

## Overview

The MB Dynamics Model 405-X dual channel signal conditioner is designed for use with MB's Win475 automated vibration transducer calibration system. It provides multiple sources of excitation voltage and/or current, programmable gains, and circuitry to work with virtually all types of vibration transducers over a very broad frequency range. It is supplied "standard" as a bench-top; or, optionally, in a rack-mounted enclosure. The MB Model 405-X signal conditioner can be tailored to connect to virtually any input transducer type and connector, via the use of either MB or user-supplied "Personality Modules." Personality Modules adapt the device under test (DUT) to the unit's D-sub front panel input connector. They are powered from standard electrical outlets and auto-select to virtually all worldwide voltage standards via the rear panel AC input connector. The Model 405-X signal conditioning unit provides all required filtering functions, programmable gain, and very low noise circuitry, as necessary to ensure quality measurements with required low Expanded System Uncertainty (ESU).



**Model 405-X Dual Channel Signal Conditioner**

Parameters	Specifications
<b>Supported transducer types</b>	Single-ended piezoelectric charge; 4-pin voltage; bridge (including strain gage); piezoresistive; IEPE (ICP); variable capacitance; servo; velocity; displacement
<b>Gain adjustment</b>	Automatic gain selection for both REF and DUT channels under Win475 program control to optimize signal-to-noise ratio; gains from 0.5 to 1000 are achievable in 1/2/5 increments (when using the MB Model 405-X, combined with a Win475 data acquisition board/module)
<b>Hardware filtering</b>	All inputs high-pass filtered at 0.01 Hz (-3 dB, 2-pole Butterworth filter) for dynamic measurements
<b>Calibration frequency range</b>	0.1 Hz minimum, 20 kHz maximum, 50 kHz maximum for mounted resonant frequency search
<b>Program communications</b>	Via high-density shielded data cable to National Instruments data acquisition board/module; USB to host PC required; internal PC backplane plug-in board standard; optional external USB data acquisition module

**MB Dynamics, Inc.**

25865 Richmond Road • Cleveland, OH 44146 USA  
Tel: +1 216 292 5850 • Fax: +1 216 292 5614 • Email: [sales@mbdynamics.com](mailto:sales@mbdynamics.com)  
[www.mbdynamics.com](http://www.mbdynamics.com)

MB-WIN475-405X-0818

Parameters	Specifications
<b>Measured transducer electrical parameters (via connection to data acquisition hardware)</b>	Bridge/piezoresistive devices: sensor input and output resistance; Zero Measurand Output (ZMO); excitation voltage; shunt calibration values including user software selection of which of four (4) legs to shunt; IEPE (ICP) devices: bias voltage
<b>Excitation sources</b>	5 VDC, $\pm 12$ VDC, and software adjusted bridge excitation from 2 VDC to 15 VDC, IEPE (ICP) at 24 VDC and nominal 4 mA
<b>Bridge completion</b>	User configures at "Personality Module" input connector
<b>Channel gain match</b>	<0.1% from 5 Hz to 10 kHz, 0.5% at 0.5 Hz and 20 kHz
<b>Channel phase match</b>	<1° from 5 Hz to 10 kHz; 2° at 0.5 Hz and 20 kHz, corrected to within 1° over full 0.1 to 20 kHz by software "self-calibration" feature
<b>Noise</b>	<100 $\mu$ V <sub>RMS</sub> on any channel
<b>Input impedance</b>	Charge: >100 M voltage and IEPE (ICP): >100K; bridge: >100K
<b>Output impedance</b>	<50 $\Omega$ on all monitor outputs, DAC output, and all ADC inputs
<b>Input sensor range</b>	Voltage mode, IEPE (ICP), variable capacitance, servo, bridge, and velocity: minimum 1 mV, maximum 10V, customer to adjust test level within these ranges; charge: minimum 0.1 pC, maximum 250 pC, customer to adjust test level within these ranges
<b>Integration</b>	Unit can be used to measure outputs from accelerometers, velocity transducers, or displacement transducers as the DUT; software performs single integration of REF accelerometer to calculate velocity; software double integrates REF acceleration to calculate displacement at driven frequency
<b>User interface</b>	Front panel LED's for channel type and gain
<b>Connectors – front panel</b>	BNC input for IEPE (ICP), Volt REF transducer; DB-9 port provides +12 VDC excitation for Volt REF; BNC input for charge, IEPE (ICP) DUT transducer; DB-15HD input for all other DUT transducer types via MB or user-supplied "Personality Module" connection
<b>Connectors – rear panel</b>	AC line input; REF and DUT channel monitor BNC's; DAC output BNC (to drive system power amplifier); DIO to MB peripherals
<b>TEDS compatibility</b>	Reads TEDS devices as DUT; reads other types of electronic ID (user to specify at time of order)
<b>Ambient temperature &amp; humidity</b>	Temperature and humidity parameters automatically measured and recorded during tests via built-in sensor
<b>Power</b>	90-264 VAC, 47-63 Hz, 65 W max.