

Description:

The Modifier is a dual channel, general purpose attenuator and filter. It is used to condition sensor signals in order to attain the desired range and response time. The Modifier is used on modified engines to keep sensor readings within their allowable limits. It also can filter signals to address drivability issues.

The Modifier is particularly effective in forced induction applications. Faults are common on mass air flow (MAF) sensor based engine management systems that are fitted with a turbo or supercharger. Boost causes much higher MAF sensor readings than a stock engine produces. These higher readings can cause fuel cut or faults resulting in a check engine light.

The gain setting can be adjusted so that the MAF sensor reading is compressed to within its normal operating range. The gain setting can also be used to compensate for larger injectors and adjust air/fuel ratio (AFR).

The Modifier is also useful on manifold absolute pressure (MAP) based engine management systems. As in MAF based systems the Modifier can be used to keep signals within range and compensate for larger injectors. The Modifier can also be used to alter MAP sensor readings in order to raise boost.

The filter adjustment can be used to slow down the rate of change for optimum performance. This is useful when a hot-wire MAF sensor which has fast response is used in place of a hot-film sensor which has slower response. Similar applications are when an MAF sensor is used to replace an air flow meter (AFM) or when a throttle position sensor (TPS) is used in place of an AFM.

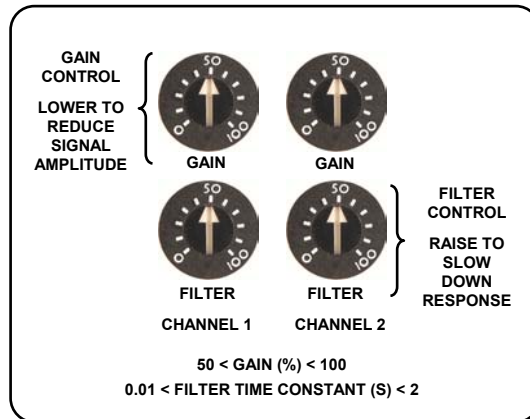
By using the filter control the user can fix a variety of drivability issues. The surging and rough idle typical of engines with large cams can be improved. The bogging on free rev. that is typical of engines using fast response load sensors can also be improved.

Features:

- Two independent channels
- Restores desired sensor signal range on modified engines
- Avoids ECU faults caused by excess signal readings
- Can be used to raise boost on turbo applications
- Adjusts the response time to address drivability issues like surging and bogging
- Comes with jumper to easily return the wiring to stock

Operation:

To access the controls, remove the four corner screws on the enclosure. Each channel of the Modifier has two controls. The gain control adjusts the attenuation over the range of 50 to 100%. The filter control adjusts the time constant of the filter response over the range of 0.01 to 2 seconds.



Internal Control Layout

Adjustment:

Start with the gain settings on 100 and the filter settings on 0. These settings provide a response that is closest to stock. Lowering the gain setting will reduce the signal amplitude. If there are no drivability or signal response issues, leave the filter setting on zero. Raise the filter setting to slow down the response as needed.

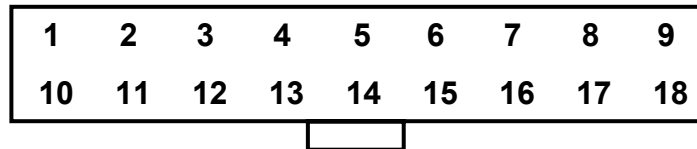
MAF sensor example: If you are adding a turbo or supercharger to an engine, start by using a diagnostic scan tool to measure the MAF sensor reading on the vehicle in its stock form. Note the maximum reading under maximum load. Adjust the gain on the Modifier to match the same maximum reading on the modified engine. This will keep the MAF sensor reading within its allowable range. Even if you have a way of recalibrating your fuel curve in the ECU, it still may be necessary to compress the MAF reading to avoid faults.

MAP sensor example: If you have a turbo engine that uses an MAF sensor to fuel the engine and a MAP sensor to control boost, you can use the Modifier to increase boost. Set on a gain setting of 100 the Modifier will provide stock boost. As the setting is lowered the maximum boost will increase.

TPS sensor example: Particularly in individual throttle applications, it can be beneficial to convert from an AFM or MAF sensor to TPS. This scheme is often referred to as alpha-N. It can simplify the intake plenum design and smooth out the pulsation caused by aggressive cams. Turn up the filter setting to match the response of the original sensor. Typical filter settings in this application will be around 10 on the 0-100 scale.

Wire Assignments:

All wire connections to the Modifier are made through the 18-pin connector on the side of the unit. This diagram shows the pin numbers as they appear with the top of the unit facing up. In this orientation, the connector latch is on the bottom. Once the Modifier is wired into the vehicle wire harness, the connections can be easily returned to stock by plugging in the jumper plug provided with the Modifier.



Connector pin assignments as viewed with the latch facing down

PIN	TYPE	LABEL	CONNECT TO	WIRE COLOR
1	Input	B-	Ground	Black
2	-	-	No connect	-
3	-	-	No connect	-
4	-	-	No connect	-
5	Output	Ch 2 out	ECU input for sensor 2	White/Green
6	Output	Ch 1 out	ECU input for sensor 1	Pink/Blue
7	Input	Ref	Signal reference	Tan/Black
8	Input	Ch 2 in	Sensor 2 output	White
9	Input	Ch 1 in	Sensor 1 output	Pink
10	Input	B+	Switched +12V	Red
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-

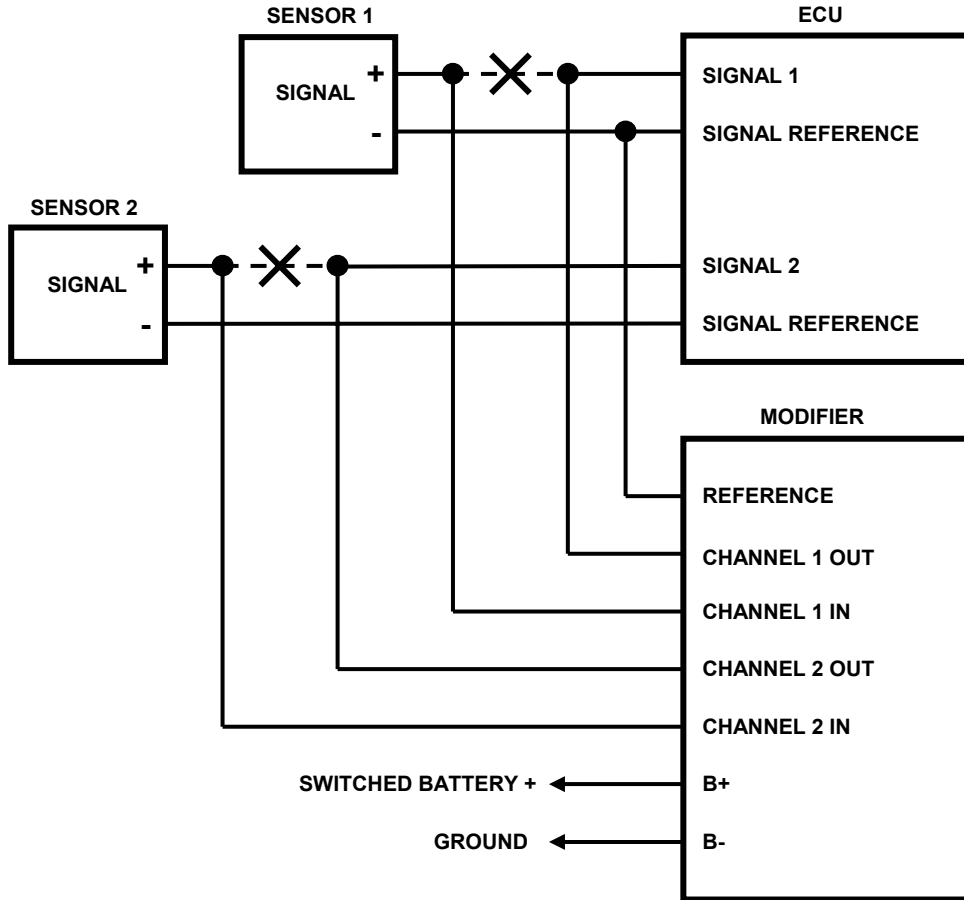
Connections:

The following diagram shows the typical connections to the Modifier. The Modifier can be used to alter the reading of one or two sensors.

The essential connection to each sensor is made by cutting the sensor signal wire and running the signal through the Modifier.

Typical Connections:

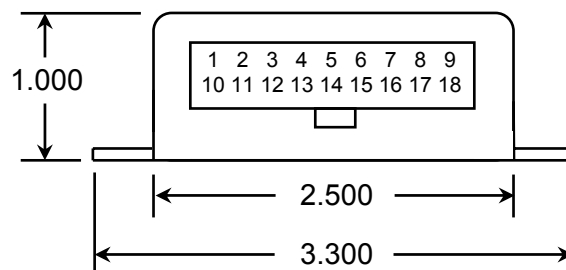
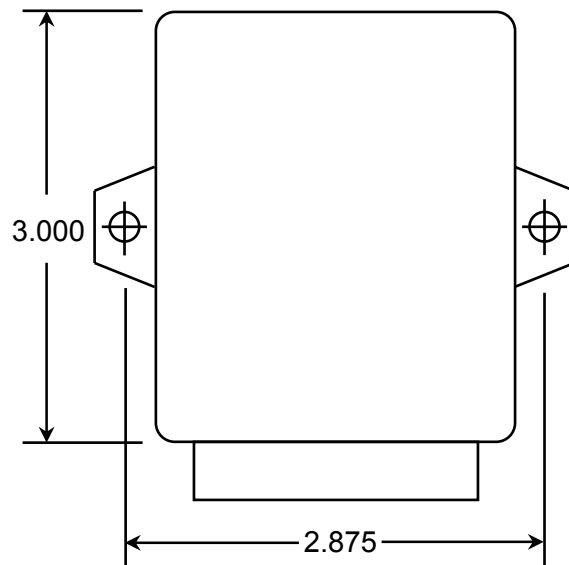
This diagram shows the typical connections for two sensors. The two channels of the Modifier share the same reference. The reference is usually tied to signal ground.



Electrical Characteristics:

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Supply voltage	B+ to B-	10	13.5	15	V
Input voltage range	Signal Input to B-	0		10	V
Input resistance			20k		ohm
Output voltage range	Signal output to B-	0		10	V
Output resistance			1k		ohm
Signal gain	Adjustable	0.5		1.0	V/V
Signal filter time constant	Adjustable	.01		2	S
Supply current	B+ to B-		1		mA

Mechanical Characteristics:



(dimensions in inches)



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