

# Linear Link®

## High Performance Turbine Meter System

### Description

The Linear Link® is a high performance turbine flowmeter linearizer which has redefined the methodology for optimum linearization. Based on measuring the time between turbine rotor blades, the Linear Link® can output “real time” corrected K-factor flow data in 10 mS, with an accuracy of  $\pm 0.1\%$  of reading over the full repeatable range of the flowmeter. This wide turndown is made possible by a unique approach that enhances a resolution in the low flow range of the turbine meter where linearization is critical.



Linear Link® is available in a compact monobody pickoff design or remote enclosure,

including NEMA 4X, aluminum and explosion-proof. The revolutionary level of compactness of the Linear Link's® integral, monobody design allows for installation where space is limited, and also eliminates the confusion of matching electronics to the appropriate flowmeter. When the operating temperature exceeds the limits of the electronics or the application requires separate electronics, the system's remote enclosure option provides a solution.

### Putting It To Work

The Linear Link® operates on a wide 9–32 VDC power input, making it ideal for on-board vehicle testing in the automotive and aircraft industries, and engine test stands in the aerospace industry. The unit eliminates bulky power supply converters, remote electronic housings and unsightly wiring.



*Linear Link®*  
High Performance Turbine Meter System

### Features

- Available in a compact monobody or remote enclosure mounting
- Linearizes outputs to  $\pm 0.1\%$  of reading over the maximum repeatable range of the flowmeter
- Fast 10 mS linearized frequency response
- Operates from 9–32 VDC power
- Simultaneous frequency and analog outputs
- Combines linearization and analog converter in one compact package
- Provides user-selectable K-factor outputs for ease of replacement
- Reduces space requirements and cost of installation
- Fully-programmable and scalable through user-friendly software, via serial communication

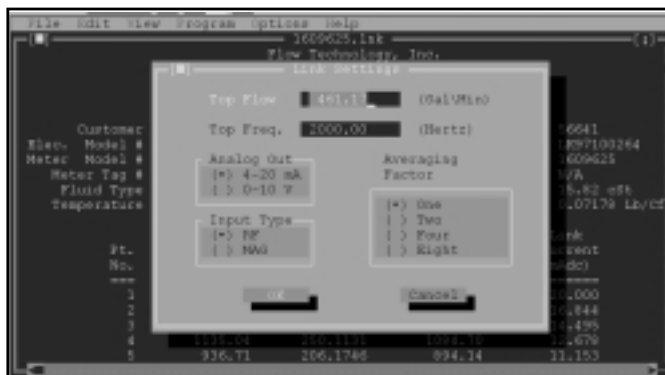
## Advanced Linearizing Technique

Flow Technology has redefined flowmeter linearization, enabling turbine flowmeters to achieve 100:1 turndown with increased speed of response. This combination of speed and precision is made possible by the unique application of an advanced RISC processor operating at 20 MHz.

Traditional linearizers use a frequency method that collects the number of pulses (representing the rotation of rotor blades) over a time period. This technique provides adequate accuracy at high frequencies, but has an inherently slow response at low frequencies (low flow) in order to maintain accuracy.

Conversely, Linear Link® takes advantage of a high-speed clock and measures the time duration (frequency) between the rotor blades, enhancing low-end resolution. The volumetric flow is a direct relationship to the time duration. This provides an optimum solution which allows high accuracy and fast response throughout the entire frequency range.

Industrial users will benefit from the Linear Link's® linearized 4–20 mA analog output. Zero and span functions are performed in software, eliminating drift and unreliable zero/span pots. All industries benefit from the Linear Link's® user-selectable K-factor output, which eliminates the need to correct ancillary electronics when replacing a meter with a spare. In addition, the unit has simultaneous linearized frequency and analog outputs, while providing field programmability with a smart cable and computer.



Example of software calibration

## Power Supply

The Linear Link's® power supply allows for an extremely wide input voltage range of 9–32 VDC. This enables 12 VDC battery systems to power the Linear Link® — a key feature for many on-board test applications. Moreover, low power consumption (300 mW, 19 mA @ 15 VDC) enables Linear Link® turbine meter systems to support intrinsic safety requirements in hazardous industrial environments.

## Field Programming the System

The Linear Link® can be calibrated with the support of a PC notebook computer, user-friendly software and a smart cable connection. The software allows the user to select between cubic spline or linear interpolation of the K-factor curve. It also gives the user the ability to manually manipulate data points if desired.

The calibration system of computer, smart cable and software allows for downloading of calibration data, table

modifications and changes in the units of measure. In order to calibrate the analog output, a device to measure voltage or current (dependent upon the analog output in use) will be required in addition to the calibration system.

The advantages of using a PC RS232 serial interface with user-friendly calibration software include random access to all data, print support for calibration data

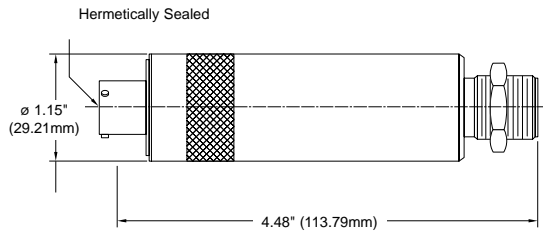
sheets, and one less hand-held terminal to match with another manufacturer's sensor.

## Retrofit Your Current Turbine Meter

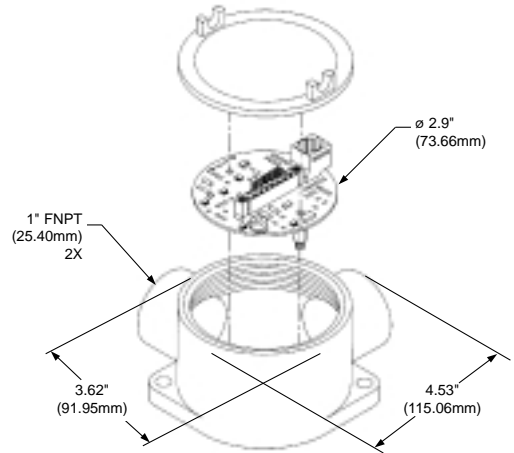
The Linear Link® not only works with Flow Technology turbine flowmeters, but will also enhance any manufacturer's product to its maximum capability. Don't get caught with a missing "link" — send us any turbine meter for an upgrade and calibration. In return, we will send you back a high performance turbine flowmeter system.

# Mechanical Dimensions

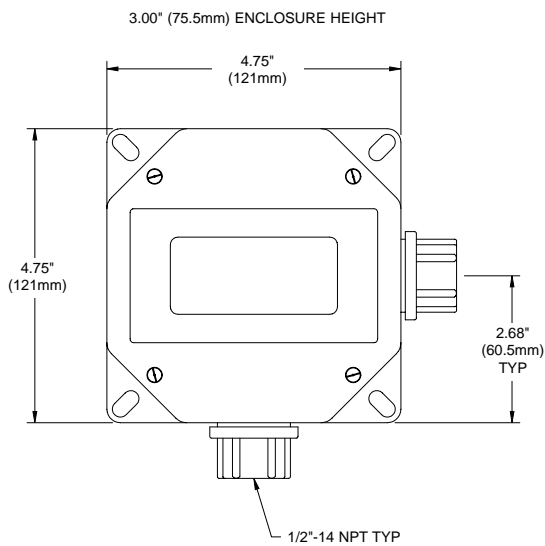
## Integral Monobody Pickoff



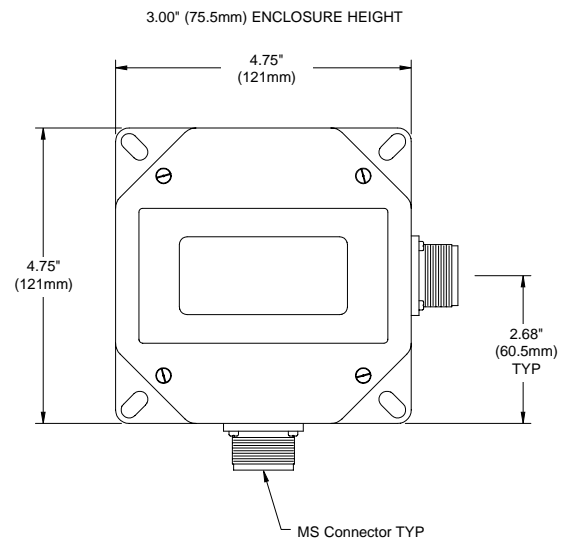
## Explosion-Proof Class I, Div. 1, Group A, B, C & D



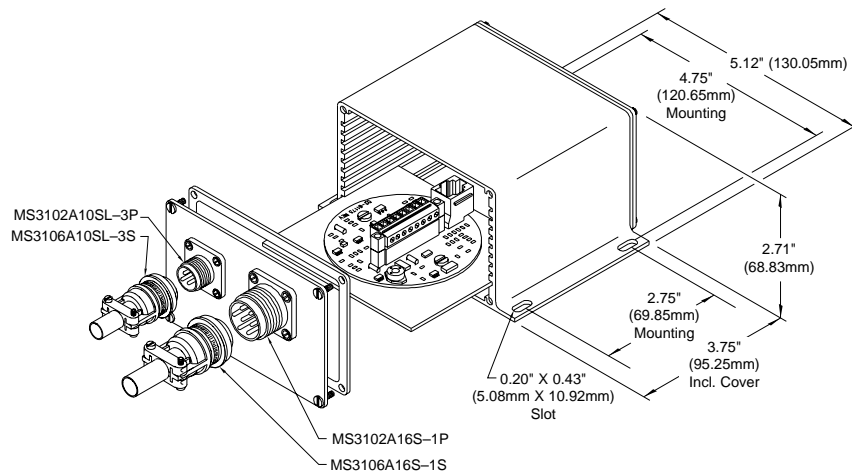
## NEMA 4X, 1/2" Conduit Connections



## NEMA 4X, MS Connections



## Dusttight Aluminum, MS Connectors



# Specifications

## Input

Frequency 5-3,500 Hz  
 Mag. Input Sensitivity 20 mV p-p (below 100 Hz)

## Output

Frequency (Std.) 1-3,500 Hz (linearized)  
 Analog Voltage 0-10 VDC  
 (zero offset <25 mV)  
 Analog Current 4-20 mA

## Applied Voltage In

9-32 VDC  
 Note: 15-32 VDC power required for 4-20mA output

## Typical Power Consumption

300 mW

## Linearization Latency

$$\frac{N}{\text{input Hz}} + 10 \text{ mSec} < 1000 \text{ Hz}$$

$$\frac{3 + N}{\text{input Hz}} + 10 \text{ mSec} > 1000 \text{ Hz}$$

N = blade average factor  
 4 = default blade average factor

## Electronics Accuracy

Frequency Output ±0.1% of reading  
 Analog Output ±0.1% of full scale

## Linearization Method

Linear or cubic spline interpolation

## Reprogrammability

1 million cycles

## Operating Temperature

-40° F to +185° F  
 (-40° C to +85° C)

## Interface

Two-wire 19.2 Kbps serial  
 USART connection to PC  
 (with special cable adapter)

## Approvals

Monobody Only

FM & CSA, Intrinsically Safe,  
 CENELEC, EEx ia IIC T4  
 I.S. approvals pending

Remote Enclosure

## Optional Display

See Universal Display data  
 bulletin for specifications

## Mating 10-Pin

MS Connector

15-93741-01

# Model Numbering System



Basic Model No.

Power

5 = 9-32 VDC

Signal Input

A = Magnetic  
 B = Pulse  
 C = RF Carrier

Analog Output

V1 = 0-10 VDC  
 MA = 4-20 mA

Approvals

Blank = No Approvals  
 IS<sup>1</sup> = Intrinsically Safe FM, CSA, CENELEC,  
 EEx ia IIC T4 (enclosure 1 only)  
 CE<sup>1</sup> = CE Mark (pending)  
 CIS<sup>1</sup> = CE & EEx ia IIC T4 (pending)  
 --- = Three-Digit Special Code  
 (factory-assigned)

Enclosure

- 0 = No Enclosure (n/a with pickoff version)  
 - 1 = Integral Pickoff 10-Pin MS  
 - 9 = Class I, Division 1, Group A, B, C & D  
 A7 = Aluminum with MS Connectors  
 B6 = NEMA 4X with 1/2" Conduit Hubs  
 B7 = NEMA 4X with MS Connectors  
 BA = NEMA 4X with MS Connectors and Display  
 BC = NEMA 4X with 1/2" Conduit Hubs  
 and Display

<sup>1</sup> Input Power = 10-32 VDC Power

Specifications are for reference only and are subject to change without notice.

Local Representative:



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