

- **Vibration-tolerant tilt sensor**
- **Thermal compensation**
- **Designed for dynamic applications**
- **Dual-axis – pitch and roll**
- **Dual sensing per axis for error detection**
- **12Vdc or 24Vdc supply**
- **J1939 CANbus output**
- **IP67 enclosure**
- **Integrated Deutsch DT04 connector**



The VTS series of vibration-tolerant tilt sensor offers an optimal combination of performance, safety and cost in dynamic applications, such as industrial vehicles.

IMU technology and fast-acting software algorithms filter out disturbances caused by vibration and vehicle motion, to provide output stability without the measurement delays usually associated with heavily-damped, alternative sensing methods.

Each measurement axis has two sensing elements, which are constantly compared to ensure correct operation. If an error is detected, the condition is communicated to the host electronics; so allowing a

safe situation to be assumed. Each output signal is calibrated to account for thermal drift, ensuring accuracy over the operating temperature range.

Powered from a voltage supply range of 6-48Vdc, the sensor provides output data over CANbus using J1939 protocol.

The sealed design offers exceptional levels of performance with respect to water, dust, shock, vibration and temperature, meaning the sensor is ideal for use in hostile, on- and off-highway vehicle environments. Electrical connection is via an integrated 4-pin Deutsch DT04 connector.



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## CONFIGURATION & ORDERING CODES

VTSXXXXXXXXXXXXXXXXXXXXXXX

Type	Angle	Electrical Interface	Node ID	Node ID 2	Baud Rate	Frame Rate
VTSXXXX	XXX	XX	XX	XX	XXXX	XXX
2021	010	CJC1	01-F7	NN	0050	020
				01-F7	0125	050
					0250	100
					0500	
					1000	

### TYPE

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

Code	Description
2021	Dual axis configuration

### ANGLE

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

Code	Description
010	±10° detection/full-scale output range

### ELECTRICAL INTERFACE

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

Code	Description
CJC1	J1939 CANbus over Deutsch DT04 compatible 4-way connector

Note: No internal termination resistor is fitted

### NODE ID (IN HEXADECIMAL)

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

Code	Description
01-F7	Factory set between 01 and F7

### NODE ID 2 (IN HEXADECIMAL)

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

Code	Description
NN	Not selected (all data communication uses the main Node ID)
01-F7	Factory set between 01 and F7



**BAUD RATE**

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

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<b>Code</b>	<b>Description</b>
0050	50 kbit/s
0125	125 kbit/s
0250	250 kbit/s
0500	500 kbit/s
1000	1 Mbit/s

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**FRAME RATE**

VTS-XXXX-XXX-XX-XX-XX-XXXX-XXX

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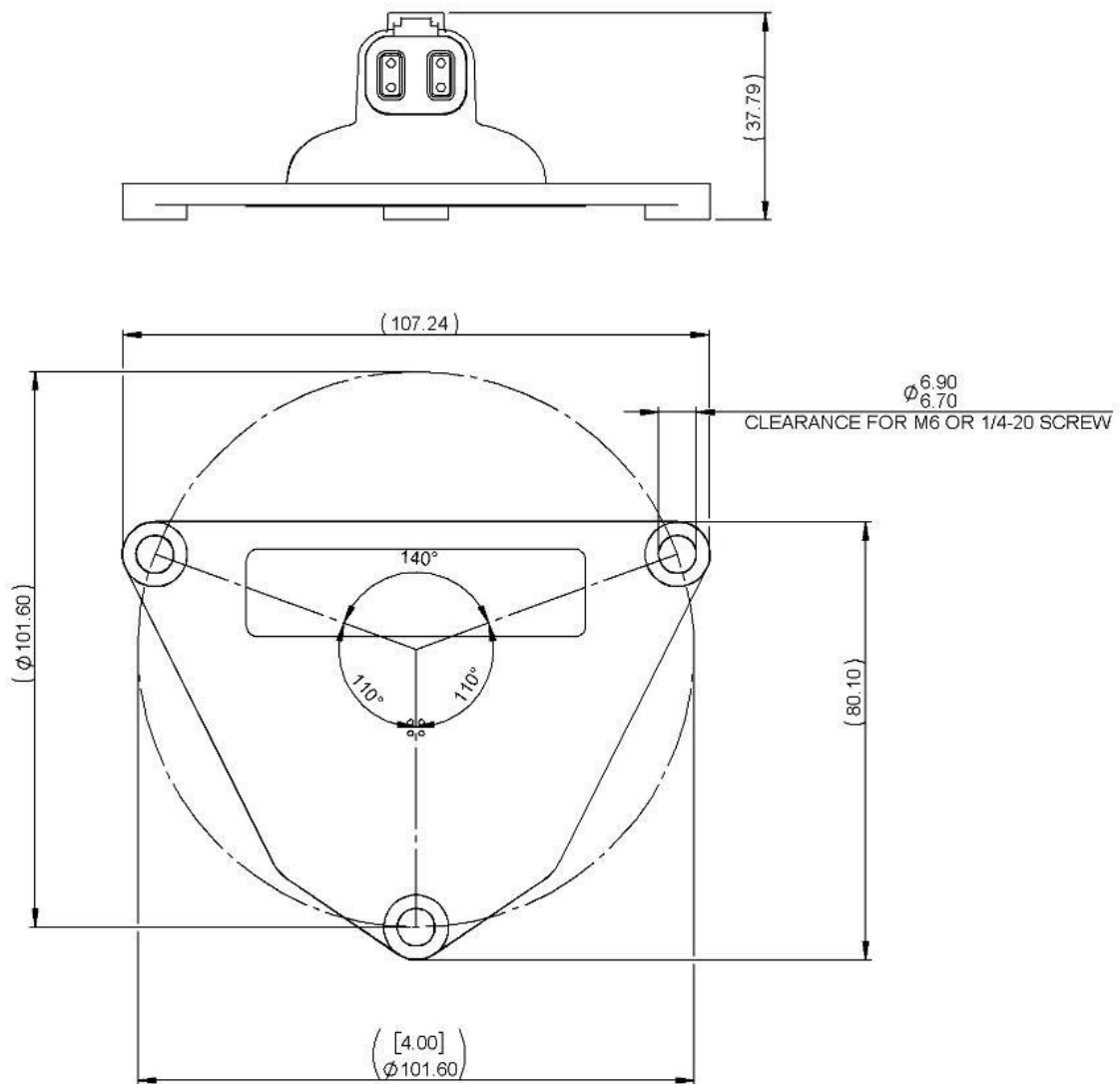
<b>Code</b>	<b>Description</b>
020	20 ms
050	50 ms
100	100 ms

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## INSTALLATION

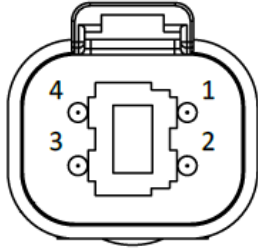
## MECHANICAL





## ELECTRICAL

### Integral Deutsch DT04 Compatible Connector



Integral connector with gold contact as per Deutsch part 0460-202-1631

To suit Deutsch Mating Part No: DT06-4S-\*\*\*\* (plug) & 0462-201-1631 (pins)

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Pin	Function
1	Vsupply
2	GND (0V)
3	CANL
4	CANH

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## SPECIFICATIONS

### ELECTRICAL

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SUPPLY VOLTAGE	6-48Vdc unregulated
SUPPLY CURRENT	<40mA at 12Vdc
SUPPLY REVERSE POLARITY PROTECTION	Up to -48Vdc
SHORT-CIRCUIT PROTECTION	Yes, all connections to all connections
OVER-VOLTAGE PROTECTION	Up to 60Vdc at ambient temperature
POWER-ON SETTLEMENT	<500ms

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### OUTPUTS

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LINEARITY	< $\pm 2\%$
RESOLUTION	16 bit output (1 bit = 0.0055°)
OUTPUT NOISE	$\pm 2$ bits ( $\pm 0.011^\circ$ )
REPEATING ACCURACY	$\leq 2\%$ of full scale range
THERMAL DRIFT	<0.5° over operating temperature

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### EMC DATA

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RF IMMUNITY	ISO 11452-2, 100V/m, 80-3000MHz frequency range, 80%AM, 1kHz sine
POWER FREQUENCY FIELD IMMUNITY	EN61000-4-8, 30A/m, 50 and 60Hz
CONDUCTED IMMUNITY	ISO 11452-4, 100mA, 10kHz-400MHz frequency range, 80%AM, 1kHz sine
ELECTROSTATIC DISCHARGE	ISO10605, $\pm 15$ kV contact, $\pm 25$ kV air discharge
RADIATED EMISSIONS	CISPR 25, 30 – 300MHz and 300 – 1000MHz
TRANSIENT PROTECTION	ISO7637-2, pulses 1-5

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### MECHANICAL

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MAXIMUM OPERATING SPEED	250°/s maximum rate of change of tilt that can be detected
WEIGHT	<150g

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**ENVIRONMENTAL**

OPERATING TEMPERATURE RANGE	-40°C to 85°C in accordance with BS EN 60068-2-14
STORAGE TEMPERATURE RANGE	-50°C to 90°C in accordance with BS EN 60068-2-1 and BS EN 60068-2-2
THERMAL SHOCK	-40°C to 85°C in accordance with BS EN 60068-2-14
SEALING	Sensor body IP69K, IP67 Deutsch connector IP67 when fully mated
VIBRATION	BS EN 60068-2-64, 14.7gn rms, 20-2000Hz random
SHOCK	BS EN 60068-2-27, 50g, 11ms, 3 shocks per axis (9 total)
DROP TEST	1m drop onto concrete
MTTF <sub>D</sub>	> 385 years
SALT SPRAY	EN 60068-2-52 test Kb severity 2 (48 hrs)
CHEMICAL RESISTANCE	Hydraulic oil, diesel fuel, gasoline/petrol, ethylene glycol, hydrochloric acid, phosphoric acid, isopropyl alcohol, ether, calcium chloride, magnesium chloride, potassium chloride, sodium hydroxide, calcium hydroxide, ammonium hydroxide, AdBlue, herbicide,, fertilizer, urea nitrogen, insect repellent
HUMIDITY	EN60068-2-30 (65°C, 93%RH)

All values recorded at room temperature of 23°C, unless otherwise stated

**IMPORTANT INFORMATION**

Whilst Curtiss-Wright Industrial Group - Penny & Giles has designed this sensor to meet a range of applications it is the responsibility of the customer to ensure it meets their specific requirement.

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