

# INTRODUCTION

The Honeywell proximity sensors in this catalogue are designed for use in the harsh environments encountered in Aerospace, Ordnance and Marine markets. They are well suited to applications with particularly demanding requirements such as temperature, vibration, shock and EMI/EMP/lightning interference.

Many of the proximity sensors contained in this catalogue have been custom designed to meet the needs of a specific customer. For example, they may have been designed to operate directly in high pressure hydraulic systems, to work without performance degradation in high radiation environments or to count projectiles in high rate of fire, high shock applications on gun systems.

The development of these demanding designs has given Honeywell a wealth of application engineering expertise with years of related experience in the Aerospace, Military and Marine markets.

Because of an infinite combination of special requirements imposed by different applications, all products are not listed in this catalogue. Honeywell Sales and Engineering personnel will be pleased to work with you to define your unique requirements and achieve a design or help you select an existing product most suited to your needs.

Global manufacturing capabilities exist to provide maximum customer service. Production lines operate in both the USA and Europe to provide dual sources of supply.

Honeywell proximity switch products are available in two distinct packaging concepts. One part products, as the name implies, contain the sensing element and the associated conditioning electronics in a single package. Two part products contain only the passive sensing element in the sensor, with the electronic conditioning contained on a separate module to allow location in more protected environments.

The technologies used on one part products are :  
ECKO - Eddy Current Killed Oscillator  
Hall Effect

The technology used on two part products is :  
Variable Inductance Balanced Bridge

Each of these technologies has unique features and the choice of technology must be based on specific application needs. The table at the bottom of the page should be used as a general guide.

The following highlights the main features of the product range:

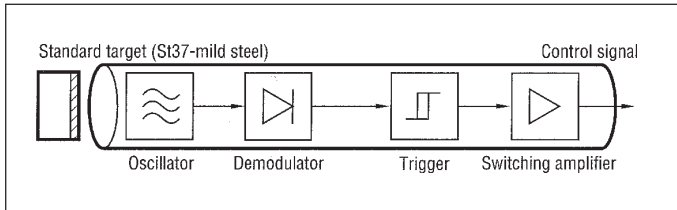
- No touch operation using highly reliable solid state technology
- Designed to meet the requirements of US and European aerospace, ordnance and marine markets. In particular, MIL Standards, RTCA/DO 160, DEF, Airbus and Boeing specifications
- One part products with self-contained electronics. Two part products for highest reliability (Mean Time Between Failure >500 K hours)
- All metal sensing on most products. Ferrous metal sensing on high pressure and two part sensors.
- Sensing distance factory-adjusted to customer specification
- High frequency switching up to 2000 Hz
- Corrosion resistant stainless steel housings, hermetically sealed by laser welding where necessary
- Overmoulded versions for underwater applications
- High pressure versions for hydraulic system applications
- Built In Test (BITE) where necessary
- High EMC/EMI/RFI performance
- Reverse polarity and short circuit protection, with fail safe output where necessary

Technology	ONE PART ECKO	ONE PART Hall Effect	TWO PART Variable Inductance Balanced Bridge
EMI resistance	Moderate*	Moderate*	High
Target material	All metals	Magnet	Ferrous metals
Reliability	High	High	Very High
Temperature extremes	-55 to +125° C	-55 to +100° C	-70 to +125° C/-40 +85° C
Speed/response time	Moderate/High	High	Low
Built-in test	Limited	Limited	Full
*EMI resistance can be improved by filtering, at increased cost			

# INDUCTIVE PROXIMITY SWITCHES

## Design

Honeywell inductive proximity switches are no-touch, non-interactive devices and sensitive to all metals. They consist of an oscillator, demodulator, level and switching amplifier.



## Mode of operation

If a metal object enters the electromagnetic field of the oscillator coil, eddy currents are induced in this coil which change the amplitude of oscillation. The demodulator converts the change in the amplitude to a dc signal which causes the trigger stage to trip and the semi-conductor output stage to switch.

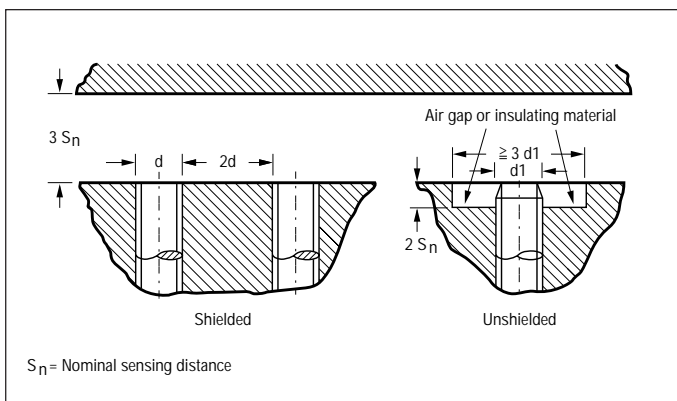
## Correction factors when applying sensors

As the nominal sensing distances stated apply to mild steel St37, the appropriate correction factor should be used for other metals.

Material	Correction factor
Mu metal	1,20
Cast iron	1,10
Mild steel St37 (DIN1623)	1,00
Aluminium foil (0,05 mm)	0,90
Stainless Steel	0,70
Brass MS63F38	0,40
Aluminium ALMG3F23	0,35
Copper CCUF30	0,30

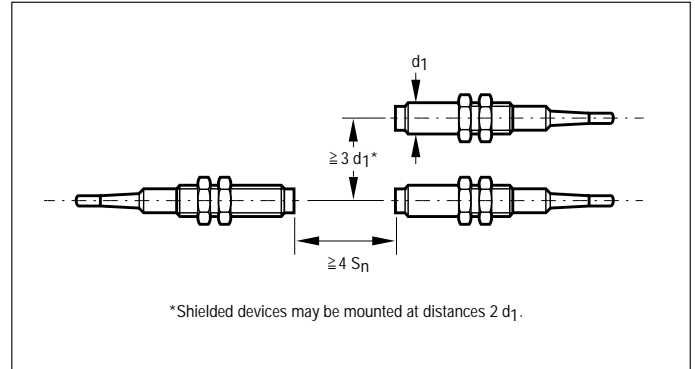
## Installation

To ensure that both shielded and unshielded proximity switches function properly, and to eliminate the possibility of false signals from nearby metal objects, the minimum distances shown in the illustration below must be adhered to.



## Minimum distances between proximity switches

The following minimum allowable distances apply to unshielded proximity switches mounted opposite to each other, or side by side:



## Measuring the maximum switching frequency

The two tests (performed in accordance with EN 60947-5-2) shown below enable the maximum switching frequency  $f = 1/(t_1 + t_2)$  to be determined exactly from the duration of the "switch on" period  $t_1$  and the "switch off" period  $t_2$ .

