

Quick Start Guide

MODEL MX5000-DK-001



MX5000 DEMO KIT - DESCRIPTION

Metrix MX5000 Demo kit will allow you to demonstrate and test the features of the MX5000 using the MX5000 Configuration and Display Software, as well as using the MX2033 Driver and the SA6200A Accelerometer when needed for the demonstration. The kit will include everything needed to demonstrate the MX5000 capabilities. It is assumed that the owner of this kit also has the DPS and SW5580 Demo Kits, and access to a Hardy Shaker.



This demo kit can be used for both Metric and English Unit Measurements.

Visit the webpage below for more information on the Metrix MX5000:
<https://www.metrixvibration.com/products/mx5000-vibration-monitoring-system>

MX5000 DEMO KIT - DESCRIPTION

Component	Purpose	Metrix P/N
MX5000 Demo Kit Bundle	Demonstrate the versatility and functions of the MX5000.	MX5000-DK-001

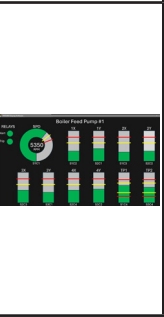
INCLUDED IN KIT

Component	Purpose	Metrix Model	Qty	Image
MX5000-SIM	Demonstration Unit	MX5000-00-01-00-00-00	1	
MX5000-REM	Demonstration Unit	MX5000-01-00-00-00-00	0	
MX5000-TIM	Demonstration Unit	MX5000-00-00-01-00-00	0	
Demonstration Stand	Support MX5000 for demonstration	2031099	1	
DIN Rail	35mm DIN Rail 5 inches long	91169-002	1	

INCLUDED IN KIT (Continued)

Component	Purpose	Metrix Model	Qty	Image
Custom MX5000 RJ45 to USB-A Cable	Connect MX5000 display output to computer	2035661-001	1	
USB-C 2.0 Cable (A-type to USB-C Type Connectors)	Connect computer to MX5000 configuration port	96014-019	1	
24 Volt Power Supply (240V/120V AC to 24 V DC)	Provide power to MX5000	96002-048	1	
Carrying Case	Case to secure all demo equipment	14" W x 10" H x 8" D	1	

INCLUDED IN KIT (Continued)

Quick Start Guide	Setup demo instructions	2009719	1	 The image shows the cover of a 'Quick Start Guide' for the METRIX MX5000 VIBRATION MONITORING SYSTEM. It includes a list of contents and a photograph of the system's hardware components.
MX5000 Configuration Software	Configure the MX5000	Follow the link: www.metrixvibration.com/products/mx5000-vibration-monitoring-system/mx5000-sensor-interface-module	1	 The image is a screenshot of the MX5000 Configuration Software interface. It displays various configuration options and a 'Configuration Summary' section on the right side.
MX5000 Display Software	HMI display on your laptop	Follow the link: www.metrixvibration.com/products/mx5000-vibration-monitoring-system/mx5000-sensor-interface-module	1	 The image is a screenshot of the MX5000 Display Software interface. It features a 'Main Data Summary' section with a circular gauge and several vertical bar charts representing different data points.

NOT INCLUDED IN KIT (Needed for Demonstration)

Component	Purpose	Metrix Model	Qty	Image
HI-903/913 Shaker	Demonstrate Acceleration and Impact on the SW5580	HI-903/913	1	
DK2030 DPS Demo Kit	Demonstrate Rotor Position and Rod Drop	DK2030	1	
SW5580 Demo Kit	Demonstrate SA6200A Accelerometer and Impact	DKSW5580	1	

MX5000 CONFIGURATION SOFTWARE DEMONSTRATION

Download the free MX5000 Configuration software from the website.

1. Open the software and show the customer that one SIM is pre loaded.
2. Add two additional SIMs using the SIM+ button
3. Click on “SIM1 Channel 1”, click on “Configure” and configure the channel for Point name SPD, Proximity SPD PH, 200mV per mil, 4000 RPM, Phase to PT-1, and orientation left or right 0 degrees. Demonstrate the ability to set Alert and Danger levels.
4. Click on “SIM2 Channel 1” and configure the channel for Point Name BRG1X, Proximity Vibration, 200mV per mil, 2Hz to 200 Hz bandpass, 10 mil p-p, phase from PT-1 and orientation left 45 degrees, set Alert at 6 mils and Danger at 8 mils.
5. Click on “SIM2 Channel 1” and configure the channel for Point name BRG1A, Acceleration 100mV/g, 2Hz to 10kHz band pass, 0-2ips full scale, phase from PT-1, orientation left or right 0 degrees. Set Alert at 1 ips and Danger at 1.5 ips.
6. Click on “SIM2 Channel 2” and configure the channel for Point Name BR1Y, Proximity Vibration, 200mV per mil, 2Hz to 200 Hz bandpass, 10 mil p-p, phase from PT-1 and orientation right 45 degrees. Set Alert at 6 mils p-p and danger at 8 mils p-p.
7. Click on “SIM 2 Channel 4” and configure for Point Name TP1, 200mv per mil, 10-90 mil fullscale. Set Alert under at 45 mils, over at 55 mils, Danger under at 40 mils, over at 60 mils.
8. Click on “SIM 3 Channel 4” and configure for Point Name TP2, 200mv per mil, 10-90 mil fullscale. Set Alert under at 45 mils, over at 55 mils, Danger under at 40 mils, over at 60 mils.
9. Click on “SIM1 Relay LEDs” and open the relay configuration screen.
10. For Relay 1, select “Standard” and “Configure” for “OR Logic” of SIM2 Channel 4 Danger and SIM3 Channel 2 Danger. Note to the customer that

MX5000 CONFIGURATION SOFTWARE DEMONSTRATION (Continued)

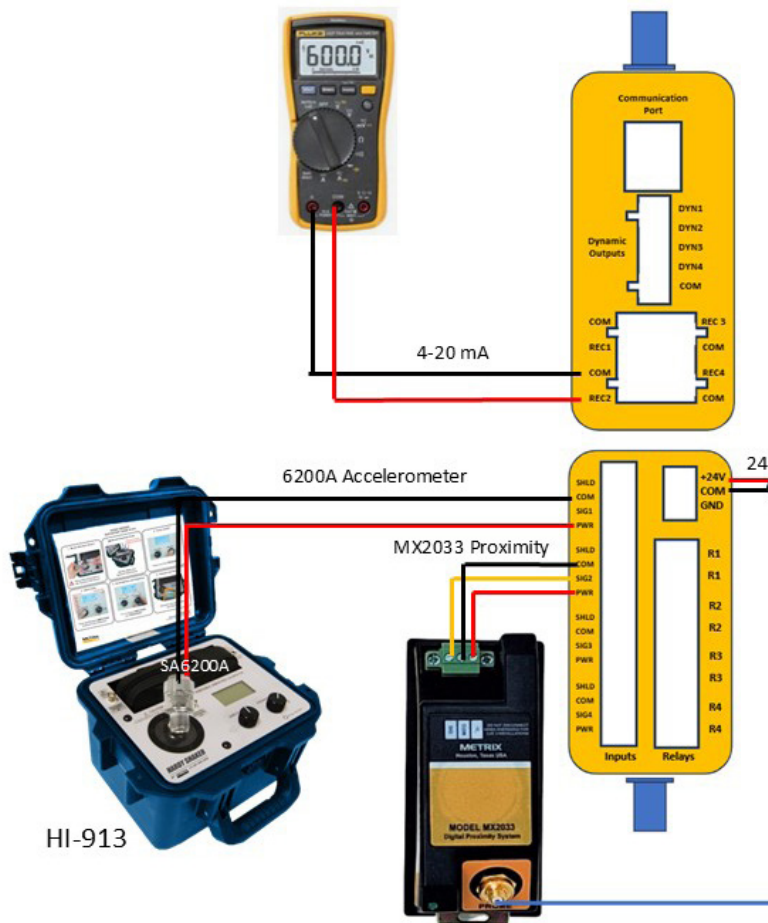
any channel from any SIM can be used with any relay for relay logic.

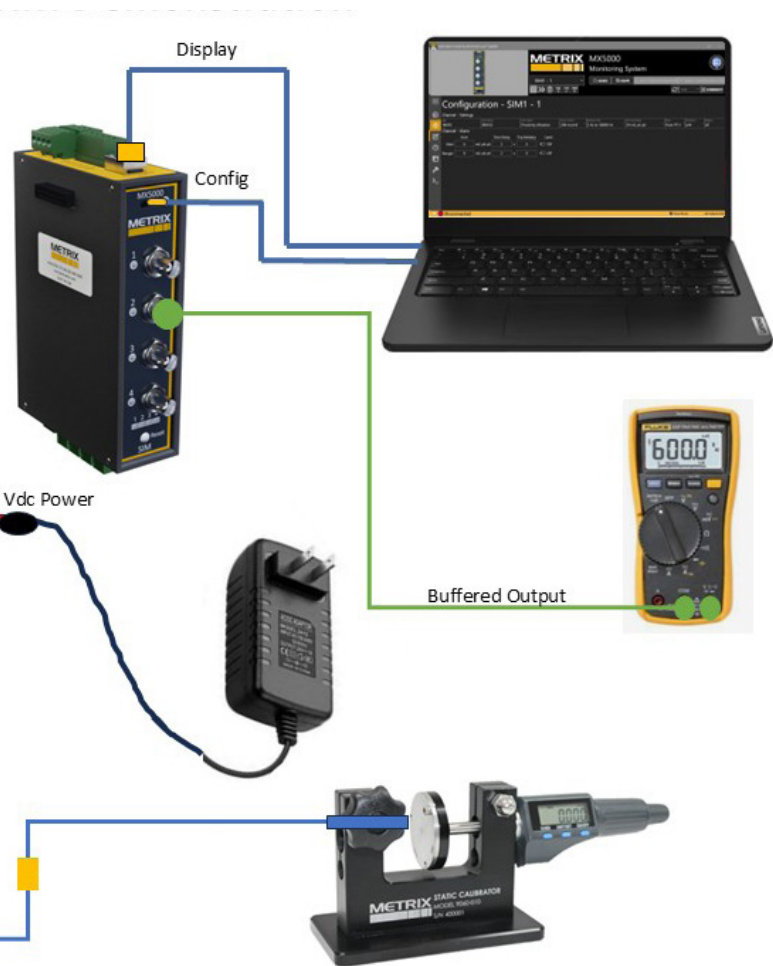
11. For Relay 2, select “Extended Combination” and Source: “System Wide Alarm”: Alert, Op: “OR”. Explain to customer that this relay will activate if any channel in the system is in Alert status.

This is a generic script to show capabilities. Condense or extend as needed. Consider discussing the customers machine types and appropriate measurements, alarm settings, and relay logic for their particular application.

Pro Tip: Research the customer’s machines and applications before your visit and build and save an MX5000 system configuration for one of the customers’ machine types.

DEMO SET UP





CONNECTING DEMO HARDWARE

1. Layout the equipment per the illustration on pages 8 and 9.
2. Mount the SA6200A to the HI-903/HI-913 Shaker (hand tighten using counter torque to not stress the shaker mounting structure).
3. Connect the acceleration cable (9334-211-009-0010) to the SA6200A that is mounted on the HI-903/HI-913 Shaker.
4. Connect the acceleration cable to the Channel 1 PWR/COM terminals on the MX5000-SIM.
5. Connect the Transducer Cable (9041-0015) to the MX2033 Proximity Driver terminal block (Red to Power (-V), White to Common (COM), Black to Signal (SIG)). Keep this connection for future demonstrations, just unplug it when not in use.
6. Connect the opposite end of the Transducer Cable to the Channel 2 PWR/SIG/COM terminals of the MX5000-SIM.
7. Connect the MX8030 Probe to the MX8031 Cable, and then connect the other end of the cable to the MX2033 Driver (ensure the MX2033 Driver is properly calibrated to the probe and cable).
8. Connect the power supply to the +24V and COM terminals on the top of the MX5000-SIM. Confirm that the power supply is properly connected to the MX5000-SIM by plugging it in and seeing the MX5000 LEDs illuminate.

DEMONSTRATING THE MX5000-SIM CAPABILITIES

Given: Download the free MX5000 Configuration software from the website. The MX5000-SIM should be configured for Acceleration and Displacement. Channel 1 should be configured for Acceleration (100 mV/g or 10.2 m/sec²) with a Scale Range of 0-10 g. Channel 2 should be configured for Proximity (200 mV/mil or 7.87 mV/μm) with a Scale Range of 10-90 mils. The Shaker should be configured for g's peak. The Proximity Probe should be gapped to 50 mils.

SA6200A ACCELEROMETER AND HI-913/903 SHAKER DEMONSTRATION

1. Connect the Computer, with the MX5000 Software loaded, to the mini-USB on the front panel of the MX5000-SIM.
2. Connect the computer, with the MX5000 Display Software loaded, to the MX5000-SIM using the custom cable provided.
3. Configure Channel 1 of the MX5000-SIM for:
Input Signal Type: Acceleration
Sensor Output: 100 mV/g
Bandpass Filters: None
Full Scale Range: 0 to 10 g pk
4. Configure the SIM Channel 1 to:
a. Channel 1 Alert Level: 2.5 g, pk 3 seconds No Latching
b. Channel 1 Danger Level: 5 g, pk 3 seconds No Latching
5. Configure SIM Relay 1 to Channel 1 Alert, then "OR" Channel 2 Alert.



SA6200A ACCELEROMETER AND HI-913/903 SHAKER DEMONSTRATION (Continued)

Configure SIM Relay 2 to Channel 1 Danger.

6. Set up the HI-913/903 Shaker for 0 g's pk, at 60 Hz. The display for Channel 1 of the MX5000-SIM should read 4 mA's and 0 g's (+/- 5%). If it does not, then verify connections, and ensure there is 24 VDC power to the MX5000-SIM.
7. Show the Customer the Setup. Have the customer increase the vibration to 2 g's peak on the Shaker. Point out that the alarm has not initiated and the reading on the MX5000 Display agrees with the Shaker for both "g" level and milliamps (+/- 5%). You can do this at several points during the demonstration, for the next steps. Also, show that the mA reading on the Display is the same as on the Voltmeter reading the 4-20 mA output.
8. Increase the vibration level to 2.6 g's peak. Wait 3 seconds and then the Channel 1 status LED should flash yellow and Relay 1 should trip (solid Red LED). Continue to increase the vibration level to 5.1 g's peak, wait 3 seconds, and then the Channel 1 status LED should flash Red and Relay 2 should trip (solid Red LED).
9. Have the Customer lower the vibration level to 4.5 g's and have them notice that the Channel 1 status LED changed from flashing Red to flashing Yellow, and the Relay 2 LED is no longer illuminated because "Latching" was not selected. Continue to lower the vibration level to 2 g's peak. The Channel 1 status LED will change to Green, and the Relay 1 LED will no longer be illuminated.
10. Ask the Customer if they have any questions. Allow the customer to change configuration parameters in the MX5000 Configuration Software, Send them, and then Test them with the Shaker.

MX8030 / MX2033 THRUST POSITION OR ROD POSITION DEMONSTRATION USING THE DIGITAL MICROMETER

1. Connect the Computer, with the MX5000 Software loaded, to the mini-USB on the front panel of the MX5000-SIM.
2. Connect the computer, with the MX5000 Display Software loaded, to the MX5000-SIM using the custom cable provided.
3. Configure Channel 2 of the MX5000-SIM for:
Input Signal Type: Proximity Position
Sensor Output: 200 mV/mil
Bandpass Filters: None
Full Scale Range: 10-90 mil
4. Configure Channel 2 Alert and Danger levels:
a. Channel 2 Alert Level:
Over: 58 mils Under: 42 mils 3 seconds No Latching
b. Channel 2 Danger Level:
Over: 70 mils Under: 30 mils 3 seconds No Latching
5. Configure SIM Relay 1 to Channel 2 Alert and SIM Relay 3 to Channel 2 Danger.
6. Set up the Digital Micrometer with 50 mils of gap. The display for SIM Channel 2 of the MX5000 Display Software should read 12 mA's and 50 mils (+/- 5%). If it does not, then verify connections, and ensure there is 24 VDC power to the MX5000-SIM.
7. Show the Customer the Setup. Have the customer increase the gap to 55 mils (+5 mils) on the Digital Micrometer. Point out that the alarm has not initiated and the reading on the display screen agrees with the Digital Micrometer for both "mils" and milliamps (+/- 5%). You can do this at several points during the demonstration, for the next steps.
8. Increase the gap to 60 mils (+5 mils). Wait 3 seconds and then SIM Channel 2 LED will flash Yellow and Relay 1 will activate. Continue to increase the

MX8030 / MX2033 THRUST POSITION OR ROD POSITION DEMONSTRATION USING THE DIGITAL MICROMETER (Continued)

Gap to 75 mils (+15 mils), wait 3 seconds, and then SIM Channel 2 LED will flash Red and Relay 3 will activate.

9. Have the Customer decrease the Gap 10 mils to a 65 mil Gap and notice that the SIM Channel 2 LED changed from flashing Red to flashing Yellow, and Relay 3 will deactivate because “Latching” was not selected. Continue to decrease the Gap to 50 mils. The SIM Channel 2 LED will change to Green and Relay 1 will deactivate.
10. Have the Customer decrease the Gap to invoke the narrow Gap alarms, namely 42 and 30 mils. Point out that the Voltmeter voltage, from the Channel 2 BNC, decreases on decreasing Gap and vice versa.
9. Ask the Customer if they have any questions. Allow the customer to change configuration parameters in the MX5000 Configuration Software, Send them, and then Test them with the Digital Micrometer.

IMPACT DEMONSTRATION USING THE SA6200A ACCELEROMETER AND HI-913/903 SHAKER

1. Connect the Computer, with the MX5000 Software loaded, to the mini-USB on the front panel of the MX5000-SIM.
2. Connect the computer, with the MX5000 Display Software loaded, to the MX5000-SIM using the custom cable provided.
3. Configure Channel 1 of the MX5000-SIM for:
Input Signal Type: Impact
Sensor Output: 100 mV/g
Bandpass Filters: None
Full Scale Range: 0 to 10 g pk
4. Set up the Shaker for 1 g at 20 Hz.
5. Using the MX5000 Configuration Software configure Impact, by going to the “Impact” tab:
 - a. Select Configure Channel 1 for Impact radio button.
 - b. Insert 150 mV for the Threshold Level.
 - c. Insert 2400 RPM into the RPM field. This is for demonstration purposes only. This will cause the Reset time to become 0.4 seconds (simulating 16 throws of the piston).
 - d. Click on “Get Peak” and the Baseline Impact Value will be generated. It should be 100 mV (+/- 5%) from the Shaker setpoint (1 g).
 - e. Click on Send.
6. Configure the Relays for Impact (values for demonstration only – limitations of the Shaker):

a. Channel 1 Alert Level:	13 Impacts	3 seconds	No Latching
b. Channel 1 Danger Level:	16 Impacts	3 seconds	No Latching
7. Have the Customer observe the Display for Channel 1. It should be reading 0 Impacts and 4 mA. This is because the Threshold has not been exceeded. Increase the vibration amplitude to 2 g's, this will cause the Threshold to

IMPACT DEMONSTRATION USING THE SA6200A ACCELEROMETER AND HI-913/903 SHAKER (Continued)

be exceeded ($2\text{ g's} = 200\text{ mV peak}$) at 20 Hz. This results in eight (8) impacts during the time window (Reset Time = 0.4 seconds, $0.4\text{ seconds} \times 20\text{ cycles per second} = 8\text{ impacts (simulated)}$). The Display should now read 12 mA and 8 Impacts. The Voltmeter reading milliamps should show 12 mA's (+/- 5%) ($4\text{ mA} + 8\text{ mA} = 12\text{ mA}$, 1 mA per Impact).

8. Have the Customer change the Shaker frequency to 25 Hz. This will cause 10 Impacts in the Time Window (Reset Time = 0.4 Seconds, $0.4\text{ seconds} \times 25\text{ cycles per second} = 10\text{ impacts (simulated)}$). The Display should now read 14 mA's and 14 Impacts. Wait 3 seconds and then the Channel 1 LED will flash Yellow. Continue to increase the frequency to 30 Hz, wait 3 seconds, and then the Channel 1 LED will flash Red.
9. Have the Customer lower the frequency level to 25 Hz and have them notice that the LED changed from flashing Red to flashing Yellow, because "Latching" was not selected. Continue to lower the frequency level to 20 Hz. The LED will change to Green.
10. Ask the Customer if they have any questions. Allow the customer to change configuration parameters in the MX5000 Software, Send them, and then Test them with the Shaker.

MX8030 / MX2033 ROD DROP DEMONSTRATION

1. Connect the Computer, with the MX5000 Software loaded, to the mini-USB on the front panel of the MX5000-SIM.
2. Connect the computer, with the MX5000 Display Software loaded, to the MX5000-SIM using the custom cable provided.
3. Configure Channel 2 of the MX5000 for:
Input Signal Type: Displacement
Sensor Output: 200 mV/mil (7.87 mV/um)
Bandpass Filters: None
Full Scale Range: 10 to 90 mils, average gap
4. Gap the Proximity Probe to 50 mils (-9 VDC).
5. Using the MX5000 Software configure Rod Drop, by clicking the Rod Drop Radio button:
 - a. Insert 40 Inches for L1.
 - b. Insert 48 Inches for L2 (This makes the L2/L1 Ratio 1.2, which will be multiplied by the Gap voltage readings in mils to obtain Rod Drop (or Rider Band wear)).
 - c. Insert -9 Vdc for the Zero Wear Point.
 - d. Enable the Rod Drop Channel by clicking on the Enable radio button.Configure Channel 2 for:
a. Channel 2 Alert Level:
Over: 62 mils Under: 38 mils 3 seconds No Latching
b. Channel 2 Danger Level:
Over: 74 mils Under: 26 mils 3 seconds No Latching
6. Set up the Digital Micrometer with 50 mil gap. The display for Channel 2 of the MX5000-SIM should read 12 mA's and 50 mils (+/- 5%). If it does not, then verify connections, and ensure there is 24 VDC power to the MX5000-SIM, and the Gap voltage is equal to the setting in the MX5000 Software.

MX8030 / MX2033 ROD DROP DEMONSTRATION (Continued)

7. Show the Customer the Setup. Have the customer increase the gap to 54 mils (+4 mils) on the Digital Micrometer. Point out that the alarm has not initiated and the reading on the display screen is 20% higher, due to the L1/L2 ratio. Have the customer test the alarms as in the other demonstrations.

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