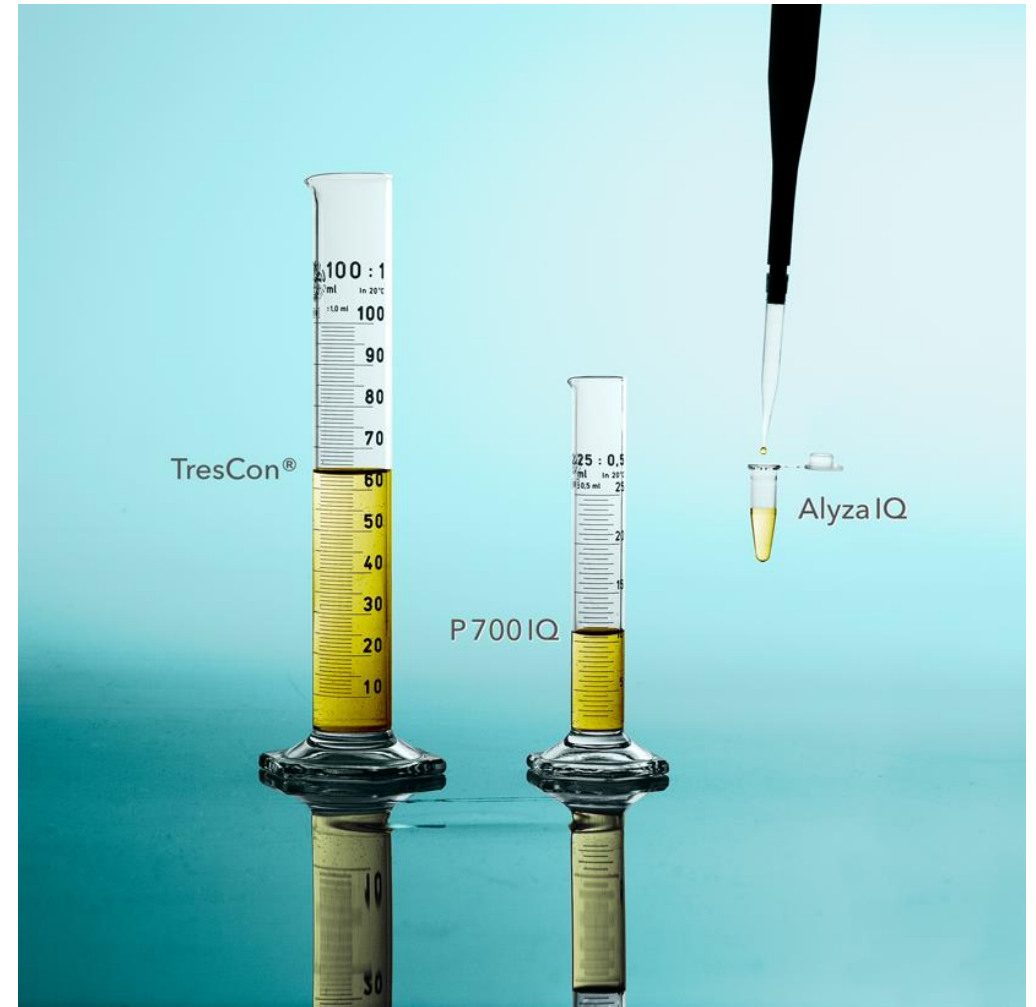
Standard dimensions, mix and match

# Wide Variety of Sensors

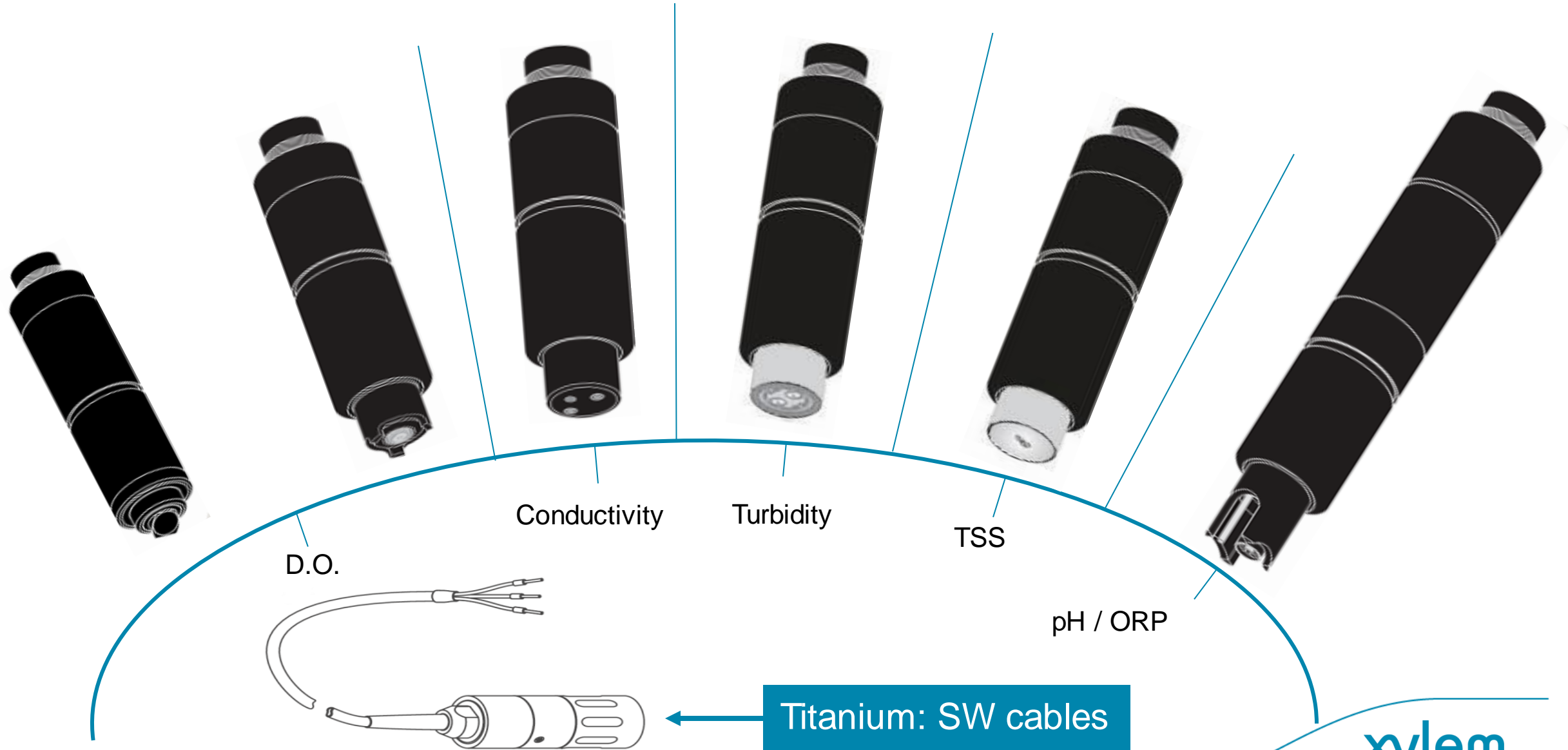


# Alyza IQ: Phosphate Analyzer

**NEW**

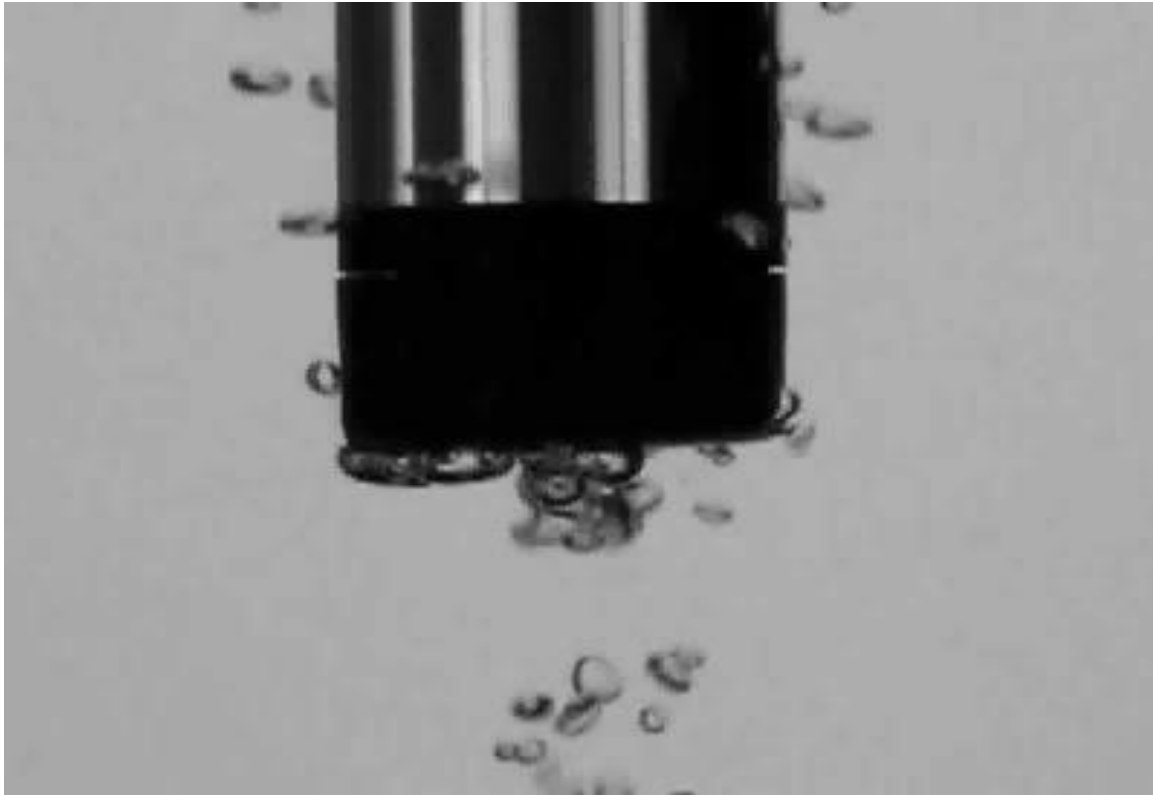


# Wide Variety of Sensors

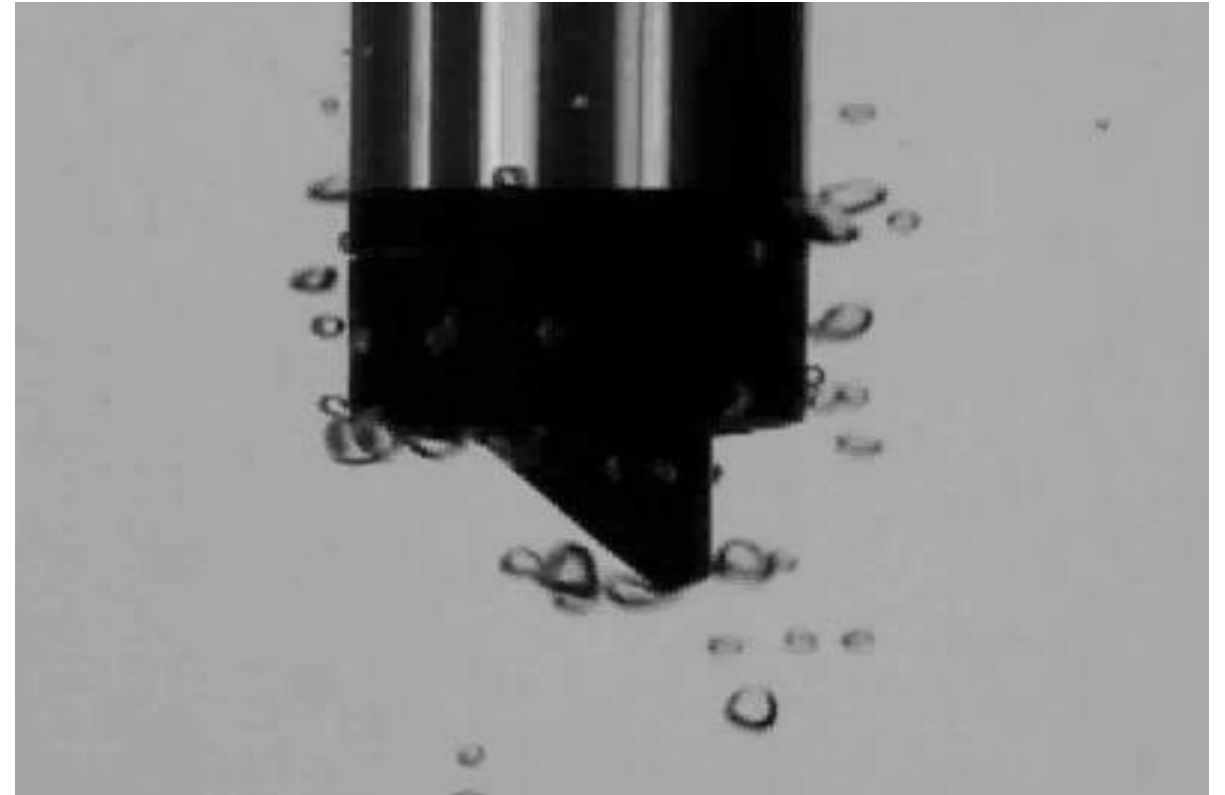


# Key Innovation: Dissolved Oxygen Sensor Cap Design

Typical DO Optical Sensor



FDO



# Spectral Sensors



- Photometer in a sensor.
- Full wavelengths scan.
- COD, BOD, NOx and Turbidity in one sensor
- Ultrasonic clean



# Sludge Blanket Level Sensor

- Ultrasonic sensor
- Maintenance-free
- Non contact scraper
- Rapid installation
- Calibration free



# Quality Features



UV light resistant



Shock proof



IP 66 modules - IP 68 sensors



EMC – electro magnetic radiation protection

**FUTURE**

Upward & downward compatible components

Build to resist & future proof...

- High quality materials for all components
- Combine old with new

# Communication



- Remote-Control via Network Technology
- Fieldbus communication:
  - EtherNet/IP
  - Modbus TCP
  - Profibus DP
  - Modbus RTU
- View measuring data with your web browser (Computer/tablet PC/Smart-Phone)
- Remote control via UMTS Router, GSM via Software Terminal



# Systems Overview

1 sensor



System 281

Single parameter

1-2 sensors



System 282

Single measuring point (1-4 parameters)

3-4 sensors



System 284

up to 20 sensors



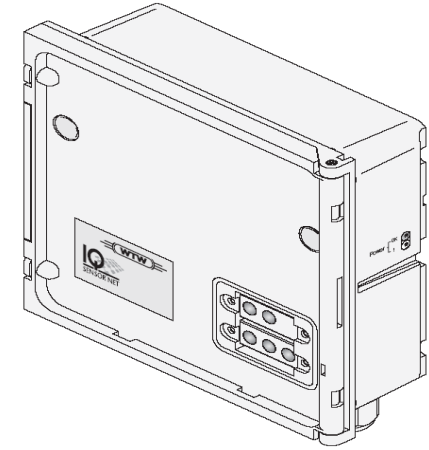
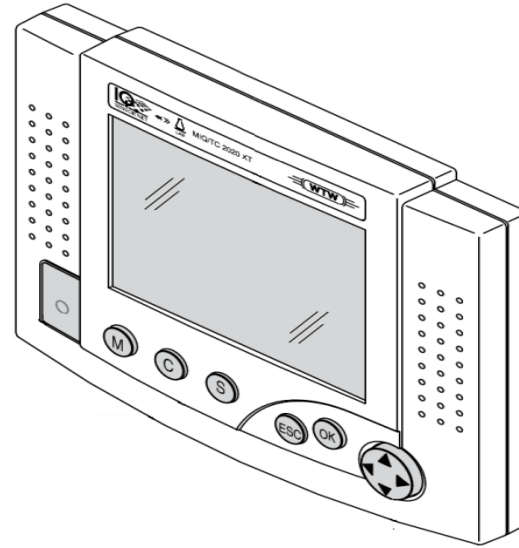
System 2020

Network

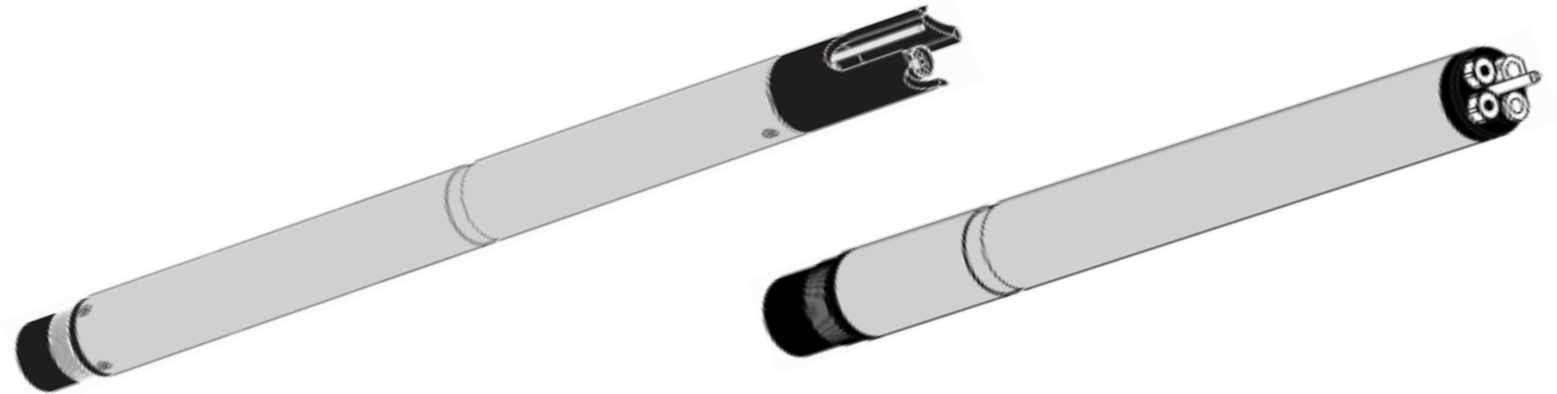
# Extended Warranty

**3 Years**

for Controllers and Modules



**2 Years**  
for Sensors



# MJK Flow and Level Product Range Overview



# Flow and Level Monitoring



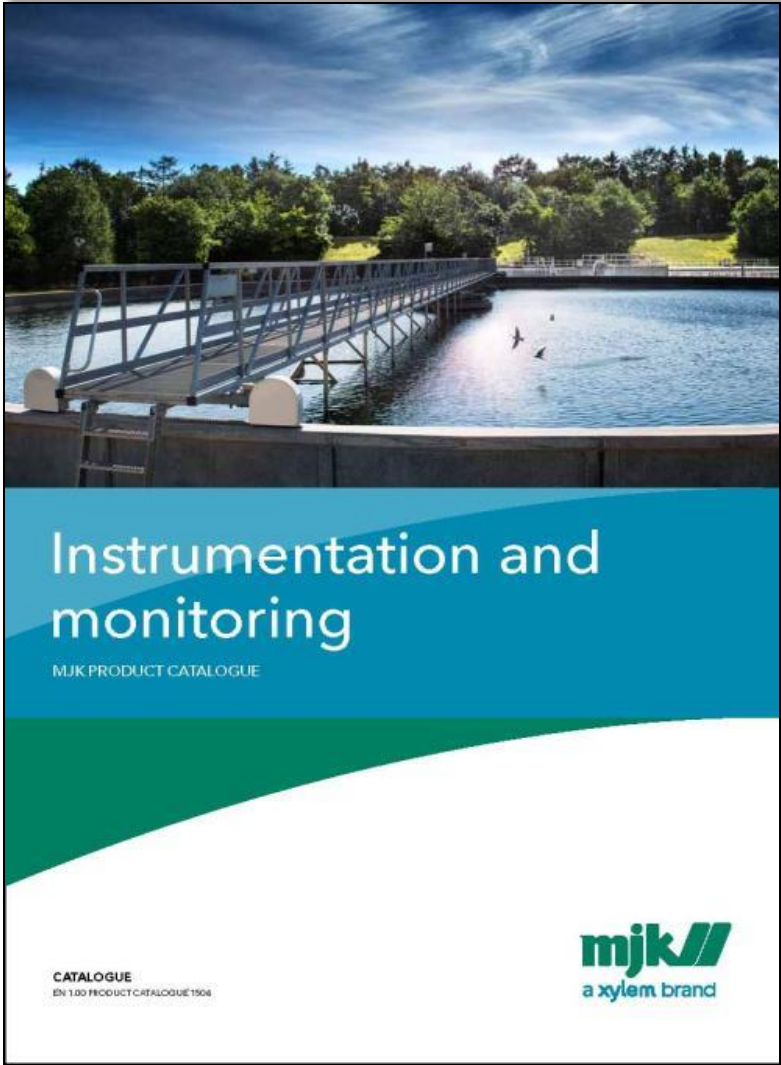
# Accurate and Reliable Instrumentation



- Level Measurement



- Flow Measurement

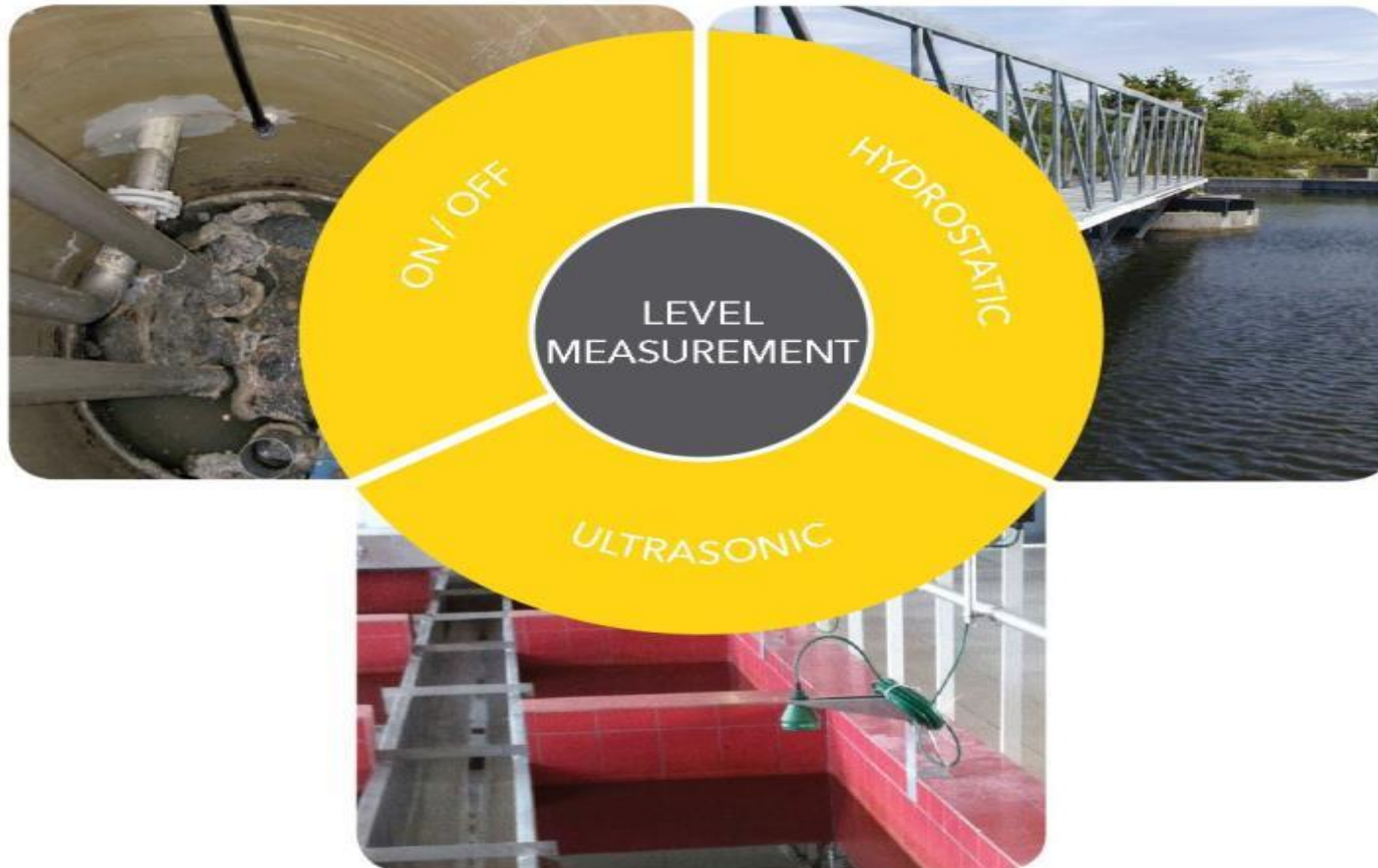


# Level Measurement



## The MJK Level Measurement Programs are:

- Ultrasonic
- Hydrostatic
- Float switch



# Shuttle® Ultrasonic Level Transmitter



## Features:

- Level transmitter with advanced features.
- Available with a range of sensors for ranges up to 30 m, and with enhanced chemical resistance.
- $\pm 0.2\%$  accuracy of measuring range
- Built-in pump Control
- Chemical resistant sensor suitable for measurements in tanks with aggressive liquids.



# Expert™ Hydrostatic Level Transmitters



## Features:

- 0.1% - 0.25% measurement accuracy and long time drift accuracy
- Ranges from 30cm to 300m
- Analog 4-20 mA output or digital Modbus output



# Level Float Switch 7030



**For simple on/off control**

## **Features:**

- Rugged level switch
- Environmentally friendly without mercury

## **Applications:**

- Wastewater pumping stations
- Sewage Treatment Plants.
- Drinking Water Reservoirs.

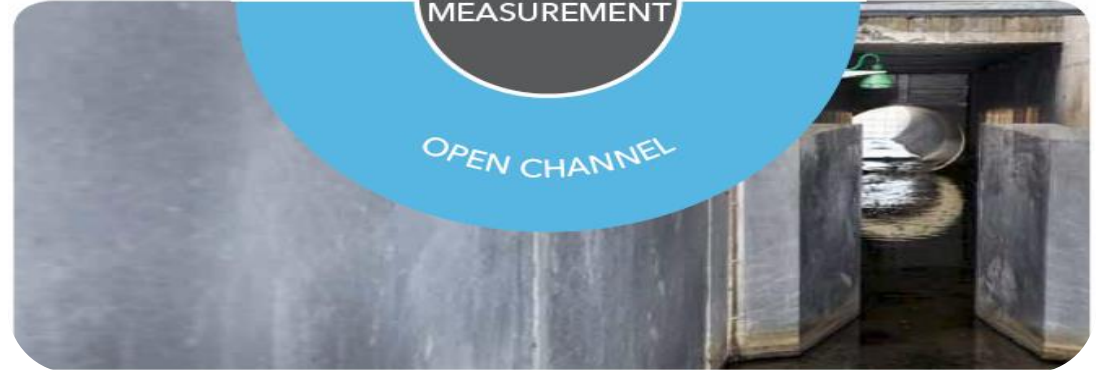


# Flow Measurement



## The MJK Flow measurement programs are:

- MagFlux Electromagnetic Flow Meter
- Open Channel Flow meter
- Pre-fabricated flumes



# MagFlux<sup>®</sup> Electromagnetic Flow Meter



## Features:

- Flow rate from 0.2 m/sec velocity!
- 0.25% accuracy over the full range from 0.2 m/sec to 10 m/sec.
- Build-in data logger with 200,000 log points
- Bi-directional sensor, Forward and reverse flow direction is selected after installation
- Display operates up to 4 MagFlux<sup>®</sup> simultaneously.
- Display can be mounted up to 1000 m from sensor.
- 4-20mA and ModBus output signals.



**PROFI<sup>®</sup>**  
**BUS**  
**Modbus**

**xylem**  
Let's Solve Water

# MagFlux<sup>®</sup> Electromagnetic Flow Meter



## Certificates and Approvals

MCERT

WRAS

MID

**SMU Slovak Institute of Metrology**  
Kortčevská 63, 842 05 Bratislava 4  
Reg. No. 001/P-035

**EC – Type-examination certificate**

Document number: **SK 13-MI001-SMU028** Revision 0

In accordance with: Government Ordinance of the Slovak Republic No. 294/2005 Coll., on measuring instruments as amended by Government Ordinance No. 445/2010 Coll. which implemented the Directive 2004/22/EC on measuring instruments as amended by Directive 2009/137/EC of the European Parliament and Council

Issued to (Manufacturer): **MJK Automation ApS**  
**Byageren 7, DK-2850 Nærum, Denmark**

Type of instrument: **Water meter (MI-001)**  
**Electromagnetic flow meter**

Type designation: **MagFlux 7200**

Essential requirements: Annex No. 1 and Annex MI-001 to Government Ordinance of the Slovak Republic No. 294/2005 Coll. as amended by Government Ordinance No. 445/2010 Coll.

Valid until: **April 17, 2023**

Notified body: **1781**

Date of issue: **April 18, 2013**

Essential characteristics, instrument description and approval conditions are set out in the appendix hereto, which forms the part of the certificate. The certificate including the appendix contains 13 pages.

**Anna Nemečková**  
representative of notified body

Note: EC-type examination certificate without signature and seal is not valid. This EC-type examination certificate may not be reproduced other than in full. Extracts may be taken only with the permission of the Slovak Institute of Metrology.

**WRAS APPROVED PRODUCT**

This certifies that  
**XYLEM WATER SOLUTIONS UK LTD**

dermentioned product examined, tested and found, fully installed, to comply with the requirements of the **Domestic Water Supply (Water Fittings) Regulations and Scottish Water Byelaws.**

**MAGFLUX FLOW METER EMF801 WATER METERS**

If it is not evidence of a valid WRAS Approval. Confirmation of the current status must be obtained from the WRAS Directory ([www.wras.co.uk/directory/](http://www.wras.co.uk/directory/))

Product so mentioned will be valid until the end of:  
**January 2021**

**1601028**  
Certificate No.

*K. Heston*  
Chairman, Product Assessment Group

**CSA Group** **CERT** **Environment Agency**

**PRODUCT CONFORMITY CERTIFICATE**

This is to certify that the **MJK MagFlux 7200**

Manufactured by:  
**Automation ApS**  
Byageren 7  
2850 NÆRUM  
DENMARK

Issued by: Sira Certification Service  
as stated on this certificate complies with:  
**Performance Standards for Water Monitoring**  
**3, Version 2.4 dated February 2013**

Certification Ranges :  
Flow rate: 0.1m<sup>3</sup>/s to 10 m<sup>3</sup>/s  
Pipe size: 25mm to 400mm

Emily Alexander  
Deputy Certification Manager

Issued on behalf of the Environment Agency by  
**Sira Certification Service**  
S. Howden Industrial Park  
Warden, Deeside, CH6 3US  
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# Open Channel Flow Convertor 713



- Compatible with Ultrasonic or hydrostatic sensor
- Flow Converter 713 comply with the ISO standard.



# Pre Fabricated Flumes



Measuring ranges from 50 m<sup>3</sup>/h to 2,000 m<sup>3</sup>/h



PARSHALL



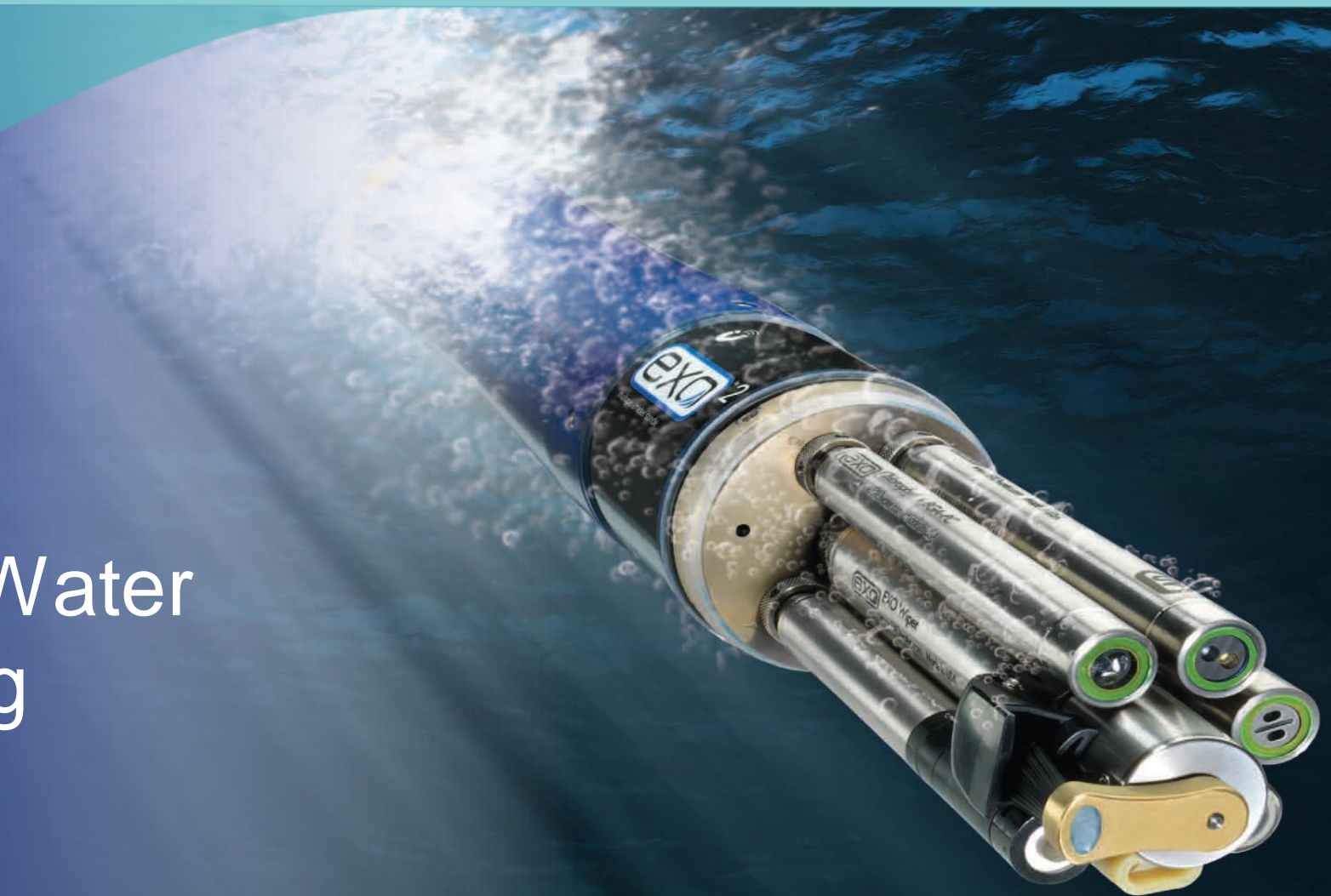
VENTURI



PALMER & BOWLIUS

# EXO Platform

Multi Parameter Water  
Quality Monitoring

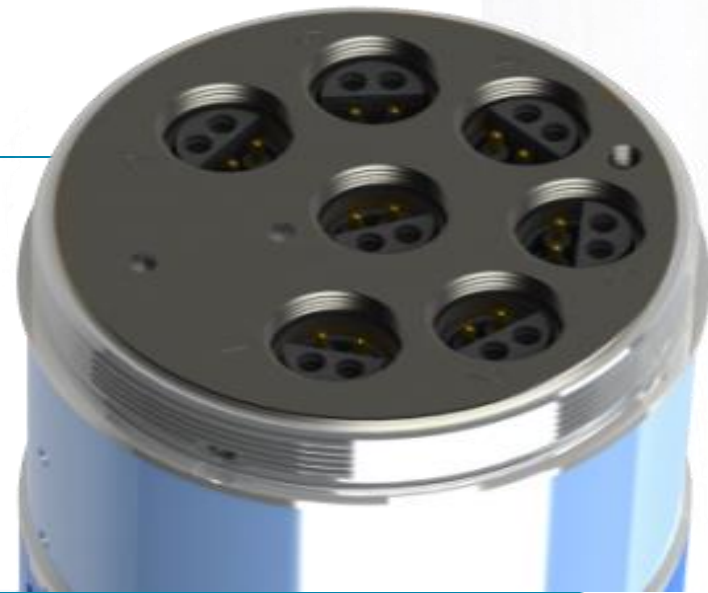


# EXO Sonde

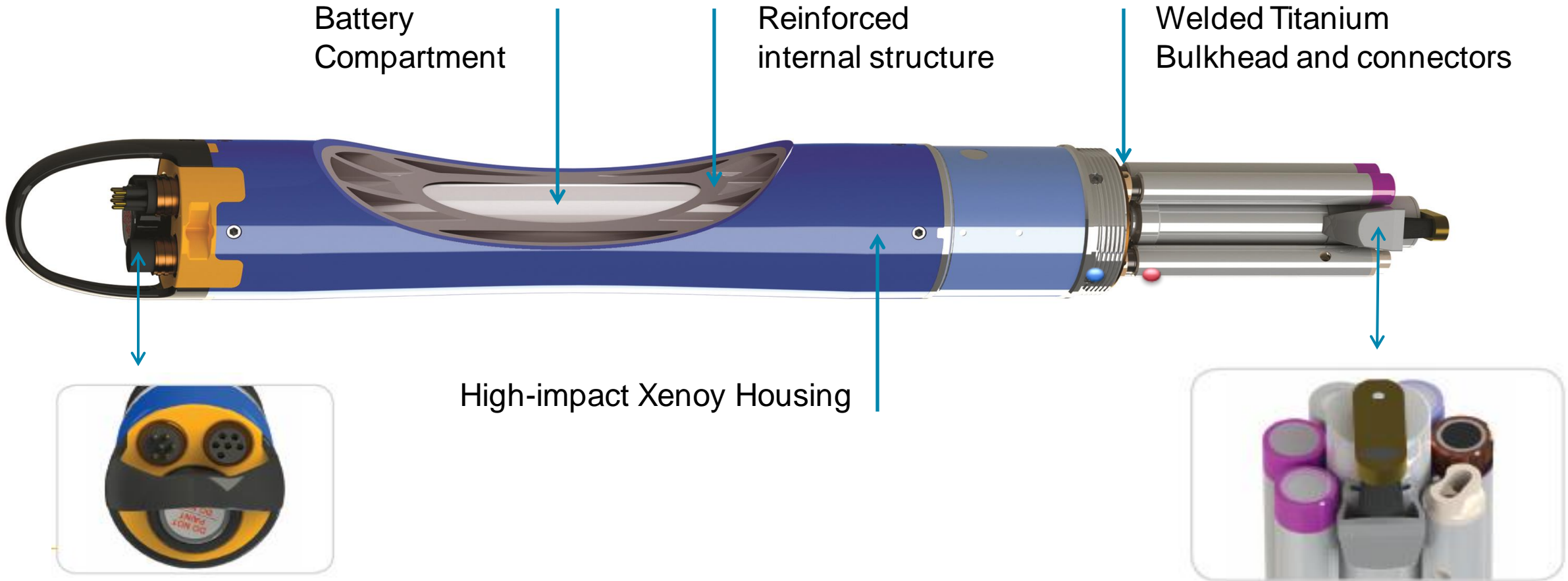


Continuous Monitoring

Up to 6 sensors + central wiper



# EXO2 Anatomy



Cable connector, battery valve, and expansion port for an additional sensor

Anti-fouling wiper keeps sensors clear of biofouling and lengthens deployment times by 25%

# EXO Smart Sensors



Conductivity  
and Temperature



Total Algae /  
Chlorophyll



Turbidity

# EXO Smart Sensors



pH + ORP



Fluorescent  
Dissolved Organic  
Matter (fDOM)



Ion Selective Electrode  
(Ammonium, Chloride,  
Nitrate)



Optical Dissolved  
Oxygen

# Central Wiper

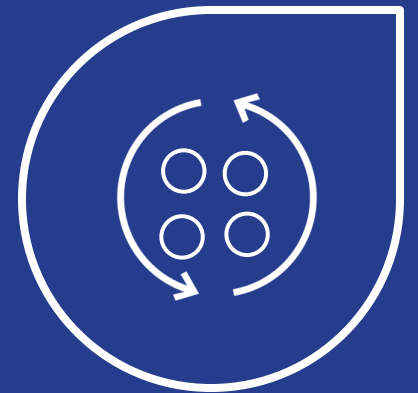
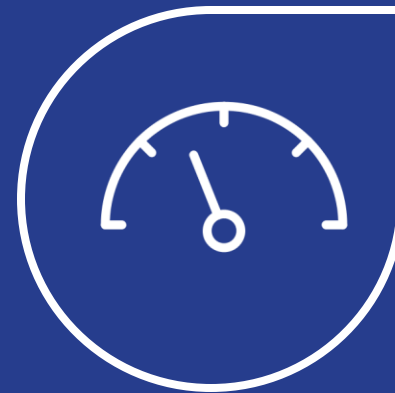


## Superior Anti-Fouling

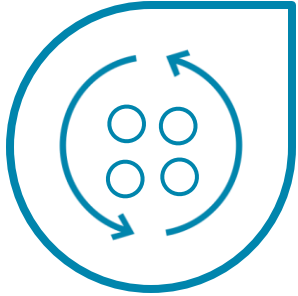
- Industry leading wiper
- Cleans all sensors
- Central probe design

# EXO's Capabilities

Features you'll only  
find with YSI



# EXO's Capabilities



## Smart Ports

- Any Sensor – Any Port
- Sensor Auto-detection



# EXO's Capabilities



## Auto-recognition

Plug in a sensor and automatically start logging data.

There are microprocessors in the sensors and the Sonde. This allows communication between the two – simplifying the process for the user.

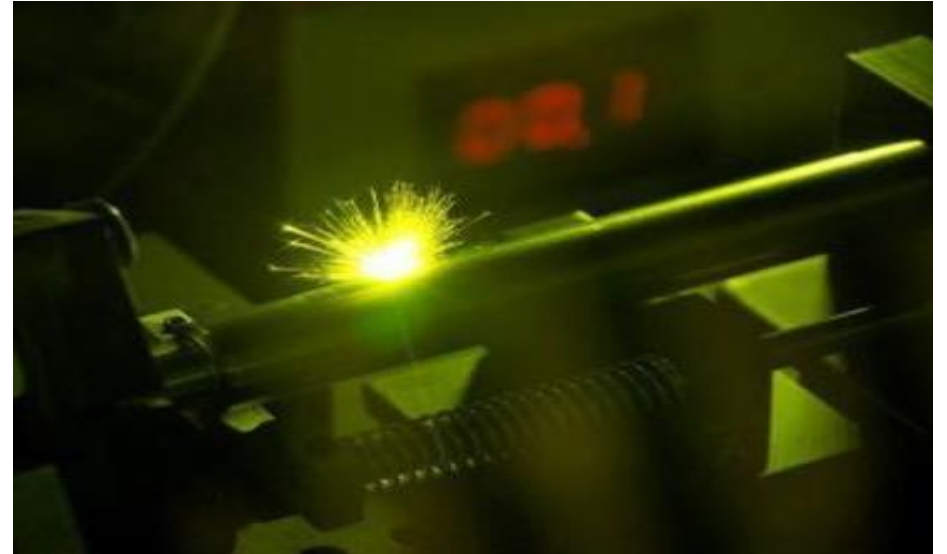


# EXO's Capabilities



## Titanium Sensors

- 250m depth rating
- Laser welded seals
- Durable titanium construction
- Fewer parts, wires, and connectors



# EXO's Capabilities



## Biofouling Protection

Photo shows sensor after 90-day deployment in the productive waters.

EXO2 central wiper balances power efficiency, ease of use, and improved reliability. Lowers overall maintenance costs.



# Handheld

- Full-Color LCD
- Built-in rechargeable Li-Ion battery
- Integrated USB, GPS
- IP-67 Housing
- Auto-buffer recognition
- KOR Software



# EXO Insertion Version



# EXO Insertion Version

