

INSTALLATION INSTRUCTIONS

MSD Advanced RPM Control Module PN 7761

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Parts Included:

1 - Module	1 - 8' DS Sensor extension harness
1 - Parts Bag	

Required Items for Operation:

MSD Power Grid - PN 7730	Hall Effect Sensor - Racepak PN 800-SS-MS-5
MSD CAN-Hub - PN 7740	Driveshaft Collar - Call Racepak

The Advanced RPM Control Module (ARC), PN 7761, has been designed to help prevent excessive wheel speed. In the event that engine and / or driveshaft rpm increase(s) at an undesirable rate the module's software will retard timing and/or rev limiting in order to prevent excessive wheel speed.

INSTALLATION:

The ARC Module should be securely mounted near the MSD CAN-Hub. Plug the ARC CAN connector to an available port on the MSD CAN-Bus Hub, PN 7740. Do NOT cut the CAN-Bus connector wires.

The driveshaft sensor must plug directly to the 7761 module. MSD recommends using an 8-magnet driveshaft collar. **Using less than an 8-magnet collar will result in less data for the processor to work with and slower, less reliable corrections.**

When connecting to a Racepak Data Recorder, the White/Blue and Brown wires will be connected to the driveshaft input on the Racepak. The wires (White/Blue and Brown) do not have a connector on them from the factory; two connectors are included in the parts bag of the module. Select and install either the 2-pin or 3-pin connector depending on which style is required by the data recorder being used. To install, push the pins (pre-installed on the wires) into the proper hole according to Figure 1 below. If these wires are not used, terminate the wires using heat shrink so that they cannot create a short.

The Yellow output wire is included in the same loom as the driveshaft output wires. The Yellow wire will switch to ground any time the ARC is controlling timing or rev limiting. The output circuit can support up to two amps continuous. This can be used to activate a light, solenoid, or boost controller.

MSD 7730 Wiring

Lead Grouping	Wire Color	Function	Description
6-PIN CONN (TO Hub / Modules)	RED	MSD CAN HI	Supplies 12V switched power to add on module units. Also communicates between modules and Power Grid System Controller. This connector is only used with modules added onto the system.
	BROWN	SHIELD	
	RED	POWER OUT	
	BLACK	MSD CAN LO	
	BLACK	MSD CAN GND	
3-PIN CONN (DS to MSD)	Green	Ground	These wires send the signal to the MSD from the driveshaft sensor.
	Purple / Blue	Signal	
	Red	Power	
LOOSE WIRES (MSD to RACEPAK) The connector must be assembled using the two pin or three pin connector to accommodate the Racepak connector needed.	Brown	Ground	These two wires should be inserted into one of the connectors supplied in the parts bag as shown in Figure 1. These wires send the driveshaft signal from the MSD to Racepak.
	White / Blue	Signal	
	Yellow	Active Indicator	Provides ground to a circuit any time the unit is active by retarding or rev limiting.

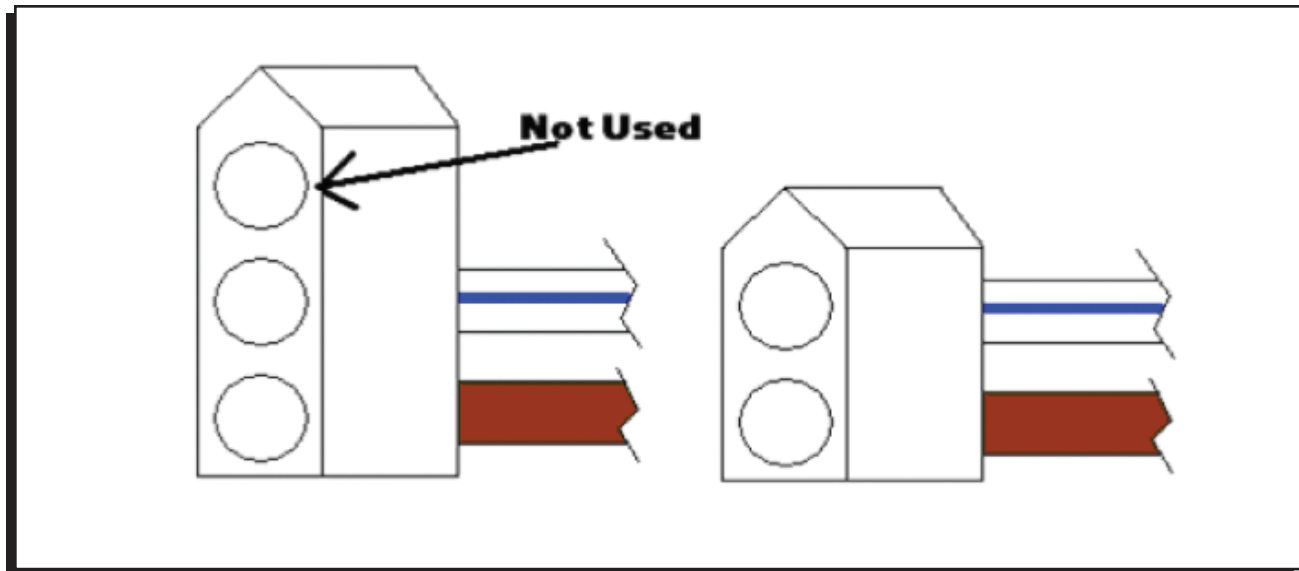


Figure 1 Installing 2-pin or 3-pin connector.

OPERATION

To program the ARC module start MSD View and connect to the 7761 with the ignition on.

- Turn on ignition power
- Connect 7730 to PC via USB
- Start MSD View
- In the Connect box select 7761
- Click "Connect"

MSD View will be display three main tabs; Settings, Driveshaft, and Crankshaft.

SETTINGS

This tab contains general settings for the ARC unit. After the items in this tab have been programmed the first time they will not need to be changed unless hardware changes are made. The settings available here are:

- Driveshaft Input** – Calibrates the signal from the driveshaft sensor. The unit accepts 2, 4, 8, or 16 magnet DS collars.
- Output to Racepak** – Calibrates the signal sent to the Racepak unit. Refer to your Racepak software or user manual to determine the proper signal for that system. The unit can send a signal representing 2, 4, or 8 magnet DS collars.
- Driveshaft Acquisition** – Enable or disable the System Controller, PN 7730, from recording driveshaft data.

DRIVESHAFT

If settings are entered for both Driveshaft and Crankshaft the module will limit accordingly for both inputs.

Settings made to these sub tabs control the engine according to driveshaft speed.

RETARD ABOVE LIMIT

The settings in this sub tab determine the amount of timing retard based on time from launch. A slope can be set if an engine needs less timing retard further into a run. Multiple steps can be plotted to coordinate with gear changes or nitrous events. The settings here vary depending on the application.

Two lines can be programmed. The software is designed so that the lower line will always be the maximum timing taken out. The top line will always be the minimum timing taken out. Because of this, it makes no difference which line is above the other.

When the driveshaft rpm is between the Retard Curves the ARC module will automatically determine timing change. The unit calculates the amount of timing change by interpolation. By using the calculation, the module makes it progressively harder for the engine to continue accelerating past the desired plot.

If only one retard setting is desired – with no progressive control – then both Retard Above Limit curves should be set identically. If one line is left at the top of the plot, the software will see the minimum retard as zero.

CURVES

There are up to three curves to set in this tab; two Retard Curves and a single Limiter Curve. The three lines can be combined or used individually for only retard or only limiter. Typically, one Retard Curve will be set to follow the driveshaft rpm curve closely. The other Retard Curve will be plotted above. The Limiter Curve is a safety by plotting above the highest Retard Curve. When driveshaft speed exceeds the Rev Limiter Curve the ARC module will clamp the engine at the engine rpm that was present when the driveshaft speed exceeded the plot. The engine rpm clamp will be released after the driveshaft speed drops below the plot. Each curve set can be programmed with up to 30 points in intervals of 0.01 seconds and 1 rpm. See “Loading Curves” below for instructions to import a driveshaft curve into this plot.

CRANK SHAFT

If settings are entered for both Driveshaft and Crankshaft the module will react accordingly for both inputs.

Settings made to these sub tabs control the engine according to crankshaft rpm. There is sometimes a lag between driveshaft and crank shaft inputs, this is especially true in vehicles with automatic transmissions due to the convertor.

SLEW RATE

The ARC Module can control the engine RPM when it exceeds the pre determined acceleration. During excessive acceleration, the ARC Module can be programmed to retard timing or to rev limit the engine speed. MSD ReView can be used to determine the slew rate and assist in slew settings. On the Engine RPM trace of any file within View the slew rate is calculated for the time between the red and blue cursors. It is best to put the cursors at the top and bottom of the steepest area of a good run to get a starting point of an engine's slew.

A margin must be set since all RPM curves experience some variances (“wobble” - jagged lines due to split second changes in speed). The margin programmed in RPMs allows for excessive slope in the slew rate for a short period of time. Without the margin, or when the margin is set too low, the module may limit the engine each time there is an upswing in the normal variance (rpm “wobble”). If margin is too large, the slew controller will not activate early enough to control rapid acceleration. The default Margin is set to 200 rpm.

- Crank Slew Limiter** - Use this setting to turn slew rate control ON or OFF.
- Launch Delay Time** - Preset the amount of time after the Dark Blue launch wire is released. In that time no corrections will be made for high slew rate.
- Timing Margin** - The excess rpm allowance for fluctuations (“wobble”) in the engine’s speed. This is necessary because of the variance seen in RPM signal. This margin sets the minimum amount of RPM climb required to activate the timing control features.
- Rev Limit Margin** - The excess rpm allowance for fluctuations (“wobble”) in the engine’s speed. This is necessary because of the variance seen in RPM signal. This margin sets the minimum amount of RPM climb required to activate the rev limit features. This margin always acts in addition to Timing Margin.
- Slew Retard** - The retard amount activated while the Engine RPM exceeds the set Slew Rate plus the Timing Margin.
- Gear 1** - The maximum slew rate the system allows for each gear. The number of gears that appear on the screen should match the number of gears programmed into the 7730.

TIME BASED

The settings here work in the same way of those for the Driveshaft settings. Unlike the driveshaft settings, the crank shaft settings allow only a single Retard Curve.

RETARD ABOVE LIMIT

The settings in this sub tab determine the amount of timing retard based on time from launch. A slope can be set if an engine requires less timing retard further into a run. Multiple steps can be plotted to coordinate with gear changes or nitrous events. The settings here vary depending on the application.

Only a single Retard Curve can be set based on Crank Shaft RPM.

CURVES

The Retard Curve or limiter Curve (AKA Dots) will be set to follow the crankshaft rpm curve closely. When crankshaft rpm exceeds the Rev Limiter Curve the ARC module will limit the engine. If a retard curve is used the timing will be retarded accordingly. Each curve set can be programmed with up to 30 points in intervals of 0.01 seconds and 1 rpm. See “Loading Curves” below for instructions to import a driveshaft curve into this plot.

FEATURES

There are a number of features of the software for the ARC module that do not have individual tabs.

LOADING RPM CURVES

In order to draw the best possible control curves for the ARC, users should import an RPM curve from data recordings to use as a base. To load an RPM curve into this plot, a user must have a .csv file from a previously recorded run. MSD View will accept up to 10 seconds worth of rpm data that automatically loads from the 0 time point. If a run has data recorded prior to the launch, adjust the 0 time point with the Time Offset feature in ReView prior to transferring the run back into the View software.

LOAD

One way to establish a base rpm in the plot is to load a saved file. The following instructions demonstrate how to load a file with the “Load” button in the Trace pane of MSD View_7761. Users can also use the Import option from the File dropdown. This method will plot 10 seconds of rpm data (or all available data after the 0 time point if there is less than 10 seconds available).

1. Open the desired base run in MSD ReView
2. Move a View cursor to the desired 0 time point
3. Right click on that cursor over the RPM trace
4. Hover over “Export”
5. Select “10s from mouse...”
6. In the Save As window navigate to a location where the file will be found later
7. Name and Save the file
8. Navigate to the “Curves” tab of MSD View_7761
9. Click “Load” in the Traces pane (left most area of the window)
10. In the Open window navigate to saved file
11. Open the file

After the trace has been opened the rpm curve will appear in the plot. No adjustments can be made to the curve. If it is desired to adjust the curve’s horizontal position, re-check the 0 time point in MSD View. If needed, redo the Export / Import process being sure to have the mouse exactly where the 0 time point is desired.

COPY AND PASTE

Another way to establish the rpm curve into View software is the Copy and Paste feature. This method will plot 10 seconds of rpm data (or all available data after the 0 time point if there is less than 10 seconds available).

1. Open the desired base run MSD ReView
2. Ensure the 0 time point is in the desired location (typically the launch limiter release)
3. Right click on a trace in MSD Review
4. Select “Copy”
5. Navigate to the Curves tab in MSD View_7761 software
6. Right click in the Traces pane (left most area of the window)
7. Select “Paste”

After the trace has been pasted the rpm curve will appear in the plot. No adjustments can be made to the curve. If it is desired to adjust the curve’s horizontal position, re-check the 0 time point in MSD View. Redo the Copy and Paste process after any changes are made.

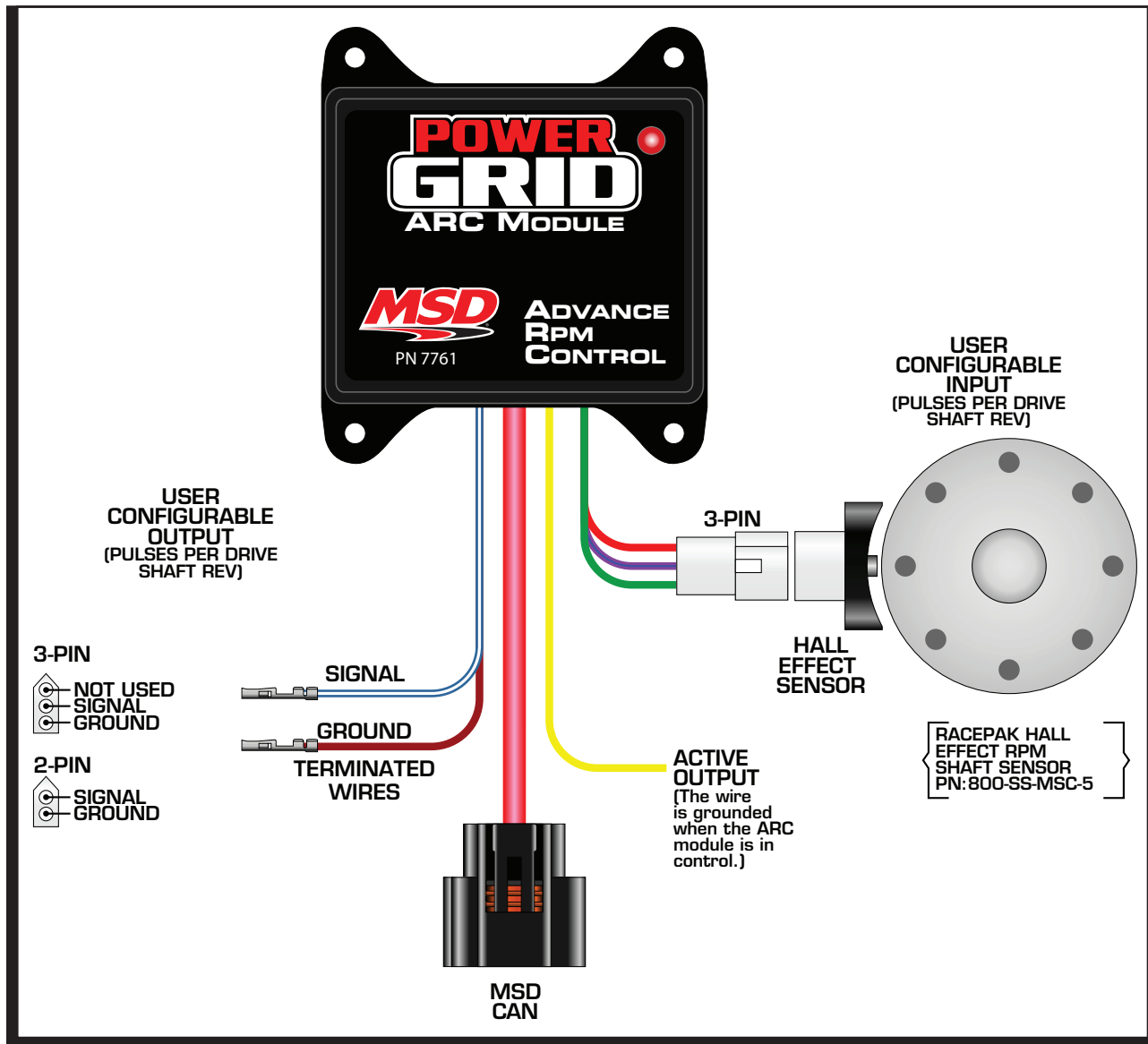


Figure 2 Wiring.

