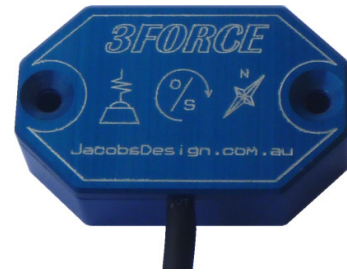


# 3Force Sensor

The 3Force sensor is compact and economical, offering triple axis measurement of G-Force, Gyroscopic Force and Magnetic Field. The sensing range of each sensor has been tailored to suit a wide range of applications characterised by high levels of dynamic motion. The sensor has four wire connection to provide power supply and CAN bus allowing easy integration into existing data acquisition systems.



## Installation – Mechanical

Two options are possible:

- Rigid Mounting (using M4 countersunk bolts) for when a more direct coupling is required. Excessive vibration may swamp the g-force measurements.
- Flexible Mounting (using double sided tape or velcro) for when an amount of shock "filtering" is required.

Both methods of mounting have been successfully used.

## Installation – Electrical

The sensor requires a supply voltage of 5 to 24 Volts, which must be from a load dump protected source. **DO NOT connect this sensor directly to vehicle battery.** The outputs of the Motec PDM are protected from load dump and may be used to power this sensor. No CAN bus termination is included in this device, but should be included as part of the overall CAN bus design.

Sensor wiring is as per the following table:

Wire Colour	Function
Red	Supply Voltage: +5 Volts to +24 Volts
Black	0 Volt Reference
Green	CAN+ / CAN High
Blue	CAN- / CAN Low

The connecting wire is approximately 150mm long, and is supplied unterminated.

## CAN Bus Communications

The sensor transmits three sequential CAN bus messages. The default address for the CAN bus messages is:

- 0x610 – X, Y and Z axis G-Force Data.
- 0x611 – X, Y and Z axis Gyroscopic Data.
- 0x612 – X, Y and Z axis Compass Data.

Each message is transmitted at a rate of 100Hz. The X, Y and Z values are all signed 16 bit data. The high-byte of the data precedes the low-byte.

The G-Force sensor has a nominal measurement range of -16g to +16g with 0g represented by a value of 0 and 1g represented by a value of 1000.

The Gyroscopic sensor has a nominal measurement range of -500°/s to +500°/s with 0°/s represented by a value of 0 and 100°/s represented by a value of 1000.

The Compass data is affected by the presence of ferrous material. The best use of the output data is to treat the values as unit-less and to calculate the trigonometric relationship between the values in the plane of interest – typically the horizontal plane. The compass data is signed, which allows for calculation of magnetic direction in all four quadrants. The typical range of the values is -500 to +500.



## Sensor Part Number

The orderable part number of this sensor is as follows:

<b>3Force</b>	This part is the combined G-Force / Gyro / Compass.
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## Specifications

General Parameters	Min	Typical	Max	Units
Supply Voltage <sup>*1</sup>	5	-	24	V
Supply Current	-	50	-	mA
Length	-	52	-	mm
Width	-	32	-	mm
Depth	-	15	-	mm
Weight	-	55	-	g
Operational Temperature <sup>*2</sup>	-20	+30	+85	°C

<sup>\*1</sup> Supply Voltage must be protected from load dump. Motec PDM output is okay.

<sup>\*2</sup> Although untested at the extremes, the operational temperature range has been designed into the product.

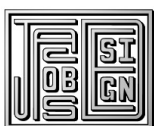
G-Force Parameters	Min	Typical	Max	Units
Dynamic Range	-	16	-	G
Reporting Rate (CAN bus)	-	100	-	Hz

Gyroscope Parameters	Min	Typical	Max	Units
Dynamic Range	-	500	-	°/s
Reporting Rate (CAN bus)	-	100	-	Hz

Compass Parameters	Min	Typical	Max	Units
Sample Rate (Internal to Sensor)	-	-	75	Hz
Reporting Rate (CAN bus)	-	100	-	Hz

## Company Information

Jacobs Design (Aust) Pty Ltd incorporated in July 2000. Since then the company has been involved in the development of custom hardware and software solutions. The company has also supplied a data analysis support service to the V8 Supercars since July 2000.



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3Force Data Brief  
16 October 2012