Auto Meter®

Custom Bagger Series

Auto Meter PRO-CYCLE

# Custom Bagger Gauge Kit

## Installation Instructions

******PLEASE READ ALL INSTRUCTIONS BEFORE STARTING******

Primary instructions are for 2004 and newer units. Special instructions for 2003 and earlier models are listed at the end of each step as necessary.

***KIT INCLUDES***

***-3 3/8" Electric Speedometer***
***-3 3/8" Electric Tachometer***
***-2 1/16" Fuel Level Gauge***
***-2 1/16" Voltmeter***
***-2 1/16" Oil Pressure Gauge***
***-2 1/16" Oil Temperature Gauge***
***-Wiring Harnesses and Fittings***
***-Oil Pressure Sending Unit***
***-Oil Temperature Sending Unit***
***-Mounting Hardware***
***-Lighting Dimmer Harness***
***-Oil Pressure sender***
***-Oil Temperature sender***
***3/8"NPT to 1/8"NPT Bushing/Adapter***
***_"NPT to 1/8" NPT Bushing Adapter***
***_"NPT to 1/8" NPT Bushing Adapter***
***(qty 2) Wire Splitter Harnesses***
***(qty 4) Crimp-on, female spade terminals***

***2008+ Models <u>REQUIRE</u> 8918 MSD GMR Tach Adapter or 22110030 Edelbrock Tach Adapter***

***STEPS***



# STEP ONE: Disassembly

1. Protect your front fender from scratches with a fender cover, towel or blanket. You will be doing a lot of work just above your fender. Don't risk any scratches or dents.

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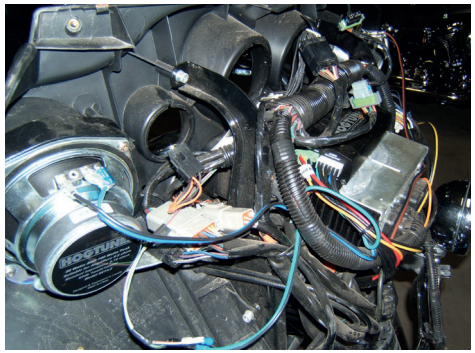
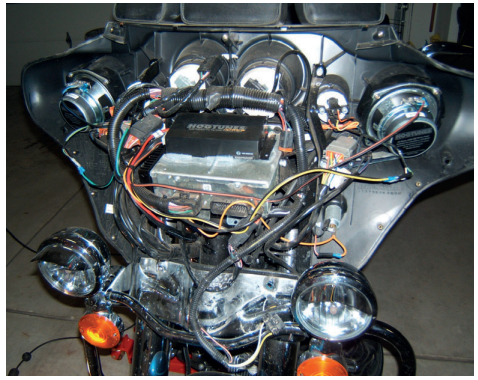
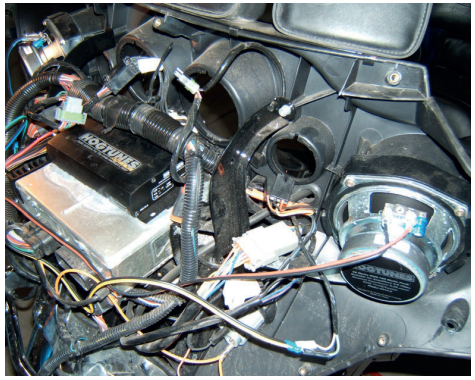
2. Remove outer fairing and windshield to expose wire harness and gauges for removal. Remove the seat, right hand saddle bag and right hand side cover. ***Note: Record what the fuel level reading, and odometer reading was prior to the following steps.**







3. Disconnect battery. Label gauge plugs to reference which gauge they belong to. Then remove all plugs from the stock gauges. Be careful not to damage any plugs or wires. Remove cable ties when necessary.
4. Remove the factory gauges. The factory gauge brackets, and nuts will no longer be used.

## STEP TWO: Install New Gauges

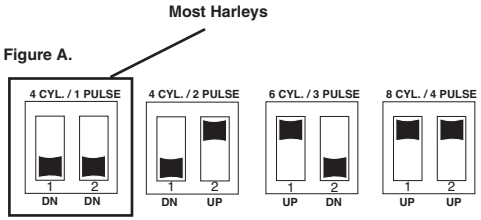
1. Install the new gauges into the appropriate holes. Typically of the two larger gauges, the speedometer is placed on the left, and the tachometer on the right (as viewed from the seat). Prior to installing the tachometer, now would be a good time to check the calibration setting of the tachometer.

Locate the access hole on the back of the tachometer. To the left of the hole you will see a pair of dip switches (see figure B). For a 2 cylinder, use the single pulse setting. Both switches should be in the down or “dn” position. Verify with illustration Figure A.

**NOTE: Take a moment to verify the proper calibration of your new tachometer. It is easier now rather than later. Follow the tachometer calibration instructions below.**

**NOTE: This tachometer has an air core meter. With power off, it is normal for the pointer to leave zero. When power is applied, the pointer will move to the correct position.**

Figure A.




We recommend: Fuel level will be at top-left. Oil temp at bottom-left. Voltmeter at top-right. Oil pressure at bottom-right

2. Secure the new gauges in the dash with the supplied, black brackets, and thumbnuts.




## STEP THREE: Install the Supplied Harnesses

1. Locate and lay out all of the supplied harnesses on your work bench or table.
   Here is what you should have:
   • Speedometer
   • Tachometer
   • Fuel Level
   • Oil Pressure
   • Oil Temperature
   • Voltage
   • Dimmer
   • Splitters (2)

2. Plug the Fuel level harness into the fuel level gauge. Plug the oil temp harness into the oil temp gauge. Plug the voltage harness into the volt gauge. Plug the oil pressure harness into the oil pressure gauge.

3. Each of the above (4) gauges will have a red wire and a black wire with a male terminal. Plug the red wire with male terminal from each new gauge, into the original 3-terminal harness connector from each gauge. You will be plugging the red wire into the 3-terminal connectors orange wire.

4. Plug the black wire with male terminal from each new gauge, into the original 3-terminal harness connector from each gauge. You will be plugging the black wire into the 3-gauge connectors black wire.

5. For the fuel level gauge harness, plug the purple wire with male terminal into the yellow wire of the original 3-terminal gauge connector.

6. The fuel level gauge will have an additional black wire and brown wire. These are later used for fuel gauge calibration, so leave these accessible for now. (Covered in Step 10)

7. Determine the location of where you will install the new oil pressure sender. (Refer to Service Manual, or Harley Technician for location if needed). Route the harness of the oil pressure gauge to the sender location.

8. Determine the location of where you will install the new oil temperature sender. (Refer to Service Manual, or Harley Technician for location if needed). Route the harness of the oil temperature gauge to the sender location.

9. White wire connection is covered in step 6.

10. Tachometer and Speedometer wire harnesses are covered in steps 4 and 5.

## STEP FOUR: Speedo & Tach Wire Harnesses

1. Connect the brown wire from the speedometer harness to the +12v terminal of the speedometer. Connect the black wire from the speedometer harness to the GND terminal of the speedometer.

2. Connect the white wire of the speedometer harness to the SIG terminal of the speedometer. Connect the white w/black stripe wire of the speedometer harness to the OUT terminal of the speedometer.
**NOTE: For some years, the white, and/or white black wires may not be used. This is covered in step 8.**


3. Connect the brown wire from the tachometer harness to the +12v terminal of the tachometer. Connect the black wire from the tachometer harness to the GND terminal of the tachometer.

4. Connect the pink wire from the tachometer harness to the SIG terminal on the back of the tachometer.


**Note**: Connection of signal wires covered in step 8.

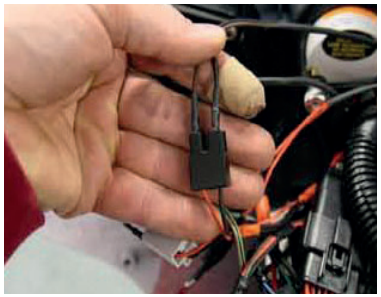


## STEP FIVE: Tach & Speedo Power & Ground

1. Locate 2 of the original 2-terminal gauge connectors. These were originally used for the lighting power and ground for the 4) smaller gauges. These will also have an orange wire and a black wire.

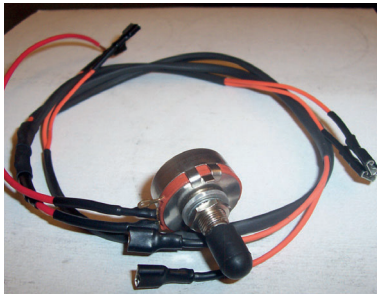
2. Connect the brown wire with male terminal from both the speedometer and the tachometer to the orange wire of one of the above described 2-terminal connectors.

3. Connect each of the black wires with a male terminal from both the speedometer and the tachometer to the black wire of one of the above described 2-terminal connectors.



## STEP SIX: Gauge Lighting

1. Locate the dimmer harness.

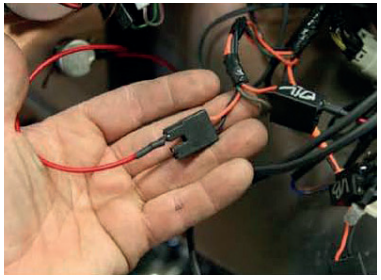


2. Find a suitable location to install your dimmer.

3. You may use the pre-existing trip/reset button hole (if equipped), or you may create your own new 3/8" hole.

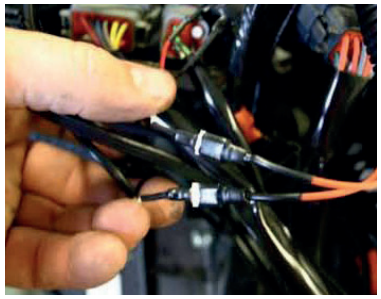
4. Mount the dimmer, using the supplied hardware.

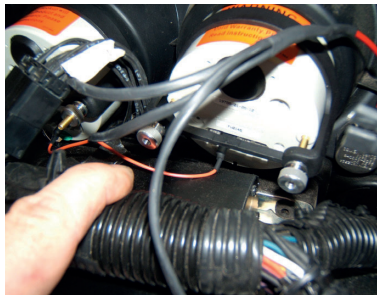
5. Connect the red wire of the dimmer to any one of the left over, 2-pin connectors, orange wire, from any one of the original 4 smaller gauges.



## STEP SIX: Gauge Lighting cont.

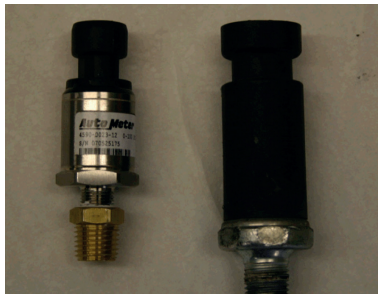
6. The dimmer harness has six orange wires with female terminals. Connect one orange wire to the white wire on each gauge. On the tachometer and speedometer, the remaining two orange wires will connect to the LAMP terminal on each.

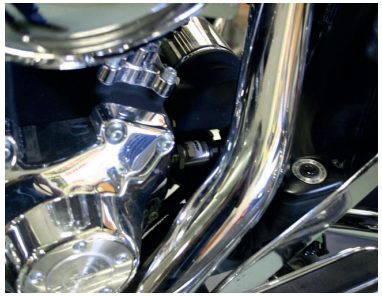




## STEP SEVEN: Sender Installation

1. Locate & replace the stock oil pressure switch or sending unit with the supplied oil pressure sending unit. Use the supplied 1/4" - 1/8" NPT reducer. Use liquid Teflon sealer on threads. (Refer to Service Manual, or Harley Technician for location if needed)



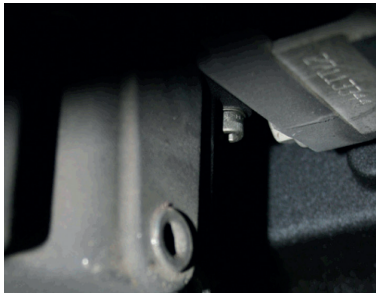


**NOTE: Depending on the location and design of your front cylinder exhaust pipe it may be necessary to remove this piece to remove and install the gauge sending units.**



## STEP SEVEN: Sender Installation cont.

2. Drain oil from the oil pan. Remove the 3/8" NPT plug from the oil pan. It is located to the left of the magnetic oil drain plug.



3. Install the oil temp sending unit with the supplied 3/8" to 1/8" NPT reducer. Be sure to use T□ □ □ sealer on threads. (Due to being pipe threads, there may be exposed threads after tightening. This is normal).

4. Install the sender & adapter into the oil pan.

5. Plug the wire harnesses into the appropriate sender (oil pressure and oil temperature).

6. Refill any previously drained oil.

# STEP EIGHT: Tach & Speedometer Signal

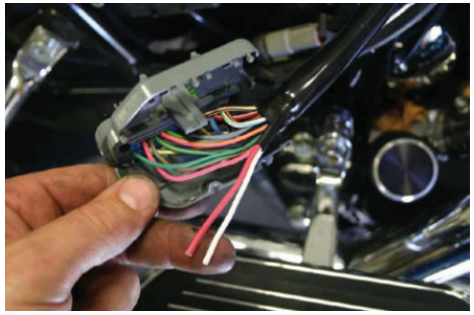
**NOTE: In this step, refer to the portion of this step that matches the model year of motorcycle that you are working on.**

**2004-2007 Touring Models**

1. Locate the ECM under the right side, side cover, and remove the 36 pin plug from the ECM. Cut the cable tie from the plug wire cover and open the gray cover to expose the wires. Be careful not to break the locking tabs.

2. Tap the supplied pink wire (from the /tach harness) to the pink tach output wire at pin 3 of the ECM Tap the supplied white wire (from the speedo harness) to the white w/green speed output wire at pin 33 of the ECM.

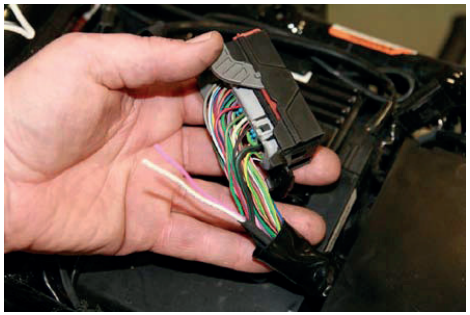
3. Plug the ECM connector back into the ECM and re-secure the gray cover.



**2008+ Touring Models**

1. Locate the ECM under the seat, and remove the 73 pin plug from the ECM. Cut the cable tie from the plug wire cover and open the gray cover to expose the wires. Be careful not to break the locking tabs.

2. Locate the white w/green wire at pin 40 of the ECM. About 3" from the ECM connector, cut this wire in half.



3. Solder the white wire w/black stripe (of the speedometer harness) to the cut white w/green wire on the ECM connector side.

4. Solder the white wire (of the speedometer harness) to the cut white w/green wire on the harness side (the left over white w/green).

5. Plug the ECM connector back into the ECM and re-secure the gray cover.

6. Route the new signal wires (pink & white) carefully up to the back of the dash for hook up to the gauges (covered in step four).

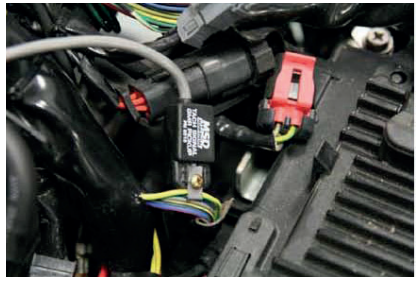


# STEP EIGHT: Tach & Speedometer Signal cont.

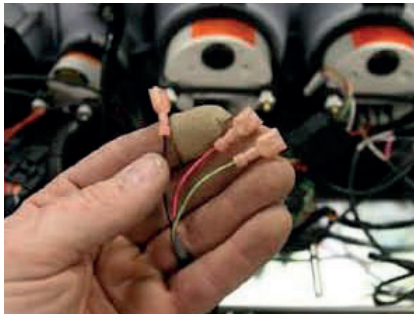
7. There will be no tachometer hook up to this ECM. The tachometer signal will require a tach signal GMR pick up. The suggested pickup is available from MSD ignition, part #8918, or from the Drag Specialties dealer where you purchased your kit, Edelbrock part #22110030.


8. Locate the ignition coil pack. In 2008, the coil is located above the front cylinder, and under the backbone. It is easiest to locate the coil harness by removing the fuel tank. In 2009 the coil is located under the seat, forward of the battery. The harness can be accessed without removing the fuel tank or the battery.

9. The coil harness has four wires: Yellow w/green, gray w/blue, yellow w/black, & blue w/orange. Using the yellow w/green wire, follow the figure 3 installation instructions which are included with the MSD GMR pickup. The connection should be made near the coil pack for the pickup to operate effectively.



10. With the GMR pickup installed, run the harness via the stock wire harness to the tach location. Terminate the black, red, and green wires of the GMR pickup with female spade connectors.



11. The pink wire of the tachometer harness will plug into the green wire of the tachometer adapter.

12. The tachometer adapter requires power and ground. You may use the supplied splitters to plug into the back of the tachometer (12v & GND terminals) for sharing power and ground with the tachometer adapter.

## STEP EIGHT: Tach & Speedometer Signal cont.

**2003 & Earlier Touring Models**

1. Tap the supplied pink wire (from the tach harness) to the pink tach output wire at pin 3 of the ECM. This is the tachometer signal.

2. Locate the supplied power and ground splitters (brown & black). Plug the brown splitter into the 12V terminal of the speedometer. Plug the black splitter into the GND terminal of the speedometer.

3. Locate the stock speedo harness that plugged into the stock speedometer.

4. You will need to cut three wires from the speedo harness connector. The red wire at pin 11, the black wire at pin 10, and the white wire at pin 9. These are the speed sensor wires.
5. You will need to strip the ends of these three cut wires and install a female spade terminal to each one. You may crimp, or solder the terminals to these wires.

6. Plug the black wire into one of the black splitter wires on the back of the new speedometer.

7. Plug the red wire into one of the brown splitter wires on the back of the new speedometer.

**NOTE: The white & white w/black stripe wires of the speedometer harness are not used in this specific application.**

8. Plug the white wire from the factory bike harness into the SIG terminal of the new speedometer.

9. Now locate the speedo wire harness (SWH). The black wire of the SWH will now plug into the remaining black splitter wire on the new speedometer. The brown wire of the SWH will plug into the remaining brown splitter wire on the new speedometer. These wires previously plugged in, in step four, but in this application they get plugged into the splitters.

## STEP NINE: Turn the Power On

**Now is a good time to turn your power on, and to make sure your gauges power up, and that you can adjust the lighting brightness with your dimmer**

## STEP TEN: Calibrate the Fuel Level Gauge

1. The left over brown & black wires of the fuel level harness are used to set the sender type. The gauge ships pre programmed to work with two HD sender types.

2. Connect a Radio Shack #275-1556 or equivalent momentary switch to the black & brown wire, or alternately touch the stripped ends of the black and brown wire to simulate pushing the button.

3. Press & hold the button, & apply power to the gauge. The pointer will sweep back & forth momentarily stopping on each 1/8 tank mark, indicating that the gauge is in sender select mode.

4. Allow the pointer to move to the appropriate location for your sender type & release the button. The pointer can be bumped to the next position by momentarily pressing the button.

**04-07 HD TOURING MODELS, POSITION E (EMPTY)**
**08-09 HD TOURING MODELS, POSITION _ (HALF)**
**All other years of senders use custom sender calibration instructions.**

5. Remove power from the gauge to store the sender type by turning off the ignition switch.

6. Re-apply power to the gauge & confirm that it displays the proper fuel level. If the proper fuel level is not shown, return to step 3 and recalibrate. If the proper fuel level is still not indicated, perform custom sender calibration.



## STEP TEN: Calibrate the Fuel Level Gauge cont.

7. Remove power from the gauge by turning off the ignition switch.

8. Remove push button switch (if used) and tape and insulate the ends of the brown and black wires so they do not touch.

**CUSTOM SENDER CALIBRATION**

The fuel level gauge can be calibrated to accurately display the output from any fuel level sender with an output between 0 and 270 ohms.

1. Make sure the fuel level sender is connected to the gauge and that the fuel tank is empty or nearly empty before proceeding.

2. Connect a Radio Shack #275-1556 or equivalent momentary switch to the black and brown sender select wires or alternately touch the stripped ends of the black and brown wire to simulate pushing the button.

3. Press & hold the button then apply power to the gauge. The pointer will sweep back & forth momentarily stopping on each 1/8 tank mark, indicating that the gauge is in sender select mode. The pointer can be bumped to the next position by momentarily pressing the button. Allow the pointer to reach 7/8 tank position and release the button.

4. Remove power from the gauge to enter the custom calibration mode.

5. Re-apply power to the gauge, the pointer will move to a position just below the Empty mark indicating that the empty calibration point can be entered.

6. With an empty or nearly empty tank, capture the empty calibration point by momentarily (less than 1 second) pushing the switch. After approximately 1 second, the pointer will move to just above the full mark.

7. Fill the tank & momentarily press (less than 1 second) the sender select button or touch the brown & black wire to capture the full calibration point. After approximately 1 second, the gauge will set & begin reading the fuel level per the custom calibration.

8. Confirm that the gauge displays the proper fuel level.

9. If the proper fuel level is shown go to step 10. If the proper fuel level is not displayed, return to step 3 and recalibrate.

10. Remove push button switch (if used) and tape the ends of the brown and black wires so they do not touch.

**Sender Error:**
If no sender is connected the pointer will move to the Empty position indicating an error. Approximately 4 seconds after the sender is connected, the pointer will move to the indicated fuel level and will resume normal operation.
**Power Up:**
The pointer will move backward to the stop pin & then display actual fuel level. This procedure is an auto calibration function & is performed on every power up. While this test is being performed the gauge may make a clicking/buzzing sound. This is normal

# STEP Eleven: Calibrate the Speedometer

Prior to the actual calibration steps, if the fuel level gauge calibrated ok, and all of your wiring is secured and buttoned up, you may install the fairing and the rest of the parts needed to make the motorcycle driveable.

***Calibration Range: 500 to 400,000 Pulses/Mile***

1. Speedometer & sender must be installed.

2. To set the speedometer in calibration mode, press & hold the Trip/Reset button on the gauge face while starting the engine. Then release the button after the pointer moves to full scale (maximum reading) and stays there.

3. Go to the beginning of a known two mile distance & stop. Press & release the Trip/Reset button. The pointer will move to half scale & is ready for calibration.

**NOTE: The accuracy of the speedometer calibration depends on the accuracy of the measured two mile distance.**

4. Drive the two mile distance and stop. Press & release the Trip/Reset button. The calibration mode will be exited & the pointer will return to zero. Calibration is Complete.

***Below are a list of factors that can affect the speedometer accuracy & how to minimize them during calibration.***

1. Tires slightly increase in diameter as bike speed increases. To minimize this error drive at an average speed during calibration. (approx 45 mph for most street vehicles).

2. Tires slightly increase in diameter as air pressure is increased. To minimize this error check tires to ensure correct air pressure.

3. The diameter of the tires change with vehicle load. Minimize this error by having an average load on the bike during calibration.

4. Tire Slippage. Minimize this error by not breaking traction.

5. Accuracy of 2 mile distance driven during calibration. Minimize this error by verifying the distance.

**NOTE: Always recalibrate speedometer after any tire size or gear ratio change.**



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