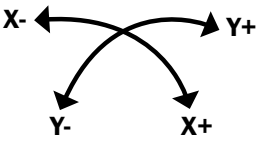
Jewell Instruments

MAKING SENSE OUT OF MOTION

RoHS



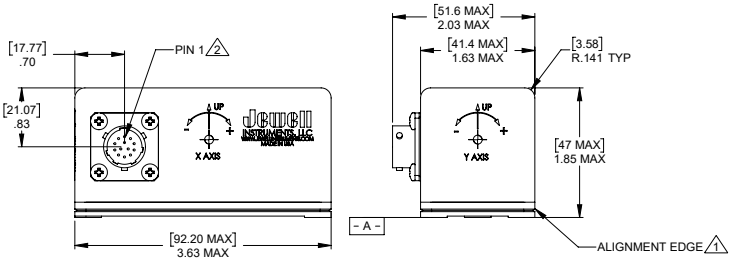
LCF-2330

Dual-Axis Analog Inclinometer

The Jewell LCF-2330 Series Inclinometer is a dual axis version of the rugged, high accuracy LCF Series. The design of the LCF-2330 was optimized to provide the high accuracy and superior repeatability of Jewell's rugged, fluid damped, flexure suspension, servo technology in a small and convenient package for applications requiring a compact dual axis solution. With many options to choose from, including a flange base, metric threads, and temperature sensor, this product can be customized to suit your individual needs.

FEATURES:

- ±1° to ±90° Input Full Range
- Micro Radian Resolution
- Available Internal Temp Sensor
- ± 5 Vdc Output or 4-20mA Output
- Superior 0° Output Stability Over Temperature
- RoHS Compliant



Dimensions: in [mm]

APPLICATIONS:

- Radar & Antenna Leveling
- Weapons Platform Leveling
- Barge and Offshore Platform Control
- Deviation Surveys
- 2-Axis Machine Tool Leveling
- Bridge Structural Monitoring
- Submersible Control Feedback
- Offshore Platform Stability
- Production/Manufacturing Process
- Equipment for Aerospace Industry

LCF-2330: ±5V OUTPUT

The design of the LCF-2330 Series was optimized to provide the high accuracy and superior repeatability of Jewell's rugged, fluid damped, Tilt Orientation flexure suspension, servo technology in a small and convenient package for applications requiring a compact dual axis solution.

APPLICATIONS:

- Radar & Antenna Leveling
- Weapons Platform Leveling
- Barge and Offshore Platform Control
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- Production/Manufacturing Process
- Equipment for Aerospace Industry

PERFORMANCE SPECIFICATIONS

PERFORMANCE

INPUT RANGE (°)	±1	±3	±14.5	±30	±60	±90
FULL RANGE OUTPUT (VDC)[1]	±5					
NONLINEARITY (% FRO)[2] max	0.05	0.05	0.02	0.02	0.02	0.02
SCALE FACTOR (V/g) nominal	286.5	95.5	20.0	10.0	5.77	5.0
SCALE FACTOR TEMP SENSITIVITY (PPM/°C max)	300	300	100	100	100	100
BANDWIDTH (-3dB) Hz, nominal	0.5	2	15	20	30	30
TRANSVERSE AXIS MISALIGNMENT, ° max	±0.25	±0.50	±0.50	±1.00	±1.00	±1.00
OUTPUT AT 0° TILT (V) max	±0.10	±0.04	±0.02	±0.02	±0.02	±0.02
0° OUTPUT TEMP. SENSITIVITY (Volts/°C) max	0.015	0.005	0.001	0.0005	0.0003	0.0003
RESOLUTION & THRESHOLD (µradians) max	1					

NOTES:
1. Full range is defined as "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

PIN OUTS

1	RED	+12 to +18 VDC
2	BLACK	-12 to -18 VDC
3	WHITE	POWER COMMON
4	ORANGE	X-AXIS OUTPUT SIGNAL

5	GREEN	X-AXIS OUTPUT RETURN
6	RED/BLACK	Y-AXIS OUTPUT SIGNAL
7	BLUE	Y-AXIS OUTPUT RETURN
8-13	-	N/C

(Color codes correspond to cable assembly.)

PRODUCT SPECIFICATIONS: LCF-2330

ELECTRICAL

NUMBER OF AXES	2
INPUT VOLTAGE RANGE (VDC)	±12 to ±18
INPUT CURRENT (mA, max)	30
OUTPUT IMPEDANCE (Ohms) nominal	100
NOISE (Vrms, max)	0.002

ENVIRONMENTAL

OPERATING TEMP. RANGE	-40° to +80°C
STORAGE TEMP. RANGE	-60° to +90°C
VIBRATION	20 grms
SHOCK	1000g, 1 msec, ½ sine

ENCLOSURE

WEIGHT	280 g
SEAL	IP65

OPTIONS

- Temperature Sensor
  Type: AD590
  Scale Factor: 1µA/K
  Spec @ Room Ambient Temperature: 298.2 ±10.5 µA
- Flange Base
- Metric Mounting Threads

ORDERING INFORMATION

HOW TO ORDER

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

EXAMPLE: LCF-2330 Series, ±3° Input, with metric mounting threads, a flange base, and temperature sensor.

SERIES - INPUT RANGE - OPTIONS* - OPTIONS* - OPTIONS*

LCF-2330 - 3/3 - M - FB - TS

*Leave options blank if not needed

	MODEL #	PART #
±1	LCF-2330-1/1	Contact Jewell Instruments for part numbers.
±3	LCF-2330-3/3	
±14.5	LCF-2330-14.5/14.5	
±30	LCF-2330-30/30	
±90	LCF-2330-90/90	

M	Metric Mounting Threads
FB	Flange Base
TS	Temperature Sensor

LCF-2330-L: 4-20mA OUTPUT

The LCF-2330-L offers the same performance and reliablility as the standard LCF-2330 series, but with a convenient 4-20mA output signal. This solution is ideal for applications that require long cable runs such as platform/radar leveling and geotechnical monitoring.

APPLICATIONS:

- Radar & Antenna Leveling
- Weapons Platform Leveling
- Barge and Offshore Platform Control
- Deviation Surveys
- 2-Axis Machine Tool Leveling
- Bridge Structural Monitoring
- Submersible Control Feedback
- Offshore Platform Stability
- Production/Manufacturing Process
- Equipment for Aerospace Industry

PERFORMANCE SPECIFICATIONS

STATIC/DYNAMIC

INPUT RANGE (°)	±1	±3	±14.5	±30	±90
FULL RANGE OUTPUT (FRO) mA ±1.0% [1]	4-20				
NONLINEARITY (% FRO) max	0.05	0.05	0.02	0.03	0.04
SCALE FACTOR (mA/g) nominal	458.40	152.90	31.95	16.00	8.00
SCALE FACTOR SENSITIVITY (PPM/°C max)	300	300	100	100	100
BANDWIDTH (-3dB) Hz, nominal	0.5	2.0	15	20	30
TRANSVERSE AXIS MISALIGNMENT, ° max	±0.5				
OUTPUT AT 0° TILT (mA, max)	12 ±0.6	12 ±0.6	12 ±0.3	12 ±0.3	12 ±0.3
OUTPUT AT 0° TILT TEMP. SENSITIVITY (mA/°C) max	0.024	0.009	0.002	0.001	0.001
RESOLUTION & THRESHOLD (µrad)	1				

NOTES:
1. Full range is defined as “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

PIN OUTS

1	RED	+12 to +18 VDC
2	BLACK	-12 to -18 VDC
3	WHITE	POWER COMMON
4	ORANGE	X-AXIS OUTPUT SIGNAL

5	GREEN	X-AXIS OUTPUT RETURN
6	RED/BLACK	Y-AXIS OUTPUT SIGNAL
7	BLUE	Y-AXIS OUTPUT RETURN
8-13	-	N/C

(Color codes correspond to cable assembly.)

PRODUCT SPECIFICATIONS: LCF-2330-L

ELECTRICAL

NUMBER OF AXES	2
INPUT VOLTAGE RANGE (VDC)	20 to 30
INPUT CURRENT (mA, nominal)	90
NOISE (mA rms, max)	0.01

ENCLOSURE

WEIGHT	280 g
SEAL	IP65

ENVIRONMENTAL

OPERATING TEMP. RANGE	-40° to +80°C
STORAGE TEMP. RANGE	-60° to +90°C
VIBRATION	20 grms
SHOCK	1000g, 1 msec, ½ sine

OPTIONS

- Temperature Sensor
  Type: AD590
  Scale Factor: 1µA/K
  Spec @ Room Ambient Temperature: 298.2 ±10.5 µA
- Flange Base
- Metric Mounting Threads

ORDERING INFORMATION

HOW TO ORDER

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

EXAMPLE: LCF-2330 Series, Version L, ±90° Input, with metric mounting threads, and a flange base.

SERIES - VERSION - INPUT RANGE - OPTIONS* - OPTIONS*

LCF-2330 - L - 90/90 - FB - M

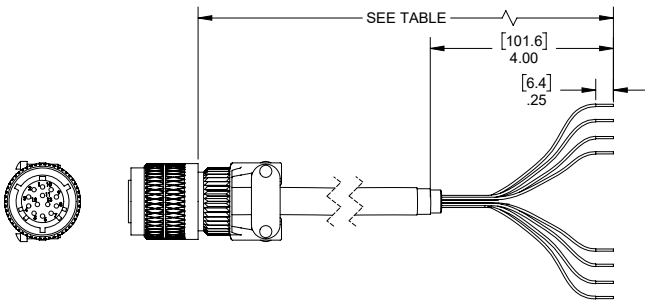
*Leave options blank if not needed

	MODEL #	PART #
±1	LCF-2330-L-1/1	Contact Jewell Instruments for part numbers.
±3	LCF-2330-L-3/3	
±14.5	LCF-2330-L-14.5/14.5	
±30	LCF-2330-L-30/30	
±90	LCF-2330-L-90/90	

M	Metric Mounting Threads
FB	Flange Base
TS	Temperature Sensor

ACCESSORIES

CONNECTOR CABLE



PART #	MODEL #	LENGTH m (ft)
847774-002	13-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)
879605-027	DSI-CBL-10M-1	10 (32.8)
879605-015	DSI-CBL-15M-1	15 (49.21)
879605-016	DSI-CBL-24M-1	24 (78.75)
879605-026	DSI-CBL-40M-1	40 (131.2)
879605-024	DSI-CBL-68M-1	68 (228.1)
879605-021	DSI-CBL-100M-1	100 (325.1)

LCF-2330 SERIES ORDERING INFORMATION

	VERSION	MODEL #	PART #
±1	±5V	LCF-2330-1/1	468233-005
	L	LCF-2330-L-1/1	02550383-001
±3	±5V	LCF-2330-3/3	468233-006
	L	LCF-2330-L-3/3	02550383-002
±14.5	±5V	LCF-2330-14.5/14.5	468233-002
	L	LCF-2330-L-14.5/14.5	02550383-003
±30	±5V	LCF-2330-30/30	468233-003
	L	LCF-2330-L-30/30	02550383-004
±60	±5V	LCF-2330-60/60	468233-008
	L	LCF-2330-L-60/60	02550383-005
±90	±5V	LCF-2330-90/90	468233-004
	L	LCF-2330-L-90/90	02550383-006

OPTIONS
*All options may be combined or omitted per customer specifications.
METRIC MOUNTING THREADS
-MB
FLANGE BASE
-FB
TEMPERATURE SENSOR
-TS

NOTE: Numbers provided are for the standard RS485 digital interface with no additional options.

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