

IK-2000 Series Water Quality Management Analyzer for Boiler Feedwater

Product Description

The IK-2000 series are multi-parameter inline water quality analyzers specifically designed as a 'Turn-Key' monitoring solution for boiler feedwater and chemical treatment applications ranging from low to high pressure operations. The Guardian boiler feedwater series is offered in "ONE-PANEL" design, with a variety of Pyxis Lab® smart sensor options based on the application and need. This format allows the user the flexibility to begin with a base model and add sensor capability over time and as desired, without the need to replace or configure anything. Simply plug in the new sensor to the available sensor pigtail on the analyzer, and the Guardian will automatically recognize, configure, and initiate operation, calibration interface and data logging of the added sensor. With all sensor options installed, the Guardian boiler feedwater series offers highly accurate and repeatable, real-time measurement, display, and data-logging of sample water Dissolved Oxygen (ppb), Temperature (°C/°F), pH, ORP (mV), Sulfite (ppm), Conductivity ($\mu\text{S}/\text{cm}$), Total Dissolved Solids (ppm) and Sample Flow Rate (mL/Min) utilizing proprietary Pyxis Lab smart sensor technology coupled with a color touch screen display and data logging terminal.

The Guardian boiler feedwater series should always be installed downstream of a sample cooler, from the deaerator storage vessel (not feedwater pump discharge) and are offered in a convenient and easy to integrate panel mounted format using only 304 and 316L stainless steel with SwageLok™ compression fittings to ensure optimum sensor performance and longevity. With an integrated shelf for easy sensor calibration and maintenance, the Guardian Boiler Feedwater Series was designed with the user in mind. The Guardian IK-2000 series boiler feedwater analyzer integrates up to four (4) unique Pyxis smart sensors.

NOTE

The base model will come equipped with one ST-774 sensor only and all remaining pre-plumbed stainless tee assemblies are plugged for future use as the user desires.

Features

- Fully Integrated & Turn-Key Boiler Feedwater Analyzer
- UC-100AGS (7-inch) Color Touch Screen Display & Data-Logging Terminal
- Pre-Configured Firmware to enable up to Four (4) Pyxis Lab® Smart Sensors
- Pre-Configured CloudLink™ 4G Wireless Gateway with Global SIM Card – Activated Upon User Enrollment
- Pre-Plumbed in fully Stainless Steel ¼-inch Tubing with Compression Fittings
- Integrated Digital Sample Flow Meter and Manual Rotameter
- Integrated ST-774 Ultralow Dissolved Oxygen Sensor with Flow Cell
- Integrated Stainless Steel Solenoid Isolation Valve for Sample Lockout on Temperature Alarm
- Three (3) Integrated ST-007 Stainless Steel Inline Tee Assemblies for up to Three (3) more Pyxis Sensors
- Plug-N-Play Sensor Installation with Pre-wired Pigtails for future Sensor Addition
- Integrated Sensor Calibration & Maintenance Shelf for User Convenience

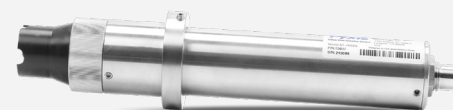
ST-774 Description

Provided on all versions of the Guardian, the ST-774 is an ultra-low range dissolved oxygen (DO) sensor with a lower limit of detection 0.1 ppb ($\mu\text{g/L}$). Its design is based on the principle of fluorescence quenching to determine the partial pressure of the dissolved oxygen in water and incorporates Pyxis' advanced technology in the field of fluorescence detection. The Pyxis ST-774 offers the robustness associated with optical DO sensor technology while achieving the ultra-low detection limit comparable to an amperometric DO sensor. The ST-774 measures the oxygen partial pressure that is at equilibrium with the dissolved oxygen in water governed by Henry's law ($\text{DO/ppb} = K \text{ PO}_2$). The ST-774 offers an easily replaceable, front loading DO membrane cartridge (DCC-2) that has been independently developed by Pyxis Lab, with a typical service life of up to 2-years. This sensor is also well known in the industry for its ability to be Zero-Calibrated in the field using the Pyxis Sulfite-ZERO calibration kit and the connected display terminal. The flat front-end design of the ST-774 makes this platform less prone to contamination or fouling and is very easy to clean. The sensor body and flow cell are composed of 316L stainless steel and is well suited for aggressive industrial application use.



ST-765SS-SO3 Description

This sensor is provided with the Level 2 through 4 versions of the Guardian along with the ST-774, or as an add-on sensor in the field. The ST-765SS-SO3 is a stainless-steel multi-parameter membrane-less sensor based on unique electrochemical principles to determine sulfite, pH, ORP and temperature of sample water. This sensor incorporates Pyxis' advanced technology in the field of bare-gold electrochemical detection. The ST-765SS-SO3 can simultaneously compensate for temperature and pH in the measurement of sulfite based on real-time conditions present in the application of use. This unique internal compensation results in a highly accurate sulfite measurement consistent with wet chemistry methodology commonly used for measurement of oxygen scavengers. This sensor may be calibrated while in service to the tested feedwater sulfite residual using a standard field drop test titration and the connected display/data logging terminal. The ST-765SS-SO3 sensor also offers a replaceable, front loading reference electrode assembly (EH-765) that has been independently developed by Pyxis Lab eliminating the shortcomings associated with membranes and gel replacement while offering reduced polarization time on startup with an electrode life span potential of up to 2-years. The ST-765SS-SO3 sensor body is composed of 304 stainless steel and is well suited for aggressive environments. This sensor is installed in one of the available stainless-steel ST-007 flow cells on the Guardian analyzer panel.



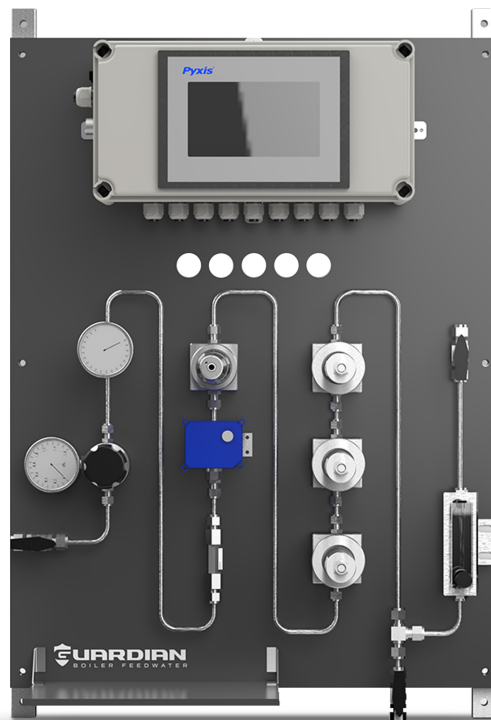


ST-525SS-T Description

This sensor is provided with the Level 3 and 4 versions of the Guardian along with the ST-774 and ST-765SS-SO3, or as an add-on sensor in the field. The ST-525SS-T is a newly designed stainless steel drop-in version of the well-known ST-525 inline fluorometer platform for the direct measurement of Fluorescein tracer utilizing LED light sources for use in industrial boiler feedwater. The new physical design of this sensor allows simple insertion into the stainless-steel ST-007 flow cell enabling easy sensor removal for cleaning and calibration. This sensor offers proprietary algorithms to determine the concentrations of Fluorescein at levels as high as 60ppb and resolution of 0.1ppb, while simultaneously measuring light loss through the optical channel to determine sensor cleanliness. After cleanliness has been verified, this sensor may be slope calibrated using Pyxis Fluorescein calibration standard solutions and the connected display terminal.

ST-724 Description

This sensor is provided with the Level 4 version of the Guardian, along with ST-774, ST-765SS-SO3 and ST-525SS-T, or as an add-on sensor in the field. The ST-724 provides a unique electrode design using a Hastelloy liquid end with integrated temperature and RTD compensation offering precision accuracy in ultra-low to low range conductivity waters with a range of detection from 0.02 to 1,000 $\mu\text{S}/\text{cm}$. User conversion programming for display as TDS (Total Dissolved Solids) is also fully integrated into the Guardian boiler feedwater series display interface. The addition of ST-724 to the Guardian analyzer makes boiler cycles of concentration a measurable value when used with an existing boiler blowdown controller.



Features

- The Guardian boiler feedwater series comes equipped with three (3) pre-mounted ST-007 Single-Sensor inline stainless steel flow cells as well as (1) ST-774 flow stainless steel flow cell. The sample plumbing is 316L stainless steel with SwageLok fittings in ¼-inch OD compression. The Guardian analyzer is also equipped with inline rotameter (100-500ml/min), solenoid sample temperature lockout valve and digital Hall-Effect inlet flow meter for precise sample flow measurement and control recommended at 100-500 mL/minute. The outlet flow should be diverted to drain or the inlet of the pretreatment system for those desiring recovery (i.e. condensate return tank).

NOTE

The Pyxis Guardian requires installation downstream of an inline sample cooler. Sample water temperatures should be maintained at or below 120 °F (49 °C). Feedwater sample pressure should not exceed 30psi and should be supplied from the deaerator storage tank prior to feedwater pump.

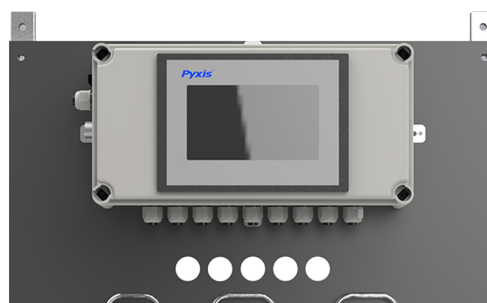
- All Pyxis sensors are connected to the UC-100AGS color touch screen (7-inch) display and data logging terminal via RS-485 Modbus (RTU) allowing for integrated sensor calibration interface, diagnostics, data alarming, log, trending and transfer within the display touch screen. The display comes prewired with a total of four prelabeled 8-pin flying lead wires with quick-adaptor allowing users to easily connect the Pyxis sensor to the input cable for immediate sensor recognition, display and use. The display/data logger offers 6 x 4-20mA outputs as well as Modbus RS-485 and TCP-IP with remote diagnosis and parameter adjustment. The display comes equipped with two 24VDC relay controls (Passive) and two Analog output controls which can be user defined and programmed based on rising or falling setpoint of any sensor value or as a timed event.
- Each Guardian boiler feedwater analyzer comes equipped with the Pyxis CloudLink 4G Gateway and global SIM Card in deactivated mode. This gateway may be activated by Pyxis Lab upon user request and annual enrollment, allowing for wireless data transmission to any cloud data management platform, including Pyxis Cloud. Contact service@pyxis-lab.com for more information.
- Convenient and simple to install back-panel with integrated sensor calibration & maintenance shelf for rap-id installation and convenience of use. Truly a plumb and power to go platform with intense factory setup, testing and sensor calibration prior to shipment.

Guardian Level Versions (Sensors Included)

Item	IK-2000	IK-2010	IK-2020	IK-2030
Part Number	47522	47744	43809	48807
ST-774	Included	Included	Included	Included
ST-765SS-SO3	Add Later if Desired	Included	Included	Included
ST-525SS-T	Add Later if Desired	Add Later if Desired	Included	Included
ST-724	Add Later if Desired	Add Later if Desired	Add Later if Desired	Included

NOTE

The Guardian Boiler Feedwater Analyzer panel design is identical for all 4 levels allowing users to purchase the base level 1 and later purchase and install as desired the additional Pyxis sensors without the need for equipment upgrade, configuration, or replacement.

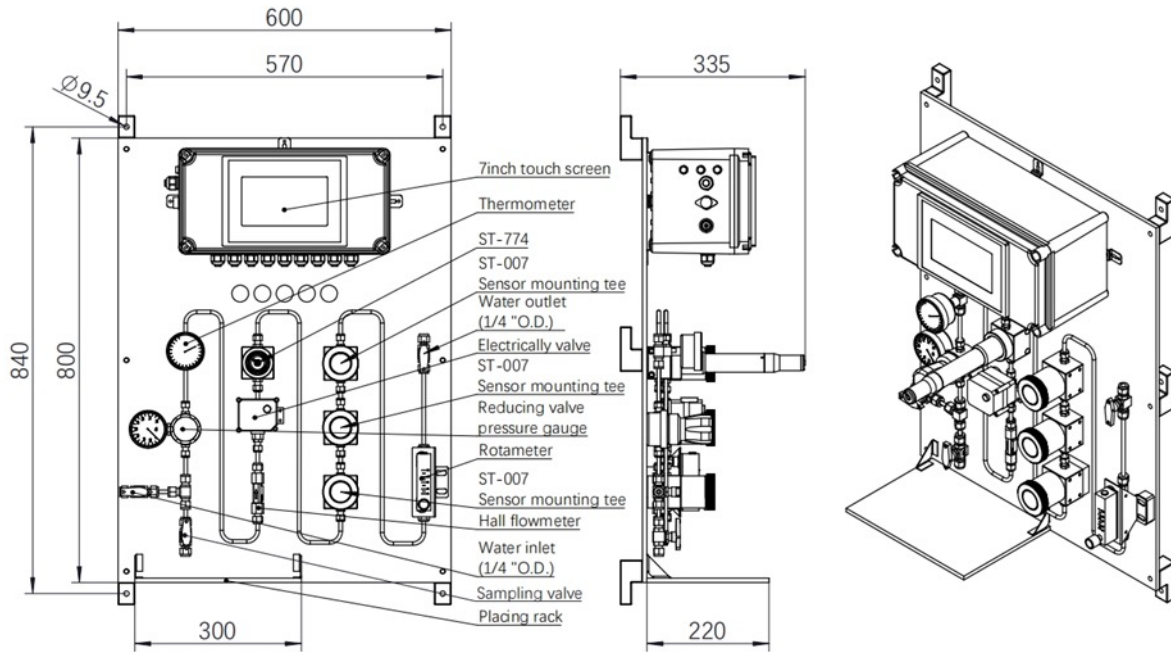


Item	IK-2000	IK-2010	IK-2020	IK-2030
Part Number	47522	47744	43809	48807
Analyzer Level	Level 1	Level 2	Level 3	Level 4
DO Range	0.1–2,000 ppb / ±0.3ppb			
DO Method	Optical - Blue Light Irradiated Excitation / Red Light Reference			
Temperature Range	0–50 °C (32–122° F) / ± 0.2% of value – Taken from ST-774			
Sulfite Range	N/A	0.00 – 100.00 ppm / ± 0.01ppm		
Sulfite Method	N/A	Bare Gold - Electrochemical Method		
pH Range	N/A	0.01 – 14.00 pH / ± 0.01pH		
ORP Range	N/A	-1,500 to 1,500mV / ±1mV		
Fluorescein Range	N/A	N/A	0.00 – 60.0 ppb / ±0.2ppb	
Fluorescein Method	N/A	N/A	Optical 470 Ex / 520 Em	
Conductivity Range	N/A	N/A	N/A	0.02 – 1,000 uS/cm
Conductivity Method	N/A	N/A	N/A	Hastelloy 2-Electrode
Cell Constant (K)	N/A	N/A	N/A	0.3
Measurement Interval	Continuous Measurement w/4 Second Delay			
UC-100AGS				
Display	7-inch LCD Color Industrial Capacitive Touch Screen			
Storage Capacity	Built-In 4GB of RAM for Storing up to 1-Million Data/Event Records			
Output	(6) 4-20 mA / RS-485 Modbus - RTU / Modbus TCP			
Input	RS-485 Modbus - RTU			
Relay Control	(2) 24VDC Relay Controls			
Analog Control	(2) Analog Controls			
USB	(1) USB Host, for Data Downloading and Screen Upgrade			
Internet	RJ-45 Socket, Modbus-TCP, Embedded CloudLink™ 4G Gateway with Global SIM			
Relative Humidity	20–90% (No Condensation)			
PANEL				
Power Requirement	96–260VAC / 75 W – USA Type B Plug			
Dimensions	600mm H x 800mm W x 335mm D			
Approximate Weight	~25kg			
Op. Temperature	40–120°F (4–49 °C)			
Storage Temperature	Instrument: -4–131 °F (-20–55 °C) / Sensors 32–122 °F (0–50 °C)			
Wet Material	Hastelloy/304SS/316SS/Glass/Gold/Platinum/CPVC/PTFEPOM/ABS/PEEK/PET/NBR/PCB			
Sample Temperature †	40–120 °F (4–49 °C) †			
Sample Pressure	7.25–30psi (0.05–0.2Mpa) (Not from feedwater pump discharge)			
Sample Flow Rate	100–500mL/minute			
Sample Line Size	¼-inch OD Stainless Steel Tubing with Swagelok Compression Inlet & Outlet			
Rating	IP-65 Panel & Display / IP-67 Sensors			
Regulation	CE / RoHS / UKCA			
Sensor Warranty	13 Months			
ST-765SS-SO3				
Electrode Warranty	6 Months			
Electrode Service Life	12–24 Months depending on Water Quality			

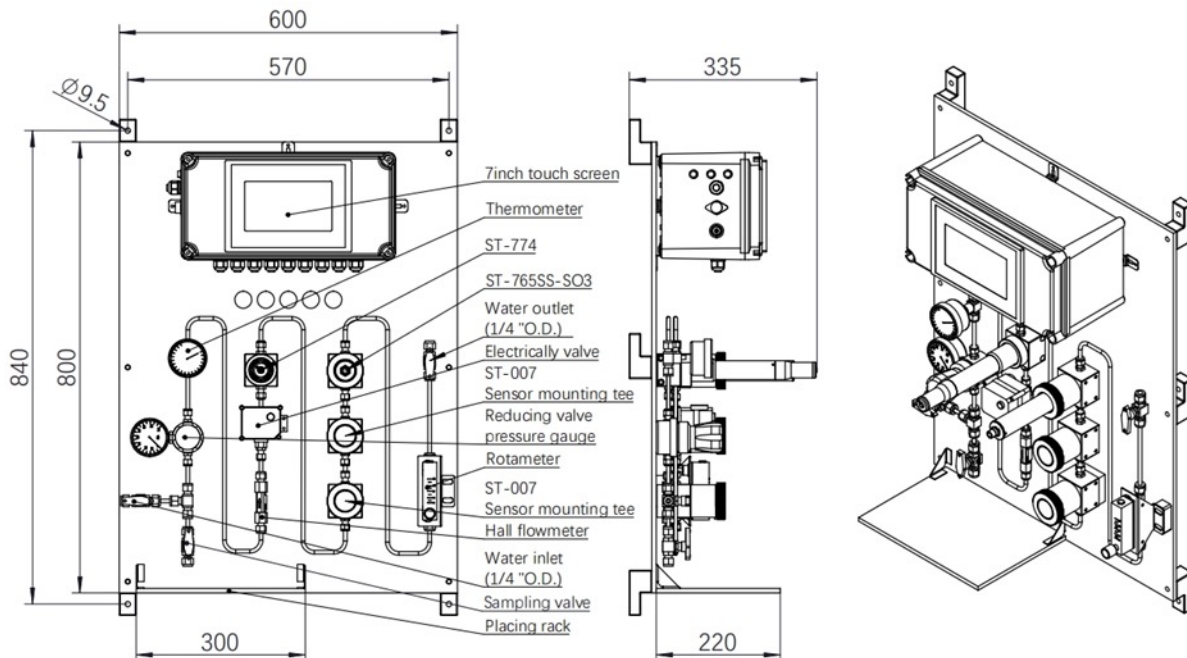
NOTE

- N/A = Sensors not included but may be later purchased & field installed if desired by user
- Specifications are subject to change without notice.
- 4G Gateway & SIM Card Activated Upon Annual Enrollment
- † = Requires Installation Downstream of Sample Cooler

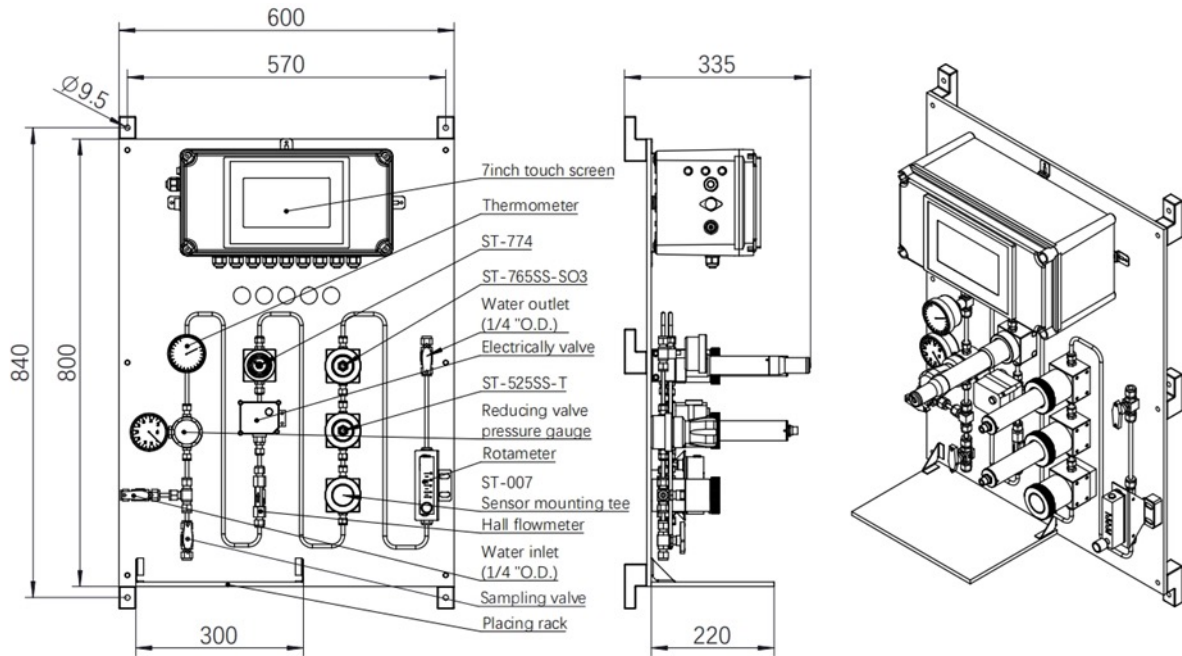
LEVEL 1 - IK-2000 Guardian Panel Dimensions (mm)



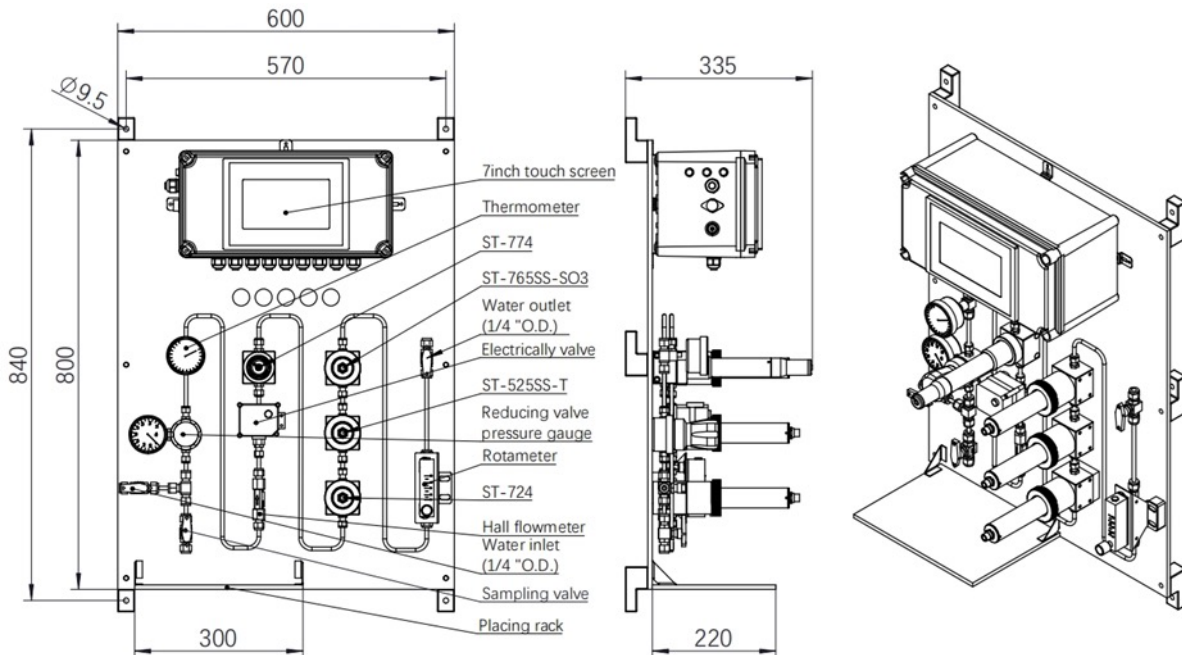
LEVEL 2 - IK-2010 Guardian Panel Dimensions (mm)



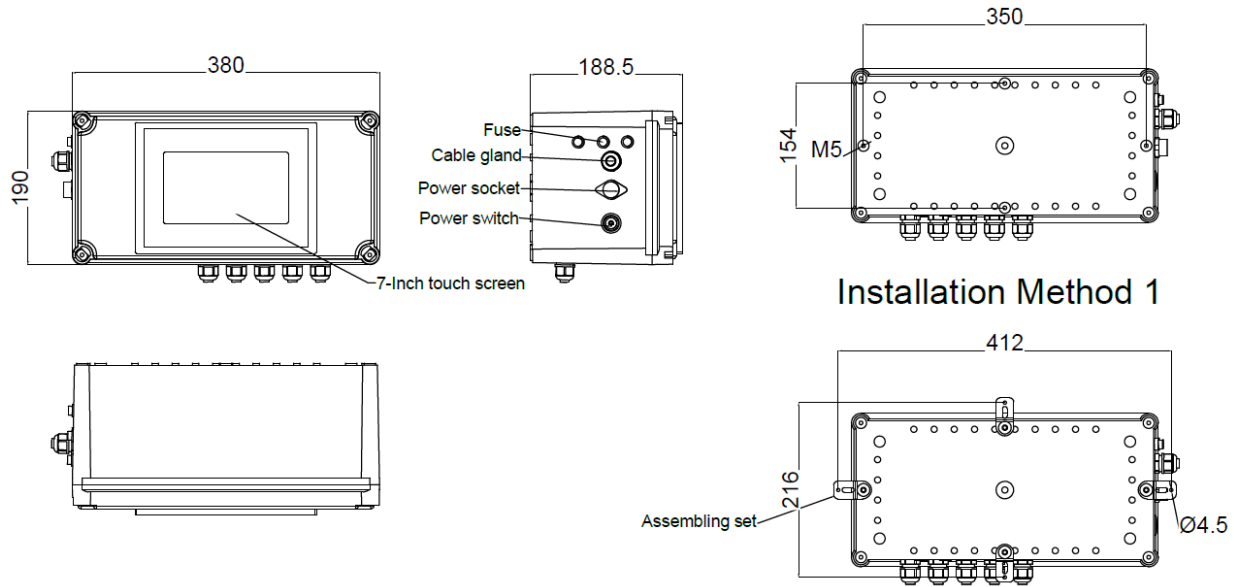
LEVEL 3 - IK-2020 Guardian Panel Dimensions (mm)



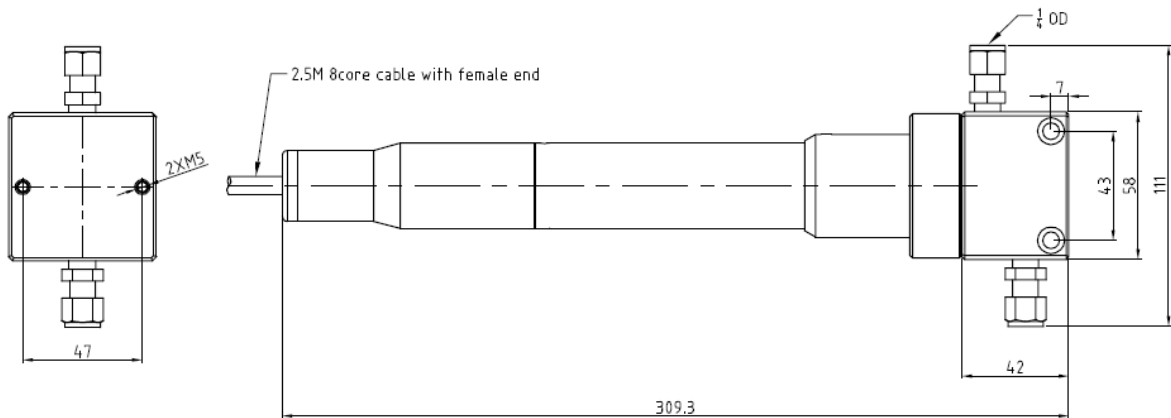
LEVEL 4 - IK-2030 Guardian Panel Dimensions (mm)



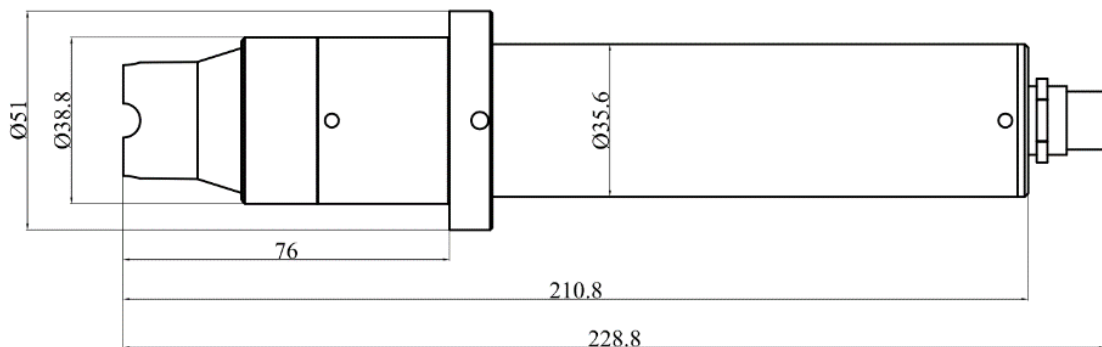
UC-100AGS Display & Data Logging Terminal Dimensions (mm)



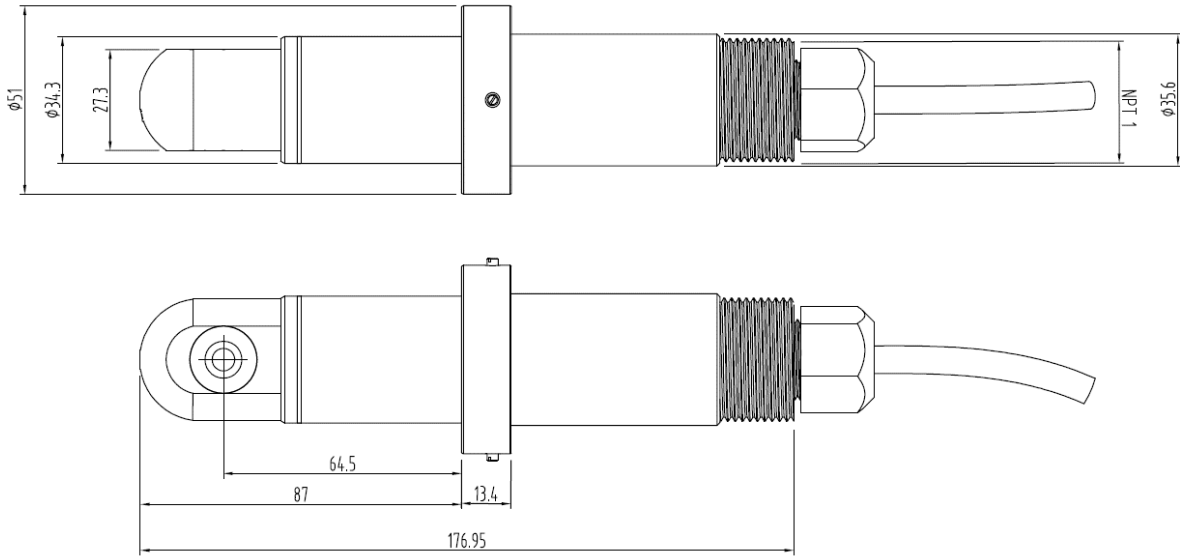
ST-774 Dissolved Oxygen Sensor Dimensions (mm)



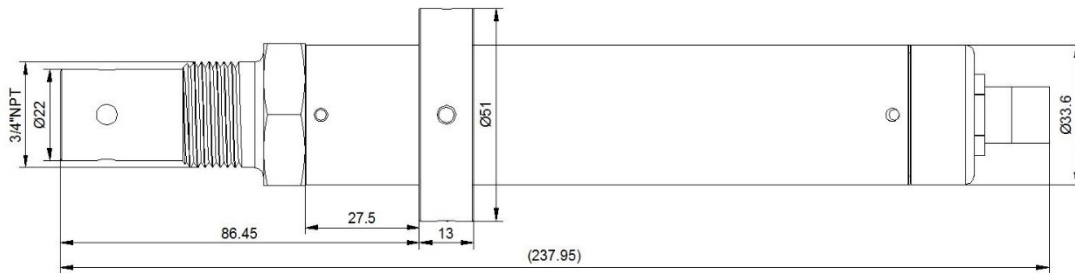
ST-765SS-SO3 Sulfite Sensor Dimensions (mm)



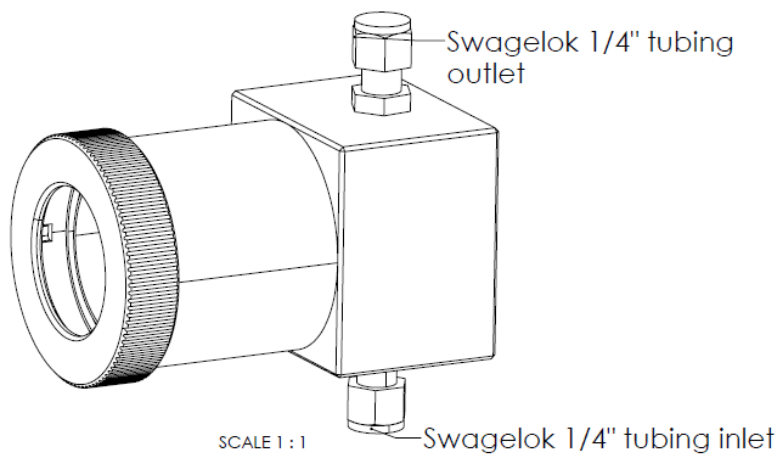
ST-525SS-T Fluorescein Sensor Dimensions (mm)



ST-724 Conductivity Sensor Dimensions (mm)



ST-007 Stainless Steel Tee Assembly Dimensions (mm)



Order Information

Guardian IK-2000 Panel - LEVEL 1
Guardian IK-2010 Panel - LEVEL 2
Guardian IK-2020 Panel - LEVEL 3
Guardian IK-2030 Panel - LEVEL 4

Part Number

47522
47744
43809
48807

Optional/Replacement Accessories

ST-774 Ultra-Low Dissolved Oxygen Sensor	53715
ST-774 Service Swap (Annual Sensor Swap by Pyxis Factory)	ST-774-SWAP
ST-765SS-SO3 Sulfite + pH + ORP Sensor	53624
ST-525SS-T Tee-Ready, Stainless Steel Fluorescein Sensor	56553
ST-724 Ultra-Low Conductivity Sensor	10009
DCC-2 Replacement DO Cartridge Cap for ST-774	53716
EH-765 Replacement Electrode Head for ST-765SS	53061
Solenoid Valve	21452
Stainless Steel Hall Effect Flow Meter	22501
Micro-Rotameter Assembly Kit	24387
ST-774 Flow Cell Assembly	53718
ST-007 Stainless Steel Tee Assembly	50700-A51
Replacement Temperature Gauge	29098
Replacement Pressure Regulating Valve with Gauge	27439
ST-002-S Stainless Steel Tee Plug	21629
Sulfite ZERO Calibration Kit	16019
Pyxis Lab® Sulfite Dropper Kit	TK35290-Z
Pyxis Lab® pH Combo Calibration Solution Kit (4/7/10)	57007
Pyxis Lab® ORP-200 mV Calibration Solution	57020
Pyxis Lab® FLUO-10 10ppb Fluorescein Calibration Solution	FLUO-10
Pyxis Lab® FLUO-20 20ppb Fluorescein Calibration Solution	FLUO-20
Pyxis Lab® 100µS/cm Conductivity Calibration Solution	39047
Pyxis Lab® 1,000µS/cm Conductivity Calibration Solution	57008