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InPOWER
 the systems people

VEHICLE CONTROL MODULES

Provide Easy Solutions for Complex Circuit Applications



Latching Relay

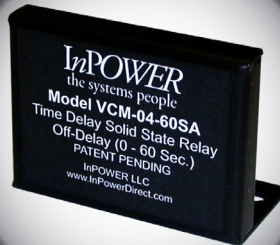
*Put InPower in
 your Tool Box!*



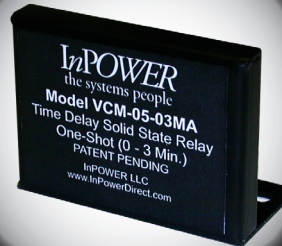
Low Voltage Disconnect



On-Delay
 Time Delay Relay



Off-Delay
 Time Delay Relay



One-Shot
 Time Delay Relay

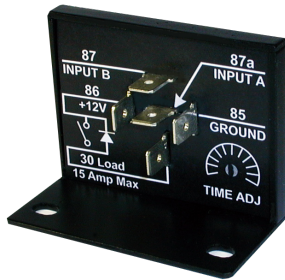
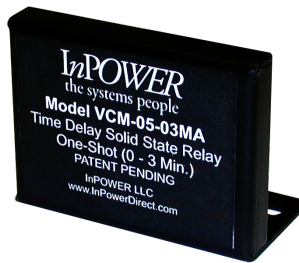


Alternating
 Lamp Flasher

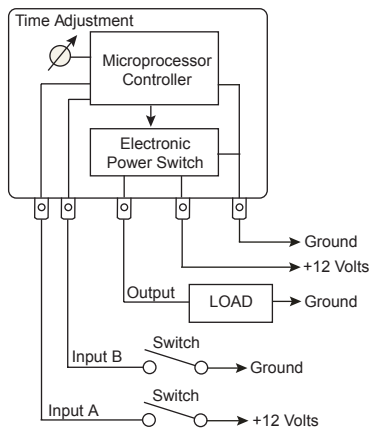
SOLUTIONS
you can count on

VEHICLE CONTROL MODULES

InPower's Vehicle Control Module (VCM) product line is a rapidly evolving set of "tools" used to provide solutions for vehicle electrical system applications. The VCM's employ a micro processor controller coupled with a solid state 12 volt 15 amp power switch to provide a completely solid state "smart" relay. By applying different software programs we can provide a wide range of product functions. After launching our first group of VCM products our customers have responded with additional product applications, thereby expanding the product line. The following describes our current VCM's. Please visit our website for more details and the latest product additions. Feel free to contact us to discuss your application requirements.



VCM-05 One-Shot Timer



VCM-01 Latching Relay

This latching relay's output will toggle to the opposite state each time the input is activated. One of its uses is to turn on/off compartment lights from one or more momentary control switches.

VCM-03 Series On-Delay Timer

This time delay relay's output will activate after a time delay when its input is set, and will remain on until its input is turned off. It can be used where one control action needs to take place at a fixed time after another control action. This provides a delayed on, instant off function. Available with fixed or adjustable time values.

VCM-04 Series Off-Delay Timer

This time delay relay's output will be activated immediately when its input is set. When its input is removed the timer will start, and its output will shut off when the timer expires. This provides an instant on, delayed off function. Fixed and adjustable time values are available.

VCM-05 Series One-Shot Timer

If not already in a timed-out sequence, this time delay relay will produce an output pulse of a timed duration when its input is set. This provides a fixed timed output regardless of its input being a short duration or long duration. Fixed and adjustable time values are available.

VCM-08 Alternating Flasher

When a ground is applied to its input, this flashing relay will alternately operate its dual 15 amp outputs at a rate of 75 cycles per minute at 50% duty cycle. It can be used to operate low current LED lights or high current halogen and incandescent lights. Use one or both outputs depending upon your design requirements.

VCM Low Voltage Disconnect

These low voltage disconnect (LVD) modules measure the battery voltage at their input and control their outputs based on the voltage being above or below a fixed reference point. They are used to remove power from battery loads before the battery charge drops below its ability to start the engine.

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Revised April 16, 2008



VCM-01

Latching Solid State Relay, Alternating

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.

Technical Description

The InPower VCM-01 is a completely 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 will toggle 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 (86) 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.

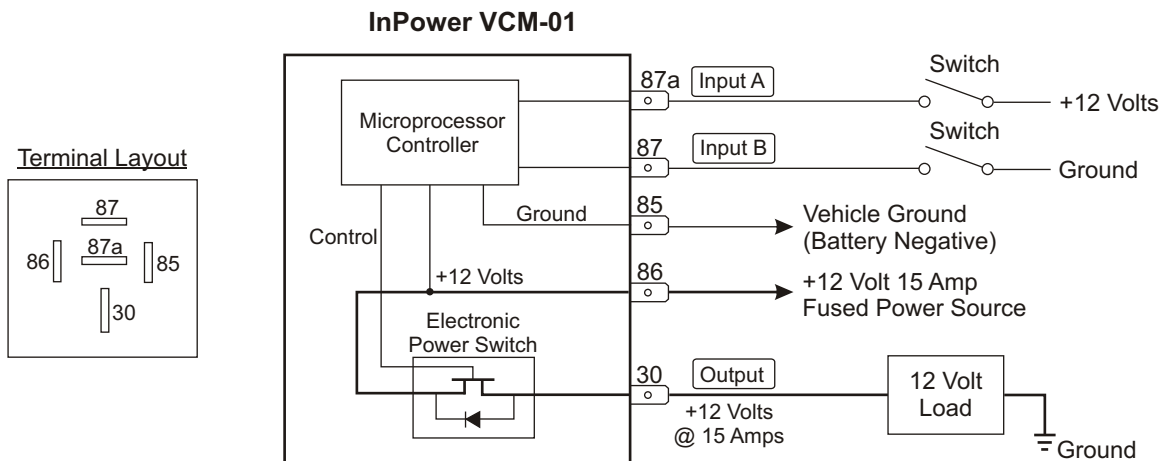
Key Features

- 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
- Durable Metal Case

Ordering Guide

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

Wiring Diagram



PATENT PENDING

VCM-01 Latching Relay, Alternating

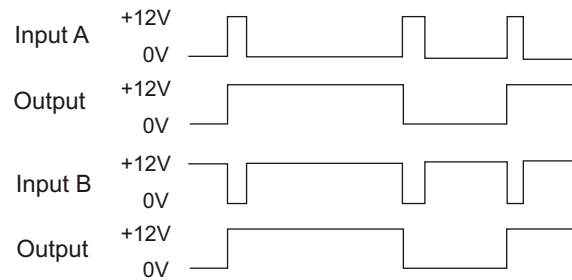
Specifications

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

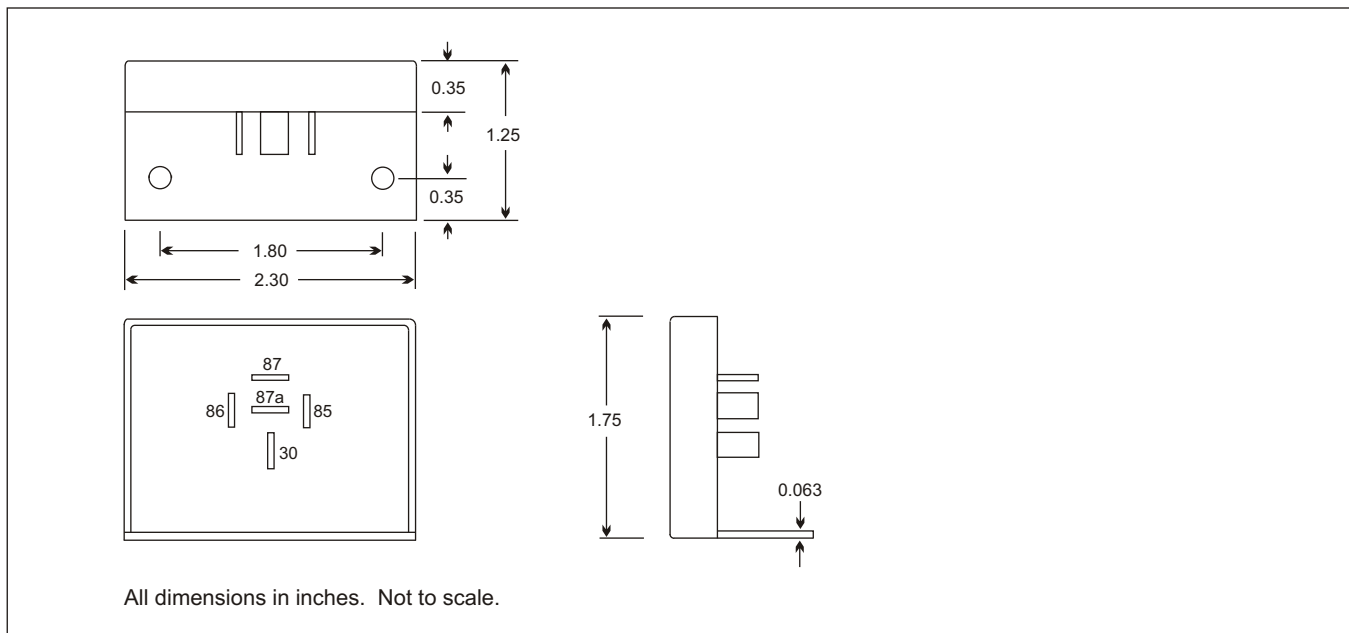
Timing Diagram



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 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 (86) 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.

Outline Drawing



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VCM-03.X

Time Delay Solid State Relay, On-Delay

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.

Technical Description

The InPower VCM-03.X is a completely solid state adjustable on-delay timer 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 timer to operate.

When an input is applied and maintained, the timer will start. When the timer expires the output will be activated. The output will remain activated until both inputs are open (cleared). The time period is adjustable with a single turn potentiometer. Time ranges include: 0-10 seconds, 0-60 seconds, 0-3 minutes, 0-10 minutes and 0-60 minutes.

The timer will start when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. The input must be maintained to operate the timer. If removed during the timer operation (before the timer expires) the operation will reset. With the input applied, when the timer expires the output will be activated, and will remain activated until the inputs are removed. The output is rated at +12 volts @ 15 amps and provides over current and short circuit shut down protection.

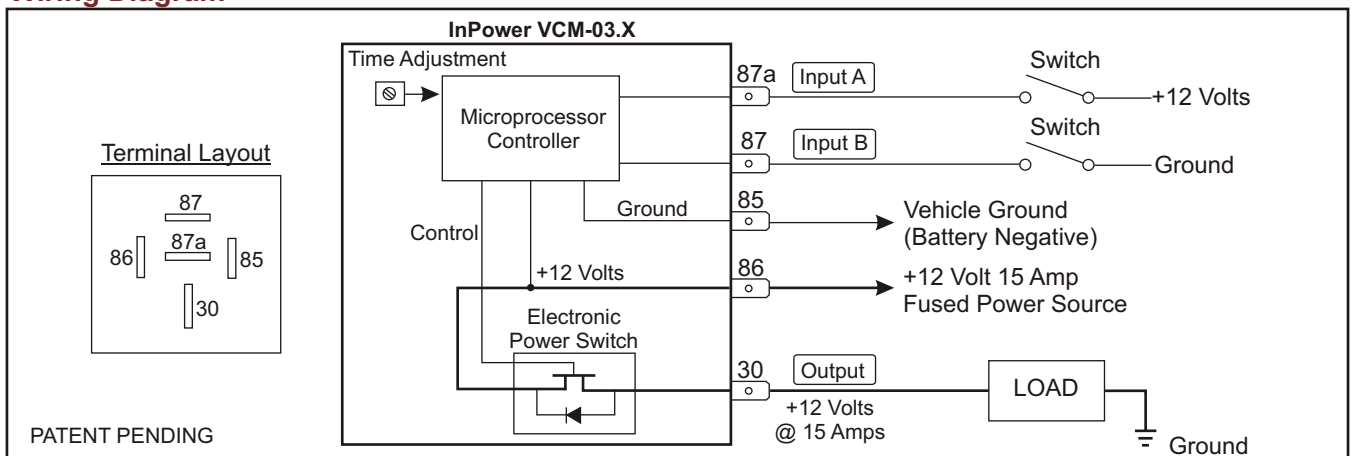
Key Features

- 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
- Durable Metal Case

Ordering Guide

Model	Time Range	Description
VCM-03.10SA	0 - 10 Sec.	Solid state on-delay timer relay, +12 volt @ 15 amp output and two inputs
VCM-03.60SA	0 - 60 Sec.	Solid state on-delay timer relay, +12 volt @ 15 amp output and two inputs
VCM-03.03MA	0 - 3 Min.	Solid state on-delay timer relay, +12 volt @ 15 amp output and two inputs
VCM-03.10MA	0 - 10 Min.	Solid state on-delay timer relay, +12 volt @ 15 amp output and two inputs
VCM-03.60MA	0 - 60 Min.	Solid state on-delay timer relay, +12 volt @ 15 amp output and two inputs

Wiring Diagram



VCM-03.X

Time Delay Solid State Relay, On-Delay

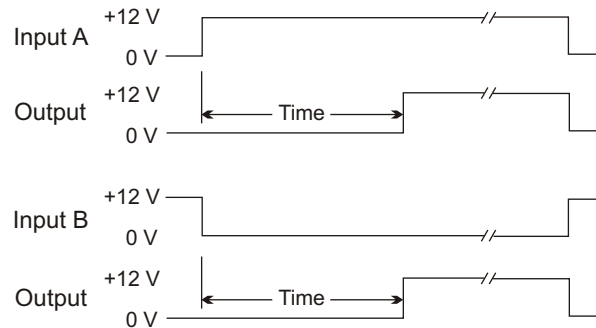
Specifications

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

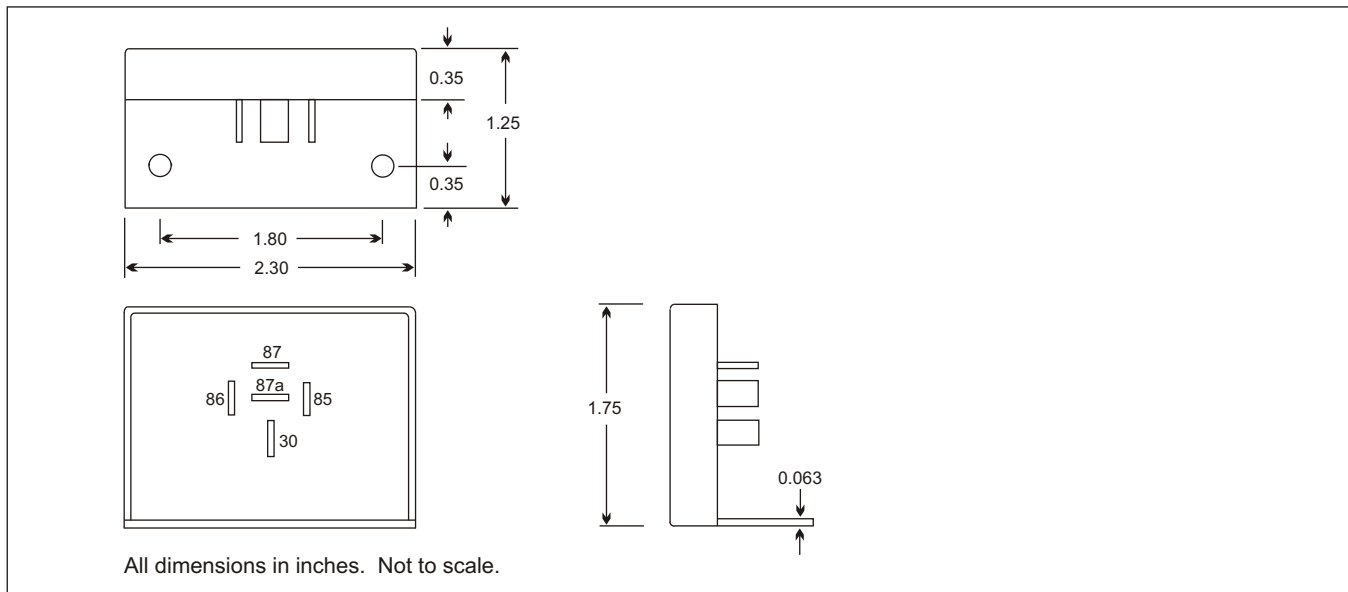
Timing Diagram



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 (86) 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.

Outline Drawing



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VCM-04.X

Time Delay Solid State Relay, Off-Delay

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.

Technical Description

The InPower VCM-04.X is a completely solid state adjustable off-delay timer 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 timer to operate.

When an input is applied the output will immediately be activated. When the input is removed, the timer will start and the output will remain activated. When the timer expires the output will deactivate. The time period is adjustable with a single turn potentiometer. Time ranges include: 0-10 seconds, 0-60 seconds, 0-3 minutes, 0-10 minutes, 0-60 minutes, and fixed 5 seconds.

The output will be activated when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. When the applied input has cleared, and its counterpart input is also clear, the timer will start. When the timer has expired the output will be deactivated and the operation is complete. The output is rated at +12 volts @ 15 amps and provides over current and short circuit shut down protection.

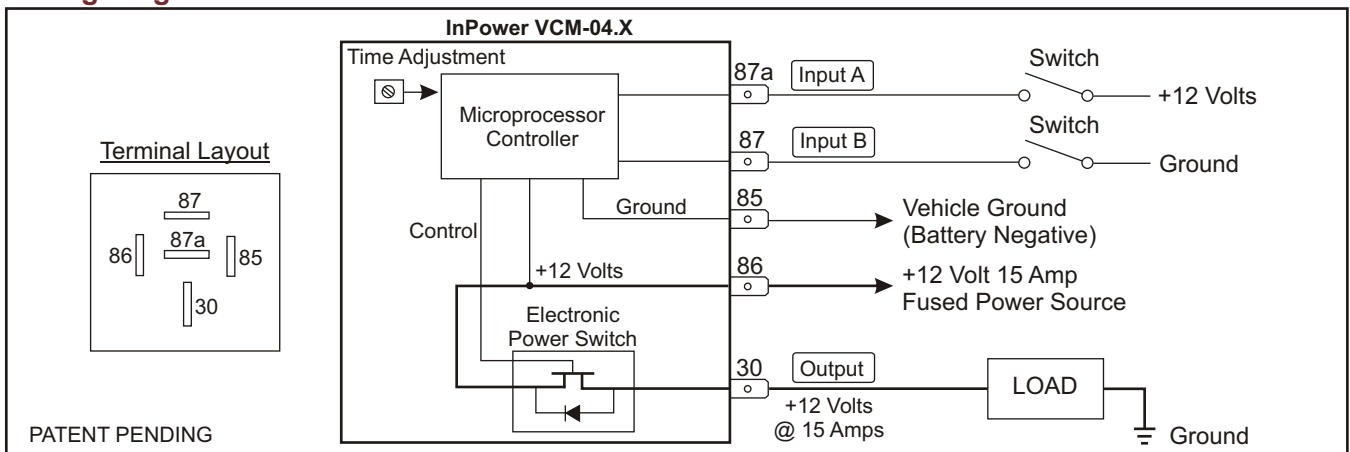
Key Features

- 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
- Durable Metal Case

Ordering Guide

Model	Time Range	Description
VCM-04.10SA	0 - 10 Sec.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.60SA	0 - 60 Sec.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.03MA	0 - 3 Min.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.10MA	0 - 10 Min.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.60MA	0 - 60 Min.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.05SF	5 Sec. Fixed	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.05MF	5 Min. Fixed	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs

Wiring Diagram



PATENT PENDING

VCM-04.X

Time Delay Solid State Relay, Off-Delay

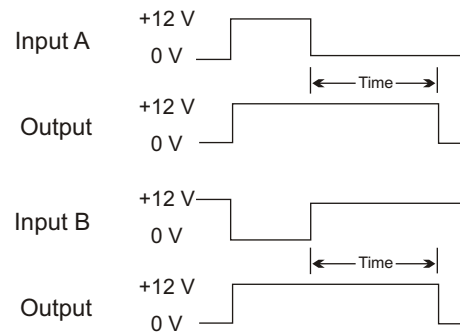
Specifications

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

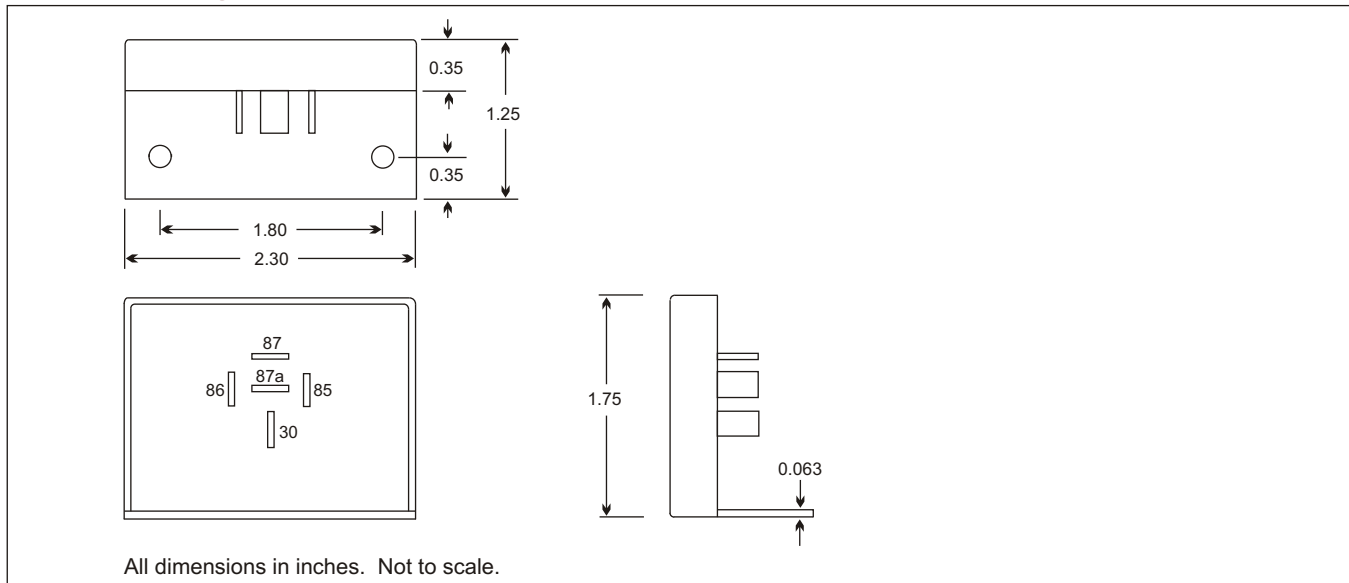
Timing Diagram



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 (86) 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.

Outline Drawing



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VCM-05.X

Time Delay Solid State Relay, One-Shot

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.

Technical Description

The InPower VCM-05.X is a completely solid state adjustable one-shot timer 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 timer to operate.

If the module is not already in a time-out sequence, its output will be activated for the adjustable time period when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. In other words, the module will not start another time sequence until both inputs are removed and the module is not in a time-out sequence. An input control signal must be applied for a minimum of 250 milliseconds, with its counterpart input open, to initiate a time-out sequence. Also, both control inputs must be removed for at least one second before another time-out sequence can be initiated. The time period is adjustable with a single turn potentiometer. Time ranges available include: 0-10 seconds, 0-60 seconds, 0-3 minutes, and 0-10 minutes, 0-60 minutes, and fixed 120 seconds. The output is rated at +12 volts @ 15 amps and provides over current and short circuit shut down protection.

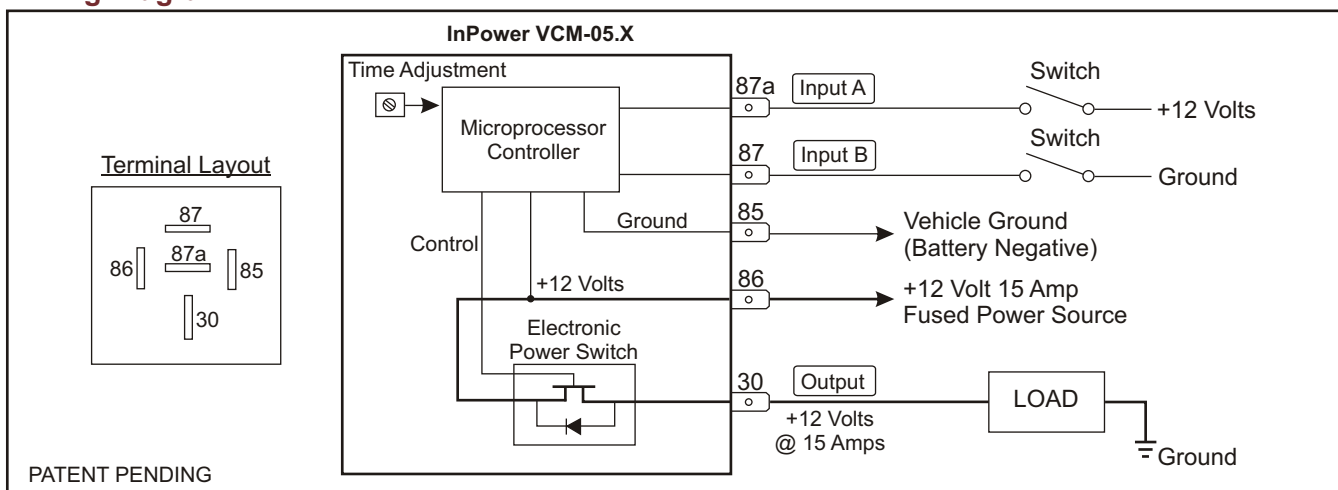
Key Features

- 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
- Durable Metal Case

Ordering Guide

Model	Time Range	Description
VCM-05.10SA	0 - 10 Sec.	Solid state one-shot time delay relay with +12 volt @ 15 amp output and two inputs
VCM-05.60SA	0 - 60 Sec.	Solid state one-shot time delay relay with +12 volt @ 15 amp output and two inputs
VCM-05.03MA	0 - 3 Min.	Solid state one-shot time delay relay with +12 volt @ 15 amp output and two inputs
VCM-05.10MA	0 - 10 Min.	Solid state one-shot time delay relay with +12 volt @ 15 amp output and two inputs
VCM-05.60MA	0 - 60 Min.	Solid state one-shot time delay relay with +12 volt @ 15 amp output and two inputs
VCM-05.02MF	Fixed 120 Sec.	Solid state one-shot time delay relay with +12 volt @ 15 amp output and two inputs

Wiring Diagram



VCM-05.X

Time Delay Solid State Relay, One-Shot

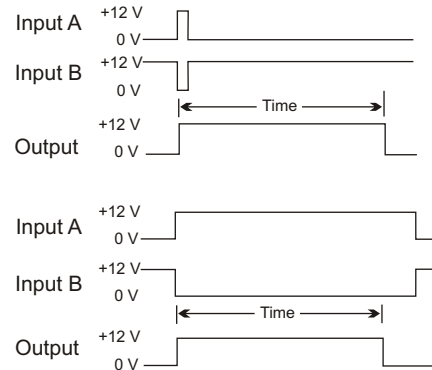
Specifications

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

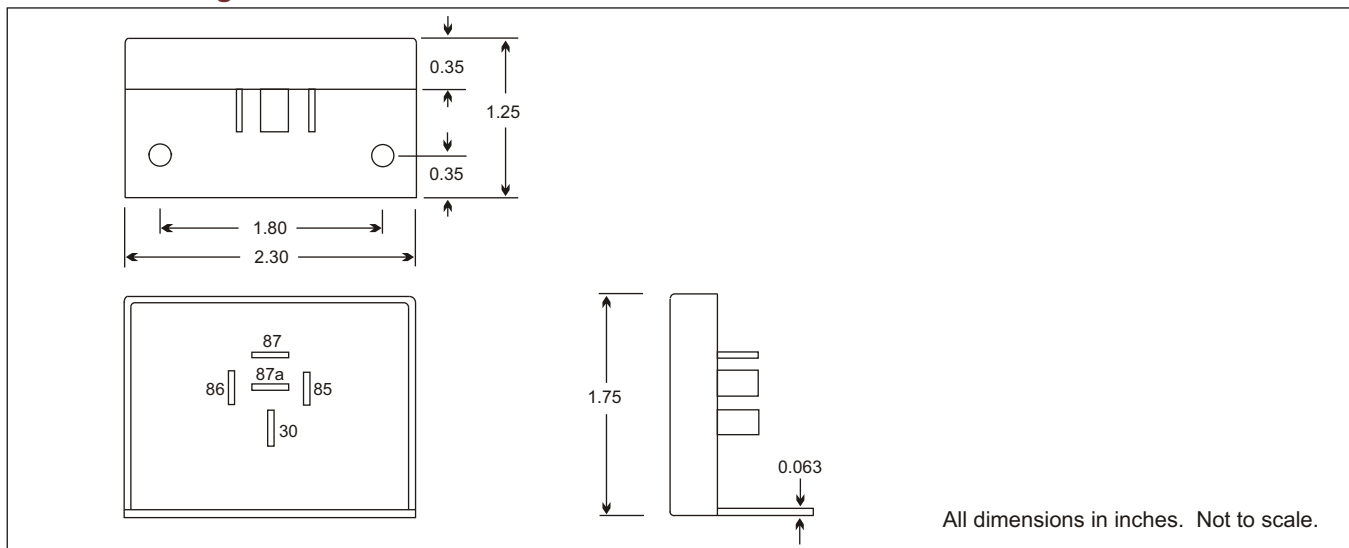
Timing Diagram



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 (86) 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.

Outline Drawing



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VCM-06
Low Voltage Power Disconnect
With Adjustable Timer

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.

Technical Description

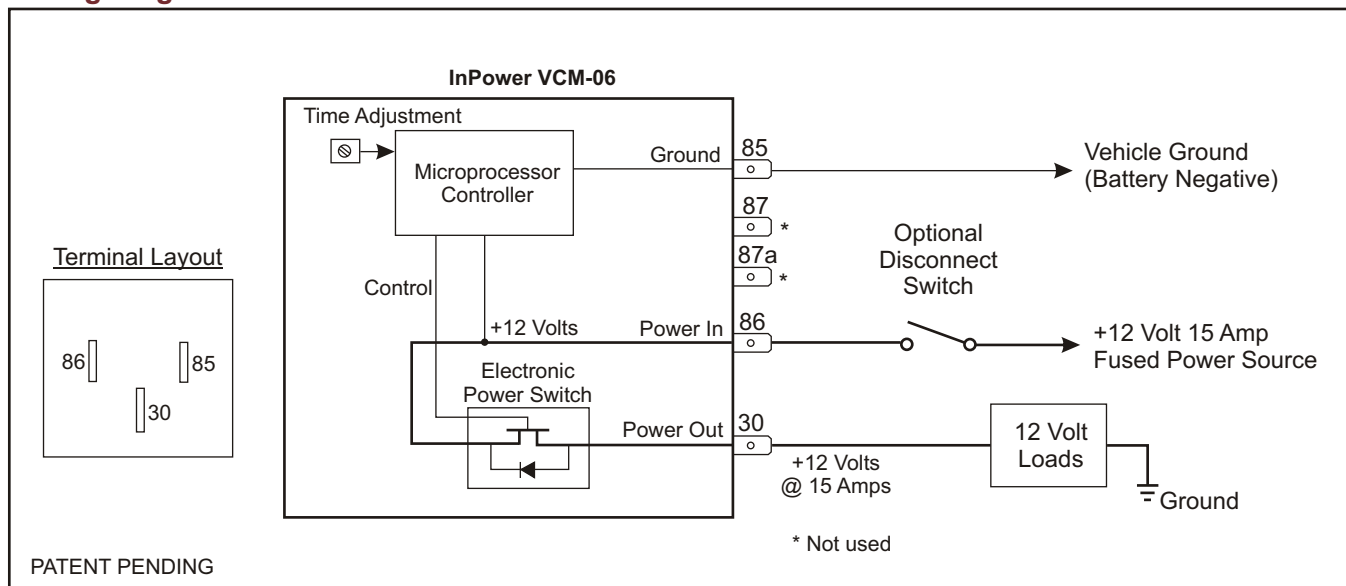
The InPower VCM-06 is a completely solid state 15 amp automatic power disconnect switch for 12 volt loads. The module contains a microprocessor controller and a solid state 15 amp power switch for powering the output loads. The module will continuously monitor the voltage level of the 12 volt power input terminal. If the voltage is above 13.25 volts the power switch will turn on to supply up to 15 amps on the output terminal to power the loads. If the voltage on the input drops below 12.8 volts a timer is started (adjustable 0 to 2 hours). If the voltage remains below 12.8 volts until the timer expires the power switch will turn off, disconnecting the power to the loads. If the voltage drops below 11.8 volts with the timer running the power switch is shut off immediately. Any time the input voltage increases to above 13.25 volts the power switch will turn on to supply power to the loads and the timer will be reset.

The timer is adjustable via a single turn potentiometer (adjustable from zero to two hours). The output is rated at +12 volts @ 15 amps and provides over current and short circuit fault shut down protection. If a fault condition is detected, the power switch will turn off and remain latched off until the input voltage is cycled to below 13.0 volts. The power switch will turn on when the voltage increases to above 13.25 volts.

Key Features

- **Voltage >13.25 - Output On**
- **Voltage <12.8 - Output Off After Adjustable Time Delay**
- **Voltage <11.8 - Output Instant Off**
- **12 Volt 15 Amp Solid State Output With Over Current Shutdown**
- **Standard Automotive Relay Pin Format**
- **Compact Size With Panel-Mount Bracket**
- **100% Solid State Construction**
- **Durable Metal Case**

Wiring Diagram



VCM-06

Low Voltage Timed Power Disconnect

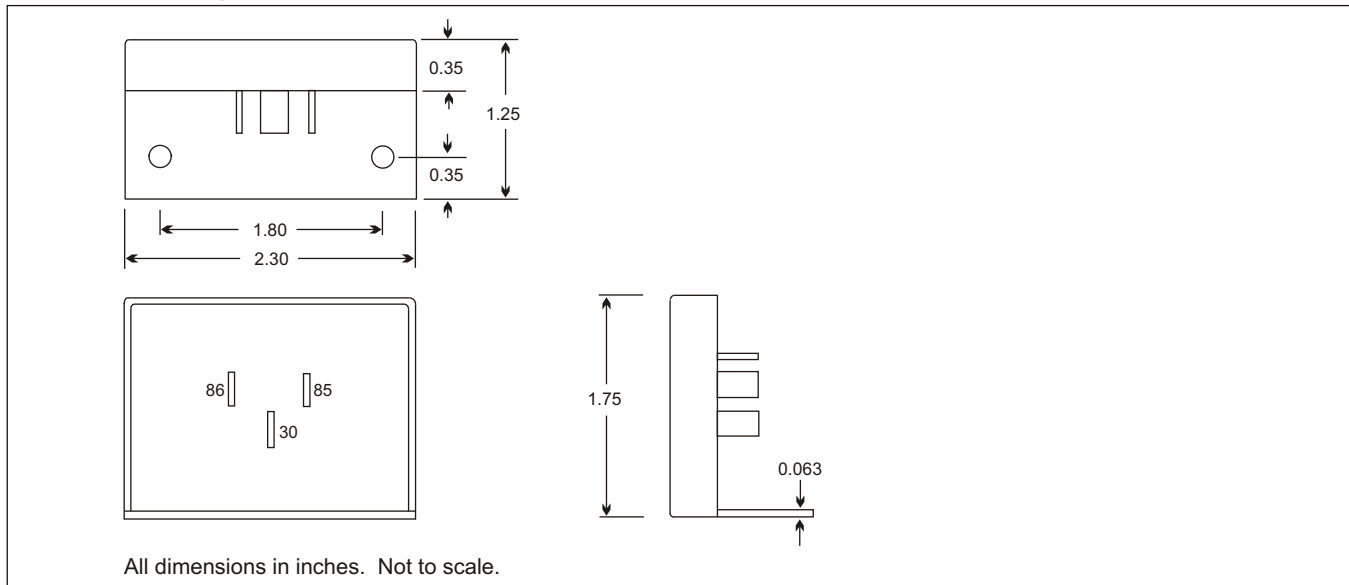
Specifications

Power Operating Range (86): Ground (85):	+8 to 16 Vdc @ 15 amps Connection to vehicle Ground (Battery Negative)	Output Disconnect Operation: Input voltage >13.25 - Output on Input voltage <12.8 - Output off after timer expires (0 to 2 hour adjustable) Input Voltage <11.8 - Output Instant Off
Module Output (30):	+12 volts @ 15 amps, over current and short circuit shutdown fault protection	
Mechanical		
Weight:	0.10 lbs.	
Operating Temperature:	-40° C to +85° C	
Dimensions:	1.75" H x 2.30" W x 1.25"	

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 (86) 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.

Outline Drawing



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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. 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.

Technical Description

The InPower VCM-08 warning lamp flasher represents a breakthrough in solid state flasher technology. The use of advanced SMT and packaging technology results in a very compact, high performance flasher with exceptional reliability and low cost.

The VCS-08 flasher is a completely solid state dual output alternating warning 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 are a unique design that 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

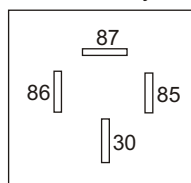
- 100% Solid State Construction
- Operates Halogen and LED Lamps
- Standard Automotive Relay Pin Format
- Dual 12 Volt 15 Amp Solid State Outputs
- Compact Size with Panel-Mount Bracket
- High Technology Power Switching Circuit
- Durable Metal Case

Ordering Guide

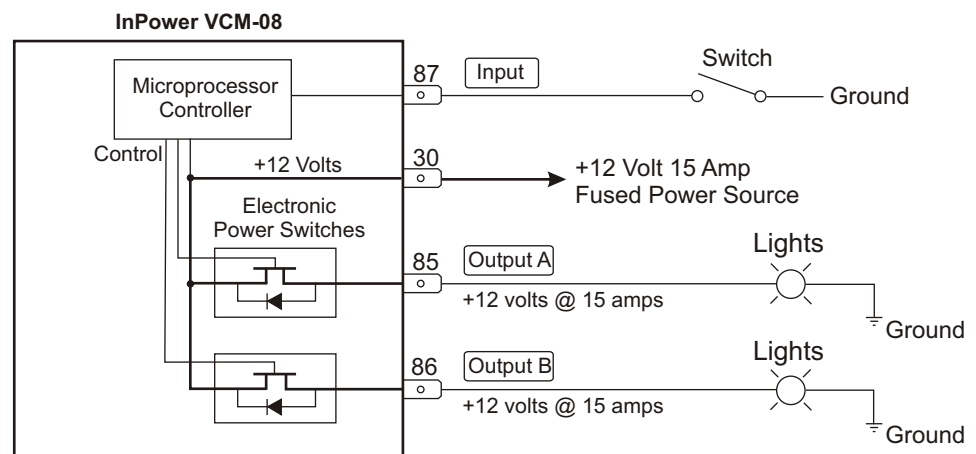
Model	Description
VCM-08	Solid state alternating lamp flasher with single input and two +12 volt @ 15 amp outputs.

Wiring Diagram

Terminal Layout



PATENT PENDING



VCM-08

Solid State Dual 15 Amp Alternating Flasher

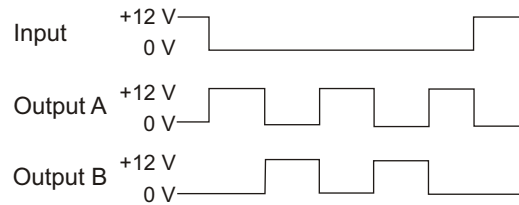
Specifications

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

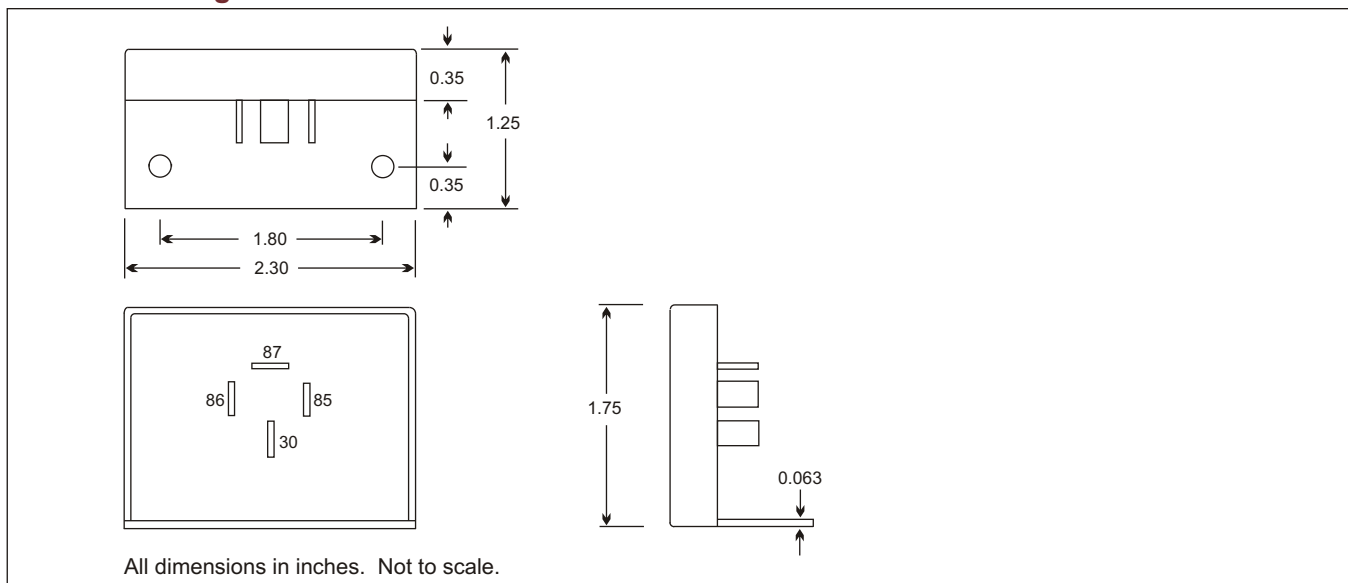
Timing Diagram



Installation

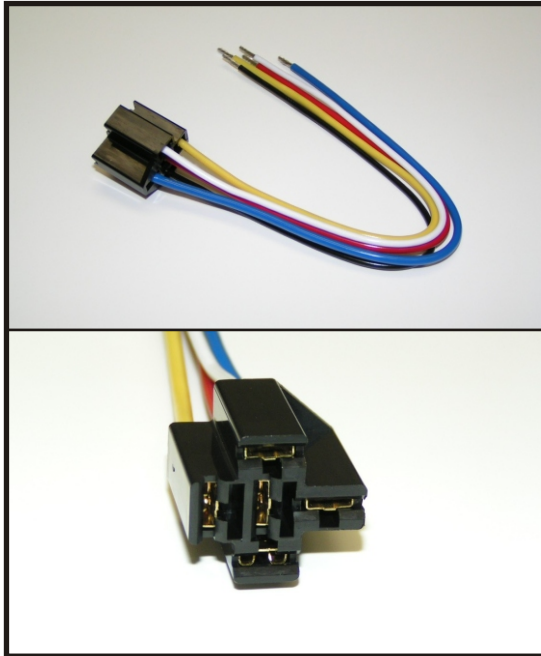
1. We recommend that the module be installed by a person trained and skilled in vehicle electrical systems. The installation should comply with SAE (Society of Automotive Engineers) and the vehicle manufacturer's electrical wiring procedures (e.g., Ford, General Motors, etc.).
2. The module should be 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.

Outline Drawing



Offered by:


Off Road Engineering LLC
www.offroadengineering.com
(949) 581 2991

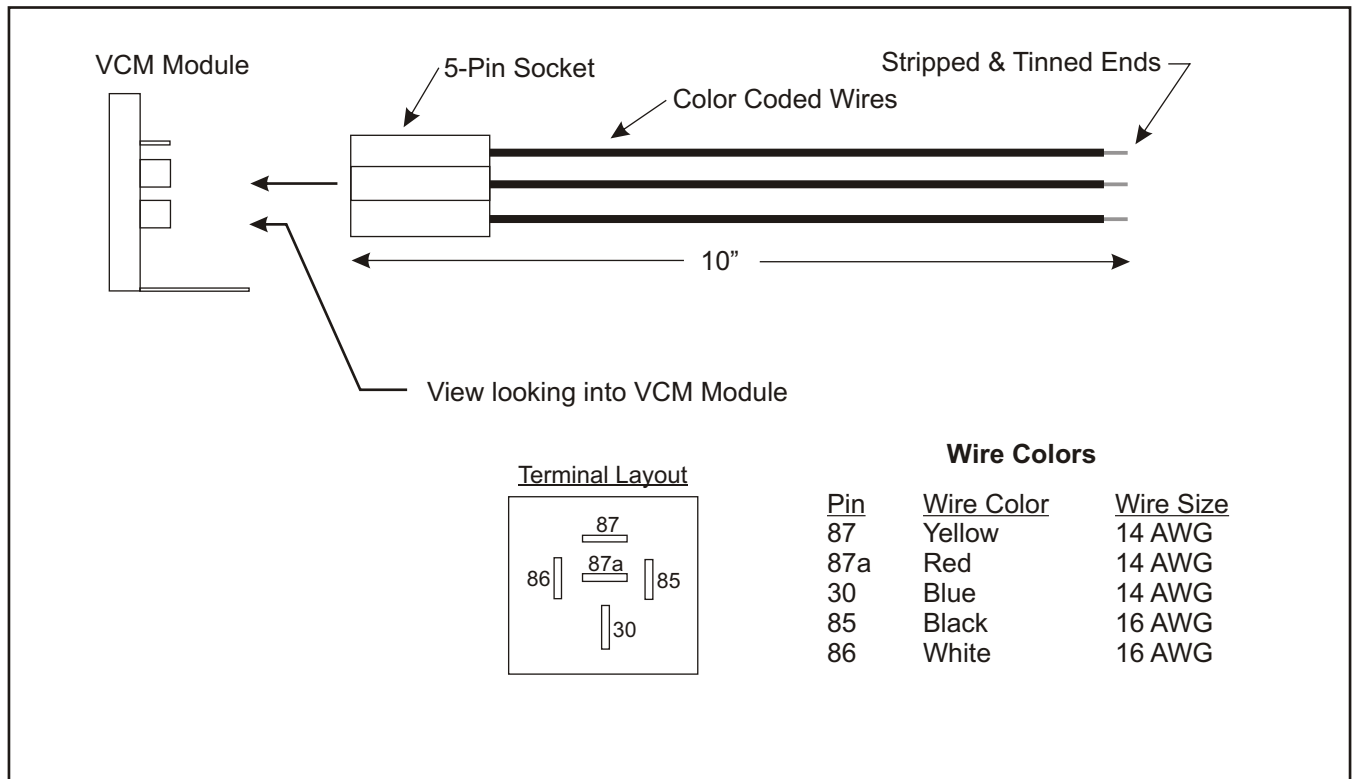


VCM-CA1
Socket Harness Assembly

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.

Technical Description

The InPower VCM-CA1 Socket Harness Assembly consists of a 5-pin socket with attached color coded wires. The socket is a universal automotive relay configuration with five sets of contacts. This socket fits the InPower Vehicle Control Module (VCM Series) products. Each wire is color coded, stripped and tinned.



Remote Controlled Engine Fast Idle Circuit

Latching circuit toggles the engine fast idle controller on/off from a remote switch.

Product Information

InPower Model: VCM-01 Alternating Latching Solid State Relay, 12 volt

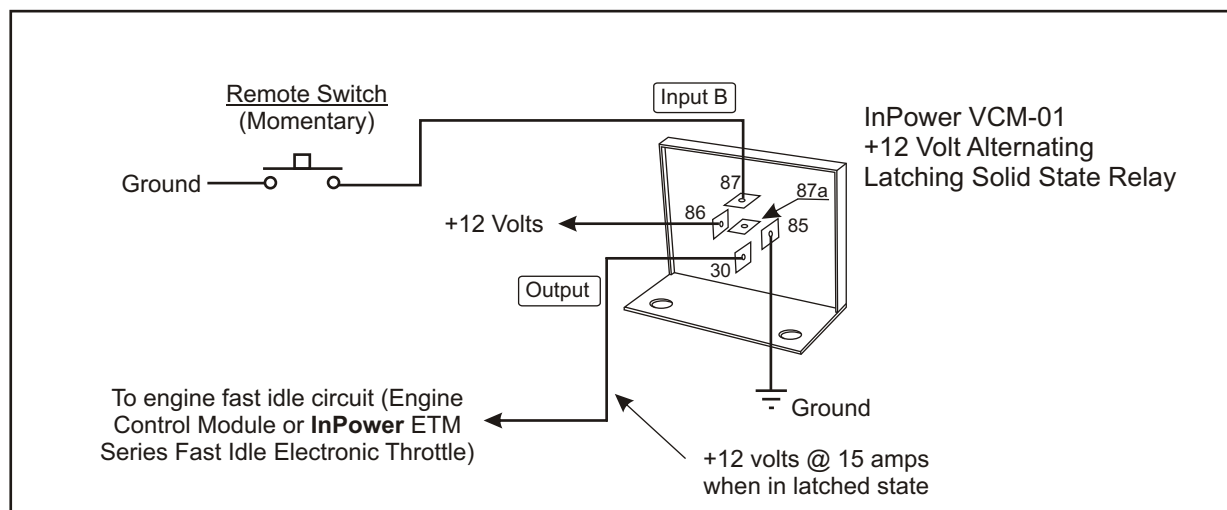
Description: The VCM-01 module contains two inputs, one actuated by a transition to +12 volts and one actuated by a transition to ground. The module's output will toggle to the opposite state when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. The module's output is +12 volts @ 15 amps when in the latched state. Upon power up the output is in the unlatched state.

Documentation: Product Data Sheet PDS-58

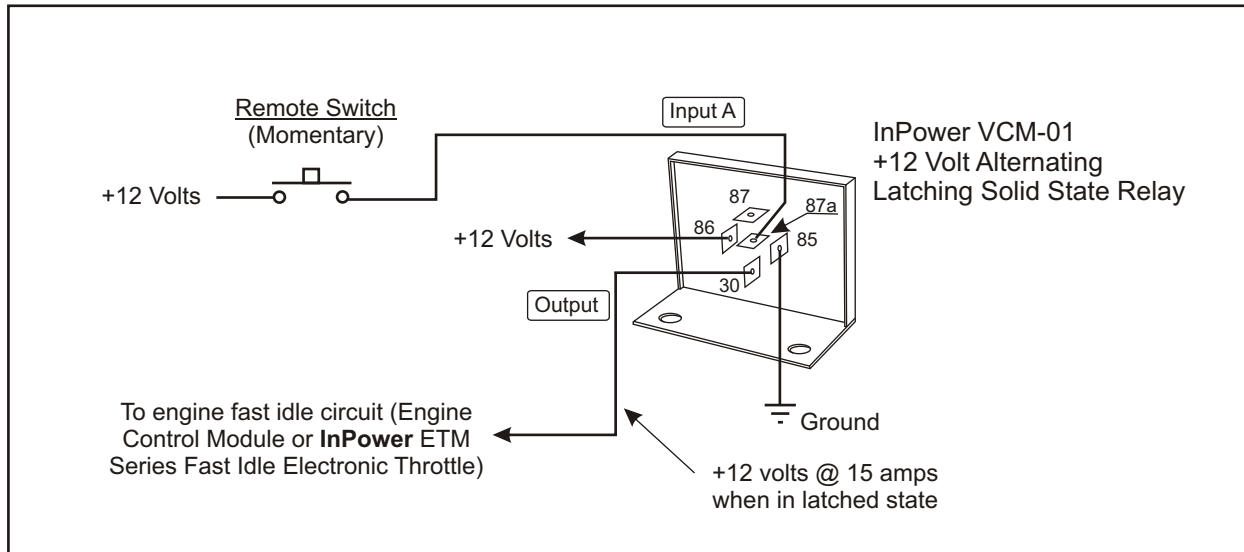
Operation

Operating the remote switch the first time will cause the VCM-01 module to set its output to the latched state (output terminal 30 at +12 volts). When set, the output will activate the engine fast idle circuit. Operating the remote switch a second time will reset the VCM-01 output to the unlatched state (no power on terminal 30). When powering up (+12 volts in terminal 86) the VCM-01 module will be in the un-latched state (no power on terminal 30).

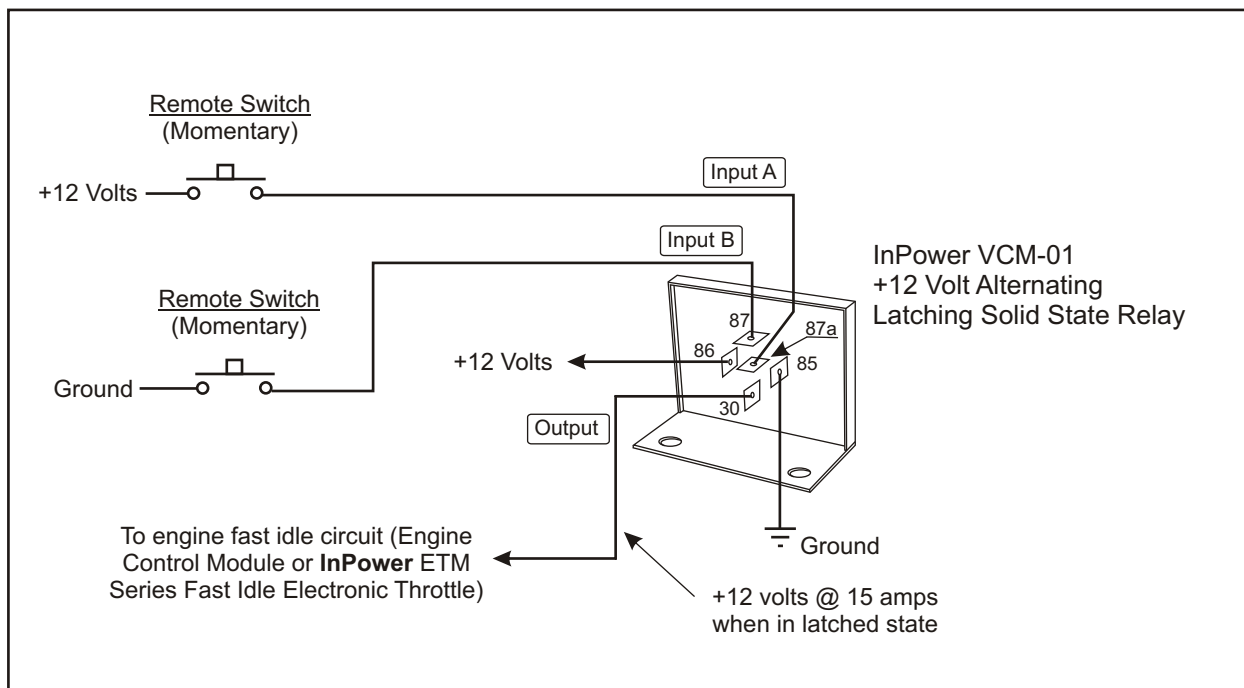
Application Wiring Diagram 1 - (Remote switch connected to ground)



Wiring Diagram 2 (Remote switch connected to +12 volts)



Wiring Diagram 3 (Two remote switches, connected to +12 volts and to ground)



Remote Controlled Compartment Light Circuit

Latching circuit toggles vehicle compartment lights on and off from multiple remote switches.

Product Information

InPower Model: VCM-01 Alternating Latching Solid State Relay, 12 volt

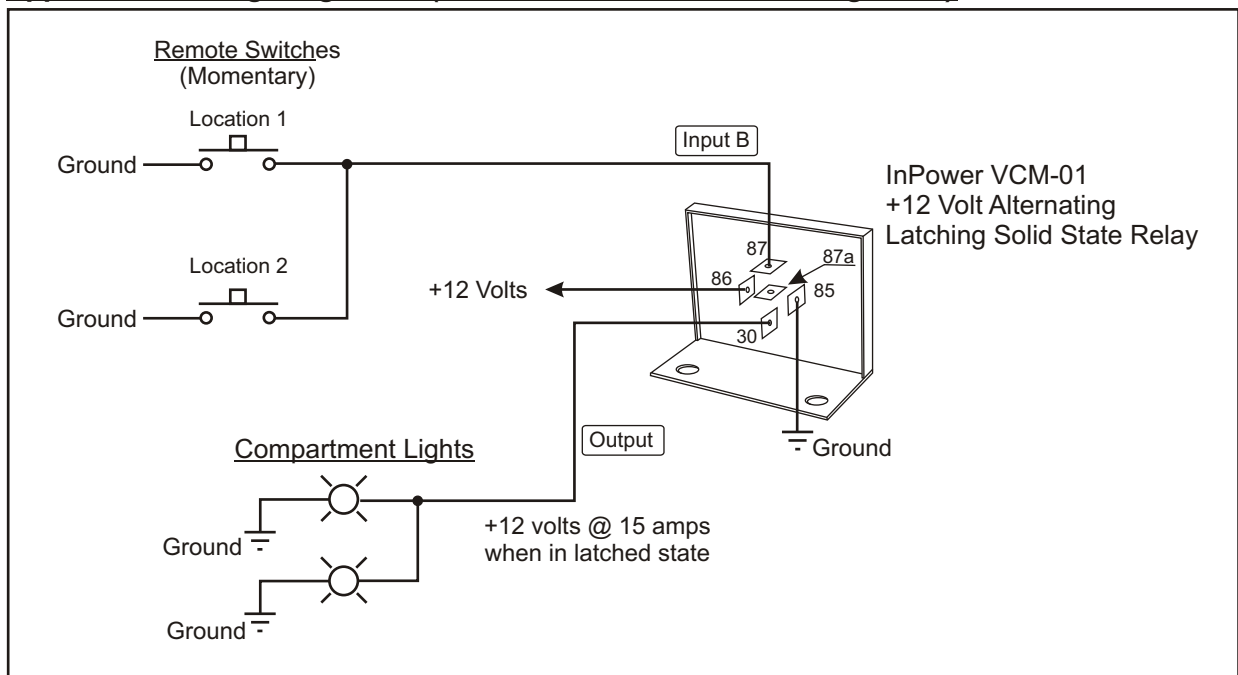
Description: The VCM-01 module contains two inputs, one actuated by a transition to +12 volts and one actuated by a transition to ground. The module's output will toggle to the opposite state when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. The module's output is +12 volts @ 15 amps when in the latched state. Upon power up the output is in the unlatched state.

Documentation: Product Data Sheet PDS-58

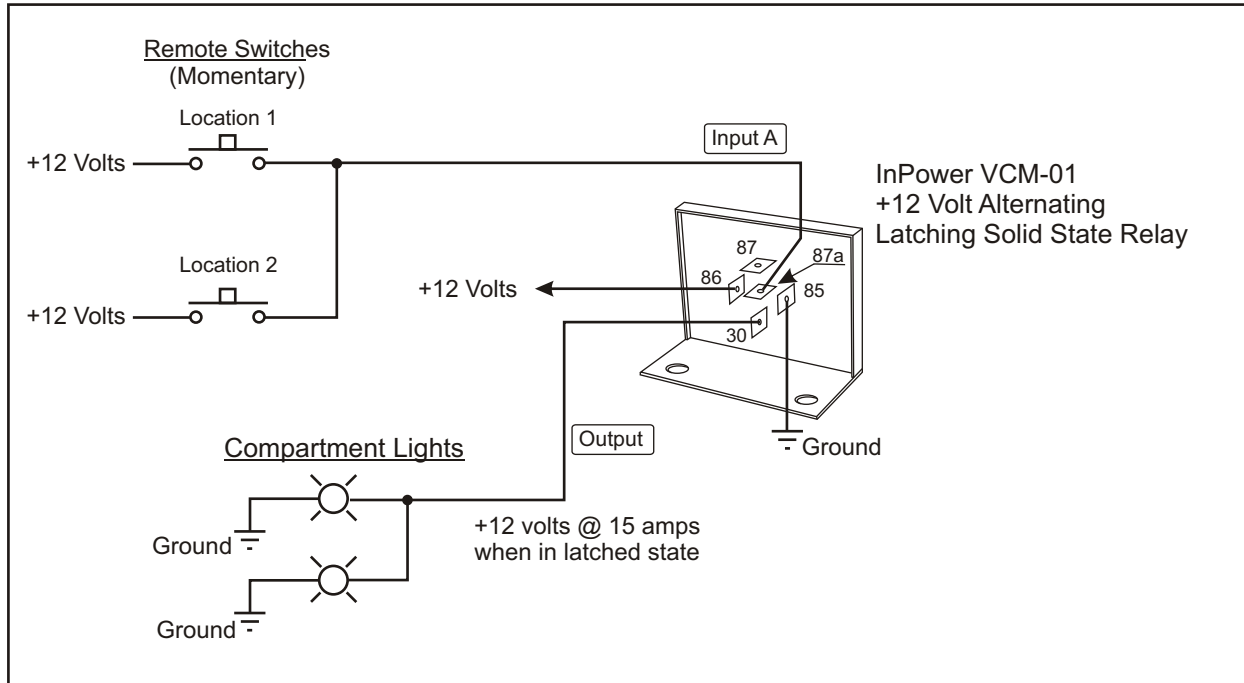
Operation

Operating a remote switch the first time will cause the VCM-01 module to set its output to the latched state (output terminal 30 at +12 volts). When set the output will power the compartment lights. Operating a remote switch a second time will reset the VCM-01 module's output to the unlatched state (no power on terminal 30). When powering up (applying +12 volts on terminal 86) the VCM-01 module will be in the unlatched state (no power on terminal 30).

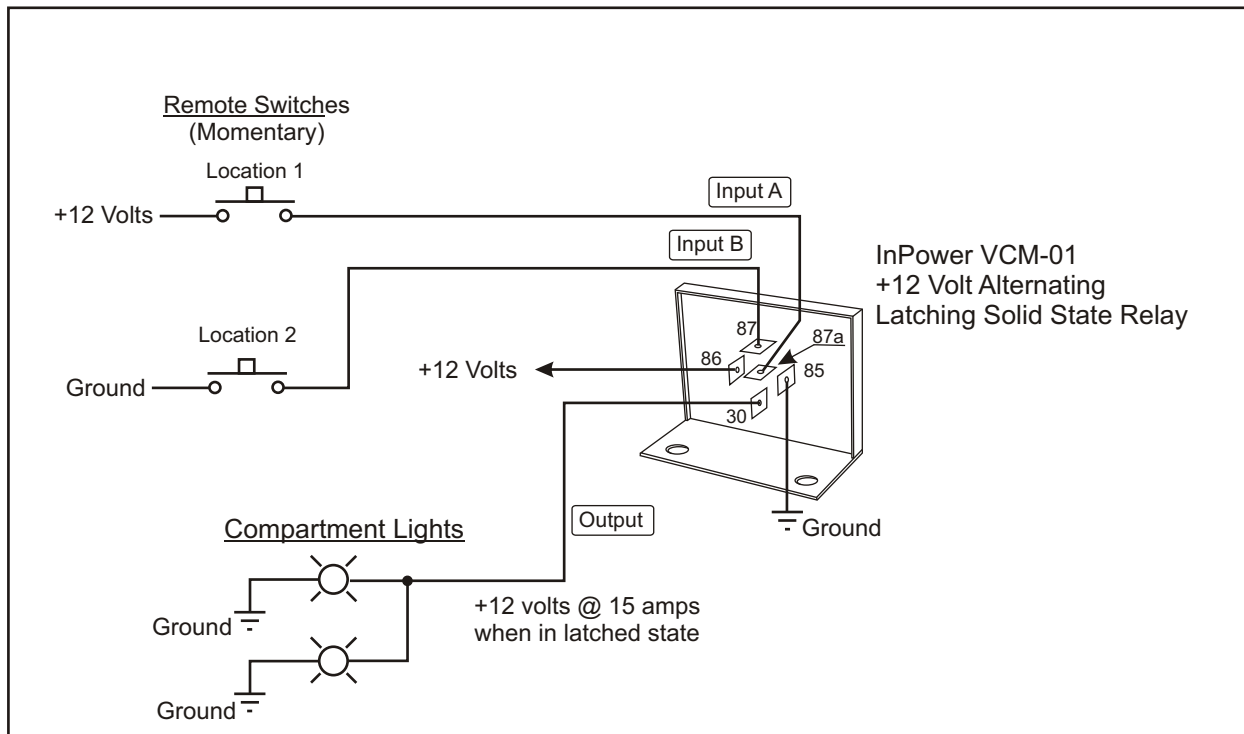
Application Wiring Diagram 1 (Remote switch connected to ground)



Application Wiring Diagram 2 (Remote switches connected to +12 volts)



Application Wiring Diagram 3 (Two remote switches, connected to +12 volts and ground)



Delayed 12 Volt Circuit Operation

Adjustable on-delay timer function provides delayed circuit operation..

Product Information

InPower Model: VCM-03.X Time Delay Solid State Relay, On-Delay

Description: The VCM-03.X is a solid state adjustable on-delay timer 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 timer to operate. When an input is applied and maintained, the timer will start. When the timer expires the output will be activated. The output will remain activated until both inputs are open (cleared). The time period is adjustable with a single turn potentiometer. Four time ranges are available: 0-10 seconds, 0-60 seconds, 0-3 Minutes, and 0-10 minutes.

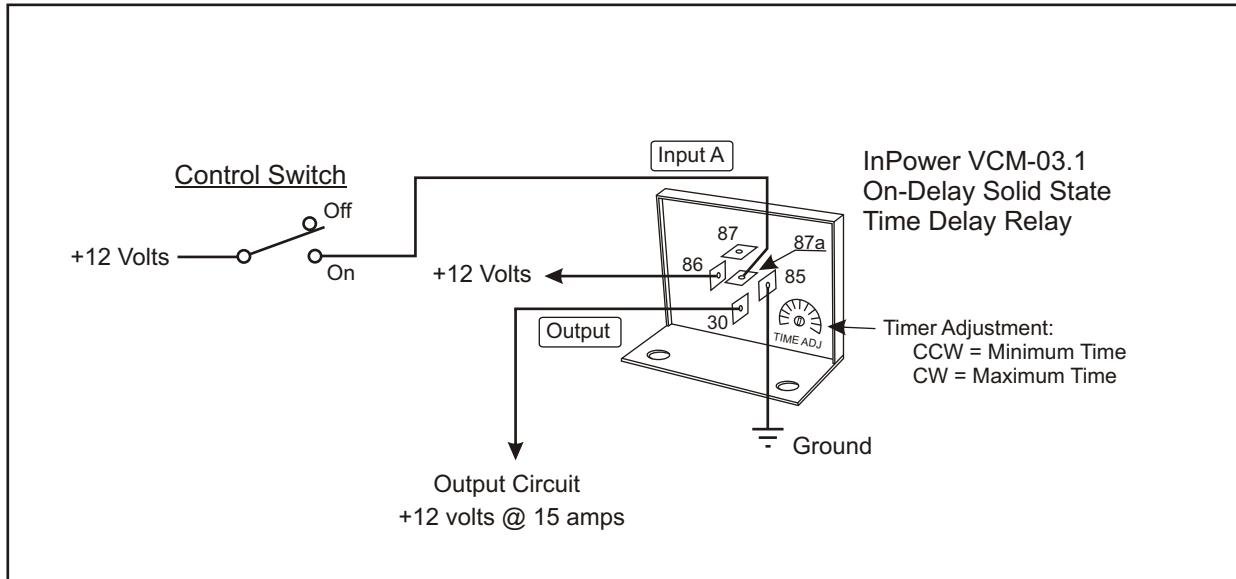
Available Models: VCM-03.1 0 - 10 Seconds Time Range
VCM-03.2 0 - 60 Seconds Time Range
VCM-03.3 0 - 3 Minutes Time Range
VCM-03.4 0 - 10 Minutes Time Range

Documentation: Product Data Sheet PDS-59

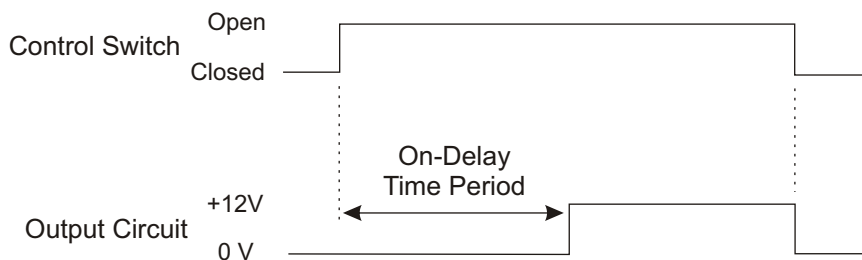
Operation

1. Operate Switch to On position. The timer is started (The time period is adjustable).
2. When the timer expires the Output Circuit is activated via the VCM-03.X output (terminal 30).
3. When Switch is set to Off position, the Output Circuit is deactivated and timer is reset.

Application Wiring Diagram (Control switch with delayed output)



Timing Diagram



Bus Egress Light Timer Circuit

Operates a bus door egress light when entry door is open, and for a timed period (adjustable) after the door is closed.

Product Information

InPower Model: VCM-04.X Time Delay Solid State Relay, Off-Delay

Description: The VCM-04.X 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 timer to operate. When an input is applied the output will immediately be activated. When the input is removed, the timer will start and the output will remain activated. When the timer expires the output will deactivate. The time period is adjustable with a single turn potentiometer. Four time ranges are available: 0-10 seconds, 0-60 seconds, 0-3 Minutes, and 0-10 minutes.

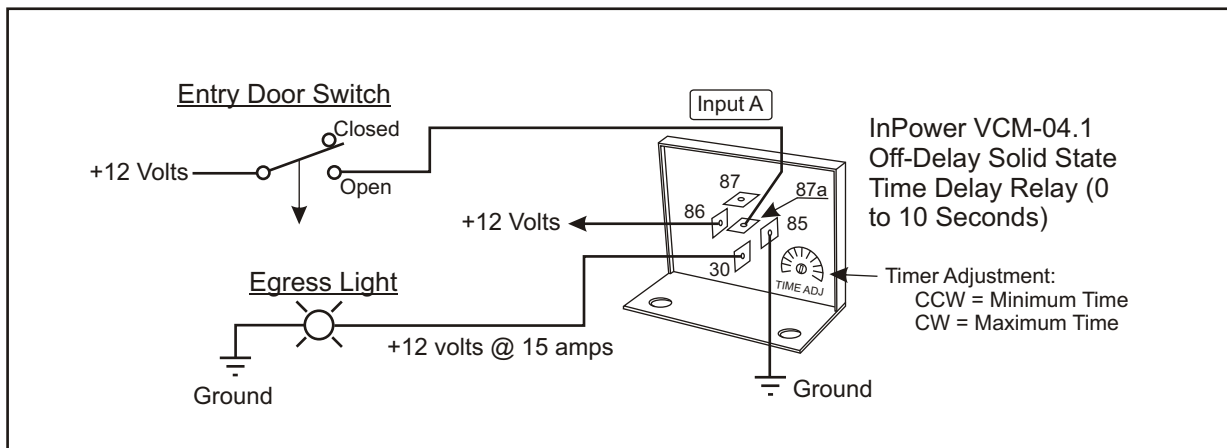
Available Models:	VCM-04.1	0 - 10 Seconds Time Range
	VCM-04.2	0 - 60 Seconds Time Range
	VCM-04.3	0 - 3 Minutes Time Range
	VCM-04.4	0 - 10 Minutes Time Range
	VCM-04.5	0 - 60 Minutes Time Range
	VCM-04.005S	Fixed 5 Seconds

Documentation: Product Data Sheet PDS-60

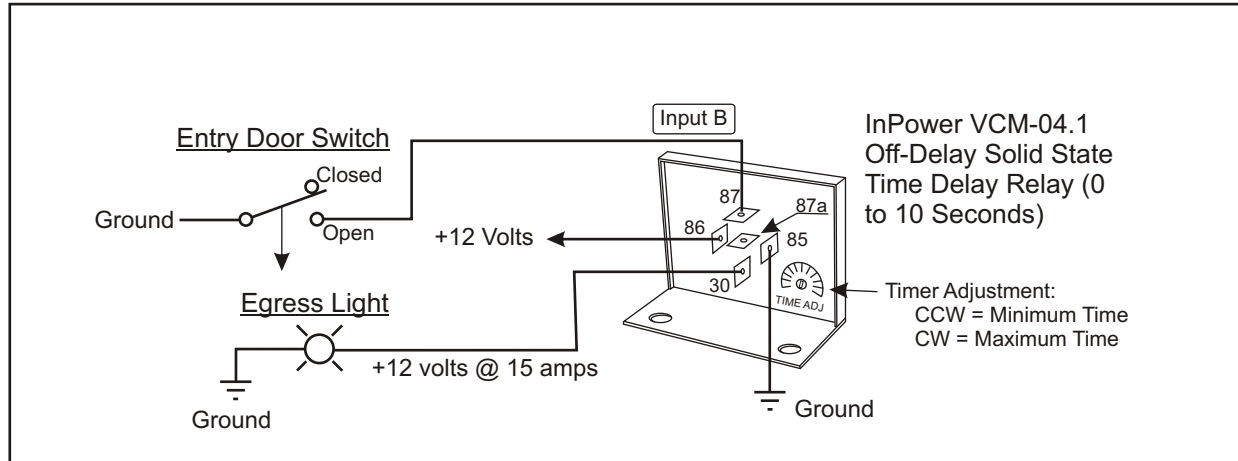
Operation

1. Door opens. Egress light turns on immediately via VCM-04.X output (terminal 30).
2. Door closes. Timer is started.
3. Timer expires and egress light turns off.

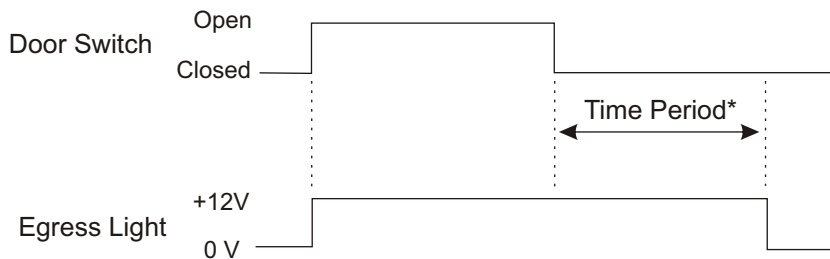
Application Wiring Diagram 1 (Entry door switch connected to +12 volts)



Application Wiring Diagram 2 (Entry door switch connected to ground)



Timing Diagram:



* On model VCM-04.1, the time period is adjustable from 0 to 10 seconds.

Bus Mirror Heater Timer Circuit

Circuit provides an adjustable timed power output to the mirror heating element when activated by the control switch.

Product Information

InPower Model: VCM-05.X Time Delay Solid State Relay, One-Shot

Description: The VCM-05.X is a solid state adjustable one-shot timer 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 timer to operate. If the module is not already in a time-out sequence, its output will be activated for the adjustable time period when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. Once the timer has started, and the output activated, it will not be affected by the state of the input. The time period is adjustable with a single turn potentiometer. Time ranges available include: 0-10 seconds, 0-60 seconds, 0-3 minutes, 0-10 minutes, 0-60 Minutes, and fixed 120 seconds.

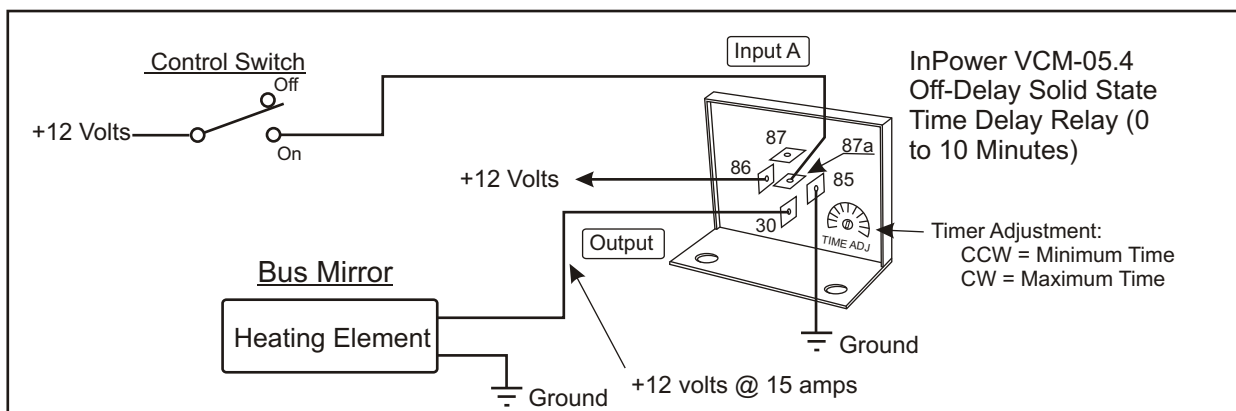
Available Models:	VCM-05.1	0 - 10 Seconds Time Range
	VCM-05.2	0 - 60 Seconds Time Range
	VCM-05.3	0 - 3 Minutes Time Range
	VCM-05.4	0 - 10 Minutes Time Range
	VCM-05.5	0 - 60 Minutes Time Range
	VCM-05.120S	Fixed 120 Seconds

Documentation: Product Data Sheet PDS-61

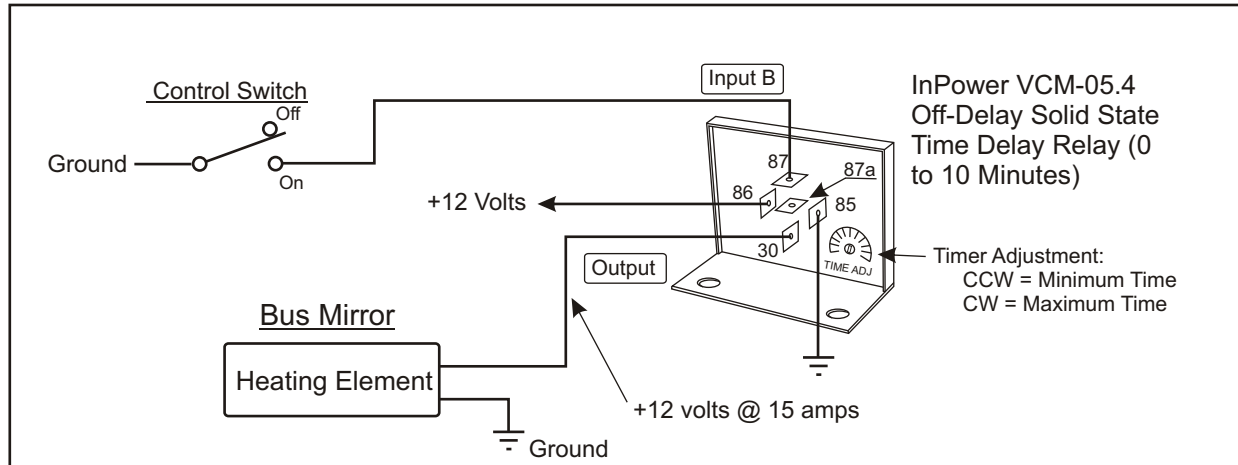
Operation

- Control Switch is turned on (This may be a momentary push button switch or a 2-position maintained switch).
- The mirror heating element is powered by the VCM-05.X output (terminal 30). The VCM-05.X keeps power on the heating element for a fixed period of time (VCM-5.X time setting) regardless of the Control Switch being in the open or closed position.

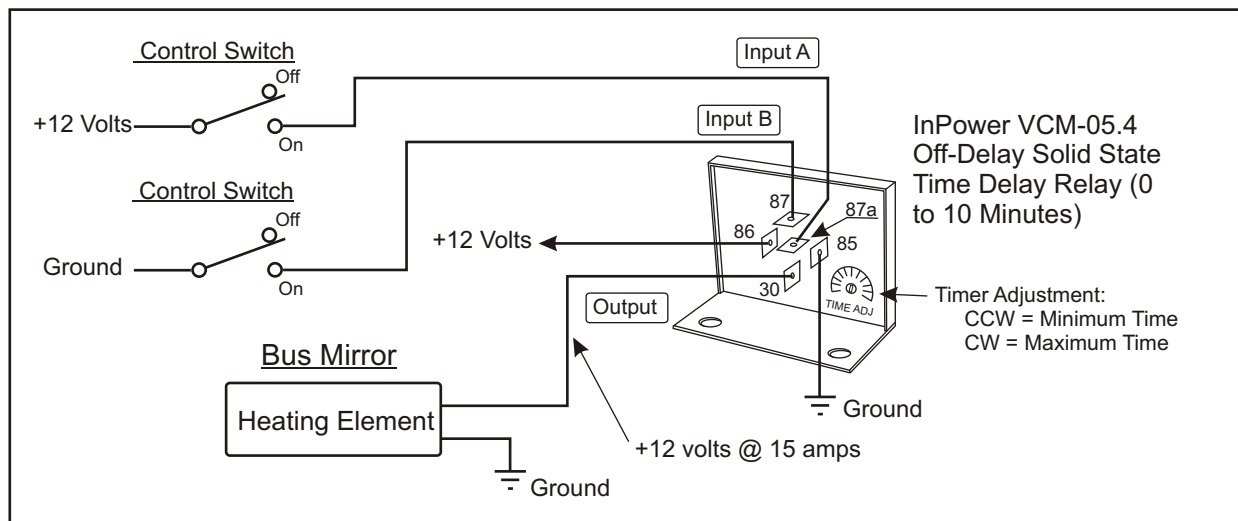
Application Wiring Diagram 1 (Control switch connected to +12 volts)



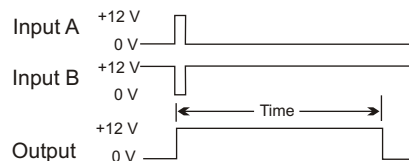
Application Wiring Diagram 2 (Control switch connected to ground)



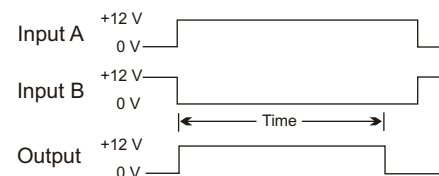
Application Wiring Diagram 3 (Control switches connected to ground and +12 volts)



Timing Diagram



This timing diagram shows a short duration (e.g., Momentary) control switch operation. The switch activation starts the timed output pulse.



This timing diagram shows a long duration control switch operation. The leading edge of the switch activation activates the timed output pulse. The timed output will end regardless of the control switch being on or off.

Bus Stop Request Circuit

Operates a bus stop request indicator and timed buzzer from the pull cord switch and resets when the entry door is opened.

Product Information

InPower Model: VCM-05.X Time Delay Solid State Relay, One-Shot

Description: The VCM-05.X is a solid state adjustable one-shot timer 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 timer to operate. If the module is not already in a time-out sequence, its output will be activated for the adjustable time period when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. Once the timer has started, and the output activated, it will not be affected by the state of the input. The time period is adjustable with a single turn potentiometer. Four time ranges are available: 0-10 seconds, 0-60 seconds, 0-3 minutes, and 0-10 minutes.

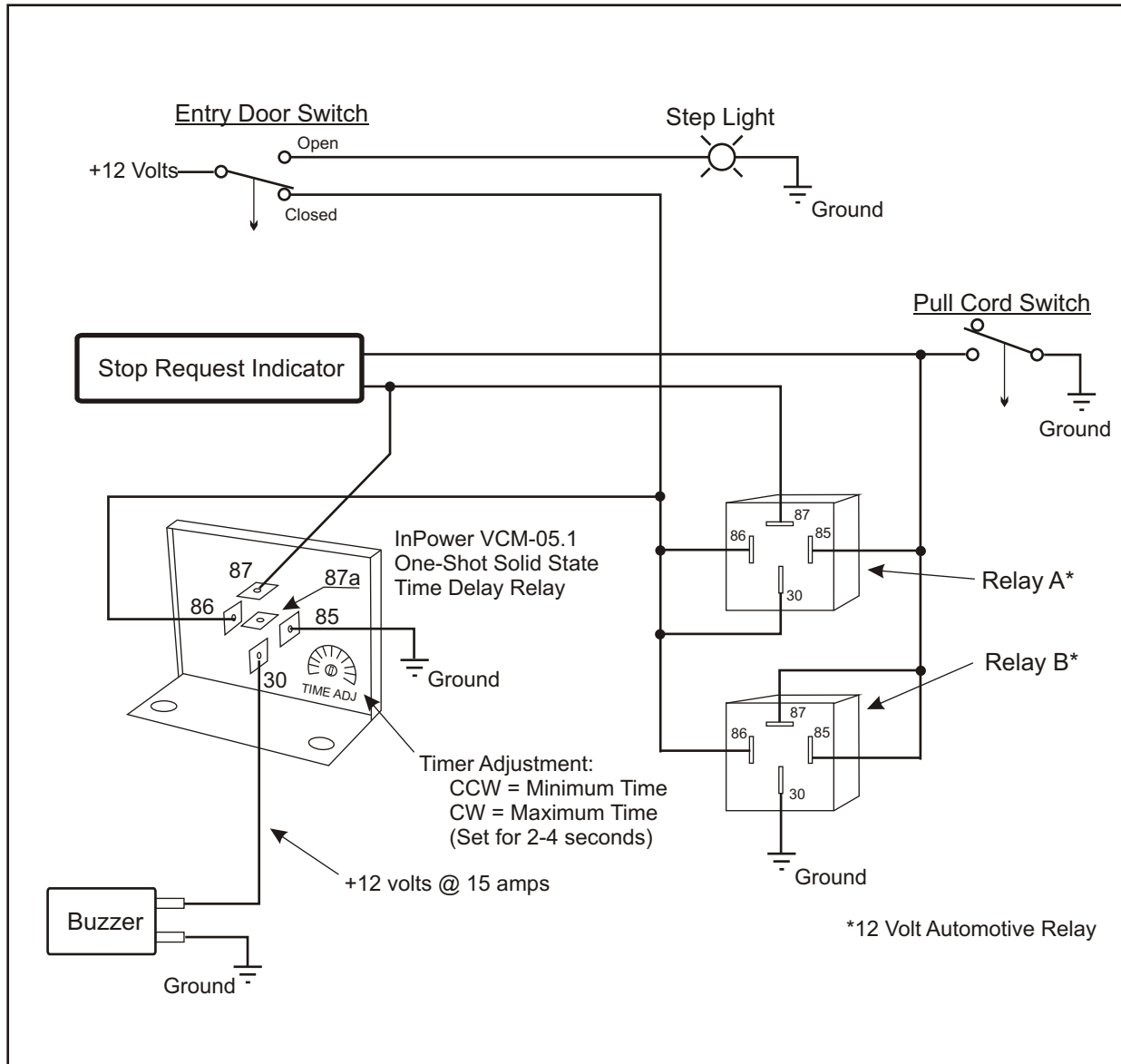
Available Models: VCM-05.1 0 - 10 Seconds Time Range
VCM-05.2 0 - 60 Seconds Time Range
VCM-05.3 0 - 3 Minutes Time Range
VCM-05.4 0 - 10 Minutes Time Range

Documentation: Product Data Sheet PDS-61

Operation

1. Door Switch is closed. Pull Cord Switch is operated. Relays A and B operate and stay latched.
2. Stop Request Indicator is powered. VCM-05.X powers buzzer immediately and keeps it powered for the VCM-05.X time period. Buzzer goes off and Stop request Indicator stays on.
3. When Door Switch goes to Door Open position, Step Light turns on and Relay A, Relay B and VCM-05.X are reset (turned off).
4. When Door Switch goes to Door Closed position the sequence can repeat.

Application Wiring Diagram



Bus Alternating Warning Light Flasher Circuit

Product Information

InPower Model: VCM-08 Dual 15 Amp Alternating Lamp Flasher

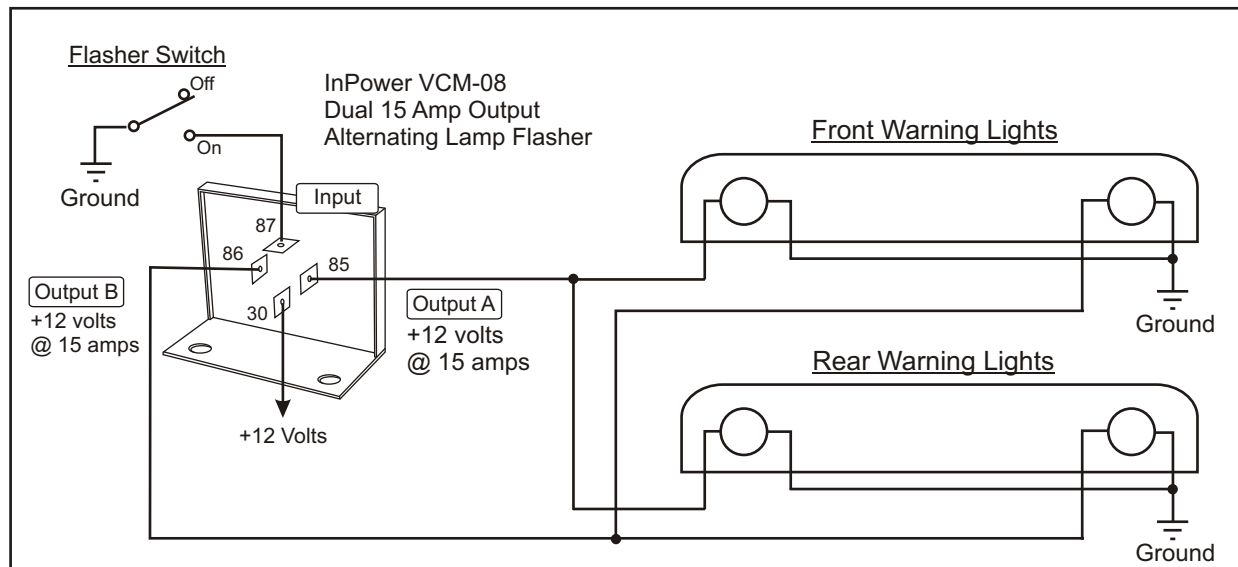
Description: The VCS-08 flasher is a completely solid state dual output alternating warning lamp flasher. Its outputs are rated at +12 volts @ 15 amps each, and are designed to operate high in-rush current halogen and incandescent lamps, as well as LED lights. When a ground is applied to the input, the outputs will alternately flash at a rate of 75 cycles per minute at a 50% duty cycle. The solid state outputs are a unique design that 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.

Documentation: Product Data Sheet PDS-62

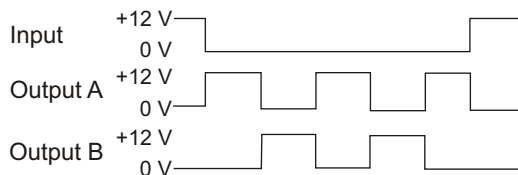
Operation

1. Flasher Switch to On position.
2. Output A and Output B alternately flash at a rate of 75 flashes per minute.

Application Wiring Diagram



Timing Diagram



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School Bus Egress Lamp Timer



- Automatically Activates Exterior Egress Lamp
- Adjustable Time Off Delay After Door is Closed
- Timer Delay Adjustable from 0-10 Seconds
- Controls up to 15 Amps



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VCM-04.X
Time Delay Solid State Relay, Off-Delay

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.

Technical Description

The InPower VCM-04.X is a completely solid state adjustable off-delay timer 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 timer to operate.

When an input is applied the output will immediately be activated. When the input is removed, the timer will start and the output will remain activated. When the timer expires the output will deactivate. The time period is adjustable with a single turn potentiometer. Time ranges available include: 0-10 seconds, 0-60 seconds, 0-3 minutes, 0-10 minutes, 0-60 minutes, and fixed 5 seconds.

The output will be activated when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. When the applied input has cleared, and its counterpart input is also clear, the timer will start. When the timer has expired the output will be deactivated and the operation is complete. The output is rated at +12 volts @ 15 amps and provides over current and short circuit shut down protection.

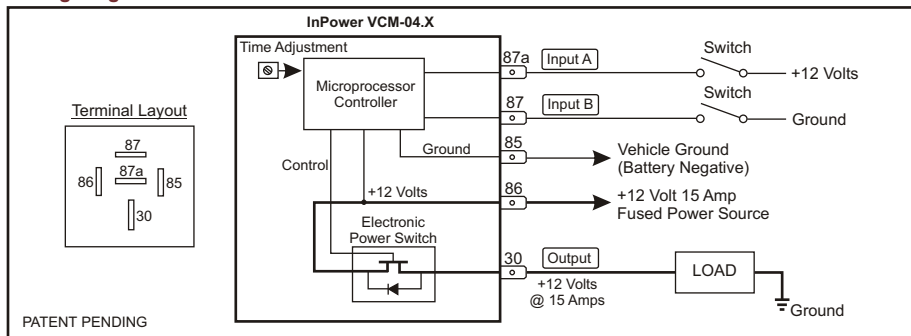
Key Features

- 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
- Durable Metal Case

Ordering Guide

Model	Time Range	Description
VCM-04.1	0 - 10 Sec.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.2	0 - 60 Sec.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.3	0 - 3 Min.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.4	0 - 10 Min.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.5	0 - 60 Min.	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs
VCM-04.005S	5 Sec. Fixed	Solid state off-delay time delay relay with +12 volt @ 15 amp output and two inputs

Wiring Diagram



Product Data Sheet

PDS-60C

VCM-04.X

Time Delay Solid State Relay, Off-Delay

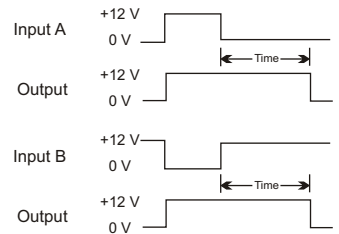
Specifications

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

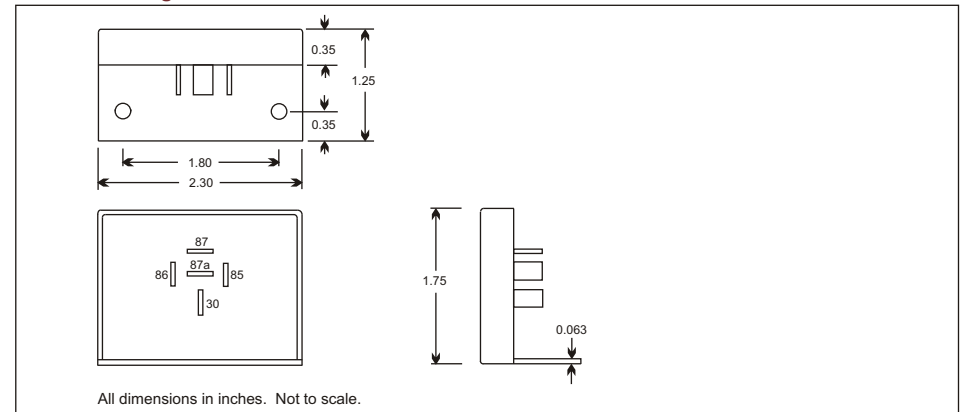
Timing Diagram



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 (86) 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.

Outline Drawing



All dimensions in inches. Not to scale.

Offered by:



PDS-60C 010308
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Automatic Mirror Heater Shut off Timer



- Prevents Mirror Damage
- Minimizes Battery Drain
- Adjustable Shut off Time Delay
- Easy to Install



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InPower Model: VCM-05.X Time Delay Solid State Relay, One-Shot

Description: The VCM-0.X is a solid state adjustable one-shot timer 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 timer to operate. If the module is not already in a time-out sequence, it's output will be activated for the adjustable time period when +12 volts is applied to Input A while Input B is open, or when ground is applied to Input B while Input A is open. Once the timer has started, and the output is activated, it will not be affected by the state of the input. The time period is adjustable with a single turn potentiometer. Five time ranges are available: 0-10 seconds, 0-60 seconds, 0-3 minutes, 0-10 minutes, and 120 seconds non-adjustable.

Available Models:	VCM-05.1	0 - 10 Seconds Time Range
	VCM-05.2	0 - 60 Seconds Time Range
	VCM-05.3	0 - 3 Minutes Time Range
	VCM-05.4	0 - 10 Minutes Time Range
	VCM-05.120S	120 Second Non-Adjustable

Wiring Diagram:

