

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 |

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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Preliminary

| 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 |

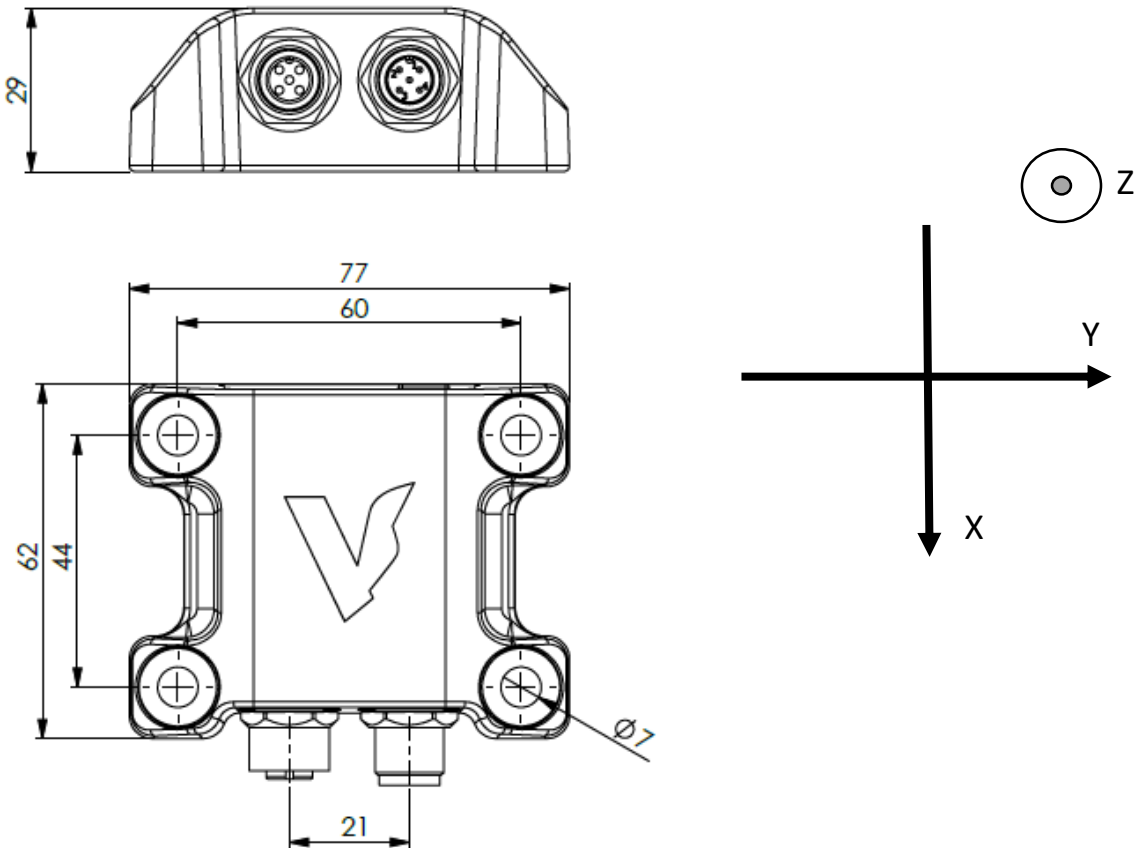
*Raw sensor performance before calibration.

| 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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Preliminary



CAN-Protocol – J1939

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

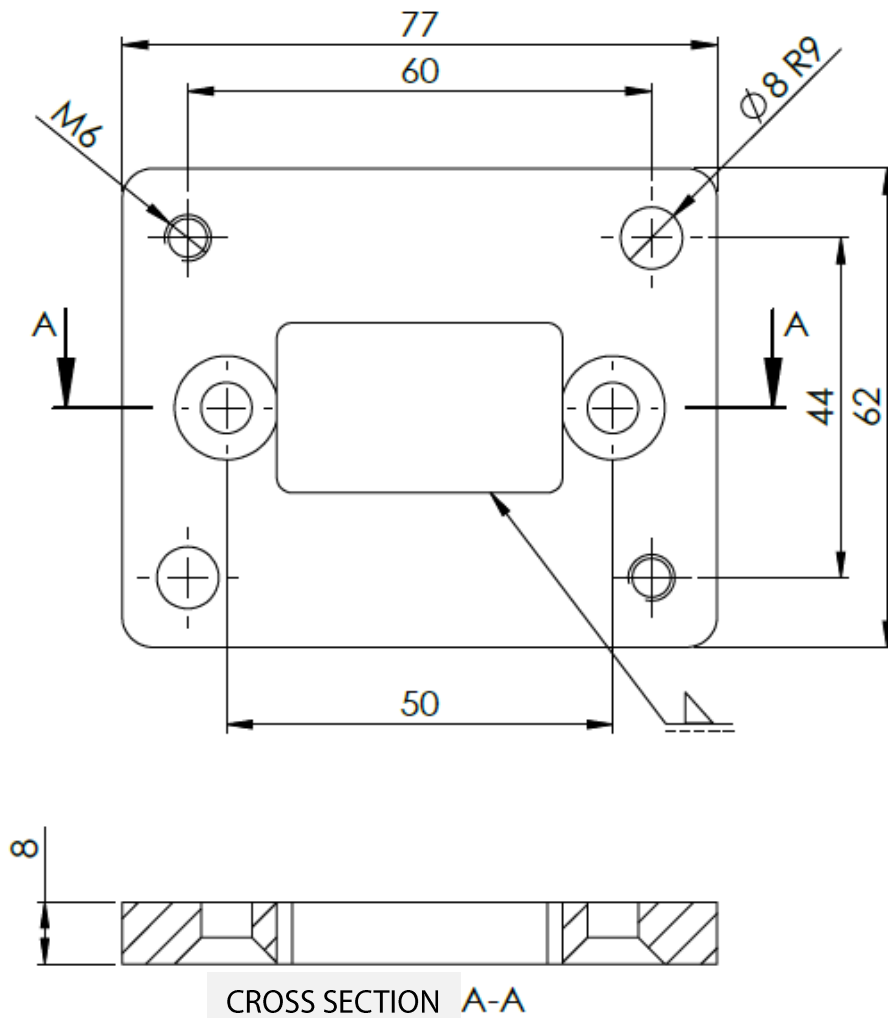
See also: IMU J1939 Specification document.

More/Customer-specific CAN protocols on request.

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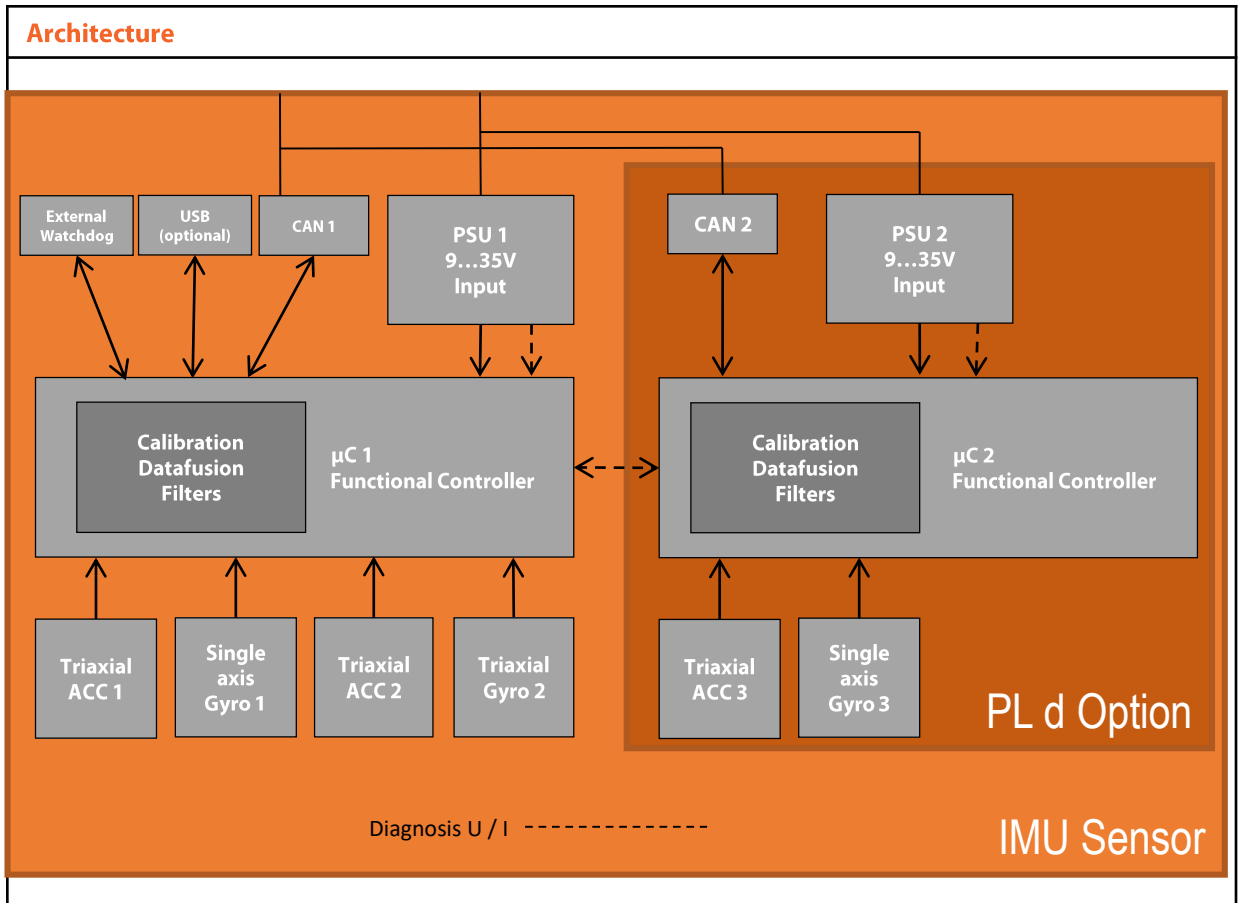
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Connecting plate:



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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