

# **INSTALLATION INSTRUCTIONS**

## **MSD Power Grid Power Module PN 7764/77643**

**ONLINE PRODUCT REGISTRATION:** Register your MSD product online. Registering your product will help if there is ever a warranty issue with your product and helps the MSD R&D team create new products that you ask for! Go to [www.msdpower.com/registration](http://www.msdpower.com/registration).

### **Parts Included:**

1-MSD Power Module  
1-Main Wiring Harness  
1-Mounting Kit

1-MSDView Software  
1-USB Cable

**WARNING:** During installation, disconnect the battery cables. When disconnecting the battery always remove the Negative cable first and install it last.

## **OPERATION**

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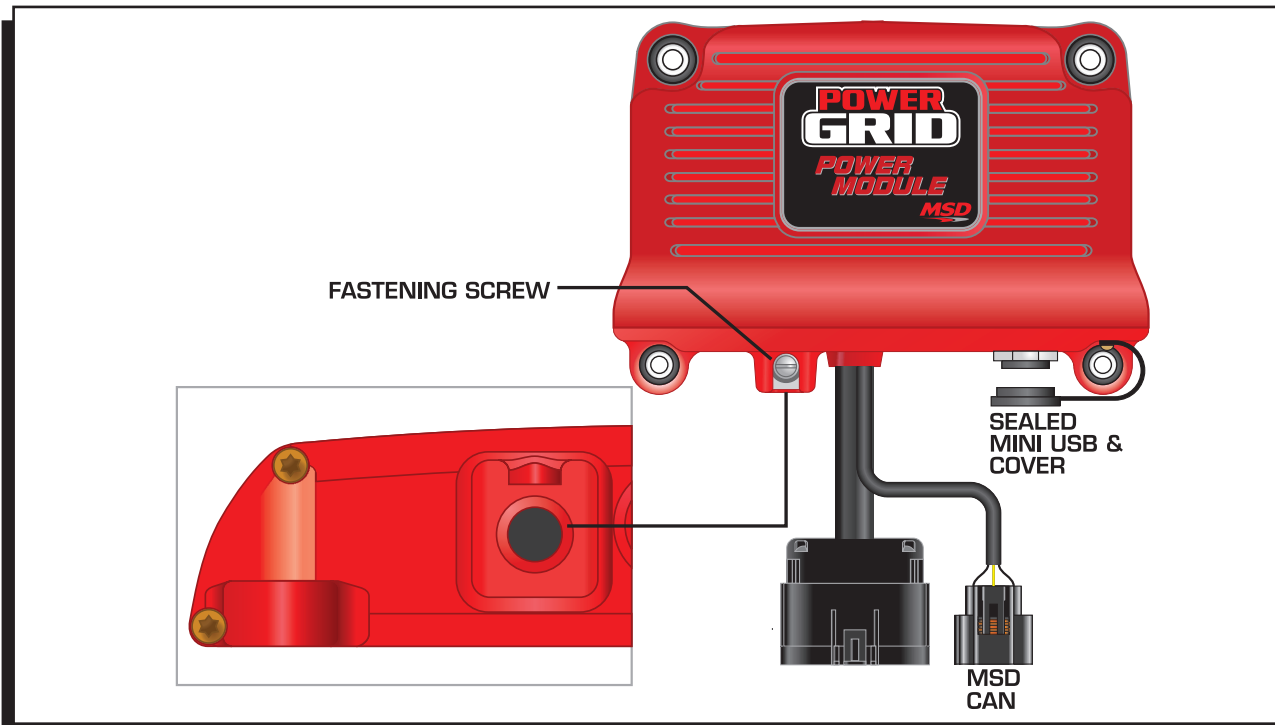
The MSD Power Module is a programmable four stage solid state switch that can handle up to 20 amps of current each.

The outputs can be controlled independently or simultaneously, giving great flexibility. Channels can use Time, RPM or temperature sensor to control fans, fuel pump, or a NOS system.

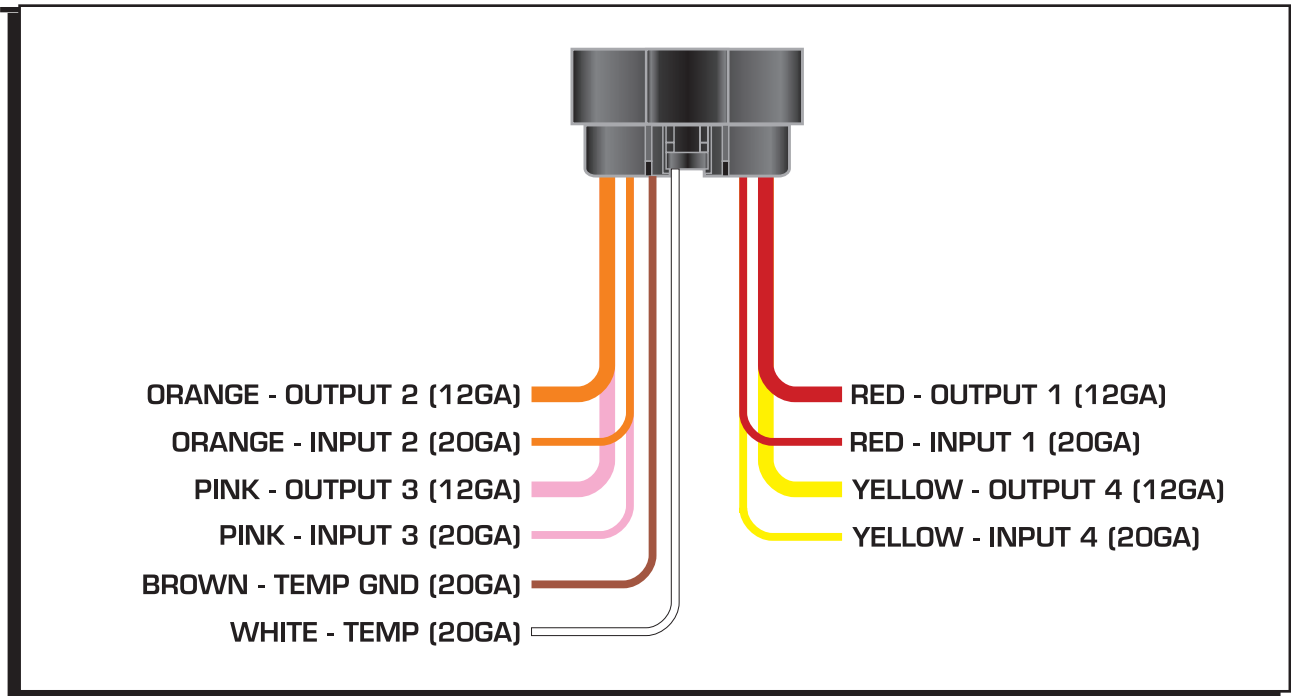
A High Speed Data Logger can be used to record all functions when paired with the MSD PN7730 Power Grid.

**WIRING FEATURES**

MAIN HARNESS (16 PIN)			
A	RED	12GA	OUTPUT 1
B	RED	20GA	INPUT 1
C			NOT USED
D			NOT USED
E			NOT USED
F			NOT USED
G	ORANGE	20GA	INPUT 2
H	ORANGE	12GA	OUTPUT 2
J	PINK	12GA	OUTPUT 3
K	PINK	20GA	INPUT 3
L	BROWN	20GA	TEMP GROUND
M	WHITE	20GA	TEMP
N			NOT USED
P			NOT USED
R	YELLOW	20GA	INPUT 4
S	YELLOW	12GA	OUTPUT 4
CAN CONNECTOR (6 PIN)			
1	BLACK	22GA	CAN LO
2	YELLOW (SLV)	22GA	SHIELD
3	BLACK	18GA	GROUND
4	RED	22GA	CAN HI
5	RED	18GA	POWER (12V)
6			NOT USED



**Figure 1 PN 7764 Power Grid Power Module**



**Figure 2 Power Module Harness**

**MOUNTING**

The Power Module must be mounted in a sturdy, dry location and away from extreme heat. The Power Module should be mounted using the included rubber mounts to limit excessive vibration. The unit is fully potted, but should not be immersed or subjected to direct spray from a power washer.

**MSDVIEW**

The MSDView software allows editing of the Output Settings, Timing and Data Acquisition tabs, as well as turning features on/off and setting up and retrieving data logs.

The following information provides a brief explanation of each function or feature.

While using the software, you can mouse over each item for a brief on-screen explanation. When the system controller is connected to a PC via USB, MSDView will automatically recognize it and load the settings stored in the Power Grid Power Module.

**INSTALLATION OF THE MSDVIEW SOFTWARE**

1. Insert the installation CD Rom into the DVD/CD drive, wait up to 30 seconds, the CD will autorun, IF THIS DOES NOT OCCUR:  
 Locate and open the DVD/CD Drive.  
 Double click on the Setup file - "autorun.exe"
2. Select "Install MSD View Software" button.
3. Click "Next" in the 'Setup - MSD View' window.
4. Accept the agreement on the 'Setup MSD View window' & keep the 'Create a desktop icon' check-box checked. Click 'Next'.
5. Click 'Install' to begin MSD View installation, then click 'Finish'
6. MSD View product list box will open showing connected products to choose from (if any).
7. If no product is seen, connect your MSD device to your PC via a USB cable. It should appear in a few seconds.
8. Click the check box then the 'View' button or double click on the product line.
9. The MSD software will open showing the products software interface.

**Note:** The MSDView Software can be downloaded from [www.msperformance.com](http://www.msperformance.com).

## **SAVES AND TRANSFERS**

Changes made to the Power Grid Controller via MSDView are in real time. You can create and save numerous different files to your PC and load them back into the unit for different applications.

The following will go through a general description of the software for the Power Grid Power Module PN 7764 Controller.

## **OPERATION**

The 7764 Power Grid Power Module is a fully programmable 4-channel solid state relay. The use of the Power Module eliminates the need for electromechanical relays and fuses. Any of the four outputs can be configured as a digital output (i.e ON/OFF) or can be configured as a Pulse Width Modulated output (i.e. PWM) with user-programmable frequencies up to 10 Kilohertz. The solid state switches are protected from over-current and over-temperature conditions and can handle currents up to 20 Amperes. The user has the ability to program a lower current limit.

To control the output signals, the user can select any of the four input wires or the signal from an external temperature sensor. Moreover, the Power Module can be used in conjunction with the Power Grid (PN7730) to expand its programmable options. For instance, when connected to the Power Grid, the outputs can be controlled by the launch wire signal or as a function of engine speed (RPM). All the programmable features are configured using the MSDView software provided.

The Power Module has two modes of operation:

Note: The Power Module self detects the mode of operation by the way it is connected in the circuit. When the CAN bus is functional, it will operate in POWER GRID MODE. Otherwise it will operate in STAND ALONE mode.

## **STAND ALONE**

The user can control any of the four outputs independently using any of the four input wires or the temperature reading from an external temperature sensor. Also, the selected input wire can be used to trigger a time counter, like a launch wire, and control the time of activation as well as the duration of the output. The state of the inputs and outputs can be observed in the monitor window in real time.

## **POWER GRID MODE**

The Power module is connected to the Power Grid (PN7730) via the CAN connector.

In Power Grid mode, the Power Module retains all the features available in Stand Alone mode and expands the control and programmable features. In addition to the four input wires, the user can select the “launch wire” signal from the Power Grid as the activation source. Also, the output control can be enabled/disabled based on the engine speed (RPM) reading from the Power Grid.

In addition to providing expanded control over the outputs, Power Grid Mode utilizes the Power Grid data recorder.

Another extra feature the Power Grid adds to the Power Module is the ability to control ignition timing retard as a function of “Time From Activation”. Time from activation is the time elapsed since the activation of the selected input wire. A 2-D plot of “timing retard vs time from activation” is provided for this feature.

**Note:** For more information on the features and settings, please refer to the “SETTINGS” section below.

## **PROGRAMMABLE FEATURES, SETTINGS AND**

### **DATA ACQUISITION**

#### **OUTPUT SETTINGS**

These settings give the user control on the behavior of the output. Each one of the four outputs has an “OUTPUT SETTINGS” sub-tab and is configured individually.

## SETTINGS

Features, such as the frequency, current limit and activation source, can be configured under this tab.

**Frequency:** This is the frequency of the output when operating in PWM mode. The possible frequency values are: 10, 30, 100, 1K, 5K and 10K Hertz.

**Current Limit:** When the output current exceeds the set value, the output will turn OFF until the next cycle.

**Note:** Continuous current over 20 Amps may overheat the driver that consequently will turn OFF to protect itself.

**Temperature Control:** This setting describes how the output state is affected by the temperature reading from the external sensor. The possible values are:

**Disable:** The temperature does not affect the output.

**ON/OFF:** The output will be active when the temperature exceeds the "Temperature Setting", and it will deactivate when the temperature falls below the setting.

**PWM:** The output will have a varying duty cycle to control the temperature until it reaches the desired value.

**Temperature Setting:** Temperature value to control the behavior of the output.

**Wire Activation Source:** Selects the output activation source, which can be either one of the four input wires or the launch wire signal coming from the Power Grid (PN7730).

**Note:** Launch wire can only be selected as the activation source if the Power Module is in Power Grid Mode.

**Time Setting:** This setting determines if the output will be controlled directly by the "Activation Source" or by the "Time From Activation". The possible values are:

**ON/OFF:** The output is controlled directly by the "Activation Source".

**Time Setting:** The output will become active when the "Time From Activation" exceeds the "Activation Time" value and will stay active for the number of seconds specified in "Activation Duration".

**Graph:** The output will activate at a duty cycle set in the corresponding graph.

**Activation Time:** This setting is the value (seconds) that the "Time From Activation" needs to exceed for the output to become active.

**Activation Duration:** This setting specifies how long the output will remain active. When this setting is set to 0, the output will remain active until the next cycle.

**Total Retard:** Amount of timing removed when the "Activation Source" is activated.

**Minimum Engine RPM:** This is the minimum engine speed that must be met to enable the total retard.

**ON Ramp Time:** The time that it will take to reach the full "Total Retard". This will allow for a softer timing retard over time. For example, if you have 10 degrees of Total Retard and a 1 second ramp time, the controller will retard 1 degree every 0.1 seconds until the full 10 degrees of timing has been pulled out. This timer will not begin until the "Minimum Engine RPM" is met. Setting On Ramp Time to 0 (zero) will cause an immediate timing retard corresponding to the "Total Retard".

**OFF Delay:** This is the time the total retard remains in effect after the "Activation Source" is deactivated.

**OFF Ramp Time:** Time it takes to decay the "Total Retard", effectively ramping timing back into the motor instead of removing it instantaneously.

**RPM Setting:** This setting enables/disables the ability to control the output as a function of engine speed (RPM).

**Activation:** The output activates when the engine speed exceeds this value.

**Deactivation:** When set above the "Activation" speed, the output will deactivate when the engine speed is above the "Deactivation" speed. On the other hand, when the "Deactivation" is set below the "Activation", the output will deactivate when the engine speed drops below the "Deactivation" speed.

**Note:** "Total Retard" and "RPM Setting" are only available in Power Grid Mode (i.e. when the Power module is connected to a Power Grid PN7730).

### DUTY CYCLE

Under this tab the user can find a plot that controls the output duty cycle as a function of “Time From Activation”. This plot is only functional when the “Time Setting” is set to “Graph”.

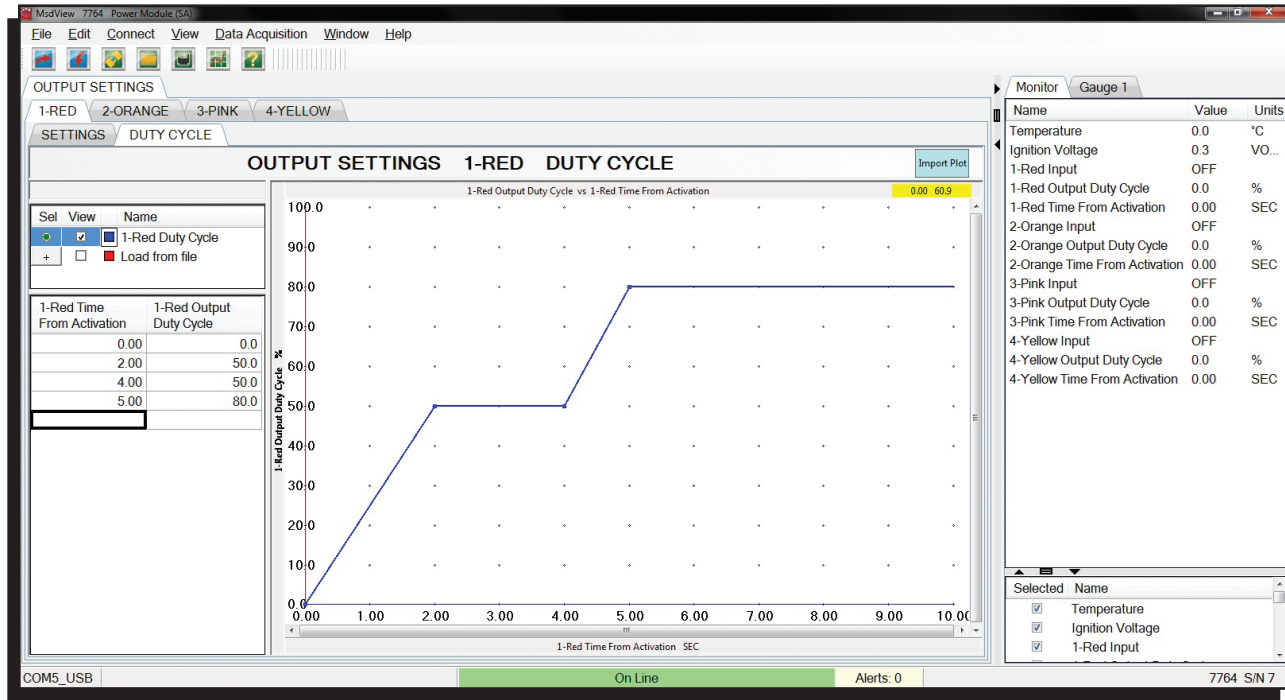


Figure 3 Output Duty Cycle vs Time From Activation.

### TIMING

This tab contains a plot that controls the amount of timing retard applied to the engine as a function of “Time From Activation”.

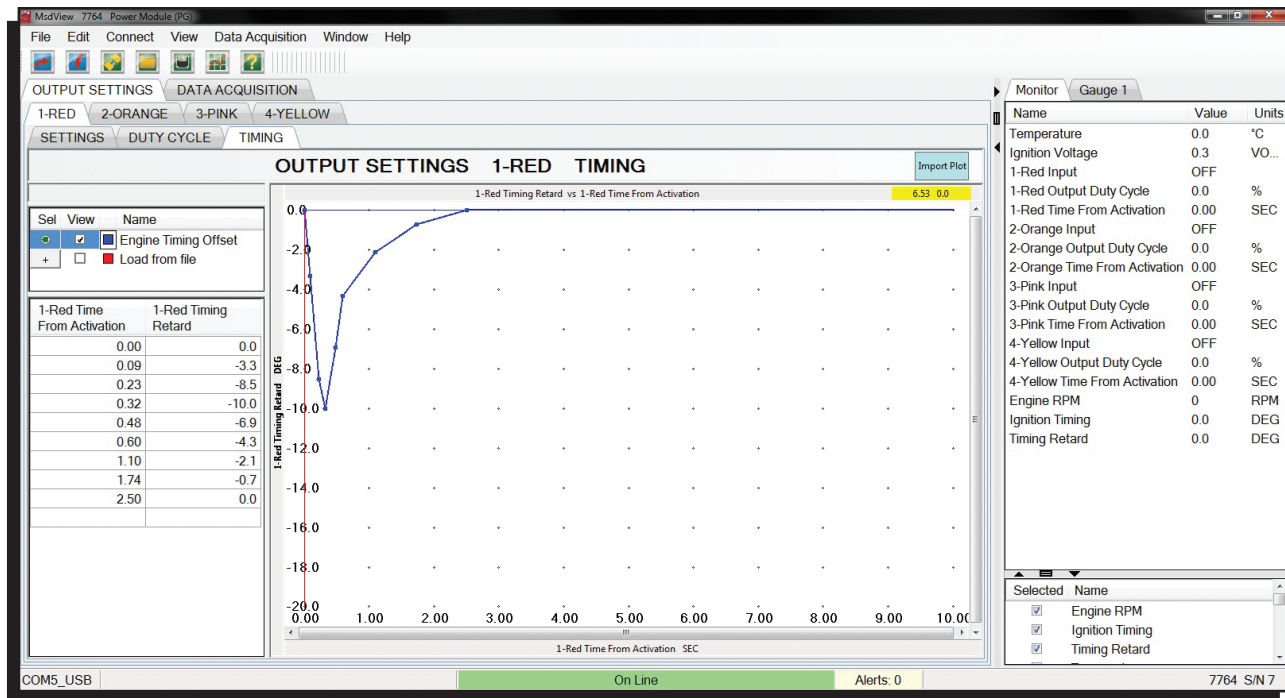


Figure 4 Timing Retard vs Time From Activation

**Note:** This tab is only available in Power Grid Mode (i.e. when the Power module is connected to a Power Grid PN7730).

**DATA ACQUISITION**

The data acquisition system works in conjunction with the Power Grid (PN7730) data recorder. It allows the user to watch input activations as well as the state of any of the outputs and temperature sensor while going down the track.

When connected to the Power Grid, the Power Module sends the enabled channels over the CAN bus to be recorded by the Power Grid. The channels will be recorded at a rate of 5 samples per second.

**CHANNELS**

<b>CHANNEL</b>	<b>DESCRIPTION</b>
1-Red Input	Input 1 (Red) status (ON or OFF)
1-Red Output	Output 1 (Red) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
2-Orange Input	Input 2 (Orange) status (ON or OFF)
2-Orange Output	Output 2 (Orange) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
3-Pink Input	Input 3 (Pink) status (ON or OFF)
3-Pink Output	Output 3 (Pink) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
4-Yellow Input	Input 4 (Yellow) status (ON or OFF)
4-Yellow Output	Output 4 (Yellow) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
Temperature	External temperature sensor reading

**Note:** This tab is only available in Power Grid Mode (i.e. when the Power module is connected to a Power Grid PN7730).

**MONITORS**

<b>MONITOR</b>	<b>DESCRIPTION</b>
Engine RPM*	Engine speed (RPM) received from PN7730
Ignition Timing*	Ignition timing referenced to Top Dead Center (TDC) received from PN7730
Timing Retard*	Total retard currently applied
Temperature	External temperature sensor reading
Time From Activation*	Time from release of the activation source
Ignition Voltage	Voltage supplied on the ignition wire
1-Red Input	Input 1 (Red) status (ON or OFF)
1-Red Output Duty Cycle	Output 1 (Red) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
2-Orange Input	Input 2 (Orange) status (ON or OFF)
2-Orange Output Duty Cycle	Output 2 (Orange) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
3-Pink Input	Input 3 (Pink) status (ON or OFF)
3-Pink Output Duty Cycle	Output 3 (Pink) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%
4-Yellow Input	Input 4 (Yellow) status (ON or OFF)
4-Yellow Output Duty Cycle	Output 4 (Yellow) duty cycle. When selected as a digital output, ON is 100% and OFF is 0%

\* This monitor is only available in Power Grid mode

# **INSTALLATION INSTRUCTIONS**

## ALERTS

ALERT	DESCRIPTION
Over current Output 1	Output 1 was disabled because the output current exceeded the set limit
Over current Output 2	Output 2 was disabled because the output current exceeded the set limit
Over current Output 3	Output 3 was disabled because the output current exceeded the set limit
Over current Output 4	Output 4 was disabled because the output current exceeded the set limit
EEPROM write error	Error writing to EEPROM
EEPROM CRC error	EEPROM data corrupted

### Service

In case of malfunction, this MSD component will be repaired free of charge according to the terms of the warranty. When returning MSD components for warranty service, **Proof of Purchase** must be supplied for verification. After the warranty period has expired, repair service is based on a minimum and maximum fee.

**All returns must have a Return Material Authorization (RMA) number** issued to them before being returned. To obtain an RMA number please contact MSD Customer Service at 1 (888) MSD-7859 or visit our website at [www.msdpower.com/rma](http://www.msdpower.com/rma) to automatically obtain a number and shipping information.

When returning the unit for repair, leave all wires at the length in which you have them installed. Be sure to include a detailed account of any problems experienced, and what components and accessories are installed on the vehicle. The repaired unit will be returned as soon as possible using Ground shipping methods (ground shipping is covered by warranty). For more information, call MSD at (915) 855-7123. MSD technicians are available from 7:00 a.m. to 5:00 p.m. Monday - Friday (mountain time).

### Limited Warranty

MSD warrants this product to be free from defects in material and workmanship under its intended normal use\*, when properly installed and purchased from an authorized MSD dealer, for a period of one year from the date of the original purchase. This warranty is void for any products purchased through auction websites. If found to be defective as mentioned above, it will be repaired or replaced at the option of MSD. Any item that is covered under this warranty will be returned free of charge using Ground shipping methods.

This shall constitute the sole remedy of the purchaser and the sole liability of MSD. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representation whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall MSD or its suppliers be liable for special or consequential damages.

\*Intended normal use means that this item is being used as was originally intended and for the original application as sold by MSD. Any modifications to this item or if it is used on an application other than what MSD markets the product, the warranty will be void. It is the sole responsibility of the customer to determine that this item will work for the application they are intending. MSD will accept no liability for custom applications.