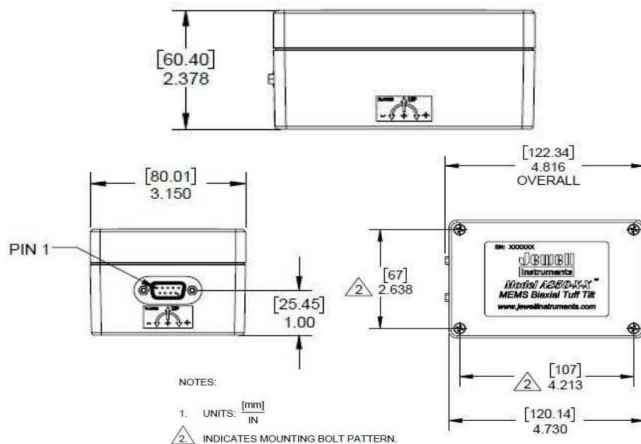


## 850 Series MEMS Tuff Tilt

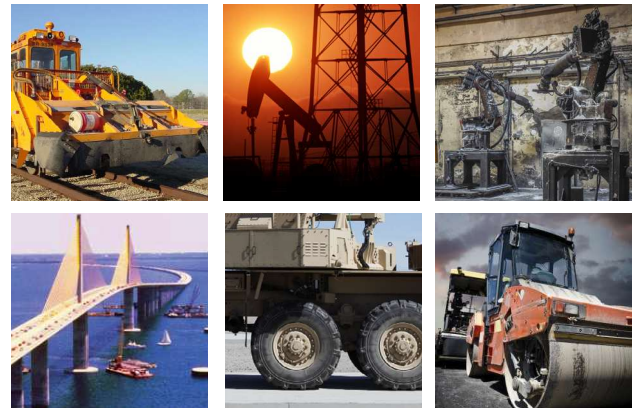
This geotechnical MEMS tiltmeter is available in uniaxial and biaxial configurations. It presents a robust and rugged design for outdoor geotechnical use, but with the benefit of low-cost MEMS technology and  $\pm 5\text{VDC}$ ,  $0-5\text{ VDC}$ , or  $4-20\text{ mA}$  output signals. It is an effective tilt sensing solution for platform leveling/positioning, structural monitoring, construction monitoring, industrial machinery positioning, radial gate measurement & control.

### FEATURES:

- Robust and Rugged Enclosure
- Uniaxial and Biaxial Models Available
- Low-Cost MEMS Technology
- RoHS Compliant
- Filtering Available
- Temperature Sensor Option Available
- IP65 Seal



Dimensions: in [mm]



### APPLICATIONS:

- Platform Leveling/Positioning
- Structural Monitoring
- Construction Monitoring
- Industrial Machinery Positioning
- Radial Gate Measurement & Control



# A850-D: $\pm 5V$ OUTPUT

The A850 MEMS Tuff Tilt series is available in uniaxial and biaxial configurations. This presents a robust and rugged design for industrial use, but with the benefit of low-cost MEMS technology.

## APPLICATIONS:

- Platform Leveling/Positioning
- Structural Monitoring
- Construction Monitoring
- Industrial Machinery Positioning
- Radial Gate Measurement & Control

## PERFORMANCE SPECIFICATIONS

### STATIC/DYNAMIC

INPUT RANGE (°)	$\pm 14.5$	$\pm 30$	$\pm 90$
FULL RANGE OUTPUT (VDC) <sup>1</sup>	$\pm 5$		
NONLINEARITY (% FRO) <sup>2</sup>	0.05		
SCALE FACTOR TOLERANCE (%)	$\pm 1$		
SCALE FACTOR SENSITIVITY (PPM/° C max)	150		
BANDWIDTH (-3dB) Hz, nominal	5		
TRANSVERSE AXIS MISALIGNMENT (° max)	$\pm 0.5$		
0° OUTPUT (VDC) nominal	$\pm 0.03$		
0° OUTPUT TEMP. SENSITIVITY (Volts/° C) max	$\pm 0.004$		
RESOLUTION (° max) <sup>3</sup>	0.002	0.002	0.004
THRESHOLD (° max)	0.002		
NONREPEATABILITY, HYSTERESIS (% FRO max)	0.014	0.007	0.004
WARM UP TIME (seconds max)	0.5		
VOLTAGE TO RADIAN CONVERSION <sup>4</sup>	ASIN(<voltage>/20)	ASIN(<voltage>/10)	ASIN(<voltage>/5)
TEMPERATURE SENSOR	PTC Thermistor, Nominal resistance is 1k $\Omega$ , +/-2%, dissipation constant 2mW/C		

### T OUTS

1	+PWR	7	SIG RTN
2	PWR RTN	8	THRM+
3	N/C	9	THRM-
4	X OUT		
5	Y OUT		
6	N/C		

#### NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as variation around the best straight line from null to full-range output.
3. Full Resolution is achieved with noise reduction techniques
4. Does not take into account any sources of error.



# PRODUCT SPECIFICATIONS: A850-D

## ELECTRICAL

<b>NUMBER OF AXES</b>	1 or 2
<b>INPUT VOLTAGE RANGE (VDC)</b>	±12 to ±18
<b>INPUT CURRENT (mA, max)</b>	±6
<b>NOISE (Vrms, max)</b>	0.005
<b>WEIGHT (g)</b>	165 (1 axis), 170 (2 axes)

## ENVIRONMENTAL

<b>OPERATING TEMP. RANGE</b>	-40° to +80° C
<b>STORAGE TEMP. RANGE</b>	-40 to +95° C
<b>SHOCK</b>	100 g, 0.011 sec, ½ sine

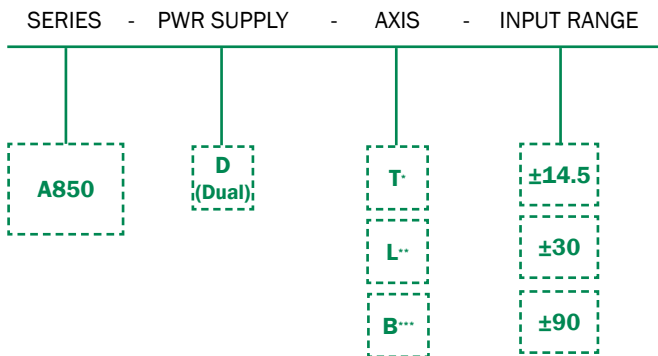
## ENCLOSURE

<b>SEAL</b>	IP65
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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.



- \*Transverse (Uniaxial)
- \*\*Longitudinal (Uniaxial)
- \*\*\*Biaxial

	AXIS	MODEL #	PART #
±14.5	T	A850-D-T-14.5	98850-07
	L	A850-D-L-14.5	98850-13
	B	A850-D-B-14.5	98850-01
±30	T	A850-D-T-30	98850-08
	L	A850-D-L-30	98850-14
	B	A850-D-B-30	98850-02
±90	T	A850-D-T-90	98850-09
	L	A850-D-L-90	98850-15
	B	A850-D-B-90	98850-03



# A850-S: 0-5VDC Output

The A850 MEMS Tuff Tilt series is available in uniaxial and biaxial configurations. This presents a robust and rugged design for industrial use, but with the benefit of low-cost MEMS technology.

## APPLICATIONS:

- Platform Leveling/Positioning
- Structural Monitoring
- Construction Monitoring
- Industrial Machinery Positioning
- Radial Gate Measurement & Control

## PERFORMANCE SPECIFICATIONS

### STATIC/DYNAMIC

INPUT RANGE (°)	±14.5	±30	±90
FULL RANGE OUTPUT (VDC) <sup>1</sup>	0-5		
NONLINEARITY (% FRO) <sup>2</sup>	0.05		
SCALE FACTOR TOLERANCE (%)	±1		
SCALE FACTOR SENSITIVITY (PPM/° C max)	150		
BANDWIDTH (-3dB) Hz, nominal	5		
TRANSVERSE AXIS MISALIGNMENT (° max)	±0.5		
0° OUTPUT (VDC) nominal	±0.03		
0° OUTPUT TEMP. SENSITIVITY (Volts/° C) max	±0.004		
RESOLUTION (° max) <sup>3</sup>	0.002	0.002	0.004
THRESHOLD (° max)	0.002		
NONREPEATABILITY, HYSTERESIS (% FRO max)	0.014	0.007	0.004
WARM UP TIME (seconds max)	0.5		
VOLTAGE TO RADIAN CONVERSION <sup>4</sup>	ASIN((<voltage> - 2.5)/10)	ASIN((<voltage> - 2.5)/5)	ASIN((<voltage> - 2.5)/2.5)
TEMPERATURE SENSOR	PTC Thermistor, Nominal resistance is 1kohm, +/-2%, dissipation constant 2mW/C		

### T OUTS

1	+PWR	7	SIG RTN
2	PWR RTN	8	THRM+
3	N/C	9	THRM-
4	X OUT		
5	Y OUT		
6	N/C		

#### NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as variation around the best straight line from null to full-range output.
3. Full Resolution is achieved with noise reduction techniques
4. Does not take into account any sources of error.



## PRODUCT SPECIFICATIONS: A850-D

### ELECTRICAL

NUMBER OF AXES	1 or 2
INPUT VOLTAGE RANGE (VDC)	12 to 30
INPUT CURRENT (mA, max)	7
NOISE (Vrms, max)	0.005
OUTPUT IMPEDANCE (Ohms nom)	1
WEIGHT (g)	165 (1 axis), 170 (2 axes)

### ENVIRONMENTAL

OPERATING TEMP. RANGE	-40° to +80° C
STORAGE TEMP. RANGE	-40 to +95° C
SHOCK	100 g, 0.011 sec, ½ sine

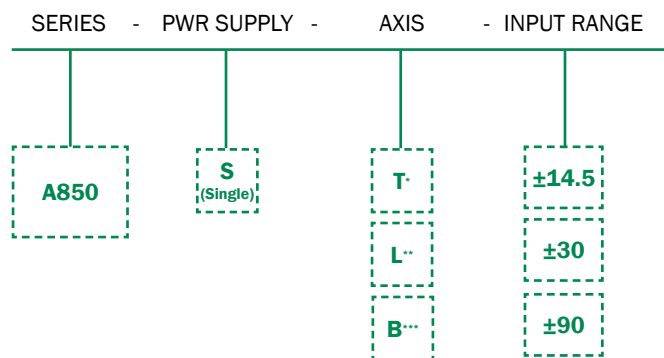
### ENCLOSURE

SEAL	IP65
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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.



\*Transverse (Uniaxial)  
 \*\*Longitudinal (Uniaxial)  
 \*\*\*Biaxial

	AXIS	MODEL #	PART #
±14.5	T	A850-S-T-14.5	98850-10
	L	A850-S-L-14.5	98850-16
	B	A850-S-B-14.5	98850-04
±30	T	A850-S-T-30	98850-11
	L	A850-S-L-30	98850-17
	B	A850-S-B-30	98850-05
±90	T	A850-S-T-90	98850-12
	L	A850-S-L-90	98850-18
	B	A850-S-B-90	98850-06

# C850: 4-20mA Output

The C850 MEMS Tuff Tilt series is available in uniaxial and biaxial configurations. This presents a robust and rugged design for industrial use, but with the benefit of low-cost MEMS technology.

## APPLICATIONS:

- Platform Leveling/Positioning
- Structural Monitoring
- Construction Monitoring
- Industrial Machinery Positioning
- Radial Gate Measurement & Control

## PERFORMANCE SPECIFICATIONS

### STATIC/DYNAMIC

INPUT RANGE (°)	±14.5	±30	±90
FULL RANGE OUTPUT (mA) <sup>1</sup>	4-20		
NONLINEARITY (% FRO) <sup>2</sup>	0.05		
SCALE FACTOR TOLERANCE (%)	±1		
SCALE FACTOR SENSITIVITY (PPM/° C max)	150		
BANDWIDTH (-3dB) Hz, nominal	5		
TRANSVERSE AXIS MISALIGNMENT (° max)	±0.5		
0° OUTPUT (mA) nominal	12 ±0.03		
0° OUTPUT TEMP. SENSITIVITY (mA/° C) max	±0.004		
RESOLUTION (° max) <sup>3</sup>	0.002	0.002	0.004
THRESHOLD (° max)	0.002		
NONREPEATABILITY, HYSTERESIS (% FRO max)	0.014	0.007	0.004
WARM UP TIME (seconds max)	0.5		
VOLTAGE TO RADIAN CONVERSION <sup>4</sup>	$\arcsin((\text{output} - 12\text{mA}) / 32\text{mA})$	$\arcsin((\text{output} - 12\text{mA}) / 16\text{mA})$	$\arcsin((\text{output} - 12\text{mA}) / 8\text{mA})$
TEMPERATURE SENSOR	PTC Thermistor, Nominal resistance is 1kohm, +/-2%, dissipation constant 2mW/C		

### T OUTS

1	+PWR	7	SIG RTN
2	PWR RTN	8	THRM+
3	N/C	9	THRM-
4	X OUT		
5	Y OUT		
6	N/C		

#### NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as variation around the best straight line from null to full-range output.
3. Full Resolution is achieved with noise reduction techniques
4. Does not take into account any sources of error.



# PRODUCT SPECIFICATIONS: C850

## ELECTRICAL

NUMBER OF AXES	1 or 2
INPUT VOLTAGE RANGE (VDC)	12 to 30
INPUT CURRENT (mA, max)	28
OUTPUT IMPEDANCE (Ohms nom)	1
NOISE (Vrms, max)	0.01
WEIGHT (g)	165 (1 axis), 170 (2 axes)

## ENVIRONMENTAL

OPERATING TEMP. RANGE	-40° to +80° C
STORAGE TEMP. RANGE	-40 to +95
SHOCK	100 g, 0.011 sec, ½ sine

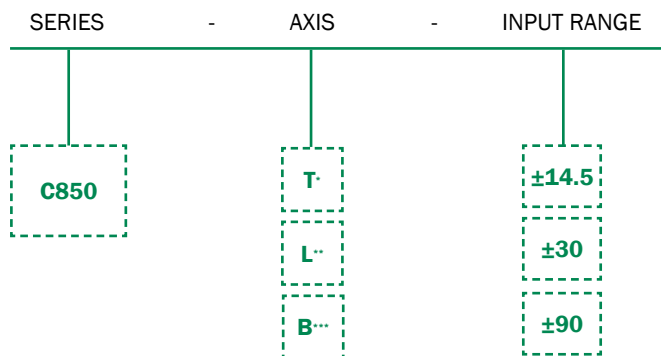
## ENCLOSURE

SEAL	IP65
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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.



\*Transverse (Uniaxial)  
 \*\*Longitudinal (Uniaxial)  
 \*\*\*Biaxial

	AXIS	MODEL #	PART #
±14.5	T	C850-T-14.5	98850-23
	L	C850-L-14.5	98850-26
	B	C850-B-14.5	98850-20
±30	T	C850-T-30	98850-24
	L	C850-L-30	98850-27
	B	C850-B-30	98850-21
±90	T	C850-T-90	98850-25
	L	C850-L-90	98850-28
	B	C850-B-90	98850-22



# ACCESSORIES

PART #	MODEL #	DESCRIPTION
84051-01	84051	Horizontal Mounting Bracket kit w/Mounting Hardware (includes alien wrench, x# mounting studs, washers, and hex nuts)
01454-01	01454-01	Horizontal Mounting Bracket only
81439-01	81439	Vertical Mounting Bracket Kit w/Mounting Hardware (includes alien wrench, x3 expansion anchors and x4 cap screws)
01439	01439	Vertical Mounting Bracket only
00210-49	00210-49	Enclosure Screws Ea. 8-J2x 5/8" (need 4 screws to mount brackets ON: 014545-01, Horizout:11 Mtg Bracket and PN: 01439, Vertical Mtg Bracket)
65050	65050	Connector, O-Sub Mini, Female 9 Pin
65052-01	65052	Connector Hood for a O-Sub, 9 Pin
70304	70304	Power/signal I O-conductor Cable, 24 A WG, polypropylene jacket, price/ft. (Specify total length on order)
879605-008	DSI-CBL-03M-1	9.84 (3)

# 850 SERIES ORDERING INFORMATION

	VERSION	AXIS	MODEL #	PART #
±14.5	D	T	A850-D-T-14.5	98850-07
		L	A850-D-L-14.5	98850-13
		B	A850-D-B-14.5	98850-01
	S	T	A850-S-T-14.5	98850-10
		L	A850-S-L-14.5	98850-16
		B	A850-S-B-14.5	98850-04
	C	T	C850-T-14.5	98850-23
		L	C850-L-14.5	98850-26
		B	C850-B-14.5	98850-20
±30	D	T	A850-D-T-30	98850-08
		L	A850-D-L-30	98850-14
		B	A850-D-B-30	98850-02
	S	T	A850-S-T-30	98850-11
		L	A850-S-L-30	98850-17
		B	A850-S-B-30	98850-05
	C	T	C850-T-30	98850-24
		L	C850-L-30	98850-27
		B	C850-B-30	98850-21

	VERSION	AXIS	MODEL #	PART #
±90	D	T	A850-D-T-90	98850-09
		L	A850-D-L-90	98850-15
		B	A850-D-B-90	98850-03
	S	T	A850-S-T-90	98850-12
		L	A850-S-L-90	98850-18
		B	A850-S-B-90	98850-06
	C	T	C850-T-90	98850-25
		L	C850-L-90	98850-28
		B	C850-B-90	98850-22

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