

Single Axis Inclinometers

LSO Series



- ±1° to ±90° Input Full Range
- Vibration 20 grams
- 1 μ Rad Resolution
- High Accuracy Closed-loop
- 1,500g Shock Capability

LSOC-8 Series



- ± 8° Input Full Range
- 3 Full Range Models
- Hysteresis 0.002 V Max
- Noise 0.001 Vrms Max
- Connector Termination
- AREMA/CENELEC Certified

LCF-100 Series



- ±1° to ±90° Input Full Range
- 1 μ Rad Resolution
- Available Internal Temperature Sensor
- High level ± 5Vdc Output

LCF-300 Series



- ±1° to ±90° Input Full Range
- Direct Bogie Mount
- Filtering Available 5-50 Hz
- Output Temp Sens >.0005
- High level ± 5Vdc Output
- 40° to +80° C Temp Rating

Digital Inclinometer

DXI-100/200 Series



- ± 1° to ± 60° Full Range
- Single or Dual Axis Available
- High Precision and Performance
- RS485 and RS422 outputs
- Resolution of 0.001°
- AREMA/CENELEC Certified

- Railcar Acceleration Control
- Automatic Train Positioning Control
- Railcar Monitoring
- Train Banking and Braking

Single Axis Accelerometers

LCA-165 Series



- ±0.5g to ±5.0g Full Range
- Filtering Available
- Exceptional Bias & Scale Factor
- High Level ± Vdc Output
- 100g Shock Capability
- AREMA/CENELEC Certified

- Railcar Accel/Decel Control
- Train Performance Test
- Active Damping
- Railcar Monitoring
- Railcar Vibration Testing

LCF-500 Series



- Filtering Available
- Exceptional Bias & Scale Factor
- High Level ± Vdc Output
- 100g Shock Capability
- AREMA/CENELEC Certified

- Railcar Accel/Decel Control
- Railcar Harshness (NVH)
- Train Performance Testing
- Railcar Monitoring
- Railcar Vibration Testing

LSMP Series



- ±0.5g to ±20.0g Full Range
- Filtering up to 200 Hz Bandwidth w/0.6 Damping
- Satellite Application Reliability
- Better Than 20 μg Res @ 10g Full Scale
- 55° C to +95° C Operating Temp Range

- Train Banking and Braking
- Train Performance Testing
- Position Double Integration
- Railcar Monitoring
- Tilt Train Controls

LSBC Series



Digital Accelerometer

DXA-100/200 Digital Series



- ± 0.25g to ± 2.0g Full Range
- Single or Dual Axis Available
- High Precision and Performance
- RS485 & RS422 outputs
- Resolution of 8 μg
- AREMA/CENELEC Certified

- Railcar Acceleration Control
- Automatic Train Positioning Control
- Railcar Monitoring
- Train Banking and Braking

MEMS Accelerometer

JMA-165 Series



- Low-cost MEMS technology
- Optional Internal heater for reduced thermal drift
- RoHS Compliant
- Filtering Available
- AREMA/CENELEC Certified

- Automated Train Controls
- Acceleration/Deceleration Control
- Rail Maintenance & Testing
- Train Performance Testing

Features & Benefits

Applications

Performance Specs

Input Range (°) 1:	±1.0	±3.0	±14.5	±30.0
Full Range Output (FRO V± 1.0%) 2:	±5.0 V or 4 - 20 mA			
Non Linearity (%FRO 3, Max.):	0.05	0.05	0.02	0.02
Scale Factor (V/g, Nom.):	286.5	95.5	20.0	10.0
Scale Factor Temp Sens (PPM/°C, Max.):	400	300	100	60
Natural Frequency (Hz, Nom. 4):	0.5	2.0	15.0	20.0
Bandwidth (-3db) (Hz, Nom.):	0.5	2.0	15.0	20.0
Input-Axis Misalignment (° Max.):	0.10	0.15	0.25	0.50
Output @ 0° Tilt (Bias) (V, Max.):	0.10	0.04	0.02	0.02
0° Output Temp Sensitivity (V/°C, Max.):	.005	.003	.001	.0005
Resolution and Threshold (μ Rad Max.):	1.0	1.0	1.0	1.0

Input Range (g)	±0.5	±1.0
Full Range Output (FRO V± 1.0%)	±5.0	±5.0
Non Linearity (%FRO, Max.)	0.2	0.1
Scale Factor (V/g, Nom.)	10	5
Scale Factor Temp Sens (PPM/°C, Max.)	See datasheets	
Bias (mg, Max.)	±0.01	
Bias Temp. Sensitivity (μg/°C, Max.)	See datasheets	
Bandwidth (-3db) (Hz, Nom.)	100	100
Transverse Axis Misalignment (°, Max.)	± 0.7	± 0.7
Resolution and Threshold (μg, Max.)	0.3 mg	0.6 mg

Number of Axes	1
Input Voltage (Vdc)	9 to 18
Input Current (mA, Max.)	40
Output Impedance (Ohms, Nom.)	10
Noise (Max.)	0.001

Operating Temperature Range	-18° C to +71° C
Survival Temperature Range	-40° C to +71° C
Vibration	20 g
Shock	1500 g, 0.5 msec, 1/2 sine
IP Rating	IP68

Features & Benefits

Applications

Performance Specs

Input Range (°) 1:	±1.0	±3.0	±14.5	±30.0
Full Range Output (FRO V± 1.0%) 2:	±5.0 V or 4 - 20 mA			
Non Linearity (%FRO 3, Max.):	0.05	0.05	0.02	0.02
Scale Factor (V/g, Nom.):	286.5	95.5	20.0	10.0
Scale Factor Temp Sens (PPM/°C, Max.):	400	300	100	60
Natural Frequency (Hz, Nom. 4):	0.5	2.0	15.0	20.0
Bandwidth (-3db) (Hz, Nom.):	0.5	2.0	15.0	20.0
Input-Axis Misalignment (° Max.):	0.10	0.15	0.25	0.50
Output @ 0° Tilt (Bias) (V, Max.):	0.10	0.04	0.02	0.02
0° Output Temp Sensitivity (V/°C, Max.):	.005	.003	.001	.0005
Resolution and Threshold (μ Rad Max.):	1.0	1.0	1.0	1.0

Number of Axes	1
Input Voltage (Vdc)	Output dependent, see datasheets
Input Current (mA, Max.)	Output dependent, see datasheets
Output Impedance (Ohms, Nom.)	Output dependent, see datasheets
Noise (Max.)	Output dependent, see datasheets

Operating Temperature Range	-18° C to +71° C
Survival Temperature Range	-40° C to +71° C
Vibration	20 g
Shock	1500 g, 0.5 msec, 1/2 sine
IP Rating	IP68

Weight	13.0 oz.
Dimensions	1.60" W x 2.94" L x 1.70" H
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	Output dependent, see datasheets
Input Current (mA, Max.)	Output dependent, see datasheets
Output Impedance (Ohms, Nom.)	Output dependent, see datasheets
Noise (Max.)	Output dependent, see datasheets

Operating Temperature Range	-25° C to +70° C
Survival Temperature Range	-60° C to +90° C
Vibration	20 g
Shock	1500 g, 0.5 msec, 1/2 sine
IP Rating	IP65

Weight	13.0 oz.
Dimensions	1.60" W x 2.94" L x 1.70" H
Custom Ability	No

Number of Axes	1
Input Voltage (Vdc)	9 to 18
Input Current (mA, Max.)	40
Output Impedance (Ohms, Nom.)	10
Noise (Max.)	0.001

Operating Temperature Range	-40° C to +80° C
Survival Temperature Range	-60° C to +90° C
Vibration	20 g
Shock	1000 g, 0.5 msec, 1/2 sine
IP Rating	Epoxy Seal

Weight	4.0 oz.
Dimensions	1.50" W x 3.10" L x 1.50" H
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	±12 to ±18
Input Current (mA, Max.)	15
Output Impedance (Ohms, Nom.)	100
Noise (Max.)	0.0020

Operating Temperature Range	-40° C to +80° C
Survival Temperature Range	-60° C to +90° C
Vibration	20 g
Shock	1500 g, 1 msec, 1/2 sine
IP Rating	IP65

Weight	4.0 oz.
Dimensions	1.50" W x 3.10" L x 1.50" H
Custom Ability	Yes

Number of Axes	1 or 2
Input Voltage (Vdc)	10 to 30
Input Current (mA, Max.)	See datasheet
Output Impedance (Ohms, Nom.)	-
Noise (Max.)	0.005

Operating Temperature Range	-55° C to +85° C
Survival Temperature Range	-60° C to +90° C
Vibration	20 g
Shock	100 g, 0.011 msec, 1/2 sine
IP Rating	IP65

Weight	13.0 oz./DXI-200 10 oz.
Dimensions	1.62" W x 3.609" L x 1.83" H
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	±12 to ±18
Input Current (mA, Max.)	25
Output Impedance (Ohms, Nom.)	100
Noise (Max.)	0.005

Operating Temperature Range	-40° C to +85° C
Survival Temperature Range	-40° C to +85° C
Vibration	20 g
Shock	1500 g, 1msec, 1/2 sine
IP Rating	IP67

Weight	8.0 oz.
Dimensions	1.38" W x 3.46" L x 1.65" H 2.15" Over Connector
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	±12 to ±18
Input Current (mA, Max.)	25
Output Impedance (Ohms, Nom.)	100
Noise (Max.)	0.005

Operating Temperature Range	-55° C to +95° C
Survival Temperature Range	-65° C to +105° C
Vibration	20 g
Shock	100 g, 11 msec, 1/2 sine
IP Rating	IP66 (LSBC)

Weight	85 grams
Dimensions	3.1" W x 1.38" L x 1.9" H
Custom Ability	Yes

Number of Axes	1 or 2
Input Voltage (Vdc)	+ 10 to + 30
Input Current (mA, Nom.)	100
Output Impedance (Ohms, Nom.)	-
Noise (g, Max.)	0.005

Operating Temperature Range	-40° C to +85° C
Survival Temperature Range	-40° C to +85° C
Vibration	20 g
Shock	1500 g, 1msec, 1/2 sine
IP Rating	IP67

Weight	13.0 oz.
Dimensions	1.60" W x 2.94" L x 1.70" H
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	±12 to ±18
Input Current (mA, Max.)	25
Output Impedance (Ohms, Nom.)	100
Noise (Max.)	0.005

Operating Temperature Range	-55° C to +95° C
Survival Temperature Range	-65° C to +105° C
Vibration	20 g
Shock	100 g, 11 msec, 1/2 sine
IP Rating	IP66 (LSBC)

Weight	13.0 oz.
Dimensions	1.60" W x 2.94" L x 1.70" H
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	±12 to ±18
Input Current (mA, Max.)	25
Output Impedance (Ohms, Nom.)	100
Noise (Max.)	0.005

Operating Temperature Range	-40° C to +85° C
Survival Temperature Range	-40° C to +85° C
Vibration	20 g
Shock	1500 g, 1msec, 1/2 sine
IP Rating	IP67

Weight	13.0 oz.
Dimensions	1.60" W x 2.94" L x 1.70" H
Custom Ability	Yes

Number of Axes	1
Input Voltage (Vdc)	±12 to ±18
Input Current (mA, Max.)	25
Output Impedance (Ohms, Nom.)	100
Noise (Max.)	0.005

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