VCM-01
Latching Solid-State Relay, Alternating, 12 Volt Output

InPower's VCM Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. These solid-state modules, designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, are available in a variety of standard and custom configurations and functions.

Key Features

- 100% Solid-State Construction
- Standard Automotive Relay Pin Format
- 12 Volt 15 Amp Solid-State Output
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)
- Durable Metal Case

Technical Description

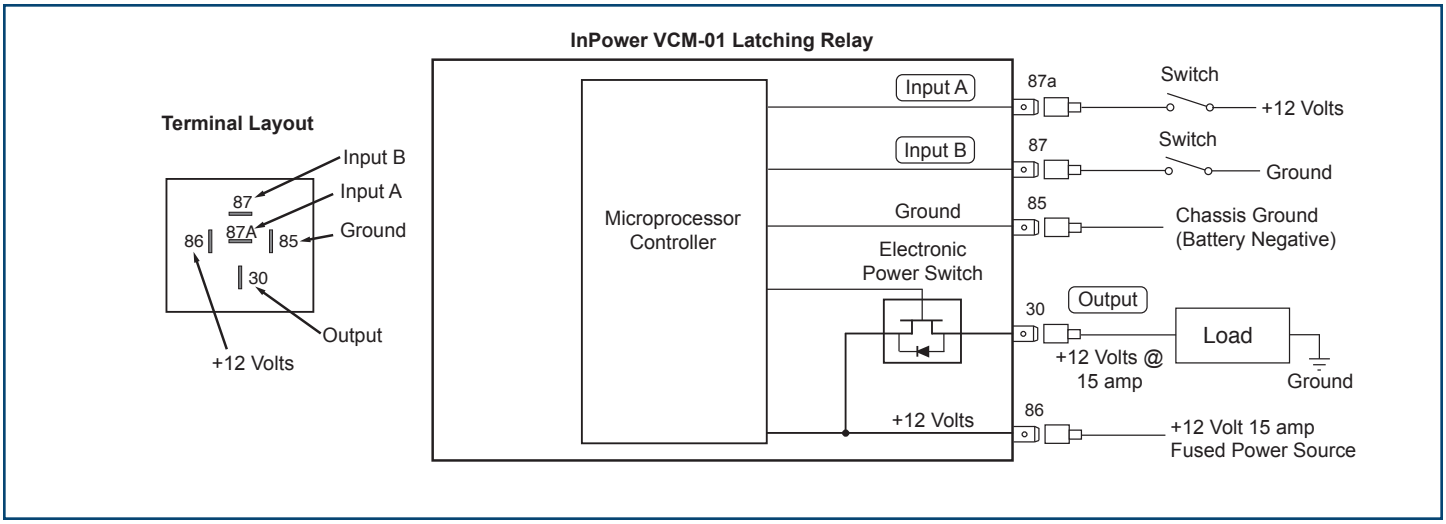
The InPower VCM-01 is a solid state alternating latching relay with a single +12 volt @ 15 amp output. The module has two inputs, one actuated by a transition to +12 volts (Input A) and one actuated by a transition to ground (Input B). The two inputs operate as a logical "Exclusive OR" so that either input can cause the output to latch (or unlatch).

The output toggles to the opposite state when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B when Input A is open. Another toggle will not be recognized until both inputs are open. To toggle the module's output, a control input signal must be applied for at least 250 milliseconds with its counterpart input open. All control inputs must be removed for at least one second before the module will recognize another toggle control input. When +12 volts is first applied to its power terminal the module will initialize in the output off state. The output is rated at +12 volts @ 15 amps and provides over current and short circuit shut down protection.

Ordering Guide

Model	Description
VCM-01	Solid-state alternating latching relay with +12 volt @ 15 amp output and two inputs.

System Diagram



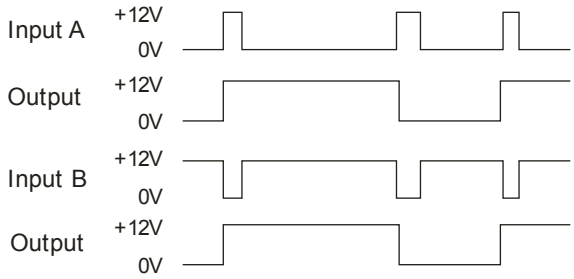
VCM-01

Vehicle Control Modules

Specifications

Power Input (86):	+8 to 16 Vdc @ 15 amps
Ground (85):	Connection to vehicle ground (Battery Negative)
Input A (87A):	External contact closure to +12 volts
Input B (87):	External contact closure to ground
Module Output (30):	+12 volts @ 15 amps in latched state
Mechanical	
Weight:	0.10 lbs.
Operating Temperature:	-40° C to +85° C
Dimensions:	1.75" H x 2.30" W x 1.25" D

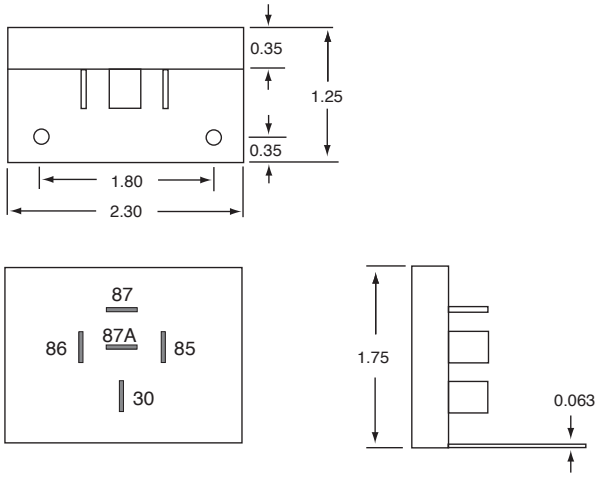
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g. Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry, protected environment.
3. For optimum power output performance the product should be mounted to a metal surface.
4. Do not connect loads to the output that will exceed the output current rating of the module.
5. The 12 volt power input must be from a properly fused +12 volt power source.
6. Wiring must be of the proper gage and type to handle the intended load currents.
7. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly to the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-02
Latching Solid-State Relay, Alternating, 24 Volt Output

InPower's VCM Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Key Features

- 100% Solid-State Construction
- Standard Automotive Relay Pin Format
- 24 Volt 15 Amp Solid-State Output
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +24 Volt Actuated)
- Durable Metal Case

Ordering Guide

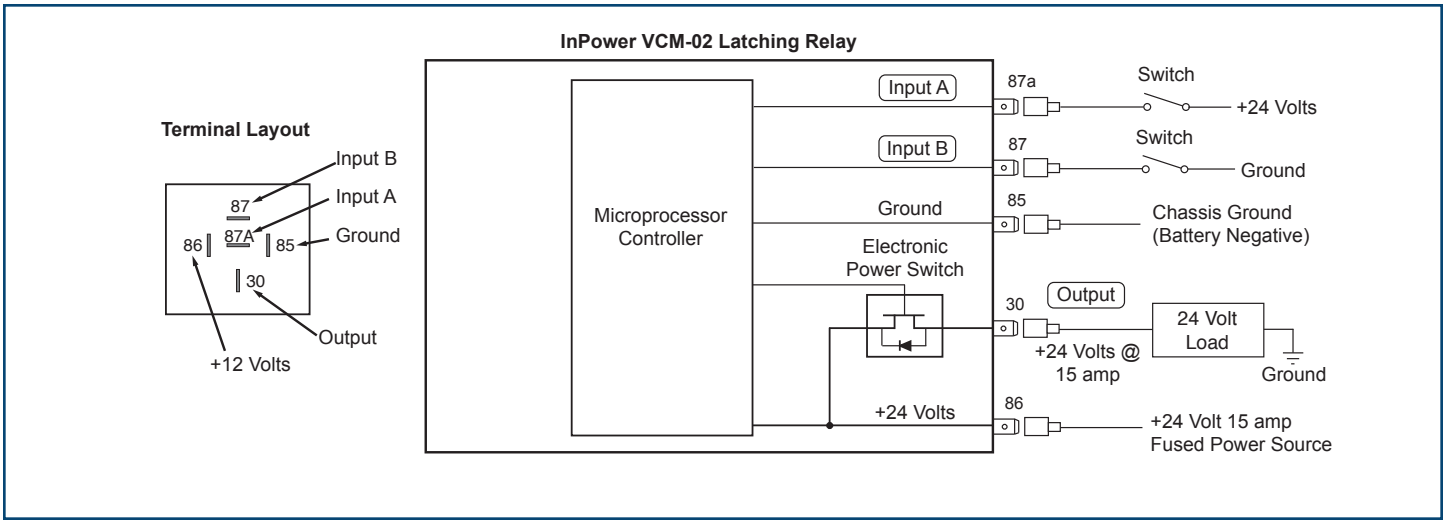
Model	Description
VCM-02	Solid-state alternating latching relay with +24 volt @ 15 amp output and two inputs.

Technical Description

The InPower VCM-02 is a completely solid-state alternating latching relay with a single +24 volt @ 15 amp output. The module has two inputs: Input A actuated by a transition to +24 volts and Input B actuated by a transition to ground. The two inputs operate as a logical "Exclusive OR" so that either input can cause the output to latch (or unlatch).

The output will toggle to the opposite state when +24 volts is applied to Input A while Input B is open, or when ground is applied to Input B when Input A is open. Another toggle will not be recognized until both inputs are open. To toggle the module's output, a control input signal must be applied for at least 250 milliseconds with its counterpart input open. All control inputs must be removed for at least one second before the module will recognize another toggle control input. When +24 volts is first applied to its power terminal the module will initialize in the output off state. The output is rated at +24 volts @ 15 amps and provides over current and short circuit shut down protection.

System Diagram



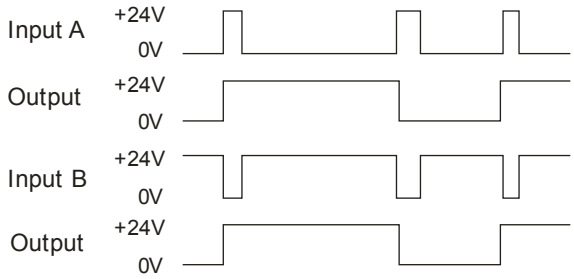
VCM-02

Vehicle Control Modules

Specifications

Power Input (86):	+16 to 32 Vdc @ 15 amps
Ground (85):	Connection to vehicle ground (Battery Negative)
Input A (87A):	External contact closure to +24 volts
Input B (87):	External contact closure to ground
Module Output (30):	+24 volts @ 15 amps in latched state
Mechanical	
Weight:	0.10 lbs.
Operating Temperature:	-40° C to +85° C
Dimensions:	1.75” H x 2.30” W x 1.25” D

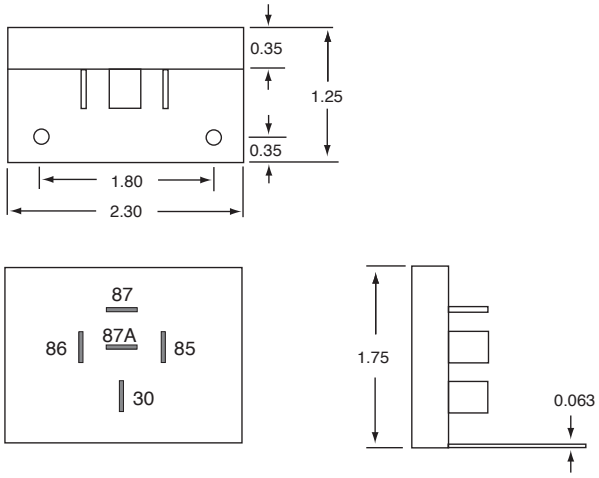
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer’s electrical wiring procedures (e.g., Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry and protected environment.
3. For optimum power output performance the product should be mounted to a metal surface.
4. Do not connect loads to the output that will exceed the output current rating of the module.
5. The 24 volt power input must be from a properly fused +24 volt power source.
6. Wiring must be of the proper gage and type to handle the intended load currents.
7. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly to the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-03

Vehicle Control Modules

VCM-03
Solid-State On-Delay Timer Relay

InPower's VCM Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, the modules are available in a variety of standard and custom configurations and functions.

Key Features

- 100% Solid-State Construction
- Standard Automotive Relay Pin Format
- 12 Volt 15 Amp Solid-State Output
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)
- Durable Metal Case

Technical Description

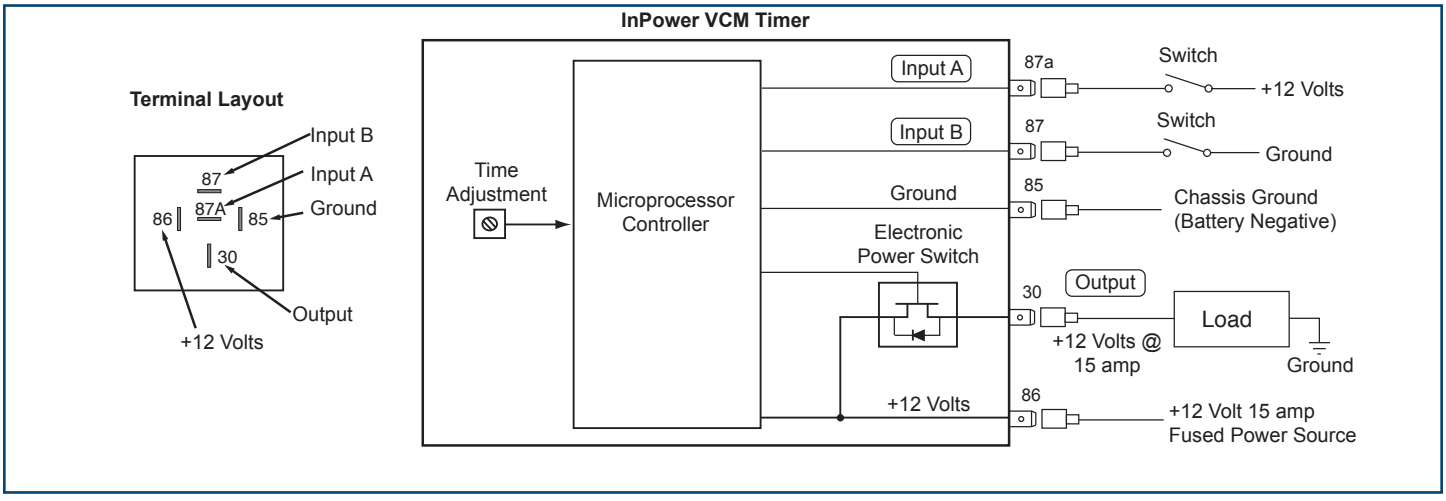
The VCM-03 Series On-Delay Timer is a completely solid-state timer relay with a +12 volt @ 15 amp output. The module's two inputs are activated by a transition to +12 volts (Input A) and by a transition to ground (Input B). The two inputs operate as a logical Exclusive OR so that either input can operate the timer.

The timer will start when +12 volts is applied to Input A while Input B is off, or when ground is applied to Input B while Input A is off. The input must be maintained to operate the timer. If removed before the timer expires, the operation will reset. Activating either input starts the timer. The output turns on when the timer expires, and will remain on until the input is removed. Fixed and adjustable time settings are available. Adjustable time values are set using a single-turn potentiometer. Custom timer values and functions are also available. See the *Ordering Guide* for the standard models and please call us regarding custom models.

Ordering Guide

Model	Time Range	Model	Time Range
VCM-03-01SA	0 - 1 Second Adjustable	VCM-03-03MA	0 - 3 Minutes Adjustable
VCM-03-01SF	1 Second Fixed	VCM-03-05MF	5 Minutes Fixed
VCM-03-04SF	4 Seconds Fixed	VCM-03-10MA	0 - 10 Minutes Adjustable
VCM-03-10SA	0 - 10 Seconds Adjustable	VCM-03-10MF	10 Minutes Fixed
VCM-03-60SA	0 - 60 Seconds Adjustable	VCM-03-60MA	0 - 60 Minutes Adjustable

System Diagram



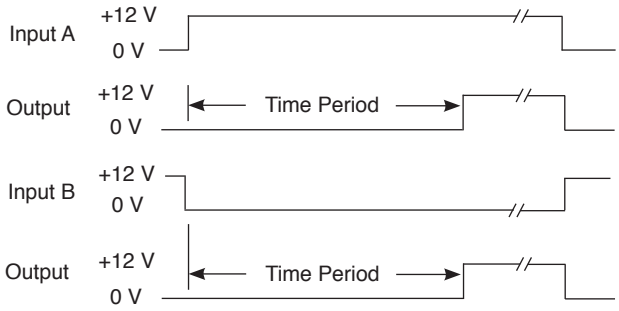
VCM-03

Vehicle Control Modules

Specifications

Power Input (86):	+8 to +16 Vdc, 15 Amps max.
Ground (85):	Connection to vehicle ground (Battery Negative)
Input A (87a):	On = >4.0 V, Off = <2.5 V
Input B (87):	On = <2.0 V, Off = >3.0 V
Module Output (30):	+12 volts @15 amps, with over current fault shutdown
Mechanical	
Dimensions:	2.30 W x 1.75 H x 1.25 D inches
Case Material:	Anodized aluminum
Operating Temperature:	-40° C to +85° C
Weight:	0.10 lbs.

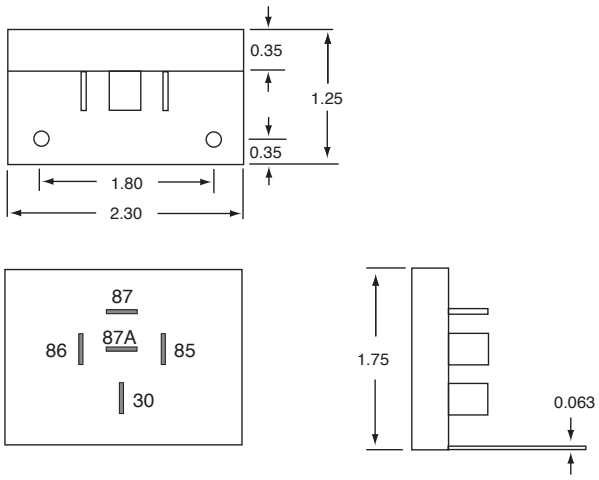
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford General Motors, etc.).
2. The module should be installed inside the vehicle in a dry and protected environment.
3. For optimum performance the module should be mounted to a flat metal surface.
4. Do not connect loads to the outputs that will exceed the output current rating of the module.
5. The power input (BAT+ terminal) must be wired to a fused +12 volt battery power source.
6. Wiring must be of the proper gauge and type to handle the intended load currents.
7. Use ¼ inch female blade terminals to connect wires to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-04
Solid-State Off-Delay Timer Relay

InPower's VCM Series *Vehicle Control Modules* are a set of "tools" for the designers of vehicle electrical control systems. These solid-state modules are designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, and are available in a variety of standard and custom configurations and functions.

Key Features

- 100% Solid-State Construction
- Standard Automotive Relay Pin Format
- 12 Volt 15 Amp Solid-State Output
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)
- Durable Metal Case

Technical Description

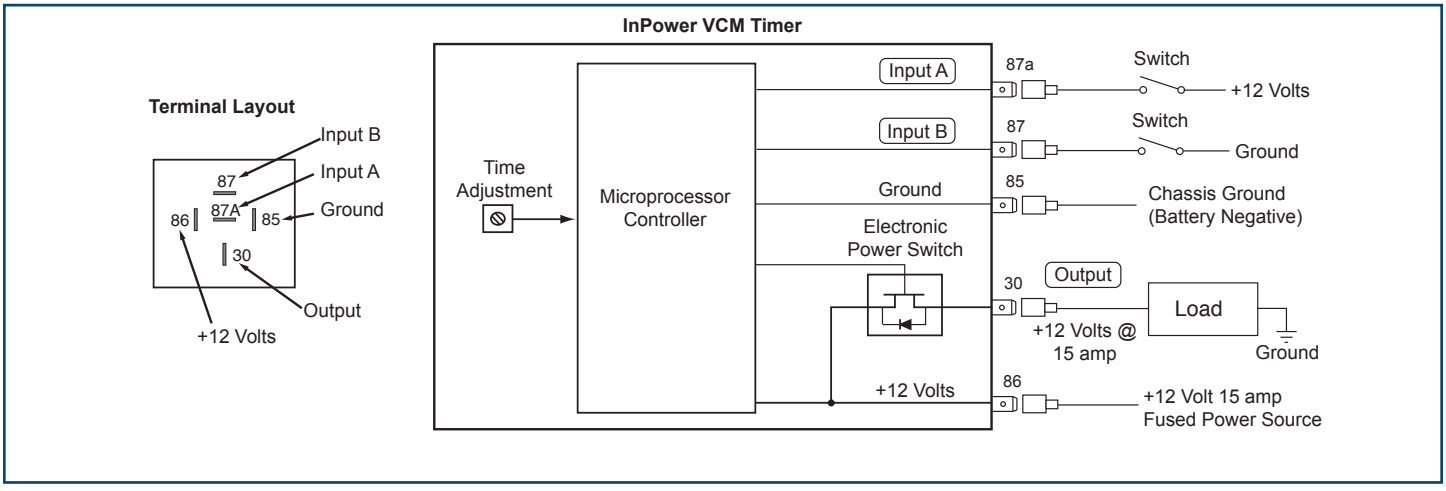
The VCM-04 Series Off-Delay Timer is a completely solid-state timer relay with a +12 volt @ 15 amp output. The module contains two inputs, one activated by a transition to +12 volts (Input A) and one activated by a transition to ground (Input B). The two inputs operate as a logical Exclusive OR so that either input can operate the timer.

The output is activated when +12 volts is applied to Input A while Input B is off, or when ground is applied to Input B while Input A is off. The timer starts when the input signal is removed. When the timer expires the output is turned off and the operation is complete. Fixed and adjustable time settings are available. Adjustable time values are set using a single-turn potentiometer. See the *Ordering Guide* for the standard models.

Ordering Guide

Model	Time Range	Model		Time Range	
VCM-04-01SA	0-1 Second Adjustable	VCM-04-60SF	60 Seconds Fixed	VCM-04-10MA	0-10 Minutes Adjustable
VCM-04-05SF	5 Seconds Fixed	VCM-04-02MA	0-2 Minutes Adjustable	VCM-04-15MF	15 Minutes Fixed
VCM-04-10SA	0-10 Seconds Adjustable	VCM-04-03MA	0-3 Minutes Adjustable	VCM-04-20MF	20 Minutes Fixed
VCM-04-10SF	10 Seconds Fixed	VCM-04-03MF	3 Minutes Fixed	VCM-04-60MA	0-60 Minutes Adjustable
VCM-04-60SA	0-60 Seconds Adjustable	VCM-04-05MF	5 Minutes Fixed	VCM-04-03HA	0 - 3 Hours Adjustable

System Diagram



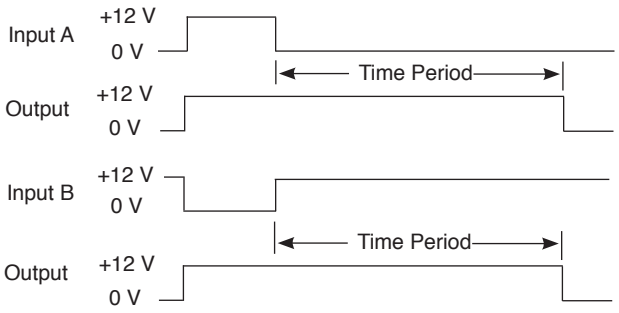
VCM-04

Vehicle Control Modules

Specifications

Power Input (86):	+8 to +16 Vdc, 15 Amps max.
Ground (85):	Connection to vehicle ground (Battery Negative)
Input A (87a):	On = >4.0 V, Off = <2.5 V
Input B (87):	On = <2.0 V, Off = >3.0 V
Module Output (30):	+12 volts @15 amps, with over current fault shutdown
Mechanical	
Dimensions:	2.30 W x 1.75 H x 1.25 D inches
Case Material:	Anodized aluminum
Operating Temperature:	-40° C to +85° C
Weight:	0.10 lbs.

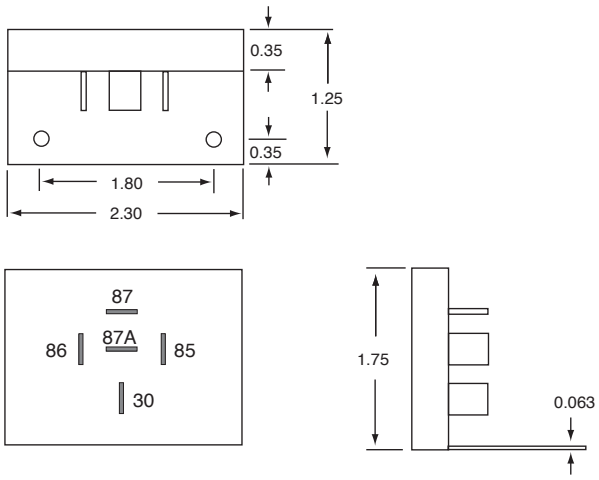
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford General Motors, etc.).
2. The module should be installed inside the vehicle in a dry and protected environment.
3. For optimum performance the module should be mounted to a flat metal surface.
4. Do not connect loads to the outputs that will exceed the output current rating of the module.
5. The power input (BAT+ terminal) must be wired to a fused +12 volt battery power source.
6. Wiring must be of the proper gauge and type to handle the intended load currents.
7. Use ¼ inch female blade terminals to connect wires to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-05
Solid-State Off-Delay Timer Relay

InPower's VCM Series *Vehicle Control Modules* are a set of "tools" for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Key Features

- 100% Solid-State Construction
- Standard Automotive Relay Pin Format
- 12 Volt 15 Amp Solid-State Output
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)
- Durable Metal Case

Technical Description

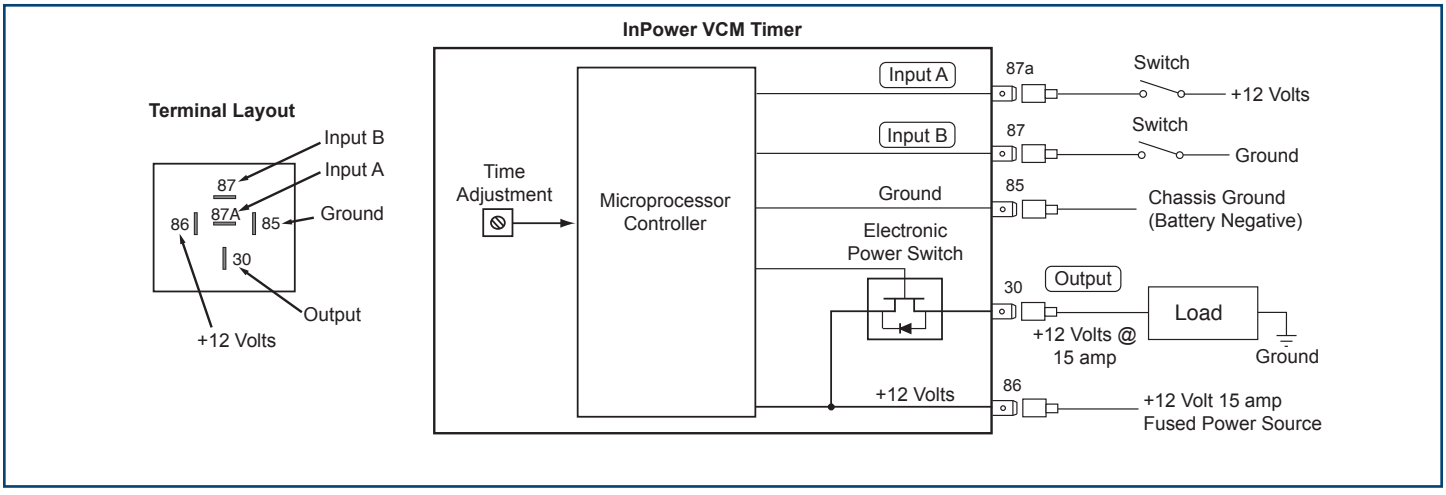
The VCM-05 Series One-Shot Timer is a completely solid-state timer relay with a +12 volt @ 15 amp output. The module contains two inputs, one activated by a transition to +12 volts (Input A) and one activated by a transition to ground (Input B). The two inputs operate as a logical Exclusive OR so that either input can operate the timer.

The timer will start and the output will be turned on when +12 volts is applied to Input A while Input B is off, or when ground is applied to Input B while Input A is off. The input duration must be at least 250 milliseconds. The output will be turned off when the timer expires. If the input is removed and reapplied during the time-out sequence the timer will reset and will restart the time-out sequence. Fixed and adjustable time settings are available. Adjustable time values are set using a single-turn potentiometer. See the *Ordering Guide* for the standard models. Please call InPower sales to discuss custom timers.

Ordering Guide

Model	Time Range	Model		Time Range	
VCM-05-01SF	1 Second Fixed	VCM-05-60SF	60 Seconds Fixed	VCM-05-30MF	30 Minutes
VCM-05-05SA	0 - 5 Seconds Adjustable	VCM-05-02MF	2 Minutes Fixed	VCM-05-60MA	0 - 60 Min. Adjustable
VCM-05-05SF	5 Seconds Fixed	VCM-05-03MA	0 - 3 Min. Adjustable	VCM-05-04HF	4 hour Fixed
VCM-05-10SA	0 - 10 Seconds Adjustable	VCM-05-10MA	0 - 10 Min. Adjustable		
VCM-05-60SA	0 - 60 Seconds Adjustable	VCM-05-20MF	20 Minutes Fixed		

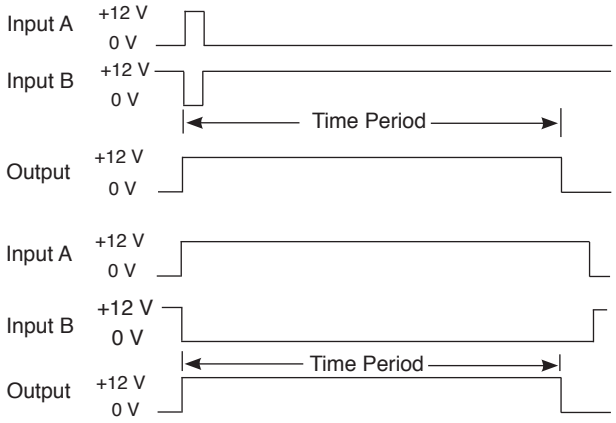
System Diagram



Specifications

Power Input (86):	+8 to +16 Vdc, 15 Amps max.
Ground (85):	Connection to vehicle ground (Battery Negative)
Input A (87a):	On = >4.0 V, Off = <2.5 V
Input B (87):	On = <2.0 V, Off = >3.0 V
Module Output (30):	+12 volts @15 amps, with over current fault shutdown
Mechanical	
Dimensions:	2.30 W x 1.75 H x 1.25 D inches
Case Material:	Anodized aluminum
Operating Temperature:	-40° C to +85° C
Weight:	0.10 lbs.

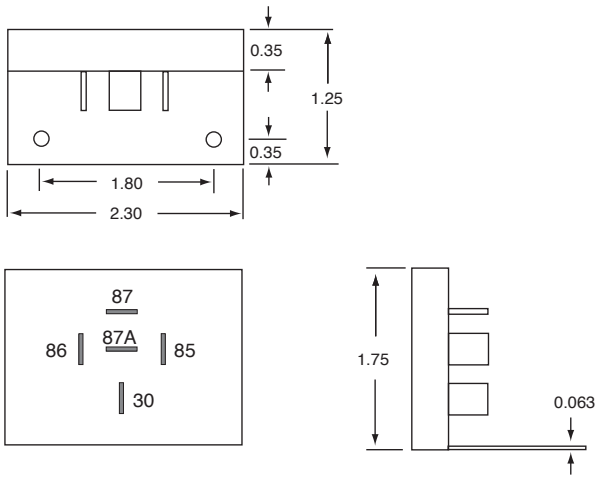
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford General Motors, etc.).
2. The module should be installed inside the vehicle in a dry and protected environment.
3. For optimum performance the module should be mounted to a flat metal surface.
4. Do not connect loads to the outputs that will exceed the output current rating of the module.
5. The power input (BAT+ terminal) must be wired to a fused +12 volt battery power source.
6. Wiring must be of the proper gauge and type to handle the intended load currents.
7. Use ¼ inch female blade terminals to connect wires to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-08
Dual 15 Amp Alternating Lamp Flasher

InPower's VCM Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Technical Description

The InPower VCM-08 warning lamp flasher is a compact, high performance flasher with exceptional reliability and low cost.

The VCS-08 flasher is a completely solid state dual output alternating arning lamp flasher. Its outputs are rated at +12 volts @ 15 amps each, and are designed to operate high in-rush current halogen and incandescent lamps, as well as LED lights.

When a ground is applied to the input, the outputs will alternately flash at a rate of 75 cycles per minute at a 50% duty cycle. The solid state outputs will automatically shut off if an over current or short circuit fault occurs. If a fault shut down occurs on one output the other output will remain operational.

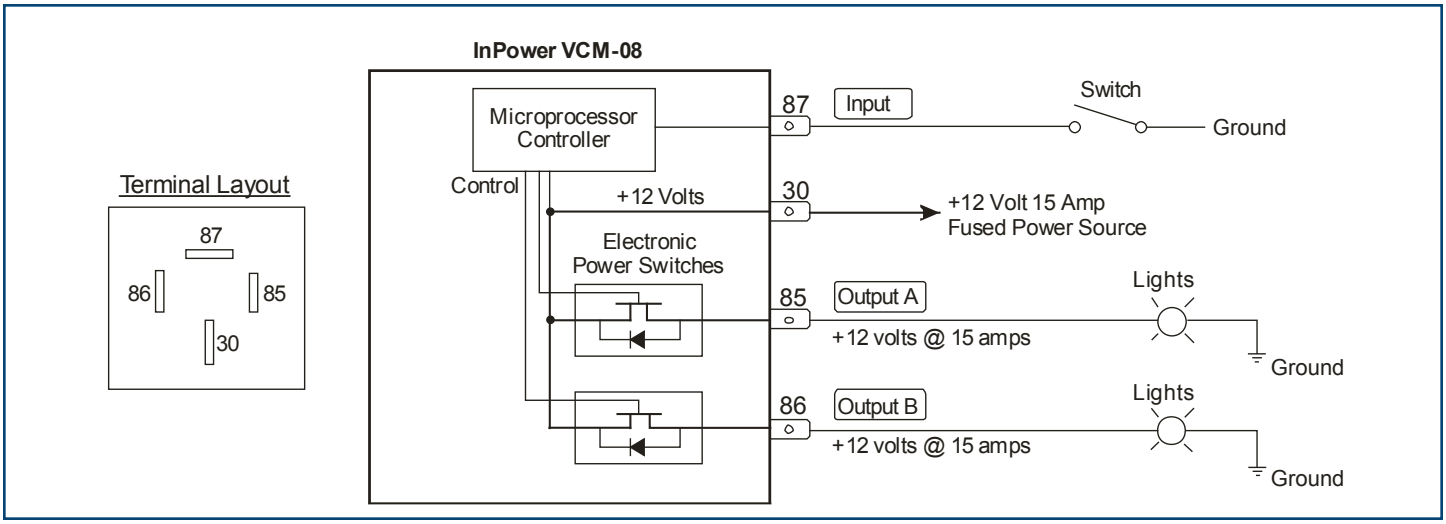
Key Features

- *100% Solid State Construction*
- *Operated Halogen and LED Lights*
- *Standard Automotive Relay Pin Format*
- *Dual 12 Volt 15 Amp Solid-State Outputs*
- *Compact Size With Panel-Mount Bracket*
- *High Technology Power Switching CIrcuit*
- *Durable Metal Case*

Ordering Guide

Model	Description
VCM-08	Solid-state alternating lamp flasher with single input and two +12 volt @ 15 amp outputs.

System Diagram



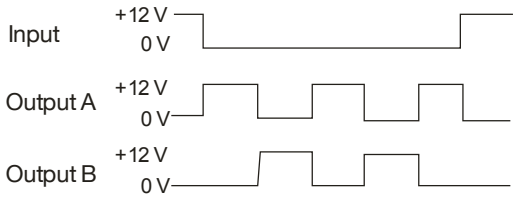
VCM-08

Vehicle Control Modules

Specifications

Power Input (30):	+8 to 16 Vdc @ 15 amps
Control Input (87):	External contact closure to ground
Output A (85):	+12 volts @ 15 amps
Output B (86):	+12 volts @ 15 amps
Flash Rate:	75 per minute
Mechanical	
Weight:	0.10 lbs.
Operating Temperature:	-40° C to +85° C

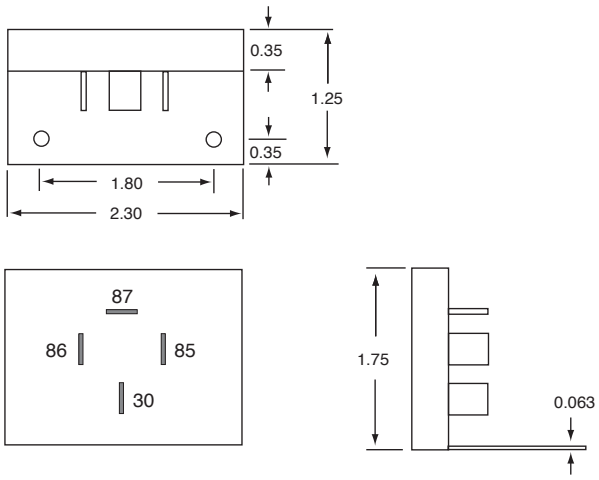
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry and protected environment.
3. For optimum power output performance the product should be mounted to a metal surface.
4. Do not connect loads to the output that will exceed the output current rating of the module.
5. The 12 volt power input (30) must be from a properly fused +12 volt power source.
6. Wiring must be of the proper gage and type to handle the intended load currents.
7. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly to the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

Vehicle Control Module (Flasher) VCM-09

VCM-09 24VDC
Dual 10 Amp Alternating Lamp Flasher

InPower's VCM Series Vehicle Control Modules are a set of tools for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Technical Description

The InPower VCM-09 warning lamp flasher is a compact, high performance flasher with exceptional reliability and low cost.

The VCM-09 flasher is a completely solid state dual output alternating warning lamp flasher. Its outputs are rated at +24 volts @ 10 amps each, and are designed to operate high in-rush current halogen and incandescent lamps, as well as LED lights.

When a ground is applied to the input, the outputs will alternately flash at a rate of 75 cycles per minute at a 50% duty cycle. The solid state outputs will automatically shut off if an over current or short circuit fault occurs. If a fault shut down occurs on one output the other output will remain operational.

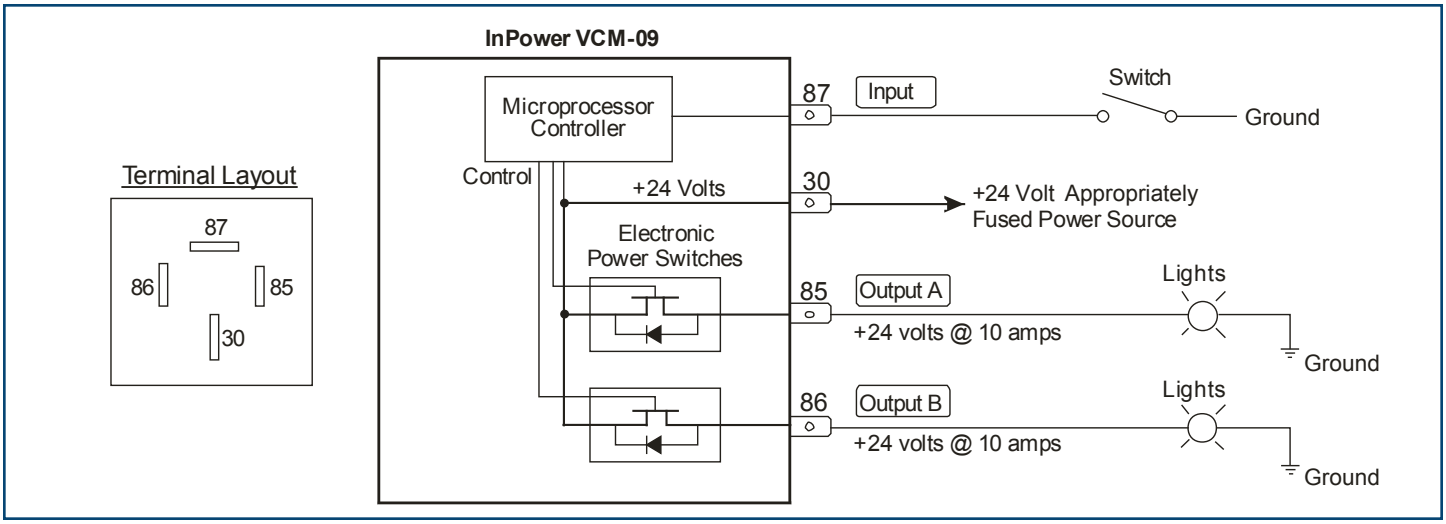
Key Features

- 100% Solid State Construction
- Operated Halogen and LED Lights
- Standard Automotive Relay Pin Format
- Dual +24 Volt 10 Amp Solid-State Outputs
- Compact Size With Panel-Mount Bracket
- High Technology Power Switching CIrcuit
- Durable Metal Case

Ordering Guide

Model	Description
VCM-09	Solid-state alternating lamp flasher with single input and two +24 volt @ 10 amp outputs.

System Diagram

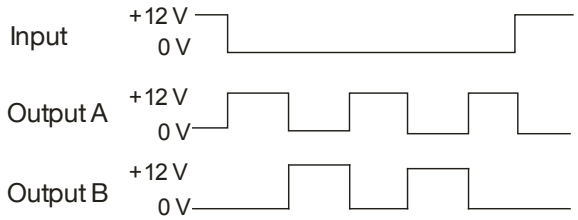


Vehicle Control Module (Flasher) VCM-09

Specifications

Power Input (30):	+8 to 26 Vdc @ 10 amps
Control Input (87):	External contact closure to ground
Output A (85):	+24 volts @ 10 amps
Output B (86):	+24 volts @ 10 amps
Flash Rate:	75 per minute
Mechanical	
Weight:	0.10 lbs.
Operating Temperature:	-40° C to +85° C

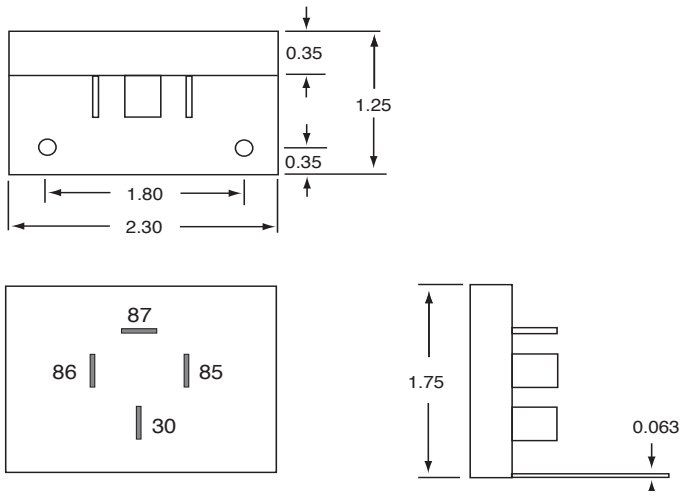
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry and protected environment.
3. For optimum power output performance the product should be mounted to a metal surface.
4. Do not connect loads to the output that will exceed the output current rating of the module.
5. The 24 volt power input (30) must be from a properly fused +24 volt power source.
6. Wiring must be of the proper gage and type to handle the intended load currents.
7. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. Do not solder wires directly to the module terminals.
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-10
Dual Input Solid-State Power Relay

InPower's VCM Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Technical Description

The InPower VCM-1 is a completely solid state relay with a single +12 volt @ 15 amp output. The module has two inputs, one actuated by a transition to +12 volts (Input A) and one actuated by a transition to ground (Input B). The output is actuated when either Input A or Input B is activated. The output is rated at +12 volts @ 15 amps and provides over current and short circuit shut down protection.

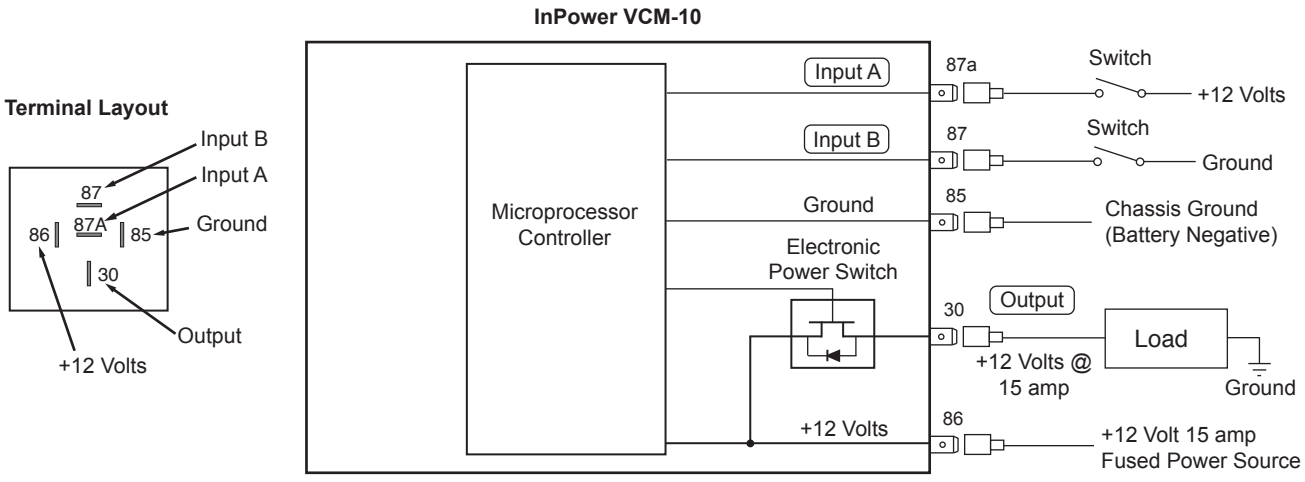
Key Features

- 100% Solid-State Construction
- Standard Automotive Relay Pin Format
- 12 Volt 15 Amp Solid-State Output
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)
- Durable Metal Case

Ordering Guide

Model	Description
VCM-10	Dual input solid-state relay with +12 volt @ 15 amp output.

System Diagram



Specifications

Power Input (86):	+8 to 16 Vdc @ 15 amps
Ground (85):	Connection to vehicle ground (Battery Negative)
Input A (87A):	External contact closure to +12 volts
Input B (87):	External contact closure to ground
Module Output (30):	+12 volts @ 15 amps

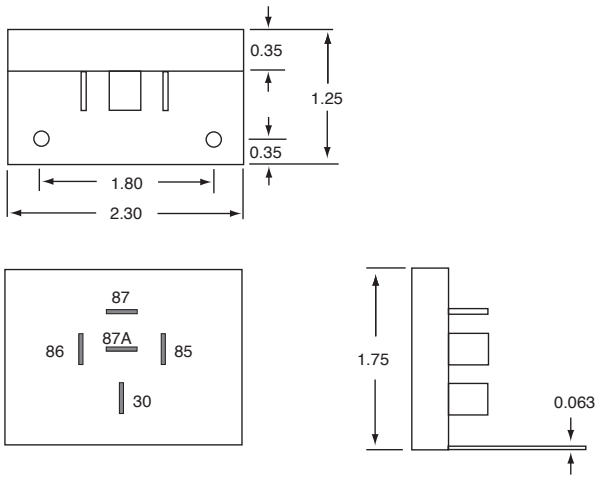
Mechanical

Weight:	0.10 lbs.
Operating Temperature:	-40° C to +85° C
Dimensions:	1.75” H x 2.30” W x 1.25” D

Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer’s electrical wiring procedures (e.g., Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry and protected environment.
3. For optimum power output performance the product should be mounted to a metal surface.
4. Do not connect loads to the output that will exceed the output current rating of the module.
5. The 12 volt power input must be from a properly fused +12 volt power source.
6. Wiring must be of the proper gage and type to handle the intended load currents.
7. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly to the module terminals.**
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



All dimensions in inches.
Do not scale.

VCM-13 Series

Vehicle Control Module
Clutch Pump Limiter

VCM-13-Series
Clutch Pump Limiter

InPower's VCM Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. Made to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Key Features

- Three Digital Inputs
- Two 12 Volt 15 Amp Solid State Outputs
- Over Current Fault Shutdown Protection
- Compact Size
- Durable Metal Case
- Programmable Flexibility for a wide variety of truck applications

Application Technical Description

The Model VCM-13 is a smart power relay with three inputs and two outputs that can be logically controlled by programming to suit your needs.

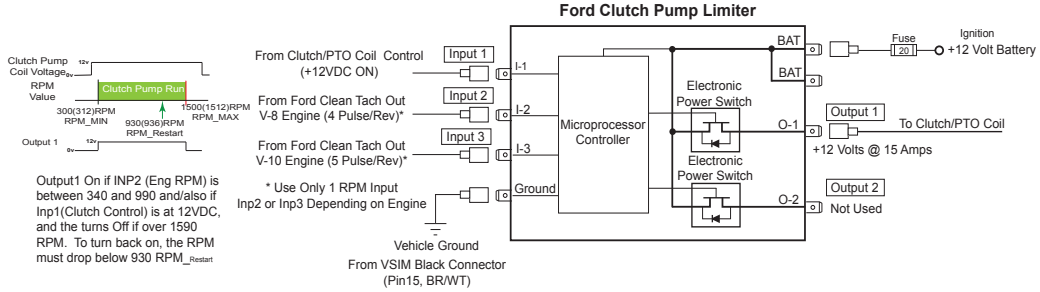
In the Clutch Pump Limiter application it is designed to protect your clutch pump from damage so it will not be exposed to excessive RPM speeds. The design takes the Clutch Pump Drive signal and Engine RPM from sources like the Clean Tach Out from Ford, or the VSIM in the case of Dodge. The RPM is calculated and these Signals then are logically combined to create Output 1. Output 1 will turn on when the Current RPM greater than RPM_Minimum and less than RPM_Max as long as the original Clutch Pump Coil Voltage is on. When the RPM_Max is reached, Output1 will turn off and then will not turn back on until RPM_Current is less than RPM_Restart.

Since different vehicles have different methodologies of presenting their Engine RPMs, different programs will be required for different manufacturers.

Example System Diagrams

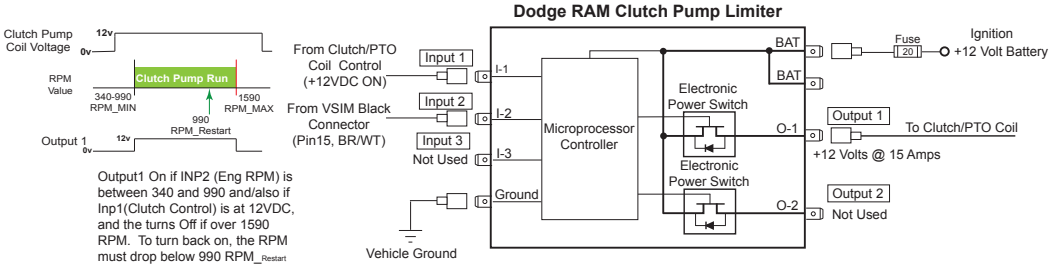
Ford E and F series

SPC378



Dodge RAM Diesels

SPC391



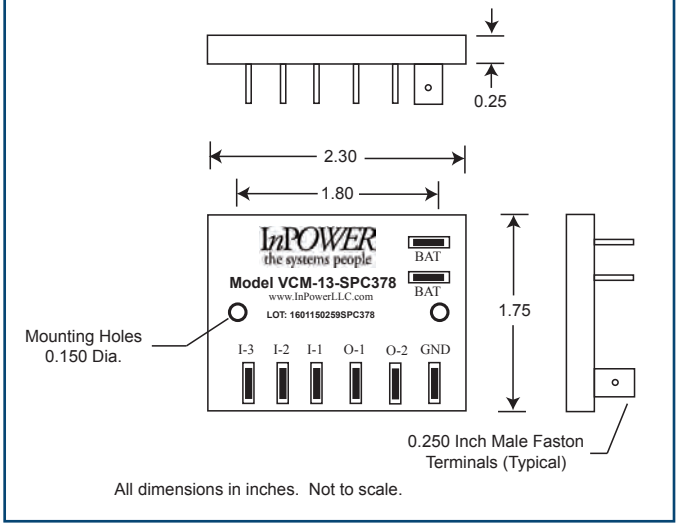
VCM-13 Series

Vehicle Control Modules
Clutch Pump Limiter

Base VCM-13 Specification

Power Input	
BAT Terminal 1:	+8.0 to 16.0 Vdc @ 20 amps
BAT Terminal 1:	Not Used
Inputs	
Input I-1:	Programmable, external contact closures to +12 volts or to ground.
Input I-2:	Programmable, external contact closures to +12 volts or to ground
Input I-3:	Programmable, external contact closures to +12 volts or to ground
Power Outputs	
Output O-1:	+12 volts @ 15 amps
Output O-2:	+12 volts @ 15 amps
Mechanical	
Dimensions:	12.30 x 1.75 x 0.57 inches
Case Material:	Anodized aluminum
Operating Temperature:	-40° C to +85° C

Mechanical Drawing



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g. Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry and protected environment.
3. For optimum power output performance the product should be mounted to a metal surface.
4. Do not connect loads to the output that will exceed the output current rating of the module.
5. The two power inputs (BAT terminals) must be wired to two separately fused +12 volt power sources. Note that the two BAT terminals are connected together inside the module. One of these is used.
6. Wiring must be of the proper gage and type to handle the intended load currents.
7. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. Do not solder wires directly to the module terminals.
8. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Custom Program Examples

Program Number	Description
SPC378	Clutch Pump Limiter for Ford 200802009 E and F Series. • Inputs consist of Clutch/PTO Coil (12V True) and an RPM input from either V8 or V10 Diesel Clean Tach Out depending on the engine. • (V8) Output 1 will provide 12Vdc @15 Amps if INP1 (4 pulses per Rev) is over 300RPM and Inp1 is 12VDC, then turning off if over 1500 RPM. Engine RPMs must drop below 930RPM before output restarts. • (V10) Output 1 will provide 12Vdc @15 Amps if INP2 (5 pulses per Rev) is over 312 RPM then turning off if over 1512 RPM. Engine RPMs must drop below 936 RPM to restart. Use the appropriate Input for the applicable engine.
SPC391	Clutch Pump Limiter for Dodge RAM trucks. • Inputs consist of Clutch/PTO Coil (12V True) and an RPM input the Dodge VSIM black connector (Pin 15, BR/WT) 0.2Hz/RPM 12 Pulses per Minute. • Output 1 will provide 12Vdc @15 Amps if INP1 (0.2Hz/RPM or 12 pulses per Minute) is over 300RPM and INP1 is 12V True, then turning off if over 1500 RPM. Engine RPMs must drop below 930RPM before output restarts.

VCMR-01

Latching Relay Control Module

Key Features

- Microprocessor Programmable Operation
- Transient Tolerant Outputs
- 12 Volt 20 Amp Form C Outputs, Normally Closed (N.C.) and Normally Open (N.O.)
- Unpowered N.C. Relay contact.
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)

Ordering Guide

Model	Description
VCMR-01	Alternating latching relay with +12 volt @ 20 amp output and two inputs.

VCMR-01

Alternating Latching Relay Control Module, 12 Volt Output

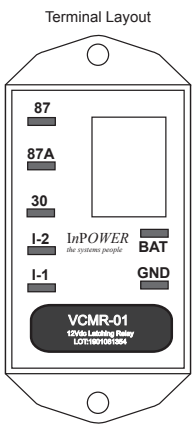
InPower's VCMR Series *Vehicle Control Modules* are a set of tools for the designers of vehicle electrical control systems. These modules, designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, are available in a variety of standard and custom configurations and functions.

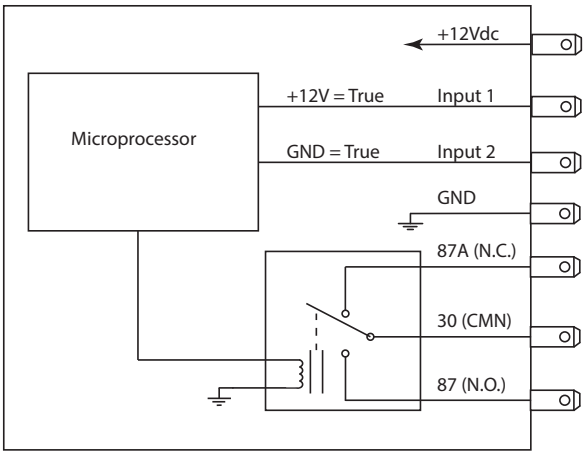
Technical Description

The InPower VCMR-01 is an alternating latching relay with Form C, One Normally Closed Contact (N.C.) and One Normally Open Contact (N.O.) (+12 volt @ 20 amp) configuration along with the common wiper. The module has two inputs, one actuated by a transition to +12 volts (Input A) and one actuated by a transition to ground (Input B). The two inputs operate as a logical "Exclusive OR" so that either input can cause the output to latch (or unlatch).

The output toggles to the opposite state when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B when Input A is open. Another toggle will not be recognized until both inputs are open. To toggle the module's outputs a control input signal must be applied for at least 250 milliseconds with its counterpart input open. All control inputs must be removed for at least one second before the module will recognize another toggle control input. When +12 volts is first applied to its power terminal the module will initialize in the output off state. The output is rated at +12 volts @ 20 amps should be appropriately fused by the installer.

System Diagram





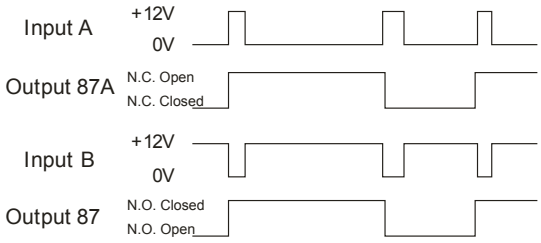
VCMR-01

Latching Relay Control Module

Specifications

Power Input (BAT):	+10 to 16 Vdc
Ground (GND):	Connection to vehicle ground (BatteryNegative)
N.C. (87A)	This is the normally closed contact of the Form-C Relay circuit. Load circuit to be fused by installer at 20 amps or less. When the logic of the VCMR using inputs I-1and/or I-2 is true this terminal will disconnect from terminal 30.
N.O. (87):	This is the normally open contact of the Form-C Relay circuit. Load circuit to be fused by installer at 20 amps or less. When the logic of the VCMR using inputs I-1 and/or I-2 is true this terminal will connect to terminal 30.
Form C Wiper (30):	This is the common wiper of the Form-C Relay output circuit. Load circuit to be fused by installer at 20 amps or less.
I-1:	This Input is used for the VCMR logic. It is 12Vdc = True like Input A on the standard VCM series of products but custom programs can be written changing this input to ground = true.
I-2 :	This Input is used for the VCMR logic. It is Ground = True like Input B on the standard VCM series of products but custom programs can be written changing this input to 12Vdc = true.
BAT:	This is the +12Vdc power supply to operate the VCMR. Operating Voltage range is 10-16Vdc. Current requirements are 0.010 amps when the relay is off and 0.175 when the relay is on.
GND:	This is the VCMR power supply ground. Current requirements are 0.010 amps when the relay is off and 0.175 when the relay is on.

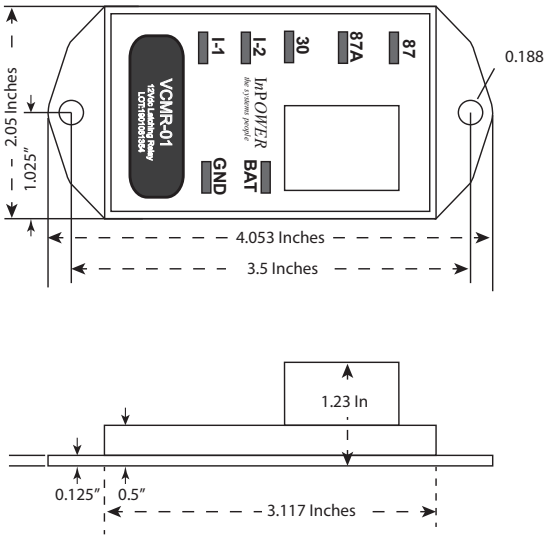
Timing Diagram



Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g. Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry, protected environment.
3. Do not connect loads to the output that will exceed the output current rating of the module.
4. The 12 volt power input must be from a properly fused +12 volt power source.
5. Wiring must be of the proper gage and type to handle the intended load currents.
6. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly to the module terminals.**
7. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



Mechanical

Weight:	0.3 lbs.
Operating Temperature:	-40° C to +85° C
Dimensions:	4.053" L x 2.05" W x 1.23" H

All dimensions in inches.
Do not scale.

VCMR-10

Microprocessor Controlled Form C Relay

VCMR-10
Dual Input Processor Controlled Power Relay

InPower's VCM Series *Vehicle Control Modules Relay* is a set of tools for the designers of vehicle electrical control systems. Designed to withstand the environments typically found on trucks, emergency vehicles, buses, coaches and speciality vehicles, these modules are available in a variety of standard and custom configurations and functions.

Technical Description

The InPower VCMR-10 is a Processor Controlled Form C relay with One Normally Closed - N.C. and One Normally Open - N.O. contact both are rated as +12 volt @ 20 amp outputs (or less). The module has two inputs, one actuated by a transition to +12 volts (Input A) and one actuated by a transition to ground (Input B). The outputs are actuated when either Input A or Input B is activated. The outputs are rated at +12 volts @ 20 amps and should be appropriately fused by the installer.

Key Features

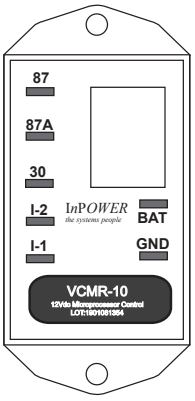
- Microprocessor Programmable Operation
- Transient Tolerant Outputs
- 12 Volt 20 Amp Form C Outputs, Normally Closed (N.C.) and Normally Open (N.O.)
- Unpowered N.C. Relay contact.
- Compact Size with Panel-Mount Bracket
- Dual Inputs (Ground and +12 Volt Actuated)

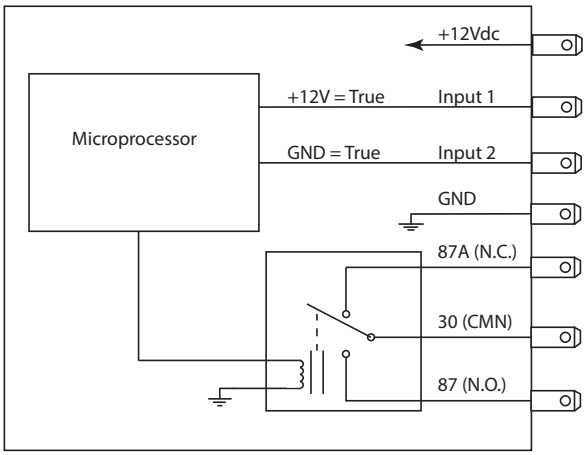
Ordering Guide

Model	Description
VCMR-10	Processor Controlled Dual input Form C relay with +12 volt @ 20 amp output and two inputs.

System Diagram

Terminal Layout





VCMR-10

Microprocessor Controlled Form C Relay

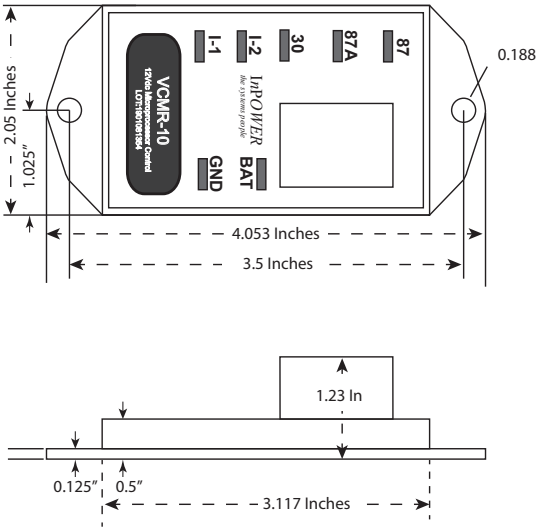
Specifications

Power Input (BAT):	+10 to 16 Vdc
Ground (GND):	Connection to vehicle ground (BatteryNegative)
N.C. (87A)	This is the normally closed contact of the Form-C Relay circuit. Load circuit to be fused by installer at 20 amps or less. When the logic of the VCMR using inputs I-1and/or I-2 is true this terminal will disconnect from terminal 30.
N.O. (87):	This is the normally open contact of the Form-C Relay circuit. Load circuit to be fused by installer at 20 amps or less. When the logic of the VCMR using inputs I-1 and/or I-2 is true this terminal will connect to terminal 30.
Form C Wiper (30):	This is the common wiper of the Form-C Relay output circuit. Load circuit to be fused by installer at 20 amps or less.
I-1:	This Input is used for the VCMR logic. It is 12Vdc = True like Input A on the standard VCM series of products but custom programs can be written changing this input to ground = true.
I-2:	This Input is used for the VCMR logic. It is Ground = True like Input B on the standard VCM series of products but custom programs can be written changing this input to 12Vdc = true.
BAT:	This is the +12 Vdc power supply to operate the VCMR. Operating Voltage range is 10-16 Vdc. Current requirements are 0.010 amps when the relay is off and 0.175 when the relay is on.
GND:	This is the VCMR power supply ground. Current requirements are 0.010 amps when the relay is off and 0.175 when the relay is on.

Installation

1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford, General Motors, etc.).
2. The module should be installed on the inside of the vehicle in a dry and protected environment.
3. Do not connect loads to the output that will exceed the output current rating of the module.
4. The 12 volt power input must be from a properly fused +12 volt power source.
5. Wiring must be of the proper gage and type to handle the intended load currents.
6. We recommend the use of insulated 1/4 inch female blade terminals that connect to the terminals on the module. Be sure to properly crimp these terminals. **Do not solder wires directly to the module terminals.**
7. If you are experiencing problems with the installation or need troubleshooting assistance, contact InPower Customer Service at 740-548-0965.

Mechanical Drawing



Mechanical

Weight:	0.3 lbs.
Operating Temperature:	-40° C to +85° C
Dimensions:	4.053" L x 2.05" W x 1.23" H

All dimensions in inches.
Do not scale.