Setting up the DM-6 Multi Gauge to the SM-AFR

Navigating the DM-6
There are a total of 3 capacitive touch buttons on the DM-6. They are highlighted in the image below.

Use the left button to toggle between sensors.*

Use the right button to toggle between Numeric, Graph, and Peak/Hold screen views.

Hold the logo button to display unit label and range. Left and right values refer to entire LED sweep range.

In the Peak/Hold view, holding the right button will open a menu option to save or reset current/peak/hold values.

The Menu
Pressing and holding both left and right buttons together will take you into the menu system. Once inside the menu system, use the left button to save changes, the logo button to select which menu item is currently selected, and the right button to access the current selection option. Please note the icons used.

* - Sensors available are based on Sensor Modules in daisy chain. Display order is based on location of the Sensor Module in the daisy chain.
Setup Unit

To setup the unit for a particular sensor, follow the procedures listed below:
1. Hold both left and right button to get into the "SETUP MENU".
2. Press the right button to get into "SETUP UNIT" screen.
3. To change the sensor, press the right button.
4. To change the unit for that particular sensor, press the logo button to move down the arrow.
5. Press the right button to change the unit.
6. Press the left button to save and go back to the "SETUP MENU" screen.

Warnings:
The DM-6 can be operated to trigger the warning by setting the limit of the parameters (Parameter 1 and Parameter 2). Sensors that are daisy-chained with the DM-6 can be selected to associate with the parameter setting. The DM-6 is capable of monitoring up to 2 parameters for warning. To trigger the warning, the reading of the DM-6 must go above or below the parameter setting as determined by the user. The table below shows the 4 schemes that are supported by DM-6.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 and P2</td>
<td>Warning triggers only when the reading falls within the range set by both Parameter 1 and Parameter 2</td>
</tr>
<tr>
<td>P1 or P2</td>
<td>Warning triggers only when the reading falls within the range set by Parameter 1 or Parameter 2</td>
</tr>
<tr>
<td>P1 Only</td>
<td>Warning triggers when the reading falls within the range set by Parameter 1 only</td>
</tr>
<tr>
<td>P2 Only</td>
<td>Warning triggers when the reading falls within the range set by Parameter 2 only</td>
</tr>
</tbody>
</table>

Example:

<table>
<thead>
<tr>
<th>Trigger point settings (SET P1 or SET P2)</th>
<th>DM-6 Reading</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter 1: AFR &gt; 15.0</td>
<td>AFR = 14.0</td>
<td>FALSE</td>
</tr>
<tr>
<td>Parameter 2: EGT &gt; 800</td>
<td>EGT = 900</td>
<td>TRUE</td>
</tr>
</tbody>
</table>

If the DM-6 measures the above values and the "SCHEME" is set to "P1 OR P2", this means that if Parameter 1 is TRUE OR Parameter 2 is TRUE, the warning will trigger.

Since EGT is set in Parameter 2 and the measured values exceed the trigger point set for this particular sensor, the warning will trigger as soon as the measured value exceeds 800.

The LEDs will be flashing, indicating that the warning has been triggered. DM-6 will also display the particular sensor that triggers the warning in the numerical mode.

If mode P1 AND P2 is selected, as the warning triggers, you can press the left button to view the two sensors that trigger the warning.
Setting up the SM-AFR

WARNING:
*Double-check polarity of power before powering it on for the first time. Connecting the SM-AFR in reverse polarity will damage the unit!

Step One
Install the Wideband O2 Sensor, Install Bung. Mount the wideband oxygen sensor before the catalytic converter and at least 24 inches downstream from your engine block or turbo.
Tip: Mount the O2 Sensor before the catalytic converter or at least 24" downstream from your engine block for naturally aspirated and 36" for turbo engines for optimal performance. The sensor should be mounted in the top side of the exhaust pipe at a 15 degree angle away from the flow of the exhaust.

Step Two
Connect the sensor to the wire harness

Step Three
Connect the harness to the SM-AFR unit
Tip: If routing O2 Harness through a firewall, use a grommet. Avoid having the harness come in direct contact with exhaust. This will prevent damage to the O2 Sensor Harness.

Step Four (Only if replacing narrowband sensor)
Connect 0-1v output to ECU
Tip: To interface with your ECU, use the gray wire supplied in your SM-AFR Connect Kit. You will need to know the Diagram Pin Out of your specific vehicle.

Step Five (Not needed for stand alone setup)
Connect 0-5v output to third party datalogging system or aftermarket ECU
Tip: To interface with your third party application, use the gray wire supplied in your SM-AFR Connect Kit. You will need to know the Diagram Pin Out of your specific vehicle.

Step Six
Connect power to the SM-AFR
Tip: Find and connect to 12-18v power source (We advise the ignition switch.) A 5Amp fuse is recommended for safety. DO NOT POWER UNIT UNTIL INSTALL IS COMPLETE.

Termination Jumper:
Termination Jumper comes pre-installed in the SM-AFR for standalone use.
Tip: When connecting multiple SM Modules, remember to remove Terminal Jumper(s) from every SM Module after the first in the iMFD daisy chain. Leave the first SM Module with the Jumper installed.
Compatibility with Other Fuels:
The above graphs assume that the device will be used with gasoline (14.7). The SM-AFR is also compatible with the following fuels: Diesel (14.6), Methanol (6.4), Ethanol (9.0), LPG (15.5), CNG (17.2), E85 (9.7). To find the new relationship of AFR to output voltage, simply multiply the lambda value by the specific fuel's stoichiometric air/fuel ratio.

Example: If your engine uses methanol instead of gasoline, the conversion will be as follows.
1) Divide the AFR value by 14.7 (gasoline) to obtain a lambda value
2) Multiply the lambda value by 6.4 (methanol)

<table>
<thead>
<tr>
<th>Lambda</th>
<th>0.68</th>
<th>0.80</th>
<th>0.90</th>
<th>1.00</th>
<th>1.10</th>
<th>1.20</th>
<th>1.30</th>
<th>1.36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel</td>
<td>9.93</td>
<td>11.68</td>
<td>13.14</td>
<td>14.60</td>
<td>16.06</td>
<td>17.52</td>
<td>18.98</td>
<td>19.86</td>
</tr>
<tr>
<td>Methanol</td>
<td>4.35</td>
<td>5.12</td>
<td>5.76</td>
<td>6.4</td>
<td>7.04</td>
<td>7.68</td>
<td>8.32</td>
<td>8.70</td>
</tr>
<tr>
<td>Ethanol</td>
<td>6.12</td>
<td>7.20</td>
<td>8.10</td>
<td>9.00</td>
<td>9.90</td>
<td>10.80</td>
<td>11.70</td>
<td>12.24</td>
</tr>
<tr>
<td>E85</td>
<td>6.60</td>
<td>7.76</td>
<td>8.73</td>
<td>9.70</td>
<td>10.67</td>
<td>11.64</td>
<td>12.61</td>
<td>13.19</td>
</tr>
<tr>
<td>LPG</td>
<td>10.54</td>
<td>12.40</td>
<td>13.95</td>
<td>15.50</td>
<td>17.05</td>
<td>18.60</td>
<td>20.15</td>
<td>21.08</td>
</tr>
<tr>
<td>CNG</td>
<td>11.70</td>
<td>13.76</td>
<td>15.48</td>
<td>17.20</td>
<td>18.92</td>
<td>20.64</td>
<td>22.36</td>
<td>23.39</td>
</tr>
</tbody>
</table>

Troubleshooting:
Upon power up, the WB analog output should read 2.30V-2.40V with the O2 sensor disconnected. With the O2 sensor connected and exposed to free air, the WB analog output should read starting from 2.3V climbing up to 5.0V within 30 seconds. If both conditions are met, your SM-AFR is properly working. If the sensor does not reach Lean/Air within 45-60 seconds, please replace your O2 sensor.

1. The output is not showing the correct AFR readings.
   a. With the O2 sensor harness disconnected, at initial power-up it should display between 14.6 and 14.7 (wideband analog voltage: 2.30V - 2.40V).
   b. If it is reading below 14.5, please verify that the unit is receiving at least 12V and you have at least a 5 amp fuse. If it is still reading below 14.5 even with the correct voltage, contact rma@plxddevices.com and request a RMA number. Your unit is faulty and needs to be repaired.
   c. If it is reading above 14.8, contact rma@plxddevices.com and request a RMA number. Your unit is faulty and needs to be repaired.

2. Reconnect the O2 sensor with the sensor harness, with the O2 sensor exposed to free air. During the 30 second warm up phase, the voltage should increase from 2.3V to 5.0V.
   a. Voltage does not reach 5.0V even after 60 seconds.
      i. Try another power source for your SM-AFR.
      ii. Verify that your fuse is rated no less than 5A.
      iii. Check connectivity of harness and O2 sensor.
      iv. Your O2 sensor needs to be replaced.
   b. When the unit says "AIR" blow on the O2 sensor. The display should show "LEAN".
      i. Display does not go to "LEAN".
         a. Your O2 sensor needs to be replaced.
      * will only show "LEARN" or "AIR" on DM-6 Gauge

Included Items:
1. SM-AFR main unit
2. Bosch LSU 4.2 wideband sensor
3. O2 sensor harness 10'
4. 4' power wire with 2.1mm connector
5. 4' Analog wires and connector with 4 terminals
6. 1' Serial Cable
7. Termination jumper
8. Users guide

Specifications:
- Physical Dimensions: 2 x 2.875 x 1.25" (52.75 x 28 mm) L x W x H
- Technology: PLX Critical Response Technology, Fast Response PID
- Accuracy: < 0.1 AFR (Gasoline) Wideband, < 0.2 AFR (Gasoline) Narrowband
- Measurement Range: 10-20 AFR, 0.68 lambda - 1.36 lambda
- Wideband: 0-5V, Narrowband: 0-1 V (Driving Current 20mA)
- Power Consumption: 30 Watts (Max), 18 Watts (Typical)
- Power Supply: 9-20V
- Operating Temperature: -40°C to 85°C
- Sensor: One Bosch LSU 4.2
- Enclosure: Extruded Aluminum

Example Daisy Chain Setup

<table>
<thead>
<tr>
<th>Display Modules</th>
<th>Sensor Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up To 16 Display Modules</td>
<td>Up To 16 Sensor Modules</td>
</tr>
</tbody>
</table>

Remove termination jumper from all sensor modules excluding sensor module furthest from display modules.

TERMS OF USE
PLX Devices Inc. does not guarantee product functionality with any ECU, data logger, or other devices that use the output signals. Implementation and integration of the PLX products with any other device(s) must be done at your own risk. Improper installation and usage may lead to engine damage. Mount and install PLX products in a location where it does not obstruct the driver's view and allows the driver to safely control the vehicle.

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PLX Devices Inc. warrants this product to be free from defects for 1 year from the date of purchase. If applicable, oxygen sensors and other non-serviceable items are excluded from this warranty. Servicable goods must be returned to PLX Devices Inc. to be defective before any warranty or replacement is issued. PLX Devices Inc.'s obligation under warranty shall be limited to repair or replace, under the discretion of PLX Devices Inc, any part proven defective. This warranty is limited to the repair or replacement of parts in the manufacturer's good and the necessary labor done to affect its repair or replacement.

SERVICE UNDER WARRANTY
In the unlikely event that your PLX Devices hardware should fail during the warranty period, a Return Material Authorization number (RMA) must be returned to PLX Devices Inc. Customer Support. Return can be made through email: rma@plxddevices.com or return to 1985-1991 Avenida Estrella St. San Diego, CA 92113. All returned items are subject to the return policies and procedures of PLX Devices Inc. for repair or replacement. All repaired or replaced items shall be warranted for the remainder of the original product warranty.

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All returns must be within 30 days of receipt. A 15% restocking fee may be assessed to applicable PLX Devices products for returns. All returns are to be packed in original condition including the packaging, documentation, manuals, and accessories. Returns that do not include all the accessories and components may be returned to the customer or charged to the credit card. The customer assumes responsibility for product receipt until receipt at PLX Devices Inc.'s location. Shipping via a common carrier is recommended. Any unauthorized shipping charges will be billed to the customer or shipped for refund.

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