

# MSD INSTALLATION INSTRUCTIONS

## MSD Power Grid Single Channel PRO 600 CDI PN 8001

**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.msperformance.com/registration](http://www.msperformance.com/registration).

**Note:** Do not use this product with Solid Core spark plug wires.

### Parts Included:

- |  |                   |
|--|-------------------|
| 1 - MSD Power Grid Single Channel Pro 600 Ignition | 1 - Power Harness |
| 1 - Coil Harness                                   | 1 - Parts Bag     |

### Required Items:

HVC III Ignition Coil - PN 82612 (Red) / 826123 (Black)  
MSD High-Temperature Rotor PN 8457 when used with the MSD Crank Trigger Distributor. See Figure 2.

**WARNING:** Failure to use the MSD High-Temperature Rotor, PN 8457, with a circular cutout at the tip (see Figure 2) **WILL** result in premature wear and misfire.

### FEATURES

- Adjustable output energy up to 680 millijoules
- Over 3A peak spark current when used with the recommended ignition coil PN 82612/3
- Spark current sense and recording for each firing
- Spark duration of greater than 250 microseconds
- Rated for continuous operation at an output of 600 Millijoules. Works with 12 and 24 Volts systems
- Starting and running down to six volts
- Direct plug-in to MSD Power Grid Controller PN 7730
- Programmable Trigger Edge
- Reverse battery protection
- Internally protected from damage caused by internal over-temperature or open / shorted coil
- Diagnostic LED
- On-the fly Power Output selection wire.

The Single Channel Pro 600 Ignition is engineered and built for the most demanding racing application.

This ignition is capable of running continuously at an energy level of up to 600 millijoules (mJ) inducing more than 250 microseconds of spark duration. With a Power Boost wire, the ignition output can be changed on the fly between programmable lower energy (325 mJ by default) to its maximum energy output of 600 mJ. The lower energy setting reduces the battery power requirements and



Figure 1. PRO 600 CDI ECU

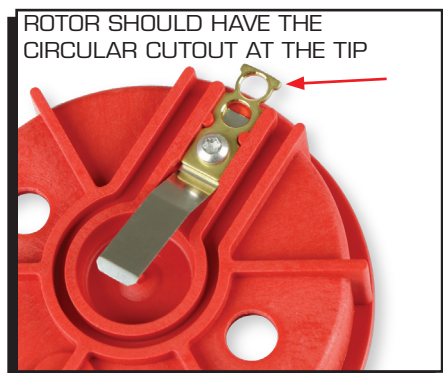


Figure 2. PN 8457 High Temperature Rotor

lessens the stress on the secondary ignition components (distributor cap, rotor, spark plug wires and spark plugs). The ignition's use of Alternating Current (AC) energy transfer and an internal coil coupler considerably improves the system's efficiency over Direct Current (DC) ignitions. This increased efficiency translates to more energy at the spark gap combined with longer spark duration and cooler operating temperature of the ignition coil. To further improve efficiency, unused spark energy is recycled back to the ignition capacitor reducing the power drawn from the battery. The Single Channel Pro 600 Ignition provides up to 20% additional spark gap energy and a 40% increase in spark duration over other 600 mJ ignitions available in the market. Additionally, the ignition's high-efficiency design reduces power demand from the battery, which in turn reduces loads on the wires and connectors. As the Single Channel Pro 600 Ignition is designed for the most challenging applications, it is also capable of continuous full-power operation. The Single Channel Pro 600 Ignition is designed to work with the MSD Power-Grid and can provide firing-by-firing spark current data acquisition. A Diagnostic LED detects the presence of faults - such as a Open Coil Primary, Shorted Coil Primary or Open Coil Secondary.

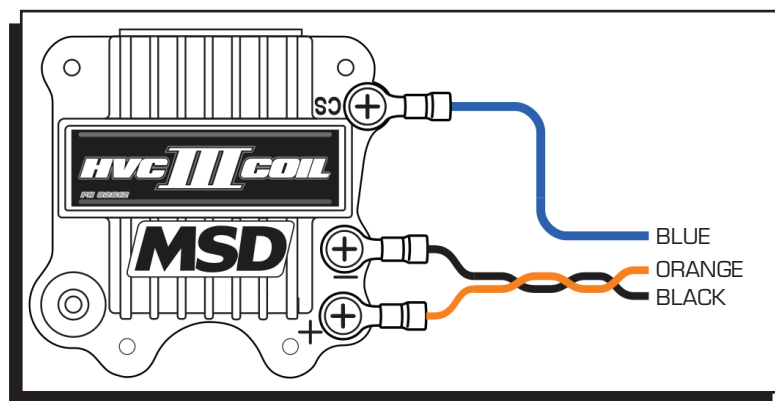
## COIL

Using the MSD HVC III ignition coil PN 82612/3 will ensure maximum spark energy output and take advantage of the secondary current data logging capability. This coil has a current sense terminal that must be connected to the blue wire of the ignition for the current sense diagnostic. **(Figure 3)**

COIL (+): Connect Orange wire to  
Coil (+) terminal

COIL (-): Connect Black wire to Coil (-)  
terminal

COIL (CS): Connect Blue wire to Coil  
(CS) terminal



**Figure 3. MSD HVC III Ignition Coil  
PN 82612-Red / 826123-Black**

**Caution:** Using a coil other than the HVC III ignition coil may damage your ignition system and/or cause overheat damage to the coil.

## SPARK PLUGS AND WIRES

The use of high-quality spark plug wires, and proper routing, are essential to ensuring proper operation and maximizing the output of your ignition system. MSD's helically wound 8.5mm Super Conductor spark plug wires are recommended.

**Note:** Do not use Solid-Core spark plug wires with an MSD Ignition.

A helically, or spiral wound wire must be used. This style wire provides a low resistance path for the spark to follow while keeping electromagnetic interference (EMI) to a minimum. Excessive EMI, such as the amount that solid-core wires produce, interferes with the operation of the MSD and other electronics in your car.

**Spark Plug Wire Routing:** Correct routing of the plug wires is also essential to performance. Route wires away from sharp edges and engine heat sources. If two wires are next to each other in the engine's firing order, route the wires from each other to avoid inducing a spark into the other wire. For example, in a Chevy V8, the firing order is 1-8-4-3-6-5-7-2. The #5 and #7 cylinders are next to each other in the engine and in the firing order. If the voltage from the #5 wire is induced into #7, detonation could occur and cause engine damage.

To add more heat protection to your plug wires, MSD offers Pro-Heat Guard, PN 3411. This is a glass woven and silicone coated protective sleeve that you slide over your plug wires. For extra protection of the spark plug boots, MSD offers Pro-Heat Boot Guard, PN 3412.

**Spark Plugs:** Selecting the right spark plug design and heat range is essential for getting the optimum performance. Since there are countless engine combinations and manufacturers, MSD does not recommend the plug or the gap for each application.

**Spark Plug Boot:** Due to the extremely high secondary voltage this system can produce, spark plug boot condition and proper sealing on the spark plug porcelain is critical. Boots should be inspected regularly for tears, pinholes and other damage. A high-quality dielectric grease (such as MSD Spark Guard, PN 8804) should be applied when the boots are installed or the wires are serviced.

**MOUNTING**

The Single Channel Pro 600 Ignition is designed to pair with the Power Grid Controller, PN 7730. Mount the Power Grid controller on top of the Ignition using the four mounting holes on top see **Figure 4**.

The mounted pair, if placed in the engine compartment, should be away from direct exhaust or engine heat sources. While finding a proper location to mount the units, ensure that the wires can reach their intended connections.

Before mounting the ignition, verify:

1. The HVC III ignition coil is mounted.
2. The wires can reach their destination.
3. The USB connector and micro-SD card are easily accessible..
4. The location is away from direct exhaust or engine heat sources.



**Figure 4. Power Grid Mounted Install**

**WIRING**

The wire connections to the battery and the ignition coil are conducting high current. Secure all connections to maintain good contact and ensure proper operation of the system.

**WARNING:** During installation, disconnect the battery cables. Always remove the negative cable first and install it last.

**WARNING:** Do not connect USB cables to the Single Channel and the Power Grid at the same time. The high voltage and current may permanently damage the USB circuits. When using the Single Channel with the Power Grid, it is not necessary to connect to the USB cable to the Single Channel.

**POWER GRID**

Connect the 4-pin connector to the matching 4-pin connector on the Power-Grid. This provides the Ignition, Power, Points, and Power Out functions. Connect the 6-pin MSD CAN connector to the system’s CAN Hub, PN 7740.

**Power Boost**

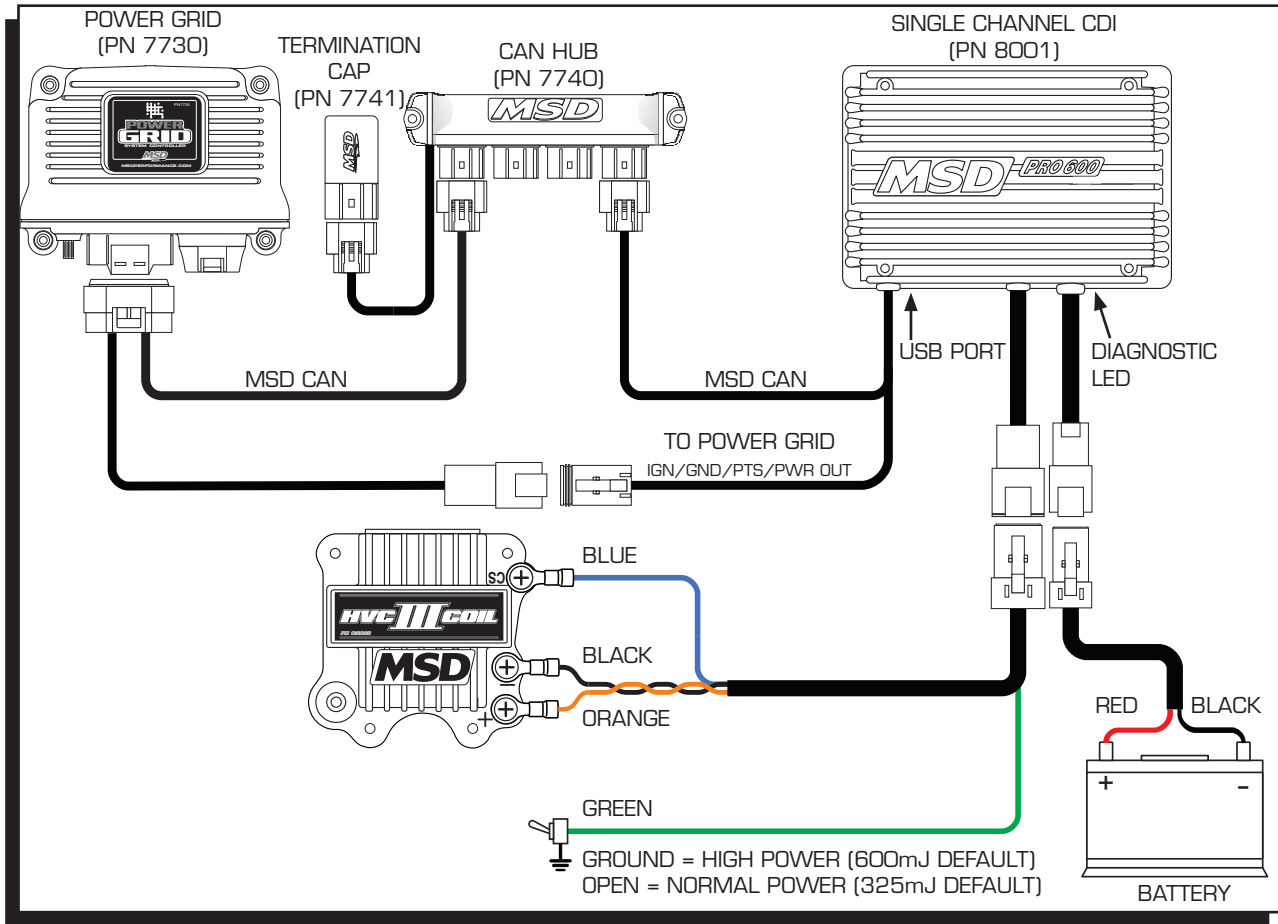
Connect the Green wire to ground for full ignition power. The Power Boost wire ignition changes the ignition energy on the fly between lower energy (325 mJ by default) to higher programmable energy (600 mJ by default).

Selecting the lower energy level reduces the battery power requirements and lessens stress on the secondary ignition components (distributor cap, rotor, spark plug wires and spark plugs).

Green Wire Grounded: 600 mJ output

Green Wire Open (Ungrounded): 325 mJ output

**POWER GRID CONNECTION**



**Figure 5. Single Channel Pro 600 Ignition to Power Grid Wiring**

**Diagnostic LED**

The dual-color LED on the housing gives useful information in verifying proper operation.

<b>GREEN</b>	Normal. No-Fault detected
<b>RED</b>	Fault. Fault detected. Please connect via MSD View to determine the cause.
<b>ORANGE</b>	Battery Voltage below 6V or Boot operation
<b>OFF</b>	No Power

**Table 1. LED Diagnostic Chart**

**MSD VIEW INTERFACE SETTINGS**

**High Power Ignition Energy**  
Range 350-680

**Normal Power Ignition Energy**

Range: 250 to 400

**Max Rev Limit**

Range: 0 to 15000

**Trigger Edge**

Rising Edge  
Falling Edge

**Spark Current DAQ**

Disabled  
1st thru 4th Peak

Select the peak current sent to the data acquisition.

**MONITOR ITEMS**

**Engine Speed**

The calculated engine speed based on the timing between consecutive inputs.

**Target Voltage**

The demanded ignition energy determines the target converter voltage on the ignition capacitor.

**Converter Voltage**

The measured capacitor voltage.

**Battery Voltage**

Displays battery voltage

**Ignition Voltage**

The voltage on the ignition wire.

**Cap Oscillation**

The AC spark cycles energy from the ignition capacitor to the ignition coil and back. The Cap Osc is the period of the first ignition oscillation. This oscillation is the effect of the ignition circuit resonance frequency. Each type of ignition coil may have a different frequency. A deviation from the typical period (frequency) can indicate an issue with the coil or secondary side of the ignition (cap & rotor, spark plug wire or spark plug).. For example, a shorted coil causes the period to shorten (higher frequency), while an open load causes the period to increase (lower frequency). A value below 100µs or above 200µs triggers a fault associated with the coil.

SETTINGS		
Function	Value	Units
High Power Ignition Energy	600	Millijoule
Normal Power Ignition Energy	325	Millijoule
Max Rev Limit	15000	RPM
Trigger Edge	RISING EDGE	Select
Spark Current DAQ	1ST PEAK	Select

Figure 6. Settings

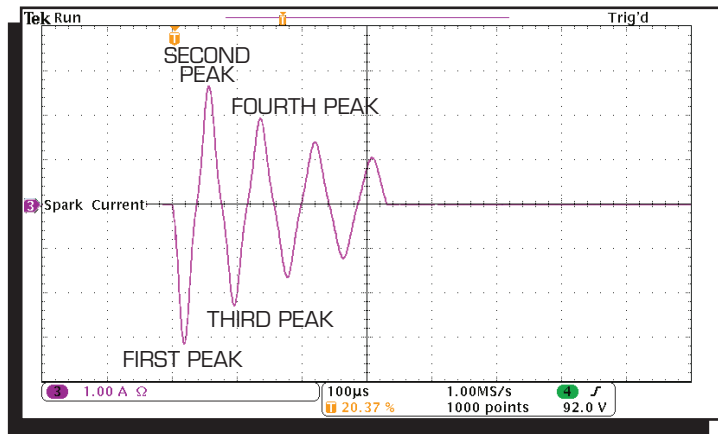


Figure 7. Spark Current

Monitor Gauge 1 Gauge 2		
Name	Value	Units
1st Peak Current	0.00	Amps
2nd Peak Current	0.00	Amps
3rd Peak Current	0.00	Amps
4th Peak Current	0.00	Amps
Battery Voltage	0.00	Volts
Cap Oscillation	0	uSec
Converter Voltage	0	Volts
Efficiency	0	%
Engine Speed	0	RPM
IGBT Temperature	0.0	°C
Ignition Voltage	0.00	Volts
Max Engine Speed	0	RPM
Max IGBT Temperature	0.0	°C
Max Temperature	0.0	°C
Max Voltage	0	Volts
Open-Load Counter	0	Events
RPM At Max Temp	0	RPM
System Temperature	0.0	°C
Target Voltage	0	Volts
Time From Start	0.00	Min
Time To Max Temp	0.00	Min

Figure 8. Monitor Items

### Open-Load Counter

The Open-Load Counters are diagnostic indicators that increment each time the ignition detects an Open-Load condition. An Open-Load condition occurs when the secondary voltage is unable to break the gap, and no secondary current occurs. An Open-Load event is determined when the Cap-Osc period is longer than 200 $\mu$ s.

### System Temperature

Two temperature sensors monitor the internal temperature. The system temperature displays the highest value. When the internal temperature exceeds 257° F (125° C), the ignition reduces its output power as a protective measure from permanent damage.

### Efficiency

The AC spark cycles energy from the ignition capacitor to the ignition coil and back. The efficiency is the ratio between the ignition capacitor energy after the first ignition cycle to initial available energy. Typically, this ratio is around 60%, but it is dependent on the ignition coil used and spark load. A number too low indicates system losses while a number too high indicates insufficient energy transfer to the spark plug.

For example: A shorted primary or open load causes the efficiency number to increase. Alternatively, excessive losses in the ignition output circuit may cause the efficiency number to drop. In most cases, the number between all cylinders is similar. Large deviations of efficiency in one or more channels from the others indicate a potential issue with the coil or the spark plug.

### Max Temperature

The maximum internal temperature of the ignition.

The value can be cleared using the Reset Diagnostic button.

(Figure 9)



**Figure 9. Reset Button**

**Note:** For optimum performance, this value should not exceed 257° F (125° C).

### Max Engine Speed

The maximum measured Engine Speed. The value can be cleared using the Reset Diagnostic button

### Max Voltage

The ignition voltage during the last MAX Temperature update

### Time to Max Temp

The time from key-on until the last MAX Temperature update

### IGBT Temperature

The temperature of the IGBT transistor during operation

### Max IGBT Temperature

The Max IGBT temperature during operation.

**RPM AT Max Temp**

The engine speed when MAX temperature was recorded

**Time From Start**

The time from key-on

**1st thru 4th Peak Current**

The spark current is a decaying AC signal. These monitors are the first four peaks. The peak values depend on the spark energy, coil, and load.

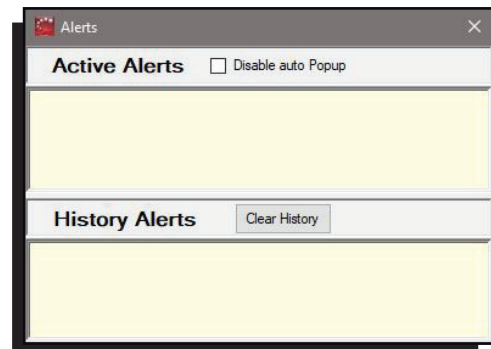
**TROUBLESHOOTING**

The Single Channel Pro 600 Ignition implements a high-speed microcontroller to control the ignition and perform real-time diagnostics. The diagnostic are a source of many details that can assure proper operation of the ignition.

**The LED:** Under normal operating conditions the on-board LED should be lit green. In most cases, a glance at the Alert Window would give a clue to the reason for the fault. **(Figure 10)**

**Spark Current:**

Miss counter



**Figure 10. Alert Window**

**Data Acquisition:**

**Fault List**

Converter Shorted	Internal error
EEPROM checksum error	Internal error
EEPROM write error	Internal error
EEPROM size error	Internal error
High Temperature Fault	Operating Temperature exceeded
Open Load	Disconnected
Open Coil	Disconnected Coil primary, Coil +, or Coil -
15V Regulator Fault	Internal Error
High Temperature Warning	Reduced output power due to temperature
Coil Shorted	Coil + and Coil - wires are shorted
Holley Channel Energy	Messaging Error (Applicable with HEFI only)
Holley Channel Rev Limit	Messaging Error (Applicable with HEFI only)
Low Secondary Current	Spark current is below specification for the delivered energy
Reversed Primary Connection	The connection to Coil - and Coil + are reversed

**Table 2. Fault List**

COIL OUTPUT HARNESS			
4 PIN DEUTSCH CONNECTOR			
PIN	COLOR	GAUGE	FUNCTION
1	BLACK	12GA	COIL -
2	ORANGE	12GA	COIL +
3	BLUE	18GA	CURRENT SENSE
4	GREEN	18GA	ENERGY LEVEL

IGNITION/GROUND/POINTS/POWER OUT			
4 PIN DEUTSCH CONNECTOR			
PIN	COLOR	GAUGE	FUNCTION
1	RED	18GA	IGNITION
2	BLACK	18GA	GROUND
3	WHITE	18GA	TRIGGER INPUT
4	ORANGE	18GA	POWER OUT

MSD CAN			
6 PIN BLACK CONNECTOR			
PIN	COLOR	GAUGE	FUNCTION
1	BLACK	22GA	CAN LO
2	GRAY	22GA	GROUND (YEL SLV)
3	PLUG	-	-
4	RED	22GA	CAN HI
5	PLUG	-	-
6	PLUG	-	-

BATTERY			
2 PIN DEUTSCH CONNECTOR			
PIN	COLOR	GAUGE	FUNCTION
1	RED	10GA	BATTERY +
2	BLACK	10GA	BATTERY -

### 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) 258-3835 or visit our website at [www.msdpowerformance.com/rma](http://www.msdpowerformance.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.