

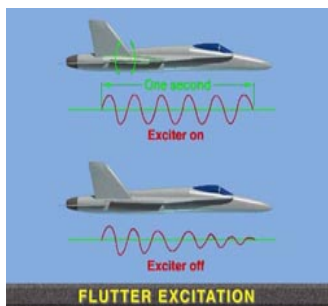


Calibrating DC Response Accelerometers



Accelerometers measure high-frequency vibration, shocks, low-frequency vibration and inertial motion. AC-coupled accelerometers – charge and voltage-mode with internal electronics – are the most common.

DC-responding accelerometers are used for automotive crash tests, munitions blast testing, trajectory monitoring, flutter testing, suspension & ride quality, motion detection, tilt & orientation, brake testing, modal studies, bridge & building monitoring, measuring milli-g's of acceleration, off-highway equipment durability tests, seismic surveys, measuring rigid body motion, and making measurements where the data are integrated to yield velocity or displacement.



These accelerometer types include piezoresistive, variable capacitance, servo, strain gage, and MEMS. DC-responding accelerometers necessitate calibration and performance verification demands beyond those of AC-coupled accelerometers.

The MB Win475-DC option automatically performs static and dynamic measurements required to calibrate and verify performance of these DC response accelerometers.



Tasks to calibrate & characterize performance of DC accelerometers

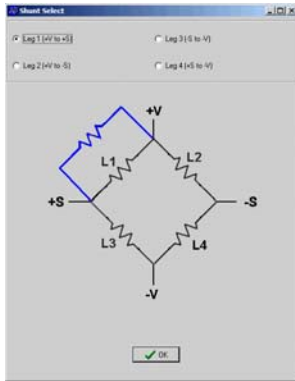
<ul style="list-style-type: none"> ❖ Static or DC measurements <ul style="list-style-type: none"> ○ Perform bridge shunt calibration ○ Measure ZMO, 0-g offset voltage, zero offset error ○ Measure input and output resistance of transducer 	<ul style="list-style-type: none"> ❖ Dynamic or frequency-dependent measurements <ul style="list-style-type: none"> ○ Sensitivity or frequency response calibration ○ Phase measurement over bandwidth ○ Verify amplitude linearity at user-selected frequencies ○ Measure resonance frequency of accelerometer
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Specification for Static or DC Measurements	Value
Bridge excitation voltage, VDC	2 – 15, continuously variable, software-selectable
Zero Measurand Output (ZMO), zero-g offset voltage, or zero offset error	Measured, stored and reported automatically
DC voltage measurement	0.005% from using PCI DMM; no operator adjustment of DMM
Shunt calibration:	
a) Number of shunt resistors	a) Up to 9 user-supplied internal to Model 407 Signal Conditioner, socketed connections; 1 user-supplied external, easy access; software automatically sequences through selected resistors; both data and settings stored in database for future retrieval
b) Shunt placement	b) Any arm, user-selected via mouse click
c) Shunt resistor values and tolerances	c) Unlimited range; user-supplied
d) Input and output resistances, error	d) Measured automatically, < 0.1%
e) Checks for opens and shorts	e) Automatic; values are obvious in input/output resistances
f) 4-wire vs. 2-wire measurement	f) 4-wire results in improved accuracy; directly measuring voltage and current then computing resistance eliminates errors due to fixturing and interface resistance
g) Shunt calibration of pressure and force transducers	g) Added functionality at no extra cost

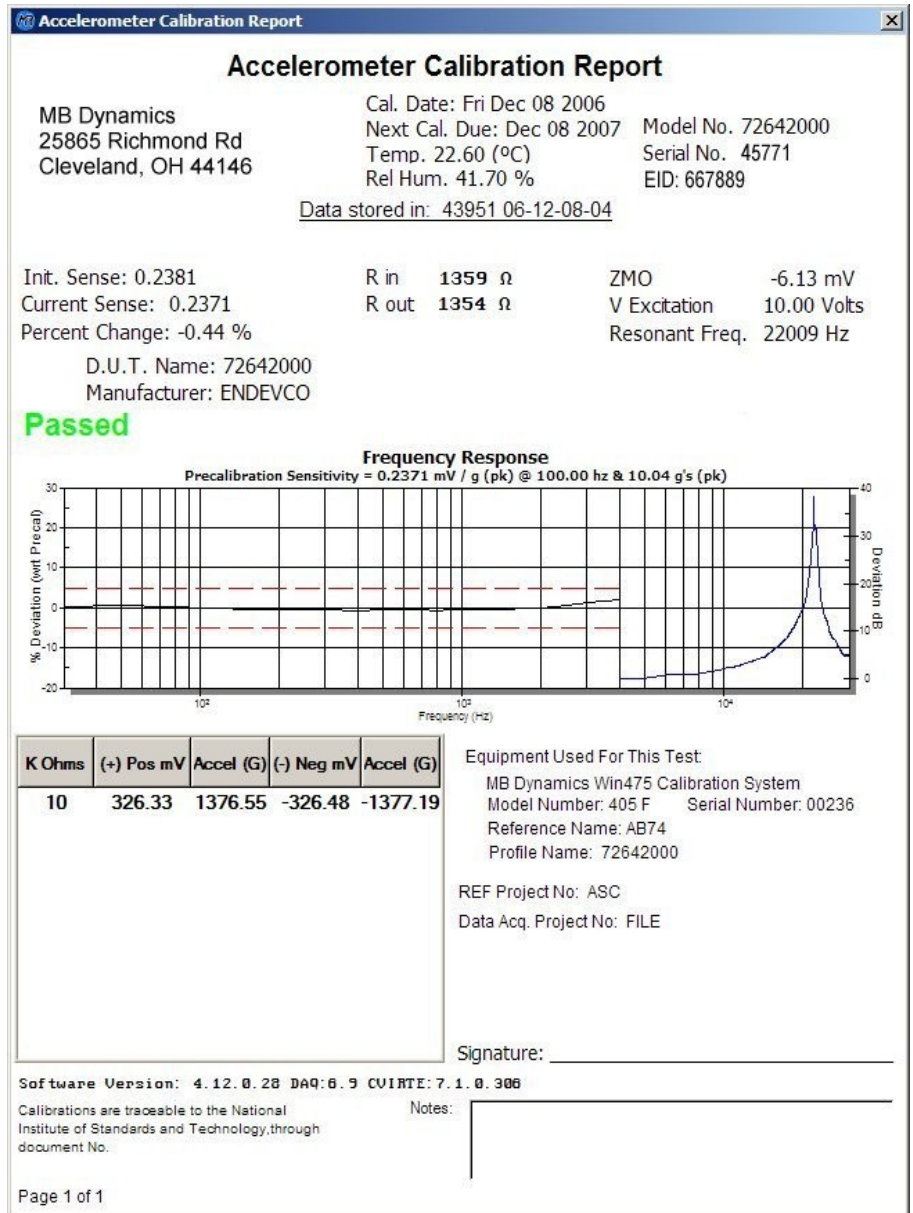
Sample Report with Optional resonance frequency measurement



Model 407 and 405
Signal Conditioners



User-selected placement
of shunt, any arm



Other Features:

- ❖ All common Win475 frequency response calibration, phase, and linearity checks from 1 to 10 kHz
- ❖ Transducer static and dynamic calibration and measurement parameters stored in DUT records
- ❖ Software selectable gain settings for dynamic measurements:
X1 to X1000 in Model 407; X1 to X1000 in Model 405; X0.5 to X20 on PCI plug-in board
- ❖ Compute damping ratio

... and Options:

- ❖ Support and seamless linkage to customer SQL-compatible databases for archiving, retrieval and sharing
- ❖ Record temperature and humidity at time of calibration
- ❖ Supply user-specified shunt resistors and tolerances
- ❖ Measure transducer resonance frequency over user-selected bandwidth up to 10 kHz using MB CAL 50 exciter
- ❖ Notify user of resonance shifting below user-specified frequency threshold
- ❖ Measure transducer resonance up to 50 kHz using customer-supplied exciter
- ❖ Measure transducer resonance up to 50 kHz using MB PIEZO actuator
- ❖ Simultaneous sensitivity calibration of up to four piezoresistive accelerometers up to 4 kHz using CAL 50 exciter and Model 407-MULTI DUT signal conditioner