

## Model TL1500 Fiber Optic Absolute Signal Conditioner

DavidsonSensors™ provide the safest, most reliable and cost-effective instrumentation for harsh industrial applications.

This product data sheet describes Model TL1500 absolute high resolution signal conditioner. This signal conditioner has been designed for the very highest resolution and accuracy and for transmission distances up to 15 km. Its use is limited to Davidson static pressure transducers in the DH1200 series of transducers.

This eight channel unit will interrogate eight of Davidson DH1200 pressure transducers and eight fiber Bragg grating temperature sensors or up to several hundred fiber Bragg grating temperature sensors. The unit is packaged in a rackmount enclosure. The unit can be ordered with a variety of outputs to interface with supervisory control systems.

### Functional Specifications

#### Channels

8 Channels

#### Input Power

120/240 VAC; 50-60Hz; 40 Watts  
or 24 VDC

#### Output Signal

RS-232/RS-485 Modbus

#### Temperature Limits

32°F to 120°F

#### Humidity Limits

0 to 100% relative humidity

#### Transmission Range

2 to 15 km

#### Displacement Range

80 to 100  $\mu$ m

#### Fiber Specification

Singlemode

#### Wavelength Specification

C-Band



**Absolute High Resolution Long Range  
Signal Conditioner**

### Physical Specifications

#### Size

12" X 10" X 6"

#### Weight

15 lbs

#### Enclosure Class

NEMA 4

#### Power/Communications Connectors

Internal Terminal Block with Conduit Interface

#### Fiber Optic Sensor Connectors

FC/APC Bulkhead

### Performance Specifications

#### Displacement Accuracy

0.005% of Full Scale

#### Update Rate

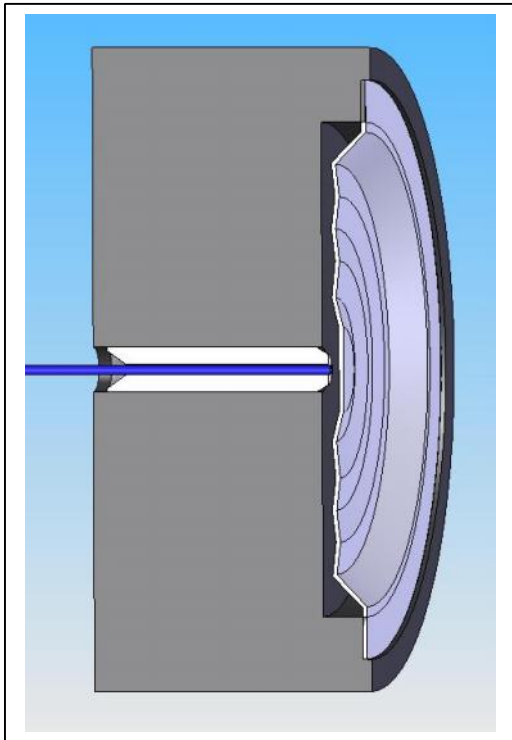
1Hz (1 channel per second)

## Theory of Operation

A fiber optic signal conditioner is the equivalent of a transmitter in conventional electronic sensing systems. During operation, the signal conditioner sends a pulse of light in sequence to each of the interferometric transducers. The light signal received from each transducer is split and projected onto a photodiode.

The light signal is converted into electronic signals that are processed by a microprocessor. The microprocessor in the signal conditioner converts the signals into a known length of the interferometric gap.

The calibration constants are known for each transducer and loaded into the micro-processor. The microprocessor converts the known gap into an output signal, i.e. RS-232/RS-485 Modbus, proportional to the engineering units, (i.e. psia), for the transducer. The result is unprecedented measurement accuracy in harsh industrial environments.



**Fiber Optic Pressure Sensing Diaphragm**

## Fiber Optic Sensing Advantages

Fiber optic sensing offers a number of advantages for measurement in harsh industrial environments. DavidsonSensors™ are intrinsically-safe, immune to electromagnetic interference, and suitable for continuous use at temperatures up to 1000°F.

Although fiber optic sensing systems can be used effectively even in benign environments, Davidson fiber optic sensing systems offer significant technical advantages when used in the following environments:

- **Hot, Corrosive Environments**
- **Explosion Hazardous Areas**
- **High EMI Areas**

Fiber optic sensing systems eliminate or mitigate many of the following common problems:

- **Failure and Drift due to Hydrogen Permeation**
- **Drift due to Fill-Fluid Leaks**
- **Failure due to Lightning**
- **Problems due to Ground Potential**
- **Noise due to EMI/RFI**
- **Costs of Nitrogen Purge Systems**

## Testing and Calibration

Calibration is performed over the entire displacement range at 72° F.

## Documentation

A user's manual is included with each unit.

## Tagging

Stainless steel tags will be permanently attached to each signal conditioner upon request.

## Other Applications

For information about other Davidson products, see [www.davidson-instruments.com](http://www.davidson-instruments.com)

## Guide to Configuring a Fiber Optic Sensing System

For information to assist you in planning a fiber optic sensing system, see

[www.davidson-instruments.com](http://www.davidson-instruments.com)

**Ordering Data**

Model Number	TL1500	
Fiber Optic Connector Type	1	FC/APC
	2	Other
Power Input	A	120 VAC
	D	24 VDC
Other Specifications*	0	No
	1	Yes

\* Tagging, documentation, other instructions etc.

**Ordering Data Worksheet**

Unit Number	Model Number	Fiber Optic Connector Type	Power Input	Other Specifications
1	TL1500			
2	TL1500			
3	TL1500			
4	TL1500			
5	TL1500			
6	TL1500			

U.S. Patents Pending

Davidson Instruments, Inc.  
8301 New Trails Drive  
The Woodlands, TX 77381 USA  
  
Telephone: 281-362-4900  
Fax: 281-362-4933  
sales@davidson-instruments.com  
www.davidson-instruments.com  
  
© 2006 Davidson Instruments, Inc.