



Aquaculture

CONTINUOUS MONITORING AND CONTROL



a xylem brand



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Thank you for considering YSI as your supplier of water quality monitoring and control instrumentation. As the demand for high quality aquaculture production increases and aquatic life support management becomes more automated, the need for water quality monitoring instrumentation to ensure a healthy harvest and productive habitat is also increasing.

YSI, the manufacturer of handheld instruments you've used and trusted for years, is here to help. We have expanded our continuous water quality monitoring and control instrumentation product line and have designed it specifically for the aquaculture and aquatic life professional.

We pride ourselves in developing and manufacturing industry-leading instrumentation to help make your job easier, provide reliable data for decision making and improve the efficiency of your facility. We are here to support you in your work. Our knowledgeable customer service and technical support staff can help with any instrument or application questions you may have.

Thank you for your interest in YSI and for reviewing our catalog. Please contact us with any questions, concerns or comments.

Laura St. Pierre | *Senior Product Manager, WQS*



Monitoring & Control **aquaculture**

Applications

RAS (recirc systems)
Raceways
Ponds
Cages
Live haul
Aquariums
Research
Systems



5200A

Dissolved Oxygen
(polarographic)
pH
Conductivity
Temperature
ORP
Salinity
TDS
External devices*



5400

Dissolved Oxygen
(galvanic)
Temperature
External devices*



5500D

Dissolved Oxygen
(optical)
Temperature
External devices*



IOEM/REM

Integrate other devices
Expand outputs
Add relays
Send data to PLC or
SCADA

* External devices refers to the ability to input signals from other devices such as TGP, DO, pH, photo period, etc.

Monitors at a Glance

Dependability. Monitoring and controlling with the 5200A, 5400, and 5500D is managed locally by the instrument, not at a central PC or PLC. This provides security that an entire system won't fail.

Scalability. Easy to use with low cost of ownership. User-scalable as your facility changes, unlike typical PLCs or DCPs. No engineers or programmers needed to change or add to the system.

Multiparameter and multilocation capability. With the ability to measure virtually any parameter using a variety of probes at multiple locations, you can design a total facility solution.

Feed management. Feed Smart™ conditional feed timer software is included with every monitor. Very powerful feeding capabilities interface with most powered feeders.

Improved management tools. With AquaManager®, you will have access to quality data (water quality parameters, event logs, etc.) to better manage your operation and improve efficiency. SMS and email alarms quickly notify if parameters exceed user-defined limits. Data can be easily accessed remotely using AquaManager.

Flexibility. Mix and match monitor and control instruments as well as expansion modules for flexibility in designing a system to best meet facility needs.

5200A Multiparameter Monitor

Designed specifically for aquaculture and aquatic life support systems, the **5200A** integrates water quality monitoring, process control, feeding, alarming, and data management into one instrument. Multiparameter monitoring functionality for dissolved oxygen (DO), temperature, pH, ORP, conductivity, and automatic salinity compensation. Plus, two configurable inputs for additional sensors and management.

5200A

- Ethernet TCP/IP or wireless communications – optional
- Event logging records calibrations, high and low conditions, and more
- Conditional feed timer with Feed Smart™ software included
- Networking capability; can be integrated with 5400 and 5500D monitors and expansion modules
- Flexible dosing and control software
- SMS and email alarming
- Graphic interface function for quick, reliable system-status checks
- Plug-and-play – easy to install, setup, and maintain
- Photo period management
- Control parameters with set points, dosing, or PID functions



5200A Specifications

Conductivity

Range: 0-200 μ S, 0-2000 μ S, 0-20 mS, 0-200 mS

Resolution: 0.1 μ S in 200 μ S range; 1 μ S in 2000 μ S range; 0.01 mS in 20 mS range; 0.1 mS in 200 mS range

Accuracy: \pm 0.5% of range (0-100 mS); \pm 1.0% of reading (100-200 mS)

Dissolved Oxygen

Description: Polarographic; automatic salinity compensation

Range: 0-500% air saturation; 0-60 mg/L

Resolution: 0.1% (0.0-99.9%); 0.01 mg/L (0-10 mg/L); 0.1 mg/L (10-60 mg/L)

Accuracy: \pm 2% of reading or \pm 2% DO sat, whichever is greater (0 to 200%)
 \pm 0.2 mg/L or \pm 2% of reading, whichever is greater (0 to 20 mg/L)
 \pm 6% of reading (20 to 60 mg/L) (200-500%)

ORP

Range: -2000 mV to 2000 mV

Resolution: 1 mV

Accuracy: \pm 20 mV

pH

Range: 0.0-14.0 units

Resolution: 0.01 units

Accuracy: \pm 0.2 pH

Salinity (calculated from conductivity and temperature)

Range: 0-80 ppt (0-50 manual input)

Resolution: 0.1 ppt

Accuracy: \pm 2% or \pm 0.1 ppt, whichever is greater

Temperature

Range: 0-45°C (32-113°F)

Resolution: 0.1°C

Accuracy: \pm 0.2°C

Timers

Description: 4 timers – 10 cascading events with start/duration setting; 1 feed timer channel

Communication Ports

Description: Standard: RS485 network (optically isolated) and RS232. Optional: Ethernet TCP/IP and wireless

Data Logger

Description: Non-volatile, 2000 data records, 1250 relay/alarm/event records, 1000 entries/configurations/change records, 500 GLP/calibration records

Warranty

Description: 2-year on instrument; 1-year on probe/cable

Auxiliary Inputs*

Description: 2 user-configurable inputs, digital or analog (0 to 1.0 VDC or 0 to 5.0 VDC or 4 – 20 mA)

Ratings

Description: ETL, cETLus, EMC, CE, RoHS, WEEE, NEMA 4X (IP-65), Made in the USA

Output Relays (not fused)

Description: 4 internal 10A at 110VAC (5A at 240 VAC) relays for parameter control and/or alarm

Alarming

Description: Local, email, and/or SMS alarming. Up to 3 emails with Ethernet Module or 10 emails with AquaManager®

Power Requirements

Description: Option 1: 12 VDC; Option 2: 100/240 VAC switches to 12 VDC backup

Display

Description: Graphic LCD; extended temp range LCD with backlight

Size

Dimension of Controller: Height: 6.5 in (16.5 cm); Length: 8.5 in (21.6 cm); Depth: 4.75 in (12.1 cm)

Enclosure

Description: NEMA 4X

Parameters

Dissolved Oxygen
(polarographic)

pH

Conductivity

Temperature

ORP

Salinity

Additional
user-configurable inputs*

*User-configurable inputs can be used for additional sensors like DO, pH, TGP, ORP, level, pressure, etc. Some sensors require an additional transmitter.

5400/5500D MultiDO Monitors

Our continuous multi-channel dissolved oxygen (DO) monitoring and control instruments are designed specifically for aquaculture systems. Easily manage a full-scale farming operation with expandable capabilities.



Access data remotely



YSI 5400

The 5400 continuous monitor for dissolved oxygen (DO) with a galvanic sensor – along with AquaManager® software – integrates process control, feeding, alarming, and data management into one product.

YSI 5500D

The 5500D Optical DO (ODO) monitoring & control instrument continuously monitors your farming operation's water quality for DO using optical-based ODO technology. Choose 1, 2, or 4 DO channels. Lower maintenance and recalibration requirements with ODO measurement technology.

5400 and 5500D

- Ethernet TCP/IP or wireless communications – optional
- Event logging records calibrations, high/low conditions, and more
- Conditional feed timer with Feed Smart™ software included
- Networking capability up to 32 instruments per communications port and can be integrated with 5200A, 5400, 5500D and expansion modules
- Instruments monitor system functionality
- Graphical interface for easy viewing and menu navigation
- Plug-and-play – easy to install, setup, and maintain
- Flexible monitoring and control software
- Email and SMS alarming
- Photo period management
- Control parameters with set points, dosing, or PID functions
- User-selectable salinity range to compensate for DO

Specifications

5400 5500D

Dissolved Oxygen

Description	4 DO channels; Galvanic	●	
	up to 4 DO channels; Optical		●
Range	0 to 500% air saturation; 0 to 60 mg/L	●	
	0 to 500% air saturation; 0 to 50 mg/L		●
Resolution	0.1% (0.0 to 99.9%); 1% (>99.9%); 0.01 mg/L (0 to 10 mg/L); 0.1 mg/L (10 to 60 mg/L)	●	●
Accuracy	±2% of reading or ±2% DO sat, whichever is greater (0 to 200%) ±0.2 mg/L or ±2% of reading, whichever is greater (0 to 20 mg/L) ±6% of reading (200 to 500%; 20 to 60 mg/L)	●	
	±1% of reading or ±1% DO sat, whichever is greater (0 to 200%) ±0.1 mg/L or ±1% of reading, whichever is greater (0 to 20 mg/L); ±10% of reading (200 to 500%) (20 to 50 mg/L)		●

Salinity Input

Range	0 to 50 ppt; manual (automatically compensates DO for manual input value)	●	●
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Timers

Description	4 timers – 10 cascading events with start/duration setting; 4 feed timer channels	●	●
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Communication Ports

Description	Standard: RS485 network (optically isolated) and RS232 Optional: Ethernet TCP/IP and wireless	●	●
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Data Logger

Description	Non-volatile, 2000 data records, 1250 relay/alarm/event records, 1000 entries/configurations/change records, 500 GLP/calibration records	●	●
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Warranty

Description	2-year on instrument; 1-year on probe/cable	●	
	2-year on instrument, probe/cable		●

Auxiliary Inputs*

Description	6 user-configurable inputs digital or analog (0 to 1.0 VDC, 0 to 5.0 VDC or 4-20 mA) 4 auxiliary inputs can be configured for temperature inputs	●	●
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Ratings

Description	ETL, cETLus, EMC, CE, RoHS, WEEE, NEMA 4X (IP-65), Made in the USA	●	●
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Output Relays (not fused)

Description	10A at 110VAC (5A at 240VAC)	●	●
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Alarming

Description	Local, email, and/or SMS alarming. Up to 3 emails with Ethernet Module or 10 emails with AquaManager®	●	●
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Power Requirements

Description	Option 1: 12 VDC; Option 2: 100/240 VAC; switches to 12 VDC backup	●	●
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Display

Description	Graphic LCD; extended temp range LCD with backlight	●	●
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Size

Dimension of Controller	Height: 6.5 in (16.5 cm); Length: 8.5 in (21.6 cm); Depth: 4.75 in (12.1 cm)	●	●
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Enclosure

Description	NEMA 4X	●	●
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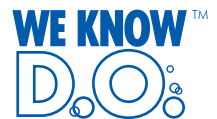
Parameters

5400

Dissolved Oxygen (galvanic)
Temperature
Additional user-configurable inputs*

5500D

Dissolved Oxygen (optical)
Temperature
Additional user-configurable inputs*



*User-configurable inputs can be used for additional sensors like DO, pH, TGP, ORP, level, pressure, etc. Some sensors require an additional transmitter.

[ysi.com/5400](https://www.ysi.com/5400)

[ysi.com/5500D](https://www.ysi.com/5500D)

Expansion Modules for Monitoring & Control

Ensure healthy livestock and maximum profits with tighter control of water quality and system parameters. The YSI IOEM and REM expansion modules increase the flexibility and capability of the YSI aquaculture monitoring and control platform when networked with the 5200A, 5400 and/or 5500D instruments.

Applications

- Recirculating systems
- Raceways
- Ponds
- Sea cages
- Live haul
- Aquariums
- Research



IOEM

- 4 (IOEM-4) or 8 (IOEM-8) user-configurable channels as inputs or outputs
- Optically isolated to eliminate electrical interferences and ground loops
- When configured as outputs (4-20 mA) either set point or PID control can be used
- 4-20 mA outputs can interface to a SCADA or PLC system
- Inputs can be used for temperature, analog (0 to 1.0 VDC, 0 to 5.0 VDC or 4-20 mA) or digital*

REM

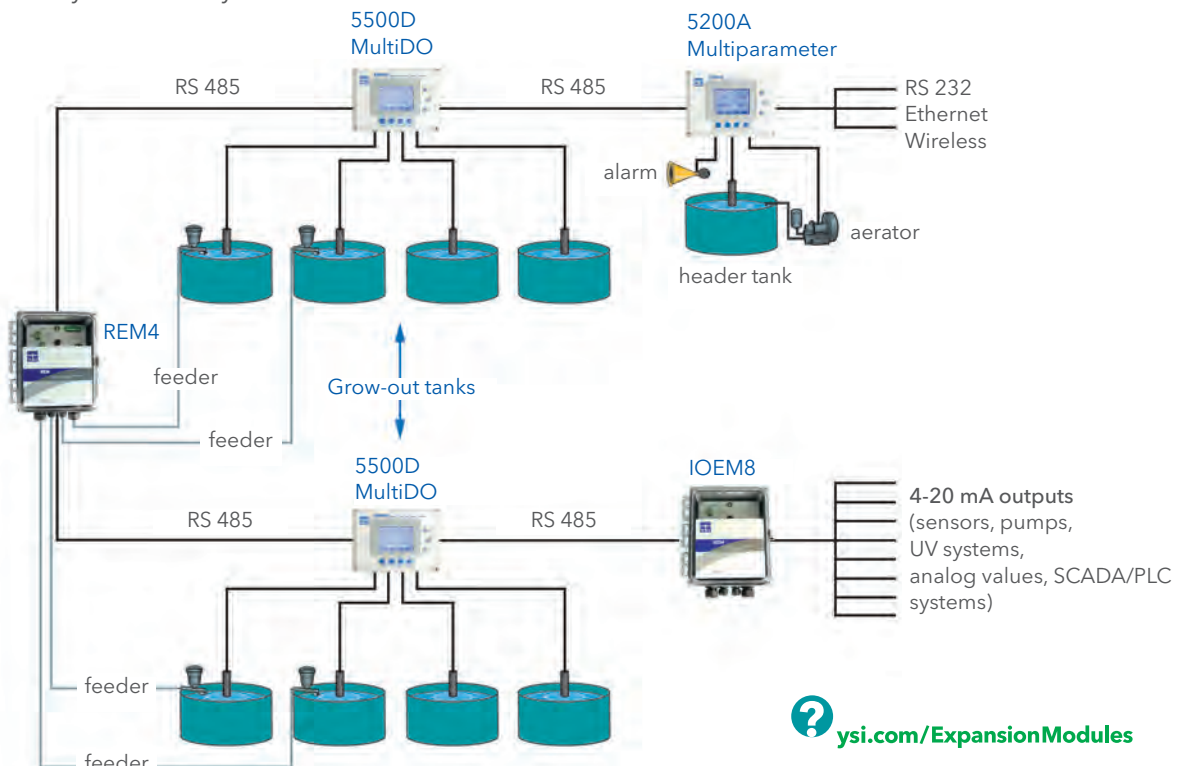
- 4 user-configurable output relays

*user-configurable inputs can be used for additional sensors like DO, pH, TGP, ORP, level, pressure, etc. Some sensors require an additional transmitter.

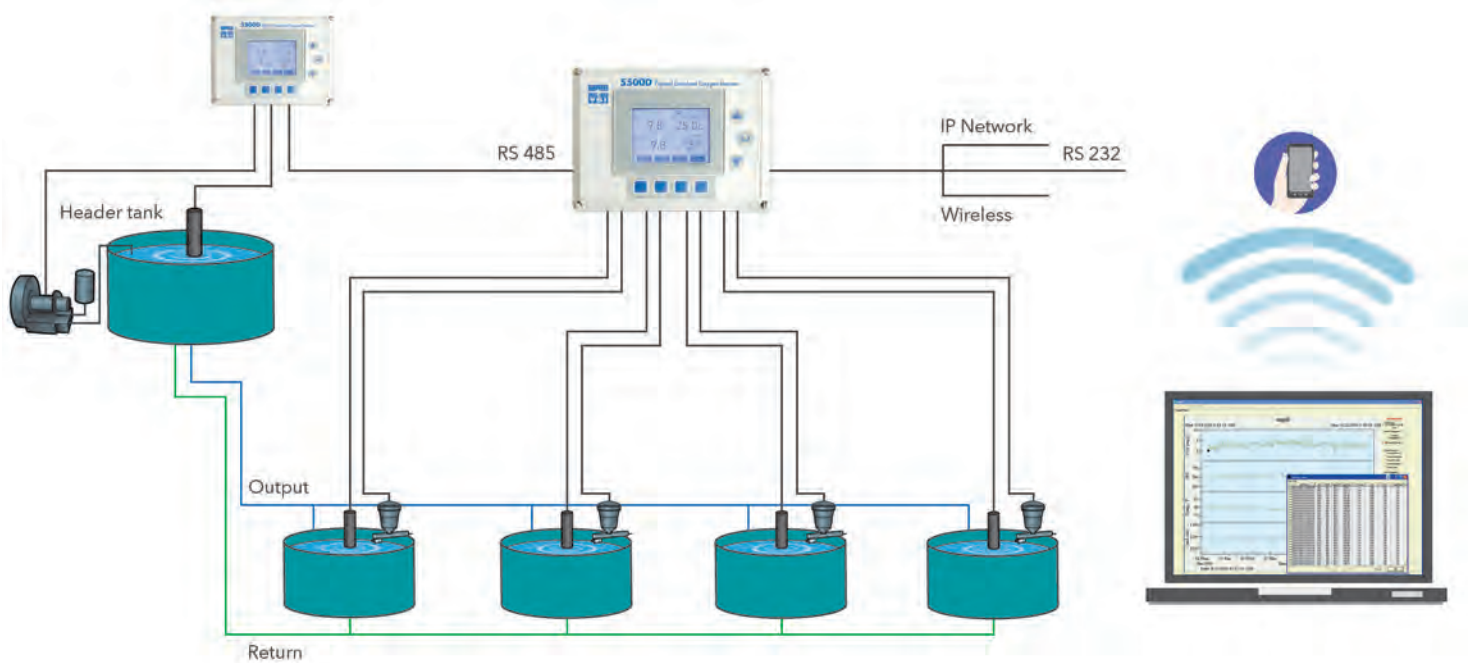
IOEM and REM

- Plug-and-play: easy to install, setup and maintain
- NEMA 4X enclosure (IP-66 rated)
- AC and DC power (DC power can be used for battery back-up if used with AC power)
- 2 year warranty

Example of three monitors individually monitoring and controlling nine tanks with two expansion modules to control feeders, lighting, and to send data to SCADA/PLC system.

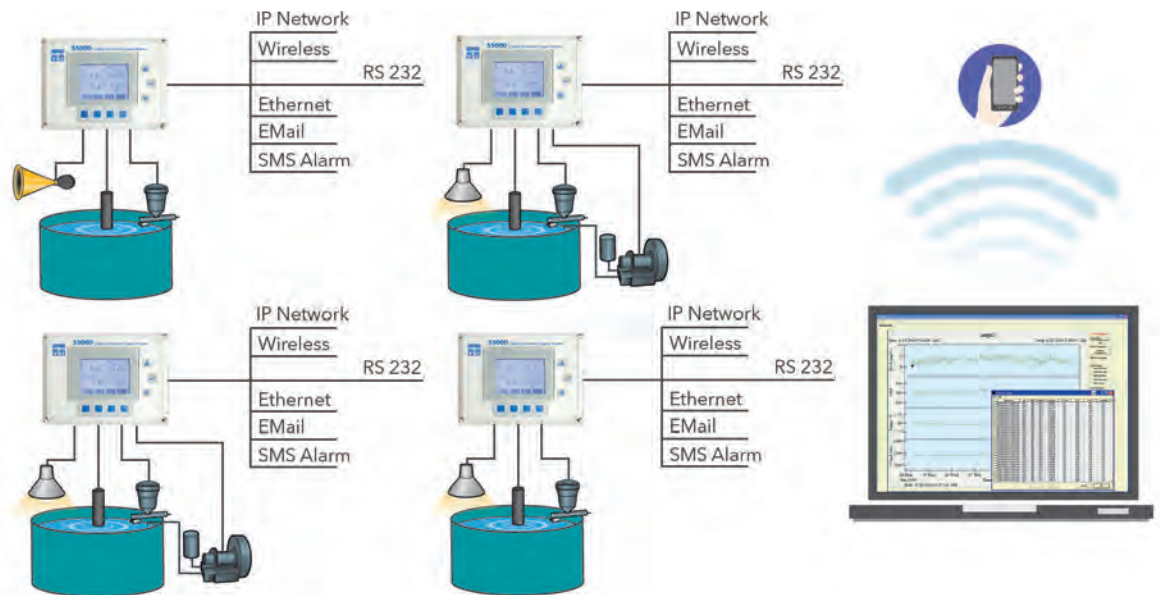


Networking User-Configurable



Multiple connectivity options include RS485, RS232, Ethernet, or wireless.

Example of two monitors in the same network providing a multiparameter solution.



Example of multiple monitors individually controlling tanks integrated into the same network with various communications channels.

Benefit Overview



Feed Smart™ (included) **Conditional feed timer around the clock**

Feed Smart™ software can be used as a basic feed timer or conditional feed timer. Manages feed delivery based on user-selectable inputs for the number of daily feedings, daily feed weights, total biomass, and feed conversion ratios (FCRs) along with parameter control based on water quality values which reduces, or stops, feeding as water quality deteriorates.

- Saves money on feed
- Eliminates excess food deteriorating water quality
- Feed when fish need to eat
- Increase yields
- Interfaces with most powered feeders
- Increase feeding daily based on FCR
- Select when to feed – time periods and days of the week (up to 100 times daily)
- Calculates biomass
- Saves money on labor and is significantly less expensive than other automated feeding options

Outputs/Timers (included) **5400/5500D**

- 8 relays 10A at 110VAC (5A at 240VAC)
- 4 timers – 10 cascading events with start/duration setting
- 4 Feed Smart channels
- Email and/or SMS alarming up to 3 emails with Ethernet module or up to 10 emails with AquaManager®
- Local alarm; configurable to relay

5200A

- 4 each 10A at 110VAC (5A at 240VAC)
- 4 timers – 10 cascading events with start/duration setting
- 1 Feed Smart channel
- Email and/or SMS alarming up to 3 emails with Ethernet module or up to 10 emails with AquaManager®
- Local alarm; configurable to relay

Inputs (included) **5400/5500D**

- Up to 4 dissolved oxygen (DO) probe inputs
- 6 user-configurable inputs, digital or analog (0 to 1.0 VDC, 0 to 5.0 VDC or 4-20 mA)
- 4 auxiliary inputs can be configured for temperature inputs

5200A

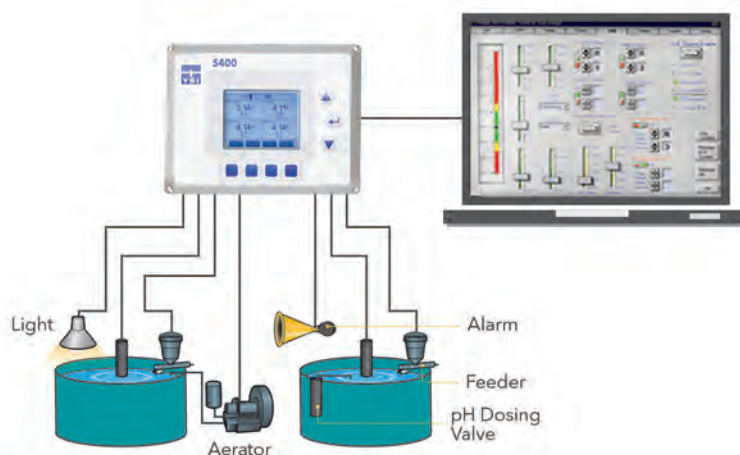
- DO, pH, ORP, conductivity, temp
- 2 user-configurable inputs, digital or analog (0 to 1.0 VDC, 0 to 5.0 VDC or 4-20 mA)*

*User-configurable inputs can be used for additional sensors like DO, pH, TGP, ORP, photo period, etc. Some sensors require an additional transmitter.

Control

Pumps, valves, feeders, alarms, lights, heaters, chillers, blowers, pure O₂, ozone, etc.

Monitor and control continuously



The relays can control pumps, valves, feeders, alarms, lights, etc.



Control Relays (included)

The **5400/5500D** comes with 8 internal relays and the **5200A** comes with 4 internal relays available for control outputs. The relays are accessible through terminal blocks on the I/O panel inside the enclosure. The terminal blocks provide Normally Open, Normally Closed, and Common Connections to the relays. Select set point, dosing, or PID control mode. With the REM expansion module, add up to 4 more relays to the network.

Expandability Inputs/Outputs

Add up to 8 user-configurable inputs/ outputs with IOEM expansion modules. Inputs can be configured as digital or analog and used for additional sensors like dissolved oxygen, pH, Total Gas Pressure, ORP, photo period, etc. 4 to 20 mA outputs can send data to facility or PLC or SCADA.

Power (Options)

Option 1 (12 VDC)

Configuration for mobile live-haul applications, or anytime AC power is not available.

Option 2 (100-240 VAC)

The system will automatically switch to 12 VDC back-up operation and sound an alarm if primary voltage drops below safe operating range.*

*12 VDC back-up power supply is optional. Contact YSI for more information.

Software

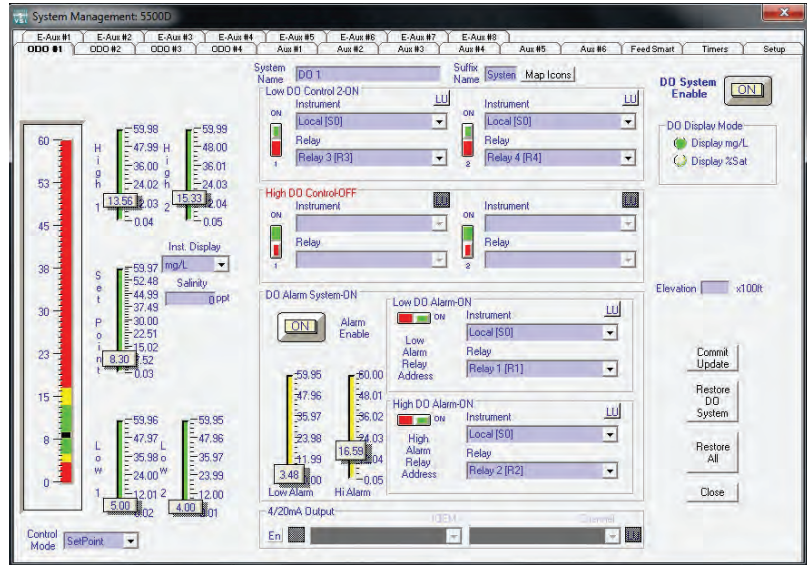
AquaManager® (optional)

AquaManager® desktop software allows you to control and set up any instrument on the network, view data, set alarming options, and change relays or set points depending on application – conveniently from one central location.

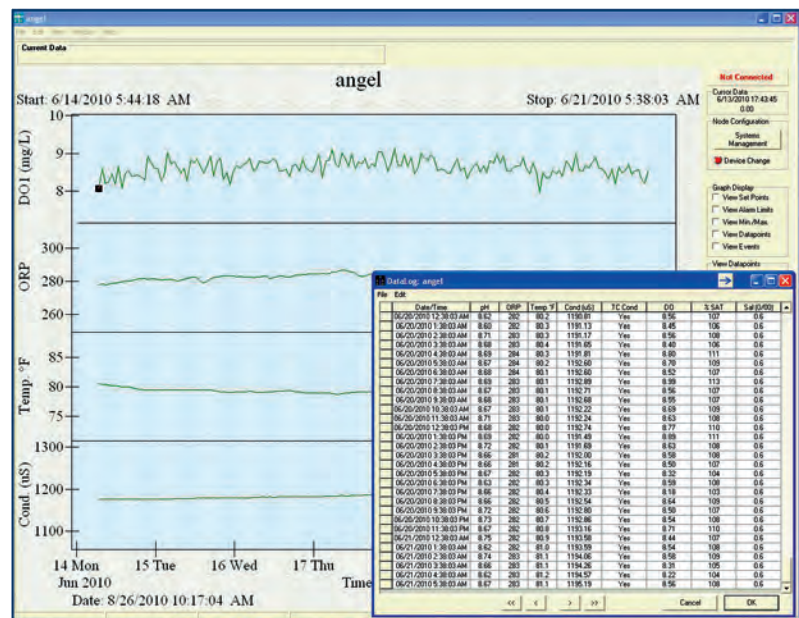
Instantly see an overview of your facility, manage parameter set points, and manage your data in order to make informed operational decisions in real time. The browser-based format makes navigation and maintenance easy.

The facility-mapping feature provides an immediate overview of all ponds or tanks indicating their current state.

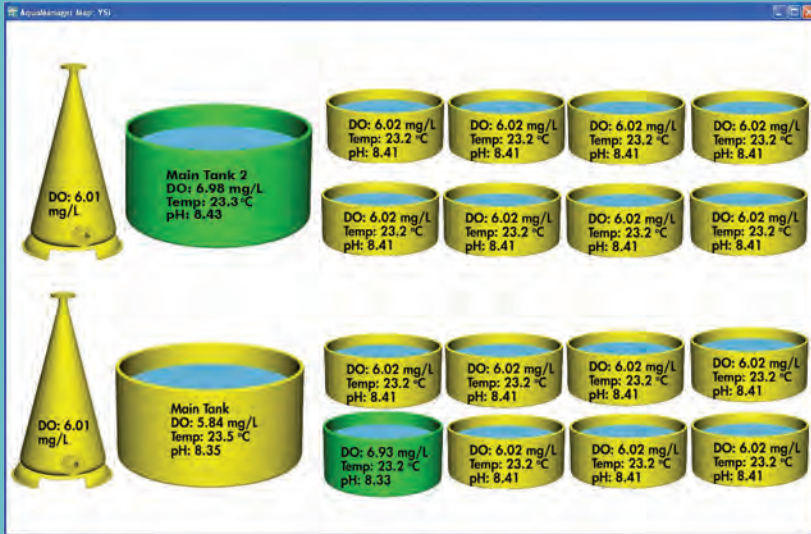
All parameter and most system settings can be managed from the desktop with the AquaManager software.



Example of the 5500D system management screen showing set points for dissolved oxygen. The 5400 and 5200A set points screen looks similar.



You can view your data instantly in tabular or graphical formats.



To quickly identify changes or issues at your facility, a visual map can be created to look like your facility. When displayed on a monitor, anyone can see where and when maintenance or action is needed. Real-time data is continually displayed. A facility JPEG or BMP file can be used as a background, and data easily added. Building a map of your facility is easy - use the provided background file, add data and choose icons from the library.



The icon library includes raceways, tanks, lights, pumps, valves, and much more in order to accurately depict what you have at your facility.



All tanks have options to show their state of activity from Inactive (operating normally), Active (some form of control is taking place), or Alarm (beyond the set point limit and control hasn't corrected it).

Quickly identify with visual cues how your facility is operating.

How to Order

Step 1: Choose Monitor.

You can also go to ysi.com/aquaculture to choose the best system for your application.

5500D

- 5500D-01-DC:** Single channel optical DO monitor, 12 VDC, power supply not included
- 5500D-01-AC:** Single channel optical DO monitor, 110-240 VAC
- 5500D-02-DC:** Two channel optical DO monitor, 12 VDC, power supply not included
- 5500D-02-AC:** Two channel optical DO monitor, 110-240 VAC
- 5500D-04-DC:** Four channel optical DO monitor, 12 VDC, power supply not included
- 5500D-04-AC:** Four channel optical DO monitor, 110-240 VAC

5400

- 5400-DC:** Four channel galvanic DO monitor, 12 VDC, power supply not included
- 5400-AC:** Four channel galvanic DO monitor, 110-240 VAC, with 115 VAC US cord

5200A

- 5200A-DC:** Multiparameter monitor (DO, temp, pH, ORP, salinity), 12 VDC, power supply not include
- 5200A-AC:** Multiparameter monitor (DO, temp, pH, ORP, salinity), 110-240 VAC, with 115 VAC US cord

Step 2: Order Expansion Modules (as needed).

- IOEM-4 AC/DC*:** Networkable module that has 4 user-configurable Inputs/Outputs
- IOEM-8 AC/DC*:** Networkable module that has 8 user-configurable Inputs/Outputs
- REM-4 AC/DC*:** Networkable module that has 4 user-configurable relay outputs

Step 3: Order Probes and Cables.

5500D

- 626200-X:** 1-, 4-, 10-, 20-, 30-, 40-, 50-, 60-, or 100-meter cable with optical DO probe

5400

- 5421-4, 10, 20, or 30:** 4-, 10-, 20-, 30-meter cable with galvanic DO probe/Temp
- 5420-4, 10, 20, or 30:** 4-, 10-, 20-, 30-meter cable with galvanic DO probe/no Temp

5200A

- 5561-4, 10, 20, or 30:** 4-, 10-, 20-, 30-meter cable with polarographic DO probe/Temp
- 5562-4, 10, or 20:** 4-, 10-, 20-meter cable with polarographic DO/Temp/Cond (order pH or pH/ORP sensor separately)
- 5564:** pH Sensor
- 5565:** pH/ORP Combination Sensor
- 5564A:** Amplified pH Sensor Kit
- 5565A:** Amplified pH/ORP Combination Sensor Kit

Step 4: Order Accessories.

- 5402:** Serial to Ethernet Module; 5200A, 5400, 5500D
- 5204:** DO Membrane Kit, 2 mil Teflon for polarographic (6 membranes with electrolyte); 5200A
- 5405-5:** DO Membrane Kit, 2 mil Teflon for galvanic; 5400
- 5405-25:** DO Membrane Kit, 2 mil Teflon for galvanic (25 membranes with electrolyte); 5400
- 5406:** DO Probe Solution, 1 Pint (473 mL) for galvanic (5 membranes with electrolyte); 5400
- 5205:** Probe Mounting Kit; 5200A (requires separate power supply)
- 5909:** DO Cap Membrane Kit, 2 mil PE for polarographic (6 caps and solution); 5200A
- 6505:** Weather Shield; 5200A, 5400, 5500D
- 5209A:** AquaManager® Desktop Software; 5200A, 5400, 5500D (version 6.0 or later required for configuration)
- 6506:** Desiccant Kit; 5200A, 5400, 5500D, IOEM, REM
- 6509:** Rail Mount Kit; 5200A, 5400, 5500D
- 6510:** Panel Mount Kit; 5200A, 5400, 5500D
- 606100:** 230 VAC cord, European
- 606101:** 230 VAC cord, UK
- 606102:** 230 VAC cord, Australia
- 6513:** Expansion Module Weather Shield
- 6514:** Expansion Module Rail Mount Kit

* Must be used with a 5200A, 5400 and/or 5500D and configured via AquaManager®

For technical assistance or help with designing an M&C system, contact Darrin Honious, YSI's Aquaculture Expert at: dhonious@ysi.com 937-767-7241 ext. 246

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Xylem |'ziləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to xylem.com



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