

# ST-774

## Ultra-Low Fluorescent Dissolved Oxygen Sensor

### Product Description

The Pyxis 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 compatible 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 ( $DO/ppb = K PO_2$ ).

The embedded process control board within the ST-774 uses the latest USGS equations to convert the built-in partial pressure and temperature measured to a DO value in ppb (or  $\mu\text{g/L}$ ).

The ST-774 offers an easily replaceable, front loading DO membrane cap that has been independently developed by Pyxis Lab, with a typical service life of up to two years. 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 is composed of 316L stainless steel and is well suited for aggressive industrial application use. The ST-774 offers both 4-20mA and RS-485 Modbus outputs and is Bluetooth enabled when used in conjunction with the MA-CR or PowerPACK Series Bluetooth Adapters. This sensor is a fully integrated sensor capable of being used with any receiving controller, PLC or network accepting 4-20mA or RS-485. It may also be purchased on a panel mounted flow assembly with optional UC-50 display/data logger.



ST-774 DO Sensor w/Flow Cell

### Product Features

- 0.0-2,000 $\mu\text{g/L}$  measurement range with 0.1  $\mu\text{g/L}$  Limit of Detection (LOD)
- Built-in temperature and pressure sensors
- Accurate and stable measurement with ultra-low drift
- Built-in transmitter without the need of using a preamplifier or meter head
- Dual outputs: isolated 4-20 mA signal and RS-485 Modbus
- Long-distance transmission with higher stability and accuracy
- Wireless Calibration, Diagnostics, Data Trend via uPyxis APP when used with MA-CR Adapter
- Zero-point calibration with Nitrogen and slope calibration in  $O_2$ -containing calibration gas

### Typical Applications

- HP Boiler Feedwater / Deaerator Storage
- Power Facilities
- Ultra-Pure Water
- Closed Loops
- Condensate Return
- Beverage Production / Post Fermentation
- Semi-Conductor Rinse Water

### Specifications

Item	ST-774
P/N	53715
Measuring Range	0.0 - 2,000 µg/L (ppb) as Dissolved Oxygen
Limit of Detection (LOD)	0.1 µg/L (ppb)
Resolution/Repeatability	0.1 µg/L (ppb)
Reproducibility	± 0.3 µg/L (ppb) or ± 1%, whichever is greater
Accuracy	± 0.3 µg/L (ppb) or ± 1%, whichever is greater
Light Source	Blue Light Irradiated Excitation Red Light Reference
Response Time (90%)	<30s Liquid Phase / <10s Gas Phase
Zero Calibration	99.9999% Nitrogen Gas via uPyxis APP
Slope Calibration	0.1% Oxygen Gas in Nitrogen via uPyxis APP
Operational Temperature	0 °C – 50 °C (32 - 122° F)
Operating Voltage	22 – 26 VDC, Power 0.6W
Signal Output	4-20mA analog output / RS-485 digital output
Dimension (L x D)	300 x 60mm (11.8 x 2.36 inches)
Weight	2150 g (4.74 lb) cable excluded
Installation Method	¼ inch OD Swagelok
Material	316L stainless steel
Working Pressure	145psi (10Bar)
Wet Material	316L stainless steel / PVC and polycarbonate
Cables Provided	MA-1.5CR – 8Pin Female Adapter / Flying Lead Cable – 1.5m Bulkhead Cable w/ 8Pin Male Adapter – 1.5m
Calibration	High Point Calibration: 0.1% Oxygen in Nitrogen Gas Zero Calibration: 99.999% Nitrogen Gas
DO Membrane Cap Life	2 years
Protection Grade	IP-67/IP-68
Regulation	CE / RoHS

### ST-774 Standard Accessories

The following accessories are included in the ST-774 sensor package (as shown in Figure 1):

- One **ST-774** Dissolved Oxygen Sensor w/4.9ft/1.5m Bulkhead Cable 8Pin (P/N - 53713)
- One **DCC-2** Membrane Cap for ST-774 (P/N – 53716)
- One **MA-1.5CR** Cable (1.5 Meter/ 4.9 ft 8Pin Female Adapter/Flying Lead) (P/N – 50746)
- One **MA-CR** Bluetooth Adapter for 8Pin Sensors (P/N – MA-CR)
- One **MA-NEB** Bluetooth/USB Adapter for use with Desktop uPyxis APP (P/N – MA-NEB)



Figure 1 ST-774 Dissolved Oxygen Probe / DCC-2 Membrane Cap / MA-CR Bluetooth Adapter / MA-NEB USB Adapter

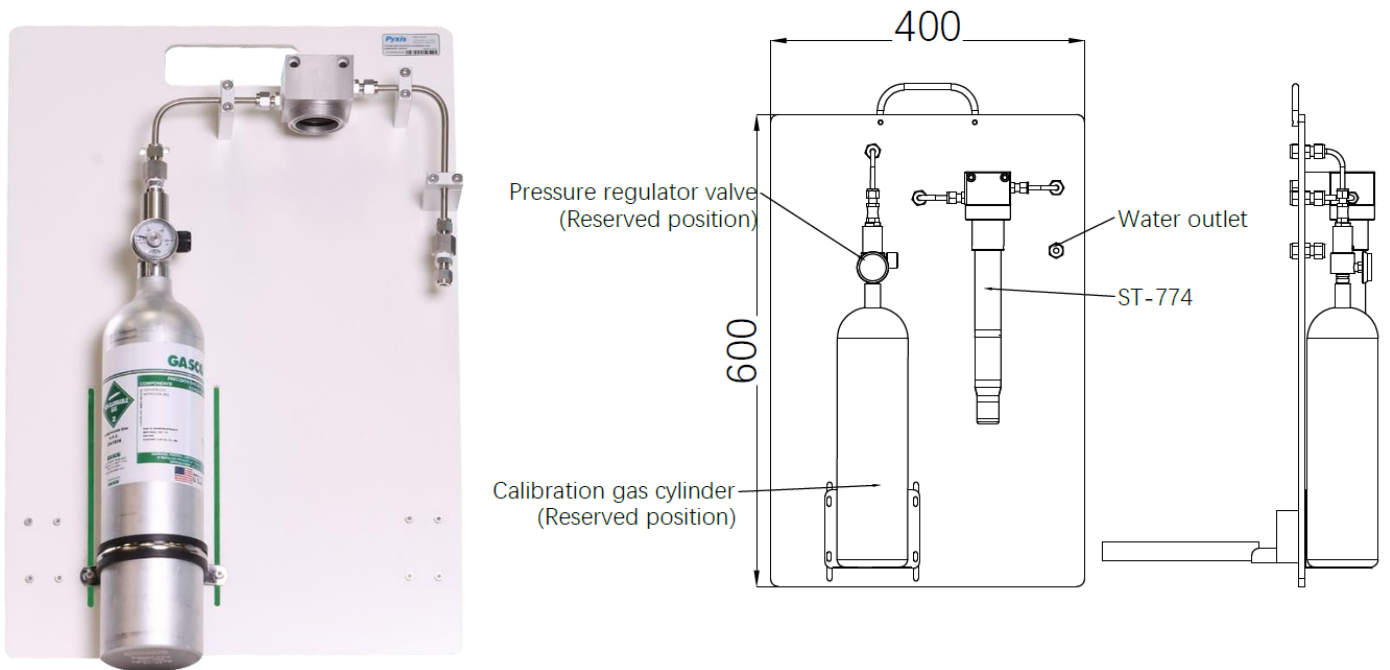
### ST-774 Optional & Replacement Accessories

Optional Accessory	P/N
MA-CR <i>(Bluetooth Adapter for 8-Pin Pyxis Sensors)</i>	MA-CR
DO-Zero Calibration Kit <i>(DO Calibration Panel includes Flow Cell / Calibration Assembly / Nitrogen Cylinder / Premounted)</i>	42058
ST-774/776 Flow Cell Assembly Replacement <i>(316L Stainless Steel – ¼" OD SwageLok)</i>	53718
DCC-2 Dissolved Oxygen Membrane Cap - Replacement	53716
DCC-3 Pure Nitrogen Gas 99.9999% Cylinder – 58L - Replacement	42059
DCC-4 Oxygen Gas 0.1% in Nitrogen Cylinder – 58L - Replacement	42060
ST-774 Porta-Panel <i>(ST-774 Premounted on Portable Panel with Flow Cell + UC-50)</i>	42096
ST-774 Premounted Flow + Calibration Panel <i>(ST-774 Premounted on Back Panel with Flow Cell + Calibration Assembly)</i>	42056
UC-50 <i>(Display + Data Logger)</i>	43007
MA-50CR (50' Extension Cable w/8Pin Adapters)	50743

**DO-Zero Calibration Kit**

Sold as an accessory, the 'DO-Zero Calibration Kit' (P/N-42058) panel comes equipped with pre-mounted ST-774 flow cell, interconnecting stainless steel tubing and DCC-3 (99.9999% Pure Nitrogen) 58-L gas cylinder. This enables users to remove their ST-774 from service and install it into the DO-Zero calibration kit flow cell for rapid zero-point and slope calibration. Users may conduct a slope calibration using the DO-Zero calibration kit by changing gas cylinders to the DCC-4 (0.1% Pure Oxygen / 99.9% Nitrogen) 58-L gas cylinder. Once calibrated, the ST-774 may be removed from the DO-Zero kit flow cell and returned to its normal service flow cell. See operation manual for detailed instructions.

**DO-Zero Calibration Kit Image & Diagram (mm)**



*Figure 2. DO-Zero Calibration Kit (P/N-42058)*

### ST-774 Porta-Panel

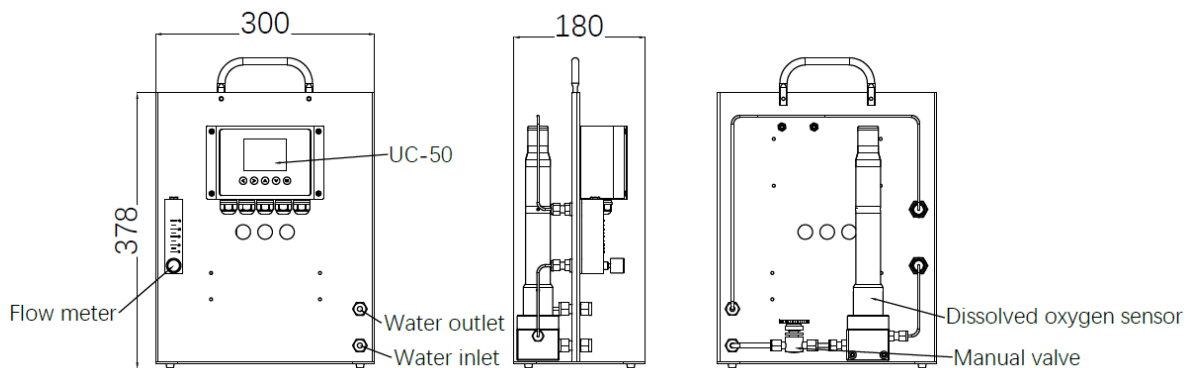
The ST-774 Porta-Panel (P/N-42096) is a prefabricated panel is ideally suited for those desiring to use the ST-774 Ultra-Low DO sensor with local display and data acquisition in a portable fashion for oxygen measurement (ie. deaerator performance studies). The Porta-Panel is pre-mounted on an easy-carry self-standing stainless-steel panel with the ST-774 sensor, flow-cell and appropriate water sample/calibration gas flow hardware. The panel also comes equipped with an integrated UC-50 Display/Data Logging Terminal for live data display, calibration interface and data logging of the ST-774 sensor. The UC-50 offers 1x contact relay output and has RS-485 Modbus and 1x 4-20mA outputs for passing the sensor value onto another device. The UC-50 also offers Bluetooth 5.0 capability for those desiring to use the uPyxis mobile or desktop apps for wireless calibration and diagnostics of the Pyxis sensor connected.

### ST-774 Porta-Panel Image



Figure 3. ST-774 Porta-Panel (P/N-42096)

### ST-774 Porta-Panel Diagram (mm)



## ST-774 PreMounted Flow and Calibration System with Optional UC-50 Display/Data Logger

Pyxis Lab offers the ST-774 Panel Mounted System (P/N-42056) as a pre-assembled and easy to integrate solution for users desiring the ST-774 Ultra-Low DO sensor pre-mounted with flow-cell and all appropriate water sample and calibration gas flow regulation hardware. With a manageable panel size, this system is ideal for installed applications and allows the user to rapidly deploy the ST-774 on a cooled water sample line without the need for costly installation. The ST-774 output wiring allows the user to terminate the pre-mounted sensor to any receiving controller, PLC or DCS. As an added convenience, the user may purchase the UC-50 Display/Data Logging Terminal (P/N-43007) with the panel or as an accessory. The UC-50 is a unique Pyxis microprocessor-based Display and Data Logging Terminal which is pre-configured for all Pyxis inline sensors in RS-485 Modbus format. Once the ST-774 is wired to the UC-50, the display automatically recognizes the sensor and its configuration providing immediate data display, data logging capability and integrated calibration interface. The UC-50 offers 1x contact relay output and has RS-485 Modbus and 1x 4-20mA outputs for passing the sensor value onto another device. The UC-50 also offers Bluetooth 5.0 capability for those desiring to use the uPyxis mobile or desktop apps for wireless calibration and diagnostics of the Pyxis sensor connected. See UC-50 Data sheet for specifications.

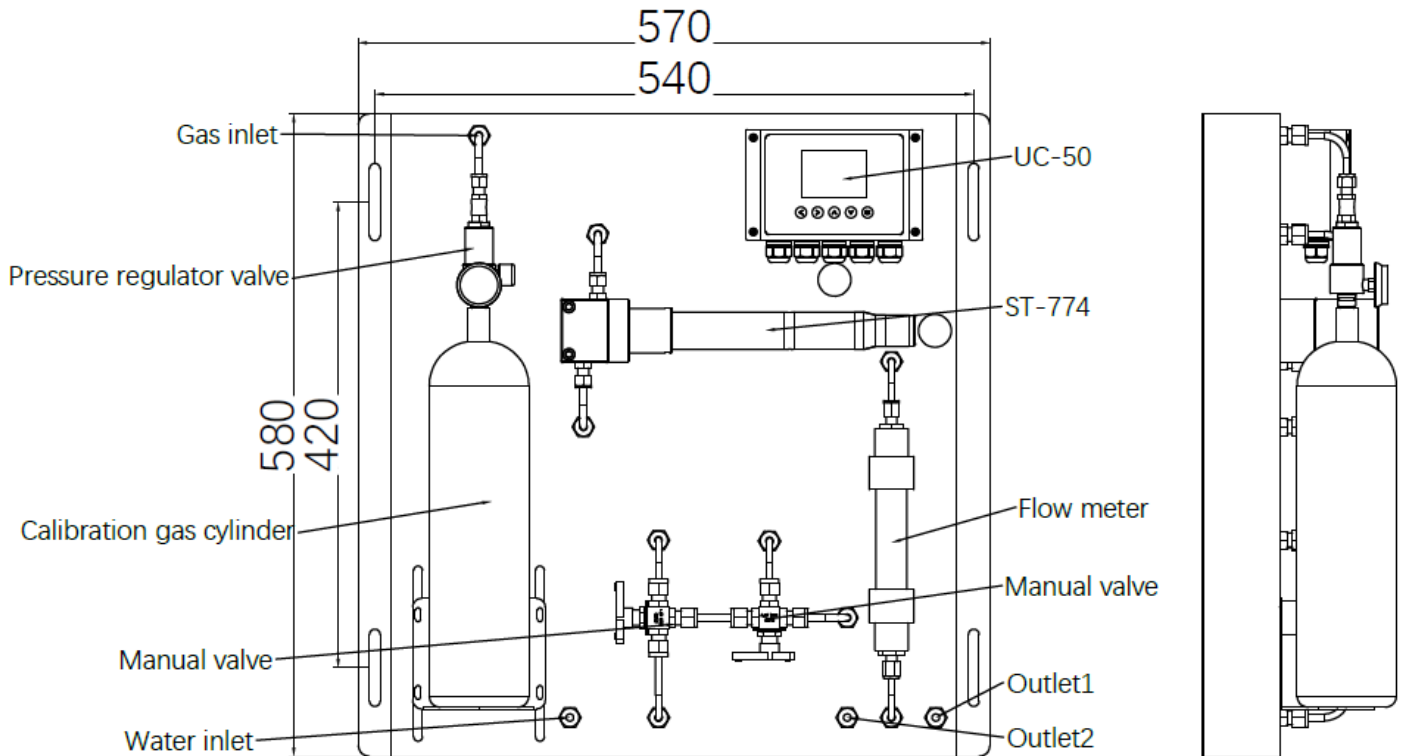
### ST-774 PreMounted Flow and Calibration System with Optional UC-50 Display - Image



Figure 4. ST-774 PreMounted Flow+Calib System (P/N-42056) + Optional UC-50 Display (P/N-43007)

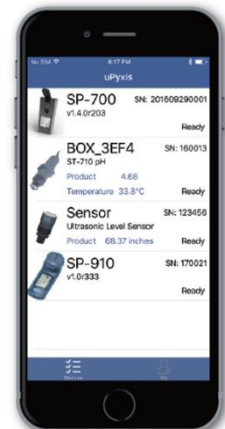


ST-774 PreMounted Flow and Calibration System with Optional UC-50 Display – Diagram (mm)



ST-774 Wireless Calibration via uPyxis APP

The uPyxis APP manages all Pyxis portable meter and inline sensors on mobile and desktop devices, including Apple iPhones and Samsung Android smartphones. When connected to the Pyxis ST-774 Dissolved Oxygen sensor with the provided MA-CR Bluetooth adapter, the uPyxis APP enables users to diagnose, clean and calibrate the sensor at both zero and slope points, preventing the need to calibrate the sensor through the receiving controller or PLC. When ST-774 connected the Pyxis UC-50 Display/Data Logger, no MA-CR is required as the UC-50 offers fully integrated BlueTooth 5.0. **\*Note\*** The uPyxis Mobile APP is evolving rapidly and users can find the latest version at no cost on Apple iStore or Google Play. The uPyxis Desktop APP may be downloaded at <https://pyxis-lab.com/support-2/>



### Order Information

	P/N
ST-774 Ultra-Low Dissolved Oxygen Sensor <i>(0.0-2,000 ppb 4-20mA &amp; RS-485)</i>	53713
ST-774 Porta-Panel <i>(Portable Panel Mounted ST-774 w/Flow Cell + UC-50 Data Logger)</i>	42096
ST-774 Panel Mounted <i>(Panel Mounted ST-774 w/Flow Cell + Calibration Assembly)</i>	42056

### Optional Accessories Information

	P/N
MA-CR Bluetooth Adapter <i>(8Pin Adapter Enables Wireless Calibration w/uPyxis APP)</i>	MA-CR
ST-774 Flow Cell Assembly <i>(316L Flow Cell w/SwageLok For Spare Use or Replacement)</i>	53718
DCC-2 <i>(Replacement Dissolved Oxygen Membrane Cap for ST-774)</i>	53716
DCC-3 <i>(Replacement Nitrogen Gas Cylinder for Zero Calibration / 99.9999% Pure / 58L)</i>	42059
DCC-4 <i>(Replacement Oxygen Gas Cylinder for Slope Calibration / 0.1% Oxygen / 58L)</i>	42060
DO-Zero Calibration Kit <i>(Portable Panel Mounted Flow Cell + Calibration Assembly)</i>	42058
UC-50 <i>(UC-50 Micro Display + Data Logging Terminal)</i>	43007