



LSOC/LSOP

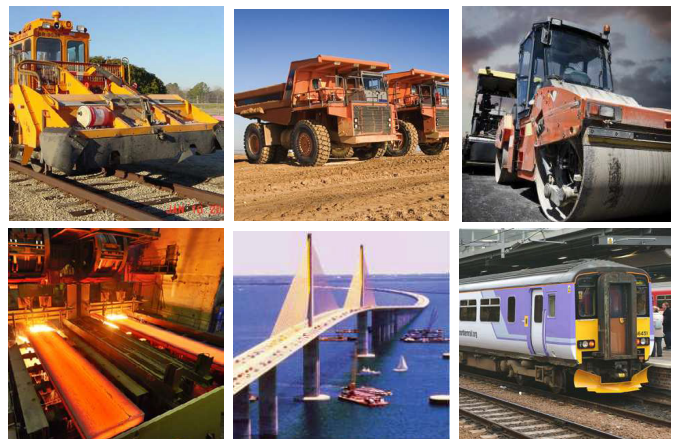
Single-Axis Analog Inclinometer

The LSOC/LSOP Series fluid damped, flexure suspension, servo inclinometer is a precision internal grade sensing instruments and it is our most robust solution designed to meet the needs of a variety of commercial, industrial, and aerospace applications. LSOC/LSOP Series is a fluid damped design. Units are available with a 6-pin connector, or pin-terminals and in $\pm 5V$ and 4-20mA outputs.



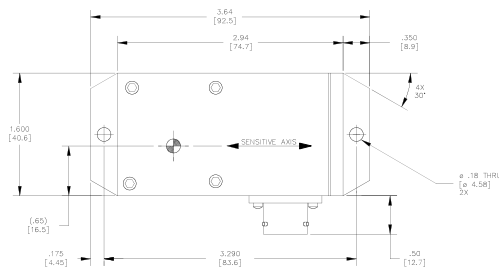
FEATURES

- Extremely high resolution and low hysteresis of less than 0.0005% of full range output.
- Extremely robust designed to withstand shocks in excess of 1500g and vibration of 20 grms.
- Responds to changes of slope as small as 0.000006"/ft.
- High accuracy closed-loop force balanced sensor technology.
- Low white noise spectral density of better than 0.15 μV /Sq. Root HZ
- RoHS compliant

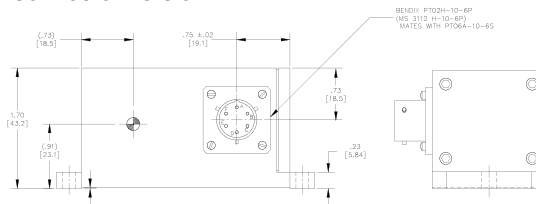


APPLICATIONS

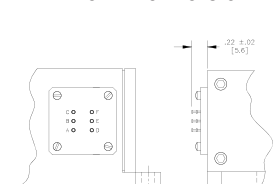
- Steel Processing
- Continuous Casting
- Electric Arc Furnace
- Idle Control
- Heavy construction
- Paving
- Grading
- Mining
- Tunneling
- Overturn Detection
- Structural Monitoring
- Automated Train Controls
- Rail Leveling and Grinding
- Rail Bed Analysis



Connector Version



Pin-Terminal Version



Dimensions: in [mm]



LSOC/LSOP: $\pm 5V$ OUTPUT

The LSOC/LSOP Series fluid damped, flexure suspension, servo inclinometer is a precision internal grade sensing instruments and it is our most robust solution designed to meet the needs of a variety of commercial, industrial, and aerospace applications.

APPLICATIONS

- Steel Processing
- Heavy Construction
- Structural Monitoring
- Railway Control & Analysis

PERFORMANCE SPECIFICATIONS

STATIC/DYNAMIC

INPUT RANGE (°)	± 1	± 3	± 14.5	± 30	± 45	± 90
FULL RANGE OUTPUT (VDC) $\pm 1\%^1$	± 5					
NONLINEARITY (% FRO) ² max	0.05	0.05	0.02	0.02	0.02	0.05
SCALE FACTOR (V/g) nominal	286.5	95.5	20.0	10.0	7.071	5.0
SCALE FACTOR TEMP. SENSITIVITY (PPM/°C max)	400	300	100	60	60	60
BANDWIDTH (-3dB) Hz, nominal	0.5	2	15	20	20	40
TRANSVERSE AXIS MISALIGNMENT, ° max	0.1	0.15	0.25	0.5	1.00	1.00
OUTPUT AT 0° TILT (V)	± 0.1	± 0.04	± 0.02	± 0.02	± 0.02	± 0.02
0° OUTPUT TEMP. SENSITIVITY (Volts/°C) max	0.005	0.003	0.001	0.0005	0.0004	0.0003
RESOLUTION & THRESHOLD (μ radians) max	1					

PIN OUT

A	RED	SUPPLY +15VDC
B	WHITE	POWER/SIGNAL COMMON
C	BLACK	SUPPLY -15VDC
D	ORANGE	$\pm 5V$ OUTPUT
E	N/C	SELF TEST RETURN
F	BLUE	SELF TEST

NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as deviation of output referenced to theoretical sine function value, independent of misalignment.

*Specifications subject to change without notice on account of continued product development



ELECTRICAL

NUMBER OF AXES	1
INPUT VOLTAGE RANGE (VDC)	±12 to ±18
INPUT CURRENT (mA, max)	15
OUTPUT IMPEDANCE (Ohms) nominal	100
NOISE (Vrms, max)	0.002

ENCLOSURE

HOUSING MATERIAL	1 Anodized Aluminum
WEIGHT	13 oz (368.5 g)
PROTECTION CLASS (per IEC 529)	IP68
FASTENER SIZE ³	#8-32 (M4X0.7)
TORQUE FOR STEEL FASTENERS ⁴	10 inch-lbs (1.0nM)
JEWELL CONNECTOR PART #	62101011-000
SURFACE FLATNESS ³	0.003 (0.0765mm)

ENVIRONMENTAL

OPERATING TEMP. RANGE	-18° to +71°C
STORAGE TEMP. RANGE	-40° to +71°C
VIBRATION	20 grms
SHOCK	1500g, 0.5 msec, ½ sine

NOTES:

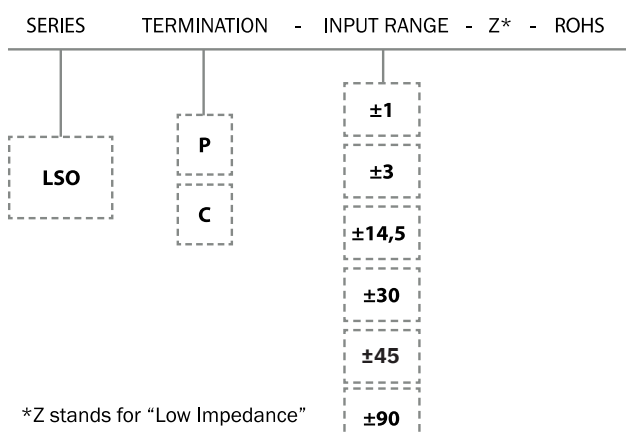
3. Jewell Instruments recommendations
4. Manufacture is Amphenol or equivalent

CUSTOM CAPABILITIES

- Internal temperature sensor and thermal modeling for the highest levels of accuracy over a wide temperature range
- Available in LSR Series package configuration for applications requiring a more compact solution
- Factory set zero biasing for non-horizontal measurements
- Solder terminals and flying leads in place of military connector
- Custom input ranges from ±0.5° to ±90° available
- Custom output impedances available
- Custom bandwidths available on certain ranges

ORDERING INFORMATION

Model Numbers are comprised of the series, the connector option, and the input range.



	TERMINATION	MODEL #	PART #
±1	PIN	LSOP-1-Z-ROHS	02550412-201-ROHS
	CONNECTOR	LSOC-1-Z-ROHS	02550412-206-ROHS
±3	PIN	LSOP-3-Z-ROHS	02550412-202-ROHS
	CONNECTOR	LSOC-3-Z-ROHS	02550412-207-ROHS
±14.5	PIN	LSOP-14.5-Z-ROHS	02550412-203-ROHS
	CONNECTOR	LSOC-14.5-Z-ROHS	02550412-208-ROHS
±30	PIN	LSOP-30-Z-ROHS	02550412-204-ROHS
	CONNECTOR	LSOC-30-Z-ROHS	02550412-209-ROHS
±45	PIN	Not Available	Not Available
	CONNECTOR	LSOC-45-Z-ROHS	02550412-211-ROHS
±90	PIN	LSOP-90-Z-ROHS	02550412-205-ROHS
	CONNECTOR	LSOC-90-Z-ROHS	02550412-210-ROHS



■ LSOC/LSOP-L: 4-20MA OUTPUT

The LSOC/LSOP “L” Series 4-20 mA Output Flexure Suspension Servo Fluid Damped Inclinometer is designed for applications where high levels of shock, vibration and electrical noise are present and/or long cable runs are required.

■ APPLICATIONS

- Steel Processing
- Heavy Construction
- Structural Monitoring
- Railway Control & Analysis
- Military Applications

■ PERFORMANCE SPECIFICATIONS

STATIC/DYNAMIC

INPUT RANGE (°) ¹	±1	±3	±14.5	±30	±90
FULL RANGE OUTPUT (FRO) mA ±1.0%	4-20				
NONLINEARITY (% FRO) ² max	0.05	0.05	0.10	0.10	0.05
SCALE FACTOR (mA/g) nominal	458.4	152.6	32.00	16.0	8.0
SCALE FACTOR TEMP SENSITIVITY (PPM/°C max)	400	300	100	100	100
BANDWIDTH (-3dB) Hz, nominal	0.3	2.0	15	20	30
TRANSVERSE AXIS MISALIGNMENT, ° max	0.15	0.25	0.50	1.00	1.00
0° OUTPUT (mA)	12 ±0.6	12 ±0.6	12 ±0.3	12 ±0.3	12 ±0.3
OUTPUT AT 0° TILT TEMP. SENSITIVITY (mA/°C) max	0.015	0.01	0.0032	0.0032	0.0016
RESOLUTION & THRESHOLD (µrad) max	1				

■ PIN OUT

A	RED	+VDC POWER
B	WHITE	POWER/SIGNAL COMMON
C	BLACK	N/C
D	ORANGE	4-20 mA SIGNAL OUTPUT
E	N/C	SELF TEST RETURN
F	BLUE	SELF TEST

NOTES:

1. Full range is defined as “from negative full input angle to positive full input angle.” The inclinometer output is proportional to the sine of the tilt angle.
2. Referenced to theoretical sine value independent of misalignment.

*Specifications subject to change without notice on account of continued product development



ELECTRICAL

INPUT VOLTAGE RANGE (VDC)	20 to 30 (24 nominal)
INPUT CURRENT (mA, max)	40
NOISE (Vrms, max)	0.01

ENVIRONMENTAL

OPERATING TEMP. RANGE	-18° to +71°C
STORAGE TEMP. RANGE	-40° to +71°C
VIBRATION	20 grms
SHOCK	1500g, 0.5 msec, ½ sine

ENCLOSURE

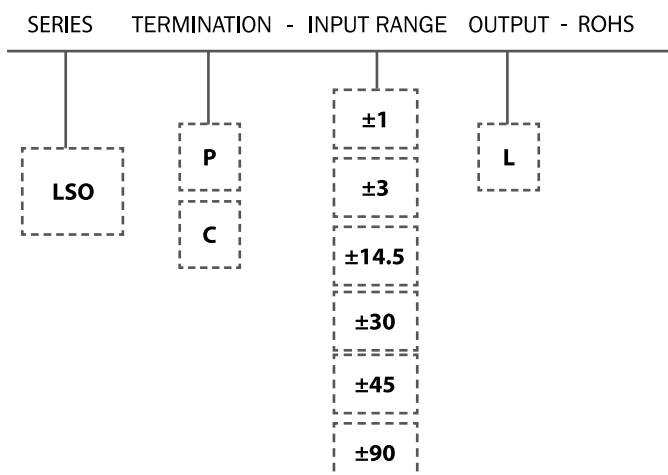
HOUSING MATERIAL	Anodized Aluminum
WEIGHT	13 oz (368.5 g)
PROTECTION CLASS (per IEC 529)	IP68
FASTENER SIZE ³	#8-32 (M4X0.7)
TORQUE FOR STEEL FASTENERS ⁴	10 inch-lbs (1.0nM)
JEWELL CONNECTOR PART #	62101011-000
SURFACE FLATNESS ³	0.003 (0.0765mm)

CUSTOM CAPABILITIES

- Internal temperature sensor and thermal modeling for the highest levels of accuracy over a wide temperature range
- Factory set zero biasing for non-horizontal measurements
- Solder terminals and flying leads in place of military connector
- Custom input ranges from $\pm 0.5^\circ$ to $\pm 90^\circ$ available
- Custom bandwidths available on certain ranges

ORDERING INFORMATION

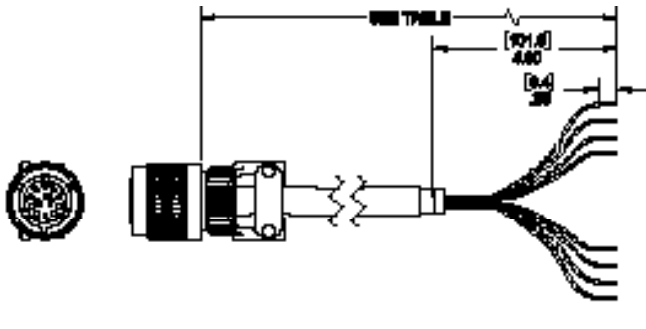
Model Numbers are comprised of the series, the connector option, and the input range.



	TERMINATION	MODEL #	PART #
± 1	PIN	LSOP-1L-ROHS	02550412-501-ROHS
	CONNECTOR	LSOC-1L-ROHS	02550412-506-ROHS
± 3	PIN	LSOP-3L-ROHS	02550412-502-ROHS
	CONNECTOR	LSOC-3L-ROHS	02550412-507-ROHS
± 14.5	PIN	LSOP-14.5L-ROHS	02550412-503-ROHS
	CONNECTOR	LSOC-14.5L-ROHS	02550412-508-ROHS
± 30	PIN	LSOP-30L-ROHS	02550412-504-ROHS
	CONNECTOR	LSOC-30L-ROHS	02550412-509-ROHS
± 45	PIN	Not Available	Not Available
	CONNECTOR	LSOC-45L-ROHS	02550412-511-ROHS
± 90	PIN	LSOP-90L-ROHS	02550412-505-ROHS
	CONNECTOR	LSOC-90L-ROHS	02550412-510-ROHS



ACCESSORIES / CONNECTOR CABLE



PART #	MODEL #	LENGTH m (ft)
62101011-001	6-Pin Mating Connector	-
879605-007	DSI-CBL-02M-1	2 (6.56)
879605-008	DSI-CBL-03M-1	3 (9.84)
879605-020	DSI-CBL-05M-1	5 (16.4)
Contact manufacturer for custom lengths		

LSOC/LSOP SERIES ORDERING

	VERS	TERMINATION	MODEL	PART
±1	±5V	PIN	LSOP-1-Z-ROHS	02550412-201-ROHS
		CONNECTOR	LSOC-1-Z-ROHS	02550412-206-ROHS
	L	PIN	LSOP-1L-ROHS	02550412-501-ROHS
		CONNECTOR	LSOC-1L-ROHS	02550412-506-ROHS
±3	±5V	PIN	LSOP-3-Z-ROHS	02550412-202-ROHS
		CONNECTOR	LSOC-3-Z-ROHS	02550412-207-ROHS
	L	PIN	LSOP-3L-ROHS	02550412-502-ROHS
		CONNECTOR	LSOC-3L-ROHS	02550412-507-ROHS
±14.5	±5V	PIN	LSOP-14.5-Z-ROHS	02550412-203-ROHS
		CONNECTOR	LSOC-14.5-Z-ROHS	02550412-208-ROHS
	L	PIN	LSOP-14.5L-ROHS	02550412-503-ROHS
		CONNECTOR	LSOC-14.5L-ROHS	02550412-508-ROHS

	VERS	TERMINATION	MODEL	PART
±30	±5V	PIN	LSOP-30-Z-ROHS	02550412-204-ROHS
		CONNECTOR	LSOC-30-Z-ROHS	02550412-209-ROHS
	L	PIN	LSOP-30L-ROHS	02550412-504-ROHS
		CONNECTOR	LSOC-30L-ROHS	02550412-509-ROHS
±45	±5V	PIN	Not Available	Not Available
		CONNECTOR	LSOC-45-Z-ROHS	02550412-211-ROHS
	L	PIN	Not Available	Not Available
		CONNECTOR	LSOC-45L-ROHS	02550412-511-ROHS
±90	±5V	PIN	LSOP-90-Z-ROHS	02550412-205-ROHS
		CONNECTOR	LSOC-90-Z-ROHS	02550412-210-ROHS
	L	PIN	LSOP-90L-ROHS	02550412-505-ROHS
		CONNECTOR	LSOC-90L-ROHS	02550412-510-ROHS