Sensotec Sensors

Honeywell

Pressure. Load. Force. Torque.
Displacement. Vibration. Instrumentation.

Full Line Catalog
27th Edition, 2006

Introduction

Whether you need measurements in a laboratory, industrial, or hazardous environment, ...whether your application involves a vacuum, 200,000 psi, 10 gms, or 3 million lbs., ...whether you need one unit or several thousand, ...Honeywell Sensotec can help you achieve your measurement goals.

For more than 30 years, Sensotec has provided quality, high performance pressure transducers, load cells, torque cells, accelerometers, LVDTs and associated instrumentation to a wide variety of industries. Having produced nearly 5000 different types of transducers and instruments, we will frequently have an existing design to meet your specific needs.

Our sales and R & D engineers have accumulated years of experience in pressure and force measurement applications. This knowledge, combined with the industry's broadest line of products and options, allows Honeywell Sensotec to provide transducers and instrumentation which meet your specific needs at the minimum cost.

How To Use This Catalog

This catalog is designed to help you:

Select the transducer and/or instrument models, options and accessories which best meet your needs.

Place an order.

Set up and operate transducers and instrumentation in the field.

First time users and individuals with limited knowledge about Sensotec products should consult the **product selection flow chart** located at the beginning of each section to identify the best model for their application and to determine its page location in the catalog.

Individuals who have already identified the model or order code for the required product can use the index on pages 2 and 3 to determine its page location in the catalog and in the price book.

After selecting the appropriate product model, refer to the appendix for guidelines on selecting range codes, options and accessories, building an order code string, and preparing a purchase order.

If you need help selecting the proper transducer or instrument, or have requirements that aren't met by the models described, call our Customer Service department or your local Sensotec Sales Representative for assistance.

Design and Specifications

Honeywell Sensotec Engineers are continually working to improve our products. Honeywell reserves the right to make changes, without notice, in design and specifications of any product as engineering advances and necessity requires.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this catalog is for reference only, DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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Notation Key

(A) — absolute pressure
(B) — bolt mount accelerometer
(C) — 4-20mA output accelerometer
(CS) — captive spring return LVDT
(F) — flat pack accelerometer
(FU) — free unguided LVDT
(G) — gage pressure
(H) — high range differential pressure
(L) — low range differential pressure
(M) — mid range differential pressure
(S) — stud mount accelerometer
(V) — ±5VDC output accelerometer

* Call for pricing

Index By Order Code

Note: Order codes beginning with “AA” designate accessories. (See Appendix)

* Not in catalog. Call for details.

1-888-282-9891

Honeywell
Sensotec Sensors

www.honeywell.com/sensing

Sensor Solutions from Honeywell Sensotec

Honeywell Sensotec…one of the broadest product ranges in the industry.

Honeywell's facility in Columbus, Ohio

Sensotec, part of Honeywell Sensing and Control, has one of the broadest product ranges in the industry. We design and manufacture a comprehensive product line of pressure transducers (10 inches of water to 170,000 psi), load cells (25 gms to 3 million pounds) and electronic sensor instrumentation. In addition Sensotec manufactures a full line of sensors for acceleration, torque and position (LVDT's). As a leader in the measurement market we work to integrate our extensive capability to meet our customers quality, reliability, cost and performance requirements.

Automotive industry instrumentation.

Honeywell Sensotec…providing customers with a single source for the measurement of load, pressure, position, torque and vibration.

Sensotec products provide you with complete engineered solutions whether they are standard off-the-shelf transducers developed for general applications or sensors developed to meet your unique requirements. Sensotec transducers can be designed for the harshest environments such as temperatures as low as –325°F or as high as +425°F or ambient conditions up to 10,000ft of sea water. Our breadth of core sensor and electronic engineering competencies has supported our continuous growth through 30 years of working to build a full product line directed to solve thousands of specific customer needs.

Sensotec supplies many medical instrument manufacturers.

Honeywell Sensotec…Creating a name in miniature pressure and load.

Sensotec's unique expertise is in the packaging of its sensor technology. Sensotec's roots are in the specialization and manufacturing technology of subminiature sensors. Customer demand drove the expansion of the product range into the areas that today forms one of the most comprehensive product line of strain gage based, piezoelectric and coil wound transducers. Accuracies of 0.05% are available in pressure sensors and calibration standard load cells have accuracies of 0.02%

Jet engine and gas turbine monitoring.

Honeywell Sensotec …manufacturing excellence sets us apart from the competition.

At Sensotec all the design, manufacturing, assembly, testing and calibration is done in house. This enables Sensotec to have complete control over the manufacturing process. At all stages of production individual sensors are tracked as they go through manufacturing. Individual product testing records are maintained during manufacture. Many times during manufacture transducers and instruments are tested in environmental chambers or fixtures that simulate the customer's exact field conditions.

Sensotec transducers are manufactured from stainless steel.

Honeywell Sensotec…sensors and instrumentation when you need them.

The original patented miniature pressure transducer.

Sensotec's stocking program is based on having thousands of finished and calibrated pressure, load, acceleration, transducers and associated instrumentation available on the shelf for immediate delivery. Those products available in the stocking program are listed in the catalog and regularly updated on the website.

The FP2000 program is a unique new concept in producing a tailored product in a very short delivery time. We have found that customers often need products with a particular connector, wiring code, output, pressure port, but they need delivery quickly. Tailoring an FP2000 model to meet each customers needs does not mean long delivery. The Sensotec FP2000 manufacturing cells have an inventory of pre-tested modular sub assemblies. As soon as the order hits the manufacturing cell your transducer is built from these interchangeable sub assemblies in a matter of days. The result is a pressure transducer for your specific application in short time delivery.

Sensotec offers the most sophisticated and extensive Custom Engineering capabilities in the test and measurement industry and allows us to expand the product range "outside the catalog". Our customer specials products program works because we have an internal company process and people culture that can respond to small batch sizes. Our in-house manufacturing, flexible designs and technologies are structured to support this extensive custom engineering program. Whether you need a simple modification of a standard product or complete customized engineering product, we are organized to accommodate your special request.

Welding technology for hermetic sealing of transducers.

Sensotec machine shop and prototype workshop.

Honeywell Sensotec…keeping ahead of fast growing markets by constant investment in engineering and product development.

Sensotec is at heart a production engineering company. We know that that the key to sustained growth and customer satisfaction is a strong engineering foundation that is responsive to be able to meet customer delivery dates. Every year Sensotec invests more and more in engineering and manufacturing to ensure our designs and assembly processes continue to be at the forefront of the industry. Sensotec embraces the new technologies of ASIC chips, smart transducers, micro machining, digital compensation and wireless and fits them into the constantly evolving product line. New lean manufacturing processes, CAD CAM packages ensure we stay ahead of the competition by bringing fast delivery, customer configured and technologically advanced products.

Extensive stock ensures next day shipment for a large portion of our customer orders.

Honeywell Sensotec…quality control by involvement of everyone in the company.

Sensotec has a stringent quality control regime that governs the way the whole company operates. This all encompassing quality control program is based on ISO 9001:2000.

FP2000 manufacturing cells provide total customer configurable transducers.

Our engineering capability can design custom built transducers for your unique requirements.

Our final inspection and testing is based upon ANSI Z540-1 and NIST traceable standards. Like all good quality control programs Sensotec's procedures are based on constant quality audits and self-improvement programs.

Honeywell Sensotec…customer service is the sustainable competitive advantage that our people strive to maintain every working hour of their day

We are dedicated to providing responsive local support where it is needed. At Sensotec we believe in working in a consultative partnership with our customers. All of our application engineers, service engineers and sales people are trained in our products, applications and our customer's needs. Customers can use our website www.honeywell.com/sensing or www.sensotec.com as a resource, they can call into our technical sales engineers and application engineers or they can call our customer service hotline. Our aim is to be your choice as business partner because we care about customer service.

One of the first internally amplified pressure sensors.

Sensotec transducers undergo extensive environmental testing during manufacture.

Honeywell Sensotec…known by the company it keeps

Honeywell is a worldwide leader in advanced switching and sensing technology and our reputation for technology, quality and reliability is second to none. In addition to the original MICROSWITCH brand switch, we offer the most complete line of electro-mechanical heavy duty limit switches available. Honeywell is a recognized technology leader in the development and manufacture of pressure and position-sensing transducers and controls, as well as speed and position sensors for the industrial markeplace.

Marine propulsion monitoring.

Stringent process control and ongoing inspections ensures quality and reliability.

Sensotec supplies specially designed sensors for harsh applications.

Weld automation and control.

1-888-282-9891

Honeywell Sensotec Sensors

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Honeywell Sensotec on the Web

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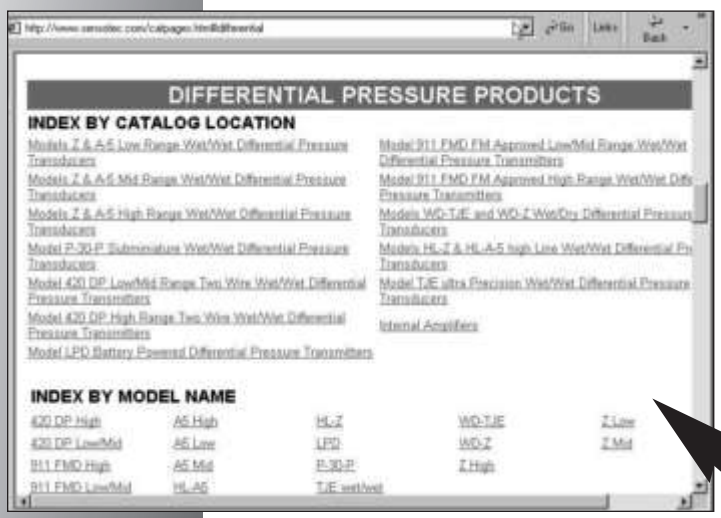
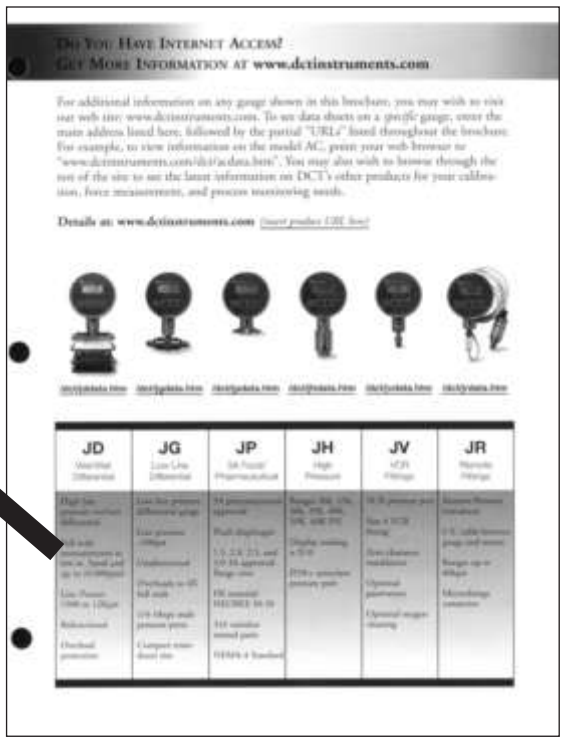
Bookmark Us Today as Your Sensor Supplier and Resource

Sensotec Home Page

Sensotec Stocking Program and Online Purchasing



Download Datasheets and user Manuals Online



Linking Literature to More Detailed Information

Visit www.honeywell.com/sensing or www.sensotec.com to get all the latest product news and information from the people who understand sensors, test and measurement and customer service!

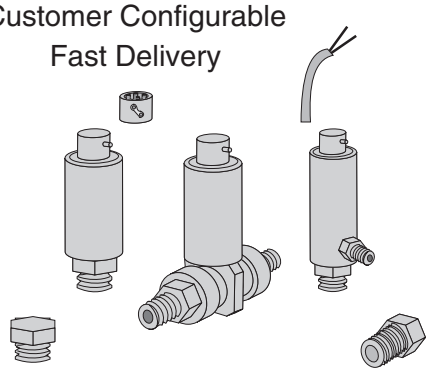
The site is continually being updated to provide the latest information. At www.honeywell.com/sensing or www.sensotec.com you can access detailed data sheets, view new product releases, or locate the nearest Sensotec Representative. Existing customers can download instruction manuals or obtain return material authorization to ensure speedy repairs or calibration. You can even order products on line! Browse through our extensive stocking program and, with your credit card handy, you can painlessly be on your way to next day delivery.

You can also configure your own FP2000 pressure transducer from one of 19,000 permutations. Day or night you can order a specially-configured FP2000 transducer to meet the needs of your application. And FP2000 delivery is guaranteed in only 2 weeks!

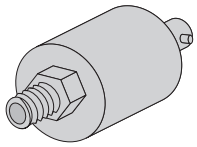
Whatever your needs, www.sensotec.com is a resource that you should be making the most of. Bookmark and return to the site whenever you need sensor information.

PRESSURE

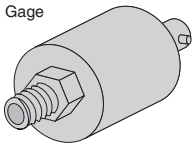
Customer Configurable Fast Delivery



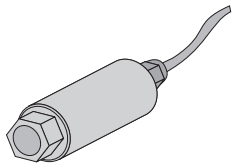
Test & Measurement Industrial



High Precision

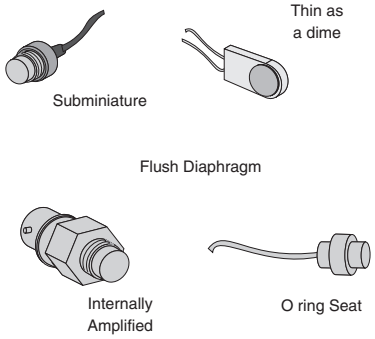


OEM

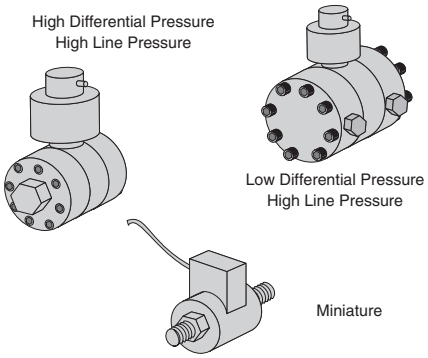


OEM/High Volume

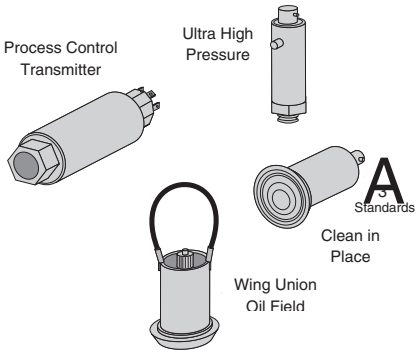
Miniature



Wet/Wet Differential

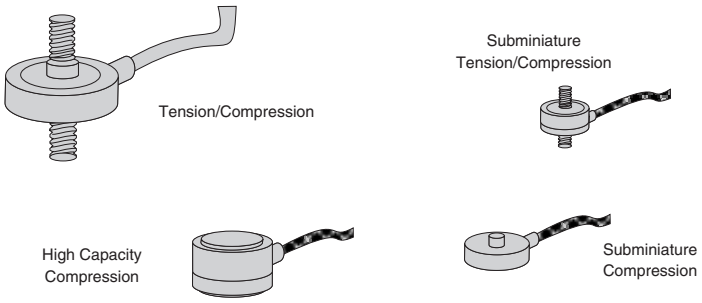


Special Applications



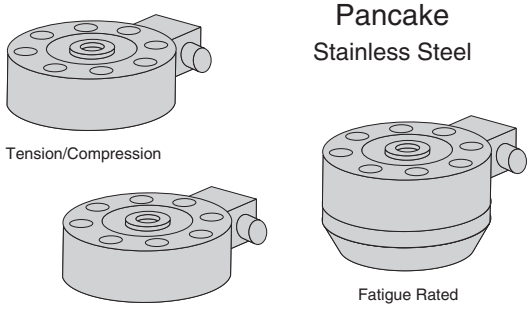
LOAD

Miniature

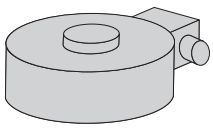


Pancake

Stainless Steel

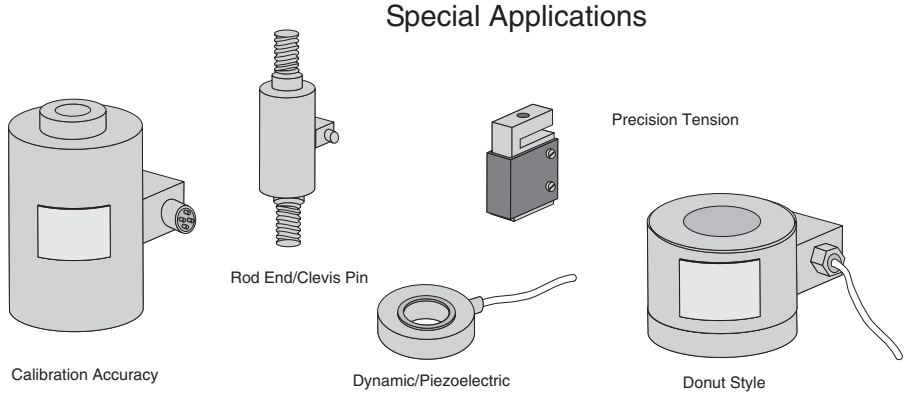


OEM/Volume



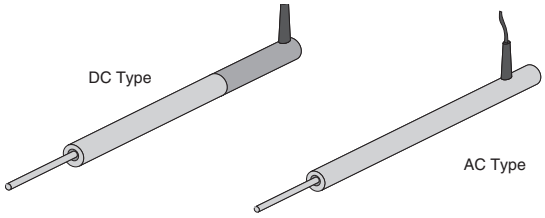
Low cost-Hermetic

Special Applications



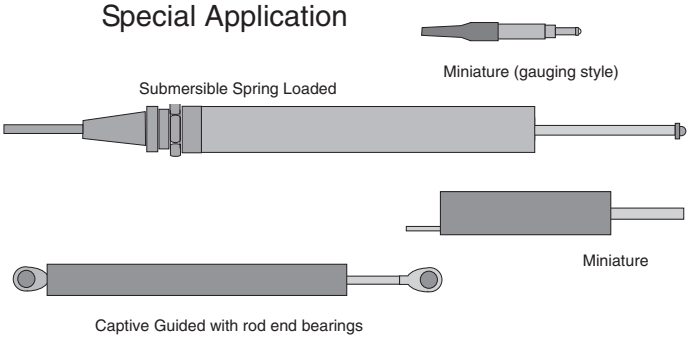
LVDT'S

General Purpose

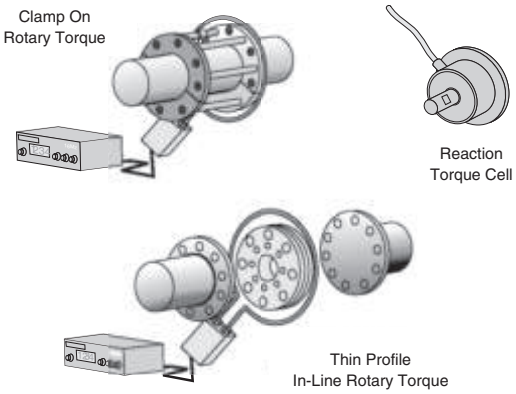


Free Unguided Captive Guided Spring Return

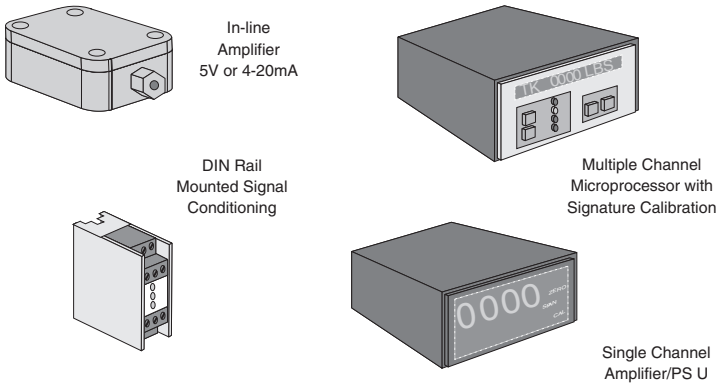
Special Application



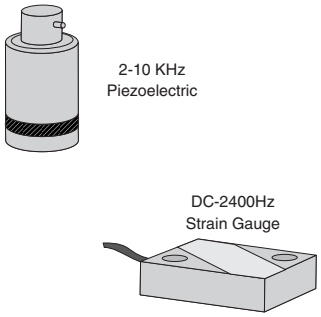
REACTION & ROTARY TORQUE



INSTRUMENTION



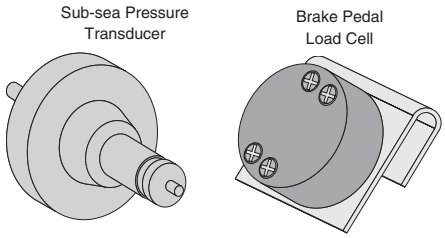
ACCELEROMETERS



APPROVALS

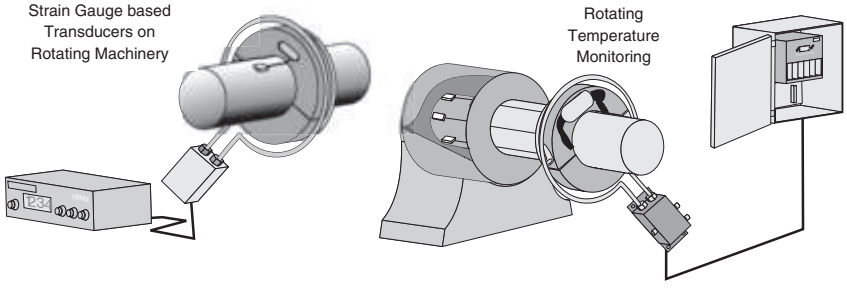
See page AP-6

CUSTOMER SPECIALS

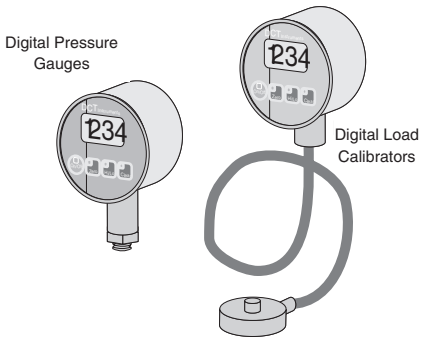


Transducers
Built to Customers
Unique Requirements

WIRELESS DATA ACQUISITION



DIGITAL GAUGES



Portable Shockproof/Weatherproof

Same Day Ship

PRESSURE

Model A105
Subminiature
Flush Diaphragm

Model S
Subminiature
Flush Diaphragm

DIFFERENTIAL PRESSURE

Model TJE or Z
True Gage or Absolute
Accuracy to 0.1%
Welded,
Hermetic

Model A-5
Wet/Wet
Differential
0.25% Accuracy

Model LM
Gage
Low Cost
Stainless Steel
Accuracy to 0.5%

LOAD CELLS

Model 53
Low Cost
Stainless Steel

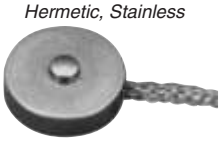
Model 31
Miniature
Welded, Stainless
Rugged, Small Size

ACCELERATION

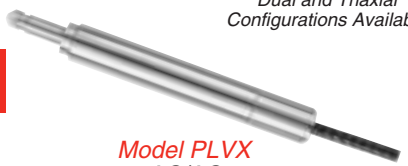
Model PA
Tapped Hole
Internally Amplified
Laboratory
Industrial
Piezoelectric

Model JTF Flat Pack
Screw Mount
Rugged, Stainless Steel
Dual and Triaxial
Configurations Available

Model 41
Pancake
Low Profile
Hermetic, Stainless



DISPLACEMENT



Model PLVX
AC/AC
Ultra Precision

Model 13
Subminiature
Height .12" - .30"
High Frequency

GM Family
Low Cost Amp/Indicator
4 1/2 Digit Display
0-5 VDC Output

INSTRUMENTATION

Model SC
Automatic Calibration
Can Drive 4 Cells
Auto Zero, 100% Tare

AMPLIFICATION

Universal In-Line Amplifiers

- *Bi-polar*
- *Vehicle*
- *3-Wire*

In-Line Amplifiers

- *DIN Rail Mount*

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Stocking Program

ORDER ON-LINE

THOUSANDS IN STOCK

SAME DAY SHIPPING

mV/V, 4-20mA, VOLTAGE OUT

The Honeywell Sensotec stocking program includes thousands of finished transducers in a wide variety of models and ranges. Throughout this catalog, stocked ranges are listed in bold type. This stock diversity readily accommodates most applications, and provides *immediate solutions* to your most urgent application challenges. Orders for stock complete units placed before noon can ship the same day - at no additional cost to you!

The units are stocked in both complete and semi-complete stages to allow for product modification. Semi-complete units can be ordered with optional pressure ports, different temperature compensation ranges, special cable/connector, or an internal amplifier and *still* deliver weeks faster than a custom engineered product.

GAGE & ABSOLUTE PRESSURE

MODEL	PAGE	REFERENCE	mV/V Output	0-5 vdc Output	4-20 mA Output	5 psi	15 psi	25 psi	50 psi	100 psi	200 psi	300 psi	500 psi	1000 psi	2000 psi	3000 psi	5000 psi	7500 psi	10,000 psi
TJE	PR-6	True Gage, high accuracy	×	×			×	×	×	×	×		×	×		×	×	×	×
TJE	PR-6	Absolute, high accuracy	×	×			×	×	×	×	×								
Z	PR-8	Gage, general purpose	×				×	×	×	×	×		×	×					
LM	PR-12	Gage, low cost	×							×	×	×	×	×	×	×	×		×
A105	PR-22	Gage, flush diaphragm	×								×		×	×	×	×	×		×
S	PR-18	Gage, miniature	×								×		×	×	×	×	×		×
440	PR-14	Gage, 2-wire			×	×	×		×	×	×		×	×		×	×		×

DIFFERENTIAL PRESSURE

We stock a range of wet/wet differential pressure transducers. These sensors are industrially rugged and highly reliable because of their stainless steel construction, including all wetted parts. Mechanical overload stops protect the transducer from high overload pressures in either direction.

MODEL	PAGE	REFERENCE	50 psid	100 psid	200 psid	500 psid
KZ	DP-4	Wet/wet differential	×	×	×	×
TJE	DP-18	Wet/wet differential	×	×	×	×
Z	DP-4	Wet/wet differential	×	×	×	×

Same Day Ship

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LOAD

Reliable Sensotec load cells are stocked in a variety of configurations to suit your needs. These industrially rugged load cells are constructed from stainless steel and hermetically welded to insure performance in the most hostile environments. Our stocking program includes miniature units which measure ranges as low as 250 grams and larger load cells with ranges up to 50,000 pounds. The selection includes compression only or tension/compression models with accuracy to 0.1%.

MODEL	*PAGE*	*REFERENCE*	250 gms	1000 gms	5 lbs	10 lbs	25 lbs	50 lbs	100 lbs	250 lbs	500 lbs	1000 lbs	2000 lbs	5000 lbs	10,000 lbs	20,000 lbs	50,000 lbs
41	LO-6	T / C, pancake						×	×		×	×	×	×	×	×	×
31	LO-18	T / C, miniature	×	×	×	×	×	×	×	×	×	×					
13	LO-20	Compression, miniature		×		×	×	×	×	×	×	×					
53	LO-30	Compression, low cost									×	×	×	×	×	×	×

ACCELERATION

Our stock of accelerometers covers a wide range of applications and environments. Our strain gage Model JTF is ideal for DC or very low frequencies, and the piezoelectric Model PA can be used when high frequency performance is required. These popular and versatile units are kept in stock for shipment within 24 hours.

MODEL	*PAGE*		Piezoelectric	Strain gage	10 G	50 G
JTF	AC-2	Flat pack, general use		×	×	×
PA	AC-4	Amplified, high impact	×			

DISPLACEMENT

Sensotec LVDTS are reliable, low maintenance displacement sensors designed to meet most single and multiple point industrial gaging applications. Our stock program includes captive armature, spring return models with either DC/DC or AC/AC operation.

MODEL	*PAGE*	*REFERENCE*	± 0.1"	± 0.2"	± 0.5"	±1"	±2"
JEC-AG	LV-6	DC / DC, captive, spring			×	×	×
PLVX	LV-2	AC / AC, captive, spring	×				
S3C	LV-17	DC / DC, captive, spring		×			
VL7A	LV-4	AC / AC, spring return			×	×	×

Stocking Program

INSTRUMENTATION

No job is complete without instrumentation. Sensotec stocks digital readouts, displays and signal conditioners to provide complete solutions for your application problems. Our inventory includes single- and multi-channel units, portables and handhelds. Remember...sensors and instruments purchased at the same time will be set up together at no charge!

MODEL	PAGE		RS 232 output	±5 VDC output	4-20 mA output	5-40 mV F.S. input	5 VDC F.S. input	0-2 VDC input	6 digit display	4 1/2 digit display	3 1/2 digit display	Dummy zero	Peak & Hold	Limits	Switchable gain	Shunt calibration	Auto zero	Signature Calibration	100% tare	Can drive 4 cells
SC	IN-2	Indicator, conditioner	×	×	×	×	×[1]	×[1]	×			×	×[1]	×[1]	×	×	×	×	×	×
GM	IN-10	Indicator		×	×	×	×	×		×			×	×	×[1]	×				
GM-A	IN-10	Low cost indicator		×			×			×										
HM	IN-10	Programmable	×	×		×	×[1]	×[1]		×					×	×	×			
DM	IN-9	Demodulator	×[1]	×	×					×		×[1]	×	×						
HH	IN-12	Hand held indicator				×					×	×	×		×	×				
NK	IN-12	Portable				×				×					×					

1 - Available with short lead time.

AMPLIFICATION

A variety of amplifiers are available for immediate shipment including our Universal In-line amps which are compatible with any strain gage sensor and are housed in a rugged plastic enclosure. The universal amps are NEMA 4 and IP-66 rated for use in harsh locations. Our DIN rail mount models provide easy front access to electrical connections and adjustments, and are RFI and ESD protected.

MODEL	PAGE	TYPE	±5 VDC output	0-10 VDC output	±10 VDC output	4-20 mA output	5-40 mV F.S. input	Switchable gain	Shunt calibration
U3W	IN-6	Universal, 3-wire				×	×	×	×
UBP	IN-6	Universal, bi-polar	×				×	×	×
UBP-10	IN-6	Universal, bi-polar		×			×	×	×
UV	IN-6	Universal, vehicle	×				×	×	×
UV-10	IN-6	Universal, 3-wire			×		×	×	×
DLD-HV	IN-8	DIN mount	×		×			×	
DV-05	IN-8	DIN mount	×					×	×
DV-10	IN-8	DIN mount			×			×	×
DLD-CH	IN-8	DIN mount				×[1]		×[1]	×[1]
DA-05	IN-8	DIN mount				×[1]		×[1]	×[1]

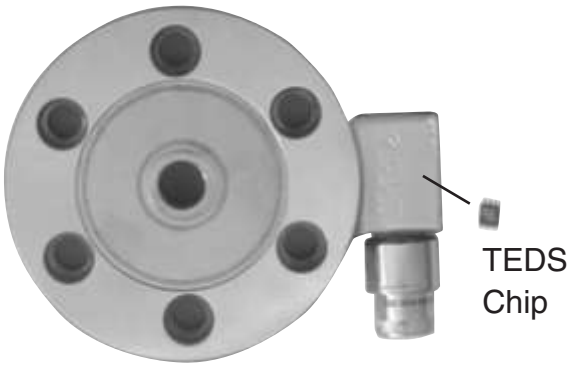
1 - Available with short lead time.

Plug and Play Sensors and Signal conditioning

IEEE 1451.4 STANDARD

BUILT IN AS NEW, RETROFITTABLE OR VIRTUAL

CAL DATA STORED ON SENSOR FOR AUTOMATIC SETUP



Sensotec can supply your sensor and/or signal conditioning with IEEE1451.4 plug and play technology. The plug and play technology consists of adding a memory chip to the sensor and having software (standard on the SC2000) to interpret the data that then automatically sets up and calibrates your system so that you are ready to take data. Its as easy as 1-2-3.

The transducer electronic data sheet (T.E.D.S) containing sensor specifications, calibration data and user defined location information is stored in the sensor. When connected to the SC2000 or any IEEE1451.4 compliant signal conditioning the sensor is interrogated for the TEDS information and automatically sets up and calibrates the signal conditioning with the sensor.

No More Paper. Plug and play eliminates the need to read and enter data from a paper calibration sheet. You don't have to endure the hassle of having the sheet filed in one location while the sensor is used in another or worst of all, that the calibration sheet will get misplaced or lost.

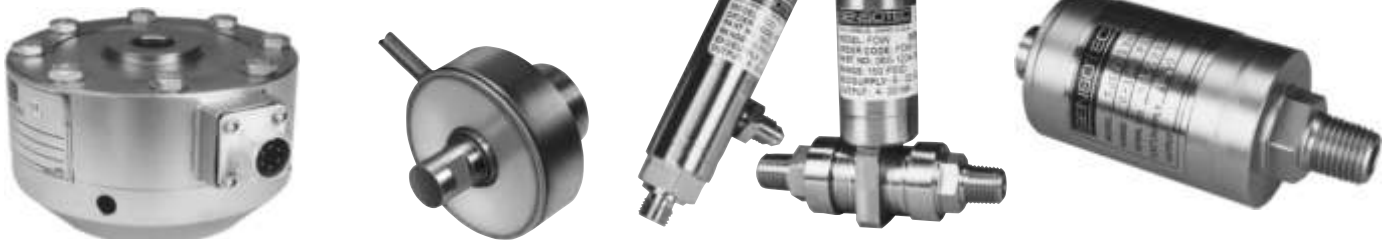
Labeling and Cabling Made Easy. Sensor users often find themselves with a bundle of cables, trying to figure out which cable goes with which sensor so they can make the proper connections to their signal conditioner. Plug and play technology introduces the potential for enabling the signal conditioner to read not only a sensor's type and calibration information but also its location.

Swapping Made Easy. Even a rugged sensor can be damaged in an industrial testing situation. When that happens, you want to change sensors and get your test back up and running as soon as possible. With a TEDS sensor that automatically provides calibration data to an active signal conditioner, even a technician unfamiliar with calibration procedurescan swap sensors quickly without jeopardizing the integrity of system operations..

Plug and Play Inventory Control. Burning location data onto each sensor's TEDS will also help you inventory your sensors.

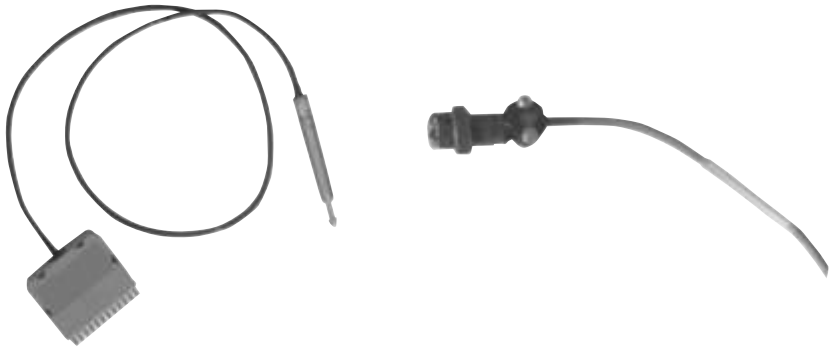
Mix and Match. Wouldn't it be convenient if you could plug sensors from one manufacturer into signal conditioners from another? Plug and play implemented according to 1451.4 makes that mixing and matching possible. All sensors manufactured according to the standard will carry the same basic self-identification information on TEDS formatted in exactly the same way.

PLUG AND PLAY SUPPLIED WITH SENSOR



IEEE 1451.4 TEDS sensors are available in all strain gage based sensors with 4 wire unamplified, amplified voltage or current outputs. TEDS uses two wires so a 6 pin connector or 6 wire cable is fitted to these sensors. Miniature sensors require the TEDS chip to be mounted as an in-line module or mounted in the connector. Piezoresistive accelerometers uses 6 wires (4 for the bridge and 2 for TEDS) while IEPE accelerometers use 2 wire TEDS where the digital data is switched onto the 2 wire constant current loop when TEDS data is read.

RETRO-FIT KITS



Sensotec can retrofit your sensors by having them returned to the factory or Sensotec can provide you with retro-fit kits. Three types of retrofit kits can be provided.

1. Connector adapter that extends the sensor connector to house the TEDS chip
2. In line TEDS module that is heat shrunk onto the cable that adds TEDS to 2 of the 6 wires
3. Connctor with built-in TEDS that replaces the existing cable connected to the sensor integral cable

VIRTUAL TEDS

For those whose systems are PC-enabled, National Instruments in conjunction with Sensotec has developed the concept of Virtual TEDS, whereby sensor calibration data are downloaded directly to your signal conditioning system. National Instruments is becoming a clearinghouse for TEDS gathering calibration data from many sensor manufacturers and posting it on their Web site. In order to download Sensotec TEDS data go to the National Instruments website and by entering Serial Number and Model number binary TEDS data can be downloaded into your software application.

Gage & Absolute Pressure Transducers and Transmitters

0.05% to .5% ACCURACY

VACUUM TO 175,000 psi

SENSOTEC manufactures a wide range absolute, gage, and true gage pressure transducers and transmitters. All of these sensors are manufactured as standard, modified standard, and custom transducers to provide fast delivery. Many units can ship from our extensive stocking program within 24 hours.

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UNAMPLIFIED OUTPUT

TRANSDUCERS

APPLICATION	Model	Accuracy	PAGE #
QUICK SHIP			
Absolute	FPA	0.10% or 0.25%	PR-2
Barometric	FPB	0.10% or 0.25%	PR-2
Gage	FPG	0.10% or 0.25%	PR-2
Vacuum	FPV	0.10% or 0.25%	PR-2
PRECISION TEST/MEASUREMENT			
Ultra High Precision, True Gage	Super TJE	0.05%	PR-4
High Precision, True Gage	TJE	0.1%	PR-6
General Purpose	A-5; Z	0.5%, 0.25%	PR-10, PR-8
Dual Output	DS	0.1%	PR-26
TRANSDUCER WITH READOUT			
Ultra High Precision	AG400	0.05%	PR-34
Low Cost	AG401	0.10%	PR-34
LOW COST PRESSURE			
OEM	LM	0.5%	PR-12
Universal	BDR		PR-13
SUBMINIATURE FLUSH DIAPHRAGM			
Thread Mount	S	1.0%	PR-18
Flange Mount	G	1.0%	PR-20
Flat Low Profile	F	1.0%	PR-20
High Level Output	355	0.25%	PR-25
Industrial Straight Thread	A-105		PR-22
Industrial Pipe Thread	A-205		PR-22
AEROSPACE PRODUCTS			
Absolute Pressure	AS17A	0.15%	PR-32
Gage Pressure	AS19G	0.15%	PR-32
Differential Pressure	AS25D	0.2%	PR-32
SPECIAL APPLICATIONS			
Oil Field/Wing Union	424,425	0.25%	PR-30
Vacuum	FPV	0.10% or 0.25%	PR-2
High Pressure	HP	0.5%	PR-33
Barometric	FPB	0.10 % or 0.25%	PR-2
Liquid Level	LL-V	0.1%	PR-27

AMPLIFIED OUTPUT

TRANSMITTERS

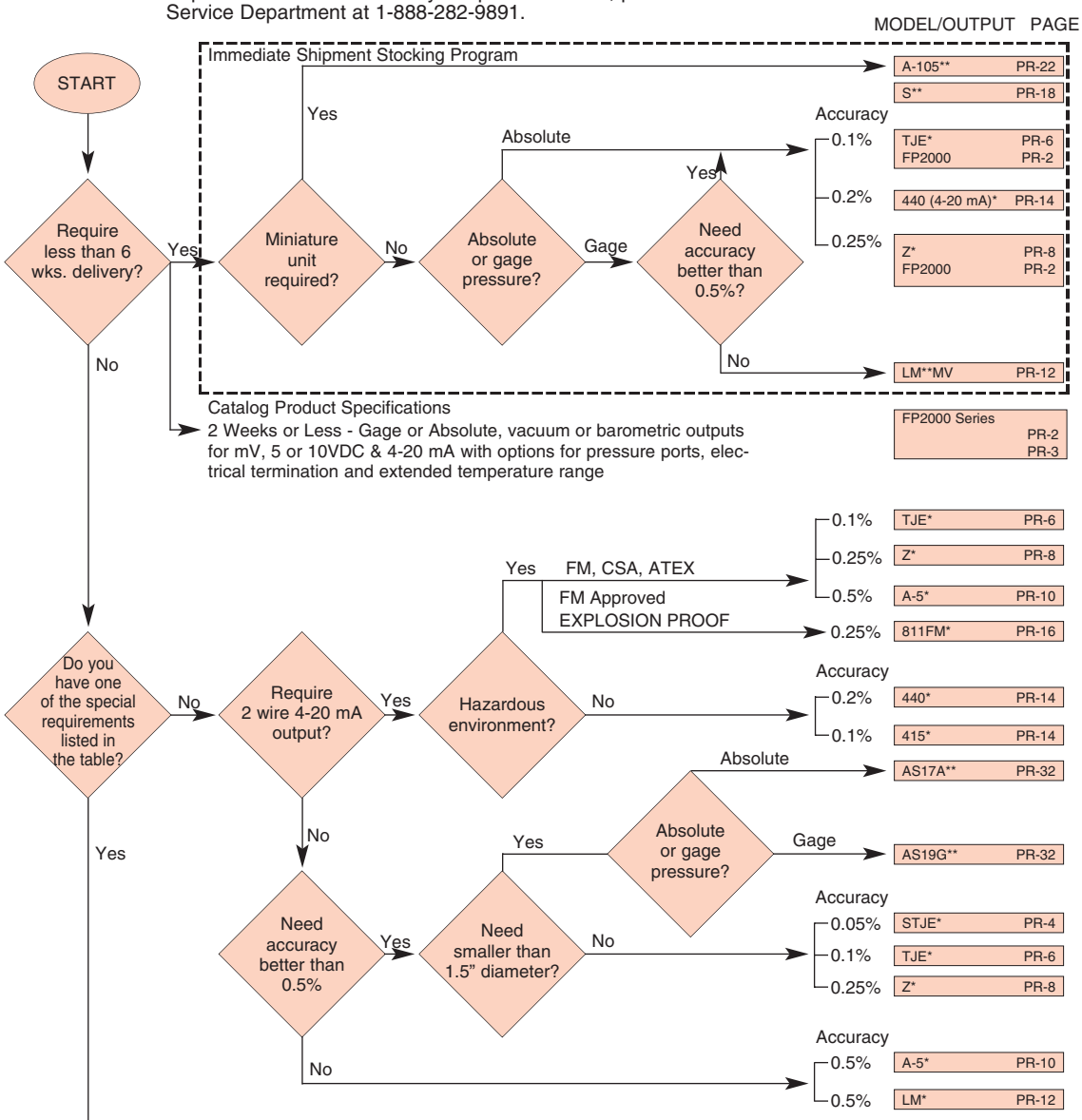
APPLICATION	Model	Accuracy	PAGE #
INTERNALLY AMPLIFIED; 5V, 10V, 4-20mA			
High Precision	TJE	0.1%	PR-6
Ultra High Precision	STJE	0.05%	PR-4
Hazardous Locations	811	0.25%	PR-16
Flush Diaphram, Miniature	355	0.25%	PR-25
General Purpose	Z	0.25%	PR-8
General Purpose	A-5	0.5%	PR-10
Intrinsically Safe	Pressure & Load		AP-6
Oil Field/Wing Union	424,425	0.25%	PR-30
Vacuum	FPV	0.10% or 0.25%	PR-2
Flush diaphragm, miniature	A-105a	0.5%	PR-24
Clean In Place, Sanitary (3A Standards)	CIP-Ultra	0.15%, 0.25%, 0.5%	PR-28
TWO WIRE, INTERNALLY AMPLIFIED; 4-20mA			
Process Control	415	0.1%	PR-14
Process Control	440	0.2%	PR-14
Process Control	FP2000	0.10% or 0.25%	PR-2

Consult Sensotec on the availability of these approvals. (Page AP-6)

Pressure

SELECTION FLOW CHART

This selection flow chart is designed to help you choose the best product for your application. Simply follow the path that best characterizes your requirements and turn to the appropriate product pages. If you need further assistance in identifying the "best" product or have a unique requirement that is not met by the products listed, please contact our Customer Service Department at 1-888-282-9891.



SPECIAL REQUIREMENTS TABLE	MODEL	PAGE
• **FM, CSA a**pproved, intrinsically safe models available. See page AP-6	TJE, Z, A-5, 811FM*	PR-6, 8, 10, 16
• **Flight Rated** small size	AS17A, AS19G**	PR-32
• **Low cost**—small	LM**	PR-12
	F,G**	PR-20
• **Miniature Unit** (0.125" to 0.5" Dia.)	A-105, A-205, S, G**	PR-22, 18, 20
• **Flush Diaphragm**	355	PR-25
• Pressure range exceeds **30,000** psi	TJE, HP	PR-6, 33
• **Barometric** Pressure measurements only	FPB	PR-2
• **Vacuum** measurements	FPV	PR-2,
• **Ultra High Precision**	STJE, AG401*	PR-4, 34
• **Clean-in-Place**, Sanitary Applications	CIP-Ultra	PR-28

NOTE: Amplified output (0-5v, 4-20mA, 0-10v) is available on all models;
* internal amplification available
** in-line amplification available

PRESSURE

Configurable Pressure Transducers

FP2000 Series

APPROVED

APPROVED

APPROVED INTRINSICALLY SAFE AMP

2-WEEK DELIVERY

mV/V, 0-5, 0-10 VDC, OR 4-20 mA

GAGE, ABSOLUTE, VACUUM, BAROMETRIC

The FP2000 series is a manufacturing and delivery system which allows the customer to select the configuration which best fits the needs of the application. Choose from two accuracies, four outputs, six pressure ports, five electrical terminations and twenty-five pressure ranges. The FP is available with gage, absolute, barometric or vacuum reference and, best of all, they deliver in 2 weeks or less.

	Order Code	Gage FPG	Absolute FPA	Barometric FPB	Vacuum FPV
PERFORMANCE	Pressure Ranges		See chart next page		
	Accuracy (BFSL)		0.1% or 0.25% F.S.		
	Output (selectable)		mV/V, 0-5 VDC, 0-10 VDC, or 4-20 mA (2 wire)		
	Resolution		Infinite		
ENVIRONMENTAL	Temperature, Operating		-40° F to 240° F		
	Temperature, Compensated		40° F to 140° F		
	Temperature Error Band*				
	0.1% Accuracy		±0.5% F.S.		
	0.25% Accuracy		±1% F.S.		
ELECTRICAL	Excitation (calibration)				
	Amplified (4-20mA, 0-5 VDC)		9 - 28 VDC		
	Amplified (0-10 VDC)		15 -28 VDC		
	Unamplified (mV/V)		10 VDC		
MECHANICAL	Media		Gas, Liquid		
	Overload-Safe				
	1000 psi and below		4x FS or 3,000 psi, whichever is less		
	1500 psi and above		4x FS or 15,000 psi, whichever is less		
	Wetted Parts Material		Ha C276 & 316L ss		

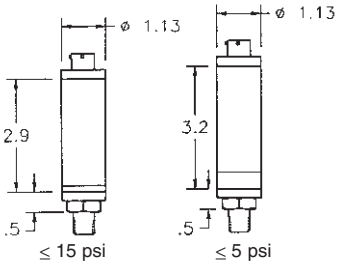
*For ranges below 15psi, temperature effects may vary.

Non-amplified output @10 VDC excitation

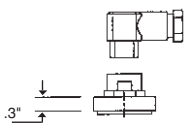
	FPG & FPA	FPV	FPB
0.10% accuracy	50 mV	33 mV	40 mV
0.25% accuracy	100 mV	50 mV	80 mV

Dimensions

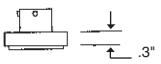
GAGE, ABSOLUTE, BAROMETRIC & VACUUM



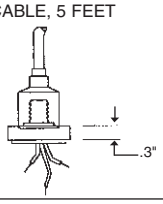
CODE 6n
4-PIN, VENTED
MINI DIN



CODE 6a
6-PIN, VENTED
BENDIX STYLE

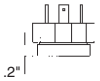


CODE 6q
4-CONDUCTOR
VENTED, INTEGRAL
CABLE, 5 FEET



CODE 6r
4-CONDUCTOR
VENTED, INTEGRAL
CABLE, CONDUIT
FITTING, 5 FEET

CODE 6m
4-PIN, VENTED
STD. DIN (43650)



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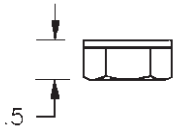
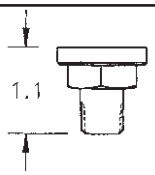
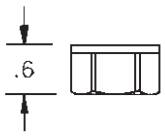
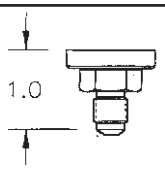
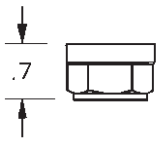
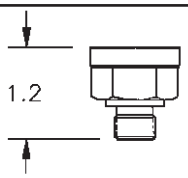
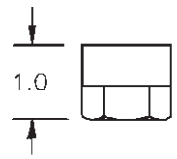
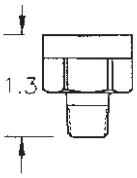
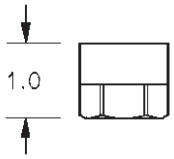
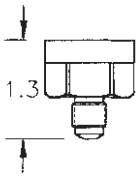
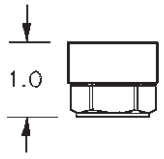
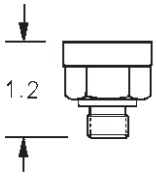
Pressure Port Options	CODE 5a 1/4-18 NPT Female	CODE 5b 1/4-18 NPT Male	CODE 5c 7/16-20 UNF Female	CODE 5d 7/16-20 UNF Male	CODE 5f G1/4B Female	CODE 5g G1/4 B Male
≤1000PSI						
≥1500PSI						

HOW TO ORDER

www.sensotec.com/FP2000.htm

It's easy to order exactly what you need. Simply make one selection in each of the required categories, choose adders and accessories only if you want them. The result is a custom transducer with standard delivery!

Example Order Code:	TYPE	ACCURACY	RANGE	OUTPUT	PORT	CONNECTOR
	FPG	1	AT	2u	5b	6a

This example is for a gage pressure unit, 0.10% accuracy, 5 psi range, mV/V output, 1/4-18 NPT Male pressure port, and a Bendix electrical connection.

TRANSDUCER TYPE
- ❑ Gage (FPG)
- ❑ Absolute (FPA)
- ❑ Barometric (FPB)
- ❑ Vacuum (FPV)

ACCURACY
- ❑ 0.10% (1)
- ❑ 0.25% (2)

GAGE/ABSOLUTE RANGES
- ❑ 10" H_2O (WA)*
- ❑ 1 psi (AP)*
- ❑ 5 psi (AT)
- ❑ 15 psi (BJ)
- ❑ 30 psi (BM)
- ❑ 50 psi (BN)
- ❑ 100 psi (BR)
- ❑ 150 psi (CJ)
- ❑ 250 psi (CN)
- ❑ 500 psi (CR)
- ❑ 750 psi (CT)
- ❑ 1000 psi (CV)
- ❑ 1500 psi (DJ)
- ❑ 2500 psi (DM)
- ❑ 5000 psi (DR)
- ❑ 7500 psi (DT)
- ❑ 10000 psi (DV)

*Gage only

BAROMETRIC
- ❑ 16"-32" Hga (UQ)
- ❑ 26"-32" Hga (UR)
- ❑ 0-30" Hga (UG)

VACUUM
- ❑ 10" H_2Ov (WA)
- ❑ 1 psiv (AP)
- ❑ 5 psiv (AT)
- ❑ 10 psiv (AV)
- ❑ 15 psiv (BJ)

ELECTRICAL CONNECTIONS
- ❑ Bendix PTIH-106P (6a)
- ❑ MINI DIN, 40050 (6n)
- ❑ 5´ Integral cable, polyurethane (6q)
- ❑ Std. DIN, 43650 (6m)
- ❑ Conduit fitting, (6r)

AVAILABLE OUTPUTS
- ❑ mV/V (2u)
- ❑ 5 VDC (2d)
- ❑ 10 VDC (2g)
- ❑ 4-20 mA (2p)
- ❑ 4-20 mA, CE (2y)
- ❑ 4-20 mA, Intrinsically Safe (2n or 2N; limited to ranges </= 5000 psi.)

PRESSURE PORTS
- ❑ 1/4-18 NPT F (5a)
- ❑ 1/4-18 NPT M (5b)
- ❑ 7/16-20 UNF F (5c)
- ❑ 7/16-20 UNF M (5d)
- ❑ G 1/4 B F (5f)
- ❑ G 1/4 B M (5g)

ADDERS

Selecting an Adder will automatically update the output code.

- ❑ Extended temperature range (1y)
- ❑ Buffered shunt cal (3d)
- ❑ CE rating (9e)
- ❑ Intrinsically safe, 2 wire (9d) See page AP-6
- ❑ CE and Intrinsically safe (9f) See page AP-6
- ❑ Potentiometers (14c)

ACCESSORIES

Mating connectors with 15' of cable for Bendix connector (6a)

	without shunt	with shunt (3d)
❑ mV/V	AA113	AA513
❑ 4-20 mA	AA116	AA516
❑ 0-5 / 0-10 VDC	AA117	AA517

Mating Connectors Only

❑ Mini DIN (40050)	AA161
❑ Bendix	AA111
❑ Standard DIN (43650)	AA157

WIRING CODES, no shunt cal

Mating Connectors \ Output	mV/V 2u	0-5 VDC 2d	0-10 VDC 2g	4-20 mA 2p	4-20 mA 2n or 2N
AA161 Mini DIN	#37	#38	#38	#54	#53
AA111 Bendix	#2	#50	#50	#49	#23
6q Integral Cable	#1	#52	#52	#51	#22
6r Conduit	#1	#52	#52	#51	#22
AA157 Std DIN	#37	#38	#38	#54	#53

WIRING CODES, with shunt cal option (3d)

Mating Connectors \ Output	mV/V 2u	0-5 VDC 2e	0-10 VDC 2f	4-20 mA 2y	4-20 mA 2n or 2N
AA161 Mini DIN	NA	#56	#56	#55	#64
AA111 Bendix	#57	#60	#60	#58	#59
6q Integral Cable	NA	#63	#63	#61	#62
6r Conduit Fitting	NA	#63	#63	#61	#62
AA157 Std DIN	NA	#56	#56	#55	#64

AVAILABLE with Signature Calibration
SEE PG. IN-5

Ultra Precision Gage/Absolute Pressure Transducers

Model Super TJE

0.05% ACCURACY

TRUE GAGE OR ABSOLUTE

SUPERIOR TEMP. SPECS

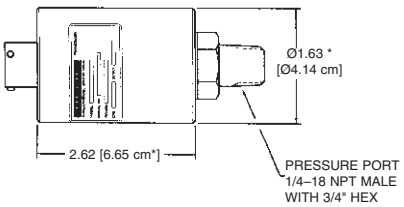
AMPLIFIED OUTPUT AVAILABLE

Model Super TJE is one of the most accurate industrial pressure transducers available today. The Super TJE features 0.05% FS Accuracy and a zero temperature error of less than 0.0015% FS/°F. These specifications are maintained by welding a double jacket shell of stainless steel along with our proprietary “True Gage” second diaphragm that isolates the strain gage circuitry from atmospheric contamination. High output options of 5 or 10 Vdc and 4-20 mA eliminate the need for an amplifier card in your data system. An optional internal *Signature Calibration* chip provides calibration information for automatic set up with the Model SC four or twelve-channel digital indicators.

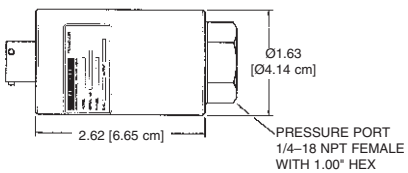
Dimensions

	Available Ranges
Absolute (Order Code AP112)	15; 25; 50 75; 100; 150; 200; 300; 500; 750; 1000; 1500; 2000; 3000; 5000; 7500 psi
True Gage (Order Code AP111)	10; 15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000; 1500; 2000; 3000; 5000; 7500 psi

1 to 1500 psi



2000 to 7500 psi



Options (See Appendix)

Internal amplifiers: 2a (for replacement only, see page AP-20); 2c (0-5VDC); 2j.

Amplifier enhancements: 3d; Int. shunt cal 8a; Signature calibration 53e

Accessories: Mating connectors and connector/cable assemblies; Pressures port adapters

*For 10 and 15 psi (700 mbar and 1 bar) true gage models, the diameter is 2.00” (5.08 cm).

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Model Super TJE

True Gage: Order Code AP111
Absolute: Order Code AP112

PERFORMANCE	Pressure Ranges	10 to 7,500 psi (700 mbar to 500 bar)
	Accuracy (min.)	±0.05% F.S. (BFSL)
	Output (standard)	2mV/V
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F (-50° to 120° C)
	Temperature, Compensated	60° F to 160° F (15° to 70° C)
	Temperature Effect	
	– Zero (max.)	0.0015% F.S./° F (0.0027% F.S./° C)
	– Span (max.)	0.0015% Rdg./° F (0.0027% Rdg./° C)
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	10VDC
	Excitation (acceptable)	Up to 12VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC
	Bridge Resistance	350 ohms
	Shunt Calibration Data	Included
	Wiring Code (std.)	#2 (See Pg. AP-8)
	Electrical Termination (std.)	PTIH-10-6P or equiv. (Hermetic stainless)
	Mating Connector (not incl.)	PT06A-10-6S or equiv.
MECHANICAL	Media	Gas Liquid
	Overload-Safe	50% over capacity
	Overload-Burst	300% over capacity
	Pressure Port	
	10 to 1500 psi	1/4-18 NPT male
	2000 to 7500 psi	1/4-18 NPT female
	Dead Volume	0.17 cu. in.
	Wetted Parts Material	17-4 PH Stainless
	Type	True Gage or Absolute
	Weight	12 oz. (Nominal)
	Case Material	17-4 PH Stainless
INTERNALLY AMPLIFIED UNITS (Optional)	Outputs Available	0-5VDC, 4-20mA
	Additional Length	1.12" (28.5 mm)

NOTES *Gage pressure units greater than 500 psi (35 bar) are sealed at atmospheric pressure.

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

AVAILABLE with Signature Calibration
SEE PG. IN-5

Precision Gage/Absolute Pressure Transducers

Model TJE

0.1% ACCURACY

1 to 60,000 psi, 70 mbar to 4000 bar

TRUE GAGE DESIGN

AMPLIFIED OUTPUT AVAILABLE

1 to 1500 psi
70 mbar to 100 bar

2000 to 60000 psi
140 bar to 4000 bar

CSA APPROVED

Ex

FM APPROVED INTRINSICALLY SAFE AMP

Model TJE pressure transducers are all-welded stainless steel sensors built for rugged industrial applications that require high accuracy and measurement stability. The Model TJE is a strain gage based sensor and features a unique "True Gage" design which utilizes a second welded stainless steel diaphragm that hermetically seals the strain gage circuitry from atmospheric contamination. This design references the primary pressure sensing diaphragm to the atmosphere, and provides a stable zero regardless of the transducer environment.

The Absolute Model TJE has an all welded vacuum reference chamber assuring long term stability. The Model TJE is available with a variety of options for extended temperature operation, electrical terminations and high level outputs including 5 or 10 Vdc and 4-20 mA. All high level output models have internal shunt calibration circuits as a standard feature to allow easy set up of the sensor to your data system. An optional internal *Signature Calibration* chip provides calibration information for automatic set up with the Model SC four-or twelve-channel digital indicators.

Dimensions

Model TJE True Gage
(Order Code AP121)

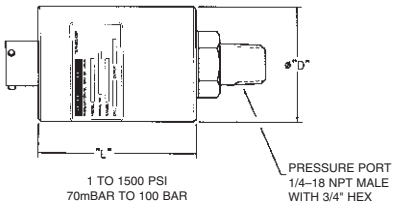
Available Ranges*	D"	L"
1; 2; 5 psig	2.25 (5.72 cm)	1.81 (4.59 cm)
10; **15** psig	1.75 (4.45 cm)	2.00 (5.08 cm)
25; 50; 75; **100;** 150; **200;** 300; **500** psig	1.5 (3.81 cm)	2.01 (5.10 cm)
750; **1000;** 1500 psig	1.5 (3.81 cm)	2.35 (5.97 cm)
2000; **3000; 5000; 7500; 10,000** psig	1.50 (3.81 cm)	2.39 (6.07 cm)
15,000; 20,000; 30,000; 50,000; 60,000 psig	1.50 (3.81 cm)	2.21 (5.61 cm)

Model TJE Absolute
(Order Code AP122)

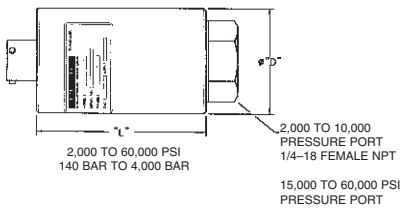
Available Ranges*	D"	L"
5 psia	2.25 (5.72 cm)	2.09 (5.31 cm)
10; **15; 25; 50;** 75; **100;** 150; **200;** 300; **500;** 750; **1000;** 1500 psia	1.5 (3.81 cm)	2.35 (5.97 cm)
2000; **3000; 5000;** 7500; **10,000** psia	1.5 (3.81 cm)	2.39 (6.07 cm)
15,000; 20,000; 30,000; 50,000; 60,000 psia	1.5 (3.81 cm)	2.21 (5.61 cm)

*Stocked ranges (bold face print) are available with 0-5 VDC (vehicle) or mV/V output.
**Consult Sensotec

1 to 1500 psi
7 mbar to 100 bar



2000 to 60000 psi
140 bar to 4000 bar



Options (See Appendix)

Temperature compensation: 1b, 1c, 1d, 1e, 1f; Internal amps: 2a, 2c, 2j, 2k, 2n or 2N intrinsically safe amp, See page AP-6; 2t;

Amp enhancement: 3d; Pressure ports: 5a, 5b, 5c, 5d (</=15,000 psi); Electrical termination 6e, 6f, 6g, 6h, 6i; Int. shunt cal 8a; Signature Calibration 53e

Premium Options: 1g (>/=15 psi); 1i (>/=15 psi); 2q; 3c; 6b, 6c, 6j; Special calibration 9a; 10a (absolute only); 12a (>/=10 psi only); 12b (>/=10 psi only) (See Appendix)

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

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www.honeywell.com/sensing

Model TJE

True Gage: Order Code AP121
Absolute: Order Code AP122

PERFORMANCE		
	Pressure Ranges	1 to 60,000 psi (70 mbar to 4000 bar)
	Accuracy (min)	+ /-0.1% F.S. (BFSL)
	Output (standard)	3mV/V*
	Resolution	Infinite
ENVIRONMENTAL		
	Temperature, Operating	
	1 to 1,000 psi	-100° to 325° F (-73° to 162° C)
	1,500 to 60000 psi	-100° to 250° F (-73° to 95°C)
	Temperature, Compensated	60° to 160° F (15° to 71° C)
	Temperature Effect	
	– Zero (max)	0.0025% F.S./° F (0.0045% FS./° C)
	– Span (max	0.0025% Rdg./° F (0.0045% Rdg./° C)
ELECTRICAL		
	Strain Gage Type	Bonded foil
	Excitation (calibration)	10VDC
	Excitation (acceptable)	Up to 12VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC
	Bridge Resistance	350 ohms
	Shunt Calibration Data	Included
	Wiring Code (std)	#2 (See Pg. AP-8)
	Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)
	Mating Connector (not incl.)	PT06A-10-6S or equiv.
MECHANICAL		
	Media	Gas Liquid
	Overload-Safe	
	1 to 15000 psi	50% over capacity
	20000 to 60000 psi	25% over capacity
	Overload-Burst	
	1 to 5000 psi	300% over capacity
	7500 to 10,000 psi	200% over capacity
	15,000 to 60,000 psi	70% over capacity
	Pressure Port	
	1 to 1500 psi	1/4-18 NPT male
	2000 to 10,000 psi	1/4-18 NPT female
	15,000 to 60,000 psi	Autoclave AE F250-C
	Dead Volume	
	1 to 5 psi	0.32 cu. in.
	10 to 15 psi	0.25 cu. in.
	25 to 1500 psi	0.17 cu. in.
	2000 to 15,000 psi	0.12 cu. in.
	Wetted Parts Material	17-4 PH Stainless/15-5 PH Stainless
	Type	Absolute or True Gage**
	Weight	10 oz. (283 gm) (Nominal)
	Case Material	Stainless Steel
INTERNALLY AMPLIFIED UNITS (Optional)		
	Outputs Available	0-5VDC, 4-20mA — 4-20mA Intrinsically safe
	Additional Length	1.12" (2.84 cm) — 2n or 2N See page AP-6; 2.0" (5.08 cm)

NOTES * Output for 1 and 2 psi units is 1mV/V/psi minimum.
** Gage pressure units greater than 500 psi (35 bar) are sealed at atmospheric pressure.

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

AVAILABLE with Signature Calibration
SEE PG. IN-5

General Purpose Gage/Absolute Pressure Transducers

Model Z

AMPLIFIED OUTPUT AVAILABLE

STAINLESS STEEL

0.5 to 60,000 psi, 35 mbar to 4000 bar

FM APPROVED INTRINSICALLY SAFE AMP

APPROVED

The Model Z is designed as a general industrial pressure transducer with a wide variety of available options to meet specific application requirements. Pressure ranges span from 0.5 to 30,000 psi. All models are constructed of stainless steel and utilize complete four arm 350 ohm strain gage bridges. Model Z transducers use a standard gage design. The absolute models have an internal sealed 0 psia reference.

Dimensions

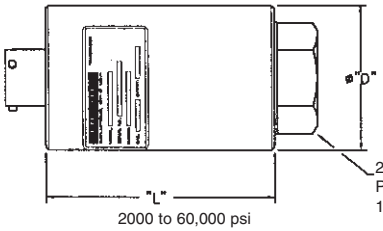
Model Z Gage
(Order Code AP131)

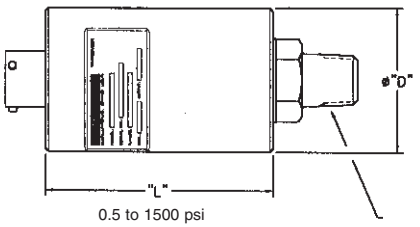
Available Ranges*	D"	L"
0.5; 1; 2; 5 psig	2.25 (5.72 cm)	2.42 (6.15 cm)
10; **15** psig	1.50 (3.81 cm)	2.35 (5.97 cm)
25; 50; 75; 100; 150; **200;** 300; **500** psig	1.5 (3.81 cm)	2.35 (5.97 cm)
750; **1000;** 1500; psig	1.5 (3.81 cm)	2.35 (5.97 cm)
2000; 3000; 5000; 7500; 10,000 psig	1.5 (3.81 cm)	2.39 (6.07 cm)
15,000; 20,000; 30,000; 50,000; 60,000 psig	1.5 (3.81 cm)	2.21 (5.61 cm)

Model Z Absolute
(Order Code AP132)

Available Ranges*	D"	L"
0.5; 5 psia	2.25 (5.72 cm)	2.09 (5.31 cm)
10; 15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000; 1500 psia	1.5 (3.81 cm)	2.35 (5.97 cm)
2000: 3000; 5000; 7500; 10,000 psia	1.5 (3.81 cm)	2.39 (6.07 cm)
15,000; 20,000; 30,000; 50,000; 60,000 psia	1.5 (3.81 cm)	2.21 (5.61 cm)

*Stocked ranges are in bold face print.
**Consult Sensotec





Options (See Appendix)

Temperature compensated 1b, 1c, 1d, 1e, 1f; Internal amps 2a; 2c; 2k; 2j; 2t; 2n or 2N Intrinsically Safe Amp - see page AP-6.

Amp enhancements 3d; Pressure ports 5a, 5b, 5c, 5d (</=15,000 psi); Electrical terminations 6e, 6f, 6g, 6h, 6i; Int. shunt cal 8a; Signature calibration 53e

Premium Options: 1g (>/=15 psi); 1i (>/=15 psi only); 2q; 3a, 3c; 6b, 6c, 6j; Special calibration 9a (>/=5 psi gage only); 9b (Gage only, >/=5 psi); 10a; 12a, 12b

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters.

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Model Z

Gage: Order Code AP131
Absolute: Order Code AP132

PERFORMANCE

Pressure Ranges	0.5 to 60,000 psi* (35 mbar to 4000 bar)
Accuracy (min)	+ /-0.25% F.S.
Non-Linearity	+ /-0.15% F.S.
Hysteresis	+ /-0.10% F.S.
Non-Repeatability	+ /-0.05% F.S.
Output (standard)	3mV/V**
Resolution	Infinite

ENVIRONMENTAL

Temperature, Operating	
1 to 1,000 psi	-100° to 325° F (-73° to 162° C)
1,500 to 60000 psi	-100° to 250° F (-73° to 95°C)
Temperature, Compensated	60° F to 160° F (15° C to 71° C)
Temperature Effect	
– Zero (max)	0.005% F.S./° F (0.009% FS./° C)
– Span (max	0.005% Rdg./° F (0.009% Rdg./° C)

ELECTRICAL

Strain Gage Type	Bonded foil
Excitation (calibration)	10VDC
Excitation (acceptable)	Up to 12VDC or AC
Insulation Resistance	5000 megohm @ 50VDC
Bridge Resistance	350 ohms
Shunt Calibration Data	Included
Wiring Code (std)	#2 (See Pg. AP-8)
Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)
Mating Connector (not incl.)	PT06A-10-6S or equiv.

MECHANICAL

Media	Gas Liquid
Overload-Safe	50% over capacity
Overload-Burst	
0.5 to 5000 psi	300% over capacity
7500 to 10,000 psi	200% over capacity
15,000 to 60,000 psi	70% over capacity
Pressure Port	
0.5 to 1500 psi	1/4-18 NPT male
2000 to 10,000 psi	1/4-18 NPT female
15,000 to 60,000 psi	Autoclave AE F250-C
Dead Volume	
0.5 to 5 psi	0.32 cu. in.
10 to 15 psi	0.17 cu. in.
25 to 1500 psi	0.17 cu. in.
2000 to 10,000 psi	0.12 cu. in.
Wetted Parts Material	17-4 PH Stainless / 15-5 Stainless
Type	Absolute or Gage***
Weight	10 oz. (50 psi)
Case Material	Stainless Steel

INTERNALLY AMPLIFIED UNITS (Optional)

Outputs Available	0-5VDC, 4-20mA	4-20mA Intrinsically safe See page AP-6
Additional Length	1.12" (2.84 cm)	2.0" (5.08 cm)

NOTES * 0.5 psi (35 mbar) is not available in absolute pressure
** Output for 1 and 2 psi units is 1mV/V/psi minimum.
*** Gage pressure units greater than 500 psi (35 bar) are sealed at atmospheric pressure.

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

AVAILABLE with Signature Calibration
SEE PG. IN-5

General Purpose Gage/Absolute Pressure Transducers

Model A-5

AMPLIFIED OUTPUT AVAILABLE

STAINLESS STEEL

0.5 to 30,000 psi, 35 mbar to 2000 bar

APPROVED FM APPROVED INTRINSICALLY SAFE AMP

The Model A-5 is designed as a general industrial pressure transducer with a wide variety of available options to meet specific application requirements. Pressure ranges span from 0.5 to 30,000 psi. All models are constructed of stainless steel and utilize complete four arm 350 ohm strain gage bridges. Model A-5 transducers use a standard gage design. The absolute models have an internal sealed 0 psia reference.

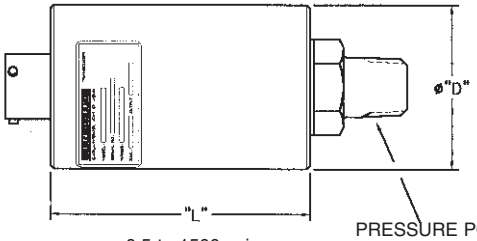
Dimensions

Model A-5 Gage
(Order Code AP141)

Available Ranges	D"	L"
.5; 1; 2; 5 psig	2.25 (5.72 cm)	2.42 (6.15 cm)
10; 15; 25; 50; 75; 100 psig	1.5 (3.81 cm)	2.35 (5.97 cm)
200; 300; 500; 750; 1000; 1500 psig	1.5 (3.81 cm)	2.35 (5.97 cm)
2000; 3000; 5000; 7500; 10,000 psig	1.5 (3.81 cm)	2.35 (5.97 cm)
15,000; 20,000; 30,000 psig	1.5 (3.81 cm)	2.21 (5.61 cm)

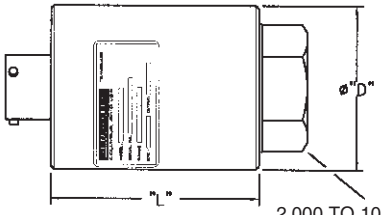
Model A-5 Absolute
(Order Code AP142)

Available Ranges	D"	L"
1; 2; 5 psia	2.25 (5.72 cm)	2.09 (5.31 cm)
10; 15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000; 1500 psia	1.5 (3.81 cm	2.35 (5.97 cm)
2000; 3000; 5000; 7500; 10,000 psia	1.5 (3.81 cm)	2.39 (6.07 cm)
15,000; 20,000; 30,000 psia	1.5 (3.81 cm)	2.21 (5.61 cm)



0.5 to 1500 psi
35 mbar to 100 bar

PRESSURE PORT
1/4–18 NPT MALE



2000 to 30,000 psi
140 bar to 2000 bar

2,000 TO 10,000 PSI
PRESSURE PORT
1/4–18 FEMALE NPT

15,000 TO 30,000 PSI
PRESSURE PORT
AUTOCLAVE F-250C

Options (See Appendix)

Temperature compensation: 1b, 1c, 1d, 1e, 1f; Internal amplifiers: 2a, 2n or 2N intrinsically safe amp - see page AP-6, 2j, 2k, 2t;

Amp enhancements 3d; Pressure ports: 5a, 5b, 5c, 5d (≤15,000 psi); Electrical terminations 6e, 6f, 6g, 6h, 6l; Int. shunt cal 8a; Special calibration 9a (≥5 psi gage only); Signature calibration 53e

Premium Options: 1g (≥15 psi only); 1i (≥15 psi only); 2c, 2q, 3a, 3c, 6b, 6c, 6j; 9b (Gage only, ≥5 psi); 10a, 12a, 12b

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters.

1-888-282-9891
Honeywell Sensotec Sensors
www.honeywell.com/sensing

Model A-5

Gage: **Order Code AP141**
Absolute: **Order Code AP142**

PERFORMANCE	
Pressure Ranges	0.5 to 30,000 psi (35 mbar to 2000 bar)*
Accuracy (min)	+ /-0.5% F.S.
Non-Linearity	+ /-0.25% F.S.
Hysteresis	+ /-0.13% F.S.
Non-Repeatability	+ /-0.07% F.S.
Output (standard)	3mV/V**
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	
1 to 1,000psi	-100° to 325° F (-73° to 162° C)
1,500 to 30000psi	-100° to 250° F (-73° to 95°C)
Temperature, Compensated	60° to 160° F (16° to 71° C)
Temperature Effect	
– Zero (max)	0.0075% F.S./° F (0.0135% FS./° C)
– Span (max	0.01% Rdg./° F (0.018% Rdg./° C)
ELECTRICAL	
Strain Gage Type	Bonded foil
Excitation (calibration)	10VDC
Excitation (acceptable)	Up to 12VDC or AC
Insulation Resistance	5000 megohm @ 50VDC
Bridge Resistance	350 ohms
Shunt Calibration Data	Included
Wiring Code (std)	#2 (See Pg. AP-8)
Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)
Mating Connector (not incl.)	PT06A-10-6S or equiv.
MECHANICAL	
Media	Gas Liquid
Overload-Safe	50% over capacity
Overload-Burst	
0.5 to 5000 psi	300% over capacity
7500 to 10,000 psi	200% over capacity
15,000 to 30,000 psi	70% over capacity
Pressure Port	
1 to 1500 psi	1/4-18 NPT male
2000 to 10,000 psi	1/4-18 NPT female
15,000 to 10,000 psi	Autoclave AE F250-C
Dead Volume	
0.5 to 5 psi	0.32 cu. in.
10 to 15 psi	0.17 cu. in.
25 to 1500 psi	0.17 cu. in.
2000 to 30,000 psi	0.12 cu. in.
Wetted Parts Material	17-4 PH Stainless /15-5 Stainless
Type	Absolute or Gage***
Weight	10 oz. (50 psi)
Case Material	Stainless Steel

INTERNALLY AMPLIFIED UNITS (Optional)		
Outputs Available	0-5VDC, 0-10VDC, 4-20mA	4-20mA Intrinsically safe See page AP-6
Additional Length	1.12" (2.84 cm)	2.0" (5.08 cm)

NOTES * 0.5 psi (35 mbar) is available in gage only.
** Output for 0.5, 1, 2 psi units is 1-2mV/V
*** Gage pressure units greater than 200 psi (7 bar) are sealed.

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

Low Cost Gage Pressure Transducers

Model LM

WELDED STAINLESS

The Model LM pressure transducer is a low cost alternative with good performance for high volume applications. Each unit is constructed of welded stainless steel for durability in dry rugged environments. Both gas and liquid pressure overloads of up to 50% over capacity are safely accepted.

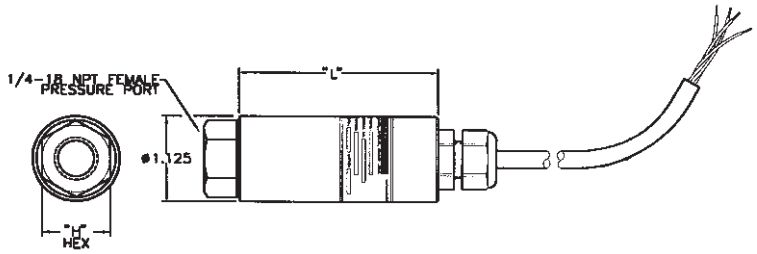
		Model LM **Order Code BP211**
PERFORMANCE	Pressure Ranges	1 to 10,000 psig
	Accuracy (min.)	±0.5% F.S.
	Output	≤5psi...5mV/V (nom) 15-100psi...10mV/V (nom) ≥150psi...2mV/V (nom)
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65°F to 250°F
	Temperature, Compensated	60°F to 160°F
	Temperature Effect*	
	- Zero (max.)	0.01% F.S./°F
	-Span (max.)	0.02% Rdg./°F
ELECTRICAL	Input	
	2mV/V output nom 150-10,000 psi	10VDC
	10mV/V output nom 0-75 psi	10VDC
	Bridge Resistance	350 ohms**
	Wiring Code (std.)	#1 (See Pg. AP-8)
	Electrical Termination (std.)	Cable 3 ft.
MECHANICAL	Media	Gas, Liquid
	Overload-Safe	50% over capacity
	Pressure Port	1/4-18NPT female
	Wetted Parts Material	Stainless steel
	Type	Gage
	Case Material	Stainless steel

* Consult Sensotec on units below 150psi.
** 5000 ohm below 150psi.

Dimensions

Model LM (Order Code BP211)

Ranges (Bold ranges are stocked)	D"	L"	H"
1, 2.5, 5 psig	1.125 (2.86 cm)	2.26 (5.74 cm)	1 hex
15, 30, 50 , 75, **100** psig	1.125 (2.86 cm)	2.23 (5.66 cm)	1 hex
150, **200, 300, 500,** 750 psig	1.125 (2.86 cm)	2.00 (5.08 cm)	.875 hex
1000, 1500, **2000, 3000, 5000,** 7500, **10,000** psig	1.125 (2.86 cm)	1.78 (4.52 cm)	.750 hex



Universal Pressure Transducer/Transmitter

Model BDR

ALL WELDED STAINLESS STEEL

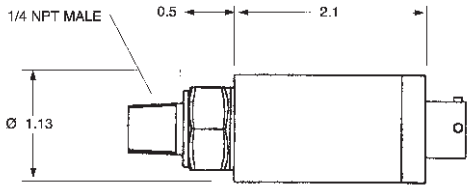
RANGES FROM 0-150 TO 0-15,000 PSI

CONFIGURABLE ELECTRICAL CONNECTION

The new BDR Series offers a new class of pressure transducers/transmitters for universal test measurement applications in ranges from 0-150 psi (10 Bar) through 0-15,000 psi (1500 Bar), and featuring +/-0.5% BFSL or 0.25% BFSL accuracies. Select the electrical terminations for your application.

	Model BDR Order Code BP217
PERFORMANCE	
Available Ranges	0-150 psig, to 0-15,000 psig
Optional Measurement Units	Inches of Hg Gage; Bar or kPa; (Specify)
Accuracy:	150 psig: +/-0.75% BFSL
	300 psig: +/-0.5% BFSL
	For 0.25% Accuracy: Consult Factory
Output	+/- 5Vdc (2d) or 4-20mA (2p)
Output Resolution	Infinite
ENVIRONMENTAL	
Operating Temperature	-45 to +135°C
Compensated Temperature	+20 to +75°C
Optional	0 to +50°C, Option 1j
	-20 to +85°C, Option 1k
	-25 to +120°C, Option 1m
Temperature Effects On	Zero & Span: +/-0.01%FS/°C
ELECTRICAL	
Power Requirements	+/-5 Vdc: 9-28 Vdc@40mA 4-20mA: 9-28 Vdc
Wiring Code	5Vdc Output: #50 (Appendix) 4-20mA Output: #49 (Appendix)
CE Mark	Option 9e, EN50081-2 & EN50082-2
Internal *Signature Calibration* Chip	Option 53e (See page IN-5)
TEDS, IEEE 1451, 1 Serial Chip:	Option 53t (See page AP-26)
MECHANICAL	
Media	Gas or Liquid compatible with stainless steel
Safe Overload	50% over capacity
Burst Pressure	250% over capacity, or 24,000 psi whichever is less
Pressure Port	1/4-18NPT MALE
Wetted Parts	17400 Stainless Steel all-welded construction
Weight	10 ounces

Dimensions



Model BDR, Order Code BP217
How to Order
Example: BP217CV, 2d, 1k, 6a
0-1000 psig, with 5Vdc output, -20 to + 80°C and Bendix connection

Order Code	Range (psig)	Output	Compensated Temperature	Electrical Connection
BP217	CV	2d	1k	6a
	150 (CJ) 300 (CP) 500 (CR) 750 (CT) 1000 (CV) 2000 (DL) 3000 (DN) 5000 (DR) 7500 (DT) 10,000 (DV) 15,000 (EJ)	+/- 5Vdc (2d) 4-20mA (2p)	0 to 50°C (1j) -20 to +85°C (1k) -25 to +120°C (1m)	Bendix 6-pin (6a) DIN 43650 (6m) DIN 40050 (6n) Cable exit (6q)

Two Wire Gage/Absolute Pressure Transmitters

Model 415 and 440

4-20mA OUTPUT

ACCURACY 0.1% TO 0.25% F.S.

WELDED STAINLESS

Two-wire transmitter Models 415 and 440 offer rugged, stainless steel construction suitable for even the harshest working environments. These models are available with zero and span adjustments and operate with a supply voltage from 15 to 32 VDC. Two-wire, 4-20mA output is provided. Both models set the accuracy standards for their competitive niches. The Model 415 offers an accuracy of 0.1% while the Model 440 offers an accuracy of 0.25% F.S.

A wide range of electrical connectors are offered, with a DIN-type as standard on the Model 440. This connector offers many significant advantages to the user, including flexibility to use any cable size between 4.5 mm and 14 mm or utilize a 1/2" NPT conduit fitting. It has the convenience and advantage of being a solderless and water-resistant connection, as well as allowing the user to turn the vibration-proof mating connector in any direction to achieve optimum cable clearance and cable/conduit run paths.

These characteristics and extremely competitive prices make the 415 and 440 units perfect for industrial transmitter applications like bulk liquid inventory control, steam management, and other power plant applications.

Dimensions

Gage Model 415 (Order Code AP411)
Absolute Model 415 (Order Code AP412)

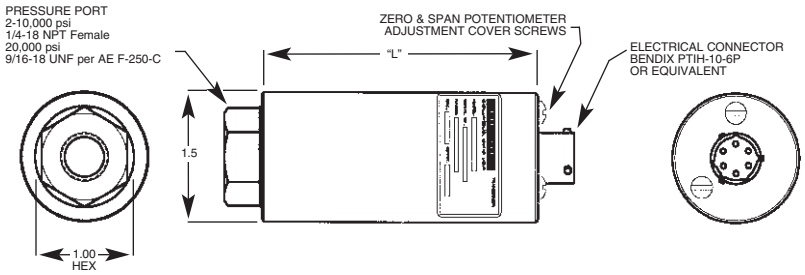
Available Ranges	D"	L"
2; 5; 10; 15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000 psi	1.5 (3.81 cm)	3.3 (8.38 cm)
1500 psi	1.5 (3.81 cm)	3.24 (8.23 cm)
2000; 3000; 5000; 7500; 10,000 psi	1.5 (3.81 cm)	3.00 (7.62 cm)
20,000 psi	1.5 (3.81 cm)	3.085 (7.84 cm)

Gage Model 440 (Order Code AP415)
Absolute Model 440 (Order Code AP416)

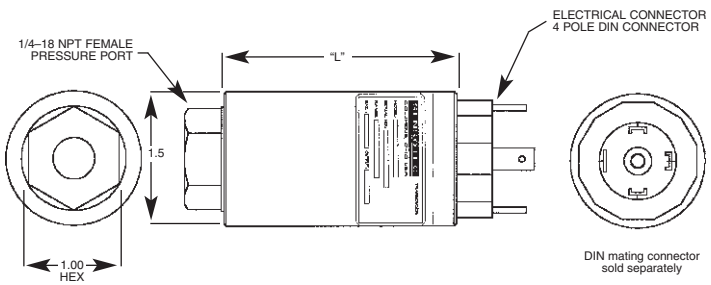
Available Ranges	D"	L"
5; 15; 25; **50;** 75; **100;** 150; **200;** 300; psi	1.5 (3.81 cm)	2.6 (6.60 cm)
500; 750; **1000;** 1500; 2000	1.5 (3.81 cm)	3.3 (8.38 cm)
2500; **3000; 5000;** 7500; **10,000** psi	1.5 (3.81 cm)	3.0 (7.62 cm)

(Bold ranges are available from stock, gage only)

MODEL 415 (2 PSI-20,000 PSI)



MODEL 440 (5 PSI-10,000 PSI)



		Model 415 (0.1%) Gage: Order Code AP411 Absolute: Order Code AP412	Model 440 (0.25%) Gage: Order Code AP415 Absolute: Order Code AP416
PERFORMANCE	Pressure Ranges	2 to 20,000 psi	5 to 10,000 psi
	Accuracy (min)	±0.1% F.S.	±0.25% F.S.
	Combined Non-Linearity, Hysteresis, Non-Repeatability	0.10% BFSL	0.2% BFSL
	Output	4-20mA	4-20mA
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-20°F to 200°F	-20°F to 185°F
	Temperature, Compensated	60°F to 160°F	30°F to 130°F
	Temperature Effect		
	-Zero (max)	0.005% F.S./°F.	0.01% F.S./°F
	-Span (max)	0.007% Rdg./°F	0.01% Rdg./°F
ELECTRICAL	Supply (acceptable)	15 to 32VDC	9 to 32VDC
	Max Load Resistance*	1000 ohms	1000 ohms
	Wiring Code (std)	Sensotec #23	Sensotec #36
	Electrical Termination (std)	PTIH-10-6P or equiv. (Hermatic stainless)	DIN 43650 Water Resistant
	Mating Connector (not incl.)	PT06A-10-6S or equiv.	DIN mating connector with solderless terminal**
	Zero & Span Adjustment	Access through o-ring sealed screws	Located under top cover
MECHANICAL	Media	Liquid, Gas	Liquid, Gas
	Overload-Safe	50% over capacity	50% over capacity
	Overload-Burst	200% over capacity	200% over capacity
	Pressure Port		
	2 to 10,000 psi	1/4-18 NPT female	1/4-18 NPT female
	20,000 psi	9/16-18 UNF per AE F-250-C	NA
	Wetted Parts Material	Stainless Steel	Stainless Steel
	Type	Gage or Absolute	Gage or Absolute
	Weight	13 oz.	13 oz.
	Case Material	Stainless Steel	Stainless Steel

*Maximum load resistance is 500 ohms at 23VDC.
**Specify cable dia. can handle 4.5 mm to 14 mm or 1/2" NPT conduit fitting.

Options (See Appendix)

Options: Model 415 only
- Temperature compensation 1b; 1c
- Pressure ports 5a; 5b; 5c; 5d
- Electrical connection 6e; 6f; 6g; 6h

Options: Model 440 only
- CE marking 9e

Premium Options: Model 415 only
- Electrical termination 6i; 6j
- Special calibration 9a
- 316SS construction 10a

Accessories: Model 415, Model 440
- Mating connectors
- Connector/cable assemblies
- Pressure port adapters

Two Wire Gage/Absolute Pressure Transmitters

Model 811 FMG and 811 FMA

HAZARDOUS LOCATIONS

4-20mA, 2 WIRE

BULKHEAD MOUNTING

FM

APPROVED
EXPLOSION PROOF
See page AP-6

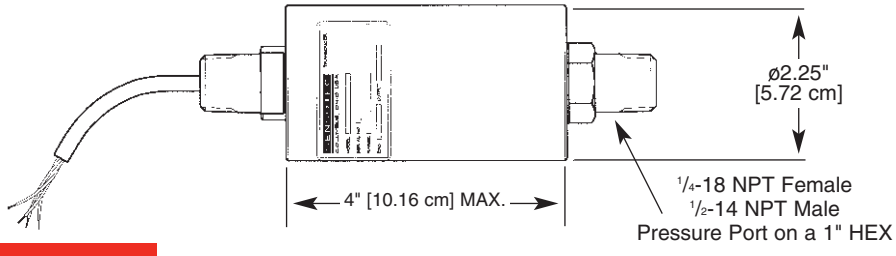
The Two Wire Factory Mutual Approved Models 811 FMA and 811 FMG transmitters have welded, stainless steel diaphragms for use with liquid, gas, or corrosive vapors. Both models have hermetically sealed, stainless steel cases which require no adjustments. These transducers are corrosion and shock resistant, as well as reverse polarity protected. The two wire 4-20mA output permits cable runs up to 10 miles long with high signal to noise ratio. Model 811 FMG utilizes our proprietary "true gage" design. A dual pipe thread pressure fitting is provided for easy bulkhead mounting.

	Model 811 FMG (Gage): Order Code BP421 **Model 811 FMA (Absolute): Order Code BP422**
PERFORMANCE	
Pressure Range	0-2 to 10,000 psi
Accuracy (min)	±0.25% F.S.
Non-linearity (max)	±0.15% F.S.
Hysteresis (max)	±0.10% F.S.
Non-repeatability (max)	±0.05% F.S.
Output (std)	4-20mA
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	0° F to 180° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
- Zero (max)	.01% F.S./° F
- Span (max)	.01% Rdg./° F
ELECTRICAL	
Strain Gage Type	Bonded foil
Excitation	15 to 32VDC
Insulation Resistance	5000 megohm @ 50VDC
Wiring Code (std)	#22 (See Pg. AP-8)
Electrical Termination (std)	1/2-14NPT male w/7/8" wrench flat. 20GA, 2 ft. cable with case ground
MECHANICAL	
Media	Gas, Liquid
Overload-Safe	50% over capacity
Pressure Port	1/4-18NPT female 1/2-14NPT male w/1" Hex
Wetted Parts Material	17-4 PH Stainless
Type	Gage or Absolute
Case Material	Stainless steel

Dimensions

Available Ranges

2; 5; 10; 15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000; 1500; 2000; 3000; 5000; 7500; 10,000 psi



Options (See Appendix)

Wetted diaphragm 10a (25-1000 psi only)

Intrinsically Safe Rated

Pressure Transmitters and Load Cells

FM, CSA, DNV, CE

ACCURACY TO 0.10%

LOAD RANGES FROM 5 TO 400,000 LBS.

PRESSURE RANGES FROM 0.5 TO 30,000 PSI

TRUE GAGE, ABSOLUTE, DIFFERENTIAL

Intrinsically safe equipment is not capable of releasing sufficient electrical or thermal energy to ignite a hazardous atmosphere of gas or dust.

- Automotive, Engine test
- Brewing, Distilling
- Chemical
- Cosmetics
- Fuels Testing
- Fuel Pump Testing
- Grain Storage
- Munitions
- Mining
- Pharmaceuticals
- Petrochemical
- Paint & Ink
- Utilities
- Waste Water
- Oil field
- Explosive Pellet Compaction

Intrinsically Safe transmitter, Option 2n or 2N (See page AP-6), is a standard add-on to the following models and features a welded stainless steel electrical connection. (Options may increase length, consult factory) NOTE: Some combination of options may not be available intrinsically safe, consult factory.

Pressure

PRESSURE AND DIFFERENTIAL PRESSURE TRANSMITTERS

MODEL	ACCURACY*	CATALOG PAGE	RANGES AVAILABLE
FP2000	0.25% or 0.1%	PR-2	10" H_20 to 10,000 psi
TJE	±0.1%	PR-6, DP-18	1 to 15,000 psi
Z	±0.25%	PR-8, DP-4, DP-6, DP-8	0.5 to 30,000 psi
A-5	±0.50%	PR-10, DP-4, DP-6, DP-8	0.5 to 30,000 psi
424 & 425	±0.25%	PR-30	0 to 6,000, 10,000, 15,000 psi
HL-Z	±0.25%	DP-17	50 to 3,000 psid
HL-A-5	±0.5%	DP-17	50 to 3,000 psid

Load/Force

LOAD CELLS

MODEL	ACCURACY	CATALOG PAGE	RANGES AVAILABLE	
45	±0.05%*	LO-12	200 to 100,000 lbs	Ultra Precision Fatigue rated
73, 75	±0.1%	LO-8	50 to 200,000 lbs	Fatigue rated
41,43	±0.1%	LO-6	5 to 400,000 lbs.	Precision

*Accuracy is defined as BFSL at full scale.

Subminiature, Flush Diaphragm Pressure Transducers

Model S

150 TO 20,000 psi

FLUSH DIAPHRAGM

HIGH FREQUENCY

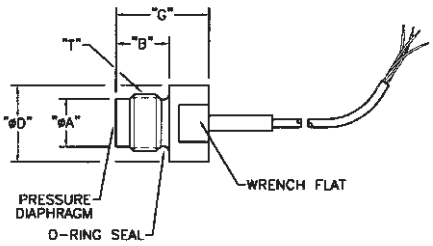
Model S

Our full line of subminiature pressure transducers accurately measure pressure ranges from 150 psi to 20,000 psi. These subminiature pressure transducers have a high natural frequency and utilize a flush diaphragm.

Temperature compensation is accomplished by using temperature sensitive components located inside the transducers. These transducers have a small electrical zero balance circuit board which is in the lead wire (approximately 1" X .087" thick). This balance board does not have to be the same temperature as the transducers. All units have four (4) active bonded strain gages arranged in a Wheatstone bridge configuration.

Dimensions

Model S



Available Pressure Ranges*
150; **200;** 300; **500;** 750; **1000;** 1500;
2000; 3000; 5000; 7500; **10,000;** 15,000; 20,000 psi

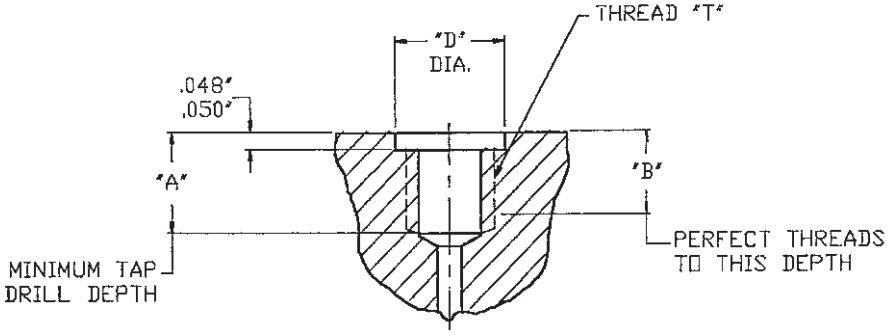
Order Code	"T" Thread	A" Dia.	D" Dia.	B"	G"	Diaphragm
BP357	3/8-24 UNF	.310	.50	.45	.69	Welded
BP358	7/16-20 UNF	.375	.56	.50	.75	Welded

*Stocked units (bold face print) available with 3/8- 24 UNF thread only. 3/8-24 UNF thread is only available on ranges 15,000 psi. Consult factory for ranges below 150 psi.

Installation

Standard "S" type transducers have straight threads and use an O-ring for pressure sealing. To get the best seal with the O-ring on the transducer, the tapped hole should have the dimensions shown below. For normal operating temperatures (-65° F to +250° F) use BUNA-N (black)) O-rings. For high temperatures (250° F to 425° F) use silicone rubber (red).

"T"	"A"	"B"	"D" +.000" -.002"	O-Ring	Max. Torque (For 17-4 PH only)
3/8 - 24 UNF	.47"	.30"	.445"	#11	300 In-lbs.
7/16 - 20 UNF	.54"	.36"	.504"	#12	500 In-lbs.



		Model S
PERFORMANCE	Pressure Ranges	3/8-24 UNF Thread: 150 to 15,000 psi (10 bar to 1050 bar) 7/16-20 UNF Thread: 150 to 20,000 psi (10 bar to 1375 bar)
	Non-Linearity and Hysteresis (max)	1.0% F.S.
	Non-repeatability (max)	+ /-0.1% F.S.
	Output (standard)	2mV/V
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° to 300° F (-54° to 150° C)
	Temperature, Compensated	60° to 160° F (15° to 70° C)
	Temperature Effect	
	– Zero (max)	.01% F.S./° F (0.018% F.S./° C)
	– Span (max)	.02% Rdg./° F (0.036% Rdg./° C)
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	5VDC
	Bridge Resistance	350 ohms
	Wiring Code (std)	#1 (See Pg. AP-7)
	Electrical Termination (std)	4 twisted leads (5 ft.)
MECHANICAL	Media	Gas, Liquid
	Overload-Safe	50% over capacity
	Wetted Parts Material	17-4 PH Stainless
	Type (Gage, Abs.)	Gage
	Case Material	17-4 PH Stainless

Options (See Appendix)

Temperature compensated 1b, 1c

Premium Options: 1d, 1e, 1g, 1h, 1i
Custom threads, metric threads, underwater cable, microtech connector, special headers and 400° F (200° C) temperature are available on some models and ranges, consult factory.

Accessories: Mating connectors and connector/cable assemblies

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

Subminiature, Flush Diaphragm Pressure Transducers

Models G & F

10 TO 20,000 psi

FLUSH DIAPHRAGM

HIGH FREQUENCY

Model G

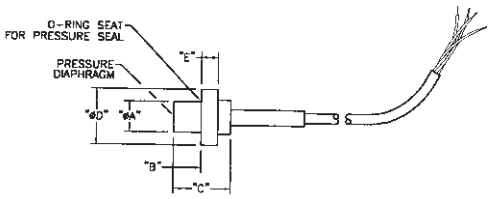
Model F

SENSOTEC products include a full line of subminiature pressure transducers to accurately measure pressure ranges from 10 psi to 20,000 psi. These subminiature pressure transducers have a high natural frequency and utilize a flush diaphragm. The specifications listed below are classified by high pressure ranges or low pressure ranges, and by foil gages (350 ohms) or semiconductor gages (500 ohms).

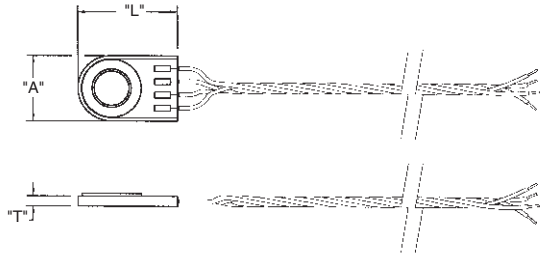
Temperature compensation is accomplished by using temperature sensitive components located inside the transducers. These transducers have a small electrical zero balance circuit board which is in the lead wire (approximately 1" X .087" thick). This balance board does not have to be the same temperature as the transducer. The application should dictate the type of strain gage utilized. Generally, the semiconductors are used when high output (30 mv/v) is required; and foil strain gages are used when longer term very high stability and excellent thermal characteristics are required. All units have four (4) active bonded strain gages arranged in a Wheatstone bridge configuration.

Most SENSOTEC subminiature transducers are manufactured with a unitized stainless steel diaphragm. The advantage of this type of design is that a thin diaphragm and heavy sidewalls are made from one piece of stainless steel. This unitized diaphragm is rugged, but at the same time it is thin enough to measure low pressures.

Dimensions



Model G



Model F

Model G

Order Code	Available Ranges	A"	B"	C"	D"	E'	Diaphragm
BP386	150-15,000 psi	.310	.15	.47	.44	.15	Welded
BP387	150-20,000 psi	.375	.15	.47	.50	.15	Welded

Model F

Order Code	Available Ranges	A"	T"	L"
BP340 FOIL	150-500 PSI	.275	.042*	.38
BP341 FOIL	150-3000 PSI	.320	.042*	.50
BP342 FOIL	150-3000 PSI	.425	.060	.56
BP343 SEMICONDUCTOR	15-500 PSI	.150	.042	.38
BP344 SEMICONDUCTOR	10-500 PSI	.275	.042	.38
BP345 SEMICONDUCTOR	10-3000 PSI	.320	.042	.50
BP346 SEMICONDUCTOR	10-3000 PSI	.425	.060	.56

* Nominal

Note: All Model F's have a cemented diaphragm.

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High Pressure Ranges

		Foil Gages (350 ohms)
PERFORMANCE	Pressure Ranges	150 to 20,000 psi
	Non-Linearity and Hysteresis (max)	1.0% F.S.
	Non-repeatability (max)	±0.1% F.S.
	Output (standard)	2mV/V
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° to 300° F
	Temperature, Compensated	60° to 160° F
	Temperature Effect	
	– Zero (max)	.01% F.S./° F
	– Span (max)	.02% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	5VDC
	Bridge Resistance	350 ohms
	Wiring Code (std)	#1 (See Pg. AP-8)
	Electrical Termination (std)	4 twisted leads (5 ft.)
MECHANICAL	Media	Gas, Liquid
	Overload-Safe	50% over capacity
	Wetted Parts Material	17-4 PH Stainless
	Type	Gage
	Case Material	17-4 PH Stainless

Low Pressure Ranges

		Semiconductor Gages (500 ohms)
PERFORMANCE	Pressure Ranges	10 to 100 psi
	Non-Linearity and Hysteresis (max)	±0.5mV
	Non-repeatability (max)	±0.1mV
	Output (standard)	2-5mV/psi (@ 5VDC)
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° to 300° F
	Temperature, Compensated	60° to 160° F
	Temperature Effect	
	– Zero (max)	.02mv/° F
	– Span (max)	.03mv/° F
ELECTRICAL	Strain Gage Type	Bonded semiconductor
	Excitation (calibration)	5VDC
	Bridge Resistance	500 ohm
	Wiring Code (std)	#1 (See Pg. AP-8)
	Electrical Termination (std)	4 twisted leads (5 ft.)
MECHANICAL	Media	Gas, Liquid
	Overload-Safe	100% over capacity
	Wetted Parts Material	17-4 PH Stainless or BeCu
	Type	Gage
	Case Material	17-4 PH Stainless

Available Ranges (depending on model)
10; 15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000; 1500; 2000; 3000; 5000; 7500; 10,000; 15,000; 20,000 psi

Options (See Appendix)

Temperature compensated 1b, 1c, 1f

Premium Options: 1d, 1e, 1g, 1i
Special options such as underwater cable, microtech connector, special headers and 400° F temperature are available on some ranges of the Model G. Consult factory.

Accessories: Mating connectors and connector/cable assemblies

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

Flush Diaphragm Pressure Transducers

Model A-105 and A-205

UNITIZED FLUSH DIAPHRAGM

15 TO 15,000 PSI

STAINLESS STEEL

Model A-105

Model A-205

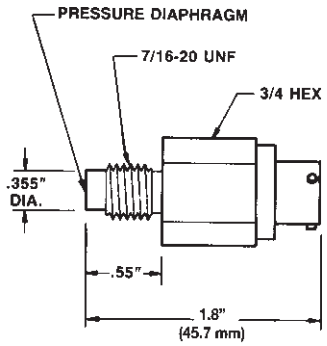
Models A-105, A-205 Subminiature Pressure Transducers are manufactured with a unitized stainless steel diaphragm. The advantage of this type of design is that a thin diaphragm and heavy sidewalls are made from one piece of stainless steel. This unitized diaphragm is rugged, but at the same time can be made thin enough to measure low pressures. Available pressure ranges span from 15 to 15,000 psi. These models can be used in corrosive fluid environments. Models A-105 and A-205 have welded stainless steel electrical connectors as an integral part of the transducer body. A-105's and A-205's are recommended for applications involving rough handling or where a completely hermetically sealed transducer is required.

Dimensions

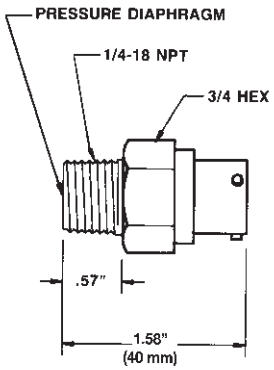
Model A-105 (Order Code AP311)
Model A-205 (Order Code BP312)

*Stocked ranges (in bold) for Models A-105 only.

Available Ranges* (All Models)
15; 25; 50; 75; 100; 150; 200; 300; 500; 750; 1000; 1500; 2000; 3000; 5000; 7500; 10,000; 15,000 psi



Model A-105



Model A-205

Options (See Appendix)

Temperature compensated 1b, 1c, 1f

Premium Options: 1d, 1e, 1g, 1h, 1i

Accessories: Mating connectors and connector/cable assemblies

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		Models A-105 Order Code AP311 A-205 Order Code BP312	Pressure Threads 7/16-20 UNF 1/4-18 NPT
		Low Pressure Ranges	**High Pressure Ranges**
PERFORMANCE	Pressure Ranges	<100 psi (1 bar to 7 bar)	100 to 15,000 psi (10 bar to 1000 bar)
	Non-Linearity and Hysteresis (max)*	1% F.S.	+ /-0.5% F.S.
	Non-repeatability (max)*	1% F.S.	+ /-0.1% F.S.
	Output (standard)*	.1mV/psi (@ 5VDC)	2mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° to 300° F (-54° to 150° C)	-65° to 300° F (-54° to 150° C)
	Temperature, Compensated	60° to 160° F (15° to 71° C)	60° to 160° F (15° to 71° C)
	Temperature Effect		
	– Zero (max)*	0.001mV/° F (0.0018mV/° C)	0.01% F.S./° F (0.018% F.S./° C)
	– Span (max)*	0.002mV/° F (0.0036mV/° C)	0.02% Rdg./° F (0.036% Rdg./° C)
ELECTRICAL	Strain Gage Type	Bonded foil	Bonded foil
	Excitation (calibration)	5VDC	5VDC
	Excitation (acceptable)	Up to 5VDC or AC	Up to 5VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC	5000 megohm @ 50VDC
	Bridge Resistance	350 ohms	350 ohms
	Shunt Calibration Data	Included	Included
	Wiring Code (std)		
	A-105/A-205	#2 (See Pg. AP-8)	#2 (See Pg. AP-8)
	Electrical Termination (std)		
	A-105/A-205	PTIH-10-6P or equiv. (Hermetic stainless)	PTIH-10-6P or equiv. (Hermetic stainless)
	Mating Connector (not incl.)		
	A-105/A-205	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
MECHANICAL	Media	Gas, Liquid	Gas, Liquid
	Overload-Safe	100% over capacity	50% over capacity
	Overload-Burst	400% over capacity	400% over capacity
	Pressure Port		
	A-105	7/16-20 UNF male	7/16-20 UNF male
	A-205	1/4-18 NPT male	1/4-18 NPT male
	Dead Volume	Flush diaphragm	Flush diaphragm
	Wetted Parts Material	17-4 PH Stainless	17-4 PH Stainless
	Type	Gage	Gage
	Weight	1-2 oz.	1-2 oz.
	Case Material	17-4 PH Stainless	17-4 PH Stainless
IN-LINE AMPLIFIERS	Outputs Available	0-5VDC, 4-20mA (≥50 psi) 0-1VDC (<50 psi)	0-5VDC, 4-20mA

NOTES *Unit of measure in specifications is different for low ranges than high ranges.

General Information

How to order (See Pg. AP-19)
Gage/Absolute pressure selection flow chart (See Pg. PR-1)

Flush Diaphragm, High Level Output Pressure Transducer

Model A-105a

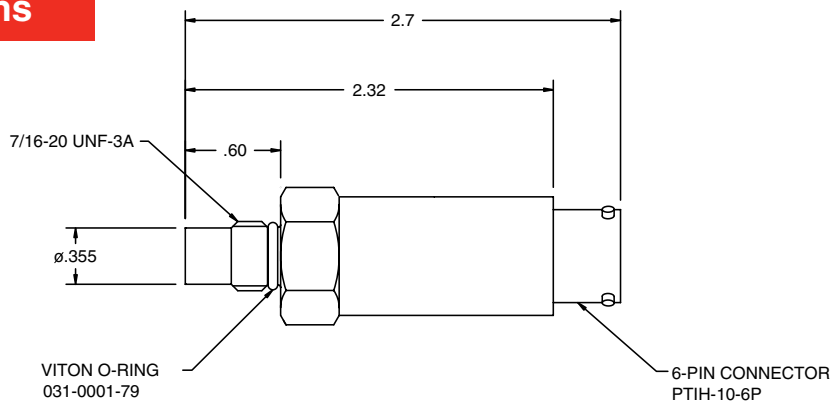
FLUSH DIAPHRAGM

FULLY WELDED CONSTRUCTION

METRIC OR ENGLISH THREADS

The Model A-105a high level output, flush diaphragm pressure transducer features 4-20mA, 1-5 VDC or 1-10VDC (unipolar) output with an unregulated power supply. Pressure ranges are available up to 15,000 psi or 1000 bar. The mounting threads are 7/16-20UNF or M12x1.75 with an o-ring seal. These pressure transducers feature all welded construction and 17-4PH stainless steel wetted parts. The electrical connector is hermetic with a stainless steel shell and is welded to the transducer body.

Dimensions



Model A-105a Order Codes

	Output		
Mounting Threads	4-20mA	1-5 VDC	1-10 VDC
7/16-20 UNF	AP313	AP314	AP315
M12 x 1.75-6G	AP316	AP317	AP318

PERFORMANCE

Pressure Ranges	0-200, 500, 1000, 2000, 3000, 5000, 10,000, 15,000 psi (0-10, 35, 70, 150, 200, 350, 700, 1000 Bar)
Accuracy (min.)	±0.5% F.S.
Resolution	Infinite

ENVIRONMENTAL

Temperature, Operating	-40°F to 200°F	(-40°C to 93°C)
Temperature, Compensated	30°F to 160°F	(-1°C to 71°C)
Temperature Effect		
– Zero (max.)	±0.015% F.S./°F	(±0.033%F.S./°C)
– Span (max.)	±0.02% F.S./°F	(±0.044%F.S./°C)
Output/Power	4-20mA at 9-28VDC 1-5 or 1-10VDC at 16-28VDC	

ELECTRICAL

Connector	PTIH-10-6P or equivalent
Mating Connector (not incl.)	AA111 (PT06A-10-6S)

MECHANICAL

Wetted Material	17-4PH welded stainless steel
Overload-Safe	2X Range
Overload-Burst	5X Range, to a max of 25,000 psi
Type of Measurement	PSIS Gage-Sealed

Flush Diaphragm Pressure Transducer

Model 355

± 0.25% ACCURACY (BFSL)

HIGH LEVEL OUTPUT

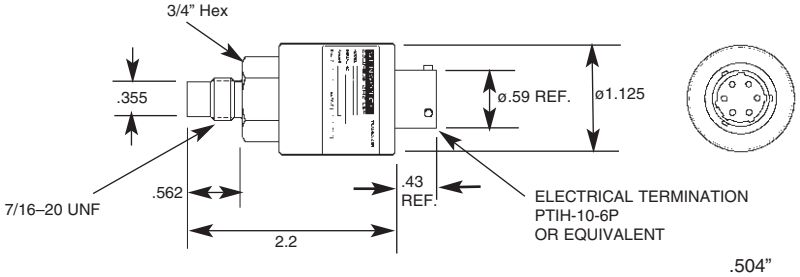
FLUSH DIAPHRAGM

Subminiature Model 355 pressure transducer is a rugged, one-piece, stainless steel unit which features a flush diaphragm design, making it ideal for operations which involve the spraying or application of sealants, paints, coatings or other congealable media which can clog conventional pressure ports. The internally amplified Model 355 accepts input voltage from 9-32 VDC and delivers a high level 4-20 mA or 0-5 output. The Model 355 is all welded and hermetically sealed for reliable performance in corrosive environments.

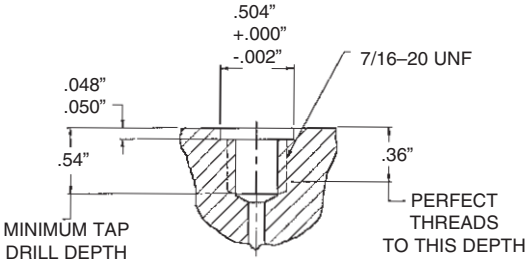
Specifications

	Model 355 Order Code BP313
PERFORMANCE	
Pressure Range	0-500 psi to 0-5000 psi 35 bar to 350 bar
Non-linearity	0.5%
Non-repeatability	0.1%
Resolution	Infinite
ENVIRONMENTAL	
Temperature, operating	-40° to 200° F
Temperature, compensated	60° to 160° F
Temperature effect	
-Zero	0.01% FS/°F
-Span	0.02%/°F
ELECTRICAL	
Output	4-20mA (Std.) 0-5 VDC (Option 2c)
Excitation	
4-20mA, 2-wire (Std.)	9-32 VDC
0-5 VDC, 3-wire (option 2c)	9-28 VDC
Insulation resistance	50 meg ohm @ 50 V
Wiring Code	4-20mA: #43 0-5VDC: #50
Electrical Termination	PTIH-10-6P
Mating Connector	PTO6-10-6S
MECHANICAL	
Media	gas/liquid compatible with 17-4PH SS
Overload, safe	3X
Overload, burst	5X or 20,000 psi, whichever is less

Dimensions



MOUNTING: The Model 355 has straight threads and uses a #12 O-ring for pressure sealing. To get the best seal with the O-ring on the transducer, the tapped hole should have the dimensions shown here. For normal operating temperatures (-65° F to +250° F) use the BUNA-N (black) O-rings. For high temperatures (250° F to 425° F) use silicone rubber (red).
Maximum torque is 50 IN-LBS, 17-4 PH SS only.



Dual Output Pressure Sensor

Model DS

0.1% ACCURACY INCLUDING TEMPERATURE

1200 Hz ANALOG RESPONSE

380 READINGS / SECOND DIGITAL OUTPUT

The NEW Model DS offers the "smart" combination of microprocessor based internal signal conditioning and micromachined silicon pressure sensor technology to provide digital communications directly to your PC with superior accuracy and stability. With <1 ms step response on the analog output and >300 readings / second on the digital output, the Model DS provides the speed required for dynamic automotive or aerospace applications. With an all-welded stainless steel construction, the Model DS is suitable for rugged environments and pressure media compatible with stainless steel.

Specifications

Model DS

ORDER CODES:	GAGE	ABSOLUTE
Outputs: 0-5 VDC and RS-232:	AP611	AP612
Outputs: 0-5 VDC and RS-485:	AP613	AP614

PERFORMANCE	Operation	10^8, Undirectional
	Available Ranges (psig, psia)	0-5, 15, 30, 50, 100, 150, 250, 500, 750, 1000, 2500 PSI
	Units: User defined	PSI, mBar, % FS
	Accuracy	0 .1%Typical Accuracy over the compensated temperature range.
	Digital (and/or) Analog Outputs	RS485 or RS232, plus 0-5 VDC (non isolated)
	Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200
	Data Framing	1 start bit, 8 data bits, 1 stop bit
	Output Response	
	Digital	>300 readings / second at 115k baud
	Analog	Max. 2500 updates / sec. with < l millisecond step response
	Output Resolution	1.22mV/bit (12 bits on 0-5 VDC)
ENVIRONMENTAL	Operating Temperature	-40°F to 180°F
	Compensated Temperature Range	40°F to 140°F (4°C to 60°C) Standard Options 1c (0-185°F) or 1k (-40 to +85°C) available
	Over Range	Ranges <1000 psi, 4 x or 3,000 psi whichever is less Ranges >1000 psi, 4 x or 15,000 psi whichever is less
ELECTRICAL	Power Requirements	15-28 Volts DC @ 75 mA
	Electrical Connection	Bendix PT02-12-8P or equivalent connector mates with PT06A-12-8S(SR)
MECHANICAL	Media Compatibility	Fluids and gases compatible with 316L stainless steel and Hastelloy® C-276
	Pressure Port Options	1/4 NPT & 7/16-20UNF male or female
	Construction	All Welded Stainless Steel

ELECTRICAL WIRING CODES

PIN	FUNCTION	PIN	FUNCTION
A	RS-485 A(+) / RS-232 TxD	E	Supply return
B	0-5VDC Analog output	F	(+) Supply 15-28 VDC
C	Analog output return	G	RS-485 B(-) / RS-232 RxD
D	No connection	H	RS-485 Ground / RS-232 Ground

SOFTWARE REQUIRED

Refer to transducer user manual 008-0627-00

The dual output of both the digital and analog signals allow flexibility in applications where the conventional 0-5 VDC output is desired. The digital output replaces the computer interface A-D card with direct connection into your PC RS-232 or RS-485 port.

APPLICATIONS

Aircraft flight test and component testing, hydraulic pump & valve testing, engine test stands. Automotive cold engine testing, brake testing, and transmission testing are only a few of the applications for the Model DS.

Vertical Entry Liquid Level Sensor

Model LL-V

0.1 % ACCURACY

TRUE GAGE DESIGN

CONDUIT CONNECTION

The Model LL-V Liquid Level Sensor is designed for vertical entry into a tank or stilling well for complete submersion in the fluid. The all-welded stainless steel housing and pressure sensing diaphragm provides corrosion resistance to most fluids. The pressure sensing diaphragm is mechanically protected by a welded-on screen. The electrical cable exits through a 1/2-14 NPT threaded fitting which allows the attachment of a variety of tubing or flexible conduit.

The electrical cable is vulcanized to a welded-on stainless steel ferrel by an oceanographic electrical connector company. The standard 10 ft. four conductor electrical cable has an atmospheric vent tube inside the cable jacket. The vent tube is attached to the "True Gage" all-welded chamber inside the sensor to provide a trouble-free atmospheric zero reference. An external desiccant is not required for dependable operation.

Model LL-V
Order Code BP712

PERFORMANCE

Ranges	Inches of Water Column: 0-25", 0-50", 0-100", 0-200", 0-300", 0-500", 0-1000" PSIG: 0-1, 0-2, 0-5, 0-10, 0-15, 0-25, 0-25, 0-50
Accuracy	+/- 0.1% F.S. (Static Error Band)
Resolution	Infinite

ENVIRONMENTAL

Operating Temperature	0-180° F (-20° to 80° C)
Compensated Temperature Ranges	60° to 160°F (15° to 70°C)
Temperature Effect On:	Zero . . . . . +/-0.0025%FS/°F (+/-0.0045%FS/°C) Span . . . . . +/-0.0025%Rdg./°F (+/-0.0045%Rdg./°C)

ELECTRICAL

Outputs	Option	Power Requirements	Wiring Code
0+/- 5 VDC	2c	11-28 VDC @ 40 mA (Three Wire)*	# 16
4-20 mA	2k	13-40 VDC (Two Wire)	Special
4-20 mA	2j	22-32 VDC @ 65 mA (Three Wire)*	# 21

*Also includes Sensotec's standard internal shunt calibration circuit

MECHANICAL

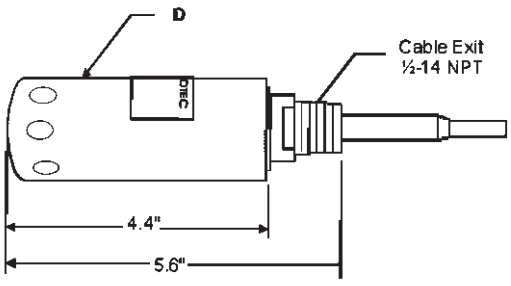
Media:	Liquids compatible with 304 & 17-4PH Welded Stainless Steel.
Cable jacket material:	Polyurethane & Neoprene®
Type:	Sensotec's True Gage Design with an all welded stainless steel atmospheric reference chamber built around a second sensing diaphragm, offers environmental protection and long term reliability that is unmatched in the industry.

OPTIONS

Longer cable lengths	10 ft is standard.
Option: 3d:	Buffered shunt calibration. Buffered relay activation of the internal shunt cal circuit offers a quick setup method for span by providing a calibrated output signal without applying a calibrated pressure to the sensor.
Option: 53e:	An internal Signature Calibration chip which stores calibration information for the automatic setup and calibration with Sensotec's Model SC Digital Indicator. Note: Options 3d & 53e cannot be used together.

Dimensions

AVAILABLE RANGES	D
0-1, 0-2 psi	2.25"
0-5, 10, 15, 25, 50, 75, 100 psi	1.50"



Sanitary Process Transmitters

Model CIP-Ultra; Pressure and Tank Level

0-1 psi to 0-600 psi (41 bar)

ACCURACY TO 0.1%

TRACKS TEMPERATURE CHANGES – 200° F./MINUTE

4-20 mA OUTPUT

500 µs PRESSURE RESPONSE TIME

SECONDARY CONTAINMENT EXCEEDS 1500 PSI (103 bar)

3-A Standards

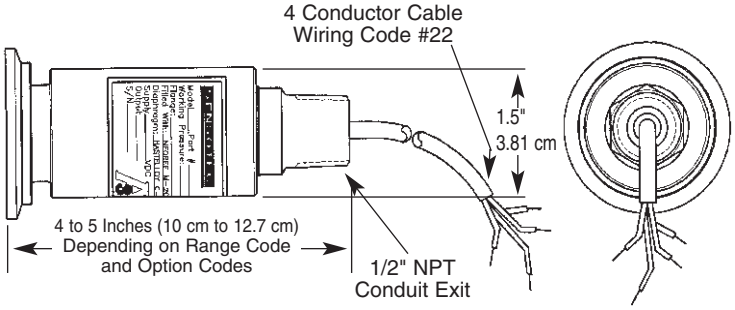
These sanitary process transmitters are manufactured in stainless steel and offer a variety of flanges, electrical connections, and operating temperatures designed to meet the environmental demands found in these applications:

- Food Processing
- Dairy & Cheese
- Beverage Processing
- Paint & Ink
- Clean-in-Place Systems
- Sanitizers and Cleaning Systems
- Pulp & Paper
- Pharmaceuticals
- Chemical Manufacturing
- Biological Systems
- Cosmetics, Perfumes
- Clean Gas Systems
- Microprocessor Industry

Dimensions

Accuracy	Order Code	Available Ranges
Model CIP-Ultra 0.1% Accuracy	**CP100 (Gage)** **CP101 (Absolute)**	1; 2.5; 5; 10; 15; 25; 50; 100; 200; 250; 400; 500; 600 psi 70; 175; 350; 700 mbar 1; 1.7; 3.4; 7; 14; 17; 27.5; 35; 41 bar
Model CIP-Ultra 0.25% Accuracy	**CP200 (Gage)** **CP201 (Absolute)**	1; 2.5; 5; 10; 15; 25; 50; 100; 200; 250; 400; 500; 600 psi 70; 175; 350; 700 mbar 1; 1.7; 3.4; 7; 14; 17; 27.5; 35; 41 bar
Model CIP-Ultra 0.5% Accuracy	**CP300 (Gage)** **CP301 (Absolute)**	1; 2.5; 5; 10; 15; 25; 50; 100; 200; 250; 400; 500; 600 psi 70; 175; 350; 700 mbar 1; 1.7; 3.4; 7; 14; 17; 27.5; 35; 41 bar

See Flange Size Code Chart



Flanges

Flange Size Codes

Flange	Size in.	Size cm	Option Code
Cherry-Burrell	1½"	3.81	16f
	2	5.08	16g
	2½	6.35	16h
	3	7.62	16i

Flange	Size in.	Size cm	Option Code
Tri-Clover	1½	3.81	16b
	2	5.08	16c
	2½	6.35	16d
	3	7.62	16e

Options (See Appendix)

- Electrical termination 6j; 6m; 6n
- Potentiometer access for zero and span adjustment by instrumentation tech. Electrical termination is DIN 43650 Hirschmann plug; environmental class IP 65 (NEMA 4). Conduit attachment by PG 9 thread on plug.
- Hermetic glass/metal connector; Bendix PTIH-10-6P equivalent.
- Single pole 3 Hz filter for electrical damping. Helps remove vibration induced noises from pumps, stirrers, etc.

		Gage CP100 Absolute CP101	Gage CP200 Absolute CP201	Gage CP300 Absolute CP301
PERFORMANCE	Accuracy	0.1% BFSL	0.25% BFSL	0.5% BFSL
	Pressure Ranges[1]			
	1-1/2" Flange	0-5 to 0-600 psi	0-5 to 0-600 psi	0-5 to 0-600 psi
	2" Flange	0-1 to 0-500 psi	0-1 to 0-500 psi	0-1 to 0-500 psi
	2-1/2" Flange	0-1 to 0-400 psi	0-1 to 0-400 psi	0-1 to 0-400 psi
	3" Flange	0-1 to 0-250 psi	0-1 to 0-250 psi	0-1 to 0-250 psi
	Max. Flange Pressure	600 psi with 13MHHS clamp at 72° F, 1½" size.	600 psi with 13MHHS clamp at 72° F, 1½" size.	600 psi with 13MHHS clamp at 72° F, 1½" size.
	Response Time (comb. elect. & mech.)	500 microseconds	500 microseconds	500 microseconds
	Resolution	Infinite	Infinite	Infinite
	Orientation sensitivity	.03 psi/G	.03 psi/G	.03 psi/G
ENVIRONMENTAL	Process Temp.[1]	-20° F to 260° F[2]	-20° F to 260° F[2]	-20° F to 260° F[2]
	Sensor Temp.	30° F to 180° F[3]	30° F to 180° F[3]	30° F to 180° F
	Temp. Effect on combined Zero and Span errors:[4]			
	1-1/2", 2", 2-1/2" & 3" Flange	1% FS/100° F (2% FS/100° F for 1 psi)	1% FS/100° F (2% FS/100° F for 1 psi)	1% FS/100° F (2% FS/100° F for 1 psi)
ELECTRICAL	Supply Voltage	13 to 32 VDC	13 to 32 VDC	13 to 32 VDC
	Electrical Connection (Std.)			
	1-1/2", 2", 2-1/2" & 3" Flange	1/2-14 Conduit Exit w/5 ft. Cable	1/2-14 Conduit Exit w/5 ft. Cable	1/2-14 Conduit Exit w/5 ft. Cable
	Load Impedance (Max.)	950 ohm at 32 VDC	950 ohm at 32 VDC	950 ohm at 32 VDC
	Zero Balance	4mA ± .16mA	4mA ± .16mA	4mA ± .16mA
	Output (Standard)	4-20mA, 2-Wire	4-20mA, 2-Wire	4-20mA, 2-Wire
	Wiring Code			
	1-1/2", 2", 2-1/2" & 3" Flange	#22	#22	#22
MECHANICAL	Media	Steam, Ethylene Oxide, Liquid, Gas	Steam Ethylene Oxide, Liquid, Gas	Steam, Ethylene Oxide, Liquid, Gas
	Wetted Parts	316-L Stainless, Hastelloy C-276	316-L Stainless, Hastelloy C-276	316-L Stainless, Hastelloy C-276
	Fill Material	NEOBEE M-20	NEOBEE M-20	NEOBEE M-20
	Weight (Nominal)	16 oz.	16 oz.	16 oz.
	Case Material	316-L Stainless	316-L Stainless	316-L Stainless
	Sanitary Std.	3-A, #37-01	3-A, #37-01	3-A, #37-01

NOTES: [1] Higher ranges may be available for special applications. Consult SENSOTEC.

[2] Specifications may vary with flange size and pressure range. Consult SENSOTEC.

[3] 30° F to 130° F for 1 psi range (-1° C to 54° C for 7 mbar range).

[4] Temperature profile for heated vessels:

Process temp	Sensor temp	Process temp	Sensor temp
260° F	180° F	126° C	82° C
200° F	145° F	93° C	63° C
150° F	120° F	65° C	49° C
100° F	90° F	38° C	32° C
75° F	75° F	24° C	24° C
50° F	65° F	10° C	18° C
0° F	40° F	-17° C	4° C
-20° F	30° F	-29° C	-1° C

Wing Union Pressure Transmitters

Model 425 & 424

- LONG LIFE X-750 MATERIAL
- RUGGED, ROBUST DESIGN
- AVAILABLE IN BOTH 1502 & 2202 2" WING UNION SIZES
- RFI/EMI PROTECTED
- INTRINSICALLY SAFE
- QUICK DELIVERY & SERVICE
- 0.2% ACCURACY

Now with optional temperature sensing capability !

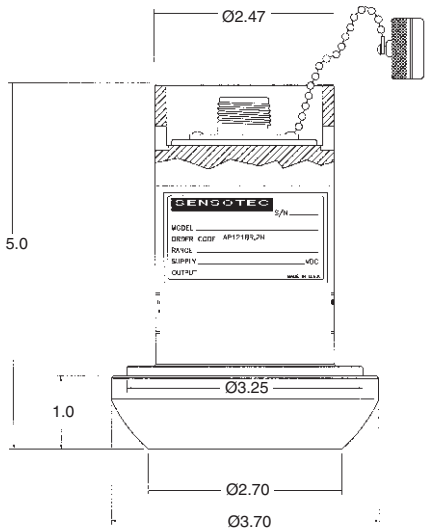
Model 425 (1502 fitting) Model 424 (2202 fitting)

The Models 425 and Model 424 Wing Union Pressure Transmitters are extremely rugged sensors designed specifically for use with both 1502 and 2202 two-inch wing unions in the demanding environment of high-pressure applications for both land-based and off-shore installations.

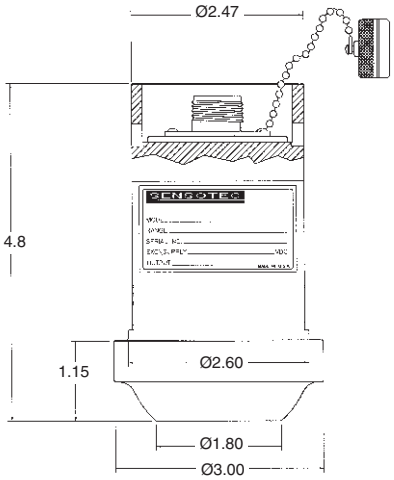
The isolated pressure sensing diaphragm minimizes zero shift during hammer-up and eliminates long-term signal drift in the field. The sensor diaphragm and wing union fitting are machined as one part. The Model 425 and 424 are constructed as an all-welded assembly using a deep penetration, proprietary, electron beam welding process which also ensures hermetic integrity for all field conditions. These transmitters incorporate special assembly processes to vibration and shock proof the components to ensure performance is maintained during the rigors of fracturing and cementing applications.

The 1502 and 2202 wing union compatible fittings are machined of Inconel X-750 providing service with highly abrasive and corrosive media. Both configurations comply with NACE Standard MR-01-75 (1980) for corrosive service.

The unique modular design of these models, Honeywell Sensotec's supply chain management system and specialized production area assure quick delivery for many standard configurations. Our repair and calibration departments are geared up to support customers needing fast response and timely turnaround for transmitters damaged during use or in need of recalibration.



Model 425



Model 424

Applications

- Mud Logging
- Cementing
- Drilling
- Wellhead Measurement
- Fracturing
- Acidizing

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Specifications

		Model 425 (1502 fitting) Order Code BP425	Model 424 (2202 fitting) Order Code BP424
PERFORMANCE	Accuracy	±0.2% BFSL	
	Repeatability	0.1% Full Scale Output	
ENVIRONMENTAL	Temperature, Operating	-45°F to +200°F (-43°C to +93°C)	
	Temperature, Compensated	-30°F to +180°F (-35°C to +80°C)	
	Temperature Effect on Zero	</= 0.01% F.S./°F (</= 0.018% F.S./°C)	
	Temperature Effect on Span	</= 0.01% Rdg/°F (</= 0.018% Rdg/°C)	
ELECTRICAL	Supply Voltage	9 - 28 Volts DC	
	Output (Standard)	4-20mA (2-Wire) Full Scale	
	Insulation Resistance	>/= 100 Megaohms at 50 VDC	
	Maximum Loop Resistance	950 Ohms at 28 Volts Decreasing Linearly to 0 Ohms at 9 Volts	
	Circuit Protection	Reverse Polarity Protection of Supply Leads	
	RFI/EMI Protection	Noise Immunity from 5000 Hz to 1.0 GHz	
	Electrical Connection (standard)	MS-3102E-14S-2P, 4-Pin Stainless Steel Hermetic	
	Frequency Response	Customer Specified and Factory Installed Filter for Frequency Response of Min. 10 Hz to Max of 2500 Hz (1.4 x 10^{-4} Sec.)	
	"Zero" and "Span" Adjustment	Field Adjustable by removing connector	
	CE Marked	Yes	
MECHANICAL	Pressure Ranges	0-5000 psi; 0-6000 psi; 0-10,000 psi; 0-15,000 psi 0-20,000 psi	
	Safe Overpressure	1.5 Times Rated Full Scale Pressure or Limit of the WECO 1502 Fitting	
	Burst Pressure	2.5 Times Rated Pressure or Limit of WECO Fitting	
	Pressure Fitting	®WECO 1502/2202 Wing Union, 2" Pipe, Male Sub End	
	Wetted Parts, Material	Inconel X-750	
AMPLIFIER CERTIFICATIONS	CSA Approved	CLASS I, Div 1, GRP ABCD CLASS I, ZONE 0, GRP IIC Exia Install per 001-0799-02 Tamb = 85°C NRTL/C Intrinsically Safe	
	FM Approved Intrinsically Safe	CLASS I, II, III, Div 1 Groups ABCDEFG Tamb = 85°C	
PHYSICAL	Connector/Mating Connector	NEMA 4x	
	Weight	6 Pounds	
	Labels	Welded Stainless Steel with Embossed Characters Serial Number Scribed into Housing for Permanent ID	
OPTIONS	Mechanical Connector Guard	Stainless Steel	
	Carrying Handles/Connector Guards	Consult Factory to Select from the Variety of Handles or Connector Guards	
	Frequency Response Filter	Customer Specified and Factory Installed Filter for Frequency Response of Min. 10Hz to Max of 2500 Hz (1.4 x 10^{-4} Mil sec.)	
	Shunt Calibration	Buffered Remote Activated with Optical Isolator Available. (Intrinsically Safe Approval is Pending)	
	DNV Approval	Available	
	Customer-specified Wiring Codes & Electrical Connectors	Available. Consult Factory.	
	Temperature Sensing Options	**Option 45c:** RTD output direct to connector. Gives temperature as a resistance reading. Intrinsically Safe. **Option 45d:** RTD with temperature as a 4-20mA output. Not Intrinsically Safe.	

AEROSPACE
Pressure Transducers
Models AS17A, AS19G and AS25D

AS17A / AS19G AS25D

NON-LINEARITY 0.15% BFSL

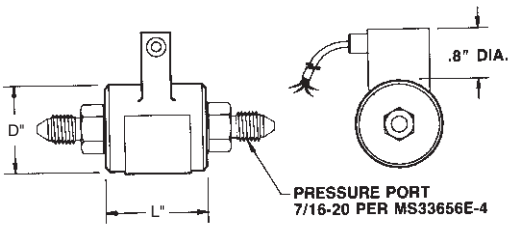
LIGHTWEIGHT

Model AS17A high accuracy strain gage absolute pressure transducer combines light weight and small size with rugged stainless steel construction. The Model AS19G is a true gage unit with our special double diaphragm design which provides hermetic protection for the internal components while allowing the unit to reference atmospheric pressure. Model AS25D wet/wet differential pressure sensor features welded stainless steel diaphragms on both ports. All units are able to meet MIL-45208 and traceability requirements.

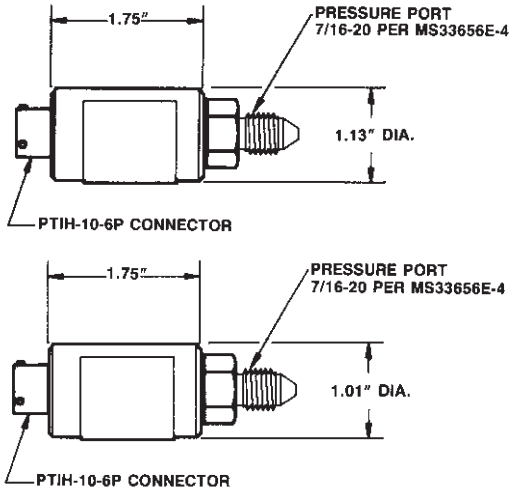
	Model AS17A (Absolute) AP161 Model AS19G (Gage) AP162	Model AS25D Wet/Wet Differential (Order Code BD313)
PERFORMANCE		
Pressure Ranges		15 to 2,000 psid
– Model AS17A (Absolute)	10 to 10,000 psia	
– Model AS19G (Gage)	25 to 10,000 psig	
Non-Linearity	±0.15% F.S.	±0.2% F.S.
Hysteresis	±0.10% F.S.	±0.1% F.S.
Output	3 mV/V Nominal	2 mV/V Nominal
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	– 65° F to 300° F	– 65° F to 300° F
Temperature, Compensated	– 65° F to 250° F	– 65° F to 250° F
Temperate Effect		
– Zero (max)	0.005% F.S./° F	0.005% F.S./° F
– Span (max)	0.005% Rdg./° F	0.005% Rdg./° F
ELECTRICAL		
Excitation (calibration)	10 VDC	10 VDC
Bridge Resistance	350 Ohm	350 Ohm
Electrical Termination	Bendix PTIH-10-6P or equivalent	Shielded Cable (Connector Optional)
MECHANICAL		
Media	Fluids compatible w/17-4 PH Stainless	Fluids compatible w/17-4 PH Stainless
Wetted Parts Material	17-4 PH Stainless	17-4 PH Stainless
Case Material	Stainless steel	Stainless steel
Pressure Port	7/16-20 per MS33656E-4	7/16-20 per MS33656E-4
Weight	5 oz.	Consult factory

General Information

AP162 Gage



BD313 Differential	L"	D"
15 to 25psid	1.125	1.36
50 to 500psid	1.125	1.63
750 to 2000psid	1.375	1.63



AP161 Absolute

High Pressure Transducers

Model HP

TO 100,000 PSI

0.05% ACCURACY

AE F250-C PORT

AMPLIFIED OUTPUT AVAILABLE

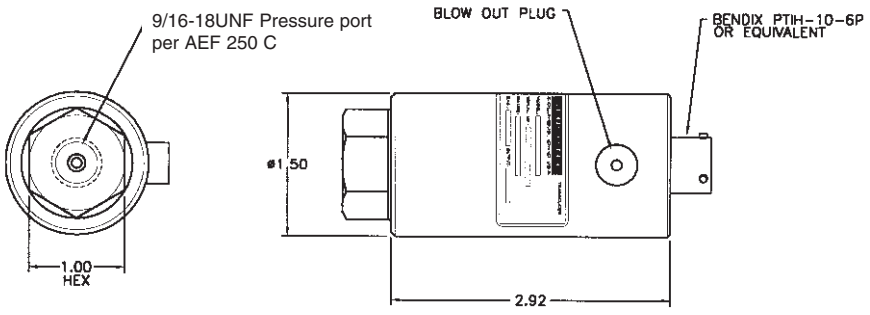
The High Pressure Transducer Model HP is designed to accept extreme pressure ranges of up to 100,000 psi. Equipped with a special blow out plug in its outer case, this transducer will allow the excess pressure to gradually leak out should the pressure element rupture. These transducers operate in a wide temperature range from -65° F through 250° F. Temperature effects on span and zero are 0.005% each and a full scale accuracy of 0.5% is achieved.

	Model HP Order Code BP521
PERFORMANCE	
Pressure Ranges	50,000 to 100,000 psi
Accuracy	±0.5% F.S.
Output	1mV/V
ENVIRONMENTAL	
Temperature, Operating	-65° F to 250° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
-Zero (max)	.005% F.S./° F
-Span (max)	.005 Rdg./° F
ELECTRICAL	
Excitation (calibration)	10VDC
Bridge Resistance	350 ohms
Wiring Code (std)	#2 (See Pg. AP-8)
Electrical Termination	Bendix PTIH-10-6P or equivalent

Dimensions

Model HP (Order Code BP521)

Available Ranges*
50,000; 75,000; 100,000 psi



Options (See Appendix)

*For pressure ranges 75,000 psi or above, consult factory for pressure port information.

Temperature compensated 1b, 1c, 1d, 1f; Internal amp 2a, 2j; Electrical termination 6b, 6e, 6f, 6g, 6h; Int. shunt cal 8a; Signature calibration 53e

Premium Options: 1i; 6i

Accessories: Mating connectors and connector/cable assemblies

Accu-Gage

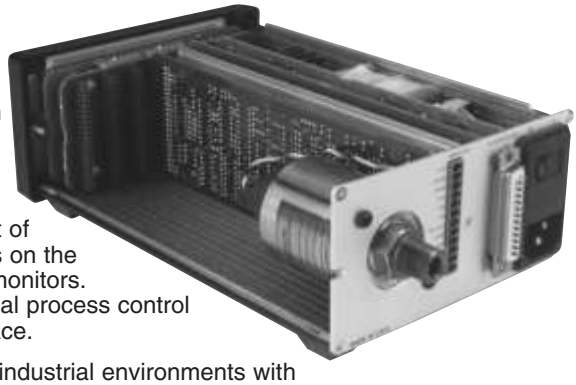
Digital Pressure Gages and Digital Pressure Indicators

TRANSDUCER WITH READOUT

HIGHLY STABLE READING

.05% F.S. ACCURACY

INSTRUMENT & TRANSDUCER ARE N.I.S.T. TRACEABLE



This combination pressure transducer and digital readout is designed for use in both industrial and laboratory applications. ACCU-GAGE offers portability, high accuracy, industrial grade durability, and very competitive prices.

ACCU-GAGE units are also suitable for panel mounting to provide a clear readout of pressure or vacuum to machine operators on the process line or as on-line quality control monitors. They are also perfect additions to statistical process control systems, using the optional RS232 interface.

ACCU-GAGE handles even the harshest industrial environments with a metal case and handle to avoid failures caused by shock or vibration often associated with the use of plastics.

These instruments are perfect replacements for:

- **Precision Dial Gages**
- **Mercury Columns**
- **Quartz Tube Barometers**

ULTRA HIGH PRECISION

The ACCU-GAGE Model AG-400 was designed to provide the highest accuracy (0.05% F.S.) and overall stability available in digital pressure indicators. To achieve the high level of stability demanded by Metrology and Calibration/Standards laboratories, SENSOTEC has chosen to fit all AG-400 instruments with our dependable, high-accuracy pressure transducer. During manufacture these transducers undergo an extensive burn-in program. In addition, all ACCU-GAGE Instruments undergo individual burn-in prior to shipment, thus the AG benefits from a double burn-in at both transducer and instrument level. This truly enhances the long-term stability of the instrument enabling the AG to perform as a high integrity pressure transfer standard. Full traceability is assured to National Standards.

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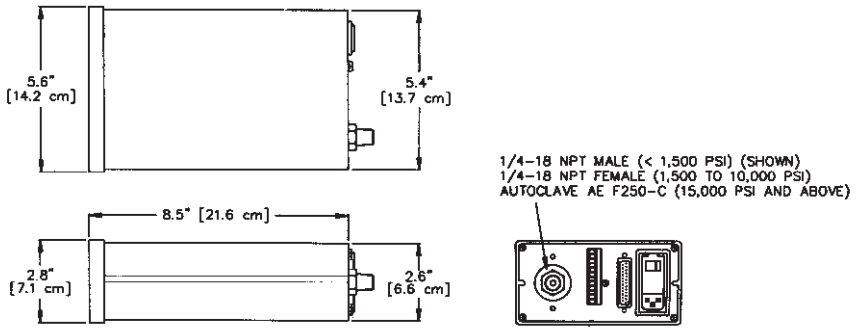
MODEL SELECTION CHART

		AG400	AG401
	Order Codes	AE435 (Gage) AE436 (Absolute)	AE441 (Gage) AE442 (Absolute)
	Accuracy	0.05%	0.10%
	Pressure Ranges	15-15,000 psi	15-60,000 psi
STANDARD FEATURES		0-5V or 0-10V Output (Field Selectable) Absolute Pressure Gage Pressure Field Selectable Engineering Units Auto-Zero Tare RS-232 Interface Hi/Lo Quad Limits Peak/Hold	
OPTIONS		Expanded Temp. Range (30° F to 130° F) (Option 1b) Vacuum Bench Top/Carrying Handle Panel Mounting Hardware RS-485 Interface (Option 53d) 4-20mA Output (Option 56a)	
GENERAL	# Channels	1	
	Case Material	Black Powder-Painted Aluminum	
	Case Size	3/8 DIN	
ENVIRONMENTAL	Temperature, Storage	-20° F to 200° F	
	Temperature, Operating	60° F to 105° F	
	Temperature Effect	.004% / ° F Over Operating Range	
AMPLIFIER CHARACTERISTICS	Frequency Response	2 Hz	
	Step Response	40 ms	
DIGITAL DISPLAY CHARACTERISTICS	# Characters Displayed	6	
	Scaling	0-999999	
	Field selectable units	psi, bar, mbar, torr, in.H_2O, ft.H_2O, in.Hg, mmHg, MPa	
	Resolution	1/50000	
PHYSICAL CHARACTERISTICS	Power Requirements	100 to 230 VAC, 47 to 63 Hz	
	Limits Outputs	Open collector (up to 4)	
	Pressure Port (15 to 1000 psi)	1/4-18 NPT (M)	
	Pressure Port (1500 to 10,000 psi)	1/4-18 NPT (F)	
	Pressure Port (15,000 to 60,000 psi)	Autoclave AE F250-C	

Available Ranges (Gage & Absolute)
15; 25; 50; 75; 100; 200; 300; 500; 750; 1000; 1500; 2000; 3000; 5000; 7500; 10,000; 15,000, 60,000 psi

aDimensions



NOTE: Both Pressure Transducer and Instrument are in box.

Differential Pressure Transducers

WET/WET, WET/DRY

0.1% to 0.5% F.S. ACCURACY

.5 to 10,000 psid

Honeywell Sensotec manufactures a wide range of wet/wet and wet/dry differential pressure transducers and transmitters. These sensors are manufactured as standard, modified standard, and custom products to provide the fastest possible delivery. Many of these units can ship from our extensive stocking program within 24 hours. These pressure sensors are industrially rugged and highly reliable because of their stainless steel construction (including wetted parts). Mechanical overload stops protect the transducer from high overload pressures in either direction.

These units measure a wide range of pressures; 0.5 psid to 10,000 psid. SENSOTEC DPs also offer the highest levels of accuracy and stability commercially available today; 0.1% to 0.5% F.S. while coping with temperatures from as low as -100° F up to 325° F. Our custom transducers are capable of handling temperatures above as well as below this range.

Our range of “on board” outputs are as varied as any manufacturer in the world. They include 4 - 20 mA, 0 - 5V, 0 - 20 mA, 1 - 10VDC, and ±5VDC, as well as 0 - 2VDC. We can also provide in-line amplification and digital outputs such as RS-232 or RS-485. Honeywell Sensotec also offers a wide range of sizes including miniature transducers along with an extensive list of connector types including submersible, underwater cable connections.

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Honeywell Sensotec Sensors

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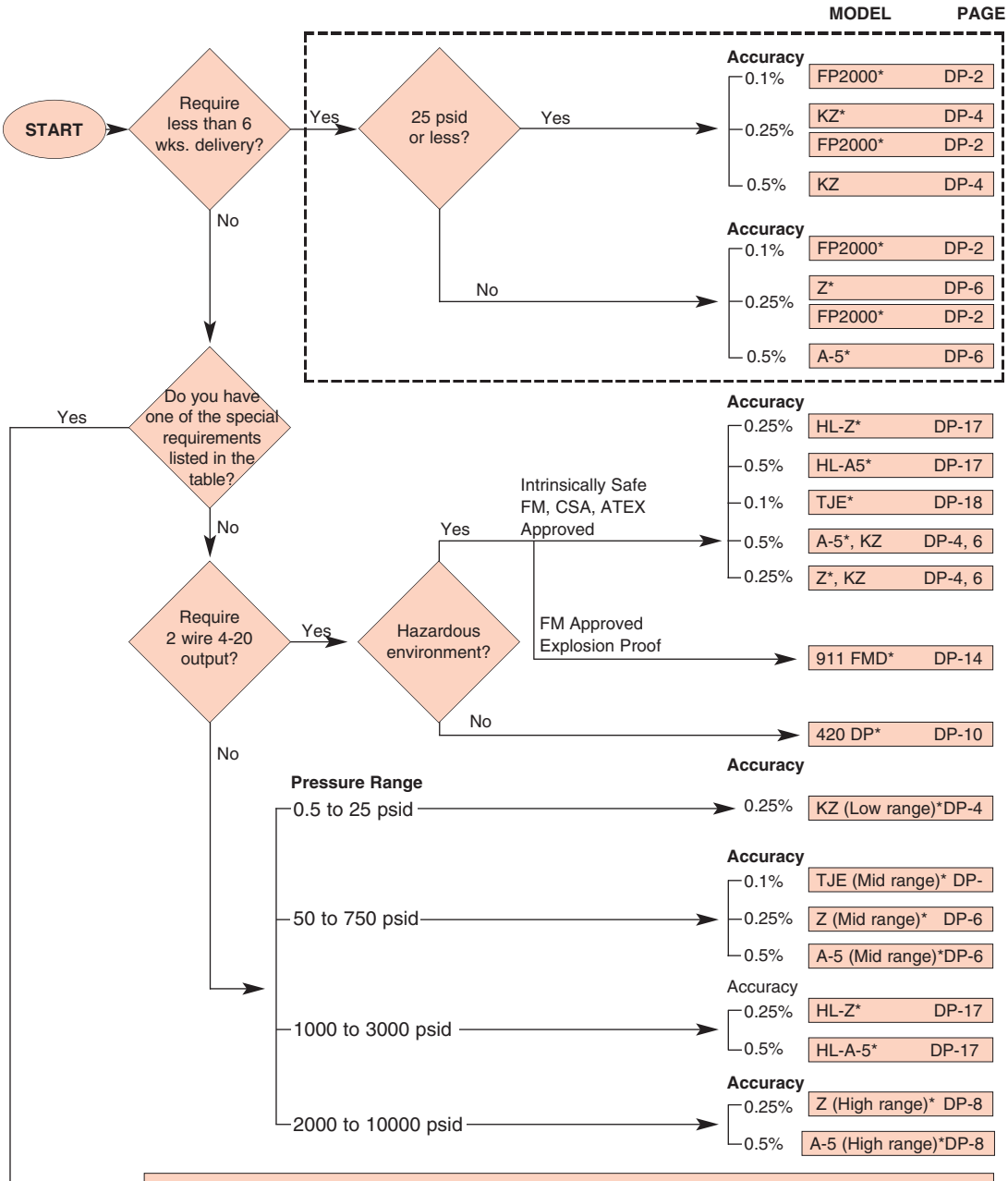
PRODUCT PAGE INDEX

Consult Sensotec on the availability of these approvals.

SELECTION FLOW CHART

This selection flow chart is designed to help you choose the best product for your application. Simply follow the path that best characterizes your requirements and turn to the appropriate product pages. If you need further assistance in identifying the "best" product or have a unique requirement that is not met by the products listed, please contact our Customer Service Department at (888) 282-9891.



SPECIAL REQUIREMENTS TABLE

• **Aerospace** Products	AS25D	PR-32
• Line pressure is between **1500 and 5000 psi** and exceeds 100% of full scale, **and** differential pressure exceeds 25 psid	HL-Z or HL-A-5*	DP-17
• **Miniature** wet/wet (less than 1.5" Diam.)	P-30-P**	DP-9

NOTE: Amplified output (0-5v, 4-20mA, 0-10v) is available on all models;
* internal amplification available
** in-line amplification available
For DPs used with refrigerants or lighter-than-air gases consult factory.

DIFFERENTIAL

Configurable Differential Pressure Transducers

FP2000 Series

APPROVED

APPROVED INTRINSICALLY SAFE AMP

2-week delivery

mV/V, 0-5, 0-10 VDC, OR 4-20 mA

WET WET & WET DRY DIFFERENTIAL

The FP2000 Series is a manufacturing and delivery system which allows the customer to select the configuration which best fits the needs of the application. Choose from two accuracies, four outputs, six pressure ports, five electrical terminations and twelve pressure ranges. The FP is available with wet/wet or wet/dry reference and, best of all, they deliver in 2 weeks or less.

	Wet/wet differential	Wet/dry differential
Order Code	FDW	FDD
PERFORMANCE		
Positive Pressure Ranges	See chart next page	
Accuracy (BFSL)	0.1% or 0.25% F.S.	
Output (selectable)	mV/V, 0-5 VDC, 0-10 VDC, or 4-20 mA (2 wire)	
Resolution	Infinite	
ENVIRONMENTAL		
Temperature, Operating	-40° F to 240° F	
Temperature, Compensated	40° F to 140° F	
Temperature Error Band*		
0.1% Accuracy	±0.5% F.S.	
0.25% Accuracy	±1% F.S.	
ELECTRICAL		
Excitation (calibration)		
Amplified (4-20mA, 0-5 VDC)	9 - 28 VDC	
Amplified (0-10 VDC)	15 - 28 VDC	
Unamplified (mV/V)	10 VDC	
MECHANICAL		
Media**	Gas, Liquid	
Overload-Safe (+direction)	4x FS or 3,000 psi, whichever is less	
Overload-Safe (-direction)	4xFS or 250 psi, whichever is less	
Wetted Parts Material	Ha C276 & 316L ss	
Line Pressure	500 psi	

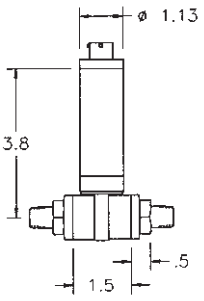
* For ranges below 15psi, temperature effects may vary.

** The Wet/Wet differential pressure transducer has two separate, welded Hastelloy diaphragms. In the wet/dry unit, the wet port (high port) has all-welded stainless and Hastelloy construction. The dry port (low port) has no isolation diaphragm.

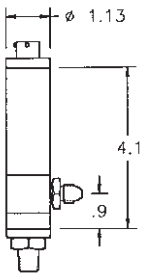
NOTE: Output for non-amplified units @ 10VDC excitation: 0.10% Accuracy = 50mV, 0.25% Accuracy = 100mV.

Dimensions

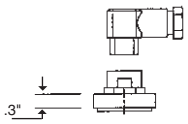
WET/WET DIFFERENTIAL



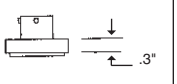
WET/DRY DIFFERENTIAL



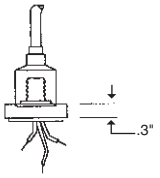
CODE 6n
4-PIN, VENTED
MINI DIN



CODE 6a
6-PIN, VENTED
BENDIX STYLE



CODE 6q
4-CONDUCTOR
VENTED, INTEGRAL
CABLE, 5 FEET



CODE 6r
4-CONDUCTOR
VENTED, INTEGRAL
CABLE, CONDUIT
FITTING, 5 FEET

CODE 6m
4-PIN, VENTED
STD. DIN (43650)

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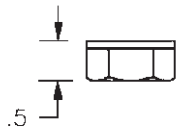
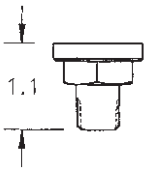
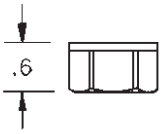
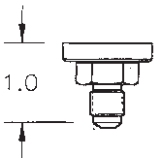
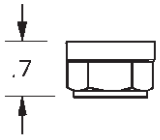
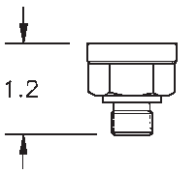
Pressure Port Options	CODE 5a 1/4-18 NPT Female	CODE 5b 1/4-18 NPT Male	CODE 5c 7/16-20 UNF Female	CODE 5d 7/16-20 UNF Male	CODE 5f G 1/4 B Female	CODE 5g G 1/4 B Male
						

HOW TO ORDER

www.sensotec.com/FP2000.htm

It's easy to order exactly what you need. Simply make one selection in each of the required categories, choose adders and accessories only if you want them. The result is a custom transducer with quick delivery!

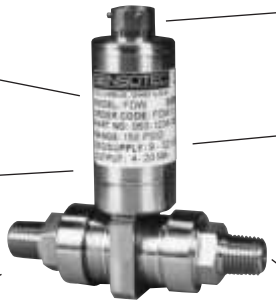
Example Order Code:	Type	Accuracy	Range	Output	Port	Connector
	FDW	1	AT	2u	5b	6a

This example is for a wet/wet differential pressure unit, 0.10% accuracy, 5 psi range, mV/V output, 1/4-18 NPT Male pressure port, and a Bendix electrical connection.

TRANSDUCER TYPE
- ❒ Wet/wet (FDW)
- ❒ Wet/dry (FDD)

ACCURACY
- ❒ 0.10% (1)
- ❒ 0.25% (2)

POSITIVE PRESSURE RANGES
- ❒ 10" H_2O (WA)
- ❒ 1 psi (AP)
- ❒ 5 psi (AT)
- ❒ 15 psi (BJ)
- ❒ 30 psi (BM)
- ❒ 50 psi (BN)
- ❒ 100 psi (BR)
- ❒ 150 psi (CJ)
- ❒ 250 psi (CN)
- ❒ 500 psi (CR)
- ❒ 750 psi (CT)
- ❒ 1000 psi (CV)



ELECTRICAL CONNECTIONS
- ❒ Bendix PTIH-106P (6a)
- ❒ MINI DIN, 40050 (6n)
- ❒ 5´ Integral cable, polyurethane (6q)
- ❒ Standard DIN, 43650 (6m)
- ❒ Conduit fitting (6r)

AVAILABLE OUTPUTS
- ❒ mV/V (2u)
- ❒ 5 VDC (2d)
- ❒ 10 VDC (2g)
- ❒ 4-20 mA (2p)
- ❒ 4-20 mA, CE (2y)
- ❒ 4-20 mA, Intrinsically Safe (2n or 2N; limited to ranges </= 5000 psi.) See page AP-6.

PRESSURE PORTS
- ❒ 1/4-18 NPT F (5a)
- ❒ 1/4-18 NPT M (5b)
- ❒ 7/16-20 UNF F (5c)
- ❒ 7/16-20 UNF M (5d)
- ❒ G 1/4 B F (5f)
- ❒ G 1/4 B M (5g)

Note: The dry port on the FDD is 7/16 x 20 UN, and is not selectable.

ADDERS

Selecting an Adder will automatically update the output code.

- ❒ Extended temperature range (1y)
- ❒ Buffered shunt cal (3d)
- ❒ CE rating (9e)
- ❒ Intrinsically safe, 2 wire (9d) see page AP-6
- ❒ CE and Intrinsically safe (9f) see page AP-6
- ❒ Potentiometers (14c)

ACCESSORIES

Mating connectors with 15' of cable for Bendix connector (6a)

	without shunt	with shunt (3d)
❒ mV/V	AA113	AA513
❒ 4-20 mA	AA116	AA516
❒ 0-5 / 0-10 VDC	AA117	AA517

Mating Connectors Only

❒ Mini DIN (40050)	AA161
❒ Bendix	AA111
❒ Standard DIN (43650)	AA157

WIRING CODES, no shunt cal.

Mating Connectors \ Output	mV/V 2u	0-5 VDC 2d	0-10 VDC 2g	4-20 mA 2p	4-20 mA 2n or 2N
AA161 Mini DIN	#37	#38	#38	#54	#53
AA111 Bendix	#2	#50	#50	#49	#23
6q Cable	#1	#52	#52	#51	#22
6r Conduit Fitting	#1	#52	#52	#51	#22
AA157 Std. DIN	#37	#38	#38	#54	#53

WIRING CODES, with shunt cal. option (3d)

Mating Connectors \ Output	mV/V 2u	0-5 VDC 2e	0-10 VDC 2f	4-20 mA 2y	4-20 mA 2n or 2N
AA161 Mini DIN	N/A	#56	#56	#55	#64
AA111 Bendix	#57	#60	#60	#58	#59
6q Cable	N/A	#63	#63	#61	#62
6r Conduit Fitting	N/A	#63	#63	#61	#62
AA157 Std. DIN	N/A	#56	#56	#55	#64

AVAILABLE with Signature Calibration
SEE PG. IN-5

Low Range Wet/Wet Differential Pressure Transducers

Model KZ

0.5 TO 30 PSID

ALL-WELDED DESIGN

AMPLIFIED OUTPUT AVAILABLE

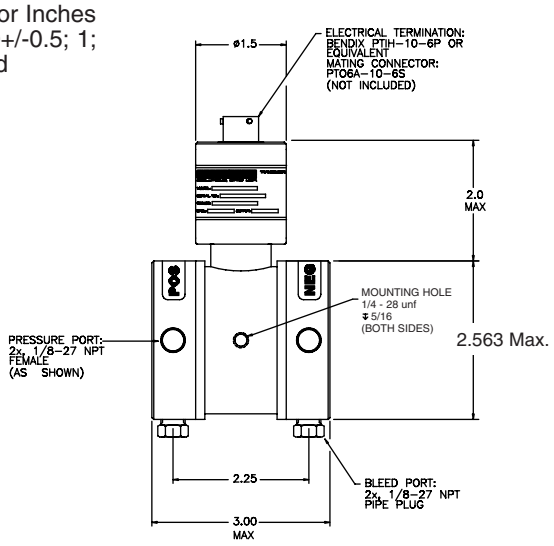
The Model KZ offers a completely new all-welded stainless steel assembly that eliminates internal "O" ring leaks and material compatibility. The overall size is reduced by 50 % from the Model Z, but the mechanical footprint is the same for drop-in replacement. The Model KZ line pressure zero shift specification can be reduced to less than 0.25% FS / 1000 psi by the use of an internal line pressure sensor and analog correction circuit. Line pressures are available up to 5000 psig with safe overload of either side up to the maximum line rating. The natural resonant frequency is increased with the Model KZ because of a stiffer pressure sensing element and the all- welded assembly.

A variety of standard options are available with the Model KZ including the traditional removable pressure adaptors for cleaning purposes, alternative pressure ports, special materials for wetted parts, internal amplifiers options and electrical terminations. Lead Times are reduced by the improved design and assembly procedures.

Dimensions

Model KZ Order Code: AD115

Available Ranges: PSID, Inches of Water Column or Inches of Hg Column (Specify) 0+/-0.5; 1; 2; 5; 10; 15; 25; & 30 psid



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		Model KZ Order Code AD115
PERFORMANCE	Pressure Ranges	0+/-0.5; 1; 2; 5; 10; 15; 25; & 30 psid
	Inches of Water Column or Inches of Hg Column	(Specify)
	Accuracy (BFSL)	+/-0.25% F.S. (min)
	Non-linearity	+/-0.15% F.S.(max)
	Hysteresis	+/-0.10% F.S.(max)
	Non-Repeatability	+/-0.05%F.S. (Max)
	Output Sensitivity (Calibration Factor)	
	0.5 Psid Range	1.0 mV / V
	1 to 2 Psid Range	1.5 mV / V
	5 to 30 Psid Range	2.0 mV / V
	Output Resolution	Infinite
ENVIRONMENTAL	Operating Temperature	30°F to 190°F
	Compensated Temperature Range	30°F to 130°F (3.6°C to 55.5°C) Standard
	Temperature Effect on Zero (max)	+/- 0.5 % F.S. / 100°F
	Span (max)	+/- 0.5 % Reading / 100°F
ELECTRICAL	Strain Gage Type	Bonded Foil
	Excitation (calibrated at)	10.0 Volts dc
	Acceptable Excitation	DC 12 Vdc maximum
	Insulation Resistance	5000 megOhm @ 50 Volts Maximum
	Bridge Resistance	350 Ohm (Nominal)
	Wiring Code	# 2 (Appendix page AP-9)
	Shunt Calibration Data	Included on calibration certificate
	Electrical Termination (standard)	Welded-on, hermetic, Bendix SS, PTIH-10-6P or equiv
	Mating Electrical Connector	Not supplied with transducer. Order Code AA111 Bendix PTO6A-10-6S (SR) OR 15ft Cable / Connector Assy Order Code: AA113 (specify)
MECHANICAL	Media Compatibility	All fluids and gases compatible with 316 stainless steel.
	Maximum Line Pressure (standard)	1500 Psi
	Line Pressure Effect on Zero	+/-0.5% F.S. / 1000 psi
	Max. Overload Pressure on either side	1500 psi
	Pressure Port Connections (standard)	1/8-27 FNPT (2)
	Tapped Mounting Hole	1/4-18 UNF X 5/16" Deep
	Drain Ports	1/8-27 FNPT (2)
	Weight	4.2 lbs
	Dead Volume	0.4 cubic inches
	Case Material	316 Stainless steel

Options (See Appendix)

Options: Amplified output; 2c, 2t, 2j, 2k. Compensated temperature range; 1a, 1d. Electrical termination; 6e, 6i, 6j. Increased line pressure; 25a; 25b; 25c. Pressure port; 5c. Line pressure output; consult factory. Special wetted material; consult factory.

Accessories: Pressure port adapters; page AP-5.

AVAILABLE with Signature Calibration
SEE PG. IN-5

Mid Range Wet/Wet Differential Pressure Transducers

Models Z and A-5

APPROVED

FM APPROVED INTRINSICALLY SAFE AMP

50 TO 750 PSID

ACCURACY TO 0.25%

HIGH LINE

AMPLIFIED OUTPUT AVAILABLE

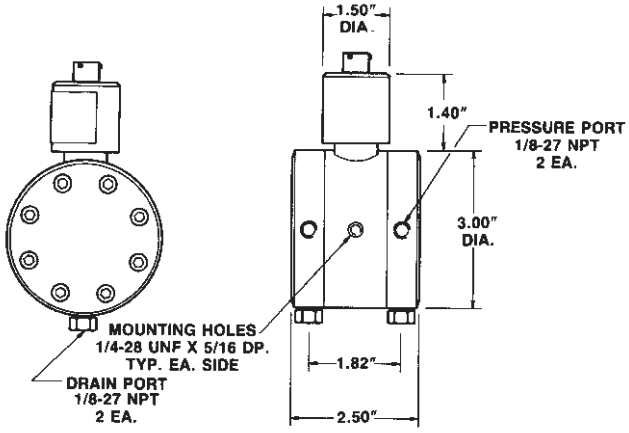
Models Z and A-5 Mid Range Wet/Wet Differentials are high accuracy, bonded foil strain gage transducers designed to accept fluid in both ports and measure differential pressure ranges of 50 to 750 psid. Standard features such as overload stops and stainless steel construction provide unit durability in rugged industrial environments. Each series is bi-directional and achieves accuracies of .25-.5% full scale. The models are available with extended temperature ranges. Typical applications include flow measurement, depth sensing, pressure equalization, and liquid level.

Dimensions

Model Z (Order Code AD122)

Model A-5 (Order Code AD123)

Available Ranges*
50; 75; 100; 150; 200; 300; 500; 750 psid
* Stocked ranges are in bold faced print. Model A-5 is stocked complete and semi-complete. Model Z is stocked semi-complete (3-6 weeks) only.



Model Z or A-5

Options (See Appendix)

Temperature compensated 1b, 1c, 1d, 1e, 1f; Internal amps 2b, 2c, 2n or 2N intrinsically safe amp, see page AP-6; 2j; Amp enhancements 3b, 3d; Electrical termination 6e, 6f, 6g, 6h; Int. shunt cal 8a; Signature calibration 53e

Premium Options: 1g, 1i; 2q; 3a; 5c; 6b, 6c, 6i; 10a; 26a

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

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		Model Z Order Code AD122	Model A-5 Order Code AD123
PERFORMANCE	Pressure Ranges	50 to 750 psid	50 to 750 psid
	Accuracy (min)	±0.25% F.S.	±0.5% F.S.
	Non-Linearity (max)	±0.15% F.S.	±0.25% F.S.
	Hysteresis (max)	±0.10% F.S.	±0.13% F.S.
	Non-Repeatability (max)	±0.05% F.S	±0.07% F.S
	Output (standard)	2mV/V	2mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect		
	– Zero (max)	.5% F.S./100° F	.75% F.S./100° F
	– Span (max	.5% Rdg./100° F	1% Rdg./100° F
ELECTRICAL	Strain Gage Type	Bonded foil	Bonded foil
	Excitation (calibration)	10VDC	10VDC
	Excitation (acceptable)	Up to 10VDC or AC	Up to 15VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC	5000 megohm @ 50VDC
	Bridge Resistance	350 ohm	350 ohm
	Shunt Calibration Data	Included	Included
	Wiring Code (std)	#2 (See Pg. AP-8)	#2 (See Pg. AP-8)
	Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)	PTIH-10-6P or equiv.
	Mating Connector (not incl.)	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
MECHANICAL	Media	Gas, Liquid	Gas, Liquid
	Maximum Line Pressure	1500 psi	1500 psi
	Maximum Overload – safe (either side)	1500 psi	1500 psi
	Pressure Port	1/8-27 NPT	1/8-27 NPT
	Tapped Mounting Hole (2ea)	1/4-28 UNF x 5/16 DP	1/4-28 UNF x 5/16 DP
	Drain Port	1/8-27 NPT	1/8-27 NPT
	Wetted Parts Material	17-4 PH Stainless	17-4 PH Stainless
	Weight	5.0 lbs.	5.0 lbs.
	O-Ring Seals	viton	viton
	Dead Volume	0.25 cu. in.	0.25 cu. in.
	Case Material	17-4 Stainless	17-4 Stainless
INTERNALLY AMPLIFIED UNITS (Optional)	Outputs Available	±5VDC, 4-20mA	±5VDC, 4-20mA
	Additional Length	2"	2"

NOTE: Unless otherwise specified on order, amplified units with 4-20mA output will provide 4mA at 0 psid and 20mA at positive full scale and the unit will not operate in the negative direction. An available alternative is to specify 4mA at negative full scale and 20mA at positive full scale. Intrinsically safe amp (Option 2n or 2N, see page AP-6) adds 2" to amplifier housing.

General Information

How to order (See Pg. AP-19)
Differential pressure selection flow chart (See Pg. DP-1)

AVAILABLE with Signature Calibration
SEE PG. IN-5

High Range Wet/Wet Differential Pressure Transducers

Models Z and A-5

AMPLIFIED OUTPUT AVAILABLE

2000 to 10,000 psid

ACCURACY TO 0.25%

The Z and A-5 High Range Wet/Wet transducers are engineered to measure differential pressures as great as 10k psid and achieve accuracies of 0.25%-0.5% full scale. Each series is bi-directional and accepts fluid in both ports. 17-4 PH stainless steel ensures durability of these bonded foil strain gage units under harsh industrial conditions. Typical applications include flow measurement, depth sensing, pressure equalization, and hydraulic testing.

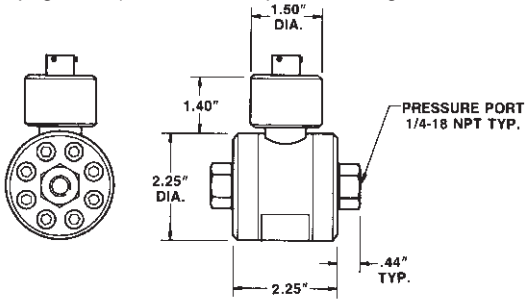
	Model Z Order Code: BD141	Model A-5 Order Code: BD142
PERFORMANCE		
Pressure Ranges	2000 to 10,000 psid	2000 to 10,000 psid
Accuracy	+/– 0.25% F.S.	+/– 0.5% F.S.
Non-Linearity (max)	+/– 0.15% F.S.	+/– 0.25% F.S.
Hysteresis (max)	+/– 0.10% F.S.	+/– 0.13% F.S.
Non-Repeatability (max)	+/– 0.05% F.S.	+/– 0.07% F.S.
Output (standard)	2mV/V	2mV/V
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	–65° F to 250° F	–65° F to 250° F
Temperature, Compensated	60° F to 160° F	60° F to 160° F
Temperature Effect		
– Zero (max)	0.5% F.S/100° F	0.75% F.S/100° F
– Span (max)	0.5% Rdg./100° F	1% Rdg./100° F
ELECTRICAL		
Strain Gage Type	Bonded foil	Bonded foil
Excitation (calibration)	10VDC	10VDC
Bridge Resistance	350 ohm	350 ohm
Wiring Code (std)	#2 (See Pg. AP-8)	#2 (See Pg. AP-8)
Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)	PTIH-10-6P or equiv.
Mating Connector (not incl.)	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
MECHANICAL		
Media	Gas, Liquid	Gas, Liquid
Maximum Line Pressure	2000 psi	2000 psi
Maximum Overload - safe (either side)		
2000 to 3000 psid	100% over capacity	100% over capacity
5000 to 10,000 psid	50% over capacity	50% over capacity
Pressure Port	1/4-18NPT female	1/4-18NPT female
Wetted Parts Material	17-4 PH Stainless	17-4 PH Stainless
Case Material	17-4 PH Stainless	17-4 PH Stainless

NOTES *Unless otherwise specified on order, amplified units with **4-20mA output will provide 4mA at 0 psid and 20mA at positive full scale** and the unit will not operate in the negative direction. An available alternative is to specify 4mA at negative full scale and 20mA at positive full scale. Intrinsically safe amp (option 2n or 2N, see page AP-6) adds 2" to amplifier housing.

Dimensions

Models Z (Order Code BD141)
Models A-5 (Order Code BD142)

Available Ranges
2,000; 3,000; 5,000; 7,500; 10,000 psid



Options (See Appendix)

Temperature compensated 1b, 1c, 1d, 1e, 1f; Internal amps 2b, 2c, 2n or 2N intrinsically safe amp (see page AP-6), 2j, Amp enhancements 3b, 3d; Electrical termination 6e, 6f, 6g, 6h, Int. shunt cal 8a, 25b, Signature calibration 53e.

Premium Options: 2q, 3a, 5c, 6b, 6c, 6i, 6j

Accessories: Mating connectors and connector/cable assemblies, Pressure port adapters

Subminiature Wet/Wet Differential Pressure Transducers

Model P-30-P

HIGH FREQUENCY

LIGHT WEIGHT

COMPACT DESIGN

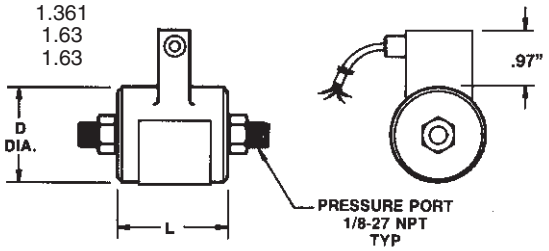
The Model P-30-P, wet/wet differential pressure transducer, is a subminiature unit which is uniquely suited to aerospace, chemical or nuclear applications. Features include small size, bidirectional overload protection, wide temperature compensation, and high natural frequencies (on ranges 25 psid). Available with internal or in-line amplification, optional high line pressure, and alternative construction materials for media compatibility.

	Model P-30-P	
	Order Code BD311 (low ranges)	**Order Code BD312 (high ranges)**
PERFORMANCE		
Pressure Ranges	5 to 25 psid	50 to 2000 psid
Accuracy	±0.3% F.S.	±0.3% F.S.
Non-linearity (max)	±0.2% F.S.	±0.2% F.S.
Hysteresis (max)	±0.1% F.S.	±0.1% F.S.
Non-repeatability (max)	±0.1% F.S.	±0.1% F.S.
Output	100 mV nom	2mV/V nom
Resolution	Infinite	Infinite
Line Pressure (max)	250 psi	500 psi or 2 X F.S. whichever is higher
ENVIRONMENTAL		
Temperature, Operating	-65° F to 250° F	-65° F to 250° F
Temperature, Compensated	60° F to 160° F	60° F to 160° F
Temperature Effect		
- Zero (max)	1.5% F.S./100° F	1% F.S./100° F
- Span (max)	1.5% Rdg./100° F	1% Rdg./100° F
ELECTRICAL		
Strain Gage Type	Bonded semi cond.	Bonded foil
Excitation	10VDC	10VDC
Bridge Resistance	500 ohms	350 ohms
Wiring Code (std)	#1 (See Pg. AP-8)	#1 (See Pg. AP-8)
Electrical Termination (std)	Teflon cable 5 ft.	Teflon cable 5 ft.
MECHANICAL		
Media	Gas, Liquid	Gas, Liquid
Maximum Overload	Max. line pressure either side	Max. line pressure either side
Pressure Port	1/8-27NPT male: 7/16" Hex	1/8-27NPT male: 7/16" Hex
Wetted Parts Material	17-4 PH Stainless	17-4 PH Stainless
Case Material	17-4 PH Stainless	17-4 PH Stainless

Dimensions

Models P-30-P (Order Code BD311: low range/BD312: high range)

Available Ranges	D"	L"
5; 10; 15; 25 psid	1.125	1.361
50; 75; 100; 150; 200; 300; 500 psid	1.125	1.63
750; 1000; 2000 psid	1.375	1.63



Options (See Appendix)

Temperature compensated 1b, 1d, 1f; Pressure ports 5d

Premium Options: 1c, 1e; 6i

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

Low/Mid Range Two Wire Wet/Wet Differential Pressure Transmitters

Model 420 DP

OEM APPLICATIONS

STAINLESS STEEL

0.5% ACCURACY

Low Range

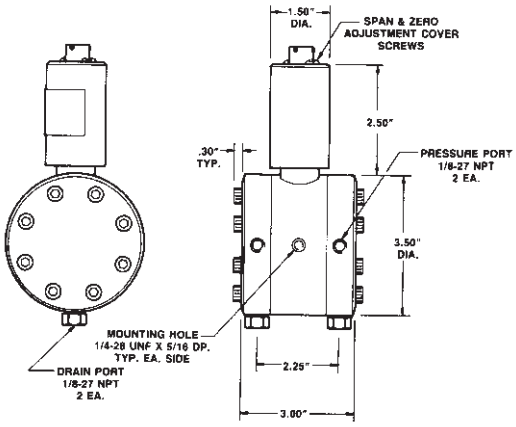
Mid Range

The Model 420 DP Two-Wire Low and Mid Range Differential pressure transmitters utilize supply voltage of 15 to 40 VDC to produce a two-wire 4-20mA process loop output for differential pressure ranges of 2 to 750 psid. A minimum full scale accuracy of 0.5% is achieved. Stainless steel construction ensures durability under harsh, industrial conditions. Both Low and Mid Range units include Zero and Span adjustments. Typical applications for these models include steam management, bulk liquid inventory, and flow measurement. High range (2000 to 10,000 psid) units are presented on the next two pages.

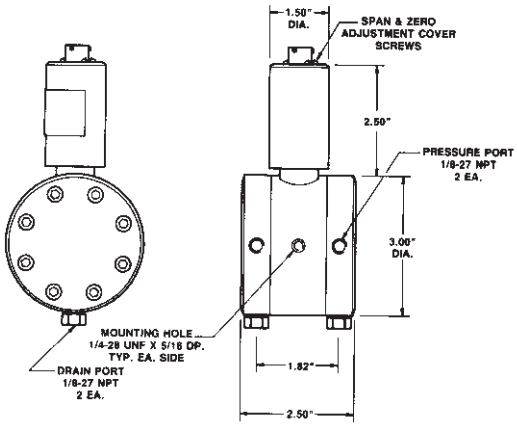
Dimensions

Model 420 DP
Low Range (Order Code AD411)
Mid Range (Order Code AD412)

Available Ranges
2; 5; 10; 15; 25 psid
50; 75; 100; 150; 200; 300; 500; 750 psid



Low Range



Mid Range

Options (See Appendix)

Temperature compensated 1a (low range only), 1b (mid range only), 1c; Electrical termination 6e, 6f, 6g, 6h

Premium Options: 3d; 5c; 6i, 6j; 25a (low range only), 25b (low range only), 25c (low range only); 26a, 26c

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

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Model 420 DP

		Low Range Order Code AD411	Mid Range Order Code AD412
PERFORMANCE	Pressure Ranges	2 to 25 psid	50 to 740 psid
	Accuracy	±0.5% F.S.	±0.5% F.S.
	Non-Linearity (max)	±0.25% F.S.	±0.25% F.S.
	Hysteresis (max)	±0.13% F.S.	±0.13% F.S.
	Non-Repeatability (max)	±0.07% F.S.	±0.07% F.S.
	Output	4-20mA	4-20mA
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	0° F to 180° F	0° F to 180° F
	Temperature, Compensated	30° F to 130° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	1.0% F.S./100° F	1.0% F.S./100° F
	- Span (max)	1.0% Rdg./100° F	1.0% Rdg./100° F
ELECTRICAL	Strain Gage Type	Bonded foil	Bonded foil
	Supply*	15-40VDC	15-40VDC
	Max. Load Resistance*	500 ohms	500 ohms
	Wiring Code (std)	#23 (See Pg. AP-8)	#23 (See Pg. AP-8)
	Electrical Termination (std)	PTIH-10-6P or equivalent	PTIH-10-6P or equivalent
		(Hermetic stainless)	(Hermetic stainless)
	Mating Connector (not incl.)	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
MECHANICAL	Media	Liquid, Gas	Liquid, Gas
	Maximum Line Pressure	1500 psi	1500 psi
	Maximum Overload	1500 psi either side	1500 psi either side
	Pressure Port	1/8-27NPT female	1/8-27NPT female
	Wetted Parts Material	316 Stainless	17-4 PH Stainless
	Case Material	Stainless steel	Stainless steel

Notes * For supply voltage under 20VDC, a load resistance of less than 500 ohms is required.
* Unless otherwise specified on order, amplified units with **4-20mA output will provide 4mA at 0 psid and 20mA at positive full scale** and the unit will not operate in the negative direction. An available alternative is to specify 4mA at negative full scale and 20mA at positive full scale.

General Information

How to order (See Pg. AP-19)
Differential pressure selection flow chart (See Pg. DP-1)

High Range Two Wire Wet/Wet Differential Pressure Transmitters

Model 420 DP

FLUID IN BOTH PORTS

OEM APPLICATIONS

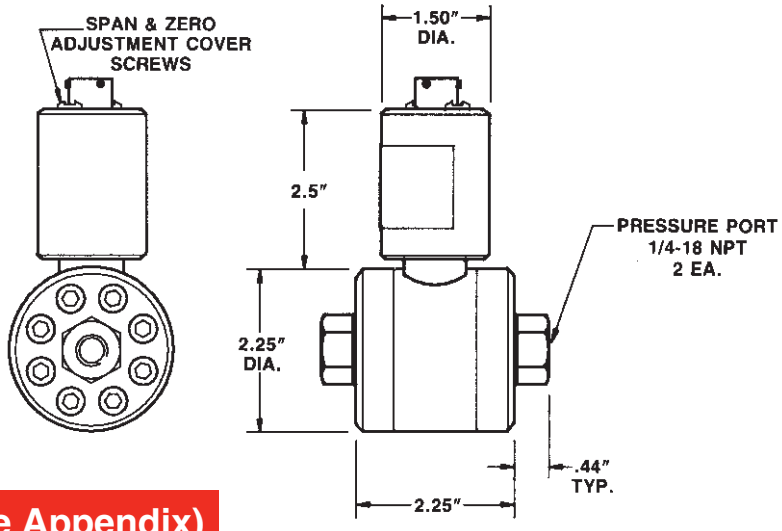
0.5% ACCURACY

Model 420 DP High Range Two-Wire Differential pressure transmitters are designed to accept fluid pressures of 2000 to 10,000 psid in both ports. Model 420 DP uses a supply voltage of 15 to 40VDC and provides a two-wire 4-20mA process loop output. Constructed with stainless steel, this bonded foil strain gage transducer provides excellent durability in rugged environments. Accuracy of 0.5% full scale is achieved with minimal 0.01% F.S./° F temperature effects on both zero and span. This model also includes zero and span adjustments. Typical applications for this model include steam management, bulk liquid inventory and flow measurement. Low range (1 to 25 psid) and Mid range (50 to 750 psid) units are presented on the previous two pages.

Dimensions

Model 420 DP (Order Code AD413)

Available Ranges
2000; 3000; 5000; 7500; 10,000 psid



Options (See Appendix)

Temperature compensated 1b, 1c; Electrical termination 6e, 6f, 6g, 6h

Premium Options: 3d; 5c, 5d; 6i, 6j

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

Model 420 DP
High Range
Order Code AD413

PERFORMANCE	Pressure Ranges	2000 to 10,000 psid
	Accuracy	±0.5% F.S.
	Non-Linearity (max)	±0.25% F.S.
	Hysteresis (max)	±0.13% F.S.
	Non-Repeatability (max)	±0.07% F.S.
	Output	4-20mA
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	0° F to 180° F
	Temperature, Compensated	60° F to 160° F
	Temperature Effect	
	- Zero (max)	1.0% F.S./100° F
	- Span (max)	1.0% Rdg./100° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Supply*	15-40VDC
	Max. Load Resistance	500 ohms
	Wiring Code (std.)	#23 (See Pg. AP-8)
	Electrical Termination	PTIH-10-6P or equiv.
	(std.)	(Hermetic stainless)
	Mating Connector (not incl.)	PT06A-10-6S or equiv.
MECHANICAL	Media	Gas, liquid
	Maximum Line Pressure	1500 psi
	Maximum Overload	50% over capacity
	Pressure Port	1/4-18NPT female
	Wetted Parts Material	17-4 PH Stainless
	Case Material	Stainless steel

***Notes** For supply voltage under 20VDC, a load resistance of less than 500 ohms is required. Unless otherwise specified on order, amplified units with **4-20mA output will provide 4mA at 0 psid and 20mA at positive full scale** and the unit will not operate in the negative direction. An available alternative is to specify 4mA at negative full scale and 20mA at positive full scale.

General Information

How to order (See Pg. AP-19)
Differential pressure selection flow chart (See Pg. DP-1)

FM Approved Low/Mid Range Wet/Wet Differential Pressure Transmitters

Model 911 FMD

FACTORY MUTUAL

HIGH LINE

4-20mA 2 WIRE

APPROVED
EXPLOSION PROOF
(See page AP-6)

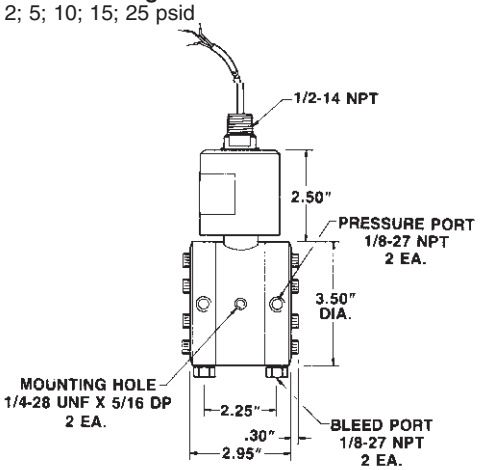
Model 911 FMD Low and Mid Range, Factory Mutual Approved Wet/Wet Differential transducers are engineered for use in harsh industrial applications. The two-wire, 4-20mA current output permits cable runs up to 10 miles long with a high signal to noise ratio. This model is constructed with stainless steel, sealed hermetically.

		Low Range Order Code BD421	Mid Range Order Code BD422
PERFORMANCE	Pressure Ranges	2 to 25 psid	50 to 750 psid
	Accuracy (min)	±0.25% F.S.	±0.25% F.S.
	Non-Linearity (max)	±0.15% F.S.	±0.15% F.S.
	Hysteresis (max)	±0.10% F.S.	±0.10% F.S.
	Non-Repeatability (max)	±0.05% F.S.	±0.05% F.S.
	Output	4-20mA	4-20mA
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	0° F to 180° F	0° F to 180° F
	Temperature, Compensated	30° F to 130° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	1.2% F.S./100° F	1.2% F.S./100° F
	- Span (max)	1.2% Rdg./100° F	1.2% Rdg./100° F
ELECTRICAL	Strain Gage Type	Bonded Foil	Bonded Foil
	Supply (acceptable)	15 - 50 VDC	15 - 50 VDC
	Electrical Termination (std)	1/2-14NPT 22 GA cable with case ground (2 ft)	1/2-14NPT 22 GA cable with case ground (2 ft)
	Wiring Code (std)	#22 (See Pg. AP-8)	#22 (See Pg. AP-8)
MECHANICAL	Media	Gas,Liquid	Gas, Liquid
	Maximum Line Pressure	1500 psi	1500 psi
	Maximum Overload, Safe (either side)	1500 psi	1500 psi
	Pressure Port	1/8-27 NPT Female	1/8-27 NPT Female
	Wetted Parts Material	316 Stainless	17-4 PH Stainless
	Case Material	Stainless steel	Stainless steel

Dimensions

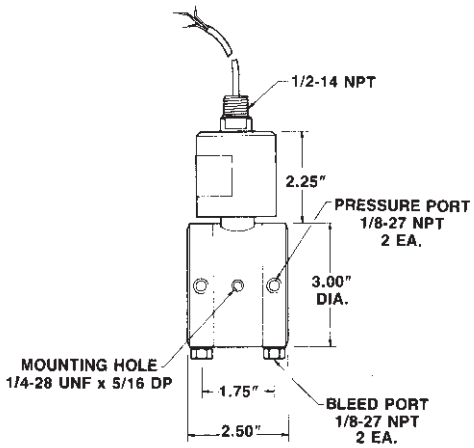
Model 911 FMD

Low Range (Order Code BD421):
Available Ranges
2; 5; 10; 15; 25 psid



Model 911 FMD

Mid Range (Order Code BD422):
Available Ranges
50; 75; 100; 150; 200; 300; 500; 750 psid



FM Approved High Range Wet/Wet Differential Pressure Transmitters

Model 911 FMD

FACTORY MUTUAL

HIGH LINE

4-20mA 2 WIRE

APPROVED
EXPLOSION PROOF
(See page AP-6)

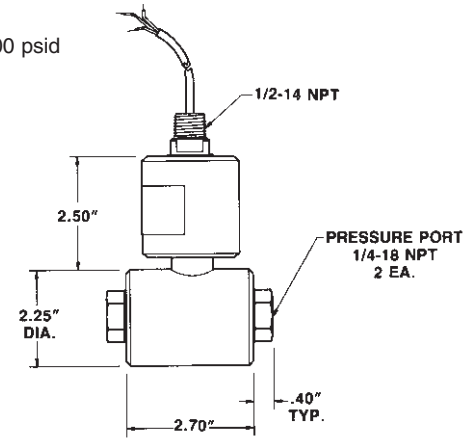
Model 911 FMD is a Factory Mutual Approved Wet/Wet transmitter, ideal for oil refinery and drilling rig differential pressure measurements. Model 911 FMDs are corrosion and shock resistant.

PERFORMANCE	Pressure Ranges	1000 to 10,000 psid
	Accuracy (min)	±0.25% F.S.
	Non-Linearity (max)	±0.15% F.S.
	Hysteresis (max)	±0.10% F.S.
	Non-Repeatability (max)	±0.05% F.S.
	Output (standard)	4-20mA
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	0° F to 180° F
	Temperature, Compensated	60° F to 160° F
	Temperature Effect	
	- Zero (max)	1.2% F.S./100° F
	- Span (max)	1.2% Rdg./100° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Supply (acceptable)	15 - 50 VDC
	Electrical Termination (std)	1/2-14 NPT - 22 GA cable w/case ground (2 ft.)
	Wiring Code (std)	#22 (See Pg. AP-8)
MECHANICAL	Media	Liquid
	Maximum Line Pressure	F.S. capacity + 2K psi
	Maximum Overload, Safe (either side)	
	1000 to 3000 psi	100% over capacity
	5000 to 10,000 psi	50% over capacity
	Pressure Port	1/4 - 18 NPT female
	Wetted Parts Material	17-4 PH Stainless
	Case Material	17-4 PH Stainless

Dimensions

Model 911 FMD (Order Code BD423)

Available Ranges
1000; 2000; 3000; 5000; 7500; 10,000 psid



Notes

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AVAILABLE with Signature Calibration
SEE PG. IN-4

High Line Wet/Wet Differential Pressure Transducers

Models HL-Z and HL-A-5

APPROVED

APPROVED INTRINSICALLY SAFE AMP

LINE PRESSURE TO 5000 psi

ACCURACY TO 0.25%

The High Line Wet/Wet Differential Pressure Models HL-Z and HL-A-5 are designed to accept extreme line pressures of up to 5000 psi.* This unique design features standard bonded foil strain gages on stainless steel. Liquid and gas differential pressures of 50 to 7500 psid are measured within a 0.25-0.50% full scale accuracy. Typical applications include flow measurement and laboratory testing.

	Model HL-Z	Model HL-A-5
PERFORMANCE		
Pressure Ranges	50 to 7500 psid	50 to 7500 psid
Accuracy	±0.25% F.S.	±0.5% F.S.
Non-Linearity (max)	±0.15% F.S.	±0.25% F.S.
Hysteresis (max)	±0.10% F.S.	±0.13% F.S.
Non-Repeatability (max)	±0.05% F.S.	±0.07% F.S.
Output (standard)	2 mV/V	2mV/V
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	-65° F to 250° F	-65° F to 250° F
Temperature, Compensated	60° F to 160° F	60° F to 160° F
Temperature Effect		
- Zero (max)	0.5% F.S./100° F	0.75% F.S./100° F
- Span (max)	0.5% Rdg./100° F	1% Rdg./100° F
ELECTRICAL		
Strain Gage Type	Bonded foil	Bonded foil
Excitation (calibration)	10VDC	10VDC
Bridge Resistance	350 ohms	350 ohms
Wiring Code (std)	#2 (See Pg. AP-8)	#2 (See Pg. AP-8)
Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)	PTIH-10-6P or equiv. (Hermetic stainless)
Mating Connector (not incl.)	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
MECHANICAL		
Media	Gas, Liquid	Gas, Liquid
Line Pressure (std)	2500 psi*	2500 psi*
Overload (F.S. capacity)		
-50-1500 psi	2000 psi	2000 psi
-2000-7500 psi	F.S. capacity + 2000 psi	F.S. capacity + 2000 psi
Pressure Port	1/4-18NPT female	1/4-18NPT female
Wetted Parts Material	17-4 PH Stainless	17-4 PH Stainless
Case Material	17-4 PH Stainless	17-4 PH Stainless

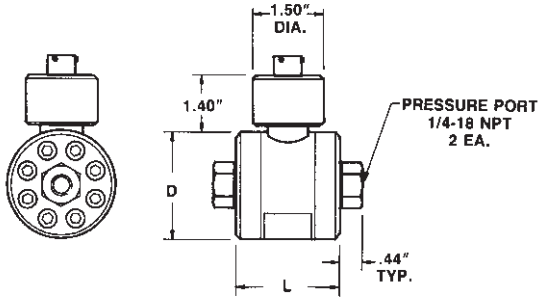
NOTES Unless otherwise specified on order, amplified units with **4-20mA output will provide 4mA at 0 psid and 20mA at positive full scale** and the unit will not operate in the negative direction. An available alternative is to specify 4mA at negative full scale and 20mA at positive full scale.
* On units >/=200 psid the sum of full-scale pressure and line pressure must be </=9500 psi; on units <200 psid, consult SENSOTEC.

Dimensions

Model HL-Z (Order Code BD511)
Model HL-A-5 (Order Code BD512)

Available Ranges	D"	L"
50; 75; 100; 150; 200; 300; 500;750; 1000; 1500; 2000; 3000; 5000; 7500*	2.50	2.50

*Not available with FM approval.



Options (See Appendix)

Temperature compensated: 1b, 1c, 1d, 1e, 1f, 1g, 1i; Temperature compensated 1b, 1c; Internal amp 2b, 2c, 2k, 2n or 2N intrinsically safe amp see page AP-6; 2j; Amp enhancements 3d; Electrical termination 6e, 6f, 6g, 6h; Int. shunt cal 8a; Line pressure 25c; Signature calibration 53e.

Premium Options: 2q; 3a, 6b, 6c, 6i, 6j

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

AVAILABLE with Signature Calibration
SEE PG. IN-4

Ultra Precision Wet/Wet Differential Pressure Transducers

Model TJE

0.1% ACCURACY

BI-DIRECTION

AMPLIFIED OUTPUT AVAILABLE

CE

Ex

FM APPROVED INTRINSICALLY SAFE AMP

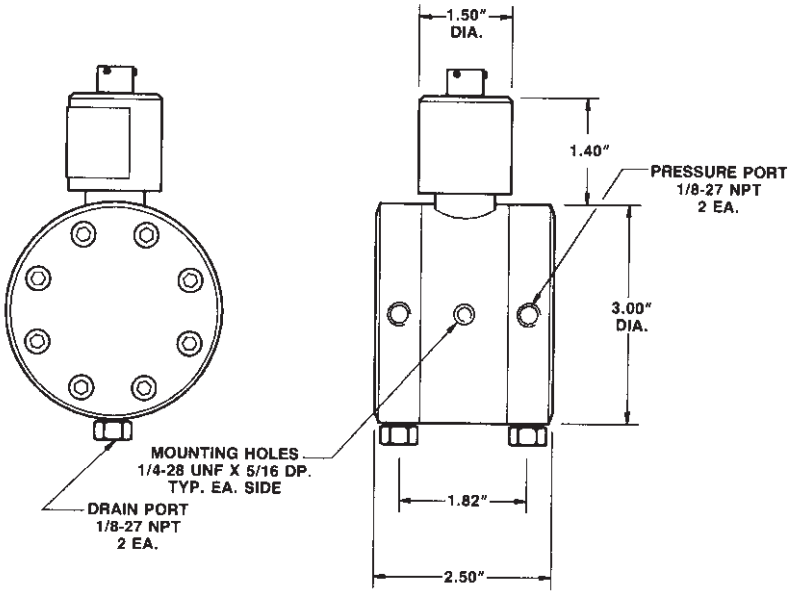
The Ultra Precision Wet/Wet Differential Pressure Model TJE is engineered for pressure ranges of 50 to 750 psid with 0.1% full scale accuracy. This bi-directional transducer is designed to accept fluid in both ports. Durability is ensured for harsh industrial conditions through standard features such as stainless steel construction and built-in overload protection.

Dimensions

Model TJE (Order Code BD121)

Available Ranges*
50; 75; **100;** 150; **200;** 300; **500;** 750 psid

*Bold ranges are in stock.



Options (See Appendix)

Temperature compensated 1b, 1c, 1d, 1e, 1f; Internal amps 2b, 2n or 2N intrinsically safe amp see page AP-6; 2j; 2k; Amp enhancements 3d; Pressure ports 5c; Electrical termination 6e, 6f, 6g, 6h; Int. shunt cal 8a; Signature calibration 53e

Premium Options: 1g, 1i; 2c; 5d; 6b, 6c, 6i, 6j

Accessories: Mating connectors and connector/cable assemblies; Pressure port adapters

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Model TJE
Order Code BD121

PERFORMANCE	Pressure Ranges	50 to 750 psid
	Accuracy (min)	±0.1% F.S.
	Output (standard)*	2mV/V
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F
	Temperature Effect	
	- Zero (max)	0.25% F.S./100° F
	- Span (max)	0.25% Rdg./100° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	10VDC
	Excitation (acceptable)	Up to 15VDC or AC
	Insulation Resistance	10,000 megohm @ 50VDC
	Bridge resistance	350 ohms
	Shunt Calibration Data	Included
	Wiring Code (std)	#2 (See Pg. AP-8)
	Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)
	Mating Connector (not incl.)	PT06A-10-6S or equiv.
MECHANICAL	Media	Gas, Liquid
	Maximum Line Pressure	1500 psi
	Maximum Overload— Safe (either side)	1500 psi
	Pressure Port(s)	1/8-27 NPT Female
	Tapped Mounting Hole(s)	1/4-28 UNF X 5/16 DP
	Drain Port(s)	1/8-27 NPT Female
	Wetted Parts Material	17-4 PH Stainless
	Weight	4.6 lbs.
	O-Ring Seals	viton
	Dead Volume	.25 cu. in
	Case Material	17-4 PH Stainless
INTERNALLY AMPLIFIED UNITS (Optional)	Output Available	0-5VDC, 4-20mA
	Additional Height	1.12"

***Notes** * Unless otherwise specified on order, amplified units with **4-20mA output will provide 4mA at 0 psid and 20mA at positive full scale** and will not operate in the negative direction. An available alternate set-up is 4mA at negative full scale and 20mA at positive full scale.
* 50 psid units have 1.5 mV/V output.

General Information

How to order (See Pg. AP-19)
Differential pressure selection flow chart (See Pg. DP-1)

Load Cells

0.05% TO 1% F.S.

25 GMS TO 3 MILLION LB.

WELDED STAINLESS STEEL

SENSOTEC manufactures a wide range of tension, compression, and universal measurement load cells. These sensors are manufactured as standard, modified standard, and custom sensors to provide fast delivery. Many units can ship from our extensive stocking program within 24 hours. Our load sensors are industrially rugged and highly reliable because of their stainless steel construction.

We use bonded foil and semiconductor gages so that your sensor will provide the best measurement possible given the conditions encountered in your application. These units measure a wide range of force; 25 grams to 3,000,000 lb. These load cells also offer the highest levels of accuracy and stability commercially available today; 0.02% to 0.5% F.S. while coping with temperatures from –60° F up to 320° F. And we offer custom transducers that are capable of handling temperatures outside of this temperature range.

PRODUCT INDEX

* Many ranges in stock.

Consult Sensotec on the availability of these approvals.

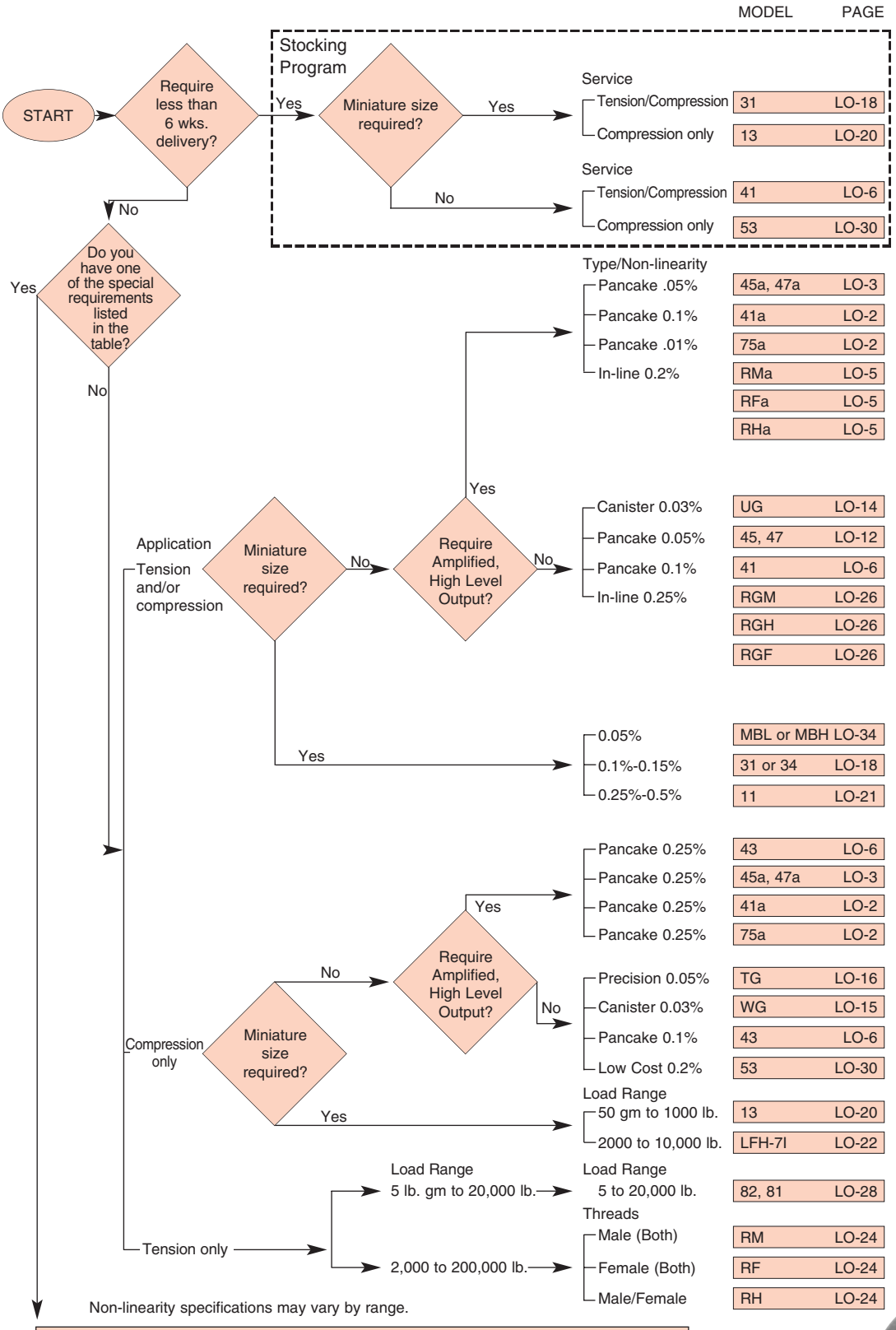
1-888-282-9891

Honeywell Sensotec Sensors

www.honeywell.com/sensing

SELECTION FLOW CHART

Use this selection flow chart to choose the best load cell for your application. Simply follow the path that best characterizes your requirements and turn to the appropriate product pages. If you need further assistance or have a unique requirement that is not met by the products listed, please contact Technical Sales at 1-(888) 282-9891.

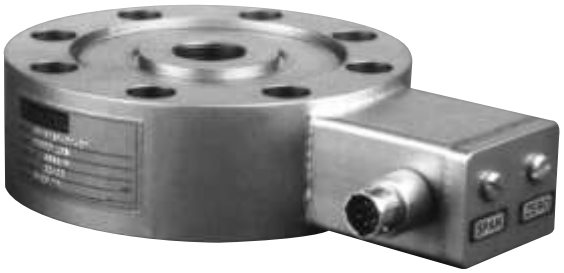


Non-linearity specifications may vary by range.

SPECIAL REQUIREMENTS TABLE	MODEL	PAGE
• **Fatigue** Life must exceed 1 million cycles	75 or 73	LO-8
• Load range exceeds **400,000** lb.	MPB	LO-17
• Require **donut** shaped load cell which allows load structure to pass through the center	TH or D	LO-29, 32
• Calibration class accuracy	IC48	LO-36

High Output, Pancake Style Tension/Compression Load Cells

Models 41a, 75a



ZERO & SPAN ADJUSTMENTS

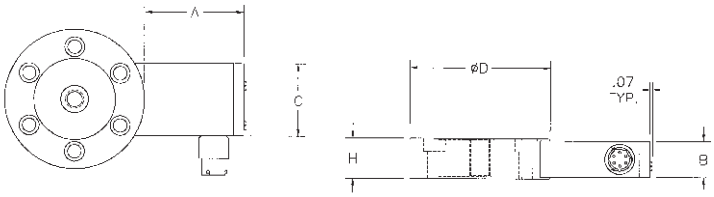
WELDED STAINLESS STEEL

Model 41a & Model 75a high output pancake style load cells have the same features as the Models 41 & 75 Tension & compression Cells with hermetically sealed, all welded stainless steel construction and high resistance to side loads. The added feature of an internal amplifier for voltage or current output reduces the effects of signal noise, and eliminates the need in most cases for a signal conditioning card in ones data acquisition system. Options include an internal buffered shunt calibration circuit for ease of set-up with an associated indicator, and the removal of zero & span adjustments.

		Model 41a Order Code AL141	Model 75a Order Code BL175
PERFORMANCE	Ranges	0-50 to 50,000 lb.*	0-50 to 20,000 lb.
	Accuracy		
	Non-linearity	±0.1% F.S.	±0.1% F.S.
	Hysteresis	±0.08% F.S.	±0.1% F.S.
	Non-repeatability	±0.03% F.S.	±0.03% F.S.
	Outputs	See below	
ENVIRONMENTAL	Operating Temperature Range	0°F to 185°F	0°F to 185°F
	Compensated Temperature Range	60°F to 160°F	60°F to 160°F
	Temperature Effects on Zero and Span	±0.005% F.S./°F	±0.005% F.S./°F
ELECTRICAL	Electrical Termination	PTIH-10-6P Welded Stainless Hermetic Connector Mating Connector Order Code AA111	
MECHANICAL	Life Cycles (approx)	10^7 fully reversed	10^9 fully reversed
	Operation	Tension/Compression	Tension/Compression
	Casing Material	Welded Stainless Steel	Welded Stainless Steel

Notes * Special ranges available from 5 to 500,000 lb.
Standard calibration for tension/compression load cells is in tension only.

Dimensions (inches)



Model 41a
(Order Code AL141)
Precision

Model 75a
(Order Code BL175)
Fatigue Rated

Available Ranges	Available Ranges	Dia.	Ht.	Mtg. Hole ID	Center Thread	A"	B"	C"
50; 100; 250; 500; 1000 lb.	50; 100; 250; 500 lb.	3.00	1.00	0.28"	3/8-24UNF	2.5	0.9	1.8
2000; 3000; 4000; 5000 lb.	1000; 2000 lb.	3.50	1.00	0.34"	1/2-20UNF	2.5	0.9	1.8
7500; 10,000; 15,000 lb.	3000; 4000; 5000; 7500 lb.	5.50	1.80	0.40"	1-14UNS	2.3	1.5	2.0
20,000; 30,000; 50,000 lb.	10,000; 15,000; 20,000 lb.	6.00	1.80	0.53"	1-1/2-12UNF	2.3	1.5	2.0

Specify Output:

Output/Options	Voltage/Option	Current/Option	Enhancement Options
See pages AP-6 & 7 for details	0 ± 5 Vdc/2c	4-20mA/2k (2 wire)	Remote Shunt calibration/3d
	0 ± 10Vdc/2t	4-20mA/2j (3 wire)	

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www.honeywell.com/sensing
Honeywell
Sensotec Sensors

High Output Ultra Precision & Fatigue Rated Load Cells

Models 45a, 47a

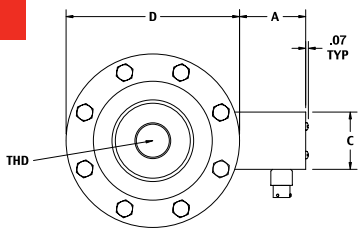
ZERO & SPAN ADJUSTMENTS

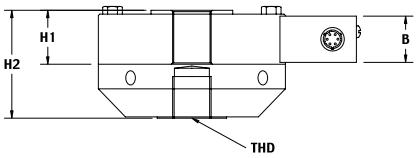
TENSION & COMPRESSION

Model 45a & Model 47a high output ultra precision & fatigue rated load cells include all the features and the industry common dimensions of the Model 45 & Model 47 plus a high level voltage or current output. The high level output reduces the effects of signal noise, and in most cases, eliminates the need for an additional signal conditioning card in ones data acquisition system. Options include certifications for use in hazardous areas, an internal buffered shunt calibration circuit for ease of setup with an associated indicator, and the removal of zero & span adjustments. The standard calibration is in tension, and optional data is available for both tension and compression.

		Model 45a Order Code AL145	Model 47a Order Code AL147
PERFORMANCE	Ranges	0-250 to 0 to 100,000 lb.	0-250 to 0-100,000 lb.
	Accuracy (Static Error Band)	±0.04% F.S. to ±0.06% F.S.	±0.02% F.S. to ±0.05% F.S.
	Output Options	See Below (calibrated in tension)	See Below (calibrated in tension)
ENVIRONMENTAL	Operating Temperature Range	0°F to 185°F	
	Compensated Temperature Range	30°F to 130°F	
	Temperature Effects on Zero & Span	±0.005%F.S./°F	
ELECTRICAL	Electrical Termination	PT1H-10-6P welded stainless steel hermetic connector Mating Connector Order Code AA111	
MECHANICAL	Operation	Tension/Compression (calibrated in tension)	
	Life Cycles (approximately)	One Billion, Fully Reversed	
	Case Material	Welded Stainless Steel	

Dimensions (inches)





Model 45a Fatigue Rated

(Order Code AL145)

Range	D."	H1"	Center Thread	Clearance Holes for Mounting
250; 500; 1,000; 2,500; 5,000; lb.	4.12	1.37	5/8-18 UNF-3B	9/32 Dia., 8 Holes Eq. Sp., 3.50 B.C.
10,000; 25,000 lb.	6.06	1.75	1-1/4-12 UNF-3B	13/32 Dia., 12 Holes Eq. Sp., 5.125 B.C.
50,000 lb.	8.00	2.50	1-3/4-12 UNF-3B	17/32 Dia., 16 Holes Eq. Sp., 6.50 B.C.
100,000 lb.	11.00	3.50	2-3/4-8 UNF-3B	11/16 Dia., 16 Holes Eq. Sp., 9.00 B.C.

Model 47a Ultra Precision Fatigue Rated

(Order Code AL147) Includes Factory Installed Base Plate

Range	D."	H2"	Center Thread
250; 500; 1,000; 2,500; 5,000 lb.	4.12	2.5	5/8-18 UNF-3B
10,000; 25,000 lb.	6.06	3.5	1-1/4-12 UNF-3B
50,000 lb.	8.00	4.5	1-3/4-12 UNF-3B
100,000 lb.	11.00	6.5	2-3/4-8 UNF-3B

Specify Output: Output/Options	Voltage/Option	Current/Option	Enhancement Options
See pages AP-6 & 7 for details	0 ± 5 Vdc/2c 0 ± 10Vdc/2t	4-20mA/2k (2 wire) 4-20mA/2j (3 wire)	Remote Shunt calibration/3d

NOTE: Standard calibration for tension/compression load cells is in tension only. Do not remove pull plate.

High Output Pancake Style Compression Load Cells

Models 43a, 73a

WELDED STAINLESS STEEL

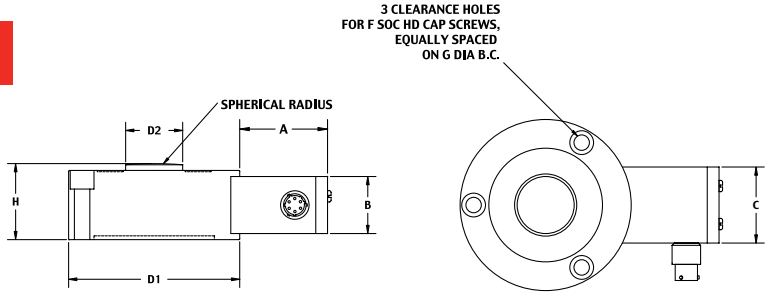
ZERO & SPAN ADJUSTMENTS

Model 43a & Model 73a high output compression type load cells include all the features of the Models 43 & 73 plus the option of either voltage or current output. These load cells are of all welded stainless steel construction with hermetic welded-on electrical connectors. The high level ±5, 10 Vdc or 4-20mA outputs are standard with zero and span adjustments with gasketed cap screw covers. Options include an internal buffered shunt calibration circuit for ease of set-up with an associated indicator, and the removal of zero & span adjustments for tamper free installations, and a variety of electrical terminations.

	Model 43a Order Code AL143	Model 73a Order Code BL173
PERFORMANCE		
Ranges*.....	0-50 to 0-200,000 lb.	0-50 to 0-100,000 lb.
Accuracy		
Non-linearity	±0.1% F.S.	±0.1% F.S.
Hysteresis.....	±0.08% F.S.	±0.1% F.S.
Non-repeatability	±0.03% F.S.	±0.03% F.S.
Outputs.....	See Below	
ENVIRONMENTAL		
Compensated Temperature Range	60°F to 160°F	
Operating Temperature Range	0°F to 185°F	
Temperature Effects on Zero & Span	±0.005%F.S./°F	
ELECTRICAL		
Electrical Termination.....	PTIH-10-6P or equiv. (Hermetic stainless) Mating Connector Order Code AA111	
MECHANICAL		
Operation.....	10^8, Undirectional	10^9, Unidirectional
Case Material	Welded Stainless Steel	Welded Stainless Steel

*Special Ranges available from 5 to 500,000 lb. Contact Sensotec sales for details.

Dimensions



Model 43a
Precision

Model 73a
Fatigue Rated

Available Ranges(lb.)	Available Ranges(lb.)	D1"	D2"	H"	F"	G"	A"	B"	C"
50; 100; 250; 500;1000	50; 100; 250; 500;	3.00*	0.56	1.18	1/4	2.250	2.5	0.9	1.8
2000; 3000; 4000; 5000	1000; 2000	3.50	0.69	1.18	5/16	2.625	2.5	0.9	1.8
7500; 10,000; 15,000	3000; 4000: 5000	4.50	1.50	2.00	3/8	3.790	2.3	1.5	2.0
20,000; 30,000; 50,000	7500; 10,000; 15,000	4.50	1.50	2.00	3/8	3.790	2.3	1.5	2.0
75,000; 100,000	20,000; 30,000; 50,000	4.50	1.50	2.00	3/8	3.790	2.3	1.5	2.0
150,000; 200,000	75,000; 100,000	5.50	2.00	2.18	3/8	4.812	2.3	1.5	2.0

* 3.00 cell has six mounting holes.

Specify Output:

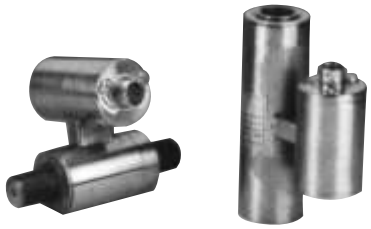
Output/Options	Voltage/Option	Current/Option	Enhancement Options
See pages AP-6 & 7 for details	0 ± 5 Vdc/2c	4-20mA/2k (2 wire)	Remote Shunt calibration/3d
	0 ± 10Vdc/2t	4-20mA/2j (3 wire)	

High Output Rod End/In-line Tension Type Load Cells

Models RMa, RHa, RFa

ALL WELDED STAINLESS STEEL

ZERO & SPAN ADJUSTMENTS



Model RMa, with male threads, Model RHa with both male and female threads, and the Model RFa with female threads are all High Output Rod End Load Cells designed to be mounted in-line to the load axis to measure tension. The outputs for these load cells are +/-5 or 10 Vdc, or 4-20mA (two wire) all calibrated in tension. The mounting thread configurations and the all welded stainless steel construction make these tension load cells ideal for a variety of rugged field applications as well as in the laboratory. Options include removal of zero & span adjustments for tamper free installations and a variety of electrical terminations. The high output signal offers resistance to electrical noise as well as additional signal resolution. Additional options include an internal buffered shunt calibration circuit for ease of setup with an associated indicator, and a variety of thread selections, including metric sizes.

	Model RMa		Model RHa		Model RFa	
PERFORMANCE		**OD**		**OD**		**OD**
Ranges: 0-2,000 to 0-4,000 lb.	AL613	1.50	AL619	1.50	AL614	1.50
0-7,500 to 0-20,000 lb.	AL615	1.75	AL620	1.75	AL616	1.75
0-20,000 to 50,000 lb.	AL617	2.50	AL624	2.50	AL618	2.50
Operation	Calibrated in Tension					
Linearity & Hysteresis	+/-0.2%F.S.					
Repeatability	+/-0.05%F.S.					
Output Options	See Below					
ENVIRONMENTAL						
Operating Temperature Range	0°F to 185°F					
Temperature Effects on Zero & Span	+/-0.01%F.S./°F					
ELECTRICAL						
Electrical Termination	PTIH-10-6P Welded Stainless Hermetic Connector					
Mating Connector	AA111					
MECHANICAL						
Case Materal	All Welded Stainless Steel Construction					

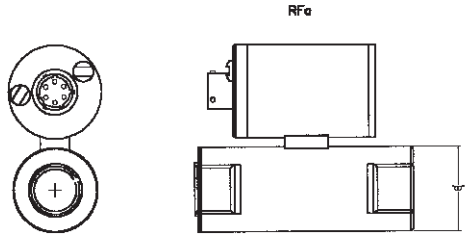
Specify Output:

Voltage/Option
0 ± 5 Vdc/2c
0 ± 10Vdc/2t
4-20mA/2j (3 wire)

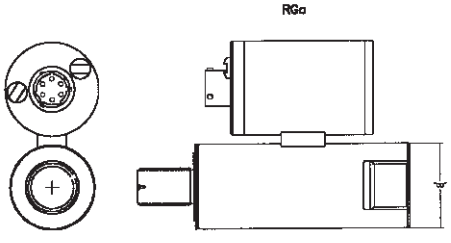
Current/Option
4-20mA/2k (2 wire)

Dimensions

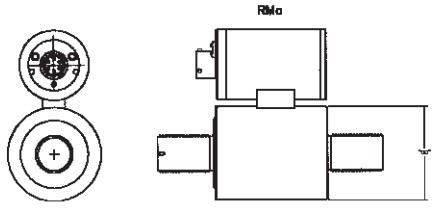
RFa



RHa



RMa



Consult factory for frame sizes and current outline drawings

AVAILABLE with Signature Calibration
SEE PG. IN-5

Precision Pancake Load Cells

Models 41 and 43

HERMETIC, STAINLESS

5 to 500,000 lb.

Model 41
Tension/Compression

Model 43
Compression Only

Models 41 and 43 are low profile “pancake” type load cells. These bonded foil, strain gage load cells are engineered to measure loads from 5 to 500,000 lb. The tension/ compression Model 41 is designed with the threaded hole running completely through the center of the cell. Model 41 utilizes two stabilizing diaphragms, which are welded to the sensing member to reduce off-center and side-loading effects. The compression-only Model 43 has a load button which is fixed as an integral part of the load cell and cannot be removed or changed. Both models achieve impressive non-linearity, hysteresis, and repeatability specifications for such applications as tube mills, extruding processes and weighing. Each unit has a welded construction and can be hermetically sealed for added durability. **Models 41 and 43 are available with optional 0-5VDC or 4-20mA output.**

Dimensions

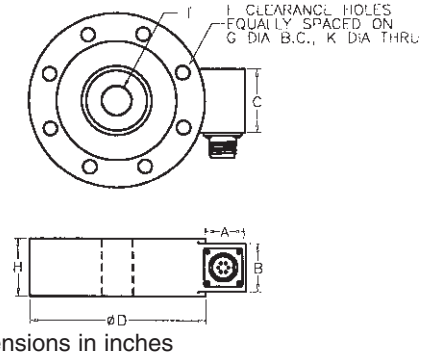
Note, standard calibration for tension/compression load cells is in tension only.

Model 41 (Order Code AL111)

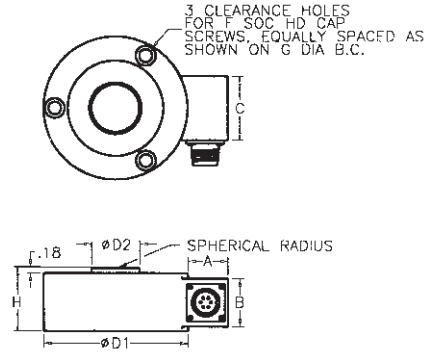
Available Ranges*	D"	H"	F#	G" Dia. B.C.	K" Dia. Thru	T	A"	B"	C"
5; 10; 25 lb.	2.50	0.80	6	2.000	0.19	1/4-28UNF	0.82	0.75	1.25
50; 100; 250; **500; 1,000** lb.	3.00	1.00	6	2.250	0.28	3/8-24UNF	0.82	0.75	1.25
2,000; 3,000; 4,000; **5,000** lb.	3.50	1.00	6	2.625	0.34	1/2-20UNF	0.82	0.75	1.25
7,500; **10,000;** 15,000 lb.	5.50	1.80	8	4.500	0.40	1-14UNS	1.25	1.50	2.00
20,000; 30,000; **50,000** lb.	6.00	1.80	8	4.875	0.53	1-1/2-12UNF	1.25	1.50	2.00
75,000; 100,000 lb.	9.00	2.50	12	7.750	0.66	2-12UN	1.25	1.50	2.00
150,000; 200,000 lb.	11.00	2.50	12	9.500	0.78	2-1/2-12UN	1.25	1.50	2.00
300,000; 400,000; 500,000 lb.	14.00	4.25	12	11.750	1.03	3-1/2-8UN	1.25	1.50	**

NOTES: * Stocked ranges are in bold.
** “C” dimension varies on high ranges. Consult SENSOTEC.
Bolt holes (K) are counter-bored for ranges 15,000 lb. and below.
Models 41 and 43 load cells ≤ 25 lbs do not have overload stops. Consult SENSOTEC for custom cells with overload stops.

Model 41 (Tension/Compression)



Model 43 (Compression Only)



Dimensions in inches

Model 43 (Order Code AL112)

Available Ranges	D1" Dia.	D2" Dia.	H"	F Typ. Dia.	G" B .C.	A"	B"	C"
5; 10; 25 lb.	2.50	0.37	0.98	#8	2.000	0.82	0.75	1.25
50; 100; 250; 500; 1,000 lb.	3.00*	0.56	1.18	1/4	2.250	0.82	0.75	1.25
2,000; 3,000; 4,000; 5,000 lb.	3.50	0.69	1.18	5/16	2.625	0.82	0.75	1.25
7,500; 10,000; 15,000; 20,000; 30,000 lb.	4.50	1.50	2.00	3/8	3.790	1.25	1.50	2.00
50,000; 75,000; 100,000 lb.	4.50	1.50	2.00	3/8	3.790	1.25	1.50	2.00
150,000; 200,000 lb.	5.50	2.00	2.18	3/8	4.812	1.25	1.50	2.00
300,000 lb.	7.00	2.50	2.68	3/8	6.000	1.25	1.50	2.00
400,000 lb.	7.50	2.50	2.68	3/8	6.750	1.25	1.50	2.00
500,000 lb.	11.00	4.75	4.50	3/4	9.500	1.25	1.50	2.00

* 3" diameter has six mounting holes.

Options (See Appendix)

Temperature compensated 1b, 1c, 1d, 1e, 1f; Int. shunt cal 8a; Special calibration (Model 41) 30a, 30b; Signature calibration 53e

Premium Options: 1i; 2a (Model 43>/=50 lb.), 2b (Model 41>/=50 lb.), 2n or 2N intrinsically safe amp see page AP-6; 2q; 3a, 6a (>/=5000 lb.), 6e, 6f, 6g, 6h, 6i, 6j (>/=7500 lb.); 9a, 9b;

Accessories: Mating connectors and connector/cable assemblies; Pull plates; Load buttons.

		Model 41 (Tension/Compression) Order Code AL111	Model 43 (Compression only) Order code AL112
PERFORMANCE	Load Ranges	5 to 500,000 lb.	5 to 500,000 lb.
	Non-Linearity (max)		
	5 to 25 lb.	±0.2% F.S.	±0.2% F.S.
	50 to 500,000 lb.	±0.1% F.S.	±0.1% F.S.
	Hysteresis (max)		
	5 to 25 lb.	±0.1% F.S.	±0.1% F.S.
	50 to 500,000 lb.	±0.08% F.S.	±0.08% F.S.
	Non-Repeatability (max)		
	5 to 25 lb.	±0.1% F.S.	±0.1% F.S.
	50 to 500,000 lb.	±0.03% F.S.	±0.03% F.S.
	Output (standard)		
	5 to 25 lb.	2mV/V	2mV/V
	50 to 500,000 lb.	3mV/V	3mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	0.002% F.S./° F	0.002% F.S./° F
	- Span (max)	0.002% Rdg./° F	0.002% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil	Bonded foil
	Excitation (calibration)	10VDC	10VDC
	Excitation (acceptable)	Up to 15VDC or AC	Up to 15VDC or AC
	Insulation Resistance	5000 megohms @ 50VDC	5000 megohms @ 50VDC
	Bridge Resistance	350 ohms	350 ohms
	Shunt Calibration Data	Included	Included
	Wiring Code (std)	#2 (See P. AP-8)	#2 (See Pg. AP-8)
	Electrical Termination (std)		
	5 to 5,000 lbs	PTIH-10-6P or equiv. (Hermetic stainless)	PTIH-10-6P or equiv. (Hermetic stainless)
	7,500 to 500,000 lbs	MS3102E-14S-6P or equiv.	MS3102E-14S-6P or equiv.
	Mating Connector (not incl.)		
	5 to 5,000 lbs	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
	7,500 to 500,000 lbs	MS3106A-14S-6S or equiv.	MS3106A-14S-6S or equiv.
MECHANICAL	Static Overload Capacity	50% over capacity	50% over capacity
	Thread Size	See "T" Dimension Info	N/A
	Maximum Extraneous Forces without damage	See table below	See table below
	Deflection—Full Scale	0.003"	0.003"
	Casing Material		
	5 to 200,000 lbs	17-4PH Stainless	17-4PH Stainless
	300,000 to 500,000 lbs	4340 Painted	17-4PH Stainless
INTERNALLY AMPLIFIED UNITS* (Optional)	Outputs Available	±5VDC, 4-20mA	0-5VDC, 4-20mA

NOTES: *Standard calibration for tension/compression load cells is in tension only. Internal amplifiers are available for all ranges. Internal amplification for ranges <5,000 lb. ("H" dimension <1.80") may increase height. Using an in-line amplifier will avoid this height increase.

ALLOWABLE EXTRANEOUS FORCE WITHOUT DAMAGE (% of load capacity)

Ranges	Side Load (lb.)	Bending (in-lb)	Torque (in-lb)	Total Extraneous Force
5; 10; 25; 50; 100; 250; 500 lb.	50%	40%	25%	100%
1000; 2000; 3000; 4000; 5000 lb.	30%	25%	25%	100%
10,000; 15,000; 20,000; 30,000; 50,000 lb.	20%	20%	15%	100%
100,000; 150,000; 200,000; 300,000; 400,000; 500,000 lb.	20%	20%	10%	100%

General Information

How to order (See Pg. AP-19)
Load cell selection flow chart (see Pg. LO-1)

AVAILABLE with Signature Calibration
SEE PG. IN-5

Precision, Fatigue Rated Pancake Load Cells

Model 73 and 75

LONG FATIGUE LIFE

50 TO 200,000 lb.

HIGH OVERLOAD

Model 73
(Compression Only)

Model 75
(Tension/Compression)

Models 73 and 75, Fatigue Rated Load Cells are engineered for applications such as materials or product fatigue testing, which involve an extremely large number of cycles or occasional overload conditions. These fatigue rated load cells have load ranges from 50 to 200,000 lbs and achieve a non-linearity of 0.1% full scale. The superior design of these bonded foil, strain gage compression and/or tension load cells permits a fatigue life of 1 billion cycles (zero to full scale). Model 75 measures tension/compression while Model 73 measures compression only. Both models must be used on a smooth flat surface to achieve rated specifications. The load button on Model 73 is an integral part of the load cell and cannot be removed or changed. The tension/compression Model 75 is designed with the threaded hole running completely through the center of the cell. Models 75 and 73 utilize two stabilizing diaphragms, which are welded to the sensing member to reduce off-center and side-loading effects. Applications include spring testing, shock absorber testing and electrohydraulic shaker systems.

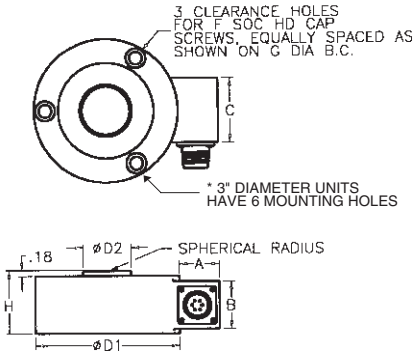
Dimensions (inches)

Note, standard calibration for tension/compression load cells is in tension only.

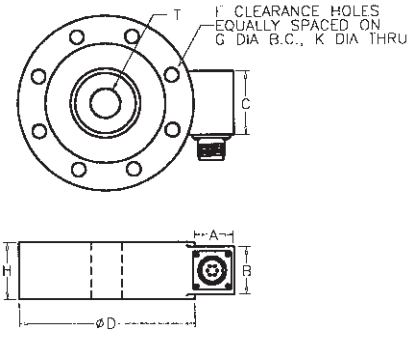
Model 73 (Order code BL113)

Available Ranges	D1"	D2"	H"	F" Typ.	G" Dia. B.C.	A"	B"	C"
50; 100; 250; 500 lb.	3.00	0.56	1.18	1/4	2.250	0.82	0.75	1.25
1,000; 2,000 lb.	3.50	0.69	1.18	5/16	2.625	0.82	0.75	1.25
3,000; 4,000; 5,000; 7,500; 10,000 lb.	4.50	1.50	2.00	3/8	3.790	1.25	1.50	2.00
15,000; 20,000; 30,000; 50,000 lb.	4.50	1.50	2.00	3/8	3.790	1.25	1.50	2.00
75,000; 100,000 lb.	5.50	2.00	2.18	3/8	4.812	1.25	1.50	2.00
150,000; 200,000 lb.	7.50	2.50	2.68	3/8	6.750	1.25	1.50	2.00

Model 73 (Compression Only)



Model 75 (Tension/Compression)



Model 75 (Order code BL114)

Available Ranges	D" Dia.	H"	F"	G" Dia. B.C.	K" Dia. Thru	T	A"	B"	C"
50; 100; 250; 500 lb.	3.00	1.00	6	2.250	0.28	3/8-24UNF	0.82	0.75	1.25
1,000; 2,000 lb.	3.50	1.00	6	2.625	0.34	1/2-20UNF	0.82	0.75	1.25
3,000; 4,000; 5,000; 7,500 lb.	5.50	1.80	8	4.500	0.40	1-14UNS	1.25	1.50	2.00
10,000; 15,000; 20,000 lb.	6.00	1.80	8	4.875	0.53	1-1/2-12UN	1.25	1.50	2.00
30,000; 50,000 lb.	7.50	2.00	8	6.000	0.78	2-12UN	1.25	1.50	2.00
75,000; 100,000 lb.	9.00	2.50	12	7.750	0.66	2-1/2-12UN	1.25	1.50	2.00
150,000; 200,000 lb.	14.00	4.25	12	11.750	1.03	3-1/2-8UN	1.25	1.50	*

NOTE: Bolt holes (K) are counter-bored for ranges 7500 lb. and below.
* "C" dimension varies on high ranges. Consult SENSOTEC.

1-888-282-9891
Honeywell Sensotec Sensors
www.honeywell.com/sensing

Options (See Appendix)

Temperature compensated 1b, 1c, 1d, 1e, 1f; Int. shunt cal 8a (≥1,000 lb. only); Special calibration 30a, 30b (Model 75 only); Signature calibration 53e

Premium Options: 1i; 2n or 2N intrinsically safe amp see page AP-6; 2q; 3a; 6e; 6f; 6g; 6h; 6i; 6j; Int. amps 2a (Model 73), 2b (Model 75),

Accessories: Mating connectors and connector/cable assemblies; Pull plates; Load buttons

		Model 73 (Compression only) Order Code BL113	Model 75 (Tension/Compression) Order code BL114
PERFORMANCE	Load Ranges	50 to 200,000 lb.	50 to 200,000 lb.
	Non-Linearity (max)	±0.1% F.S.	±0.1% F.S.
	Hysteresis (max)	±0.1% F.S.	±0.1% F.S.
	Non-repeatability(max)	±0.03% F.S.	±0.03% F.S.
	Output (standard)	2mV/V	2mV/V
	Resolution	Infinite	Infinite
	Life cycle	1 billion	1 billion
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	0.002% F.S./° F	0.002% F.S./° F
	- Span (max)	0.002% Rdg./° F	0.002% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded Foil	Bonded foil
	Excitation (calibration)	10VDC	10VDC
	Bridge Resistance	350 ohms	350 ohms
	Wiring Code (std)	#2 (See Pg. AP-8)	#2 (See Pg. AP-8)
	Electrical Termination (std)		
	50 to 2,000 lbs	PTIH-10-6P or equiv. (Hermetic stainless)	PTIH-10-6P or equiv. (Hermetic stainless)
	3,000 to 200,000 lbs	MS3102E-14S-6P or equiv.	MS3102E-14S-6P or equiv.
	Mating Connector (not incl.)		
	50 to 2,000 lbs	PT06A-10-6S or equiv.	PT06A-10-6S or equiv.
	3,000 to 200,000 lbs	MS3106A-14S-6S or equiv.	MS3106A-14S-6S or equiv.
MECHANICAL	Static Overload Capacity	200% of capacity	200% of capacity
	Thread Size	N/A	See table
	Material		
	50 thru 100,000 lb.	Stainless Steel	Stainless Steel
	125,00 thru 200,00 lbs	Stainless Steel	Carbon Steel
	Deflection—Full Scale		
	10-1000lbs	0.0022"	0.0035"
	≥1000 lbs	0.0022"	0.0035"
INTERNALLY AMPLIFIED UNITS* (Optional)	Outputs Available	±5VDC, 4-20mA	0-5VDC, 4-20mA

NOTES: *Standard calibration for tension/compression load cells is in tension only. Internal amplifiers are available for all ranges. Internal amplification for ranges <3,000 lb. ("H" dimension <1.80") may increase height.

ALLOWABLE EXTRANEOUS FORCE WITHOUT DAMAGE

(% of load capacity)

Ranges	Side Load (lb)	Bending (in-lb)	Torque (in-lb)	Total Extraneous Force
50; 100; 250; 500 lb.	75%	60%	35%	100%
1,000; 2,000 lb;	45%	35%	35%	100%
3,000; 4,000; 5,000; 7,500 10,000; 15,000; 20,000 lb.	30%	30%	25%	100%
30,000; 50,000; 75,000 100,000; 150,000; 200,000 lb.	30%	30%	15%	100%

General Information

How to order (See Pg. AP-19)
Load cell selection flow chart (See Pg. LO-1)

High Output Load Cells

Model AL-JP

LOW MECHANICAL DEFLECTION

SMALL SIZE

TENSION/COMPRESSION

HIGH OUTPUT/LOW BRIDGE RESISTANCE

DRIVE METERS WITHOUT AMPLIFICATON

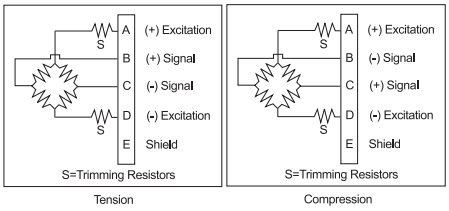
Model AL-JP
Order Code TL121

PERFORMANCE	
Ranges	500; 1,000; 2,000 lb. (225 kg; 450 kg; 905 kg)
Accuracy	±0.15% Full Scale (SEB*)
Non-Repeatability	±0.05% Full Scale
Output	30 mV/V Minimum
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	-65°F to 200°F (-54°C to 93°C)
Temperature, Compensated	30°F to 130°F (-1°C to 54°C)
Temperature effect over compensated range:	
Zero	0.5% Full Scale
Sensitivity	0.5% Reading
ELECTRICAL	
Excitation	5 VDC or VAC (RMS)
Insulation Resistance	5000 Megaohms@50V
Bridge Resistance	125 ohms Nominal (Input and output)
Electrical Termination	3106B-14S-5P Connector mounted at end of 10'cable
MECHANICAL	
Overload without damage	150% Full Scale
Side load without damage	100% of rated load

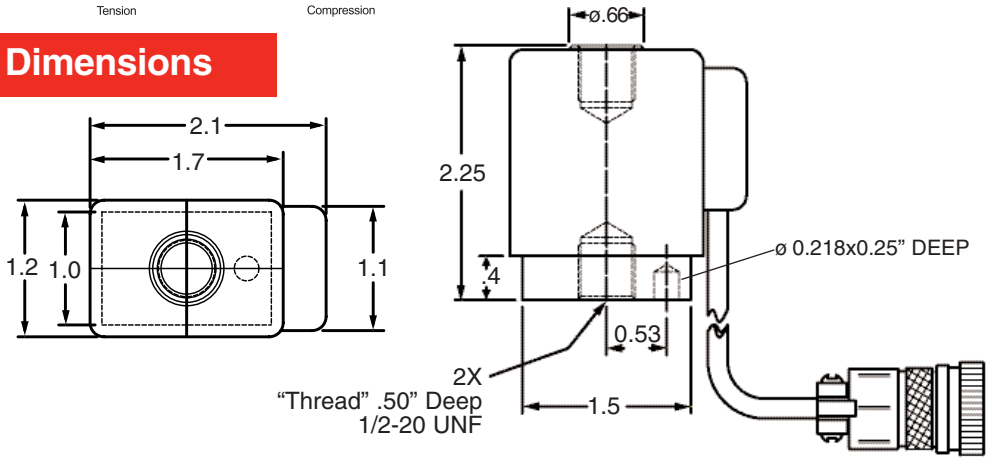
DEFLECTIONS AND RINGING FREQUENCIES

Capacity	Axial Deflection at F.S. (in)	Axial Deflection at F.S. (mm)	Natural Frequency (Hz)
500 lb.	0.0010	0.025	5000
1000 lb.	0.0015	0.038	6000
2000 lb.	0.0020	0.51	6700

WIRING CODE



Dimensions



* Static error band is the guaranteed performance specification. The static error band is calculated as the best fit straight line through zero, including the effects of non-linearity, hysteresis and non-repeatability.

High Output Load Cells

Model AL-SC

HIGH OUTPUT VOLTAGE

500 TO 2000 LB.

TENSION/COMPRESSION

SMALL SIZE

LOW MECHANICAL DEFLECTION

PERFORMANCE

	Model AL-SC Order Code TL131
Ranges	500; 1,000; 2,000 lb. (225 kg; 450 kg; 905 kg)
Accuracy	±1.25% Full Scale (SEB*)
Non-Repeatability	±0.10% Full Scale
Output	70 mV/V Minimum
Resolution	Infinite

ENVIRONMENTAL

Temperature, Operating	-65°F to 200°F (-54°C to 93°C)
Temperature, Compensated	10°F to 120°F (-12°C to 49°C)
Temperature effect over compensated range:	
Zero	±0.5% Full Scale
Sensitivity	±1.0% Reading

ELECTRICAL

Excitation	24 VDC or VAC (RMS)
Insulation Resistance	5000 Megaohms@50V
Bridge Resistance	1000 ohms Nominal (input)
	3000 ohms Nominal (output)
Electrical Termination	MS3100A-14S-5P at end of 1' cable

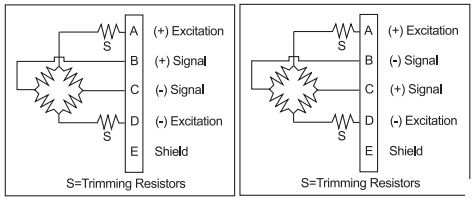
MECHANICAL

Overload without damage	200% F.S.
Side load without damage	25% of rated load

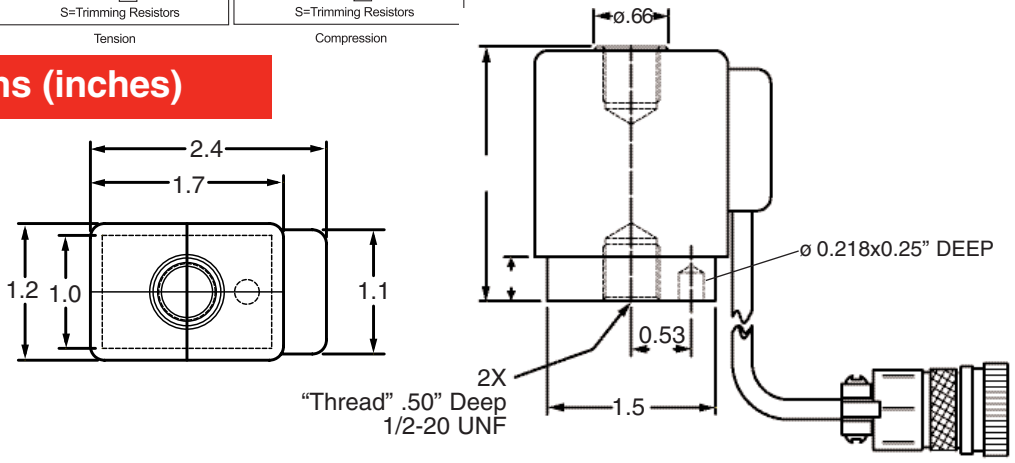
DEFLECTIONS AND RINGING FREQUENCIES

Capacity	Axial Deflection at F.S. (In)	Axial Deflection at F.S. (mm)	Ringing Frequency (Hz)
500 lb.	0.0010	0.025	5000
1000 lb.	0.0015	0.038	6000
2000 lb.	0.0020	0.051	6700

WIRING CODE



Dimensions (inches)



* Static error band is the guaranteed performance specification. The static error band is calculated as the best fit straight line through zero, including the effects of non-linearity, hysteresis and non-repeatability.

Ultra Precision, Fatigue Rated Universal Load Cells

Models 45 and 47

LONG FATIGUE LIFE

STAINLESS STEEL

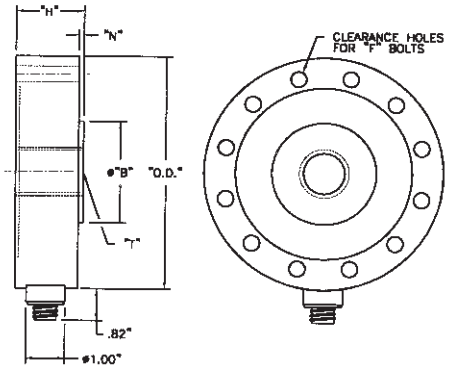
ACCURACY UP TO 0.02%

250 TO 100,000 lb.

Model 45 and 47 Ultra Precision Fatigue Rated Load Cell offers a low profile design for both tension and compression applications. The all welded stainless steel construction and stabilizing diaphragms provide the same ruggedness which has made our Model 41 and 43 pancake type load cells so successful. The Model 45 and 47 are available in ranges 250 lb. thru 100,000 lb. and mounting dimensions are universally interchangeable within the industry. Options include hi-level outputs of 4-20 mA or 0-5 VDC as well as weatherproof or submersible cable configurations.

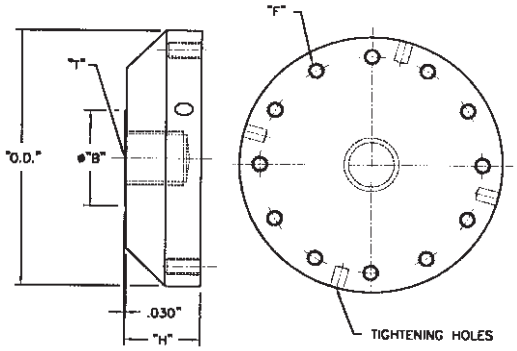
LOAD CELL

Model 45 (Order Code AL116)
Model 47 (Order Code AL117)



PULL PLATE

Model 45 Optional
Model 47 Installed



Dimensions

Model 45 Fatigue Rated (Order Code AL116)
Model 47 Ultra Precision Fatigue Rated (Order Code AL117)

Range	O.D."	H"	T	B"	N"	F
250; 500; 1,000; 2,500; 5,000 lb.	4.12	1.37	5/8-18 UNF-3B	1.34	0.12	9/32 Dia., 8 Holes Eq. Sp., 3.50 B.C.
12,500-25,000 lb.	6.06	1.75	1-1/4-12 UNF-3B	2.65	0.12	13/32 Dia., 12 Holes Eq. Sp., 5.125 B.C.
50,000 lb.	8.00	2.50	1-3/4-12 UNF-3B	3.76	0.25	17/32 Dia., 16 Holes Eq. Sp., 6.50 B.C.
100,000 lb.	11.00	3.50	2-3/4-8 UNF-3B	4.81	0.50	11/16 Dia., 16 Holes Eq. Sp., 9.00 B.C.

Pull Plate for Model 45

Range	Order Code	O.D."	H"	T	B"	F
250; 500; 1,000; 2,500; 5,000 lb.	AA229	4.12	1.12	5/8-18 UNF-3B	1.25	1/4-28, 8 Holes Eq. Sp., 3.50 B.C.
12,500-25,000 lb.	AA230	6.06	1.75	1-1/4-12 UNF-3B	2.25	3/8-24, 12 Holes Eq. Sp., 5.125 B.C.
50,000 lb.	AA231	8.00	2.00	1-3/4-12 UNF-3B	3.00	1/2-20, 16 Holes Eq. Sp., 6.50 B.C.
100,000 lb.	AA232	11.00	3.00	2-3/4-8 UNF-3B	4.50	5/8-18, 16 Holes Eq. Sp., 9.00 B.C.

1-888-282-9891
Honeywell Sensotec Sensors
www.honeywell.com/sensing

Fatigue Rated (Fatigue Rated Ultra-Precision)

		Model 45 (Model 47)**				
PERFORMANCE	Range	250*; 500; 1,000 lb.	2,500; 5,000 lb.	12,500; 25,000 lb.	50,000 lb.	100,000 lb.
	Output, standard (mV/V)	2.0	2.0	2.0	2.0	2.0
	Static error band, (+/-%F.S.)[1]	0.04 (0.02)	0.05 (0.03)	0.05 (0.04)	0.05 (0.04)	0.06 (0.05)
	Nonlinearity, (+/-%F.S.)[2]	0.04 (0.02)	0.05 (0.03)	0.05 (0.04)	0.05 (0.04)	0.05 (0.05)
	Hysteresis, (+/-%F.S.)[2]	0.03 (0.02)	0.05 (0.04)	0.05 (0.05)	0.05 (0.05)	0.05 (0.05)
	Non-Repeatability, (+/-%F.S.)[2]	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
	Fatigue Life Cycle	10^8 fully reversed				
ENVIRONMENTAL	Temperature, Operating	-65°F to 200°F				
	Temperature, Compensated	30°F to 130°F				
	Temperature Effect					
	– Zero (max) %F.S./°F	0.0008				
	– Span (max) %Rdg./°F	0.0008				
ELECTRICAL	Excitation, calibrated (VDC)	10				
	Excitation, maximum (VDC)	20				
	Bridge Resistance, nominal	350				
	Insulation Resistance m	5000 @ 50 VDC				
	Wiring Code, standard	#39, see appendix				
	Electrical Termination	PC02A-10-6P				
	Mating Harness	AA163				
MECHANICAL	Deflection @ full scale load (in.)	0.0015	0.001	0.002	0.002	0.0025
	Static Overload Capacity, (+/-%F.S.)***	300	300	300	300	300
	Ringing Frequency (kHz)	2.4, 2.4, 3.4	6.8, 9.1	5.7, 7.0	6.3	4.5
	Weight, Element (lb)	3.1	3.2	8.8	22	55
	Base (optional on model 45)	AA229	AA229	AA230	AA231	AA232
	Weight, base (lb)	3.5	3.5	11	20	61
	Load Button (optional)	AA290	AA290	AA291	AA292	AA293

* 250 lb range has 700 Ohm bridge resistance
** Data for model 47 shown in parenthesis, otherwise same for both models
*** Off-axis loading maximum allowable 50% of F.S.

[1] Static error band is the guaranteed performance specification. The static error band is calculated as the best fit straight line through zero, including the effects of non-linearity, hysteresis and non-repeatability.
[2] Values noted are typical values but fall within the static error band.

General Information (See Appendix)

How to order (See Pg. AP-19)

Load cell selection flow chart (See Pg. LO-1)

Model 45 (Fatigue Rated) is standard without a pull plate. On Ultra Precision Model 47, the load cell and pull plate are calibrated as a unit. Internal amplifiers are available for all ranges. Internal amplification for ranges <12,500 lb. (“H” dimension <1.80") may increase height. Using an in-line amplifier for ranges <12,500 lb. will avoid this height increase.

Options: A.S.T.M. E74 calibration; Overload stops, compression only, engage at approximately 125% of cell capacity—requires pull plate. Internal amplifiers; 2c; 2j; 2k; 2t. Note: Some specs may vary with amplifier options, consult Sensotec for details.

Premium Options: Signature calibration 53e (Model 45 only); 2n or 2N intrinsically safe amp see page AP-6

Connector: PT02E-12-8P; PTIH-10-6P

Accessories: Mating connectors and connector/cable assemblies; Load Buttons (See Appendix).

AVAILABLE with Signature Calibration
SEE PG. IN-5

Ultra Precision Universal Canister Load Cells

Model UG

0.03% NON-LINEARITY

100-200,000 lb.

STAINLESS STEEL

ALL-WELDED DESIGN

Model UG Ultra Precision Universal load cell achieves scale quality and performance standards. The Model UG achieves ±0.03% non-linearity with very little deflection (typically .0045"). It utilizes a four arm strain gage bridge which is bonded and tested for high precision and dependability. Female threads on both ends facilitate mounting in any position for tension, compression, or universal force measurements. Model UG load cells can be used in both static and dynamic applications. Stainless steel construction ensures high reliability. Typical applications include wind tunnels; rocket engine tests; hopper, tank, or bin weighing; and weighing scales.

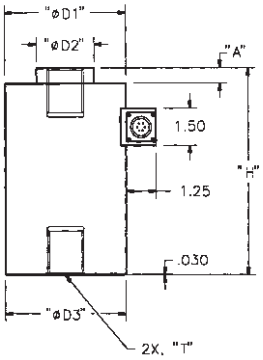
	Model UG Order Code BL122
PERFORMANCE	
Load Ranges	100 to 200,000 lb.
Non-Linearity (max)	±0.03% F.S.*
Hysteresis (max)	±0.03% F.S.
Non-Repeatability (max)	±0.02% F.S.
Output	3mV/V
Resolution	Infinite
Creep (max)	0.02% (20 min.)
ENVIRONMENTAL	
Temperature, Operating	-30° F to 185° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
- Zero (max)	0.0015% F.S./° F
- Span (max)	0.0008% Rdg./° F
ELECTRICAL	
Strain Gage Type	Bonded foil
Excitation (calibration)	10VDC
Bridge Resistance	350 ohms
Wiring Code (std)	#2 (See Pg. AP-8)
Electrical Termination (std)	
100-200,000 lbs	MS3102E-14S-6P
Mating Connector (not incl.)	MS3106A-14S-6S
MECHANICAL	
Static Overload Capacity	50% over capacity
Casing Material	Stainless steel
Deflection—Full Scale	0.0045"

Notes Standard calibration for tension/compression load cells is in tension only.
* 0.05% at ranges ≤250 lb., and ≥75,000 lb.

Dimensions (inches)

Model UG
(Order Code BL122)

Available Ranges	H"	D1" Dia.	D2" Dia.	D3" Dia.	A"	T Typ.
100; 250; 500 lb.	2.75	2.00	0.63	1.9	0.09	3/8-24 UNF x 7/16
1,000; 2,000; 3,000; 4,000 lb.	4.13	2.50	0.75	2.0	0.09	1/2-20 UNF x 5/8
5,000; 7,500; 10,000 lb.	5.88	3.50	1.56	3.0	0.19	1-14 UN x 1-1/8
15,000; 20,000; 30,000 lb.	8.50	5.00	2.38	4.3	0.63	1-1/2-12 UNF x 2
50,000; 75,000 lb.	12.00	6.00	3.63	5.5	0.69	2-12 UN x 2-1/2
100,000; 150,000 lb.	17.00	8.00	6.00	6.8	0.69	3-8 UN x 4-1/2
200,000 lb.	21.00	9.00	7.50	8.1	0.75	4-8 UN x 5-1/2



Options (See Appendix)

Temperature compensated 1b, 1c; Electrical termination 6e, 6f, 6g, 6j; Int. Shunt cal 8a
Special calibration 30a, 30b; Signature calibration 53e

Premium Options: 9a, 9b

Accessories: Mating connectors and connector/cable assemblies; Load buttons

AVAILABLE with Signature Calibration
SEE PG. IN-5

Ultra Precision Compression Canister Load Cell

Model WG

0.03% LINEARITY & HYSTERESIS

10,000-500,000 lb.

ALL-WELDED DESIGN

STAINLESS STEEL

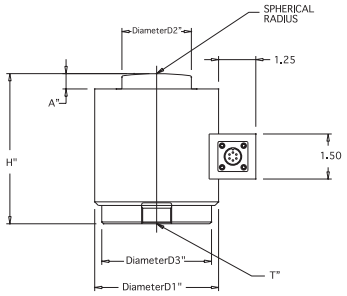
PERFORMANCE	Load Ranges	10,000 to 500,000 lb.
	Linearity	0.03%*
	Hysteresis	0.03%*
	Non-Repeatability (max)	±0.01% F.S.
	Output	2mV/V
	Resolution	Infinite
	Creep (max)	0.03% (20 min.)
ENVIRONMENTAL	Temperature, Operating	-30° to 185° F
	Temperature, Compensated	60° to 160° F
	Temperature Effect	
	– Zero (max)	0.0015% F.S./° F
	– Span (max)	0.0008% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded Foil
	Excitation (calibration)	10VDC
	Bridge Resistance	350 ohms
	Wiring Code (std)	#2 (See Pg. AP-6)
	Electrical Termination (std)	MS3102E-14S-6P
	Mating Connector (not incl.)	MS3106A-14S-6S
MECHANICAL	Static Overload Capacity	50% over capacity
	Casing Material	Stainless steel
	Deflection—Full Scale	0.0031"

Note * 0.05% at ranges ≥75,000 lb.

Dimensions

Model WG (Order Code BL125)

Ranges	D1"	D2"	D3"	H"	T"	A"
10,000; 15,000; 25,000; 50,000 lb.	2.88 (7.32 cm)	1.25 (3.18 cm)	2.12 (5.38 cm)	3.25 (8.26 cm)	1/2-20 UNF-2B	0.40 (1.02 cm)
100,000 lb.	4.12 (10.46 cm)	2.31 (5.87 cm)	3.66 (9.30 cm)	5.00 (12.70 cm)	3/4-16 UNF-2B	0.51 (1.30 cm)
200,000; 300,000 lb.	6.00 (15.24 cm)	3.13 (7.95 cm)	5.31 (13.49 cm)	7.25 (18.42 cm)	3/4-16 UNF-2B	0.88 (2.64 cm)
500,000 lb.	6.50 (16.51 cm)	3.69 (9.37 cm)	5.81(14.76 cm)	9.00 (22.86 cm)	3/4-16 UNF-2B	0.56 (1.42 cm)



Options (See Appendix)

Temperature compensated 1b, 1c; Electrical termination 6a, 6e, 6f, 6g, 6h, 6i, 6j; Int. shunt cal 8a; Signature calibration 53e

Premium Options: 9a, 9b

Accessories: Mating connectors and connector/cable assemblies

AVAILABLE with Signature Calibration
SEE PG. IN-5

Precision, Universal, High Off-Axis Canister Load Cells

Model TG

0.10% MAX NON-LINEARITY

50,000 TO 500,00 LB.

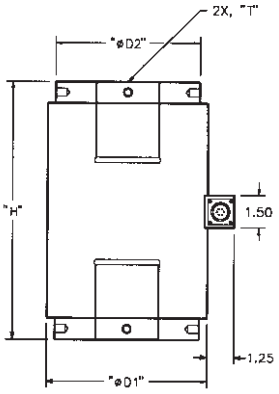
Model TG High Precision Universal strain gage force transducer is specifically designed to resist and reject side loads and bending moments encountered during most high capacity applications. The Model TG achieves ±0.1% non-linearity with very little deflection measuring load ranges from 50,000 to 500,000 lb. Its design highlights extended fatigue life and excellent stability under harsh conditions. Up to four strain gage bridges can be installed in the Model TG Load Cell for multiple monitoring, controlling, switching, and/or spare replacement bridges.

	Model TG Order Code BL124
PERFORMANCE	
Load Ranges	50K to 500K
Non-Linearity (max)	±0.1% F.S.
Hysteresis (max)	±0.05% F.S.
Non-Repeatability (max)	±0.03% F.S.
Output	2mV/V
Resolution	Infinite
Creep (max) (20 min)	0.03% F.S.
ENVIRONMENTAL	
Temperature, Operating	-65° F to 200° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
- Zero (max)	0.2% F.S./100°F
- Span (max)	0.2% Rdg./100°F
ELECTRICAL	
Strain Gage Type	Bonded foil
Excitation	10VDC
Insulation Resistance	5K meg. min.
Bridge Resistance	350 ohms
Wiring Code (std)	#2 (See Pg. AP-8)
Electrical Termination (std)	MS3102E-14S-6P
Mating Connector (non incl).	MS3106A-14S-6S
MECHANICAL	
Static Overload Capacity	150% capacity
Deflection—Full Scale	0.0045" Nom.
Material	Stainless Steel

Dimensions

Model TG (Order Code BL124)

Available Ranges	H"	D1" Dia.	D2" Dia.	B"	T Typ.
50,000; 100,000; 150,000 lb.	9.00	5.50	4.75	0.63	2-12 UN-2B
300,000 lb.	12.00	7.50	6.75	1.00	3-8 UN-2B
500,000 lb.	16.00	10.00	9.25	1.50	5-8 UN-2B



Options (See Appendix)

Temperature compensated 1b, 1c; Electrical termination 6a, 6e, 6f, 6g, 6h, 6i, 6j; Int. shunt cal 8a; Signature calibration 53e

Premium Options: 9a, 9b

Accessories: Mating connectors and connector/cable assemblies

High Capacity Compact Compression Load Cell

Model MPB

STAINLESS STEEL

MV/V OUTPUT

1 TO 1000 TONNES RANGE

0.25% ACCURACY

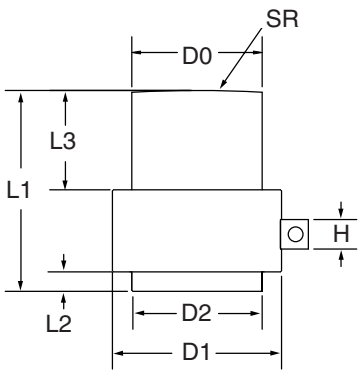
Model MPB
Order Code BL515

PERFORMANCE		
	Accuracy	0.25% BFSL *1
	Non-Repeatability	0.02% Full scale
	Output	2 mV/V (Nominal)
ENVIRONMENTAL		
	Temperature, Operating	-55°C to 120°C
	Temperature, Compensated	20°C to 70°C
	Temperature Effect	
	Zero	0.01% Full scale/°C
	Span	0.01% Reading/°C
ELECTRICAL		
	Strain Gage Type	Foil
	Excitation	10 VDC
	Insulation Resistance	5000 Megaohms@50V
	Bridge Resistance	350 ohms (Nominal)
	Shunt Calibration Data	Included
	Electrical Termination	Connector, except 1, 2.5, 5 tonne-cable
MECHANICAL		
	Construction	Column with welded diaphragm
	Material	All welded stainless steel
	Fatigue Life	1 Million cycles
	Max. Load without Damage	150% of full scale

For standard configuration with spherical radius, a hardened surface is recommended to maintain the best loading conditions. RC42 is recommended minimum hardness. Bearing lubricant at loading interface recommended for maximum life.

Options (See Appendix)

Temperature Compensation	1d.	1h	Shunt Calibration	8a.	
	1e.	1i.	Special Calibration	9a.	
	1f.	1j.		9b.	
	1g.	1k.		9c.	
		1m.	Bridge Type	11a.	
Electrical Termination	6b.			11c.	
	6c.		Bridge Resistance	12b.	
	6d.		Electrical Connector Orientation	15d.	
	6f.				
	6g.		Special Calibration	30a.	
	6h.			30b.	
	6i.			30c.	
	6j.		Shock & Vibration	44a.	
	6q.		Interfaces	53e.	
	6v.			53t.	
	15d.				



Wiring Codes

Cable Exit – 1-25 tonnes
Cable/Unamplified

Red	(+)	Excitation
Black	(–)	Excitation
Green	(–)	Output
White	(+)	Output

Connector Exit – 50-1,000 tonnes
Connector/Unamplified

Red	(+)	Excitation
Black	(–)	Excitation
Green	(–)	Output
White	(+)	Output

Dimensions

Capacity: tons (US)	D0 (mm)	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H	Thread Lifting Eye	Bottom Thread
1	6.5	22	9.5	19	.5	1.5	9.5	N/A	M4 X 4 Deep
2.5	6.5	22	9.5	19	.5	1.5	9.5	N/A	M4 X 4 Deep
5	10.5	25	13.5	22.5	1.0	1.5	9.5	N/A	M4 X 4 Deep
10	19	38	19	28.5	1.5	4.0	9.5	N/A	M6 X 6 Deep
25	30	50	30	45	3	7.5	19	N/A	M6 X 6 Deep
50	43	88	43	64	4	8	38.1	N/A	M10 X 10 Deep
100	60	100	60	90	5.5	22.5	38.1	N/A	M10 X 10 Deep
250	95	138	95	142	11	65	38.1	M6	M20 X 20 Deep
500	134	190	134	200	16	117	38.1	M8	M20 X 20 Deep
1000	185	240	185	285	39	175	38.1	M10	M24 X 24 Deep

Precision Miniature Load Cells

Model 31 and 34

WELDED STAINLESS

RUGGED, SMALL SIZE

TENSION/COMPRESSION

Model 31
(Tension/Compression)

Model 34
(Tension/Compression)

Models 31 and 34, Precision Miniature load cells measure both tension and compression load forces of 50 grams to 10,000 lb. These models are our highest accuracy, rugged miniature load cells. Model 31's welded, stainless steel construction is designed to eliminate or reduce to a minimum, the effects of off-axis loads. (The internal construction assures excellent long term stability for ranges 1000 grams and above.) A modification permits this model to be completely welded for underwater applications. The Model 31 tension/compression load cell has male threads while the Model 34 tension/compression load cell has female threaded load attachments. High accuracies of 0.15-0.25% full scale are achieved. Each bonded strain gage unit is built of welded 17-4 PH stainless steel for additional ruggedness. All load cells that have ranges 10 lb. have a small electrical zero balance circuit board which is in the lead wire (approximately 1"x .087" thick). This balance board does not have to be the same temperature as the transducer. Applications include cable tension and electromechanical parts testing.

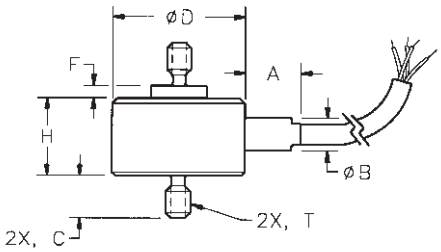
Dimensions (inches)

Model 31 (Order Code AL311)

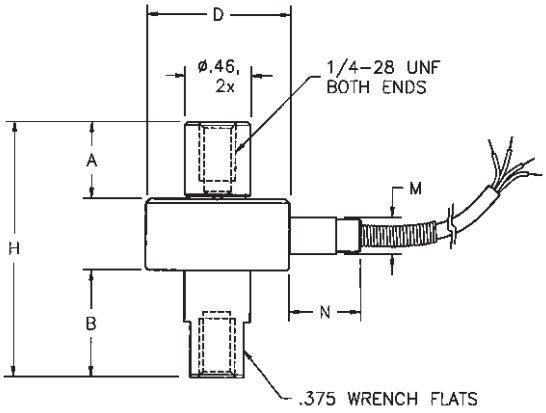
Available Ranges*	T Thread	D"	H"	C"	F"	A"	B"
50; 150; **250** 500; g.	#6-32 UNC	1.00	0.75	0.25	0.11	0.50	0.38
1,000 g.; **5**; **10** lb.	#6-32 UNC	0.75	0.45	0.25	0.05	0.31	0.19
25; 50; 100 lb.	#10-32 UNF	1.00	0.52	0.25	0.03	0.50	0.25
250; 500; 1,000 lb.	1/4-28 UNF	1.00	0.52	0.38	0.03	0.50	0.25
2,000; 3,000 lb.	3/8-24 UNF	1.00	0.72	0.50	0.03	0.50	0.38
4,000; 5,000 lb.	1/2-20 UNF	1.25	0.94	0.63	0.03	0.50	0.38
7,500; 10,000 lb.	3/4-16 UNF	1.38	1.10	0.88	0.03	0.50	0.38

* Stocked ranges are in bold face print.

Notes: Model 31 load cells ≤250 grams have overload stops. For custom cells without overload stops consult SENSOTEC.



Model 31 Male Threads
(Tension/Compression)



Model 34 Female Threads
(Tension/Compression)

Model 34 (Order Code AL312)

Available Ranges	D"	H"	A"	B"	M"	N"
50; 150; 250; 500 g.	1.00	1.75	0.52	0.52	0.38	0.50
1,000 g.; 5; 10 lb.	0.75	1.75	0.60	0.72	0.19	0.31
25; 50; 100 lb.	1.00	1.75	0.52	0.72	0.25	0.50
250; 500; 1,000 lb.	1.00	2.00	0.75	0.75	0.25	0.50

Options (See Appendix)

Temperature compensated 1b, 1c, 1f; Special calibration 30a, 30b

Premium Options: 1d, 1e, 1g, 1h (</=25 lb), 1i; 6d; 9a (</=5 lb.)

Accessories: Rod end attachments for Model 31

		Model 31 (Male Threads) (Tension/Compression) Order Code AL311	Model 34 (Female Threads) (Tension/Compression) Order Code AL312
PERFORMANCE	Load Ranges	50 g to 10,000 lb.	50 g to 1,000 lb.
	Non-Linearity/Hysteresis (max)		
	50 to 1,000 g	±0.15% F.S.	±0.15% F.S.
	5 to 250 lb.	±0.15% F.S.	±0.15% F.S.
	500 to 10,000 lb.	±0.2% F.S.	±0.2% F.S.
	Non-Repeatability (max)		
	50 to 1,000 g	±0.1% F.S.	±0.1% F.S.
	5 to 10,000 lb.	±0.05% F.S.	±0.05% F.S.
	Output (standard)		
	50 to 150 g (semi)	0.1mV/V/g max	0.1mV/V/g
	250 to 500 g (semi)	20mV/V	20mV/V
	1,000 g	1.5mV/V (nominal)	1.5mV/V (nom)
	5 lb. to 10,000 lb. (foil)	2mV/V	2mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect – Zero/Span (max)		
	50 to 500 g	0.015% F.S./° F	0.015% F.S./° F
	1,000 g	0.005% F.S./° F	0.005% F.S./° F
	5 to 10,000 lb.	0.005% F.S./° F	0.005% F.S./° F
ELECTRICAL	Strain Gage Type	Foil or Semiconductor	Foil or Semiconductor
	Excitation (Calibration)		
	50 g to 10 lb.	5.00VDC	5.00VDC
	20 lb. to 10,000 lb.	10.0VDC	10.0VDC
	Insulation Resistance	5000 megohm @ 50VDC	5000 megohm @ 50VDC
	Bridge Resistance		
	50 to 500 g	500 ohms (semi)	500 ohms (semi)
	1,000 gms	350 ohms (foil)	350 ohms (foil)
	5 to 10,000 lb.	350 ohms (foil)	350 ohms (foil)
	Shunt Calibration Data	Included	Included
	Wiring Code (std)	#1 (See Pg. AP-8)	#1 (See Pg. AP-8)
	Electrical Termination (std)	Teflon cable (5 ft.)	Teflon cable (5 ft.)
MECHANICAL	Overload, Safe	50% over capacity	50% over capacity
	Thread Size	See table	See table
	Deflection – Full Scale	0.0005"-0.0020"	0.0005"-0.0020"
	Casing material	17-4 PH Stainless	17-4 PH Stainless
	Weight (nom)	1.6 oz.	2.5 oz.
IN-LINE AMPLIFIERS (Optional)	Outputs Available	±5VDC, 4-20mA	±5VDC, 4-20mA

NOTES *Standard calibration for tension/compression load cells is in tension only.

General Information

How to order (See Pg. AP-19)
Load cell selection flow chart (See Pg. LO-1)
Installation Note: Maximum torque for installation of Model 31 in ranges less than 25 lb. is 12 lb.-in.

Subminiature Load Cells

Model 13

150 g to 1,000 lb.

STAINLESS STEEL

Model 13 Compression Only

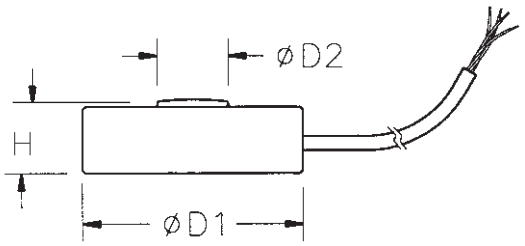
Model 13 (compression only) Subminiature Load Cell is designed to measure load ranges from 150 g to 1000 lb. With subminiature dimensions, including diameters from 0.38" to 0.75" and heights of 0.13" to 0.25", these units are easily incorporated into systems having limited space. Model 13 combines high frequency and low deflection to achieve a combined non-linearity and hysteresis of 0.25%-0.5% full scale. A small circuit board is included in the load cell's lead wire cable for temperature compensation, and should not be removed.

Dimensions

Model 13 (Order Code AL322)

Available Ranges*	**D1"**	**D2"**	**H"**
150; 250; 500 g;	0.38	0.09	0.13
1,000 g; 5; **10; 25; 50** lb.	0.38	0.09	0.13
100; 250 lb.	0.50	0.12	0.15
500; 1,000 lb.	0.75	0.25	0.25

*Stocked ranges are in bold faced print.



PERFORMANCE

Load Ranges	150 g to 1000 lb.
Non-Linearity/Hysteresis (max)	±0.5% F.S.
Non-Repeatability (max)	±0.1% F.S.
Output (standard)	
150 g to 500 g	15mV/V nom.
1,000 g	1.5mV/V nom.
5 lb. to 1,000 lb.	2mV/V nom.
Resolution	Infinite
Zero Balance (norm.)	±0.3% F.S.

ENVIRONMENTAL

Temperature, Operating	-65° F to 250° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
– Zero (max)	0.01% F.S./° F
– Span (max)	0.02% Rdg./° F

ELECTRICAL

Strain Gage Type	
150 g to 500 g	Semiconductor
1,000 g to 1,000 lb	Foil
Excitation (calibration)	5VDC
50 g to 1000 lb.	5000 megohm @ 50VDC
Insulation Resistance	
Bridge Resistance	500 ohms (semi)
50 g to 500 g	350 ohms (foil)
1000 g to 1000 lb.	Included
Shunt Calibration Data	#1 (See Appendix)
Wiring Code (std)	5' integral cable with balance board*
Electrical Termination (std)	

MECHANICAL

	150g	250g	500g	1000g	5lb	10lb	25lb	50lb	100lb	250lb	500lb	1000lb
Deflection @ F.S. ($x10^{-3}$ in)	0.06	0.06	0.08	0.05	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.6
Static Overload Capacity (% F.S.)	500	500	500	150	150	150	150	150	150	150	150	150
Ringing Frequency (kHz)	26	31	39	26	34	46	69	88	71	86	57	61
Weight (g)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	3.1	3.2	10	10

NOTES *A small 2" long circuit board is included in the cable, 2 ft. from the load cell. Do not remove this board.

Options (See Appendix)

Temperature compensated 1b, 1c

Premium Options: 1e (≥1,000 g only), 1f (≥1,000 g only)

1-888-282-9891
Honeywell Sensotec Sensors
www.honeywell.com/sensing

Subminiature Load Cells

Model 11

150 g to 1,000 lb.

STAINLESS STEEL

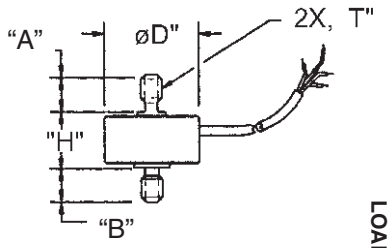
Model 11 Tension/Compression

Model 11 (tension/compression) Subminiature Load Cell is designed to measure load ranges from 150 g to 1000 lb. With subminiature dimensions, including diameters from .50" to 0.75" and height of 0.38", these units are easily incorporated into systems having limited space. The model achieves a combined non-linearity and hysteresis of 0.5% full scale and a frequency response of up to 58 kHz. A small circuit board is included in the load cell's lead wire cable for zero balance, and should not be removed.

Model 11 (Order Code BL321)

Available Ranges	øD"	T	H"	A"	B"	Q *
150; 250; 500; 1000 g	0.50	#4-40UNC	0.29	0.19	0.18	4
5; 10; 25; 50; 100 lb.	0.50	#4-40UNC	0.29	0.19	0.18	4
250; 500; 1,000 lb.	0.75	1/4-28UNF	0.38	0.31	0.31	20

*** "Q" = maximum tightening torque allowed inch-lb.**



PERFORMANCE

Load Ranges	150 g to 1000 lb.
Non-Linearity (max)	±0.5% F.S.
Hysteresis (max)	±0.5% F.S.
Non-Repeatability (max)	±0.1% F.S.
Output (standard)	
150 g to 500 g	10mV/V nom.
1,000 g to 1,000 lb.	2mV/V nom.
Resolution	Infinite
Zero Balance (nom.)	± 3% F.S.

ENVIRONMENTAL

Temperature, Operating	-65° F to 250° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
– Zero (max)	0.01% F.S./° F
– Span (max)	0.02% Rdg./° F

ELECTRICAL

Strain Gage Type	
150 g to 500 g	Semiconductor
1,000 g to 10,000 lb.	Foil
Excitation (calibration)	5VDC
Insulation Resistance	5000 megohm @ 50VDC
Bridge Resistance	
150 g to 500 g	500 ohms (semi)
1,000 g to 1,000 lb.	350 ohms (foil)
Wiring Code (std)	#1 (See Appendix)
Electrical Termination (std)	5' integral cable with balance board*

MECHANICAL

	150g	250g	500g	1000g	5lb	10lb	25lb	50lb	100lb	250lb	500lb	1000lb
Deflection @ F.S. ($x10^{-3}$ in)	0.05	0.04	0.03	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.7	1.0
Static Overload Capacity (% F.S.)	500	500	500	150	150	150	150	150	150	150	150	150
Ringing Frequency (kHz)	10	14	22	8	11	17	24	34	48	25	33	40
Weight (g)	5	5	5	5	5	5	5	5	5	19	19	19

NOTE: Standard calibration for tension/compression load cells is in tension only.
* A small 2" long circuit board is included in the cable, 2 ft. from the load cell. Do not remove this board.

Options (See Appendix)

Temperature compensated 1b, 1c

Premium Options: 1e (≥1,000 g only), 1f (≥1,000 g only)

Subminiature Load Cells

Model LFH-7I (Top Hat)

250-10,000 lb.

STAINLESS STEEL

Model LFH-7I
Compression Only

Model LFH-7I Subminiature Load Cell is a low profile force transducer for applications with minimal space and high capacity requirements. This transducer utilizes foil strain gages to measure compression loads of up to 10,000 lb. and achieves non-linearity and hysteresis of +/- 0.7% full scale. The top of the load cell is the area where the force is applied and the base ring of the load cell must be placed on a hard, machine-ground flat surface to obtain optimum accuracy.

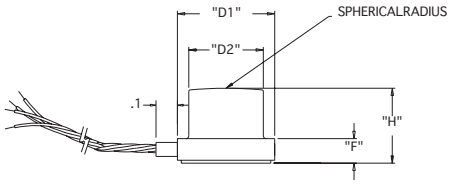
SPECIFICATIONS

	Model LFH-7I (Compression Only) Order Code BL351
Load Ranges	250 to 10,000 lb.
Overall Accuracy	±0.7% F.S.
Output	1.5mV/V-2.5mV/V
Temperature, Operating	-65° F to 250° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
– Zero (max)	0.01% F.S./° F
– Span (max)	0.01% Rdg./° F
Excitation (calibrated)	5VDC
Bridge Resistance	350 ohms
Wiring Code (std)	#1 (See Pg. AP-8)
Electrical	
Termination (std)	Cable (5 ft.)
Overload, Safe	50% over capacity
Deflection—Full Scale	0.001"-0.003"

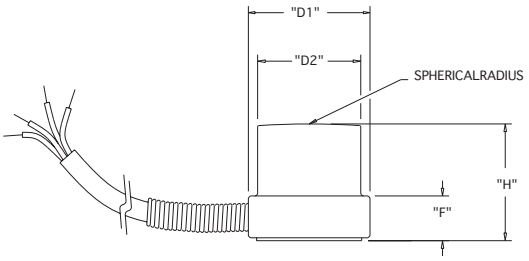
Dimensions

Top Hat Model LFH-7I (Order Code BL351)

Available Ranges	D1" Dia.	D2" Dia.	H"	F"
250 lb.	0.50 (1.27 cm)	0.22 (.69 cm)	0.38 (0.97 cm)	0.13 (0.33 cm)
500 lb.	0.50 (1.27 cm)	0.28 (.71 cm)	0.38 (0.97 cm)	0.13 (0.33 cm)
1,000 lb.	0.50 (1.27 cm)	0.31 (.79 cm)	0.38 (0.97 cm)	0.13 (0.33 cm)
2,000 lb.	0.50 (1.27 cm)	0.41 (1.04 cm)	0.38 (0.97 cm)	0.13 (0.33 cm)
3,000 lb.	0.50 (1.27 cm)	0.45 (1.14 cm)	0.38 (0.97 cm)	0.13 (0.33 cm)
4,000 lb.	0.63 (1.60 cm)	0.49 (1.24 cm)	0.60 (1.52 cm)	0.23 (0.58 cm)
5,000 lb.	0.63 (1.60 cm)	0.53 (1.35 cm)	0.60 (1.52 cm)	0.23 (0.58 cm)
7,500 lb.	0.88 (2.24 cm)	0.63 (1.60 cm)	0.63 (1.60 cm)	0.54 (1.37 cm)
10,000 lb.	0.88 (2.24 cm)	0.63 (1.60 cm)	0.63 (1.60 cm)	0.54 (1.37 cm)



250 to 3,000 lb.



4,000 to 5,000 lb.

Options (See Appendix)

Temperature compensated 1b, 1f

* Bridge resistance is 700 ohms on ranges > 5,000 lb.

Notes

AVAILABLE with Signature Calibration
SEE PG. IN-5

Rod End In-Line Tension Load Cells

Models RM, RH and RF

2000 TO 200,000 LB.

HERMETICALLY SEALED

0-5VDC OR 4-20mA OPTION

Model RM

Model RH

Model RF

Model RM, RH and RF Rod End In-Line load cells are designed with a unique sensing element. This unique design results in rejection of off center loads. In addition, side load resistance has been enhanced in the 2,000 lb. to 50,000 lb. range. Each unit is constructed of 17-4 PH stainless steel and is hermetically sealed for use in corrosive and very high humidity environments.

		Model RM, Model RH, Model RF
PERFORMANCE	Load Ranges	2,000 to 200,000 lb.
	Non-repeatability (max)	±0.05% F.S.
	Output (std)	2mv/v
	Resolution	Infinite
	Linearity & Hysteresis	
	100-1,000 lb.	±0.2% F.S.
	2,000-50,000 lb.	±0.15% F.S.
	75,000-200,000 lb.	±0.2% F.S.
ENVIRONMENTAL	Temperature, Operating	-65°F to 250°F
	Temperature, Compensated	60°F to 160°
	Temperature Effect	
	-Zero (max)	0.005% F.S./°F
	-Span (max)	0.005% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	10VDC
	Excitation (acceptable)	Up to 15VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC
	Bridge Resistance	350 ohms
	Shunt Calibration Data	Included
	Wiring Code (std)	#2 (See Pg. AP-7)
	Electrical Termination (std)	
	2,000 to 50,000 lb.	PTIH-10-6P or equiv. (Hermetic stainless)
	75,000 to 200,000 lb.	MS3102E-14S-6P
	Mating Connector (not incl.)	
	2,000 to 50,000 lb.	PT06A-10-6S or equiv.
	7,5,000 to 200,000 lb.	MS3106A-14S-6S or equiv.
MECHANICAL	Static Overload Capacity	50% over capacity
	Thread Size	See dimension table
	Deflection - Full Scale	
	100 to 5,000 lb.	0.003"
	7,500 to 200,000 lb.	0.004"
	Casing Material	Stainless Steel
INTERNALLY AMPLIFIED UNITS (Optional)	Outputs Avaialble	0-5VDC, 4-20ma

Options (See Appendix)

Temp. compensation 1b, 1c, 1d, 1e, 1f; Electrical terminations 6e, 6f, 6g, 6i, 6j; Int. shunt cal 8a (See pg. AP-18) Signature calibration 53e

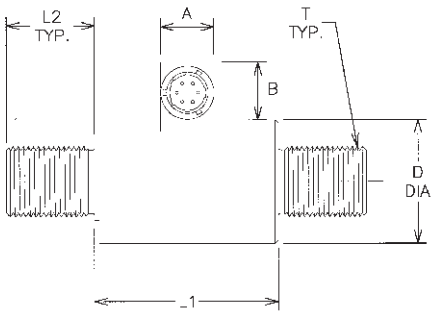
Consult factory for A & B dimensional changes when ordering non-standard electrical termination.

Premium Options: 1i; 2b; 3a; 3d; 9a; 9b; 12b (See Pg. AP-18)

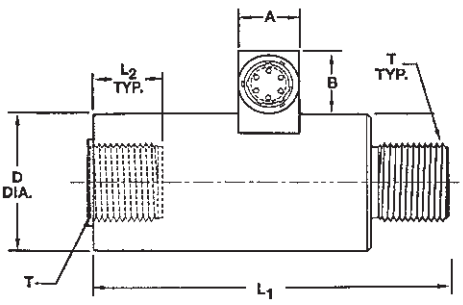
Accessories: Mating connectors and connector/cable assemblies; Rod end attachments for RM (See Pg. AP-2)

Dimensions

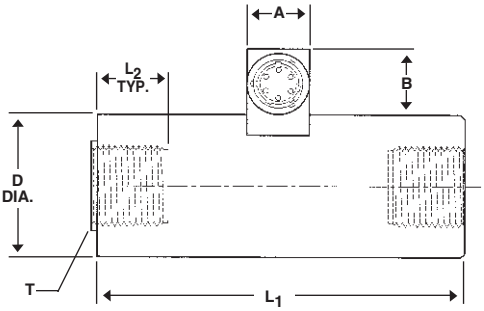
Model RM



Model RH



Model RF



Model RM Male/Male — Frame Size Matrix

Order Code	D" Dia.	L1"	A"	B"	L2"
AL413	1.50	2.60	0.75	0.82	See bottom row of order code chart.
AL415	1.75	2.60	0.75	0.82	
AL417	2.50	3.05	0.75	0.82	

Model RH Male/Female, Model RF Female/Female — Frame Size Matrix

Order Code	Order Code	D" Dia.	L1"	A"	B"	L2"
AL419	AL414	1.50	4.25	0.75	0.82	See bottom row of order code chart.
AL420	AL416	1.75	5.00	0.75	0.82	
AL424	AL418	2.50	7.00	0.75	0.82	

1. ORDER CODE SELECTION CHART: Locate the **load range** and **thread** required for your application on the chart below. The correct **ORDER CODE** is indicated where the load range and thread type intersect. **Note the option code indicated for your thread size. Highlighted order codes indicate preferred range/thread configurations.**

EXAMPLE: AL415

Standard Ranges
Model RM - Male/Male

Range	Thread Sizes & Option Codes 13a 1/2-20	13b 3/4-16	13c 7/8-14	13d 1-14	13e 1-1/2-12
2,000 lb.	AL413	AL413	AL413		
3,000 lb.	AL413	AL413	AL413		
4,000 lb.	AL413	AL413	AL413		
5,000 lb.	AL413	AL413	AL413		
7,500 lb.		AL415	AL415	AL415	AL417
10,000 lb.		AL415	AL415	AL415	AL417
15,000 lb.		AL415	AL415	AL415	AL417
20,000 lb.			AL415	AL415	AL417
30,000 lb.					AL417
50,000 lb.					AL417
L2 Length	0.95"	0.95"	0.95"	1.25"	1.5"

Non-standard Ranges
Model RM, Order Code AL411

Load Ranges	Thread Type	D"	L1"	L2"
75,000 lb. or 100,000 lb.	2-1/2-12 UN	3.50	4.00	3.00
150,000 lb. or 200,000 lb.	3-1/2-8 UNF	4.50	5.00	4.00

2. INDICATE LOAD RANGE: From the table below, choose the order code for your LOAD RANGE.

EXAMPLE: AL415 EJ

Load Range	Order Code	Load Range	Order Code	Load Range	Order Code
2,000	DL	10,000	DV	75,000	ER
3,000	DN	15,000	EJ	100,000	ET
4,000	DP	20,000	EL	150,000	FJ
5,000	DR	30,000	E	200,000	FL
7,500	DT	50,000	EP		

3. INDICATE THREAD SIZE: The option code for your THREAD SIZE is shown on the order code selection chart.

EXAMPLE: AL415 EJ, 13d

Standard Ranges
Model RH - Male/Female
Model RF - Female/Female

Range		Thread Sizes & Option Codes 13a 1/2-20	13b 3/4-16	13c 7/8-14	13d 1-14	13e 1-1/2-12
2,000 lb.	RH	AL419	AL419			
	RF	AL414	AL414			
3,000 lb.	RH	AL419	AL419			
	RF	AL414	AL414			
4,000 lb.	RH	AL419	AL419			
	RF	AL414	AL414			
5,000 lb.	RH	AL419	AL414			
	RF	AL414	AL414			
7,500 lb.	RH		AL420	AL420	AL420	AL424
	RF		AL416	AL416	AL416	AL418
10,000 lb.	RH		AL420	AL420	AL420	AL424
	RF		AL416	AL416	AL416	AL418
15,000 lb.	RH		AL420	AL420	AL420	AL424
	RF		AL416	AL416	AL416	AL418
20,000 lb.	RH			AL420	AL420	AL424
	RF			AL416	AL416	AL418
30,000 lb.	RH					AL424
	RF					AL418
50,000 lb.	RH					AL424
	RF					AL418
L2 Length		0.75"	0.95"	0.95"	1.0"	1.5"

Non-standard Ranges
Model RH, Order Code AL425
Model RF, Order Code AL412

Load Ranges	Thread Type	D"	L1"	L2"
75,000 lb. or 100,000 lb.	2-1/2-12 UN	4.50	14.00	3.50
150,000 lb. or 200,000 lb.	3-1/2-8 UNF	5.50	18.00	4.50

AVAILABLE with Signature Calibration
SEE PG. IN-5

Rod End In-Line Compression-Tension Load Cells

Models RGM, RGH and RGF

COMPRESSION-TENSION

2000 TO 50,000 lb.

HERMETICALLY SEALED

0-5VDC OR 4-20MA OPTION

Model RGM
(Order Code AL426)

Model RGH
(Order Code AL427)

Model RGF
(Order Code AL428)

The Model RGM, RGH, and RGF In-Line load cells are high quality, hermetic, rugged load cells capable of withstanding significant off-axis loads, making them an ideal choice for in-line compression measurement or tension measurement where side loading cannot be completely controlled. The flexible mounting options make applications easier to implement, and the all stainless steel, hermetic construction is well suited to corrosive and very high humidity environments.

PERFORMANCE	Load Ranges	2,000 to 50,000 lb.
	Non-repeatability (max)	±0.05% F.S.
	Output (std)	1mV/V (nom.)
	Resolution	Infinite
	Linearity & Hysteresis	0.25% F.S.
ENVIRONMENTAL	Temperature, Operating	-65°F to 250°F
	Temperature, Compensated	60°F to 160°
	Temperature Effect	
	-Zero (max)	0.005% F.S./°F
	-Span (max)	0.005% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	10VDC
	Excitation (acceptable)	Up to 15VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC
	Bridge Resistance	700 ohms
	Shunt Calibration Data	Included
	Wiring Code (std)	#2 (See Pg. AP-8)
	Electrical Termination (std)	PTIH-10-6P or equiv. (Hermetic stainless)
MECHANICAL	Static Overload Capacity	50% over capacity
	Deflection - Full Scale	0.003”
	Casing Material	Stainless Steel
INTERNALLY AMPLIFIED UNITS (Optional)	Outputs Available	0-5VDC, 4-20mA

Options (See Appendix)

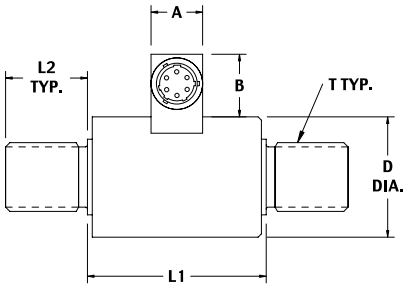
Temp. compensation 1b, 1c, 1d, 1e, 1f; Electrical terminations 6e, 6f, 6g, 6i, 6j; Int. shunt cal 8a Signature calibration 53e

Premium Options: 1i; 2b, 2c 2j, 2k; 3a, 3b, 3d; 9a, 9b; 12b

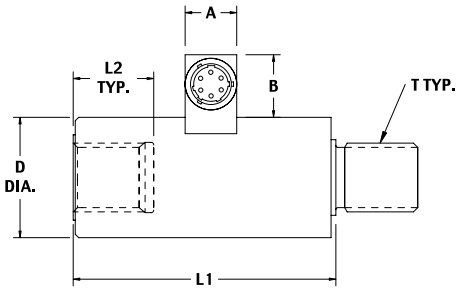
Accessories: Mating connectors and connector/cable assemblies; Rod end attachments for RGM

Dimensions

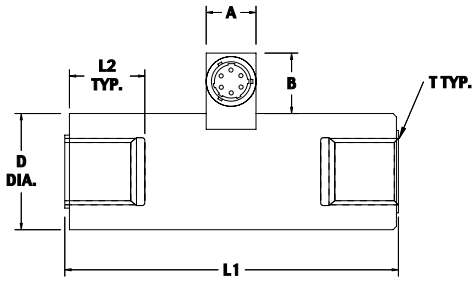
Model RGM
(Order Code AL426)



Model RGH
(Order Code AL427)



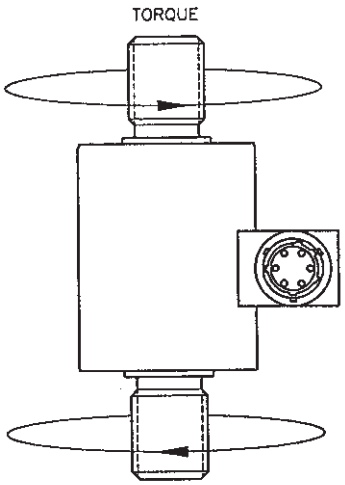
Model RGF
(Order Code AL428)

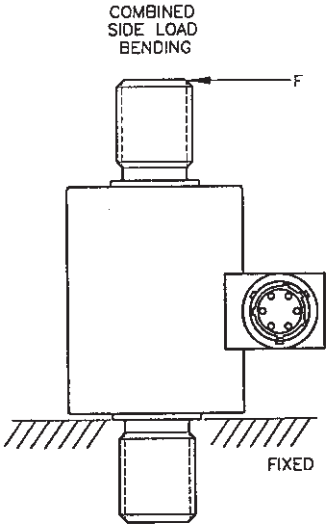


Available Ranges	D”	T”	L2”	RGM L1”	RGH L1”	RGF L1”	A”*	B”*
2000, 3000, 5000 lbs	1.75	3/4–16 UNF	0.95	2.63	2.63	3.56	0.75	0.82
10,000; 15,000 lbs	2.50	1 1/2–12 UNF	1.75	3.50	4.50	6.12	0.75	0.82
25,000; 50,000 lbs	3.50	2–12 UNF	2.25	3.50	5.75	8.00	0.75	0.82

Extraneous Loads

Allowable Extraneous Loads (% of Load Capacity)	Side Load Bending Lbs	Torque Inch Lbs
All Capacities	20%	20%





Precision Tension Load Cells

Models 81 and 82

0.03% NON-LINEARITY

5 TO 20,000 lb.

COMPACT SIZE

HERMETICALLY SEALED OPTION

Models 81 and 82 load cells combine both a compact form and high precision to offer a superior tension force transducer. The one-piece S-shaped design achieves a maximum non-linearity of 0.03% full scale for load ranges from 5 to 10,000 lb. Additional features include minimal temperature effects on zero and span of 0.001% and 0.0008% per degree F respectively. Models 81 and 82 load cells are well suited for steelyard rod conversions. Additional applications include converting mechanical weigh bridges and platform scales into electronic scales.

	Model 81 (Tension Only) Order Code BL433	Model 82 (Tension Only) Order Code BL434
PERFORMANCE		
Load Ranges	5 to 250 lb.	100 to 10,000 lb.
Non-Linearity (max)	±0.05% F.S.	±0.03% F.S.
Hysteresis	±0.03% F.S.	±0.02% F.S.
Non-Repeatability (max)	±0.02% F.S.	±0.01% F.S.
Output	3mV/V*	2mV/V
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	0° F to 130° F	0° F to 130° F
Temperature, Compensated	30° F to 130° F	30° F to 130° F
Temperature Effect		
– Zero (max)	0.001% F.S./° F	0.001% F.S./° F
– Span (max)	0.0008% Rdg./° F	0.0008% Rdg./° F
ELECTRICAL		
Strain Gage Type	Foil	Foil
Excitation (calibration)	10VDC	10VDC
Bridge Resistance	350 ohms	350 ohms
Wiring Code (std)	#1 (See Pg. AP-8)	#1 (See Pg. AP-8)
Electrical Termination (std)	Cable (5 ft.)	Cable (5 ft.)
MECHANICAL		
Static Overload Capacity	50% over capacity	50% over capacity
Material		
5 to 250 lb.	Aluminum	Aluminum
500 to 20,000 lb.	N.A.	Stainless Steel

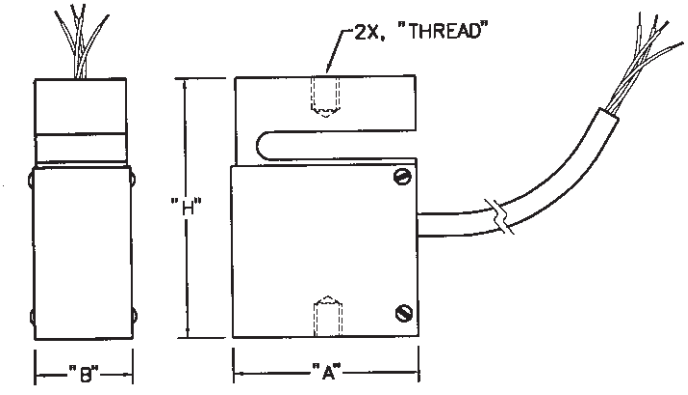
Dimensions

Model 81 (Order Code BL433)

Available Ranges	H"	A"	B"	Thread
5; 10; 25; 50; 100 lb.	2.38	1.7	0.9	1/4-28 UNF
250 lb.	2.75	1.7	0.9	3/8-24 UNF

Model 82 (Order Code BL434)

Available Ranges	H"	A"	B"	Thread
100; 250 lb.	3.00	2.00	1.00	1/4-28 UNF
500; 1000; 2000; 3000 lb.	3.00	2.19	0.94	1/2-20 UNF
5000 lb.	3.75	2.25	1.00	3/4-16 UNF
10,000 lb.	6.00	5.00	2.00	1 1/4-12 UNF



* 5lb. output is 2mV/V.

Donut Shaped Load Cell

Model TH

THRU-HOLE DESIGN

15,000-200,000 lb.

LINEARITY TO 0.25%

Model TH (Compression Only)

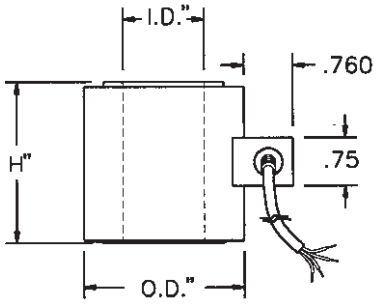
Model TH Donut Shaped Load Cell features a smooth thru-hole design for use in applications which require the load structure to pass through the cell. Such applications include bolt force measurement, post or leg mount, and rolling mill systems. Load ranges as low as 15,000 pounds and as great as 200,000 pounds can be measured within a maximum full scale non-linearity of ±0.25% F.S. This model is used in compression applications. For optimum performance, this load cell must be mounted between load surfaces which are flat and parallel. The Model TH Donut Shaped Load Cell is designed to provide the customer with an internal hole diameter which is large relative to the outside diameter. The Model TH is a small size, high capacity load cell.

	Model TH (Compression Only) Order Code BL911
PERFORMANCE	
Load Ranges	15,000 to 200,000 lb.
Non-linearity (max)	±0.25% F.S.
Hysteresis (max)	±0.25% F.S.
Non-repeatability (max)	±0.1% F.S.
Output	2mV/V
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	-65° F to 250° F
Temperature, Compensated	60° F to 160° F
Temperature Effect	
- Zero (max)	0.005% F.S./° F
- Span (max)	0.005% Rdg./° F
ELECTRICAL	
Strain Gage Type	Bonded Foil
Excitation (calibration)	10VDC
Bridge Resistance	350 ohms
Wiring Code (std)	#1 (See Pg. AP-8)
Electrical Termination (std)	Teflon cable (5ft.)
MECHANICAL	
Static Overload Capacity	50% over capacity
Casing Material	Stainless steel
Deflection—Full Scale	0.0025"

Dimensions (inches)

Model TH (Order Code BL911)

Available Ranges	0.D"	H"	I.D."
15,000; 20,000 lb.	1.50	1.50	0.76
30,000; 50,000 lb.	2.00	2.00	1.01
75,000; 100,000 lb.	2.50	2.50	1.26
150,000 lb.	3.00	3.00	1.51
200,000 lb.	3.50	3.50	1.76



Options (See Appendix)

Temperature compensated 1b, 1c, 1f; Electrical termination 6j; Special calibration 9a, 9b

Premium Options: 1g, 1h; 12b

Low Cost Load Cell

Model 53

±0.25% NON-LINEARITY

5 TO 50,000 lb.

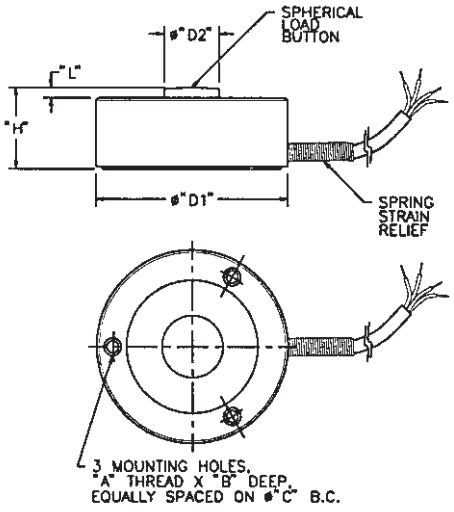
STAINLESS STEEL

Model 53 load cells are bonded foil strain gage transducers designed for low cost production and testing applications (i.e. press calibration). Engineered compression force measurements up to 50,000 lb., this model achieves a maximum non-linearity of 0.25% full scale. Precision gaging techniques and a stainless steel construction provides excellent long-term stability and reliability under severe operating conditions. The Model 53 compression-only load cell has an integral load button machined as part of the load cell. The Model 53 must be mounted on a smooth flat surface for proper operation. Three tapped holes are provided for mounting.

Dimensions

(Order Code) AL131)

Ranges	**D1"**	**D2"**	**H"**	**L"**	**A"**	**B"**	**C"**
5, 10, 25, 50, 100 lb.	1.00	0.21	0.62	0.05	#4-40 UNC	.22	0.75
250, **500**, **1000**, **2000** lb.	1.25	0.32	0.39	0.07	#6-32-UNC	.25	1.00
3000, 4000, **5000**, 7500, **10,000** lb.	1.50	0.40	0.63	0.08	#6-32 UNC	.25	1.25
15,000, **20,000**, 30,000 lb.	2.00	0.60	1.00	0.12	#6-32 UNC	.25	1.625
50,000 lb.	3.00	0.78	1.50	0.18	#6-32 UNC	.25	2.375



Options (See Appendix)

Temperature compensated 1b; 1c; 1e

Premium Options: 1g; 1h; 1i; 6d; 6i (H" dimension will increase); 12b

Model 53
(Compression Only)
Order Code AL131)

PERFORMANCE	Load Ranges	5 to 50,000 lb.
	Non-Linearity (max)	±0.25% F.S.
	Hysteresis (max)	±0.3% F.S.
	Non-Repeatability (max)	±0.1% F.S.
	Output (standard)	2mV/V
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F
	Temperature Effect	
	– Zero (max)	0.005% F.S./° F
	– Span (max)	0.01% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil
	Excitation (calibration)	10VDC
	Excitation (acceptable)	Up to 10VDC or AC
	Insulation Resistance	5000 megohm @ 50VDC
	Bridge Resistance	350 ohms
	Shunt Calibration Data	Included
	Wiring Code (std.)	#1 (See Pg. AP-8)
	Electrical Termination (std)	Teflon cable (5 ft.)
MECHANICAL	Overload, Safe	50% over capacity
	Deflection – Full Scale	0.001" – 0.003"
	Casing Material	17-4 PH Stainless
IN-LINE AMPLIFIERS (Optional)	Outputs Available	0-5VDC, 4-20mA

General Information

How to order (See Pg. AP-19)
Load cell selection flow chart (See Pg. LO-1)

Donut Shaped Load Cells

Model D

THRU-HOLE DESIGN

150 g - 30,000 lb.

FLEXIBLE DESIGN

Model D (Compression Only)

The Model D Donut Shaped Load Cell features a smooth thru-hole design perfect for applications which require the load structure to pass directly through the cell. Such applications include bolt force measurements, clamping forces, and monitoring overloads. Load ranges as low as 150 grams and as great as 30,000 pounds can be measured within a maximum full scale non-linearity and hysteresis of ±0.5% F.S. These models are used in compression applications and are available in multiple hole sizes. For optimum performance, these cells must be mounted between load surfaces which are flat and parallel. The Model D miniature load cell is designed to have a minimum thickness.

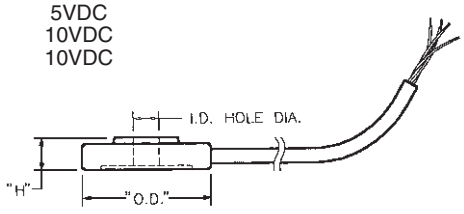
		Model D (Compression Only)
PERFORMANCE	Load Ranges	150 g to 30,000 lb.
	Non-linearity and Hysteresis (max)	±0.5% F.S.
	Non-repeatability (max)	±0.1% F.S.
	Output	20mV/V (gram units) 2mV/V (5 lb. and above)
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F
	Temperature Effect	
	- Zero (max)	0.005% F.S./° F (5 lb. and above); 0.01%/° F (gram units)
	- Span (max)	0.010% Rdg./° F (5 lb. and above); 0.02%/° F (gram units)
ELECTRICAL	Strain Gage Type	Semi conductor (gram units) Bonded foil (5 lb. and above)
	Excitation (calibration)	Semi conductor 5V Bonded foil 10V
	Bridge Resistance	500 ohms (gram units) 350 ohms (5 lb. and above)
	Wiring Code (std)	#1 (See Pg. AP-8)
	Electrical Termination (std)	Teflon cable (5 ft.)
MECHANICAL	Overload, Safe	50% over capacity
	Casing Material	Stainless Steel

Dimensions

Model D (Order Code BL912)

Selection Guide—150 g to 100 lb. units

Available Ranges	O.D."	I.D."	H"	Excitation
150; 250; 500; 1000 g	0.50	0.10	0.15	5VDC
5; 10 lb.	1.00	0.20	0.28	10VDC
25; 50; 100 lb.	1.00	0.20	0.28	10VDC



Options (See Appendix)

Temperature compensated 1b, 1c, 1f; Special calibration 9a, 9b

Premium Options: 1g (≥5 lb. only); 12b

Selection Instructions for Larger Capacity Units—30,000 lb.

Shown below are three separate outline drawings for the Model D Load Cell. The frame size selection guide below indicates that with a single shell size (outside diameter), different "donut holes" are available. For example, in the small frame size (A) it is possible to select a 250 lb. load cell with a nominal hole size of 1/8" (P), 3/16" (Q), 1/4" (R), or 3/8" (S) diameter. We manufacture the actual hole dimensions to provide some clearance; for example the 1/8" (P) diameter dimension, the actual dimension is 0.128".

HOW TO ORDER: SPECIAL ORDER INSTRUCTIONS

1. Specify the **order code** (See frame size A, B or C)
2. State the **load range** required in pounds and range code.
3. State the nominal **hole diameter** letter.

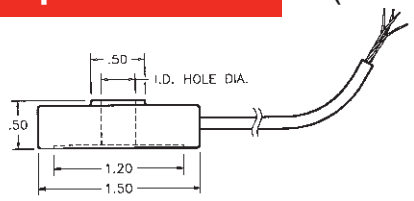
e.g. Model D: BL914CN R (1/4 inch) [250 lb.]

Frame Size Selection Guide

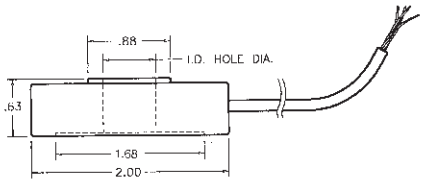
Hole Letters	P	Q	R	S	T	V	W	Y	Z
Nominal Hole Dia.	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"	1 -1/4"
Actual Hole Dia.	0.128"	0.193"	0.266"	0.391"	0.532"	0.656"	0.781"	1.032"	1.281"
100 lb.	A	A	A	A					
250 lb	A or B	A or B	A or B	A or B	B	B			
500 lb.	A or B	A or B	A or B	A or B	B	B			
1,000 lb.	A or B	A or B	A or B	B	B	B			
2,000 lb.	A, B or C	A, B or C	A, B or C	B or C	B or C	B or C	C	C	C
3,000 lb.	B or C	B or C	B or C	B or C	B or C	C	C	C	C
5,000 lb.	B or C	B or C	B or C	B or C	B or C	C	C	C	C
7,500 lb.	B or C	B or C	B or C	B or C	B or C	C	C	C	C
10,000 lb.	B or C	B or C	B or C	B or C	B or C	C	C	C	C
15,000 lb.	C	C	C	C	C	C	C	C	C
20,000 lb.	C	C	C	C	C	C	C	C	C
30,000 lb.	C	C	C	C	C	C	C	C	C

Options

(Dimensions in inches)

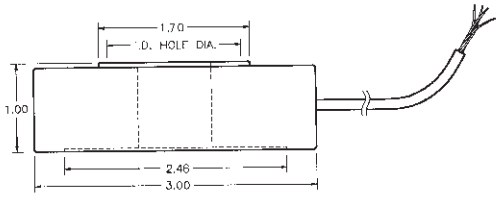


FRAME SIZE A
ORDER CODE BL913



FRAME SIZE B
ORDER CODE BL914

***Choose Hole Dia. from Selection Guide above.**



FRAME SIZE C
ORDER CODE BL915

Minigram Beam Load Cells

Models MBL and MBH

25 g TO 10 lb.

MINIATURE SIZE

Model MBL/Model MBH

Models MBL and MBH Minigram Beam Load Cells are engineered to measure very low bending forces and still achieve an impressive 0.1% full scale non-linearity and hysteresis. Built-in overload stops are incorporated to provide additional reliability. Miniature dimensions allow easy unit integration into existing systems. Model MBL uses semiconductor gages and is available for load ranges from 25 to 1000 grams. Model MBH uses foil gages and is available for load ranges from 150 grams to 10 pounds.

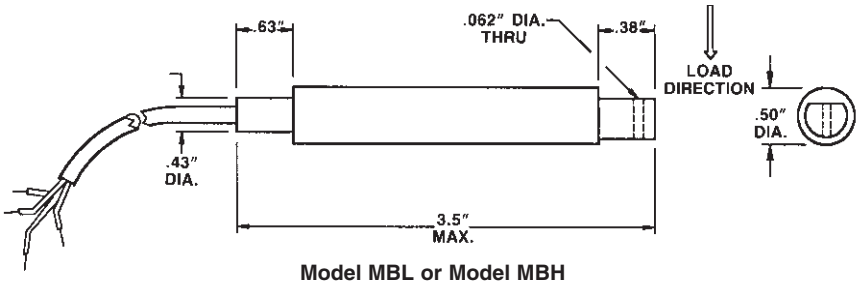
		Model MBL Order Code BL341	Model MBH Order Code BL342
PERFORMANCE	Load Ranges	25 g to 1000 g	150 g to 10 lb
	Non-Linearity and Hysteresis (max)	±0.1% F.S.	±0.1% F.S.
	Non-Repeatability (max)	±0.03% F.S.	±0.03% F.S.
	Output	20mV/V	2mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	0° F to 200° F	0° F to 200° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	0.015% F.S./° F	0.005% F.S./° F
	- Span (max)	0.02% Rdg./° F	0.005% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded semiconductor	Bonded foil
	Excitation	5VDC	5VDC
	Bridge Resistance	500 ohms	350 ohms
	Wiring Code (std)	#1 (See Pg. AP-8)	#1 (See Pg. AP-8)
	Electrical Termination (std)	Cable (5 ft.)	Cable (5 ft.)
MECHANICAL	Overload, Safe	400% over capacity	400% over capacity or 20 lb., whichever is less

Dimensions

Available Ranges

Model MBL (Order Code BL341)
25; 50; 100; 150; 250; 500; 1000 g

Model MBH (Order Code BL342)
150; 250; 500; 1000 g; 5; 10 lb.



Model MBL or Model MBH

Options (See Appendix)

Temperature compensation 1b; 1c; 1f.

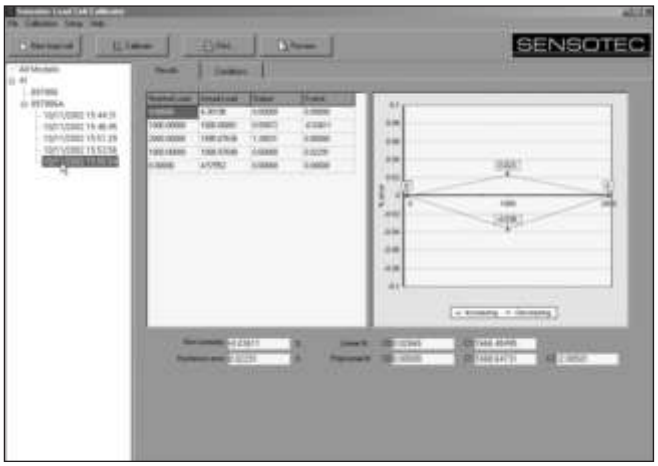
Premium Options: 1i; 6d; 9a

LOAD CELL CALIBRATION SOFTWARE

WINDOWS BASED

DESIGNED FOR USE WITH SC2000 SIGNAL CONDITIONING

AUTOMATES LOAD CELL CALIBRATION PROCESS



The SensoCal Software facilitates on-site calibration of load cells, maintains records for auditing purposes and reports results in several file formats. Calibration of load cell units under test (UUT) can bebased upon a reference load cell or other standard. The Software guides the operator through the calibration process, automatically acquiring data values when possible.

The Software accepts two inputs: the output of the UUT and the actual applied load as read from a reference load cell. These inputs are normally gathered by Sensotec's calibration-class signal-conditioning instrument which is connected to the operator's PC. The instrument acquires data values from the UUT and reference load cell as mV/V readings. Upon completion of the calibration, the Software calculates and reports on the performance of the UUT. Archiving and retrieval functions are included so that information on previously calibrated load cells can be reviewed.

The Software offers four modes of operation depending on your system's configuration:

Automatic Operation Mode

Both inputs to the Software are mV/V electrical values automatically captured by the instrument when prompted by the operator. The operator receives color-coded feedback from the Software as the actual load read by the reference load cell approaches the target load value. This is the most accurate and repeatable method of calibration because the Software is able to curve fit the reference load cell while filtering the outputs of both load cells.

Display Operation Mode

The Display Operation Mode is useful when the UUT is already connected to your existing instrument/ display. The reference load values are read from Honeywell Sensotec's instrument and the UUT load values are key entered by the operator. The benefits of curve fitting and filtering of the reference cell data are maintained as with the Automatic Mode. However, the accuracy of the UUT load values are dependent upon the operator and method used to obtain the load values.

Deadweight Operation Mode

The reference load values are key entered by the operator and the UUT load values are read by the Honeywell Sensotec instrument in mV/V. This mode is useful when you already have calibrated reference load standards that you wish to use for your reference load values. Note that no curve fitting or filtering is applied to the reference load values because these values are key entered by the operator.

Key-Entry Operation Mode

In the Key-Entry Mode, both reference load values and UUT load values are key entered by the test operator. This mode is primarily for tracking purposes only since the Software performs no correction necessary for calibration.

Specific features of the SensoCal Software include:

- Storage of multiple reference-cell curve-fitting data for precise determination of applied load
- Acquires input from Honeywell Sensotec calibration-class signal-conditioning instrument for reference cell and load cell UUT
- Optional key-entry data input for Deadweight or Display Mode
- Graphical and tabular display of results
- Polynomial curve-fitting of data from load cell UUT
- User input of data for environmental and traceability requirements
- Configurable number of symmetrical load data points
- Configurable increasing only or increasing/decreasing load data points
- Color-coded visual feedback of target load and actual load applied
- Storage and retrieval of historical data of UUTs
- Printed calibration reports in HTML format
- Detailed results available in spreadsheet (CSV) text-file format

Visit our web site for the latest information including an instructional video and sample reports.

Imperial Class Tension & Compression Load Cells

Models IC48

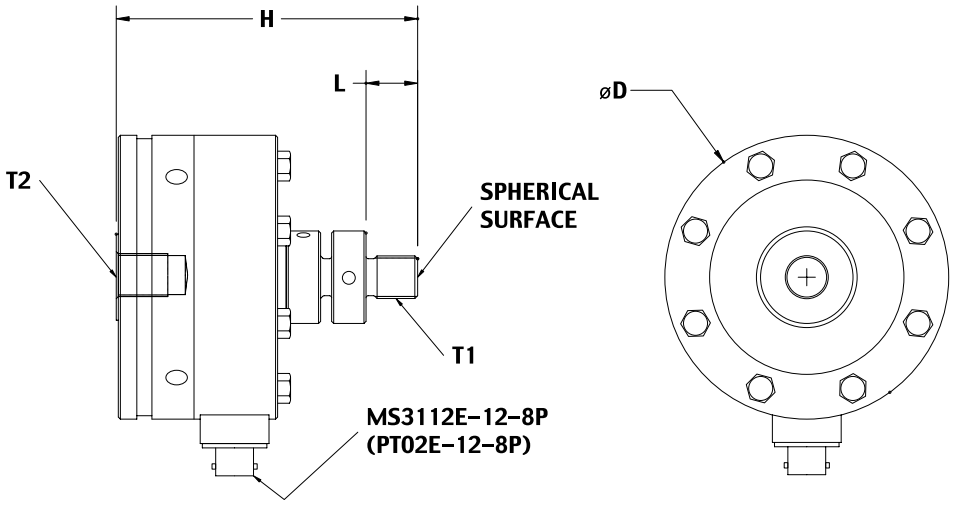
ULTRA PRECISION 0.02%

DESIGNED AS CALIBRATION REFERENCE STANDARDS

ULTRA HIGH STABILITY

OPTIONAL ASTM E74 CALIBRATION

Sensotec's Calibration Class ultra high accuracy load cells are calibrated and traceable to NIST. These stainless steel hermetically sealed rugged standards are designed for use in the metrology lab and as reference standards when calibrating other load cells. The Model 48 load cells are designed for low creep, high stability and high immunity to eccentric loads. The load cell comes complete with a factory installed pull plate and a calibration adaptor to ensure high repeatability when using the load cell in a test frame.



Model 48
Order Code AL121

Range, lb.	D"	H"	L"	T1	T2
100	3.00	2.25	0.50	3/8-24 UNF-2A	3/8-24 UNF-2B
250	3.00	2.25	0.50	3/8-24 UNF-2A	3/8-24 UNF-2B
500	4.13	4.38	0.75	5/8-18 UNF-3A	5/8-18 UNF-3B
1,000	4.13	4.38	0.75	5/8-18 UNF-3A	5/8-18 UNF-3B
2,500	4.13	4.38	0.75	5/8-18 UNF-3A	5/8-18 UNF-3B
5,000	4.13	4.38	0.75	5/8-18 UNF-3A	5/8-18 UNF-3B
10,000	6.06	6.38	1.50	1-1/4-12 UNF-3A	1-1/4-12 UNF-3B
25,000	6.06	6.38	1.50	1-1/4-12 UNF-3A	1-1/4-12 UNF-3B
50,000	8.00	8.25	2.00	1-3/4-12 UNF-3A	1-3/4-12 UNF-3B
100,000	11.00	9.75	2.50	2-3/4-8 UNF-3A	2-3/4-8 UNF-3B

1-888-282-9891
Honeywell Sensotec Sensors
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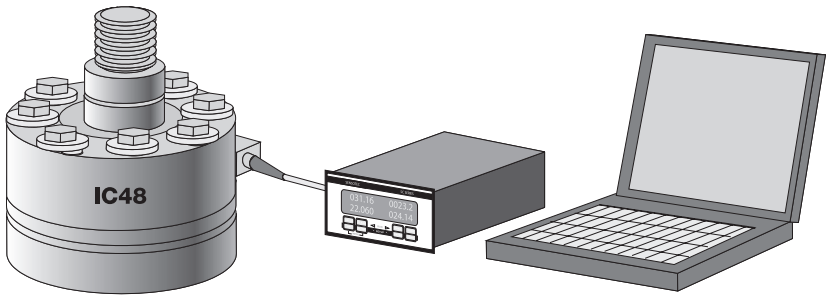
General Information

PERFORMANCE	Range*(lbs)	100; 250	500; 1000	2,500 5,000	10,000 25,000	50,000	100,000
	Output, standard (mV/V)	2.0	2.0	2.0	2.0	2.0	2.0
	Static error band (±% F.S.)[1]	0.02	0.02	0.03	0.03	0.03	0.05
	Non-Linearity (±% F.S.)[2]	0.02	0.02	0.03	0.04	0.04	0.05
	Hysteresis (±% F.S.)[2]	0.02	0.02	0.04	0.04	0.05	0.05
	Non-Repeatability (±% F.S.)[2]	0.005	0.005	0.005	0.005	0.005	0.005
	Creep, 20 min (%)	0.01	0.01	0.01	0.01	0.01	0.01
	Eccentric Load Sensitivity (±% /in.)	0.1	0.1	0.1	0.1	0.1	0.1
ENVIRONMENTAL	Temperature, Operating	-65° to 200° F					
	Temperature, Compensated	30° to 130° F					
	Temperature Effect						
	– Zero (max) % F.S./ °F	0.0008					
	– Span (max) % Rdg/ °F	0.0008					
ELECTRICAL	Excitation, Calibrated (VDC)	10					
	Bridge Resistance, nominal (ohms)	350					
	Zero Balance (±% F.S.)	0.5					
	Insulation Resistance	5000 megohm @ 50 VDC					
	Wiring Code Standard	#8 see appendix					
	Electrical Termination						
	100; 250 lb	PTIH-10-6P					
	500 lb.and above	MS3112E-12-8P					
MECHANICAL	Mating Connector (Optional)						
	100; 250 lb.	PT06A-10-6S					
	500 lb. and above	MS3116A-12-8S					
	Deflection @ Full Scale (in)	0.002	0.001	0.002	0.002	0.002	0.002
	Static Overload Capacity (±% F.S.)	300	300	300	300	300	300
	Ringing Frequency (kHz)	2.0	2.4; 3.4	6.8; 9.1	5.7; 7.0	6.3	4.5
	Weight (lbs)	4.5	7	7	22	48	133

Typical System Configuration



Typical system set up showing signal conditioning and display unit calibrated as a system with the load cell. Also shown is a laptop computer running Sensotec load cell calibration software.

General Information

* Other size/range/output configurations available. Consult factory.

1. Static error band is the guaranteed performance specification. The static error band is calculated as the best fit straight line through zero, including the effects of non-linearit, hysteresis and non-repeatability.

2. Values noted are typical values but fall within the static error band. Removal of any components may invalidate calibration.

3. Off-axis loading maximum allowable 50% of F.S.

For the Imperial Class Model IC48 the load cell, pull plate and adapter are calibrated as a unit.

Options: Calibration types: Standard calibration (performed in-house) includes two 11-point tests per direction specified: tension (standard), tension and compression (option 30b), or compression (option 30a or 30c). An 11-point test is defined as 20% increments for increasing and decreasing load with one zero return reading (e.g. 0, 20%, 40%, 60%, 80%, 100%, 80%, 60%, 40%, 20%, 0). Other calibration types are available, including ASTM E-74 with coefficients, and may be performed at an outside accredited lab of the customer's choice.
Model IC48 performs best when paired with one of our many calibration systems and software.

Force Sensing Clevis Pin

Model LP

ALL WELDED CONSTRUCTION

AMPLIFIED OUTPUT AVAILABLE

Model LP load pins are designed to be installed where pins or bolts are carrying a load. Applications which involve the use of shackle pins, clevis pins and pully shafts are prime examples of where force sensing clevis pins can provide accurate, real time monitoring of load forces. The Model LP features hermetic, welded stainless steel construction and is available with a standard PTIH-10-6P connector or an optional submersible cable. These rugged clevis pins provide excellent long term stability and reliable operation under severe operating conditions.

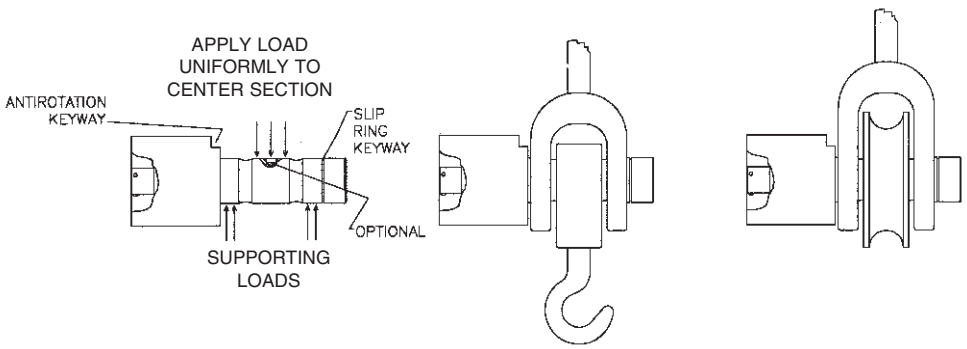
		Model LP **Order Code AL441**
PERFORMANCE	Load Ranges	2,000 to 200,000 lb.
	Non-Linearity and Hysteresis (max)	From 0.5%, consult factory
	Non-Repeatability (max)	0.15% of F.S.
	Output	1mV/V nominal
ENVIRONMENTAL	Temperature, Operating	-65° F to 250° F
	Temperature, Compensated	60° F to 160° F
	Temperature Effect	
	- Zero (max)	0.003% of F.S./° F
	- Output (max)	0.008% of Load/° F
ELECTRICAL	Excitation (calibration)	10VDC
	Wiring Code (std)	#2
	Electrical Termination (std)	PTIH-10-6P
	Mating Connector (not incl.)	PT06A-10-6S or equivalent
	Bridge resistance	5,000 Ohm
MECHANICAL	Static Overload Capacity without Breaking	200% F.S.
	Casing Material	17-4 ph stainless steel

Options (See Appendix)

Internal amps: 4-20mA (2-wire); 2n or 2N intrinsically safe amp see page AP-6; 4-20mA output (2-wire) 2k; Integral underwater cable 6i. Connector guard-consult factory.

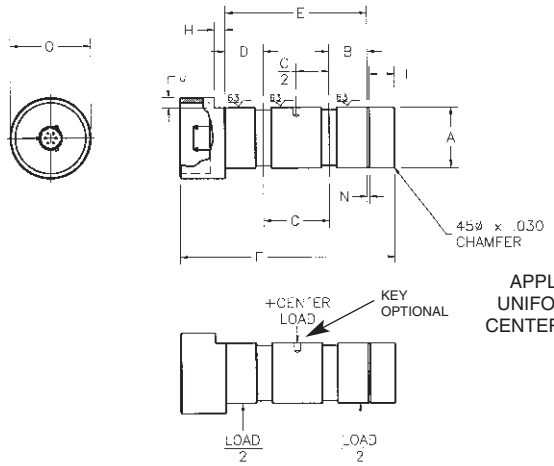
Installation

Standard uses for Sensotec clevis pins include tongue and yoke shackles and tension pulleys. Clevis pins are also ideal for use in web tension applications. Consult SENSOTEC for web tension measurement kits from 200 to 500,000 lb.



Dimensions

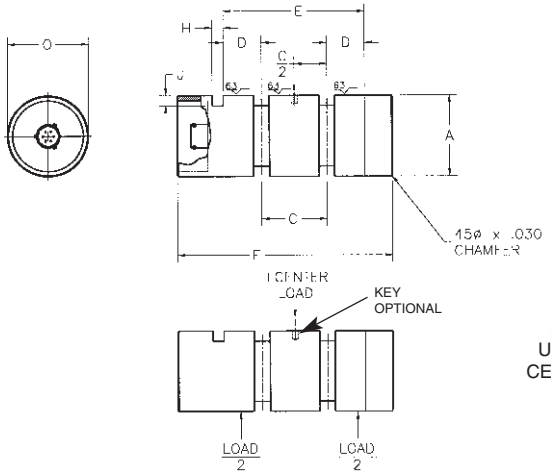
Model LP
(Order Code AL441)



APPLY LOAD UNIFORMLY TO CENTER SECTION

Dimensions in inches

Capacity, lb.	A Dia.	B	C	D	E	F (Nom.)	H	J	KEY DIA.	L	SNAP RING GROOVE DIA.	N	0
2000; 3000	.500	.50	.75	.50	1.75	4.00	.20	.25	N/A	.25	0.468	0.039	1.50
5000; 6000	.750	.59	1.00	.59	2.18	4.50	.20	.25	.156	.31	0.704	0.046	2.00
10,000; 12,500	1.000	.63	1.00	.63	2.26	4.75	.20	.25	.219	.50	0.940	0.046	2.00
18,000; 20,000	1.250	.81	1.38	.81	3.00	5.63	.27	.25	.219	.63	1.176	0.056	2.00
30,000	1.500	.94	1.63	.94	3.51	6.13	.27	.25	.281	.63	1.406	0.056	2.00
	+0.000 -0.002												



APPLY LOAD UNIFORMLY TO CENTER SECTION

Dimensions in inches

Capacity, lb.	A Dia.	C	D	E	F	H	J	KEY DIA.
50,000	2.000	2.00	1.00	4.00	6.63	0.266	0.38	0.281
75,000	2.500	2.50	1.25	5.00	7.63	0.266	0.50	0.281
100,000	2.750	2.69	1.47	5.63	8.38	0.406	0.50	0.406
125,000	3.000	3.00	1.44	5.88	8.75	0.406	0.63	0.406
160,000	3.500	3.50	1.75	7.00	10.00	0.531	0.63	0.531
200,000	4.000	4.00	2.25	8.50	11.75	0.531	0.75	0.531
	+0.000 -0.002							

Note: The Model LP is available in both standard and custom sizes. Consult Factory if you require an application-specific design not shown on this data sheet

Notes

1-888-282-9891

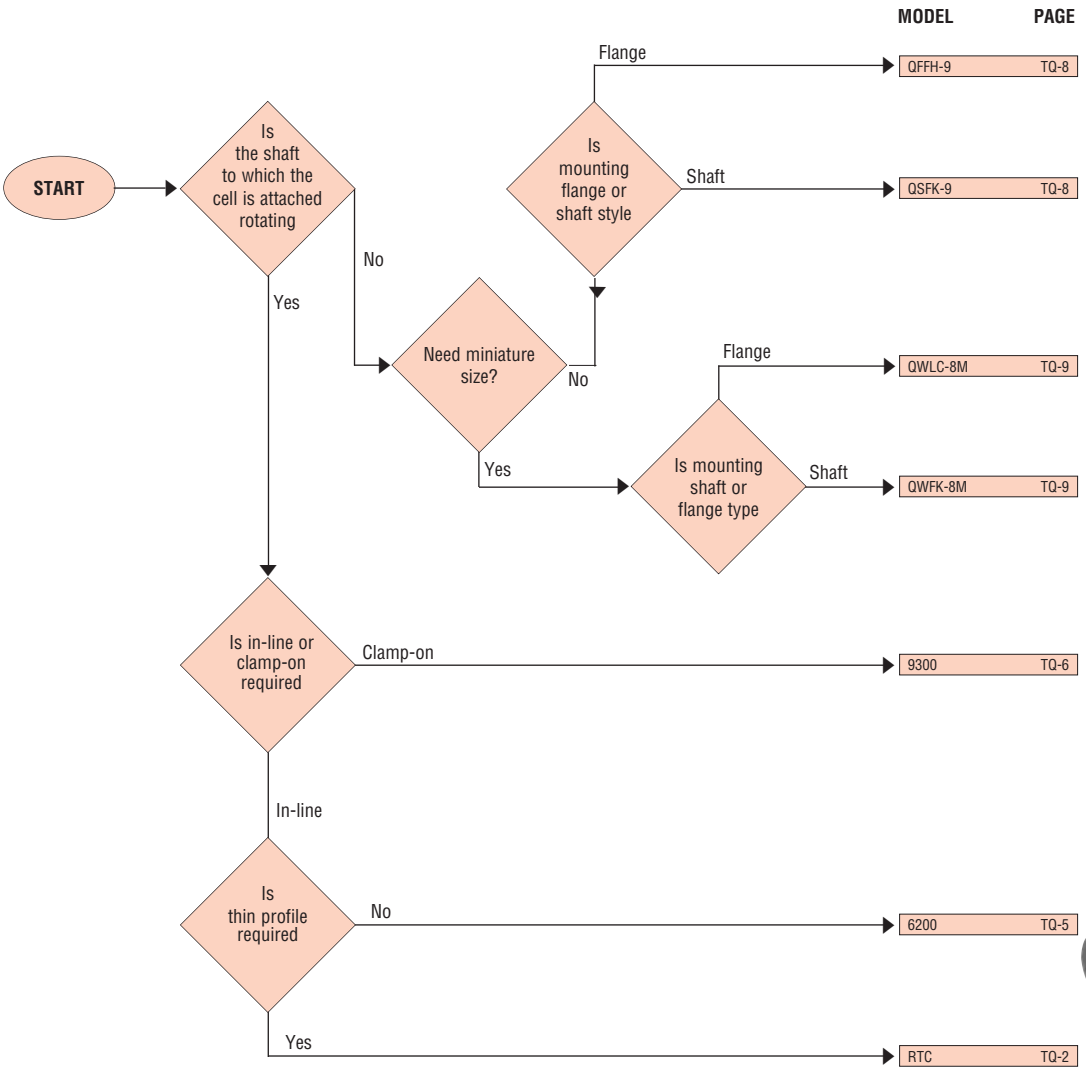
Honeywell
Sensotec Sensors

www.honeywell.com/sensing

SELECTION FLOW CHART

SENSOTEC's Torque Sensors feature both Reaction (non-rotating) and Rotary Torque Sensors that utilize Bonded Strain Gage Technology. The New Rotary Torque capability offers both in-line mounting configurations and clamp-on sensors that cover the ranges of +/- 100 inch pounds to 24,000 inch pounds, and shaft diameters from 3.5 inches up to 32 inches. These Rotary Torque Sensors are capable of sensing torque over rotational speeds from zero rpm to 15,000 rpm. The SENSOTEC Rotary Torque Sensors are non-contact and do not use support bearings or slip rings. The torque signal from the strain gage sensors is rf coupled to a loop antenna. An rf receiver converts the signal to 0+/-5 Vdc output.

The Reaction Torque Sensors offer torque measurements from 0+/-25 inch-ounces to ranges of 0+/-24,000 inch-pounds. A variety of mounting configurations are offered including: Shaft to Shaft, Flange to Flange, and Shaft to Flange on the low range models. All of SENSOTEC's Torque Sensors are machined from stainless steel and temperature hardened for low torsional deflection as well as temperature compensated for long term stability. Applications include automotive braking, engine and transmission dynamometers, torque table, fastener testing, aircraft engine testing, and marine shaft torque measurements with shaft horsepower monitors.



TORQUE

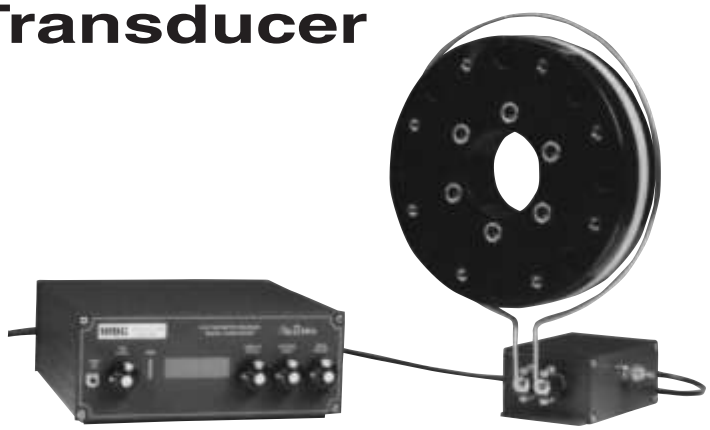
Thin Profile In-Line Rotary Torque Transducer

Model RTC

NON CONTACTING

FRICTIONLESS

1,500-170,000 IN-LBS RANGE



The Model RTC is an in-line rotary torque sensor that mounts to standard S.A.E or Metric Flanges, and transmits the torque signal to an RF receiver. The thin profile of this rotary torque sensor minimizes the spacing between shaft mounting flanges. Running speeds up to 15,000 rpm depending on the diameter. The Model RTC features extremely low maintenance free operation. The on-board RF transmitter may be environmentally sealed and it is available with options to withstand high g forces and elevated temperatures.

The Model RTC is ideal for measuring torque on machinery with existing flanges or for coupling to industry standard drive shafts and commercial coupling halves.

The RF telemetry package is induction-powered by a stationary loop antenna coupled to a power supply and receiver. The on-board telemetry concept eliminates the need for support bearings and slip rings.

The power to the transmitter is induced into the strain gage type torque sensor through the rf transmitter/receiver loop antennas, and stability is maintained with our power guard regulation circuit. The receiver has a digital torque indicator and features a "received strength indicator" for peaking the antenna coupling and simplifying the installation and start up.

The RTC system consists of the RTC rotary torque sensor with built in transmitter and antenna.

		Model RTC Order Code BT211
PERFORMANCE	Rotary Torque Sensor Combined Linearity, Hysteresis, & Repeatability	From 0.25%
	System Accuracy	better than 1% FS
	Temperature Compensation Range	40-140°F
	Data Bandwidth	DC-1000Hz
	Running Limit	6000-15,000 RPM depending on diameter
ENVIRONMENTAL	Operating Temperature Range	-15°F to 165°F
	Temperature Effect on Zero and Span	+/- 0.004% FS / °F
ELECTRICAL	Power Source	160 kHz induction power
	RF Operating Frequency	10.7 MHz
	Output	+/-5 Vdc @ 1mA (opt: 4-20 mA)

Electronics Completion Package System (Part #060-G834-00)

Includes:		
	Induction power supply	Model 2175A
	Cable assembly	Part #90845-091
	RF receiver	Model 2145A
	Manual	Part #54749-010

1-888-282-9891

Honeywell Sensotec Sensors

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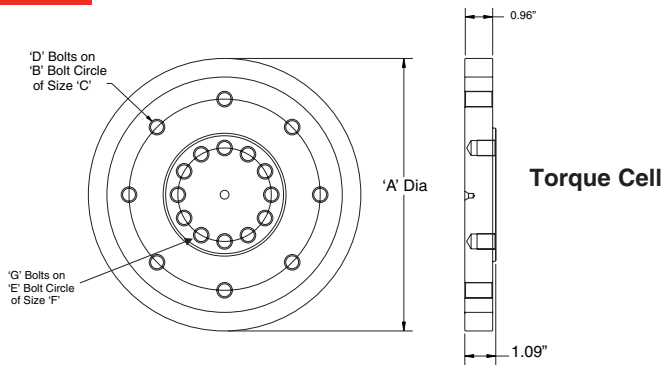
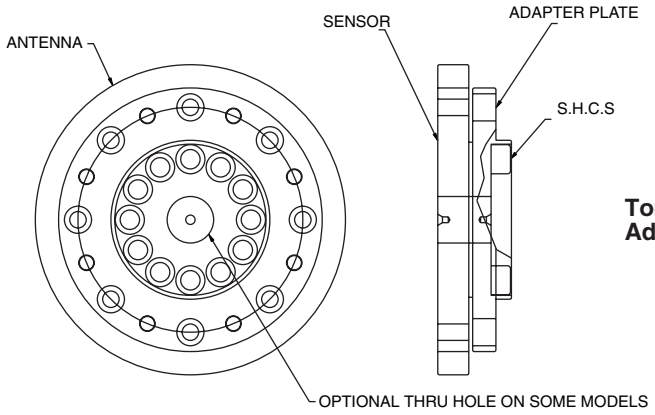
Dimensions Model RTC



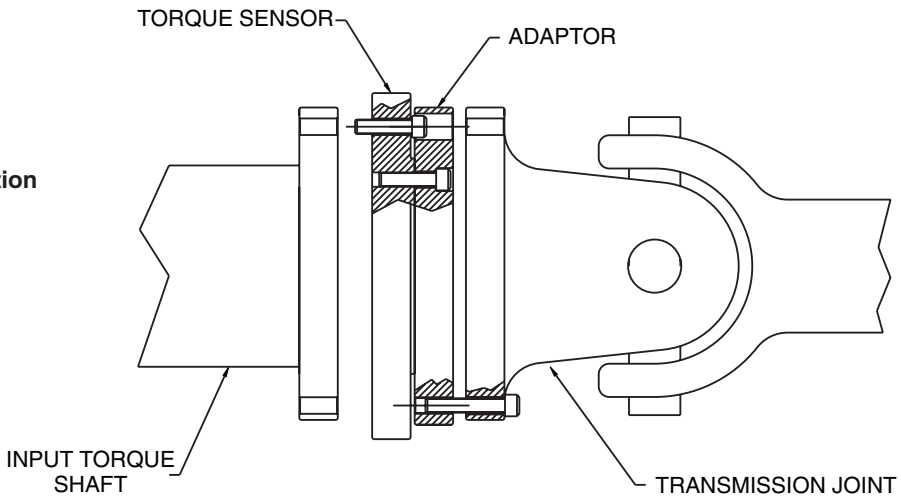
Torque Cell



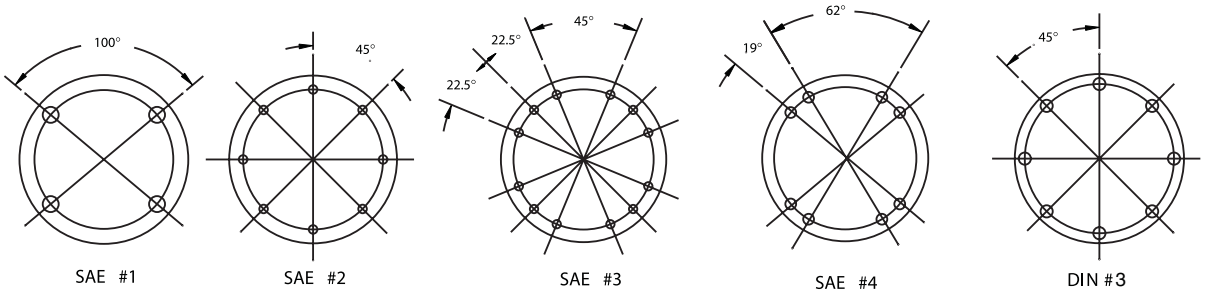
Torque Cell and Adapter Assembly

FLANGE STYLE SAE	BOLT PATTERN STYLE	MAX RATED CAPACITY IN-LBS	A"	B"	C"	D	E"	F"	G
37-41	SAE #1	1,500	5.9	3.75	7/16-20	4	1.863	5/16-24	12
37-41	SAE #1	3,000	5.9	3.75	7/16-20	4	1.863	5/16-24	12
48-55	SAE #1	6,000	7	4.75	1/2-20	4	2.281	7/16-20	10
61	SAE #2	10,000	8.2	6.125	3/8-24	8	3.808	7/16-20	12
71	SAE #2	15,000	9.3	7.250	3/8-24	8	5.036	3/8-24	12
81	SAE #3	30,000	9.4	7.25	7/16-20	12	4.85	7/16-20	16
88-91	SAE #4	70,000	10.7	8.25	5/8-18	8	5.375	5/8-18	14
FLANGE STYLE DIN	**BOLT PATTERN STYLE**	**MAX RATED CAPACITY IN-LBS**	**A"**	**B"**	**C"**	**D**	**E"**	**F"**	**G**
150	DIN #3	10,000	7.3	5.118	12mm-1.75	8	2.75	7/16-20	13
180	DIN #3	15,000	8.5	6.122	14mm-2.0	8	3.375	1/2-20	12
225	DIN #3	42,000	10.2	7.717	16mm-2.0	8	5	1/2-20	18
250	DIN #3	92,000	11.2	8.583	18mm-2.5	8	5.523	5/8-18	16
285	DIN #3	128,000	12.25	9.646	20mm-2.5	8	6.367	3/4-16	16
315	DIN #3	170,000	14	11.024	22mm-2.5	8	7.295	3/4-16	16

Dimensions Model RTC



Typical Installation



Bolt Pattern Style

FLANGE STYLE SAE	MAX RATED CAPACITY IN-LBS	MAX* SPEED RPM	TORSIONAL STIFFNESS X10^6 IN-LB/RAD"	ROTATING INERTIA LB-IN2	MAX THRUST LBS	MAX SHEAR (SIDELOAD) LBS	MAX BENDING IN LBS
37-41	1,500	16,000	11	10.5	750	700	600
37-41	3,000	16,000	23	10.5	2000	1400	1200
48-55	6,000	15,000	57	24	3000	2000	2500
61	10,000	13,000	136	51	3500	2000	6000
71	15,000	11,000	246	94	3500	2000	9500
81	30,000	11,000	485	98	7000	4000	15000
88-91	70,000	9,000	1258	178	10000	6000	25000
FLANGE STYLE DIN	**MAX RATED CAPACITY IN-LBS**	**MAX* SPEED RPM**	**TORSIONAL STIFFNESS X10^6 IN-LB/RAD"**	**ROTATING INERTIA LB-IN2**	**MAX THRUST LBS**	**MAX SHEAR (SIDELOAD) LBS**	**MAX BENDING IN LBS**
150	10,000	13,000	115	30	5000	3000	6000
180	15,000	11,000	180	61	6000	4500	9000
225	42,000	9,000	660	141	10000	6000	25000
250	92,000	8,000	1610	219	13000	8000	58000
285	128,000	7,000	2540	330	16000	10000	65000
315	170,000	6,000	3870	608	20000	12000	75000

* Higher speed available, consult Sensotec.

In-Line Rotary Torque Transducer

Model 6200

NON CONTACTING

FRICTIONLESS

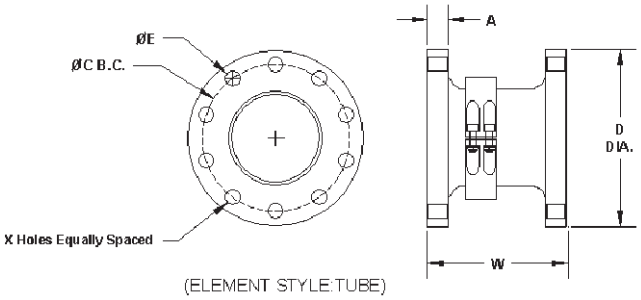
2,000-100,000 IN-LBS RANGE

Model 6200 (flange type) shown installed

As a replacement for conventional slip-ring type, in-line rotating shaft torque sensors, the new 6200 Series utilizes wireless technology that eliminates bearings and slip-rings. The 6200 features high torsional stiffness and high over-load capability. Torque ranges are available from 2,000 to 100,000 in-lb and running limits to 12,000 rpm. Applications include brake testing, motor and transmission dynamometers, and friction testing. The RF telemetry system consists of the rotary torque transducer, a combined induction power supply unit and RF antenna as well as a receiver unit. The shaft mounted electronics, antenna and induced power supply are immune to oils and dirt and are suitable for most industrial environments.

		Model 6200 Order Code BT212
PERFORMANCE	Rotary Torque Sensor Combined Linearity, Hysteresis, & Repeatability	From 0.25% to 1% FS
	Temperature Compensation Range	40-140°F
	Data Bandwidth	DC-100Hz
ENVIRONMENTAL	Operating Temperature Range	-15°F to 165°F
ELECTRICAL	Power Source	160 kHz induction power
	RF Operating Frequency	10.7 MHz
	Output	+/-10 Vdc @ 1mA (optional 4-20 mA)

Dimensions



(ELEMENT STYLE:TUBE)

Torque in-lbs	Dia D"	W"	A"	X Holes	Bolt Circle C"	Dia Thru E"
2,000; 4,000; 6,000; 8,000; 10,000	5.00	3.50	0.63	10	4.25	0.39
15,000; 20,000; 30,000	6.25	5.00	0.75	10	5.25	0.65
35,000; 40,000; 50,000	8.00	6.00	1.00	10	6.50	0.78
75,000; 100,000	10.00	8.00	1.25	10	8.25	0.90

Max rated Capacity IN-LBS.	Speed Max RPM.	Torsional Stiffness $X10^6$ IN-LB/RAD"	Moment of Inertia LB-IN^2	Max Thrust LBS.	Max Shear (sideload) LBS.	Max Bending IN-LBS.
10,000	12,000	10.45	0.0569	10,000	2,500	5,000
30,000	10,000	25.42	0.1788	17,000	5,000	15,000
50,000	8,500	52.70	0.6012	30,000	7,500	25,000
100,000	7,000	93.19	1.8237	40,000	12,000	50,000

Electronics Completion Package System (Part #060-G834-00)

Includes:		
	Induction power supply	Model 2175A
	Cable assembly	Part #90845-091
	RF receiver	Model 2145A
	Manual	Part #54749-010

Clamp On Rotary Torque Transducer

Model 9300

IDEAL FOR SHORT TERM TESTING

CONVERTS YOUR SHAFT INTO A TORQUE TRANSDUCER

SHAFT SIZES FROM 2.5" TO 15.4"

The Series 9300 Torsionometer is ideal for measuring torque on machinery where little down time can be afforded. The quick installation of the clamp-on collars with the pre-calibrated bending beam converts I/O shafts into instant torque transducers. The 9300 Series are ideal for those applications involving repetitive testing of identical systems.

The clamp-on 9300 Series uses a pre-calibrated bending beam which is clamped at each end by a counterbalanced collar around a heavy-wall or solid shaft to sense torque. The torque generated between the collars is dependent on the shaft diameter, RPM, and the distance between the collars. Each installation uses one of a selection of bending beam lengths to generate the specific output to the on-board RF transmitter.

The RF telemetry package is induction-powered by a stationary loop antenna coupled to a power supply and receiver. The on-board telemetry concept eliminates the need for support bearings and slip rings. The clamp-on feature allows an installation without modifying the shaft surface.

A variety of collars and bending beams are available to accommodate high torque ranges and shafts from 2.5" to 32" in diameter. Running speeds are from 2500 rpm down to zero rpm. The system is insensitive to shaft speed variations, and full accuracy is obtained down to zero RPM. The built-in transmitter can be environmentally sealed for harsh environments and high vibration.

The Series 9300 works in applications where at least 175 micro-strain is induced in the shaft during running conditions.

Specifications

		Model 9300 Order Code BT213
PERFORMANCE	Rotary Torque Sensor Combined Linearity, Hysteresis, & Repeatability	From 0.25% to 1% FS
	Temperature Compensation Range	40-140°F
	Static G Force	100
	Compensated Temperature Range	5°C to 60°C
	Data Bandwidth	DC-100Hz
	Minimum Operating Strain	175 micro-strain
ENVIRONMENTAL	RPM Limits	2500 for 2.5" dia to 1000 for 15" dia
	Vibration	10 g, any axis
	Operating Temperature Range	-15°F to 165°F
ELECTRICAL	Power Source	160 kHz induction power
	RF Operating Frequency	10.7 MHz
PHYSICAL	Weight	Various (3 to 15 pounds)
SYSTEM	System Consists of	1650B Rotary Torque Transducer 2145A Receiver and Display Unit 2175 Induction Power Supply

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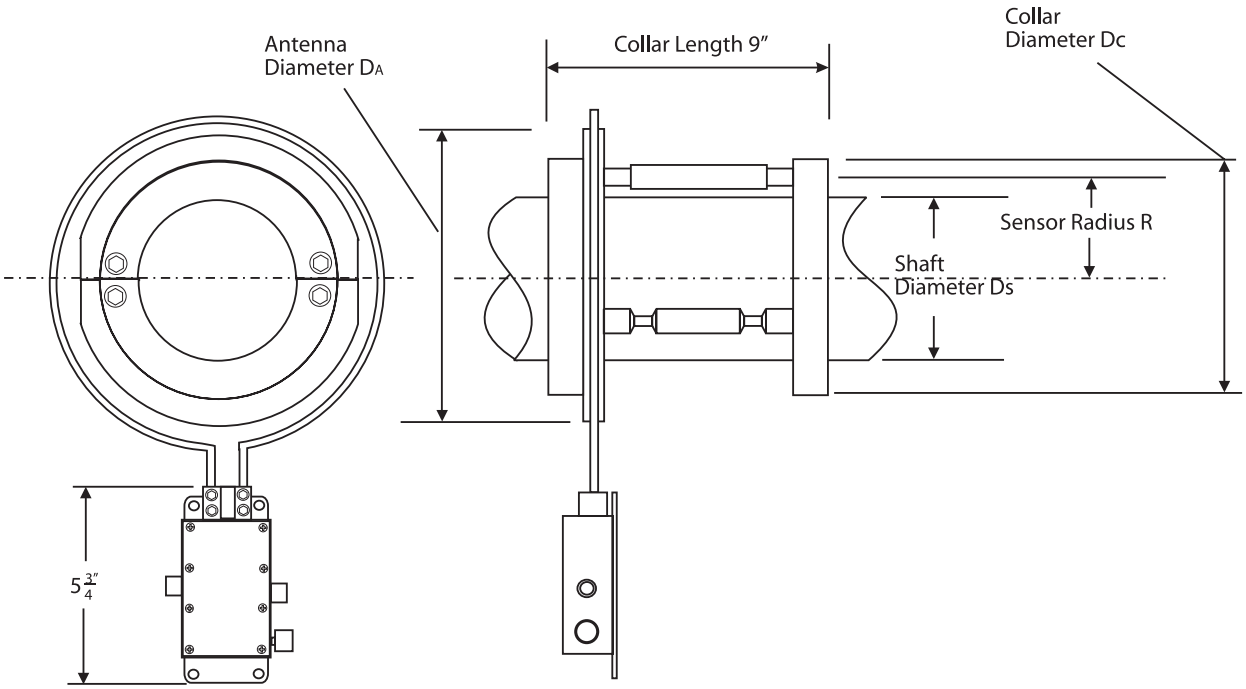


Shaft Diameter Ds"		Sensor Radius R"	Antenna Diameter DA"	Collar Diameter Dc"
2.5"	3.44"	2.4	7.00	5.88
3.44"	4.44"	2.9	8.00	6.88
4.44"	5.44"	3.4	9.00	7.88
5.44"	6.44"	3.9	10.00	8.88
6.44"	7.44"	4.4	11.00	9.88
7.44"	8.44"	4.9	12.00	10.88
8.44"	9.44"	5.4	13.00	11.88
9.44"	10.44"	5.9	14.00	12.88
10.44"	11.44"	6.4	15.00	13.88
11.44"	12.44"	6.9	16.00	14.88
12.44"	13.44"	7.4	17.00	15.88
13.44"	14.44"	7.9	18.00	16.88
14.44"	15.44"	8.4	19.00	17.88

Electronics Completion Package System (Part #060-G834-00)

Includes:	Induction power supply	Model 2175A
	Cable assembly	Part #90845-091
	RF receiver	Model 2145A
	Manual	Part #54749-010

Shaft and Flange Type Reaction Torque Transducers

Models QSFK-9 and QFFH-9

WIDE DYNAMIC RANGE

HIGH FREQUENCY

STAINLESS STEEL

Model QSFK-9 (Shaft Type)

Model QFFH-9 (Flange Type)

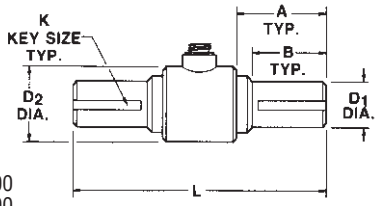
Models QSFK-9 and QFFH-9 Reaction Torque, (shaft and flange type) transducers are designed for installation between test pieces such as motors, switches, axles or shafts and their mounting plate. These models operate and are calibrated in both directions. Stainless steel construction enhances durability in harsh, industrial environments. These models have no moving parts and utilize four bonded strain gages on a special machined portion of the transducer to achieve a maximum non-linearity of 0.1% over a wide dynamic range. Typical applications include tire braking, motor dynamometers, friction-skid testing, torque tables and twist measurement.

		Model QSFK-9	Model QFFH-9
PERFORMANCE	Torque Ranges	100 to 24,000 in.-lb.	3000 to 24,000 in.-lb.
	Non-Linearity (max)	±0.1% F.S.	±0.1% F.S.
	Hysteresis (max)	±0.1% F.S.	±0.1% F.S.
	Non-Repeatability (max)	±0.03% F.S.	±0.03% F.S.
	Output	2mV/V	2mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 225° F	-65° F to 225° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	.005% F.S./° F	.005% F.S./° F
	- Span (max)	.005% Rdg./° F	.005% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil	Bonded foil
	Excitation	10VDC	10VDC
	Bridge Resistance	350 ohms	350 ohms
	Wiring Code (std)	#2 (See Pg. AP-7)	#2 (See Pg. AP-7)
	Electrical Termination (std)	MS3102A-14S-6P or equiv.	PTIH-10-6P or equiv.
	Mating Connector (non incl.)	MS3106A-14S-6S or equiv.	PT06A-10-6S or equiv.
MECHANICAL	Static Overload Capacity	50% over capacity	50% over capacity
	Case Material	Stainless steel	Stainless steel

Dimensions

Model QSFK-9 (Order Code BT111)
Available Ranges

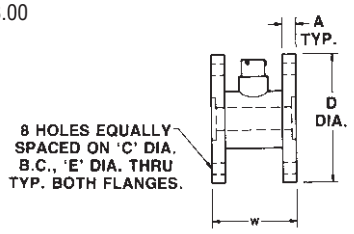
(IN-LBS)	D1"	D2"	K" Key Size	A" Typ.	B"	L"
100	.75	2.25	3/16	2.75	2.25	8.00
600; 1200	1.00	2.25	1/4	2.75	2.25	8.00
3000; 6000; 12,000	1.50	3.50	3/8	3.75	3.00	11.00
24,000	2.75	4.00	5/8	5.10	4.00	13.00



Model QSFK-9 (Shaft Type)

Model QFFH-9 (Order Code BT121)
Available Ranges

(IN-LBS)	D" Dia.	W"	A"	C" Dia. B.C.	E" Dia. Thru
3000; 6000	4.00	3.00	.50	3.25	.33
12,000; 24,000	5.00	3.50	.75	4.25	.39



Model QFFH-9 (Flange Type)

Options (See Appendix)

Temperature compensated 1b, 1c, 1f; Electrical termination 6a (shaft type only); 6e, 6f, 6g, 6h

Premium Options: 1d, 1e

Accessories: Mating connectors and connector/cable assemblies

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Miniature Reaction Torque Transducers

Models QWFK-8M and QWLC-8M

COMPACT SIZE

HIGH FREQUENCY

0.1% LINEARITY

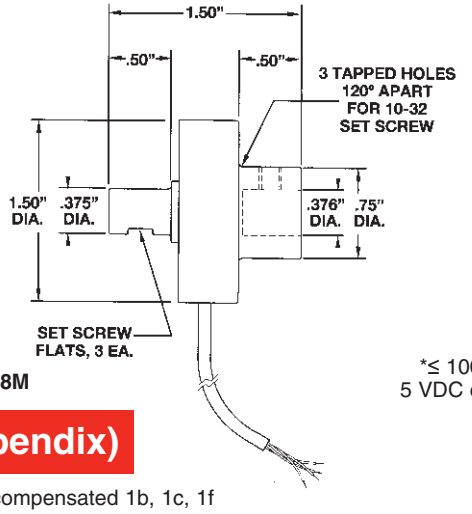
Model QWFK-8M

Models QWFK-8M and QWLC-8M Miniature Reaction Torque Transducers are engineered for minimum size and to achieve an impressive 0.1% maximum non-linearity. Four bonded strain gages are positioned on a special machined portion of the transducer to effectively measure even slight torque motion. These models operate and are calibrated in both directions. A modular, stainless steel construction and no moving parts provide excellent durability under harsh industrial conditions. Typical miniature reaction torque transducer applications include motor dynamometer, tire braking, twist measurement, torque tables, and friction-skid test measurements.

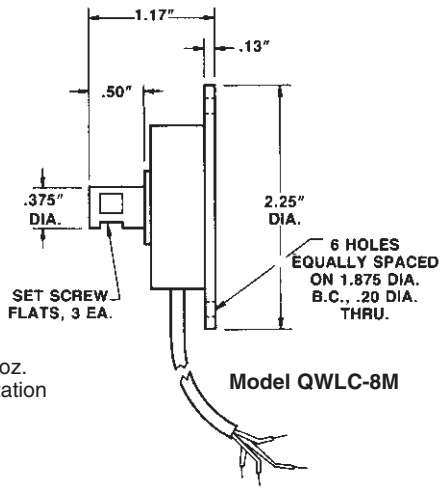
		Model QWFK-8M	Model QWLC-8M
PERFORMANCE	Torque Ranges	25 in.-oz. to 300 in.-lb.	25 in.-oz to 300 in.-lb.
	Non-Linearity (max)	±0.1% F.S.	±0.1% F.S.
	Hysteresis (max)	±0.1% F.S.	±0.1% F.S.
	Non-Repeatability (max)	±0.03% F.S.	±0.03% F.S.
	Output (nominal)	2mV/V	2mV/V
	Resolution	Infinite	Infinite
ENVIRONMENTAL	Temperature, Operating	-65° F to 225° F	-65° F to 225° F
	Temperature, Compensated	60° F to 160° F	60° F to 160° F
	Temperature Effect		
	- Zero (max)	.005% F.S./° F	.005% F.S./° F
	- Span (max)	.005% Rdg./° F	.005% Rdg./° F
ELECTRICAL	Strain Gage Type	Bonded foil	Bonded foil
	Excitation	10VDC*	10VDC*
	Bridge Resistance	350 ohms	350 ohms
	Wiring Code (std)	#1 (See Pg. AP-8)	#1 (See Pg. AP-8)
	Electrical Termination (std)	Teflon cable (5 ft.)	Teflon cable (5 ft.)
MECHANICAL	Overload Safe	50% over capacity	50% over capacity
	Case Material	Stainless steel	Stainless steel
	Deflection—Torsional		
	25 in.-oz-50 in.-lb.	.0027 radians	.0027 radians
	100, 300 in-lb.	.00255 radians	.00255 radians

Dimensions

Model QWFK-8M (Order Code BT311)
Model QWLC-8M (Order Code BT312)



Model QWFK-8M



*≤ 100 in-oz.
5 VDC excitation

Model QWLC-8M

Options (See Appendix)

Temperature compensated 1b, 1c, 1f

Premium Options: 1d, 1e

Torque Watch Gauge Series

Models 366, 651 and 940

Low Range 366 Series

Models 366-0, 366-2, 366-3

- 0.003 to 0.6 oz. in.
- 0.2 to 42 gm. cm.

The 366 Torque Watch Series accurately measures very low torque. Three miniature adapter chucks allow simple coupling to the device being measured.

To minimize friction, a calibrated helical spring, shaft, and pointer assembly are mounted in jeweled bearings. The unit can measure torque in either a clockwise or counterclockwise direction. A stainless steel internal rotation stop prevents damage from over-torque up to three times the normal range.

Mid Range 651 Series

Models 651C-1, 651C-2, 651C-3, 651X-2, 651X-3, 561X-4

- 0.05 to 40 oz. in.
- 2.5 to 2.8k gm. cm.
- 0.5 to 265 n. mm.

The 651 Torque Watch Series provides accurate measurement of low static torque. A 1/4 inch keyed chuck provides a simple means of coupling to the device under measurement.

The 651 Series utilizes a calibrated spring, shaft, and pointer assembly within a rugged steel and aluminum housing. The unit can measure torque in either a clockwise or counterclockwise direction. Internal stainless steel rotation stops prevent damage from over-torque up to two times the normal range.

High Range 940 Series

Models 940-1 and 940-2

- 15 to 200 oz. in.
- 2.5 to 2.8k gm. cm.
- 0.1 to 1.4 n. m.

The 940 Torque Watch Series accurately measures high range torque. A 3/8 inch keyed chuck and a 3/8 inch square socket driver adapter provides a simple means of coupling to the device under measurement.

The 940 Series utilizes a calibrated spring, shaft, and pointer assembly within a rugged steel and aluminum housing. The unit can measure torque in either a clockwise or counterclockwise direction. Internal stainless steel rotation stops prevent damage from over-torque up to two times the normal range.

Ranges

LOW RANGE 366 SERIES

	Standard		Metric		System International	
Accuracy	Model	ounce-inches	Model	gram-centimeter	Model	newton-millimeter
±5%	366-0	0.06 to 0.6	366-0M	6 to 42		
±10%	366-2	0.01 to 0.1	366-2M	1 to 7.5		
±10%	366-3	0.003 to 0.03	366-3M	0.2 to 2		

MID RANGE 651 SERIES

Accuracy	Model	ounce-inches	Model	gram-centimeter	Model	newton-millimeter
±2%	651C-1	0.05 to 1.2	651C-1M	2.8 to 80	651-1SI	0.5 to 9
±2%	651C-2	1 to 20	651C-2M	50 to 1.2k	651C-2SI	10 to 140
±2%	651C-3	2 to 40	651C-3M	150 to 2.8k	651C-3SI	15 to 265
±2%	651X-2	0.1 to 2.4	651X-2M	5 to 150	651X-2SI	1 to 18
±2%	651X-3	0.25 to 5	651X-3M	10 to 300	651X-3SI	2 to 36
±2%	651X-4	0.5 to 10	651X-4M	25 to 600	651X-4SI	5 to 70

HIGH RANGE 940 SERIES

Accuracy	Model	ounce-inches	Model	kilogram-centimeter	Model	newton-meter
±2%	940-1	30 to 200	940-1M	2 to 14	940-1SI	0.25 to 1.4
±2%	940-2	15 to 100	940-2M	1 to 7	940-2SI	0.1 to 0.7

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Rotary Torque Measurement System

MODEL TMS 9000

The TMS 9000 torque measurement system represents an advanced generation of rotary transformer sensors designed to operate entirely in the digital domain for enhanced accuracy and versatility. The TMS 9000 series physically integrates rotor electronics and telemetry into one element, with all set-up and output controlled through computer software. This digital wireless telemetry system supplies power to the rotating sensor, supports two-way communications and provides wide testing capabilities. More than a stand-alone sensor, the specially designed TMS 9000 is a complete torque measurement system, with standard analog, frequency and digital outputs. Fully software driven, the durable TMS 9000 utilizes a custom 19-bit digital wireless telemetry system, which maximizes resolution and frequency response while also being able to provide excitation power across the wireless gap. System set-up can be changed "on-the-fly" without affecting calibration. The TMS 9000 can be expanded for future market needs by using standard PC104 cards.

FEATURES:

- Standard or Custom Configurations Available
- Single or Multi-Channel
- Ranges to 200,000 lb.-ft.

APPLICATIONS:

- Transportation & Automotive
- Manufacturing & Production
- Aerospace & Military
- Medical
- Design & Engineering
- Testing & Quality

PERFORMANCE SPECS:

TMS 9000

SPECIFICATIONS

Torque Ranges	Varies on application; consult factory (max. 200,000 lb.-ft.)
System Accuracy	< 0.05% F.S.
Standard Outputs	+/- 10 VDC 4-20mA 10 KHz +/- 5 KHz 60 KHz +/- 20 KHz
Digital	RS232-485
Resolution	16 Bits (65,536 Counts)
Frequency Response	2800 Hz (Fast Mode)
Digital Filter	0.1 - 1 kHz
Sampling Rate	17,656 sps

ENVIRONMENTAL

Temperature, Operating	-40° to 185° F
Temperature, Compensated	14° to 158°F.

MODEL TMS 9000

Mechanical Mating Configurations

TMS 9000 Series torque sensors perform well under tough conditions. For years sensor operators in varied applications have acknowledged the enhanced accuracy, durability and quality built into each sensor. TMS 9000 Series sensors can be tailored to specific applications for even greater versatility with capacities up to 200,000 lb.-ft.

SAE-DIN Drive Shaft Yokes

Integral Coupling

Rotating Circular Keyed Shaft

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MODEL TMS 9000

Mechanical Sensor Features

- No hoop antenna
- System error < 0.05% FS
- High torsional stiffness
- High overload capability
- Low rotating inertia
- Variety of mating flange designs
- Custom designs available

Dynamics of the TMS 9000

The rotor electronics module is encapsulated to enhance protection against vibration, G Force and chemicals.

- The rotating antenna is comprised of an annular printed circuit board, peripherally or centrally mounted on the rotor.
- Four layer construction ensures enhanced strength with no exposed tracks in the outer region.
- IP65 caliper-style coupling module with die cast aluminum casing. Provides power transmission and signal recovery with BNC connector for coaxial cable.

Electrical Features

- Rotor Electronics Module. This is embedded in the sensor and receives and conditions the input signal before transmitting it to the SPM.
- Signal Processing Module (SPM). This device integrates two microprocessors to share data processing and communications. It recovers the signal from the rotor, provides scaling and filtering, and offers a variety of outputs, compatible with various data acquisition systems.
- PC104 expansion. This option allows the operator functionality beyond the hardware and software provided.

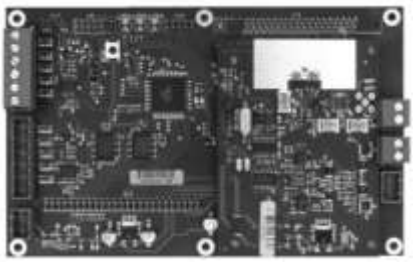
Signal Processing Module (SPM)

The SPM contains two separate microprocessors to share data processing and communications. Calibration is all digital, via RS232/485 link, eliminating potentiometers or dip switches. The durable unit has an external BNC connector for the RF coaxial cable, internal 2-part plug and socket connectors for output signals, digital communication and DC power. The SPM external housing also features a "SHUNT CAL" button and LED's to indicate "Power ON", "Rotor Active" and "SHUNT CAL Mode". Because of these enhanced technologies, the end result is a true advancement in telemetry-based torque systems.

MODEL TMS 9000

Software Features

The software at the heart of the TMS 9000 system is designed to offer flexibility and adaptability. The software puts the operator fully in control and can be tailored to the test conditions required at the time. Standard or custom set ups can be saved to parameter files and recalled at any time. Input scaling and output scaling is independent, providing a wider application advantage. The software-driven SPM (Signal Processing Module) is offered with five standard interfaces. Consult the factory for availability of optional interfaces such as: CANopen, Ethernet and USB, and PC104 expansion cards. The software flexibility allows single or multiple sensors to share the same wireless telemetry link, with digital output as standard, or with multi-channel digital-to-analog available as an option.



SPM Card

Toolkit Features

- Full Software Set Up
- No Potentiometers or Dip Switches
- Scalable Output "On-The-Fly"
- Nine Point Linearization Feature
- Multi-Digital Filter Feature
- Simple ASCII Communications Protocol

Additional Features

- Multiple Channels
- Multiplexing
- Custom Designs Available

How to Order

Please consult factory for ordering information.

CE

Software Toolkit Capabilities

Test Communications

Parameters/System Setup

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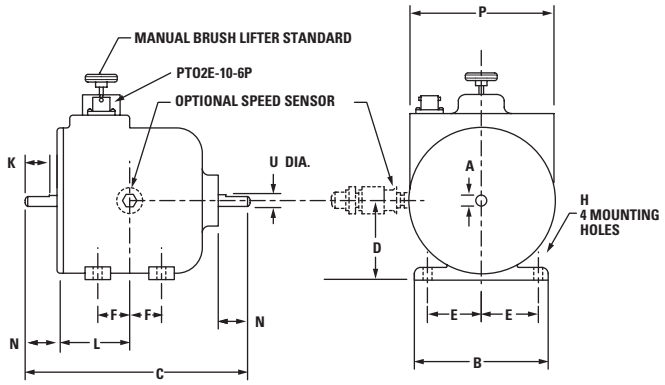
Slip Ring Torque Sensors

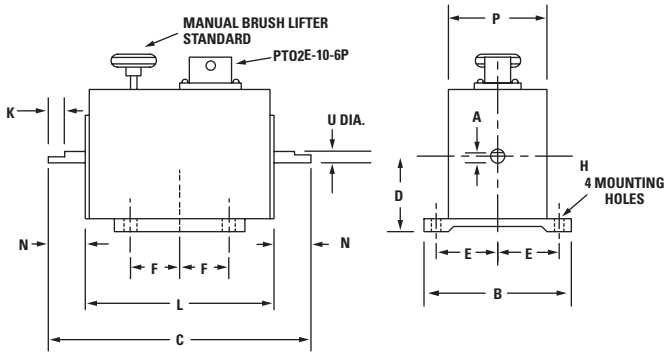
MODELS 1102/1103

Low capacity torque sensors

1102

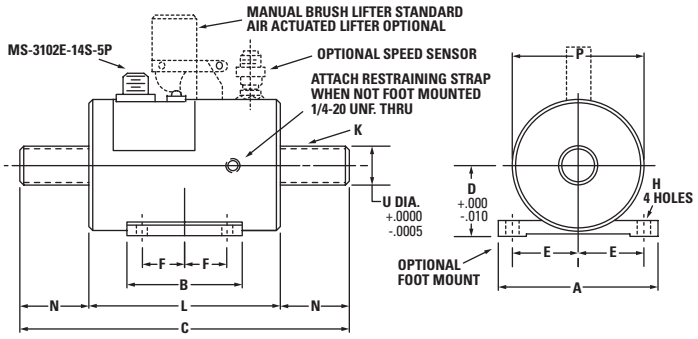


1103



MODELS 1104–1121

Standard rotating shaft torque sensor for general application



1104 IN.		CM.
C	10	25.40
L	5.81	14.76
N	2.09	5.32
P	4	10.16
U	*1.00	*2.54
K	*0.25 sq.	*0.64 sq.
A	4.75	12.07
B	3.50	8.89
D	2.13	5.40
E	2	5.08
F	1.38	3.49
H	0.28	0.71

1105 IN.		CM.
C	12.75	32.39
L	7.25	18.42
N	2.75	6.99
P	4.72	11.99
U	1.50	3.81
K	0.38 sq.	0.95 sq.
A	6.25	16.51
B	4	10.16
D	2.50	6.35
E	2.63	6.67
F	1.50	3.81
H	0.41	1.03

1106 IN.		CM.
C	14.63	37.15
L	6.88	17.46
N	3.88	9.84
P	5.50	13.47
U	2.25	5.72
K	0.50 sq.	1.27 sq.
A	7.25	18.42
B	5.25	13.34
D	3	7.62
E	3	7.62
F	2	5.08
H	0.53	1.35

1107 IN.		CM.
C	19	48.26
L	7.50	19.05
N	5.75	14.61
P	6.50	16.51
U	3.00	7.62
K	0.75 sq.	1.91 sq.
A	8.50	21.59
B	5.50	13.97
D	3.50	8.89
E	3.50	8.89
F	2	5.08
H	0.53	1.35

*100 & 200 lb. inch units; K=3¹⁄₄₁₆" sq., U=3¹⁄₄₄"

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1102	IN.	CM.
C	6.50	16.50
L	2.25	5.70
N	1.00	2.50
P	3.50	8.90
U	0.37	0.95
K	0.75 flat	1.90 flat
A	0.34	0.86
B	4.13	10.50
D	1.75	4.44
E	1.75	4.44
F	1.00	2.50
H	0.20	0.50

1103	IN.	CM.
C	4.00	10.16
L	2.88	7.30
N	0.56	1.43
P	1.50	3.81
U	0.12	0.32
K	0.25 flat	0.64 flat
A	0.09	0.24
B	2.25	5.70
D	1.00	2.50
E	0.94	2.38
F	0.75	1.90
H	0.14	0.37

1108	IN.	CM.
C	21	53.34
L	8.75	22.23
N	6.13	15.56
P	8.88	22.54
U	4.50	11.43
K	1 sq.	2.54 sq.
A	10	25.40
B	6	15.24
D	5	12.70
E	4.25	10.80
F	2.25	5.72
H	0.53	1.35

1109	IN.	CM.
C	28	71.12
L	11.25	28.58
N	8.38	21.27
P	10.25	26.04
U	5	12.70
K	1 sq.	2.54 sq.
A	11.5	29.21
B	6	15.24
D	5.75	14.61
E	5	12.70
F	2.25	5.72
H	0.53	1.35

1118	IN.	CM.
C	36	91.44
L	10	25.40
N	13	33.02
P	12	30.48
U	7.94	20.16
K	2 sq.	5.08 sq.
A	n/a	n/a
B	n/a	n/a
D	n/a	n/a
E	n/a	n/a
F	n/a	n/a
H	n/a	n/a

1121	IN.	CM.
C	42	106.68
L	10	25.40
N	16	40.64
P	13	33.02
U	8.94	22.70
K	2 sq.	5.08 sq.
A	n/a	n/a
B	n/a	n/a
D	n/a	n/a
E	n/a	n/a
F	n/a	n/a
H	n/a	n/a

FEATURES:

- Higher frequency response
- Lower cost for general "in-line" applications
- Can be used with almost all existing DC and AC signal conditioning instrumentation
- Accurate "in-line" torque measurements

Foot Mounting–foot mount plate and housing available for models 1104, 1105, 1106, 1107, 1108 and 1109.

Brush Lifters–recommended for protracted runs in which continuous readings are not taken. When released, brushes do not contact the rings.

Speed Sensor–a 60-tooth gear and a magnetic pickup provides an output of 60 pulses per shaft revolution. On models 1104 and 1105 for speeds less than 200 RPM, Zero Velocity Speed Sensors are recommended. On models 1106 and higher for speeds less than 100 RPM, Zero Velocity Speed Sensor is recommended. Zero Velocity Speed Sensor is not available on model 1102. No speed sensor is available on model 1103.

Safety Considerations: *"It would be unsafe to operate Lebow® Torque Sensors and Load Cells beyond Static Overload or Ultimate Extraneous Load Limits as defined in the Glossary of Terms or, when applicable, higher than maximum speed. When in doubt, consult the factory. Lebow® Products is not responsible for any property damage or personal injury which may result because of the misapplication of the Transducer."*

PERFORMANCE SPECS: 1102/1103 AND 1104–1121

SPECIFICATIONS

Actual performance average: *Nonlinearity:* *Hysteresis:*	 0.026% 0.031%
Nonlinearity: *of rated output*	±0.1%*
Hysteresis: *of rated output*	±0.1%*
Output at rated capacity: *millivolts per volt, nominal*	2*
Repeatability: *of rated output*	±0.05%
Zero balance: *of rated output*	±1.0%
Bridge resistance: *ohms nominal*	350*
Temperature range, compensated: *°F*	+70 to +170
Temperature range, compensated: *°C*	+21 to +77
Temperature range, usable: *°F*	-20 to +200
Temperature range, usable: *°C*	-29 to +93
Temperature effect on output: *of reading per °F*	±0.002%
Temperature effect on output: *of reading per °C*	±0.0036%
Temperature effect on zero: *of rated output per °F*	±0.002%
Temperature effect on zero: *of rated output per °C*	±0.0036%
Excitation voltage, maximum: *volts DC or AC rms*	20
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000
Number of bridges	1

*Model 1103 output at rated capacity is 0.95, nonlinearity is .05%, hysteresis is .05% and bridge resistance is 240 ohms.

SENSOR CHARACTERISTICS: 1102/1103 AND 1104-1121

MODEL NUMBER	CAPACITY oz. in. (N • m)	MAX. SPEED RPM	PROTECTED FOR OVERLOADS TO oz. in. (N • m)	TORSIONAL STIFFNESS lb. in./rad. (N • m/rad.)	ROTATING INERTIA lb.-in. sec.^{2} (N • m sec.^{2})	WEIGHT lbs. (kg.)	BRUSH LIFE FACTOR x 10^6	RING DIAMETER in. (cm.)
1102-50	50 (0.35)	20,000	75 (0.53)	665 (75.13)	1.75×10^{-3} (2.00×10^{-4})	2 (0.90)	8.20	0.75 (1.91)
1102-100	100 (0.70)	20,000	150 (1.06)	1,070 (120.89)	1.75×10^{-3} (2.00×10^{-4})	2 (0.90)	8.20	0.75 (1.91)
1102-200	200 (1.50)	20,000	300 (2.12)	1,790 (202.24)	1.76×10^{-3} (2.00×10^{-4})	2 (0.90)	8.20	0.75 (1.91)
1102-500	500 (3.50)	20,000	750 (5.30)	3,480 (393.18)	1.77×10^{-3} (2.00×10^{-4})	2 (0.90)	8.20	0.75 (1.91)
1102-1K	1,000 (7.00)	20,000	1,500 (10.50)	4,850 (547.97)	1.78×10^{-3} (2.00×10^{-4})	2 (0.90)	8.20	0.75 (1.91)
1103-10	10 (0.07)	20,000	15 (0.11)	112 (12.65)	2.59×10^{-5} (3.00×10^{-6})	0.75 (0.34)	n/a	n/a -
1103-20	20 (0.15)	20,000	30 (0.21)	113 (12.76)	2.59×10^{-5} (3.00×10^{-6})	0.75 (0.34)	n/a	n/a -

MODEL NUMBER	CAPACITY lb. in. (N • m)	MAX. SPEED RPM	PROTECTED FOR OVERLOADS TO lb. in. (N • m)	TORSIONAL STIFFNESS lb. in./rad. (N • m/rad.)	ROTATING INERTIA lb.-in. sec.^{2} (N • m sec.^{2})	WEIGHT lbs. (kg.)	BRUSH LIFE FACTOR x 10^6	RING DIAMETER in. (cm.)
1104-100	100 (10)	9,000	150 (15)	6,430 (726)	3.93×10^{-3} (4.50×10^{-4})	11 (4.99)	15.40	2.00 (5.08)
1104-200	200 (20)	9,000	300 (30)	17,000 (1,920)	3.96×10^{-3} (4.50×10^{-4})	11 (4.99)	15.40	2.00 (5.08)
1104-500	500 (55)	9,000	750 (85)	45,200 (5,100)	4.11×10^{-3} (4.70×10^{-4})	11 (4.99)	15.40	2.00 (5.08)
1104-1K	1,000 (115)	9,000	1,500 (170)	103,000 (11,640)	4.11×10^{-3} (4.70×10^{-4})	11 (4.99)	15.40	2.00 (5.08)
1104-2K	2,000 (225)	9,000	3,000 (340)	182,500 (20,620)	4.14×10^{-3} (4.70×10^{-4})	11 (4.99)	15.40	2.00 (5.08)
1105-5K	5,000 (565)	8,500	7,500 (850)	475,000 (53,670)	9.29×10^{-3} (10.50×10^{-4})	28 (12.70)	14.00	2.19 (5.56)
1105-10K	10,000 (1,130)	8,500	15,000 (1,695)	750,000 (84,740)	1.06×10^{-2} (1.22×10^{-3})	28 (12.70)	14.00	2.19 (5.56)
1106-20K	20,000 (2,250)	4,500	30,000 (3,390)	2,610,000 (294,890)	3.93×10^{-2} (4.50×10^{-3})	42 (19)	10.20	3.00 (7.62)
1107-50K	50,000 (5,650)	4,000	75,000 (8,475)	7,220,000 (815,720)	0.14 (15.50×10^{-3})	74 (33.60)	7.20	4.25 (10.80)
1107-100K	100,000 (11,300)	4,000	150,000 (16,950)	12,450,000 (1,407,000)	0.15 (1.70×10^{-2})	74 (33.60)	7.20	4.25 (10.80)
1108-120K	120,000 (13,560)	2,400	180,000 (20,340)	15,400,000 (1,740,000)	0.69 (7.80×10^{-2})	162 (73.50)	5.30	5.75 (14.61)
1108-240K	240,000 (27,100)	2,400	360,000 (40,675)	23,300,000 (2,630,000)	0.74 (8.30×10^{-2})	162 (73.50)	5.30	5.75 (14.61)
1109-360K	360,000 (40,700)	2,100	540,000 (61,000)	28,000,000 (3,164,000)	1.04 (0.12)	240 (109)	4.40	7.00 (17.78)
1109-600K	600,000 (67,800)	2,100	900,000 (101,700)	40,000,000 (4,520,000)	1.49 (0.17)	240 (109)	4.40	7.00 (17.78)
1118-840K*	840,000 (94,900)	1,125	1,260,000 (142,360)	100,000,000 (11,298,000)	10.45 (1.18)	650 (295)	3.30	9.38 (23.81)
1118-1200K*	1,200,000 (135,600)	1,125	1,800,000 (203,375)	135,000,000 (15,253,000)	10.71 (1.21)	650 (295)	3.30	9.38 (23.81)
1118-1800K*	1,800,00 (203,400)	1,125	2,700,000 (305,000)	175,000,000 (197,723,000)	11.21 (1.26)	650 (295)	3.30	9.38 (23.81)
1121-2400K*	2,400,00 (270,000)	1,000	3,600,000 (406,800)	225,000,000 (25,422,000)	20.40 (2.30)	950 (430)	3.00	10.38 (26.35)
1121-3000K*	3,000,000 (340,000)	1,000	4,500,000 (508,400)	250,000,000 (28,246,000)	21.02 (2.40)	950 (430)	3.00	10.38 (26.35)

***Calibration performed to 600,000 lbs. in. Consult factory for higher calibrations.**

Socket Wrench Torque Sensors

MODEL 1254

FEATURES:

- Adaptable for portable usage
- No special adapter tools required
- Precision repeatable torque measurements
- Calibration reference for "hard usage" mechanical torque wrenches

The sensors are primarily used to measure the output torque of stall and clutch type nutrunners in production fastening operations (not recommended for mechanical impact wrenches). Units equipped with incremental encoders are available for applications where fastener's angle of rotation as well as torque data are required. These sensors are used to monitor operation of systems using the following fastening strategies:

- Turn of the nut
- Tension control
- Yield control
- Torque rate

PERFORMANCE SPECS: 1254 AND 2133-300 SERIES

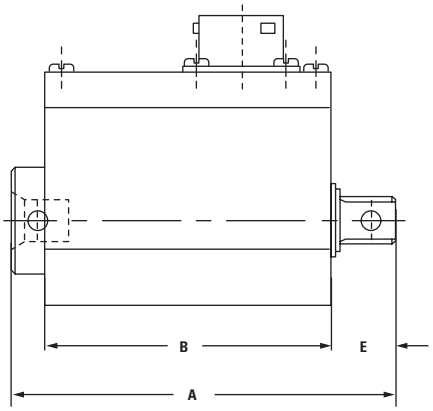
SPECIFICATIONS	1254	2133-300
Actual performance average:		
Nonlinearity:	0.019%	
Hysteresis:	0.015%	
Nonlinearity: *of rated output*	±0.15%	±0.25%
Hysteresis: *of rated output*	±0.15%	±0.20%
Output at rated capacity: *millivolts per volt*	2 ±0.25% FS	2 nominal
Repeatability: *of rated output*	±0.1%	
Zero balance: *of rated output*	±5% or better	
Bridge resistance: *ohms nominal*	350	
Temperature range, compensated: *°F*	+70 to +170	
Temperature range, usable: *°F*	-65 to +200*	
Temperature effect on output: *of reading per °F*	±0.002%	
Temperature effect on zero: *of rated output per °F*	±0.002%	
Excitation voltage, recommended: *volts DC or AC rms*	10	
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000	
Speed rating: *maximum RPM*	5000	n/a

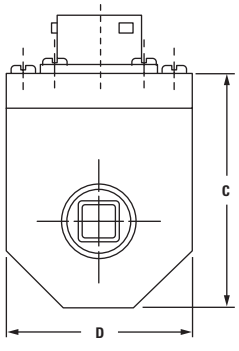
*w/encoder 185°F

SPECIFICATIONS - 1254 ENCODER

Pulses per revolution:	360
Output:	2 square wave signal 90 degrees phase difference flat over operating speed range
Output voltage:	High 5V, Low 0.5V**
Power required:	5 VDC @ 40 mA max.

**Output will drive two standard TTL loads.
Consult factory for hand-held computer floor routing system.





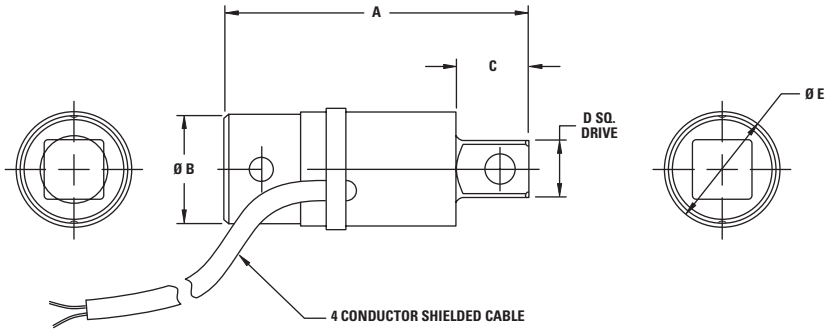
Receptacle: PTO2H-12-10P
Mating Connector: PTO6E-12-10S

SENSOR CHARACTERISTICS: 1254

MODEL NUMBER W/O ENCODER	MODEL NUMBER W/ENCODER	CAPACITY	OVERLOAD CAPACITY	DRIVE	SPEED (RPM)	DIMENSIONS A	B	C	D	E
1254-301	1254E-301	50 lb. in. 5.60 Nm	150%	1/4 in. hex	5,000	3.25	2.53	1.94	1.62	0.46
1254-301	1254E-301	100 lb. in. 11.30 Nm	150%	1/4 in. hex	5,000	3.25	2.53	1.94	1.62	0.46
1254-303	1254E-303	200 lb. in. 22.60 Nm	150%	3/8 in sq.	2,500	3.38	2.53	2.06	1.62	0.56
1254-305	1254E-305	50 lb. ft. 67.80 Nm	150%	1/2 in. sq.	2,500	3.54	2.53	2.06	1.62	0.68
1254-305	1254E-305	100 lb. ft. 135.60 Nm	150%	1/2 in. sq.	2,500	3.54	2.53	2.06	1.62	0.68
1254-307	1254E-307	300 lb. ft. 406.70 Nm	150%	3/4 in. sq.	2,000	4.45	3.07	3.37	2.38	0.91
1254-309	1254E-309	1,000 lb. ft. 1356 Nm	125%	1 in. sq.	1,000	5.36	3.42	3.77	2.88	1.22

MODEL 2133-300 SERIES

Reaction socket torque sensor



SENSOR CHARACTERISTICS: 2133-300 SERIES

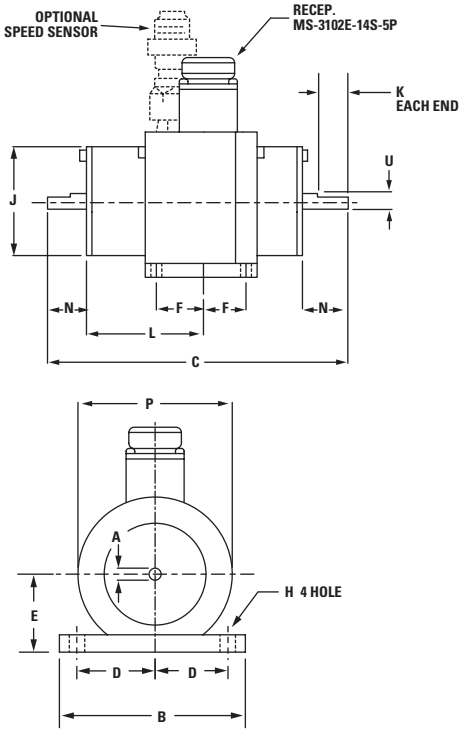
MODEL NUMBER	CAPACITY lb. ft.	DIMENSIONS A	Ø B	C	D	Ø E
2133-301-10	10	1.75	0.60	0.38	1/4	0.69
2133-301-20	20	1.75	0.60	0.38	1/4	0.69
2133-302-50	50	2.50	0.94	0.50	3/8	1.00
2133-303-100	100	2.62	0.94	0.62	1/2	1.00
2133-304-250	250	3.50	1.69	0.69	5/8	1.75
2133-305-600	600	3.62	1.69	0.81	3/4	1.75
2133-306-1K	1,000	4.75	1.94	1.09	1.00	2.00

Dimensions in inches.

Rotary Transformer Torque Sensors

MODELS 1602

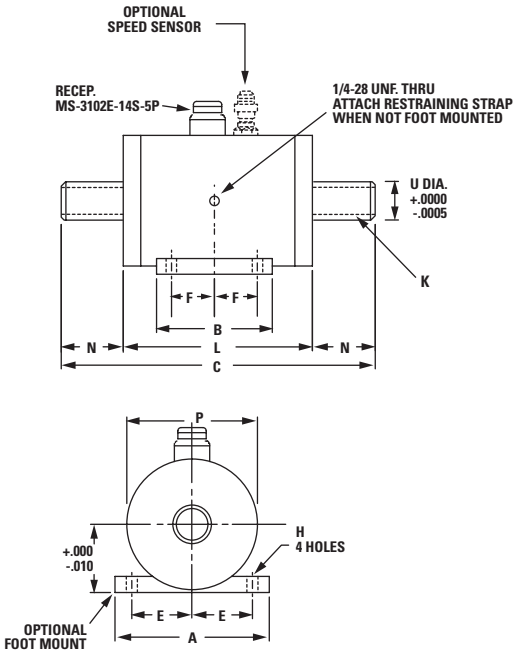
Low capacity torque sensors



MODELS 1604–1607

Standard rotating shaft torque sensor for general application

Model 7542 on-board amplifier option.



1602	IN.	CM.
C	6.50	16.50
L	2.25	5.71
N	1.00	2.50
P	3.50	8.89
U	0.37	0.95
K	0.75	1.90
A	0.34	0.86
B	4.00	10.16
D	1.75	4.44
E	1.75	4.44
F	1.00	2.50
H	0.20	0.50
J	2.38	6.03

1604	IN.	CM.
C	10	25.40
L	6	15.24
N	2	5.32
P	4	10.16
U	*1.00	2.54
K	*0.25 sq.	0.64
A	4.75	12.07
B	3.50	8.89
D	2.13	5.40
E	2	5.08
F	1.38	3.49
H	0.28	0.71

1605	IN.	CM.
C	12.75	32.39
L	7.25	18.42
N	2.75	6.99
P	4.75	11.99
U	1.50	3.81
K	0.38 sq.	0.95
A	6.25	16.51
B	4	10.16
D	2.50	6.35
E	2.63	6.67
F	1.50	3.81
H	0.41	1.03

1606	IN.	CM.
C	15.75	40.01
L	8.25	20.96
N	3.75	9.53
P	5.50	13.97
U	2.25	5.72
K	0.50 sq.	1.27
A	7	18.42
B	5.25	13.34
D	3	7.62
E	3	7.62
F	2	5.08
H	0.53	1.35

1607	IN.	CM.
C	19	48.26
L	8.75	22.23
N	5.13	13.02
P	6.50	16.51
U	3.00	7.62
K	0.75 sq.	1.91
A	8.50	24.59
B	5.50	13.97
D	3.50	8.89
E	3.50	8.89
F	2	5.08
H	0.53	1.35

*50, 100 & 200 lb. inch units; K=3¹⁄₁₆" sq., U=3¹⁄₆₄".

FEATURES:

- High overload protection with high signal output (sensitivity)
- Extended speed range
- Minimal maintenance due to "bearings only" contact
- Carrier frequency excitation provides increased signal/noise immunity

Foot Mounting–foot mount adapter is available for models 1604, 1605, 1606 and 1607. Foot mount is standard on model 1602.

Speed Sensor–a 60-tooth gear and a magnetic pickup provides an output of 60 pulses per shaft revolution. On models 1604, 1605 and 1615 for speeds less than 200 RPM, Zero Velocity Speed Sensor is recommended. On models 1606, 1607, 1641 and 1648 for speeds less than 100 RPM, Zero Velocity Speed Sensor is recommended. Zero Velocity Speed Sensor is not available on model 1602.

Air/Oil Mist Bearings–standard grease pack bearings should not operate for more than 200–300 hours continuous at rated speed or more than 1,000 hours at 40% of rated speed. If exceeded request air/oil mist also provides approximately 40% higher speed ratings and for the exact rating consult the factory. Some air/oil mist units vary dimensionally–consult factory for information.

PERFORMANCE SPECS: 1602, 1604, 1605, 1606 AND 1607

SPECIFICATIONS

Actual performance average: *Nonlinearity:* *Hysteresis:*	 0.026% 0.024%
Nonlinearity: *of rated output*	±0.1%
Hysteresis: *of rated output*	±0.1%
Output at rated capacity: *millivolts per volt, nominal*	2
Repeatability: *of rated output*	±0.05%
Zero balance: *of rated output*	±1.0%
Bridge resistance: *ohms nominal*	350
Temperature range, compensated: *°F*	+70 to +170
Temperature range, compensated: *°C*	+21 to +77
Temperature range, usable: *°F*	-20 to +200
Temperature range, usable: *°C*	-29 to +93
Temperature effect on output: *of reading per °F*	±0.002%
Temperature effect on output: *of reading per °C*	±0.0036%
Temperature effect on zero: *of rated output per °F*	±0.002%
Temperature effect on zero: *of rated output per °C*	±0.0036%
Excitation voltage, 10 VAC max. rms:	3.28 kHz optimum
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000
Number of bridges	1

Higher accuracy versions available. Consult factory for details.

SENSOR CHARACTERISTICS: 1602 AND 1604-1607

MODEL NUMBER	CAPACITY oz. in. (N • m)	MAX. SPEED RPM	PROTECTED FOR OVERLOADS TO oz. in. (N • m)	TORSIONAL STIFFNESS lb. in./rad. (N • m/rad.)	ROTATING INERTIA lb.-in. sec.² (N • m sec.²)	WEIGHT lbs. (kg.)
1602-50*	50 (0.35)	20,000	150 (1.05)	400 (45.20)	9.06×10^{-4} (1×10^{-4})	3.25 (1.48)
1602-100	100 (0.70)	20,000	300 (2.10)	1,000 (113)	9.06×10^{-4} (1×10^{-4})	3.25 (1.48)
1602-200	200 (1.50)	20,000	600 (4.50)	2,500 (282)	9.06×10^{-4} (1×10^{-4})	3.25 (1.48)
1602-500	500 (3.50)	20,000	1,500 (10.50)	5,500 (621)	9.06×10^{-4} (1×10^{-4})	3.25 (1.48)
1602-1K	1,000 (7.00)	20,000	1,500 (10.50)	8,000 (903)	9.06×10^{-4} (1×10^{-4})	3.25 (1.48)

***Output on this capacity only: 1 mV/V nominal.**

MODEL NUMBER	CAPACITY lb. in. (N • m)	MAX. SPEED RPM	PROTECTED FOR OVERLOADS TO lb. in. (N • m)	TORSIONAL STIFFNESS lb. in./rad. (N • m/rad.)	ROTATING INERTIA lb.-in. sec.² (N • m sec.²)	WEIGHT lbs. (kg.)
1604-50	50 (5)	10,000	150 (15)	5,000 (565)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1604-100	100 (10)	10,000	300 (30)	13,500 (1,525)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1604-200	200 (20)	10,000	600 (60)	33,000 (3,728)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1604-500	500 (55)	10,000	1,500 (165)	85,000 (9,603)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1604-1K	1,000 (115)	10,000	3,000 (340)	150,000 (16,946)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1604-2K	2,000 (225)	10,000	3,000 (340)	225,000 (25,420)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1605-2K	2,000 (225)	10,000	6,000 (675)	700,000 (79,085)	8.41×10^{-3} (9.60×10^{-4})	28 (12.70)
1605-5K	5,000 (565)	10,000	15,000 (1,695)	950,000 (107,330)	8.41×10^{-3} (9.60×10^{-4})	28 (12.70)
1605-10K	10,000 (1,130)	10,000	20,000 (2,260)	1,000,000 (112,979)	8.41×10^{-3} (9.60×10^{-4})	28 (12.70)
1606-20K	20,000 (2,250)	6,700	60,000 (6,750)	4,080,000 (460,955)	3.62×10^{-2} (4×10^{-3})	40 (18.20)
1606-30K	30,000 (3,390)	6,700	60,000 (6,750)	4,080,000 (460,955)	3.62×10^{-2} (4×10^{-3})	40 (18.20)
1607-50K	50,000 (5,650)	6,000	150,000 (16,950)	11,800,000 (1,333,154)	0.15 (1.70×10^{-2})	75 (34.10)
1607-100K	100,000 (11,300)	6,000	150,000 (16,950)	19,950,000 (1,333,154)	0.47 (1.70×10^{-2})	75 (34.10)

Metric dimensions and specifications are purely mathematical calculations from standard English dimension control drawings. Request certified drawings before designing mountings or fixtures. Dimensions and specifications are subject to change without notice. Higher accuracy versions available. Contact factory for details.

Non-Contact/ Amplified Output

MODEL 1700 SERIES

Torque transducers

F E A T U R E S :

- Built-in instrumentation amplifier (±10 V output)
- Contactless
- Single supply voltage
- Compact size
- Wide application range

O P T I O N S :

- Speed sensing (S) option
- Angle encoder (E) option

These transducers are suitable for laboratory applications as well as industrial evironments because of their compact size and multiple mounting options. The contactless transmission of supply voltage and measuring signal enables continuous operation with low maintenance.

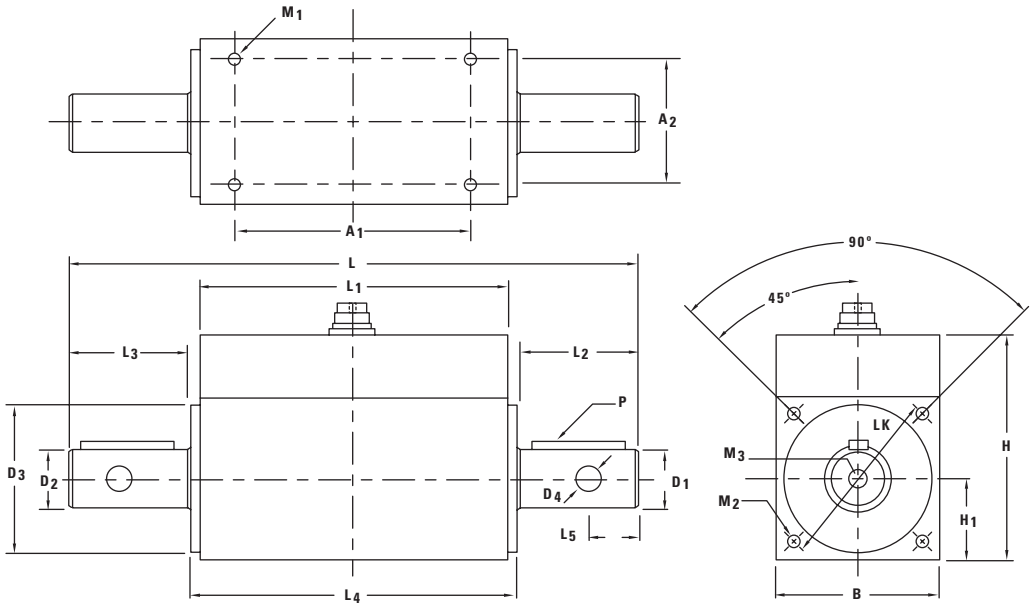
P E R F O R M A N C E S P E C S :

1700 SERIES

SPECIFICATIONS	1700	1701	1702	1703	1706
Capacity range:	0.02; 0.05 Nm	0.1; 0.2; 0.5; 1; 2 Nm	5; 10; 20 Nm	50; 100; 200; 300 Nm	500; 1,000, 1,500 Nm
Supply voltage:	12 VDC ±10%	12 VDC ±10%	12 VDC ±10%	12 VDC ±10%	12 VDC ±10%
Current consumption:	approx. 160 mA	approx. 160 mA	approx. 250 mA	approx. 200 mA	approx. 250 mA
Rise time:	2 ms	2 ms	2 ms	2 ms	1 ms (1 Hz)
Limit frequency—3dB:	200 Hz	200 Hz	200 Hz	200 Hz	–
Voltage output:	0 to ±10 V	0 to ±10 V	0 to ±10 V	0 to ±10 V	0 to ±10 V
Internal resistance:	100	100	100	100	100
Ripple:	<100mVpp	<100mVpp	<100mVpp	<100mVpp	<100mVpp
Overall accuracy:	<0.25%	<0.25%	<0.25%	<0.25%	<0.25%
Operating temperature:	0-60°C	0-60°C	0-60°C	0-60°C	0-60°C
Compensated temperature range:	5-45°C	5-45°C	5-45°C	5-45°C	5-45°C
Temperature error:					
Zero point:	0.02%/K	0.02%/K	0.02%/K	0.02%/K	0.02%/K
Sensitivity:	0.01%/K	0.01%/K	0.01%/K	0.01%/K	0.01%/K
Mechanical overload: *of rated output*	200%	200%	200%	200%	200%
Weight:	approx. 200g	approx. 200g	approx. 600g	approx. 1300g	approx. 4500g
Max. sensor speed (RPM):	15,000	37,000	19,000	13,500	7,900

OPTIONS	
Speed sensing (RPM):	(S)
Speed max:	10,000 RPM
Output:	open collector
Internal pull up:	100k (5V level)
External pull up:	24V max.
I max:	20mA
Pulses/rev.:	60
Angle:	(E)
Speed max:	3,000 RPM
Pulses/rev.:	360
Resolution:	1°
Phase shift:	Quadrature

RANGE	SPRING CONSTANT C (N • m/rad.)	MOMENT OF INERTIA I (kgm2)	ALLOWABLE AXIAL LOAD (N)	ALLOWABLE LOAD (N)
0...0.1 Nm	20	1×10^{-6}	2	2
0...0.2 Nm	20	1×10^{-6}	3	3
0...0.5 Nm	20	1×10^{-6}	3	3
0... 1 Nm	43	1×10^{-6}	4	4
0... 2 Nm	103	1×10^{-6}	5	5
0... 5 Nm	355	1×10^{-6}	5	5



SENSOR CHARACTERISTICS: 1700 SERIES

MODEL DIMENSIONS	1700 0.02/0.05 (N • m)	1701 0.1/0.2 0.5/1 2 (N • m)	1702 5/10/20 (N • m)	1703 50/100 200/300 (N • m)	1706 500/1000 1500 (N • m)
L (mm)	70	89 95	145	170	270
B (mm)	32	28	42	56	88
H (mm)	46	48,5	58	73	104
H_1 (mm)	14	14	21	28	44
D_1 g6 (mm)	Ø3	Ø5 Ø6	Ø15	Ø26	Ø45
D_2 g6 (mm)	Ø3	Ø8 Ø8	Ø15	Ø26	Ø45
D_3 -0,1 (mm)	Ø15	Ø27	Ø38	Ø54	Ø80
D_4 H7 (mm)	–	Ø2 Ø2.5	–	–	–
LK ±0,1 (mm)	*	Ø32	Ø46	Ø65	Ø98
L_1 (mm)	51	62	79	72	84
L_2 (mm)	7.5	10 14	30	45	85
L_3 (mm)	7.5	11 14	30	45	85
L_4 (mm)	55	66	83	78	90
L_5 -0,1 (mm)	–	4 5	–	–	–
A_1 (mm)	38	40	60	42	46
A_2 (mm)	24	22	32	40	70
M_1	M2.5 x 5 Deep	M3 x 5 Deep	M3 x 6 Deep	M4 x 8 Deep	M6 x 12 Deep
M_2	M2.5 x 5 Deep	M3 x 6 Deep	M3 x 6 Deep	M4 x 8 Deep	M6 x 12 Deep
M_3	–	–	–	M8 x 15 Deep	M10 x 20 Deep
P (DIN6885)	–	–	2 x A5 x 5 x 25	2 x A8 x 7 x 40	4 x A14 x 9 x 80

Dimensions are in mm.
***Consult factory.**

High-Accuracy Rotary Transformer

MODELS 1804–1807

High-accuracy rotating shaft torque sensor

Model 7927 shunt cal reference box included with each purchase of 1800 series.

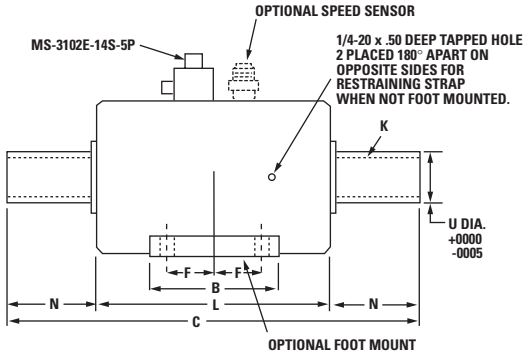
FEATURES:

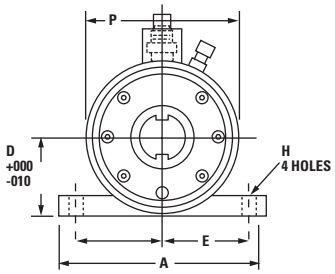
- High accuracy
- High overload protection with high signal output (sensitivity)
- Extended speed range
- Minimal maintenance due to "bearings only" contact
- Carrier frequency excitation provides increased signal/noise immunity
- 100 to 100,000 lb. in. capacities

PERFORMANCE SPECS: 1804–1807

SPECIFICATIONS

Actual performance average:	
Nonlinearity:	0.016%
Hysteresis:	0.012%
Nonlinearity: *of rated output*	±0.05%
Hysteresis: *of rated output*	±0.05%
Output at rated capacity: *millivolts per volt, nominal*	2
Repeatability: *of rated output*	±0.02%
Zero balance: *of rated output*	±1.0%
Temperature range, compensated: *°F*	+70 to +170
Temperature range, compensated: *°C*	+21 to +77
Temperature range, usable: *°F*	-20 to +170
Temperature range, usable: *°C*	-30 to +77
Temperature effect on output: *of reading per °F*	±0.001%
Temperature effect on output: *of reading per °C*	±0.0018%
Temperature effect on zero: *of rated output per °F*	±0.001%
Temperature effect on zero: *of rated output per °C*	±0.0018%
Excitation voltage, 10 volts AC rms:	3.28 kHz optimum
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000
Number of bridges	1





1804	IN.	CM.
C	10	25.40
L	6	14.76
N	2	5.32
P	4	10.16
U	*1.00	2.54
K	*0.25 sq.	0.64
A	4.75	12.07
B	3.50	8.89
D	2.13	5.40
E	2	5.08
F	1.38	3.49
H	0.28	0.71

1805	IN.	CM.
C	12.75	32.39
L	7.25	18.42
N	2.75	6.99
P	4.75	11.99
U	1.50	3.81
K	0.38	0.95
A	6.25	16.51
B	4	10.16
D	2.50	6.35
E	2.63	6.67
F	1.50	3.81
H	0.41	1.03

*100 & 200 in. lbs.;
U= 3¼4", K= 3¼16" sq.

SENSOR CHARACTERISTICS: 1804–1807

MODEL NUMBER	CAPACITY lb. in. (N • m)	MAX. SPEED RPM*	PROTECTED FOR OVERLOADS TO lb. in. (N • m)	TORSIONAL STIFFNESS lb. in./rad. (N • m/rad.)	ROTATING INERTIA lb.-in. sec.^{2} (N • m sec.^{2})	WEIGHT lbs. (kg.)
1804-100	100 (10)	27,000	300 (30)	13,500 (1,525)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1804-200	200 (20)	27,000	600 (60)	33,000 (3,728)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1804-500	500 (55)	27,000	1,500 (165)	85,000 (9,603)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1804-1K	1,000 (115)	27,000	3,000 (340)	150,000 (16,946)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1804-2K	2,000 (225)	27,000	3,000 (340)	225,000 (25,420)	2.59×10^{-3} (3.00×10^{-4})	18 (8.20)
1805-2K	2,000 (225)	22,000	6,000 (675)	700,000 (79,085)	8.41×10^{-3} (9.60×10^{-4})	29 (13.20)
1805-5K	5,000 (565)	22,000	15,000 (1,695)	950,000 (107,330)	8.41×10^{-3} (9.60×10^{-4})	29 (13.20)
1805-10K	10,000 (1,130)	22,000	20,000 (2,260)	1,000,000 (112,979)	8.41×10^{-3} (9.60×10^{-4})	29 (13.20)
1806-20K	20,000 (2,250)	12,000	30,000 (3,390)	3.27×10^{6} (369,475)	3.84×10^{-2} (4.40×10^{-4})	55.90
1807-50K	50,000 (5,650)	10,000	150,000 (16,950)	11.71×10^{6} (1.32×10^{6})	0.14 (1.61×10^{-2})	85.20
1807-100K	100,000 (11,300)	10,000	150,000 (16,950)	18.86×10^{6} (2.13×10^{6})	0.15 (1.68×10^{-2})	85.20

*Consult factory for higher speed ratings when used with air/oil mist bearings.

1806	IN.	CM.
C	15.75	40.01
L	8.25	20.96
N	3.75	9.53
P	5.50	13.97
U	2.25	5.72
K	0.50 sq.	1.27
A	7	18.42
B	5.25	13.34
D	3	7.62
E	3	7.62
F	2	5.08
H	0.53	1.35

1807	IN.	CM.
C	19	48.26
L	8.75	22.23
N	5.125	13.02
P	6.50	16.51
U	3.00	7.62
K	0.75 sq.	1.91
A	8.50	24.59
B	5.50	13.97
D	3.50	8.89
E	3.50	8.89
F	2	5.08
H	0.53	1.35

Consult factory for specials.

High-Accuracy Rotary Transformer

MODEL 1815

Flange housing mount with AND pads to match Army-Navy mountings standard. Spline drive.

Model 7927 shunt cal reference box included with each purchase of 1800 series.

FEATURES:

- Shortened drive length
- Extended speed range
- Minimal maintenance due to "bearings only" contact
- High overall performance accuracy

Safety Considerations: *"It would be unsafe to operate Lebow® Torque Sensors and Load Cells beyond Static Overload or Ultimate Extraneous Load Limits as defined in the Glossary of Terms or, when applicable, higher than maximum speed. When in doubt, consult the factory. Lebow® Products is not responsible for any property damage or personal injury which may result because of the misapplication of the Transducer."*

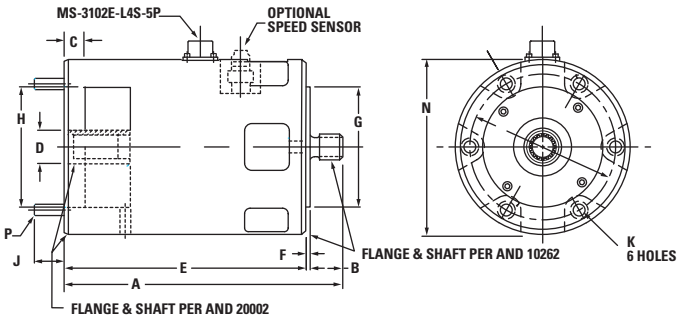
PERFORMANCE SPECS: 1815

SPECIFICATIONS	
Actual performance average:	
Nonlinearity:	0.026%
Hysteresis:	0.016%
Nonlinearity: *of rated output*	±0.05%
Hysteresis: *of rated output*	±0.05%
Output at rated capacity: *millivolts per volt, nominal*	2
Repeatability: *of rated output*	±.03%
Zero balance: *of rated output*	±1.0%
Bridge resistance: *ohms nominal*	350
Temperature range, compensated: *°F*	+70 to +170
Temperature range, compensated: *°C*	+21 to +77
Temperature range, usable: *°F*	-20 to +200
Temperature range, usable: *°C*	-29 to +93
Temperature effect on output: *of reading per °F*	±0.002%
Temperature effect on output: *of reading per °C*	±0.0036%
Temperature effect on zero: *of rated output per °F*	±0.002%
Temperature effect on zero: *of rated output per °C*	±0.0036%
Excitation voltage, 10 VAC max. rms:	3.28 kHz optimum
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000
Number of bridges	1

Other models available: 1115K, 1115A and 1615K.

SENSOR CHARACTERISTICS: 1815

MODEL NUMBER	CAPACITY lb. in. (N • m)	MAX. SPEED RPM	PROTECTED FOR OVERLOADS TO lb. in. (N • m)
1815A-50	50 (5)	25,000	150 (15)
1815A-100	100 (10)	25,000	300 (30)
1815A-200	200 (20)	25,000	600 (60)
1815A-500	500 (55)	25,000	1,500 (165)
1815A-1K	1,000 (115)	25,000	1,500 (165)
1815K-50	50 (5)	15,000	150 (15)
1815K-100	100 (10)	15,000	300 (30)
1815K-200	200 (20)	15,000	600 (60)
1815K-500	500 (55)	15,000	1,500 (165)
1815K-1K	1,000 (115)	15,000	3,000 (330)
1815K-2K	2,000 (225)	15,000	6,000 (675)
1815K-5K	5,000 (565)	15,000	15,000 (1,695)
1815K-10K	10,000 (1,130)	15,000	15,000 (1,695)



1815A	IN.	CM.
A	9.27	23.55
B	1.05	2.67
C	0.63	1.60
D	1.12	2.84
E	8.25	20.96
F	0.14	0.36
G	4.12	10.47
H	4.13	10.48
J	1.03	2.62
K	0.41	1.03
L	5.00	12.70
N	6.00	15.24
P	31/48-24	-

1815K	IN.	CM.
A	9.94	25.25
B	1.69	4.29
C	0.63	1.60
D	1.58	4.01
E	8.25	20.96
F	0.14	0.36
G	4.12	10.47
H	4.13	10.48
J	1.03	2.62
K	0.41	1.03
L	5.00	12.70
N	6.00	15.24
P	31/48-24	-

INTERNAL AND EXTERNAL SPLINE DATA

MODEL	PRESSURE ANGLE	PITCH DIA. in. (cm.)	PITCH	NO. OF TEETH
1815A	30°	0.80 (2.03)	20/30	16
1815K	30°	1.20 (3.05)	20/30	24

1-888-282-9891
Honeywell
Sensotec Sensors–Lebow Products
www.honeywell.com/sensing

MODEL 1115A AND 1115K

Other designs that conform to Army/Navy mounting standard. Please consult factory for details about 1115 and 1615 sensor designs.

MODEL 1615K

Consult factory for specials.

Reaction Torque Sensors

FEATURES:

- Reaction measurements eliminate speed limitations
- Minimal friction error
- No maintenance of slip rings, bearings or brushes
- Compact, "low mass" physical size

Safety Considerations: *"It would be unsafe to operate Lebow® Torque Sensors and Load Cells beyond Static Overload or Ultimate Extraneous Load Limits as defined in the Glossary of Terms or, when applicable, higher than maximum speed. When in doubt, consult the factory. Lebow® Products is not responsible for any property damage or personal injury which may result because of the misapplication of the Transducer."*

PERFORMANCE SPECS: 2105 AND 2102

SPECIFICATIONS

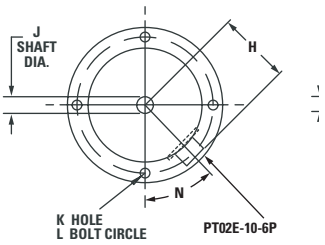
Actual performance average:	
Nonlinearity:	0.039%
Hysteresis:	0.028%
Nonlinearity: *of rated output*	±0.1%
Hysteresis: *of rated output*	±0.1%
Output at rated capacity: *millivolts per volt, nominal*	2.5
Repeatability: *of rated output*	±0.05%
Zero balance: *of rated output*	±1.0%
Bridge resistance: *ohms nominal*	350
Temperature range, compensated: *°F*	+70 to +170
Temperature range, compensated: *°C*	+21 to +77
Temperature range, usable: *°F*	-65 to +200
Temperature range, usable: *°C*	-54 to +93
Temperature effect on output: *of reading per °F*	±0.002%
Temperature effect on output: *of reading per °C*	±0.0036%
Temperature effect on zero: *of rated output per °F*	±0.002%
Temperature effect on zero: *of rated output per °C*	±0.0036%
Excitation voltage, maximum: *volts DC or AC rms*	20
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000
Number of bridges	1

MODELS 2105

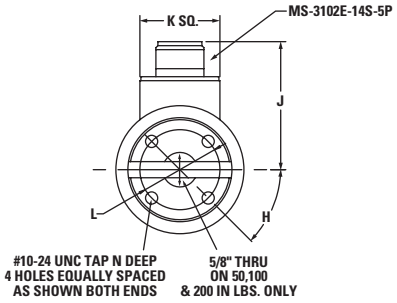
Low capacity torque sensor

MODELS 2102

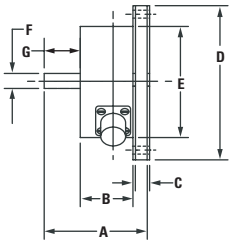
Small flanged reaction torque sensor

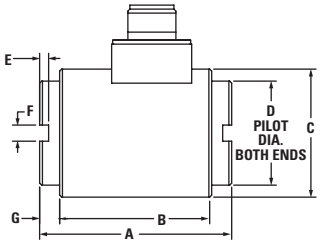


2105	IN.	CM.
A	2.41	6.11
B	1.59	4.05
C	0.38	0.95
D	3.49	8.87
E	2.56	6.55
F	0.34	0.86
G	0.75	1.91
H	1.69	4.28
J	0.38	0.95
K	0.22	0.55
L	3.06	7.77
N	45°	45°



2102	IN.	CM.
A	3	7.62
B	2.38	6.03
C	2	5.08
D	1.63	4.13
E	0.14	0.36
F	0.25	0.64
G	0.31	0.79
H	45°	45°
J	2	5.08
K	1.25	3.18
L	1.25	3.18
N	0.38	0.95





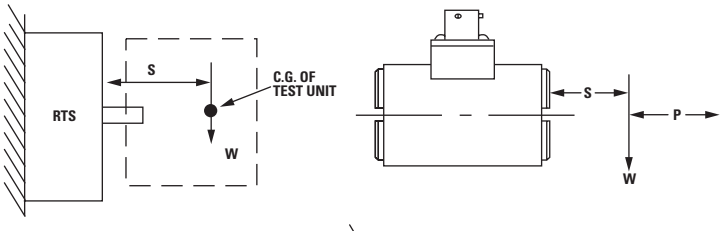
LOAD CARRYING CAPACITY

W = weight of test device

W x S = overhung moment

S = distance to center of gravity of test unit

Do not exceed moment (**W x S**) or shear (**W**), whichever value is attained first. **P** = thrust.



SENSOR CHARACTERISTICS: 2105 AND 2102

MODEL NUMBER	CAPACITY oz. in. N • m	OVERLOAD oz. in. N • m	TORSIONAL STIFFNESS oz. in./rad. N • m/rad.	MAX. OVERHUNG MOMENT WxS oz. in. N • m	MAX. SHEAR W oz. N	MAX. THRUST P oz. N
2105-50	50 0.35	75 0.53	12,900 91	100 0.72	160 44.50	320 89
2105-100	100 0.70	150 1.06	18,000 127	150 1.08	240 66.75	640 178
2105-200	200 1.50	300 2.25	51,500 364	200 1.44	320 89	960 267
2105-500	500 3.50	750 5.30	95,500 674	250 1.80	400 110	1,600 445
2105-1K	1,000 7.00	1,500 10.60	258,000 1,822	400 2.88	480 133	2,400 667

Torsional stiffness given for sensor less shaft extension(s).

MODEL NUMBER	CAPACITY lb. in. N • m	OVERLOAD lb. in. N • m	TORSIONAL STIFFNESS lb. in./rad. N • m/rad.	MAX. OVERHUNG MOMENT WxS lb. in. N • m	MAX. SHEAR W lbs. N	MAX. THRUST P lbs. N
2102-50	50 5	75 7.50	2,350 266	50 5.50	13 5.90	200 886
2102-100	100 10	150 20	6,725 760	100 11	20 9.09	280 1236
2102-200	200 20	300 30	18,800 2,124	200 22	26 11.80	400 1760
2102-500	500 55	750 85	73,600 8,315	250 27.50	500 227	500 2200
2102-1K	1,000 115	1,500 170	127,000 14,348	500 56	800 364	660 2900

FEATURES:

- High torsional stiffness
- Higher resistance to bending moments
- Minimal friction error
- Low end sensitivity due to absence of moving parts

Safety Considerations: *"It would be unsafe to operate Lebow® Torque Sensors and Load Cells beyond static overload or ultimate extraneous load limits as defined in the glossary of terms or, when applicable, higher than maximum speed. When in doubt, consult the factory. Lebow® Products is not responsible for any property damage or personal injury which may result because of the misapplication of the Transducer."*

PERFORMANCE SPECS: 2110–2116 AND 2320–2404

SPECIFICATIONS

Actual performance average:	
Nonlinearity:	0.026%
Hysteresis:	0.029%
Nonlinearity: *of rated output*	±0.1%
Hysteresis: *of rated output*	±0.1%
Output at rated capacity:* *millivolts per volt, nominal*	2
Repeatability: *of rated output*	±0.05%
Zero balance: *of rated output*	±1.0%
Bridge resistance: *ohms nominal*	350*
Temperature range, compensated: *°F*	+70 to +170
Temperature range, compensated: *°C*	+21 to +77
Temperature range, usable: *°F*	-65 to +200
Temperature range, usable: *°C*	-54 to +93
Temperature effect on output: *of reading per °F*	±0.002%
Temperature effect on output: *of reading per °C*	±0.0036%
Temperature effect on zero: *of rated output per °F*	±0.002%
Temperature effect on zero: *of rated output per °C*	±0.0036%
Excitation voltage, maximum: *volts DC or AC rms*	20
Insulation resistance, bridge/case: *megohms at 50 VDC*	>5,000
Number of bridges	1

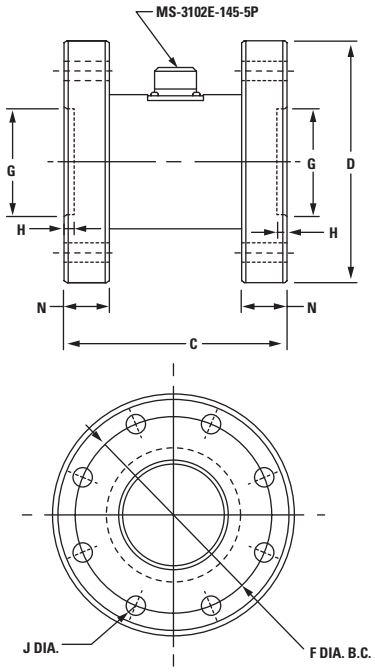
***Model 2404 output at rated capacity is 1.5 mV/V nominal and bridge resistance 700 ohms.**

MODEL 2110–2116

Flanged reaction torque sensors

MODEL 2320 AND 2404

Hollow reaction torque sensors



2110-2K, 5K	IN.	CM.
C	3	7.62
D	4	10.16
F	3.25	8.26
G*	1.50	3.81
H	0.13	0.32
N	0.50	1.27
J†	0.33	0.83

2111-10K, 20K	IN.	CM.
C	3.50	8.89
D	5	12.70
F	4.25	10.80
G*	2.00	5.08
H	0.25	0.64
N	0.75	1.91
J†	0.39	0.99

2112-50K, 100K	IN.	CM.
C	7.38	18.73
D	8	20.32
F	6.50	16.51
G*	3.50	8.89
H	0.31	0.79
N	1.50	3.81
J†	0.65	1.63

2113-200K	IN.	CM.
C	8.50	21.59
D	9.75	24.77
F	8	20.32
G*	4	10.16
H	0.31	0.79
N	1.50	3.81
J†	0.77	1.94

2114-300K‡, 500K‡	IN.	CM.
C	10.50	26.67
D	14	35.56
F	11	27.94
G*	6	15.24
H	0.31	0.79
N	2	5.08
J†	1.02	2.59

2115-600K‡, 750K‡	IN.	CM.
C	10.50	26.67
D	15	38.10
F	12	30.48
G*	6	15.24
H	0.31	0.79
N	2	5.08
J†	1.52	3.85

2116-1200K‡, 2400K‡	IN.	CM.
C	16	40.64
D	20	50.80
F	16	40.64
G*	8	20.32
H	0.50	1.27
N	2	5.08
J††	1.52	3.86

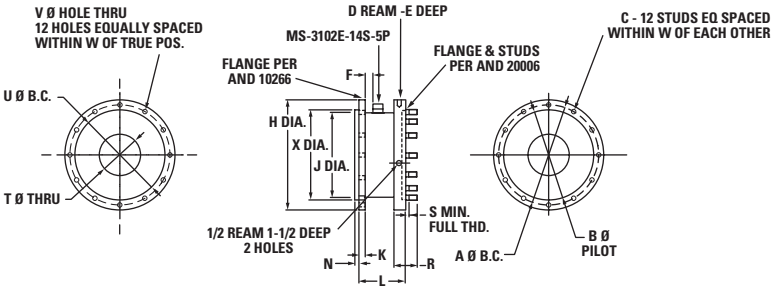
* Diameter tolerance +.002–.000.

† 8 equally spaced holes are located within .005 of true position.

†† 16 equally spaced holes.

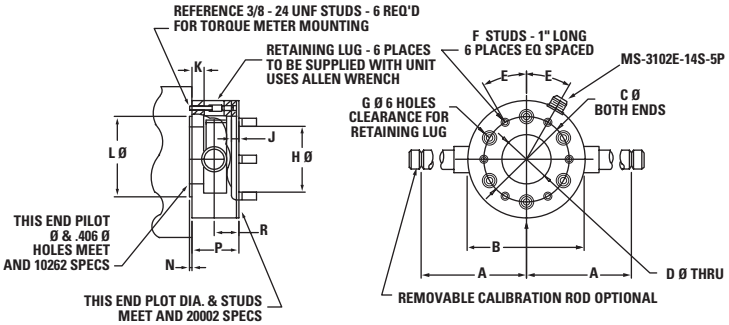
‡ Calibration performed to 300,000 lbs. in. maximum.

2320



2320	IN.	CM.
A	10	25.40
B	9.00	22.86
C	3 1/48-24	-
D	0.38	0.94
E	0.38	0.94
F	1.25	3.15
G	0.25	0.64
H	11.00	27.94
J	8.50	21.59
K	0.63	1.58
L	4.25	10.79
N	0.22	0.56
P	1.13	2.85
R	1.13	2.85
S	0.81	2.06
T	4.13	10.47
U	10.00	25.40
V	0.41	1.03
W	0.01	0.02
X	8.99	22.83

2404



2404	IN.	CM.
A	10	25.40
B	6.44	16.35
C	5.00	12.70
D	3.00	7.62
E	30°	30°
F	3 1/48-24	-
G	0.63	1.59
H	4.13	10.48
J	0.44	0.44
K	0.63	1.58
L	4.12	10.47
N	0.15	0.37
P	2.75	6.98
R	1.28	3.25
S	0.31	0.79
T	-	-
U	-	-
V	-	-
W	-	-
X	-	-

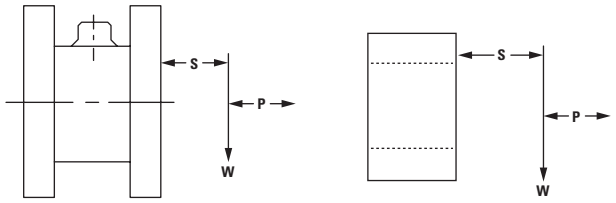
LOAD CARRYING CAPACITY

W = weight of test device

W x S = overhung moment

S = distance to center of gravity of test unit

Do not exceed moment (**W x S**) or shear (**W**), whichever value is attained first. **P** = thrust.



SENSOR CHARACTERISTICS: 2110-2116, 2320 AND 2404

MODEL NUMBER	CAPACITY lbs. in. (N • m)	OVERLOAD lbs. in. (N • m)	TORSIONAL STIFFNESS lbs. in./rad. (N • m/rad.)	MAX. OVERHUNG MOMENT WxS lbs. in. (N • m)	MAX. SHEAR W lbs. (N)	MAX. THRUST P lbs. (N)
2110-2K	2,000 (25)	3,000 (340)	384,000 (43,384)	1,000 (113)	1,500 (6,675)	2,000 (8,895)
2110-5K	5,000 (565)	7,500 (845)	920,000 (103,941)	2,000 (226)	2,000 (8,896)	3,000 (13,344)
2111-10K	10,000 (1,130)	15,000 (1,690)	2,680,000 (302,784)	5,000 (565)	4,000 (17,800)	6,000 (26,688)
2111-20K	20,000 (2,250)	30,000 (3,380)	5,750,000 (649,630)	10,000 (1,130)	6,500 (28,900)	10,000 (44,480)
2111-30K	30,000 (3,390)	45,000 (5,085)	10,000,000 (1,129,790)	15,000 (1,695)	8,500 (3,863)	13,000 (57,824)
2112-50K	50,000 (5,650)	75,000 (8,475)	8,000,000 (903,833)	24,000 (2,704)	12,000 (53,375)	18,000 (80,064)
2112-100K	100,000 (11,300)	150,000 (16,950)	20,000,000 (2,259,584)	50,000 (5,650)	20,000 (89,000)	30,000 (133,440)
2113-200K	200,000 (22,600)	300,000 (33,900)	33,400,000 (3,773,505)	90,000 (10,170)	30,000 (133,440)	40,000 (177,920)
2114-300K	300,000 (33,900)	450,000 (50,850)	60,000,000 (6,778,752)	150,000 (16,950)	42,000 (186,800)	60,000 (266,880)
2114-500K*	500,000 (56,500)	750,000 (84,750)	114,000,000 (12,879,628)	200,000 (22,600)	55,000 (244,640)	80,000 (355,840)
2115-600K*	600,000 (67,796)	900,000 (101,695)	160,000,000 (18,079,096)	200,000 (22,600)	95,000 (422,560)	90,000 (400,320)
2115-750K*	750,000 (84,745)	1,125,000 (127,119)	210,000,000 (23,728,814)	250,000 (28,250)	110,000 (489,280)	105,000 (467,040)
2116-1200K*	1,200,000 (135,593)	1,800,000 (203,375)	180,000,000 (20,338,983)	350,000 (39,550)	140,000 (622,720)	130,000 (578,240)
2116-2400K*	2,400,000 (271,186)	3,600,000 (406,800)	430,000,000 (48,587,570)	700,000 (79,096)	225,000 (1,000,800)	210,000 (934,080)
2404-50	50 (5)	250 (25)	17,000 (1,920)	200 (22)	50 (222)	200 (889)
2404-100	100 (10)	300 (30)	40,000 (4,519)	300 (34)	100 (445)	300 (1,334)
2404-200	200 (20)	500 (55)	100,00 (11,298)	400 (44)	150 (667)	400 (1,779)
2404-500	500 (55)	750 (85)	250,000 (28,245)	700 (77)	300 (1,334)	600 (2,668)
2404-1K	1,000 (115)	1,500 (170)	500,000 (56,490)	1,000 (113)	400 (1,779)	1,000 (4,448)
2404-2K	2,000 (225)	3,000 (340)	1,250,000 (141,224)	2,000 (226)	500 (2,224)	1,500 (6,672)
2404-5K	5,000 (565)	7,500 (850)	3,500,00 (395,427)	3,000 (338)	600 (2,669)	2,500 (11,120)
2320-12K	12,000 (1,350)	18,000 (2,030)	6,000,000 (677,875)	6,000 (676)	1,500 (6,672)	6,000 (26,688)
2320-36K	36,000 (4,050)	54,000 (6,085)	30,000,000 (3,389,376)	15,000 (1,694)	3,000 (13,344)	15,000 (66,720)

***Calibration performed to 300,000 lbs. in.; consult factory for higher calibrations.**

Notes

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Accelerometers

STRAIN GAGE

PIEZOELECTRIC

DC TO 6000 HZ

MANY MODELS IN STOCK

These sensors are manufactured as standard, modified standard, and custom accelerometers to provide the fastest possible delivery. Many units can be shipped from our extensive stocking program within 24 hours.

We offer a wide range of frequencies from DC to 6000 Hz and full ranges of 5 G to 2000 G. These units will survive overloads up to 500% (varies with model) and are also designed to cope with operating temperatures between 100° F to 500° F. Our range of outputs are as varied as any manufacturer in the world and include ±5V, 100mV, 100 pC/G, and 2-10mA. We offer a wide range of sizes, including miniature transducers, and a wide array of mounting configurations (screw type, bolt mount, epoxy, etc.). Bi-axial and tri-axial measurements and special underwater, submersible units are also available.

PRODUCT INDEX

* Intrinsically safe amp see page AP-6

ACCELERATION

General Purpose Accelerometers

Model JTF

ZERO HERTZ OPERATION

EASY CALIBRATION

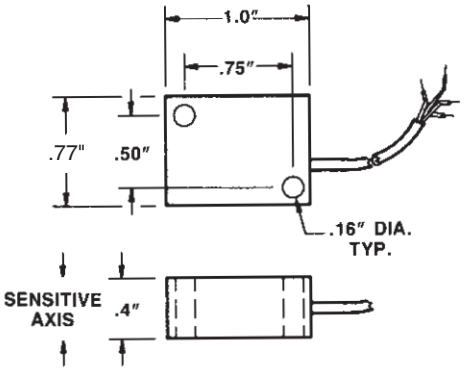
LOW IMPEDANCE

Screw Mount (Flat Pack) | Bolt Mount | Stud Mount

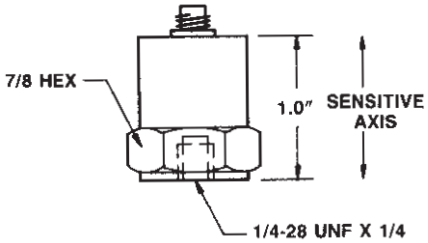
The JTF Accelerometers offer three mounting choices to meet specific application requirements. The sensing technique for these accelerometers is based on piezoresistive technology. Frequency response extends down to DC. Hermetic construction of the JTF Series provides dependable performance in harsh industrial environments. The case material is non-magnetic from either anodized aluminum or stainless steel which provides low magnetic field susceptibility. Our Standard In-Line Amplifiers and Instrumentation may be used with the JTF Series Accelerometers. The Screw Mount model can be supplied with an optional Triaxial Mounting Block, allowing for more than one accelerometer to be used.

Dimensions

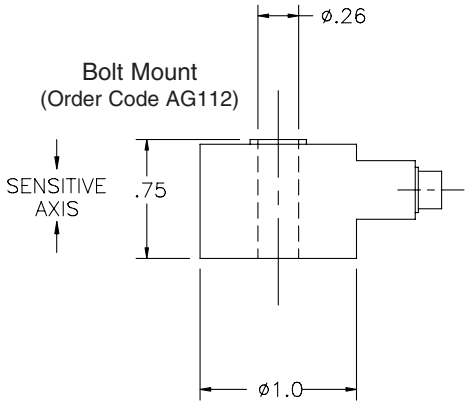
Screw Mount (Flat Pack)
(Order Code AG111)



Stud Mount
(Order Code AG113)



Bolt Mount
(Order Code AG112)

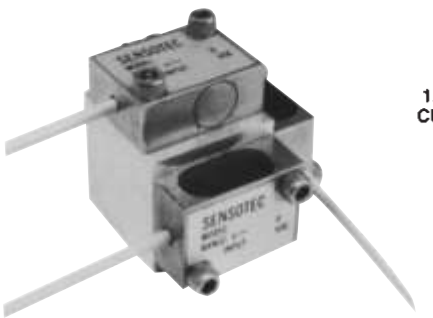


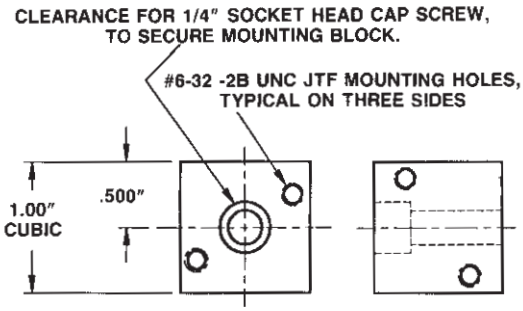
Options (See Appendix)

Accessories: Mating connectors and connector/cable assemblies

Triaxial Mounting Block
(Order Code AA235)

(For use with AG111 only)





Model JTF

Screw Mount: Order Code AG111
Bolt Mount: Order code AG112
Stud Mount: Order Code AG113

PERFORMANCE	Ranges (in Peak g)	±5 to 500
	Non-linearity and Hysteresis	±1% F.S.
	Frequency response (%)*	±5%
	Transverse sensitivity	5% max.
	Damping ratio (nominal)	.7 C @ 70° F
ENVIRONMENTAL	Temperature, Operating	-40° F to 250° F
	Temperature, Compensated*	70° F to 200° F
	Temperature Effect	
	– Zero (max)	0.02% F.S./° F
	– Sensitivity (max)	±10%
ELECTRICAL	Excitation (calibration)	5VDC
	Excitation (acceptable)	Up to 10VDC
	Electrical Termination	see below
	Bridge Resistance	4,000 Ohm (nom.)
MECHANICAL	Acceleration limits, any direction	20x
	Weight	Screw Mount: 1oz.
		Bolt & Stud Mount: 2.1oz.
	Case material	Screw Mount: Anodized Aluminum
		Bolt & Stud Mount: Stainless Steel

NOTE: Output voltage is proportional to input voltage.

SPECIFICATIONS

Available Ranges (peak g)	Sensitivity Nominal (mV/g)	Sensitivity Range (mV/g)	Usable Frequency Range (Hz)	Mounted Resonant Frequency (Hz)
±5	8	5.0-12	0-300	800
±10	3.8	2.4-5.0	0-400	1000
±20	1.8	1.2-2.4	0-600	1500
±50	0.8	0.5-1.2	0-1000	2000
±100	0.38	.24-0.5	0-1500	3000
±200	0.18	.12-.24	0-2000	4000
±500	0.08	.05-.12	0-2400	5000

Stocked ranges are in bold face type, for flat pack model only.

	Screw mount	Bolt mount Stud mount
Wiring Code	#1 (See pg AP-9)	#27 (See pg AP-10)
Electrical Termination	Teflon Cable 5'	10-32 UNF 4-Pin connector
Mating Connector AA141(not incl.)	N/A	10-32 UNF Socket Plug

General Information

How to order (See Pg. AP-19)

Amplified Piezoelectric Accelerometer

Model PA

HIGH SENSITIVITY

CASE ISOLATED

RUGGED, HIGH IMPACT

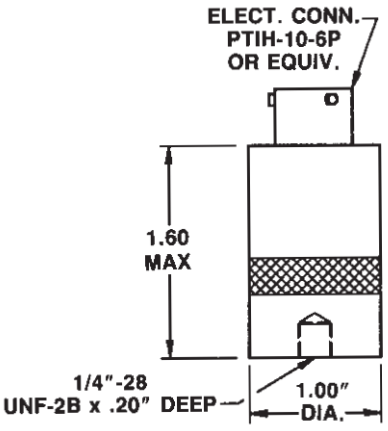
The SENSOTEC Model PA amplified piezoelectric accelerometers are designed to be used in test/measurement and industrial environments; including laboratory testing, modal studies and vibration testing for engine, turbine monitoring, and mining engineering. The low output impedance combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The Model PA features high natural frequency, a wide frequency range, and a flat sensitivity vs. temperature response over the temperature range. Since the unit has very low internal damping, there is very low phase shift over the operating frequency range.

This seismic element is mechanically isolated from the mounting base, resulting in a low strain sensitivity. All materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed enclosure, assure, accurate and reliable data.

The 1/4-28 UNF mounting hole is provided for easy installation. The Model PA accelerometer is well suited for rough industrial environments where a small size and a rugged electrical connector is needed. A six pin connector with a heavy gauge wall is welded to the top of the accelerometer. Any 4 conductor cable may be used.

		Order Code: AG714
PERFORMANCE	Capacities	±5 to ±1000g
	Useable Frequency Range	3 to 5,000 Hz
	Full Scale Output	±5 V
	Mounted Natural Frequency	30kHz
	Transverse Sensitivity	5% of F.S.
ENVIRONMENTAL	Shock Limits	3000g
	Vibration Limits	2000g
	Operating Temperature Range	-40° F to 200° F
ELECTRICAL	Input Power	±13.5 to ±16.5 Vdc
	Output Impedance	100 ohms
	Connector	PTIH-10-6P
MECHANICAL	Weight	3 oz.
	Case Material	316 SS
	Sealing	Welded

Dimensions



Wiring Code:

A	+ 13.5 to 16.5 VDC
B	— output/supply common
C	— 13.5 to —16.5 VDC
D	+ output (±5 VDC)
E	N/A
F	N/A

Sensitivity Table

Range	Sensitivity
5g	1,000mV/g
10g	500mV/g
50g	100mV/g
100g	50mV/g
500g	10mV/g
1,000g	5mV/g

Accessories: Mating connector AA111; Cable assembly AA165. See Appendix.

Submersible Accelerometer

Model JTFS

SUBMERSIBLE

LOW IMPEDANCE

EASY CALIBRATION

Amplified

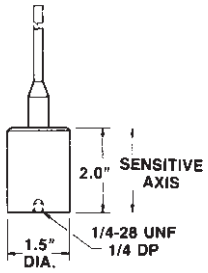
SENSOTEC's Model JTFS Submersible Accelerometers provide underwater measurement over full scale ranges of 5 to 500g. An all-welded, stainless steel construction and special cable permit immersion for indefinite periods. Units will operate at external pressures to 500 psi. Additional features include low impedance and simple calibration.

	MODEL JTFS Amplified (±5 VDC) Order Code BG913 (4-20mA) Order Code BG914
PERFORMANCE	
Ranges (in Peak g)	±5 to 500
Non-linearity and Hysteresis	±1% F.S.
Output	±5 volts or 12 ± 8 mA
Frequency Response (%)	±10%
Transverse Sensitivity	5% max
Damping Ratio (nominal)	.7 C @ 70° F
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	0° F to 200° F
Temperature, Compensated	70° F to 200° F
Temperature Effect	
- Zero (max)	.015% F.S./° F
- Sensitivity (max)	±10%
ELECTRICAL	
Excitation/supply	26-32VDC (BG913)
	22-32VDC (BG914)
Bridge Resistance	4000 ohms
Wiring Code (std)	±5 VDC #10 (See Pg. AP-8)
	4-20mA Consult factory
Electrical Termination (std)	Submersible cable (10 ft.)
MECHANICAL	
Overload, Safe	5 X F.S.
Weight	10 oz.
Case Material	316 Stainless

NOTE: Amplified 4-20mA units swing ±8mA centered on 12mA. Zero vibration is 12mA output.

Available Ranges (Peak g)	Usable Frequency Range (Hz)	Mounted Resonant Frequency (Hz)
±5	0-200	300
±10	N/A	N/A
±50	0-600	1000
±100	0-800	1500
±500	0-200	3000

Dimensions



Order Code BG913 (±5VDC output)
Order Code BG914 (4-20mA output)

Miniature Piezoelectric Accelerometer

Model PEC-S

2 TO 8000 HZ

–40° F TO 200° F

RUGGED, SHOCK RESISTANT

Model PEC-S

SENSOTEC's Model PEC-S miniature shear Piezoelectric Accelerometer features high natural frequency, a wide frequency range, and a flat temperature response over its temperature range.

The accelerometer is designed to be used in test/measurement and industrial environments. This model utilizes a small diameter, coaxial cable with teflon insulation. A 8-32 UNF tapped hole is provided for ease of attachment to the mounting surface. This model measures .59" high by 0.375" in diameter. Typical applications include laboratory testing, impact testing, modal studies, acoustically induced vibration, and jet engine testing.

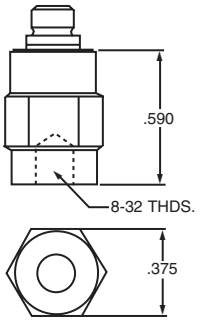
The accelerometer has an internal impedance converter with low output impedance. Therefore expensive low noise cable is not required and the unit is fairly immune to electrical noise.

A constant current power supply is required.

	Model PEC-S Order Code: AG740
PERFORMANCE	
Sensitivity (1000g unit)	5 mV/g (nom)
Mounted Natural Frequency	50 kHz
Transverse Sensitivity	5% (max)
Frequency Response	± 5% 2 Hz to 8,000 Hz
Output Impedance	<100
Transducer Resistance	1 g ohm (min)
Strain Sensitivity (at 250 microstrain)	.5 g equivalent (max)
ENVIRONMENTAL	
Shock	3000 g peak half sine
Vibration	2000 g peak
Temperature, Operating	–40° F to 200° F
Temperature Effect – Sensitivity (max)	± 5%
ELECTRICAL	
Electrical Termination	10-32 UNF Coaxial connector
Mating Conn/Cable Ass'y. (not incl.)	AA160 (See page AP-2)
Cable	5 ft. teflon jacketed
Grounding	Single Return
Current	2 to 10 mA
MECHANICAL	
Design	Shear
Weight	8 grams
Case Material	Stainless Steel
Mounting	Tapped Hole for 8-32 UNF

Note: Constant current power supply; Model CC2 (See Pg. IN-14)

Dimensions



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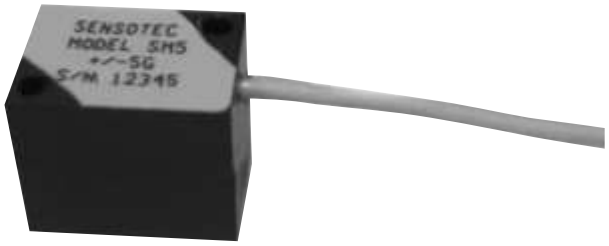
Accelerometer

Model SM-5

QUICK DELIVERY

LOW COST

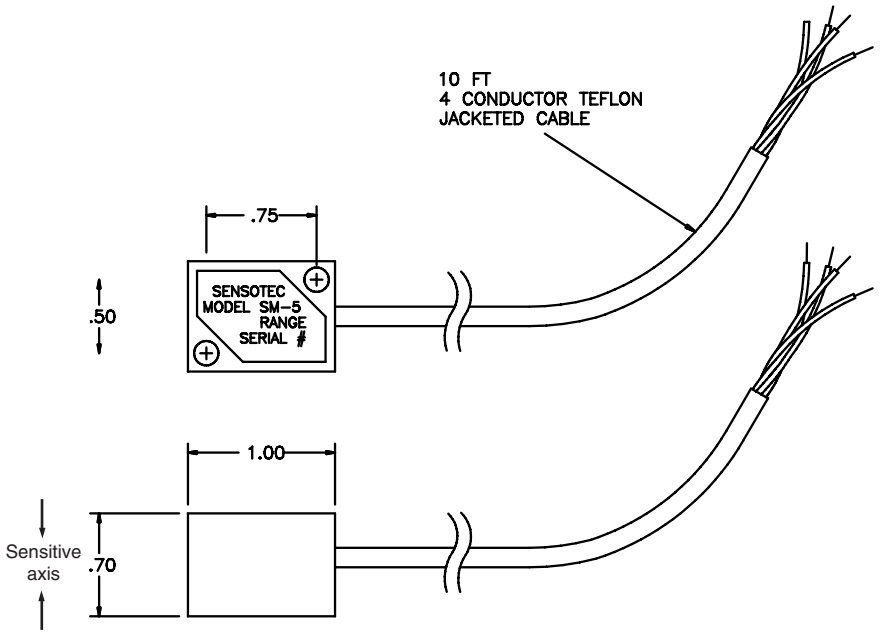
LIGHTWEIGHT



Model SM-5 Accelerometer is designed for general or rugged applications requiring high performance (up to 600 Hz) and quick delivery. The Model SM-5 is available in ranges from 2g to 50g. These accelerometers are based upon a micro machined silicon chip, air damped element which is encapsulated in a lightweight aluminum housing. The Model SM-5 is supplied with 10 feet of Teflon jacketed, shielded cable. The safe overload is ± 500 g.

Dimensions

	Model SM-5 Order Code: AG751
PERFORMANCE	
Ranges	0±2g to 0±50g
Full Scale Output	±1.25V
Transverse Sensitivity	<5% FS
Usable Frequency Response	0-600Hz
ELECTRICAL	
Bias Voltage @ 0 g	2.5V
Supply Voltage	8-28VDC@5mA
Cable: 4 conductor Teflon insulated with a woven shield and Teflon jacket	10 feet
Wiring Code	001-0927-00
ENVIRONMENTAL	
Compensated Temperature Range	-40 to +120°F
Temperature Effect on Zero	50mV over T/C range
Temperature Effect on Sensitivity	±0.5%FS over T/C range
MECHANICAL	
Weight	<1 oz.
Housing	Aluminum
Safe Overload	±500g



Accelerometer

Model MA11

GENERAL PURPOSE

INTRINSICALLY SAFE OPTION*

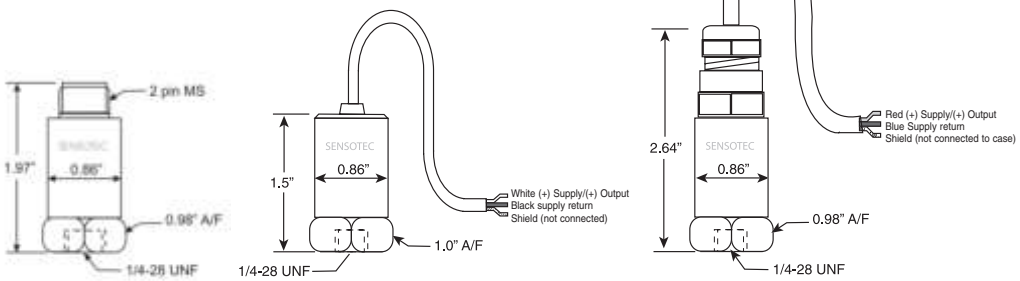
IEPE OUTPUT

2Hz-10kHz USABLE RANGE

The SENSOTEC Model MA11 amplified piezoelectric accelerometers are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The model MA11 is available in a number of configurations and options that includes connector or integral stainless steel armored cable (specify length at time of ordering), or a submersible format. The Model MA11 can be supplied in a number of different dynamic ranges to suit the expected vibration levels for the application.

Specifications



	Order Code AG901	Order Code AG902	Order Code AG905
PERFORMANCE			
Sensitivity	100 mV/g ±10%	100 mV/g ±10%	100 mV/g ±10%
Usable frequency range	2 Hz to 10 kHz	2 Hz to 10 kHz	2 Hz to 10 kHz
Mounted base resonance	18 kHz	18 kHz	18 kHz
Dynamic range	±80g	±80g	±80g
Temperature sensitivity	0.145 per degree F	0.145 per degree F	0.145 per degree F
Transverse sensitivity	Less than 5%	Less than 5%	Less than 5%
Amplitude linearity	Better than 1% Linearity	Better than 1% Linearity	Better than 1% Linearity
ENVIRONMENTAL			
Temperature range	-70° F to 280° F	-70° F to 280° F	-70° F to 280° F
Sealing	IP 67/Nema 4	IP 67/Nema 4	IP 68/Nema 4X
ELECTRICAL			
Input	Constant current	Constant current	Constant current
Current range	0.5 mA to 8 mA	0.5 mA to 8 mA	0.5 mA to 8 mA
Bias voltage	12V dc	12V dc	12V dc
Cable	-	S/S overbraided PTFE	PU
Standard cable length	-	16 ft.	Specify at time of order
Mating connector	MH002	-	-
Electrical noise	0.1 mg max	0.1 mg max	0.1 mg max
Isolation	Base isolated	Base isolated	Base isolated
MECHANICAL			
Weight	3.85 oz.	3.85 oz.	5.3 oz.
Case material	Stainless steel	Stainless steel	Stainless steel
Mounting torque	6 ft. lbs.	6 ft. lbs.	6 ft. lbs.
OPTIONS			
Different sensitivity	30 mV/g	30 mV/g	30 mV/g
Cable length	-	Specify at time of order	Specify at time of order
Different mounting	Quickfit female	Quickfit female	Quickfit female

*Note: Intrinsically safe option 2n or 2N (see page AP-6) only available with cable exit.

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Accelerometer

Model MA12

GENERAL PURPOSE

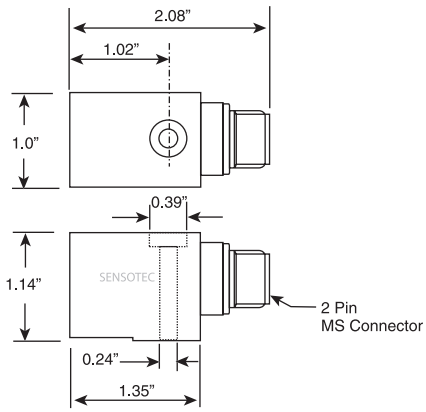
IEPE OUTPUT

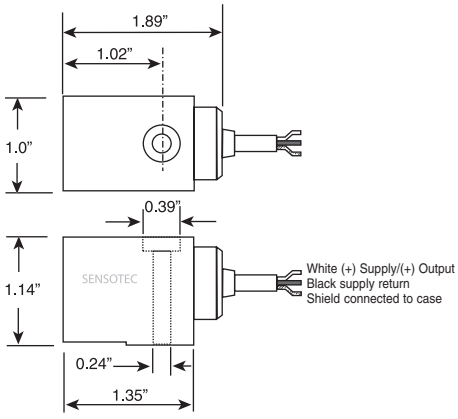
2Hz-8kHz USABLE RANGE

The SENSOTEC Model MA12 low profile amplified piezoelectric accelerometers are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where head room is limited and where a low profile unit is desirable. The constant current low output impedance output combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The Model MA12 can be supplied in a number of different sensitivites to suit the expected vibration levels for the application.

Specifications





		Order Code AG903	Order Code AG904
PERFORMANCE	Sensitivity	100 mV/g ±10%	100 mV/g ±10%
	Usable frequency range	2 Hz to 10 kHz	2 Hz to 10 kHz
	Mounted base resonance	18 kHz	18 kHz
	Dynamic range	± 80 g	± 80 g
	Temperature sensitivity	0.145 per degree F	0.145 per degree F
	Transverse sensitivity	Less than 5%	Less than 5%
	Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	-70° F to 280° F	-70° F to 280° F
	Sealing	IP67/Nema 4	IP67/Nema 4
ELECTRICAL	Input	Constant current	Constant current
	Current range	0.5 mA to 8 mA	0.5 mA to 8 mA
	Bias voltage	12 V dc	12 V dc
	Cable	-	S/S overbraided PTFE
	Standard cable length	-	16 ft.
	Mating connector	MH002	-
	Electrical noise	0.1mg	0.1mg
	Isolation	Base isolated	Base isolated
MECHANICAL	Weight	6 oz.	6 oz.
	Case material	Stainless steel	Stainless steel
	Mounting torque	6 ft. lbs.	6 ft. lbs.
OPTIONS	Different sensitivity	30 mV/g	30 mV/g

Accelerometer

Model MA15

GENERAL PURPOSE

4-20 mA PROPORTIONAL TO g

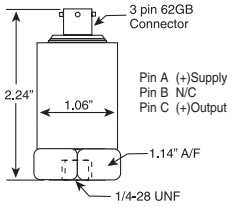
2 Hz-1kHz USABLE RANGE

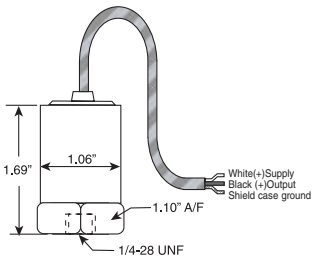
INTRINSICALLY SAFE OPTION*

The Model MA15 is a low cost amplified piezoelectric accelerometer which is designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells. The constant current low output impedance output combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The Model MA15 features a high natural frequency, a wide frequency range and a flat sensitivity vs. temperature response over the temperature range. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The Model MA15 is available in a number of configurations and options that include connector or integral stainless steel armored cable (specify length at time of ordering) and an intrinsically safe option. The mounting hole can be supplied with different threads. The Model MA15 can be supplied in a number of different sensitivities to suit the expected vibration levels for the application.

Dimensions





	Order Code AG906	Order Code AG907
PERFORMANCE		
Sensitivity	4-20 mA for 50 g	4-20 mA for 50g
Usable frequency range	2Hz to 1kHz ±10%	2Hz to 1kHz ±10%
Mounted base resonance	5 kHz min	5 kHz min
Dynamic range	±50g	±50g
Temperature sensitivity	0.145 per degree F	0.145 per degree F
Transverse sensitivity	Less than 5%	Less than 5%
Amplitude linearity	1% linearity	1% linearity
ENVIRONMENTAL		
Temperature range	-10° F to 210° F	-10° F to 210° F
Sealing	IP67/Nema 4	IP67/Nema 4
ELECTRICAL		
Input	Voltage	Voltage
Output	4-20mA for 50g	4-20mA for 50g
Supply voltage	12-32V	12-32V
Cable	-	Stainless steel overbraided PTFE
Standard cable length	-	16 ft.
Mating connector	MH008	-
Electrical noise	0.3 mg max	0.3 mg max
Isolation	Base isolated	Base isolated
MECHANICAL		
Weight	5 oz.	5 oz.
Case material	Stainless steel	Stainless steel
Mounting torque	6 ft. lbs.	6 ft. lbs.
OPTIONS		
Different dynamic ranges	± 5, 10, 50, 120, 700g	± 5, 10, 50, 120, 700g
Cable length	-	Must specify at time of order
Different mounting	Quickfit female	Quickfit female

*Note: Intrinsically safe option 2n or 2N (See page AP-6) only available with cable exit.

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Accelerometer

Model MA21

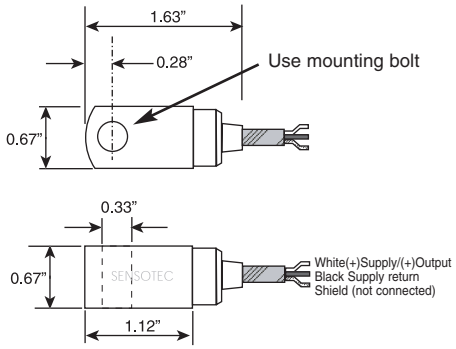
MINIATURE SIZE

LOW PROFILE

IEPE OUTPUT

The SENSOTEC Model MA21 miniature, low profile amplified piezoelectric accelerometers are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where head room is limited and where a low profile unit is desirable. The constant current low output impedance output combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The Model MA21 features a high natural frequency, a wide frequency range and a flat sensitivity vs. temperature response over the temperature range. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

Specifications



		Order Code AG913
PERFORMANCE	Sensitivity	100 mV/g ±10% @ 80Hz
	Usable frequency range	2 Hz to 9 kHz
	Mounted base resonance	18 kHz
	Dynamic range	± 80g
	Temperature sensitivity	0.145 per degree F
	Transverse sensitivity	Less than 5%
	Amplitude linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	10° F to 280° F
	Sealing	IP 67/Nema 4
ELECTRICAL	Input	Constant current
	Current range	0.5 mA to 8 mA
	Bias voltage	12 VDC
	Cable	S/S overbraided PTFE
	Standard cable length	16 ft.
	Electrical noise	0.1 mg max
	Isolation	Base isolated
MECHANICAL	Weight	3.90 oz.
	Case material	Stainless steel
	Mounting torque	6 ft. lbs.
OPTIONS	Different sensitivity	30 mV/g
	Cable length	Specify at time of ordering

Piezoelectric Accelerometer

Model PEC

2 to 5000 Hz

-40° F TO 200° F

RUGGED, SHOCK RESISTANT

Model PEC

SENSOTEC's Model PEC Piezoelectric Accelerometer features high natural frequency, a wide frequency range, and a flat temperature response over its temperature range.

The accelerometer is designed to be used in test/measurement and industrial environments. This model utilizes a small diameter, coaxial cable with teflon insulation. A 10-32 UNF tapped hole is provided for ease of attachment to the mounting surface. This model measures 0.9" high by 0.63" in diameter. Typical applications include laboratory testing, impact testing, modal studies, acoustically induced vibration, and jet engine testing.

The accelerometer has an internal impedance converter with low output impedance. Therefore expensive low noise cable is not required and the unit is fairly immune to electrical noise.

A constant current power supply is required.

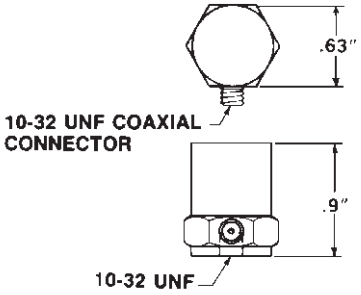
MODEL PEC
ORDER CODE AG713

PERFORMANCE	Sensitivity	15 mv/G (nom)
	Mounted Natural Frequency	27K Hz (min)
	Transverse Sensitivity	5% (max)
	Frequency Response	±5% 2 Hz to 5000 Hz
	Output Impedance	<100Ω
	Transducer Resistance	1 G ohm (min)
	Strain Sensitivity (at 250 microstrain)	1 G equivalent (max)
ENVIRONMENTAL	Shock	3000 G peak half sine
	Vibration	2000 G peak
	Temperature, Operating	-40° F to 200° F
ELECTRICAL	Electrical Termination	10-32 UNF Coaxial Connector
	Mating Conn/Cable Ass'y (not included)	AA160 (See Pg. AP-2)
	Grounding	Single Return (connected to case)
	Current	2 to 10 ma
MECHANICAL	Design	Single-ended compression
	Weight	30 grams
	Case Material	Stainless Steel
	Mounting	Tapped Hole for 10-32 UNF

Note: Constant current power supply; Model CC2

Dimensions

Model PEC
Order Code AG713



Accelerometer

Models MA341 & MA342

HIGH FREQUENCY

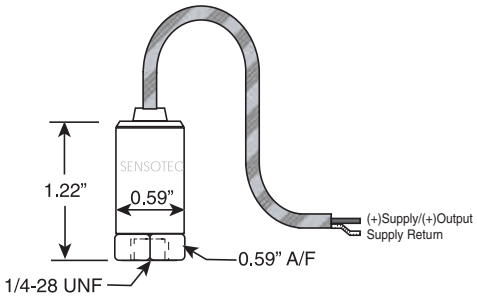
IEPE OUTPUT

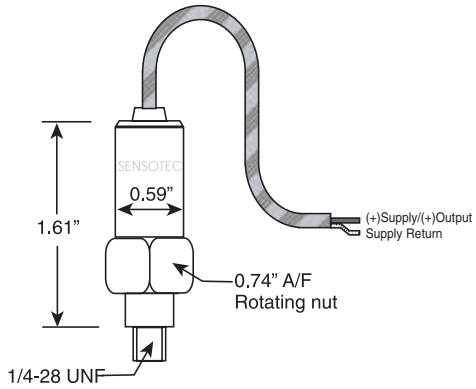
2 Hz TO 15 kHz USABLE

The SENSOTEC MA341/342 Series miniature amplified piezoelectric accelerometers are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where space is limited and small size is desired or a high natural frequency is required. The constant current low output impedance output combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The MA341/342 series is available in a number of configurations and options that includes different mounting arrangement patterns and different stainless steel armored cable lengths, (specify length at time of ordering).

Specifications





		Model MA341 Order Code AG922	Model MA342 Order Code AG923
PERFORMANCE	Sensitivity	100 mV/g ±10%	100 mV/g ±10%
	Usable frequency range	2 Hz to 15 kHz ± 5%	2 Hz to 15 kHz ± 5%
	Mounted base resonance	22 kHz	22 kHz
	Dynamic range	± 80 g	± 80 g
	Temperature sensitivity	0.145 per degree F	0.145 per degree F
	Transverse sensitivity	Less than 5%	Less than 5%
	Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	-10° F to 280° F	-10° F to 280° F
	Sealing	IP 67/NEMA	IP 67/NEMA
ELECTRICAL	Input	Constant current	Constant current
	Current range	0.5 mA to 8 mA	0.5 mA to 8 mA
	Bias voltage	12 VDC	12 VDC
	Cable	S/S overbraided PTFE	S/S overbraided PTFE
	Standard cable length	16 ft.	16 ft.
	Electrical noise	0.1mg	0.1mg
	Isolation	Base isolated	Base isolated
MECHANICAL	Weight	1 oz.	1 oz.
	Case material	Stainless steel	Stainless steel
	Mounting torque	6 ft. lbs.	6 ft. lbs.
OPTIONS	Different sensitivity	30 mV/g	30 mV/g
	Cable length	Specify at time of ordering	Specify at time of ordering

Accelerometer

Model MAQ14

SMALL SIZE

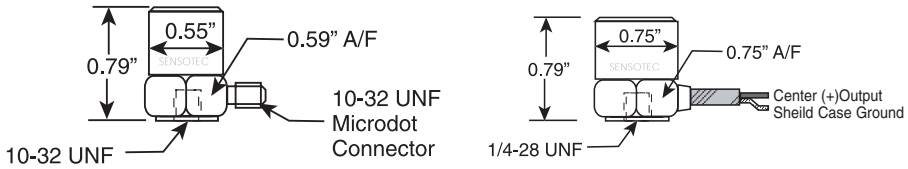
CHARGE OUTPUT

18kHz MOUNTED FREQUENCY

GENERAL PURPOSE

The SENSOTEC Model MAQ14 charge output miniature accelerometer is designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where high temperatures are likely to be encountered and where space is limited and small size is desired or a high natural frequency is required. The MAQ 16 comes with a side exit connector. The MAQ14 is a self generating piezoelectric transducer which has no internal electronics and requires no external power for operation. These units are usually connected to a local charge amplifier that is mounted as near as possible in a lower temeperature environment. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

Specifications



	Order Code AG909	Order Code AG910
PERFORMANCE		
Sensitivity	50 pC/g	50 pC/g
Usable frequency range	1 Hz to 10 kHz	1 Hz to 10 kHz
Mounted base resonance	18 kHz	18 kHz
Dynamic range	1000 g	1000 g
Temperature sensitivity	0.145 per degree F	0.145 per degree F
Transverse sensitivity	Less than 5%	Less than 5%
Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL		
Temperature range	-70° F to 480° F	-70° F to 480° F
Sealing	IP 67/Nema 4	IP 67/Nema 4
ELECTRICAL		
Input	Self generating	Self generating
Standard cable length		16 ft.
Charge amplitude required	CA003	CA003
Mating connector	Microdot	
Capacitance	450 pf	450 pf
Isolation	Base isolated	Base isolated
MECHANICAL		
Weight	1.20 oz.	1.20 oz.
Case material	Stainless steel	Stainless steel
Mounting torque	2 ft. lbs.	2 ft. lbs.
OPTIONS		
Cable length		Specify at time of ordering

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Accelerometer

Model MAQ13

SMALL SIZE

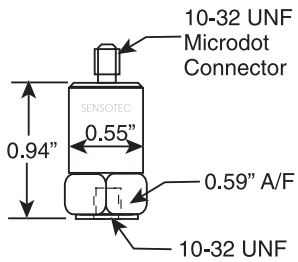
CHARGE O/P

18kHz MOUNTED FREQUENCY

GENERAL PURPOSE

The SENSOTEC Model MAQ13 charge output miniature accelerometer is designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where high temperatures are likely to be encountered and where space is limited and small size is desired or a high natural frequency is required. The MAQ13 is a self generating piezoelectric transducer which has no internal electronics and requires no external power for operation. These units are usually connected to a local charge amplifier that is mounted as near as possible in a lower temperature environment. The Model MAQ13 features a wide frequency range, and a flat sensitivity vs. temperature response over the temperature range. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

Specifications



Order Code AG908

PERFORMANCE	Sensitivity	20 pC/g
	Usable frequency range	Dependent on charge amp.
	Mounted base resonance	30 kHz
	Dynamic range	±800 g
	Temperature sensitivity	0.145 per degree F
	Transverse sensitivity	Less than 5%
	Amplitude linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	-70° F to 480° F
	Sealing	IP 67/Nema 4
ELECTRICAL	Input	Self generating
	Output	Charge
	Charge amplitude required	CA003
	Mating connector	Microdot
	Capacitance	450 pf
	Isolation	Base isolated
MECHANICAL	Weight	1.00 oz.
	Case material	Stainless steel
	Mounting torque	2 ft. lbs.

Accelerometer

Models MA23

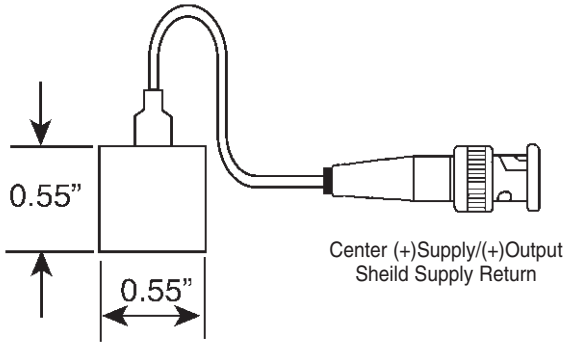
SUB-MINIATURE

IDEAL FOR MODAL ANALYSIS

IEPE OUTPUT

LOW IMPEDANCE VOLTAGE O/P

The SENSOTEC Model MA23 sub miniature amplified piezoelectric accelerometers are designed to be used in laboratory testing, modal analysis studies and structural monitoring. The constant current low output impedance output combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The Model MA23 features a high natural frequency, a high sensitivity, a wide frequency range and a flat sensitivity vs. temperature response over the temperature range. The model MA23 would normally be mounted to the structure using beeswax or adhesive. The model MA23 can be supplied with different cable lengths.



Specifications

Order Code AG914

PERFORMANCE	Sensitivity	1 V/g
	Usable frequency range	5 kHz to 14 kHz ±10%
	Mounted base resonance	25 kHz
	Dynamic range	± 10 g
	Temperature sensitivity	0.145 per degree F
	Transverse sensitivity	5% max
	Amplitude linearity	Better than1% linearity
ENVIRONMENTAL	Temperature range	-70° F to 250° F
	Sealing	IP 65/Nema 2
ELECTRICAL	Input	Constant current
	Supply voltage	18-30 V
	Current range	0.5 mA to 8 mA
	Bias voltage	12 V
	Cable	PTFE
	Standard cable length	16 ft.
	Isolation	Base isolated
MECHANICAL	Weight	0.3 oz.
	Case material	HE 30 Aluminum
	Mounting	beeswax or adhesive
OPTIONS	Different sensitivity	100 mV/g
	Cable length	Specify at time of ordering

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Accelerometer

Model MAQ36

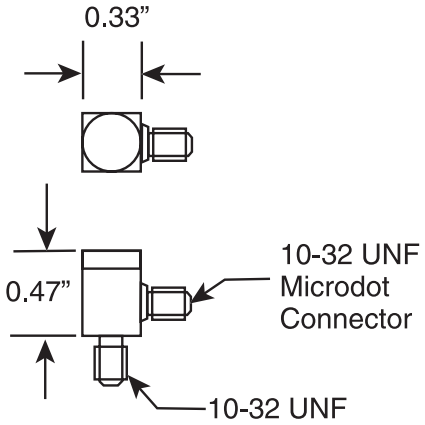
SUB-MINIATURE

CHARGE O/P

45kHz MOUNTED FREQUENCY

The SENSOTEC Model MAQ36 charge output miniature accelerometer is designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where high temperatures are likely to be encountered and where space is limited and small size is desired or a high natural frequency is required. The MAQ36 is a self generating piezoelectric transducer which has no internal electronics and requires no external power for operation. These units are usually connected to a local charge amplifier that is mounted as near as possible in a lower temperature environment. The Model MAQ36features a wide frequency range, and a flat sensitivity vs. temperature response over the temperature range. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

Specifications



Order Code AG924

PERFORMANCE	Sensitivity	5 pC/g ± 10%
	Usable frequency range	1 Hz to 30 kHz
	Mounted base resonance	45 kHz
	Dynamic range	± 2000 g
	Temperature sensitivity	0.145 per degree F
	Transverse sensitivity	Less than 5%
	Amplitude linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	-70° F to 480° F
	Sealing	IP 67/Nema 4
ELECTRICAL	Input	Self generating
	Output	Charge
	Charge amplitude required	CA003
	Mating connector	Microdot
	Capacitance	300 pf
	Isolation	Base isolated
MECHANICAL	Weight	0.25 oz.
	Case material	Stainless steel
	Mounting torque	2 ft. lbs.

Accelerometer

Model MAQ41

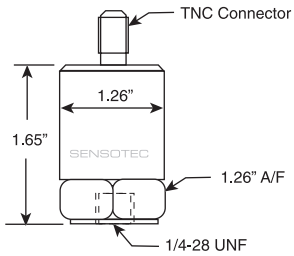
HIGH OUTPUT

CHARGE OUTPUT

10kHz MOUNTED FREQUENCY

The SENSOTEC Model MAQ41 charge output accelerometer is designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells where high temperatures are likely to be encountered. The MAQ41 is a self generating piezoelectric transducer which has no internal electronics. These units are usually connected to a local charge amplifier that is mounted as near as possible in a lower temeperature environment. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

Specifications



Order Code AG925

PERFORMANCE	Sensitivity	1100 pC/g ±10%
	Usable frequency range	Dependent on charge amp.
	Mounted base resonance	10kHz
	Dynamic range	± 100 g
	Temperature sensitivityTransverse	0.145 per degree F
	sensitivity	Less than 5%
	Amplitude linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	-70° F to 480° F
	Sealing	IP67/Nema 4
ELECTRICAL	Input	Self generating
	Charge amplitude required	Sensotec CA003
	Mating connector	TNC
	Capacitance	4000 pf
	Isolation	Non-isolated
MECHANICAL	Weight	3.50 oz.
	Case material	Stainless Steel
	Mounting torque	6 ft. lbs.

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Accelerometer

Model MAT53

TEMP & VIBRATION OUTPUT

2 Hz to 10 kHz

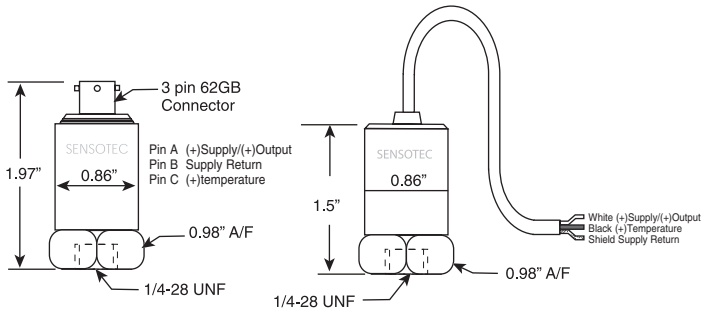
IEPE OUTPUT

CURRENT O/P FOR TEMPERATURE

The SENSOTEC Model MAT53 amplified piezoelectric accelerometers combined with integrated temperature sensors are designed to be used in Industrial test and automation environments; including laboratory test, modal studies and testing cells where simultaneous temperature and velocity vibration are required to be measured. The constant current low output impedance for the velocity vibration combined with the current output for the temperature output provide the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The model MAT53 is available in a number of configurations and options that includes connector or integral stainless steel armored cable (specify length at time of ordering), The Model MAT53 can be supplied in a number of different dynamic ranges to suit the expected temperature and vibration levels.

Dimensions



	Order Code AG930	Order Code AG931
PERFORMANCE		
Sensitivity	100 mV/g ±10%	100 mV/g ±10%
Usable frequency range	2 Hz to 10 kHz ±5%	2 Hz to 10 kHz ±5%
Mounted base resonance	18kHz	18kHz
Dynamic range	±80 g	±80 g
Temperature sensitivity	10mV/°F	10mV/°F
Transverse sensitivity	Less than 5%	Less than 5%
Amplitude linearity	1% linearity	1% linearity
ENVIRONMENTAL		
Temperature range	-10° F to 280° F	-10° F to 280° F
Sealing	IP 67/Nema 4	IP 67/Nema 4
ELECTRICAL		
Input	Constant current	Constant current
Current range	0.5 mA to 8 mA	0.5 mA to 8 mA
Bias voltage	12 VDC	12 VDC
Cable	-	stainless steel braided PTFE
Standard cable length	-	16 ft.
Mating connector	MH008	-
Electrical noise	0.3 mg max.	0.3 mg max.
Isolation	Base isolated	Base isolated
MECHANICAL		
Weight	3.80 oz.	3.80 oz.
Case material	Stainless steel	Stainless steel
Mounting torque	6 ft. lbs.	6 ft. lbs.
OPTIONS		
Different sensitivity	30 mV/g	30 mV/g
Cable length	-	Specify at time of ordering
Different mounting	Quickfit female	Quickfit female

Accelerometer

Model MAV51

VELOCITY MEASUREMENT

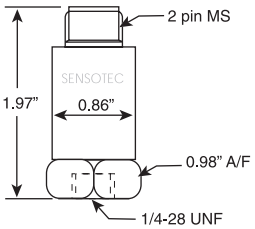
5 Hz TO 4 kHz ±5%

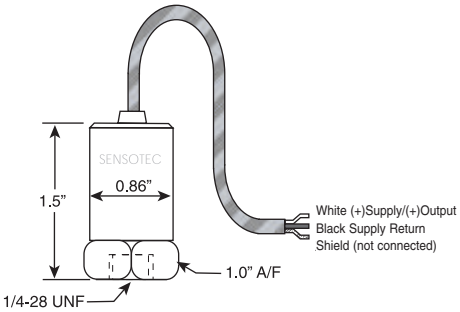
IEPE OUTPUT

The SENSOTEC Model MAV51 amplified piezoelectric accelerometers with velocity output are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells. The MAV51 is ideal for applications where velocity content of vibration is a more meaningful parameter to measure and where noise issues or system simplicity makes integration of the acceleration signal in the sensor rather than the signal conditioning more attractive. The constant current low output impedance output combined with the ability to drive high load capacitance allows long runs of low cost cable without degradation of data. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The model MAV51 is available in a number of configurations and options that includes connector or integral stainless steel armored cable (specify length at time of ordering). The Model MAV51 can be supplied in a number of different sensitivites to suit the expected vibration levels for the application.

Specifications





		Order Code AG926	Order Code AG927
PERFORMANCE	Sensitivity	4 mV/mm/sec	4 mV/mm/sec
	Usable frequency range	5 Hz to 4 kHz ±5%	5 Hz to 4 kHz ±5%
	Mounted base resonance	18 kHz nominal	18 kHz nominal
	Dynamic range		
	Temperature sensitivity	0.145 per degree F	0.145 per degree F
	Transverse sensitivity	Less than 5%	Less than 5%
	Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	-10° F to 280° F	-10° F to 280° F
	Sealing	IP 67/Nema 4	IP 67/Nema 4
ELECTRICAL	Input	Constant current	Constant current
	Current range	0.5 mA to 8 mA	0.5 mA to 8 mA
	Bias voltage	12 Vdc	12 Vdc
	Cable	-	S/S overbraided PTFE
	Standard cable length	-	16 ft.
	Mating connector	MH002	-
	Electrical noise	0.3 mg max	0.3 mg max
	Isolation	Base isolated	Base isolated
MECHANICAL	Weight	3.88 oz.	3.88 oz.
	Case material	Stainless steel	Stainless steel
	Mounting torque	6 ft. lbs.	6 ft. lbs.
OPTIONS	Different sensitivities	12.7, 25.4, 50.8, 101.6 mm/sec RMS	12.7, 25.4, 50.8, 101.6 mm/sec RMS
	Cable length	-	Specify at time of order
	Different mounting	Quickfit female	Quickfit female

Accelerometer

Model MAV52

VELOCITY MEASUREMENT

4-20 mA PROPORT. TO VELOCITY

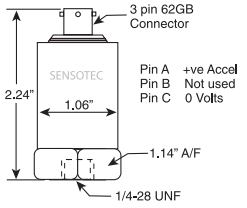
2 Hz-1kHz USABLE RANGE

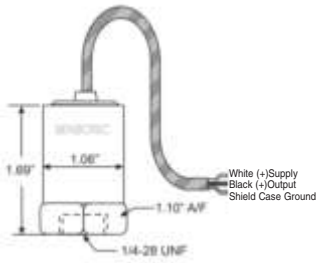
SUBMERSIBLE OPTION

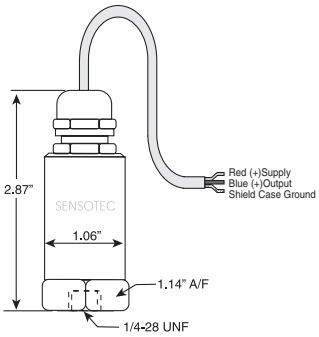
The SENSOTEC Model MAV52 amplified piezoelectric accelerometers with velocity output are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells. The MAV52 is ideal for applications where velocity content of vibration is a more meaningful parameter to measure and where noise issues or system simplicity makes integration of the acceleration signal in the sensor rather than the signal conditioning more attractive. The 4-20mA output makes it ideal in applications where noise, cable losses and long cable runs are likely to be an issue. The seismic element is mechanically isolated from the mounting base, resulting in a low base strain sensitivity. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

The model MAV52 is available in a number of configurations and options that includes connector or integral stainless steel armored cable (specify length at time of ordering), intrinsically safe option or a submersible format. The mounting hole can be supplied with different threads. The Model MAV52 can be supplied in a number of different sensitivites to suit the expected vibration levels for the application.

Specifications







	Order Code AG928	Order Code AG932	Order Code AG929
PERFORMANCE			
Sensitivity	25.4mm/sec for 4-20mA	25.4mm/sec for 4-20mA	25.4mm/sec for 4-20mA
Usable frequency range	2Hz to 1kHz ±10%	2Hz to 1kHz ±10%	2Hz to 1kHz ±10%
Mounted base resonance	5 kHz min	5 kHz min	5 kHz min
Dynamic range	50g	50g	50g
Temperature sensitivity	0.145 per degree F	0.145 per degree F	0.145 per degree F
Transverse sensitivity	Less than 5%	Less than 5%	Less than 5%
Amplitude linearity	Better than1% linearity	Better than1% linearity	Better than1% linearity
ENVIRONMENTAL			
Temperature range	-10° F to 210° F	-10° F to 210° F	-10° F to 210° F
Sealing	IP67/Nema 4	IP67/Nema 4	IP68/Nema 4X
ELECTRICAL			
Input	Voltage	Voltage	Voltage
Output	4-20mA	4-20mA	4-20mA
Supply voltage	12-32V	12-32V	12-32V
Cable	-	Stainless steel armored PTFE	PU
Standard cable length	-	16 ft.	16 ft.
Mating connector	MH008	-	-
Electrical noise	0.3 mg max	0.3 mg max	0.3 mg max
Isolation	Base isolated	Base isolated	Base isolated
MECHANICAL			
Weight	5 oz.	5 oz.	5 oz.
Case material	Stainless steel	Stainless steel	Stainless steel
Mounting torque	6 ft. lbs.	6 ft. lbs.	6 ft. lbs.
OPTIONS			
Different sensitivities	12.7, 25.4, 50.8, 101.6 mm/sec RMS	12.7, 25.4, 50.8, 101.6 mm/sec RMS	12.7, 25.4, 50.8, 101.6 mm/sec RMS
Cable length	-	Specify at time of order	Specify at time of order
Different mounting	Quickfit female	Quickfit female	Quickfit female

Accelerometer

Model MA311& MA312

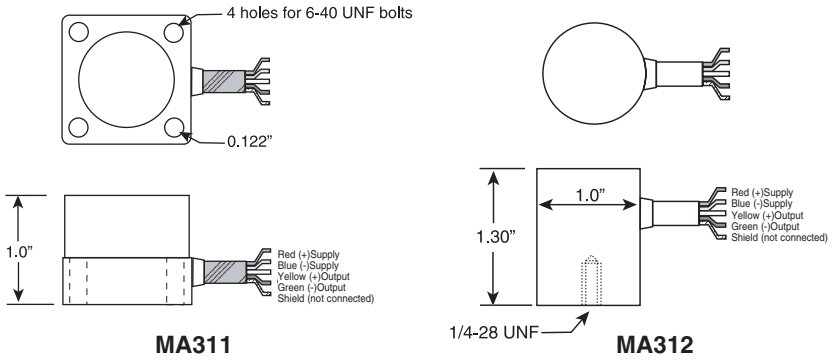
DC RESPONSE

AMPLIFIED VOLTAGE OUTPUT

UP TO 0-1800Hz USABLE RANGE

The MA 311/312 Series accelerometers are available in a variety of configurations and can be stud or bolt mounted to meet specific application requirements. Welded austenitic stainless steel construction ensures dependable performance in harsh industrial environments. Designed with low impedance strain gages, the frequency ranges extend down to DC, sensitivity to noise is minimized, and amplifier electronics are simplified.

Specifications



MA311 **MA312**

	Order Code AG915	Order Code AG916
PERFORMANCE		
Sensitivity	100mV/g	100mV/g
Usable frequency range	Dependant on dynamic range (±5%) ±1g – DC to 250 Hz ±2g – DC to 250 Hz ±5g – DC to 300 Hz ±10g – DC to 500 Hz ±20g – DC to 700 Hz ±50g – DC to 1 kHz	Dependant on dynamic range (±5%) ±1g – DC to 250 Hz ±2g – DC to 250 Hz ±5g – DC to 300 Hz ±10g – DC to 500 Hz ±20g – DC to 700 Hz ±50g – DC to 1 kHz
Acceleration Limits	x20 of dynamic range	x20 of dynamic range
Temperature sensitivity	0.145 per degree F	0.145 per degree F
Transverse sensitivity	Less than 5%	Less than 5%
Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL		
Temperature range	0° F to 180° F	0° F to 180° F
Sealing	IP 65/Nema 2	IP 65/Nema 2
ELECTRICAL		
Input	Voltage	Voltage
Supply voltage	12 - 24V @7mA	12 - 24V @7mA
Output Impedance	50 ohms	50 ohms
Cable	S/S overbraided PTFE	S/S overbraided PTFE
Standard cable length	16 ft.	16 ft.
Electrical noise	10 micro g	10 micro g
Isolation	Base isolated	Base isolated
MECHANICAL		
Weight	1.40 oz.	1.40 oz.
Case material	Stainless Steel	Stainless Steel
OPTIONS		
Different dynamic ranges	1, 2, 5, 10, 20, 50 g	1, 2, 5, 10, 20, 50 g
Cable length	Specify at time of ordering	Specify at time of ordering
Different mounting	10-32 UNF female or Quickfit female	10-32 UNF female or Quickfit female

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Accelerometer

Model MA321& MA322

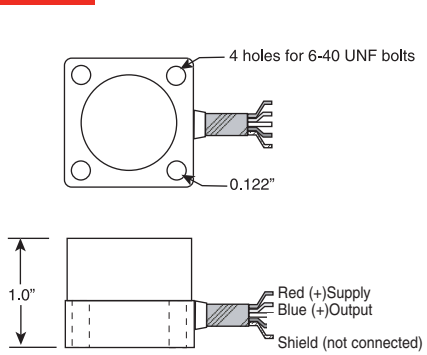
DC RESPONSE

4-20 mA OUTPUT proportional to G

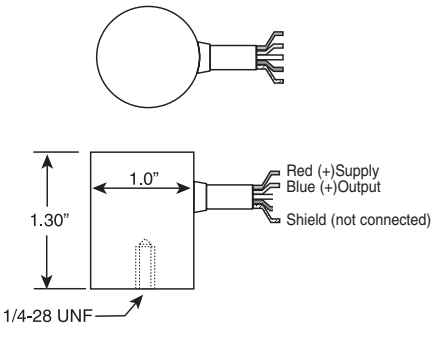
BUILT-IN SIGNAL CONDITIONING

The MA 321/322 Series accelerometers are available in a variety of configurations and can be stud or bolt mounted to meet specific application requirements. Welded austenitic stainless steel construction ensures dependable performance in harsh industrial environments. Designed with low impedance strain gages, the frequency ranges extend down to DC, sensitivity to noise is minimized, and amplifier electronics are simplified.

Specifications



MA321



MA322

		Order Code AG917	Order Code AG918
PERFORMANCE	Output	4-20mA range, 12mA @ 0g with sensitivity scaled to a full range output, i.e. ±5g = 1.6mA/g	4-20mA range, 12mA @ 0g with sensitivity scaled to a full range output, i.e. ±5g = 1.6mA/g
	Usable frequency range	Dependant on dynamic range (±5%) ±1g – DC to 250 Hz ±2g – DC to 250 Hz ±5g – DC to 300 Hz ±10g – DC to 500 Hz ±20g – DC to 700 Hz ±50g – DC to 1 kHz	Dependant on dynamic range (±5%) ±1g – DC to 250 Hz ±2g – DC to 250 Hz ±5g – DC to 300 Hz ±10g – DC to 500 Hz ±20g – DC to 700 Hz ±50g – DC to 1 kHz
	Acceleration Limits	x20 of dynamic range	x20 of dynamic range
	Temperature sensitivity	0.145 per degree F	0.145 per degree F
	Transverse sensitivity	Less than 5%	Less than 5%
	Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL	Temperature range	0° F to 180° F	0° F to 180° F
	Sealing	IP 65/Nema2	IP 65/Nema2
ELECTRICAL	Input	Voltage	Voltage
	Supply voltage	10 to 30V	10 to 30V
	Output Impedance	3000 ohms	3000 ohms
	Cable	S/S overbraided PTFE	S/S overbraided PTFE
	Standard cable length	16 ft.	16 ft.
	Electrical noise	10 micro g	10 micro g
	Isolation	Base isolated	Base isolated
MECHANICAL	Weight	1.40 oz.	1.40 oz.
	Case material	Stainless Steel	Stainless Steel
OPTIONS	Different dynamic ranges	±1, 2, 5, 10, 20, 50 g	±1, 2, 5, 10, 20, 50 g
	Cable length	Specify at time of ordering	Specify at time of ordering
	Different mounting	10-32 UNF female or Quickfit female	10-32 UNF female or Quickfit female

Accelerometer

Model MA331& MA332

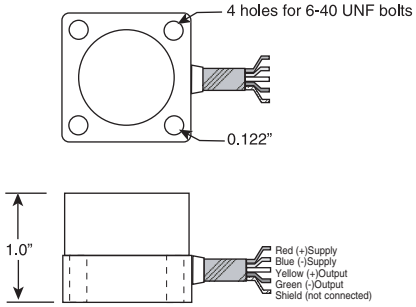
DC RESPONSE

mV OUTPUT

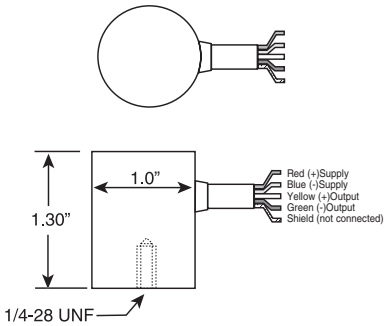
FOR USE WITH STRAIN GAGE AMPS

The MA 331/332 Series accelerometers are designed to be used in Industrial test and automation environments; including laboratory testing, modal studies and test cells in application requiring a frequency response down to zero hertz. The MA 331/332 Series accelerometers come in different styles. This mV ouput version is for applications where strain gage signal conditioning is likely to be used to condition the signal. The Model MA 331/332 Series can also be supplied in a number of different frequency ranges and sensitivites to suit the application. The stainless steel materials are non-magnetic resulting in very low magnetic field susceptibility. These features, together with a sealed body, assure accurate and reliable data.

Specifications



Model MA331



Model MA332

	Order CodeAG919	Order Code AG920
PERFORMANCE		
Output	15 - 75mV full scale	15 - 75mV full scale
Usable frequency range	Dependant on dynamic range (±5%)	Dependant on dynamic range (±5%)
	±1g – DC to 250 Hz	±1g – DC to 250 Hz
	±2g – DC to 250 Hz	±2g – DC to 250 Hz
	±5g – DC to 300 Hz	±5g – DC to 300 Hz
	±10g – DC to 500 Hz	±10g – DC to 500 Hz
	±20g – DC to 700 Hz	±20g – DC to 700 Hz
	±50g – DC to 1 kHz	±50g – DC to 1 kHz
Acceleration Limits	x20 of dynamic range	x20 of dynamic range
Temperature sensitivity	0.145 per degree F	0.145 per degree F
Transverse sensitivity	Less than 5%	Less than 5%
Amplitude linearity	Better than 1% linearity	Better than 1% linearity
ENVIRONMENTAL		
Temperature range	0° F to 180° F	0° F to 180° F
Sealing	IP 65/Nema 2	IP 65/Nema 2
ELECTRICAL		
Input	Voltage	Voltage
Supply voltage	5V @7mA	5V @7mA
Output Impedance	3000 ohms	3000 ohms
Cable	S/S overbraided PTFE	S/S overbraided PTFE
Standard cable length	16 ft.	16 ft.
Electrical noise	Less than10 micro g	Less than10 micro g
Isolation	Base isolated	Base isolated
MECHANICAL		
Weight	1.40 oz.	1.40 oz.
Case material	Stainless Steel	Stainless Steel
OPTIONS		
Different dynamic ranges	1, 2, 5, 10, 20, 50 g	1, 2, 5, 10, 20, 50 g
Cable length	Specify at time of ordering	Specify at time of ordering
Different mounting	10-32 UNF female or Quickfit female	10-32 UNF female or Quickfit female

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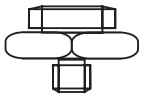
Mounting Studs & Adapters

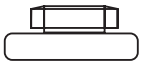
Male Studs

Set Screws

MS028	10-32 UNF	to	M8
MSO36	1/4” - 28 UNF	to	M6
MSO39	1/4” - 28 UNF	to	10-32 UNF
MSO65	10-32 UNF	to	M6
MS067	1/4” - 28 UNF	to	M8
MS068	1/4” - 28 UNF	to	1/4” - 28 UNF
MS124	1/4” - 28 UNF	to	M10
MS132	1/4” - 28 UNF	to	M12

Quick Fit Adapters

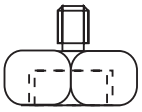




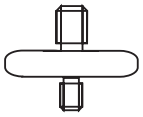
Glue Type

Order Code			
MS001	Q/F Male	to	Glue Base
MS002	Q/F Male	to	M8 Male
MS003	Q/F Male	to	M10 Male
MS004	Q/F Male	to	1/4” - 28 UNF Male
MS005	Q/F Male	to	1/4” - 28 UNF Female
MS006	Q/F Male	to	M6 Male
MS007	Q/F Male	to	10 - 32 UNF Female
MS008	Q/F Male	to	M8 Female
MS010	MA35 Q/F Male	to	Glue base
MS055	MA35 Q/F Male	to	M8 Male
MS072	MA35 Q/F Male	to	M6 Male
MS106	Q/F Male	to	M10 Female
MS117	MA35 Q/F Male	to	1/4” - 28 UNF Male

Other Adapters



Stud to Q/F Female

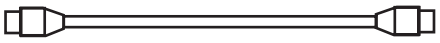


Isolated Stud

Order Code			
MS011	1/4” - 28 UNF Male	to	Q/F Female
MS013	1/4” - 28 UNF Male	to	GLUE BASE
MS033	1/4” - 28 UNF Male	to	Q/F Female
MS034	1/4” - 28 UNF Male	isolated to	1/4” - 28 UNF Female
MS061	1/4” - 28 UNF Male	to	10 - 32 UNF Male
MS079	1/4” - 28 UNF Male	to	Q/F Female
MS093	M6 Male	isolated to	M6 Female
MS102	MA35 Q/F Female	to	10 - 32 UNF Male

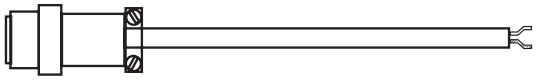
Cable Assemblies

Microdot to Microdot



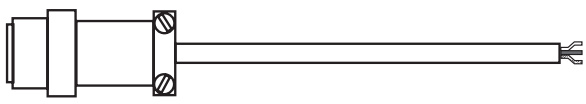
CA051	3 ft. PVC
CA338	3 ft. PTFE overbraided

2 PIN MS Connector



CA052	3 ft. overbraided PVC
CA053	3 ft. overbraided PTFE
CA058	Half length coiled cable
CA072	Full length coiled cable
CA999	3 ft. PVC unbraided

3 PIN 62GB Connector



CA108	3 ft. overbraided PVC
CA137	3 ft. overbraided PTFE
CA888	3 ft. PVC unbraided

Piezoelectric Accelerometer

Models PEL and PEI

2 TO 5000 HZ

-100° F TO 500° F

RUGGED, SHOCK RESISTANT

SENSOTEC's Models PEL and PEI Piezoelectric Accelerometers feature high natural frequency, a wide frequency range, and a flat temperature response over an extended temperature range. There are two basic models with different cable exit configurations for different environmental applications.

The Model PEL Piezoelectric Accelerometer is designed to be used in test/measurement and industrial environments. This model utilizes a small diameter, low noise, co-axial cable with teflon insulation. A 10-32 UNF tapped hole is provided for ease of attachment to the mounting surface. This model measures 0.8" high by 0.63" in diameter. Typical applications include laboratory testing, impact testing, modal studies, acoustically induced vibration, and jet engine testing.

The Model PEI Piezoelectric Accelerometer is designed to be used in rough industrial or testing environments when a rugged electrical connector is needed. This model features a three pin connector with a heavy gage wall and exits out the top of the accelerometer. It uses a low noise, teflon insulated cable. A 1/4-28 UNF mounting hole is provided for installation to the customer's equipment. Typical applications include vibration sensing for engine and turbine monitoring, power plants and mining engineering.

These models are self-generating piezoelectric transducers which require no external power for operation. Since these units have very low internal damping, Models PEL and PEI have very low phase shift over the operating frequency range. The piezoelectric material used gives the models a flat output sensitivity (charge) versus temperature response over the range of -100° F to +500° F. The seismic element is mechanically isolated from the mounting base, resulting in a low strain sensitivity. All materials are non-magnetic. These features together with a sealed enclosure assure accurate, reliable data.

		Model PEL Order Code AG711	Model PEI Order Code AG712
PERFORMANCE	Sensitivity	100 pC/G (nom)	100 pC/G (nom)
	Mounted Natural Frequency	27 kHz (min)	27 kHz (min)
	Transverse Sensitivity	5% (max)	5% (max)
	Frequency Response	±5% 2 Hz to 5000 Hz	±5% 2 Hz to 5000 Hz
	Transducer Capacitance	5000 pF (nom)	6000 pF (nom)
	Transducer Resistance	1 G ohm (min)	1 G ohm (min)
	Strain Sensitivity (at 250 microstrain)	1 G equivalent (max)	1 G equivalent (max)
ENVIRONMENTAL	Shock	5000G peak half sine	5000G peak half sine
	Vibration	2000G peak	2000G peak
	Temperature, Operating	-100° F to + 500° F	-100° F to + 500° F
ELECTRICAL	Electrical Termination	10-32 UNF Coaxial Connector	3Pin MS-10SL Connector
	Mating Conn./Cable Ass'y (not incl.)	AA158 (See Pg. AP-2)	AA174 or AA175 (See Pg. AP-2)
	Cable (low noise)	5 ft. teflon jacketed	Twisted pair low noise cable*
	Grounding	Single return	Balanced output
		(connected to case)	(isolated from case)
MECHANICAL	Design	Single-ended compression	Single-ended compression
	Weight	30 grams (max)	60 grams
	Case Material	Stainless steel	Stainless steel
	Mounting	Tapped hole for 10-32 UNF	Tapped hole for 1/4-28 UNF

*Consult SENSOTEC if you are going to use your own cable.

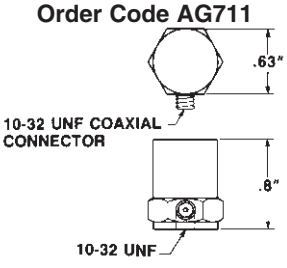
Note: Charge amplifier; Model CA1

Dimensions

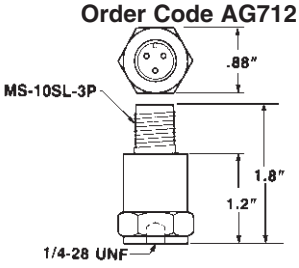
PEI Wiring Code

Cable	Connector
White	PIN A Signal Out +
Blue	PIN B Signal Out -
Black	PIN C Shield

Model PEL
Order Code AG711



Model PEI
Order Code AG712



Vibration Meter Kit

Model VM110 & VM120

HAND HELD

LCD DISPLAY

BATTERY POWERED

The Model VM110 Vibration Meter is a battery powered, portable instrument designed to accept any MA Series accelerometer, to enable vibration measurements to be taken. The meter is capable of providing RMS and peak measurements of acceleration, velocity and displacement. A switch for filtering high frequencies is provided. DC and AC output via a D-type socket is available for logging or for further signal analysis.

Specifications

		Model VM110 RMS Peak Order code AG941	Model VM120 RMS Peak to Peak Order code AG942
PERFORMANCE			
	Acceleration	2g, 20g, 200g.	
	Ranges	Velocity: 2"/sec, 20"/sec, 200"/sec. Displacement: 2thou, 20thou, 200thou.	
	Frequency	Upper, selectable low pass filters of 5kHz, 10kHz and 20kHz.	
	Range	Lower, fixed Acc 5Hz,Vel 10Hz, Dis 15Hz.	
	Detector	RMS or Peak switch selectable	
	Display	1/2 inch, 3.5 digit LCD. (3 readings per second)	
ELECTRICAL			
	Accuracy	Acceleration: 1.5% RMS, 3% Peak. Velocity: 2.5% RMS, 4% Peak. Displacement: 3.5%RMS, 5% Peak.	
	Noise	RMS / Peak	
		Acceleration: 2mg / 6mg	
		Velocity: 0.01 inch/sec / 0.03 inch/sec	
		Displacement: 0.02 thou / 0.06 thou	
	Input	10 mV/g from hand held accelerometer or other MA Series via cal hood	
	Output	AC 200mV, full range as selected. DC 200mV, full range as selected	
	Power	(2) PP3 9-volt battery, low battery indicator on display. Battery life 15 hours approx.	
	Kit contents	(1) Vibration Meter (1) Hand held probe (1) Magnet (1) 4" spike (1) Carrying Case	
	Options	Other MA series accelerometers	

Accessories

MTN/1100C	100mV/g accelerometer, 5 meters integral PTFE cable
MTN/1100	100mV/g, 2 pin MS connector
MTN/1020	100mV/g, TNC connector
MTN/CA42	Coiled cable assembly 2 pin MS to IA110 for use with MTN/1100
MTN/CA43	Coiled cable assembly TNC to IA110 for use with MTN/1020
MTN/2100	Hand held probe
MTN/CA61	IA110 adapter for use with MTN/1100C
MTN/MM1	Magnet, 1/4" UNF mounting, 35mm, strength 20kgs
MTN/PS1	Hand held spike, 25mm, 1/4" UNF mounting
MTN/PS2	Hand held spike, 100mm, 1/4" UNF mounting
MTN/PS3	Hand held spike, 150mm, 1/4" UNF mounting
MTN/PS4	Hand held spike, 200mm, 1/4" UNF mounting
MTN/HE1	Carrying case with foam cut outs

LVDTs

0.25% F.S. NON-LINEARITY

±.01" TO ±18.5" RANGE

-58°F TO 257°F TEMP.

SENSOTEC manufactures a wide range of LVDT type displacement transducers. These sensors are manufactured as standard, modified standard,and custom transducers to provide the quickest possible delivery. Many units can ship from our extensive stocking program within 24 hours. These LVDT transducers are designed to meet requirements of most single and multiple-point industrial gaging applications as well as micro-displacement instruments in research and scientific laboratories.

SENSOTEC offers a wide range of models so that your sensor will provide the best measurements possible given the conditions encountered in your application. Models are available with free unguided, captive spring return, and captive guided armatures. Non-linearity of 0.25% F.S. and measuring ranges from ±0.1" to ±18.5" are available. Electrically, SENSOTEC offers both AC and DC models to match your power requirement needs. These units operate in temperatures as low as -58°F and as high as 257°F.

SENSOTEC's welded, stainless steel construction and submersible, underwater connectors are combined to offer units that are perfect for offshore drilling, mining, marine, and hydraulic engineering applications.

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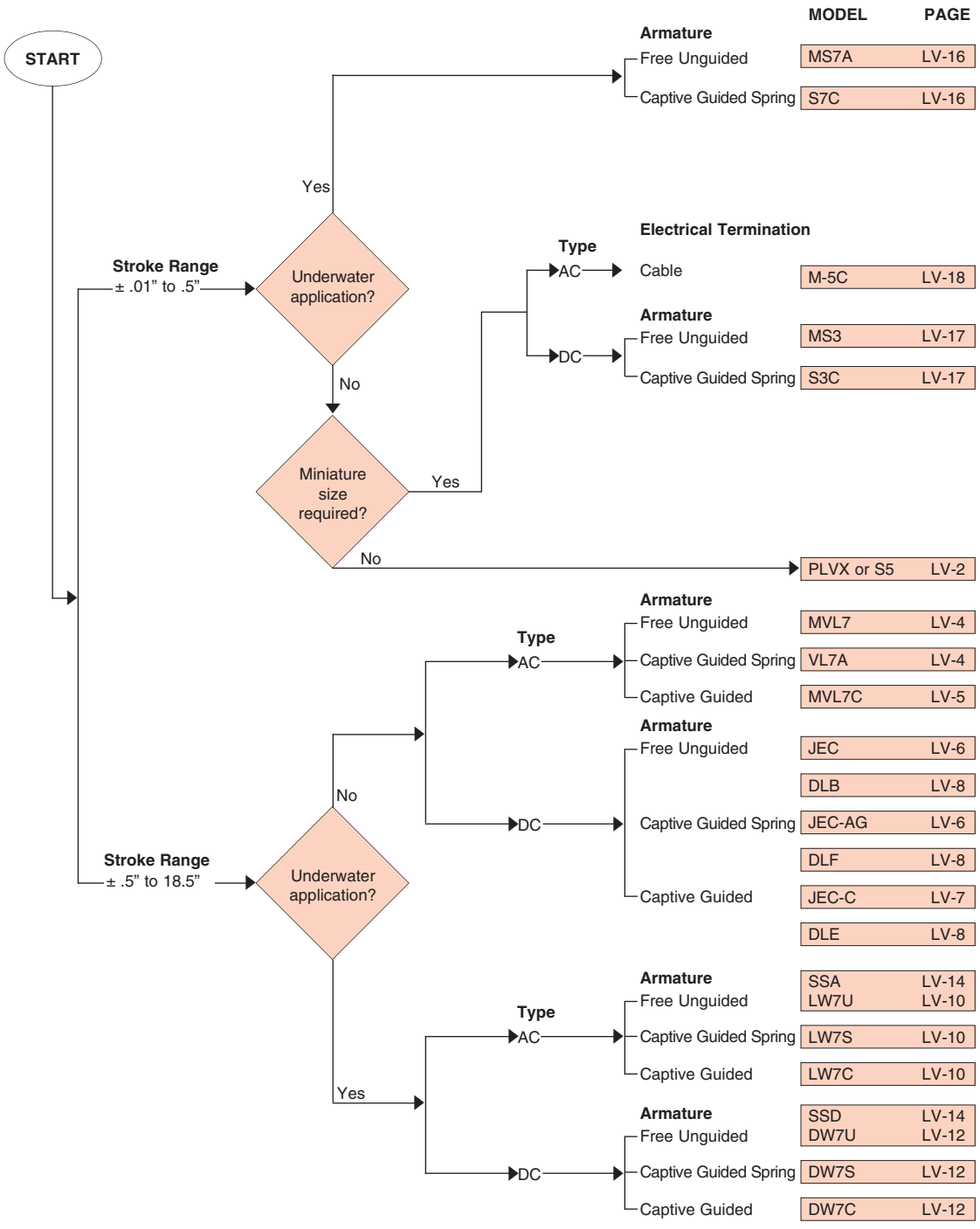
PRODUCT INDEX

*Many ranges in stock.

SELECTION FLOW CHART

This selection flow chart is designed to help you choose the best SENSOTEC product for your application. Simply follow the path that best characterizes your requirements and turn to the appropriate product pages. If you need further assistance in identifying the "best" product or have a unique requirement that is not met by the products listed, please contact our Customer Service Department.



DISPLACEMENT

AC-AC Ultra Precision LVDTs

Models PLVX AND S5

0.25% NON-LINEARITY

NON-ROTATING PROBE

STAINLESS STEEL

Model PLVX
All ranges

Model S5
0.1" to 0.5"

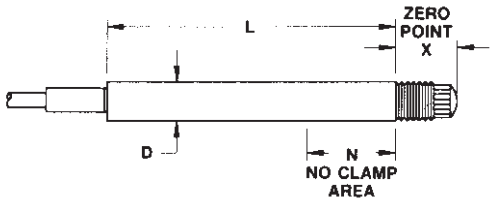
Model S5
0.01" to 0.04"

SENSOTEC's Models PLVX and S5 Ultra Precision LVDTs are designed for single and multi-point industrial gaging applications and micro-displacement measurements in research and scientific studies. Both models incorporate non-rotating armatures to increase resistance to side loads and improve repeatability. Bodies and probes are stainless steel constructed and windings are magnetically shielded. Ultra Precision LVDTs utilize spring loaded captive guided armatures and low friction, non-rotating probes. Non-linearity is 0.25% full scale. The Model PLVX with a 0.02" stroke range has a mechanical zero adjustment to correct pre- and over-travel.

Dimensions

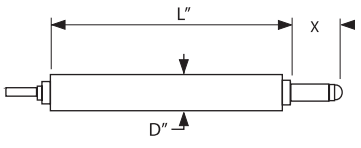
Model PLVX

Order Code W/Range	Available Stroke Ranges	Output Sensitivity mv/v/.001"	L"	N"	D"	X"	Approx. Unit Wt. (oz.)
AY111HI	+/-0.02"	6	1.02	0.22	0.31	0.30	0.45
AY111HK	+/-0.04"	4	2.09	0.55	0.31	0.55	0.56
AY111HM	+/-0.1"	4	2.24	0.71	0.31	0.79	0.63
AY111HN	+/-0.2"	3	*	1.18	0.31	0.87	0.78

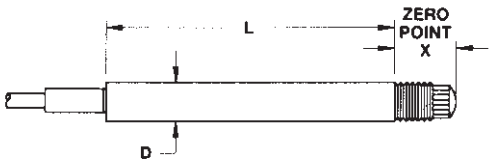


Model S5

Order Code W/Range	Available Stroke Ranges	Output (Nom) Sensitivity mV/V/0.001"	L"	D"	X"	Approx. Unit Wt. (grams)
AY112HH	+/-0.01"	37	1.89	0.31	0.43	14
AY112HI	+/-0.02"	75	1.89	0.31	0.43	14
AY112HK	+/-0.04"	150	2.01	0.31	0.51	18
AY112HM	+/-0.1"	375	2.40	0.37	0.45	22
AY112HN	+/-0.2"	700	*	0.37	0.45	26
AY112HF	+/-0.3"	420	3.46	0.37	0.60	30
AY112HG	+/-0.4"	580	3.90	0.37	0.75	34
AY112HP	+/-0.5"	780	4.76	0.37	0.85	42



Model S5
0.1" to 0.5"



Model S5
0.01" to
0.04"

* Consult factory

		Model PLVX Order Code AY111	Model S5 Order Code AY112
PERFORMANCE	Stroke Ranges	+ /-.02" to .2"	+ /-.01" to .5"
	Non-linearity (max)	+ /-0.25% F.S.	+ /-.25% F.S.
	Non-repeatability (max)	6 microinches	<20 microinches
	Output Sensitivity	See dimension table	See dimension table
	Resolution	Infinite	Infinite
	Phase Shift	<10° @ 5KHz	<10° @ 5KHz
ENVIRONMENTAL	Temperature, Operating	-40° F to 212° F	-4° F to 257° F
	Temperature Effect		
	– Zero (max)	.005% F.S./° F	.006% F.S./° F
	– Span (max)	.005% F.S./° F	.006% F.S./° F
ELECTRICAL	Element Type	AC-AC LVDT	AC-AC LVDT
	Input Supply (calibrated)	5V RMS @ 5KHz	5V RMS @ 5KHz
	Input Supply (acceptable)	1-7V RMS @ 2-10KHz	1-7V RMS @ 2-10KHz
	Output Load (min.)	100k ohms	100k ohms
	Wiring Code (std)	#30 (See Pg. AP-8)	#30 (See Pg. AP-8)
	Electrical Termination	Multiconductor shielded cable	Multiconductor shielded cable
MECHANICAL	Case Material	Stainless steel	Stainless steel
	Probe Material	Stainless steel	Stainless steel
	Armature Type	Captive guided spring return	Captive guided spring return
	Unit Weight	See dimension table	See dimension table
	Spring Force (max)	3.5 oz. (.02") 3.56 oz. (.04") 4.16 oz. (.1") 5.29 oz. (.2")	7.5 oz. (.01", .02", .04") 4.23 oz. (.1") 4.58 oz. (.2") 8.64 oz. (.3") 7.40 oz. (.4") 7.58 oz. (.5")

General Information

How to order (See Pg. AP-19)
LVDT selection flow chart (See Pg. LV-1)
Consult factory for pneumatic (air push) option

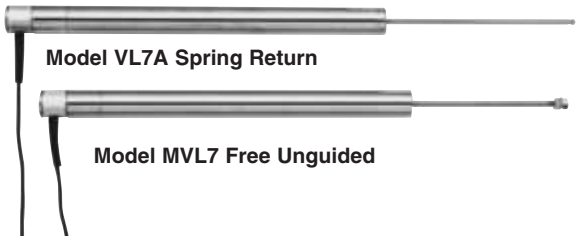
AC-AC Long Stroke LVDTs

Models MVL7 and VL7A

0.25% NON-LINEARITY

STAINLESS STEEL

0.5" TO 8.0" RANGES



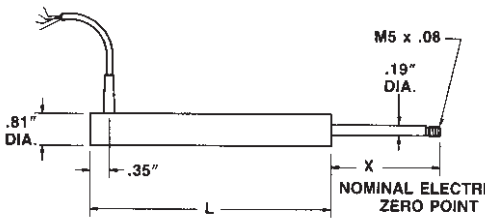
SENSOTEC's Models MVL7 (free unguided armature) and VL7A (captive guided spring return armature) AC-AC Long Stroke LVDTs are designed for measuring static and dynamic displacements from ±0.5" to ±8.0". These models achieve impressive 0.25% full scale non-linearities. LVDT bodies and probes are constructed of stainless steel for durability in harsh, industrial environments. Model MVL7C (captive guided armature) has a stroke range to ±18.5" and is presented on the next page.

	Model MVL7	Model VL7A
PERFORMANCE		
Stroke Ranges	±0.5" to 8.0"	±0.5" to 3.0"
Non-linearity (max)	±0.25% F.S.	±0.25% F.S.
Output Sensitivity	See dimension table	See dimension table
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	-58°F to 257°F	-58°F to 257°F
Temperature Effect		
- Zero (max)	.006% F.S./°F	.006% F.S./°F
- Span (max)	.006% F.S./°F	.006% F.S./°F
ELECTRICAL		
Element Type	AC-AC LVDT	AC-AC LVDT
Input Supply (calibrated)	5V RMS @ 5KHz	5V RMS @ 5KHz
Input Supply (acceptable)	1-7V RMS @ 2-10KHz	1-7V RMS @ 2-10KHz
Wiring Code (std)	#30 (See Pg. AP-8)	#30 (See Pg. AP-8)
Electrical Termination	Multiconductor shielded cable	Multiconductor shielded cable
MECHANICAL		
Case Material	Stainless steel	Stainless steel
Probe Material	Stainless steel	Stainless steel
Armature Type	Free unguided	Captive guided spring return
Probe Thread	M5 x 0.8	N/A
Spring Force (max)	N/A	4 oz./in.

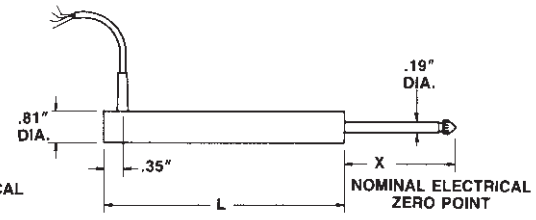
Dimensions

Model MVL7 (Order Code BY125)

Order Code W/Range	Available Stroke Ranges	L"	X"	Approximate Body	Weight Armature	Typical F.S. Output at 3V RMS
BY125HP	±0.5"	5.0	1.7	6	1.25	2.4V RMS
BY125HQ	±1.0"	6.0	2.7	8	1.75	3.0V RMS
BY125HR	±2.0"	10.6	3.2	13	2.0	4.8V RMS
BY125HS	±3.0"	15.0	4.7	16	2.2	4.5V RMS
BY125HT	±4.0"	16.75	5.2	20	2.5	9.5V RMS
BY125HU	±6.0"	24.25	7.2	29	4.0	7.2V RMS
BY125HV	±8.0"	31.75	10.2	42	5.1	4.8V RMS



Model MVL7 Free Unguided



Model VL7A Spring Return

Model VL7A (Order Code BY122)

Order Code W/Range	Available Stroke Ranges	L"	X"	Approx. Unit Wt. (oz.)	Typical F.S. Output at 3V RMS
BY122HP	±0.5"	5.35	1.5	6.5	2.4V RMS
BY122HQ	±1.0"	6.35	2.5	8.0	3.0V RMS
BY122HR	±2.0"	11.0	3.0	14.0	4.8V RMS
BY122HS	±3.0"	15.35	4.5	17.0	4.5V RMS

AC-AC Long Stroke LVDTs

Model MVL7C

0.25% NON-LINEARITY

STAINLESS STEEL

0.5" TO 18.5" RANGES

SENSOTEC's Model MVL7C (captive guided armature) AC-AC Long Stroke LVDT is designed for measuring static and dynamic displacements from ±0.5" to ±18.5". This model achieves an impressive 0.25% full scale non-linearity. LVDT bodies and probes are constructed of stainless steel for durability in harsh, industrial environments. Free unguided (Model MVL7) and captive guided spring return (Model VL7A) versions are presented on the previous page.

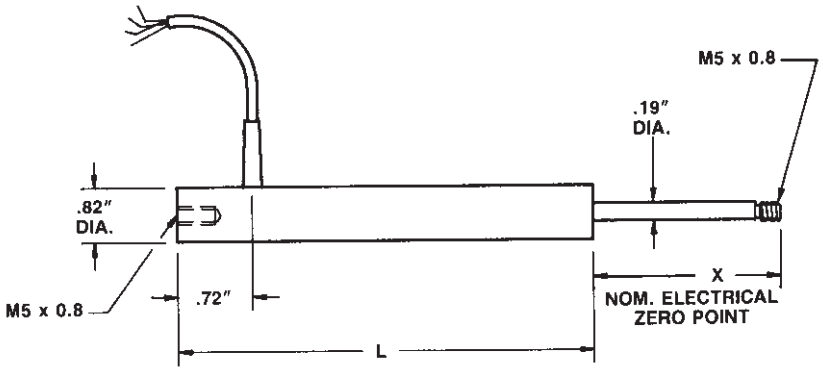
		Model MVL7C (Captive Guided) Order Code: BY126
PERFORMANCE	Stroke Ranges	±0.5" to 18.5"
	Non-Linearity (max)	±0.25% F.S.*
	Output Sensitivity	See dimension table
	Resolution	Infinite
ENVIRONMENTAL	Temperature, Operating	-58° F to 257° F
	Temperature Effect	
	– Zero (max)	.006% F.S./°F
	– Span (max)	.006% F.S./°F
ELECTRICAL	Element Type	AC-AC LVDT
	Input Supply (calibrated)	5V RMS @ 5KHz
	Input Supply (acceptable)	1-7V RMS @ 2-10KHz
	Wiring Code (std)	#30 (See Pg. AP-8)
	Electrical Termination	Multiconductor shielded cable (6 ft.)
MECHANICAL	Case Material	Stainless steel
	Probe Material	Stainless steel
	Armature Type	Captive guided
	Probe Thread	M5 x 0.8

* Non-linearity for models BY126HY (15" stroke) and BY126HZ (18.5" stroke) is .5%

Dimensions

Model MVL7C (Order Code BY126)

Order Code W/Range	Available Stroke Ranges	L"	X"	Approx Unit Wt. (oz.)	Typical F.S. Output at 3V RMS
BY126HP	±0.5"	6.0	1.5	10	2.4V RMS
BY126HQ	±1.0"	7.0	2.5	12	3.0V RMS
BY126HR	±2.0"	11.6	3.0	18	4.8V RMS
BY126HS	±3.0"	16.0	4.5	23	4.5V RMS
BY126HT	±4.0"	17.8	5.0	25	9.6V RMS
BY126HU	±6.0	25.3	7.0	36	7.2V RMS
BY126HV	±8.0"	32.8	10.0	50	4.8V RMS
BY126HW	±10.0"	40.5	12.0	56	6.0V RMS
BY126HY	±15.0"	56.5	16.0	75	9.0V RMS
BY126HZ	±18.5"	67.0	20.0	89	11.1V RMS



Model MVL7C Captive Guided

DC-DC Long Stroke LVDTs

Models JEC and JEC-AG

STAINLESS STEEL

VOLTAGE REGULATION

REVERSE POLARITY PROTECTED

Model JEC Free Unguided

Model JEC-AG Captive Guided Spring Return

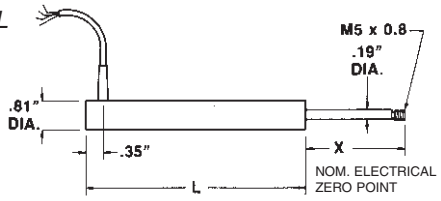
SENSOTEC'S Models JEC (free unguided armature) and JEC-AG (captive guided spring return) DC-DC Long Stroke LVDTs utilize an improved internal circuit which incorporates both reverse polarity protection and voltage regulation. These features eliminate the danger of permanent damage if supply voltage is accidentally reversed, and ensure that sensitivity will remain constant over large variations in supply voltage. These models require no further conditioning, thus permitting easy operation. Model JEC-C (captive guided armature) provides stroke ranges to 18.5" and is presented on the next page.

	Model JEC Order Code AY321	Model JEC-AG Order Code AY322
PERFORMANCE		
Stroke Ranges	±0.5" to 8"	±0.5" to 3"
Non-linearity (max)	±0.25% F.S.	±0.25% F.S.
Output (field selectable)	±5VDC or 0-10 VDC	±5VDC or 0-10 VDC
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	-58° F to 158° F	-58° F to 158° F
Temperature Effect		
- Zero (max)	.006% F.S./°F	.006% F.S./°F
- Span (max)	.017% F.S./°F	.017% F.S./°F
ELECTRICAL		
Element Type	DC-DC LVDT	DC-DC LVDT
Power Supply (@ 30mA)		
- Single Supply	24 to 40 VDC	24 to 40 VDC
- Dual Supply	±12 to ±20 VDC	±12 to ±20 VDC
Output Impedance	2 ohms	2 ohms
Output Load (min.)	2K ohms w/3-wire supply, 20K ohms w/floating supply	2K ohms w/3-wire supply, 20K ohms w/floating supply
Output Ripple	30mv peak to peak	30mv peak to peak
Reverse Polarity Protection	Yes	Yes
Wiring Code (std)	#31	#31
Electrical Termination	Multiconductor shielded cable (6 ft.)	Multiconductor shielded cable (6 ft.)
MECHANICAL		
Case Material	Stainless steel	Stainless steel
Probe Material	Stainless steel	Stainless steel
Armature Type	Free unguided	Captive guided spring return
Probe Thread	M5 x 0.8	N/A
Spring Force (max)	N/A	4 oz./in.

Dimensions

Model JEC (Order Code AY321) *Replaces Model MDL*

Range Code	Stroke Ranges	L"	X"	Approx. Weights (oz.) Body	Armature
HP	±0.5"	6.9	1.7	7.5	1.0
HQ	±1.0"	7.9	2.7	9.5	2.0
HR	±2.0"	12.5	3.2	13.0	2.5
HS	±3.0"	16.9	4.7	17.5	3.0
HT	±4.0"	18.6	5.2	22.0	3.5
HU	±6.0"	26.1	7.2	30.0	4.0
HV	±8.0"	33.6	10.2	44.0	5.0

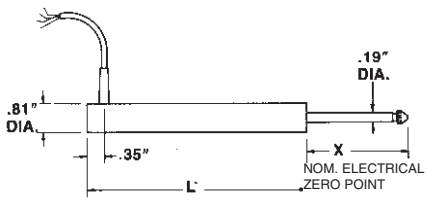


Model JEC Free Unguided

Model JEC-AG (Order Code AY322)
Replaces Model DLA

Range Code	Stroke Ranges	L"	X"	Approx. Unit Wt. (oz.)
HP	±0.5"	7.5	1.5	8.0
HQ	±1.0"	8.25	2.5	10.0
HR	±2.0"	12.85	3.0	14.0
HS	±3.0"	17.25	4.5	18.0

CE AVAILABLE



Model JEC-AG Captive Guided Spring Return

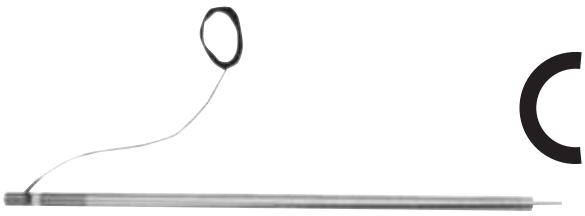
DC-DC Long Stroke LVDTs

Model JEC-C

VOLTAGE REGULATION

EASY TO OPERATE

REVERSE POLARITY PROTECTED



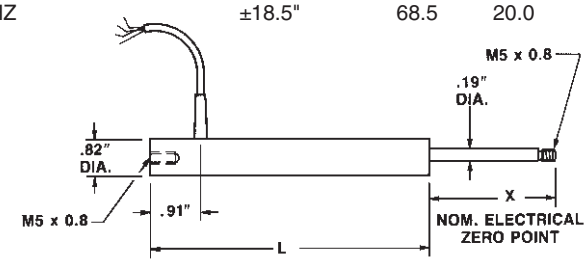
SENSOTEC'S Model JEC-C (captive guided armature) DC-DC Long Stroke LVDT utilizes an improved internal circuit which incorporates both reverse polarity protection and voltage regulation. These features eliminate the danger of permanent damage if supply voltage is accidentally reversed and ensure that sensitivity will remain constant over large variations in supply voltage. This Model requires no further conditioning, thus permitting easy operation. Stroke ranges from 0.5" to 18.5" are available. Free unguided (Model JEC) and captive guided spring return (Model JEC-AG) models are presented on the previous page.

	Model JEC-C (Captive Guided) Order Code AY323
PERFORMANCE	
Stroke Ranges	±0.5" to 18.5"
Non-linearity (max)	±0.25% F.S.
Output (field selectable)	±5VDC or 0-10VDC
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	-58°F to 158°F
Temperature, Effect	
-Zero (max)	0.005% F.S./°F
-Span (max)	0.015% F.S./°F
ELECTRICAL	
Element Type	DC-DC LVDT
Power Supply (@ 30mA)	
-Single Supply	24 to 40VDC
-Dual Supply	±12 to ±20VDC
Output Impedance	2 ohms
Output Load (min.)	2K ohms w/3-wire supply, 20K ohms w/floating supply
Output Ripple	30mv peak to peak
Reverse Polarity Protection	Yes
Wiring Code (std)	#31
Electrical Termination	Multiconductor shielded cable (6 ft.)
MECHANICAL	
Case Material	Stainless steel
Probe Material	Stainless steel
Armature Type	Captive guided
Probe Thread	M5 x 0.8

Dimensions

Model JEC-C (Order Code AY323) ***Replaces Model MDLC***

Range Code	Stroke Ranges	Approx. Unit L"	X"	Wt. (ozs.)
HP	±0.5"	7.5	1.5	12.0
HQ	±1.0"	8.5	2.5	14.0
HR	±2.0"	13.1	3.0	18.0
HS	±3.0"	17.5	4.5	22.0
HT	±4.0"	19.3	5.0	27.0
HU	±6.0"	26.8	7.0	36.0
HV	±8.0"	34.3	10.0	51.0
HW	±10.0"	42.0	12.0	59.0
HY	±15.0"	58.0	16.0	78.0
HZ	±18.5"	68.5	20.0	92.0



DC-DC Long Stroke LVDTs

Models DLB, DLE and DLF

LOW VOLTAGE REQUIREMENTS

EASY TO OPERATE

STAINLESS STEEL

REVERSE POLARITY PROTECTED

Model DLB Free Unguided

Model DLF Captive Guided Spring Return

Model DLE Captive Guided Armature

CE

SENSOTEC'S Model DLB (free unguided), DLE (captive guided armature) and DLF (captive guided spring return) operate from either +5 VDC regulated or +6 to +18 VDC unregulated and generate an output signal of ±2 VDC. The output signal is electrically isolated from the input voltage and can be used with digital panel meters to from a complete readout system. The DLB, free unguided is available with stroke ranges of 0.5" to 8.0". the DLE, captive guided armature has stroke ranges of 0.5" to 18.5" and the DLF, captive guided spring return from 0.5" to 3.0".

	Model DLB Order Code BY127	Model DLF Order Code BY129	Model DLE Order Code BY128
PERFORMANCE			
Stroke Ranges (Model DLB)		±0.5" to 8"	
(Model DLF)		±0.5" to 3"	
(Model DLE)		±0.5" to 18.5"	
Non-linearity (max)		±0.25% F.S.	
Output sensitivity		±2VDC F.S.	
ENVIRONMENTAL			
Temperature, Operating		-58° F to 158° F	
Temperature Effect			
-Zero (max)		.006% F.S./°F	
-Span (max)		.017% F.S./°F	
ELECTRICAL			
Element type		DC-DC LVDT	
Input supply		+6V to +18VDC unregulated or 5V regulated	
Output impedance		2 ohms	
Output load (min)		2K ohms	
Output ripple		30mv peak to peak	
Reverse polarity protection		Yes	
Wiring Code (std)		#35	
Electrical termination		Multiconductor shielded cable (6 ft.)	
MECHANICAL			
Case material		Stainless steel	
Probe material		Stainless steel	
Armature type (Model DLB)		Free Unguided	
(Model DLF)		Captive Guided Spring Return	
(Model DLE)		Captive Guided	
Probe thread		M5 x 0.8	
Spring force (max)		4 ozs./in. (DLF Only)	

1-888-282-9891

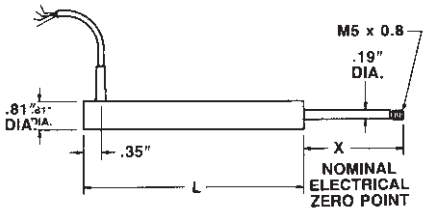
Honeywell Sensotec Sensors

www.honeywell.com/sensing

Dimensions

Model DLB (Order Code BY127)

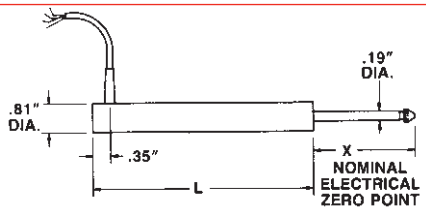
Order Code W/Range	Available Stroke Ranges	L"	X"	Approx. Weights (ozs.) Body	Armature
BY127HP	±0.5"	6.9	1.7	7.5	1.0
BY127HQ	±1.0"	7.9	2.7	9.5	2.0
BY127HR	±2.0"	12.5	3.2	13.0	2.5
BY127HS	±3.0"	16.9	4.7	17.5	3.0
BY127HT	±4.0"	18.6	5.2	22.0	3.5
BY127HU	±6.0"	26.1	7.2	30.0	4.0
BY127HV	±8.0"	33.6	10.2	44.0	5.0



Model DLB Free Unguided

Model DLF (Order Code BY129)

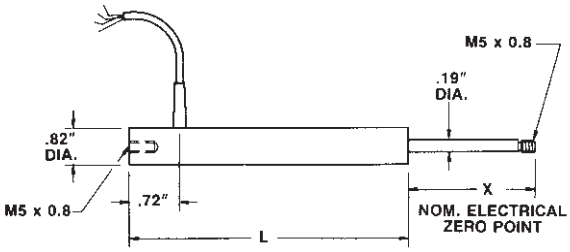
Order Code W/Range	Available Stroke Ranges	L"	X"	Approx. Unit Weights (ozs.)
BY129HP	±0.5"	7.25	1.5	8.0
BY129HQ	±1.0"	8.25	2.5	10.0
BY129HR	±2.0"	12.85	3.0	14.0
BY129HS	±3.0"	17.25	4.5	18.0



Model DLF Captive Guided Spring Return

Model DLE (Order Code BY128)

Order Code W/Range	Available Stroke Ranges	L"	X"	Approx. Unit Weights (ozs.)
BY128HP	±0.5"	7.5	1.5	12.0
BY128HQ	±1.0"	8.5	2.5	14.0
BY128HR	±2.0"	13.1	3.0	18.0
BY128HS	±3.0"	17.5	4.5	22.0
BY128HT	±4.0"	19.3	5.0	27.0
BY128HU	±6.0"	26.8	7.0	36.0
BY128HV	±8.0"	34.3	10.0	51.0
BY128HW	±10.0"	42.0	12.0	59.0
BY128HY	±15.0	58.0	16.0	78.0
BY128HZ	±18.5"	68.5	20.0	92.0



Model DLE Captive Guided Armature

General Information

How to order (See Pg. AP-19)
LVDT selection flow chart (See Pg. LV-1)

AC-AC Submersible* LVDTs

Models LW7U, LW7C and LW7S

SUBMERSIBLE

STAINLESS STEEL

3 ARMATURE DESIGNS

Sensotec's Models LW7U, LW7C and LW7S Submersible LVDTs are ideal for drilling, mining, and hydraulic engineering applications which require a displacement transducer with a stainless steel, waterproof construction. These models may be used as direct measuring linear displacement devices or positional feedback elements in dynamic systems. They are suitable for submersion in fresh water and some corrosive fluids for long periods. The captive guided spring return armature is fitted with a ball ended probe.

	Models LW7U, LW7C and LW7S Order Codes: AY200, AY201, AY202
PERFORMANCE	
Stroke Ranges (Model LW7U & LW7C)	+/– 0.5" to 4.0" (12.5 mm to 100 mm)
(Model (LW7S)	+/– 0.5" to 3.0" (12.5 mm to 75 mm)
Non-linearity (max.)	+/– 0.25% F.S.
Output Sensitivity	See dimension table
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	–40° F to 194° F (–40° C to 90° C)
Temperature Effect	
– Zero (max.)	0.005% F.S. / ° F (0.01% F.S. / ° C)
– Span (max.)	0.005% F.S. / ° F (0.01% F.S. / ° C)
Pressure Rating, Std.	150 psi (10 bar) Up to 3000 psi (200 bar) with cable options
ELECTRICAL	
Element Type	AC-AC LVDT
Input Supply	5V RMS at 5K Hz
Input Supply (acceptable)	1-7V RMS at 5K Hz
Output Load (min.)	100K
Wiring Diagram	See page LV-11
Electrical Termination (std.)	Submersible mating connector with 16.5' (5 meters) cable
MECHANICAL	
Case Material	Stainless Steel
Probe Material	Stainless Steel
Armature Type	LW7U .....Free Unguided LW7C .....Captive Guided LW7S .....Captive Guided Spring Return
Probe Thread (Model LW7U & LW7C)	M5 x 0.8"
Spring Force (Model LW7S)	4 oz./in. (.028 N-m)

OPTIONAL ELECTRICAL TERMINATIONS

Available options – consult Sensotec

- No connector or cable, terminated with solder pins
- Flexible stainless steel cable, up to 100 ft. (30 meters) long, pressure rating 3000 psi (200 bar).
- Mineral insulated welded stainless steel sheathed cable, 0.12" (3 mm) dia. cable, 1 to 164 ft. (50 meters) lengths avail., –67° F to 390° F, (–55° to 200° C) 3000 psi, (200 bar).
- Radial outlet submersible connector with 16.5 ft. (5 meters) cable

*Not recommended for saltwater use. Consult SENSOTEC for saltwater submersible applications.

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DIMENSIONS

Model LW7U (Order Code AY200) Free Unguided

Order Code Range	Available Stroke Ranges		L		X		Armature Wt.		Typical F.S. Output at 5V RMS
	in.	mm	in.	cm	in.	cm	oz.	gm	
HP	+/– 0.5	+/– 12.5	6.02	15.29	1.5	3.81	0.75	21.3	3.5V RMS
HQ	+/– 1.0	+/– 25	7.12	18.08	2.5	6.35	1.0	28.4	4.5V RMS
HR	+/– 2.0	+/– 50	11.97	30.40	3.0	7.62	1.5	42.5	7.6V RMS
HS	+/– 3.0	+/– 75	16.53	41.98	4.5	11.43	3.0	85.1	7.5V RMS
HT	+/– 4.0	+/– 100	17.83	45.28	5.0	12.7	3.7	104.9	16.0V RMS

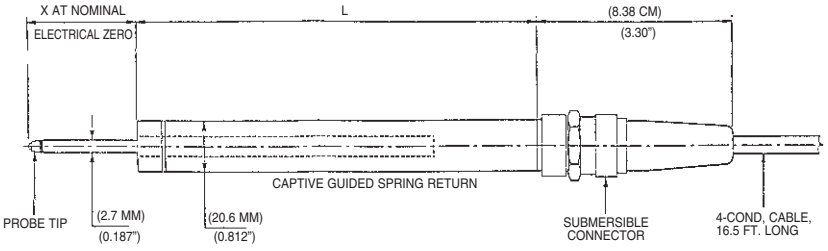
Model LW7C (Order Code AY201) Captive Guided

Order Code Range	Available Stroke Ranges		L		X		Armature Wt.		Typical F.S. Output at 5V RMS
	in.	mm	in.	cm	in.	cm	oz.	gm	
HP	+/– 0.5”	+/– 12.5	6.02	15.29	1.5	3.81	0.75	21.3	3.5V RMS
HQ	+/– 1.0”	+/– 25	7.12	18.08	2.5	6.35	1.0	28.4	4.5V RMS
HR	+/– 2.0”	+/– 50	11.97	30.40	3.0	7.62	1.5	42.5	7.6V RMS
HS	+/– 3.0”	+/– 75	16.53	41.98	4.5	11.43	3.0	85.1	7.5V RMS
HT	+/– 4.0”	+/– 100	17.83	45.3	5.0	12.7	3.7	104.9	16.0V RMS

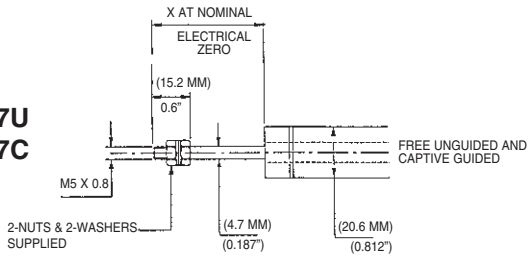
Model LW7S (Order Code AY202) Captive Guided Spring Return

Order Code Range	Available Stroke Ranges		L		X		Spring Force		Typical F.S. Output at 5V RMS
	in.	mm	in.	cm	in.	cm	oz.-in.	N-m	
HP	+/– 0.5”	+/– 12.5	6.02	15.29	1.5	3.81	4	.028	3.5V RMS
HQ	+/– 1.0”	+/– 25	7.12	18.08	2.5	6.35	4	.028	4.5V RMS
HR	+/– 2.0”	+/– 50	11.97	30.4	3.0	7.62	4	.028	7.6V RMS
HS	+/– 3.0”	+/– 75	16.53	41.98	4.5	11.43	4	.028	7.5V RMS

MODEL LW7S



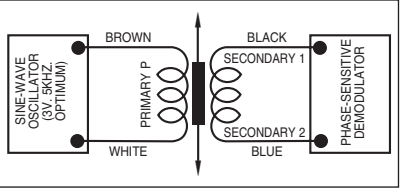
MODEL LW7U
MODEL LW7C



WIRING DIAGRAM

CONNECTIONS

Brown – Supply
White – Supply Return
Blue – Output
Black – Output Return



DC-DC Submersible* LVDTs

Models DW7U, DW7C and DW7S

SUBMERSIBLE

STAINLESS STEEL

3 ARMATURE DESIGNS

Sensotec's Models DW7U, DW7C and DW7S Submersible LVDTs are ideal for drilling, mining, and hydraulic engineering applications which require a displacement transducer with a stainless steel, waterproof construction. These models may be used as direct measuring linear displacement devices or positional feedback elements in dynamic systems. They are suitable for submersion in fresh water and some corrosive fluids for long periods. The captive guided spring return armature is fitted with a ball-ended probe.

	Models DW7U, DW7C and DW7S Order Codes: AY250, AY251, AY252
PERFORMANCE	
Stroke Ranges (Model DW7U & DW7C)	+/– 0.5" to 4.0" (12.5 mm to 100 mm)
(Model (DW7S)	+/– 0.5" to 3.0" (12.5 mm to 75 mm)
Non-linearity (max.)	+/– 0.25% F.S.
Output Sensitivity	See dimension table
Resolution	Infinite
ENVIRONMENTAL	
Temperature, Operating	–40° F to 158° F (–40° C to 70° C)
Temperature Effect	
– Zero (max.)	0.005% F.S. / ° F (0.01% F.S. / ° C)
– Span (max.)	0.015% F.S. / ° F (0.03% F.S. / ° C)
Pressure Rating	150 psi (10 bar) standard Up to 3000 psi (200 bar) with cable options
ELECTRICAL	
Element Type	DC-DC LVDT
Input Supply	+/– 10 to 20 VDC unregulated (45mA max.) or 20 to 40 VDC unregulated (45mA max.)
Wiring Diagram	See LV-13
Electrical Termination (std.)	Submersible mating connector with 16.5' (5 meters) cable
MECHANICAL	
Case Material	Stainless Steel
Probe Material	Stainless Steel
Armature Type	DW7U .....Free Unguided DW7C .....Captive Guided DW7S .....Captive Guided Spring Return
Probe Thread (Model DW7U & DW7C)	M5 x 0.8"
Spring Force (Model DW7S)	4 oz./in. (.028 N-m)

OPTIONAL ELECTRICAL TERMINATIONS

Available Options – Consult Sensotec

- No connector or cable, terminated with solder pins
- Flexible stainless steel cable, up to 100 ft. (30 meters) long, pressure rating 3000 psi (200 bar).
- Mineral insulated welded stainless steel sheathed cable, 0.12" (3 mm) dia. cable, 1 to 164 ft. (50 meters) lengths avail., –67° F to 390° F (–55° C to 200° C), 3000 psi (200 bar).
- Radial outlet submersible connector with 16.5 ft. (5 meters) cable

*Not recommended for saltwater use. Consult SENSOTEC for saltwater submersible applications.

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DIMENSIONS

Model DW7U (Order Code AY250) Free Unguided

Order Code Range	Available Stroke Ranges		L		X		Armature Wt.		Typical F.S. Output
	in.	mm	in.	cm	in.	cm	oz.	gm	
HP	+/– 0.5	+/– 12.5	8.00	20.32	1.5	3.81	0.75	21.3	+/– 5 VDC
HQ	+/– 1.0	+/– 25	9.10	23.11	2.5	6.35	1.0	28.4	+/– 5 VDC
HR	+/– 2.0	+/– 50	13.95	35.43	3.0	7.62	1.5	42.5	+/– 5 VDC
HS	+/– 3.0	+/– 75	18.52	47.04	4.5	11.43	3.0	85.1	+/– 5 VDC
HT	+/– 4.0	+/– 100	19.80	50.29	5.0	12.7	3.7	104.9	+/– 5 VDC

Model DW7C (Order Code AY251) Captive Guided

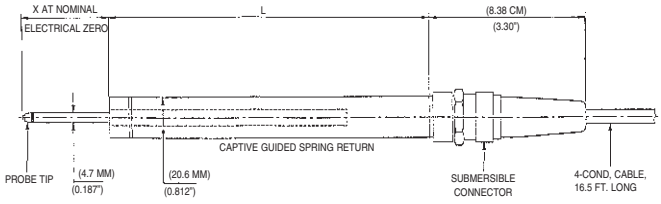
Order Code Range	Available Stroke Ranges		L		X		Armature Wt.		Typical F.S. Output
	in.	mm	in.	cm	in.	cm	oz.	gm	
HP	+/– 0.5”	+/– 12.5	8.00	20.32	1.5	3.81	0.75	21.3	+/– 5 VDC
HQ	+/– 1.0”	+/– 25	9.10	23.11	2.5	6.35	1.0	28.4	+/– 5 VDC
HR	+/– 2.0”	+/– 50	13.95	35.43	3.0	7.62	1.5	42.5	+/– 5 VDC
HS	+/– 3.0”	+/– 75	18.52	47.04	4.5	11.43	3.0	85.1	+/– 5 VDC
HT	+/– 4.0”	+/– 100	19.80	50.29	5.0	12.7	3.7	104.9	+/– 5 VDC

Model DW7S (Order Code AY252) Captive Guided Spring Return

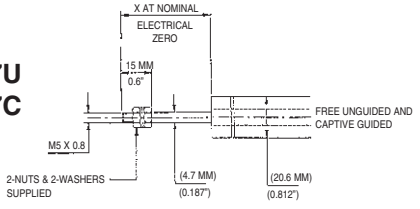
Order Code Range	Available Stroke Ranges		L		X		Spring Force		Typical F.S. Output
	in.	mm	in.	cm	in.	cm	oz.-in.	N-m	
HP	+/– 0.5”	+/– 12.5	8.00	20.32	1.5	3.81	4	.028	+/– 5 VDC
HQ	+/– 1.0”	+/– 25	9.10	23.11	2.5	6.35	4	.028	+/– 5 VDC
HR	+/– 2.0”	+/– 50	13.95	35.43	3.0	7.62	4	.028	+/– 5 VDC
HS	+/– 3.0”	+/– 75	18.52	47.04	4.5	11.43	4	.028	+/– 5 VDC

Output options of 0-10 VDC or 4-20mA available – consult Sensotec

MODEL DW7S



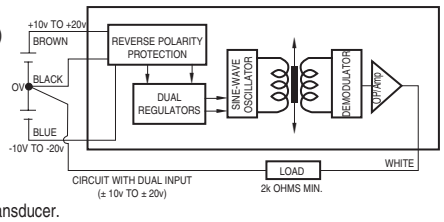
MODEL DW7U
MODEL DW7C



DC/DC DUAL POWER SUPPLY

Reverse polarity protected with voltage regulator.

Brown – (+)Supply (+10 to +20 VDC)
Blue – (-)Supply (-10 to -20 VDC)
Black – (-)Output common/ Supply Return
White – (+)Output +/- 5 VDC (Min. 2K ohm load across Black and White)

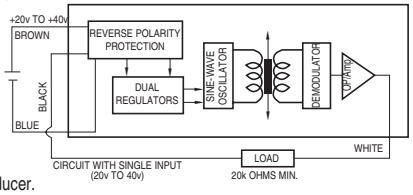


- Cable shield is not connected to transducer.

DC/DC SINGLE POWER SUPPLY

Reverse polarity protected with voltage regulator.

Brown – (+)Supply (+20 to +40 VDC)
Blue – Supply return
White – (+) Output +/- 5 VDC (Min. 20K ohm load across Black and White)
Black – (-)Output



- Cable shield is not connected to transducer.
- Either black or blue must float. If both are grounded or connected together, the unit will be destroyed.

SUB-SEA DISPLACEMENT SENSORS

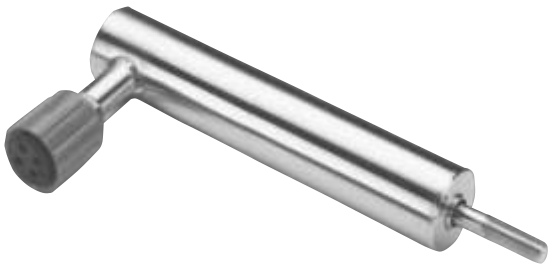
Model SSA & SSD

Free Unguided LVDT

ALL-WELDED 316 SS

UP TO 7500 FT DEPTH

+/-0.5" TO +/- 4" RANGE



Both AC & DC type of LVDTs are offered in ranges from +/- 0.5" up to +/- 4.0" stroke length. The oceanographic type of electrical plug allows the connection to be made underwater. These Sub-Sea Displacement Sensors are pressure rated to operate down to a depth of 7500 feet in sea water. The body of the sensor is made from 316 SS with all-welded construction. Sensotec offers In-Line Amplifiers and Digital Indicators for both LVDT models that provide +/-5, 10 VDC or 4-20 mA and RS232 ouputs with zero and span adjustments.

	Model SSA Order Code AY910	Model SSD Order Code AY911
PERFORMANCE		
Stroke Ranges	+/- 0.5" to +/- 4.0"	+/- 0.5" to +/- 4.0"
Non-Linearity	+/- 0.5% FS	+/- 0.5% FS
Output	See Dimensions Table	+/- 5.0 Vdc
Resolution	Infinite	Infinite
Noise & Ripple	N/A	30 mV Peak to Peak
ENVIRONMENTAL		
Temperature	-40°F to +122°F	-40°F to +122°F Note:* +15° to +140°F on 4-20mA output
Temperature effect on		
Zero (max	+/- 0.005%FS/degree F	+/- 0.005% FS/degree F
Span (max)	+/- 0.005%FS/degree F	+/- 0.015% FS/degree F
Operating Pressure	3500 PSI	3500 PSI
ELECTRICAL		
Element Type	AC - AC LVDT	DC - DC LVDT
Input Supply	0.5 to 7 V rms, 5 kHz	Single floating supply: +20 to 40 Vdc, 25 mA Dual supply: +/- 10 to 20 Vdc, 25 mA
Electrical Termination	Includes a submersible, neoprene and nickle-aluminum bronze connector molded to 6 ft of neoprene jacketed 10.2 mm diameter cable. The electrical connector may be mated under water up to 500 psi or 1100 ft. Longer cable lengths are available up to 3250 ft. Call Sensotec for information.	
MECHANICAL		
Case and Armature Material	316 Stainless Steel with all-welded construction	

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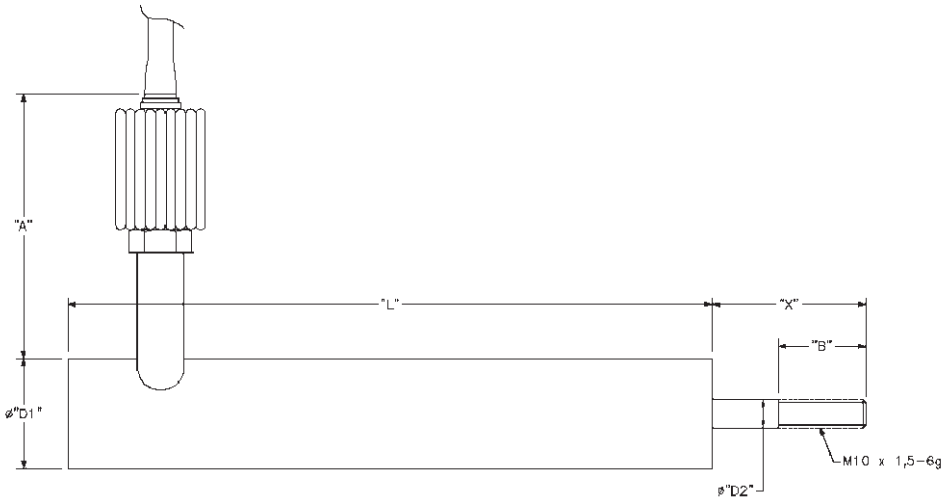
Dimensions

Model SSD Order Code AY911

Order Code	Available Stroke Range	Output Sensitivity	"L"	"X"	"D1"	"D2"	"A"	"B"
AY911HP	+/- 0.5"	+/- 5 VDC	8.8"	2.1"	1.5"	0.39"	3.6"	1.2"
AY911HQ	+/- 1.0"	+/- 5 VDC	9.9"	2.6"	1.5"	0.39"	3.6"	1.2"
AY911HR	+/- 2.0"	+/- 5 VDC	13.6"	3.6"	1.5"	0.39"	3.6"	1.2"
AY911HS	+/- 3.0"	+/- 5 VDC	17.1"	4.6"	1.5"	0.39"	3.6"	1.2"
AY911HT	+/- 4.0"	+/- 5 VDC	21.1"	5.6"	1.5"	0.39"	3.6"	1.2"



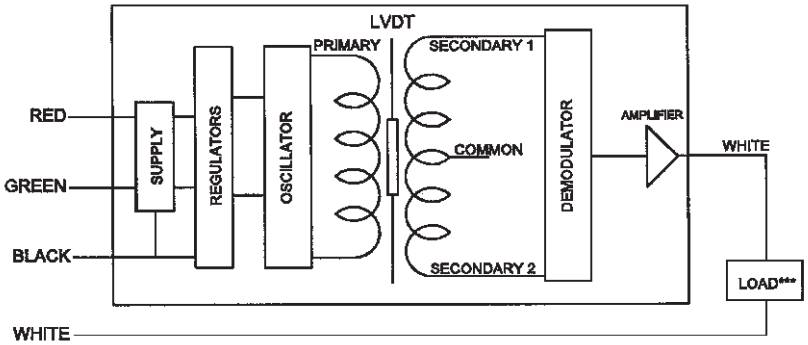
Model SSA Order Code AY910

Order Code	Available Stroke Range	Output Sensitivity	"L"	"X"	"D1"	"D2"	"A"	"B"
AY910HP	+/- 0.5"	Contact Factory 0.3 to 3 V rms range dependent	8.8"	2.1"	1.5"	0.39"	3.6"	1.2"
AY910HQ	+/- 1.0"		9.9"	2.6"	1.5"	0.39"	3.6"	1.2"
AT910HR	+/- 2.0"		13.6"	3.6"	1.5"	0.39"	3.6"	1.2"
AY910HS	+/- 3.0"		17.1"	4.6"	1.5"	0.39"	3.6"	1.2"
AY910HT	+/- 4.0"		21.1"	5.6"	1.5"	0.39"	3.6"	1.2"

HOW TO ORDER:

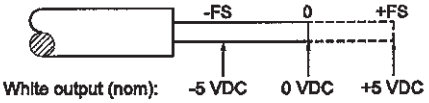
1. Select the stroke range & order code
2. Select the cable length Includes mating electrical connector and 6 ft. cable. Additional cable at $ 3.75/ft
3. Specify the depth to be used
4. Select the Sensotec in-line amplifier or digital indicator reference page IN-2,8-9.

DC/DC LVDT (Single or Dual power supply) with single and dual outpputs INCORRECT CONNECTION MAY CAUSE IRREPARABLE DAMAGE



COLOR or PIN	DESIGNATION	
	Single Supply*	Dual Supply
Red or PIN A	20 to 40 V Supply	+10 to +20 V Supply
Green or PIN B	Supply Common	-10 to -20 v Supply
Black or PIN C	Output Common**	0 V Common
White or PIN D	Output	Output

*Supply must be fully floating.
**Output common floats at Vsupply/2.
*** Min 2K ohms with dual supply, 20K ohms with single supply



AC-AC Submersible* LVDTs

Models MS7A and S7C

WATERPROOF DESIGN

WITHSTANDS 250 psi

2 ARMATURE DESIGNS

Model MS7A Free Unguided

Model S7C Captive Spring

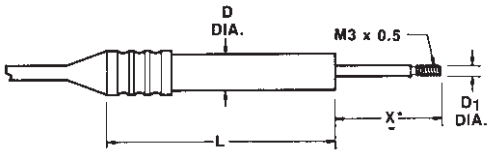
SENSOTEC's Models MS7A and S7C AC-AC Submersible LVDTs are engineered for rugged industrial applications which require a waterproof transducer. These stainless steel units are designed with permanently attached, waterproof connecting cables. Connecting cables and a waterproof outer jacket are hermetically sealed to the transducer to allow for submersion in most liquids and corrosive fluids. These models can withstand external pressures to 250 psi.

	Model MS7A (Free Unguided) Order Code BY921	Model S7C (Captive Spring) Order Code BY912
PERFORMANCE		
Stroke Ranges	+ /-.04" to .5"	+ /-.04" to .5"
Non-linearity (max)	+ /-0.25% F.S.	+ /-0.25% F.S.
Non-repeatability (max)	<10 microinches	<10 microinches
Output Sensitivity	2mv/v/.001"	2mv/v/.001"
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	-4° F to 257° F	-4° F to 257° F
Temperature Effect		
– Zero (max)	.006% F.S./° F	.006% F.S./° F
– Span (max)	.006% F.S./° F	.006% F.S./° F
ELECTRICAL		
Element Type	AC-AC LVDT	AC-AC LVDT
Input Supply (calibrated)	5V RMS @ 5KHz	5V RMS @ 5KHz
Input Supply (acceptable)	1-7V RMS @ 2-10KHz	1-7V RMS @ 2-10KHz
Output Load (min.)	100k ohms	100k ohms
Wiring Code (std)	#30 (See Pg. AP-8)	#30 (See Pg. AP-8)
Electrical Termination	Hermetically sealed waterproof cable (6 ft.)	Hermetically sealed waterproof cable (6 ft.)
MECHANICAL		
Case Material	Stainless steel	Stainless steel
Probe Material	Stainless steel	Stainless steel
Armature Type	Free unguided	Captive guided spring return
Probe Thread	M3 x 0.5	N/A

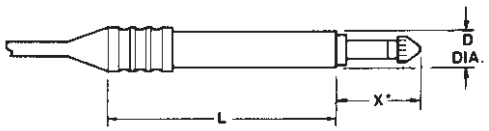
Dimensions

Model MS7A (Order Code BY921)

Order Code W/Range	Available Stroke Ranges	Total L"	D"	X"**	D1"	Total Weight***	Armature Weight
BY921HK	+/-0.04"	1.61	0.315	0.669	0.092	0.90 oz.	0.13 oz.
BY921HM	+/-0.10"	1.85	0.375	0.708	0.092	1.00 oz.	1.20 oz.
BY921HN	+/-0.20"	1.98	0.375	0.900	0.092	1.15 oz.	0.25 oz.
BY921HF	+/-0.30"	2.75	0.375	1.180	0.092	1.60 oz.	0.35 oz.
BY921HG	+/-0.40"	2.91	0.375	1.280	0.092	1.70 oz.	0.37 oz.
BY921HP	+/-0.50"	3.54	0.375	1.375	0.092	2.10 oz.	0.45 oz.



Model MS7A Free Unguided



Model S7C Captive Spring

Model S7C (Order Code BY912)

Order Code W/Range	Available Stroke Ranges	L"	D"	X" **	Maximum Spring Force	Total Weight ***
BY912HK	+/-0.04"	2	0.315	0.45	7.5 oz.	1.8 oz.
BY912HM	+/-0.10"	2.52	0.375	0.46	5.0 oz.	2.9 oz.
BY912HN	+/-0.20"	2.75	0.375	0.48	5.0 oz.	2.9 oz.
BY912HF	+/-0.30"	3.75	0.375	0.72	5.0 oz.	3.9 oz.
BY912HG	+/-0.40"	4.19	0.375	0.87	5.0 oz.	4.4 oz.
BY912HP	+/-0.50"	5.08	0.375	0.97	5.0 oz.	5.4 oz.

** Dimensions at "X" at nominal electrical zero
*** Excluding cable

* Not recommended for saltwater use.

DC-DC Miniature LVDTs

Models MS3 and S3C

MINIATURE DESIGN

COST EFFECTIVE

0.25% NON-LINEARITY

Model MS3 Free Unguided

Model S3C Captive Guided Spring Return

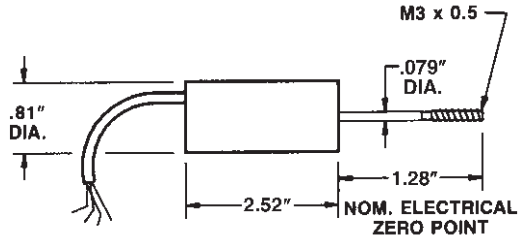
SENSOTEC's Models MS3 (free unguided armature) and S3C (captive guided spring return armature) DC-DC Miniature LVDTs are ideally suited for multi-point applications with space constraints and provide a cost-effective alternative to larger, more expensive units. These models are compatible with DC data logging equipment used for taking readings from strain gages or other DC operated transducers.

	Model MS3 (Free Unguided) Order Code BY327	Model S3C (Captive Guided Spring Return) Order Code BY324
PERFORMANCE		
Strokes Ranges	±.1" to .4"	±.1" to .4"
Non-linearity (max)	±0.25% F.S.	±0.25% F.S.
Output (field selectable)	±5 VDC or 0-10 VDC	±5 VDC or 0-10 VDC
Resolution	Infinite	Infinite
ENVIRONMENTAL		
Temperature, Operating	-58° F to 158° F	-58° F to 158° F
Temperature Effect		
- Zero (max)	.006% F.S./°F	.006% F.S./°F
- Span (max)	.017% F.S./°F	.017% F.S./°F
ELECTRICAL		
Element Type	DC-DC LVDT	DC-DC LVDT
Power Supply (@ 30mA)		
- Single Supply	24 to 40 VDC	24 to 40 VDC
- Dual Supply	±12 to ±20 VDC	±12 to ±20 VDC
Output Impedance	2 ohms	2 ohms
Output Load (min.)	20,000 ohms	20,000 ohms
Noise (filtered output)	2mV RMS at zero output 5-10 mV RMS at full range	2mV RMS at zero output 5-10 mV RMS at full range
Wiring Code (std)	#31	#31
MECHANICAL		
Electrical Termination	Multiconductor shielded cable (6 ft.)	Multiconductor shielded cable (6 ft.)
Case Material	Stainless steel	Stainless steel
Probe Material	Stainless steel	Stainless steel
Armature Type	Free unguided	Captive guided spring return
Unit Weight	73.5 grams	82.5 grams
Probe Thread	M3 x 0.5	N/A

Dimensions

Model MS3 (Order Code BY327)

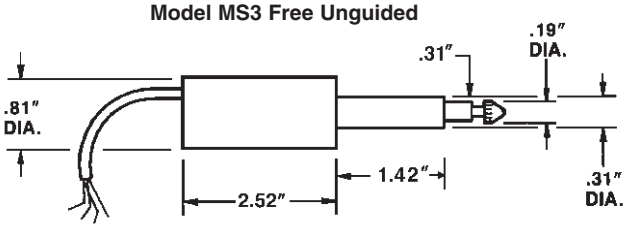
Range Code	Available Stroke Ranges
HM	±.1"
HN	±.2"
HF	±.3"
HG	±.4"



Model MS3 Free Unguided

Model S3C (Order Code BY324)

Range Code	Available Stroke Ranges
HM	±.1"
HN	±.2"
HF	±.3"
HG	±.4"



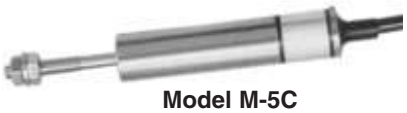
Model S3C Captive Guided Spring Return

AC-AC Miniature LVDTs

Model M-5C

MINIATURE DESIGN

RUGGED, HIGH ACCURACY

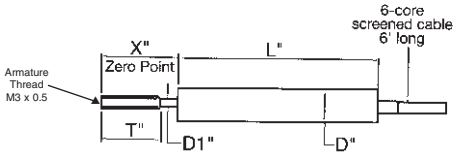


Model M-5C

Model M-5C, AC-AC Miniature LVDTs are rugged, stable, and compact transducers, which provide high accuracy static and dynamic displacement measurement. These units are easily mounted in any position, at remote or hazardous locations where direct measurement would not be practical. High electrical output, exceptional linearity and infinite resolution enable these units to be effective in a variety of applications. M-5C has a free unguided armature, which may be mounted to be virtually friction-free. The LVDT body and armature are separable.

	Model M-5C Order Code AY318
PERFORMANCE	
Strokes Ranges	±0.10" to ±0.50"
Non-linearity (max)	±0.25% F.S.
Non-repeatability (max)	Not measurable
Output Sensitivity	2mV/V/0.001"
Resolution	Infinite
Phase Shift	<10° @ 5KHz
ENVIRONMENTAL	
Temperature, Operating	-4°F to 257°F
Temperature Effect	
- Zero (max)	.006% F.S./F°
- Span (max)	.006% F.S./°F
ELECTRICAL	
Element Type	AC-AC LVDT
Input Supply (calibrated)	5V RMS @ 5KHz
Input Supply (acceptable)	1-7 RMS @ 2-10KHz
Output Load (min.)	100 ohms
Wiring Code (std)	#30 (See Pg. AP-8)
Electrical Termination.....	Multiconductor shielded cable (6 ft.)
MECHANICAL	
Case Material	Stainless steel
Probe Material	Stainless steel
Armature Type.....	Free unguided
Probe Thread	M3 x 0.5

Dimensions



Model M-5C

Order Code W/Range	Stroke Ranges	L"	X"	D"	D1"	T"	Total Weight	Armature Weight	Nom. Sensitivity (mV/V@F.S.)
AY318HJ	±0.025"	1.38	1.1	0.375	0.075	0.75	0.5 oz.	0.045 oz.	43
AY318HM	±0.1"	1.69	0.75	0.375	0.09	0.59	0.56 oz.	0.05 oz.	375
AY318HN	±0.2"	*	1	0.375	*	0.71	0.63 oz.	0.07 oz.	700
AY318HF	±0.3"	2.28	1.18	0.375	0.08	0.71	0.78 oz.	0.078 oz.	420
AY318HG	±0.4"	2.48	1.28	0.375	0.08	0.71	0.99 oz.	0.067 oz.	580
AY318HP	±0.5"	3.11	1.37	0.375	0.08	0.71	1.27 oz.	0.081 oz.	780

Options (See Appendix)

Options: Threaded body: 13f (3/8-32 UNEF); 13g (1/8 BSP).
Premium Options: Threaded body: 13h (M-10). (Not available on ranges over 0.2")
* Consult factory.

LVDT
Selection Considerations

The following factors should be considered when selecting an LVDT:
1. Measurement range.
2. Armature type.
3. AC-AC vs. DC-DC.
4. Environment.

Measurement Range

LVDTs are available with ranges from ±.01" to ±18.5". An LVDT with a ±18.5" range can be used in one direction to measure up to 37". If accuracy is important, the range selected should not be any larger than necessary.

Armature Type

Three armature types are available: free unguided armatures, captive guided spring return armatures, and captive guided armatures.

Free unguided armatures are recommended for applications in which the target being measured moves parallel to the transducer body as well as those which require frequent or continuous measurements. This armature type is well suited for dynamic applications. When using a free unguided armature, the armature and the LVDT body must be mounted so that their correct relative positions are maintained. This type of LVDT features an armature/threaded push rod assembly which is completely separable from the LVDT body. Since the free unguided armature involves no mechanical coupling between the armature and the LVDT body, there are no springs or bearings to fatigue. This unit has a virtually unlimited fatigue life.

Captive guided spring return armatures are well suited for those applications requiring the measurement of multiple targets or applications in which the target moves transverse to the armature and changes in a structure's surface are being measured. In this type of LVDT, the armature moves over bearings in the LVDT body. The armature is biased by an internal spring so that the ball-ended probe bears against the surface of the target whose displacement is being measured. The LVDT is held in position by clamping the body alone. The armature is not attached to the target being measured.

Captive guided armatures are designed for applications requiring a longer working range. The armature moves freely over machined bearings but cannot be removed from the body. The LVDT body has a threaded mounting hole and the armature is attached to the structure being measured. The armature end is threaded so that special adapters such as spherical bearings or rollers can be attached.

AC-AC vs. DC-DC

The major advantages of DC-DC LVDTs are the ease of installation, the ability to operate from dry cell batteries in remote locations, and lower system cost, which AC-AC LVDT advantages include greater accuracy and a smaller body size.

An AC-AC LVDT can be equipped with more sophisticated electronics such as SENSOTEC's SC instrumentation. The SC instrument provides an AC power supply, a phase sensitive demodulator, a scaling amplifier and DC output. The AC-AC LVDT system has less residual noise at minimum readings that DC-DC units which utilize internal electronics.

Environment

For applications involving very high humidity or requiring submersion of the LVDT, a submersible LVDT is required. Submersible units are available for either AC-AC or DC-DC operation and with free unguided or captive spring return armatures.

The unit selected should also operate and survive at the temperatures dictated by the application. Note that AC-AC units will operate at higher temperatures (up to 257°F) than the DC-DC units (up to 158°F) which have internal electronics.

Side Loads

Side loads must be kept to a minimum since they will cause rubbing between the armature and the LVDT body. This friction will cause excessive wear of bearings and parts and in extreme cases, the armature may bend. At a minimum, side loads will reduce the unit's life and accuracy.

Mounting Block

Mounting block (accessory code AA937) comes in two sizes. The large size accommodates LVDTs with an outside diameter of 0.80" (20.6mm). The small size is for units with outside diameters of 0.37" (9.5mm) or 0.32" (8mm). the mounting blocks are designed to be bolted to a flat surface. The sensor is clamped with a captive cap head screw. Two mounting cap screws are furnished. both units are made from glass filled nylon and have an operating temperature of -20° to 230°F. Strokes up to 0.4" require 1 mounting block, strokes over 0.5" require 2 mounting blocks. Consult factory for outline and dimensional drawings.

Instrumentation

SINGLE/MULTI CHANNEL

0.01% TO 0.02% ACCURACY

ENGINEERING UNITS

ANALOG/DIGITAL OUT

SENSOTEC manufactures a wide range of low to medium priced instruments including single-channel, multi-channel, and microprocessor-based units. These instruments are manufactured as standard and modified standard units to provide the fastest possible delivery. Many units can ship from our extensive stocking program within 24 hours. Additionally, we offer a wide range of in-line amplifiers to be used with transducers made by SENSOTEC or other manufacturers.

The Accu-Gage line also offers a complete range of digital pressure gages. These instruments house the pressure transducer as well as the digital readout and are perfect replacements for dial gages, dangerous mercury columns, and quartz tube barometers. Accu-Gage units combine portability, high accuracy and durability with low cost.

These industrially rugged, highly reliable instruments come in table top, panel mount, and rack mounted configurations and are suitable for lab or shop floor use. Most models come with such standard features as a 4 1/2 digit LED display, 20,000 count resolution, as well as 5V or 10V transducer excitation supply, and ±5VDC output. Shunt calibration (R-cal) also comes standard on most models. A wide range of optional features such as zero track and tare, transducer linearization, high/low limits, peak detector, track and hold, a 4-20mA output are also offered.

1-888-282-9891

Honeywell Sensotec Sensors

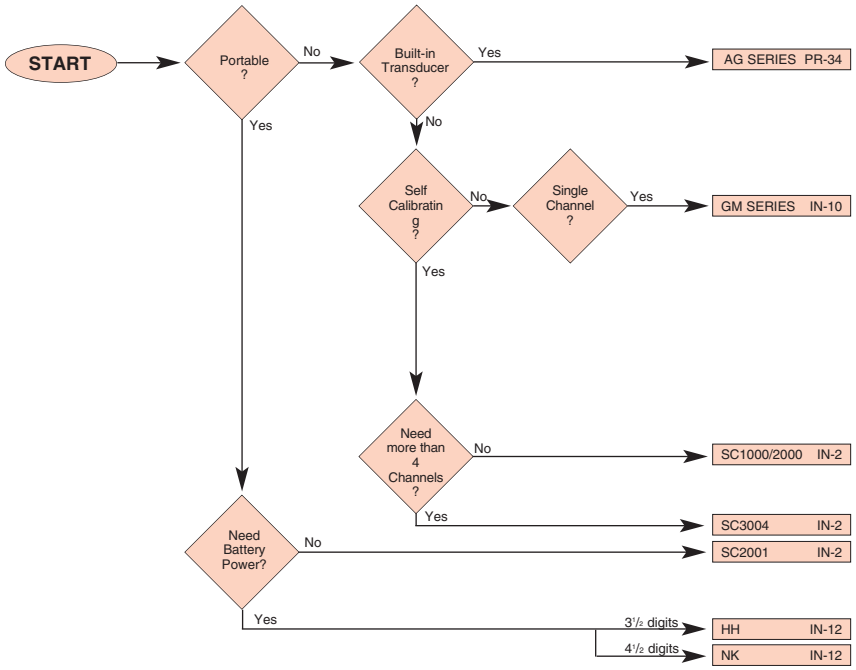
www.honeywell.com/sensing

PRODUCT INDEX

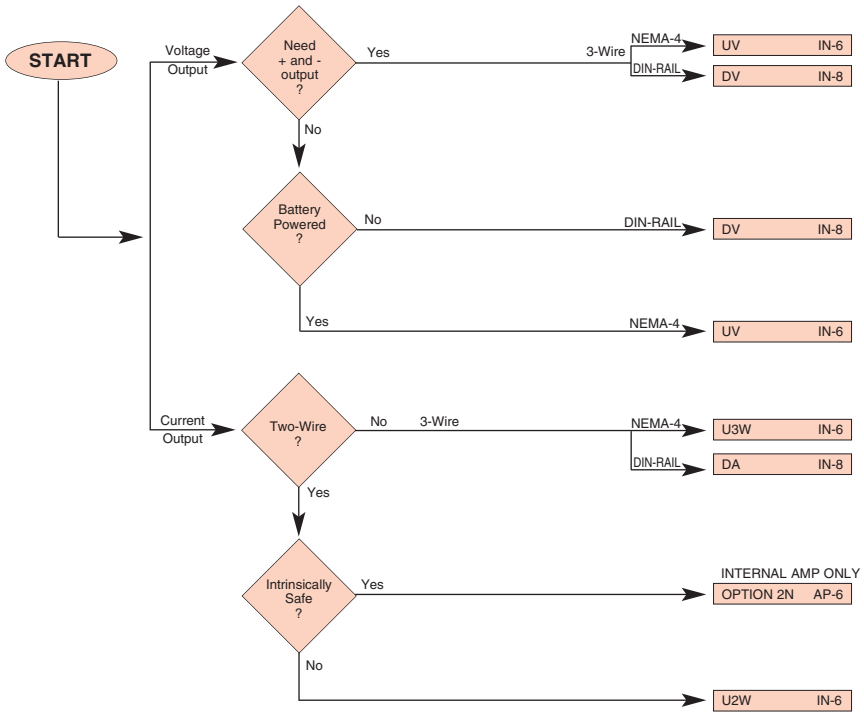
APPLICATION

Instrumentation

This selection flow chart is designed to help you choose the best SENSOTEC product for your application. Simply follow the path that best characterizes your requirements and turn to the appropriate product pages. If you need further assistance in identifying the "best" product or have a unique requirement that is not met by the products listed, please contact our Customer Service Department at 1-800-848-6564.



In-Line Amplifier



INSTRUMENTS

Transducer Indicator/ Conditioner

Model SC1000, SC2000, SC2001, SC3004

AUTOMATIC SET-UP, CALIBRATION AND SCALING WITH SENSOR

1 TO 14 CHANNELS

± 6 DIGIT DISPLAY (999,999)

12 TO 18 BIT RESOLUTION

FIELD SELECTABLE CALIBRATION: SHUNT-CAL, MV/V, OR KNOWN LOAD

ISOLATED RS-232 OR RS-485 INTERFACE

EMI AND RFI PROTECTED

Model SC2001

Model SC2000

Model SC3004

The SC series of self-calibrating microprocessor-based Transducer Signal Conditioner/Indicators are available with several different types of chassis, input channels, and output channels. When used with unamplified strain-gage transducers that have the Sensotec *Signature Calibration Module* installed, these instruments will completely **self calibrate** zero, span, linearity, decimal point, and engineering units automatically.

Input channels are available for a variety of transducers. Each input channel includes an excitation power supply and either an isolated voltage or isolated current analog output.

- Unamplified pressure or load
- Pressure or load with internal voltage amplifiers
- Pressure or load with internal or external 2-wire current amplifiers
- AC/AC LVDT
- DC/DC LVDT
- RTD Temperature probes (Pt100)

Available **Output channels** for the Models SC2000, SC2001 and SC3004 only include:

- Contact relays for the 4 standard limits or an additional 4 limits (max. 16 limits/chassis)
- Isolated digital-to-analog voltage (+/-5 or +/-10VDC) or current (4-20mA)

In addition to the physical input and output channels, up to 8 **Virtual channels** can be configured to assist in many applications:

- Summation for weighing
- Floating-point mathematics
- Split screen display
- Conditional programs
- Timer applications

FOUR CHANNEL CHASSIS

The Models SC1000 and SC2000 can hold up to 4 physical channels in their 3/8 DIN aluminum bench-top chassis. Input amplifier cards are ordered separately. A bright, dual-line 16-character display can display 5, 6 or 7 numeric digits; simply press a button to select the next channel to be viewed. If configured for split-screen operation, up to 4 channel values can be displayed at the same time. The SC2000 includes 4 limit (alarm) outputs plus peak and valley detection.

FOURTEEN CHANNEL CHASSIS

Model SC3004 can hold up to 14 physical channels in its 19", 2U rack-mount enclosure. Up to three quad-line displays can be installed which will display the values of up to 12 channels.

PORTABLE SINGLE CHANNEL CHASSIS

The Model SC2001 includes all of the features of the SC2000 in a portable, rugged enclosure.

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www.honeywell.com/sensing

		Bench Mount		Portable	Rack Mount
GENERAL	Model	**SC1000**	**SC2000**	**SC2001**	**SC3004**
	# Physical Channels	1 to 4	1 to 4	1 to 4	1 to 14
	# Virtual Channels	8	8	8	8
	Case Material	Aluminum	Aluminum	Aluminum	Aluminum
PHYSICAL	Form factor	3/8 DIN		suitcase	2U rack
	Mounting	bench panel or rack		portable	rack
	Size	5.6" wide, 2.8" high, 8.75" deep		13.25"x9.2"x11.5"	19" wide, 3.5" high, 8.75" deep
DISPLAY	# Characters/Line	16	16	16	20
	# Line/Display	2	2	2	4
	# Displays	1	1	1	1, 2 or 3
	Scaling	Automatic or manual setup	Automatic or manual setup	Automatic or manual setup	Automatic or manual setup
	Max. Display Count	9,999,999	9,999,999	9,999,999	9,999,999
	Decimal Point Selection	0 to 5	0 to 5	0 to 5	0 to 5
	Display Type	Vacuum Fluorescent	Vacuum Fluorescent	Vacuum Fluorescent	Vacuum Fluorescent
ENVIRONMENTAL	Storage Temp	-20°F to 200°F	-20°F to 200°F	-20°F to 200°F	-20°F to 200°F
	Operating Temp	40°F to 105°F	40°F to 105°F	40°F to 105°F	40°F to 105°F
SPECIAL FEATURES	Limits Setup	N/A	Front panel	Front panel	Front panel
	Limits Output (std.)	N/A	Open-collector	Open-collector	Open-collector
	Limits Output (relay output channel)	N/A	Contact relays	Contact relays	Contact relays
	Limits Quantity	N/A	4 std., 16 max.	4	4 std., 16 max.
	Peak/Valley hold on input channels	N/A	yes	yes	yes
	Digital, isolated control inputs	N/A	4	4	4
COMMUNICATIONS	Serial Setup & Output	RS-232/RS-485	RS-232/RS-485	RS-232/RS-485	RS-232/RS-485
	Isolation	500V	500V	500V	500V
	Max. Baud Rate	38400	38400	38400	38400
POWER	Standard AC Powered	100 to 230 VAC, 47 to 63Hz	100 to 230 VAC, 47 to 63Hz	100 to 230 VAC, 47 to 63Hz	100 to 230 VAC, 47 to 63Hz
	Excitation Drive	120 mA max.	120 mA max.	120 mA max.	315 mA max.

INPUT AMPLIFIER CARDS

All input cards include two non-isolated open-collector control inputs that can be field configured for any one of the following functions: • Track hold • Peak/Valley hold • Peak/Valley clear • Tare on • Tare off

		Strain Gage Millivolts	High Level Volts/mA	RTD Millivolts	AC/AC LVDT
INPUT	Transducer types	unamplified pressure or load sensors	amplified pressure or load DC/DC LVDT	platinum 100ohm, alpha=0.00385	AC/AC LVDT
	Ranges*	.5 to 11 mV/V@5V .5 to 5.5 mV/V@10V	±5 or ±10 VDC 4-20mA	-200°C to +800°C	.1 to 15 VRMS
	Frequency response	see table below	see table below	see table below	see table below
	Resolution	see table below	see table below	see table below	see table below
	Calibration type	shunt, mV/V, 2-, 3-, or 5-point known load	shunt, 2-, 3-, or 5-point known load	2-, 3-, or 5-point known load	2-, 3-, or 5-point known load
	Transducer Excitation	5 or 10 VDC w/sense	+/- 15 VDC, +28 VDC, or +12 VDC	10VDC	3 VAC @ 3kHz
	Push-button 100% tare	yes	yes	N/A	yes
	Push-button shunt test	yes	yes	N/A	yes
OUTPUT	Voltage range (field selectable)	5,±5,10,±10 VDC	5,±5,10,±10 VDC	5,±5,10,±10 VDC	5,±5,10,±10 VDC
	Current range	4-20 mA	4-20 mA	4-20 mA	4-20 mA
	Source	any channel	any channel	any channel	any channel
	Isolation	500V	500V	500V	500V
	Resolution	13 bits	13 bits	13 bits	13 bits
	Frequency response	same as input	same as input	same as input	same as input

Frequency Response (Hz) (field selectable)	Step Response (ms) (typical)	Resolution (counts) (not including minimum 10% overrange/underrange capability) Strain Gage/RTD	High Level	AC-AC LVDT
2 (fast mode)	40	±50000	±50000	±25000
2	440	±50000	±50000	±25000
8	110	±25000	±25000	±15000
16	55	±20000	±25000	±10000
32	28	±10000	±20000	±10000
50	16	±5000	±15000	±5000
100	8	±5000	±10000	±5000
250	3	±2000	±10000	±2000
500	2	±2000	±4000	±2000
800	2	±2000	±2500	±2000

* Ranges are field-programmable, except for RTD input.

OUTPUT CHANNELS

The following output channels are not available on the SC1000 or SC2001 instruments.

Option Code R **Relay Output channel (1, 2, 3 or 4 channels)**
The first Relay Output channel installed will mirror the standard chassis open-collector limit outputs of limits 1 to 4. Each additional Relay Output channel will add an additional 4 limits to the instrument, up to a maximum of 16. The relays have form C contacts and are rated at 1A @ 30VDC and 0.5A @ 125 VAC.

Option Code O **Voltage DAC Output channel**
Option Code P **Current DAC Output channel**
These digital-to-analog converter outputs can be driven by any channel's track, peak or valley value. Both feature 12-bit resolution and are electrically isolated from the rest of the instrument. The voltage DAC Output can be setup in the field as either a +/-5VDC or 0-10 VDC output. The Current DAC Output is 4-20mA.

VIRTUAL CHANNELS

Virtual channels occupy a channel number, but not a physical slot, in an SC instrument.

Option Code T **Split Display Virtual channel**
Split Display channels allow each display of an SC1000, SC2000 or SC2001 to view two track, peak or valley values from any channel in the instrument. This option is not available on the SC3004.

Option Code S **Mathematics Virtual channel**
Mathematics channels can be programmed by Sensotec to evaluate mathematical expressions or perform special functions in custom applications.

ACCESSORIES

- SensoCom instrument utility software for Windows 98/NT/2000 (AA183)
- Cable assembly, 25-pin D-sub connector (to SC Series) to 9-pin D-sub connector (to computer) (AA178)

For Models SC1000 and SC2000 only:
- Panel mounting hardware (AA928)
- Carrying handle (AA926)
- 19" rack-mount panel (AA934)

HOW TO ORDER

CHASSIS ORDER CODES

First, select the order code for the chassis of your instrument.

Readout	Output	Bench Mount		Portable	Rack Mount
		SC1000	SC2000	SC2001	SC3004
1 Display	RS-232 RS-485	AE600 AE616	AE601 AE617	AE602 AE618	AE606 AE622
2 Display	RS-232 RS-485	— —	— —	— —	AE607 AE623
3 Display	RS-232 RS-485	— —	— —	— —	AE608 AE624
1 Display Vehicle Power	RS-232 RS-485	AE632 AE648	AE633 AE649	AE634 AE650	— —

CHANNEL INPUT OPTION CODES

Next, select the Channel Input Option Codes and their quantities.

	Strain Gage	High Level	RTD	AC/AC LVDT
Voltage output	A	C	E	G
Current output	B	D	F	H

EXAMPLE

The order code begins with the chassis code, followed by the channel codes and all other options (with quantities), in alphabetical order.

Chassis Order Code	Channel Option Codes with Quantities					
AE606	A4	R2	S1			

For example, order code "AE606, A4, R2, S1" specifies an SC3004 instrument with a single display, RS-232 output, 4 Strain Gage input channels, 2 Relay Output channels and 1 Mathematics channel. Note that the channel option codes are listed in alphabetical order.

Signature Calibration MODULE

For use with Model SC Signal Conditioner. *Signature Calibration* **(SIG CAL) is the revolutionary new way to eliminate set-up and calibration headaches forever. By including the SIG CAL (option 53e) on your next sensor, you can save up to 90% of your set-up and calibration time.**

WHAT IS SIG CAL? (OPTION 53e)**

A *SIG CAL-Equipped* transducer will save you the time consuming and frustrating task of setting up and calibrating a transducer with an instrument prior to each use. A small memory is installed in the sensor which contains all of the necessary set-up and calibration information for that transducer.

SELF CALIBRATION AND AUTOMATIC SET-UP

After simply connecting the sensor to the instrument and turning on the power, all of these stored characteristics are used to completely set up and calibrate the system - within seconds. This approach also eliminates all of the potential human error that may occur with manual set-ups, assuring accurate measurements and a good overall statistical data base.

USE WITH ANY STRAIN GAGE SENSOR

SIG CAL (option 53e) is available on most sensors as an on-board (internal) option, when the size of the sensor allows it. For smaller sensors, older Sensotec sensors or another manufacturer's sensor, an in-line *SIG CAL MODULE* (accessory code AA180) will provide the same benefits.

SIG CAL IS AVAILABLE ON:

LOAD

- 11*
- 13*
- 31*
- 34*
- 41
- 43
- 45
- 53*
- 73
- 75
- 81*
- 82*
- D*
- LFH 71*
- MBH*
- MBL*
- MPB
- RGF
- RGH
- RGM
- RF
- RH
- RM
- TG
- TH
- UG
- WG

PRESSURE

- 415
- 440*
- 811*
- 911*
- A-5
- A-105*
- A-205*
- F*
- FP 2000*
- G
- H
- HL-A-5
- HP-Z
- HP
- K
- L
- LM
- P-30-P
- S
- STJE
- TJE
- Z

TORQUE

- QFFH-9
- QSFK-9
- QWFK-8M
- QWLC-8M

ACCELEROMETERS*

- JTF
- JTFS
- PEC-S
- PA

* In-line module only.

** Not to be used in combination with intrinsically safe amplifier option 2n or 2N, see page AP-6.

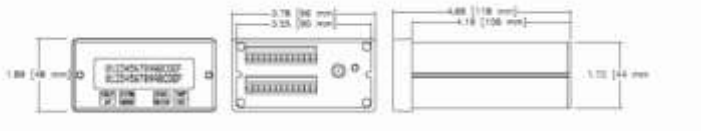
Note: Signature module may change dimensions on some units - consult SENSOTEC

Programmable Single-Channel Transducer Indicator/Conditioner

Model SC500

- CHOICE OF TRANSDUCER INPUTS
- SMALL, 1/8 DIN FORM FACTOR
- AUTOMATIC SET-UP, CALIBRATION VIA SIGNATURE CALIBRATION
- FIELD-SELECTABLE CALIBRATION: SHUNT-CAL, mV/V OR KNOWN LOAD
- PEAK / VALLEY CAPTURE
- OPTIONAL RELAYS, ANALOG OUTPUT AND RS-232 / RS-485
- FIELD-SELECTABLE FREQUENCY RESPONSE

Model SC500



PHYSICAL	Form Factor	1/8 DIN
	Case Material	Aluminum
ENVIRONMENT	Temperature, Operating	5 ºC to 40 ºC [40°F to 105°F]
	Temperature, Storage	-30 ºC to 90 ºC [-40°F to 195°F]
DISPLAY	Display Type	Vacuum fluorescent
	Numeric Display Format	+999 999 to -99 999 (0, 1, 2, 3 or 4 decimal places)
	Digit size (normal mode)	5 mm H x 2,5 mm W [0.2 in H x 0.1 in W] (with engineering units)
	Digit size (large mode)	10 mm H x 5 mm W [0.4 in H x 0.2 in W] (no engineering units)
	Engineering-Units Display	4 characters, available in normal mode only
	Display Updates Per Second	4
POWER	Power Supply Type	AC (with included wall-mount adapter) or DC
	DC Power Supply Requirements	10 to 26 VDC @ 1 A
	AC Wall-Mount Adapter (included)	Interchangeable plugs for use in the Americas, Europe, the United Kingdom and Australia
ANALOG OUTPUT	Voltage Range	5, ±5, 10 or ±10 VDC (field selectable)
	Current Range	N/A
	Isolation	500 V
	Digital-to-Analog Resolution	15 bits
	Frequency Response	same as input
COMMUNICATIONS OUTPUT	Serial Setup and Output	isolated RS-232 or RS-485 (factory option)
	Max. Baud Rate	38400 baud
LIMITS OUTPUT	Quantity	2 Form C or 3 Form A (factory option)
	Response Time	same as input
	Relay Energized when Signal is	less than, greater than, inside or outside the set points
	Contact Ratings	1 A @ 30 VDC, 0.5 A @ 50 VAC

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Options

Output Options	53a.	RS-232 (not available with 53d)
	53d.	RS-485 (not available with 53a)
	58a.	2 limit set-points with Form C contact relays (not available with 58h)
	58h.	3 limit set-points with Form A contact relays (not available with 58a)
	58i.	Isolated digital-to-analog (DAC) voltage

Capabilities

AA943	Panel mounting hardware
AA924	Bench mount stand
056-0062-00	19" 2U rack-mount panel for one 1/8-DIN panel meter
056-0066-00	19" 2U rack-mount panel for four 1/8-DIN panel meters
023-1074-00	Replacement 12-pin connector and cover
AA183	SensoCom interface and data logging software for Windows 98/NT/2000
AA145	RS-232 cable assembly, 2m [6 feet] long, with 9-pin female D-sub connector
023-0769-01	Mating connector for DC power jack
AA144	Relay/digital output connector/cable assembly
AA961	Replacement wall mount AC power supply with 4 adapter plugs

Input

The input channel includes two non-isolated, open-collector control inputs that can be field configured for one of these functions: • Track/hold • Peak/Valley hold • Peak/Valley clear • Tare on • Tare off

	Strain Gage Millivolts	High Level Volts/mA	AC/AC LVDT
Order Code	AE236	AE237	AE238
Transducer Types	un-amplified pressure or load	amplified pressure or load, DC/DC LVDT	AC/AC LVDT
Range	0.5 to 21 mV/V	±5 or ±10 VDC	0.1 to 15 VRMS
Frequency Response & Resolution	see table below	see table below	see table below
Calibration Type (Field Selectable)	shunt, mV/V, 2-, 3- or 5-point known load	shunt, 2-, 3- or 5-point known load	2-, 3- or 5-point known load
Transducer Excitation	5 VDC @ 60 mA max.	+12 VDC, ±15 VDC, +28 VDC	3 VAC @ 3kHz
Push-button 100% tare	yes	yes	yes
Push-button shunt test	yes	yes	no

Frequency Response (Hz) (field selectable)	Step Response (ms) (typical)	Resolution(counts) (not including min. 10% overrange/underrange capability) Strain Gage	High Level	AC/AC LVDT
2 (fast mode)	40	±50000	±50000	±25000
2	440	±50000	±50000	±25000
8	110	±25000	±25000	±15000
16	55	±20000	±25000	±10000
32	28	±10000	±20000	±10000
50	16	±5000	±15000	±5000
100	8	±5000	±10000	±5000
250	3	±2000	±10000	±2000

How to Order

The order code consists of the product model and the available options.

AE236 Strain-Gage Input for un-amplified pressure transducers or load cells

AE237 High-Level Input for
- Pressure transducers or load cells with internal voltage amplifiers
- Pressure transducers or load cells with internal 2-wire or 3-wire current amplifiers
- DC/DC LVDT

AE238 AC/AC LVDT Input

CE

Universal In-Line Amplifiers

Models UBP, UV, UV-10, U3W, And U2W

COMPATIBLE WITH ANY STRAIN GAGE SENSOR

USER PROGRAMMABLE

NEMA-4 & IP-66 WATER RESISTANCE

SELECTABLE EXCITATION VOLTAGES

Applications

Applications that may require an in-line amplifier:

1. In some applications, a transducer must be located in a hostile environment or one which is some distance from the display. If the environment at the sensing site is subject to high temperatures, humidity, or corrosive conditions, it may be necessary to place the amplifier in-line and away from the transducer.
2. In-Line Amplifiers can be shipped from stock for quick delivery.
3. Can be used with miniature transducers or when space is limited.
4. An In-Line Amplifier may be more accessible than the transducer itself, therefore potentiometer adjustments which are located in the amplifier are more convenient.

The SENSOTEC Universal In-Line Amplifier is a highly serviceable, user-programmable unit which meets NEMA-4 and IP-66 ratings for water resistance.

The SENSOTEC Universal In-Line Amplifier is housed in a rugged plastic package, which is connected between the transducer and a readout instrument. The amplifier supplies a highly regulated bridge excitation voltage for the transducer and converts the milivolt signal of the transducer to 0-5, 0-10 VDC or 4-20 mA. The In-Line features include three selectable excitation voltages, programmable gain setting, a wide adjustment range on zero and a buffered solid state shunt cal for quick calibration.

Advantages

Using SENSOTEC's In-Line Amplifier with a strain gage transducer has many advantages:

1. Signal-to-noise ratio is increased.
2. Effects of voltage drops in excitation sources are eliminated.
3. Signals can be sent to the data systems from low-impedance sources.

MODEL UV, UV-10

Connect with power pack or vehicle battery power for field use. This amplifier has a high degree of regulation to accept battery voltage changes plus transient protection. It can drive loads of up to 5 milliamperes at full output. Model UV provides ± 5 VDC output, Model UV-10 provides ± 10 VDC output. New optional metal cable glands are now available.

MODEL U3W, U2W

Model U3W provides 4-20 mA (3-wire) output, and is ideal for applications requiring long signal transmission with minimal signal loss. The U3W is inherently protected against incorrect wiring. Maximum load resistance is 1000 ohms. Model U2W provides 4-20 mA (2-wire) output. New optional metal cable glands are now available.

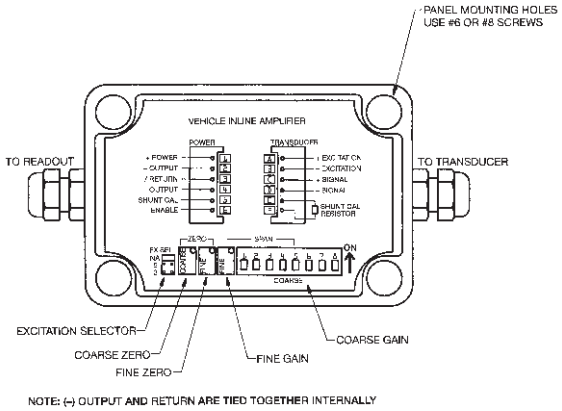
MODEL UBP

Connect ±15VDC power input to get non-floating output. Model UBP is used when both positive and negative output (±5VDC) or positive only output (0-5VDC) are required.

NEW METAL CASE OPTION

New optional metal case and electrical connections for all universal in-line amplifiers (2½ high x 5" long x 3" wide).

Universal Vehicle Powered

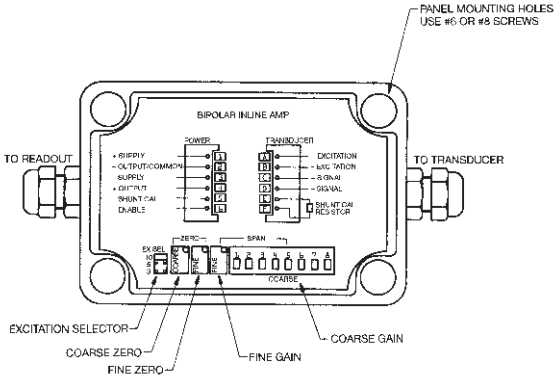


NOTE: (–) OUTPUT AND RETURN ARE TIED TOGETHER INTERNALLY

Dimensions: L; 3.75" x W; 2.50" x H; 2.10"

	Model UV ± 5 VDC Output (Order Code BE124)	Model UV-10 ±10 VDC Output (Order Code BE127)
Operating Voltage	11 - 28 VDC	18 - 32 VDC
Operating Temperature	-20° to 158° F (-30° to 70° C)	-20° to 158° F (-30° to 70° C)
Excitation Voltage	3 or 5, VDC @ 70 mA	3, 5 or 10 VDC @ 50 mA
Output Voltage Range	±5 VDC @ 2.5 mA	± 10 VDC @ 2.5 mA
Zero Adjustment Range	±50% coarse ±15% fine	± 25% Coarse ± 10% Fine
Span Adjustment Range	.75 mV/V to 10 mV/V	1 mV/V to 20 mV/V
Shunt Calibration*	Solid state relay on-board	Solid State Relay On-Board
Frequency Response	DC - 5000 Hz.	DC - 5000 Hz
Environment	IP-66 or NEMA-4	IP-66 or NEMA-4
Linearity	.02% F.S.	.02% F.S.

Universal Bi-Polar

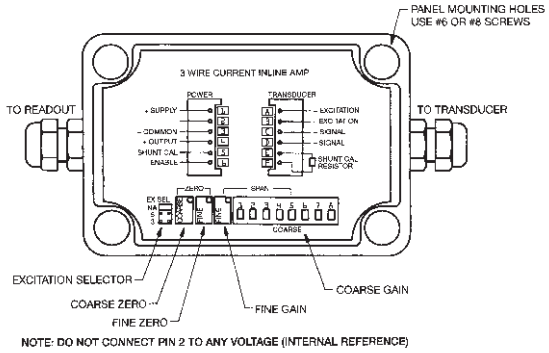


Dimensions: L; 3.75" x W; 2.50" x H; 2.10"

	Model UBP ± 5 VDC Output (Order Code BE123)
Operating Voltage	±15 VDC
Operating Temperature	-20° to 158° F (-30° to 70° C)
Excitation Voltage	3, 5 or 10 VDC @ 70 mA
Output Voltage Range	±5VDC @ 2mA with ±15VDC ±5VDC @ .2mA with 28VDC
Zero Adjustment Range	±50% coarse ±15% fine
Span Adjustment Range	.5 mV/V to 10 mV/V
Shunt Calibration*	Solid state relay on-board
Frequency Response	DC - 5000 Hz.
Environment	IP-66 or NEMA-4
Linearity	.01% F.S.

NOTE: This model is for replacement only, not to be used in new designs

Universal 3-Wire

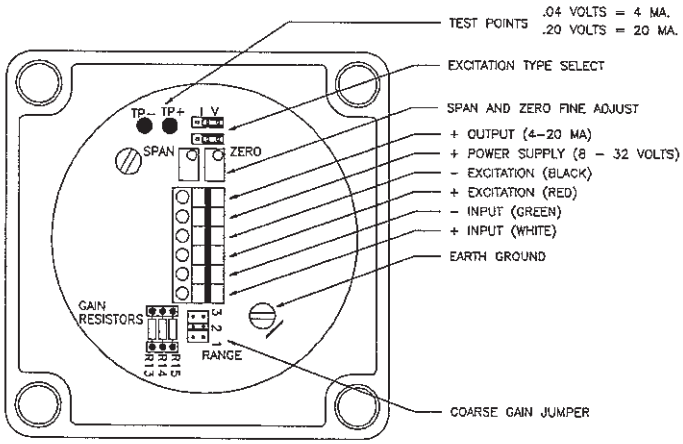


NOTE: DO NOT CONNECT PIN 2 TO ANY VOLTAGE (INTERNAL REFERENCE)

Dimensions: L; 3.75" x W; 2.50" x H; 2.10"

	Model U3W (Order Code BE125)
Operating Voltage	18 - 32 VDC
Operating Temperature	-20° to 158° F (-30° to 70° C)
Excitation Voltage	3 or 5 VDC @ 70 mA
Output Voltage Range	4 - 20 mA
Zero Adjustment Range	± 70% coarse ± 25% fine
Span Adjustment Range	.5 mV/V to 6.6 mV/V
Shunt Calibration*	Solid state relay on-board
Frequency Response	DC - 5000 Hz.
Environment	IP-66 or NEMA-4
Linearity	.02% F.S.

Universal 2-Wire



Dimensions: L; 3.77" x W; 3.7" x H; 2.24"

	Model U2W (Order Code BE128)
Operating Voltage	8 - 32 VDC
Operating Temperature	-20° to 158° F (-30° to 70° C)
Transducer Bridge Excitation and Resistance	
Constant Voltage Mode	5 VDC @ 2 mA max.; 3K to 10 K ohms
Constant Current Mode	0.5 mA w/3 volts compliance; 2K to 6 K ohms
Output	4-20 mA 2-wire
Zero Adjustment Range	± 15% fine
Span Adjustment Range	Jumper selectable and ± 20% fine adjustment
Frequency Response	1 KHz @ 2 mV/V
Environment	IP-66 or NEMA-4
Lightning Protection	Yes

New-Package size available. Same configuration as above models UV or U3W

*Standard Shunt Calibration resistor is 59k.

New Metal Case option: enclosure size: 5" long, 3" wide, 21/2" high. Electrical connection options: 51k Metal Case, 59e Turck output connector 15 ft. cable and Turck molded connector assembly order code AA128

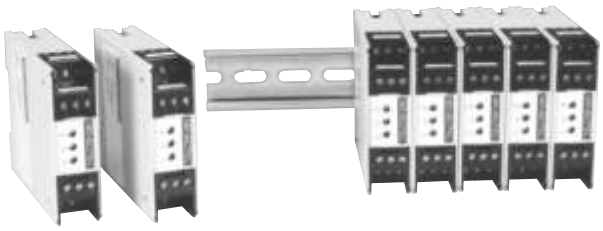
DIN Rail Mount In-Line Amplifiers

Models DV-05, DA-05, DV-10, DLD-VH, DLD-CH

CONVENIENT DIN RAIL MOUNT

FOR STRAIN GAGE TRANSDUCERS AND AC LVDTS

RFI, ESD PROTECTED



These In-line Amplifiers feature DIN Rail Mount enclosures with front accessible electrical connections and adjustments. Amplifiers are available for Strain Gage Transducers and AC Type LVDTs with outputs in both VDC and milliamps.

The STRAIN GAGE TRANSDUCER AMPLIFIER provides a selectable, regulated DC excitation voltage for the strain gage bridge. The transducer millivolt output signal is amplified to a high level, 0-5 or 0-10 VDC, with a frequency response of DC to 5000 Hz. Calibration and set up are made easy with a "relay buffered" shunt calibration circuit that allows span adjustment without applying a known input to the strain gage transducer. All models include RFI and ESD protection.

For Strain Gage Transducers

	Model DV-05 0±5 VDC output (3-wire) with 11-28 VDC power Order Code BE151	Model DA-05 4-20mA output (3-wire) with 13-28 VDC power Order Code BE153	Model DV-10* 0±10VDC output (3-wire) with 15-28 VDC power Order Code BE155
Current Draw	60mA	60mA	60mA
Bridge Excitation (@ 30mA)	3 or 5 VDC	3 or 5 VDC	5.4 or 9 VDC
Frequency Response	DC - 5000Hz		
Zero Adjustment Range	DV-05 & DA-05: ±60% coarse & ±10% fine DV-10: ±30% coarse & ±5% fine		
Span Adjustment Range:	DV-05 & DA-05: Switch selectable 0.5 to 13.3 mV/V, ±20% fine adjustment DV-10: Switch selectable 1.75 to 13.3 mV/V, -8 to +20 fine adjustment		
Operating Temperature:	-20° to 180°F		
Linearity:	±0.01%		
Mounting:	35mm DIN Rail		
Dimensions	0.9" wide x 4.3" deep x 2.9" high 22.5mm wide x 110mm deep x 75mm high		

For AC LVDTs

	Model DLD-VH 0±5 or 0±10 VDC output with 18-36 VDC power Order Code BE152	Model DLD-CH 4-20mA output with 18-36 VDC power Order Code BE154
Power Requirements	18-36VDC @ 150mA max.	
LVDT Excitation:	3 volts RMS @ 5 KHz	
Outputs	DLD-VH: 0±5 or 0±10VDC, field selectable	DLD-CH: 4-20mA
Frequency Response	DC to 300 Hz	
Zero Adjustment Range:	±100% coarse & ±20% fine	
Span Or Gain Adjustment	±10% fine adjustment over input range form 0.1 to 15 VRMS	
Linearity	±0.05% F.S.	
Operating Temperature	-20° to 140°F	
Mounting	35mm DIN Rail	
Dimensions	0.9" wide x 4.3" deep by 2.9" high 22.5mm wide x 110mm deep x 75mm high	
Power Supply Isolation	500V	

* Bridge excitation is 5.4 or 9.0 VDC @ 30mA

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Single-Channel Carrier Demodulator For AC Transducers

Model DM

USED WITH

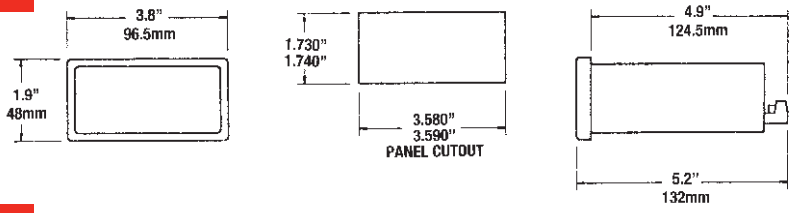
LVDTS OR VRTS

Model DM, for carrier transducers, is a low-cost bench, panel, or rack-mounted instrument which contains a power supply, signal conditioner, amplifier (Bipolar 5 Volt output), and digitizer. The 4 1/2-digit LED display features bright, easy-to-read .56" high characters. The compact 1/8 DIN size case measures 3.8" W x 1.9" H x 5.2" D. High/Low limits, peak detection, or track/hold options are available; however, **due to the small unit size, only one of these features can be specified per unit.** Wires easily attach to the rear connector using screw terminals.

The model DM features an accurate 5 KHz. drive supply for the transducer, a stable signal amplifier and a novel demodulation technique that produces a high accuracy result.

		Order Code AE214
GENERAL	# Channels	1
	Case Material	Noryl Plastic
ENVIRONMENTAL	Temperature, Storage	-20° to 200° F (-30° to 95° C)
	Temperature, Operating	32° to 130° F (0° to 55° C)
TRANSDUCER INTERFACE	Transducer Excitation	3 VRMS @ 5 KHz
	Type of Inputs Accepted	AC, LVDT, VRT
	Transducer Current Drive (ma.)	See transducer minimum impedance
	Input Gain Range	< 1 to 300
	Calibration Method	Manual displacement
	Noise & Ripple	< 300 microvolts
	Transducer Minimum Impedance	7 ohms
AMPLIFIER CHARACTERISTICS	Full Scale Output	±5 Volts
	Output Impedance	< 2 ohms
	Accuracy	±0.2%
	Frequency Response	300 Hz
	Common Mode Rejection	60 dB
	Fine Span Adjust	> ±15%
	Coarse Span Adjust	> 80%
	Fine Zero Adjust	> ±5%
	Coarse Zero Adjust	> ±20%
	Short Circuit Protected	Yes
DIGITAL DISPLAY CHARACTERISTICS	# Characters Displayed	4-1/2
	Conversions Per Second	3
	Scaling	0-19,999
	Scaling Method	Potentiometer
	Polarity Indication?	Yes
	Decimal Pt. Selection	Jumper (non-solder)
	Display Size	0.56"
	Overrange Indication	Flashing display
	Resolution	1/20000
	Type	LED
PHYSICAL CHARACTERISTICS	Input/Output Connector	Press-in terminals
	Weight	2 lbs.
POWER SUPPLY	Power Requirements	115VAC (optional 220VAC,12VDC)

Dimensions



Options (See Appendix)

58a High/Low limits (relay contact closure rated at 24V @ 1 amp); 58c Peak/Hold unipolar; 58d Track/Hold; 60c Battery power (12VDC)
Bench mount adapter (Order Code AA924).

Single-Channel Signal Conditioner/Indicators

Models GM, GM-A and HM

LARGE 0.56" READOUT

20000 COUNT RESOLUTION

4 ½ DIGIT LED DISPLAY

SHORT CIRCUIT PROTECTED

Shown with accessory AA924 bench mount bracket

Model GM-A (Order Code AE216)

The GM-A is a low cost digital readout that works with amplified (0-5V or 4-20ma) transducers or transmitters. This unit supplies power to the sensors. For use with two wire current transducers, contact factory. Separate power supply required for 3-wire use. Not for use with intrinsically safe applications utilizing a barrier.

Model GM (Order Code AE213)

The GM is a versatile full function signal conditioner, amplifier and power supply that works with unamplified mv/v transducers. It also provides shunt calibration (R-cal) which enables the system to be set up without using an expensive primary stimulus (done at no extra charge at the factory if the readout and transducer are purchased at the same time). A full range of options like peak/hold, track/hold and dual limits are available.

Model HM (Order Code AE218)

The HM offers all of the standard features of the GM plus a microprocessor based factory programming capability. Linearization can improve the accuracy of a particular transducer. The HM also allows for special application programming which may be required for certain applications. (i.e. can make an accelerometer read out in degrees in order to use it as an inclinometer.) The HM features auto zero, RS-232, and tare capability.

ELECTRICAL	# Characters Displayed	4 1/2
	Power Requirements Standard	115 VAC
	Optional	12 VDC, 220 VAC
	Conversions per Second	3
	Scaling Method	Potentiometer
	Polarity Indication	Yes
	Decimal Point Selection	Jumper (non-solder)
	Display Size	0.56"
	Overrange Indication	Flashing Display
	Display Resolution	1/20000 Max.
	Digital Display	LED
ENVIRONMENTAL	Temperature, Storage	-20°F to 200°F
	Temperature, Operating	32°F to 130°F
PHYSICAL	Weight	2 1/4 lbs.
	Mounting*	Bench, Rack or Panel
	Case Size, Standard	1/8 DIN
	Case Material	Noryl plastic

* Panel mount included with unit.

	INPUT ACCEPTED					EXCITATION PROVIDED		
	.5 mV/V to 5 mV/V	5 mV/V to 50 mV/V	0-2V	0-5V	4-20mA	5V (±2.5V)	10V (±5V)	±15V
GM-A	NA	NA	o	•	x	NA	NA	•
GM	•	x	o	o	o	•	•	NA
HM	•	x	o	o	o	•	•	NA

• = Standard
x = Standard variable, customer's choice
o = Optional
NA = Not Available

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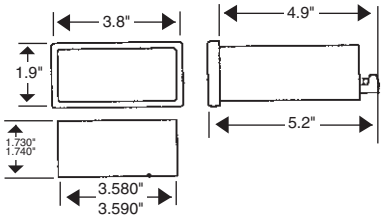
Features

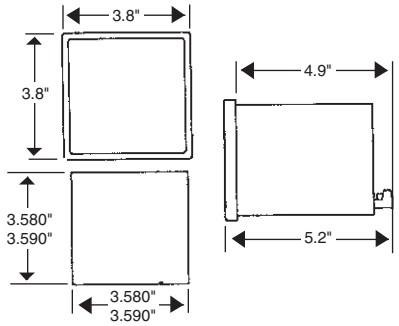
	GM-A	GM	HM
Readout scaled in engineering units	•	•	•
Amplified output, ±5V	•	•	•
Amplified output, 4-20mA	o	o	o
Shunt calibration	NA	•	•
Set up with transducer (no charge)	NA	•	•
Zero reset, tare	NA	NA	•
Linearization	NA	NA	o
RS-232 interface	NA	NA	•
Amplifier output impedance < 2 Ohms	•	•	•
±0.03% Accuracy	•	•	•
Amplifier frequency response 250 Hz	•	•	•
Common mode rejection 80 DB	NA	•	•
Fine span adjust > ±15%	NA	•	•
Coarse span adjust > 80%	NA	•	•
Fine zero adjust > ± 15%	NA	•	•
Coarse zero adjust > 80%	•	•	•
Short circuit protection	•	•	•
Decal for engineering units	•	•	•
Light Bar & Scaling Decal	NA	•	•

• = Standard
o = Optional
NA = Not Available

Dimensions



PANEL CUTOUT: 1/8 DIN



PANEL CUTOUT: 1/4 DIN

Options

	Option Code	GM-A	GM	HM
Rack Mount Adapter 19"	51a	o	o	o
NEMA Enclosure	51c	o	o	o
Custom Front Panel	51d	o	o	o
4-20mA Output	56a*	o	o	o
Hi-Low Limits	58a	NA	o	NA
Peak/Hold**	58c	NA	o	NA
Track/Hold	58d	NA	o	NA
220 VAC	60a	o	o	o
Battery powered (12 VDC)	60c	NA	o	NA

* Optional 56a requires 1/4 DIN enclosure
** Bleed-off rate: ≤ 0.01%

Accessories

AA154 Mating connector and power cord for Model GM-A
AA924 Bench mount bracket
AA923 NEMA-4 Splash proof front cover
AA172 25 pin RS232 (Model HM)

Portable Instruments

Models NK and HH

PORTABLE

4-1/2 OR 3-1/2 DIGIT

BATTERY OPERATED

Model NK
Portable

Model HH
Handheld

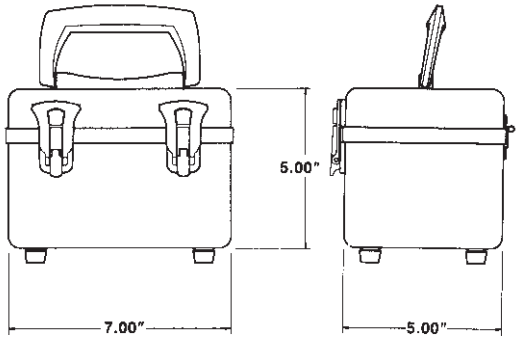
The Model NK portable instrument features full 4-1/2 digit accuracy while the Hand-Held Model HH has 3-1/2 digits. Both are designed for use in remote field operations as a portable calibrator or readout device. Shunt calibration offers the operator quick field setup with a minimum of warm-up. The Model NK is enclosed in a rugged, weatherproof aluminum carrying case, while the Model HH can be held in the palm of the hand. A peak/hold feature is optional on the Model NK, and standard on the Model HH. Models NK and HH are stocked for quick delivery.

WIRING DIAGRAM

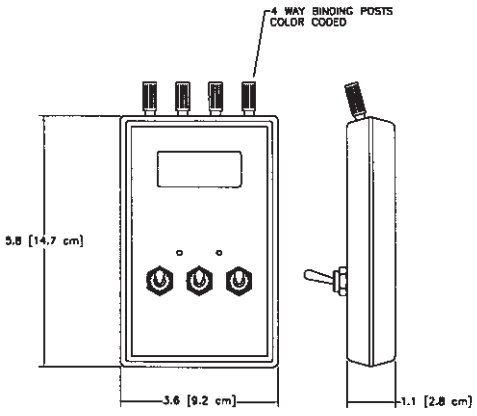
Model NK

A = + Excitation
B = + Sense
C = - Excitation
D = - Sense
E = - Input
F = + Input

Dimensions



Model NK (Order Code AE221)



Model HH (Order Code AE222)

Options (See Appendix)

Input 52c; Outputs 56e (NK only); Special features 58c (Model NK only), 58m

		Model NK Order Code AE221	Model HH Order Code AE222
GENERAL	# Channels	1	1
	Material	Deep drawn aluminum case	Hand-held plastic case
ENVIRONMENTAL	Temperature, Storage	-20° F to 150° F	-20° F to 150° F
	Temperature, Operating	32° F to 130° F	32° F to 130° F
	Power Requirement	Batteries - 4 “D” cells	Battery - one 9V cell
TRANSDUCER INTERFACE	Transducer Excitation	4VDC	2.5VDC
	Type of Inputs Accepted	.5 to 4mV/V	.5 to 4mV/V
	Transducer Bridge Range (ohms)	350	350
	Pushbutton Shunt Cal	Yes	Yes
	Calibration Method	Manual	Manual
	Electrical Connection Type	PT02A-10-6S (mating connector* incl.)	4 banana jacks
	Zero Balance	±15% F.S. (min.)	±15% F.S. (min.)
	Noise & Ripple	30 microvolts	30 microvolts
AMPLIFIER CHARACTERISTICS	Full Scale Outputs Available	0-1V (optional)	N/A
	Output Impedance	<1 ohm (optional)	N/A
	Non-linearity (% F.S.) (max)	±.02%	±0.1%
	Drift (max. zero and span)	±5mv	±50mv
	Stability - Zero (% F.S./yr.)	0.1%	1.0%
	Stability - Span (% F.S./yr.)	0.1%	1.0%
	Frequency Response (Hz)	1000 Hz	1000 Hz
	Fine Span Adj. (% Range)	±15%	±15%
	Coarse Span Adj. (% Range)	100%	N/A
	Fine Zero Adj. (% Range)	±15%	±15%
	Coarse Zero Adj. (% Range)	100%	N/A
	Short Circuit Protection	Yes	Yes
SPECIAL FEATURES	Peak/Hold	Yes (optional)	Yes
DIGITAL DISPLAY CHARACTERISTICS	# Display Characters	4-1/2	3-1/2
	Conversion/second	1.5	1.5
	Scaling	0-19,999	0-1999
	Scaling Method	Potentiometer	Potentiometer
	Maximum Display Count	19,999	1999
	Polarity Indications?	Yes	Yes
	Programmable Decimal Pts.?	Yes	Yes
	Display Size	0.4"	0.4"
	Overrange Indication?	Yes	Yes
	Resolution	1/20,000	1/2000
	Type	LCD	LCD
	Maximum Sensitivity	.1µV/count	.1µV/count
PHYSICAL CHARACTERISTICS	Weight	3 lbs.	1 lb.
POWER SUPPLY	Power Requirements	4 “D”Cells	One 9V cell
FRONT PANEL	Digital Display	4-1/2 digits LCD	3-1/2 digit LCD
	Environmentally Sealed	Weatherproof case	No

General Information

How to order (See Pg. AP-19)
Instrument selection flow chart (See Pg. IN-1)
* PT06A-10-6P (SR) mating connector, Order Code AA119, Page AP-2.

MECHANICAL

Specify: 1) Transducer Sensitivity in mV/V (unless specified set for 3mV/V)
2) Display Scaling (include units)
3) Options

Strain-Gage Transducer Simulator

Models TS

EASY TO USE

SIMULATES EITHER 350 Ω OR 5000 Ω TRANSDUCER BRIDGE

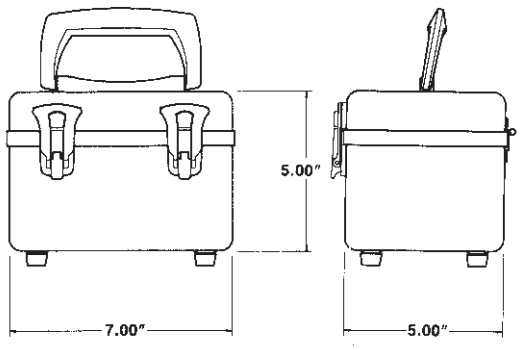
RUGGED, WEATHERPROOF CASE

PRECISION WIRE-WOUND RESISTORS

The Model TS is a Strain-Gage Transducer Simulator for use in calibrating or testing pressure, force, torque or weigh system indicators and signal conditioning amplifiers. It greatly assists in trouble shooting, and testing of systems that use strain-gage transducers. The Model TS simulates either a 350 Ohm or 5000 Ohm strain-gage transducer bridge with precise adjustments for transducer sensitivities in five ranges from in 0.5 to 10 millivolts per volt. The output adjustments are in 10% increments from 0 to 100% of each of the above ranges. No batteries to replace as the excitation voltage is supplied by the instrument to be calibrated.

Specifications

		Model TS Order Code AE415
ELECTRICAL	Input Excitation Requirements	4.5 to 12 VDC, constant voltage only
	Input Resistance	350 or 5000 Ohms
	Full-Scale Output Ranges	0.5, 1, 2, 5 and 10 mV/V
	Output Adjustment	0% to 100% in 10% steps
	Output Linearity and Hysteresis	±0.01% of full scale typ., ±0.025% of full scale max.
	Output Zero Balance	350 Ohm resistance: ±100µV max. 5000 Ohm resistance: 0.01% FS max.
ENVIRONMENTAL	Temperature, operating	5 to 40 °C
	Temperature, storage	-30 to 90 °C
PHYSICAL	Connections	Binding posts for use with wire or banana jacks
	Case size	7"W x 5"H x 5"D
	Case material	Aluminum
	Weight	2.5 lbs



Accessories

- Standard double banana plug, black (part number 023-0819-00)
- Connector/cable assembly, double banana plug to 3 ft. of 2 conductor cable (part number 043-0307-00)

Charge Amplifier

Model CA2 Order Code AE411

Model CA3 Order Code AE413

GENERAL

Charge mode piezoelectric transducers require charge amplifiers to convert their output to useful levels. Sensotec Inline Charge Amplifiers are a versatile and convenient solution to the use of charge mode piezoelectric transducers.

POWER REQUIRED

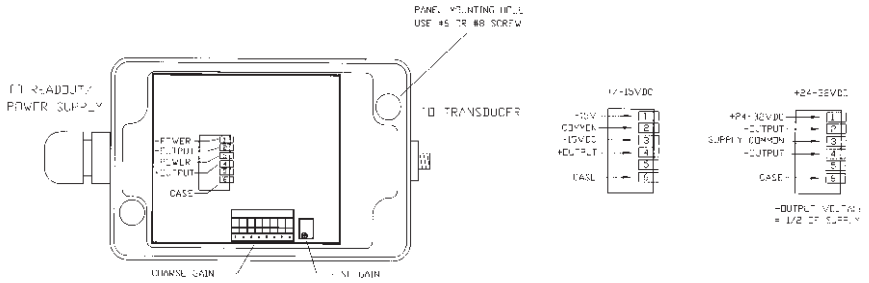
Input Voltage	±15VDC or 24-32VDC
Input Current	20 milliamperes

AMPLIFIER CHARACTERISTICS

Sensitivity	Programmable (.05mV/pc to 6.4mV/pc)
Input Range	780pc to 100,000pc
Output	±5V RMS max
Frequency Response	3 HZ to 30KHz (Model CA2)
	~DC to 30KHz (Model CA3)
Time Constant	50 milliseconds (Model CA2)
	2000 seconds (Model CA3)
Short Circuit Protected	+Output to -Output
Operating Temperature	32° F to 180° F

PHYSICAL CHARACTERISTICS

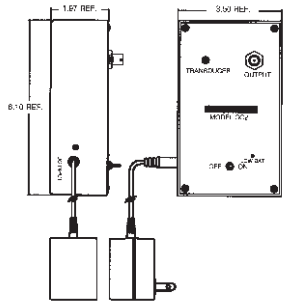
Size	2.5"W x 3.8"L x 2.2"H
Environmental Protection	Moisture and dust resistant
Method of Connection	
Input:	Terminal strip inside of box
Output:	Miniature coaxial connector
Mounting	Recessed screws, outside of the sealed volume



Constant Current Power Supply

Model CC2 Order Code AE412

- **For PEC series accelerometers**
- **Battery powered**
- **Low battery indicator**
- **Uses common 9 VDC batteries**
- **Adjustable drive current**



POWER REQUIREMENTS

Batteries	9V alkaline (3)
Battery life	100 Hrs @ 2mA
Low battery indicator	LED lights at approximately 17.5V

INPUT CHARACTERISTICS

Current to transducer	Adjustable 1.8-10mA DC
Input connector	BNC

OUTPUT CHARACTERISTICS

Gain	Unity
Coupling time constant (1 Meg ohm load)	2 seconds
Load impedance	>100K
Output connector	BNC
Output	10 V Peak to Peak max.

PHYSICAL CHARACTERISTICS

Size	5.12"L x 3.7" W x 2.24"H
Temperature	32° F - 150° F

DC Power Supply

for Amplified Transducers

REGULATED

MINIATURE SIZE

TERMINAL-STRIP CONNECTION

Provides regulated voltages ranging from 10 to 28 VDC and output currents to 600 milliamps. Terminal strip connections eliminate soldering. Features include short-circuit protection, encapsulated construction and conservative design to assure long-term stability. Power supplies may be used in series. No derating or heat sinking required.

Specifications

Input voltage.....	105-125VAC, 47-420 Hz, single phase
Output Specifications.....	See table below
Output Voltage Trim Adjustment...	Outputs are factory set to +/-1% of nominal output voltage. Single output models may be trimmed to the nominal output voltage with an external trim resistor.
Polarity.....	Either positive or negative terminal of a single output module may be grounded. Dual output modules have a positive/common/negative output terminal configuration.
Ambient Operating Temperature...	0°F to 150°F
Storage Temperature.....	-67°F to 185°F
Temperature Error.....	0.008% F.S./°F nominal
Impedence.....	0.07 Ohms at 1kHz and 0.2 Ohms at 10 kHz (approx.)
Regulation.....	Line: +/-0.05% Load: +/-0.1%
Ripple.....	1 mV RMS
Optional 230 VAC input.....	For operation on an input of 230 VAC, 46-420 Hz.

Power Supplies for in-line amplifiers or internally amplified transducers and transmitters:

Order Code	Output Voltage	Output Current	Height H"	L" x W"
AA951	10 VDC	240 mA Max.	1.4	2.5 x 3.5
AA952	24 VDC	600 mA Max.	2.375	3.5 x 2.5
AA953	+/-15 VDC	100 mA Max.	1.375	3.5 x 2.5
AA954	28 VDC	500 mA Max.	2.375	3.5 x 2.5
AA955	28 VDC	300 mA Max.	1.625	3.5 x 2.5
AA956	28 VDC	150 mA Max.	1.375	3.5 x 2.5
AA957	28 VDC	80 mA Max.	1.375	3.5 x 2.5

1-888-282-9891
Honeywell Sensotec Sensors
www.honeywell.com/sensing

APPENDIX

APPENDIX

Accessories

MATING CONNECTORS AND CONNECTOR/CABLE ASSEMBLIES

Mating Connector Selection Chart

Your Transducer Electrical Termination	Mating Connector Only	Connector/Cable Assemblies: Unamplified Output 6 Conductor*	Unamplified Output 4 Conductor*	Voltage Output	3-Wire Curr Output
	Order Code	Order Code	Order Code	Order Code	Order Code
PTIH-10-6P	AA111	AA112	AA113	AA114	AA115
MS3102E-14S-6P	AA121	AA122	AA123	AA124	AA125
DR-4S-4H	AA141	N/A	AA143	N/A	N/A
PTIH-10-6P (250-400° F)	AA151	AA152	AA153	N/A	N/A

* Where a distance of 35 feet or more separates the readout device and the transducer, remote voltage sensing is recommended (Model NK or SC). Use 6 conductor cable in this case.

Mating Connector Description Table

Order Code	Model	Description
AA111	PTO6A-10-6S	mating connector
AA112	PTO6A-10-6S	mating connector with 50 ft. of 6 conductor cable
AA113	PTO6A-10-6S	mating connector with 15 ft. of 4 conductor cable
AA114	PTO6A-10-6S	mating connector with 15 ft. of 6 conductor cable
AA115	PTO6A-10-6S	mating connector with 15 ft. of 5 conductor cable
AA116	PTO6A-10-6S	mating connector with 15 ft. of 3 conductor cable
AA118	PTO6E-10-6S	mating connector, environmental type
AA119	PTO6A-10-6P(SR)	mating connector for Model NK
AA121	MS3106A-14S-6S	mating connector
AA122	MS3106A-14S-6S	mating connector with 50 ft. of 6 conductor cable
AA123	MS3106A-14S-6S	mating connector with 15 ft. of 4 conductor cable
AA124	MS3106A-14S-6S	mating connector with 15 ft. of 6 conductor cable
AA125	MS3106A-14S-6S	mating connector with 15 ft. of 5 conductor cable
AA128	Turck	mating connector molded to 15 ft. cable for in-line amplifiers
AA131	WK-6-21C-3/8”	mating connector
AA132	WK-6-21C-3/8”	mating connector with 50 ft. of 6 conductor cable
AA133	WK-6-21C-3/8”	mating connector with 15 ft. of 4 conductor cable
AA134	WK-6-21C-3/8”	mating connector with 15 ft. of 6 conductor cable
AA135	WK-6-21C-3/8”	mating connector with 15 ft. of 5 conductor cable
AA141	DP-4S-1	mating connector
AA143	DP-4S-1	mating connector with 15 ft. or 4 conductor cable
AA151	MS3476L10-6S	mating connector*
AA152	MS3476L10-6S	mating connector with 50 ft. of 6 conductor cable*
AA153	MS3476L10-6S	mating connector with 15 ft. of 4 conductor cable*
AA155	DIN43650	“L” plug connector, 1/2 NPTF (conduit fitting)
AA156	DIN43650	“L” plug connector, PG9 socket for 4.5-7 mm cable
AA157	DIN43650	“L” plug connector, PG11 socket for 6-10 mm cable
AA158	064-0435	mating connector (BP-50-1) with 5 ft. of low noise cable miniature coaxial cable
AA159	DIN43650	“L” plug connector (AA156) with 15 ft. of 4 conductor cable
AA160	064-0567	mating connector (BP-50-1) with 5 ft. of miniature coaxial cable (no noise treatment)
AA161	DIN40050	“L” plug connector, PG7 socket for 3.5-6 mm cable
AA162	PCO6A-10-6S	mating connector
AA163	PCO6A-10-6S	mating connector with 15 ft. of 6 conductor cable
AA165	PTO6A-10-6S	mating connector with 15ft. of shielded teflon cable (Model PA)
AA174	MS3106F-10SL-3S	mating connector
AA175	MS3106F-10SL-3S	mating connector with 15 ft. of 2 conductor, twisted cable (low noise)

*Designed for high temperature applications (250°-400° F)

Note: Available cable lengths are 15, 25, 50, 75 or 100 ft.

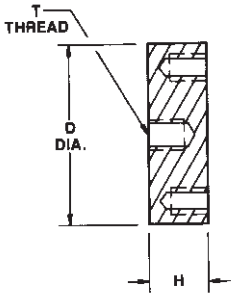
SHUNT CALIBRATION RESISTORS

Order Code	Calibration Resistance
AA211	59,000 ohm for 1.6 to 3 mV/V output
AA212	90,000 ohm for 1 to 1.5 mV/V output
AA213	200,000 ohm for less than 1 mV/V output

PULL PLATES

Order Code	Used w/Models 41 and 42 (Range in lbs.)	Used w/Model 75 (Range in lbs.)	T" Thread	D" Dia.	H	# Bolt Holes	Size	Depth
AA221	5 to 25	N/A	1/4-28 UNF-2B	2.50	.75	6	8-32	.50
AA222	50 to 1000	50 to 500	3/8-24 UNF-2B	3.00	1.00	6	1/4-28	.50
AA223	2K to 5K	1K to 2K	1/2-20 UNF	3.50	1.00	6	5/16-24	.50
AA224	7500 to 15K	3K to 7500	1-14 UNS	5.50	1.50	8	3/8-24	.75
AA225	20K to 50K	10K to 20K	1 1/2-12 UNF	6.00	1.80	8	1/2-13	1.00
AA233	N/A	30K to 50K	2-12 UNC	7.50	2.50	8	3/4-16	1.75
AA234	N/A	75K to 100K	2 1/2-12 UNC	9.00	3.00	12	5/8-18	1.00
AA226	75K to 100K	N/A	2-12 UNC	9.00	3.00	12	5/8-18	1.00
AA227	150K to 200K	N/A	2 1/2-12 UN	11.00	3.50	12	3/4-16	1.00
AA228	300K to 500K	150K to 200K	3 1/2-8	14.00	4.25	12	1-8	2.25

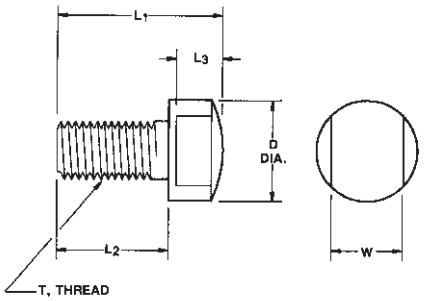
Note: Mounting bolts included with pull plates.



MOUNTING KITS

Order Code	
AA235	Triaxial Mounting Block for Model JTF.
AA236	Insulated stud for Piezoelectric accelerometers.
AA237	U-shaped magnetic mount with 10-32 or 1/4-28 mounting screw; PA.
AA238	Mounting studs with 10-32 or 1/4-28 thread; JTF (stud mount).

LOAD BUTTONS

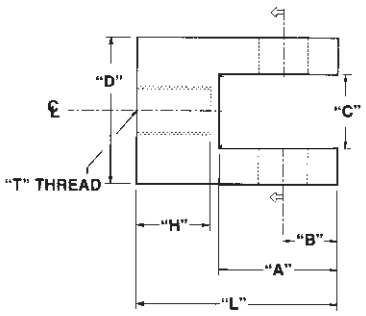


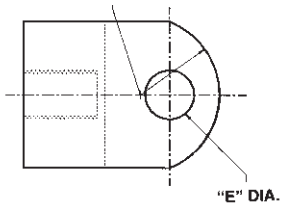
Order Code	Models 41 & 42 Range in lbs.	Model 75 Range in lbs.	T	L1"	L2"	L3"	D"	W"
AA241	5 to 25	N/A	1/4-28 UNF-2B	1.125	.750	.250	.500	.375
AA242	50 to 1K	50 to 100	3/8-24 UNF-2B	1.250	.875	.250	.750	.625
AA243	2K to 5K	1K to 2K	1/2-20 UNF	1.375	.875	.375	.750	.625
AA244	7500 to 15K	3K to 7500	1-14 UNS	2.375	1.625	.562	1.500	1.250
AA245	20K to 50K	10K to 20K	1 1/2-12 UNF	2.625	1.625	.750	2.250	2.000
AA246	75K to 100K	30K to 50K	2-12 UN	3.000	1.875	.938	3.000	2.750
AA247	150K to 200K	75K to 100K	2 1/2-12 UN	4.250	2.50	1.125	3.500	3.250
AA248	300K to 500K	150K to 200K	3 1/2-8 UN	6.000	4.000	1.500	6.000	5.000

Order Code	Model UG Range in lbs.	T	L1"	L2"	L3"	D"	W"
AA251	50 to 500	3/8-24 UNF-2B	.750	.375	.250	.750	.625
AA252	1K to 4K	1/2-20 UNF	1.000	.500	.375	.750	.625
AA253	5K to 10K	1-14 UNS	1.750	1.000	.562	1.500	1.250
AA254	15K to 30K	1 1/2-12 UNF	2.500	1.500	.750	2.250	2.000
AA255	50K to 75K	2-12 UN	3.125	2.000	.938	3.000	2.750
AA256	100K to 150K	3-8 UN	5.000	3.000	1.500	4.500	4.000
AA257	200K	4-8 UN	6.000	4.000	1.500	5.500	5.000

Order Code	Models 45 & 47 Range in lbs.	T	L1"	L2"	L3"	D"	W"
AA290	250; 500; 1K 2.5K; 5K	5/8-18 UNF-3A	1.28	1.00	.28	1.06	0.94
AA291	12.5K; 25K	1-1/4-12 UNF-3A	1.56	0.69	1.49	1.75	1.25
AA292	50K	1-3/4-12 UNF-3A	3.75	2.12	1.63	2.50	1.75
AA293	100K	2-3/4-8 UNF-3A	5.00	3.12	1.88	4.00	2.75

YOKE SHACKLE





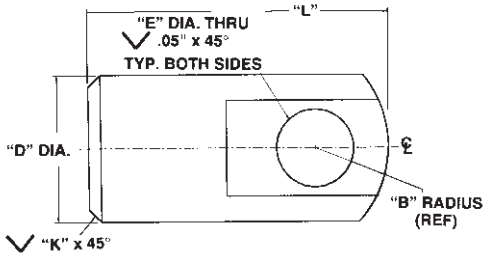
(For Models RM and 31 only)
(STAINLESS STEEL)

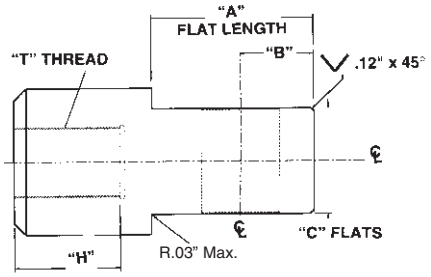
Order Code	Static Load Rating*	"T" Thread	"A"	"B"	"C"	"D" Dia.	"E" Dia.	"L" Length	"H"
AA360	100,000 lb	2 1/2-8 UN-2B	6.50"	3.00"	3.04"	6.00"	3.010"	10.25"	3.50"
AA361	100,000 lb	2 1/2-12 UN-2B	6.50"	3.00"	3.04"	6.00"	3.010"	10.25"	3.50"
AA362	50,000 lb	1 1/2-12UNF-2B	4.35"	1.81"	2.54"	5.00"	1.76"	7.00"	2.25"
AA363	20,000 lb	1-14 UNF-2B	2.42"	1.11"	1.52"	3.00"	1.01"	4.25"	1.50"
AA364	10,000 lb	3/4-16 UNF-2B	1.94"	.94"	1.28"	2.50"	.76"	3.50"	1.25"
AA365	5,000 lb	1/2-20 UNF-2B	1.30"	.55"	.78"	1.75"	.51"	2.00"	.70"

(CARBON STEEL)

Order Code	Static Load Rating*	"T" Thread	"A"	"B"	"C"	"D" Dia.	"E" Dia.	"L" Length	"H"
AA370	120,000 lb	2 1/2-12 UN-2B	6.00"	2.75"	3.00"	6.00"	3.00"	9.50"	3.50"
AA371	45,600 lb	1 1/2-12 UNF-2B	4.00"	1.75"	2.50"	5.00"	1.75"	6.25"	2.25"
AA372	21,700 lb	1-14 UNF-2B	2.31"	1.00"	1.50"	3.00"	1.00"	3.94"	1.63"
AA373	11,2000 lb	3/4-16 UNF-2B	1.75"	.75"	1.25"	2.50"	.75"	2.88"	1.13"
AA374	4,900 lb	1/2-20 UNF-2B	1.25"	.50"	.75"	1.75"	.50"	2.00"	.75"

TONGUE SHACKLE





(For Models RM and 31 only)
(STAINLESS STEEL)

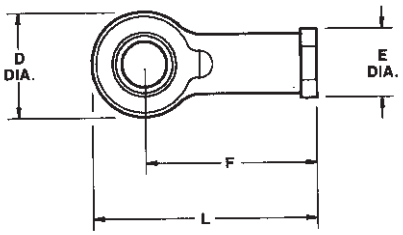
Order Code	Static Load Rating*	"T" Thread	"A" Flat Length	"B"	"C" Flats	"D" Dia.	"E" Dia.	"L" Length	"H"
AA380	100,000 lb	2 1/2-8 UN-2B	6.38"	3.00"	3.00"	4.50"	3.01"	9.75"	3.56"
AA381	100,000 lb	2 1/2-12 UN-2B	6.38"	3.00"	3.00"	4.50"	3.01"	9.75"	3.56"
AA382	50,000 lb	1 1/2-12 UNF-2B	4.22"	2.03"	2.50"	3.00"	1.76"	7.00"	2.62"
AA383	20,000 lb	1-14 UNF-2B	2.54"	1.16"	1.50"	2.00"	1.01"	4.00"	1.25"
AA384	10,000 lb	3/4-16 UNF-2B	2.07"	.94"	1.25"	1.50"	.76"	3.25"	1.31"
AA385	5,000 lb	1/2-20 UNF-2B	1.30"	.55"	.75"	1.00"	.51"	2.00"	.70"

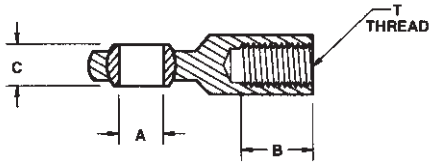
(CARBON STEEL)

Order Code	Static Load Rating*	"T" Thread	"A" Flat Lengths	"B"	"C" Flats	"W" Width	"E" Dia.	"L" Length	"H"
AA390	110,000 lb	2 1/2-12 UN-2B	9.13"	3.00"	3.00"	6.00"	3.00"	9.13"	3.50"
AA391	45,000 lb	1 1/2-12 UNF-2B	5.75"	1.75"	2.50"	3.50"	1.75"	5.75"	2.25"
AA392	21,700 lb	1-14 UNF-2B	3.81"	1.00"	1.50"	2.00"	1.00:	3.81"	1.63"
AA393	12,000 lb	3/4-16 UNF-2B	2.81"	.75"	1.25"	1.50"	.75"	2.81"	1.13"
AA394	5,700 lb	1/2-20 UNF-2B	2.00"	.50"	.75"	1.00"	.50"	2.00"	.75"

*The static load rating is the maximum capacity in lbs. for that part based on a 4:1 load factor (in tension).

ROD END BEARINGS





(For Models RM and 31 only)

Order Code	A"	B"	C"	D" Dia.	E" Dia.	F"	L"	T Thread	Approx. Wt (lbs)	Safe Static Load Rating
AA271	.250	.687	.375	.750	.500	1.312	1.687	1/4-28 UNF	.05	3500 lb
AA272	.375	.812	.500	1.000	.687	1.625	2.125	3/8-24 UNF	.13	5500 lb
AA273	.500	1.062	.625	1.312	.875	2.125	2.781	1/2-20 UNF	.29	9500 lb
AA274	.750	1.562	.875	1.750	1.125	2.875	3.750	3/4-16 UNF	.63	15000 lb

PRESSURE PORT ADAPTERS

(STAINLESS STEEL)

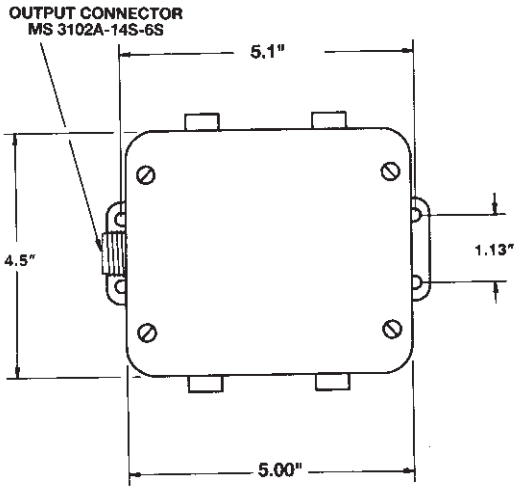
Order Code	Pressure Port A	Pressure Port B
AA310	9/16 - 18 UNF Male	1/4 - 18 NPT Male
AA311	1/4 - 18 NPT Female	1/8 - 27 NPT Female
AA312	1/4 - 18 NPT Female	7/16 - 20 UNF Female (MS33649-04)
AA313	1/4 - 18 NPT Female	7/16 - 20 UNF Male (MS33656-E4)
AA314	1/4 - 18 NPT Male	1/8 - 27 NPT Female
AA315	1/4 - 18 NPT Male	7/16 - 20 UNF Female (MS33649-04)
AA316	1/4 - 18 NPT Male	7/16 - 20 UNF Male (MS33656-E4)
AA317	1/8 - 27 NPT Male	7/16 - 20 UNF Male (MS33656-E4)
AA318*	1/4 - 18 NPT Male	1/4 - 18 NPT Male
AA319	1/4 - 18 NPT Female	1/4 - 18 NPT Female

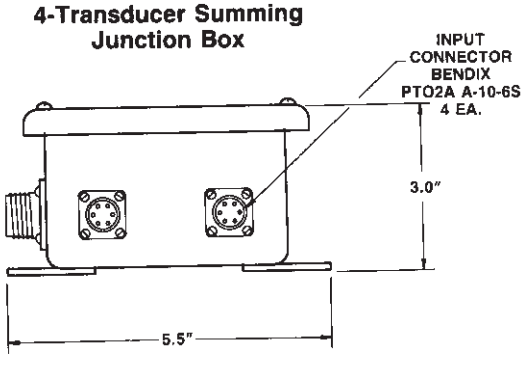
* Maximum pressure range is 6000 psi.

The pressure ports indicated describe the adapter, which may be installed in either direction.

MISCELLANEOUS

Order Code	
AA180	Signature Calibration Module (In-Line)
AA911	4 Transducer (maximum) Summing Junction Box
AA912	Set of 5 Mating Connectors for Summing Junction Box
AA921	Explosion Proof Enclosure (Gage or Absolute Pressure)
AA922	Explosion Proof Enclosure (Differential Pressure)
AA923	GM NEMA-4 Splashguard for 1/8 DIN
AA924	GM Bench Mount Adapter
AA925	Bench Top/Handle (1/8 DIN)
AA926	Bench Top/Handle (3/8 DIN)
AA927	Panel Mount Adapter (1/8 DIN)
AA928	Panel Mont Adapter (3/8 DIN)
AA937	LVDT mounting block (DC/DC only)
AA940	M14 x 11/2mm (M) to G 1/4 B(M) 60° Internal Cone
AA951	Power supply for unamplified transducers, voltage output:10VDC, current output: 4-20mA max.





Internal Amplifiers

Internal amplifiers are practical if temperatures at the transducer are in the range of 0° F to 185° F. When temperatures are beyond these levels, in-line amplifiers can be used to amplify the transducer output. Our internal transducer electronics condition and amplify the strain gage millivolt signal to a standard output range of 0-5 vdc or 4-20mA.

The amplifier is constructed as an integral part of the electrical connector end of the pressure transducer or load cell. Potentiometer adjustments for the zero and span (gain), accessible through two small holes in the transducer body, are usually provided. (Potentiometers may not be available on units with conduit or cable exit.) These holes are covered with O-ring sealed screws to provide environmental protection. The range of zero and span adjustments are +/– 15% min. of full scale. **With the exception of the 2-wire current amp, the internal amplifiers listed below include a precision internal shunt calibration resistor as a standard feature.**

1-888-282-9891
Honeywell Sensotec Sensors
www.honeywell.com/sensing

VOLTAGE AMP
(Option 2a)

Connect ± 15 vdc power input to get non-floating output. This amplifier is used when only positive output is required. (ie: gage or absolute pressure transducers, compression-only load cells, etc.) Use wiring code 11, 12, or 13 depending on electrical termination (Reference application sheet #008-0356-00).*

BIPOLAR VOLTAGE AMP
(option 2b)

Connect ± 15 vdc power input to get non-floating output. This amplifier is used when both positive and negative output are required. (ie: differential pressure transducers, tension/compression load cells, accelerometers.) Use wiring code 11, 12, or 13 depending on electrical termination (Reference application sheet #008-0356-00).*

VEHICLE POWERED VOLTAGE AMP
(Option 2c)

Connect with power pack or vehicle battery power for field use. This amplifier has a high degree of regulation to accept battery voltage changes plus transient protection. It can drive loads of up to 5 milliamperes at full output. Use wiring code 14, 15, or 16 depending on electrical termination. (Reference application sheet #008-0357-00).

VOLTAGE AMP 3-WIRE
0-10 or ± 10V (Option 2t)

Connect with any power supply from 15 to 28 VDC to get output of 0-10 VDC or ±10 VDC, with respect to the (-) power supply terminal. Can drive loads up to 2.5 mA at 10 V output. (Reference application sheet #008-0360-00).

CURRENT AMP 3-WIRE
(Option 2j)

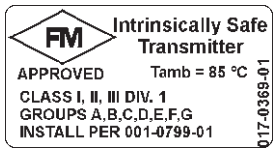
This amplifier has inherent protection against shorting any combination of pins to ground. Applying 32 volts on output will not harm amplifier. Maximum load resistance is 500 ohms. Long lead wires create no loss in accuracy. Use wiring code 19, 20, or 21 depending on electrical termination. (Reference application sheet #008-0361-00).

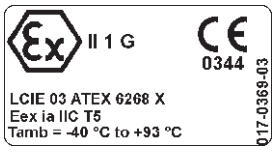
CURRENT AMP 2-WIRE
(Option 2k)

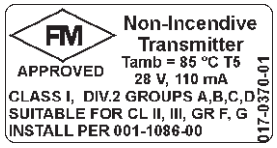
This amplifier is ideal for unregulated power supplies in rugged industrial locations, fits two-wire 4-20ma current loops, and is useable and accurate over great distances. (not available on all transducer models, 5000 ohm bridge required.) Use wiring code 22 or 23 depending on electrical termination (Reference application sheet #008-0358-00).

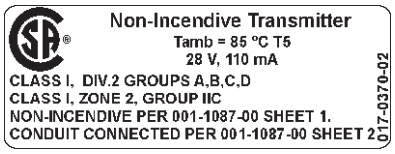
CURRENT AMP 2-WIRE
Intrinsically Safe, non-incendive
(Option 2n or 2N)

Honeywell Sensotec products configured with a 4-20mA, 2-wire output using option code 2n or 2N are marked as follows:









Connection options: Products with option code 2n or 2N feature a standard welded, stainless-steel electrical connector. Products with permanent integral cable (option 6y) and CSA or ATEX approval are limited to 30.5m (100') of cable.

Honeywell Sensotec document #008-0547-00, available from our web site, contains up-to-date information regarding:

- Intrinsically-safe installation
- Entity parameters
- CSA Certificate of Conformity
- ATEX Declaration of Conformity
- Non-Incendive installation.

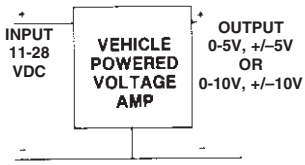
Explosion-proof transmitters Models 811 and 911 are NOT intrinsically safe and thus do not use option code 2n or 2N.

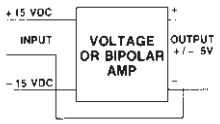
Power is the input voltage required to drive the transducer bridge including the built-in electronics. When the illustration shows a voltage input of, for example, 26-32 vdc, this means that the amplified transducer will run on any input voltage between 26-32 volts. Slow variation in in-put voltage will not have any effect on the output because the internal electronics have built-in voltage regulation. The specification for output means the transducer is calibrated at the factory for the specified output at full range. For example, for a 100 psia pressure transducer, the output would be 5 volts DC when 100 psia pressure is applied to the transducer.

* Not for new design, for replacement only.

SPECIFICATIONS

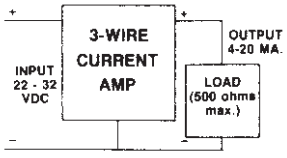
	Voltage Output Option 2c	Voltage Output Option 2t	Voltage Output Option 2b
Input Power (Voltage)	11-28 VDC	15-28 VDC	+/–15 VDC
Input Power (Current)	40 mA	40 mA	45 mA
Output Signal	0-5V or +/–5 @ 5 mA	0-10 V or +/–10V @ 5mA	+/– 5V @ 2.5 mA
Frequency Response	3000 Hz	3000 Hz	3000 Hz
Power Supply Rejection	60db	60db	80 db w. +/– 15V pwr. 60 db w. 26-32V power
Operating Temperature	-20° F to 185° F	-20° F to 185° F	0° F to 185° F
Reverse Voltage Protection:	Yes	Yes	Yes
Short Circuit Protection:	Momentary	Momentary	Output to Output Gnd.
Possible Options	Special Temp. Ranges Remote Buffered Shunt Calib.	Special Temp. Ranges Remote Buffered Shunt Calib.	Special Temp. Ranges Programmable Range Changing Remote Buffered Shunt Calib.

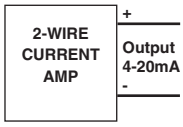


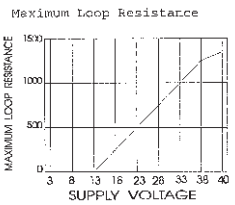


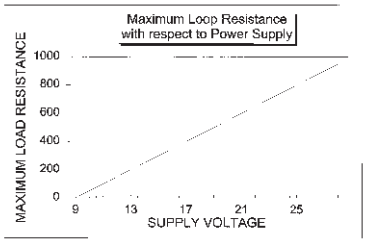
SPECIFICATIONS

	Current 3-Wire Option 2j	Current 2-Wire Option 2k	Intrinsically Safe Amp Option 2n (2N) See page AP-6
Input Power (Voltage)	22-32 VDC (depends upon load resistance)	9-32 VDC typical (depends upon load resistance)	9-28 VDC
Input Power (Current)	65 mA	4-28 mA	4-24 mA
Output Signal	4-20 mA	4-20 mA	4-20 mA
Frequency Response	2500 Hz	300 Hz	2000 Hz
Power Supply Rejection	60db	60db	60db
Operating Temperature	0° F to 185° F	0° F to 185° F	-20° F to 200° F
Reverse Voltage Protection:	Yes	Yes	Yes
Short Circuit Protection:	Yes	Yes	Yes
Possible Options	Special Temp. Ranges Remote Buffered Shunt Calib.	Special Temp. Ranges Remote Buffered Shunt Calib.	Remote Buffered Shunt Calib.









SENSOTEC Wiring Codes

STANDARD WIRING CODES

		Standard Cable	Standard Connector	Submersible Cable
	Unamplified – no shunt cal.			
	– no shunt cal.	#1	#2	#3
	– with shunt cal. (50%)*	#4	#5	#6
	– with sense leads	#7	#8	#9
OPTION 2c	Voltage amp. (Vehicle powered) 0-5 VDC with 11-28 VDC supply @ 25mA			
	– with shunt cal. (80%)*	#14	#15	#16
OPTION 2t	Voltage amp. 0-10 VDC with 15-28 VDC supply @ 40mA			
	– with shunt cal. (80%)	#46	#47	#48
OPTION 2j	Current amp. (3wire, 4-20mA) with 22-32 VDC supply @ 65mA			
	– no shunt cal.	#17	#29	#18
	– with shunt cal. (75%)*	#19	#20	#21
OPTION 2k	Current amp. (2-wire, 4-20mA), Not FM approved			
	– no shunt cal.	#22	#23	S
OPTION 2n (2N) See page AP-6	Current amp. (2-wire, 4-20mA), FM approved			
	– no shunt cal**	#22	#23	S

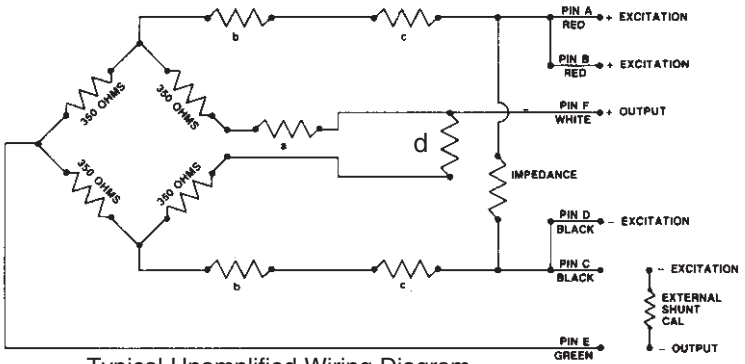
* Interconnecting shunt cal. 1 terminal with shunt cal. 2 terminal (see wiring code) provides 50% (unamplified units) or 75% (4-20mA 3 wire only), .80% (voltage amp) of full scale output for quick calibration.

** Relay buffered shunt cal is optional consult Sensotec.

S Special (consult factory)

DEFINITIONS

Supply: Positive lead of source (power supply) used to drive amplified transducer.
Supply Return: Negative lead of source (power supply) used to drive amplified transducer.
\+ **Output or Output:** Signal side of output.
– **Output or Output Return:** Reference side of output signal.
Supply Common: Center terminal if bipolar supplies (i.e. ±15VDC) are used.
\+ **Excitation:** Positive lead of source (power supply) used to drive unamplified transducer.
– **Excitation:** Negative lead of source (power supply) used to drive unamplified transducer.
\+ **Sense:** Positive lead used for sensing bridge excitation with long cables.
– **Sense:** Negative lead used for sensing bridge excitation with long cables.



Typical Unamplified Wiring Diagram

a - Zero temperature compensation resistor
b - Span temperature compensation resistors
c - Trim resistors for output standardization
d - Zero balance trim resistors

#1 Cable/Unamplified

Red	(+) Excitation
Black	(-) Excitation
Green	(-) Output
White	(+) Output

#2 Connector/Unamplified

A & B	(+) Excitation
C & D	(-) Excitation
E	(-) Output
F	(+) Output

#3 Cable/Unamplified/Submersible

Red	(+) Excitation
Brown	(-) Excitation
Yellow	(-) Output
Orange	(+) Output

#4 Cable/Unamplified/Int. Shunt Cal

Red	(+) Excitation
Black	(-) Excitation
Green	(-) Output
White	(+) Output
Blue	Shunt Cal 1*
Brown	Shunt Cal 2*

#5 Connector/Unamplified/Int. Shunt Cal

A	(+) Excitation
B	(-) Excitation
C	(+) Output
D	(-) Output
E	Shunt Cal 1*
F	Shunt Cal 2*

#6 Cable/Unamplified/Int. Shunt Cal/ Submersible

Red	(+) Excitation
Blue	(-) Excitation
Orange	(+) Output
Green	(-) Output
Brown	Shunt Cal 1*
Yellow	Shunt Cal 2*

#7 Cable/Unamplified/Sense Leads

Red	(+) Excitation
Black	(-) Excitation
Green	(-) Output
White	(+) Output
Blue	(-) Sense
Brown	(+) Sense

#8 Connector/Unamplified/Sense Leads

A	(+) Excitation
B	(+) Sense
C	(-) Excitation
D	(-) Sense
E	(-) Output
F	(+) Output

#9 Cable/Unamplified/Sense/Leads/Submersible

Red	(+) Excitation
Blue	(-) Excitation
Orange	(+) Output
Green	(-) Output
Brown	(+) Sense
Yellow	(-) Sense

#10 Cable/Voltage (+/-5VDC Output with +/-15VDC supply) /Submersible

+/–15VDC Supply	**Wire**
(+) Supply (+15VDC)	Red
(-) Supply (-15VDC)	Orange
(+) Output (+/-5VDC)	Yellow
(-) Output/Supply Com.	Brown

#11 Cable/Voltage (+/-5VDC Output with +/-15VDC supply) /Int. Shunt Cal

+/–15VDC Supply	**Wire**
(+) Supply (+15VDC)	Red
(-) Supply (-15VDC)	Black
(-) Output/Supply com.	Green
(+) Output (+/-5VDC)	White
Shunt cal 1*	Blue
Shunt cal 2*	Brown

#12 Connector/Voltage (+/-5VDC Output with +/-15VDC /Int. Shunt Cal

+/–15VDC Supply	**Pin**
(+) Supply (+15VDC)	A
(-) Output/Supply com.	B
(-) Supply (-15VDC)	C
(+) Output (+/-5VDC)	D
Shunt cal 1*	E
Shunt cal 2*	F

#13 Cable/Voltage (+/-5VDC Output with +/-15VDC /Int. Shunt Cal/Submersible

+/–15VDC Supply	**Wire**
(+) Supply (+15VDC)	Red
(-) Supply (-15VDC)	Brown
(-) Output/Supply com.	Orange
(+) Output (+/-5VDC)	Green
Shunt cal 1*	Blue
Shunt cal 2*	Yellow

#14 Cable/Vehicle Voltage 0-5VDC Supply/Internal Shunt Cal

Red	(+) Supply (+11-26VDC)
Black, Green	Output Common/Supply Return (Internal Connection)
White	(+) Output (0-5VDC)
Blue	Shunt Cal 1*
Brown	Shunt Cal 2*

#15 Connector/Vehicle Voltage 0-5VDC w/11-26VDC Supply/Internal Shunt Cal

A	(+) Supply (+11-26VDC)
B, C	Output Common/Supply Return (Internal Connection)
D	(+) Output (0-5VDC)
E	Shunt Cal 1*
F	Shunt Cal 2*

#16 Cable/Vehicle Voltage 0-5VDC w/11-26VDC Supply/Internal Shunt Cal/Submersible

Red	(+) Supply (+11-26VDC)
Brown, Orange	Output Common/Supply Return (Internal Connection)
Green	(+) Output (0-5VDC)
Blue	Shunt Cal 1*
Yellow	Shunt Cal 2*

#17 Cable/3 wire current

Red	(+) Supply
Black	Output common/
Green	Supply return (Internal Connection)
White	(+) Output

#18 Cable/3 wire current, 4-20mA/Submersible

Red	(+) Supply
Brown, Yellow Green	Output common/ Supply return (Internal Connection) for outputs
Orange	(+) Output (4-20mA)

#19 Cable/3 wire current, 4-20mA/Shunt Cal

Red	(+) Supply
Black, Green	Output common/ Supply return (Internal Connection)
White	(+) Output (4-20mA)
Blue	Shunt Cal 1*
Brown	Shunt Cal 2*

#20 Connector/3 wire current, 4-20mA/Shunt Cal

A	(+) Supply
B, C	Output common/Supply return (Internal connection)
D	(+) Output (4-20mA)
E	Shunt Cal 1*
F	Shunt Cal 2*

#21 Cable/3 wire current, 4-20mA/ Int. Shunt Cal/Submersible

Red	(+) Supply
Brown,	Output common/
Green	Supply return (Internal Connection)
Orange	(+) Output (4-20mA)
Blue	Shunt Cal 1*
Yellow	Shunt Cal 2*

#22 Cable/2 wire current, 4-20mA

Red	(+) Supply
Black	(+) Output (4-20mA)
White	Case Ground

#23 Connector/2 wire current, 4-20mA

A	(+) Supply
B, C & F	No Connection
D	(+) Output (4-20mA)
E	Case Ground

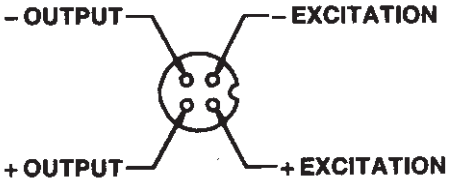
#24 Cable/Frequency Output/ Internal Shunt Cal

Red	(+) Supply
Black,	Output common/
Green	Supply return (Internal Connection)
White	(+) Output
Blue	Shunt Cal 1*
Brown	Shunt Cal 2*

#25 Connector/Frequency Output/ Internal Shunt Cal

A	(+) Supply
B, C	Output common/Supply return (Internal Connection)
D	(+) Output
E	Shunt Cal 1*
F	Shunt Cal 2*

#27 Microtech Connector



#28 Consult Sensotec

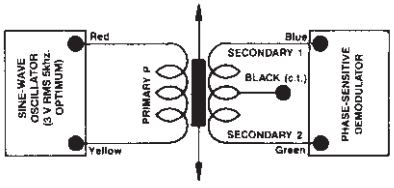
#29 Connector/3 wire current, 4-20mA/w/22-32VDC Supply

A	(+) Supply (+22-32VDC)
B, C	Output common/Supply return (Internal Connection)
D	(+) Output (4-20mA)
E & F	No Connection

#30 AC/AC LVDT

Red	Supply (Calibrated @ 3V RMS 5 KHz)
Yellow	Supply return
Blue	Output
Green	Output return
Black	Secondary Center Tap (normally not connected)

Cable shield is not connected to transducer.



#31 DC/DC LVDT (single power supply) Reverse polarity protected w/voltage regulator

Dual Supply

Red	+12 to +20V input
Blue	-12 to -20V input
Black	OV common

Single Supply

Red	+24 to 40V input
Blue	Supply negative

Outputs

Yellow	0-5-10 Volt
Green	±5 VDC

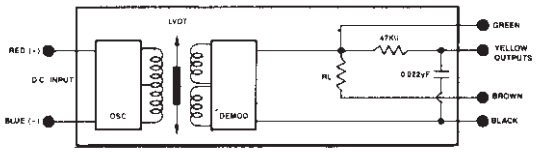
* Must be floating output common = ½ supply voltage

#32 DC/DC LVDT (single power supply) without reverse polarity protection or voltage regulation

Red	(+) Supply (+6 to +12VDC)
Blue	Supply return
Yellow	Note: See below
Green	for outputs
Black	
Brown	

– Short Black and Brown for internal 10,000 ohm load
– Filtered output – Yellow and Black/Brown
– Unfiltered output – Green and Black/Brown

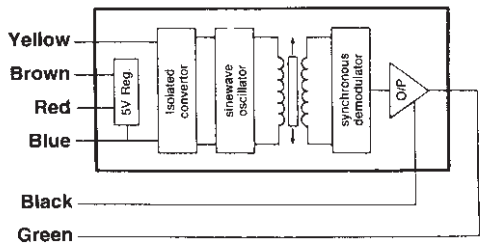
Cable shield is not connected to transducer.



#35 DC/DC LVDT (single power supply) Reverse polarity protected w/voltage regulator

Yellow	+5V, Regulated Input
Brown	+5V, Regulated Output
Red	+6V to 18V, Unregulated
Blue	OV, supply common/ground
Black	Output (lo)
Green	Output (hi)
Shield	Connect to Instrument ground

Link the Yellow and Brown wires together when using the +6V./+18V. Input Option. Ensure the Red and Brown wires are disconnected when using the 5V. The D.C. Output signal is electrically isolated from the Input voltage.



#36 Connector/2 wire current, 4-20 mA

1	+ Supply
2	+ Output
3	N/C
	Case Ground

#37 Connector/Unamplified
1 + Excitation
2 + Output
3 – Output
– Excitation

#38 Connector/Voltage
1 + Supply
2 + Output
3 Supply/Output Common
N/C to Case

#39 Connector/Unamplified
A + Excitation
B + Output
C – Output
D – Excitation

#40 Unamplified, 6 pin Connector with Signature Module
A (+)Excitation
B (+)Signature
C (–)Excitation
D (–)Signature
E (–)Output
F (+)Output

#41 Unamplified, 6 Conductor for Signature Module
Red (+)Excitation
Black (–)Excitation
Green (–)Output
White (+)Output
Blue (–)Signature (Memory –)
Brown (+)Signature (Memory +)

#44 Cable, 4-20mA out
Red (+)Supply
Black (+)Output (4-20mA)
White Case Ground

#45 Unamplified, 6 pin header for coil connections on LVDT
1 & 6 Primary Coil
2 & 5 Secondary Coils
3 or 4 Secondary Centre Tap (whichever is longer)

#46 Vehicle amplifier 0-10VDC
Red (+)Supply
Black Supply return
Green (–)Output
White (+)Output (0-10VDC)
Blue Shunt Cal 1
Brown Shunt Cal 2

#47 Vehicle amplifier 0-10VDC
A (+)Supply
B (–)Output
C Supply return
D (+)Output (0-10VDC)
E Shunt Cal 1
F Shunt Cal 2

#48 Vehicle amplifier 0-10VDC/ Submersible Cable
Red (+)Supply
Brown (–)Output
Orange Supply return
Green (+)Output (0-10VDC)
Blue Shunt Cal 1
Yellow Shunt Cal 2

#49 FP2000, current output, Bendix connector
A (+)Supply 9-28VDC (red)
B N/C
C N/C
D (+) Output 4-20 (black)
E N/C
F N/C

#50 FP2000, voltage output, Bendix connector
A (+) Supply 9-28VDC (red)
B (-) Supply return (black)
C (-) Output (green)
D (+) Output 0-5VDC (white)
E N/C
F N/C

#51 FP2000, current output, cable exit
(+) Supply 9-28VDC (red)
(-) Output 4-20 mA (black)

#52 FP2000, voltage output, cable exit
(+) Supply 9-28VDC (red)
Supply return (black)
(-) output (green)
(+) output (0-5 VDC) (white)

#53 FP2000, current output, DIN connector, I.S. option 2n or 2N, see page AP-6
1 (+) Supply
2 (+) Output
3 Case ground

#54 FP2000 current output DIN connector, option 2p
1 + supply
2 + output 4-20 mA
3 No connection
GND No connection

#55 FP2000 current output DIN connector, option 2y with shunt cal.
1 + supply
2 + output 4-20 mA
3 N/C
GND Shunt Cal

#56 FP2000 voltage output pin conn opt. 2e/2f with shunt calibration
1 + supply
2 + output
3 Supply ret/-output
GND Shunt Cal

#57 FP2000 Millivolt output Bendix conn opt. 2u
A + excitation
B - excitation
C + output
D - output
E N/C
F Shunt Cal

#58 FP2000 current output Bendix conn opt. 2y
A + supply
B N/C
C N/C
D + output (4-20mA)
E N/C
F Shunt Cal

#59 FP2000 with current output, Bendix connector, shunt cal, I.S. option 2n or 2N, see page AP-6
A + supply
B N/C
C N/C
D + output (4-20mA)
E Case ground
F Shunt Cal

#60 Voltage output with shunt cal Bendix conn. opts. 2e/2f
A + supply
B - supply return
C - output
D + output
E N/C
F Shunt Cal

#61 Current output w/ shunt cal & integral cable opt. 2y/6r/6q
Red + supply
Black + output
Green Shunt Cal

#62 Current output with shunt cal & integral cable. I.S. option 2n or 2N, see page AP-6
Red + supply
Black + output (4-20mA IS)
Green Shunt
White Case ground

#63 Voltage output with shunt cal & integral cable opt. 2e/2f/6r/6q
Red + supply
Black - supply return
Green Shunt Cal
White + output

#64 Current output with shunt cal, DIN connector, I.S. option 2n or 2N, see page AP-6
1 + supply
2 + output (4-20mA)
3 Case ground
GND Shunt Cal

Field Set-up of Transducer and Instrument

The most common method for quick field calibration is the “shunt calibration” technique. This method applies a known, accurate resistance across one leg of the transducer, which simulates an actual physical stimulus when one is not present. Upon application of this resistance, the output of the transducer changes exactly as it would if a known pressure or load were applied.

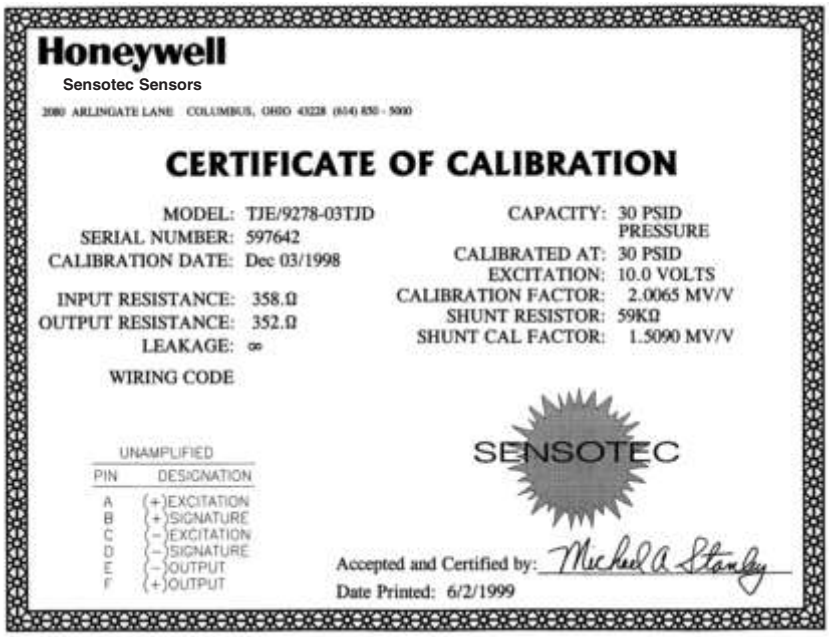
In performing shunt calibration, the transducer should have no pressure or load applied, so that it is at “zero” initially. The data instrument’s ZERO control can then be adjusted to give a zero output on its indicator, or a zero voltage on its output terminals. (In the case of 4-20 milliampere outputs, this value would be a 4 milliamperes.) The shunt calibration circuitry may then be activated by use of the front-panel SHUNT CAL button. A step change in amplifier out put or reading will occur. If the amount of the step change does not agree with the expected change as indicated by the Transducer Calibration Data sheet, adjust the SPAN or GAIN control until it does. This will insure that the amplification given by the data device will be correct, so that an actual stimulus will give correct readings.

It is advisable to recheck the zero when the shunt calibration resistance is removed, since there may be some interaction if the GAIN or SPAN control adjustments were large.

Strain gage transducers with internal amplifiers usually have a shunt calibration resistor installed. The shunt calibration resistor may be activated by interconnecting two terminals on the connector. The wiring code section of the Transducer Calibration Data sheet will indicate which terminals are to be interconnected to activate the shunt calibration. For current output units (4-20 milliamperes), several full cycles of adjusting the ZERO and SPAN controls may be required, since these controls interact greatly in such units.

Shown is a typical Transducer Calibration Data sheet. This sheet will be used as an example to illustrate the setup procedure for both unamplified transducers, as well as instruments with an amplified output. The calibration record for amplified transducers includes the “amplified” shunt cal value so no calculation is required.

Calibration Data Sheet



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CERTIFICATE OF CALIBRATION

MODEL: TJE/9278-03TJD
SERIAL NUMBER: 597642
CALIBRATION DATE: Dec 03/1998

INPUT RESISTANCE: 358.Ω
OUTPUT RESISTANCE: 352.Ω
LEAKAGE: ∞

CAPACITY: 30 PSID PRESSURE
CALIBRATED AT: 30 PSID
EXCITATION: 10.0 VOLTS
CALIBRATION FACTOR: 2.0065 MV/V
SHUNT RESISTOR: 59KΩ
SHUNT CAL FACTOR: 1.5090 MV/V

WIRING CODE

UNAMPLIFIED

PIN	DESIGNATION
A	(+)EXCITATION
B	(+)SIGNATURE
C	(–)EXCITATION
D	(–)SIGNATURE
E	(–)OUTPUT
F	(+)OUTPUT

SENSOTEC

Accepted and Certified by: Michael A Stanley
Date Printed: 6/2/1999

Step-by-Step Procedure for Shunt Cal

1. Make all required connections between the transducer and the instrument.
2. Apply power and allow 10 to 20 minutes for stabilization.
3. Turn the ZERO adjustment so that the indicator reads zero. (If you are working with a PSIA transducer, the transducer must be evacuated to get zero. However, the unit can be shunt calibrated at atmosphere, and the atmospheric reading added to the shunt calibration reading.)
4. From the Transducer Calibration Data sheet, obtain the transducer full scale output in millivolts per volt, and the shunt calibration output in millivolts per volt.
5. Select and perform the proper calculation from the discussion below.
6. Depress the SHUNT CAL switch and turn the SPAN or GAIN adjustment to obtain the value calculated in step 5.

Unamplified Transducers

Transducers with millivolt outputs usually do not have internal shunt calibration circuitry, but the effect of a known shunt calibration resistor being connected across the leads will be noted on the Transducer Calibration Data sheet. To determine the output of an unamplified transducer under shunt calibration conditions, perform the following calculation:

(Shunt Cal Factor in mV/V) x Excitation Voltage = Output Voltage

Substituting the values from the sample Transducer Calibration Data sheet into the above equation provides the following:

(1.5090 mv/v) x (10 V) = 15.090 millivolts

Instrument with 0 to 5 Volt Output

Consider next an amplified transducer with a 0 to 5 volt output, or an instrument which has been factory calibrated with a transducer. Determining the output under shunt calibration conditions is done with the following equation:

$$\frac{\text{Shunt Cal Factor in mV/V}}{\text{Full-Scale Output in mV/V}} \times \text{Full-Scale Output} = \text{Output Voltage}$$

Using the same data sheet as before, and assuming an amplified transducer with a 5 volt full scale provides:

$$\frac{(1.5090\ \text{mV/V})}{(3.0057\ \text{mV/V}} \times 5\ \text{volts} = 2.510\ \text{volts}$$

Instrument with 4-20 Milliampere Output

Consider next the case of a 4-20 milliampere output from an amplified transducer. Notice that this represents a span of 16 milliamperes, offset upward by 4 milliamperes. To calculate the shunt cal output, use the following equation:

$$\text{Shunt Cal Output in mV/V} \times 16\ \text{mA.} + 4\ \text{mA.} = \text{Output Current}$$
$$\text{Full-Scale Output in mV/V}$$

Using the same data sheet again, and assuming a 4-20 mA. case,

$$\frac{(1.5090\ \text{mV/V})}{(3.0057\ \text{mV/V})} \times 16\ \text{mA.} + 4\ \text{mA.} = 12.033\ \text{mA.}$$

Instrument Display

The following equation applies to instruments with a display:

$$\frac{\text{Shunt Cal Factor in mV/V}}{\text{Full-Scale Output in mV/V}} \times \text{Full-Scale Display Value} = \text{Shunt Cal Display Value}$$

Since the transducer shown on the Transducer Calibration Data sheet is a 1,000-pound unit, the display should read:

$$\frac{(1.5090\ \text{mV/V})}{(3.0057\ \text{mV/V})} \times 1{,}000\ \text{lbs.} = 502\ \text{lbs.}$$

Conversion Tables

Pressure

('FROM') Multiply Number of

by ↘	lb/in² (psi)	Bars	In of H_2O (4° C)	In of Hg (0° C)	mm of Hg torr	pascals	Atmos	Dynes/ cm²	Kgrams/ meter²
lb/in² (psi)	1	14.504	3.6127 X 10^{-2}	0.4912	1.934 X 10^{-2}	1.4503 X 10^{-4}	14.6956	1.4504 X 10^{-5}	1.423 X 10^{-3}
Bars	6.8948 X 10^{-2}	1	2.491 X 10^{-3}	3.3864 X 10^{-2}	1.333 X 10^{-3}	10-5	1.01325	10-6	9.0867 X 10^{-5}
In of H_2O (4° C)	27.68	401.48	1	13.60	0.5354	4.014 X 10^{-3}	406.8	4.0148 X 10^{-4}	3.937 X 10^{-2}
In of Hg (0° C)	2.036	29.53	7.355 X 10^{-2}	1	3.937 X 10^{-2}	2.953 X 10^{-4}	29.9213	2.953 X 10^{-5}	2.896 X 10^{-3}
mm of Hg torr	51.715	750.06	1.868	25.4	1	7.502 X 10^{-3}	760	7.5006 X 10^{-4}	7.3558 X 10^{-2}
Pascals	6.8948 X 10^{3}	1 X 10^{5}	2.491 X 10^{2}	3.386 X 10^{3}	1.333 X 10^{2}	1	1.01325 X 10^{5}	10^{-1}	9.8067
Atmos	0.068046	9.86923 X 10^{-1}	2.458 X 10^{-3}	3.34207 X 10^{-2}	1.316 X 10^{-3}	9.869 X 10^{-6}	1	9.86923 X 10^{-7}	9.678 X 10^{-5}
Dynes/ cm²	6.8948 X 10^{4}	10^{6}	2.491 X 10^{3}	3.386 X 10^{4}	1.333 X 10^{3}	10	1.01325 X 10^{6}	1	98.067
Kgrams/ meter²	7.0306 X 10^{2}	1.0197 X 10^{4}	25.40	345.3	13.59	1.019 X 10^{-1}	1.033227 X 10^{4}	1.0197 X 10^{-2}	1

('TO') To Obtain

Load

Multiply Number of

by	Pound	Grams	Newton	Dyne
Pound	1	2.205 X 10^{-3}	.2248	2.248 X 10^{-6}
Grams	453.6	1	102.0	1.020 X 10^{-3}
Newton	4.448	9.807 X 10^{-3}	1	1.0 X 10^{-5}
Dyne	4.448222 X 10^{5}	980.665	1.0 X 10^{5}	1

To Obtain

TORQUE	N-m
1 oz-in	7.06 X 10-3
1 lb-in	0.113
1 lb-ft	1.3558
1 kg-m	9.806
1 dyne-cm	1.00 X 10-7

ACCELERATION
1g = 9.806650 m/s² = 9.81 ¤ 10

Temperature

°C = (°F -32)/1.8
°F = (1.8 x °C) + 32

METRIC EQUIVALENTS Linear Measure	
1 centimeter	0.3937 inch
1 inch	2.54 centimeters
1 foot	0.3048 meter
1 meter	39.37 inches…1.0936 yds.
1 yard	0.9144 meter
1 rod	5.029 meters
1 kilometer	0.621 mile
1 miles	1.609 kilometers

WEIGHTS	
1 gram	0.03527 ounce
1 ounce	28.35 grams
1 kilogram	2.2046 pounds
1 pound	0.4536 kilogram
1 metric ton	0.98421 English ton
1 English ton	1.016 metric ton

LINEAR DISPLACEMENT	
inch	SI unit
0.01	0.254 mm
0.1	2.54 mm
1.0	2.54 cm
1.0	25.4 mm
2.0	50.8 mm
3.0	76.2 mm
4.0	101.6 mm
5.0	127.0 mm
6.0	152.4 mm
7.0	177.8 mm
8.0	203.2 mm
9.0	228.6 mm
10.0	254.0 mm
1 ft	0.3048 m
1 yd	0.9144 m

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Technical Definitions of Terminology

ABSOLUTE PRESSURE TRANSDUCER: A transducer that has an internal reference chamber sealed at or close to 0 psia (full vacuum) and normally provides increasing output voltage for increases in pressure.

ACCURACY: The combined error of nonlinearity, repeatability, and hysteresis expressed as a percent of full scale output.

AXIAL LOAD: A load applied along or parallel to and concentric with the primary axis.

BFSL: Best fit straight line. The sensitivity of a sensor is ideally a straight line but is often has some small non-linearity associated with it. BFSL takes all the data points from the curve and describes a straight line through these data points such that the deviation (and hence the error) between the curve and the straight line is at a minimum.

BRIDGE: A Wheatstone bridge configuration utilizing four active strain gages.

BRIDGE RESISTANCE: The nominal value of the individual legs that make up a complete Wheatstone bridge.

CALIBRATION: The comparison of transducer voltage outputs against the outputs of a reference standard.

DAMPING: The reduction of response at the resonant frequency through the use of a damping media such as oil. Usually specified as the ratio of critical damping.

DEAD VOLUME: The volume inside the pressure port of a transducer at room temperature and barometric pressure.

DEFLECTION: The change in length along the primary axis or distance a diaphragm moves at the center between no-load and rated load conditions.

DIAPHRAGM: The sensing membrane which is deformed when pressure is applied.

EXCITATION, ELECTRICAL: The voltage or current applied to the input terminals of the transducer.

FLUSH DIAPHRAGM: Sensing element is located on the very tip of the transducer (No pressure port).

FREQUENCY RESPONSE: The range of frequencies over which the transducer voltage output will follow the sinusoidally varying mechanical input within specified limits.

FULL SCALE: See Rated Capacity.

FULL SCALE OUTPUT: The algebraic difference between the minimum output (normally zero) and the rated capacity.

GAGE PRESSURE: The pressure above (or below) atmospheric. Represents positive difference between measured pressure and existing atmospheric pressure. Can be converted to absolute by adding actual atmospheric pressure value.

GAGE PRESSURE TRANSDUCER: A transducer which measures pressure relative to the atmospheric pressure.

HYSTERESIS: the maximum difference between output readings for the same measured point, one point obtained while increasing from zero and the other while decreasing from full scale. The points are taken on the same continuous cycle. The deviation is expressed as a percent of full scale.

IEEE 1451.4: IEEE1451.4 specifies a table of self-identifying parameters that are stored within the sensor in the form of a TEDS (Transducer Electronic Datasheet). This standard directs its attention to only the TEDS part of the sensor and signal conditioning system. (As opposed to IEEE1451.2 which is for 'smart sensors'.)

INPUT IMPEDANCE: The resistance measured across the excitation terminals of a transducer at room temperature, with no load applied, and with the output terminals open-circuited.

INSULATION (Isolation) RESISTANCE: The DC resistance expressed in ohms measured between any electrical connector pin or lead wire and the transducer body or case. Normally measured at 50 VDC.

Technical Definitions of Terminology

LINEARITY: The maximum deviation of the calibration curve from a straight line between zero and full scale, expressed as a percent of full scale output and measured on increasing measured only.

LINE PRESSURE: The maximum pressure in the pressure vessel or pipe for differential pressure measurement.

LOAD: The weight, torque, or force applied to the transducer.

LOAD BUTTONS: The spherical shape of the top surface of a load cell where the load is applied.

MEASURED MEDIA: The physical quantity, property, or condition which is measured. (eg: pressure, load, weight, acceleration).

MOUNTED RESONANT FREQUENCY: the frequency at which the internal spring/mass system of an accelerometer resonates, producing a 90° phase shift in output signal vs. applied acceleration.

OUTPUT: The electrical signal measured at the output terminals which is produced by an applied input to a transducer.

OUTPUT IMPEDANCE: The resistance as measured on the output terminals of a transducer at standard temperature, with no measured applied, and with the excitation terminals open-circuited.

OVERRANGE, SAFE: the maximum pressure or load which may be applied to the transducer without causing a permanent change in the performance specifications.

PHASE SHIFT: The phase angle between the output signal and the applied acceleration.

PRIMARY AXIS: The axis along which the transducer is designed to be loaded; normally its geometric centerline.

PSI: Pounds per square inch.

PSIA: Pounds per square inch absolute.

PSID: Pounds per square inch differential.

PSIG: Pounds per square inch gage.

PULL PLATE: Load cell attachment which allows tension or compression force to be directed at the center line of a load cell through a threaded center hole.

RANGE: the measured values, over which a transducer is intended to measure specified by their upper and lower limits.

RATED CAPACITY: The maximum measured that a transducer is designed to measure within its specification.

REPEATABILITY: The ability of a transducer to reproduce output readings when the same measured value is applied to it consecutively, under the same conditions and in the same direction. Repeatability is expressed as the maximum difference between output readings as a percent of full scale.

RESOLUTION: The smallest change in mechanical input which produces a detectable change in the output signal.

SENSING ELEMENT: The part of the transducer which reacts directly in response to the measured.

SENSITIVITY: The ratio of change in transducer output to a change in the value of the measured.

SHUNT CAL (R-CAL): The change in electrical output caused by placing a fixed resistor between the appropriate transducer terminals. Used “in the field” for quick calibration.

SPAN: The algebraic difference between the limits of the range from zero to full scale.

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Technical Definitions of Terminology

SPECIFICATIONS: The group of error limits within which each device will operate.

STRAIN GAGE: A measuring element for converting force, pressure, tension, etc., into an electrical signal.

TEDS: Transducer Electronic Datasheet. An electronic table of parameters that identify a transducer and are stored within the transducer on an EEprom for interrogation by external electronics. TEDS is the data contained on a sensor as defined by IEEE1451.4.

TEMPERATURE, COMPENSATED: The range of temperature over which a transducer can operate up to full scale and still meet all specifications.

TEMPERATURE COMPENSATION: The utilization of supplementary devices, materials, or components within the bridge to minimize sources of error caused by changing temperature.

TEMPERATURE, OPERATING: The range of temperature over which a transducer may be safely operated up to full scale without causing failure, but specifications may not be met.

TEMPERATURE EFFECT ON SPAN: The change in rated output due to a exchange in ambient temperature. Usually expressed as +/- a percentage change in rated output per degree F change in ambient temperature, over the compensated temperature range.

TEMPERATURE EFFECT ON ZERO: The change in zero balance due to a change in ambient temperature. Usually expressed as +/- a percentage change in rated output per degree F change in ambient temperature over the compensated temperature range.

TRANSDUCER: A device (or medium) that converts energy from one form to another. The term is generally applied to devices that take physical phenomenon (pressure, temperature, humidity, flow, etc.) and convert it to an electrical signal.

TRANSMITTER: A transducer that has a 4-20 mA two-wire output.

TRANSVERSE SENSITIVITY: Signal output as a result of acceleration perpendicular to the sensitive axis. Specified as a percentage of sensitive axis output for equivalent right angle acceleration or as a decimal fraction.

TRUE GAGE: A true gage transducer differs from a standard gage because it has a second diaphragm. The additional diaphragm seals the strain gages and element in a hermetic chamber, keeping moisture and potentially corrosive gasses out. Wet or dry atmospheric pressure is vented to the back side of the second diaphragm to reference barometric changes on the sensing element. Higher range units (750 psi and above) are sealed at atmospheric pressure.

VIBRATION ERROR: the maximum change in output of a transducer when a specific amplitude and range of frequencies are applied to a specific axis at room temperature.

WET/DRY DIFFERENTIAL: A differential pressure transducer or transmitter that uses a metal diaphragm at the wet port where fluids can be applied, and no diaphragm at the dry port. The dry port exposes the internal circuitry to the medium, so only clean dry gas can be applied to this port.

WET/WET DIFFERENTIAL: A differential pressure transducer or transmitter that has a metal diaphragm in each pressure port to permit fluid into both ports.

WETTED PARTS: the diaphragm and pressure port material that comes in direct contact with the medium (gas, liquid).

ZERO ADJUSTMENTS: Used when “setting up” a transducer to adjust the output signal to zero when zero load/pressure is applied.

ZERO BALANCE: The output signal of the transducer with rated excitation and with no-load applied, usually expressed as a percent of rated output.

ZERO RETURN: The difference in zero balance measured immediately before rated load application of specified duration and measured after removal of the load, and when the output has stabilized.

Terms and Conditions of Sale and Shipment

Terms

1. Payment terms are net thirty (30) days (after credit approval) from invoice date.
2. All prices are F.O.B. SENSOTEC's plant unless otherwise specified and are firm for thirty (30) days from date of quotation.
3. Title to merchandise passes to the Purchaser upon Company delivery to a carrier at SENSOTEC'S plant, 2080 Arlingate Lane, Columbus, OH 43228.
4. Normal shipment method is UPS. Purchaser can specify any other shipping method. Shipping cost normally will be prepaid and added as a separate item on the invoice.
5. If the financial condition of the Purchaser is not satisfactory to Company, the Company may cancel the order or require full or partial payment in advance.

Prices

6. Prices published in catalogs, bulletins, or price lists are not offers to sell and are subject to change without notice. General price information should be specifically confirmed.

Product Modification & Substitutions

7. The Company reserves the right to change or modify, at any time or without notice, any product, or to discontinue the manufacture of any product.

Contract

8. Any acceptance by SENSOTEC of the buyer's order is expressly conditional on the buyer's assent to any additional or different terms and conditions contained herein. Quotations issued by a Company field office or by Sales Representatives are not offers and should not be construed as offers to sell. Such quotations issued are not binding on Company nor shall the Buyer's acceptance thereof be binding upon Company, unless expressly confirmed in writing by the Company Headquarters at Columbus, Ohio. All orders are received subject to acceptance by Company at said Headquarters.
9. The Company reserves the right to make partial shipments of equipment as fabrication is completed. Partial shipment will be invoiced at standard terms.

Delivery Schedules

10. Delivery information is approximate and refers to time of delivery to carrier and is made in good faith. Delivery schedules are not guaranteed and the company will not accept any liability for any penalty or damages, liquidated or otherwise, for delayed shipments or installation.

Cancellation

11. In the event of cancellation, Purchaser shall pay the Company promptly upon receipt of invoice from the Company:
    (a) The full contract price for all products which shall have been completed prior to the Company's receipt of notice of cancellation.
    (b) All costs actually incurred by the Company in connection with the uncompleted portion of the order.
    (c) Cancellation charges incurred by the Company on account of its purchasing commitments made under the order.

Claims

12. The company's liability under this warranty or any other warranty whether expressed or implied in law or fact shall be limited to the repair or replacement of defective material and workmanship; and in no event shall the company be liable for consequential or indirect damages.

Modifying or Conflicting Terms

13. Acceptance of this offer is expressly conditional on purchaser's acceptance of all company's terms. Neither modification of, nor addition to, the foregoing terms of sale and shipment, oral or written, nor any conflicting terms or conditions incorporated in purchaser's order, are a part of the contract unless specifically agreed to by the company in writing and signed by an officer of the company.

Patent Infringement

14. The company makes no representations as to whether goods being sold are free of the rightful claim of any third person by way of infringement of similar claims and disclaims any warranty against infringement or similar claims with respect to the goods.

Confidential Information

15. Selected software and hardware, drawing, diagrams, manuals, specifications, and other materials furnished by Company relating to the use and service of articles furnished hereunder, including any information, may be identified as proprietary to Company. Such software and hardware, diagrams, manuals, drawings, specifications and other materials, have been developed at great expense and are considered to be trade secrets of Company. Buyer may not reproduce in any way without the expressed written permission of Company, such diagrams, drawings, manuals, specifications and other materials, except as needed to operate and maintain the equipment supplied by Company (except information as may be established to be in the public domain or disclosed pursuant to judicial or Government action) shall be received in confidence and Buyer shall exercise reasonable care to hold such information in confidence.

Authority of the Company's Agents

16. No agent, employee or representative of the Company has the authority to bind the Company to any affirmation, representation or warranty concerning the goods sold under this contract, and unless an affirmation, representation or warranty made by an agent, employee or representative is specifically included within this bargain, it shall not in any way be enforceable by the Purchaser.

Prevailing Law

17. This contract shall be governed in accordance with the laws of the Sate of Ohio. Should any term of condition contained in the contract contravene or be invalid under applicable law, the contract shall not fail by reason thereof, but shall be construed in the same manner as if such term or condition had not appeared herein.

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How To Create An Order Code

After selecting the appropriate product model, identify the desired range and the available options, if any, that you require, and build an appropriate order code. The order code consists of a series of numbers and letters which identify the specific characteristics of the unit you select.

Sample Order Code

AP131	BR	1c, 2a
1	2	3
Model Order Code from Product Page	Range Code from page AP-22	Option Codes from pages AP-20, 21

The Order Code has three basic sections:

1. **The first 5 characters** of the Order Code identify the **specific product** and are located directly above the product specifications on each product page. (eg. AP131, BD141).

2. **The next 2 characters** of the Order Code identify the product's **operating range** (pressure, load, etc.). Available ranges for each model are listed in the dimensions section on each product page and on page AP-20. Select an available range and insert its range code (eg. BR, ET) as the next 2 characters of the order code string.

3. **The remaining characters** of the Order Code identify the **options**, if any, which you select. (Note that options and premium options are provided at an additional charge and may increase delivery time). Available options for each model are identified via option codes on each product page. Flip out the back insert (page AP-18) for a description of the options. Insert the option code for each option selected at the end of the order code string.

Order Code Example

AP131BR, 1c, 2c is a Model Z, 100 psi gage pressure transducer, which is temperature compensated from 0° F to 185° F, and has an internal voltage amplifier which provides an output of 0-5VDC.

After building a complete order code string, prepare a purchase order like the example on page AP-23), including the order code and a detailed description of the product and options. Please provide a name and telephone number for both a purchasing and a technical contact at your company for the order. When purchasing sensors and instruments as a system, specify which sensor is to be calibrated with each instrument or each instrument channel.

Special Requirements

If you require assistance in selecting the proper sensor or require options that aren't listed as available, call Customer Service or your local Honeywell Sensotec Sales Representative and be prepared to provide the following minimum information about your application: accuracy requirements; dimensional limitation; environmental conditions including temperature, humidity, or corrosion factors; normal and maximum operating ranges; output requirements; power limitations; cycle rate; and delivery requirements.

Since 1973, we have designed thousands of different transducers. One of these designs is likely to meet your requirements. If not, our engineers will be happy to design a unit to meet your unique requirements. Special modifications are available on some models for large orders. These modifications include special temperature compensated ranges, special internal amplifiers, overload stops, special pressure ports, special electrical terminations, special wetted diaphragm and casing materials, special calibration, explosion proof enclosures, special testing, and extended temperature ranges, to name a few.

Options List

IMPORTANT

Options and premium options are available at an additional charge. Consult the options section of product specification page(s) for information on availability/restrictions. Certain options may affect the performance characteristics on some models.

GENERAL

Temperature Compensated Range

1a. 60° to 160° F
1b. 30° to 130° F
1c. 0° to 185° F
1d. -20° to 130° F
1e. -20° to 200° F
1f. 70° to 250° F
1g. 70° to 325° F
1h. 70° to 400° F
1i. -65° to 250° F
1j. 0° C to 50° C
1k. -20° C to 85° C
1m. -25° C to 110° C

Internal Amplifiers

(Also available as In-Line units) – See Internal Amplifier section for details. Note that all internal amplifiers listed below already include a precision internal shunt calibration resistor (except 2-wire amplifiers, option 2k) and have an operating temperature range of 0° F to 185° F.

2c. Voltage Amp Vehicle Powered: 0-5VDC output with 11-28VDC supply at 25ma.
2t. Voltage Amp: 0-10VDC output with 15-28VDC supply.
2j. Current Amp: 4-20ma (3-wire) output with 22-32VDC supply @ 65ma.
2k. Current Amp: 4-20ma (2-wire) output with 9-32 VDC typical supply.
2n or 2N, Current amp: 4-20mA (2-wire) out, 9-28 VDC supply. Intrinsically safe with pots and shunt cal. See page AP-6.

For replacement purposes only - not for new designs:
2a. Voltage Amp: 4 wire 0-5VDC output with +/-15VDC @ 45ma. (Used with gage and absolute pressure transducers and compression-only or tension-only load cells.)
2b. Bipolar Voltage Amp: 4 wire +/-5VDC output with +/-15VDC @ 45ma. (Used with differential pressure transducers and tension/compression load cells.

Internal Amplifier Enhancements

3a. Input/output isolation.
3d. (Also 3D) Remote Buffered Shunt Calibration: Available with all internal amplifiers. Allows user to recalibrate a transducer using the internal relay circuit, thereby removing the effects of cable length in long-cable installations.

Overload Stops

4a. Overload stops.

Pressure Ports

5a. 1/4" - 18 NPT Female
5b. 1/4" - 18 NPT Male
5c. 7/16" - 20 UNF Female (per MS33649-4)
5d. 7/16" - 20 UNF Male (per MS33656E4)
5f. G 1/4 British Pipe Female
5g. G 1/4 Male
5h. 1/8"-27 Female
5i. 1/8"-27 Male
5r. 9/16 - 18 2A Male - SAE straight thread
5s. 9/16 - 18 2A Female - SAE straight thread
5t. G 1/2 Male
5u. 9/16-18 Autoclave F-250-C
5w. VCR Male
5z. VCR Female

Electrical Termination

Connectors and cable attached to transducer.
6a. Bendix PTIH-10-6P – (or equivalent) 6 pin (max. 250° F)
6b.* MS type connector mates with MS3106-14S 6 pin (max. 160° F)
6c. Cannon WK6-325 Series connector 6 pin (max. 160° F). Special Wiring Code.
6d. Microtec DR-4S-4H 4 pin (max. 250° F)
6e. Integral cable: Teflon (-65 to 475° F)
6f. Integral cable: PVC (-20 to 160° F)
6g.* Integral cable: Neoprene (0 to 180° F)
6h. Integral cable: Silicone (-65 to 300° F)
6i.* Integral underwater cable (max. 180° F)
6j. 1/2-14 conduit fitting with 5' of 4 conductor PVC cable (may be used with 6e-i)
6m. DIN 43650
6n. DIN 40050
6q.* Molded Integral Cable: Polyurethane (max. 180°F)
6r. 1/2-14 conduit with 5' PVC cable (FP2000)
6s. G 1/2 conduit (British Pipe Thread)
6t. Integral Cable with Heyco Spring Strain relief (5 ft.)
6v. Phoenix connector on end of cable.

Shunt Calibration

8a. Precision Internal Resistor (max. 250° F)

Special Calibration
(Subject to available calibration levels)

9a. 10 point (5 up/5 down) 20% increments @ 70° F
9b. 20 point (10 up/10 down) 10% increments @ 70° F
9c. A.S.T.M. E-74 calibration
9e. CE mark

Wetted Diaphragm

10a. 316 Stainless steel
10b. Crucible A-286
10c. Hastelloy-C
10d. Monel K-500
10e. Inconel X-750

* Not available with option 1c, 1e, 1f, 1g, 1h, or 1i.

Bridge Type

11a. Square bridge.
11b. Symmetrical bridge.
11c. Square & symmetrical bridge.

Bridge Resistance

12a. 1,000 ohm (foil) (max. 400° F)
12b. 5,000 ohm (foil) (max. 250° F)

Thread Option
(Specify M or F)

13a. 1/2"-20 (Load Cell)
13b. 3/4"-16 (Load Cell)
13c. 7/8"-14 (Load Cell)
13d. 1"-14 (Load Cell)
13e. 1-1/2"-12 (Load Cell)
13f. 3/8”-32 UNEF (LVDT body thread)
13g. 1/8” BSP (LVDT body thread)
13h. M-10 (LVDT body thread)
13s. 2-1/2” - 12
13t. 2-1/2” - 8

Potentiometers

14a. No access to pots.
14b. Top access to pots
14c. Side access to pots

Electrical Connector Orientation

15a. Horizontal Electrical Exit Port Orientation (models RM, RF, RGM, RGH, & RGF)
15b. Vertical Electrical Exit Port Orientation (Models RM, RF, RGM, RGH, & RGF)
15c. Radial Electrical Exit Port Orientation (Models RM, RF, RGM, RGH, & RGF)
15d. Connector on end of cable.

CIP Flanges

16b. 1.5" Tri-Clover
16c. 2.0" Tri-Clover
16d. 2.5" Tri-Clover
16e. 3.0" Tri-Clover
16f. 1.5" Cherry Burrell
16g. 2.0" Cherry Burrell
16h. 2.5" Cherry Burrell
16i. 3.0" Cherry Burrell

DIFFERENTIAL PRESSURE TRANSDUCERS ONLY

High Line Pressure

25a. 2,000 psi line pressure
25b. 3,000 psi line pressure
25c. 5,000 psi line pressure

O-Ring Seals

26a. Metal **26b.** Vi-ton **26c.** Teflon

LOAD CELLS ONLY *Load cells which operate in tension and compression are calibrated in tension only unless one of the following options is specified.*

Special Calibration

30a. Compression only (+) output
30b. Tension and Compression (+,-) output
30c. Compression only (–) output

31a. Dual bridge.

Metric Threads

32a. M3 x 0.5
32b. M4 x 0.7
32c. M5 x 0.8
32d. M6 x 1.0
32e. M10 x 1.0
32f. M10 x 1.5
32g. M12 x 1.5
32h. M12 x 1.75
32i. M20 x 1.5
32j. M24 x 1.5
32k. M27 x 1.5
32l. M36 x 3.0
32m. M39 x 1.5
32n. M52 x 3.0
32p. M64 x 2.0
32q. M90 x 4.0
32r. M14 x 1.5 male
32s. M15 x 1.5 female

Shock & Vibration

44a. Shock and vibration resistance.

AMPLIFIERS AND INSTRUMENTS ONLY

Mounting & Packaging

51a. Rack mount adapter (GM) 19”
51k. Metal enclosure In-Line Amplifiers
51d. Custom front panel or logo

Inputs Accepted

52a. 0-5VDC
52b. 4-20ma
52c. 0-4.5mv/v to 0-40mv/v

Interfaces

53d. RS-485 interface
53e. Signature Calibration (Temp. range -20 to 160° F only) (Wiring Code # 40)
53t. T.E.D.S. IEEE 1451.4 Module
53s. Phoenix with signature module cable termination.

Outputs

56a. 4-20ma
56c. 0-20ma
56e. 0-1VDC

Special Features

58a. Hi/Lo limits (dual)
58c. Peak/Hold
58d. Track/Hold

Electrical Connection

59e. Turck connectors (In-Line amplifiers)

Power

60a. 220VAC
60c. Battery power (12VDC)

Range Codes

Use these codes to specify the desired range when ordering.

RANGE CODE	GAGE/ABSOLUTE PRESSURE	DIFFERENTIAL PRESSURE	LOAD
AF	N/A	N/A	10 gm.
AH	N/A	N/A	25 gm.
AJ	N/A	N/A	50 gm.
AL	N/A	N/A	150 gm.
AN	.5 psi	.5 psid	250 gm.
AP	1 psi	1 psid	500 gm.
AR	2 psi	2 psid	1000 gm.
AS	2.5 psi	2.5 psid	2.5 lbs.
AT	5 psi	5 psid	5 lbs.
AV	10 psi	10 psid	10 lbs.
BJ	15 psi	15 psid	N/A
BL	25 psi	25 psid	25 lbs.
BM	30 psi	30 psid	30 lbs.
BN	50 psi	50 psid	50 lbs.
BP	75 psi	75 psid	N/A
BR	100 psi	100 psid	100 lbs.
CJ	150 psi	150 psid	N/A
CL	200 psi	200 psid	N/A
CN	250 psi	250 psi	250 lbs.
CP	300 psi	300 psid	N/A
CQ	400 psi	400 psid	400 lbs.
CR	500 psi	500 psid	500 lbs.
CS	600 psi	600 psid	600 lbs.
CT	750 psi	750 psid	N/A
CV	1,000 psi	1,000 psid	1,000 lbs.
DJ	1,500 psi	N/A	N/A
DL	2,000 psi	2,000 psid	2,000 lbs.
DM	2,500 psi	2,500 psid	2,500 lbs.
DN	3,000 psi	3,000 psid	3,000 lbs.
DP	N/A	N/A	4,000 lbs.
DR	5,000 psi	5,000 psid	5,000 lbs.
DS	6,000 psi	6,000 psid	6,000 lbs.
DT	7,500 psi	7,500 psid	7,500 lbs.
DV	10,000 psi	10,000 psid	10,000 lbs.
EJ	15,000 psi	N/A	15,000 lbs.
EL	20,000 psi	N/A	20,000 lbs.
EM	25,000 psi	N/A	25,000 lbs.
EN	30,000 psi	N/A	30,000 lbs.
EP	50,000 psi	N/A	50,000 lbs.
ER	75,000 psi	N/A	75,000 lbs.
ES	60,000 psi	N/A	60,000 lbs
ET	100,000 psi	N/A	100,000 lbs.
FJ	150,000 psi	N/A	150,000 lbs.
FK	175,000 psi	N/A	175,000 lbs.
FL	200,000 psi	N/A	200,000 lbs.
FN	N/A	N/A	300,000 lbs.
FP	N/A	N/A	400,000 lbs.
FU	N/A	N/A	1,500,000 lbs.

Range Codes

ACCELERATION

Code	Range
GJ	5g
GK	10g
GL	20g
GN	50g
GP	100g
GR	500g

TORR

Code	Range
HA	15
HB	50
HC	135
HD	250
HE	750
HF	1500

mBAR

Code	Range
JA	35
JB	70
JC	175
JD	350
JE	700
JF	750
JG	1,000
JH	3,500
JI	7,000
JK	10,000

KPa

Code	Range
KA	2
KB	7
KC	15
KD	35
KE	70
KF	100
KG	200
KH	300
KJ	700
KL	1,000
KM	1,500
KN	1,700
KP	2,000
KQ	3,000
KR	5,000
KS	7,000
KT	10,000
KU	15,000
KV	20,000
KW	35,000
KY	50,000
KZ	70,000

LOAD CELL, HIGH RANGE

Code	Range
RA	1 Metric Ton
RB	3 Metric Ton
RC	5 Metric Ton
RD	10 Metric Ton
RE	20 Metric Ton
RF	30 Metric Ton
RG	50 Metric Ton
RH	100 Metric Ton
RI	200 Metric Ton

TORQUE

Code	Range
TA	10 in. ozs.
TB	25 in. ozs.
TD	100 in. ozs.
TF	250 in. ozs.
TH	50 in. lbs.
TJ	100 in. lbs.
TL	300 in. lbs.
TN	600 in. lbs.
TP	1,200 in. lbs.
TR	3,000 in. lbs.
TT	6,000 in. lbs.
TV	12,000 in. lbs.
TW	24,000 in. lbs.
TX	Special

LIQUID PRESSURE
Inches Hg (mercury)

Code	Range
UB	1" Hg
UD	2" Hg
UF	5" Hg
UA	10" Hg
UC	15" Hg
UE	20" Hg
UG	30" Hg
UI	50" Hg
UK	60" Hg
UM	80" Hg
UP	100" Hg
UH	200" Hg
UJ	300" Hg
UL	500" Hg
UN	1,000" Hg
UQ	16"-32" Hg
UR	26"-32" Hg
US	0"-32" Hg

LIQUID PRESSURE
mm Hg (mercury)

Code	Range
VA	15mm Hg
VB	50mm Hg
VC	135mm Hg
VD	250mm Hg
VE	750mm Hg
VF	1,500mm Hg

LIQUID PRESSURE
Inches H_2O (water)

Code	Range
WA	10" H_2O
WC	20" H_2O
WE	30" H_2O
WG	50" H_2O
WI	100" H_2O
WK	120" H_2O
WM	150" H_2O
WP	200" H_2O
WR	300" H_2O
WS	500" H_2O

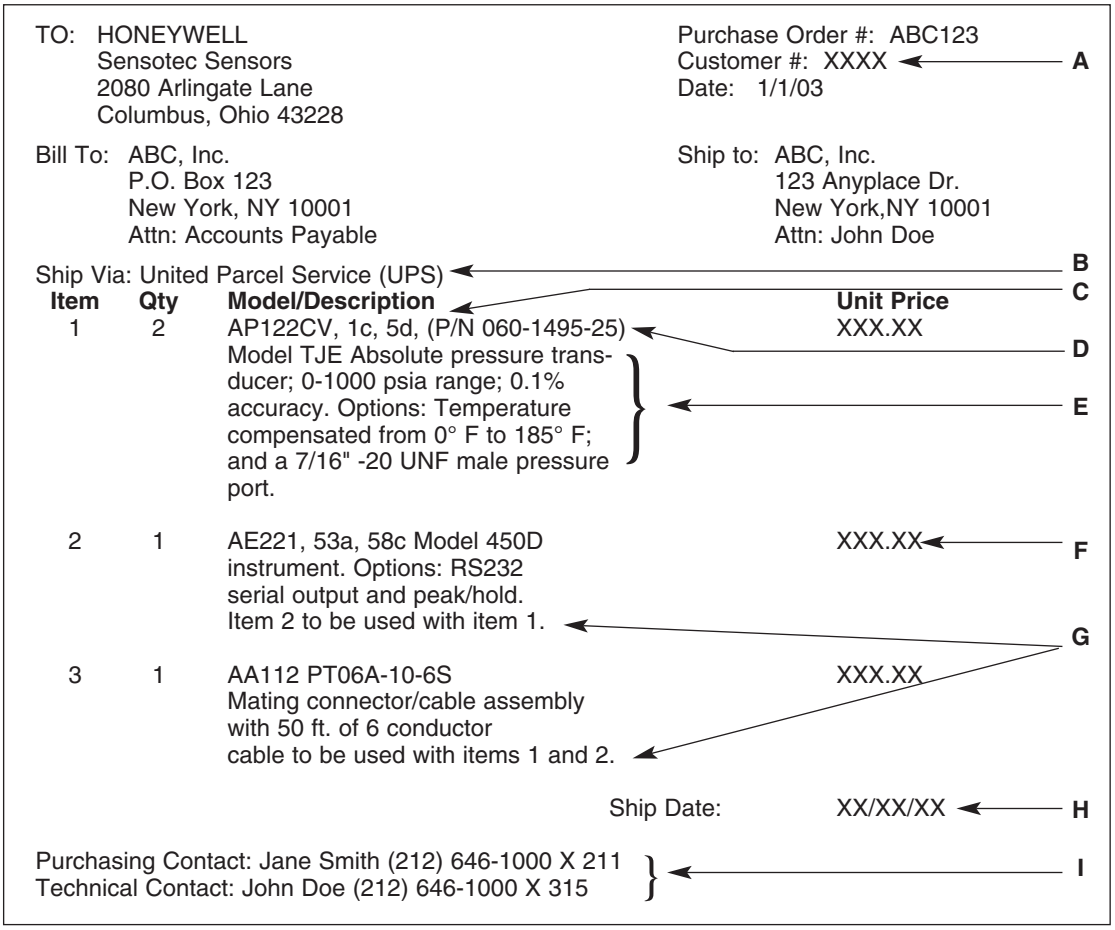
Range Codes

RANGE CODE	GAGE,ABSOLUTE & DIFFERENTIAL PRESSURE		LOAD CELLS	
MA	.035 bar	N/A	N/A	N/A
MB	.1 bar	1.45 psi	.1 Newton	N/A
MC	.2 bar	2.9 psi	.2 Newton	N/A
MD	.5 bar	7.25 psi	.5 Newton	50.9 gm
ME	1 bar	14.5 psi	1 Newton	101.8 gm
MF	2 bar	29 psi	2 Newton	203.6 gm
NA	3.5 bar	50.75 psi		
MG	5 bar	72.5 psi	5 Newton	1.12 gm
NB	7 bar	101.5 psi		
MH	10 bar	145 psi	10 Newton	2.2 lbs
MI	20 bar	290 psi	20 Newton	4.496 lbs
MJ	30 bar	435 psi	30 Newton	N/A
NC	35 bar	507.5 psi		
MK	50 bar	725 psi	50 Newton	11.24 lbs
ND	70 bar			
ML	100 bar	1,450 psi	100 Newton	22.48 lbs
NE	135 bar			
MY	200 bar	2,900 psi	500 Newton	112.4 lbs
NG	350 bar			
MM	500 bar	7,250 psi	200 Newton	44.96 lbs
NH	700 bar			
MN	1,000 bar	14,500 psi	1,000 Newton	224.8 lbs
MO	2,000 bar	29,000 psi	2,000 Newton	449 lbs
MP	3,000 bar	43,500 psi	3,000 Newton	674.4 lbs
MQ	5,000 bar	72,500 psi	5,000 Newton	1,124 lbs
MR	10,000 bar	N/A	10,000 Newton	2,248 lbs
MS	N/A	N/A	20,000 Newton	4,496 lbs
MT	N/A	N/A	50,000 Newton	11,240 lbs
MU	N/A	N/A	100,000 Newton	22,480 lbs
MV	N/A	N/A	200,000 Newton	44,960 lbs

METRIC THREADS

Code	Range
32a	M3 x 0,5
32b	M4 x 0,7
32c	M5 x 0,8
32d	M6 x 1,0
32e	M10 x 1,0
32f	M10 x 1,5
32g	M12 x 1,5
32h	M12 x 1,75
32i	M20 x 1,5
32j	M24 x 1,5
32k	M27 x 1,5
32l	M36 x 3,0
32m	M39 x 1,5
32n	M52 x 3,0
32p	M64 x 2,0

Sample Purchase Order



A Existing customers have an established customer number for specific bill to and ship to locations.

B Unless otherwise specified, Honeywell Sensotec will ship your product UPS. Other means of shipment such as Emery, Federal Express, UPS next day, etc. are available. Terms: FOB Honeywell Sensotec plant.

C Order Code identifies product model, range, and options.

D If you wish to reorder an exact duplicate of a product ordered previously, you can use the part number (ie: part number 060-1495-25 would appear as TJE/1495-25 on the product label) when ordering. Otherwise, leave this space blank.

E It is important to include a full description of the product after the order code. By providing both the order code and a full description, you reduce the possibility of an order error and avoid unnecessary delays in shipment.

F Unit price includes the list price for the model/range you select, plus any additional charges for options specified, less any quantity or GSA discount.

G By specifying which items will be used together, you help insure that compatible products will be shipped. When you purchase both the transducer and instrument from Honeywell Sensotec and specify that they will be used together, we calibrate the two units as a system, free of charge.

H Ship dates should be confirmed by the Customer Service Department. Items with different ship dates should be listed separately. Unless otherwise specified on the order, Honeywell Sensotec assumes that early and/or partial shipments are acceptable. When ordering products from the stocking program, specify “Ship From Stock” on the order.

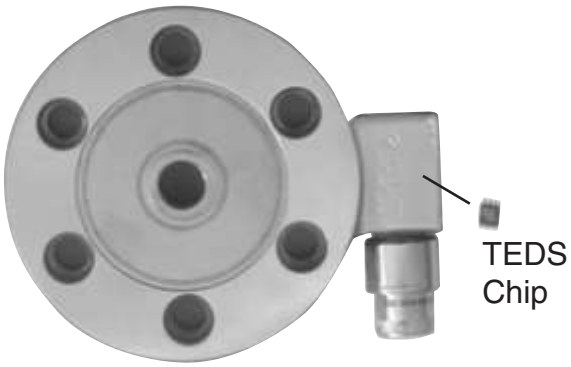
I The name and telephone number of both a purchasing and a technical contact should be provided so that questions concerning the order can be easily resolved without unnecessarily delaying processing and shipment.

Plug and Play Sensors and Signal Conditioning

IEEE 1451.4 STANDARD

BUILT IN AS NEW, RETROFITTABLE OR VIRTUAL

CAL DATA STORED ON SENSOR FOR AUTOMATIC SETUP



Sensotec can supply your sensor and/or signal conditioning with IEEE1451.4 plug and play technology. The plug and play technology consists of adding a memory chip to the sensor and having software (standard on the SC2000) to interpret the data that then automatically sets up and calibrates your system so that you are ready to take data. Its as easy as 1-2-3.

The transducer electronic data sheet (T.E.D.S) containing sensor specifications, calibration data and user defined location information is stored in the sensor. When connected to the SC2000 or any IEEE1451.4 compliant signal conditioning the sensor is interrogated for the TEDS information and automatically sets up and calibrates the signal conditioning with the sensor.

No More Paper. Plug and play eliminates the need to read and enter data from a paper calibration sheet. You don't have to endure the hassle of having the sheet filed in one location while the sensor is used in another or worst of all, that the calibration sheet will get misplaced or lost.

Labeling and Cabling Made Easy. Sensor users often find themselves with a bundle of cables, trying to figure out which cable goes with which sensor so they can make the proper connections to their signal conditioner. Plug and play technology introduces the potential for enabling the signal conditioner to read not only a sensor's type and calibration information but also its location.

Swapping Made Easy. Even a rugged sensor can be damaged in an industrial testing situation. When that happens, you want to change sensors and get your test back up and running as soon as possible. With a TEDS sensor that automatically provides calibration data to an active signal conditioner, even a technician unfamiliar with calibration procedures can swap sensors quickly without jeopardizing the integrity of system operations..

Plug and Play Inventory Control. Burning location data onto each sensor's TEDS will also help you inventory your sensors.

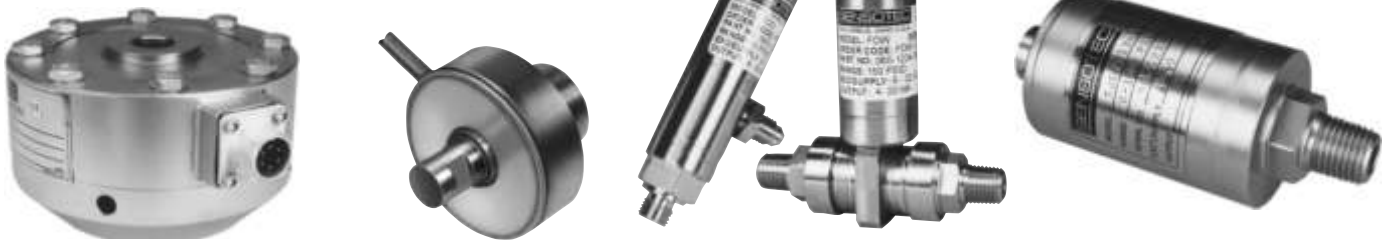
Mix and Match. Wouldn't it be convenient if you could plug sensors from one manufacturer into signal conditioners from another? Plug and play implemented according to 1451.4 makes that mixing and matching possible. All sensors manufactured according to the standard will carry the same basic self-identification information on TEDS formatted in exactly the same way.

1-888-282-9891

Honeywell Sensotec Sensors

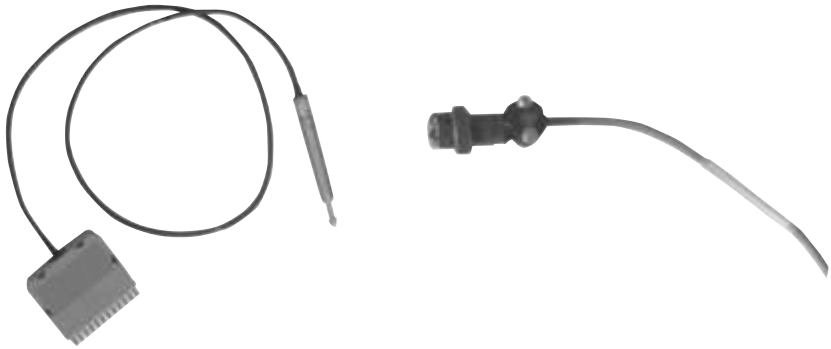
www.honeywell.com/sensing

PLUG AND PLAY SUPPLIED WITH SENSOR



IEEE 1451.4 TEDS sensors are available in all strain gage based sensors with 4 wire unamplified, amplified voltage or current outputs. TEDS uses two wires so a 6 pin connector or 6 wire cable is fitted to these sensors. Miniature sensors require the TEDS chip to be mounted as an in-line module or mounted in the connector. Piezoresistive accelerometers uses 6 wires (4 for the bridge and 2 for TEDS) while IEPE accelerometers use 2 wire TEDS where the digital data is switched onto the 2 wire constant current loop when TEDS data is read.

RETRO-FIT KITS



Sensotec can retrofit your sensors by having them returned to the factory or Sensotec can provide you with retro-fit kits. Three types of retrofit kits can be provided.

1. Connector adapter that extends the sensor connector to house the TEDS chip
2. In line TEDS module that is heat shrunk onto the cable that adds TEDS to 2 of the 6 wires
3. Connector with built-in TEDS that replaces the existing cable connected to the sensor integral cable

VIRTUAL TEDS

For those whose systems are PC-enabled, National Instruments in conjunction with Honeywell Sensotec has developed the concept of Virtual TEDS, whereby sensor calibration data are downloaded directly to your signal conditioning system. National Instruments is becoming a clearinghouse for TEDS gathering calibration data from many sensor manufacturers and posting it on their Web site. In order to download Sensotec TEDS data go to the National Instruments website and by entering Serial Number and Model number binary TEDS data can be downloaded into your software application.

Troubleshooting Guide

Unamplified Transducers

Symptom/Problem	Action/Troubleshooting
No Output	Verify correct wiring Verify excitation per calibration sheet. Make sure pressure, load, etc. is being applied. Check strain gage bridge for continuity per calibration sheet.
Erratic/Intermittent Output or Zero Drift	Check electrical connections for discontinuity or damage. Check for isolation resistance between bridge wiring and transducer body. Make sure pressure, load, etc. is constant. Check stability of excitation power supply. Check millivolt output with volt meter. Check for RFI/EMI interference. Make sure there are no rapid changes in temperature.
Incorrect Output	Check actual input and output resistance against calibration sheet data for possible change or open bridge. Check Zero offset to see if high.
High Zero Offset	Usually indicates transducer was overranged beyond specifications. Overranged transducers should be recalibrated. Check actual input and output resistance measurements against calibration sheet for possible changes or open bridge. Check for possible mechanical preload or damping on transducer body.

Amplified Transducers

Symptom/Problem	Action/Troubleshooting
No Output	Make sure power supply voltage meets transducer requirements. Check wiring connections and wiring code. Check transducer specifications for type of output provided (i.e. voltage, frequency, etc.) Make sure pressure, load, etc. is being applied. Make sure that the output load is not shorted.
Incorrect Zero Level	Check for pre-load on transducer. Adjust zero or balance control. For load cells check mounting fixture bias. For pressure transducers, check for orientation bias.
Erratic/Intermittent Output or Zero Drift	Make sure pressure, load, etc. is constant. Make sure power supply remains within specifications. Check for RFI interference. Make sure there are no rapid changes in temperature. Check electrical connections for discontinuity or damage. Check output with volt meter. Check for insulation resistance between amplifier wiring and transducer shell.
Incorrect Output	Check “shunt” calibration output value against calibration sheet and adjust span control per instructions. Verify that transducer is being operated within its temperature compensated range. Check transducer range on label. Check for insulation resistance between amplifier wiring and transducer shell.

Transducers with Instrument Readout

Symptom/Problem	Action/Troubleshooting
Erratic Display	Check electrical connections for continuity and wiring code for pin layout.
No Display/No Output Voltage	Check powerline fuse per instrument instructions.
Blinking Display	Indicated overload; make sure wires are all connected, and transducer is within its range.
Incorrect Readout Value	Check transducer range on label. Verify that system was set-up per instructions. Review set-up procedure. Refer to transducer troubleshooting guide and verify that transducer operates properly. Use Shunt-Cal to verify calibration.

Worldwide customer support

At Honeywell, products are based upon technology providing you with enhanced quality and reliability. When service is needed, our customer support engineers and service centers are strategically located around the world to provide efficient and responsive support.

Honeywell Sensing and Control designs, manufactures and markets one of the industry's most extensive lines of sensing and control technologies available from a single switch or sensor manufacturer. Honeywell aims to develop the right products that are delivered on time and work right.

Phone and Fax:

Tel: 614-850-5000
Fax: 614-850-1111

E-Mail: sales@sensotec.com

Internet: www.honeywell.com/sensotec

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective.

The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Honeywell
Sensotec Sensors
2080 Arlingate Lane
Columbus, Ohio 43228, USA

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