

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 $+85^{\circ}\text{C}$
- 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

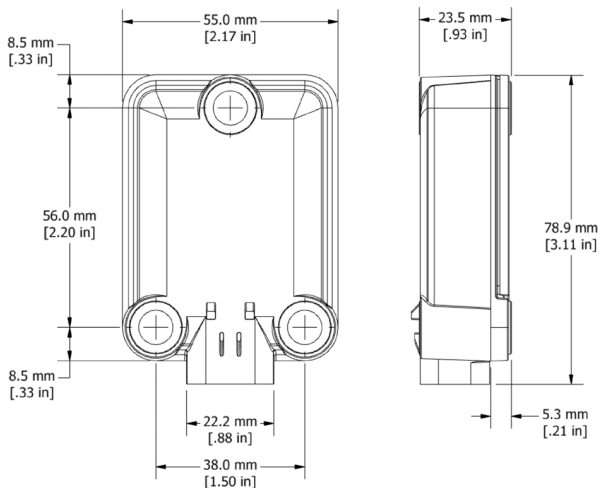
- Auto-steer and terrain compensation
- Dynamic incline detection (roll, pitch, rotation)
- Vehicle stability and levelling
- Platform control, alignment and stabilisation
- Bucket/stick/boom angle
- Impact detection
- Operator feedback
- Precision navigation

MicroStrain MV7-AR Specifications

Inertial Measurement Unit (IMU) Sensor Outputs		
	Accelerometer	Gyroscope
Measurement range	±16 g	±1000°/s
Output range*	±157 m/s ² (±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.