

## Aerospace Proximity Sensors

IHM Series

**32318768**

Issue 1

**Datasheet**



### DESCRIPTION

Honeywell has over 30 years' experience designing and delivering accurate and reliable proximity sensors that are currently used in a variety of military and commercial aircraft. Honeywell's patented IHM Series Aerospace Proximity Sensors are configurable, non-contact, hermetically sealed devices designed to sense the presence or absence of a target in harsh-duty aircraft applications. The IHM Series provides on/off output, and can be configured with an optional health monitoring output to the host system. The technology Honeywell uses in the IHM Series is considered an improvement on traditional ECKO (Eddy Current Killed Oscillator) topology that previously had been the standard in aerospace applications. The IHM Series helps to reduce downtime and maintenance costs due to a unique circuit that can detect any internal failures and display a fault output instead of a false positive or false negative.

### VALUE TO CUSTOMERS

- Enhanced vibration and EMI specifications help to increase revenue (flight hours) and reduce cost to serve (system maintenance)
- Hermetic sealing helps increase revenue (flight hours), reduce cost to serve (maintenance), & reduce cost of goods (spares)
- Platform approach helps to increase revenue (speed to market) and reduce cost to serve (lower engineering investment)
- Health monitoring helps to increase revenue (flight hours), reduce cost to serve (maintenance), and reduce cost of goods (spares)
- Supplier stability helps to reduce cost to serve (troubleshoot with original supplier)
- Current install base helps to reduce cost to serve (proven performance and MTBF)

### FEATURES

- Industry-leading indirect lightning and dielectric ruggedness: Meets the increased requirements of today's composite aircraft and most challenging applications including landing gear, thrust reversers, and flight controls
- Superior vibration ruggedness: Capable of withstanding extremely high vibration applications
- Environmentally rugged: Fully hermetic packages provide long-term reliability in very harsh environments by eliminating the potential for contamination of the sensor from the application environment. In addition, Honeywell has developed an innovative method to hermetically seal wire-lead (pigtail) configurations
- Integral Health Monitoring Capability: Optional third output state to indicate the health of the sensor (whether it is healthy or failed). Reduces maintenance time, reduces delayed flights, and lowers overall maintenance cost across the life of the aircraft
- Non-contact design: Utilizes non-contact technology to sense the presence or absence of a target regardless of the dirty, harsh environment in which it is placed, eliminating mechanical failure mechanisms, reducing wear, minimizing downtime, increasing durability, and increasing reliability

### POTENTIAL APPLICATIONS

- Thrust reverser actuation system (TRAS) (stowed or deployed status)
- Doors (open/closed position, locked status)
- Cargo loading latch detection (palet locked)
- Evacuation slide door-lock mechanism
- Flight controls (flap/slat, spoilers)
- Landing gear (uplock, downlock, & Weight On Wheels (WOW))

### DIFFERENTIATION

- Diagnostic capability: Integral Health Monitoring: sinks 9 mA  $\pm$ 1 mA or <1 mA on fault detection
- Honeywell has developed an innovative method to hermetically seal wire-lead (pigtail) configurations
- Fire detection/integrity: Explosion proof RTCA/DO-160G Section 9, Cat E&H
- Operational shock: RTCA/DO-160G Section 7, Cat B
- Crash safety: RTCA/DO-160G Section 7, Cat B
- Radio frequency emission: RTCA/DO-160G Section 21, Cat M
- Lightning induced transient susceptibility: RTCA/DO-160G Section 22, Cat B3K3L3

### PORTFOLIO

Honeywell's IHM Series is part of a comprehensive line of aerospace sensors, switches, and value-added solutions. To view Honeywell's complete product offering, click [here](#).

# Aerospace Proximity Sensors, IHM Series

Table 1. Performance Specifications

Characteristic	Parameter		
<b>Mechanical Characteristics</b>			
Weight	60 g to 150 g		
Sealing	Hermetically sealed		
Connector/leads	<ul style="list-style-type: none"> <li>• D38999/25YA98PN</li> <li>• D38999/25YA98PA</li> <li>• EN2997Y10803MN</li> <li>• M83723/90Y1005N</li> <li>• M83723/90Y10056</li> <li>• M83723/90Y10057</li> <li>• M83723/90Y10058</li> <li>• Pigtail</li> </ul>		
Form factor	<ul style="list-style-type: none"> <li>• Inline, cylindrical, threaded</li> <li>• Right angle, cylindrical, threaded</li> <li>• Inline, cylindrical, flanged</li> <li>• Right angle, cylindrical, flanged</li> </ul>		
Sensing distance	5 mm max.		
Sensing face	Inconel <sup>®</sup>		
Outer body material	Stainless steel		
Sensor head diameter	13,5 mm [0.53 in]		
Sensor length	various; 60 mm [2.36 in] max.		
MTBF	>1,000,000 flight hours		
<b>Electrical Characteristics</b>			
Supply voltage	12 Vdc to 28 Vdc		
Supply current	<10 mA		
Operating temperature range	-55 °C to 115 °C [-67 °F to 239 °F]		
Storage temperature range	-65 °C to 115 °C [-85 °F to 239 °F]		
Output type	Current sinking output	Open collector output, Normally Closed	Open collector output, Normally Open
Target far	Output current: 12 mA to 16 mA	Switch closed Max. load current: 250 mA res. Output voltage drop: less than 2 V at 250 mA resistive load current	Switch open Max. leakage current: 50 µA @ 28 Vdc
Target near	Output current: 4 mA to 6 mA	Switch open Max. leakage current: 50 µA @ 28 Vdc	Switch closed Max. load current: 250 mA res. Output voltage drop: less than 2 V at 250 mA resistive load current
Internal failure	Output current: <1 mA or 9 mA to 11 mA	n/a	n/a
Target response time	5 ms		
Power on delay time	<1 second		
Bonding resistance	<2.5 mΩ		
Dielectric strength	1500 Vdc and 1500 Vac		
Insulation resistance	200 mΩ min. at 50 Vdc		
<b>Sensing Characteristics</b>			
Ga/Gd	see Figure 2		
Target material	17-4 PH stainless steel heat treated to condition H1025		
Target dimension	Rectangular target of 25 mm x 18 mm x 3 mm		

# Aerospace Proximity Sensors, IHM Series

Characteristic	Parameter
<b>Environmental Characteristics</b>	
Temperature and altitude	RTCA/DO-160G – Section 4, Category D3
Temperature variation	RTCA/DO-160G – Section 5, Category S2
Humidity	RTCA/DO-160G – Section 6, Category C
Operational shock and crash safety	RTCA/DO-160G – Section 7, Category B
Vibration	RTCA/DO-160G – Section 8, Category R (Curve E & E1)
Explosion safety	RTCA/DO-160G – Section 9, Category E&H ENV III
Water proofness	RTCA/DO-160G – Section 10, Category R
Fluid susceptibility	RTCA/DO-160G – Section 11, Category F
Sand and dust	RTCA/DO-160G – Section 12, Category D
Fungus resistance	RTCA/DO-160G – Section 13, Category F
Salt spray	RTCA/DO-160G – Section 14, Category T
Magnetic effects	RTCA/DO-160G – Section 15, Category A
Power input	RTCA/DO-160G – Section 16, Category A
Voltage spike	RTCA/DO-160G – Section 17, Category A
Audio frequency conducted susceptibility	RTCA/DO-160G – Section 18, Category Z
Induced signal susceptibility	RTCA/DO-160G – Section 19, Category CWE
Radio frequency radiated susceptibility	RTCA/DO-160G – Section 20, Category G
Radio frequency conducted susceptibility	RTCA/DO-160G – Section 20, Category Y
Radio frequency emission	RTCA/DO-160G – Section 21, Category M
Lightning induced transient susceptibility	RTCA/DO-160G – Section 22, Category B3K3L3
Icing	RTCA/DO-160G – Section 24, Category A
Electrostatic discharge	RTCA/DO-160G – Section 25, Category A

Figure 1. Product Nomenclature

	<b>1P</b>	<b>CT</b>	<b>A</b>	<b>3A</b>	<b>A</b>	<b>N</b>	<b>N</b>	<b>-000</b>
	Series	Form Factor	Range Ga/Gd mm [in]	Electrical Output Type	Termination	Pigtail Length	Hardware	Reserved
IHM Series One-Piece (Active) Proximity Sensor	<b>CT</b>	Inline, cylindrical threaded	<b>A</b> 1,75/2,75 [0.069/0.108]	<b>3A</b> 3-wire, current sink output Near/Fault/Far	<b>A</b> D38999/25YA98PN	<b>N</b> Not applicable	<b>N</b> No hardware	
	<b>RT</b>	Right angle cylindrical threaded	<b>B</b> 2,00/3,00 [0.078/0.118]	<b>3B</b> 3-wire, open collector output normally closed	<b>B</b> D38999/25YA98PA	<b>A</b> 30,84 cm [12.0 in]	<b>1</b> Washer MS25081C6 (1 nos.) Hex nut MS21340-05 (2 nos.)	
	<b>CF</b>	Inline, cylindrical flanged	<b>C</b> 2,25/3,25 [0.088/0.128]	<b>3C</b> 3-wire, open collector output normally open	<b>C</b> EN2997Y10803MN	<b>B</b> 60,96 cm [24.0 in]		
	<b>RF</b>	Right angle cylindrical flanged	<b>D</b> 2,50/3,50 [0.098/0.138]		<b>D</b> M83723/90Y1005N	<b>C</b> 91,44 cm [36.0 in]		
			<b>E</b> 2,75/3,75 [0.108/0.147]		<b>E</b> M83723/90Y10056	<b>D</b> 121,92 cm [48.0 in]		
			<b>F</b> 3,00/4,00 [0.118/0.157]		<b>F</b> M83723/90Y10057	<b>E</b> 152,40 cm [60.0 in]		
					<b>G</b> M83723/90Y10058	<b>F</b> 182,88 cm [72.0 in]		
					<b>H</b> Pigtail (flying lead)	<b>G</b> 213,36 cm [84.0 in]		

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Figure 2. Slide-by Curves

Proximity Sensor Actuation and De-Actuation Curves

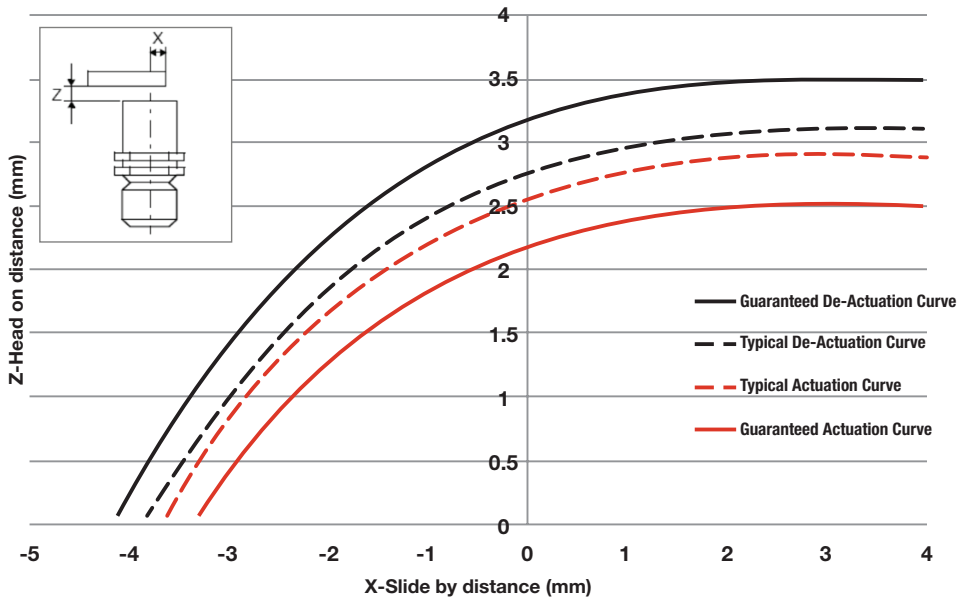
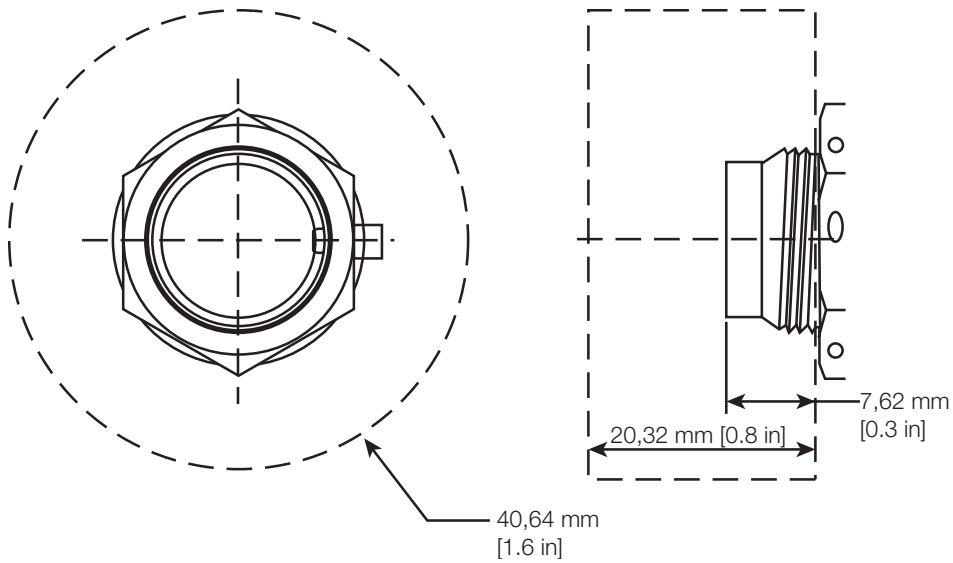


Figure 3. Keep Out Zone Map



# Aerospace Proximity Sensors, IHM Series

## PRODUCT DIMENSIONS

Figure 4. IHM Series: Cylindrical, Flanged Housing with EN2997Y10803MN Connector mm [in]

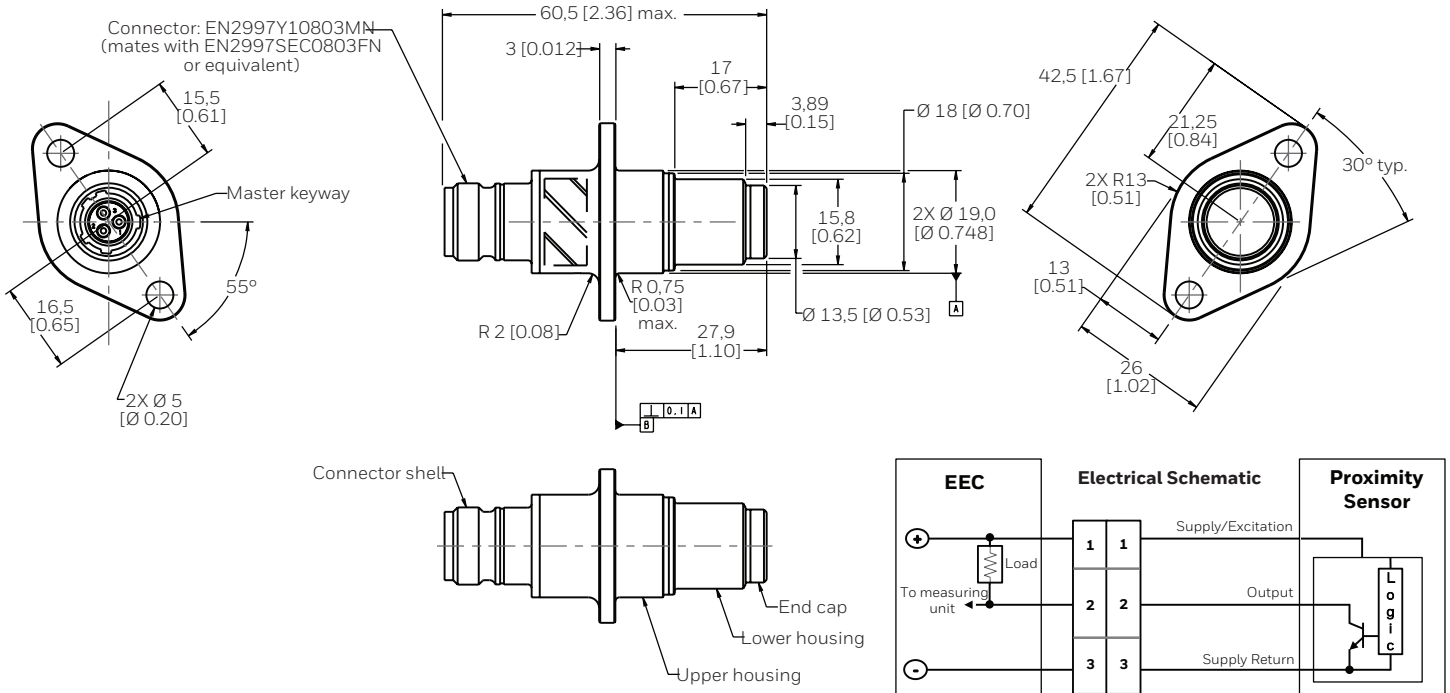
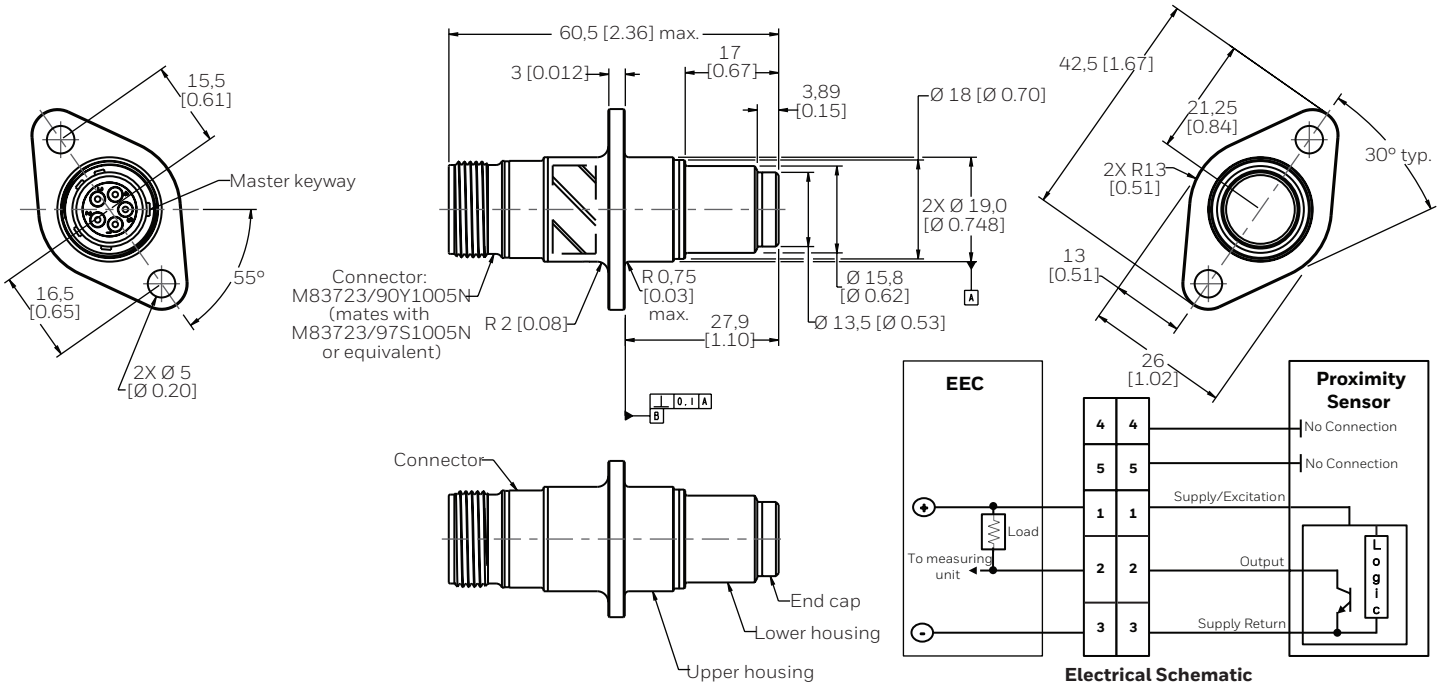


Figure 5. IHM Series: Cylindrical, Flanged Housing with M83723/90Y1005N Connector mm [in]



# Aerospace Proximity Sensors, IHM Series

Figure 6. IHM Series: Cylindrical Housing with D38999/25YA98PN Connector mm [in]

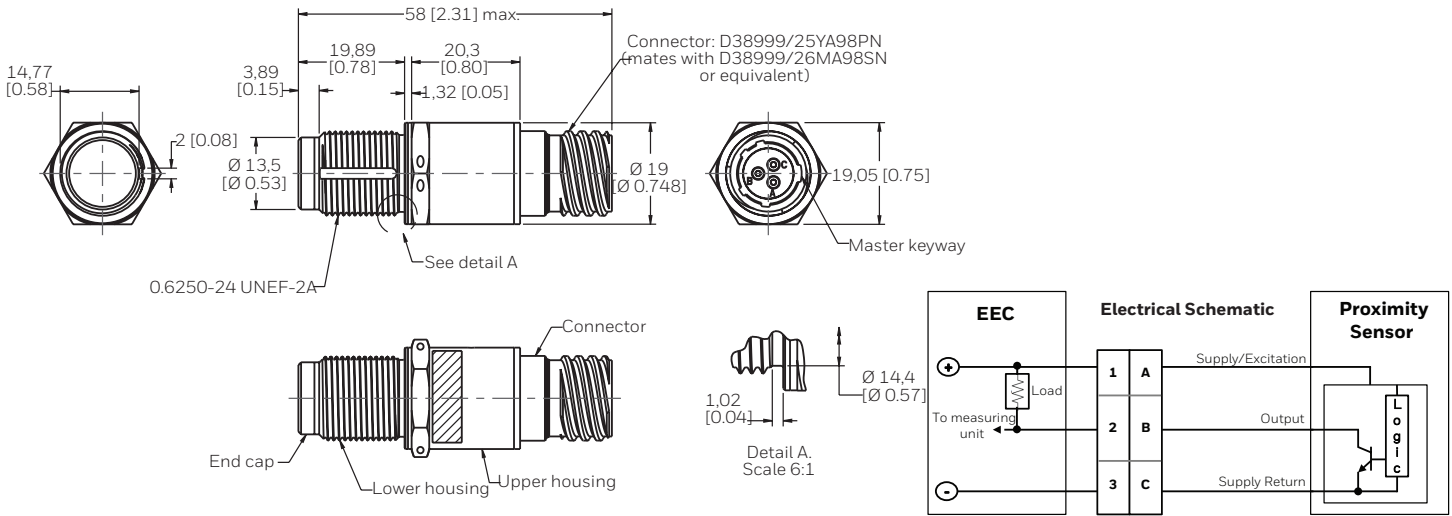
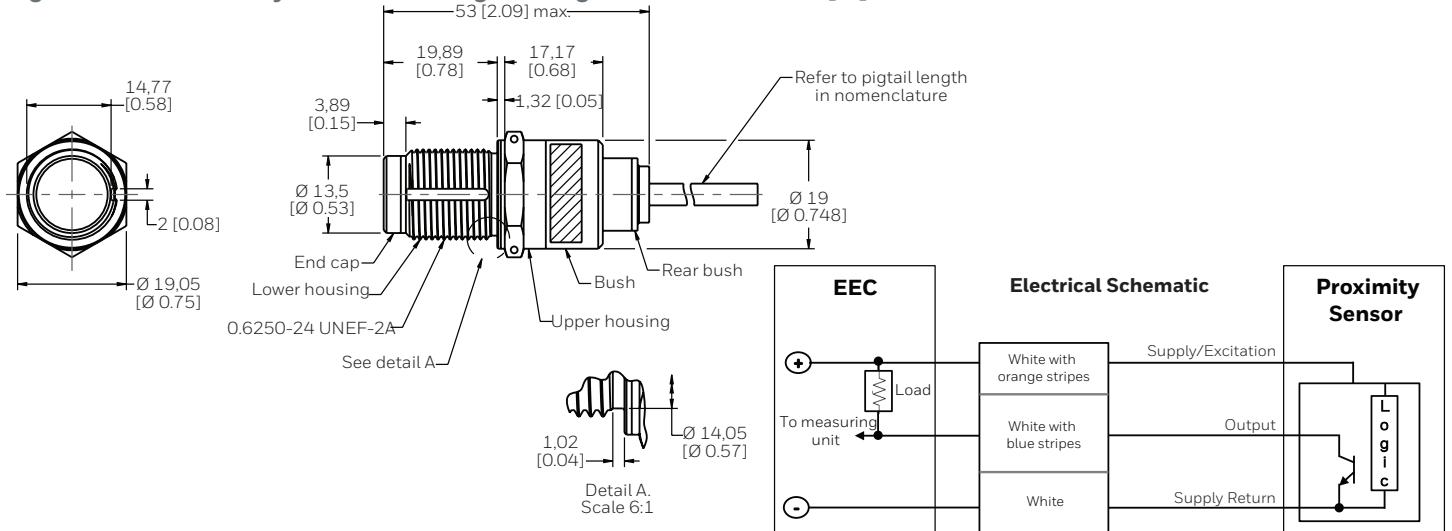


Figure 7. IHM Series: Cylindrical Housing with Pigtail Connection mm [in]



# Aerospace Proximity Sensors, IHM Series

Figure 8. IHM Series: Right Angle, Flanged Housing with D38999/25YA98PN Connector mm [in]

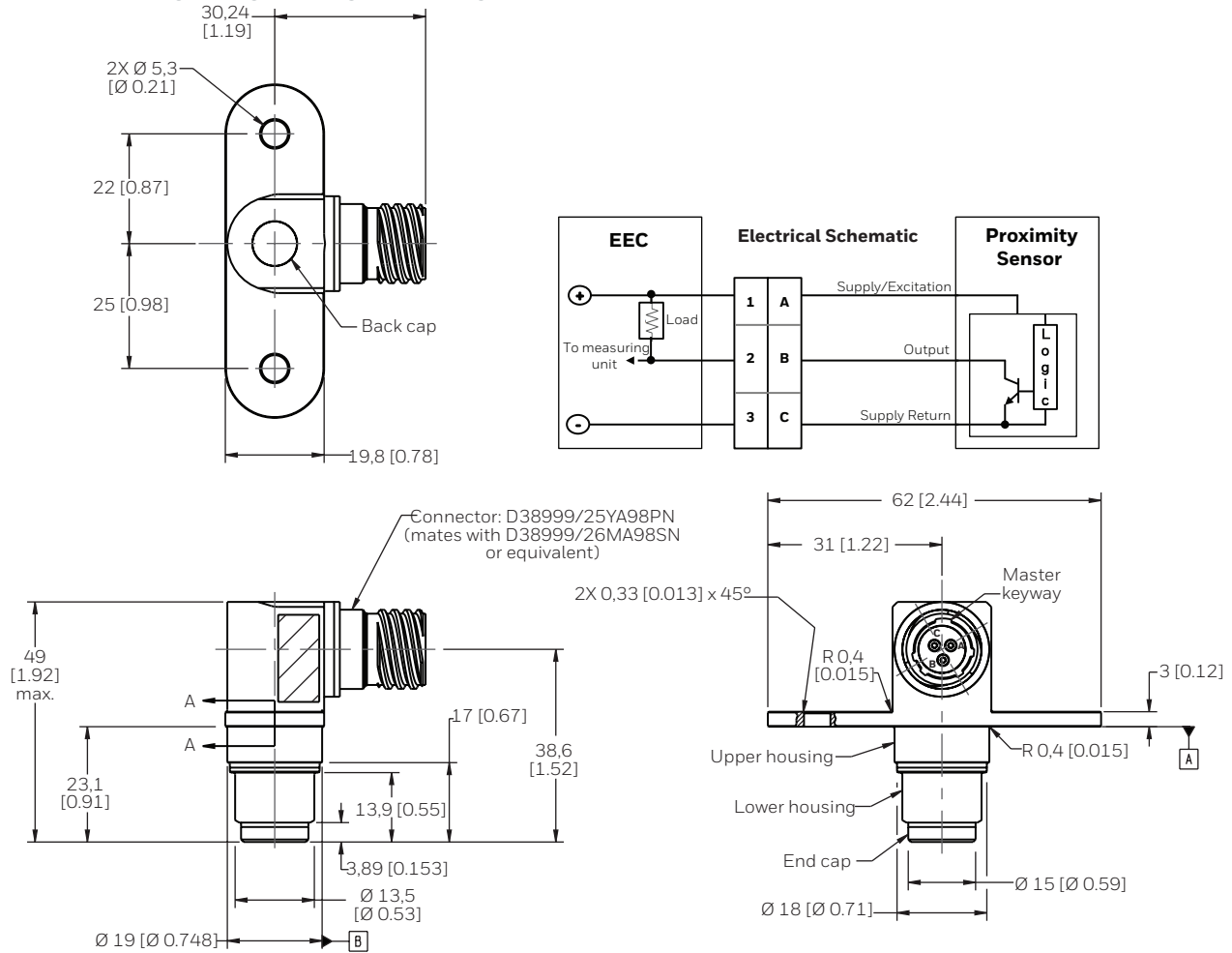
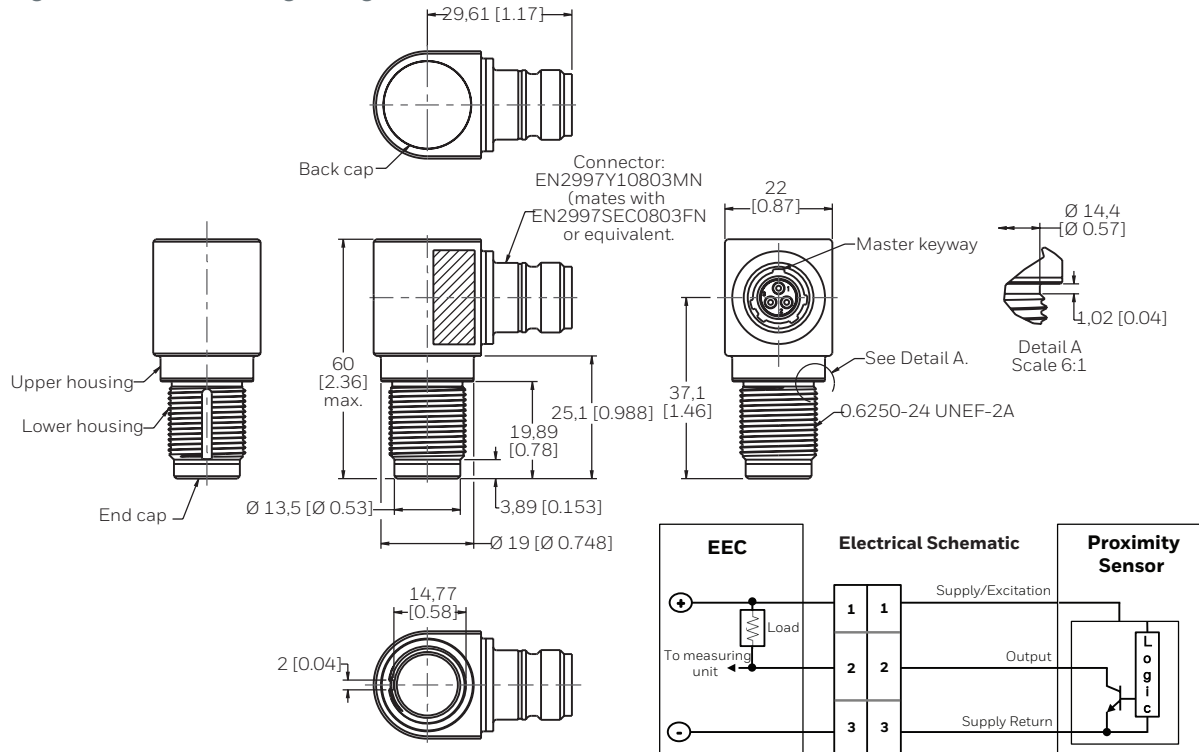
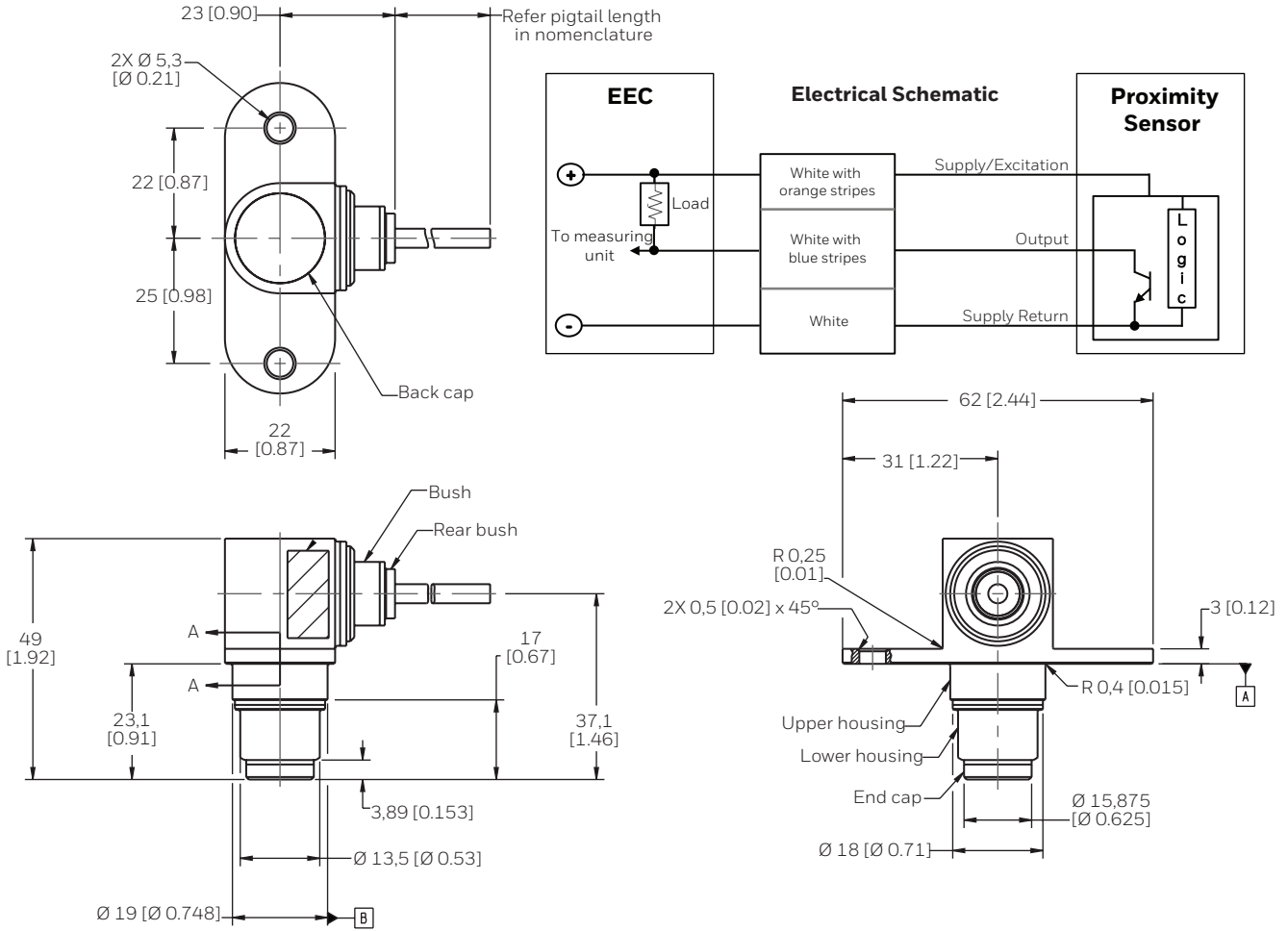


Figure 9. IHM Series: Right Angle with EN2997Y10803MN Connector mm [in]



# Aerospace Proximity Sensors, IHM Series

Figure 10. IHM Series: Right Angle, Flanged Housing with Pigtail Connection mm [in]





# Aerospace Proximity Sensors, IHM Series

Figure 11. IHM Series: Right Angle with M83723/90Y1005N Connector mm [in]

