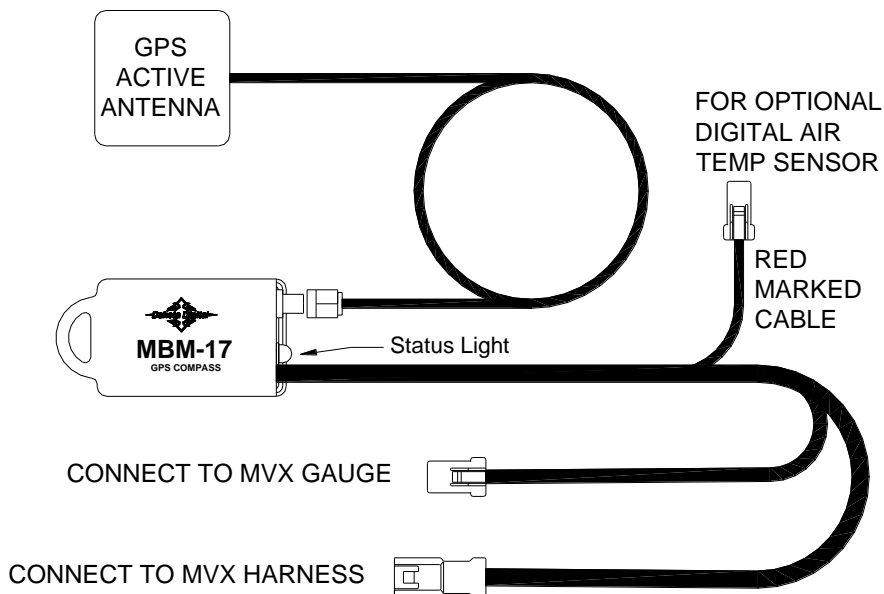




MBM-17 MVX Bus Interface Module for GPS based Compass, altimeter, and clock



This Motorcycle Bus Interface Module (MBM) allows direct plug in connection to add a compass heading, altimeter, and auto-set clock to an MVX gauge system. No setup is required to get it working. On an MVX-8k gauge system unplug the power/data cable from one of the gauges closest to where you want to mount the MBM. Plug the 4-pin, female housing into the power/data harness and plug the 4-pin, male housing into the gauge. It doesn't matter which gauge is used. On an MVX-2k system, connect the 4-pin, female housing into the MBM extension harness. An air temperature sensor (SEN-1701) can also be optionally added using the red marked, 3-pin, male housing. On an MVX-8k system this will replace the stock air temperature sensor reading. On an MVX-2k system this will add an outside temperature reading next to the compass heading.

The GPS antenna is magnetic and can be mounted to a flat, steel bracket or secured using a double-sided adhesive. It should be mounted as high as possible and preferably with very little on top of it to get the best signal.

The heading is determined by the change in position as you are moving, so the compass heading is accurate while you are riding. At speeds below 3 MPH, it will keep the last heading held constant. On initial power-up it will need to wait for the GPS to acquire satellite signals to begin operation. The time required may be from 15 seconds to 15 minutes depending on how long the gauge has been off and the visibility of the satellites in the sky. The typical acquisition time is from 30 seconds to 2 minutes.

This module has no warning points, but a setup screen is available to show the GPS signal strength.

- Make sure the MBM unit is connected to the gauge.
- Hold the switch for the gauge while turning the key on to enter the setup menu.
- Release switch.
- Press and release the switch until "SETUP DISPLAY" is shown on the gauge.
- Press and hold the switch until the display blanks. Release the switch.
- Press and release the switch until "MBMS" is shown. "CM" should appear below this indicating it sees the MBM-17 Compass unit connected. If the optional air temperature sensor is also connected, "AT" should also appear.
- Press and hold the switch until the display blanks to enter setup for the MBM's connected.
- Release the switch. If "GPS SIGNAL" is not displayed, press and release the switch until it is shown. The number shown is an indication of the signal strength and can be used to test and optimize the antenna mounting location. Make sure the MBM-17 status light is flashing slowly, and not pulsing rapidly. A rapid pulse indicates it has not yet obtained a GPS fix.
- Once finished, you may select "DONE" to exit or turn the key off.

OPERATION:

HOW IT WORKS:

The MBM-17 uses the same GPS (Global Positioning System) signals that many common navigation systems use to determine location in the world. This location data is used to determine your motorcycle's direction of travel. Altimeter (height above sea-level) and time data is also available from these signals and can be displayed on the MVX gauge. The internal gauge clock will be set based on the GPS time; you will need to set the hours for your time zone.

To function properly, the GPS antenna connected to the MBM-17 must have a clear view of the satellites in the sky to receive the correct signals. This view can be blocked if the antenna is in a building, parking garage, or in underground tunnels. Even going under very wide overpasses can have an effect on the signal strength.

The gauge's heading (N, NW, E etc.) is determined by the actual direction of the MOVEMENT of the antenna itself. This is different from a conventional magnetic compass which uses the earth's magnetic field to determine direction. Using GPS signals for compass heading has several benefits over the magnetic method:

First, the orientation of the gauge is not critical to get a correct heading reading. The GPS compass will read correctly even if it is mounted at an angle to the ground or the bike itself, which can often be the case in a motorcycle.

Second, the GPS compass will not be affected by the bending of the magnetic field due to close by metallic objects (like the handle bars or motorcycle frame) or other magnetic fields from wires or speakers.

Third, the GPS compass will not need to be calibrated after it is installed, which is often the case for a magnetic compass.

It is important to note however that the GPS compass MUST BE MOVING in order to get an accurate direction reading. If the gauge is at a standstill, it will display the last direction calculated when it was moving, which may or may not be the direction the vehicle is now pointed. Once the gauge is again moving, a new direction can be calculated and displayed.

POWERING UP:

When the gauge is powered on, it must first locate the satellites and determine its location. This can take some time, especially if it has been a while since the gauge was last powered up. It can take up to a full minute depending on the current position of the satellites and last power on time.

While the gauge is locating, the heading section of the gauge will be inverted until a GPS location is determined. Riding while the gauge is in this state will not have any negative effect on the gauge or its location process.

Once the gauge has located enough satellites, the heading will be displayed normally.

Troubleshooting quick tips:

While the MBM is operating, the light next to the cables will indicate the status. On steady indicates it is powered up but not receiving any bus activity. Slowly flashing indicates it is communicating on the bus. Rapidly flashing indicates two of the same MBM are connected and colliding.

Troubleshooting guide.

Problem	Possible cause	Solution
Sensor does not show on gauge readout. MBM status light off.	Power/Data harness connector not seated fully. Power/Data harness damaged. Module is damaged.	Reseat harness connector. Inspect harness for pinched or cut wires, replace if necessary. Return for service. (see instructions)
Sensor does not show on gauge readout. MBM status light on steady.	Power/Data harness connector not seated fully. Power/Data harness damaged. On MVX-8k systems, the MBM display for may be on the speed or tach.	Reseat harness connector. Inspect harness for pinched or cut wires, replace if necessary. Cycle through all messages on both gauges to check for the reading.
Sensor does not show on gauge readout. MBM status light slow flash.	On MVX-8k systems, the MBM display for may be on the speed or tach.	Cycle through all messages on both gauges to check for the reading.
Compass reading is inverted. MBM status light pulsing rapidly.	The module has not yet gotten a GPS fix. The cycle is inside a structure blocking view of the GPS satellites.	Depending on the position of the GPS satellites and how long since it last powered, it may take from 5 seconds to 15 minutes to obtain a fix from the satellites in view. Move the cycle outside so it can get a clear view of the sky.
Gauge lights up, but does not read temp correctly.	Loose connection on sensor wires. Connector not seated on sensor. Incorrect sensor is connected. Sensor attached to incorrect location on the engine.	Inspect and reconnect wires. Reattach the sensor plug, making sure the locking tab clicks in place. Only the SEN-1701 sensor can be used. Check the location and move to a different position if necessary.
Gauge lights up, but displays "---".	Sensor wire is shorted to ground. Sensor is not connected to MBM. Sensor wire is damaged. Sensor is damaged. Module is damaged.	Check wire for damaged insulation. Replace if necessary. Connect harness from module to sensor wires. (see wiring diagram) Test and replace wire. Replace sensor. Return module for service. (see instructions)
Gauge lights up, but displays "EEE".	Sensor is not connected to MBM. Wire between MBM and sensor is broken. Sensor is damaged.	Connect harness from module to sensor wires. (see wiring diagram) Test and replace wire. Replace sensor.
Clock reading is incorrect.	Time zone offset not set.	Adjust the hours to match your time zone.

SERVICE AND REPAIR

DAKOTA DIGITAL offers complete service and repair of its product line. In addition, technical consultation is available to help you work through any questions or problems you may be having installing one of our products. Please read through the Troubleshooting Guide. There, you will find the solution to most problems.

Should you ever need to send the unit back for repairs, please call our technical support line, (605) 332-6513, to request a Return Merchandise Authorization number. Package the product in a good quality box along with plenty of packing material. Ship the product by UPS or insured Parcel Post. Be sure to include the RMA number on the package, and include a complete description of the problem with RMA number, your full name and address (street address preferred), and a telephone number where you can be reached during the day. Any returns for warranty work must include a copy of the dated sales receipt from your place of purchase. Send no money. We will bill you after repair.

Dakota Digital Limited Lifetime Warranty

DAKOTA DIGITAL warrants to the ORIGINAL PURCHASER of this product that should it, under normal use and condition, be proven defective in material or workmanship for the lifetime of the original vehicle it was installed in, such defect(s) will be repaired or replaced at Dakota Digital's option.

This warranty does not cover nor extend to damage to the vehicle's systems, and does not cover removal or reinstallation of the product. This Warranty does not apply to any product or part thereof which in the opinion of the Company has been damaged through alteration, improper installation, mishandling, misuse, neglect, or accident.

This Warranty is in lieu of all other expressed warranties or liabilities. Any implied warranties, including any implied warranty of merchantability, shall be limited to the duration of this written warranty. No person or representative is authorized to assume, for Dakota Digital, any liability other than expressed herein in connection with the sale of this product.

⚠ WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov



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