iQunet®

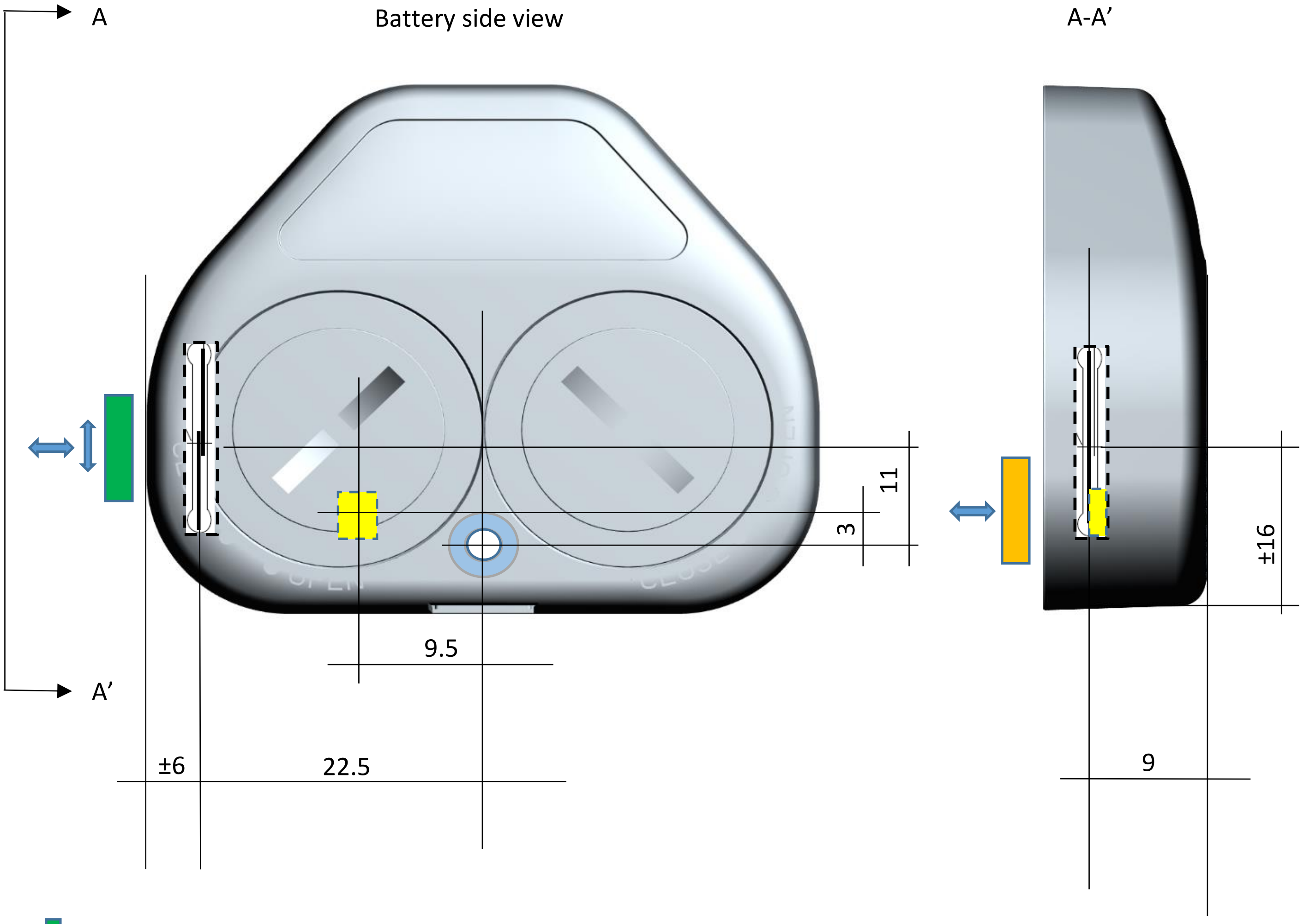
DATASHEET

Proximity Switch / Proximity Sensor

Positioning electronic sensor components within iQunet sensor housing *

Reed sensor component (Proximity Switch Sensor)

Linear hall sensor component (Proximity Monitoring Sensor)



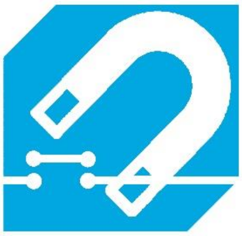
Advised Magnet position to Reed sensor component (Proximity Switch Sensor)

Advised Magnet position Linear Hall sensor (Proximity Sensor)

*drawing not on scale

DATASHEET

Proximity Switch Sensor



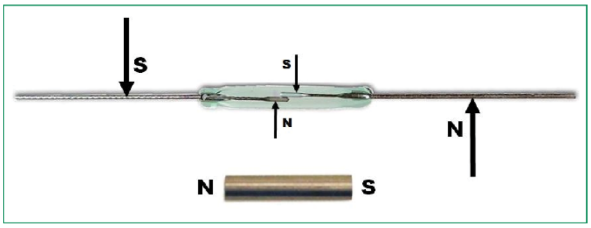
Introduction

Although a reed switch can be activated by placing it inside an electrical coil, many reed switches and reed sensors are used for proximity sensing and are activated by a magnet. As the magnet is brought into the proximity of the reed sensor/switch, the device activates. As the magnet is removed from the proximity of the reed sensor/switch, the device deactivates. However, the magnetic interaction involved in activating the reed switch contacts is not necessarily obvious.

Magnetic Induction and Flux

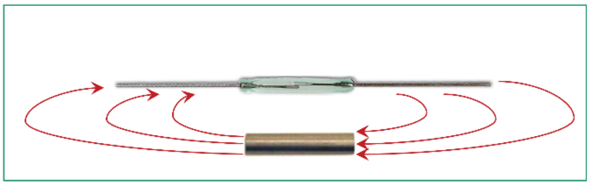
One way of thinking about the interaction is that the magnet induces magnetic poles into the metal parts of the reed switch and the resulting attraction between the electrical contacts causes the reed switch to activate.

Figure 1.
Magnetic Induction



Another equally valid way of thinking about the interaction between a magnet and a reed switch is that the magnet induces magnetic flux through the electrical contacts. When the magnetic flux is high enough, the magnetic attraction between the contacts causes the reed switch to close.

Figure 2.
Magnetic Flux



Reed Switch/Sensor Activation Distances

The following are examples of typical reed switch and reed sensor activation distances.

Figure 3.
Magnet Parallel to Reed Switch

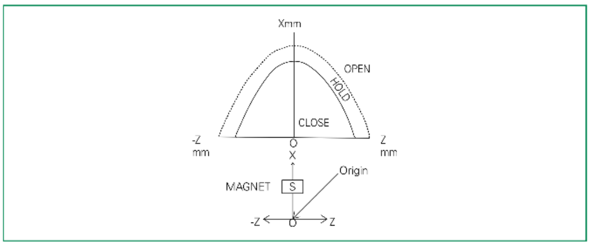


Figure 4.
Magnet Perpendicular to Reed Switch

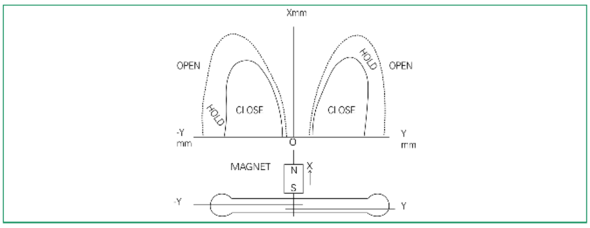
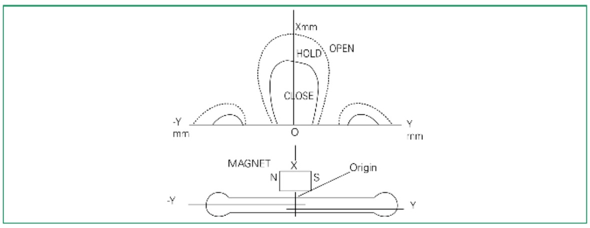


Figure 5.
Magnet Parallel to Reed Switch



As can be seen, the magnetic orientation and location relative to the reed switch play important roles in the activation distances. In addition, the size of the activate regions (lobes) will vary depending on the strength of the magnet and the sensitivity of the reed switch. Proper orientation of the magnet with respect to the reed sensor/switch is an important consideration in meeting the application's requirements across the tolerance range for mechanical systems, magnetic strength and reed sensor or reed switch sensitivity. See also Littelfuse application note AN102 – Ampere*turn versus mT and Gauss for guidance on magnet and switch sensitivity.

iQunet®

DATASHEET

Proximity Monitoring Sensor

The iQunet proximity sensor monitors (linear) distance of machine components. By measuring the magnetic field the accurate and easily programmable sensors are able to detect proximity of a magnet in a range of a few µm. This enables accurate monitoring of e.g. alignment and tension of conveyor belts over long periods of time.

LINEAR HALL EFFECT SENSOR TYPE SPECIFICATION

Internal Electronic sensor Type : A1454KLETR-4N-T

Sensitivity : 4 LSB/G

Magnet type : Neodymium

MAGNETIC CALIBRATION CHARACTERISTICS: valid at T_A = 25°C and C_{BYPASS} = 0.1 µF; unless otherwise noted

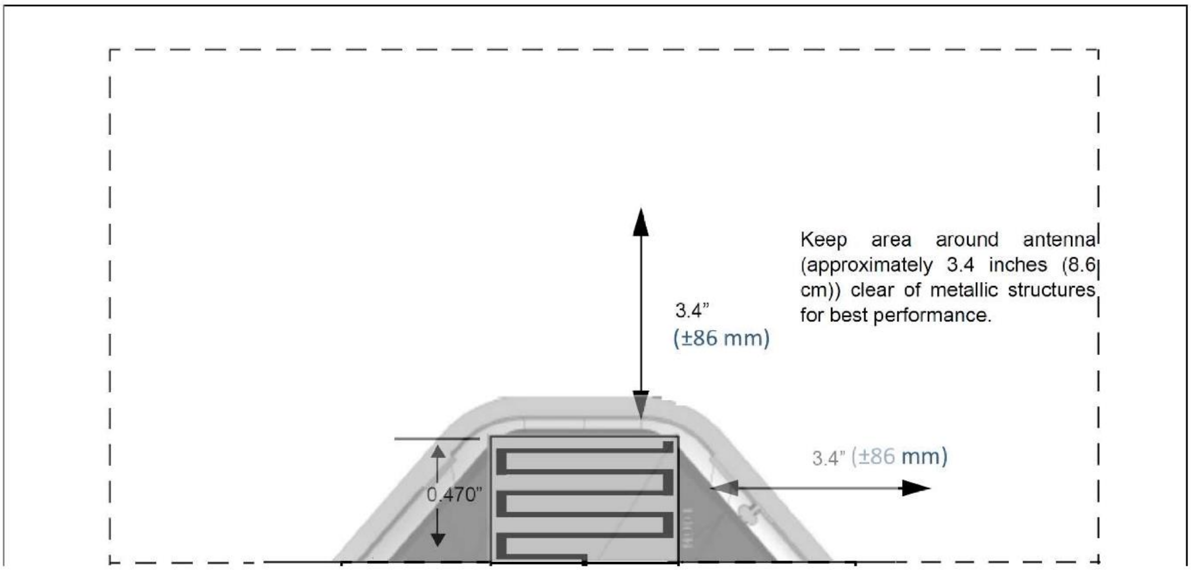
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit[1]
Factory Programmed Quiescent Voltage Output	QVO	A1454KLETR-4N,T_A = 25°C	–	±10	–	LSB
		A1454KLETR-4F,T_A = 25°C	–	±10	–	LSB
		A1454KLETR-2N,T_A = 25°C	–	±10	–	LSB
		A1454KLETR-2F,T_A = 25°C	–	±10	–	LSB
Factory Programmed Sensitivity	Sens	A1454KLETR-4N,T_A = 25°C FSI = +/- 500 G	–	4.0	–	LSB/G
		A1454KLETR-4F,T_A = 25°C FSI = +/- 500 G	–	4.0	–	LSB/G
		A1454KLETR-2N,T_A = 25°C FSI = +/- 1000 G	–	2.0	–	LSB/G
		A1454KLETR-2F,T_A = 25°C FSI = +/- 1000 G	–	2.0	–	LSB/G
Sensitivity Temperature Coefficient	TC_{sens}	NdFeB compensated[2] applies to part numbers with suffix 'N'	–	0.12	–	%/ºC
		Ferrite compensated[3] applies to part numbers with suffix 'F'	–	0.21	–	%/ºC
Linearity sensitivity error[4]	Lin_{ERR}		–	<±1	–	%
Effective Number of Bits		Field = 1000 G, Temp = 25ºC, BW = 2 kHz.	–	~10	–	Bits
Effective Number of Bits		Field = 500 G, Temp = 25–C, BW = 2 kHz.	–	~9	–	Bits
Sensitivity Error vs. Temp	$Sens_{Err}$	–40ºC ~ +85ºC	–	<±3	–	%
		–40ºC ~ +125ºC	–	<±6	–	%

[1]1 G (gauss) = 0.1 mT (millitesla).
[2]The slope of the Hall gain function with temperature change is meant to compensate for the variation of a Neodymium magnet with temperature.
[3]The slope of the Hall gain function with temperature change is meant to compensate for the variation of a ferrite magnet with temperature.
[4] See Characteristic Definitions section.

DATASHEET

Proximity Switch / Proximity Sensor

MOUNTING DETAILS

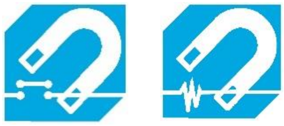


Keep the area around the antenna free from metallic structures as shown in the figure above.

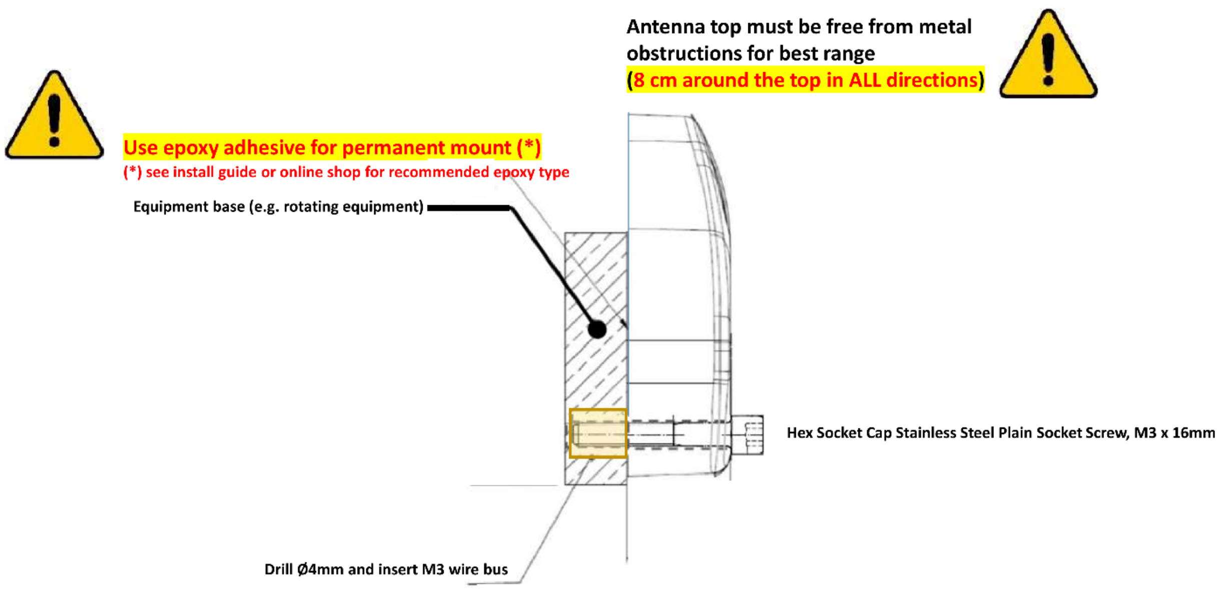
If metallic structures are unavoidable around the antenna, this will reduce the wireless reach of the iQunet sensor. In this case, it is recommended to test the antenna reach in the mounting configuration before permanent installation.

DATASHEET

Proximity Switch / Proximity Sensor



MOUNTING DETAILS



IMPORTANT NOTE : Do not mount the proximity sensors on a magnetic base