



## IK-2000 SERIES

### Boiler Feedwater Quality Sensor Analyzer



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#### DESCRIPTION

The Guardian 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 (µS/cm), Total Dissolved Solids (ppm) and Sample Flow Rate (mL/Min) utilizing proprietary Pyxis Lab smart sensor technology coupled with a Pyxis color touch screen display and data logging terminal.

The Guardian boiler feedwater series should always be installed downstream of a sample cooler and the sample should be taken from the low pressure (<30psi) storage section of the feedwater or deaerator tank. The analyzers are offered in a convenient and easy to integrate panel mounted format using only 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 4 Pyxis Lab® Smart Sensors
- › Pre-Installed CloudLink™ 4G Wireless Gateway with Global SIM Card - Requires Enrollment
- › Pre-Plumbed in Fully Stainless Steel ¼ inch Tubing with Compression Fittings
- › Integrated Ultrasonic Flow Meter with Motorized Regulating Valve
- › Integrated ST-774 Ultra-Low Dissolved Oxygen Sensor with Flow Cell
- › Integrated Stainless Steel Isolation Valve for Sample Lockout on Temperature Alarm
- › (3) Integrated ST-007 Stainless Steel Tee Assemblies for up to 3 more Pyxis Lab® Sensors
- › Plug-N-Play Sensor Installation with Pre-Wired Pigtails for Future Sensor Addition
- › Integrated Sensor Calibration and Maintenance Shelf for User Convenience

## DISPLAY + HARDWARE FEATURES

The Guardian Boiler Feedwater Series includes three (3) pre-mounted ST-007 single-sensor stainless steel flow cells and one (1) dedicated ST-774 stainless steel flow cell. Sample plumbing is 316L stainless steel with ¼-inch OD Swagelok compression fittings. The system features an inline rotameter (100–500 mL/min), motorized sample flow and temperature lockout valve, and the FS-100 ultrasonic flowmeter for precise PID-controlled sample flow regulation. Recommended sample flow is 100–500 mL/min with a maximum inlet pressure of 30 psig. Outlet flow should discharge to drain or return to a lower-pressure pretreatment system (e.g., condensate return tank).

The Guardian must be installed downstream of an inline sample cooler, with effluent directed to atmospheric drain or a lower-pressure feedwater storage zone. Sample temperature must be maintained at or below 120°F (49°C) and pressure at or below 30 psig.

Each Guardian PRO includes a Pyxis CloudLink™ 4G Gateway with global SIM (shipped deactivated). Upon user request and annual enrollment, the gateway can be activated for wireless data transmission to any cloud platform, including Pyxis Cloud™. For activation details, contact [service@pyxis-lab.com](mailto:service@pyxis-lab.com).

The analyzer features a back-panel design with integrated calibration and maintenance shelf for simplified installation. Each unit is factory plumbed, fully tested, and sensor-calibrated prior to shipment for true plug-and-play startup.

## ANALYZER VERSIONS

Item	Guardian IK-2000 Level 1	Guardian IK-2010 Level 2	Guardian IK-2020 Level 3	Guardian IK-2030 Level 4	Guardian IK-2040 Level 5
Part Number	47522	47744	43809	48807	47552
ST-774	Included	Included	Included	Included	No Sensors Included All Tees Plugged for Individual Sensor
ST-765SS-S03	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	Add Later If Desired

## SENSOR FEATURES

### ST-774 Ultra-Low Dissolved Oxygen

The ST-774, included on all Guardian versions, is an ultra-low range optical dissolved oxygen (DO) sensor with a detection limit of 0.1 ppb ( $\mu\text{g/L}$ ). Based on fluorescence quenching technology, it measures oxygen partial pressure in equilibrium with dissolved oxygen according to Henry's Law, delivering the robustness of optical DO sensing with detection limits comparable to amperometric sensors.

The sensor features a replaceable front-loading DO membrane cartridge (DCC-2) with a typical service life of up to two years and can be zero-calibrated in the field using the Pyxis Sulfite-ZERO calibration kit and connected display terminal. Its flat front-end design minimizes fouling and simplifies cleaning, while the 316L stainless steel sensor body and flow cell ensure durability in aggressive industrial environments.

### ST-765SS-SO3 Sulfite + pH Sensor

The ST-765SS-SO3 is a stainless-steel, membrane-less, multi-parameter sensor designed to measure sulfite, pH, ORP, and temperature in feedwater applications. Available with Guardian Level 2–4 systems (with ST-774) or as a field add-on, it uses Pyxis' bare-gold electrochemical technology with real-time temperature and pH compensation to deliver highly accurate sulfite readings consistent with standard wet chemistry methods.

The sensor can be calibrated in-service using a field drop test titration and connected display terminal. It features a replaceable front-loading reference electrode assembly (EH-765) engineered by Pyxis to eliminate membrane and gel replacement issues, reduce polarization time, and provide up to two years of electrode life. Constructed from 304 stainless steel, the sensor is built for aggressive environments and installs into the ST-007 stainless-steel flow cell on the Guardian panel.

### ST-525SS-T Fluorescein Sensor

The ST-525SS-T is included with Guardian Level 3 and 4 systems (alongside the ST-774 and ST-765SS-SO3) or available as a field add-on. This stainless-steel drop-in version of the proven ST-525 inline fluorometer directly measures Fluorescein tracer in industrial boiler feedwater using LED-based fluorescence technology.

Designed for simple insertion into the ST-007 stainless-steel flow cell, the sensor allows easy removal for cleaning and calibration. Proprietary algorithms measure Fluorescein concentrations up to 60 ppb with 0.1 ppb resolution, while simultaneously monitoring optical light loss to verify sensor cleanliness. Once cleanliness is confirmed, the sensor can be slope calibrated using Pyxis Fluorescein standards and the connected display terminal.

## SENSOR FEATURES

### ST-724 Ultra-Low Conductivity

The ST-724 is included with Guardian Level 4 systems (alongside the ST-774, ST-765SS-SO3, and ST-525SS-T) or available as a field add-on. Featuring a Hastelloy liquid-end electrode design with integrated temperature and RTD compensation, it delivers precision measurement in ultra-low to low conductivity applications across a range of 0.02 to 1,000  $\mu\text{S}/\text{cm}$ .

The Guardian interface allows user-selectable conversion to TDS (Total Dissolved Solids), and when paired with a boiler blowdown controller, the ST-724 enables direct measurement of boiler cycles of concentration.

### FS-100 Flow Meter & Control

The Pyxis FS-100 is an ultrasonic flowmeter based on transit-time differential technology, measuring flow from 0 to 3,000 mL/min with 1 mL resolution. Its advanced PCB design provides integrated temperature compensation and supports instantaneous, accumulated, and setpoint-controlled flow directly within the sensor.

Sample flow is regulated via built-in PID control logic, communicating directly with the pre-mounted motorized valve on the analyzer for precise, stable flow management.



## SPECIFICATIONS

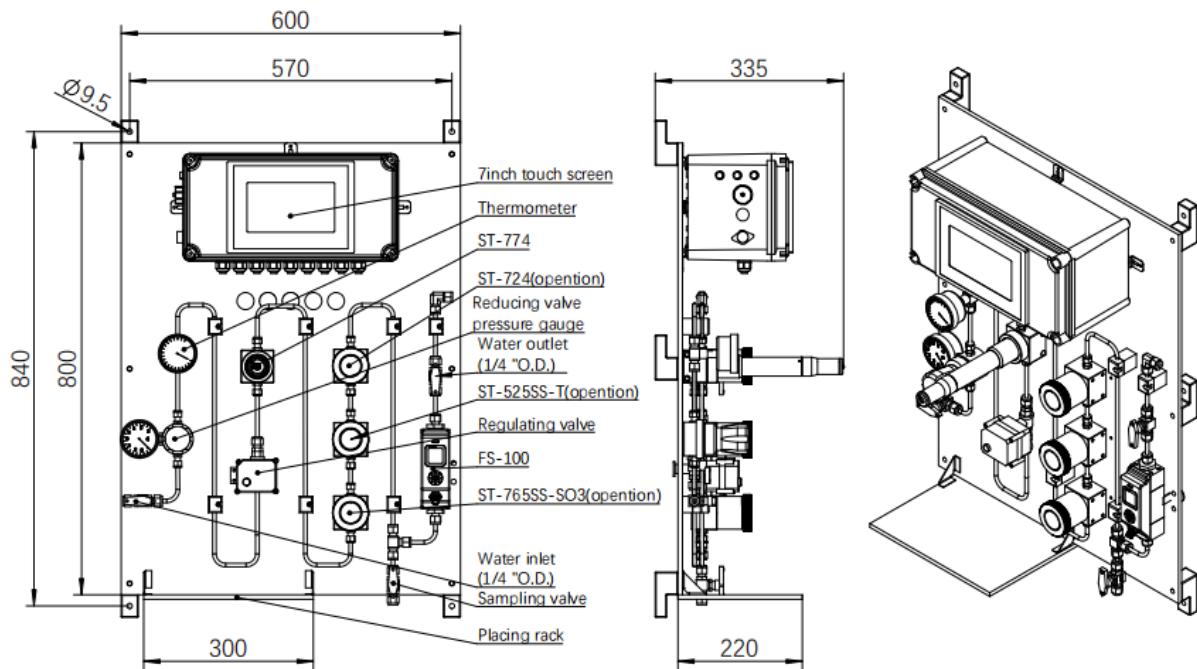
Item	IK-2000	IK-2010	IK-2020	IK-2030	IK-2040
Part Number	47522	47744	43809	48807	47552
Level	Level 1	Level 2	Level 3	Level 4	Level 5
Dissolved Oxygen Range	0.1–2,000ppb / ±0.3ppb				N/A
Dissolved Oxygen Method	Optical - Blue Light Irradiated Excitation / Red Light Reference				N/A
Temperature Range	0–50 °C (32–122 °F) / ±0.2% of Value - Taken from ST-774				N/A
Sulfite Range	N/A	0.00–100.00ppm / ±0.01ppm		N/A	
Sulfite Method	N/A	Bare-Gold Electrochemical Method			N/A
pH Range	N/A	0.01–14.00pH / ±0.01pH			N/A
ORP Range	N/A	-1,500 to 1,500mV / ±1mV			N/A
Fluorescein Range	N/A	N/A	0–60ppb / ±0.1ppb		N/A
Fluorescein Method	N/A	N/A	UV Fluorescence		N/A
Conductivity Range	N/A	N/A	N/A	0.02–1,000µS/cm	N/A
Conductivity Method	N/A	N/A	N/A	Hastelloy Dual	N/A
Conductivity Cell Constant (K)	N/A	N/A	N/A	0.3	N/A
Measurement Interval	Continuous Measurement with 4 sec Delay				
UC-100AGS Display	7inch LCD Color Industrial Capacitive Touch Screen				
UC-100AGS Storage Capacity	Built-In 4GB RAM for Storing up to 1-Million Data/Event Records				
UC-100AGS Output	(6) 4-20mA / RS-485 Modbus - RTU / Modbus-TCP				
UC-100AGS Input	RS-485 Modbus-RTU				
UC-100AGS Relay Control	(2) 24VDC Relay Controls				
UC-100AGS Analog Control	(2) Analog Controls				
UC-100AGS USB	(1) USB Host for Data Downloading and Screen Upgrade				
UC-100AGS Internet	RJ-45 Socket, Modbus-TCP, Embedded CloudLink 4G Gateway with Global SIM				
UC-100AGS Relative Humidity	20–90% (No Condensation)				
Panel Power Requirement	96–260VAC / 75W - USA Type B Plug				
Panel Dimensions	600mm H, 800mm W, 335mm D				
Panel Approximate Weight	25kg				
Panel Operational Temperature	40–120 °F (4–49 °C)				
Panel Storage Temperature	Instrument: -4–131 °F (-20–55 °C) / Sensors: 32–122 °F (0–50 °C)				
Panel Wet Material	Hastelloy / 304SS / 316SS / Glass / Gold / Platinum / CPVC / PTFEPOM / ABS / PEEK / PET / NBR / PCB				
Sample Water Temperature †	40–120 °F (4–49 °C) †				
Sample Water Pressure	7.25–30psi (0.05–0.2MPa) Inlet / Atmospheric Drain Outlet				
Sample Water Flow Rate	100–500mL/min				
Sample Line Size	¼ inch OD Stainless Steel Tubing with Swagelok Compression Inlet & Outlet				
Rating	IP-65 Panel and Display / IP-67 Sensors				
Regulation	CE / RoHS / UKCA				
Sensor Warranty (ALL)	13 Months				
FS-100 Method of Measurement	Ultrasonic Flow Detection				
FS-100 Rated Flow Range	0–3,000mL/min (±1mL/min or ±2%)				
ST-765SS-SO3 Electrode Warranty	6 Months				
ST-765SS-SO3 Replacement	12–24 Months depending on Water Quality				

Specifications are subject to change without notice.  
CloudLink 4G Gateway & SIM Card Activated upon Annual Enrollment.

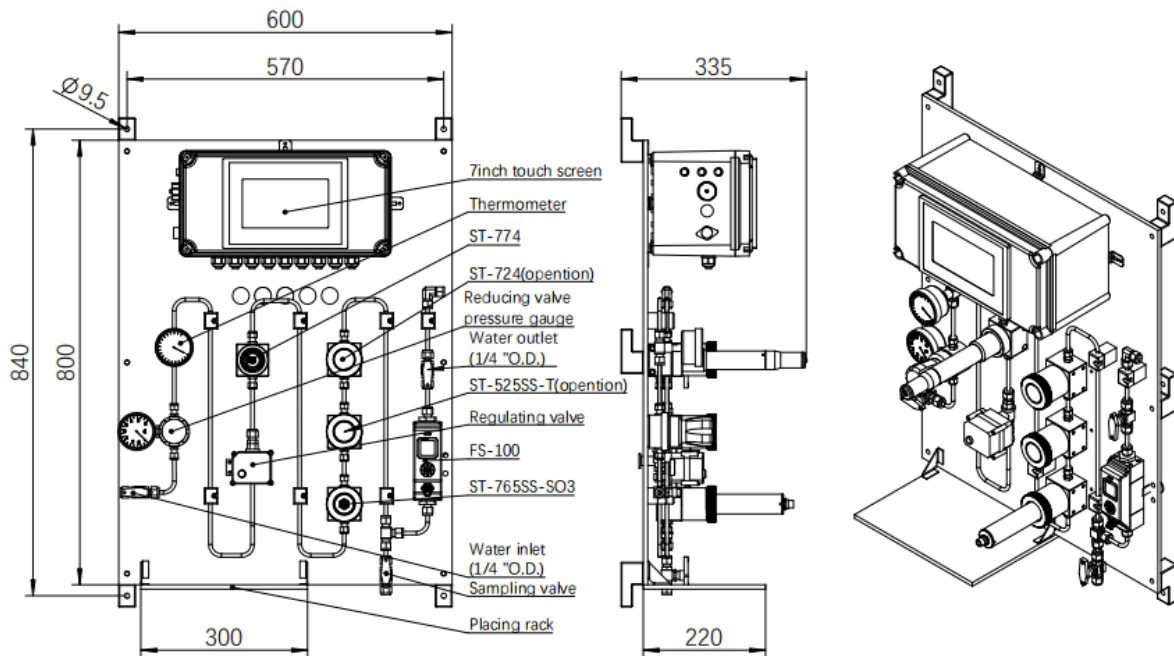
N/A = Sensor not included but may be later purchased & field installed if desired by user. | † = Requires Installation Downstream of Sample Cooler.

# DIMENSIONS

## Level 1 - Guardian Boiler Feedwater IK-2000 (mm)

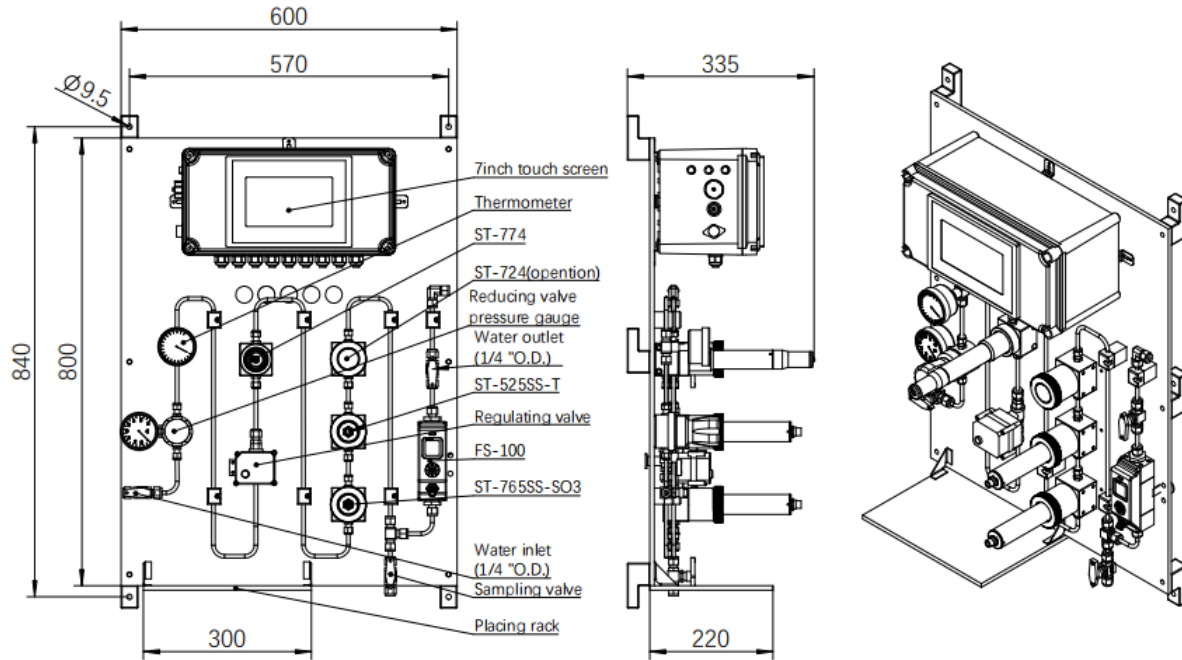


## Level 2 - Guardian Boiler Feedwater IK-2010 (mm)

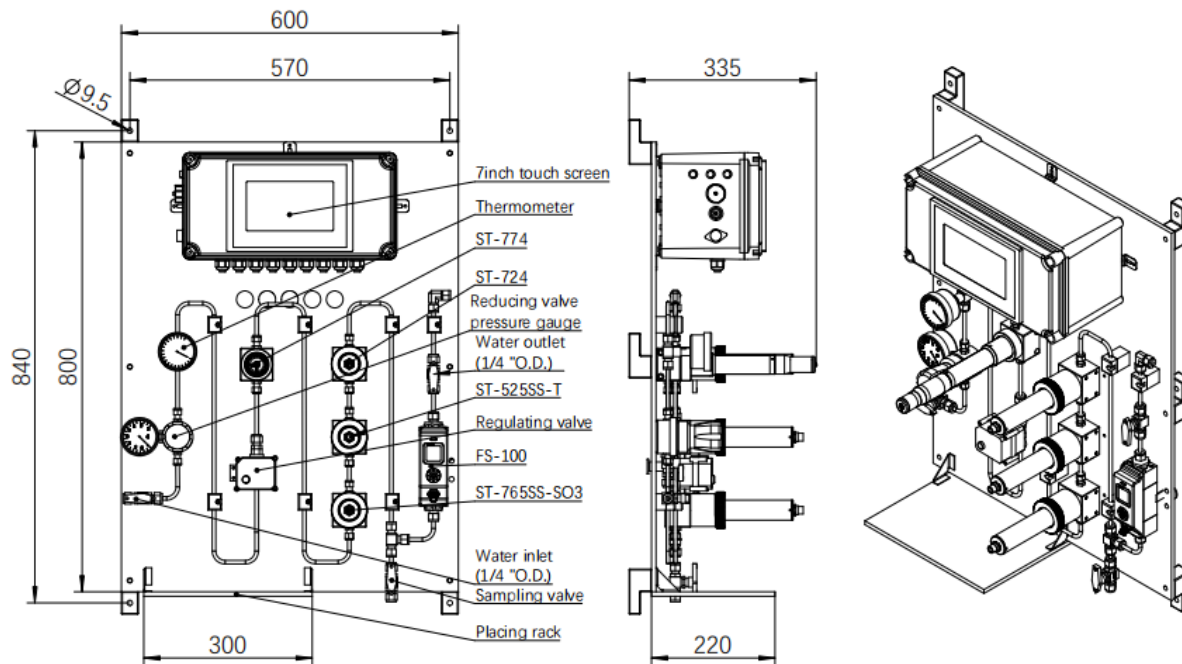


## DIMENSIONS

### Level 3 - Guardian Boiler Feedwater IK-2020 (mm)

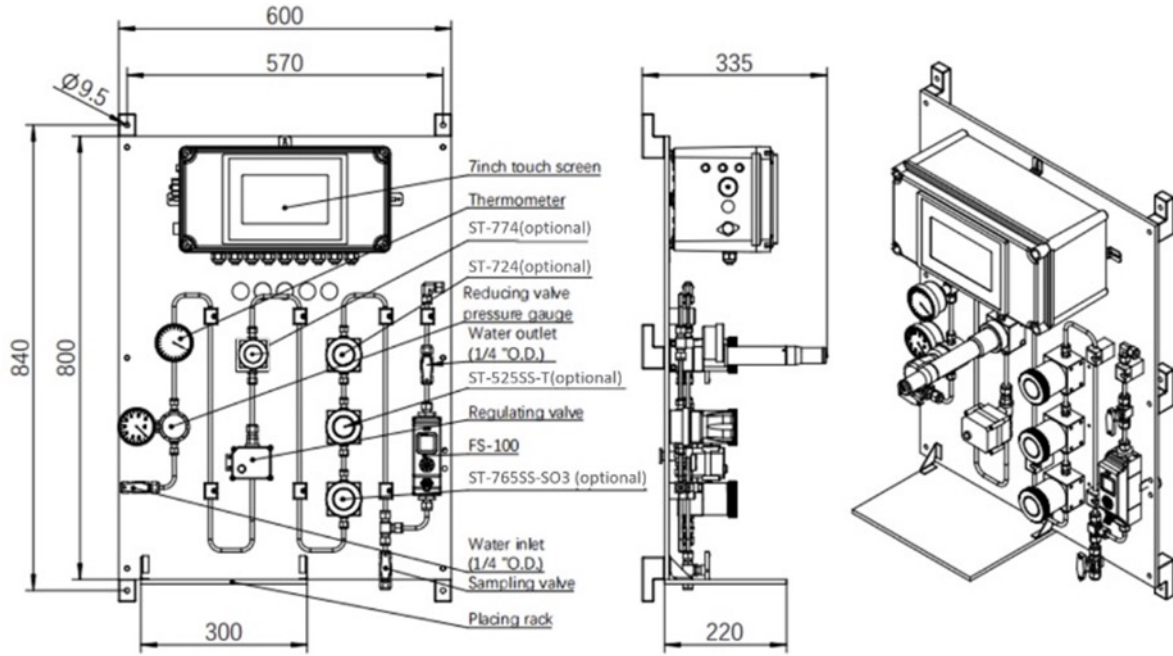


### Level 4 - Guardian Boiler Feedwater IK-2030 (mm)

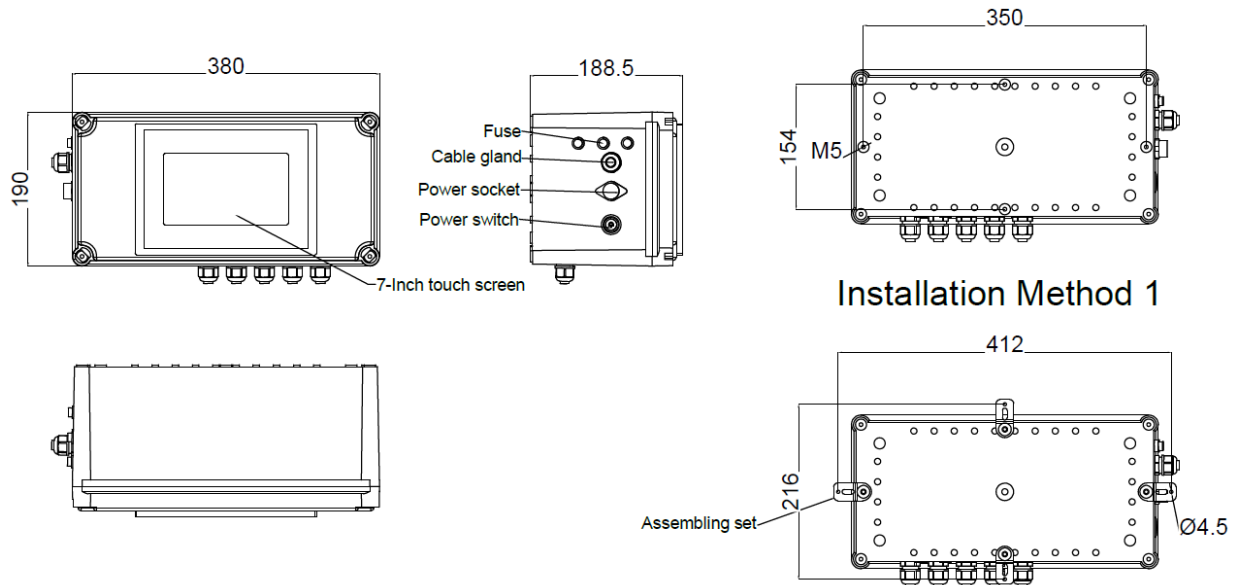


# DIMENSIONS

## Level 5 - Guardian Boiler Feedwater IK-2040 (mm)

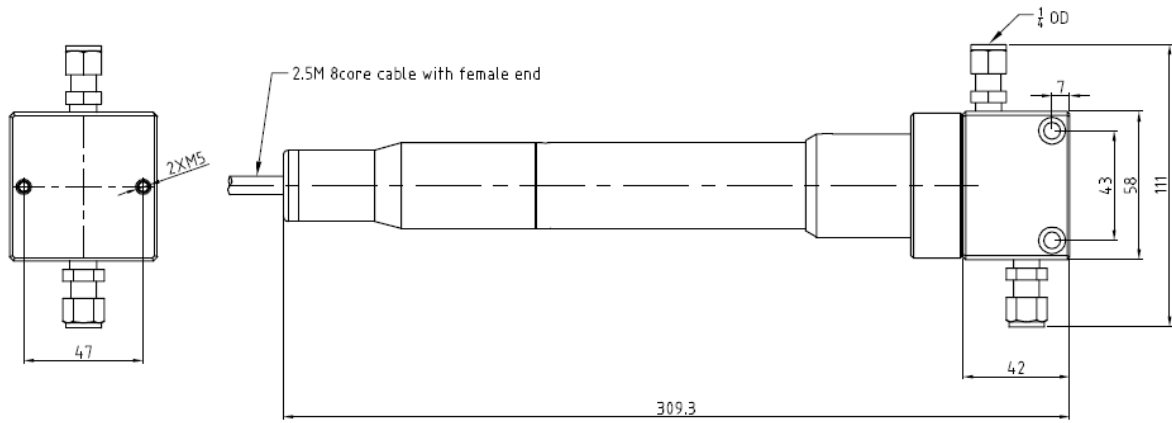


## UC-100AGS Display/Data Logger (mm)

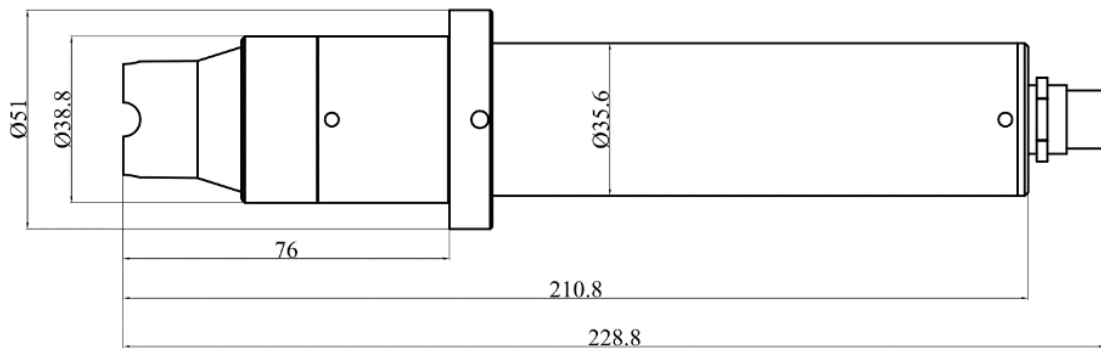


## DIMENSIONS

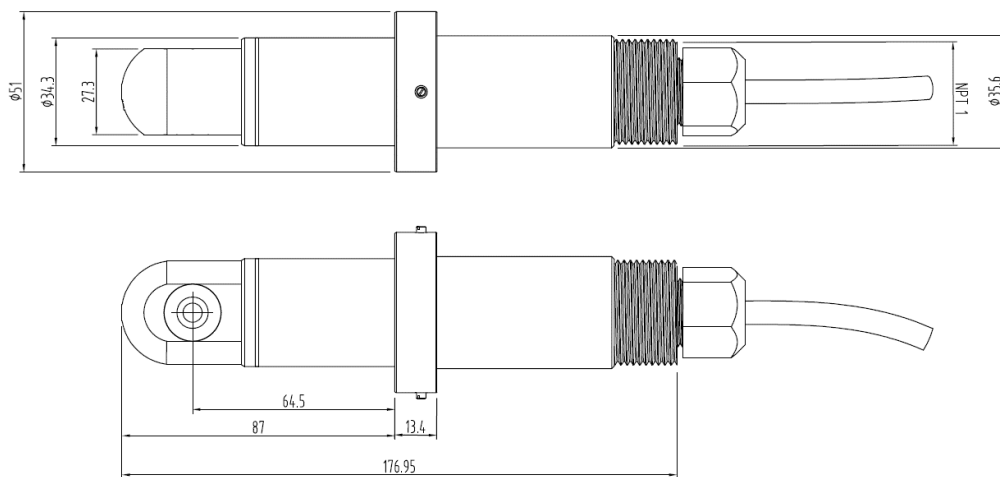
ST-774 Sensor (mm)



ST-765SS-SO3 Sensor (mm)

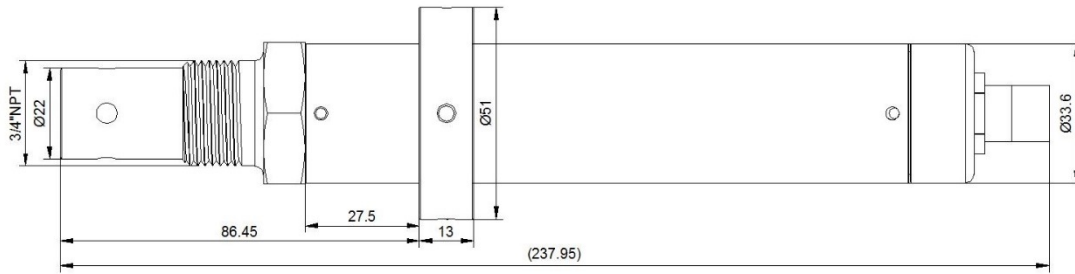


ST-525SS-T Sensor (mm)

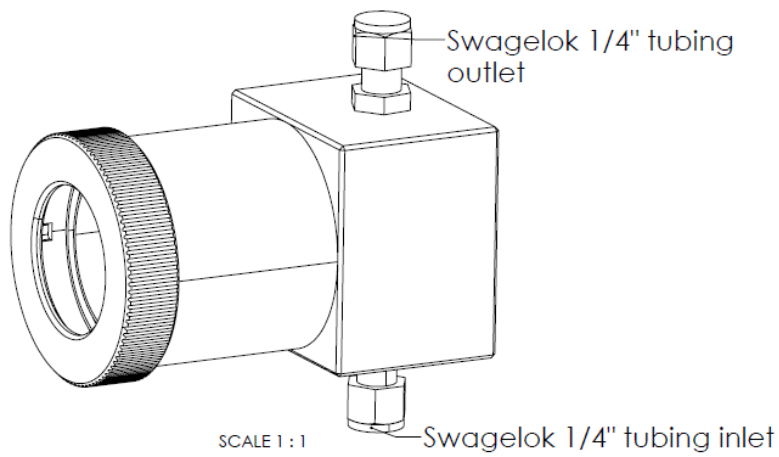


## DIMENSIONS

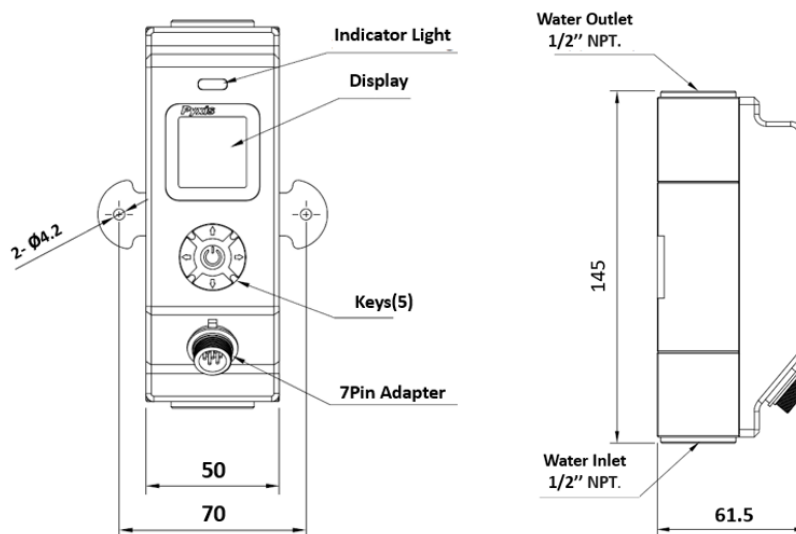
ST-724 Sensor (mm)



ST-007 Stainless Steel Tee Assembly (mm)



FS-100 (mm)



Order Information	Part Number
Guardian Boiler Feedwater IK-2000 (Level 1)	47522
Guardian Boiler Feedwater IK-2010 (Level 2)	47744
Guardian Boiler Feedwater IK-2020 (Level 3)	43809
Guardian Boiler Feedwater IK-2030 (Level 4)	48807
Guardian Boiler Feedwater IK-2040 (Level 5)	47552

Optional & Replacement Accessories	Part Number
ST-774 Ultra-Low Dissolved Oxygen Sensor	53715
ST-774 SERVICE SWAP (Annual Swap for Serviced ST-774)	ST-774-SWAP
ST-765SS-SO3 Sulfite + pH + ORP Sensor	53624
ST-525SS-T Fluorescein Sensor	56553
ST-724 Ultra-Low Conductivity Sensor	10009
DCC-2 Replacement Luminescent Cartridge for ST-774	53716
EH-765 Replacement Electrode Head for ST-765SS-SO3	53601
FS-100 Replacement Ultrasonic Flow Meter with Display	54200
Flow Regulating Motorized Valve with 4-20mA Control Replacement	27427
ST-774 Flow Cell Replacement	53718
ST-007 Replacement Stainless Steel Flow Cell for All Other Sensors	50700-A51
Replacement Temperature Gauge	29098
Replacement Pressure Regulating Valve with Gauge	27439
ST-002-S Stainless Steel Plug	21629
Sulfite-Zero Calibration Kit (Sensor Cap and Catalyzed Sulfite w/ Vial for ST-774)	16109
Sulfite Dropper Kit (Sulfite Dropper Titration Kit for ST-765SS-SO3)	TK35290-Z
pH Combo Calibration Kit	57007
ORP-200 Calibration Solution (200mV)	57020
FLUO-10 Fluorescein Calibration Solution (10ppb)	FLUO-10
FLUO-20 Fluorescein Calibration Solution (20ppb)	FLUO-20
Conductivity Calibration Solution (100µS/cm)	39047
Conductivity Calibration Solution (1,000µS/cm)	57008