

Description:

The FC2-100 Frequency Clamp can be used to limit frequency signals to either a maximum or minimum level. Its primary use is to avoid fuel cut by limiting mass air flow (MAF) sensors with a frequency output to their normal operating range. Some MAF sensors produce an output that increases with higher flow while others produce an output that decreases. Both types can be limited with the FC2-100.

The FC2-100 is especially useful for forced induction conversions where a supercharger or turbocharger is fitted to an engine that was originally naturally aspirated. Under boost, the engine can generate higher flow levels than normal. The clamping function of the FC2-100 maintains the input to the ECU within normal levels.

Because of its selectable frequency ranges, the FC2-100 can be used in a wide variety of applications that use pulse signals. MAF sensors typically operate from zero to 15kHz while vehicle speed sensors operate from zero to 150Hz. When used to limit vehicle speed sensors, the FC2-100 can eliminate the vehicle speed limiter.

Another function of the FC2-100 is frequency calibration. When used in this mode, it can be used to scale the reading from MAF or other sensors. When used with MAF sensors, the calibration function can be used to adjust for different sized sensors or injectors. When used with speed sensors, it can be used to calibrate a speedometer for different sized tires.

The FC2-100 also has an output driver that pulls to ground when it is activated. This can be used to drive a shift light or turn on a load through a relay. A typical application would be to control a radiator cooling fan that only operates at low vehicle speeds.

Features:

- Selectable for high or low clamp frequency
- DIP switch selectable frequency ranges from 100Hz to 15kHz
- Can be used to avoid fuel cut
- Can be used to remove speed limiters
- Trigger a shift light
- Selectable for 5V or 12V frequency output
- Can be used to calibrate a speedometer signal

Wire Assignments:

TYPE	LABEL	CONNECT TO	WIRE COLOR
Input	B-	Ground	Black
Input	B+	Switched battery positive	Red
Input	F In	Frequency source	Yellow
Input	F Out	ECU or control module	Yellow/Black
Output	Driver Out	Relay to switch external load	Orange

Operation:

The different functions that the FC2-100 can perform are selected by a combination of DIP switch settings. The DIP switches are accessed by removing the bottom cover.

Internal Settings:

The six internal DIP switches control the operation of the unit. Switches 1 through 3 select the frequency range from 100Hz to 15kHz according to the table below. The clamp level is adjustable from zero to the full scale frequency for each frequency range. Switch 4 selects the output high logic voltage. When switch 4 is off, the logic high voltage is 12V. When switch 4 is on, the logic high voltage is 5V.

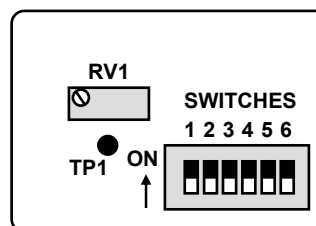
Switch 5 selects High or Low limiting. Turn it off to select high limiting and on to select low limiting. The limit level is set by the RV1 trim potentiometer setting. Switch 6 selects limit or calibrate mode. Turn it off to select limit mode. Turn it on for frequency calibration mode. In calibration mode RV1 can set the frequency gain from 0.5 to 2.0.

RV1 is a 20-turn potentiometer. The setting of RV1 can be read on TP1 with a voltmeter. As RV1 is turned, the voltage on TP1 will vary from zero to 5V.

Switch

Frequency Range (Hz)			Output High	Limit Hi/Lo	Limit/ Calibrate
S1	S2	S3	S4	S5	S6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> B+	<input type="radio"/> High	<input type="radio"/> Limit
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/> 5V	<input checked="" type="radio"/> Low	<input checked="" type="radio"/> Cal
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>			
<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>			
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Internal



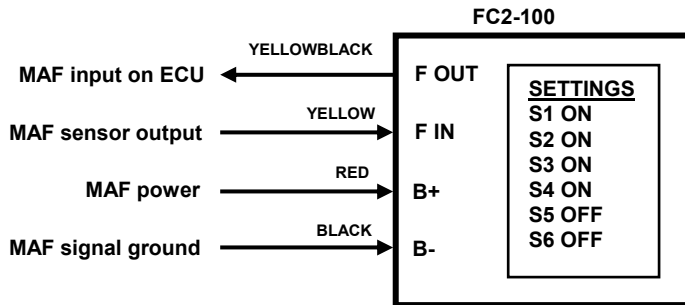
= OFF

= ON

Typical Connections:

MAF Sensor Frequency Clamp with High Limit to Prevent Fuel Cut

This diagram shows the typical connections for a frequency clamp on an MAF sensor signal. Switches one through 3 are on which selects the 15kHz range. Switch 4 is on to select an output high voltage of 5V which is typical of MAF sensors. Switches 5 and 6 are off to select high limiting.

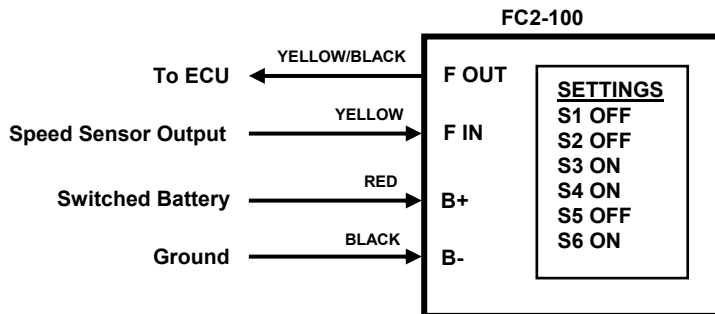


All connections can be made to the wires leading to the MAF sensor. The red and black wires connect to the power and ground for the sensor.

The signal wire is cut. The yellow wire connects to the MAF sensor output. The yellow/black connects to the MAF sensor input on the ECU.

Vehicle Speed Signal Modifier to Calibrate Speedometer

This diagram shows the typical connections for a vehicle speed sensor. Switches one and 2 are off and switch 3 is on to select the 150Hz range. Switch 4 is on for a 5V output high voltage. Switch 5 is off. Switch 6 is on to select calibrate mode.

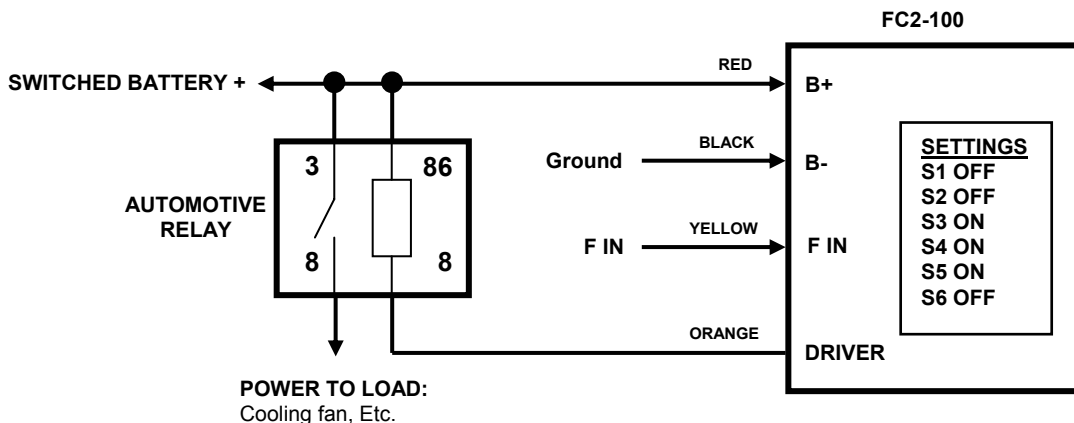


The vehicle speed signal wire is cut. The yellow wire connects to the speed sensor output. The yellow/black connects to the speed signal input on the ECU or other control module.

Turn off switch 6 to use the FC2-100 to limit the speed signal.

Relay Driver to Turn on Cooling Fan below Set Vehicle Speed

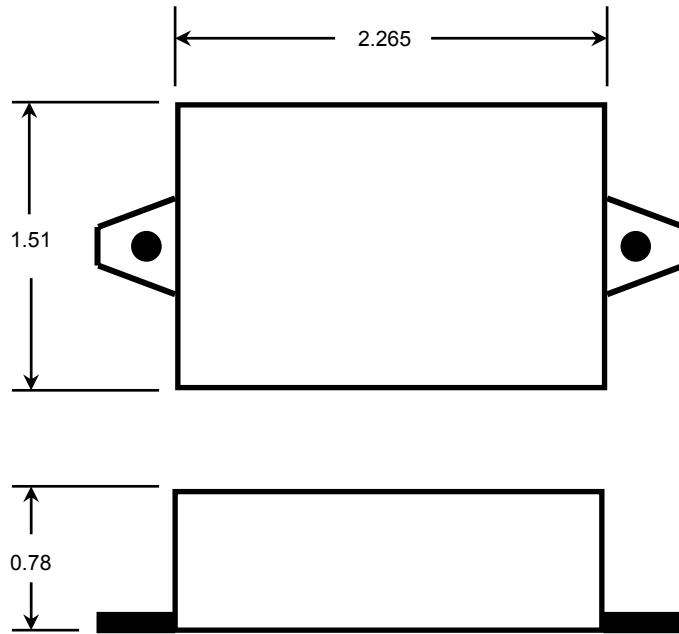
The yellow wire is connected to the speed signal with a T-tap.



Electrical Characteristics:

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage	B+ to B-	10	13.5	15	V
Input Frequency Range		0		15	kHz
Output Frequency Range		0		15	kHz
Clamp Frequency Range	Set by range	0		15	kHz
Multiply-by Range	Calibration mode	0.5		2.0	
Driver Output Current	Driver pulling to ground			500	mA
Supply Current	B+ draw		22		mA

Dimensions:



(dimensions in



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