Pyxis®

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Data Sheet &
Start-Up Guide

FT-100-PLUS Auto-Brushing Flow Tee for LT-Series Turbidity Sensors

Product Description

The FT-100-PLUS (P/N: 16005) is a uniquely designed automated mechanical brushing flow tee assembly designed to be used with the Pyxis LT-73x Series turbidity sensor platform. This flow assembly system is specially engineered to maintain optimum sensor optical cleanliness in challenging applications.

The FT-100-PLUS and LT-73x Series sensor combination are combined with UC-100 Series display and datalogging terminals to offer the market a fully integrated Pyxis analyzer called IK-73x-PLUS Series also reviewed in this guide. This analyzer solution is US-EPA 180.1 compliant and achieves very precise measurement of turbidity ranging from 0.00–1,000 NTU.

Alternatively, the LT-73x Series turbidity sensors and the FT-100-PLUS auto-brushing flow tee assembly may be utilized with industry OEM controllers, PLC's and DCS networks to providing a higher level of accuracy and reduced maintenance for challenged water turbidity measurement applications. This application guide provides a detailed overview of the operational use, integration and maintenance of the FT-100-PLUS flow tee assembly for use with OEM controllers as well as those devices capable of using the RS-485 digital communication control features offered by Pyxis Lab.

Typical Applications

- *Reduce Stray Light Interference*
- *Eliminates Build-Up of Air Bubbles, Large Particulate & Suspended Solids*
- *Capable of being installed in 'Sensor Up' or 'Sensor Down' format for Optimal Cleaning Function*
- *Supports Self-Cleaning of Sensor Lens for Dirty Water Applications*
- *Brush Parameters can be set in the UC-100 Series Display (or others) via RS485 Communications*
- *May be utilized with conventional OEM controllers with Power ON/OFF Relay (24VDC)*

Specifications

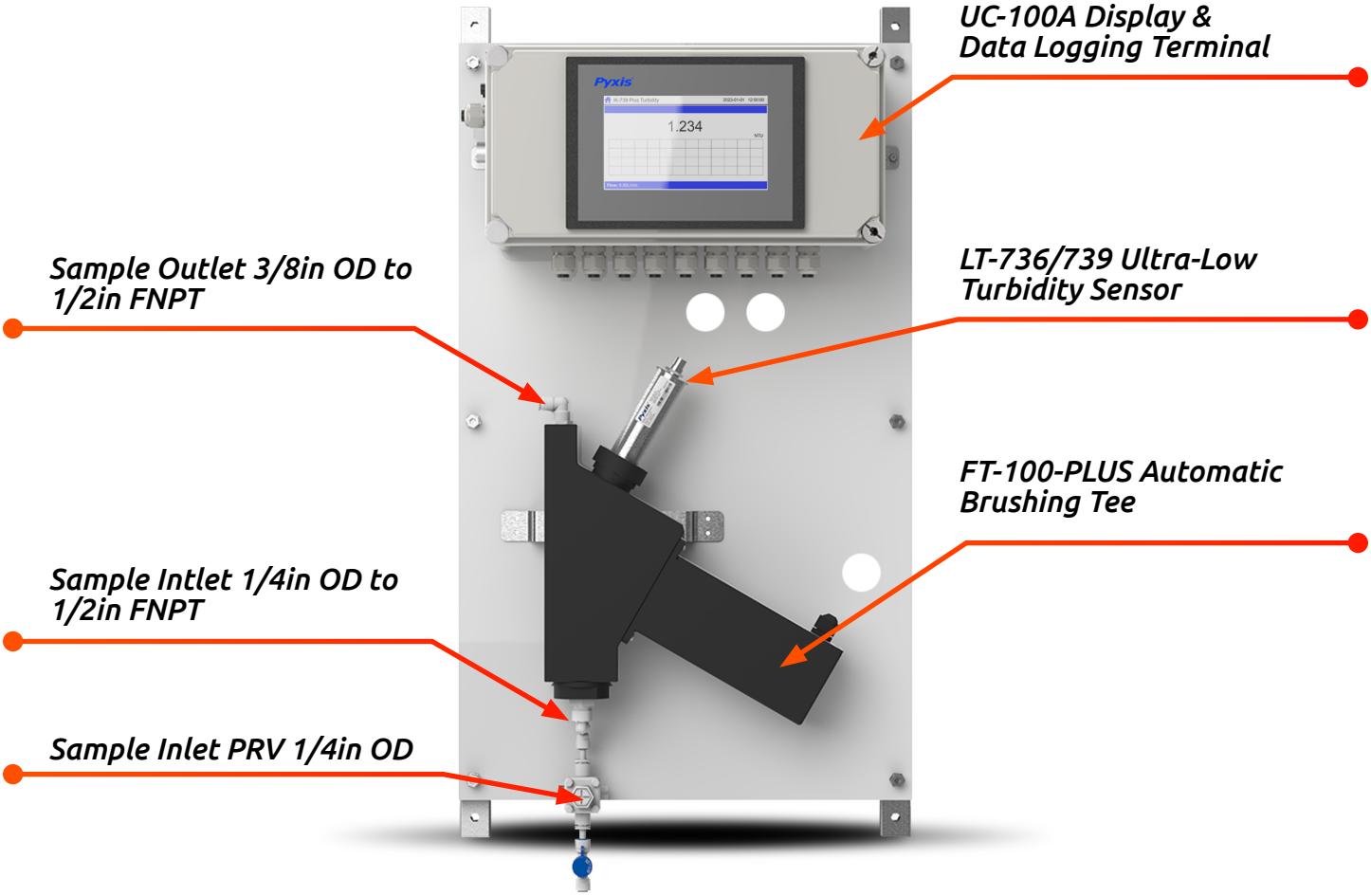
Item	FT-100-PLUS
Part Number	16005
Description	Self-Brushing, Single Sensor Flow Reservoir for LT-73X Ultra-Low Turbidity Sensors
Power Supply	24VDC, 16W
Storage Temperature	-7–60 °C (20–140 °F)
Control Methodology	RS-485 Modbus or Powered Relay
Body Material	ABS
Weight	2175g (4.795lbs)
Operating Temperature	4–40 °C (40–104 °F)
Sample Inlet Pressure	Up to 30psi (0.2MPa)
Sample Inlet/Outlet	1/2 NPT
Sample Flow Rate	400–800mL/min
Wet Material	ABS, POM, SUS316, PP
Cable Length	1ft Terminated with IP67 Adapter; 4.9ft Flying Lead Cable with IP67 Adapters

NOTE *Specifications are subject to change without notice. Contact service@pyxis-lab.com for any questions.*

Order Information	Part Number
FT-100-PLUS Replacement Flow Assembly	16005
FTP-100-1 Replacement Brushing & Sealing Assembly	28698
CE-FE-4.9 Replacement 1.5m Flying Lead w/ 7-Pin Adapter Cable	50762
CE-MS-FE-2.0 Replacement 0.6m Cable w/7-PIN Dual Adapters	15526
MA-AC-7US 110VAC-24VDC Power Adapter for 7-PIN with USA Type A	26398
MA-AC-7EU 230VAC-24VDC Power Adapter for 7-PIN with EU Type DIN	28787

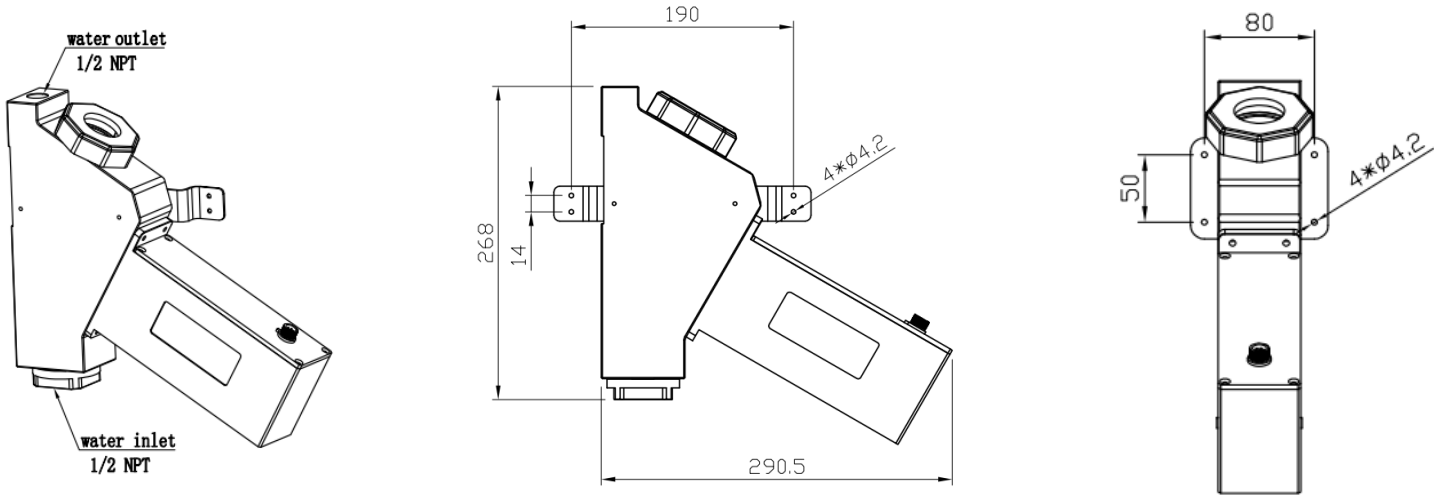
IK-73X-PLUS Series (Fully Integrated Turbidity Analyzer

Sold separately, the IK-73X-PLUS series offers highly accurate, auto-brushing, real-time measurement, display and data-logging of Ultra-Low Turbidity, utilizing proprietary Pyxis Lab smart sensor technology, coupled with a Pyxis touch screen display and data logging terminal. The IK-739-PLUS measures a range of 0.000 – 40.00 NTU while the IK-736-PLUS measures a range of 0.000 – 1000 NTU. The IK-73X-PLUS series is offered in a convenient and easy to integrate panel mounted format for rapid installation and simple maintenance.

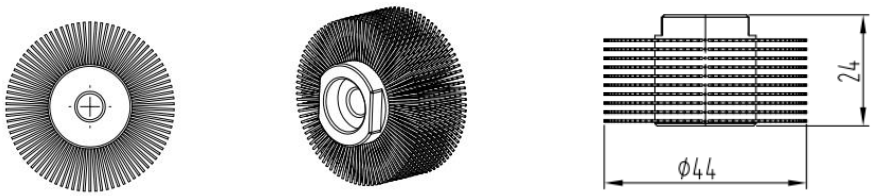


Order Information	Part Number
IK-739-PLUS Auto-Brushing Turbidity Analyzer 0–40NTU	12001
IK-736-PLUS Auto-Brushing Turbidity Analyzer 0–1,000NTU	12003
LT-739 Ultra-Low Turbidity Sensor 0–40NTU	53221
LT-736 Ultra-Low Turbidity Sensor 0–1,000NTU	53215
UC-100A Touch Screen Display & Data Logging Terminal	43054

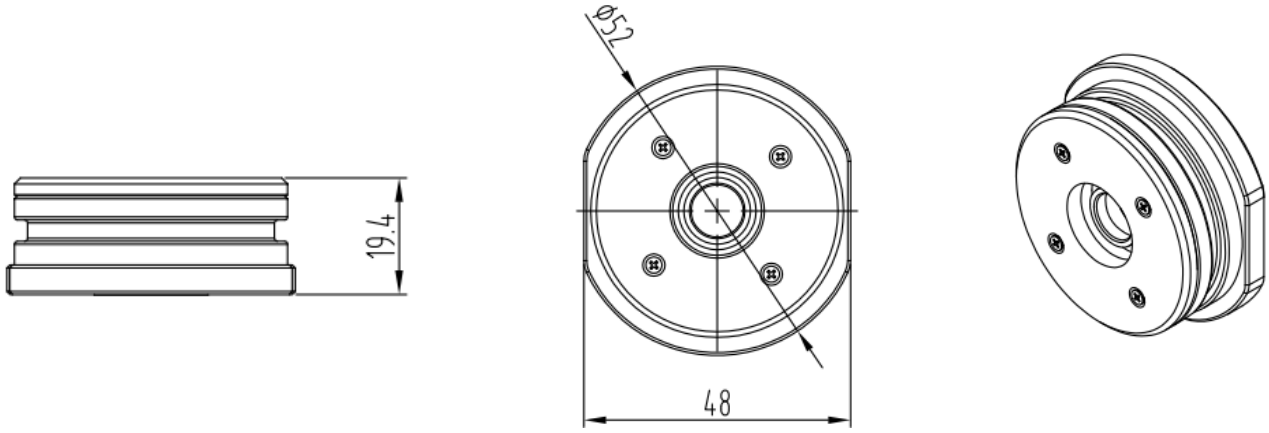
FT-100-PLUS Dimensions (mm)



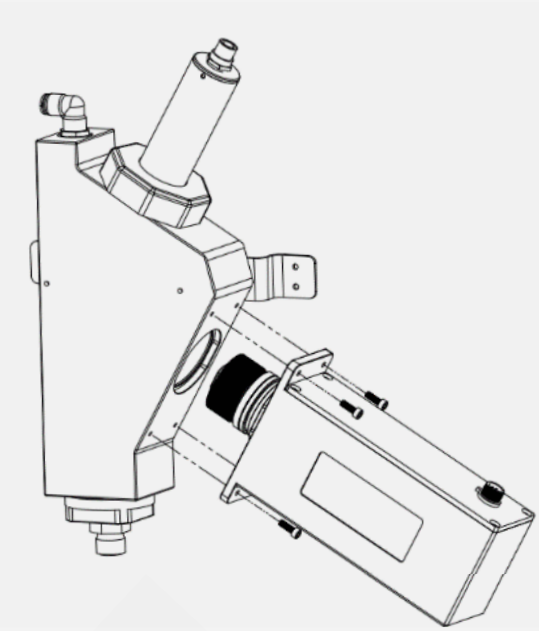
FTP-100-1 Replacement Brush Dimensions (mm)



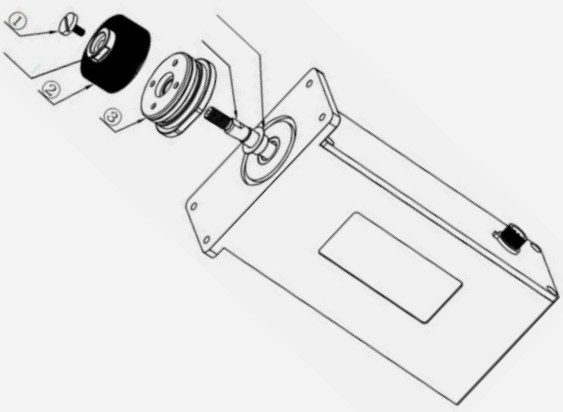
FTP-100-1 Replacement Seal Assembly Dimensions (mm)



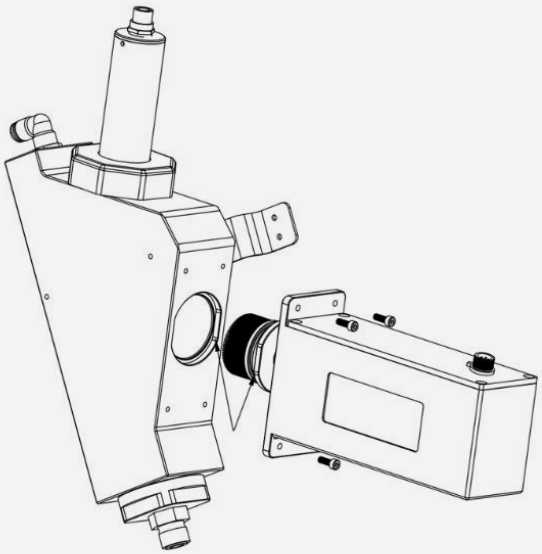
FTP-100-1 Replacement Brush & Seal Assembly Procedure



STEP 1
Remove the 4 screws (M4), separate the flow-reservoir from the motor box.

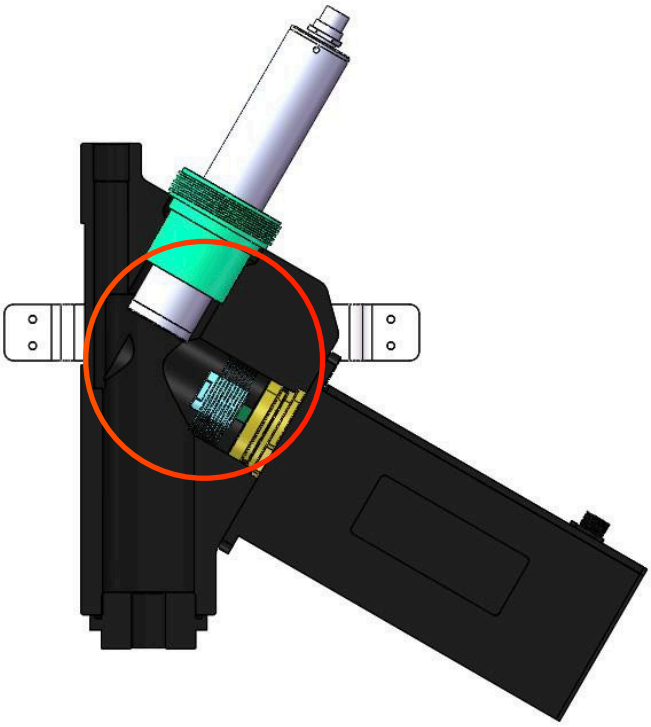


STEP 2
Remove the shaft tip screw then rotate the brush head and remove the sealing assembly. Then replace with a new sealing assembly and brush head kit then reinstall and tighten the shaft screw.

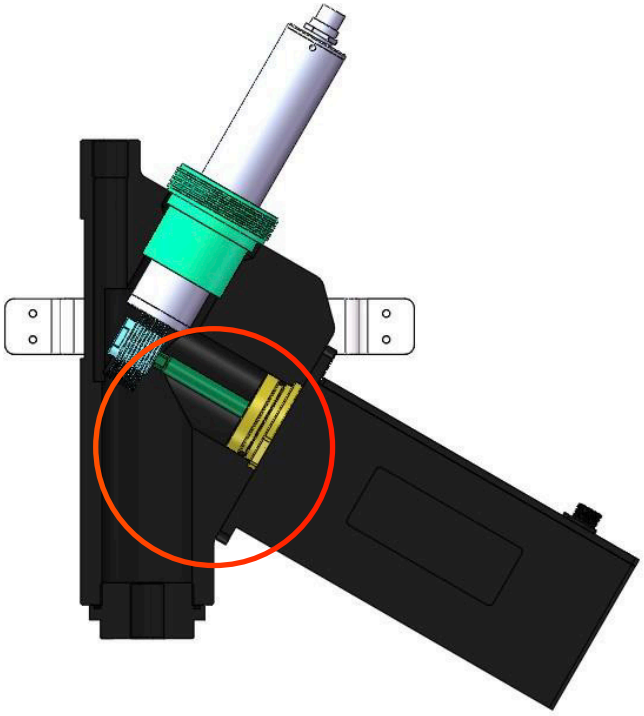


STEP 3
Reinstall the motor-box parts shown and tighten the screws snuggly.

Operational Images of the FT-100-PLUS



FT-100-PLUS Brush in ‘WAIT’ Mode



FT-100-PLUS Brush in Rotational ‘CLEANING’ Mode

FT-100-PLUS Wiring

Follow the wiring table below to connect the FT-100-PLUS to a controller via 24VDC and RS-485 Modbus. Alternatively, any OEM controllers capable of providing 24VDC (16W) power supply may also be used. The FT-100-PLUS can be operated by providing the unit 24VDC power supply operating the brushing mechanism as desired in an ON/OFF relay format based on application needs. Each FT-100-PLUS will be shipped with one flying lead cable (CE-FE-4.9) for direct wiring to terminal and one PowerPACK connection cable (CE-ME-FE-2.0) for direct adapter connection to Pyxis PowerPACK Series for power supply.

NOTE *The FT-100-PLUS may also be operated via 110VAC or 230VAC outlet power supply by utilizing optional Pyxis power supply adapter cables with plug purchased separately. See the ORDER DETAILS section of this document for details.*

Wiring Guide

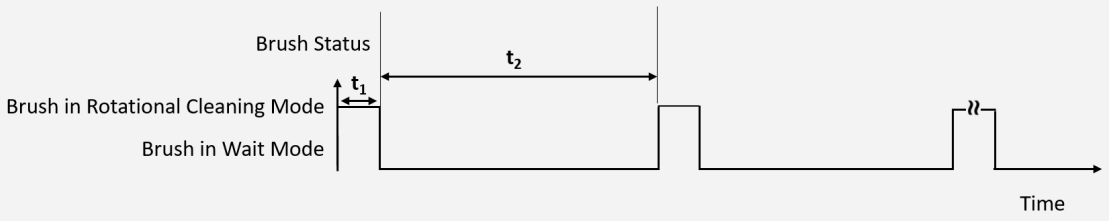
Wire Color	*Designation*
RED	24V +
BLACK	0V
BLUE	RS485 A
YELLOW	RS485 B
SILVER	Earth Ground
WHITE	N/A
GREEN	N/A

Parameter Description of FT-100-PLUS Cleaning Cycle Control

When in the 24VDC powered ON/OFF relay operational mode, the users do not have the ability to regulate brush speed or precise duration of the cleaning cycle. The FR-300-PLUS does allow ON/OFF relay operation, however users should consider the duration of the relay power supply and allow an extra 15 seconds before and after the brushing cycle duration to allow the for insertion and retraction action of the brushing piston. For 24VDC power ON/OFF relay setup, the relay should be powered for a minimum of 1 minute. This would allow for approximately 30 seconds of active brushing or 100 rotations.

NOTE *During this cycle, the OEM controller or PLC should be programmed lock-out the turbidity sensor reading and resume turbidity measurement at least 30 seconds after the cleaning cycle has ended.*

The FT-100-PLUS works according to the following timing diagram after powering on.



t1 = **Brushing Phase**: Single Brushing Time * Number of Brushing
t2 = **Brushing Wait Cycle**: Idle Time between Brushing Cycle

NOTE *When using the Pyxis UC-100 Series Display-Data Logging Terminals, the automatic brush cycle is configured using the* ***'Clean Control'*** *function offered in the dropdown menu. Please refer to the operating instructions of the Pyxis display for further information. The adjustment of t1 and t2 are only available via RS-485 communication protocol.*

FT-100-PLUS Modbus Communication Setting

Modbus Settings	
Baudrate	9600bps
Databit	8-bit
Stopbit	1-bit
Parity Check	Even
Bus Type	RS-485

FT-100-PLUS Modbus Protocol

FT-100-PLUS Modbus RTU Protocol	
Registered Address Model	PLC Address Base 1
Byte Order	CDAB Little Endian Byte Swap
Supported Function Code	
03	Read Holding Register
06	Write Single Register
16	Write Multiple Register

FT-100-PLUS Modbus Registers

Register Address	Read	Write	Type of Data	Description
42001	0x03	0x06	16bit Unsigned Integer	Mailing address, Range: 1-250, Default: 201
42002	0x03	---	16bit Unsigned Integer	Communication Data Bits
42003	0x03	0x06	16bit Unsigned Integer	Comm. Parity, 0: no parity, 1: even parity, 2: odd parity
42004	0x03	---	16bit Unsigned Integer	Communication Baud Rate
48000	0x03	0x06	16bit Unsigned Integer	Start/Stop, 1 is Start, 0 is Stop
48001	0x03	---	16bit Unsigned Integer	Alarm Flag, 0 means no alarm, others are alarm
48003	0x03	0x06	16bit Unsigned Integer	Single Brushing Time Default: 20, Range: 1-100sec
48004	0x03	0x06	16bit Unsigned Integer	Brush Rotation Direction, Default: 0, 0 = Counter Clockwise, 1= Clockwise
48005	0x03	0x06	16bit Unsigned Integer	Brushing Wait Cycle Default: 60, Range 5-10000 minutes
48007	0x03	---	16bit Unsigned Integer	Number of Brushings, Default: 2, Range 1-5