

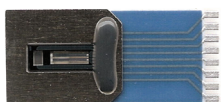
# **SENSORS & TRANSDUCERS CATALOGUE**

# FLOW SENSORS



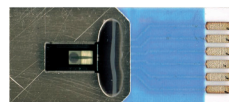
# FLOW SENSORS

## MASS AIR FLOW SENSORS



### LMM-H03

Package	Hybrid
Type	<ul style="list-style-type: none"> <li>Hot film anemometer component</li> <li>Bidirectional</li> </ul>
Operating Temp.	-40°C to 125°C
Unique Features	High sensitivity at low heater temperatures, fast response time, true air temperature sensor
Calibration/Accuracy	Dependent on electronics
Dimensions (mm)	23 x 10.15 x 1.1
Typical Applications	Air intake of combustion engine, spirometer, industrial gas flow



### LMM-H04

Package	Hybrid
Type	<ul style="list-style-type: none"> <li>Hot film anemometer component</li> <li>Unidirectional</li> </ul>
Operating Temp.	-40°C to 125°C
Unique Features	High sensitivity at low heater temperatures, fast response time, true air temperature sensor
Calibration/Accuracy	Dependent on electronics
Dimensions (mm)	24 x 10.15 x 1.1
Typical Applications	Air intake of combustion engine, spirometer, industrial gas flow

## FLOW SWITCHES



### FS-01

Package	Noryl®
Type	Flow switch for direction of liquid and gas flow
Max. Pressure	10 bar at 20°C
Operating Temp.	-30°C to 85°C
Unique Features	Triac, normally open, close on flow
Dimensions (mm)	106 x 32 x 32
Typical Applications	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-02

Package	Noryl®
Type	Flow switch for direction of liquid and gas flow
Max. Pressure	10 bar at 20°C
Operating Temp.	-30°C to 85°C
Unique Features	SPST reed switch, normally open, close on flow
Dimensions (mm)	106 x 32 x 32
Typical Applications	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-05

Package	Brass
Type	Flow switch for direction of liquid and gas flow
Max. Pressure	10 bar at 20°C
Operating Temp.	-30°C to 100°C
Unique Features	Triac, normally open, close on flow
Dimensions (mm)	113 x 53 x 36
Typical Applications	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-06

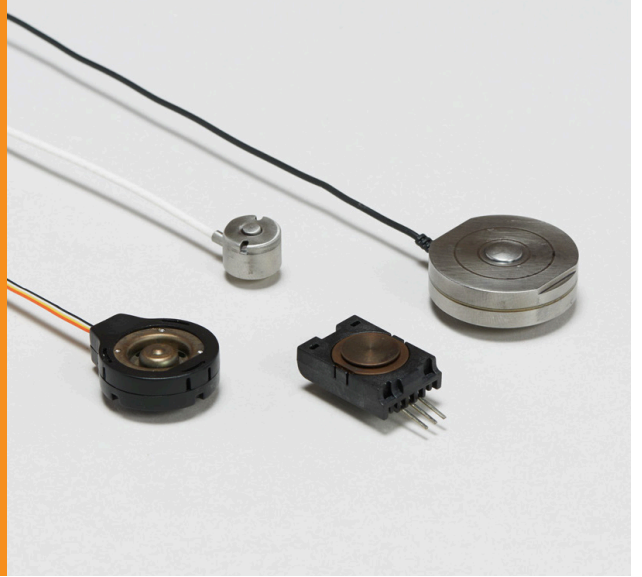
Package	Brass
Type	Flow switch for direction of liquid and gas flow
Max. Pressure	10 bar at 20°C
Operating Temp.	-30°C to 100°C
Unique Features	SPST reed switch, normally open, close on flow
Dimensions (mm)	113 x 53 x 36
Typical Applications	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-90/1

Package	Copper
Type	Flow switch for direction of liquid and gas flow
Max. Pressure	10 bar at 20°C
Operating Temp.	-30°C to 85°C
Unique Features	SPST reed switch, normally open, close on flow
Dimensions (mm)	153 x 25 x 15
Typical Applications	Leak detection, flow sensing, mains water control, cooling systems, circulation pump protection

# FORCE SENSORS





# FORCE SENSORS

## LOAD CELLS

Low Cost OEM



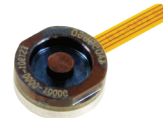
### FX19

Package	Low profile "coin cell" design
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Low cost, low strain design</li> <li>• Essentially unlimited cycle life</li> </ul>
FS Ranges	10 to 200 lbf 50 to 100 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	0°C to 50°C
Dimensions (mm)	Ø25.00 x 8.00
Typical Applications	Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices



### FX29

Package	Welded miniature compression load cell, Analog and Digital options
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Best price to performance</li> <li>• Designed for unlimited cycles and high over-range</li> </ul>
FS Ranges	10 to 100 lbf 50 to 500 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV, 0.5-4.5 VDC, Digital (I <sup>2</sup> C)
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	0°C to 50°C
Dimensions (mm)	Ø19.70 x 4.95
Typical Applications	Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices



### FS19

Package	Stainless steel housing with flexible PCB
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Small size and light weight</li> </ul>
FS Ranges	500 to 3,000 grams-force 5 to 30 Newton
Max. Over-range	2X FS
Output/Span	100 mV
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	0°C to 40°C
Dimensions (mm)	Ø9.5 x 3.45
Typical Applications	Infusion pump, load sensing, contact sensing, weighing, household appliances



### FS20

Package	Miniature, drop in replacement for industry standard
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Load cell design operates at very low strains</li> <li>• Not subject to lead die fatigue</li> </ul>
FS Ranges	500 to 5,000 grams-force 5 to 50 Newton
Max. Over-range	2.5X FS
Output/Span	0.5-4.5 VDC, 1.0-4.0 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	-40°C to 85°C
Dimensions (mm)	30.708 x 17.272 x 8.255
Typical Applications	Infusion pumps, contact sensing, medical devices, consumer appliances



### FC22

Package	Plastic housing, button, flange mounting
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Low cost button shape</li> <li>• Essentially unlimited cycle life</li> </ul>
FS Ranges	10 to 100 lbf 50 to 500 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	-40°C to 85°C
Dimensions (mm)	Ø26.00 x 42.00 x 19.50
Typical Applications	Infusion pumps, robotics end-effectors, exercise machines, contact sensing, appliances



### FC23

Package	Stainless steel housing button shape for higher weight loads
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Industry standard low profile all stainless steel design</li> <li>• Resistant to off-axis loads</li> </ul>
FS Ranges	50 to 2,000 lbf 250 to 1,000 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	-40°C to 85°C
Dimensions (mm)	Ø31.75 x 10.20
Typical Applications	Batch weighing, robotics, assembly line force, printing presses, pumps, winch and hoist

# FORCE SENSORS

## LOAD CELLS

### Standard



	<b>FMT</b>	<b>FN1010</b>	<b>FN2420</b>	<b>FN3000, FN3050</b>	<b>FN3002</b>
<b>Package</b>	Washer	Load pin design	Very high capacity load button	Pan-cake	Very high capacity dual stud
<b>Operating Mode</b>	Compression	Tension and compression	Compression	Tension and compression	Tension and compression
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>• High stiffness</li> <li>• Clamping and bolt forces</li> <li>• High temperature option</li> </ul>	<ul style="list-style-type: none"> <li>• Keyed anti-rotation slot</li> <li>• Bidirectional available</li> <li>• Optional watertight construction</li> </ul>	<ul style="list-style-type: none"> <li>• High stiffness</li> <li>• Optional load button</li> <li>• Optional high level output module</li> </ul>	<ul style="list-style-type: none"> <li>• High stability</li> <li>• All FN3050 have same housing</li> <li>• Optional high level output</li> </ul>	<ul style="list-style-type: none"> <li>• Threaded male fitting</li> <li>• Integrated amplifier</li> <li>• Optional rod end</li> </ul>
<b>FS Ranges</b>	4K to 64K lbf 20K to 320K Newton	2K to 400K lbf 10K to 2,000K Newton	4K to 1000K lbf 20K to 5,000K Newton	20 to 200K lbf 100 to 1,000K Newton	2K to 400K lbf 10K to 2,000K Newton
<b>Max. Over-range</b>	1.5X FS	1.5X FS	1.5X FS	1.5X FS (10X FS with stops)	1.5X FS
<b>Output/Span</b>	±20 mV	±20 mV, 0.5-4.5 VDC, 4-20 mA	±20 mV, 0.5-4.5 VDC	±20 mV, 0.5-4.5 VDC	±20 mV, 0.5-4.5 VDC
<b>Combined Linearity &amp; Hysteresis</b>	±1.5% FS	±1% FS	±0.25% FS	±0.1% FS	±0.25% FS
<b>Operating Temperature</b>	-20°C to 80°C	-20°C to 80°C	-40°C to 150°C	-40°C to 150°C	-40°C to 150°C
<b>Dimensions (mm)</b>	Range dependent	Range dependent	Range dependent	Range dependent	Range dependent
<b>Typical Applications</b>	Robotics, process control, bolt clamping for bridges	Crane monitoring, offshore, load-limited devices	Calibration presses, robotics and effectors, laboratory and research	Static fatigue tests, laboratory and research, robotics	Assembly forces, tool force, offshore



	<b>FN3030</b>	<b>FN3148</b>	<b>FN9620</b>	<b>FN9630, FN9635</b>
<b>Package</b>	S-beam	S-beam with stops	S-beam	Very high accuracy pan-cake
<b>Operating Mode</b>	Tension and compression	Tension and compression	Tension and compression	Tension and compression
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>• Optional rod ends</li> <li>• Optional high level output</li> <li>• Optional high compensation temperature</li> </ul>	<ul style="list-style-type: none"> <li>• Very high accuracy</li> <li>• High resolution</li> <li>• Mechanical stops</li> </ul>	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• IP68</li> <li>• Entry level</li> </ul>	<ul style="list-style-type: none"> <li>• High stability &amp; accuracy</li> <li>• Connection flange supplied for model FN9635</li> <li>• Minimal cross effect</li> </ul>
<b>FS Ranges</b>	10 to 20K lbf 50 to 100K Newton	2 to 400 lbf 10 to 2,000 Newton	100 to 2,000 lbf 500 to 10K Newton	2K to 40K lbf 10K to 200K Newton
<b>Max. Over-range</b>	1.5X FS	5X to 100X FS	1.5X FS	3X FS
<b>Output/Span</b>	±20 mV, 0.5-4.5 VDC	±20 mV, 0.5-4.5 VDC	±10 mV to ±20 mV	±20 mV
<b>Combined Linearity &amp; Hysteresis</b>	±0.1% FS	±0.05% FS	±0.05% FS	±0.08% FS
<b>Operating Temperature</b>	-40°C to 150°C	-40°C to 120°C	-40°C to 90°C	-40°C to 90°C
<b>Dimensions (mm)</b>	Range dependent	Range dependent	56 x 20 x 60	Range dependent
<b>Typical Applications</b>	Laboratory and research, process control, customized options	Product validation tests, medical instruments, weighing	Test bed, dynamic fatigue testing, robotics and effectors	Static fatigue tests, weighing calibration, robotics

# FORCE SENSORS

## FORCE LOAD CELLS

### Miniature Load Cells



	ELAF	XFC200R	XFL212R	XFTC300	XFU400
Package	Button, dual stud	Small diameter load button	Low profile load button	Low/high capacity dual stud	Miniature rod end
Operating Mode	Tension and compression	Compression	Compression	Tension and compression	Tension and compression
Unique Features	<ul style="list-style-type: none"> <li>• Low cost, small profile</li> <li>• Microfuse technology</li> <li>• Low off-axis response</li> </ul>	<ul style="list-style-type: none"> <li>• High stiffness</li> <li>• High overload capacity</li> <li>• Static and dynamic</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely flat</li> <li>• Integrated load button</li> <li>• Small diameter</li> </ul>	<ul style="list-style-type: none"> <li>• High stiffness</li> <li>• High overload capacity</li> <li>• Threaded male/female fitting</li> </ul>	<ul style="list-style-type: none"> <li>• High stiffness</li> <li>• High accuracy</li> <li>• High temperature</li> </ul>
FS Ranges	10 to 2,000 lbf 50 to 10K Newton	0.4 to 2,000 lbf 2 to 10K Newton	1 to 100 lbf 5 to 500 Newton	0.4 to 400 lbf 2 to 2,000 Newton	100 to 1,000 lbf 500 to 5,000 Newton
Max. Over-range	2.5X FS	2X FS	2X FS	2X FS	1.5X FS
Output/Span	±100 mV, 0.5-4.5 VDC	±100 mV	±100 mV	±100 mV, 0.5-4.5 VDC	±100 mV
Combined Linearity & Hysteresis	±0.25% FS	±0.5% FS	±1% FS	±0.5% FS	±0.3% FS
Operating Temperature	-40°C to 120°C	-40°C to 120°C	-40°C to 120°C	-40°C to 150°C	-20°C to 120°C
Dimensions (mm)	Range dependent	Ø10 to Ø16	Ø12.5 x 3.5	Range dependent	Range dependent
Typical Applications	Theatrical rigging loads, assembly forces, weighing, thrust measurements, product validation testing	Material test, measuring tools, robotics and effectors	Dental and biomechanical, surface mount assembly system, production validation test	Material test, tool forces, robotics end effectors	Spherical rod end bearings, engine & suspension testing, machinery equipment

## FORCE LOAD CELLS

### Multiaxial Load Cells



	FN7110	FN7325
Package	Dual S-beam range	Custom design and ranges available upon request
Operating Mode	Tension and compression	Multiaxial force and torque
Unique Features	<ul style="list-style-type: none"> <li>• High resolution</li> <li>• Optional high level output</li> <li>• Double range</li> </ul>	<ul style="list-style-type: none"> <li>• Measures load and torque in 3 directions, 6DOF total</li> <li>• Fatigue rated</li> <li>• Minimal cross effects</li> </ul>
FS Ranges	2 to 2,000 lbf 10 to 10K Newton	1K to 50K lbf 5K to 250K Newton
Max. Over-range	1.2X FS	1.2X FS
Output/Span	±20 mV, 0.5-4.5 VDC	±150 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±0.1% FS	±1% FS
Operating Temperature	-20°C to 80°C	-20°C to 80°C
Dimensions (mm)	60 x 30 x 100	Range dependent
Typical Applications	Process control, assembly forces, weighing, thrust measurements, product validation testing	Structure testing, crash testing, industrial test benches, robotic joints

# FORCE SENSORS

## FORCE LOAD CELLS

Automotive Load Cells



### FN2114

Package	Brake pedal
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• Extra flat</li> <li>• Compact</li> </ul>
FS Ranges	40 to 500 lbf 200 to 2,500 Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	Range dependent
Typical Applications	Brake pedal, clutch pedal, test bed



### FN2317

Package	Hand brake
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• Easily installed</li> <li>• Ergonomic design</li> <li>• Fits most vehicles</li> </ul>
FS Ranges	100 to 200 lbf 500 to 1,000 Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±0.5% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	100 x 20 x 15
Typical Applications	Hand brake, test bed



### FN2570

Package	Brake pedal
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• Compact and extra flat</li> <li>• Rugged, stainless steel design</li> </ul>
FS Ranges	40 to 500 lbf 200 to 2,500 Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV
Combined Linearity & Hysteresis	±2.5% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	59 x 59 x 12.5
Typical Applications	Brake pedal, clutch pedal, test bed



### FN4055

Package	Seat belt sensor
Operating Mode	Tension
Unique Features	<ul style="list-style-type: none"> <li>• Low operating ranges</li> <li>• Protected against overload</li> <li>• Compatible with most seat belts</li> </ul>
FS Ranges	20 to 60 lbf 100 to 300 Newton
Max. Over-range	10X FS
Output/Span	±20 mV
Combined Linearity & Hysteresis	±0.25% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	63.5 x 63.5 x 12.7
Typical Applications	Auto crash testing, tension at the belt receptacle



### FN4070 & FN4080

Package	Seat belt buckle sensor
Operating Mode	Tension
Unique Features	<ul style="list-style-type: none"> <li>• High operating ranges</li> <li>• Detachable tongue and cable</li> <li>• Compatible with most seat belts</li> </ul>
FS Ranges	200 to 8,000 lbf 1K to 40K Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV
Combined Linearity & Hysteresis	±0.5% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	Range dependent
Typical Applications	Auto crash testing, tension at the belt receptacle



### FN7080

Package	Gear stick design
Operating Mode	Multi-axial
Unique Features	<ul style="list-style-type: none"> <li>• Measures force in three directions</li> <li>• Replaces gear knob</li> <li>• Ease of mounting</li> </ul>
FS Ranges	40 to 100 lbf 200 to 500 Newton
Max. Over-range	1.2X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	< ±0.3% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	Ø25 spherical
Typical Applications	Change gear force measurement, roughness of material



### EL20-S458

Package	Special purpose seat belt load cell for automotive crash testing
Operating Mode	Seat belt tension
Unique Features	<ul style="list-style-type: none"> <li>• Mass optimized to minimize acceleration induced errors during SAE J2570 ATD and ISO 6487</li> <li>• Optional high level and linearized outputs</li> <li>• Smoothed design and slotted titanium axles eliminate drag errors and dummy damage</li> </ul>
FS Ranges	1,000 to 5,000 lbf 5K to 25K Newton
Max. Over-range	2X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±0.5% FS
Operating Temperature	-40°C to 120°C
Dimensions (mm)	66 x 35 x 16.5
Typical Applications	Seat belt forces, safety and restraint system crash test, parachute tether and riser forces

# FORCE SENSORS

## FORCE LOAD CELLS

Digital Display Meters



### ARD154

Package	Din rail mountable
Type	Signal conditioning for wheatstone bridge sensors
No. of Channels	Four
Unique Features	<ul style="list-style-type: none"> <li>• Suited for full bridge strain gage sensors</li> <li>• Test stands and process industries</li> <li>• 2 kHz or 20 kHz max. bandwidth</li> </ul>
Output/Span	±10 VDC or 4-20 mA current output
Accuracy	±0.01% FS
Operating Temperature	-10°C to 60°C
Dimensions (mm)	99 x 17.5 x 112
Typical Applications	Test stands, power plants, manufacturing systems, test and measurement, test bed regulation, automat interfaces



### CPA150

Hand held indicator
Portable display suited for strain gage type sensors
Two
<ul style="list-style-type: none"> <li>• Suited for 1 or 2 sensors</li> <li>• 45 hour life battery</li> <li>• Calibration pushbutton from 0.1 to 10 mV/V</li> </ul>
Display only
±0.005% FS
-10°C to 50°C
90 x 34 x 152
Outdoor punctual measurements, test and measurement, portable calibration device



### M210

Front panel or housed in case
Signal conditioning and display meter
One
<ul style="list-style-type: none"> <li>• Red LED display: ±2,000 count</li> <li>• High bandwidth: 1,000 Hz at -3 dB</li> <li>• Low noise level</li> </ul>
±10 VDC
±0.05% FS
0°C to 50°C
96 x 48 x 155
High bandwidth test bed display, monitoring, laboratory and research, process control equipment



### M905

Package	Front panel or housed in case
Type	Display suited for process or strain gage type sensors
No. of Channels	One
Unique Features	<ul style="list-style-type: none"> <li>• Suited for process or strain gage type sensors</li> <li>• 5 digits: -19999 to 19999</li> <li>• Front panel programming</li> </ul>
Output/Span	±10 VDC or 4-20 mA current output
Accuracy	±15 bits, 20 sample/sec
Operating Temperature	-10°C to 60°C
Dimensions (mm)	96 x 48 x 60
Typical Applications	Display on test bed, monitoring, laboratory and research



### 121

Bench top
DC amplifier and signal conditioner
Three
<ul style="list-style-type: none"> <li>• 0.001 to 9999</li> <li>• Low noise operation with auto-zero</li> <li>• For bridge type sensors</li> <li>• µP controlled, programmable</li> <li>• Low pass filter options</li> </ul>
±10 VDC
±0.1% FS
0°C to 50°C
301 x 258 x 102
Instrumentation labs, test benches, R&D facilities



### 140A / 142A

Inline amplifier
DC amplifier and auto-zero
one
<ul style="list-style-type: none"> <li>• ±1.5 mV auto-zero</li> <li>• For bridge type sensor (140A)</li> <li>• For strain gage (142A)</li> <li>• x10, x25, x50, x100, x200 gain</li> <li>• 5 to 30 VDC excitation</li> </ul>
0.5-4.5 VDC, ref to 2.5 VDC
±0.5% FS
-10°C to 50°C
56.9 x 25.4 x 12.7
Instrumentation labs, test benches, R&D facilities

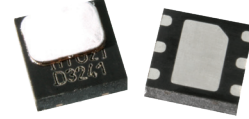
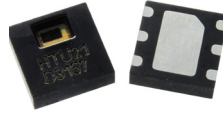
# HUMIDITY SENSORS



# HUMIDITY SENSORS

## HUMIDITY AND TEMPERATURE (NTC) COMPONENTS

Analog Voltage and Digital Output



	HS1101LF	HTU2X	HTU2XF
Package	Through hole TO39 with side opening plastic cap	DFN type	DFN type
Type	Capacitive humidity	Digital RH and NTC temperature	Digital RH and NTC temperature
Operating RH Range	0 to 100% RH	0 to 100% RH	0 to 100% RH
Operating Temp.	-60°C to 140°C	-40°C to 125°C	-40°C to 125°C
Unique Features	<ul style="list-style-type: none"> <li>• Robust and recognized component</li> <li>• Suitable for most humidity applications</li> <li>• Cost effective solution</li> </ul>	<ul style="list-style-type: none"> <li>• Low power consumption</li> <li>• Fast response time</li> <li>• Very low temperature coefficient</li> <li>• I<sup>2</sup>C interface or PWM interface or SDM interface</li> </ul>	<ul style="list-style-type: none"> <li>• Low power consumption</li> <li>• Fast response time</li> <li>• Very low temperature coefficient</li> <li>• I<sup>2</sup>C interface or PWM interface or SDM interface</li> <li>• Optimal filter</li> </ul>
Accuracy	180 pF, ±3 pF at 55% RH	±3% RH at 25°C (10 to 95% RH) ±0.3°C at 25°C	±3% RH at 25°C (10 to 95% RH) ±0.3°C at 25°C
Dimensions (mm)	10 x 10 x 19	3.0 x 3.0 x 1.0	3.0 x 3.0 x 1.0
Typical Applications	Applications requiring a robust humidity sensor in appliance, HVACR, consumer electronics, printing, meteorology	Humidity and temperature plug and play transducers for OEM demanding applications in appliance, printer, medical, HVACR	Humidity and temperature plug and play transducers for OEM demanding applications in appliance, printer, medical, HVACR

## HUMIDITY AND TEMPERATURE (NTC) MINI-MODULES

Analog Voltage and Digital Output



	HTU3535PVBW/Wire	HTU383X/Wire	HTG351xCH
Package	Cost effective, small size mini-module	Cost effective small size mini-module	Cost effective small size mini-module
Type	Analog voltage RH and NTC temperature	Digital RH and NTC temperature	Analog voltage RH and NTC temperature
Operating RH Range	0 to 100% RH	0 to 100% RH	0 to 100% RH
Operating Temp.	-40°C to 110°C	-40°C to 110°C	-40°C to 110°C
Unique Features	<ul style="list-style-type: none"> <li>• PTFE filter (Optional)</li> <li>• Electronics fully protected (5 V)</li> <li>• Multiple connector choices (JST, Samtec board to board through hole)</li> <li>• Based on HTU21</li> </ul>	<ul style="list-style-type: none"> <li>• PTFE filter (Optional)</li> <li>• Electronics fully protected (5 V)</li> <li>• Multiple connector choices (JST, Samtec board to board through hole)</li> <li>• Based on HTU21</li> </ul>	<ul style="list-style-type: none"> <li>• Electronics fully protected with potting material (3.3 V or 5 V)</li> <li>• Multiple connector choices (JST, Samtec board to board through hole)</li> </ul>
Calibration	±3% RH at 55% RH; ±0.25°C at 25°C	±3% RH at 55% RH; ±0.25°C at 25°C	±3% RH at 55% RH; ±0.25°C at 25°C
Dimensions (mm)	27 x 11.9 x YY (Depending on the connector, from 6 to 10.8 mm length)	27 x 11.9 x YY (Depending on the connector, from 6 to 10.8 mm length)	27 x 11.9 x 6.7
Typical Applications	Humidity and temperature plug and play transducers for OEM demanding applications in HVACR, home appliance, printer and medical	Humidity and temperature plug and play transducers for OEM demanding applications in HVACR, home appliance, printer and medical	Humidity and temperature plug and play transducers for OEM applications in HVACR, appliance, printer and medical

# HUMIDITY SENSORS

## HUMIDITY AND TEMPERATURE (NTC) PROBES

Analog Output



### HM1500LF

Package	Probe, RH only
Type	Cost effective analog voltage RH probe
Operating RH Range	0 to 100% RH
Operating Temp.	-40°C to 60°C
Unique Features	<ul style="list-style-type: none"><li>• Electronics fully protected with potting material</li><li>• Optional wiring length and connectors</li></ul>
Calibration	±3% RH at 55% RH
Dimensions (mm)	57 x 11 x 11 (Standard wire length of 200 mm)
Typical Applications	Medical, telecommunication cabinets, green houses, process control, industrial



### HM1520LF

Package	Probe, RH only
Type	Dedicated to low RH accurate measurement
Operating RH Range	0 to 100% RH
Operating Temp.	-40°C to 60°C
Unique Features	<ul style="list-style-type: none"><li>• Electronics fully protected with potting material</li><li>• Optional wiring length and connectors</li></ul>
Calibration	±3% RH at 10% RH
Dimensions (mm)	57 x 11.5 x 11.5 (Standard wire length of 200 mm)
Typical Applications	Medical, drying cabinets, low humidity, meteorology

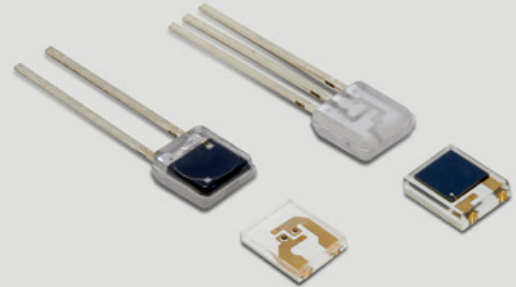


### HTM2500LF

Package	Probe, RH and temperature
Type	Cost effective analog voltage RH
Operating RH Range	0 to 100% RH
Operating Temp.	-40°C to 85°C
Unique Features	<ul style="list-style-type: none"><li>• Electronics fully protected with potting material</li><li>• Optional wiring length and connectors</li></ul>
Calibration	±3% RH at 55% RH; ±0.25°C at 25°C
Dimensions (mm)	86 x 11.5 x 11.5 (Standard wire length of 200 mm)
Typical Applications	Hygrostat, data loggers, cabinets



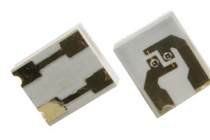
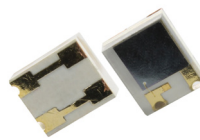
# PHOTO OPTIC SENSORS



# PHOTO OPTIC SENSORS

## PHOTO OPTIC SENSORS

### Photo Optic Components



	<b>ELM-4000</b>	<b>EPM-4001</b>	<b>ELM-5000</b>	<b>EPM-5000</b>
<b>Package</b>	Lead frame	Lead frame	Surface mount	Surface mount
<b>Type</b>	Emitter assembly	Detector assembly	Emitter assembly	Detector assembly
<b>Range</b>	660 nm / 880-940 nm	—	660 nm / 890-905 nm	—
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Dual drive</li> <li>• Clear epoxy lens</li> </ul>	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Fast response</li> <li>• High efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Reflow solderable</li> <li>• Dual drive</li> <li>• Clear epoxy lens</li> </ul>	<ul style="list-style-type: none"> <li>• Reflow solderable</li> <li>• Fast response</li> <li>• High efficiency</li> </ul>
<b>Accuracy</b>	Sensor dependent	Sensor dependent	Sensor dependent	Sensor dependent
<b>Operating Temp.</b>	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C
<b>Dimensions (mm)</b>	4.4 x 5.1 x 1.9	4.4 x 5.1 x 1.8	4.0 x 4.8 x 1.3	4.0 x 4.8 x 1.3
<b>Typical Applications</b>	Pulse oximetry, finger and ear probes, disposable	Pulse oximetry, finger and ear probes, disposable	Pulse oximetry, finger and ear probes, disposable	Pulse oximetry, finger and ear probes, disposable

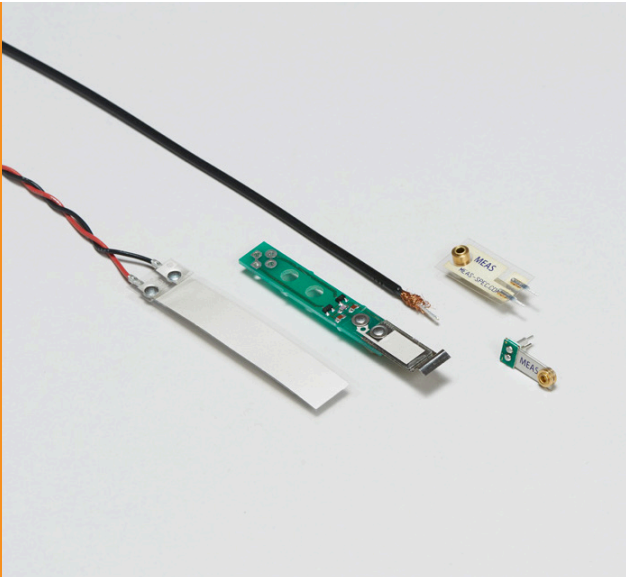
## PHOTO OPTIC SENSORS

### Pulse Oximetry (SpO<sub>2</sub>) Probe Platforms



	<b>Disposable Sensor</b>	<b>Finger Clip Sensor</b>	<b>Soft Sensor</b>
<b>Package</b>	Biocompatible	Biocompatible	Silicon boot
<b>Type</b>	Sensor platform	Sensor platform	Sensor platform
<b>Range</b>	Adult/neonatal	Adult	Adult/pediatric
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>• Latex free</li> <li>• Lightweight</li> <li>• Microfoam/cloth</li> </ul>	<ul style="list-style-type: none"> <li>• Soft pads</li> <li>• Lightweight</li> <li>• Easily cleaned</li> </ul>	<ul style="list-style-type: none"> <li>• Ease of use</li> <li>• Lightweight</li> <li>• Latex free</li> </ul>
<b>Accuracy</b>	Sensor dependent	Sensor dependent	Sensor dependent
<b>Operating Temp.</b>	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C
<b>Typical Applications</b>	Pulse oximetry	Pulse oximetry	Pulse oximetry

# PIEZO FILM SENSORS



## PIEZO FILM



	DT1, SDT1	Piezo Cable	CM-01	FLDT1
Package	Unshielded element with twisted pair or shielded element with shielded cable	Shielded coaxial 20 gage piezo cable	Metallized plastic housing	Unshielded film element with screen printed leads
Type	Flexible film, adhesive mount	Polymer jacketing, armored jacketing	Contact microphone	Flexible film, adhesive mount
Range	15 mV/ $\mu\epsilon$ up to 1% strain	$\mu\text{Pa}$ sensitivity	40 V/mm; 8 Hz to 2.2 kHz	15 mV/ $\mu\epsilon$ , up to 1% strain
Unique Features	<ul style="list-style-type: none"><li>Thin, flexible, robust</li><li>Withstands &gt;2% strain</li><li>Ultra-low power (Self generating)</li></ul>	<ul style="list-style-type: none"><li>Continuous lengths of up to 1 km</li><li>Shielded construction</li></ul>	<ul style="list-style-type: none"><li>Low noise</li><li>Shielded construction</li><li>High sensitivity</li></ul>	<ul style="list-style-type: none"><li>Thin, flexible</li><li>Leads screen printed on film</li><li>Connects to standard connector</li></ul>
Accuracy	$\pm 20\%$ (Typical)	$\pm 20\%$ (Typical)	—	$\pm 20\%$ (Typical)
Operating Temp.	-40°C to 70°C (Higher available custom)	-40°C to 85°C	5°C to 60°C	-40°C to 70°C; (Higher available custom)
Dimensions (mm)	Application dependent	$\varnothing 3$ (Continuous lengths)	$\varnothing 18 \times 11$ high	12 x 30 active; (Custom available)
Typical Applications	Dynamic strain gage, contact microphone, acoustic pickup	Perimeter and fence security, geophone, impact sensors, intrusion detection, seat occupancy (e.g. airbag), patient bed vital signs monitor	Electronic stethoscope, contact microphone, vibration	Event timing, dynamic strain, motion detection

# PIEZO FILM SENSORS

## PIEZO FILM



### Sleep Monitor Strip

Package	Unshielded element with crimps
Type	Flexible film, adhesive mount
Range	15 mV/ $\mu\epsilon$ up to 1% strain
Unique Features	<ul style="list-style-type: none"> <li>Thin, flexible, robust</li> <li>Withstands &gt;2% strain</li> <li>Ultra-low power (Self generating)</li> </ul>
Accuracy	$\pm 20\%$ (Typical)
Operating Temp.	-40°C to 70°C (Higher available custom)
Dimensions (mm)	28 $\mu\text{m}$ PVDF; 8mm x 800mm
Typical Applications	Respiration and heart beat monitoring for mattress or seat



### BL Traffic Sensor

Center Core: 16 gage copper wire Piezoelectric Material: Piezoelectric film cable Outer Sheath: 0.016" thick brass
Spiral wrapped PVDF piezo film cable
15 mV/ $\mu\epsilon$ up to 1% strain
<ul style="list-style-type: none"> <li>Flexible, durable, available in many lengths</li> <li>Withstands &gt;2% strain</li> <li>Ultra-low power (Self generating)</li> </ul>
$\pm 20\%$ (Typical)
-40°C to 70°C (Higher available custom)
0.260" wide x 0.063" thick; 0.005"
Traffic counting, classifying, toll booths, speed detection, red light cameras



### Laboratory Amplifier

Bench top
Piezo film lab amp
0.1 Hz to 100 kHz
<ul style="list-style-type: none"> <li>Voltage or charge mode settings</li> <li>Multi-pole high-pass and low-pass filters</li> <li>Adjustable gain</li> </ul>
Application dependent
0°C to 40°C
150 x 100 x 100
Low frequency dynamic strain, pyroelectric signals, machine vibration, piezo cable and traffic sensor interface



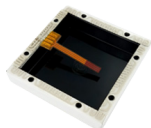
### 80 KHz Transducers

Pin mounted
Air ultrasound transducer
80 kHz
<ul style="list-style-type: none"> <li>Small size</li> <li>Low mechanical Q</li> <li>Shielded package</li> </ul>
Application dependent
-20°C to 80°C
$\varnothing 6 \times 9$
Air ranging, ultrasonic mouse, digitizers



### NDT-1

Package	Adhesive mounted
Type	High frequency ultrasound transducer
Range	3 MHz
Unique Features	<ul style="list-style-type: none"> <li>Flexible</li> <li>High bandwidth, low Q</li> <li>Low impedance</li> </ul>
Accuracy	Application dependent
Operating Temp.	-20°C to 60°C
Dimensions (mm)	12 x 30
Typical Applications	Thickness measurement, speed of sound measurement, pulse/echo NDT



### Tammer Box

Flat film or box mounted
Tamper detection sensor
Application dependent
<ul style="list-style-type: none"> <li>Low power</li> <li>Custom shapes and sizes</li> <li>High security</li> </ul>
Application dependent
-40°C to 85°C
Application dependent
Encryption modules, POS card readers, PIN entry devices



### ACH-01

Ceramic base, plastic cover, shielded cable
Adhesive mount
$\pm 250$ g (Typical)
<ul style="list-style-type: none"> <li>Extremely high bandwidth</li> <li>Low cost</li> <li>Ultra-low power</li> </ul>
$\pm 20\%$ (Typical)
-40°C to 85°C
18.80 x 13.21 x 6.10
Vibration sensing, gear box and high speed monitoring, high speed bearings and centrifuges, speaker motional feedback



### LDTC Family

Piezo film elements with or without mass
Cantilever beam with vertical or horizontal pins
$\pm 10$ g (Typical)
<ul style="list-style-type: none"> <li>Very low cost</li> <li>High sensitivity (1 V/g)</li> <li>Ultra-low power (Self generating)</li> </ul>
$\pm 20\%$ (Typical)
-40°C to 70°C
19.05 x 6.35 x 6.35
Wake-up switch, load imbalance, antitheft devices, impact sensing, vital signs monitoring

# POSITION SENSORS



# POSITION SENSORS

## ANISOTROPIC MAGNETORESISTIVE (AMR) SENSOR COMPONENTS

Magnetoresistive (MR)



### KMY, KMZ

Package	SOT-223, E-line 4 pin
Type	Linear low field sensor
Range	-2 to 2 kA/m magnetic field
Unique Features	<ul style="list-style-type: none"> <li>• High sensitivity</li> <li>• Low hysteresis</li> <li>• Linear to uniaxial field strength</li> </ul>
Output	Ratiometric with output voltage range 20 mV/V
Resolution	Typ. 0.1% of range
Accuracy	Typ. 1.0% of range
Operating Temp.	-40°C to 150°C
Dimensions (mm)	SOT: 6.6 x 7.0 x 1.6 E-line: 16 x 4.2 x 2.4
Typical Applications	Non-destructive material testing, spray arm detection in dish washers, magnetic imaging, brake pedal position



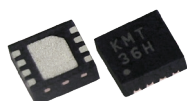
### MS32

Package	TDFN
Type	Low field switch sensor
Range	1 to 3 kA/m magnetic switching field
Unique Features	<ul style="list-style-type: none"> <li>• Linearized ratiometric output</li> <li>• Temperature compensated switching point</li> </ul>
Output	Ratiometric with output voltage range 10 mV/V
Resolution	Typ. 0.1 kA/m
Accuracy	Typ. 0.1 kA/m
Operating Temp.	-25°C to 85°C
Dimensions (mm)	TDFN: 2.5 x 2.5 x 0.8
Typical Applications	Piston position switch, reed switch replacement



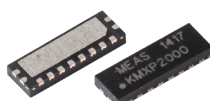
### KMT39 (Former 32B), KMT37

Package	TDFN
Type	Angle sensor
Range	180° angle
Unique Features	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• High resolution</li> </ul>
Output	Sine and cosine signals with output voltage range 20 mV/V
Resolution	Typ. 0.01° to 0.1°
Accuracy	Typ. 0.1° to 1.0°
Operating Temp.	-40°C to 150°C (175°C on request)
Dimensions (mm)	TDFN: 2.5 x 2.5 x 0.8 SO-8: 5 x 4 x 1.75
Typical Applications	Steering position, flow meters, rpm meters, rotary encoders



### KMT36H

Package	TDFN 2.5 x 2.5
Type	Angle sensor
Range	360° angle
Unique Features	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• High resolution</li> <li>• 360° full turn</li> </ul>
Output	Three 120° phase shifted output signals with output voltage range 20 mV/V
Resolution	Typ. 0.01° to 0.1°
Accuracy	Typ. 0.1° to 1°
Operating Temp.	-40°C to 150°C
Dimensions (mm)	TDFN: 2.5 x 2.5 x 0.8
Typical Applications	Steering position, gage readings, rotary encoders



### KMXP

Package	DFN 2 x 6
Type	Linear displacement sensor, 3 flat and 3 perpendicular versions
Range	Absolute within magnetic pole pitch, else incremental
Unique Features	<ul style="list-style-type: none"> <li>• For pole pitch</li> <li>• KMXP 1000: p= 1 mm</li> <li>• KMXP 2000: p= 2 mm</li> <li>• KMXP 5000: p= 5 mm</li> </ul>
Output	Sine and cosine signals with output voltage range 20 mV/V
Resolution	0.01% to 0.1% of pole pitch
Accuracy	0.1% to 1.0% of pole pitch
Operating Temp.	-40°C to 125°C
Dimensions (mm)	DFN: 2 x 6 x 0.8
Typical Applications	Roller conveyors, circular saws, bending machines



### KMA36

Package	TSSOP
Type	Angle sensor with digital output
Range	360° angle
Unique Features	<ul style="list-style-type: none"> <li>• Low cost MR encoder for rotational and incremental measurements</li> <li>• Digital output</li> </ul>
Output	Analog and I <sup>2</sup> C Digital
Resolution	Typ. 0.1°
Accuracy	Typ. 0.3°
Operating Temp.	-25°C to 85°C
Dimensions (mm)	TSSOP20: 6.5 x 6.4 x 1.2
Typical Applications	Knobs, small robotics, angular/linear position

# POSITION SENSORS

## ANGULAR POSITION TRANSDUCERS—INDUCTIVE

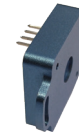
Absolute



	<b>RVIT-Z</b>	<b>R60D</b>	<b>R30A</b>
Package	PCB for OEM volumes	Servo mount with ball bearing	Servo mount with ball bearing
Resolution	Infinite	Infinite	Infinite
Excitation	DC voltage	DC symmetrical $\pm 15$ VDC	AC operated
Output	DC voltage, DC current, digital	$\pm 7.5$ VDC	AC voltage
Range	Up to $\pm 75^\circ$	$\pm 60^\circ$	$\pm 30^\circ$ to $\pm 60^\circ$
Unique Features	<ul style="list-style-type: none"> <li>Absolute position</li> </ul>	<ul style="list-style-type: none"> <li>Absolute position</li> <li>Low momentum of inertia</li> </ul>	<ul style="list-style-type: none"> <li>Absolute position</li> </ul>
Operating Temp.	-25°C to 85°C	-25°C to 85°C	-55°C to 150°C
Dimensions (mm)	Custom	Aluminum case size 11 ( $\varnothing 27$ mm)	Aluminum case size 11 ( $\varnothing 27$ mm)
Typical Applications	Viscometers, valve position, robotics, HVACR vane position, ATM's, joysticks	Dancer arm position, rotary actuator position feedback, throttle lever position feedback, ball valve position, textile manufacturing equipment, printing presses	Machine tool equipment, rotary actuator feedback, valve positioning, power generation valve position

## ANGULAR POSITION—ENCODERS

Absolute



	<b>H005, H009</b>	<b>H009, 1200</b> Dual Output	<b>R36</b>
Package	<ul style="list-style-type: none"> <li>12.7 mm - 22.19 mm/500 in - .875 in housing diameter</li> <li>3.170 mm/.1248 in shaft diameter</li> <li>16.9 mm - 17.4 mm/.670 in - .680 in housing length</li> </ul>	<ul style="list-style-type: none"> <li>22.23 mm/.875 in housing diameter</li> <li>3.170 mm/.1248 in shaft diameter</li> <li>26.1 mm/1.03 in housing length</li> </ul>	Heavy duty shaftless
Range	Up to 359°	Up to 359° (Dual output)	180°
Output Options	Analog/PWM/Serial	Analog/PWM/Serial	Voltage
Resolution	12-bit analog/PWM 14-bit serial (SPI)	12-bit analog/PWM 14-bit serial (SPI)	Analog 1.4°
Excitation	—	—	5 VDC
Unique Features	—	—	<ul style="list-style-type: none"> <li>Rugged housing</li> <li>Shaftless</li> <li>No optical degradation</li> </ul>
Absolute Linearity	$\pm 0.2\%$	$\pm 0.2\%$ (Dual output)	—
Nominal Supply	5 volts	5 volts (Dual output)	—
Operating Temp.	-40°C to 150°C	-40°C to 150°C	-40°C to 85°C
Rotational Life	> 100 million cycles (Bearing life)	> 100 million cycles (Bearing life)	—
Dimensions (mm)			37.36 x 25.4 x 7.62
Typical Applications	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets	Feedback sensor or human machine interface device, rudder control, servomotor position and speed control

# POSITION SENSORS

## TILT SENSORS

Single Axis



### E-Series

Package	Ceramic housing
Type	Inclination sensor module
Range	±5°, ±15°
Output	Voltage
Unique Features	<ul style="list-style-type: none"><li>• Easy to handle</li><li>• Minimal temperature drift</li><li>• Good long term stability</li></ul>
Accuracy	±0.2° to ±0.5°
Operating Temp.	-25°C to 85°C
Dimensions (mm)	29 x 17 x 16.5
Typical Applications	Road construction, building monitoring, weighing systems, mobile and stationary cranes, platform leveling



### AccuStar EA

LCP housing
Inclinometer sensor module
±45° to ±60°
Voltage
<ul style="list-style-type: none"><li>• Compact</li><li>• Low power</li><li>• Vertical and horizontal mount</li></ul>
0° to 10° ±0.1% accuracy 10° to 60° ±0.75% reading
-30°C to 65°C
65.91 x 51.56 x 30.5
Wheel alignment, construction, equipment, antenna positioning, robotics, crane/boom angle



### APS System

Plastic housing
Inclination system
±45°, ±90°
Analog/digital
<ul style="list-style-type: none"><li>• Stand alone system</li><li>• Separate system and sensor</li></ul>
0° to 10° ±0.1% accuracy 10° to 45° ±0.75% of reading
-25°C to 65°C
127.5 x 88 x 32.2
Tower crane safety, RV and mobile trailer leveling, water and oil well drilling rigs, mining equipment



# POSITION SENSORS

## TILT SENSORS

Single Axis



	G-Series	IT9000	AccuStar IP66
Package	Aluminum housing IP67	Aluminum or stainless	Aluminum housing IP66
Type	Inclinometer	Inclinometer	Inclinometer
Range	$\pm 10^\circ$	$\pm 45^\circ$ to $\pm 240^\circ$	$\pm 3^\circ$ to $\pm 45^\circ$
Output	Switch	Voltage divider, 4 - 20 mA	Current
Unique Features	<ul style="list-style-type: none"> <li>• Programmable</li> <li>• EMC standard</li> <li>• High switch accuracy</li> </ul>	<ul style="list-style-type: none"> <li>• Rugged industrial design, IP67/68</li> <li>• Submersible</li> <li>• Designed for brutal environments</li> <li>• CSA, CENELEC certification for hazardous area applications</li> </ul>	<ul style="list-style-type: none"> <li>• EMI and RFI rated</li> <li>• CE pending</li> <li>• Water tight enclosure</li> </ul>
Accuracy	$\pm 0.25^\circ$	$\pm 1\%$	0° to 10° $\pm 0.1\%$ linearity 10° to 45° $\pm 1\%$ linearity
Operating Temp.	-25°C to 85°C	-34°C to 90°C	-25°C to 60°C
Dimensions (mm)	80 x 75 x 57.5	$\varnothing 130 \times 100$	98.04 x 63 x 35.05
Typical Applications	Lift platforms, building device control, train inclination monitoring, position switch	Waste water control, tainter gates, draw bridges, heavy industrial applications	Tower crane safety, RV and mobile trailer leveling, water and oil well drilling rigs, mining equipment

## TILT SENSORS

Dual Axis



	DPL, DPN	DOG2	DPG	D-Series
Package	PCB board	Plastic PA 6.6 housing, IP67	Aluminum housing IP67	Aluminum housing IP67
Type	Inclination board module	Inclinometer	Inclinometer	Inclinometer
Range	$\pm 2^\circ$ to $\pm 30^\circ$	$\pm 25^\circ$ , $\pm 45^\circ$ , $\pm 90^\circ$	$\pm 5^\circ$ to $\pm 30^\circ$	$\pm 5^\circ$ to $\pm 30^\circ$
Output	Voltage/RS 232/SPI	Voltage/Current/J1939/CANopen®	RS232/Voltage	RS232/Voltage/Current/Switch/PWM/CANopen®
Unique Features	<ul style="list-style-type: none"> <li>• High resolution</li> <li>• Minimal temperature drift</li> <li>• User configurable</li> </ul>	<ul style="list-style-type: none"> <li>• Plug and play</li> <li>• Wide measurement range</li> <li>• Cost-efficient</li> <li>• Cable with connector</li> <li>• Fast MEMS sensor</li> </ul>	<ul style="list-style-type: none"> <li>• CE approved</li> <li>• Rugged housing</li> <li>• Easy to use</li> <li>• User configurable</li> </ul>	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• Rugged housing</li> <li>• Programmable</li> <li>• CE approved</li> </ul>
Accuracy	$\pm 0.05^\circ$ to $\pm 0.8^\circ$	$\pm 0.5^\circ$ (Full temp. range)	$\pm 0.05^\circ$ to $\pm 0.3^\circ$	$\pm 0.04^\circ$ to $\pm 0.8^\circ$
Operating Temp.	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Dimensions (mm)	45 x 45 x 20	70.5 x 45 x 15	84 x 70 x 34.2	84 x 70 x 46
Typical Applications	Laser leveling, weighing systems, mobile and stationary cranes, hydraulic leveling, building monitoring, wind power	Off road vehicle, fork lift, truck leveling, man lift, harvester, farm machine, tip over protection, solar panel control	Platform leveling, road construction machines, tunnel drilling, mobile leveling	Drilling machines, mobile and stationary cranes, wind power, antenna/radar leveling

# POSITION SENSORS

## PROXIMITY SENSORS



### PS801

Stainless steel

- Proximity sensor
- Used with proximity magnet

SPST reed switch, normally open

-30°C to 120°C

Ø12 x 65

Door interlocks, hook switches, security systems, safety interlocks, position indication



### PS811

Nylon 6.6

- Proximity sensor
- Used with proximity magnet

SPST reed switch, normally open

-30°C to 110°C

Ø10 x 38

Door interlocks, hook switches, security systems, safety interlocks, position indication



### PS831

Stainless steel

- Proximity sensor
- Used with proximity magnet

SPST reed switch, normally open

-30°C to 130°C

Ø12 x 32

Door interlocks, hook switches, security systems, safety interlocks, position indication



### PS2011AB

Glass filled nylon 6.6

- Proximity sensor
- Used with proximity magnet

SPST reed switch, normally open

-30°C to 105°C

29 x 7 x 20

Door interlocks, hook switches, security systems, safety interlocks, position indication



### PS2021AB

Glass filled nylon 6.6

- Proximity sensor
- Used with proximity magnet

SPST reed switch, normally closed

-30°C to 105°C

29 x 7 x 20

Door interlocks, hook switches, security systems, safety interlocks, position indication



### PS2031AB

Glass filled nylon 6.6

- Proximity sensor
- Used with proximity magnet

SPDT reed switch

-30°C to 105°C

29 x 7 x 20

Door interlocks, hook switches, security systems, safety interlocks, position indication



### PS501

Glass filled nylon 6.6

- Proximity sensor
- Used with proximity magnet

SPST reed switch, normally open

-30°C to 130°C

Ø6 x 32

Door interlocks, hook switches, security systems, safety interlocks, position indication

# POSITION SENSORS

## PROXIMITY MAGNET



	PM101	PM50	PM81	PM83
Package	Glass filled nylon 6.6	Glass filled nylon 6.6	Nylon 6.6	Stainless steel
Type	<ul style="list-style-type: none"> <li>Proximity magnet</li> <li>Used with proximity sensor</li> </ul>	<ul style="list-style-type: none"> <li>Proximity magnet</li> <li>Used with proximity sensor</li> </ul>	<ul style="list-style-type: none"> <li>Proximity magnet</li> <li>Used with proximity sensor</li> </ul>	<ul style="list-style-type: none"> <li>Proximity magnet</li> <li>Used with proximity sensor</li> </ul>
Unique Features	Housed magnet	Housed magnet	Housed magnet	Housed magnet
Operating Temp.	-30°C to 105°C	-30°C to 70°C	-30°C to 120°C	-30°C to 120°C
Dimensions (mm)	29 x 7 x 20	Ø6 x 32	Ø10 x 38	Ø12 x 32
Typical Applications	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication

## LINEAR POSITION TRANSDUCERS

### Cable Extension Transducers



	PT1, PT5	PT8000	PT9000
Range	0 - 2 to 0 - 250 inches	0 - 2 to 0 - 60 inches	0 - 75 to 0 - 1700 inches
Output	Voltage divider, 0 - 5 VDC, 0 - 10 VDC, 4 - 20 mA, incremental encoder, CANbus, DeviceNet™, RS-232	Voltage divider, 0 - 5 VDC, 0 - 10 VDC, 4 - 20 mA, incremental/absolute encoder, CANbus, DeviceNet™, RS-232	Voltage divider, 0 - 5 VDC, 0 - 10 VDC, 4 - 20 mA, incremental/absolute encoder, CANbus, DeviceNet™, RS-232
IP Rating	IP65, IP67 (PT5)	IP67, IP68	IP67, IP68
Enclosure	Aluminum and abs plastic (PT1)	Aluminum or stainless	Aluminum or stainless
Accuracy	±0.04% to ±0.25%	±0.04% to ±0.25%	±0.04% to ±0.25%
Unique Features	<ul style="list-style-type: none"> <li>Designed for most factory environments</li> <li>Industry standard output signals</li> <li>User serviceable</li> <li>Compact design (PT1)</li> </ul>	<ul style="list-style-type: none"> <li>Heavy duty, submersible</li> <li>Designed for extreme industrial and marine environments</li> <li>CSA, CENELEC certification for hazardous area applications</li> <li>High accuracy, high acceleration</li> <li>Free-release proof with VLS option</li> <li>M12 and DEUTSCH connector options</li> </ul>	<ul style="list-style-type: none"> <li>Heavy duty, submersible</li> <li>Proven workhorse for long stroke applications</li> <li>Designed for extreme industrial and marine environments</li> <li>CSA, CENELEC certification for hazardous area applications</li> <li>Free-release proof with VLS option</li> <li>M12 and DEUTSCH connector options</li> </ul>
Operating Temp.	-40°C to 90°C	-40°C to 90°C	-40°C to 90°C
Dimensions (mm)	85 x 100 x 70 (PT1) 100 x 175 x 80 (PT5)	90 x 140 x 135	200 x 135 x 125
Typical Applications	Factory automation, industrial, die casting, injection molding	Steel mills, lumber and paper mills, factory automation, die-casting, injection molding, mobile construction and mining	Mobile hydraulic boom position, water resource management, mining and tunnel boring equipment, telescoping mechanism position, theater stage control

# POSITION SENSORS

## LINEAR POSITION TRANSDUCERS

### Cable Extension Transducers



#### M150, MTA

Range	0 - 1.5 to 0 - 5 inches
Output	Voltage divider
Environment/ IP Rating	IP50
Enclosure	Aluminum
Accuracy	$\pm 0.4\%$ to $\pm 1\%$
Unique Features	<ul style="list-style-type: none"><li>• M150: one of the world's smallest string potentiometer</li><li>• Designed for space-critical and testing applications</li></ul>
Operating Temp.	-40°C to 85°C (M150) -55°C to 100°C (MTA)
Dimensions (mm)	19 x 19 x 10 (M150)
Typical Applications	Aerospace, automotive instrumentation, automotive crash testing, automotive and motorcycle racing



#### MT2, MT3

Range	0 - 3 to 0 - 30 inches
Output	Voltage divider, incremental encoder
Environment/ IP Rating	IP50, IP67 (MT3A)
Enclosure	Aluminum and polycarbonate
Accuracy	$\pm 0.25\%$ to $\pm 1.1\%$
Unique Features	<ul style="list-style-type: none"><li>• Designed for test applications</li><li>• Dual-axis measuring cable alignment</li><li>• Tracks high-acceleration linear position up to 136g's</li><li>• High-frequency response</li><li>• GAM EG 13 certification</li></ul>
Operating Temp.	-55°C to 125°C
Dimensions (mm)	55 x 45 x 55
Typical Applications	Automotive crash testing, aerospace and flight testing



#### SM, SP

Range	0 - 2.5 to 0 - 50 inches
Output	Voltage divider, 0 - 10 VDC, 4 - 20 mA
Environment/ IP Rating	IP50, IP67 (SP)
Enclosure	Polycarbonate with stainless steel bracket
Accuracy	$\pm 0.25\%$ to $\pm 1\%$
Unique Features	<ul style="list-style-type: none"><li>• Compact design</li><li>• M12 connection</li><li>• Adjustable mounting bracket</li><li>• Free-release tolerant</li><li>• Custom configurations for OEMS</li></ul>
Operating Temp.	-18°C to 70°C (SM) -40°C to 85°C (SP)
Dimensions (mm)	120 x 140 x 140
Typical Applications	Factory automation, light industrial, seismic testing, racing instrumentation, medical imaging systems, fume hood position



#### SG, SR

Range	0 - 80 to 0 - 175 inches
Output	Voltage divider, 0 - 5 VDC, 0 - 10 VDC, 4 - 20 mA, incremental encoder, CANbus
Environment/ IP Rating	IP67
Enclosure	Polycarbonate with stainless steel bracket
Accuracy	$\pm 0.35\%$ to $\pm 0.5\%$
Unique Features	<ul style="list-style-type: none"><li>• Low cost, high value string potentiometer</li><li>• Versatile stainless steel mounting bracket</li><li>• Simple one-button user scalable stroke range (SR)</li><li>• Custom configurations available for OEM customers</li></ul>
Operating Temp.	-40°C to 85°C
Dimensions (mm)	100 x 120 x 200
Typical Applications	Outdoor mobile construction equipment, outrigger positioning, hydraulic lifts, water and power controls



#### SK

Range	0 - 250 and 0 - 400 inches
Output	4 - 20 mA, 0 - 10 V, voltage divider, CAN J1939, CANopen®, Encoder drive
Environment/ IP Rating	IP67
Enclosure	Polycarbonate with stainless steel bracket
Accuracy	$\pm 0.25\%$ FS
Unique Features	<ul style="list-style-type: none"><li>• Compact design</li><li>• M12 connectivity</li><li>• Adjustable mounting bracket</li></ul>
Operating Temp.	-40°C to 85°C
Dimensions (mm)	120 x 140 x 140
Typical Applications	Mobile construction equipment, factory automation



#### PTX, PT101

Range	0 - 2 to 0 - 100 inches
Output	Voltage divider, 0 - 5 VDC, 0 - 10 VDC, 4 - 20 mA, incremental encoder, velocity output (DV301)
Environment/ IP Rating	IP50
Enclosure	Aluminum
Accuracy	$\pm 0.04\%$ to $\pm 0.25\%$
Unique Features	<ul style="list-style-type: none"><li>• Original classic design</li><li>• High precision</li><li>• Proven track record</li></ul>
Operating Temp.	-40°C to 90°C
Dimensions (mm)	Model and range specific
Typical Applications	Aerospace testing, architectural and structural testing, factory automation

# POSITION SENSORS

## LINEAR POSITION TRANSDUCERS—INDUCTIVE

Absolute



	<b>HR</b>	<b>M12</b>	<b>HC</b>
Package	AISI-400 series stainless steel	AISI-304 series stainless steel	AISI-400 series stainless steel
Linearity	±0.25% of range	±0.25% of range	±0.25% of range
Excitation	AC operated	AC operated	AC and DC operated versions
Output	AC voltage	AC voltage	AC or DC voltage, 4 - 20 mA loop or RS-485
Range	±0.05 to ±10 inches	±10 to ±100 mm	±0.05 to ±10 inches
Unique Features	<ul style="list-style-type: none"> <li>• Large bore to core clearance</li> <li>• Broad range of excitation frequencies</li> <li>• Variety of options</li> <li>• Mild radiation resistance option</li> </ul>	<ul style="list-style-type: none"> <li>• Metric series</li> <li>• High stroke to length ratio</li> <li>• Constant sum of secondaries</li> <li>• Excellent temperature coefficient</li> </ul>	<ul style="list-style-type: none"> <li>• Hermetically sealed</li> <li>• Welded connector</li> <li>• Double shielding</li> <li>• Intrinsically safe version</li> <li>• CE mark for DC versions</li> </ul>
Operating Temp.	-55°C to 150°C (220°C optional)	-55°C to 150°C (220°C optional)	-55°C to 150°C (AC); 0°C to 70°C (DC)
Diameter (mm)	20.6	12	19
Typical Applications	General industrial	Hydraulic spool valve position feedback, flight simulators, aircraft flight control feedback	Harsh environments, submersible applications, process controls, valve position feedback



	<b>XS-C</b>	<b>DC-SE</b>	<b>XS-D</b>
Package	AISI-304 series stainless steel	AISI-400 series stainless steel	AISI-400 series stainless steel
Linearity	±0.25% of range	±0.25% of range	±2% of range
Excitation	AC operated	8.5 to 28 VDC	AC operated
Output	AC voltage	0 - 5 VDC (4 wire), 1 - 6 VDC (3 wire)	AC voltage
Range	±0.25, ±0.5 and ±1 inches	0 - 0.1 to 0 - 6 inches	±1 to ±10 inches
Unique Features	<ul style="list-style-type: none"> <li>• High pressure</li> <li>• Bulkhead mounting</li> <li>• Hermetically sealed welded assembly</li> </ul>	<ul style="list-style-type: none"> <li>• CE mark</li> <li>• Low current consumption (6 mA typical)</li> <li>• Synchronous demodulation</li> <li>• Shielded cable</li> </ul>	<ul style="list-style-type: none"> <li>• Very high stroke to body length ratio</li> </ul>
Operating Temp.	-55°C to 150°C	-25°C to 85°C	-55°C to 150°C
Diameter (mm)	19	19	20.6
Typical Applications	Hydraulic actuators, other pressurized vessels	Positioning sensing feedback, battery operated systems, test labs, ram guide, platen position	Where sensor installation length is restricted, ideal replacement for linear potentiometers

# POSITION SENSORS

## LINEAR POSITION TRANSDUCERS—INDUCTIVE

Absolute



### MACRO HSTA/R

Package	AISI-410 stainless steel
Linearity	±0.25% of range
Excitation	AC operated
Output	AC voltage
Range	±0.050 to ±10.0 inches
Unique Features	<ul style="list-style-type: none"> <li>• IP68 rating, hermetically sealed</li> <li>• Mild radiation resistant (30 Mrad) optional</li> <li>• Axial or radial connector with thru-bore construction</li> </ul>
Operating Temp.	-55°C to 200°C standard (Contact factory for higher temperature)
Diameter (mm)	19
Typical Applications	High temperature steam and gas valves, nuclear power plants, harsh and corrosive environments, environments with heavy dust, dirt, and humidity



### MACRO SSI/R

Package	Alloy 625
Linearity	±0.10% of range
Excitation	AC or DC operated
Output	AC or 4-20 mA loop digital CANbus available
Range	±1.0 to ±10.0 inches
Unique Features	<ul style="list-style-type: none"> <li>• Operating pressure to 5,000 psi</li> <li>• (7,500 psi proof)</li> <li>• Seawater submersible IP68</li> <li>• Standard Seacon connector</li> <li>• Axial or radial connection</li> </ul>
Operating Temp.	-40°C to 80°C
Diameter (mm)	23.9
Typical Applications	Off-shore drilling platforms, pipeline monitoring, choke valves, mooring cables, extensometers, pulp and paper mills



### MACRO HPGS 750

Package	AISI-410 stainless steel
Linearity	±0.25% of range
Excitation	AC operated
Output	AC voltage
Range	±0.050 to ±10.0 inches
Unique Features	<ul style="list-style-type: none"> <li>• Radial screw-on 38999 connector</li> <li>• IP68 rating, hermetically sealed</li> <li>• Designed for high vibration applications</li> </ul>
Operating Temp.	-55°C to 200°C
Diameter (mm)	19
Typical Applications	Nuclear power generation equipment, hydraulic cylinder position, steam valve positioning, power generation equipment, corrosive environments, high-vibration environments



### MACRO CD375

Package	AISI-410 stainless steel
Linearity	±0.25% of range
Excitation	AC operated
Output	AC voltage
Range	± 0.025 to ±1 inches
Unique Features	<ul style="list-style-type: none"> <li>• Compact design</li> <li>• Operating pressure to 20,000 psi+</li> </ul>
Operating Temp.	-55°C to 200°C
Diameter (mm)	9.5
Typical Applications	Machine tools, robotic grippers, medical equipment, valve position sensing, hydraulic cylinder, down-hole equipment



### MACRO GHSE/R

Package	AISI-410 stainless steel
Linearity	±0.1% of range
Excitation	DC operated
Output	0 - 10 VDC
Range	0.100 to 4 inches
Unique Features	<ul style="list-style-type: none"> <li>• Spring loaded design</li> <li>• IP68 rating, hermetically sealed</li> <li>• Axial and radial connection</li> <li>• Low pressure air-extend/spring-retract version available (GHSE 750-A)</li> </ul>
Operating Temp.	-20°C to 70°C
Diameter (mm)	19
Typical Applications	Industrial gaging systems, replaces dial indicators, fabricated metal products gaging

# POSITION SENSORS

## LINEAR POSITION TRANSDUCERS—INDUCTIVE

Dimensional Gaging Products



	LBB Spring-Extend	LBB Air-Extend	PCA 375	GC	Ultimate-Precision Digital LBB
Linearity	±0.2% of range	±0.2% of range	±0.5% of range	±0.25% (Voltage) to ±0.5% (4 - 20 mA) of range	Accuracy ±0.2%
Excitation	AC operated	AC operated	AC operated	AC or DC voltage	5 VDC USB (Bus or external)
Output	AC voltage	AC voltage	AC voltage	AC or DC voltage, RS-485, or 4 - 20 mA loop	RS485; USB
Range	±0.02 to ±0.20 inches	±0.04 and ±0.1 inches	±0.02 to ±1 inches	±0.05 to ±2 inches	1, 2, 5 and 10 mm
Unique Features	<ul style="list-style-type: none"> <li>• 0.000004 inch (0.1 µm) repeatability</li> <li>• Removable tungsten carbide contact tip</li> <li>• Double shielded LVDT</li> <li>• Repairable</li> </ul>	<ul style="list-style-type: none"> <li>• 0.000004 inch (0.1 µm) repeatability</li> <li>• Removable tungsten carbide contact tip</li> <li>• Double shielded LVDT</li> <li>• Repairable</li> </ul>	<ul style="list-style-type: none"> <li>• Longer strokes</li> <li>• IP65 cable exit</li> <li>• Accepts industry standard contact tips</li> <li>• Heavy duty return spring</li> </ul>	<ul style="list-style-type: none"> <li>• Hermetically sealed</li> <li>• Welded MS connector (MIL-C-5015) "</li> <li>• CE mark for DC versions</li> <li>• Special tips available</li> <li>• Air extend spring retract available</li> </ul>	<ul style="list-style-type: none"> <li>• Plug-and-play</li> <li>• 14-bit resolution</li> <li>• COM libraries provided</li> <li>• CE mark</li> <li>• USB adapter and power supply available</li> </ul>
Operating Temp.	-40°C to 70°C	-40°C to 70°C	-20°C to 70°C	-55°C to 150°C (AC) 0°C to 70°C (DC)	0°C to 60°C
Diameter (mm)	8 or 9.5	8 or 9.5	9.5	19 mm body, 1/2 - 20 threads	Stackable gage system
Typical Applications	Process standards, manufacturing on-line inspection, robotics, replaces dial indicators in manual measurement systems	Process standards, manufacturing on-line inspection, robotics, replaces dial indicators in manual measurement systems	High density gaging fixtures, resistance weld verification, pressing applications, X-Y stage position feedback, rough casting inspection	Harsh environments, environments requiring hermetic seal, high temperatures (150°C for AC units)	Multi-channel electronic dimensional gaging, precision dimensional measurement, optics inspection systems, SPC data collection, hand tools

## LINEAR POSITION ENCODERS

Incremental



	ED32i
Package	IP67 aluminum
Range	Magnetic scale, 5 mm pole pitch, typically up to 100 m absolute version up to 100 mm range on request
Excitation	5 VDC
Output	5 V TTL ABZ differential quadrature; RS-485
Resolution	≥10 µm; field programmable
Max. Speed	4 m/s
Unique Features	<ul style="list-style-type: none"> <li>• Contactless incremental measurement</li> <li>• Very high accuracy, programmable resolution</li> <li>• High speed up to 4 m/s</li> <li>• Error detection, missing scale function</li> <li>• Adapter plate for easy mounting</li> </ul>
Operating Temp.	-25°C to 85°C
Dimensions (mm)	60 x 20 x 10
Typical Applications	Linear displacement measurement in industrial and medical applications

# POSITION SENSORS

## LVDT/RVDT INSTRUMENTATION



### LVM-110, LiM-420

Package	Open circuit board
Supply	DC voltage
Output	DC voltage or current
Operating Temp.	0°C to 55°C
Unique Features	<ul style="list-style-type: none"> <li>• Master/slave for multi-up applications</li> <li>• Dip switch selectable excitation frequencies</li> <li>• Plug-in PCB or wire termination</li> <li>• Small form factor</li> </ul>
Dimensions (mm)	63 x 56 x 21
Typical Applications	OEM applications



### LDM-1000

Package	DIN rail mount
Supply	10 to 30 VDC
Output	DC voltage and current
Operating Temp.	-25°C to 85°C
Unique Features	<ul style="list-style-type: none"> <li>• Operates with 4, 5 &amp; 6 wire LVDT/RVDTs</li> <li>• Adjustable zero, span and phase</li> <li>• Status LEDs</li> <li>• CE mark</li> </ul>
Dimensions (mm)	115 x 99 x 23
Typical Applications	Automotive test track instrumentation, gas and steam turbine controls, factory automation



### ATA-2001

Package	1/8 DIN panel mount
Supply	115 and 220 VAC, 50 - 400 Hz
Output	DC voltage and current
Operating Temp.	-40°C to 85°C
Unique Features	<ul style="list-style-type: none"> <li>• Push button programmable</li> <li>• Splash proof front panel</li> <li>• LED status lights</li> <li>• Mounting hardware included</li> <li>• CE mark</li> </ul>
Dimensions (mm)	267 x 99 x 49
Typical Applications	Precision metrology labs, power generation valve position monitoring



### PML 1000

Package	1/8 DIN panel mount
Supply	90 to 265 VAC, 50 - 60 Hz or 24 VDC
Output	DC voltage and current (RS-485 optional)
Operating Temp.	10°C to 55°C
Unique Features	<ul style="list-style-type: none"> <li>• 5 digit LED display</li> <li>• Auto-calibration</li> <li>• Programmable</li> <li>• Splash proof front panel</li> <li>• Mounting hardware included</li> <li>• CE mark</li> </ul>
Dimensions (mm)	173 x 97 x 49
Typical Applications	Remote monitoring stations, measurement test stands, process monitoring



### MP 2000

Package	1/4 DIN panel mount
Supply	100 to 240 VAC, 47 - 63 Hz
Output	DC voltage and RS-232
Operating Temp.	0°C to 55°C
Unique Features	<ul style="list-style-type: none"> <li>• Programmable set point controller</li> <li>• Dual channel with math functions</li> <li>• Digital I/O</li> <li>• Large LCD display</li> <li>• Splash proof front panel</li> </ul>
Dimensions (mm)	178 x 92 x 92
Typical Applications	LVDT based weighing systems, pass/fail parts sorting, quality inspection



### MMX Mini Module

Package	DIN rail mount
Supply	15 to 30 VDC
Output	DC voltage or 4-20 mA
Operating Temp.	0°C to 70 °C
Unique Features	<ul style="list-style-type: none"> <li>• Push-button calibration</li> <li>• Flame retardant mini-module housing</li> <li>• Master/slave excitation synchronization (Up to 10 channels)</li> <li>• LED status lights</li> <li>• Supports all standard AC LVDTs, RVDTs, and VR half-bridge sensors</li> </ul>
Dimensions (mm)	85.1 x 70.4 x 17.8
Typical Applications	Automotive test instrumentation, factory automation



# POSITION SENSORS

## LINEAR POSITION—POTENTIOMETERS



	<b>MLP, CLP</b>
Package	Aluminum body, steel rod, IP65, IP67
Range	0 - 0.5 to 0 - 6" (MLP) 0 - 1 to 0 - 10" (CLP)
Linearity	±0.5 to ±1% (MLP) ±0.1 to ±0.2% (CLP)
Excitation	Up to 40 VDC max.
Output	Voltage divider
Resolution	Essentially infinite
Max. Speed	10 m/s
Unique Features	<ul style="list-style-type: none"><li>• Extended temperature range, miniature design</li><li>• First choice for auto racing applications</li><li>• Perfect for high cycle applications</li></ul>
Operating Temp.	-40°C to 90°C
Dimensions (mm)	Diameter/cross section: Ø9.5 mm (MLP) 15 mm x 15 mm (CLP)
Typical Applications	Vehicle testing, autosport instrumentation, structural and architectural testing and robotics.

## LINEAR POSITION—POTENTIOMETERS



	<b>5903, 5905</b> Linear Motion
Package	<ul style="list-style-type: none"><li>• 7.94 mm - 12.7 mm/0.312" - 0.500" housing diameter</li><li>• 1.98 mm - 3.18 mm/0.078" - 0.125" shaft diameter</li></ul>
Resistance	1K/5K/10K
Range	5903 series - up to 50.8 mm/2" stroke 5905 series - up to 101.6 mm/4" stroke
Linearity	±1%
Output Smoothness	<0.1%
Resolution	Infinite
Operating Temp.	-65°C to 125°C
Stroke Life	50 million cycles min
Typical Applications	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets

# POSITION SENSORS

## ANGULAR POSITION—POTENTIOMETERS



	<b>6000</b> Servo Mount	<b>6200</b> Bushing Mount	<b>6900</b> Element/Wiper/Insulator	<b>6100</b> Hollow Shaft
Package	<ul style="list-style-type: none"> <li>12.7 mm - 50.8 mm/0.500" - 2.00" housing diameter</li> <li>3.170 mm - 6.34 mm/0.1248" - 0.2498" shaft diameter</li> <li>12.7 mm - 1.74 mm/0.500" - 0.680" housing length</li> <li>11.11 mm - 47.62 mm/0.438" - 1.875" mounting pilot diameter</li> </ul>	<ul style="list-style-type: none"> <li>12.7 mm - 50.8 mm/0.500" - 2.00" housing diameter</li> <li>3.170 mm - 6.34 mm/0.1248" - .2498" shaft diameter</li> <li>12.7 mm - 1.74 mm/0.500" - 0.680" housing length</li> <li>3/8 32 NEF thread/10.31 mm/0.4062" pilot diameter</li> </ul>	<ul style="list-style-type: none"> <li>17.81 mm - 45.85 mm/0.702" - 1.805 in element outside diameter</li> <li>4.724 mm - 11.05 mm/0.186" - 0.435" element inside diameter</li> <li>3.175 mm - 6.35 mm/0.125" - 0.250 shaft insulator inside diameter</li> <li>4.064 mm - 7.80 mm/0.160" - 0.307" mating wiper inside diameter</li> <li>5.08 mm/0.200" assembled package height</li> </ul>	<ul style="list-style-type: none"> <li>27.94 mm - 66.5 mm/1.100" - 2.62" housing diameter</li> <li>3.175 mm - 19 mm/0.125" - 0.752" hollow shaft diameter</li> </ul>
Resistance	1K - 20K $\Omega$	1K - 20K $\Omega$	1K/5K/10K $\Omega$	1K - 20K $\Omega$
Range	Up to 355°	Up to 355°	Up to 350°	Up to 355°
Linearity	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$
Output Smoothness	<0.1%	<0.1%	< 0.1%	< 0.1%
Resolution	Infinite	Infinite	Infinite	Infinite
Operating Temp.	-65°C to 125°C	-65°C to 125°C	-65°C to 125°C	-65°C to 125°C
Rotational Life	50 million cycles/minute	50 million cycles/minute	50 million cycles/minute	50 million cycles/minute.
Typical Applications	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets	Critical position feedback applications in commercial, industrial, medical, aircraft and military markets

## ANGULAR POSITION—POTENTIOMETERS



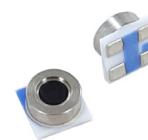
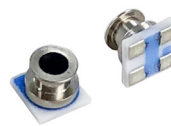
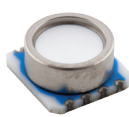
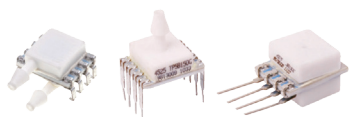
	<b>RT8, RT9</b>
Package	Aluminum or stainless IP67, IP68
Resolution	$\pm 0.15\%$ to $\pm 1.25\%$
Unique Features	<ul style="list-style-type: none"> <li>Absolute rotary</li> <li>Designed for heavy industrial applications</li> <li>CSA, CENELEC certification for hazardous area applications</li> </ul>
Output	Voltage divider, 0 - 5 V, 0 - 10 V, 4 - 20 mA, incremental encoder, CANbus, DeviceNet™
Range	0 - 0.125 to 0 - 200 turns
Operating Temp.	-40°C to 90°C
Dimensions (mm)	Ø65 x 100 (RT8) Ø115 x 60 (RT9)
Typical Applications	Valve control, airport passenger loading bridge, water management, factory automation

# PRESSURE SENSORS



## BOARD LEVEL PRESSURE SENSORS

Digital Output and Altimeter

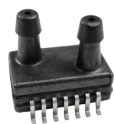


	MS4515DO, MS4525DO	MS5803	MS5837	MS5840
Package	8 pin DIL	Surface mountable	Surface mountable	Surface mountable
Type	Gage, compound (MS4515DO) Gage, absolute, differential, compound (MS4525DO)	Absolute	Absolute	Absolute
Pressure Range	0 - 2 to 30" H <sub>2</sub> O (MS4515DO) 0 - 1 to 150 psi (MS4525DO)	0 - 1 to 30 bar	0 - 2 bar 0 - 30 bar	0 - 2 bar Operating range: 300 to 1200 mbar
Output/Span	14-bit ADC SPI or I <sup>2</sup> C	24-bit ADC I <sup>2</sup> C and SPI (Mode 0, 3)	24-bit ADC I <sup>2</sup> C	24-bit ADC I <sup>2</sup> C
Resolution	—	12 µbar (MS5803-01BA) 0.5 mbar (MS5803-30BA)	0.016 mbar (2 bar) 0.2 mbar (30 bar)	13 cm of air
Unique Features	<ul style="list-style-type: none"> <li>• Optional gel coat, low power</li> <li>• Pressure and temperature measurement</li> <li>• Single supply of 3.3 or 5.0 VDC</li> <li>• Top, side barbed or manifold o-ring port</li> <li>• J lead or thru hole pins</li> </ul>	<ul style="list-style-type: none"> <li>• 24-bit digital sensor, software calibration and temperature compensation (I<sup>2</sup>C and SPI), no external components</li> <li>• Supply voltage 1.8 to 3.6 V</li> </ul>	<ul style="list-style-type: none"> <li>• Supply voltage: 1.5 to 3.6 V</li> <li>• Pressure and temperature measurement</li> <li>• Excellent long term stability</li> <li>• Hermetically sealable for outdoor devices</li> <li>• Sealing designed for 1.8 x 0.88 mm o-ring</li> </ul>	<ul style="list-style-type: none"> <li>• Supply voltage: 1.5 to 3.6 V</li> <li>• Pressure and temperature measurement</li> <li>• Low power, 0.6 µA (standby ≤ 0.1 µA at 25°C)</li> <li>• Protected against direct sunlight</li> </ul>
Linearity/Absolute Accuracy	0.25%/1% TEB	±1.5 mbar at 25°C (MS5803-01BA) ±250 mbar at 0°C to 40°C (MS5803-30BA)	±5 mbar (2 bar) ±400 mbar (30 bar)	±0.5mbar at 20°C ±4mbar from -20°C to 85°C
Overpressure	300 psi	10 bar (1, 2 bar) 30 bar (5, 7, 14 bar) 50 bar (30 bar)	10 bar (2 bar) 50 bar (30 bar)	—
Operating Temp.	-10°C to 85°C (MS4515DO) -25°C to 105°C (MS4525DO)	-40°C to 85°C	-20°C to 85 °C	-20°C to 85 °C
Dimensions (mm)	12.5 x 9.9	6.4 x 6.2 x 2.9	3.3 x 3.3 x 2.75	3.3 x 3.3 x 1.7mm
Typical Applications	Medical instruments, air flow measurements, process control, leak detection	Precision altimeter, diving and multi-mode watches, in-building navigation, variometers/flight instruments	Mobile water depth measurement systems, diving computers, adventure or multi-mode watches, data loggers	Altimeter and barometer applications, adventure or multi-mode watches, drones, bike computers

# PRESSURE SENSORS

## BOARD LEVEL PRESSURE SENSORS

Digital Output and Altimeter



### MS5525DSO

Package	SOIC-14
Type	Gage, absolute, differential, compound
Pressure Range	0 - 1 to 30 psi
Output/Span	24-bit ADC SPI or I <sup>2</sup> C protocol
Resolution	—
Unique Features	<ul style="list-style-type: none"><li>• 24-bit digital small outline sensor</li><li>• Pressure and temperature measurement</li><li>• Single supply of 1.8 or 3.6 VDC</li><li>• Barb, tube and hole package style options</li></ul>
Linearity/Absolute Accuracy	0.25%/2.5% TEB
Overpressure	3X range
Operating Temp.	-40°C to 125°C
Dimensions (mm)	12.5 x 7.9
Typical Applications	Medical respirators, ventilators, factory automation, altitude and airspeed measurements, leak detection, home appliances



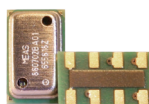
### MS5607, MS5611, MS5637

Surface mountable
Absolute
10 - 2K mbar
24-bit ADC I <sup>2</sup> C
0.016 mbar
<ul style="list-style-type: none"><li>• 24-bit digital sensor</li><li>• 13 cm resolution (MS5607, MS5637)</li><li>• 10 cm resolution (MS5611)</li><li>• Supply voltage: 1.5 to 3.6 V (MS5637) Supply voltage: 1.8 to 3.6 V (MS5607, MS5611)</li><li>• Low power, 0.6 <math>\mu</math>A (Standby <math>\leq</math> 0.1 <math>\mu</math>A at 25°C)</li></ul>
$\pm$ 2.0 mbar at 25°C
6 bar
-40°C to 85°C
3 x 3 x 0.9 (MS5637) 5 x 3 x 1 (MS5607, MS5611)
Smart phones, tablets, personal navigation devices, tire pressure monitoring, compressors



### MS5805

Package	Surface mountable
Type	Absolute
Pressure Range	10 - 2K mbar
Output/Span	24-bit ADC I <sup>2</sup> C
Resolution	0.02 mbar
Unique Features	<ul style="list-style-type: none"><li>• 24-bit digital sensor</li><li>• 20 cm resolution</li><li>• Supply voltage: 1.8 to 3.6 V</li><li>• Sealing designed for 2.5 x 1 mm o-ring</li><li>• Silicone gel protection</li><li>• Waterproof</li></ul>
Linearity/Absolute Accuracy	$\pm$ 2.0 mbar at 25°C
Overpressure	5 bar
Operating Temp.	-40°C to 85°C
Dimensions (mm)	4.5 x 4.5 x 3.5
Typical Applications	Mobile altimeter and barometer systems, bike computers, adventure or multi-mode watches, variometers, data loggers



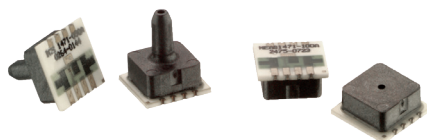
### MS8607

Surface mountable
Absolute
10 - 2K mbar
24-bit ADC I <sup>2</sup> C
0.016 mbar
<ul style="list-style-type: none"><li>• Integrated pressure, humidity and temperature</li><li>• Supply voltage: 1.5 to 3.6 V</li><li>• Fully factory calibrated sensor</li></ul>
$\pm$ 4 mbar
6 bar
-40°C to 85°C
5 x 3 x 1
Mobile water depth measurement systems, diving computers, adventure or multi-mode watches, data loggers

# PRESSURE SENSORS

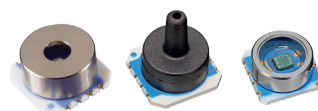
## BOARD LEVEL PRESSURE SENSORS

mV Output



### MS1451, MS1471

Package	Surface mountable
Type	Gage, absolute
Pressure Range	0 - 5 to 500 psi
Output/Span	60 mV typical
Unique Features	<ul style="list-style-type: none"><li>• Low cost</li><li>• Coarse calibrated at room temp. (MS1471)</li><li>• With gel to protect against moisture</li><li>• Tube or hole</li></ul>
Accuracy	±0.25% non-linearity
Operating Temp.	-40°C to 125°C
Dimensions (mm)	7.6 x 7.6, application dependent
Typical Applications	Altitude measurement, barometric pressure, medical instrumentation, consumer appliances, tire pressure

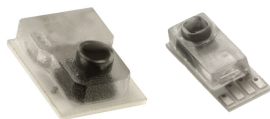


### MS52xx, MS54xx

Package	Surface mountable
Type	Gage, absolute
Pressure Range	0 - 1 to 12 bar
Output/Span	150 mV, 240 mV
Unique Features	<ul style="list-style-type: none"><li>• Small size (MS54xx)</li><li>• High linearity or high sensitivity options</li><li>• Plastic tube or metal ring options</li><li>• With gel to protect against moisture</li><li>• High endurance (Option HM)</li></ul>
Accuracy	±0.05%, ±0.15% FS non-linearity (MS52xx) ±0.05%, ±0.2% FS non-linearity (MS54xx)
Operating Temp.	-40°C to 125°C
Dimensions (mm)	7.6 x 7.6, application dependent (MS52xx) 6.4 x 6.2 (MS54xx)
Typical Applications	Absolute pressure sensor systems, engine controls, high resolution altimeters, variometers, waterproof watches, diver computers, barometers, tire pressure monitoring systems (TPMS), medical instrumentation, pneumatic controls

## DISPOSABLE MEDICAL PRESSURE SENSORS

mV Output



### 1620, 1630

Package	Hybrid assembly
Type	Gage
Pressure Range	-30 to 300 mmHg
Output/Span	5 $\mu$ V/V/mmHg
Unique Features	<ul style="list-style-type: none"><li>• Low cost, disposable design</li><li>• Supplied in tape and reel</li><li>• Compliant to AAMI spec</li><li>• ISO13485 certified</li></ul>
Operating Temp.	10°C to 40°C
Dimensions (mm)	1620: 11.43 x 8.13 x 4.20 1630: 12.7 x 5.08 x 3.94
Typical Applications	Disposable blood pressure, surgical procedures, ICU, kidney dialysis machines, medical instrumentation



### Fully Assembled 1620 (Customized per customer specifications)

Package	Plastic housing
Type	Gage
Pressure Range	-30 to 300 mmHg
Output/Span	5 $\mu$ V/V/mmHg
Unique Features	<ul style="list-style-type: none"><li>• Low cost, disposable design</li><li>• Compliant to AAMI spec</li><li>• Custom designs available</li></ul>
Operating Temp.	10°C to 40°C
Dimensions (mm)	42.8 x 30.3 x 19.0
Typical Applications	Disposable blood pressure, kidney dialysis machines, surgical procedures and intensive care units. Ready to use, fully assembled disposable sensor units with cable, connector, stop cock, flush device in a plastic housing.

# PRESSURE SENSORS

## MEDIA ISOLATED PRESSURE SENSOR MODULES

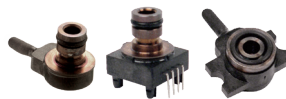
Digital Output



	85BSD	86BSD	89BSD	154BSD
Package	<ul style="list-style-type: none"> <li>• 13 mm diaphragm diameter</li> <li>• Weldable or threaded process fittings</li> </ul>	<ul style="list-style-type: none"> <li>• 16 mm diaphragm diameter</li> <li>• O-ring mount</li> </ul>	<ul style="list-style-type: none"> <li>• 9 mm diaphragm diameter</li> <li>• Threaded or weldable</li> </ul>	<ul style="list-style-type: none"> <li>• 19 mm diaphragm diameter</li> <li>• O-ring mount</li> </ul>
Type	Gage, absolute	Gage, absolute	Absolute, sealed gage	Gage, absolute
Pressure Range	0 - 0.35 to 20 bar / 0 - 5 to 300 psi	0 - 0.07 to 20 bar / 0 - 1 to 300 psi	0 - 6 to 30 bar	0 - 1 to 300 psi
Output/Span	14-bit ADC I <sup>2</sup> C or SPI	14-bit ADC I <sup>2</sup> C or SPI	24-bit ADC I <sup>2</sup> C	14-bit ADC I <sup>2</sup> C or SPI
Unique Features	<ul style="list-style-type: none"> <li>• Pressure and temperature read-out</li> <li>• Cable and connector options</li> <li>• Low power option</li> </ul>	<ul style="list-style-type: none"> <li>• Pressure and temperature read-out</li> <li>• Cable and connector options</li> <li>• Low power option</li> </ul>	<ul style="list-style-type: none"> <li>• Pressure and temperature read-out</li> <li>• Low power: 1 <math>\mu</math>A (Standby &lt; 0.15 <math>\mu</math>A)</li> </ul>	<ul style="list-style-type: none"> <li>• Pressure and temperature read-out</li> <li>• Cable and connector options</li> <li>• Low power option</li> </ul>
Accuracy	$\pm 0.25\%$ span	$\pm 0.25\%$ span	$\pm 0.3\%$ span	$\pm 0.25\%$ span
Total Error Band	$\pm 1.0\%$ FSO	$\pm 1.0\%$ FSO	$\pm 3.0\%$ FSO max.	$\pm 1.0\%$ FSO
Overpressure	2X	2X	2X	2X
Operating Temp.	-40°C to 125°C	-40°C to 125°C	-40°C to 85°C	-40°C to 125°C
Dimensions (mm)	$\varnothing 15.85 \times 7.9$	$\varnothing 15.82 \times 9.3$	$\varnothing 9.04 \times 7.5$	$\varnothing 19 \times 13.8$
Typical Applications	Level controls, tank level measurement, corrosive fluids and gas measurement systems, sealed systems, manifold pressure measurement, submersible depth monitoring	Level controls, tank level measurement, corrosive fluids and gas measurement systems, sealed systems, manifold pressure measurement, submersible depth monitoring	Level controls, tank level measurement, corrosive fluids and gas measurement systems, sealed systems, manifold pressure measurement, dive computers	Level controls, tank level measurement, corrosive fluids and gas measurement systems, sealed systems, manifold pressure measurement, submersible depth monitoring

## TRANSDUCERS AND TRANSMITTERS

Industrial Wireless



	M5600, U5600	MSP100	MSP300, MSP340
Type	Gage, sealed, absolute, compound	Gage	Gage
Pressure Range	0 - 50 to 15K psi (M5600), 0 - 5 to 10K psi (U5600)	0 - 100 to 500 psi	0 - 100 to 10K psi (MSP300) 0 - 50 to 10K psi (MSP340)
Output/Span	24-bit ADC I <sup>2</sup> C	100 mV typical	0 - 100 mV, 0.5 - 4.5 VDC, 1 - 5 VDC, 4 - 20 mA
Unique Features	<ul style="list-style-type: none"> <li>• Pressure and temperature</li> <li>• 2.3 - 3.6 V supply voltage</li> <li>• Compact and battery-powered</li> <li>• Weather resistant (IP66 and IP67)</li> <li>• Stainless steel and polycarbonate enclosure</li> </ul>	<ul style="list-style-type: none"> <li>• Microfused</li> <li>• Low cost stainless steel isolated transducer</li> <li>• No threads needed for pressure connect</li> <li>• Highly customized for OEM application</li> <li>• Small size</li> <li>• Solid state reliability</li> </ul>	<ul style="list-style-type: none"> <li>• Microfused</li> <li>• Highly customized for OEM applications</li> <li>• Small size</li> <li>• Solid state reliability</li> </ul>
Accuracy	$\pm 0.25\%$ FS (M5600) Down to $\pm 0.1\%$ FS (U5600)	$\pm 0.5\%$ FSO	$\pm 1\%$ FSO
Operating Temp.	-20°C to 85°C	0°C to 55°C	-20°C to 85°C
Dimensions (mm)	24 x 24 x 69	12.7 x 24.38 x 20.32	MSP300: 22.23 x 22.23 x 55.88 MSP340: 15.88 x 15.88 x 75.44
Typical Applications	Industrial process control and monitoring, advanced HVACR systems, refrigeration systems, automotive test stands, off-road vehicles, pumps and compressors, hydraulic and pneumatic systems, agriculture equipment, energy generation and management	Beverage dispensing systems, automation, HVACR controls, energy and water management, pumps, compressors, pneumatic equipment	Paint sprayers, braking systems, HVACR controls, energy and water management, pumps, compressors, pneumatic equipment, off road heavy equipment, agriculture equipment
Agency Approvals	CE, FCC	—	UL 508 (MSP300)

# PRESSURE SENSORS

## MEDIA ISOLATED PRESSURE SENSOR MODULES

Analog Output



### 82, 85 with Fittings

Package	Weldable (85) or process fitting
Type	Gage, absolute, vacuum gage
Pressure Range	0 - 5 to 500 psi (85), 0 - 1 to 500 psi (82)
Output/Span	100 mV typical
Unique Features	• Modular design
Non-linearity	±0.3% FSO (1 psi) ±0.2% FSO (5 psi) ±0.1% FSO (≥15 psi)
Operating Temp.	-40°C to 125°C
Dimensions (mm)	Fittings: application dependent
Typical Applications	Medical, process control, refrigeration compressor, oceanography, level systems



### 89 Button, 89 with Fittings

Package	Weldable or process fitting
Type	Sealed gage, absolute
Pressure Range	0 - 1K to 10K psi
Output/Span	100 mV typical
Unique Features	• High pressure • Modular design
Non-linearity	±0.25% FSO
Operating Temp.	-40°C to 125°C
Dimensions (mm)	89 Button: Ø9.04 x 13.2 89 with Fittings: application dependent
Typical Applications	Air tank pressure, hydraulics, process control, robotics, refrigeration compressors, oceanography



### 86A Amplified

Package	5/8" (16 mm) diameter o-ring mount
Type	Gage, absolute
Pressure Range	0 - 1 to 150 psi
Output/Span	0.5 - 4.5 VDC
Unique Features	• Small diameter, amplified output • Bar ranges available
Non-linearity	±1.0% FSO
Operating Temp.	-20°C to 85°C
Dimensions (mm)	Ø15.82 x 9.3
Typical Applications	Level measurement, OEM transmitters and transducers, process control

## MEDIA ISOLATED PRESSURE SENSOR MODULES

Analog Output



### 82, 85, 85F, 86, 154N

Package	<ul style="list-style-type: none"> <li>• 3/4" (19 mm) diameter o-ring mount (82, 154N)</li> <li>• 5/8" (16 mm) diameter o-ring mount (86)</li> <li>• 1/2" (13 mm) diameter o-ring flush mount (85F)</li> <li>• 1/2" (13 mm) diameter o-ring mount (85)</li> </ul>
Type	Gage, absolute, vacuum gage (82, 85, 86, 154N) Gage, absolute (85F)
Pressure Range	0 - 1 to 500 psi (Absolute, gage: 82, 154N) 0 - 5 to 500 psi (Absolute, gage: 85, 86) 0 - 15 to 500 psi (85F, vacuum gage: 82, 85, 86, 154N)
Output/Span	100 mV typical
Unique Features	<ul style="list-style-type: none"> <li>• High performance</li> <li>• High stability for OEM applications</li> <li>• Minimizes trapped volume (85F)</li> </ul>
Non-linearity	±0.3% FSO (1 psi), ±0.2% FSO (5 psi) ±0.1% FSO (≥15 psi), ±0.1% FSO (85F)
Operating Temp.	-40°C to 125°C (82 / 85 / 86 / 154N), -20°C to 125°C (85F)
Dimensions (mm)	82: Ø19 x 6.48      86: Ø15.82 x 11.4 154N: Ø18.97 x 13.8      85F: Ø17.2 x 11.33 85: Ø15.85 x 9.3
Typical Applications	Hydraulic controls, process control, oceanography, refrigeration/compressors, pressure transmitters, level systems, dialysis machines, infusion pumps, medical systems



### DP86 O-Ring Mount, with Fittings/Cable

Package	• 5/8" (16 mm) diameter o-ring mount or threaded process fittings
Type	Differential
Pressure Range	0 - 1 to 500 psi
Output/Span	100 mV typical/sensitivity dependent
Unique Features	<ul style="list-style-type: none"> <li>• Wet/wet differential pressure</li> <li>• Line pressure max. 1,000 psi</li> </ul>
Non-linearity	±0.3% FSO (1 psi) ±0.2% FSO (5 psi) ±0.1% FSO (≥15 psi)
Operating Temp.	-40°C to 125°C
Dimensions (mm)	O-ring: Ø15.82 x 17.5 Fittings: Application dependent
Typical Applications	Level controls, tank level measurement, corrosive fluids and gas measurement systems, flow measurement



### U86B

Package	• Mountable with o-ring seal
Type	Sealed gage, absolute
Pressure Range	0 - 5 to 13 bar/0 - 50 to 200 psi
Output/Span	0.5 - 4.5 VDC (Ratiometric output)
Unique Features	• Amplified
Non-linearity	±0.5% FSO
Operating Temp.	-7°C to 105°C
Dimensions (mm)	Ø15.82 x 13.6 Socket spacing: 31.75
Typical Applications	Urea level, urea pressure, air brakes, corrosive fluid measurement for engine & vehicle applications

# PRESSURE SENSORS

## TRANSDUCERS AND TRANSMITTERS

Industrial



	US300	AST20HA, AST20PT, AST20SW	AST4000, AST4100, AST4200
Type	Gage, absolute	Gage, sealed gage, absolute	Gage, sealed gage, compound
Pressure Range	0 - 15 to 5K psi	0 - 1 to 60K psi	0 - 25 to 10K psi
Output/Span	0 - 10 mV/V, 0.5 - 4.5 V, 1 - 5 V, 4 - 20 mA	0.5 - 4.5 V (Ratiometric) 1 - 5 V 4 - 20 mA, 0 - 5 V, 0 - 10 V, switch (AST20SW)	0.5 - 4.5 V (Ratiometric), 1 - 5 V, 1 - 10 V, 4 - 20 mA, 0.5 - 2.5 V
Unique Features	<ul style="list-style-type: none"> <li>UltraStable technology</li> <li>Highly customized for OEM applications</li> <li>Small size</li> <li>Solid state reliability</li> </ul>	<ul style="list-style-type: none"> <li>Excellent performance over temperature</li> <li>Semi-custom designs available</li> <li>Fault mode condition settings</li> <li>Four standard sensor material options</li> <li>Additional temperature output (AST20PT)</li> </ul>	<ul style="list-style-type: none"> <li>Four standard sensor material options</li> <li>Rugged construction</li> <li>100 V/m EMI/RFI protection</li> <li>Semi-custom designs available</li> </ul>
Accuracy	±0.15% FSO (15 - 1K psi), ±0.25% FSO (>1K psi)	±0.1% FSO	±0.5% FSO
Operating Temp.	-40°C to 105°C	-40°C to 85°C	-40°C to 85°C
Dimensions (mm)	15.88 x 15.88 x 98.00	Application dependent	Application dependent
Typical Applications	Paint sprayers, braking systems, HVACR controls, energy and water management, pumps, compressors, pneumatic equipment, off road heavy equipment, agriculture equipment	Test and measurement, industrial controls	Water, hydraulic equipment, HVACR, industrial controls
Agency Approvals	—	ABS, CE	UL/cUL508, ABS, CE



	M3200	M5200	U5200, U5300	D5100
Type	Gage, Compound	Gage, sealed, compound	Gage, sealed, absolute, compound	Differential wet/wet
Pressure Range	0-7bar to 500 bar / 0-100 to 7,500 Psi	0 - 3.5 to 1K bar/0 - 50 to 15K psi	0 - 0.14 to 700 bar/0 - 2 to 10K psi	0 - 0.07 to 35 bar/0 - 1 to 500 psi
Output/Span	100mV, 0.5 - 4.5 V, 1 - 5 V, 0 - 5 V, 0 - 10 V, 4 - 20 mA and I <sup>2</sup> C Digital Output	0.5 - 4.5 V, 1 - 5 V, 0 - 5 V, 0 - 10 V, 4 - 20 mA, 1 - 6 V	0.5 - 4.5 V, 1 - 5 V, 0 - 5 V, 0 - 10 V, 4 - 20 mA, 1 - 6 V	80 mV / 100 mV, 0.5 - 4.5 VDC, 1 - 5 VDC, 4 - 20 mA
Unique Features	<ul style="list-style-type: none"> <li>Microfused technology</li> <li>High performance at a low cost</li> <li>Solid state reliability</li> <li>±1.5% FSO TEB (-20°C to 85°C)</li> <li>Weatherproof - IP67 with cable</li> <li>14bit digital output for Pressure</li> </ul>	<ul style="list-style-type: none"> <li>Microfused technology</li> <li>High performance at a low cost</li> <li>Solid state reliability</li> <li>±1% FSO TEB (-20°C to 85°C)</li> <li>Weatherproof</li> <li>17 - 4 PH or 316L SS</li> </ul>	<ul style="list-style-type: none"> <li>UltraStable technology</li> <li>High performance at a low cost</li> <li>±0.75% FSO TEB (-20°C to 85°C, &gt;5 psi and ≤5000 psi) (U5200)</li> <li>±0.5% FSO TEB (-20°C to 85°C) (U5300)</li> <li>Weatherproof</li> <li>High accuracy (U5300)</li> </ul>	<ul style="list-style-type: none"> <li>UltraStable technology</li> <li>High performance at a low cost</li> <li>Solid state reliability</li> <li>±1% FSO TEB (-20°C to 85°C)</li> <li>Line pressure max. 1000 psi</li> </ul>
Accuracy	±0.25% FSO	±0.25% FSO	±0.1% FSO (>5 and ≤500 psi)	±0.3% FSO (<5 psi), ±0.25% FSO (5 psi), ±0.1 % FSO (≥15 psi)
Operating Temp.	-40°C to 125°C	-40°C to 125°C	-40°C to 125°C	-40°C to 125°C
Dimensions (mm)	22.2 on Hex x 58 max	24 X 24 X 82 max.	24 X 24 X 82 max.	25.4 x 58.4 x 72.0
Typical Applications	Suitable for measurement of liquid or gas pressure, even for difficult media such as contaminated water, steam, and mildly corrosive fluids.	Industrial process control and monitoring, advanced HVACR systems, refrigeration systems, automotive test stands, off road vehicles, pumps and compressors, hydraulic and pneumatic systems, agriculture equipment, energy generation and management	Industrial process control and monitoring, advanced HVACR systems, refrigeration systems, automotive test stands, off road vehicles, pumps and compressors, hydraulic and pneumatic systems, agriculture equipment, energy generation and management, military and aerospace test stands, calibration equipment, high accuracy applications, stationary motor fuel control, high end industry machinery	Process controls, tank level measurement, filter performance monitoring, corrosive fluids and gas measurement systems, flow measurement
Agency Approvals	CE (EMC)	CE (EMC)	CE (EMC), UL 508	CE (EMC)



# PRESSURE SENSORS

## TRANSDUCERS AND TRANSMITTERS

Heavy Industrial



	M7100, U7100	P900, P981, P1200, P700, P9000	P101, P105, P125
Type	Gage, no vent gage (M7100) Gage, sealed gage, absolute (U7100)	Gage, absolute	Gage
Pressure Range	0 - 10 to 700 bar/0 - 150 to 10K psi (M7100) 0 - 1 to 10 bar/0 - 15 to 150 psi (U7100)	0 - 5 bar to 700 bar/0 - 75 to 10K psi	0 - 10 to 7K bar/0 - 150 to 100K psi
Output/Span	0.5 - 4.5 VDC [Ratiometric output] 1 - 5 VDC [Regulated] (M7100) 0.5 - 4.5 VDC [Ratiometric output] (U7100)	0 - 5 VDC, 0 - 10 VDC, 4 - 20 mA	7.5 to 20 mV (4 V; 5 V optional)
Unique Features	<ul style="list-style-type: none"> <li>• <math>\pm 1\%</math> FSO TEB (-20°C to 85°C)</li> <li>• Solid state reliability</li> <li>• Survives high vibration and immersion</li> <li>• Microfused technology (M7100)</li> <li>• UltraStable technology (U7100)</li> <li>• Copper tube for HVACR (M7100)</li> </ul>	<ul style="list-style-type: none"> <li>• High overpressure (10X over pressure)</li> <li>• Shock and vibration resistant</li> <li>• Heavy industrial grade transducer (P9000)</li> <li>• Advanced digital compensation / calibration</li> <li>• Mechanical over pressure stops</li> <li>• High temperature operation</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel diaphragm</li> <li>• Female pressure connectors: M16 x 1.5, M20 x 1.5, 1/4 NPT</li> <li>• Metal to metal seal</li> </ul>
Accuracy	0.25% FSO	0.1% to 0.2% FSO	$\pm 0.3\%$ FSO
Operating Temp.	-40°C to 125°C	-54°C to 120°C	-20°C to 80°C
Dimensions (mm)	26.7 x 26.7 x 50.0	Application dependent	Ø29 x 85 max.
Typical Applications	HVACR refrigeration controls, off road vehicles engine control, compressors, hydraulic, energy and water management	Steel mills, hydraulic controls, power generation equipment, torpedo depth, military and aerospace, vehicle braking systems	Harsh environments, aggressive liquids
Agency Approvals	CE (EMC), UL 508	CE, CENELEC (Intrinsically Safe)	—

## TRANSDUCERS AND TRANSMITTERS

Miniature



	XP	XPC10
Type	Gage, sealed, absolute	Gage, sealed, absolute
Pressure Range	0 - 1 to 350 bar/0 - 15 to 5K psi (XP5, XPM10) 0 - 5 to 200 bar/0 - 75 to 3K psi (XPM4) 0 - 100 to 1K bar/0 - 1.5K to 15K psi (XPM6)	0 - 10 to 500 bar/0 - 150 to 7.5K psi
Output/Span	20 - 100 mV, 4 V FSO (Amplified)	12 mV FSO, 4 V FSO (Amplified)
Unique Features	<ul style="list-style-type: none"> <li>• Titanium construction (XP5, XPM4)</li> <li>• Stainless steel housing (XPM6, XPM10)</li> <li>• Amplified output options (XP5, XPM6, XPM10)</li> <li>• Cable and connector options</li> <li>• For static and dynamic applications</li> </ul>	<ul style="list-style-type: none"> <li>• Amplified output available</li> <li>• For static and dynamic applications</li> <li>• Optional IP67 ingress protection</li> <li>• High temperature operation</li> </ul>
Accuracy	Down to $\pm 0.25\%$ FSO (XP5, XPM6, XPM10), down to $\pm 0.35\%$ FSO (XPM4)	Down to $\pm 0.25\%$ FSO
Operating Temp.	-40°C to 120°C	-40°C to 220°C
Dimensions (mm)	XPM4: M4 x 0.7 thread; Hex 8 XP5: M5 x 0.8 or 10-32 UNF thread; Hex 10 XPM6: M6 x 1 thread; Hex 12 XPM10: M10 x 1 thread; Hex 15	M10 x 1 or 3/8-24 UNF thread; Hex 15
Typical Applications	Corrosive liquids and gases, braking system pressure, onboard equipment monitoring, military and aerospace, explosive test benches, robotics and effectors, laboratory and research, extreme miniature devices	Aerospace, test benches, oven monitoring equipment, cooling regulation systems

# PRESSURE SENSORS

## TRANSDUCERS AND TRANSMITTERS

### Miniature



	EB, EPRB	EPIH	EPB, EPB-PW, EPL
Type	Gage, sealed, absolute	Gage, sealed, absolute	Gage, sealed, absolute
Pressure Range	0 - 0.35 to 700 bar/0 - 5 to 10K psi	0 - 0.35 to 20 bar/0 - 5 to 300 psi	0 - 0.35 to 350 bar/0 - 5 to 5K psi
Output/Span	0.5 to 4.5 VDC	12 mV to 75 mV	10 mV to 125 mV
Unique Features	<ul style="list-style-type: none"><li>• High accuracy</li><li>• Miniature design</li><li>• UltraStable technology</li><li>• EMI protected</li><li>• Combined pressure and temperature</li></ul>	<ul style="list-style-type: none"><li>• Diffused silicon diaphragm with a large variety of sizes and shapes available as small as 0.05" outside diameter</li><li>• High frequency response (To 1.7 MHz)</li><li>• Ultra-miniature design</li></ul>	<ul style="list-style-type: none"><li>• Miniature flush mountable</li><li>• Flush stainless steel diaphragm, flanged or non-flanged</li><li>• Bonded silicon gage, high frequency response (To 400 KHz)</li><li>• IP68 ingress protection in Titanium construction (EPB-PW)</li></ul>
Accuracy	±0.25% FSO	±1.0% FSO	±0.5 to ±1% FSO
Operating Temp.	-40°C to 125°C (Available option up to 150°C)	-40°C to 120°C	-40°C to 120°C
Dimensions (mm)	11 body diameter	Application dependent	3.2 to 7 outside diameter
Typical Applications	Motor sport, hydraulic/pneumatic systems, automotive test stands, military and aerospace test stands	Aerospace testing, wind tunnels, biomedical testing, aircraft body and wing dynamics, high frequency measurements	Air flow testing, hydraulic pressure systems, air pressure systems, bearing studies, ballistics, water hammer, miniature scale model testing, centrifuge pore water pressure measurements
Agency Approvals	CE (EMC)	—	—

## TRANSDUCERS AND TRANSMITTERS

### Liquid Level



	U5700	AST45xx
Type	Gage, sealed, absolute, compound	Gage, absolute
Pressure Range	0 - 2 to 10K psi	0 - 1 to 100 psi (AST4500, AST4510, AST4520)
Output/Span	0.5 - 4.5 V, 1 - 5 V, 0 - 5 V, 0 - 10 V, 4 - 20 mA, 1 - 6 V	0.5 - 4.5 V [Ratiometric], 1 - 5 V, 4 - 20 mA, 0.5 - 2.5 V
Unique Features	<ul style="list-style-type: none"><li>• UltraStable technology</li><li>• High accuracy</li><li>• IP68 rated connection and submersible</li><li>• Polyurethane jacketed cable</li><li>• Optional Polyoxymethylene cap</li></ul>	<ul style="list-style-type: none"><li>• Intrinsically safe ratings</li><li>• Material options including: 316L, alloy C276, and PVDF</li><li>• Low power options</li><li>• High quality cable options</li></ul>
Accuracy	0.1 % FSO	±0.25% FSO
Operating Temp.	-10°C to 60°C	-40°C to 85°C
Dimensions (mm)	22.23 x 22.23 x 98.04	Application dependent
Typical Applications	Industrial process control and monitoring, advanced HVACR systems, refrigeration systems, automotive test stands, off road vehicles, pumps and compressors, hydraulic/pneumatic systems, agriculture equipment, energy generation and management, liquid level applications	Diesel tanks, chemical tanks, water tanks
Agency Approvals	CE (EMC)	UL/CSA Class I Div I, ATEX/IECEx Exia, ABS, CE

# PRESSURE SENSORS

## TRANSDUCERS AND TRANSMITTERS

### Hazardous Location



#### AST43xx, AST44xx

Type	Gage, sealed gage, compound, absolute
Pressure Range	0 - 1 to 15 psi (AST43LP, AST44LP) 0 - 25 to 20K psi (AST4300, AST4400, AST4401)
Output/Span	0.5 - 4.5 V [Ratiometric], 1 - 5 V, 4 - 20 mA, 0.5 - 2.5 V
Unique Features	<ul style="list-style-type: none"> <li>• Available with 316L, Hastalloy C276, or Inconel 718 materials</li> <li>• Low current consumption options</li> <li>• Low power options</li> <li>• High proof and burst pressure</li> </ul>
Accuracy	±0.25% FSO
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Application dependent
Typical Applications	Compressors, well sites, ships, factory automation, SCADA equipment, offshore equipment
Agency Approvals	UL/CSA Class I Div I and II, ATEX/IECEx Exia/Exn, CCOE, CNEx, ABS, CE



#### AST46xx

Type	Gage, sealed gage, compound, absolute
Pressure Range	0 - 1 to 20K psi
Output/Span	0.5 - 4.5 V [Ratiometric], 1 - 5 V, 4 - 20 mA, 0.5 - 2.5 V, switch (AST46SW)
Unique Features	<ul style="list-style-type: none"> <li>• Available with 316L, Hastalloy C276, or Inconel 718 materials</li> <li>• Low current consumption options</li> <li>• Low power options</li> <li>• Local display (AST46DS)</li> <li>• Additional temperature output</li> </ul>
Accuracy	±0.25% FSO (AST4600, AST46DS), ±0.1% FSO (AST46HA, AST46PT)
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Application dependent
Typical Applications	SCADA/RTU, well sites, offshore equipment, hydraulic controls
Agency Approvals	CSA Class I/II Div I, ATEX/IECEx Exd, ABS, CE



#### AST5100, AST5300, AST5400

Type	Differential
Pressure Range	0 - 5 H <sub>2</sub> O to 5K psi
Output/Span	0.5 - 4.5 V [Ratiometric], 0 - 5 V, 1 - 5 V, 4 - 20 mA
Unique Features	<ul style="list-style-type: none"> <li>• Wide range of pressures available</li> <li>• Full line pressure on either side without zero shifts</li> <li>• Hazardous location approvals (AST5300, AST5400)</li> </ul>
Accuracy	±0.25% FSO (AST5100, AST5300), 1% TEB (AST5400)
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Application dependent
Typical Applications	Filter monitoring, flow measurement, tank level measurement
Agency Approvals	CSA Class I/II Div I and II, ATEX/IECEx Exd/Exn, ABS, CE



#### AST2000H2

Type	Gage, sealed gage
Pressure Range	0-10 PSI to 10000 PSI
Output/Span	0.5 - 4.5 V [Ratiometric] 1 - 5 V, 4 - 20 mA
Unique Features	<ul style="list-style-type: none"> <li>• 20 bar, 448 bar, 900 bar</li> <li>• High pressure H<sub>2</sub> Storage</li> <li>• CE EN61326</li> </ul>
Accuracy	±0.25% BFSL
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Application dependent
Typical Applications	PEM fuel cells, hydrogen storage, hydrogen filling stations, backup power
Agency Approvals	EC-79 e24*79/2009*406/2010*0006*02 CE EN61326

# RATE AND INERTIAL SENSORS



## RATE SENSORS AND GYROS



### 11206AC

Package	Electroless nickel plated Aluminum
FS Ranges	±50, ±180°/sec
Unique Features	<ul style="list-style-type: none"> <li>• IdentiCal™ interchangeable sensor</li> <li>• ±0.5% accuracy from -40°C to +85°C</li> <li>• Silicon MEMS gyro</li> <li>• EN61000-6-2/-4 certified for industrial environment</li> </ul>
Accuracy	±0.1% non-linearity
Excitation Voltage	8.5 - 36 VDC
Operating Temp.	-40°C to 85°C
Dimensions (mm)	24 x 24 x 27.30
Typical Applications	Wind turbine, weapons testing, test and measurement

### 11207AC

Package	Electroless nickel plated Aluminum
FS Ranges	±300°/sec
Unique Features	<ul style="list-style-type: none"> <li>• IdentiCal™ interchangeable sensor</li> <li>• High stability</li> <li>• Low noise</li> <li>• Vibration-rejecting</li> </ul>
Accuracy	±0.01% non-linearity
Excitation Voltage	10 - 36 VDC
Operating Temp.	-40°C to 85°C
Dimensions (mm)	24 x 24 x 27.30
Typical Applications	Wind turbine, weapons testing, test and measurement

### 31206B/31207B

Package	Electroless nickel plated Aluminum
FS Ranges	±50, ±180, ±1,000°/sec
Unique Features	<ul style="list-style-type: none"> <li>• Triaxial angular rate sensor</li> <li>• Stable performance over temperature</li> <li>• Power supply regulation</li> <li>• Temperature calibration data</li> </ul>
Accuracy	±0.1% non-linearity
Excitation Voltage	8.5 - 36 VDC
Operating Temp.	-40°C to 85°C
Dimensions (mm)	24 x 24 x 28.30
Typical Applications	Weapons testing, boat stabilization, test and measurement

### 610

Package	Anodized aluminum
FS Ranges	±500 to ±50K°/sec
Unique Features	<ul style="list-style-type: none"> <li>• Small, lightweight package</li> <li>• SAE-J211, ISO-6487, NHTSA approved</li> <li>• Crash testing certified</li> <li>• Insensitive to shock</li> </ul>
Accuracy	±0.5% non-linearity
Excitation Voltage	5 - 16 VDC
Operating Temp.	-40°C to 105°C
Dimensions (mm)	14.6 x 10.2 x 7.6
Typical Applications	Automotive safety crash testing, roll-over testing, motor sports, biomechanics, weapons testing

### 603

Package	Anodized aluminum
FS Ranges	±100 to ±24K°/sec
Unique Features	<ul style="list-style-type: none"> <li>• MEMS triaxial rate sensor</li> <li>• SAEJ211 compliant</li> <li>• Shock resistant housing</li> <li>• Rugged compact package</li> </ul>
Accuracy	±0.5% non-linearity
Excitation Voltage	5 - 16 VDC
Operating Temp.	-40°C to 105°C
Dimensions (mm)	20.8 x 20.8 x 14.5
Typical Applications	Automotive safety crash testing, pedestrian impact, biomechanics, robotics

# RATE AND INERTIAL SENSORS

## 6 DEGREES OF FREEDOM SENSORS



### 633

Package	Stainless steel
FS Ranges	$\pm 500$ to $\pm 50K^\circ/\text{sec}$ $\pm 50g$ to $\pm 6,000g$
Unique Features	<ul style="list-style-type: none"><li>• Complete six degree-of-freedom (6DoF) analog sensor</li><li>• Shock resistant rugged housing</li><li>• Silicon MEMS gyros</li><li>• PR MEMS high-g shock sensors</li></ul>
Accuracy	$\pm 0.5\%$ non-linearity
Excitation Voltage	5 - 16 VDC
Operating Temp.	$-40^\circ\text{C}$ to $105^\circ\text{C}$
Dimensions (mm)	21.3 x 21.3 x 15.2
Typical Applications	Aerospace testing, weapons testing, biomechanics, shock and impact testing



### 634

Package	Anodized aluminum
FS Ranges	$\pm 100$ to $\pm 18K^\circ/\text{sec}$ $\pm 2g$ to $\pm 100g$
Unique Features	<ul style="list-style-type: none"><li>• 6DoF analog sensor</li><li>• Signal conditioned output</li><li>• Silicon MEMS gyros</li><li>• UltraStable VC MEMS low-g sensors</li></ul>
Accuracy	$\pm 0.1\%$ non-linearity
Excitation Voltage	5 - 16 VDC
Operating Temp.	$-40^\circ\text{C}$ to $105^\circ\text{C}$
Dimensions (mm)	30.5 x 30.5 x 24.6
Typical Applications	Automotive testing, motion measurements, biomechanics

## INERTIAL SENSORS



### 65210E

Package	Electroless nickel plated Aluminum
FS Ranges	$\pm 1K$ to $\pm 20K^\circ/\text{sec}$ , $\pm 10g$ to $\pm 100g$
Unique Features	<ul style="list-style-type: none"><li>• 6DoF and telemetry kit</li><li>• User configurable, IRIG encoder</li><li>• Parabolic and radome ring mounting adaptor options</li><li>• Up to 4hr battery options</li></ul>
Accuracy	$\pm 0.2\%$ non-linearity error
Excitation Voltage	Li-Ion battery included
Operating Temp.	$-40^\circ\text{C}$ to $85^\circ\text{C}$
Dimensions (mm)	$\varnothing 69.85$ x 197.3 length
Typical Applications	Weapons separation testing, captive carry testing, GTV and JTV test vehicles



### 65210ES

Package	Electroless nickel plated Aluminum
FS Ranges	$\pm 1K$ to $\pm 20K^\circ/\text{sec}$ , $\pm 10g$ to $\pm 100g$
Unique Features	<ul style="list-style-type: none"><li>• 6DoF and telemetry kit</li><li>• Parabolic and radome ring mounting adaptor options</li><li>• AES encryption option</li><li>• Wide range of signal conditioning modules</li></ul>
Accuracy	$\pm 0.2\%$ non-linearity error
Excitation Voltage	Li-Ion battery included
Operating Temp.	$-40^\circ\text{C}$ to $85^\circ\text{C}$
Dimensions (mm)	$\varnothing 69.85$ x 161.3 length
Typical Applications	Weapons separation testing, captive carry testing, GTV and JTV test vehicles

# SCANNERS AND SYSTEMS



## PRESSURE AND TEMPERATURE SCANNERS

NetScanners



**NetScanner 9216**



**NetScanner 9146-R**



**NetScanner 9146-T**



**NetScanner 9022**

Measurement Type	Pressure	Temperature	Temperature	Pressure
Media	Dry	RTD/TC/Volt	TC	Liquid
Accuracy	$\pm 0.05\%$ FS	$\pm 0.25^\circ\text{C}$	$\pm 0.25^\circ\text{C}$	$\pm 0.05\%$ FS
# of Channels	16	16/32	16	12
EU Throughput Rate	500 Hz/chan/sec	33 Hz/chan/sec	33 Hz/chan/sec	100 Hz/chan/sec
Operating Temp.	$-30^\circ\text{C}$ to $80^\circ\text{C}$	$-30^\circ\text{C}$ to $70^\circ\text{C}$	$-30^\circ\text{C}$ to $70^\circ\text{C}$	$-30^\circ\text{C}$ to $70^\circ\text{C}$
Enclosure	IP66/30 g vibration	IP66/30 g vibration	IP54/30 g vibration	IP64/30 g vibration
Typical Applications	Engine testing, portable data acquisition, wind tunnel research, process monitoring	Engine testing, portable data acquisition, wind tunnel research, process monitoring	Engine testing, portable data acquisition, wind tunnel research, process monitoring	Engine testing, third party transducers, close coupled requirements, high pressure

# SCANNERS AND SYSTEMS

## PRESSURE SCANNERS & TRANSDUCERS

NetScanners, Transducers, and Accompanying Equipment



**NetScanner 9032, 9033**

Measurement Type	Barometer, Differential Standard
Media	Dry
Accuracy	±0.01% FS
# of Channels	1
EU Throughput Rate	10 Hz
Operating Temp.	-10°C to 60°C
Enclosure	Laboratory grade
Typical Applications	Barometric monitor, precision reference



**NetScanner 9034, 9038**

Calibrator	
Media	Dry
Accuracy	±0.01% FS
# of Channels	1
EU Throughput Rate	10 Hz
Operating Temp.	-10°C to 60°C
Enclosure	Laboratory grade
Typical Applications	Calibration, transfer standard, verification testing



**NetScanner 9916, 98RK-1 Rack**

Pressure	
Media	Dry
Accuracy	±0.05% FS
# of Channels	128
EU Throughput Rate	100 Hz/chan/sec
Operating Temp.	0°C to 50°C
Enclosure	19" rackmount/4U
Typical Applications	Turbine engine test, control room location



**NetScanner 9400 Transducer**

Pressure	
Media	All-media
Accuracy	±0.05%
# of Channels	1
EU Throughput Rate	Analog Output
Operating Temp.	-30°C to 100°C
Enclosure	IP66
Typical Applications	Turbine Engine Test, liquids, hydraulics

## ELECTRONIC & MINIATURE PRESSURE SCANNERS

ESP & MicroScanner



**ESP 64HD DTC**

Type	Pressure
Media	Dry
Accuracy	±0.03% FS
# of Channels	64
Thermal Comp.	Active (DTC)
Operating Temp.	-25°C to 80°C
Multiplex Scan Rate	70 KHz
Port Sizes (Inches)	0.040
Typical Applications	Wind tunnel research, flight test, on vehicle research



**ESP 32HD DTC**

Pressure	
Media	Dry
Accuracy	±0.03% FS
# of Channels	32
Thermal Comp.	Active (DTC)
Operating Temp.	-25°C to 80°C
Multiplex Scan Rate	70 KHz
Port Sizes (Inches)	0.040 or 0.063
Typical Applications	Wind tunnel research, flight test, on vehicle research



**ESP 64HD, 32HD, 16HD**

Pressure	
Media	Dry
Accuracy	±0.05% FS
# of Channels	64, 32 or 16
Thermal Comp.	Passive
Operating Temp.	-25°C to 80°C
Multiplex Scan Rate	20 KHz
Port Sizes (Inches)	0.040 or 0.63
Typical Applications	Wind tunnel research, flight test, on vehicle research



**MicroScanner 16MS**

Pressure	
Media	Dry
Accuracy	±0.05%
# of Channels	16
Thermal Comp.	Active
Operating Temp.	-20°C to 100°C
Multiplex Scan Rate	100 KHz
Port Sizes (Inches)	Direct mount
Typical Applications	For confined space, wind tunnel, flight test

## DATA ACQUISITION SYSTEMS

Multi-Scanner Data Acquisition Systems



**Optimus**

Type	Pressure scanning
Media	Dry
Accuracy	±0.03% FS
# of Channels	2048
EU Throughput Rate	2000 Hz
Operating Temp.	0°C to 50°C
Enclosure	Laboratory grade
Typical Applications	Aerospace development



**Initium**

Pressure scanning	
Media	Dry
Accuracy	±0.05% FS
# of Channels	512
EU Throughput Rate	1200 Hz
Operating Temp.	0°C to 70°C
Enclosure	Laboratory grade
Typical Applications	Wind engineering



**mSDI Interface**

A/D conversion	
Media	Dry
Accuracy	±0.05% FS
# of Channels	512
EU Throughput Rate	2000 Hz
Operating Temp.	-25°C to 80°C
Enclosure	Miniature
Typical Applications	In-model placement, Optimus System interface



**Pneumatics**

Quick disconnect	
Media	Dry
Accuracy	—
# of Channels	19, 31, 36, 55
EU Throughput Rate	—
Operating Temp.	-40°C to 80°C
Enclosure	Miniature
Typical Applications	Pressure connections for confined spaces

# SPEED SENSORS





## SPEED SENSORS

### 3 & 4 CHANNELS HALL EFFECT SPEED SENSORS



#### Jaquet DSD 25

Technology	Differential Hall Effect three and four channels
Package	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Shaft length 29 mm</li> <li>• Shaft diameter 24.5 mm</li> </ul>
Frequency Range	0 - 20 kHz
Nominal Supply Voltage	Nominal 15VDC (9 VDC to 30 VDC)
Output Signal	3 & 4 channels push-pull
Operating Temp.	-40°C to 125°C
Typical Applications	Railway

### DUAL CHANNEL HALL EFFECT SPEED SENSOR



#### Jaquet DSD 70

Technology	Differential Hall Effect two channels
Package	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Shaft length 29 mm</li> <li>• Shaft diameter 16 mm</li> </ul>
Frequency Range	0 - 20 kHz
Nominal Supply Voltage	Nominal 15VDC (9 VDC to 30 VDC)
Output Signal	2 channels push-pull
Operating Temp.	-40°C to 125°C
Typical Applications	Railway

### EDDY CURRENT SPEED SENSORS



#### Jaquet DSH

Technology	Eddy Current single channel
Package	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Shaft length 42 mm</li> <li>• Shaft diameter 18 mm</li> </ul>
Frequency Range	up to 20 kHz
Nominal Supply Voltage	10 - 30VDC
Output Signal	Square Wave
Operating Temp.	-40°C to 125°C
Typical Applications	Industrial (Power Generation, Hydraulic, Engines, Industry)



#### Jaquet DSH 16

Technology	Eddy Current two channels
Package	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Shaft length 29 mm</li> <li>• Shaft diameter 16 mm</li> </ul>
Frequency Range	up to 20 kHz
Nominal Supply Voltage	Nominal 15 VDC (8 VDC to 30 VDC)
Output Signal	2 channels push-pull
Operating Temp.	120°C
Typical Applications	Railway

# TORQUE SENSORS



## STATIC TORQUE SENSORS



### CS1060

Package	Square male coupling
Operating Mode	Reaction
Unique Features	<ul style="list-style-type: none"> <li>• Optional high level output</li> <li>• Keyed shaft connection</li> <li>• Static measurements</li> </ul>
FS Ranges	$\pm 5$ to $\pm 7,000$ Nm $\pm 4$ to $\pm 5,600$ lbf-ft
Max. Over-range	1.5X FS
Output/Span	$\pm 20$ mV , 0.5-4.5V
Combined Non-linearity & Hysteresis	$< \pm 0.25\%$ FS
Operating Temp.	-20°C to 100°C
Dimensions (mm)	Application dependent
Typical Applications	Non-rotating parts torque measurement, robotics and effectors, laboratory and research



### CS1120

Package	Keyed shaft connections
Operating Mode	Reaction
Unique Features	<ul style="list-style-type: none"> <li>• Optional high level output</li> <li>• Static torque measurement</li> <li>• Excellent temperature stability</li> </ul>
FS Ranges	$\pm 5$ to $\pm 2,500$ Nm $\pm 4$ to $\pm 2,000$ lbf-ft
Max. Over-range	1.5X FS
Output/Span	$\pm 20$ mV , 0.5-4.5V
Combined Non-linearity & Hysteresis	$< \pm 0.25\%$ FS
Operating Temp.	-20°C to 100°C
Dimensions (mm)	Application dependent
Typical Applications	Non-rotating parts torque measurement, robotics and effectors, laboratory and research



### CS1210

Package	Collar mechanical fittings
Operating Mode	Reaction
Unique Features	<ul style="list-style-type: none"> <li>• High stiffness</li> <li>• Low transverse sensitivity</li> <li>• Optional high temp option</li> </ul>
FS Ranges	$\pm 160$ to $\pm 10,000$ Nm $\pm 128$ to $\pm 8,000$ lbf-ft
Max. Over-range	1.5X FS
Output/Span	$\pm 20$ mV , 0.5-4.5V
Combined Non-linearity & Hysteresis	$< \pm 0.25\%$ FS
Operating Temp.	-40°C to 150°C
Dimensions (mm)	Application dependent
Typical Applications	Non-rotating parts torque measurement, robotics and effectors, laboratory and research

# TORQUE SENSORS

## DYNAMIC TORQUE SENSORS



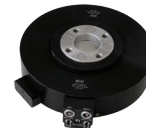
	CD1050	CD1095	CD1110
Package	Square male couplings	Keyed shaft couplings	Keyed shaft couplings
Operating Mode	Dynamic rotary	Dynamic rotary	Dynamic rotary
Unique Features	<ul style="list-style-type: none"> <li>• Optional high level output</li> <li>• Rugged</li> <li>• Slip ring measurement interface</li> </ul>	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• Built-in amplifier</li> <li>• Bi-directional measurement</li> </ul>	<ul style="list-style-type: none"> <li>• Low range measurements</li> <li>• Bi-directional measurement</li> <li>• Mechanical over-range stops</li> </ul>
FS Ranges	$\pm 5$ to $\pm 7,000$ Nm $\pm 4$ to $\pm 5,600$ lbf-ft	$\pm 5$ to $\pm 2,500$ Nm $\pm 4$ to $\pm 2,000$ lbf-ft	$\pm 0.05$ to $\pm 2$ Nm $\pm 0.04$ to $\pm 1.6$ lbf-ft
Max. Over-range	1.5X FS	1.5X FS	10X FS
Output/Span	$\pm 20$ mV, 0.5-4.5V	$\pm 20$ mV, 0.5-4.5V	$\pm 20$ mV, 0.5-4.5V
Combined Non-linearity & Hysteresis	$< \pm 0.25\%$ FS	$< \pm 0.25\%$ FS	$< \pm 0.25\%$ FS
Operating Temp.	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C
Dimensions (mm)	Application dependent	Application dependent	Application dependent
Typical Applications	Engine efficiency, robotics and effectors, laboratory and research	Process control equipment, robotics and effectors, test and measurement	Process control equipment, robotics and effectors, test and measurement

## CONTACTLESS TORQUE SENSORS



	CD1140	CD9515
Package	Keyed shaft couplings	Keyed shaft couplings
Operating Mode	Contactless	Contactless
Unique Features	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• Built-in amplifier</li> <li>• Speed and angle detection</li> </ul>	<ul style="list-style-type: none"> <li>• Economical</li> <li>• Small form factor</li> <li>• Speed and angle detection</li> </ul>
FS Ranges	$\pm 0.05$ to $\pm 20,000$ Nm $\pm 0.04$ to $\pm 16,000$ lbf-ft	$\pm 5$ to $\pm 1,000$ Nm $\pm 4$ to $\pm 738$ lbf-ft
Max. Over-range	2X FS	2X FS
Output/Span	$\pm 10$ V (60 pulses/rev)	$\pm 5$ V (60 pulses/rev)
Combined Non-linearity & Hysteresis	$\pm 0.1\%$ FS	$\pm 0.3\%$ FS
Operating Temp.	0°C to 60°C	0°C to 60°C
Dimensions (mm)	Application dependent	Application dependent
Typical Applications	Process control equipment, robotics and effectors, test and measurement	Industrial applications, process control equipment, PLC compatible

## AUTOMOTIVE TEST TORQUE SENSORS



	FCA7300	CD1124T
Package	Steering wheel adaptable	Engine shaft dynamic torquemeter
Operating Mode	Multi-sensing	Contactless
Unique Features	<ul style="list-style-type: none"> <li>• Dual torque/angle range</li> <li>• Steering velocity measurement</li> <li>• Fits all road vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy duty vehicles</li> <li>• Telemetry based</li> <li>• Gearbox to engine shaft measurement</li> </ul>
FS Ranges	10 to 200 Nm (7 lbf-ft to 150 lbf-ft)	20,000 Nm 16,000 lbf-ft
Max. Over-range	10X FS	1.5X FS
Output/Span	$\pm 10$ V	$\pm 10$ V
Combined Non-linearity & Hysteresis	$\pm 0.1\%$ FS	$\pm 1\%$ FS
Operating Temp.	-20°C to 80°C	-20°C to 80°C
Dimensions (mm)	Ø195 x 50	Ø195 x 35
Typical Applications	On-car road test, truck and buses steering test, armored vehicles steering test	Automotive test benches for engine shaft torque measurement

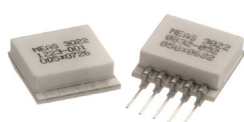
# VIBRATION SENSORS



# VIBRATION SENSORS

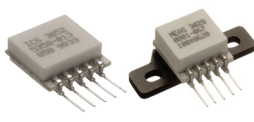
## EMBEDDED ACCELEROMETERS

### MEMS DC Accelerometer



#### 3022, 3028

Package	Pins or pads
Type	Board level
FS Range	±2g to ±100g
Unique Features	<ul style="list-style-type: none"> <li>• mV output, critically gas damped</li> <li>• Board and screw mount options</li> <li>• Pin or solder pad option</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-40°C to 125°C
Dimensions (mm)	22.8 x 15.2 x 5.3
Typical Applications	Vibration and shock monitoring, tilt applications, motion control, impact testing



#### 3052A, 3058A

Package	Pins or pads
Type	Board level
FS Range	±2g to ±100g
Unique Features	<ul style="list-style-type: none"> <li>• Temperature compensated</li> <li>• Board and screw mount options</li> <li>• Pin or solder pad option</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-40°C to 125°C
Dimensions (mm)	22.8 x 15.2 x 5.3
Typical Applications	Vibration and shock monitoring, tilt applications, motion control, impact testing



#### 3038

Package	SMD
Type	Board level
FS Range	±50g to ±6,000g
Unique Features	<ul style="list-style-type: none"> <li>• Hermetically sealed</li> <li>• High over-range protection</li> <li>• Gas damping</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-54°C to 125°C
Dimensions (mm)	7.5 x 7.5 x 3.3
Typical Applications	Vibration and shock monitoring, embedded systems, shock testing, safe and arm



#### 3255A

Package	SMD
Type	Board level
FS Range	±25g to ±100g
Unique Features	<ul style="list-style-type: none"> <li>• Amplified, signal conditioned</li> <li>• Gas damping</li> <li>• Bidirectional mounting</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-40°C to 125°C
Dimensions (mm)	13.5 x 7.6 x 3.8
Typical Applications	Vibration and shock monitoring, aerospace testing, impact testing, transportation

## EMBEDDED ACCELEROMETERS

### Piezoelectric Accelerometer



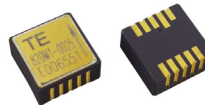
#### 805, 805M1

Package	TO-5
Type	Adhesive (Stud mount option)
FS Range	±20g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Hermetically sealed</li> <li>• Case grounded design</li> <li>• Bandwidth to 12 kHz</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-50°C to 125°C
Dimensions (mm)	Ø8.9 x 10.2
Typical Applications	Machine monitoring, data loggers, permanent structures



#### 808, 808M1

Package	TO-8
Type	Adhesive (Stud mount option)
FS Range	±4g to ±50g
Unique Features	<ul style="list-style-type: none"> <li>• Hermetically sealed</li> <li>• Case grounded design</li> <li>• Bandwidth to 8 kHz</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-50°C to 100°C
Dimensions (mm)	Ø15.2 x 16.6
Typical Applications	Machine monitoring, data loggers, embedded applications



#### 820M1

Package	Board level
Type	SMD
FS Range	±25g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Small size, low cost</li> <li>• Dynamic response</li> <li>• Wide &gt;6000Hz bandwidth</li> </ul>
Accuracy	±2.0% non-linearity
Operating Temp.	-40°C to 125°C
Dimensions (mm)	8.9 x 8.9 x 4.2
Typical Applications	Embedded predictive maintenance, condition monitoring, data loggers



#### 832, 832M1

Package	SMD
Type	Board mount
FS Range	±25g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• SMT mount, triaxial</li> <li>• Wide bandwidth &gt;6000Hz</li> <li>• Low power consumption</li> </ul>
Accuracy	±2.0% non-linearity
Operating Temp.	-20°C to 80°C (832) -40°C to 125°C (832M1)
Dimensions (mm)	18.8 x 14.2 x 4.3
Typical Applications	Data logging, asset monitoring, impact monitoring



#### 834, 834M1

Package	SMD
Type	Board mount
FS Range	±2,000g to ±6,000g
Unique Features	<ul style="list-style-type: none"> <li>• SMT mount, triaxial</li> <li>• Wide bandwidth &gt;6,000Hz</li> <li>• Low power consumption</li> </ul>
Accuracy	±2.0% non-linearity
Operating Temp.	-20°C to 80°C (834) -40°C to 125°C (834M1)
Dimensions (mm)	18.8 x 14.2 x 4.3
Typical Applications	Data logging, asset monitoring, impact monitoring

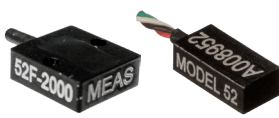
# VIBRATION SENSORS

## PLUG AND PLAY ACCELEROMETERS

Uniaxial DC Response



	<b>40A, 40B</b>
Package	Anodized aluminum
Type	Screw mount
FS Range	±25g to ±2,000g
Unique Features	<ul style="list-style-type: none"><li>• Critically damped</li><li>• Euro NCAP certified</li><li>• Compact</li></ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-20°C to 80°C
Dimensions (mm)	16.7 x 10.0 x 5.0
Typical Applications	Pedestrian crash testing, Euro NCAP testing



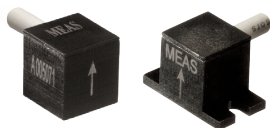
	<b>52, 52M30, 52F</b>
Package	Anodized aluminum
Type	Adhesive and Screw mount
FS Range	±50g to ±6,000g
Unique Features	<ul style="list-style-type: none"><li>• SAE-J211/2570 and ISO-6487 compliant</li><li>• Gas damping, thin profile</li><li>• Over-range stops</li></ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-40°C to 90°C
Dimensions (mm)	11.2 x 10.1 x 3.8
Typical Applications	Vibration and shock testing, safety impact testing, side-impact testing



	<b>58</b>
Package	Anodized Aluminum
Type	Adhesive mount
FS Range	±50g to ±6,000g
Unique Features	<ul style="list-style-type: none"><li>• Most reliable crush zone accelerometer available</li><li>• Rugged, water proof</li><li>• Mounting on any sides of housing</li></ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-20°C to 85°C
Dimensions (mm)	14.0 x 6.3 x 6.3
Typical Applications	On-vehicle crash and impact testing, drop testing, harsh environment



	<b>64B, 64C, 64X</b>
Package	Anodized aluminum
Type	Screw mount
FS Range	±50g to ±6,000g
Unique Features	<ul style="list-style-type: none"><li>• SAE-J211/2570 and ISO-6487 compliant</li><li>• ATD dummy certified</li><li>• Market performance leader</li></ul>
Accuracy	±0.7% non-linearity
Operating Temp.	-40°C to 121°C
Dimensions (mm)	13.1 x 10.0 x 5.0
Typical Applications	In-dummy crash and impact testing, Euro NCAP testing



	<b>1201, 1201F</b>
Package	Anodized aluminum
Type	Adhesive/screw mount
FS Range	±50g to ±2,000g
Unique Features	<ul style="list-style-type: none"><li>• Cube form factor, low noise cable</li><li>• Adhesive or screw mount</li><li>• Over-range stops</li></ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-20°C to 85°C
Dimensions (mm)	8.9 x 8.9 x 9.4
Typical Applications	On-vehicle crash and impact testing, vibration and shock monitoring

# VIBRATION SENSORS

## PLUG AND PLAY ACCELEROMETERS

Uniaxial DC Response



### 3801A, 4801A

Package	Stainless steel
Type	Stud mount
FS Range	4801A; $\pm 2g$ to $\pm 200g$ 3801A; $\pm 50g$ to $\pm 6,000g$
Unique Features	<ul style="list-style-type: none"> <li>• Hermetically sealed sensor</li> <li>• mV and amplified output options</li> <li>• Integral connector, detachable cable</li> </ul>
Accuracy	$\pm 0.1\%$ non-linearity on 4801A
Operating Temp.	$-54^{\circ}\text{C}$ to $121^{\circ}\text{C}$
Dimensions (mm)	15.9 x 15.2
Typical Applications	Impact testing, structural testing, test and instrumentation, environmental testing



### 3700

Package	Stainless steel
Type	Screw mount
FS Range	$\pm 50g$ to $\pm 6,000g$
Unique Features	<ul style="list-style-type: none"> <li>• No zero shift</li> <li>• mV output</li> <li>• 20,000 g over-range protection</li> </ul>
Accuracy	$\pm 1.0\%$ non-linearity
Operating Temp.	$-54^{\circ}\text{C}$ to $121^{\circ}\text{C}$
Dimensions (mm)	14.2 x 8.1 x 3.8
Typical Applications	Impact and shock testing, structural testing, drop testing, aerospace testing



### EGAXT, EGAXT3

Package	Stainless steel
Type	Adhesive/screw mount
FS Range	$\pm 5g$ to $\pm 2,500g$
Unique Features	<ul style="list-style-type: none"> <li>• Sub-miniature, fluid damped</li> <li>• Miniature single and triaxial designs</li> <li>• 10,000 g over-range protection</li> </ul>
Accuracy	$\pm 1.0\%$ non-linearity
Operating Temp.	$-40^{\circ}\text{C}$ to $120^{\circ}\text{C}$
Dimensions (mm)	EGAXT; 7.2 x 4.6 x 4.6 EGAXT3; 12.7 x 12.7 x 12.7
Typical Applications	Flight test and control, launch, crash, impact testing, robotics



### EGCS-D0, EGCS-D1S, EGCS-D5

Package	Stainless steel
Type	Screw/stud mount
FS Range	$\pm 5g$ to $\pm 10,000g$
Unique Features	<ul style="list-style-type: none"> <li>• Rugged housing</li> <li>• Critically damped</li> <li>• 20,000 g over-range protection</li> </ul>
Accuracy	$\pm 1.0\%$ non-linearity
Operating Temp.	$-40^{\circ}\text{C}$ to $120^{\circ}\text{C}$
Dimensions (mm)	D0: 19.0 x 19.0 x 7.6 D1S; 12.7 x 12.7 x 15.2 D5; 14.2 x 12.7 x 5.6
Typical Applications	Impact and shock testing, destructive testing, engine testing



### 4602, 4604

Package	Anodized aluminum
Type	Screw mount
FS Range	$\pm 2g$ to $\pm 200g$
Unique Features	<ul style="list-style-type: none"> <li>• UltraStable MEMS</li> <li>• Low noise, signal conditioned</li> <li>• &lt;2% TEB (total error band)</li> </ul>
Accuracy	$\pm 0.1\%$ non-linearity
Operating Temp.	$-54^{\circ}\text{C}$ to $125^{\circ}\text{C}$
Dimensions (mm)	21.1 x 21.6 x 7.6
Typical Applications	Flight testing on engines, flutter test, road load and transportation testing



### 4610, 4810A

Package	Stainless steel
Type	Screw mount
FS Range	$\pm 2g$ to $\pm 200g$
Unique Features	<ul style="list-style-type: none"> <li>• UltraStable MEMS</li> <li>• Hermetically sealed</li> <li>• &lt;2% TEB (total error band)</li> </ul>
Accuracy	$\pm 0.1\%$ non-linearity
Operating Temp.	$-55^{\circ}\text{C}$ to $125^{\circ}\text{C}$
Dimensions (mm)	25.4 x 29.1 x 7.6
Typical Applications	Low frequency monitoring, road testing, motion analysis

# VIBRATION SENSORS

## PLUG AND PLAY ACCELEROMETERS

Triaxial DC Response



### 53A, 53AF

Package	Anodized aluminum
Type	Adhesive mount
FS Range	±50 to ±2,000g
Unique Features	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Gas damping</li> <li>• Low power</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-20°C to 85°C
Dimensions (mm)	18.3 x 13.2 x 7.1
Unique Features	Auto safety, passenger comfort, transportation, NVH analysis



### 68CM1

Package	Stainless steel
Type	Screw mount
FS Range	±50 to ±2,000g
Unique Features	<ul style="list-style-type: none"> <li>• World SID</li> <li>• Gas damping</li> <li>• Low power</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-20°C to 85°C
Dimensions (mm)	12.7 x 12.7 x 12.7
Unique Features	Auto safety, in-dummy crash, on-vehicle crash



### 4630

Package	Anodized aluminum
Type	Screw mount
FS Range	±2g to ±200g
Unique Features	<ul style="list-style-type: none"> <li>• UltraStable MEMS</li> <li>• Low noise, signal conditioned</li> <li>• &lt;2% TEB (total error band)</li> </ul>
Accuracy	±0.1% non-linearity
Operating Temp.	-40°C to 115°C
Dimensions (mm)	26.2 x 26.2 x 23.4
Unique Features	Road testing, motion control, structural testing



### 4020, 4030

Package	Molded plastic
Type	Screw mount
FS Range	±2g to ±6g
Unique Features	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Biaxial, with triaxial option</li> <li>• DC response</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-40°C to 85°C
Dimensions (mm)	71.2 x 40.0 x 15.2
Unique Features	Structural monitoring, seismic array, bridge testing



### 606M1

Package	Nitrile rubber pad
Type	Removable
FS Range	±25g
Unique Features	<ul style="list-style-type: none"> <li>• 606M2 IEPE option</li> <li>• Triaxial, hermetic</li> <li>• Seat pad accelerometer</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-20°C to 85°C
Dimensions (mm)	199 x 4
Unique Features	Off road equipment, amusement rides, commercial aircraft



### 4835A

Package	Titanium
Type	Screw mount
FS Range	±2g to ±200g
Unique Features	<ul style="list-style-type: none"> <li>• UltraStable MEMS</li> <li>• Welded connector, hermetic</li> <li>• &lt;2% TEB (total error band)</li> </ul>
Accuracy	±0.1% non-linearity
Operating Temp.	-55°C to 125°C
Dimensions (mm)	22.9 x 22.9 x 17.1
Typical Applications	Road testing, motion control, flight testing



### 4630M12, 4630M14

Package	Titanium
Type	Screw mount
FS Range	±2g to ±200g
Unique Features	<ul style="list-style-type: none"> <li>• UltraStable MEMS</li> <li>• Compact, rugged and double shielded cable</li> <li>• &lt;2% TEB (total error band)</li> </ul>
Accuracy	±0.1% non-linearity
Operating Temp.	-55°C to 125°C
Dimensions (mm)	22.9 x 22.9 x 16.0
Typical Applications	Road load testing, transportation testing



### 4332M3

Package	Stainless steel
Type	Screw mount
FS Range	±2g to ±50g
Unique Features	<ul style="list-style-type: none"> <li>• Low noise ranges</li> <li>• Temperature compensated</li> <li>• High over-range</li> </ul>
Accuracy	±1.0% non-linearity
Operating Temp.	-40°C to 115°C
Dimensions (mm)	34.5 x 34.5 x 31.2
Typical Applications	Structural monitoring, bridge testing



### XL403D

Package	Nickel plated aluminum
Type	Screw mount
FS Range	±2g to ±15g
Unique Features	<ul style="list-style-type: none"> <li>• Digital triaxial accelerometer</li> <li>• Smart, onboard processing</li> <li>• Temperature output included</li> </ul>
Accuracy	±0.25% non-linearity
Operating Temp.	-40°C to 85°C
Dimensions (mm)	36.5 x 25.4 x 17.5
Typical Applications	Smart sensor function, vibration monitoring and alarm functions



# VIBRATION SENSORS

## PLUG AND PLAY ACCELEROMETERS

IEPE AC Response



### 7100A, 7101A

Package	Stainless steel/titanium
Type	Center-hole mount
FS Range	±50g to ±2,000g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Isolated mounting surface</li> <li>• Wide bandwidth, &gt;10 kHz</li> </ul>
Operating Temp.	7100A: -55°C to 150°C 7101A: -55°C to 125°C
Dimensions (mm)	7100A: 9.9 x 22.3, 7101A: 5.8 x 14.5
Typical Applications	Flight testing, general purpose, vibration monitoring



### 7102A

Package	Titanium
Type	Adhesive mount
FS Range	±50g to ±2,000g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Wide bandwidth</li> </ul>
Operating Temp.	-55°C to +125°C
Dimensions (mm)	4.4 x 11.9
Typical Applications	Small structures monitoring, minimal mass loading, general purpose testing



### 7108A

Package	Stainless steel
Type	Adhesive mounting
FS Range	±50g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Wide bandwidth</li> <li>• Small size</li> </ul>
Operating Temp.	-55°C to 125°C
Dimensions (mm)	9.5 x 10.2
Typical Applications	Vibration monitoring, modal testing, general purpose



### 7104A, 7105A

Package	Stainless steel
Type	Stud mounting
FS Range	±50g to ±2,000g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Wide bandwidth</li> </ul>
Operating Temp.	-55°C to 125°C
Dimensions (mm)	7104A: 11.11 x 14.10, 7105A: 11.11 x 19.05
Typical Applications	General purpose IEPE accel, vibration monitoring, lab testing



### 7131A, 7132A

Package	Titanium
Type	Adhesive/stud mounting
FS Range	±50g to ±2,000g
Unique Features	<ul style="list-style-type: none"> <li>• Triaxial, shear mode</li> <li>• &gt;12 kHz bandwidth</li> <li>• Hermetically sealed</li> </ul>
Operating Temp.	-55°C to 125°C
Dimensions (mm)	7131A: 11.0 x 11.0 x 11.0, 7132A: 15.2 x 15.2 x 14.5
Typical Applications	General purpose, modal testing, vibration monitoring



### 7135A

Package	Stainless steel
Type	Adhesive mounting
FS Range	±50g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Triaxial, through hole mount</li> <li>• Case isolated, internally shielded</li> <li>• Hermetically sealed</li> </ul>
Operating Temp.	-55°C to 125°C
Dimensions (mm)	28.6 x 14.0
Typical Applications	AD&M monitoring, HUMS, structural applications



### 8711-01

Package	Stainless steel
Type	Stud mount
FS Range	±5g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Industrial accelerometer</li> <li>• Case isolated, internal shielding</li> <li>• Low cost</li> </ul>
Operating Temp.	-55°C to +125°C
Dimensions (mm)	22.2 x 50.8
Typical Applications	Industrial applications, machine monitoring, wind turbines



### 8011-01, 8021-01

Package	Stainless steel
Type	Stud/center-hole mount
FS Range	±10g to ±100g
Unique Features	<ul style="list-style-type: none"> <li>• Industrial accelerometer</li> <li>• Case isolated, internal shielding</li> <li>• Reverse wiring protection</li> </ul>
Operating Temp.	-55°C to 125°C
Dimensions (mm)	22.2 x 48.3
Typical Applications	Industrial applications, machine monitoring, intrinsic safety



### 8032-01

Package	Stainless steel
Type	Stud mount
FS Range	±50g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Industrial accelerometer</li> <li>• Case isolated, internal shielding</li> <li>• Low cost, molded strain relief</li> </ul>
Operating Temp.	-40°C to 100°C
Dimensions (mm)	14.3 x 45.3
Typical Applications	Industrial applications, machine monitoring



### 8811-01

Package	Stainless steel
Type	Stud mount
FS Range	±5g to ±500g
Unique Features	<ul style="list-style-type: none"> <li>• Certified for wind turbines</li> <li>• ±2,500VAC lightning protection</li> <li>• Case isolated, internal shielding</li> </ul>
Operating Temp.	-55°C to +125°C
Dimensions (mm)	22.2 x 50.8
Typical Applications	Industrial applications, machine monitoring, wind turbines

# VIBRATION SENSORS

## PLUG AND PLAY ACCELEROMETERS

4-20mA AC Accelerometer



8011, 8021-AR/AP

Package	Stainless steel
Type	Stud/center-hole mount
FS Range	5g to 50g
Unique Features	<ul style="list-style-type: none"><li>• Industrial 4-20mA accelerometer</li><li>• Case isolated, internal shielding</li><li>• Top mount or side mount connector</li></ul>
Operating Temp.	-40°C to 85°C
Dimensions (mm)	22.2 x 48.3
Typical Applications	Industrial applications, machine monitoring, intrinsic safety



8011, 8021-VR/VP

Package	Stainless steel
Type	Stud/center-hole mount
FS Range	0.5in/sec to 5.0in/sec
Unique Features	<ul style="list-style-type: none"><li>• Industrial 4-20mA velocity transmitter</li><li>• Case isolated, internal shielding</li><li>• Top mount or side mount connector</li></ul>
Operating Temp.	-40°C to 85°C
Dimensions (mm)	22.2 x 48.3
Typical Applications	Industrial applications, machine monitoring, intrinsic safety

## PLUG AND PLAY ACCELEROMETERS

3 Wire Voltage AC Accelerometer



8102A

Package	Anodized aluminum
Type	Screw mount
FS Range	±25g to ±6,000g
Unique Features	<ul style="list-style-type: none"><li>• Triaxial PE accel, low cost</li><li>• Environmentally sealed, rugged</li><li>• &lt;22µA current consumption</li></ul>
Operating Temp.	-40°C to 125°C
Dimensions (mm)	25.4 x 21.6 x 10.8
Typical Applications	Impact and shock testing, R&D and lab applications

# VIBRATION SENSORS

## PLUG AND PLAY ACCELEROMETERS

### PE Charge Accelerometer



#### 7500A

Package	Stainless steel
Type	Center-hole mount
Sensitivity	7pC/g to 20pC/g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Hermetically sealed</li> <li>• Isolated mounting surface</li> </ul>
Operating Temp.	-73°C to 260°C
Dimensions (mm)	8.4 x 22.3
Typical Applications	Gearbox vibration monitoring, flight test, high temp. applications



#### 7501A

Package	Titanium
Type	Center-hole mount
Sensitivity	5.6pC/g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Hermetically sealed</li> <li>• Bandwidth to &gt;15 kHz</li> </ul>
Operating Temp.	-73°C to 260°C
Dimensions (mm)	5.8 x 14.5
Typical Applications	Gearbox vibration monitoring, flight test, high temp. applications



#### 7502A

Package	Titanium
Type	Adhesive mounting
Sensitivity	1.8pC/g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Hermetically sealed</li> <li>• Miniature, &lt;1 gram</li> </ul>
Operating Temp.	-73°C to 260°C
Dimensions (mm)	4.4 x 11.9
Typical Applications	Small structures monitoring, minimal mass loading, high temp. applications



#### 7504A, 7505A

Package	Stainless steel
Type	Stud mount
Sensitivity	5.6pC/g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• Top and side connector option</li> <li>• &gt;15 kHz Bandwidth</li> </ul>
Operating Temp.	-73°C to 260°C
Dimensions (mm)	7504A; 11.1 x 14.1, 7505A; 11.1 x 19.0
Typical Applications	Small structures monitoring, general purpose, high temp. applications



#### 7514A

Package	Stainless steel
Type	Stud mounting
Sensitivity	30pC/g to 100pC/g
Unique Features	<ul style="list-style-type: none"> <li>• Single axis, shear mode</li> <li>• &gt;12 kHz bandwidth</li> <li>• High sensitivity</li> </ul>
Operating Temp.	-73°C to 260°C
Dimensions (mm)	15.0 x 15.0
Typical Applications	Low frequency vibration, general purpose, high temp. applications



#### 7531A

Package	Titanium
Type	Adhesive mount
Sensitivity	1.8pC/g
Unique Features	<ul style="list-style-type: none"> <li>• Triaxial, shear mode</li> <li>• Miniature, light weight</li> <li>• &gt;10 kHz bandwidth</li> </ul>
Operating Temp.	-73°C to 260°C
Dimensions (mm)	11.0 x 13.6 x 11.0
Typical Applications	High temp. applications, flight testing, structural monitoring

## PLUG AND PLAY ACCELEROMETERS

### Amplifiers



#### 121

Type	Bench top
No. of Channels	3
Gain Range	x0.001 to 9999
Unique Features	<ul style="list-style-type: none"> <li>• Universal DC amplifier</li> <li>• Low noise operation with auto-zero</li> <li>• For bridge type sensors</li> </ul>
Dimensions (mm)	301 x 258 x 102
Typical Applications	Instrumentation labs, test benches, R&D facilities



#### 130

Type	In-line charge converter
No. of Channels	1
Gain Range	x0.1, 1, 10
Unique Features	<ul style="list-style-type: none"> <li>• Low noise, small package</li> <li>• BNC male or female</li> <li>• Wide bandwidth</li> </ul>
Dimensions (mm)	Ø13.8 x 52.2
Typical Applications	Instrumentation labs, high temperature testing PE accelerometer



#### 140A & 142A

Type	Inline amplifier with auto-zero
No. of Channels	1
Gain Range	x10, 25, 50, 100, 200
Unique Features	<ul style="list-style-type: none"> <li>• ±1.5 mV auto-zero</li> <li>• 140A for bridge type sensor, 142A for strain gages</li> <li>• 5 to 30 VDC excitation</li> </ul>
Dimensions (mm)	57 x 25 x 13
Typical Applications	Instrumentation labs, test benches, R&D facilities



#### 160

Type	Bench top
No. of Channels	1
Gain Range	x1, 10
Unique Features	<ul style="list-style-type: none"> <li>• Economical IEPE power supply</li> <li>• Portable, compact</li> <li>• Rechargeable battery</li> </ul>
Dimensions (mm)	101 x 83 x 32
Typical Applications	Instrumentation



#### 161

Type	Bench top
No. of Channels	4
Gain Range	x0.001 to 999.9
Unique Features	<ul style="list-style-type: none"> <li>• Charge and IEPE conditioner</li> <li>• Sensitivity normalization</li> <li>• Support IEEE 1451.4 TEDS</li> </ul>
Dimensions (mm)	310 x 180 x 115
Typical Applications	Instrumentation labs, PE/IEPE sensors

# WATER LEVEL SENSORS



# WATER LEVEL SENSORS

## WATER LEVEL DATA LOGGERS



### TruBlue Logger 555 Level, 575 Baro, 585 CTD

Accuracy	±0.05% FS TEB (TruBlue 555, 575, 585) 1% of reading or 20 µs/cm (TruBlue 585)
Range	0 - 692 ft (TruBlue 555, 585) 8 - 16 psia (TruBlue 575) 5 - 200,000µs/cm (TruBlue 585)
Max. Over-range	2X FS (TruBlue 555, 585) 32 psia (TruBlue 575)
Output	RS-485, SDI - 12
Data Logging Memory	8 MB
Operating Temp.	0°C to 50°C
Dimensions (mm)	Ø19.0 x 390.0
Typical Applications	Groundwater monitoring, surface water monitoring, oceanographic research, barometric pressure monitoring



### TruBlue Logger 255 Level

Accuracy	0.05% FS TEB
Range	0 - 658 ft H <sub>2</sub> O
Max. Over-range	3X FS
Output	RS 485, SDI - 12
Data Logging Memory	8 MB or 56 MB
Operating Temp.	0°C to 50°C
Dimensions (mm)	Ø19.0 x 222.0
Typical Applications	Flood and storm monitoring, wave studies and rapid sampling, stream and stage gaging, slug and pump test, aquifer characterization



### TruBlue Logger 275 Baro

Accuracy	0.05% FS TEB
Range	8 - 16 psia
Max. Over-range	3X FS
Output	RS 485, SDI-12
Data Logging Memory	8 MB or 56 MB
Operating Temp.	0°C to 50°C
Dimensions (mm)	Ø19.0 x 222.0
Typical Applications	Barometric pressure monitoring

## DIGITAL LEVEL SENSORS



### KPSI 500, 501

Accuracy	±0.05% FS TEB (KPSI 500) ±0.01 ft H <sub>2</sub> O (KPSI 501)
Range	10 - 230 ft (KPSI 500) 10 - 50 ft (KPSI 501)
Max. Over-range	2X FS
Output	SDI - 12, RS-485
Operating Temp.	-20°C to 60°C
Dimensions (mm)	Ø25.4 x 197.0
Typical Applications	Groundwater monitoring, surface water monitoring, oceanographic research



### KPSI 351, 353, 355

Accuracy	±0.10% FS TEB (KPSI 353) ±0.05% FS TEB (KPSI 355) ±0.01 ft H <sub>2</sub> O (KPSI 351)
Range	10 - 230 ft (KPSI 353, 355) 10 - 50 ft (KPSI 351)
Max. Over-range	2X FS
Output	SDI - 12, RS-485
Operating Temp.	-20°C to 60°C
Dimensions (mm)	Ø19.0 x 243.0
Typical Applications	Groundwater monitoring, surface water monitoring, oceanographic research



### KPSI 600, 601 - Ceramic

Accuracy	±0.05% FS TEB (KPSI 600) ±0.01 ft H <sub>2</sub> O (KPSI 601)
Range	10 - 230 ft (KPSI 500) 10 - 50 ft (KPSI 501)
Max. Over-range	5X FS
Output	SDI - 12, RS-485
Operating Temp.	-20°C to 60°C
Dimensions (mm)	Ø25.4 x 197.0
Typical Applications	Dissolved gas monitoring, trailrace egress monitoring, ground water monitoring, oceanographic research

# WATER LEVEL SENSORS

## DIGITAL TEMPERATURE SENSORS



KPSI 380	
Accuracy	±0.1°C
Range	-20°C to 60°C
Connection	Open port nosepiece
Output	SDI - 12, RS-485
Operating Temp.	-20°C to 60°C
Dimensions (mm)	Ø19.0 x 127.0
Typical Applications	Groundwater monitoring, surface water monitoring, storm water, dam operations and stream gaging

## ANALOG LEVEL SENSORS

1" Bore



KPSI 700, 710, 720		KPSI 730, 735	
Accuracy	±1.00%, ±0.50%, ±0.25% FSO	Accuracy	±0.10%, ±0.05% FSO
Range	Custom ranges from: 2.3 - 700 ft H <sub>2</sub> O (Vented) 10 - 700 ft H <sub>2</sub> O (Sealed) 35 - 700 ft H <sub>2</sub> O (Absolute)	Range	Custom ranges from: 5 - 700 ft H <sub>2</sub> O (Vented: KPSI 730) 0 - 5 ft H <sub>2</sub> O to 0 - 700 ft H <sub>2</sub> O (Sealed, Absolute: KPSI 730) 6 - 700 ft H <sub>2</sub> O (Vented KPSI 735)
Max. Over-range	2X FS	Max. Over-range	2X FS
Output	4 - 20 mA, 0 - 5 VDC, 0 - 2.5 VDC, 0 - 4 VDC, 0 - 10 VDC, 1.5 - 7.5 VDC	Output	4 - 20 mA, 0 - 5 VDC, 0 - 2.5 VDC, 0 - 4 VDC, 0 - 10 VDC, 1.5 - 7.5 VDC
Operating Temp.	-20°C to 60°C	Operating Temp.	-20°C to 60°C
Dimensions (mm)	Ø25.4 x 86.6	Dimensions (mm)	Ø25.4 x 86.6
Typical Applications	Groundwater monitoring, surface water monitoring, oceanographic research, pump control, life stations, landfill leachate	Typical Applications	Groundwater monitoring, surface water monitoring, oceanographic research, pump control, life stations, landfill leachate
Agency Approvals	CE, WEEE, RoHS, UL and FM (Intrinsically safe)	Agency Approvals	CE, WEEE, RoHS, UL and FM (Intrinsically safe)

## ANALOG LEVEL SENSORS

0.75" Bore



KPSI 320, 330, 335, 342	
Accuracy	±0.10%, ±0.05% FSO (KPSI 330, 335) ±0.25% FSO (KPSI 320) ±0.25% FS TEB (KPSI 342)
Range	Custom ranges from: 5 - 700 ft H <sub>2</sub> O (Vented: KPSI 320, 330, 335) 10 - 700 ft H <sub>2</sub> O (Vented KPSI 342) 0 - 5 ft H <sub>2</sub> O to 0-700 ft H <sub>2</sub> O (Sealed: KPSI 330, 342) 10 - 700 ft H <sub>2</sub> O (Sealed: KPSI 320) 35 - 700 ft H <sub>2</sub> O (Absolute: KPSI 320, 330, 342)
Max. Over-range	2X FS
Output	4- 20 mA, 0 - 5 VDC, 0 - 2.5 VDC, 0 - 4 VDC, 0 - 10 VDC, 1.5 - 7.5 VDC (KPSI 320, 330, 335) 4 - 20 mA (KPSI 342)
Operating Temp.	-20°C to 60°C (KPSI 320, 330, 335) -20°C to 85°C (KPSI 342)
Dimensions (mm)	Ø19.0 x 151.0
Typical Applications	Groundwater monitoring, surface water monitoring, oceanographic research, pump control, lift stations, landfill leachate, tailrace and forebay monitoring
Agency Approvals	CE, WEEE, RoHS, UL and FM (Intrinsically safe) (KPSI 320, 330, 335) CE, WEEE, RoHS (KPSI 342)



KPSI 300DS	
Accuracy	±0.50% FSO
Range	Custom ranges from: 700 - 6,921 ft H <sub>2</sub> O
Max. Over-range	2X FS
Output	4 - 20 mA, 0 - 5 VDC, 0 - 2.5 VDC, 0 - 4 VDC, 0 - 10 VDC, 1.5 - 7.5 VDC
Operating Temp.	-20°C to 60°C
Dimensions (mm)	Ø19.0 x 215.0
Typical Applications	Down hole, level control, pump control
Agency Approvals	CE, WEEE, RoHS