

## 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<br>Max. load current: 250 mA res.<br>Output voltage drop: less than 2 V at 250 mA resistive load current | Switch open<br>Max. leakage current: 50 µA @ 28 Vdc  |
| Target near                       | Output current: 4 mA to 6 mA  | Switch open<br>Max. leakage current: 50 µA @ 28 Vdc  | Switch closed<br>Max. load current: 250 mA res.<br>Output voltage drop: less than 2 V at 250 mA resistive load current |
| Internal failure                  | Output current:<br><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  |  |  |

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| 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    |
| <b>IHM Series One-Piece (Active) Proximity Sensor</b> | <b>CT</b> | In-line, 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.)<br>Hex nut MS21340-05 (2 nos.) |             |
|   | <b>CF</b> | In-line, 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

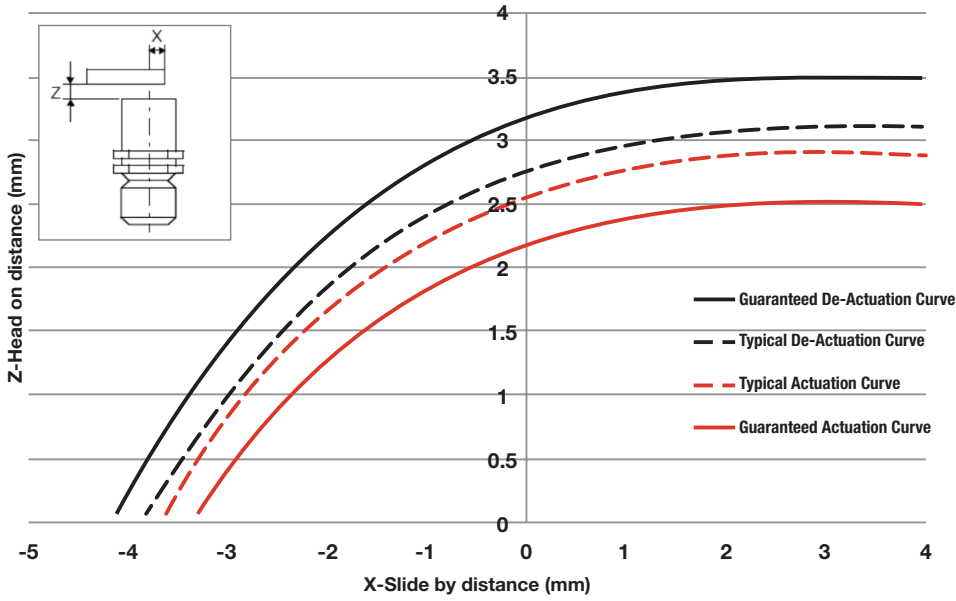
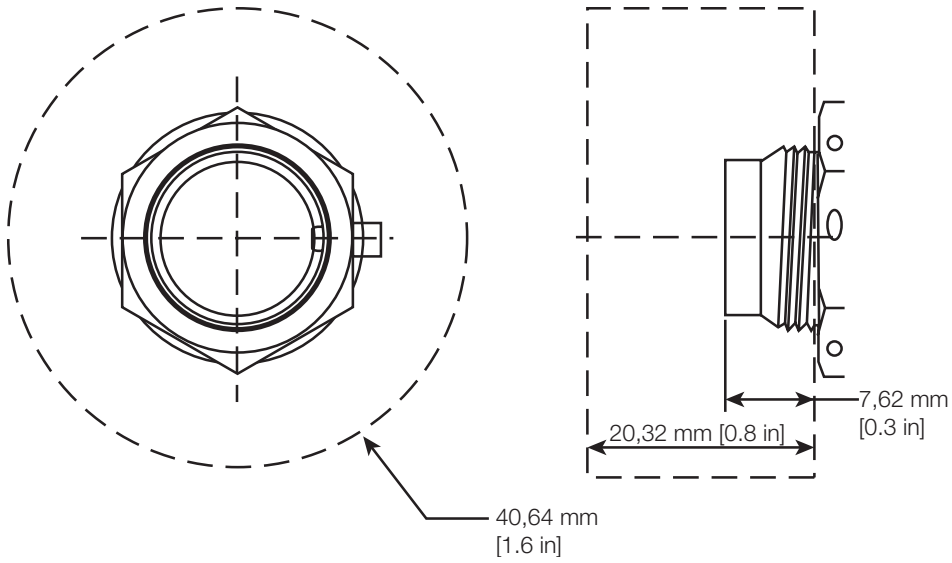


Figure 3. Keep Out Zone Map



# Aerospace Proximity Sensors, IHM Series

## PRODUCT DIMENSIONS

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

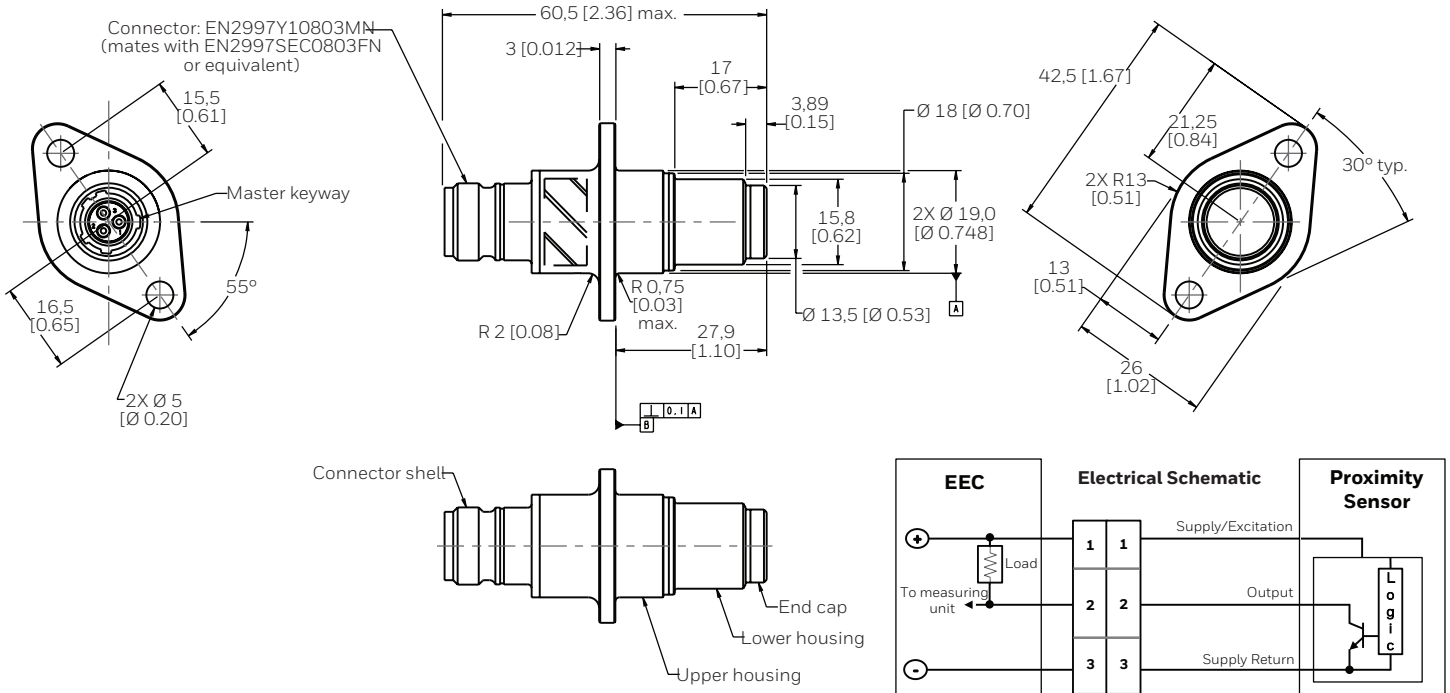
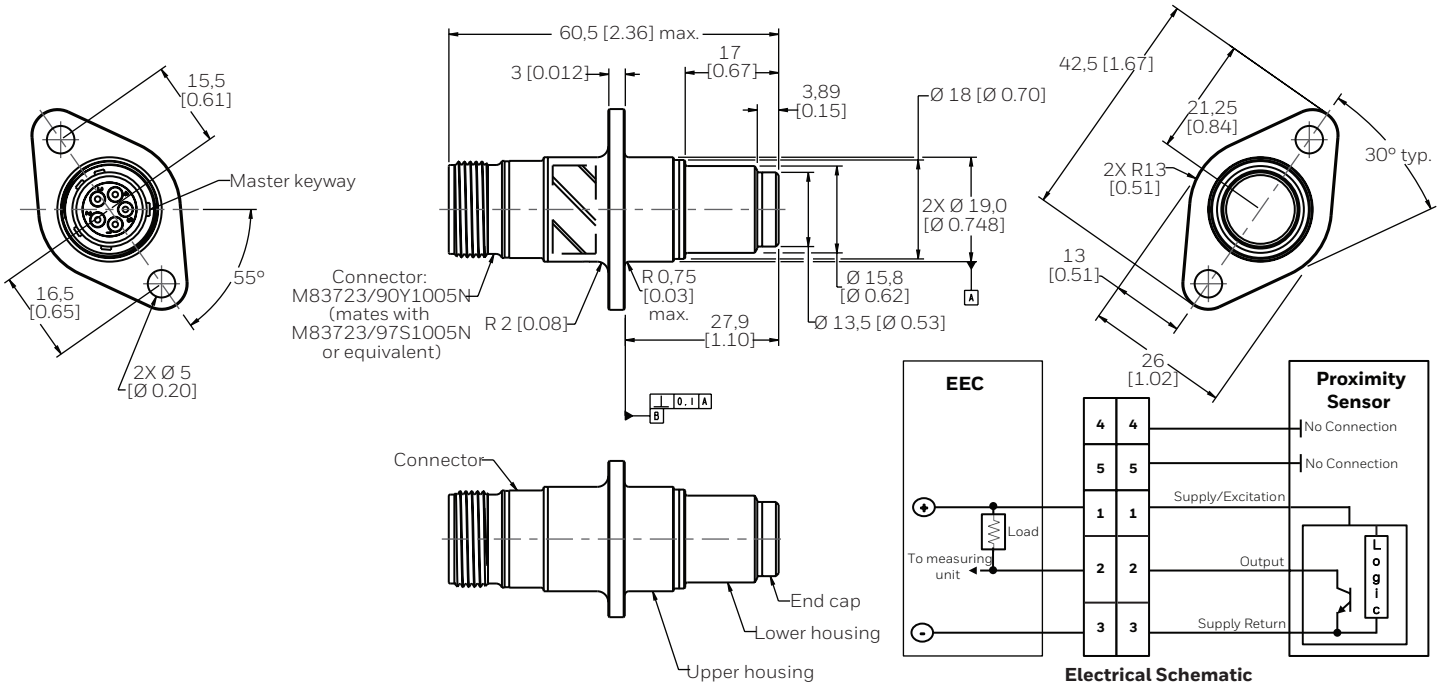


Figure 5. IHM Series: Cylindrical, Flanged Housing with M83723/90Y1005N Connector mm [in]



# Aerospace Proximity Sensors, IHM Series

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

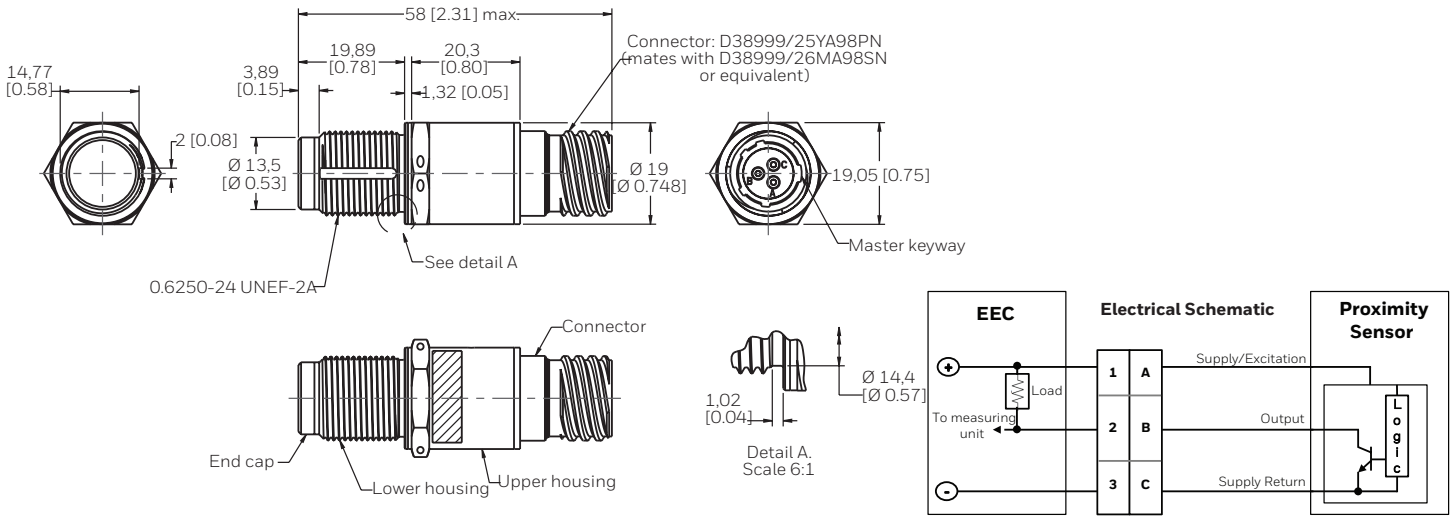
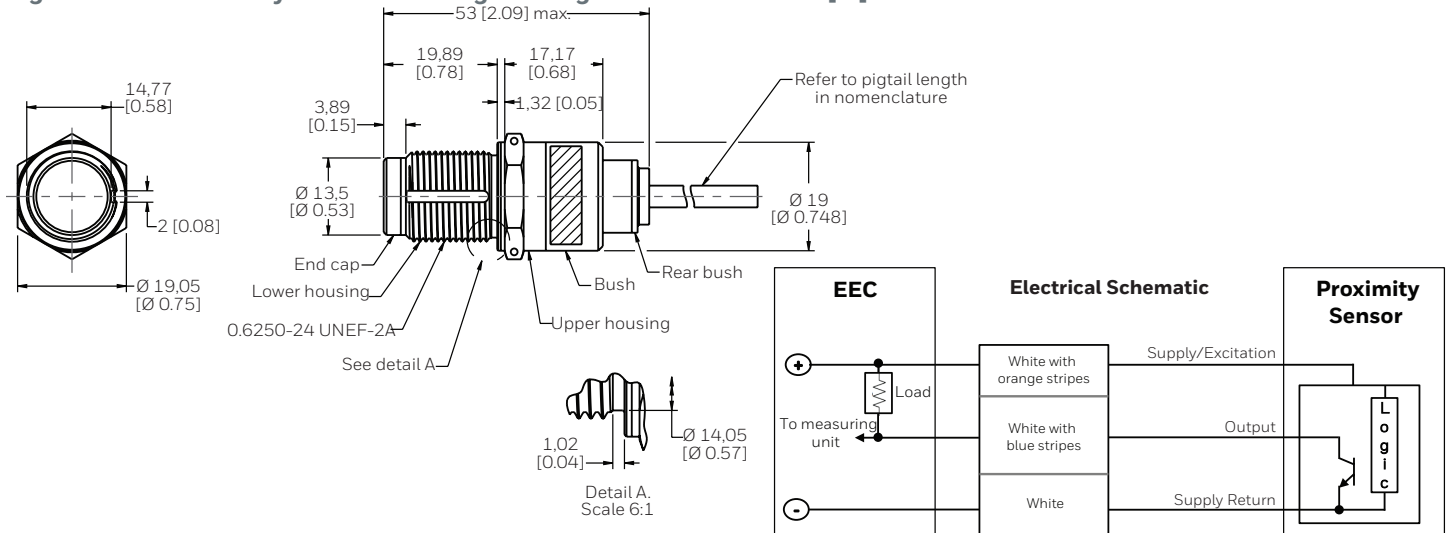


Figure 7. IHM Series: Cylindrical Housing with Pigtail Connection mm [in]



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

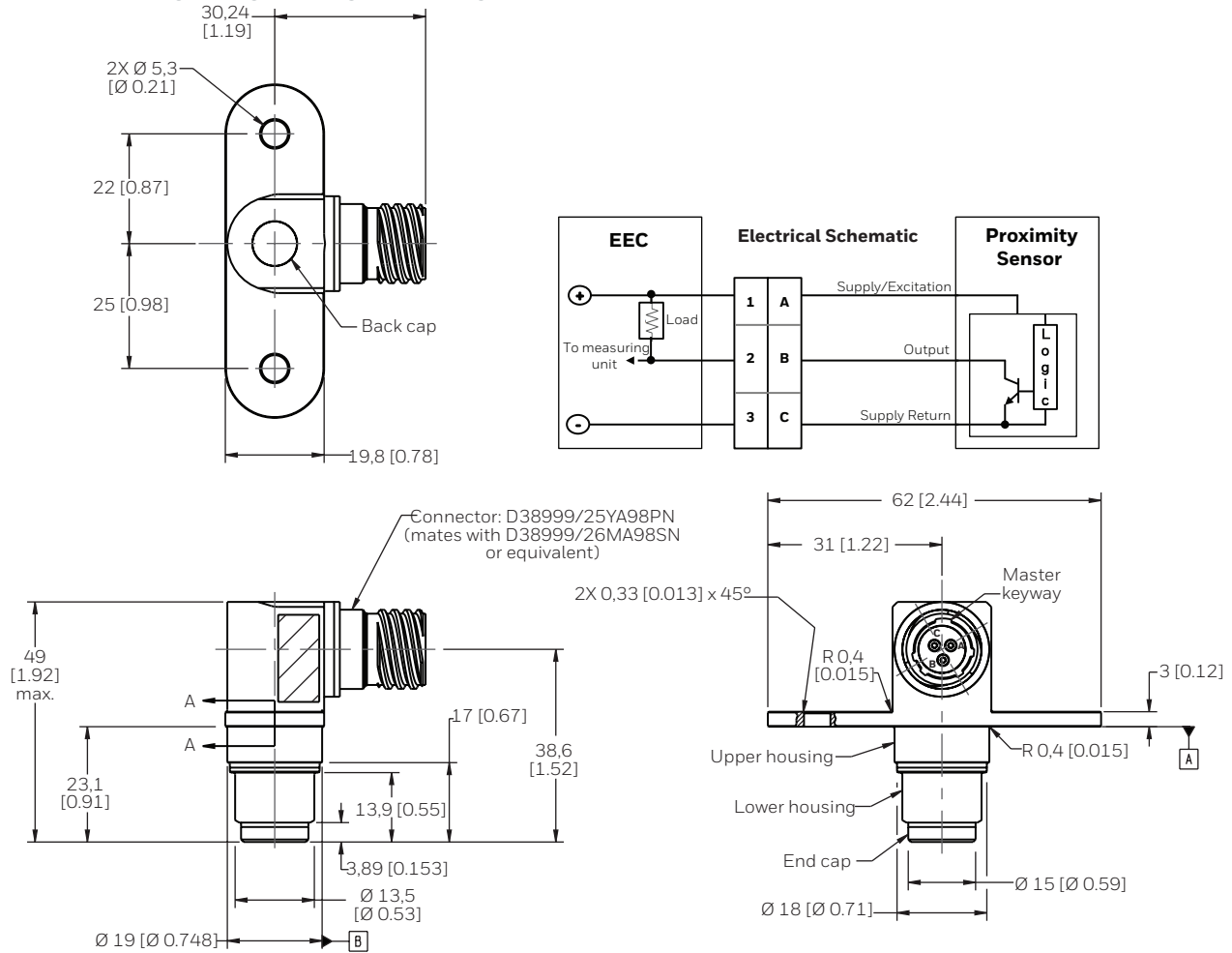
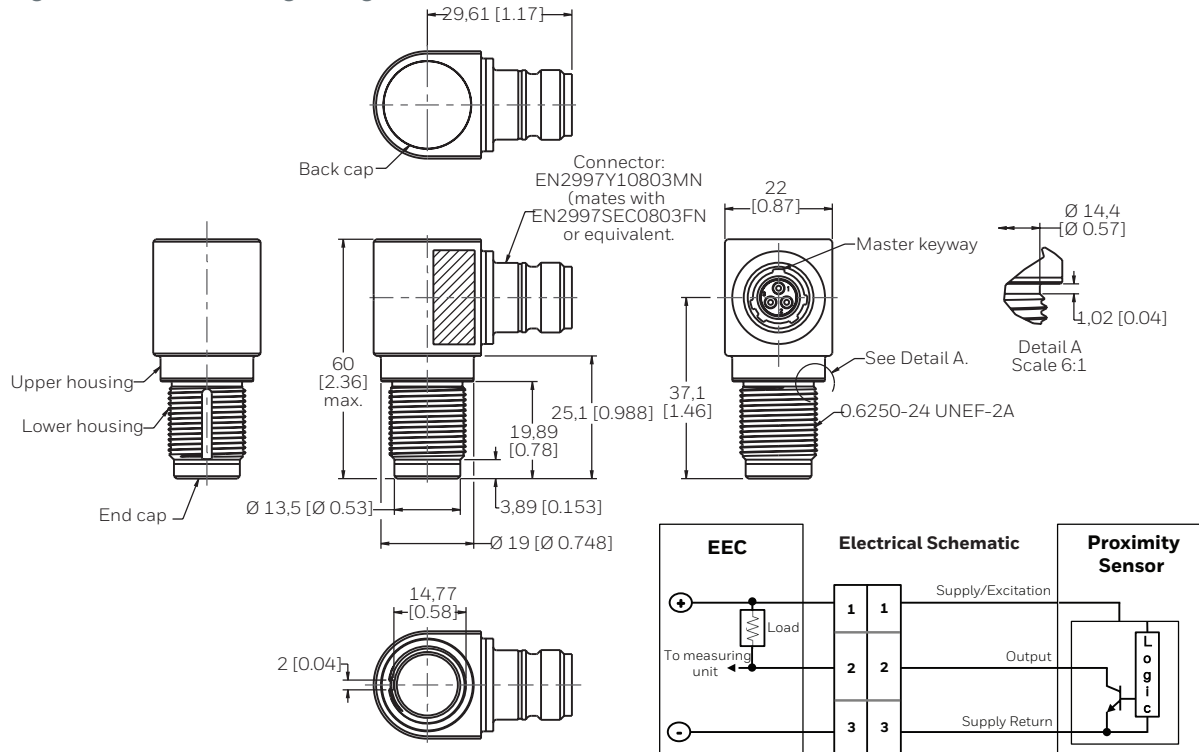
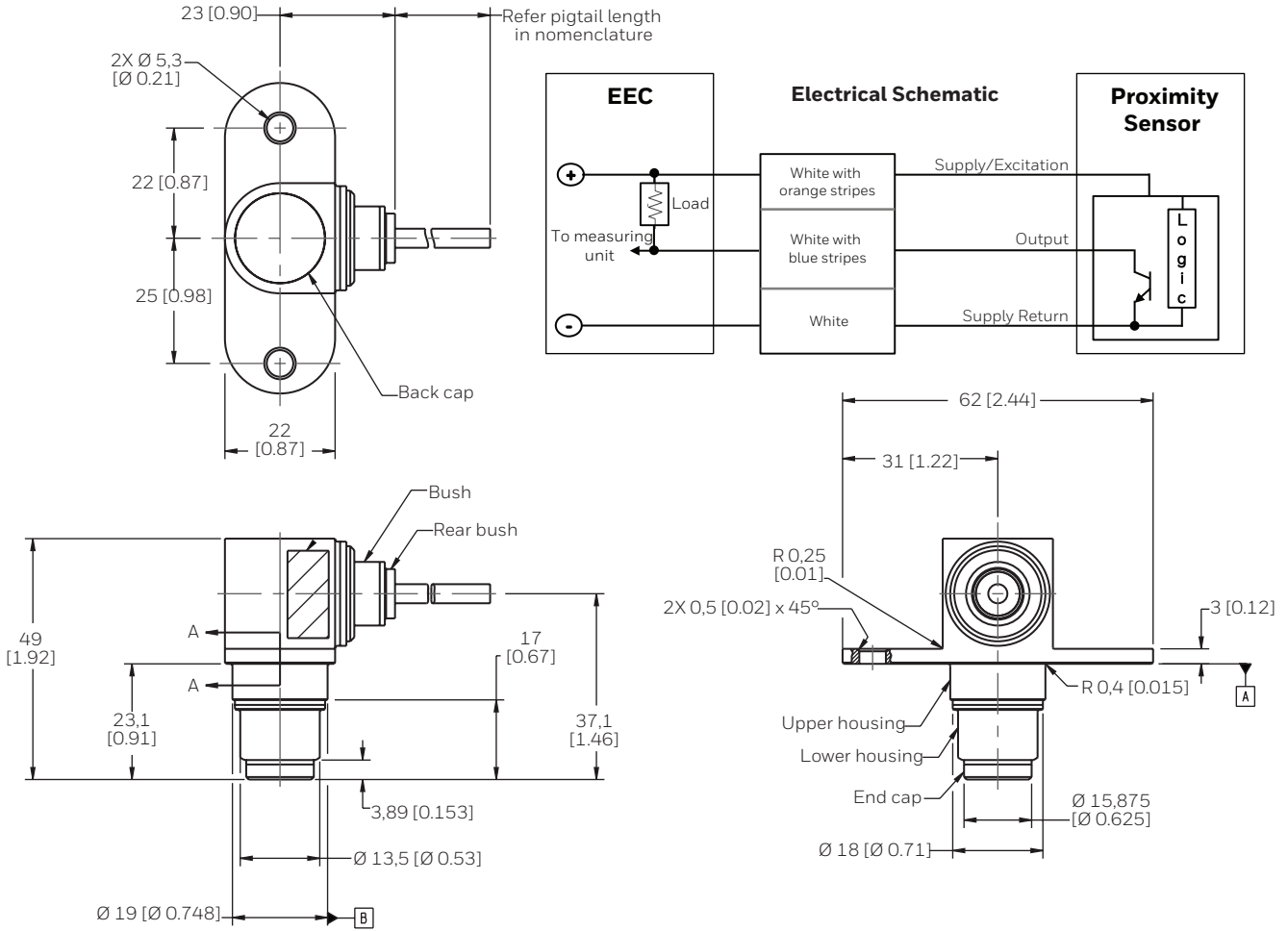


Figure 9. IHM Series: Right Angle with EN2997Y10803MN Connector mm [in]



# Aerospace Proximity Sensors, IHM Series

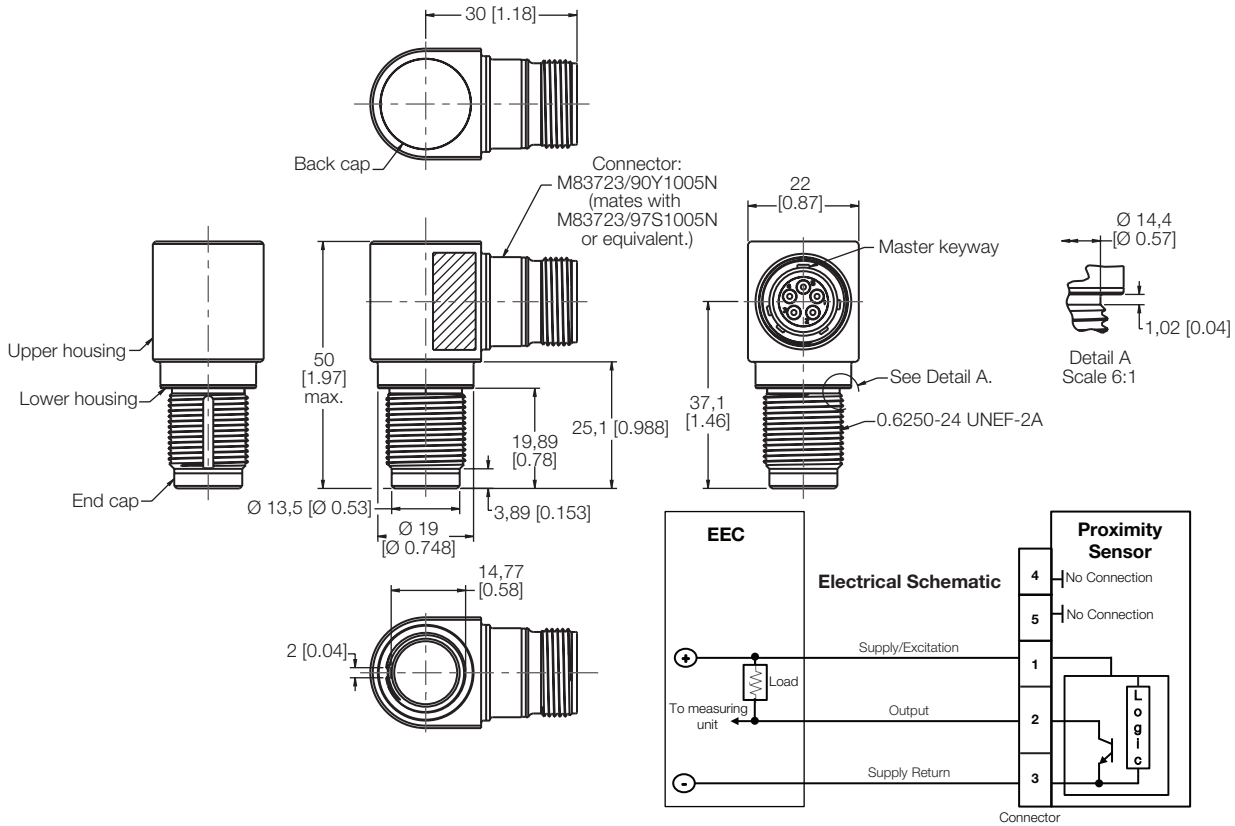
Figure 10. IHM Series: Right Angle, Flanged Housing with Pigtail Connection mm [in]





# Aerospace Proximity Sensors, IHM Series

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



## ADDITIONAL MATERIALS

The following associated literature is available on the Honeywell web site at [sensing.honeywell.com](http://sensing.honeywell.com):

- Product installation instructions
- Aerospace range guide
- Application note

### Find out more

Honeywell serves its customers through a worldwide network of sales offices and distributors.

For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell's sensing and switching products, call **+1-815-235-6847** or **1-800-537-6945**,

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DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

## **WARNING** **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

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