PRODUCT DATA

# MV7-AR: Compact, ruggedised CAN bus vertical reference unit and IMU

The MV7-AR gyro-stabilised inclinometer delivers precision measurements of dynamic inclination, acceleration, and angular rate in challenging environments such as those encountered by heavy-duty construction, off-highway, agriculture, and trucking vehicles.

The MV7-AR utilises the power of a sophisticated Auto-Adaptive Extended Kalman Filter (EKF) to remove errors associated with vibration, sudden linear motions, and quake, resulting in a true reading of inclination under all conditions.

The MV7-AR's state-of-the-art temperature compensation and calibration assures error-free performance over the full operational temperature range.

The compact size, wide 4.5 to 36 VDC power range, IP68/IP69K rating, and SAE J1939 communications protocol make the MV7-AR a single part solution for a full range of vehicle sizes and applications.

## MEASUREMENT PERFORMANCE

- 6 DOF gyro-stabilised inclinometer
- Full accuracy over the entire operational temperature range of –40°C to +85°C
- Auto-adaptive EKF provides superior dynamic accuracy
- Based on MicroStrain by HBK's proven 7th generation industrial/aerospace solid-state MEMS gyro technology

## RUGGEDISED FOR OFF-HIGHWAY USE

- Compact and rugged reinforced PBT housing is fully sealed for immersion, pressure wash (IP68/IP69K)
- Low-cost, rugged, reliable AMPSEAL 16 connector
- Optional metal guard plate protects sensor and connector and allows connector insertion and removal

## FLEXIBLE DEPLOYMENT OPTIONS

- SAE J1939 communication
- Simple sensor to vehicle frame alignment, install in any orientation
- Wide power input range (4.5 VDC – 36 VDC)
- User-settable parameters

## APPLICATIONS

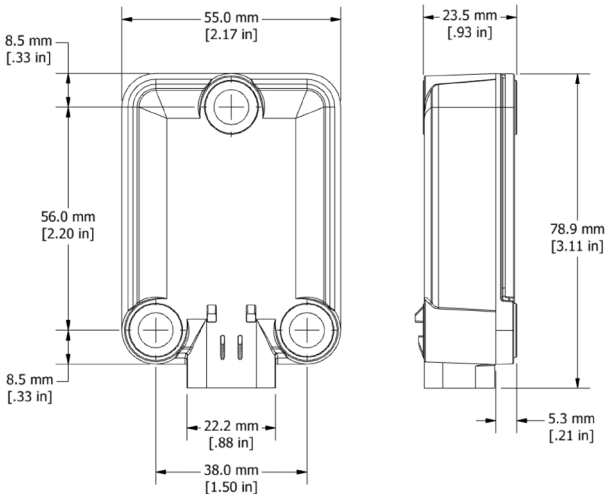
- Auto-steer and terrain compensation
- Dynamic incline detection (roll, pitch, rotation)
- Vehicle stability and levelling
- Platform control, alignment and stabilisation
- Bucket/stick/boom angle
- Impact detection
- Operator feedback
- Precision navigation

## MICROSTRAIN MV7-AR SPECIFICATIONS

| Inertial Measurement Unit (IMU) Sensor Outputs | | |
|---|---|---|
| | **Accelerometer** | **Gyroscope** |
| **Measurement range** | ±16 g | ±1000°/s |
| **Output range*** | ±157 m/s² (±16g) | ±250°/s |
| **Resolution*** | 1.0 mg | 0.008°/s |
| **Bias instability** | 18 µg | 1.5°/hr |
| **Noise density** | 30 µg/√Hz | 0.0023°/s/√Hz |
| **Offset error over temperature** | 0.75 mg | 0.08 °/s |
| **Gain error over temperature** | 600 ppm | 1000 ppm |
| **IMU output data rate** | 100 Hz default (1-500 Hz selectable) | |

| Communication | |
|---|---|
| **SAE J1939** | Order P/N 6244-7790 |
| **Baud Rate** | 125, 250 (default), 500, 1000 kb/s |

| Product Variants | | |
|---|---|---|
| **Name** | **Part Number** | **Description** |
| MV7-AR | 6244-7790 | IMU/VRU |




| General | |
|---|---|
| **Integrated sensors** | Triaxial accelerometer, triaxial gyroscope |
| **Data outputs** | Pitch, Roll, Angular Rate, Acceleration |

| Attitude (Pitch and Roll) Outputs | |
|---|---|
| **Static accuracy** | 0.25° RMS |
| **Dynamic accuracy** | 1.5° RMS |
| **EKF output data rate** | 100 Hz default (1-500 Hz selectable) |
| **Range (pitch)** | ±90° |
| **Range (roll)** | ±180° |

| Physical, Electrical, & Environmental | |
|---|---|
| **Dimensions** | L 78.9 mm × W 55.0 mm × H 23.5 mm |
| **Weight** | 107 grams |
| **Power source** | +4.5 VDC Min, 12/24 VDC Nominal, +36 VDC Max |
| **Power consumption** | 410 mW Nominal @ 12 VDC |
| **Operating temperature** | –40°C to +85°C |
| **Enclosure material** | PBT Thermoplastic, Reinforced |
| **Ingress protection** | IP68 (Immersion), IP69K (Pressure Wash) |
| **Vibration (random)** | MIL-STD-202G, Method 214A, Test Condition 1-B, 24 hrs/axis |
| **Vibration (sweep)** | SAE J1455 Appendix A 10 –2000 Hz, 5 g Peak, 0.25 octave/min/axis |
| **Thermal shock** | –40°C to +85°C, 60°C/min, 5 cycles |
| **Salt spray** | MIL-STD-202G, Method 101E Condition A (96 hours) |
| **Hot dunk** | 5X, 30 mins @ 85°C, 30 mins @ ice bath, operating |
| **Mechanical shock drop** | SAE J1455 4.11.3.1; 1m onto concrete |
| **Mechanical shock operating** | MIL STD 202, M213B; 50 g, 11 ms 1/2sine, 3x each axis; 18 total |
| **MTBF** | 1,658,495 hours (Telcordia method, GM/35C) |
| **Connectors** | AMPSEAL 16, 4 position, gold plated pins |
| **EMC**** | ISO 13766-1:2018 and ISO 13766-2:2018, ISO 14982:2009 |
| **Compliance**** | RoHS, REACH, CE, UKCA |

** Communications protocol may impose resolution limits beyond those of the measuring device. Refer to product manual for details.*

*** Additional certifications and compliance details are listed in the User Manual.*

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