

MV5-AR

Compact, Ruggedized Attitude Reference and IMU



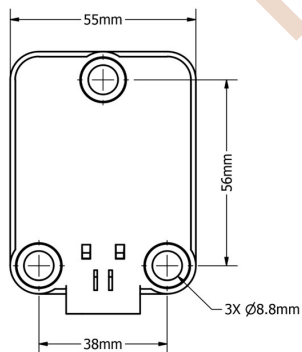
MV5-AR- High performance 6-DOF Attitude Reference and IMU in a compact, ruggedized reinforced PBT housing

The LORD Sensing MV5-AR brings a new level of precision to measurements of dynamic inclination, acceleration, and angular rate in challenging environments such as those encountered by heavy-duty construction, off-highway, agriculture, and trucking industries.

The MV5-AR utilizes 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.

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

The compact size, wide 9 to 36 V power range, IP67 / IP69K rating, and CAN J1939 communications interface make the MV5-AR a single part solution for a full range of vehicle sizes and applications.



Features and Benefits

- Low-cost, compact size, and full 360° measurement range about all axes permits single part number inventory for a variety of vehicle sizes and applications.
- Full accuracy over the entire operational temperature range of -40° C to 85° C.
- High performance 6-DOF MEMs sensor suite provides best possible accuracy regardless of mounting angle.
- Auto-Adaptive EKF provides best dynamic accuracy
- Compact and rugged reinforced PBT housing is fully sealed for immersion, pressure wash (IP67, IP69K)
- Low-cost, rugged, reliable AMPSEAL 16 connector
- CAN J1939 communication
- LORD Sensing mechanical isolation technology used internally for high shock resistance and reliability.
- Based on LORD Sensing 's proven 5th generation industrial/aerospace solid-state MEMS accelerometer and gyro inertial sensor technology.
- Optional metal guard plate protects sensor and connector - permits connector insertion/removal
- Standard or custom configurations

Applications

- Auto-steer and terrain compensation
- Dynamic incline detection (roll, pitch, rotation)
- Vehicle stability and leveling
- Platform control, alignment and stabilization
- Bucket/Stick/Boom angle
- Impact detection
- Operator feedback
- Precision navigation

Specifications

General		
Integrated sensors	Triaxial accelerometer, triaxial gyroscope, temperature sensors	
Data outputs	TBD (J1939 PGN codes)	
Inertial Measurement Unit (IMU) Sensor Outputs		
	Accelerometer	Gyroscope
Measurement range	$\pm 10\text{ g}$	$\pm 500^\circ/\text{sec}$
Non-linearity	$\pm 0.04\% \text{ fs}$	$\pm 0.06\% \text{ fs}$
Resolution	0.05 mg	$< 0.003^\circ/\text{sec}$ (500 dps)
Bias instability	$\pm 0.04\text{ mg}$	0.5°/hr
Initial bias error	$\pm 0.004\text{ g}$	$\pm 0.1^\circ/\text{sec}$
Scale factor stability	$\pm 0.05\%$	$\pm 0.05\%$
Noise density	100 $\mu\text{g}/\sqrt{\text{Hz}}$	0.0075°/sec/ $\sqrt{\text{Hz}}$ (300°/sec)
Alignment error	$\pm 0.05\%$	$\pm 0.05\%$
Bandwidth	40 Hz	40 Hz
Offset error over temperature	0.2% (typ)	0.02% (typ)
Gain error over temperature	0.05% (typ)	0.06% (typ)
Scale factor non-linearity (@ 25° C)	0.04% (typ) 0.2% (max)	0.04% (typ) 0.15% (max)
IMU data output rate	100 Hz default (1 Hz to 500 Hz selectable)	

Inclinometer Outputs	
Attitude accuracy	$\pm 0.2^\circ$ RMS roll and pitch
Attitude heading range	360° about all axes
Attitude resolution	0.05°
Attitude repeatability	0.2°
Calculation update rate	500 Hz
Data output rate	100 Hz default (1 Hz to 500 Hz selectable)
Operating Parameters	
Communication	CAN 250 kb/s, J1939
Power source	+7 V Min, 14/28 V Nominal, +36 V Max
Power consumption	350 mW (typ)
Operating temperature	-40 °C to +85 °C
Mechanical shock limit	TBD
Physical Specifications	
Dimensions	L 80 mm x W 55 mm x H 24 mm
Weight	120 grams
Enclosure material	PBT Thermoplastic, Reinforced
Ingress protection	IP67, IP69K
Mounting	3 x M8, installation torque 20 Nm \pm 2 Nm
Regulatory compliance	ROHS, REACH, CE
Integration	
Connectors	AMPSEAL 16 gold plated 4 pin
Software	MIP® Monitor, Windows XP/Vista/7/8/10 compatible

PRELIMINARY



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