

MT2A

Test Applications • Voltage Divider

Compact String Pot • Flight/Crash Test Applications
 Dual Axis 360° Mounting Bracket
 3, 9, 15 and 30-inch Stroke Range Options
 Aluminum & Polycarbonate Enclosure • GAM Certification



GENERAL

Full Stroke Range Options	0-3, 0-9, 0-15, 0-30 inches, min.
Output Signal	voltage divider (potentiometer)
Accuracy	± 1.1% to 0.15% full stroke (see ordering information)
Repeatability	± 0.02% full stroke
Resolution	essentially infinite
Measuring Cable	Ø.019-in. nylon-coated stainless steel
Enclosure Material	anodized aluminum
Sensor Cover Options	aluminum or polycarbonate
Sensor	conductive plastic-hybrid potentiometer
Weight	0.5 lb. max.

ELECTRICAL

Input Resistance	10K ohms (± 10%)
Power Rating, Watts	2.0 at 158°F (70° C), derated to 0 @ 255°F (125°C)
Recommended Maximum Input Voltage	30V (AC or DC)
Electrical Stroke	94% ±4% of input voltage
Mating Plug	LEMO FGG.OB.304.CLAD52

MECHANICAL

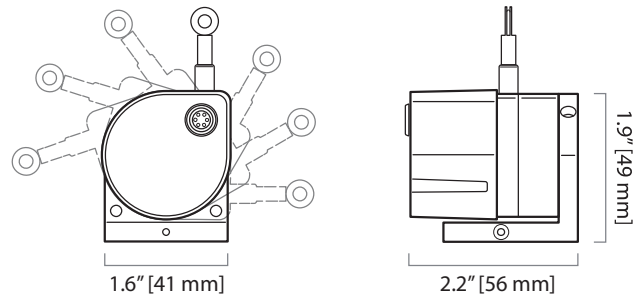
Measuring Cable Tension Options	9, 14 and 33 oz.
Maximum Measuring Cable Acceleration	136 g

ENVIRONMENTAL

Operating Temperature	-65° to 255° F (-55° to 125°C)
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GAM EG 13 CERTIFICATION

Specifications	see back page
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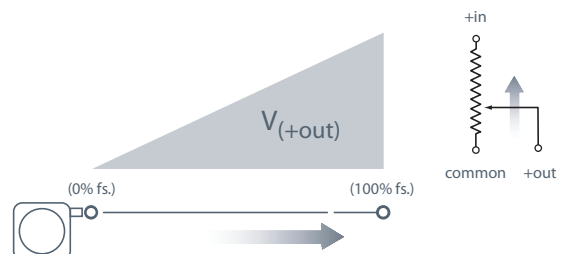


The MT2A is a member of our family of rugged, accurate miniature cable-extension position transducers designed specifically for test applications. One of the major benefits to this sensor is its 2-axis 360° rotating mounting bracket to allow for fast and simple installation in any direction.

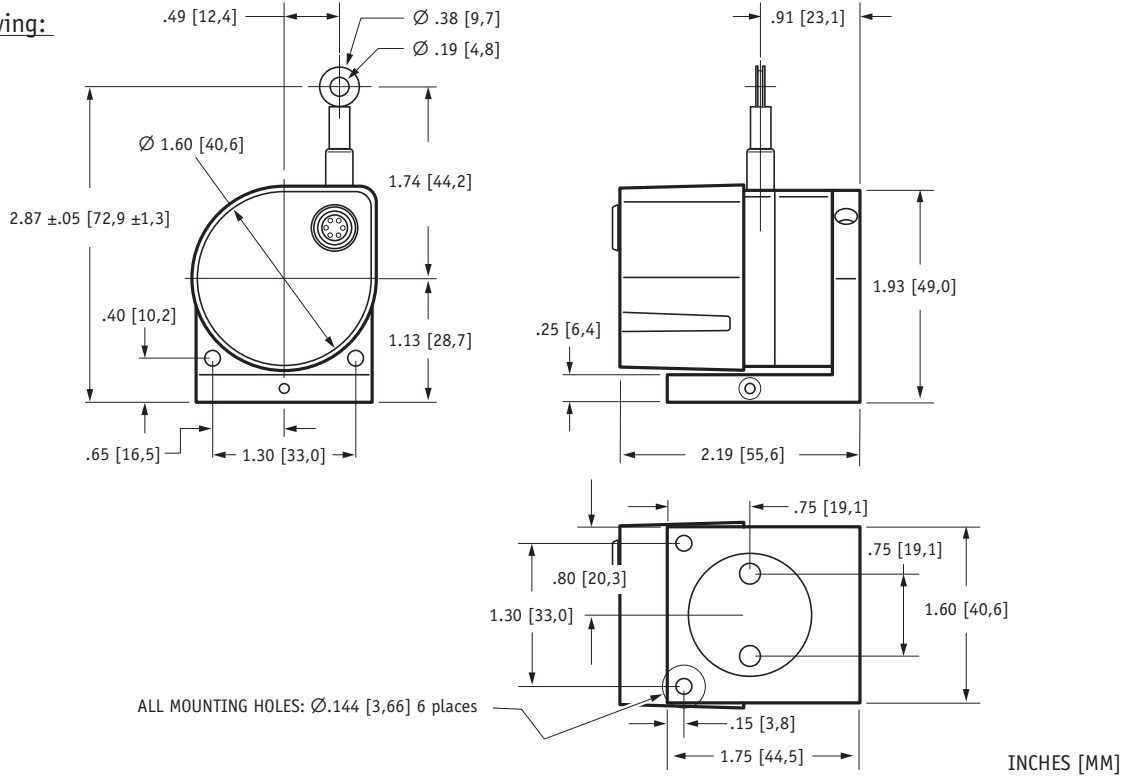
The MT2A comes in 4 different measuring ranges: 0-3", 0-9", 0-15" and 0-30" and features a highly-tensioned heavy-duty measuring cable designed for the high-acceleration demands encountered in flight testing and automotive crash tests.

For extreme impact applications, a new rugged all aluminum sensor cover is now available!

Output Signal



Outline Drawing:



Ordering Information:

Model Number:

MT2A - - **10K** -

order code: **R** **A** **B** **C**

Sample Model Number:

MT2A - 9E - 33 - 10K - M1A

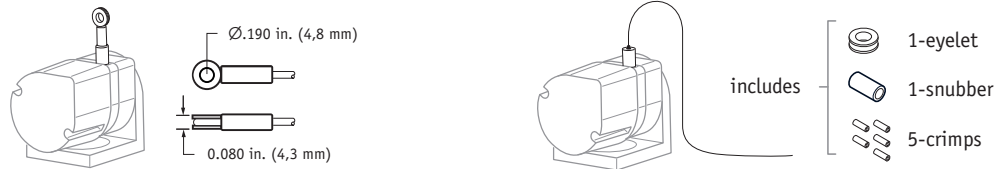
- R** range: 9 inches
- A** measuring cable termination: eyelet
- B** measuring cable tension: 33 oz. (±6 oz.)
- C** electrical connection: end-mounted connector w/ aluminum sensor cover

Full Stroke Range:

R order code:	3	9	15	30
full stroke range, min:	3 inches	9 inches	15 inches	30 inches
potentiometer cycle-life:	2.5×10^6	8.3×10^5	5.0×10^5	2.5×10^5
accuracy (% of full stroke):	1.1 %	.25%	.20%	.15%

Measuring Cable Termination:

A order code:	E	L
	Eyelet	Leader Cable (24 in. long)

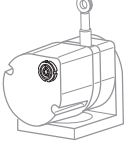




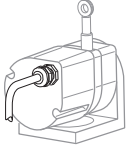
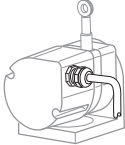
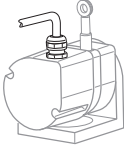
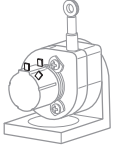
Measuring Cable Tension:

B order code:	9	14	33
tension:	9 (±2) oz.	14 (±4) oz.	33 (±6) oz.
max. cable acceleration:	99 g	136 g	136 g

Ordering Information (cont.):

Electrical Connection/Sensor Cover:

ⓐ order code:	M1	M1A	M2	M2A	M3	M3A
sensor cover:	polycarbonate	aluminum	polycarbonate	aluminum	polycarbonate	aluminum
electrical connection:		end-mount connector*		side-mount connector*		top-mount connector*

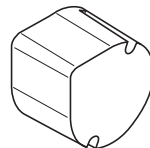
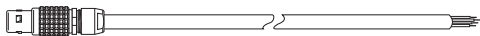
ⓐ order code:	C1	C1A	C2	C2A	C3	C3A	S
sensor cover:	polycarbonate	aluminum	polycarbonate	aluminum	polycarbonate	aluminum	none**
electrical connection:							
	end-mount, instrumentation cable (15-ft. long, 24 ga., shielded)		side-mount, instrumentation cable (15-ft. long, 24 ga., shielded)		top-mount, instrumentation cable (15-ft. long, 24 ga., shielded)		solder terminals

4-pin mating plug		Instrumentation Cable		Solder Terminals	
pin#	signal	color	signal	terminal	signal
1	+in	Red	+in	CW	+in
2	common	Black	common	CCW	common
3	+out	Green	+out	S	+out

contact view Lemo FGG.0B.304.CLAD52 24 ga., shielded

*mating plug included **blank cover available, see **Accessories** on next page

Accessories:



Additional blank sensor covers can be ordered separately. This cover comes without electrical wiring access holes so customer can drill to their requirements.

Includes screws and gasket.

Part Number	Description
9603957-0015	15 ft. long cordset. Includes mating connector with 15 ft., 24 gauge, shielded multiconductor cable

Part Number	Description
9604197-0000	Aluminum sensor cover
9603958-0000	Polycarbonate sensor cover

GAM EG 13 Certification

QUALIFICATION LEVEL FOR CLIMATIC AND THERMAL ENVIRONMENT

External Overpressure, operating (GAM EG 13 Fasc.21)

- 5 cycles: 1...4.5 Bar in 3 min., 4.5 Bar for 12 hours, 4.5...1 Bar in 1 min.
- 1 cycle: 1...3.2 Bar in 7.5 min., 3.2 Bar for 2 min., 3.2...8 Bar in 5 sec., 8 Bar for 2 hours, 8...1 Bar in 2 Bar/sec.
- 1 cycle: 1...4.5 Bar in 20 msec., 4.5 Bar for 5 sec, 4.5...1 Bar in 20 msec.

Thermal Vacuum Transitory, operating (GAM EG 13 Fasc.10)

- Room pressure and temperature (1 Bar A; 20°C ±2°C)
- 1...10-3 mBar in 100 seconds
- Vacuum (10-3 mBar) for 10 min.

Climatic Cycles (GAM EG 13 Fasc.8)

- Dry heat: 24 hours @ 70°C ±2°C Relative Humidity < 50%
- Wet heat: 24 hours @ 70°C ±2°C Relative Humidity = 50%
- Cold: 24 hours @ -10°C ±2°C Relative Humidity < 50%
- Wet heat: 24 hours @ 70°C ±2°C Relative Humidity = 100%

Dry Heat (Relative Humidity <50%)

- Room temperature to 70°C in 30 mins
- 70°C for 5 hours, non operating
- 70°C for 5 hours, operating
- 70°C to room temperature in 20 minutes

QUALIFICATION LEVEL FOR MECHANICAL ENVIRONMENT

Random Vibrations (GAM EG 13 Fasc.42 mod. Op1)

- 20...2000 Hz, 3 min. per axis, operating, 34 g.
- 20...2000 Hz, 20 sec. per axis, operating, 45 g.

Random Vibrations (GAM EG 13 Fasc.41 mod. Op3)

- Compensated Levels, short duration
- 3...300 Hz @ .2 – .002 g²/ Hz.

Reasearch Critical Frequency

- Logarithmic Run, 1 octave / min.,1...2000 Hz.

Steady Acceleration, operating (GAM EG 13 Fas.45)

- 37 g, 3 min. per direction (2 directions per axis)

Sinusoidal Vibrations, operating (Gam EG 13 Fasc.41 mod. Op3)

- Logarithmic run, 1 octave/min. on 3 axis
- 3...50 Hz., 9 hours per axis @0.6...1.25 g

Sinusoidal Vibrations, operating (Gam EG 13 Fasc.41 mod. Op3)

- Logarithmic run, 1 octave/min. on 3 axis
- 5...2 KHz., 3 axis @12...25 g.

Average Shock (GAM EG 13 Fasc.43 Mode Op1)

- 1 shock, 1/2 sinusoidal, 100g., 6 msec. operating, wlongitudinal and back direction

Free Fall (GAM EG 13 Fasc.43 Mode Op4)

- 6 consecutive drops on wood table, height = 100mm

version: **7.0** last updated: **November 14, 2012**

MT2E

Test Applications • Incremental Encoder

Compact String Pot • 30-inch Stroke Range
Dual Axis 360° Mounting Bracket
Flight/Crash Test Applications
Aluminum & Polycarbonate Enclosure



GENERAL

Full Stroke Range	0-30 inches, min.
Output Signal	incremental encoder
Accuracy	0.04% full stroke (contact factory for higher accuracy)
Repeatability	± 0.02% full stroke
Resolution	316 ± 7 pulses per inch (13 ± 1 pulses per mm)
Measuring Cable	Ø.019-in. nylon-coated stainless steel
Enclosure Material	anodized aluminum
Sensor Cover	polycarbonate
Sensor	optical incremental encoder
Weight	0.5 lb. max.

ELECTRICAL

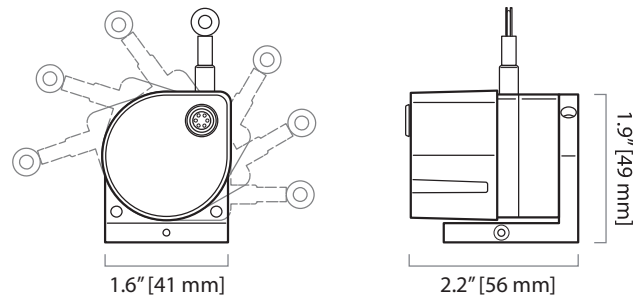
Input Voltage	5 - 26 VDC
Input Current	35 mA, no load
Output Driver	push-pull, 20 mA source/sink
Output Voltage	equal to the input voltage
Mating Plug	LEMO FGG.OB.304.CLAD52

MECHANICAL

Measuring Cable Tension Options	9, 14 and 33 oz.
Maximum Measuring Cable Acceleration	136 g

ENVIRONMENTAL

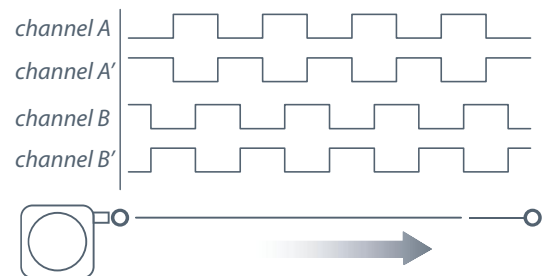
Operating Temperature	32° to 158° F (0° to 70°C)
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The MT2E is our new encoder-based member to our family of rugged, accurate miniature cable-extension position transducers. The Celesco MT2E features a highly-tensioned heavy-duty measuring cable that was designed for the high-acceleration demands encountered in flight testing and automotive crash tests.

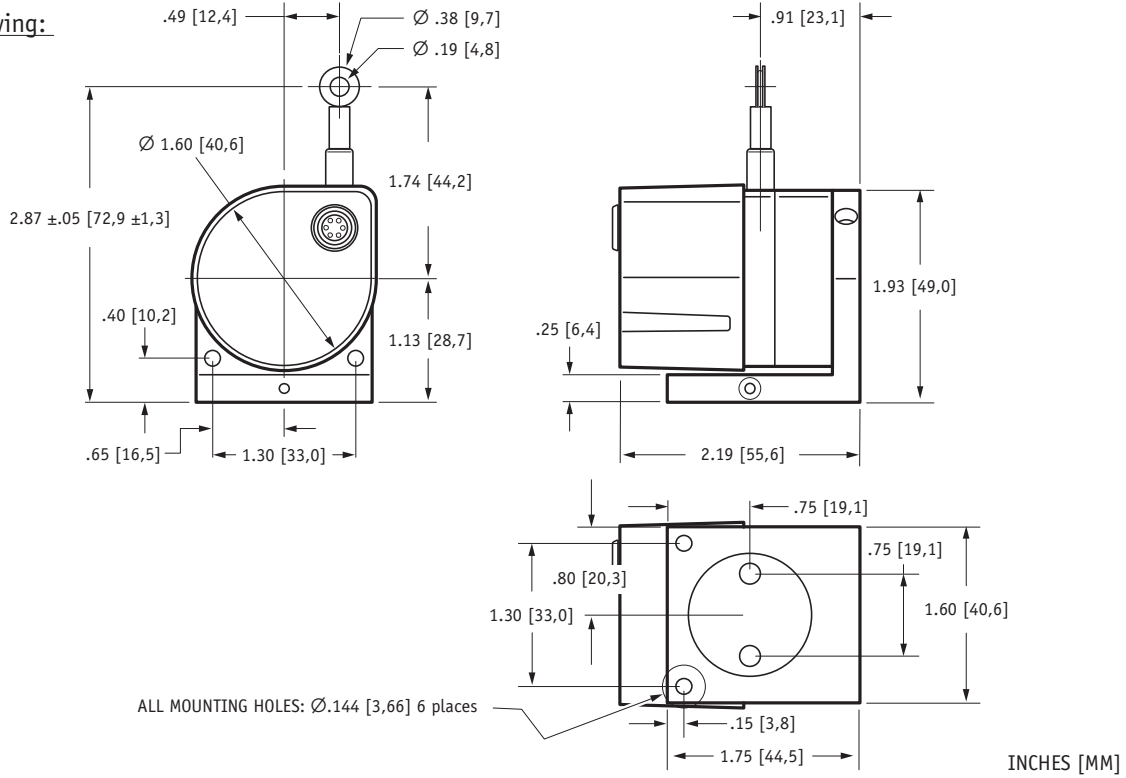
The MT2E was designed with 2-axis 360° rotation in its mounting bracket which allows for fast and simple installation in any direction.

Output Signal



-- see ordering information for available channels

Outline Drawing:



Ordering Information:

Model Number:

MT2E - 30 - - 316 -
order code: **A** **B** **C**

Sample Model Number:

MT2E - 30E - 33 - 316 - M1

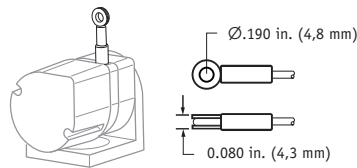
- R** range: 30 inches
- A** measuring cable termination: eyelet
- B** measuring cable tension: 33 oz. (±6 oz.)
- C** electrical connection: end-mounted connecto

Measuring Cable Termination:

A *order code:*

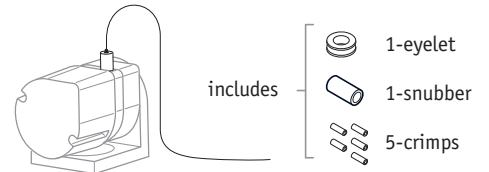
E

Eyelet



L

Leader Cable (24 in. long)



Measuring Cable Tension:

B *order code:*

9


14

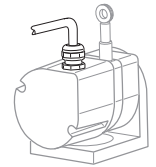
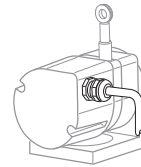
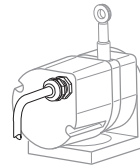
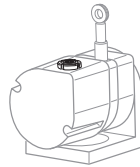
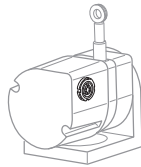
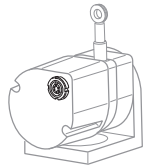
33

tension:	9 (±2) oz.	14 (±4) oz.	33 (±6) oz.
max. cable acceleration:	99 g	136 g	136 g
spring cycle-life, 25-inch extension:	≥ 1 million	150,000	75,000
spring cycle-life, 15-inch extension:	≥ 1 million	≥ 1 million	≥ 1 million


Ordering Information (cont.):

Electrical Connection:

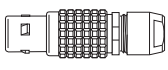
 <i>order code:</i>	M1	M2	M3	C1	C2	C3
connection:	end-mount connector	side-mount connector	top-mount connector	end-mount strain relief	side-mount strain relief	top-mount strain relief
available channels:	A, B	A, B	A, B	A, A', B, B'	A, A', B, B'	A, A', B, B'



4-pin Connector



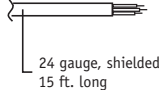
contact view



Lemo FGG.0B.304.CLAD52

pin#	signal
1	input voltage (V+)
2	common (gnd.)
3	channel A
4	channel B

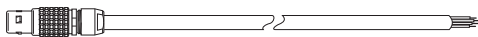
Instrumentation Cable



24 gauge, shielded, 15 ft. long

color	signal
Red	input voltage (V+)
Black	common (gnd.)
Green	channel A
White	channel B
Blue	channel A
Brown	channel B

Accessories:



Part Number	Description
9603957-0015	15 ft. long cordset. Includes mating connector with 15 ft., 24 gauge, shielded multiconductor cable

version: 5.1 last updated: April 15, 2013

MT3A

Test Applications • Voltage Divider

Compact String Pot • Flight/Crash Test Applications
 Dual Axis 360° Mounting Bracket
 3, 9, 15 and 30-inch Stroke Range Options
 Wet Environments • Aluminum Enclosure

GENERAL

Full Stroke Range Options	0-3, 0-9, 0-15, 0-30 inches, min.
Output Signal	voltage divider (potentiometer)
Accuracy	± 1.1% to 0.15% full stroke (see ordering information)
Repeatability	± 0.02% full stroke
Resolution	essentially infinite
Measuring Cable	Ø.019-in. nylon-coated stainless steel
Enclosure Material	anodized aluminum
Sensor Cover Options	aluminum or polycarbonate
Sensor	conductive plastic-hybrid potentiometer
Weight	0.5 lb. max.

ELECTRICAL

Input Resistance	10K ohms (± 10%)
Power Rating, Watts	2.0 at 158°F (70°C), derated to 0 @ 255°F (125°C)
Recommended Maximum Input Voltage	30V (AC or DC)
Electrical Stroke	94% ±4% of input voltage
Mating Plug	LEMO FGG.OB.304.CLAD52

MECHANICAL

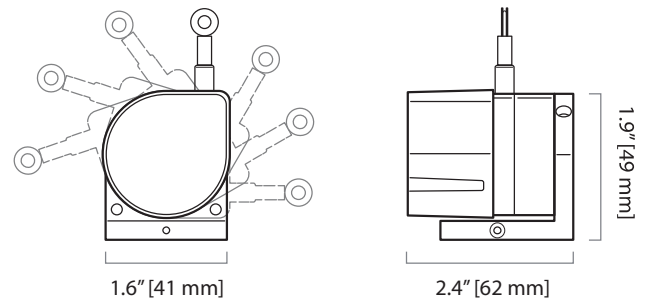
Measuring Cable Tension Options	9, 14 and 33 oz.
Maximum Measuring Cable Acceleration	90 g

ENVIRONMENTAL

Enclosure	NEMA 4 / IP67
Operating Temperature	-40° to 250° F (-40° to 120°C)



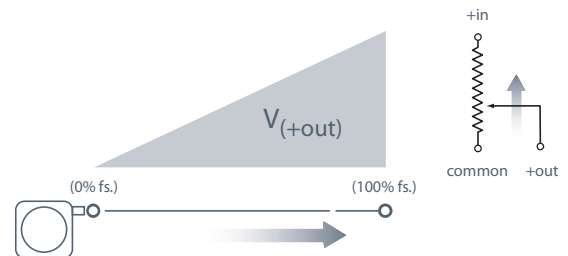
shown with aluminum cover



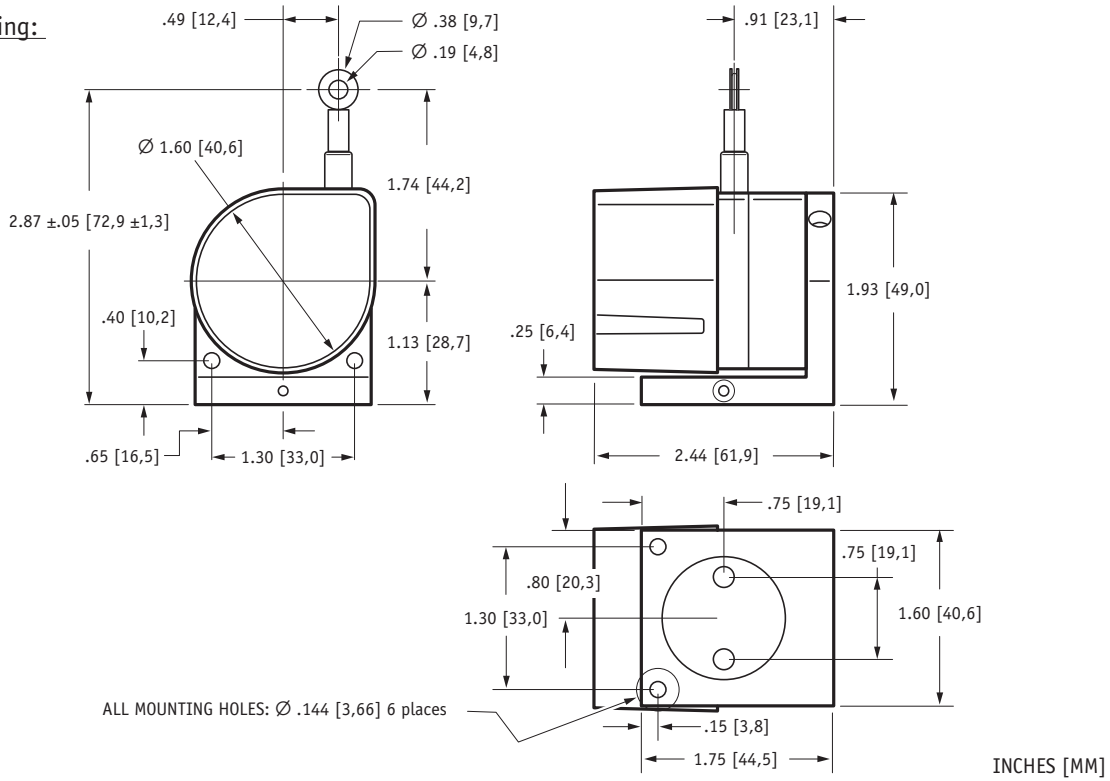
The MT3A is the solution for high-acceleration test applications in potentially wet environments. Just like the MT2A, the MT3A comes in 4 different full-stroke ranges, has a high-tension heavy-duty measuring cable designed for the demands of flight and automotive crash tests and comes with an easy to use 2-axis 360° rotation mounting bracket for installation in hard to fit areas.

For extreme high impact applications, the MT3A is now available with a rugged all aluminum sensor cover!

Output Signal



Outline Drawing:



Ordering Information:

Model Number:

MT3A - **- 10K** -
order code: **R** **A** **B** **C**

Sample Model Number:

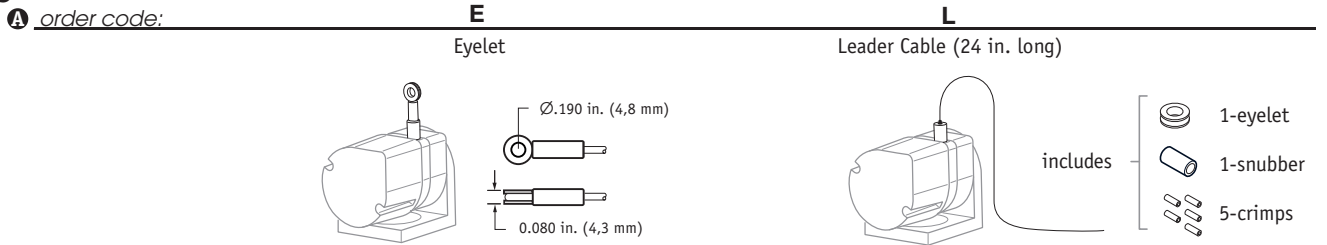
MT3A - 9E - 33 - 10K - C1A

- R** range: 9 inches
- A** measuring cable termination: eyelet
- B** measuring cable tension: 33 oz. (±6 oz.)
- C** electrical connection: 15-ft cable w/end-mounted strain relief/aluminum cover

Full Stroke Range:

R order code:	3	9	15	30
full stroke range, min:	3 inches	9 inches	15 inches	30 inches
potentiometer cycle-life:	2.5×10^6	8.3×10^5	5.0×10^5	2.5×10^5
accuracy (% of full stroke):	1.1 %	.25%	.20%	.15%

Measuring Cable Termination:

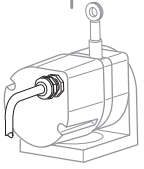
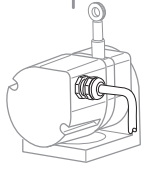
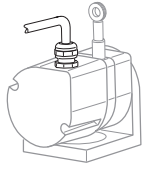
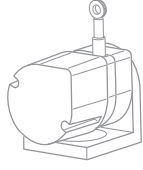
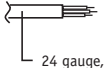


Measuring Cable Tension:

B order code:	9	14	33
tension:	9 (±2) oz.	14 (±4) oz.	33 (±6) oz.
max. cable acceleration:	17 g	50 g	90 g

Ordering Information (cont.):

Electrical Connection/Sensor Cover:

Order Code	C1	C1A	C4	C4A	C2	C2A	C5	C5A								
sensor cover:	polycarbonate	aluminum	polycarbonate	aluminum	polycarbonate	aluminum	polycarbonate	aluminum								
electrical cable length:	15 ft (4.5 m)		30 ft (9 m)		15 ft (4.5 m)		30 ft (9 m)									
end-mount strain relief																
Order Code	C3	C3A	C6	C6A	BC	BCA										
sensor cover:	polycarbonate	aluminum	polycarbonate	aluminum	polycarbonate	aluminum										
electrical cable length:	15 ft (4.5 m)		30 ft (9 m)		n/a	n/a										
top-mount strain relief																
Signal Connection Color Code			<table border="1"> <thead> <tr> <th>color</th> <th>signal</th> </tr> </thead> <tbody> <tr> <td>Red</td> <td>+in</td> </tr> <tr> <td>Black</td> <td>common</td> </tr> <tr> <td>Green</td> <td>+out</td> </tr> </tbody> </table>	color	signal	Red	+in	Black	common	Green	+out	<p><i>* blank cover option is for customers who want to provide their own connector or strain relief. This cover comes without electrical wiring access holes so customer can drill to their requirements.</i></p>				
color	signal															
Red	+in															
Black	common															
Green	+out															

version: 9.0 last updated: November 15, 2012