



San Juan Capistrano, California

ORIGINATED	AC	3/1/90	PERFORMANCE SPECIFICATION INTEGRAL ELECTRONIC ACCELEROMETER MODEL 5216MX	PS5216MX	
CHECKED	AC	5/21/92		PAGE	1 OF 12
APPROVED	JJ			REVISION	D
				EO NUMBER	20415
				DATE	11/19/92

1.0 DESCRIPTION

The ENDEVCO® Model 5216-100 series piezoelectric accelerometers are designed specifically for vibration measurement in the rugged environments of industrial machinery. These accelerometers incorporate an internal hybrid signal conditioner in a two-wire system, which transmits its low impedance voltage output through the same cable that supplies the required constant current power. They have very wide dynamic range and an extremely low noise floor. Signal ground is isolated from the mounting surface to prevent ground loops, and the sensor is hermetically sealed to ensure long term operation with excellent stability.

The Model 5216-100 series features ENDEVCO's PIEZITE® Type P-8 crystal element, operating in compression mode, in conjunction with a thermal low-pass filter to minimize thermal transient sensitivity. This line of accelerometers feature various connection options, as well as an integral coaxial cable version. The model number suffix "-100MX" specifies output sensitivity and connector type; i.e., 5216-100M3 features output sensitivity of 100 mV/g and a BNC connector.

The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75°F (+24°C), 4 mA, and 100 Hz, unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

		<u>UNITS</u>	
2.0	<u>DYNAMIC CHARACTERISTICS</u>		
2.1	RANGE	g	80
2.2	VOLTAGE SENSITIVITY ± 10%	mV/g	100
2.3	FREQUENCY RESPONSE		See Typical Curve, Page 6
2.3.1	RESONANCE FREQUENCY		
2.3.1.1	TYPICAL	kHz	30
2.3.1.2	MINIMUM	kHz	25
2.3.2	AMPLITUDE RESPONSE ± 5%	Hz	3 to 6000
2.4	TEMPERATURE RESPONSE		See Typical Curve, Page 6
2.4.1	At -67°F (-55°C) max/min	%	+15 / 0
2.4.2	At +200°F (+93°C) max/min	%	-15 / 0
2.5	TRANSVERSE SENSITIVITY	%	≤ 5
2.6	AMPLITUDE LINEARITY	%	1 to 80 g

CONTINUED PRODUCT IMPROVEMENT NECESSITATES THAT ENDEVCO RESERVE THE RIGHT TO MODIFY THESE SPECIFICATIONS WITHOUT NOTICE TO HOLDERS OF PREVIOUS ISSUES.

		<u>UNITS</u>	
3.0	<u>OUTPUT CHARACTERISTICS</u>		
3.1	OUTPUT POLARITY		Acceleration directed into base produces positive output.
3.2	DC OUTPUT BIAS VOLTAGE	Vdc	9.5
3.3	OUTPUT CONNECTION		See Connection Diagram, Page 5
3.4	OUTPUT IMPEDANCE	Ω	≤ 200
3.5	FULL SCALE OUTPUT VOLTAGE	V	± 8
3.6	RESIDUAL NOISE 2 Hz to 10 kHz, Broadband		
3.6.1	TYPICAL	equiv. g rms	0.0001
3.6.2	MAXIMUM	equiv. g rms	0.0003
3.7	LOAD		See Load Diagram, Page 5
3.8	GROUNDING		Signal ground isolated from mounting surface
4.0	<u>POWER REQUIREMENT</u>		
4.1	SUPPLY VOLTAGE	Vdc	+20 to +30
4.2	SUPPLY CURRENT	mA	+2 to +20
4.3	WARM-UP TIME To within 10% of final bias	sec	< 3
5.0	<u>ENVIRONMENTAL CHARACTERISTICS</u>		
5.1	TEMPERATURE RANGE		-67°F to +200°F (-55°C to +93°C)
5.2	HUMIDITY		Hermetically sealed sensor
5.3	SINUSOIDAL VIBRATION LIMIT	g pk	250
5.4	SHOCK LIMIT	g pk	5000
5.5	BASE STRAIN SENSITIVITY	equiv. g pk/ μ strain	0.006
5.6	THERMAL TRANSIENT SENSITIVITY	equiv. g pk/°F	0.3
5.7	ELECTROMAGNETIC SENSITIVITY	equiv. g rms/gauss	0.0002

		<u>UNITS</u>	
5.8	ACOUSTIC SENSITIVITY At 155 dB SPL	g	0.1
5.9	INTEGRATED GAMMA FLUX (without degradation)	RAD	$<1 \times 10^7$
6.0	<u>PHYSICAL CHARACTERISTICS</u>		
6.1	DIMENSIONS		See Outline Drawing, Pages 7-12
6.2	WEIGHT Without cable	gm (oz)	70 (2.45)
6.3	CASE MATERIAL		Stainless Steel
6.4	CONNECTOR M1 M2 M3 M4 M5 M6		Microdot 10-32 Integral Coaxial Cable BNC Spring Terminal PT06A-8-3S MIL-C-5015, 2 pin
6.5	MOUNTING TORQUE	lbf-in (Nm)	24 (2.7)
7.0	<u>ACCESSORIES</u>		
7.1	SUPPLIED		
7.1.1	PROTECTIVE CAP M1 M3 M5 M6	1 x 1 x 1 x 1 x	P/N EHM919 P/N EHM1010 P/N EHM438 P/N EHM485
7.1.2	VINYL BOOT M1 M2 M4	1 x 1 x 1 x	P/N EHM1016 P/N EHM1016 P/N EHM1016
7.2	OPTIONAL		
7.2.1	MOUNTING STUDS 1/4 - 28 to 1/4 - 28 1/4 - 28 to M6 x 1-6g 1/4 - 28 to 10 - 32 1/4 - 28 Cementing Stud		P/N 2984-5 P/N 2984-6 P/N 2984-7 P/N 2988M4
7.2.2	CABLE CONNECTOR FOR M5	1 x	P/N EP497
7.2.3	CABLE CONNECTOR FOR M6	1 x	P/N EP498

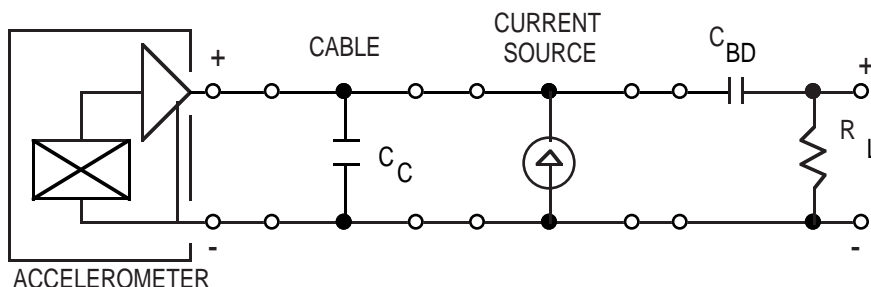
UNITS

8.0 CALIBRATION

8.1 SUPPLIED

8.1.1 SENSITIVITY mV/g

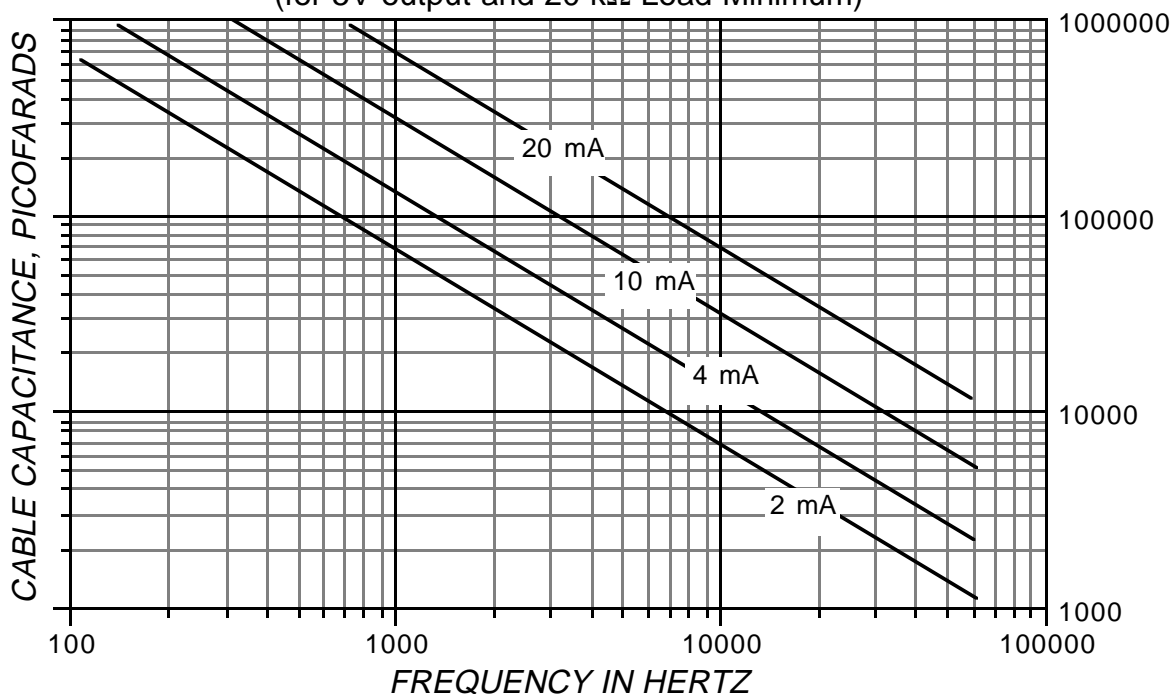
CONNECTION DIAGRAM, EACH CHANNEL



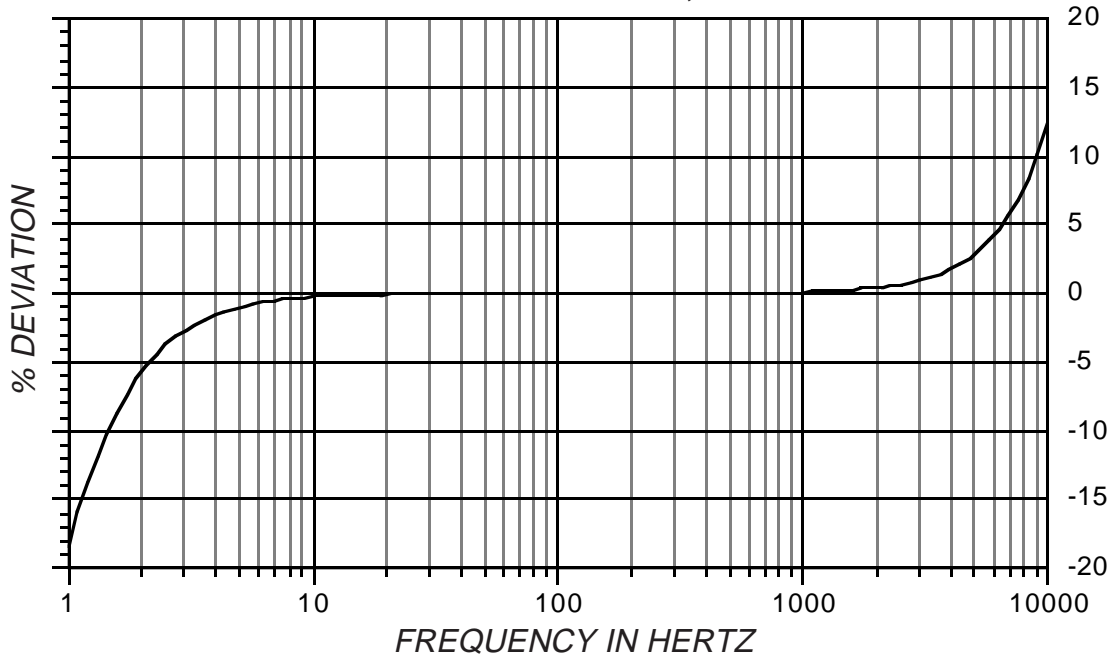
- n Range is dependent on the sensitivity of the unit and bias, and the compliance voltage of the constant current power source. The positive range is limited to the difference between the compliance voltage and the unit's bias, divided by the unit's sensitivity. The negative range is limited to approximately 2 volts less than the bias voltage divided by the unit's sensitivity.
- n Cable capacitance C_C will load the accelerometer output, affecting frequency response, and is dependent on the magnitude of constant current, as shown in Load Capacitance vs. Frequency Plot.
- n Bias decoupling capacitor C_{BD} and load resistor R_L can be determined from:

$$f_{-3\text{ dB}} = \frac{1}{2\pi R_L C_{BD}}$$
 where f is the lowest frequency of interest.

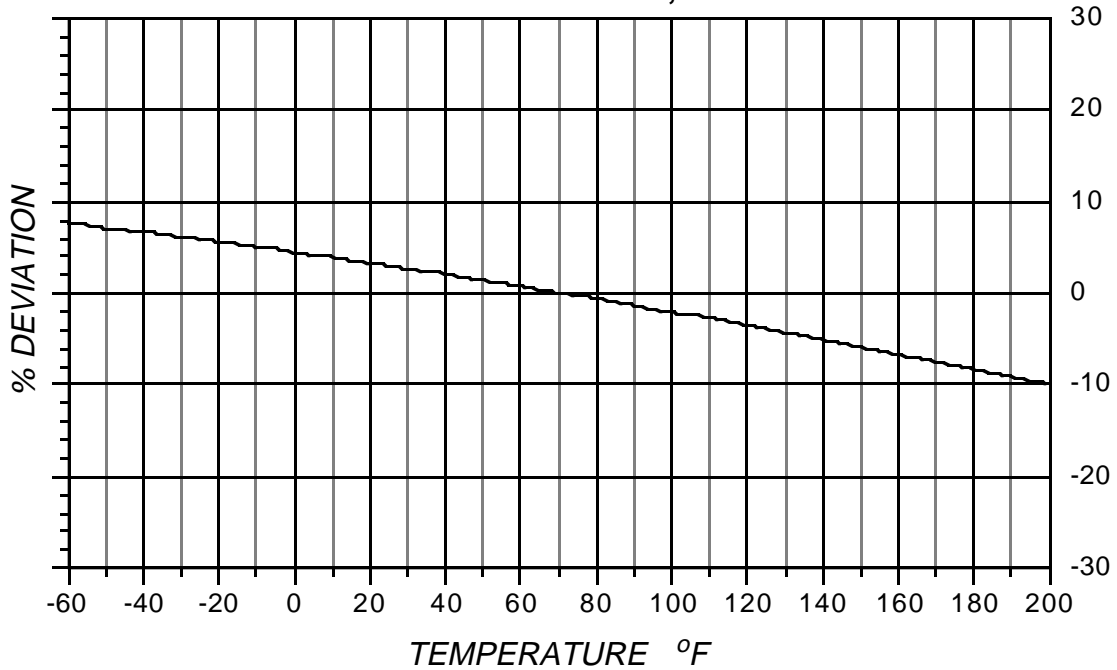
THEORETICAL LOAD DIAGRAM
(for 5V output and 20 kΩ Load Minimum)



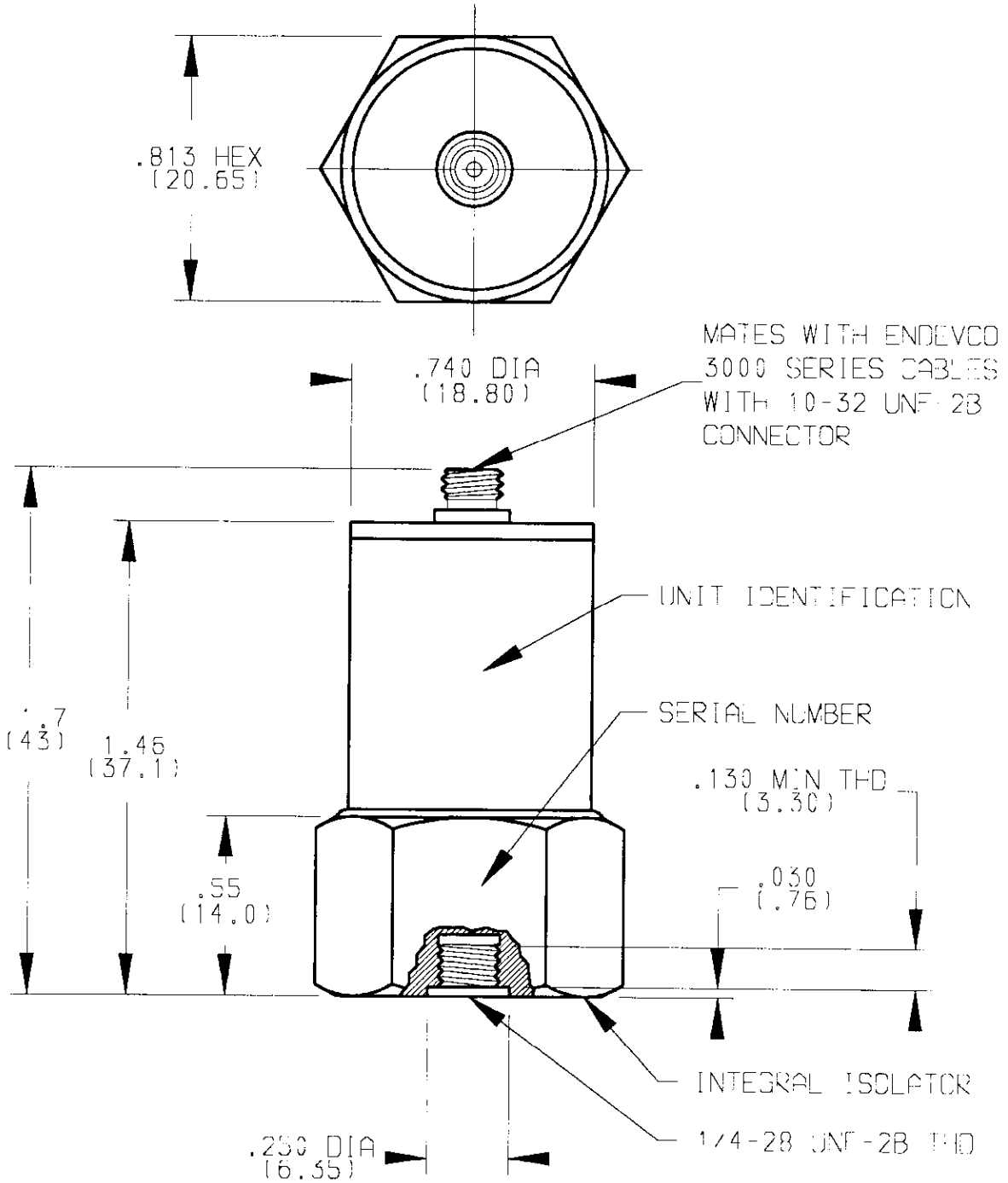
TYPICAL AMPLITUDE RESPONSE, MODEL 5216MX



TYPICAL TEMPERATURE RESPONSE, MODEL 5216MX



MODEL 5216M1



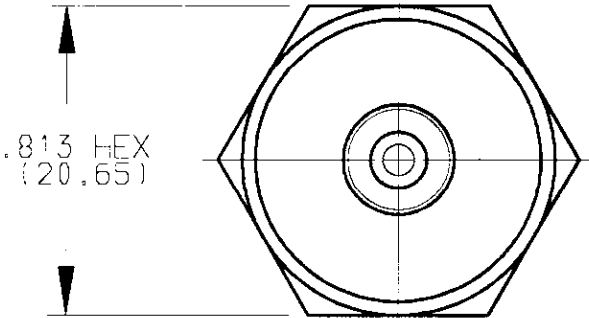
STANDARD TOLERANCE

INCHES (MILLIMETERS)

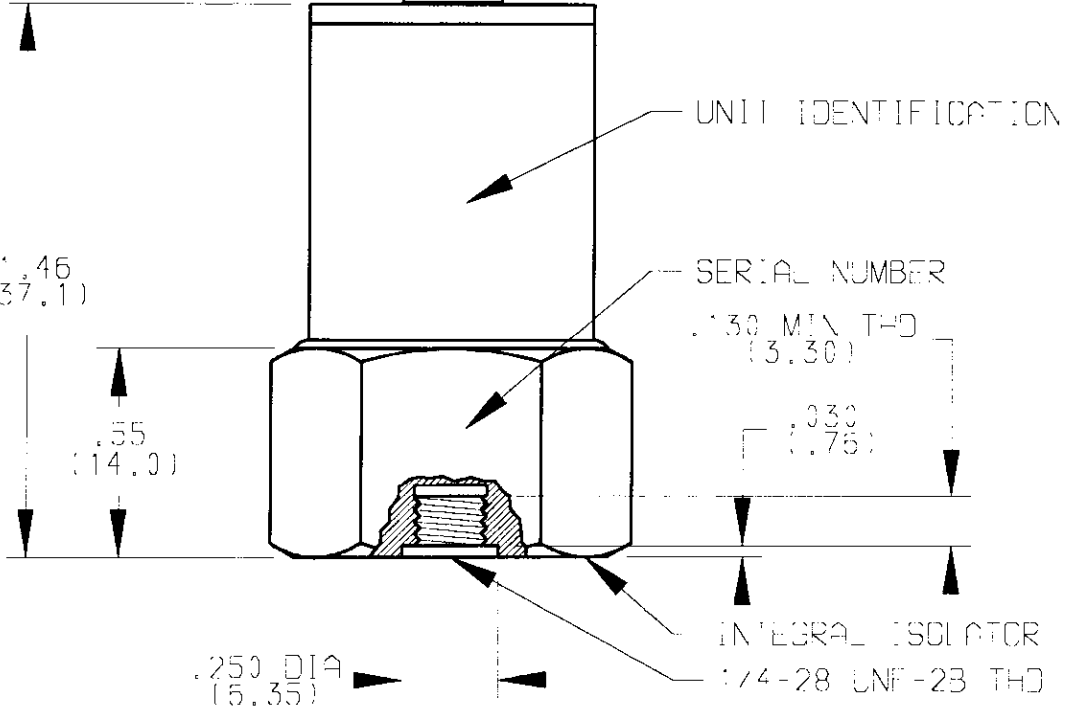
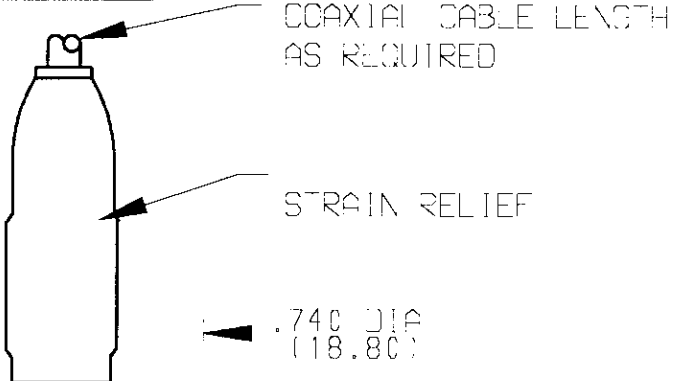
.XX = +/- .02 (.X = +/- .5)
 .XXX = +/- .010 (.XX = +/- .25)

F-CAD: PS5216M1

MODEL 5216M2



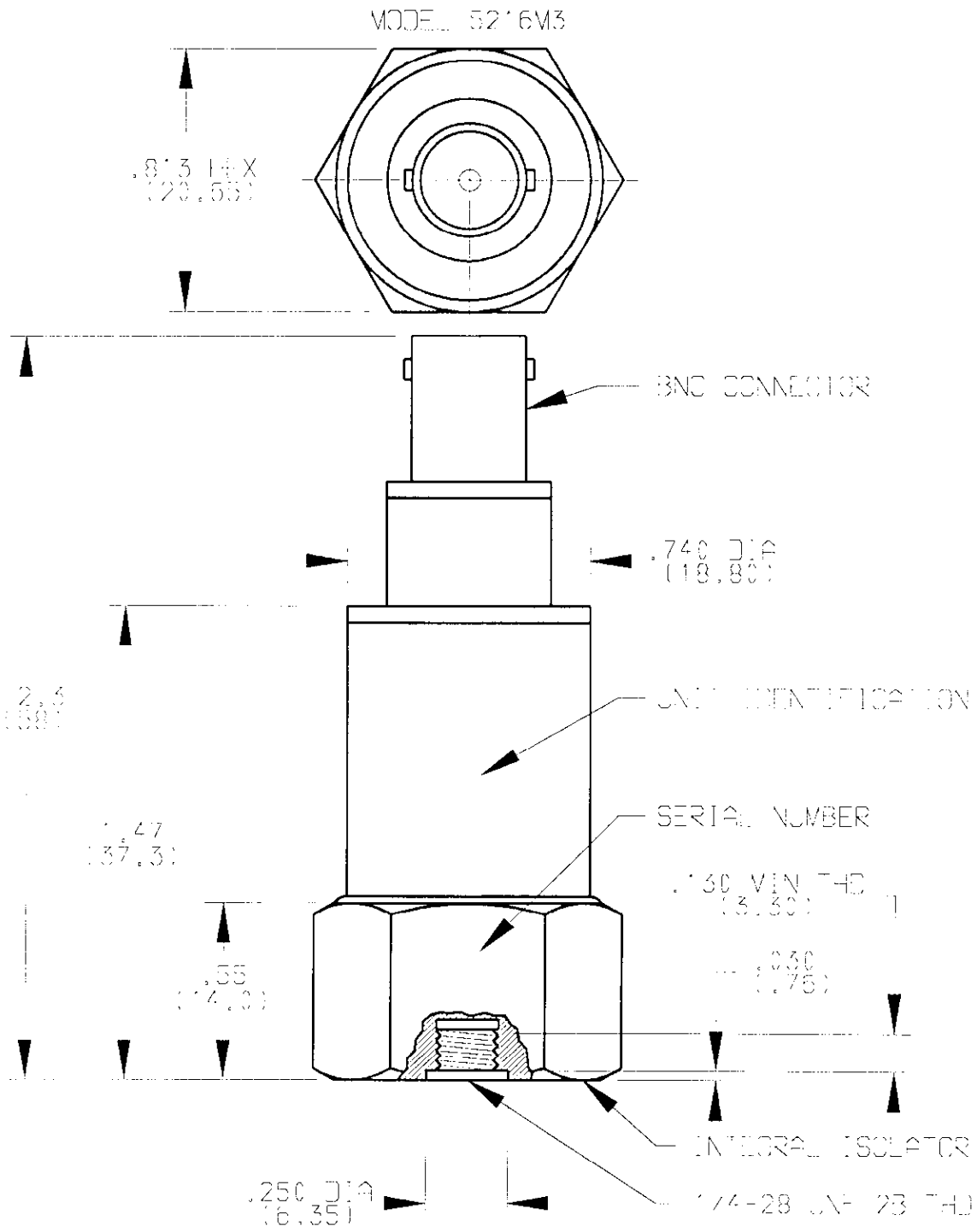
MODEL #	CABLE LENGTH
5216-100M2/10	10FT (3.05M)
5216-100M2/20	20FT (6.10M)
5216-100M2/30	30FT (9.14M)



STANDARD TOLERANCE

INCHES (MILLIMETERS)

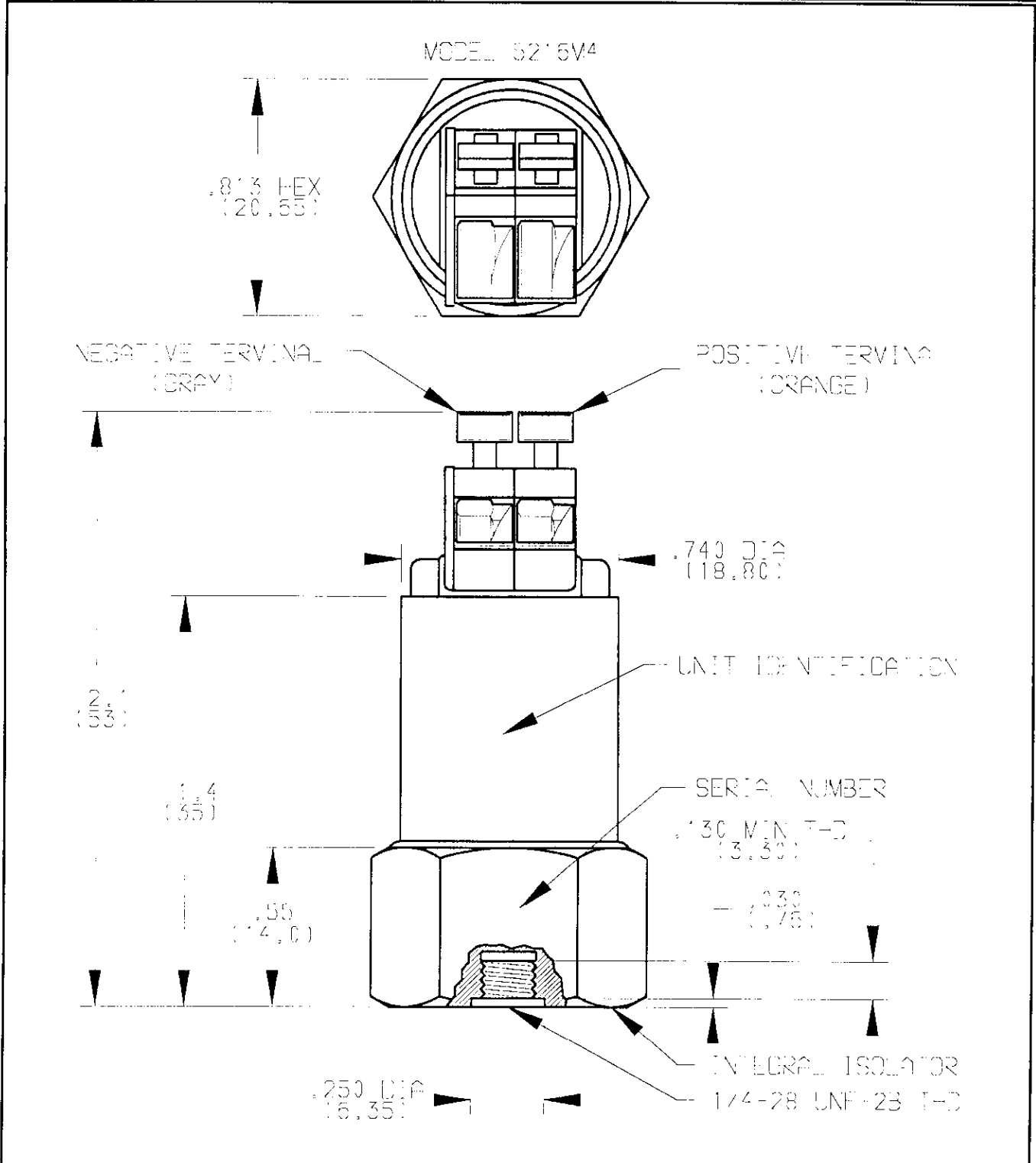
,XX = +/- .02 (,XX = +/- .5)
 ,XXX = +/- .010 (,XX = +/- .25)



STANDARD TOLERANCE

INCHES	(MILLIMETERS)
.XX = +/- .02	(.X = +/- .5)
.XXX = +/- .010	(.XX = +/- .25)

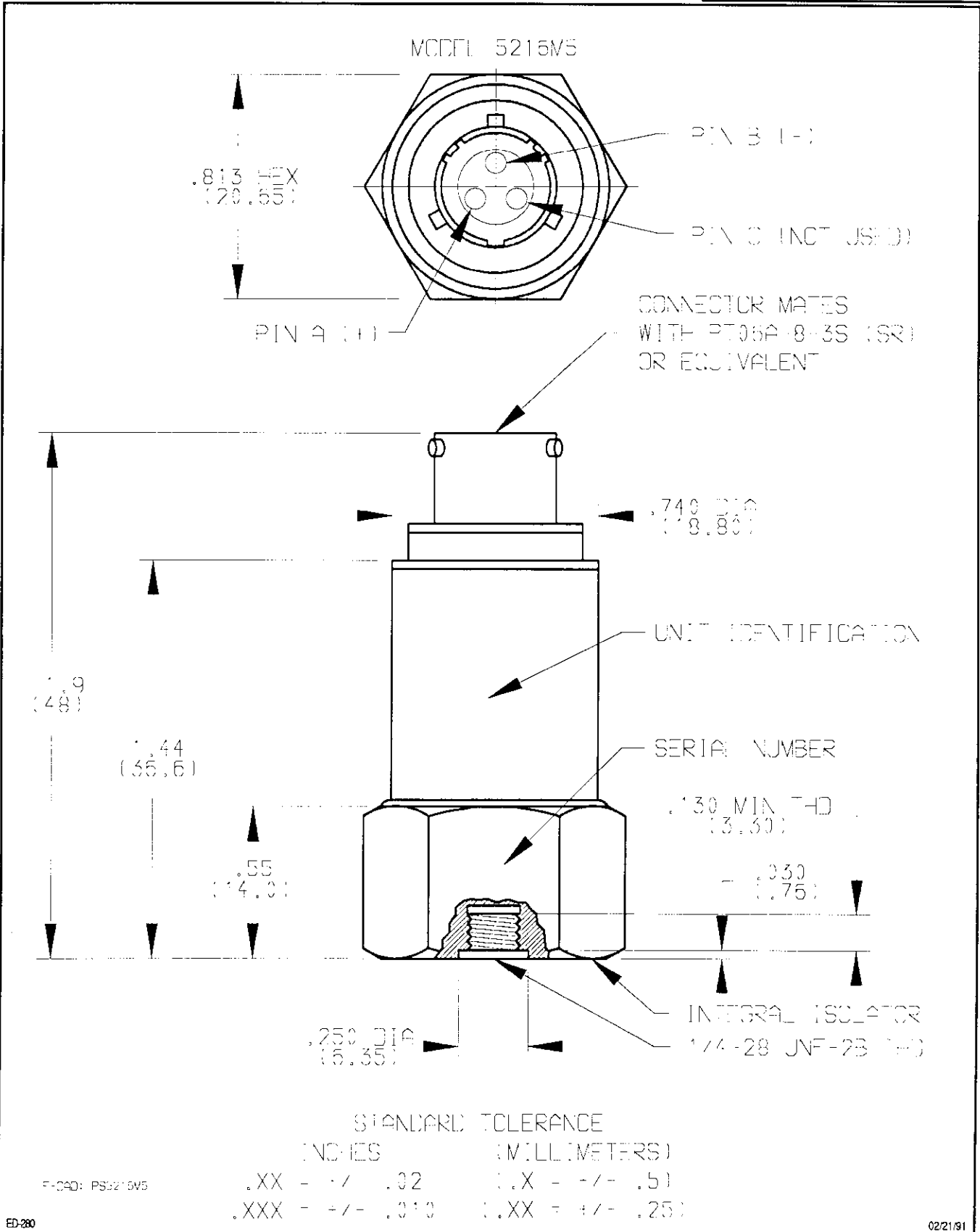
F-000: PS5216MX

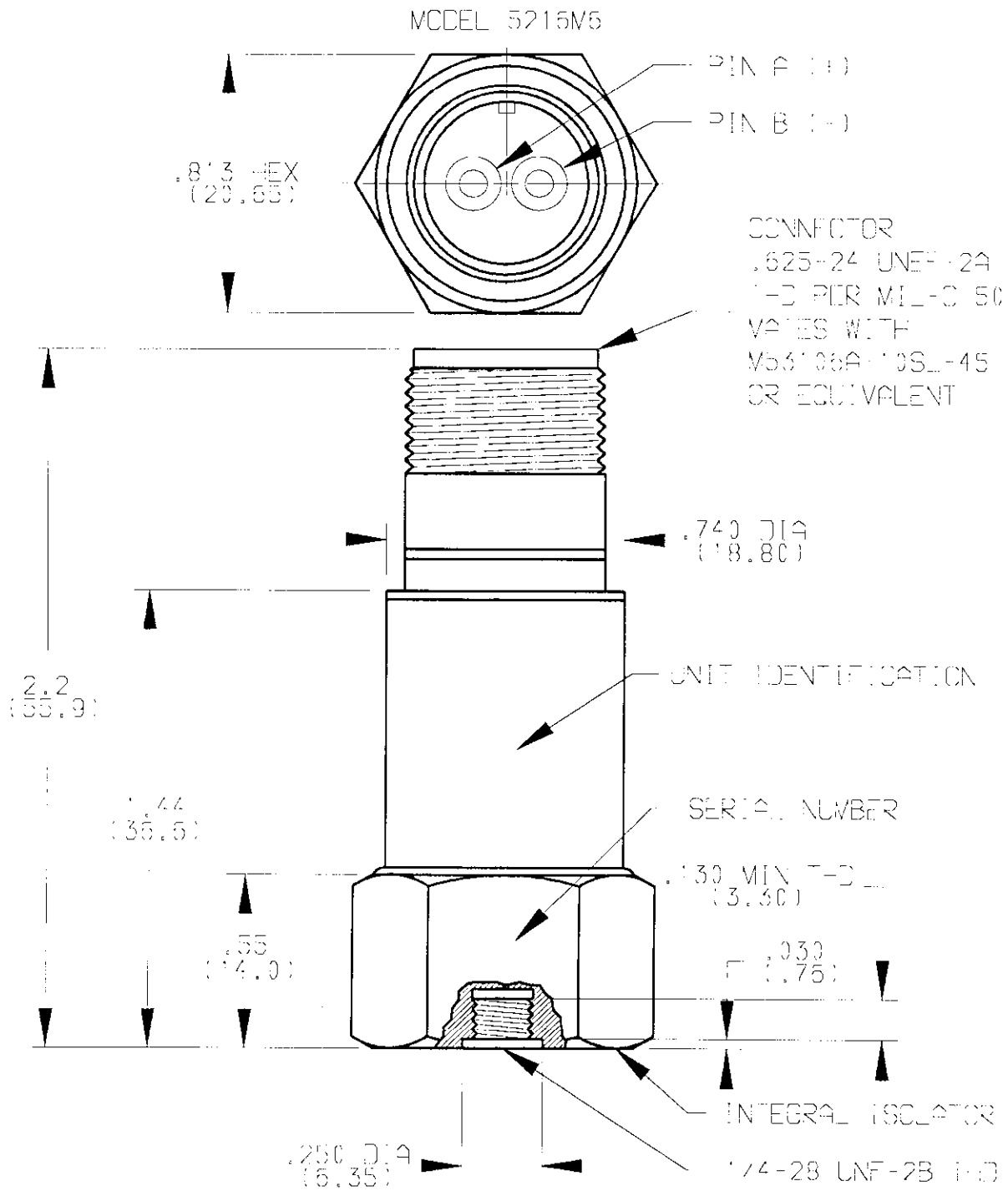


STANDARD TOLERANCE

INCHES	(MILLIMETERS)
.XX = +/- .02	(.X = +/- .5)
.XXX = +/- .010	(.XX = +/- .25)

FIGURE: PS5216V4





STANDARD TOLERANCE

INCHES	(MILLIMETERS)
.XX = +/- .02	(.X = +/- .5)
.XXX = +/- .010	(.XX = +/- .25)

FIGURE PS5216M5