

## LSOX SERIES

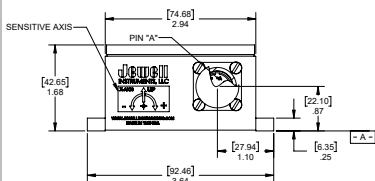
### Single-Axis Analog Inclinometer

The Jewell LSOX Single-Axis Analog Inclinometer series are rugged, high precision tilt sensor designed for peak performance in extreme conditions. These RoHS compliant sensors feature a fluid damped mechanism to deliver superior noise rejection in high shock and vibration environments as well as excellent output stability. Units are available with a 6-pin connector, pin-terminals or flying leads and in three different output versions ( $\pm 5V$  DC, 0-5V DC, and 4-20mA).

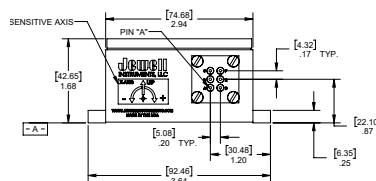
#### FEATURES:

- Extremely Rugged
- High Accuracy
- Internal Temperature Sensor Available
- $\pm 5V$  DC, 0-5V DC, and 4-20mA Outputs Available
- RoHS Compliant

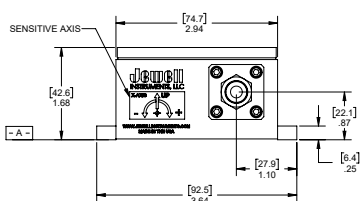
#### Connector Version



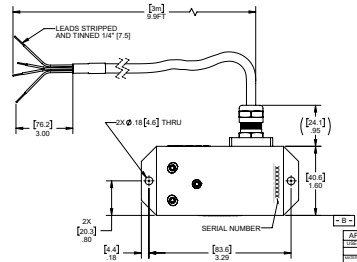
#### Pin-Terminal Version



#### Wired Version



#### Bottom View



Dimensions: in [mm]



#### APPLICATIONS:

- High-precision Geotech
- Oil and Gas, Riser Tilt Monitoring
- Railroad MOW Equipment
- Pavement Profiling Rigs
- Vehicle Wheel Alignment
- Robotics

# LSOX-D: $\pm 5V$ OUTPUT

The Jewell LSOX Series fluid damped, flexure suspension, servo inclinometer is a precision internal grade sensing instruments and it is Jewell's most robust solution designed to meet the needs of a variety of commercial, industrial, and aerospace applications. Version D features a  $\pm 5V$  DC output and input ranges from  $\pm 12^\circ$  to  $\pm 18^\circ$ . Available with either a connector, pin, or wired option.

## APPLICATIONS:

- High-precision Geotech
- Oil and Gas, Riser Tilt Monitoring
- Railroad MOW Equipment
- Pavement Profiling Rigs
- Vehicle Wheel Alignment
- Robotics

## PERFORMANCE SPECIFICATIONS

### STATIC/DYNAMIC

INPUT RANGE ( $^\circ$ )	$\pm 1$	$\pm 3$	$\pm 14.5$	$\pm 30$	$\pm 60$	$\pm 90$
FULL RANGE OUTPUT (VDC) (FRO $\pm 0.5\%$ ) <sup>1</sup>	$\pm 5$					
NONLINEARITY (% FRO) <sup>2</sup>	0.05	0.04	0.02	0.02	0.03	0.03
SCALE FACTOR (V/g) nominal	286.5	95.5	20.0	10.0	5.8	5.0
SCALE FACTOR TEMP SENSITIVITY (PPM/ $^\circ C$ max)	300	150	100	100	100	100
BANDWIDTH (-3dB) Hz, nominal	0.5	2	15	20	30	30
TRANSVERSE AXIS MISALIGNMENT, $^\circ$ max	$\pm 0.25$	$\pm 0.5$	$\pm 0.5$	$\pm 0.5$	$\pm 0.5$	$\pm 0.5$
0 $^\circ$ OUTPUT (VDC) nominal	$\pm 0.10$	$\pm 0.04$	$\pm 0.02$	$\pm 0.02$	$\pm 0.02$	$\pm 0.02$
0 $^\circ$ OUTPUT TEMP. SENSITIVITY (Volts/ $^\circ C$ ) max	0.015	0.005	0.001	0.0005	0.0003	0.0003
RESOLUTION & THRESHOLD ( $\mu rad$ )	1					

#### 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.

### PIN OUTS

#### PIN & CONNECTOR OPTIONS

A	RED	+ POWER IN
B	WHITE	COMMON
C	BLACK	- POWER IN
D	ORANGE	SIGNAL OUT
E		N/C
F	BLUE	N/C

Specifications are subject to change without notice due to continued product development

#### WIRED OPTION

RED	+ POWER IN
WHITE	COMMON
BLACK	- POWER IN
GREEN	SIGNAL OUT



# PRODUCT SPECIFICATIONS: LSOX-D

## ELECTRICAL

<b>NUMBER OF AXES</b>	1
<b>INPUT VOLTAGE RANGE (VDC)</b>	±12 to ±18
<b>INPUT CURRENT (mA, max)</b>	15
<b>NOISE (Vrms, max)</b>	0.002
<b>MASS (g)</b>	370
<b>OUTPUT IMPEDENCE (Ohms) nom.</b>	1

## ENVIRONMENTAL

<b>OPERATING TEMP. RANGE</b>	-40° to +80° C
<b>STORAGE TEMP. RANGE</b>	-60° to +90° C
<b>SHOCK</b>	1500g, 0.5 msec, ½ sine

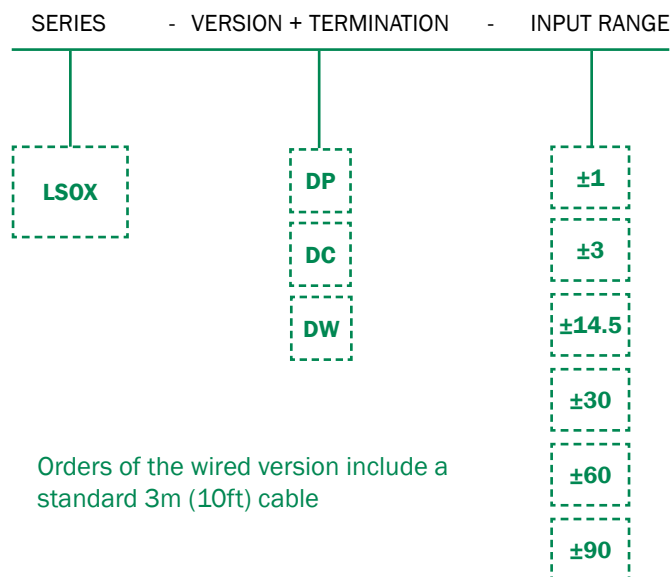
## ENCLOSURE

<b>SEAL</b>	IP66
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# ORDERING INFORMATION

## HOW TO ORDER

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



	TERMINATION	MODEL #	PART #
±1	PIN	LSOX-DP-1	02550334-201
	CONNECTOR	LSOX-DC-1	02550336-201
	WIRED	LSOX-DW-1	02550335-201
±3	PIN	LSOX-DP-3	02550334-202
	CONNECTOR	LSOX-DC-3	02550336-202
	WIRED	LSOX-DW-3	02550335-202
±14.5	PIN	LSOX-DP-14.5	02550334-203
	CONNECTOR	LSOX-DC-14.5	02550336-203
	WIRED	LSOX-DW-14.5	02550335-203
±30	PIN	LSOX-DP-30	02550334-204
	CONNECTOR	LSOX-DC-30	02550336-204
	WIRED	LSOX-DW-30	02550335-204
±60	PIN	LSOX-DP-60	02550334-205
	CONNECTOR	LSOX-DC-60	02550336-205
	WIRED	LSOX-DW-60	02550335-205
±90	PIN	LSOX-DP-90	02550334-206
	CONNECTOR	LSOX-DC-90	02550336-206
	WIRED	LSOX-DW-90	02550335-206

# LSOX-L: 4-20mA OUTPUT

The Jewell LSOX Series fluid damped, flexure suspension, servo inclinometer is a precision internal grade sensing instruments and it is Jewell's most robust solution designed to meet the needs of a variety of commercial, industrial, and aerospace applications. Version D features a 4-20mA output and input ranges from +20 to +30. Available with either a connector, pin, or wired option.

## APPLICATIONS:

- High-precision Geotech
- Oil and Gas, Riser Tilt Monitoring
- Railroad MOW Equipment
- Pavement Profiling Rigs
- Vehicle Wheel Alignment
- Robotics

## PERFORMANCE SPECIFICATIONS

### STATIC/DYNAMIC

INPUT RANGE (°)	±1	±3	±14.5	±30	±60	±90
FULL RANGE OUTPUT (mA) (FRO ± 01.0%) <sup>1</sup>	4-20					
NONLINEARITY (% FRO) <sup>2</sup>	0.05	0.05	0.02	0.02	0.03	0.03
SCALE FACTOR (mA/g) nominal	458.4	152.9	32.0	16.0	9.2	8.0
SCALE FACTOR TEMP SENSITIVITY (PPM/°C max)	300	300	100	80	80	80
BANDWIDTH (-3dB) Hz, nominal	0.5	2	15	20	30	30
TRANSVERSE AXIS MISALIGNMENT, ° max	±0.25	±0.5	±0.5	±0.5	±0.5	±0.5
0° OUTPUT (mA) range	12 ±0.3	12 ±0.6	12 ±0.3	12 ±0.3	12 ±0.3	12 ±0.3
0° OUTPUT TEMP. SENSITIVITY (mA/°C) max	0.24	0.01	0.002	0.001	0.001	0.001
RESOLUTION & THRESHOLD (µrad)	1					

#### NOTES:

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

### PIN OUTS

#### PIN & CONNECTOR OPTIONS

A	RED	POWER IN
B	WHITE	COMMON
C	BLACK	N/C
D	ORANGE	SIGNAL OUT
E		N/C
F	BLUE	N/C

Specifications are subject to change without notice due to continued product development

#### WIRED OPTION

RED	POWER IN
WHITE	COMMON
BLACK	N/C
GREEN	SIGNAL OUT

# PRODUCT SPECIFICATIONS: LSOX-L

## ELECTRICAL

NUMBER OF AXES	1
INPUT VOLTAGE RANGE (VDC)	+20 to +30
INPUT CURRENT (mA, max)	50
NOISE (mA rms, max)	0.01
WEIGHT (g)	370

## ENVIRONMENTAL

OPERATING TEMP. RANGE	-40° to +80°C
STORAGE TEMP. RANGE	-60° to +90°C
SHOCK	1000g, 1 msec, ½ sine

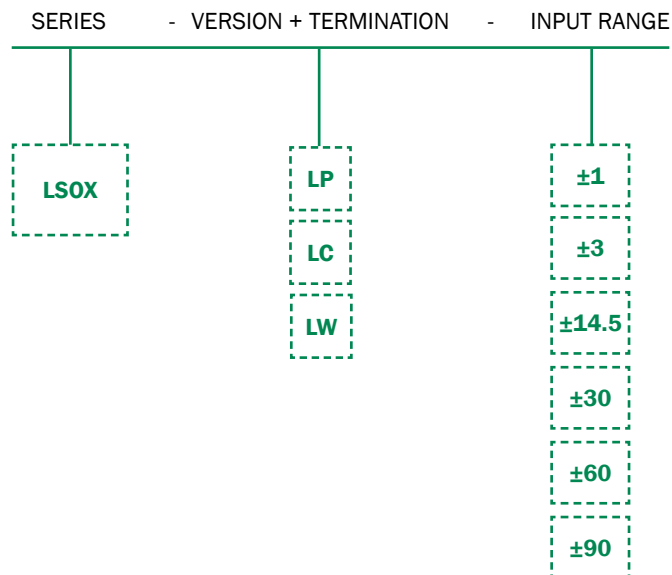
## ENCLOSURE

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# ORDERING INFORMATION

## HOW TO ORDER

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



	TERMINATION	MODEL #	PART #
±1	PIN	LSOX-LP-1	02550334-301
	CONNECTOR	LSOX-LC-1	02550336-301
	WIRED	LSOX-LW-1	02550335-301
±3	PIN	LSOX-LP-3	02550334-302
	CONNECTOR	LSOX-LC-3	02550336-302
	WIRED	LSOX-LW-3	02550335-302
±14.5	PIN	LSOX-LP-14.5	02550334-303
	CONNECTOR	LSOX-LC-14.5	02550336-303
	WIRED	LSOX-LW-14.5	02550335-303
±30	PIN	LSOX-LP-30	02550334-304
	CONNECTOR	LSOX-LC-30	02550336-304
	WIRED	LSOX-LW-30	02550335-304
±60	PIN	LSOX-LP-60	02550334-305
	CONNECTOR	LSOX-LC-60	02550336-305
	WIRED	LSOX-LW-60	02550335-305
±90	PIN	LSOX-LP-90	02550334-306
	CONNECTOR	LSOX-LC-90	02550336-306
	WIRED	LSOX-LW-90	02550335-306



# LSOX-S: 0-5V OUTPUT

**CE** The Jewell LSOX Series fluid damped, flexure suspension, servo inclinometer is a precision internal grade sensing instruments and it is Jewell's most robust solution designed to meet the needs of a variety of commercial, industrial, and aerospace applications. Version S features a 0-5V output and input ranges from +9 to +18. Available with either a connector, pin, or wired option.

## APPLICATIONS:

- High-precision Geotech
- Oil and Gas, Riser Tilt Monitoring
- Railroad MOW Equipment
- Pavement Profiling Rigs
- Vehicle Wheel Alignment
- Robotics

## PERFORMANCE SPECIFICATIONS

### STATIC/DYNAMIC

INPUT RANGE (°)	±1	±3	±14.5	±30	±60	±90
FULL RANGE OUTPUT (VDC) (FRO ± 0.5%) <sup>1</sup>	0-5					
NONLINEARITY (% FRO) <sup>2</sup>	0.05	0.04	0.02	0.02	0.02	0.05
SCALE FACTOR (V/g) nominal	143.2	47.8	10.0	5.0	2.9	2.5
SCALE FACTOR TEMP SENSITIVITY (PPM/°C max)	350	150	100	80	80	80
BANDWIDTH (-3dB) Hz, nominal	0.5	2	15	20	30	30
TRANSVERSE AXIS MISALIGNMENT, ° max	±0.25	±0.5	±0.5	±0.5	±0.5	±0.5
0° OUTPUT (VDC) nominal	±0.10	±0.02	±0.01	±0.02	±0.02	±0.02
0° OUTPUT TEMP. SENSITIVITY (Volts/°C) max	0.015	0.005	0.001	0.0005	0.0004	0.0003
RESOLUTION & THRESHOLD (µrad)	1					

#### NOTES:

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

### PIN OUTS

#### PIN & CONNECTOR OPTIONS

<b>A</b>	RED	POWER IN
<b>B</b>	WHITE	COMMON
<b>C</b>	BLACK	N/C
<b>D</b>	ORANGE	SIGNAL OUT
<b>E</b>		N/C
<b>F</b>	BLUE	N/C

Specifications are subject to change without notice due to continued product development

#### WIRED OPTION

<b>RED</b>	POWER IN
<b>WHITE</b>	COMMON
<b>BLACK</b>	N/C
<b>GREEN</b>	SIGNAL OUT

# PRODUCT SPECIFICATIONS: LSOX-S

## ELECTRICAL

NUMBER OF AXES	1
INPUT VOLTAGE RANGE (VDC)	+9 to +18
INPUT CURRENT (mA, max)	40
OUTPUT IMPEDANCE (Ohms, nom)	1
NOISE ( $\mu$ Arms, max)	0.002
MASS (g)	370

## ENVIRONMENTAL

OPERATING TEMP. RANGE	-40° to +80° C
STORAGE TEMP. RANGE	-60° to +90° C
SHOCK	1000g, 1 msec, ½ sine

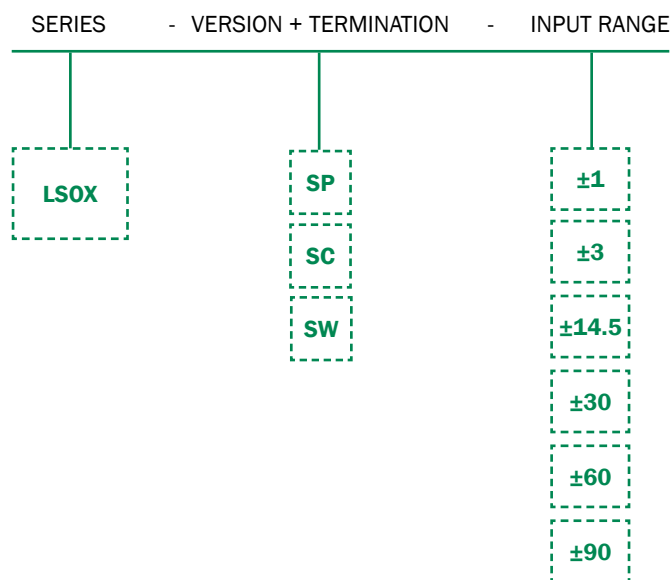
## ENCLOSURE

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# ORDERING INFORMATION

## HOW TO ORDER

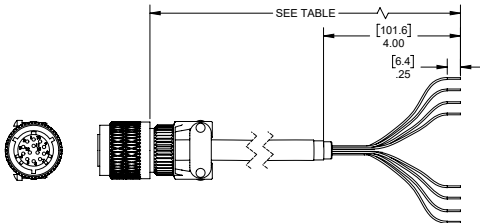
Model Numbers are comprised of the series, the version, the termination option, and the input range.



	TERMINATION	MODEL #	PART #
±1	PIN	LSOX-SP-1	02550334-101
	CONNECTOR	LSOX-SC-1	02550336-101
	WIRED	LSOX-SW-1	02550335-101
±3	PIN	LSOX-SP-3	02550334-102
	CONNECTOR	LSOX-SC-3	02550336-102
	WIRED	LSOX-SW-3	02550335-102
±14.5	PIN	LSOX-SP-14.5	02550334-103
	CONNECTOR	LSOX-SC-14.5	02550336-103
	WIRED	LSOX-SW-14.5	02550335-103
±30	PIN	LSOX-SP-30	02550334-104
	CONNECTOR	LSOX-SC-30	02550336-104
	WIRED	LSOX-SW-30	02550335-104
±60	PIN	LSOX-SP-60	02550334-105
	CONNECTOR	LSOX-SC-60	02550336-105
	WIRED	LSOX-SW-60	02550335-105
±90	PIN	LSOX-SP-90	02550334-106
	CONNECTOR	LSOX-SC-90	02550336-106
	WIRED	LSOX-SW-90	02550335-102

# 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

## LSOX SERIES ORDERING INFORMATION

	VERSION	CONNECTIVITY	MODEL #	PART #
±1	D	PIN	LSOX-DP-1	02550334-201
		CONNECTOR	LSOX-DC-1	02550336-201
		WIRED	LSOX-DW-1	02550335-201
	L	PIN	LSOX-LP-1	02550334-301
		CONNECTOR	LSOX-LC-1	02550336-301
		WIRED	LSOX-LW-1	02550335-301
	S	PIN	LSOX-SP-1	02550334-101
		CONNECTOR	LSOX-SC-1	02550336-101
		WIRED	LSOX-SW-1	02550335-101
±3	D	PIN	LSOX-DP-3	02550334-202
		CONNECTOR	LSOX-DC-3	02550336-202
		WIRED	LSOX-DW-3	02550335-202
	L	PIN	LSOX-LP-3	02550334-302
		CONNECTOR	LSOX-LC-3	02550336-302
		WIRED	LSOX-LW-3	02550335-302
	S	PIN	LSOX-SP-3	02550334-102
		CONNECTOR	LSOX-SC-3	02550336-102
		WIRED	LSOX-SW-3	02550335-102
±14.5	D	PIN	LSOX-DP-14.5	02550334-203
		CONNECTOR	LSOX-DC-14.5	02550336-203
		WIRED	LSOX-DW-14.5	02550335-203
	L	PIN	LSOX-LP-14.5	02550334-303
		CONNECTOR	LSOX-LC-14.5	02550336-303
		WIRED	LSOX-LW-14.5	02550335-303
	S	PIN	LSOX-SP-14.5	02550334-103
		CONNECTOR	LSOX-SC-14.5	02550336-103
		WIRED	LSOX-SW-14.5	02550335-103

	VERSION	CONNECTIVITY	MODEL #	PART #
±30	D	PIN	LSOX-DP-30	02550334-204
		CONNECTOR	LSOX-DC-30	02550336-204
		WIRED	LSOX-DW-30	02550335-204
	L	PIN	LSOX-LP-30	02550334-304
		CONNECTOR	LSOX-LC-30	02550336-304
		WIRED	LSOX-LW-30	02550335-304
	S	PIN	LSOX-SP-30	02550334-104
		CONNECTOR	LSOX-SC-30	02550336-104
		WIRED	LSOX-SW-30	02550335-104
±60	D	PIN	LSOX-DP-60	02550334-205
		CONNECTOR	LSOX-DC-60	02550336-205
		WIRED	LSOX-DW-60	02550335-205
	L	PIN	LSOX-LP-60	02550334-305
		CONNECTOR	LSOX-LC-60	02550336-305
		WIRED	LSOX-LW-60	02550335-305
	S	PIN	LSOX-SP-60	02550334-105
		CONNECTOR	LSOX-SC-60	02550336-105
		WIRED	LSOX-SW-60	02550335-105
±90	D	PIN	LSOX-DP-90	02550334-206
		CONNECTOR	LSOX-DC-90	02550336-206
		WIRED	LSOX-DW-90	02550335-206
	L	PIN	LSOX-LP-90	02550334-306
		CONNECTOR	LSOX-LC-90	02550336-306
		WIRED	LSOX-LW-90	02550335-306
	S	PIN	LSOX-SP-90	02550334-106
		CONNECTOR	LSOX-SC-90	02550336-106
		WIRED	LSOX-SW-90	02550335-106

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