

IMU Sensor

Preliminary



The Vemcon IMU Sensors are optimised for taking precise measurement of dynamic movements.

At a glance / USP

- High precision even during dynamic movements
- Great for active driver assistance functions
- Compact dimensions and robust construction especially for heavy-duty use
- Fast and easy calibration and parameterization
- Some device versions suitable for safety critical application (ISO13849: PL_c and PL_d)
- For each application the necessary precision available (P-DP-DPS)
- Optional analog inputs to read other analog sensors

Technical data – electrical ratings

General data	
Resolution position sensor:	<0.01 °
Angle accuracy position sensor:	<0.4° (Typical 0.1 °)
Default transmission interval (J1939)	50 ms
Supply voltage range	9...35 V
Effective integrated data processor	32 bit 168MHz FPU ARM Cortex

Technical data – mechanical ratings

Temperature range	-35 °C - +80 °C
Simple cabling due to 2x M12 for passing trough CAN signals	
Hermetically sealed (IP67)	

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Performance*		
Performance	Acceleration Sensor (3axes)	Angular Rate Sensor (3-axes)
Measuring Range	±8 g	±250 °/s
Offset-Instability	±80 mg	
Noise Density	400 µg/√Hz	0.005 (°/s)/√Hz
Resolution	16 bit	16 bit
Non-Linearity	0.5 %	0.2 %
Data Rate (Raw Data)	1 kHz	1 kHz

*Raw sensor performance before calibration.

Additional for Dynamic Performance and Dynamic Performance Safety*		
Dynamic Performance and Dynamic Performance Safety	Acceleration Sensor (3axes)	Angular Rate Sensor (3-axes)
Measuring Range	±6 g	±125 °/s
Offset-Instability	±18 mg	2 °/h
Noise Density	270 µg/√Hz	0.008 (°/s)/√Hz
Resolution	16 bit	16 bit
Non-Linearity	±5 mg (at -1 g to 1 g) ±50 mg (at -6 g to 6 g)	±0.5 %
Data Rate (Raw Data)	2.3 kHz	2.3 kHz

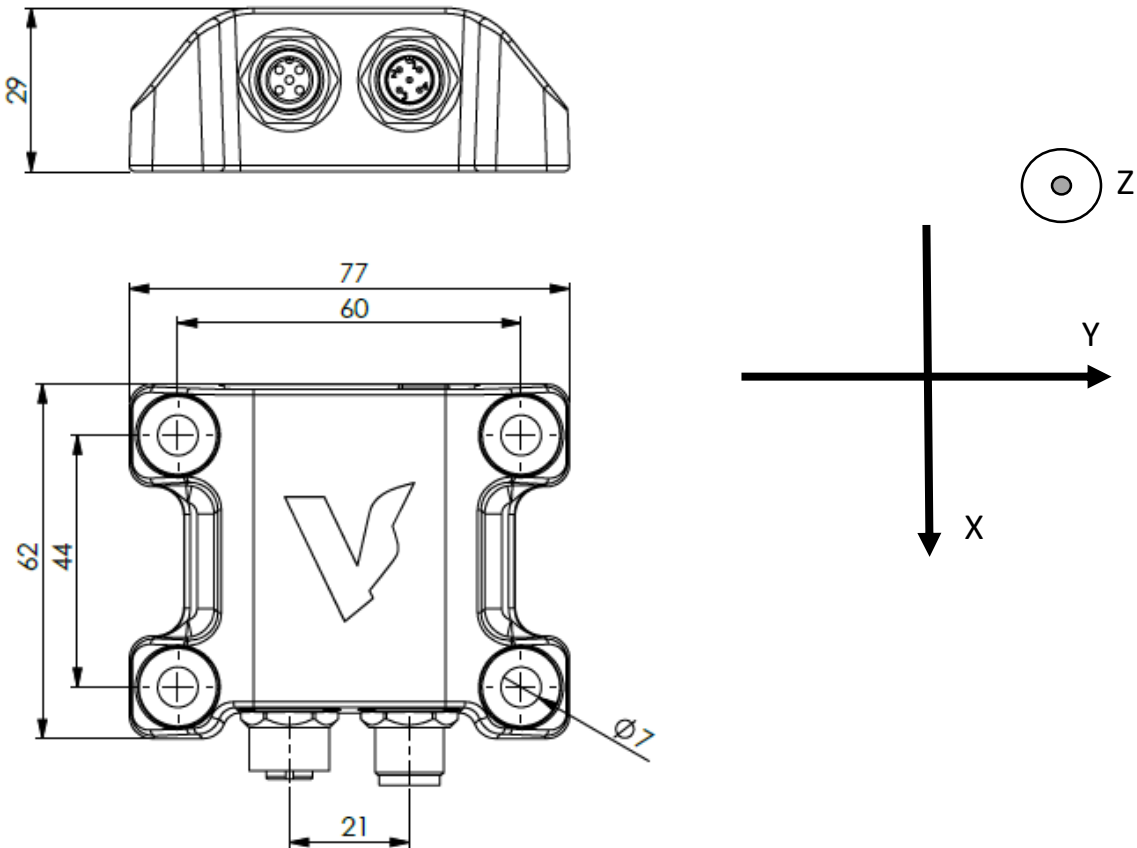
*Raw sensor performance before calibration.

Version overview			
	Performance (P)	Dynamic Performance (DP)	Dynamic Performance Safety (DPS)
Microcontroller	ARM Cortex M0 32bit 48MHz	ARM Cortex M4F 32bit, 180MHz	2x ARM Cortex M4F 32bit, 180MHz
Acceleration Sensor	3-axes, high accuracy	Additional 3-axes, extreme high accuracy	Like DP
Angular Rate Sensor	3-axes, high accuracy	Additional 1-axis, extreme high accuracy	Like DP
Performance Level	-	Compliant to DIN EN ISO 13489-1/2, Pl_c category 2	Compliant to DIN EN ISO 13489-1/2, Pl_d category 3

Design is subject to modifications. Errors and omissions may occur.

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CAN-Protocol – J1939

CAN-Baudrate	250 kBaud
Interval Between Cycles	50 ms
Default source address:	0xE2

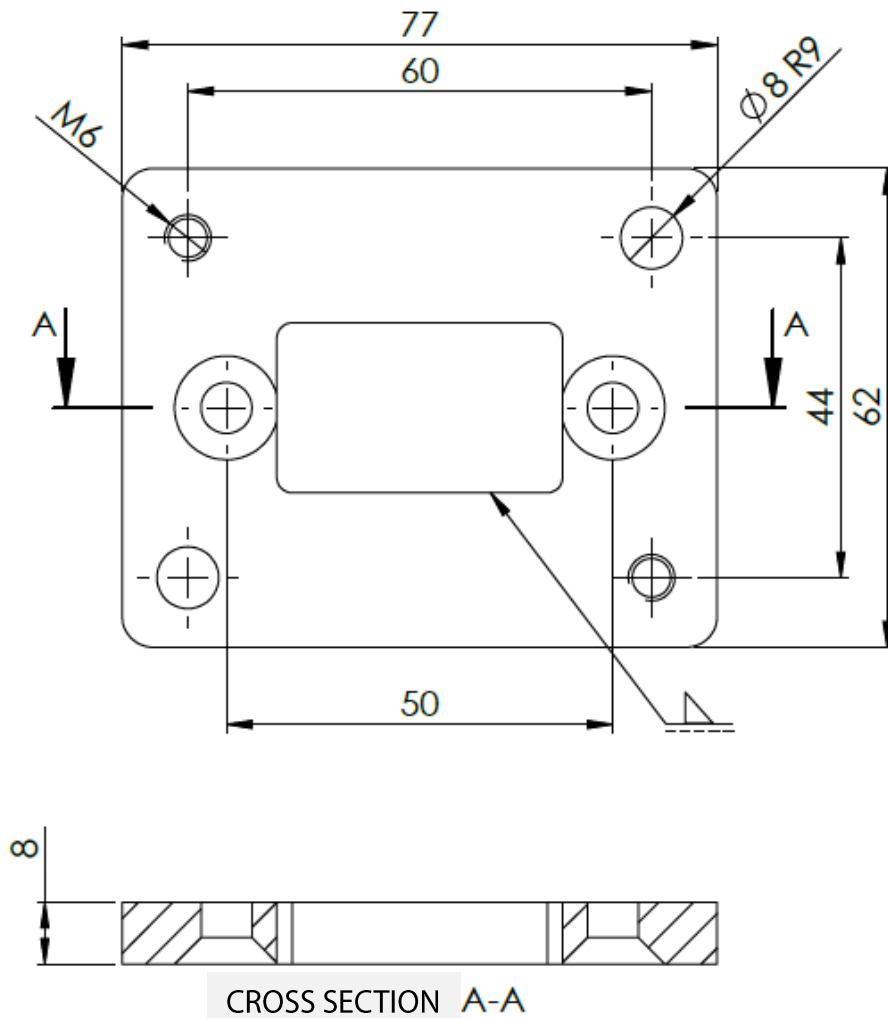
See also: IMU J1939 Specification document.

More/Customer-specific CAN protocols on request.

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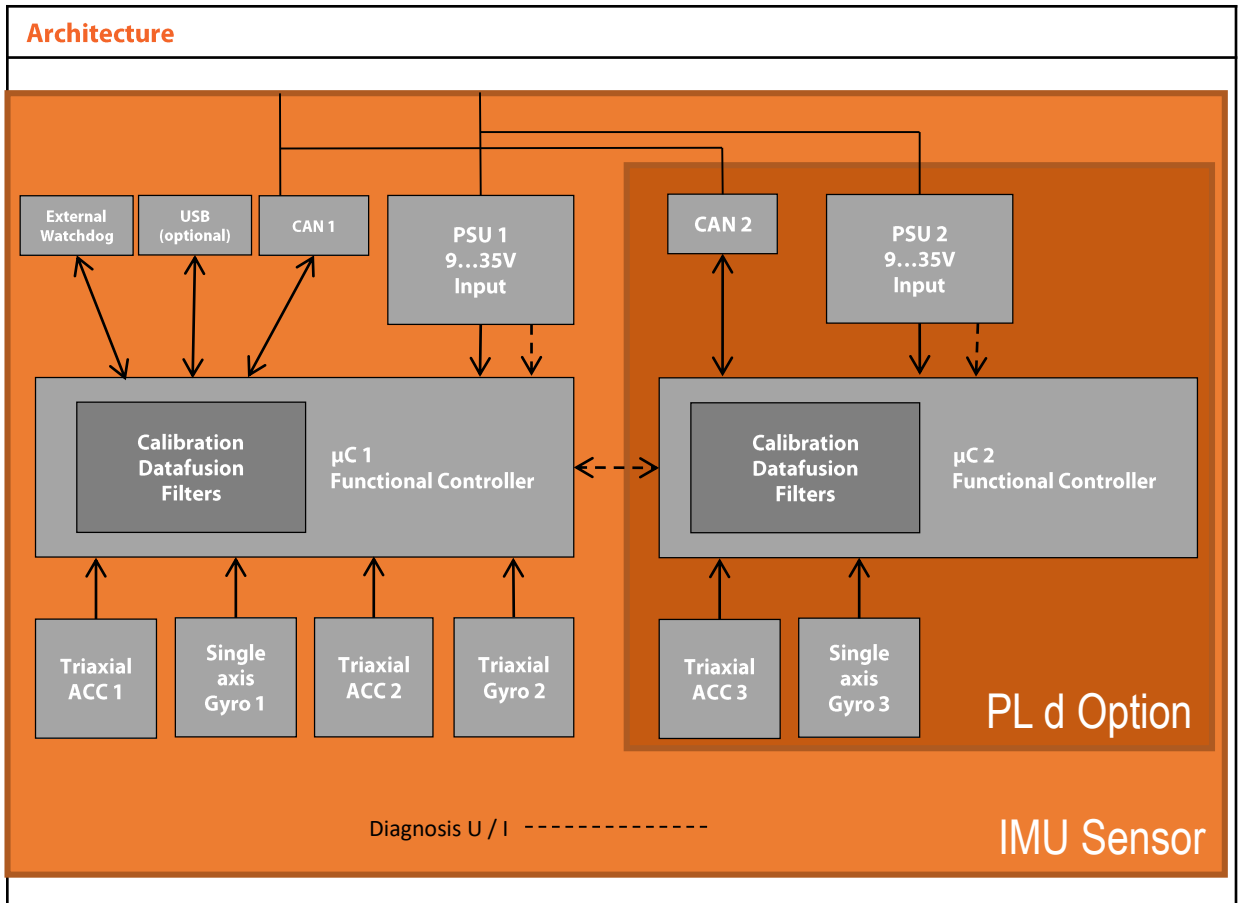
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Connecting plate:



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Application Possibilities

- Automating work functions
- Limitation of motion range
- Active end position damping
- Linearization of speed over the entire angle range