

The model A711-2(4X) Weatherproof Floor-mount Tiltmeter offers the same performance as the model A701-2(4X), but in a floor-mount package. Units are rated IP65 waterproof for use in wet, humid, and corrosive environments. The A711-2(4X) bolts or clamps to any horizontal surface, and is well suited for areas of heavy traffic or vibration. Units deliver <math><1\ \mu\text{radian}</math> resolution or better. Output is a stable $\pm 8\ \text{VDC}$ differential, and the powerful internal electronics will drive cables over 1000m. Use this precision tiltmeter for volcano monitoring, geotechnical engineering, structural monitoring, platform leveling, and any application where advanced protection from weather is required.



	A711-2A(4X) (High-gain)	A711-2B(4X) (Mid-range)	711-2C(4X) (Wide-angle)
Angular Range	$\pm 8000\ \mu\text{radians} (\pm 0.46^\circ)$	$\pm 4.0^\circ$	$\pm 70^\circ$ *
Scale Factor	$1\ \mu\text{radian/mV}$	$0.5^\circ/\text{V}$	$10^\circ/\text{V}$
Resolution	$<1\ \mu\text{radian}$	$1\ \mu\text{radian}$	$10\ \mu\text{radians}$
Repeatability	$2\ \mu\text{radians (static)}$	$2\ \mu\text{radians (static)}$	$20\ \mu\text{radian}$
Non-Linearity	1%	5% full (2% up to $\pm 3^\circ$)	4% full (1% half span)
Time Constant	0.15 sec		0.2 sec
Kz Temp Coefficient (bias/ $^\circ\text{C}$)	$\pm 4\ \mu\text{radians}/^\circ\text{C}$ (typical)		$\pm 0.004^\circ/\text{C}$ (typical)
Ks Temp Coefficient (%/ $^\circ\text{C}$)	$\pm 0.04\%/^\circ\text{C}$ (typical)		$\pm 0.13\%/^\circ\text{C}$ (typical)
Output	$\pm 8\text{VDC}$ (single ended); $\pm 16\text{VDC}$ (differential)		
Channels	X-tilt, Y-tilt, Temperature		
Output Impedance	270 ohms		
Temperature Output	0.1°C/mV typical (single ended; $0^\circ\text{C} = 0\text{mV}$)		
Power	± 11 to $\pm 15\ \text{VDC}$ @ $+11$ and -6mA , 250 mV ripple max, reverse polarity protected		
Environmental	-25 to $+70^\circ\text{C}$ operation; -30 to $+100^\circ\text{C}$ storage, IP65 (NEMA 4X)		
Dimensions	6 x 6 x 4 inches (15 x 15 x 10 cm), 3 lb (1.4 kg)		
Materials	Anodized and painted aluminum		
Cable	3m (10 ft) multiconductor cable + overall shield, PVC Jacket, connectors included		

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

Ordering Code

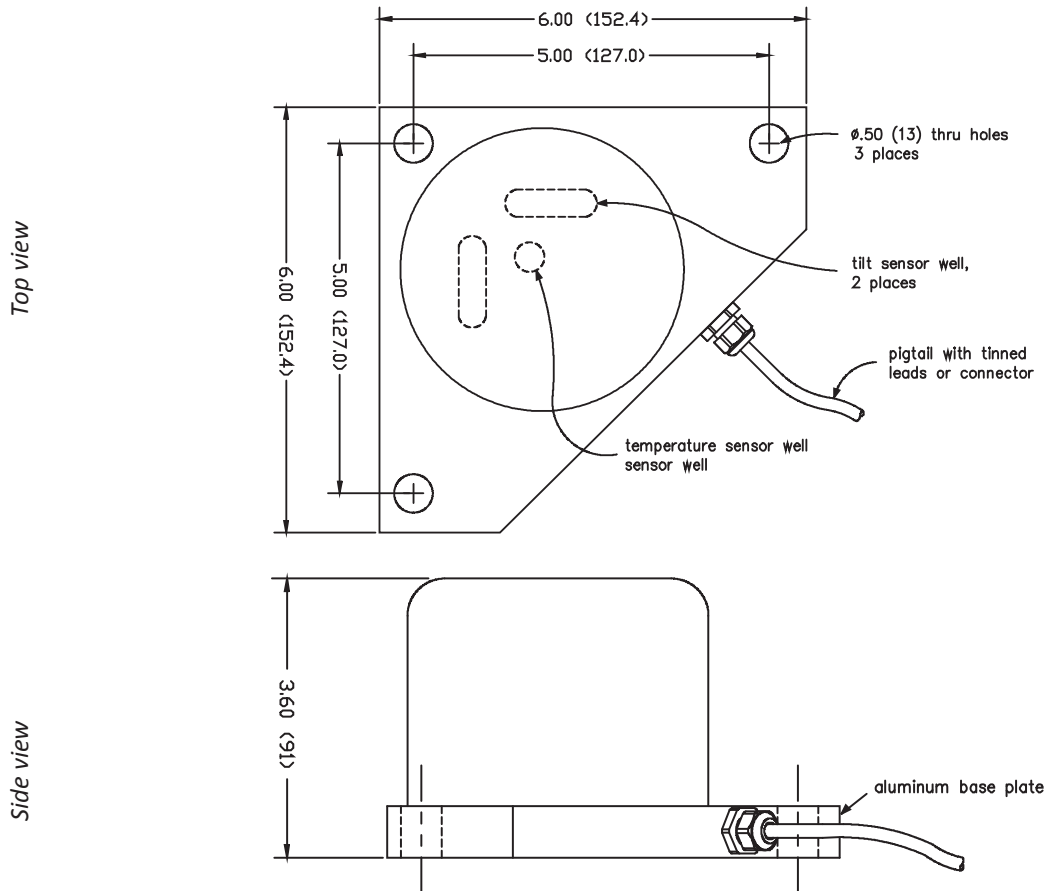
A711-2 A (4X)

- A: High Gain ($\pm 0.46^\circ$)
- B: Mid Range ($\pm 4^\circ$)
- C: Wide Angle ($\pm 70^\circ$)

Accessories

Part No.	Description
70304	Power/signal cable, 10-conductor (specify total length on order)
62301	Female panel receptacle (mates to 62302 connector included with tiltmeter)
62304	Extra female in-line receptacle (one included with tiltmeter)
719-AL	Vertical mounting bracket (L-bracket)
718-AL	Horizontal mounting plate

Dimensions:



Dimensions in inches (mm)

Wiring/Pin-out:

Wire Color	Function	Bendix Connector
Red	+12 to +15V Power	H
Black	Power Ground	A
Violet	-12 to -15V Power	B
Blue	+Y-tilt out	G
Brown	-Y-tilt out	K
Gray	-X-tilt out	J
Green	+X-tilt out	C
White	Signal ground	E
Yellow	Temperature out	D

The model A711-2 (floor-mount), and A716-2 (wall-mount) bolt or clamp to any surface, and are well suited for areas with heavy traffic or vibration. Electronic performance is identical to the model A701-2. Units include two switchable gains and two low-pass filter settings, and are sensitive to <0.1 urad. Output is a stable ± 8 DC voltage (± 16 VDC differential). Applications include volcano monitoring, high-precision geotechnical engineering, bridge deflection monitoring, precision metrology, radar platform leveling, and high-accuracy tilt monitoring applications where bolt-on installations are required.



		Type-A version (High-gain)	Type-B version (Mid-Range)
Angular Range	High-Gain:	$\pm 800 \mu\text{radians}$ ($\pm 0.046^\circ$)	$\pm 0.8^\circ$
	Low-Gain:	$\pm 8000 \mu\text{radians}$ ($\pm 0.46^\circ$)	$\pm 8.0^\circ$
Scale Factor	High-Gain:	0.1 $\mu\text{radian/mV}$	0.1 $^\circ/\text{V}$
	Low-Gain:	1 $\mu\text{radian/mV}$	1 $^\circ/\text{V}$
Non-Linearity	High-Gain:	0.2%	0.2%
	Low-Gain:	2%	1.5%
Resolution		0.1 $\mu\text{radians}$	1.0 $\mu\text{radians}$
Repeatability		1 $\mu\text{radians}$ (static)	2 $\mu\text{radians}$ (static)
Time Constant		Filter on: 7.5 sec; Filter off 0.5 sec	Filter on: 7.5 sec; Filter off 0.4 sec
Kz Temp Coefficient (deg/C)		$\pm 3 \mu\text{radians}/^\circ\text{C}$ (typical)	$\pm 0.001^\circ/\text{C}$ (typical)
Ks Temp Coefficient (%/°C)		0.05%/°C (typical)	
Output		$\pm 8\text{VDC}$ (single ended); $\pm 16\text{VDC}$ (differential)	
Channels		X-tilt, Y-tilt, Temperature	
Output Impedance		270 ohms	
Temperature Output		0.1 $^\circ\text{C}/\text{mV}$ typical (single ended; $0^\circ\text{C} = 0\text{mV}$)	
Power		± 11 to ± 15 VDC @ +11 and -6mA, 250 mV ripple max, reverse polarity protected	
Environmental		-25 to $+70^\circ\text{C}$ operation; -30 to $+100^\circ\text{C}$ storage	
Dimensions		6 x 6 x 4 inches (15 x 15 x 10 cm), 3 lb (1.4 kg)	
Materials		Anodized and painted aluminum	
Cable		3m (10 ft) multi-conductor cable + overall shield, PVC jacket, connectors included	

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

Order Code:

Floor-mount Version

A711 - 2 ■

A: High Gain ($\pm 0.46^\circ$) 2 Gains, 2 Filters
B: Mid Range ($\pm 8^\circ$) 2 Gains, 2 Filters

Wall-mount Version

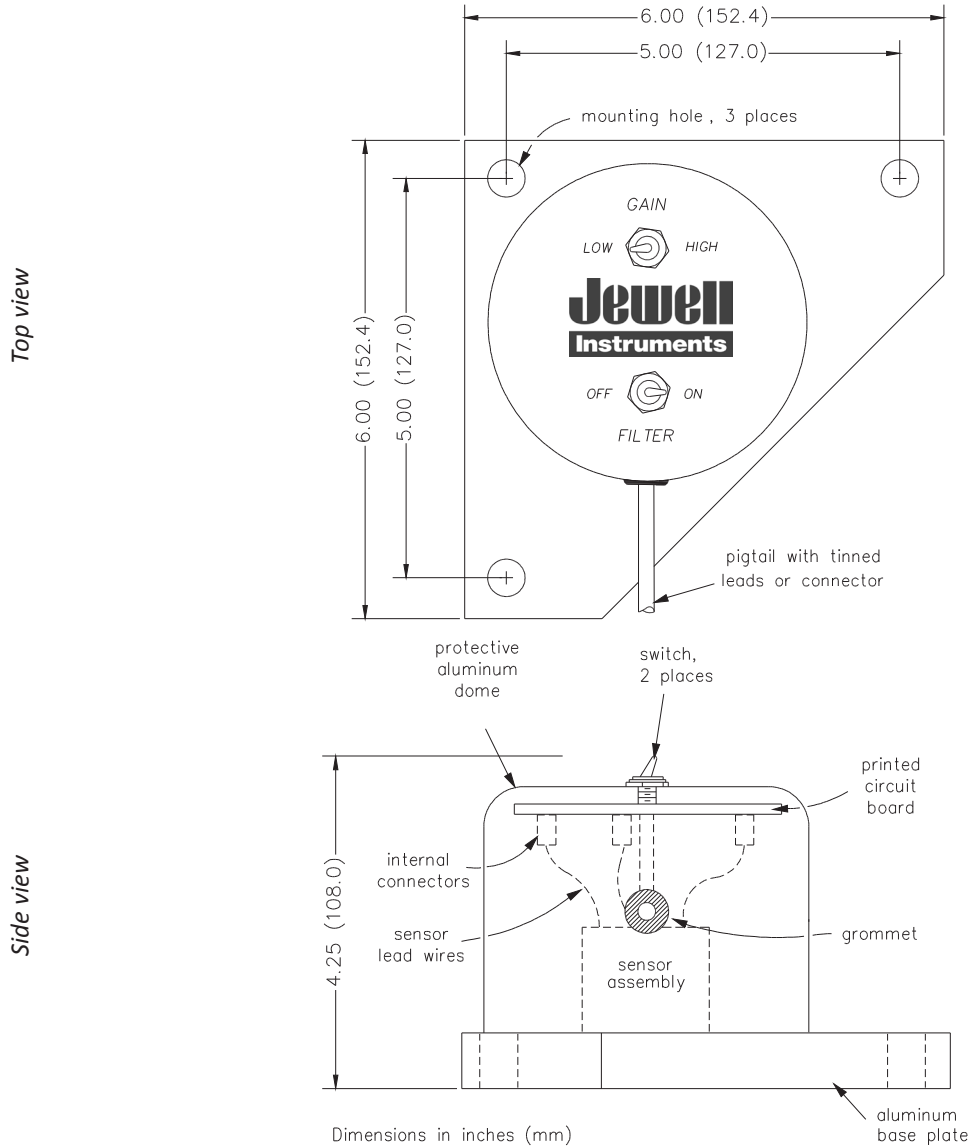
A716 - 2 ■

A: High Gain ($\pm 0.46^\circ$) 2 Gains, 2 Filters
B: Mid Range ($\pm 8^\circ$) 2 Gains, 2 Filters

Accessories:

Part No.	Description
70304	Power/signal cable, 10-conductor (specify total length on order)
62301	Female panel receptacle (mates to 62302 tiltmeter connector)
62304	Extra female in-line receptacle (one included with tiltmeter)
719-AL	Vertical mounting bracket (L-bracket)
718-AL	Mounting plate (speeds installation)

Dimensions:



Wiring/Pin-out:

Wire Color	Function	Bendix Connector
Red	+12 to +15V Power	H
Black	Power Ground	A
Violet	-12 to -15V Power	B
Blue	+Y-tilt out	G
Brown	-Y-tilt out	K
Gray	-X-tilt out	J
Green	+X-tilt out	C
White	Signal ground	E
Yellow	Temperature out	D

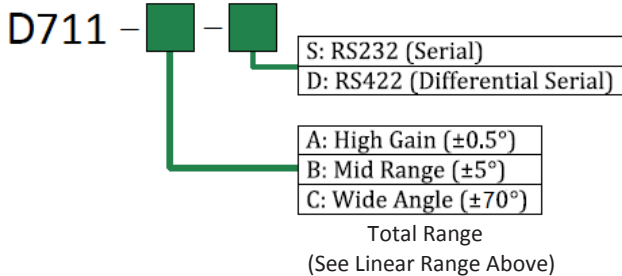
The model D711 Floor-mount Tiltmeter is a rugged, high-precision instrument with advanced digital firmware. Output is RS232 or RS422 (RS485 full duplex). The D711 bolts or clamps to any horizontal surface, and is well suited for areas of heavy traffic or vibration. Utilizing a high-precision electrolytic sensor element, units deliver up to 1 μ radian resolution with virtually zero long-term drift. Programmable firmware controls include sample averaging, auto-zero (tare), baud/output rate, temperature compensation and more. The D711 also includes on-board memory, with storage capacity up to 22,000 samples. Use the D711 for volcano monitoring, geotechnical engineering, structural monitoring, platform leveling, and more.



	D711-A (High-gain)	D711-B (Mid-range)	D711-C (Wide-angle)
Total Range	$\pm 0.5^\circ$	$\pm 5.0^\circ$	$\pm 70^\circ$
Calibrated Linear Range	$\pm 0.5^\circ$	$\pm 5.0^\circ$	$\pm 60^\circ$
Resolution	1 μ radian	10 μ radian	21 μ radians
Repeatability	4 μ radians (static)	15 μ radians (static)	350 μ radians
Non-Linearity	0.4%	0.1%	0.1%
Time Constant	0.15 sec		0.15 sec
Kz Temp Coefficient (bias/ $^\circ$ C) ¹	$\pm 3.5 \mu$ radians/ $^\circ$ C (typical)		$\pm 0.004^\circ$ / $^\circ$ C (typical)
Ks Temp Coefficient (%/ $^\circ$ C) ¹	$\pm 0.02\%$ / $^\circ$ C (typical)		$\pm 0.05\%$ / $^\circ$ C (typical)
Output	RS232, RS422 (RS485 full duplex)		
Output Format	NMEA XDR, Trimble TCM, Ashtec compatible, Simple (default: X, Y, Temp., S/N)		
Baud Rate	9600 (default), 19200, 28800, 57600, 115200, 230400		
Channels	X-tilt, Y-tilt, Temperature, Serial No.		
Power	7-28 VDC @ 30mA, 250 mV ripple max, reverse polarity protected		
Environmental	-40 to +85 C operation and storage; IP65		
Dimensions	6 x 6 x 4 inches (15 x 15 x 10 cm), 3 lb (1.4 kg)		
Materials	Anodized and painted aluminum		
Cable	3m (10 ft) multiconductor cable + overall shield, PVC jacket, connectors included		

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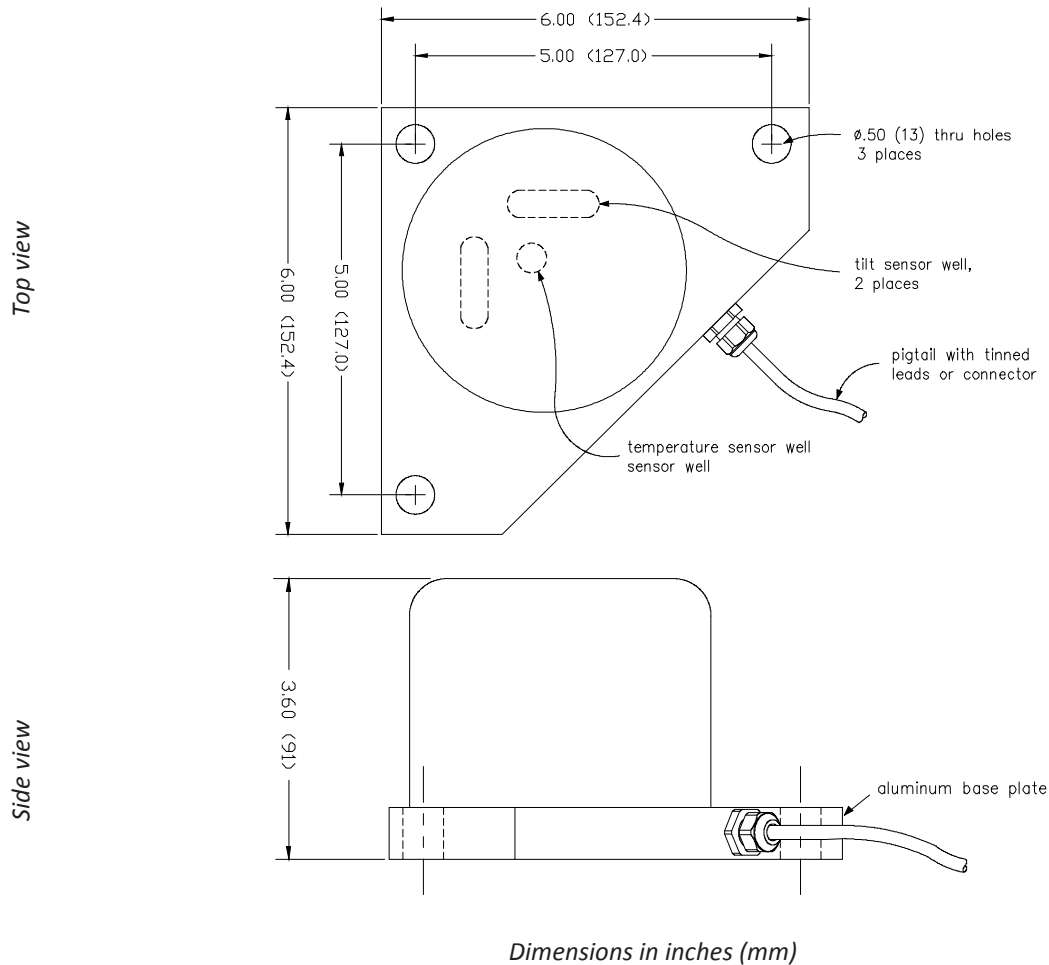
Ordering Code



Accessories

Part No.	Description
70304	Power/signal cable, 10-conductor (specify total length on order)
62401	Extra female panel receptacle (one included with tiltmeter)
719-AL	Vertical mounting bracket (L-bracket)
718-AL	Horizontal mounting plate

Dimensions:



Wiring/Pin-out:

Wire Color	Tiltmeter End		Mating Cable (Computer End)	
	Function	Connector Pin	DB9 Pin (RS422)	DB9 Pin (RS232)
Red	Power	H	---	---
Black	Ground	A	1	5
Blue	TX (RS232)	E	---	2
Green	RX (RS232)	G	---	3
Orange	TX+ (RS485)	D	4	---
Gray	TX- (RS485)	J	5	---
Yellow	RX- (RS485)	C	9	---
Brown	RX+ (RS485)	B	8	---
Drain Wire	Cable Shield	F	---	---