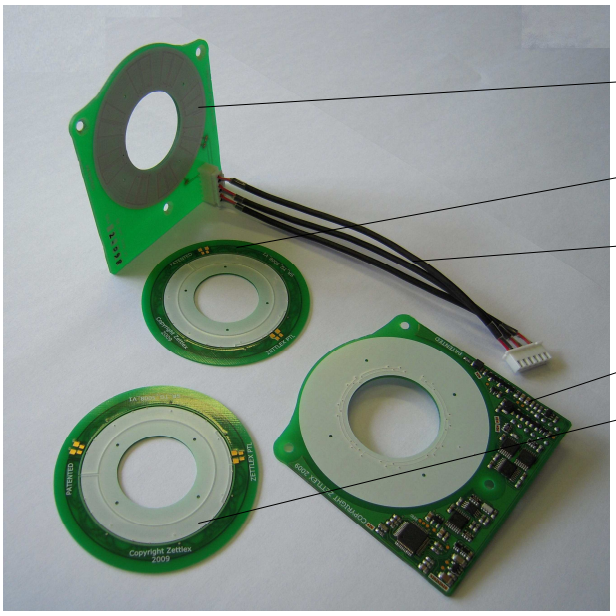
Product Guide - Tandem Rotary Encoder Type 5008-OEM



No contacts, no bearings, no bushes, no fine wires.....just reliable measurements all day, every day.

Zettlex encoders are **non-contacting, absolute** position measuring devices. They use a unique inductive technique and each individual encoder comprises two main components – a Rotor and a Stator. The Stator is powered and the Rotor is passive. An electrical output from the Stator shows the position of the Rotor relative to the Stator.

The 5008 unit is a **tandem pair** of unpackaged, lightweight, OEM encoders for **precision measurement of rotary position in 2 axes**. The 5008 unit contains two encoders. These are typically used to measure the angle of 2 independent axes – for example, azimuth and elevation measurement in gimbals. A digital data stream delivers position information for both axes in a single output channel from the azimuth encoder.

The Rotors & Stators can simply be screwed to a host product such as a PTZ camera, robotic arm or gimbal system. The transducers are ideally suited to harsh environments where electrical contacts or optical transducers would prove unreliable. **Precise mechanical mounting is not required and operation is unaffected by condensation or dust.**

Custom versions are available to OEMs with alternative temperature ranges, mechanical mounts, finer linearity etc. - simply contact Zettlex for further details.

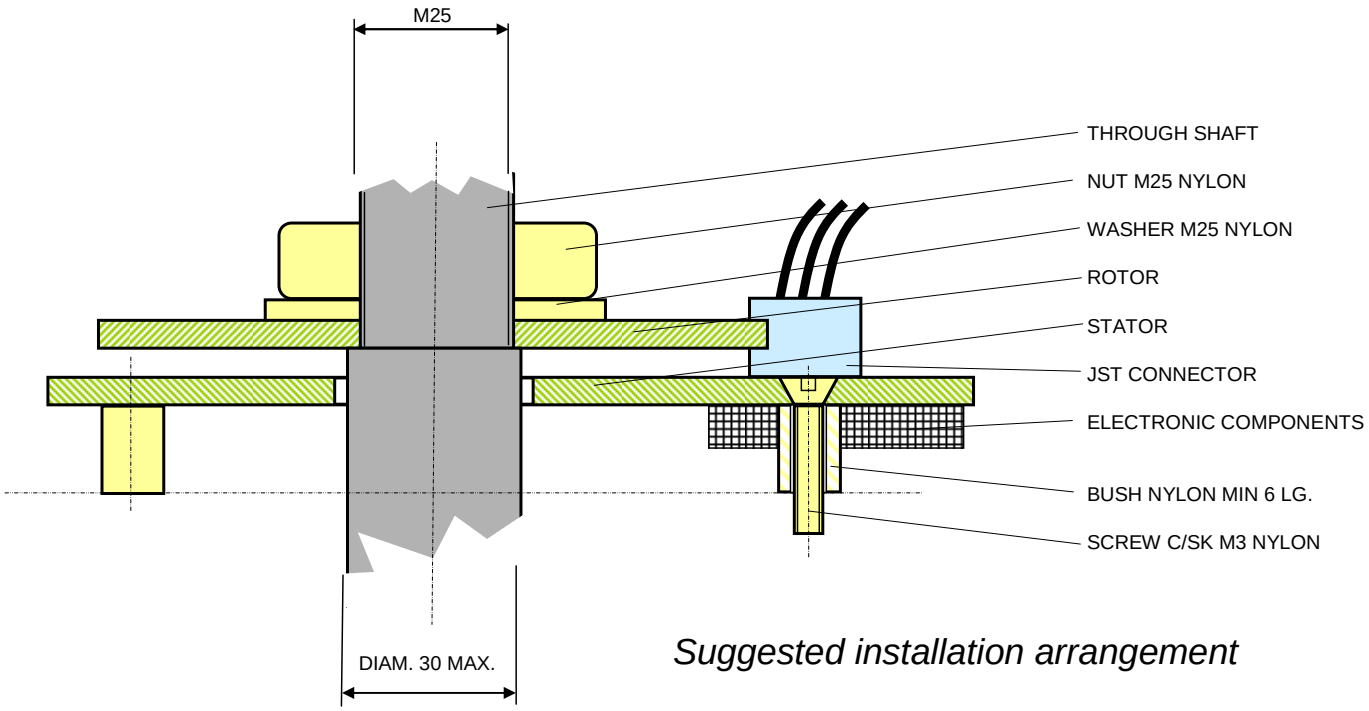
Technical Specification

a.	Geometry:	Pair of rotary encoders: o Azimuth angle encoder. o Elevation angle encoder
b.	Electronics:	Electronics on Azimuth Encoder (controls both encoders.)
c.	Packaging:	Conformally coated PCB assemblies.
d.	Measurement:	Absolute angle.
e.	Full-scale:	0-360 degrees continuous.
f.	Resolution:	16 bits.
g.	Repeatability:	≤+/-1 least significant bit.
h.	Linearity:	≤+/-0.05% Full-Scale.
i.	Measurement rate:	≥200Hz per Channel
j.	Electrical Output:	2-wire SPI master output from the Azimuth Encoder. A multi-byte protocol, including data from both azimuth and elevation encoders, will be used in a single communications channel. Data is output continuously. *See page 6.*
k.	Rotor Mount:	Single plastic nut & washer on ID – *optional fix with adhesive.*
l.	Stator Mount:	3 x M3 C/SK nylon screws and ≥6mm nylon bushes.
m.	Rotor-Stator Gap:	1,0 +/- 0,25mm stand-off nominal to achieve quoted linearity. +/-0,25mm parallelism to achieve quoted linearity. +/-0,25mm concentricity to achieve quoted linearity. Resolution and repeatability unaffected at <+/-0,5mm tolerance.
n.	Temp. Range:	-40 to 85°C Operating & -40 to 125°C Storage.
o.	Vibration:	12g, 10...2000 Hz per IEC 60068-2-6.
p.	Shock:	100g/6ms per IEC60068-2-27.
q.	Humidity:	95% RH non-condensing.
r.	Temp. Coefficient:	<10ppm/K over full-scale.
s.	Power Supply:	5V+/-5% and <5mV ripple with <25mA per Stator.
t.	Reverse Polarity:	Not fitted.
u.	Voltage Protection:	Not fitted.
v.	Interconnection between Rotor & Azimuth Boards:	6 way, 2,5mm pitch, JST Disconnectable Crimp Style Connector. Wires = 3 twisted pairs.
w.	Connector to Host:	Power & data via 4 way, 2,5mm pitch, JST Disconnectable Crimp Style Connector.

Note 1 - other than the central through shaft, electrically conductive or magnetically permeable objects should not be located within 6mm of the main faces of the Rotor & Stator during operation. This may be achieved with nylon spacer bushes.

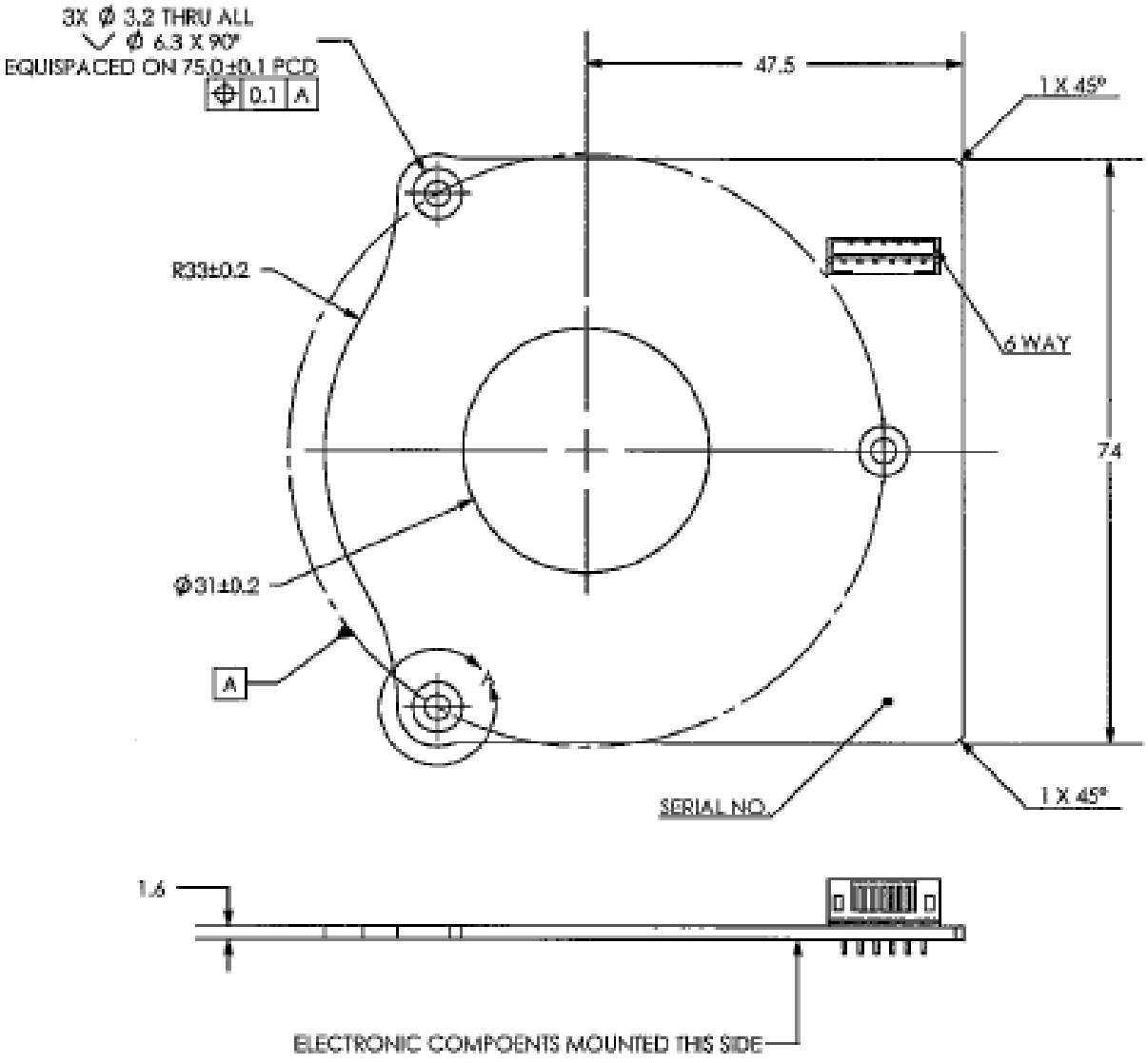
Note 2 – Azimuth Elevation encoder may be used alone. If Elevation Encoder is not connected an error is signalled on elevation data which may be simply ignored by the host system.

Suggested Assembly Arrangement – *shows centre section of Azimuth Encoder*

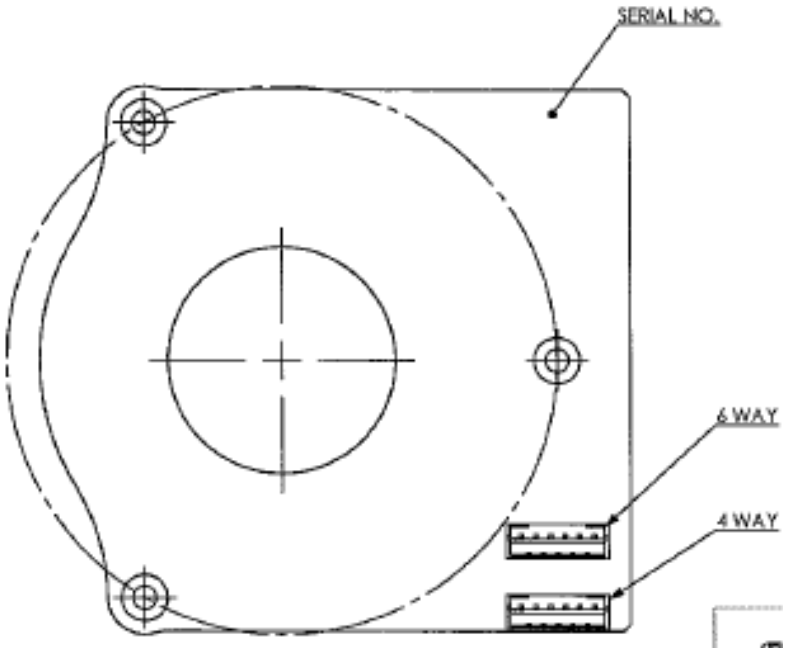


Suggested installation arrangement

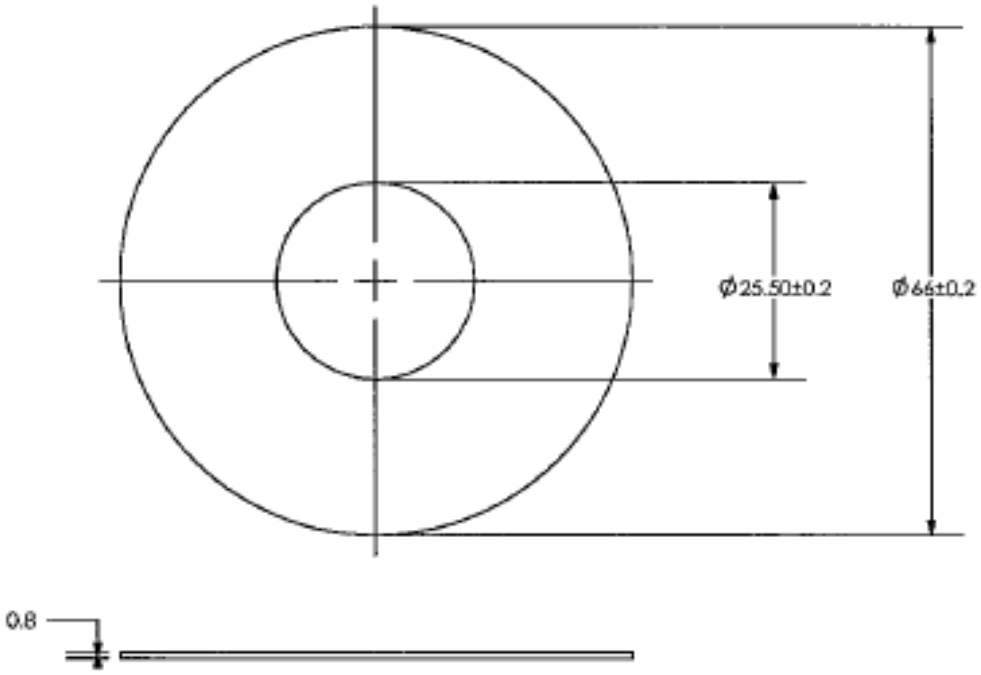
Azimuth Stator Dimensions



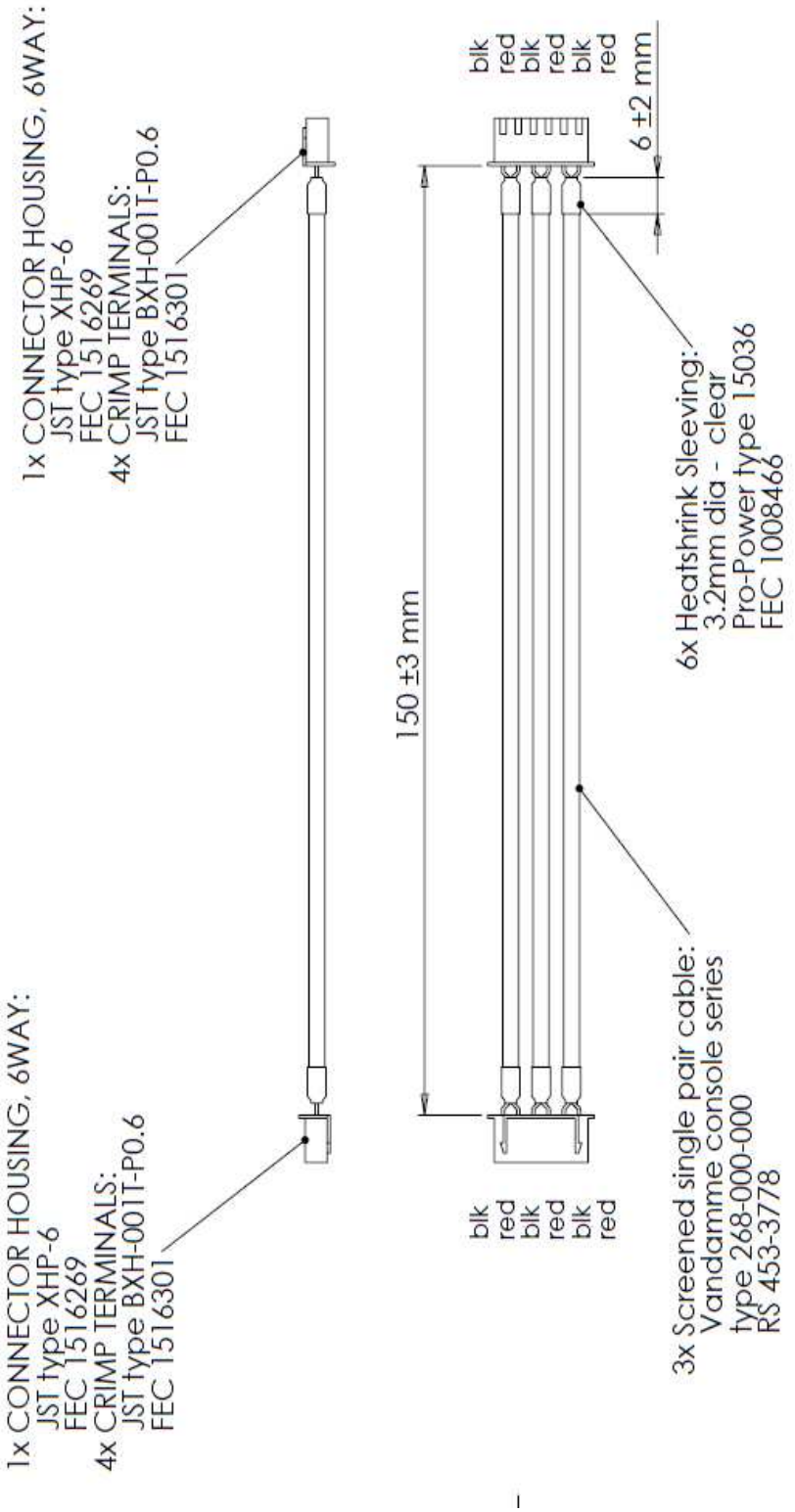
Elevation Stator Dimensions – *all dims same as Elevation other than connector positions and no electronic parts fitted*

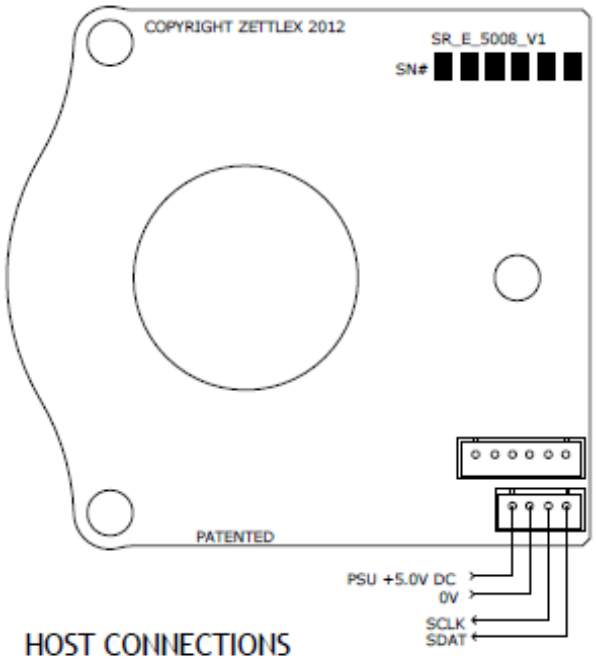


Rotor Dimensions – *Same for Elevation and Azimuth*



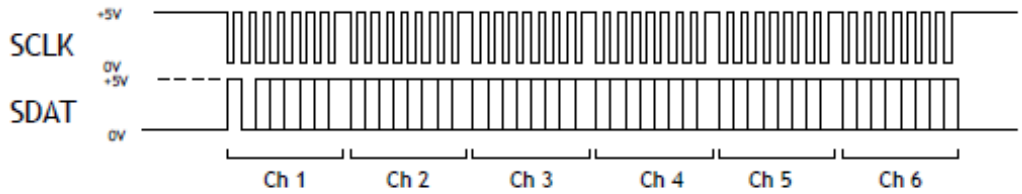
Azimuth Stator to Elevation Stator Interconnect





HOST CONNECTIONS

ENCODER SPI OUTPUT WAVEFORMS



Fclk = 125kHz

ENCODER SPI DATA FORMAT

CHARACTER 1 : 0b10xy,nndd (Frame Header)
("x" = Channel Azimuth Status & "y" = Channel Elevation Status)
("0" = Status : OK) ("1" = Status : ERROR)
("nn" = Channel Azimuth, Data Bits 1,0 & "dd" = Channel Elevation, Data Bits 1,0)
CHARACTER 2 : 0b0nnn,nnnn ("nnn,nnnn" = Channel Azimuth, Data Bits 15 TO 9).
CHARACTER 3 : 0b0nnn,nnnn ("nnn,nnnn" = Channel Azimuth, Data Bits 8 TO 2).
CHARACTER 4 : 0b0nnn,nnnn ("nnn,nnnn" = Channel Elevation, Data Bits 15 TO 9).
CHARACTER 5 : 0b0nnn,nnnn ("nnn,nnnn" = Channel Elevation, Data Bits 8 TO 2).
CHARACTER 6 : 0b0ccc,cccc (CHECKSUM) ("ccc,cccc" = Sequential XOR of Characters 1 to 5)

Ordering code

5008 – OEM Tandem Encoder
Note 1 Unit = 1 Azimuth Stator, 1 Elevation Stator, 1 Elevation Rotor, 1 Elevation Rotor

5008 – OEM – CAB Tandem Encoder Cable
Connects Elevation and Azimuth Stators

Azimuth Encoder may be used as a stand alone item for single axis.
Order code
5008 – OEM Azimuth Encoder

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