

OWNER'S MANUAL

Solid State Contactors Models: HDVCM 70 Amp HD2VCM 2x35 Amp (-01, -03, -04, -05, -15)



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Introduction

The InPower HDVCM/HD2VCM Series is a family of high current solid state DC switches with programmable configurations to meet various needs. These switches are available in either Single Channel 70Amp or Dual Channel 35Amp Solid State Switches, and are packaged in a sealed plastic case. As they have extremely low current draw when in the off state they are ideally suited for use as Load disconnect switches. A key feature is the contactor's highly efficient, low on-resistance DC power switch. This results in superior performance by producing a low voltage drop and generating only a small amount of internal heat.

Automatic fault shutdown is provided for over current, loss of ground and low battery voltage. Under a fault condition the contactor is latched in the off state. To reset the unit the fault must be cleared; then the control input voltage must be removed, then re-applied. Removing the +BAT cable will also reset the unit.

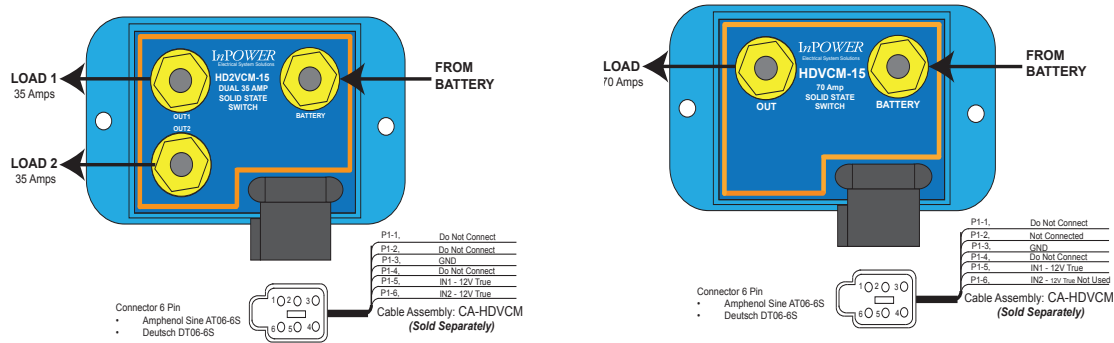
A Deuch Connector provides Control Signal(s) and Ground Connection. Connections for the high current DC cables utilize threaded studs with brass contact pads for low contact resistance.

HDVCM/HD2VCM Models

Model	Configuration	Available	Data Sheet
HDVCM-FAM	Single and Dual Solid State Switch Family Chart		OM-259
HDVCM-01	Single 70 Amp Solid State Latching Switch	In Production	PDS-273
HD2VCM-01	Dual 35 Amp Solid State Latching Switch	In Production	PDS-274
HDVCM-15	1 Channel 70 Amp - On/Off Control IN1, (Off/NoDraw) Low Current Solid State Switch	In Production	PDS-268
HD2VCM-15	2 Channel 35 Amp - On/Off Control with IN1 and IN2, (Off/NoDraw) Low Current Solid State Switches	In Production	PDS-269
HDVCM-03-10SF	1 Channel 70 Amp Latching 10S On Delay Fixed	TBD	TBD
HD2VCM-03-10SF	2 Channel 35 Amp Latching 10S On Delay Fixed	TBD	TBD
HDVCM-04-10SF	1 Channel 70 Amp 10S Off Delay Fixed	TBD	TBD
HD2VCM-04-10SF	2 Channel 35 Amp 10S Off Delay Fixed	TBD	TBD
HDVCM-05-10SF	1 Channel 70 Amp 10S Oneshot Fixed	TBD	TBD
HD2VCM-05-10SF	2 Channel 35 Amp 10S Oneshot Fixed	TBD	TBD
Other Options Available on Request			

Family Model Descriptions

This Section gives a description of the variations that are available from InPower for the control of 12 Volt loads in the HDVCM family.



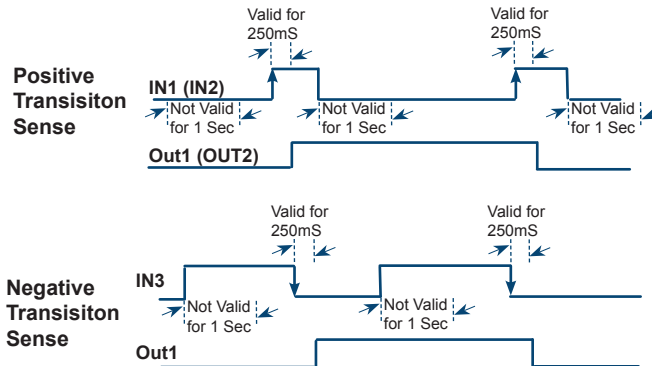
HDVCM-01, HD2VCM-01: These models consist of a single channel 70 amp model, and a dual channel 35 Amp model. Both of these a toggling (latching) Solid State Switch module, that the Single Channel 70Amp is ON in Positive transition (\uparrow IN1) is applied to IN1 or IN2, or a negative transition (\downarrow GND) on IN3.

For the Dual Channel 35 Amp, a Positive transition (\uparrow IN1) applied to IN1 or a Negative transition applied to IN3 (\downarrow GND) will control OUT1.

Likewise Positive transition (\uparrow IN2) applied to IN2 will control OUT2.

Transition Valid Time needs to be a minimum of 250ms for any of the Inputs to be recognized.

Time between Transitions: The input must be FALSE for at least 1 second prior to a new transition to be recognized.



Software in these units will latch the output (single output) or outputs (dual output) ON with the first transition of Voltage, and then turned OFF with the Second transition of Voltage in a Toggle mode. Since these units are programmed to operate in this manner, there will be a standby current consumption of 6ma.

HDVCM-15, HD2VCM-15: These Low Power Consumption models consist of a single channel 70 amp model, and a dual channel 35 Amp model. Both of these a simple solid state switch module, that the Single Channel 70Amp is ON if a voltage is applied to IN1, and for the Dual Channel 35 Amp a voltage applied to IN1 will control OUT1, and a voltage applied to IN2 will control OUT2. They feature an specialized input design that if the Control Voltage (single channel) or Control Voltages (Dual channel) are at zero voltage, the unit will draw next to no current at all (not measurable).

The HDVCM-15 is a Single Channel 12V 70 Amp Solid State Switch designed to offer precise control for a +12V 70 Amp feed, allowing seamless switching of loads. It provides a 12V True Interface for control (IN1) of the Output. This versatile controller is equipped with a microprocessor, enabling it to perform various programmable functions based on customer-specified parameters. If the Control Voltage is not active (IN1 at GND) current draw is 0mA.

To Activate the Output of the HDVCM-15, the must operate voltage is **+5.5Von** Vdc. The must release voltage is **+2.5Voff** Vdc. Note that the input voltage must drop to under +2.5Voff volts to turn it off.

In the case of an Output that has shut off due to a fault and must be reset, IN1 must drop below +2.5Volts to shut off, and then increase to +5.5Von volts to turn on again. This resets the Output.

The HD2VCM-15 is a Dual Channel 12V 35 Amp Solid State Switch designed to offer precise control for two independent +12V 35 Amp feeds, allowing seamless switching of loads. This versatile controller is equipped with a microprocessor, enabling it to perform various programmable functions based on customer-specified parameters. If the Control Voltages are not active (Both IN1 and IN2 at GND), current draw is 0mA.

To Activate the either output of the HD2VCM-15, the must operate voltage is **+5.5Von** Vdc on IN1 for OUT1, or IN2 to turn-on OUT2. The must release voltage is **+2.5Voff** Vdc for either IN1 or IN2.

In the case of an Output that has been shut off due to a Fault, in order to clear the fault, the IN1 or IN2 voltage must drop to under +2.5Voff volts, then increase to +5.5Von volts to turn on again. This resets the associated OUT1 or OUT2.

HDVCM-03-10SF (not released-Still Under Definition-Subject to Change):

This is single channel 70 amp Output with a 10 Second solid-state On-Delay Timer with +12 volt output.

The module's two inputs are activated by a transition to +12 volts (IN1) and by a transition to ground (IN2). The two inputs operate as a logical Exclusive OR so that either input can operate the timer. IN3 is unused.

The timer will start when +12 volts is applied to IN1 while IN2 is off, or when ground is applied to IN2 while IN1 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. Since these units are programmed to operate in this manner, there will be a standby current consumption of 6ma.

HDVCM-04-10SF (not released-Still Under Definition-Subject to Change):

The HDVCM-04 Series 10 Second Off-Delay Timer is a completely solid-state timer relay with a +12 volt output. The module contains two inputs, one activated by a transition to +12 volts (IN1) and one activated by a transition to ground (IN2). 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 IN1 while IN2 is off, or when ground is applied to IN2 while IN1 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. Software in these units will latch the output (single output) or outputs (dual output) ON with the first transition of Voltage, and then turned OFF with the Second transition of Voltage with an OFF delay of 10 Seconds. Since these units are programmed to operate in this manner, there will be a standby current consumption of 6ma.

HDVCM-05-10SF (not released-Still Under Definition-Subject to Change):

The HDVCM-05 Series 10 Second One-Shot Timer is a completely solid-state timer relay with a +12 volt output. The module contains two inputs, one activated by a transition to +12 volts (IN1) and one activated by a transition to ground (IN2). 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 IN1 while IN2 is off, or when ground is applied to Input B while IN1 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.

Software in these units will perform a one shot action on the output (single ouput) or outputs (dual output) ON with the first transition of Voltage. Since these units are programmed to operate in this manner, there will be a standby current consumption of 6ma.

HDVCM/HD2VCM Baseline Family (Common) Specifications

The Following Specifications cover many different variations of the HDVCM/HD2VCM Family. Individual -nn models may deviate, but are called out in the operational description.

The HDVCM and HD2VCM can detect different types of Faults that will shut to Output down to protect the Switch. These can be:

1. An over current condition for greater than 500 milliseconds.
2. Low battery voltage Current Rating.

Maximum current at 85° C (185° F) with Metal Mounting

HDVCM (85°C)	HDVCM (85°C) Surge	HDVCM(85°C) Max
70 Amps	80 Amp (Over Current 5 Sec)	140 Amps (Immediate Trip 500mS)
HD2VCM (85°C)	HD2VCM (85°C) Surge	HD2VCM(85°C) Max
35 Amps	70 Amps (Over Current 5 Sec)	70 Amps (Immediate Trip 500mS)

70 Amps Per channel at 185°F (85°C) *

80 Amp Trip after 5 Sec and Latches OFF *

140 Amp Surge Trip after 500mS and Latches OFF *

* All Ratings Mounted on a 12x12in, unpainted, Aluminum plate

Latched OFF Outputs require Manual Restart • *Turn OFF, then Turn ON again*

On Voltage Batt Pin: 5.5V Minimum

On Voltage IN1/IN2 Inputs: 5.5V Minimum

Control Input Voltage: >+5.5 Vdc to activate, <+2.5 Vdc to deactivate (for voltage level sensitive inputs)

BAT+ to LOAD Terminal

Leakage Current: 10 nanoamps maximum

Control Input Resistance: 33 K Ohm to ground (IN1, IN2)

Control Input Voltage HDVCM-15: >+5.5 Vdc to activate, <+2.5 Vdc to deactivate (for voltage level sensitive inputs)

Control Input Resistance -15: 33 K Ohm to ground

Weight: 0.17 lbs (0.077 kg)

Dimensions: 3.40 (86.36mm) x 1.88 (47.75mm) x 1.12 inches (23.44mm)

Power Terminals: 1/4-20 3/4" stainless steel studs, Brass 1/4-20 Jam Nuts, 1/4-20 Serrated Flange Brass Power

Terminal Torque: 4 ft/lbs Min, 5.5 ft/lbs Max,

Case Mounting Screw: Zinc Self Drilling #10 (10-16 Hex Washer Head)

Mounting surface type:

Metal Mount - surface such as an aluminum plate 0.25 x 12 x 12 inches.

Operating Voltage Range: +5.5 to +18.0 volts, 6mA current draw

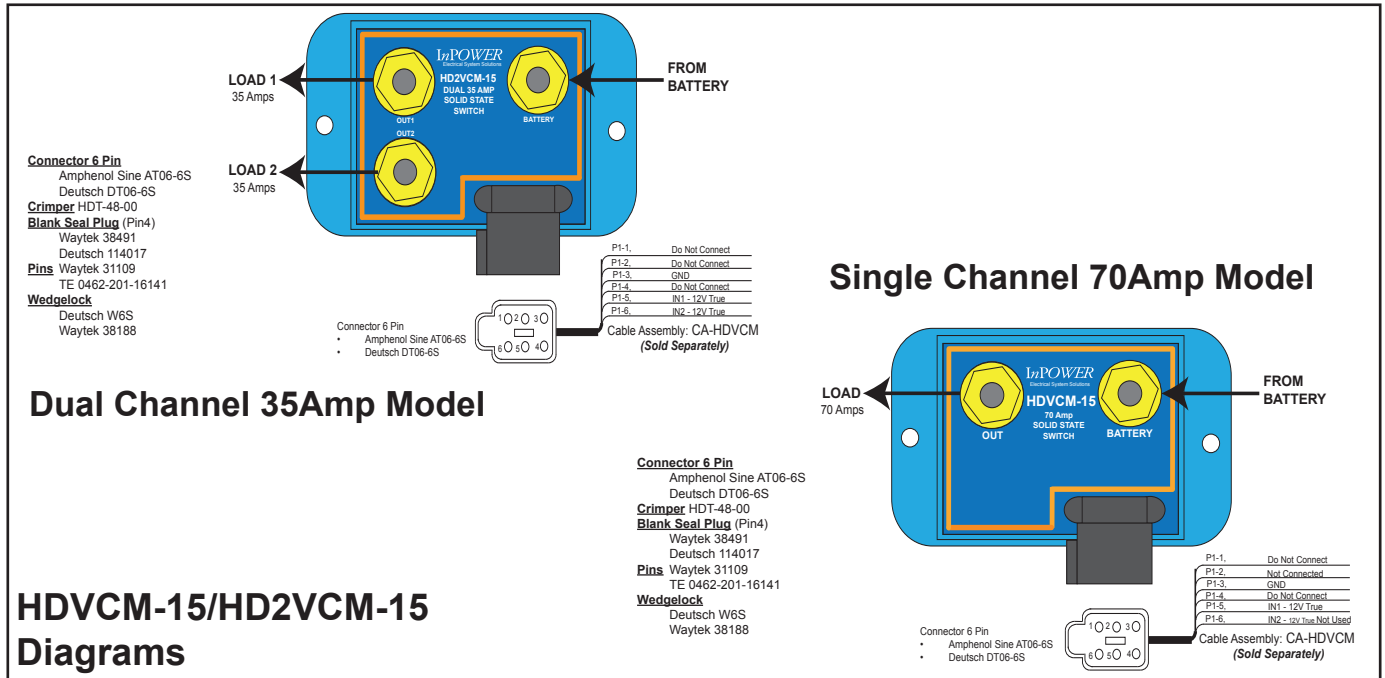
Case Maximum Temperature: +185° F (85° C)

Operating Temp: -40°F to 185°F

Logic Power Current Draw: 6ma @13.2V for all except HDVCM-15 and HD2VCM-15

Control and GND Connectors: Deutsch Connector

HDVCM-15 HD2VCM-15 System Description



The HDVCM-15/HD2VCM-15 Solid State Switches are controlled by a positive DC voltage on the control terminal(s). The must operate voltage is **+5.5Von Vdc**. The must release voltage is **+2.5Voff Vdc**. **Note: To reset the switch, the input voltage must drop to under +2.5Voff volts, then increase to +5.5Von volts to turn on again. This resets the Output.**

The HDVCM-15 is a Single Channel 70A Unit with the Single Output Controlled a voltage on the IN1 Input. The HD2VCM-15 is a Dual Channel 35A Unit with Out1 controlled by a Voltage on the IN1 Input, and Out2 controlled by a Voltage on the IN2 Input.

Fault conditions (such as Over Current or Over Temp) will cause the power switch to turn off and remain latched off until the fault is cleared and the control input voltage is removed, then re-applied. If a channel is in a Fault condition, the OUTPUT will be OFF even though the Correct Control Voltage is applied. There is no indication that the unit is in a Fault Condition.

HDVCM-15 and HD2VCM-15 Control Specifications

- Control (IN1, IN2) Input Voltage: >+5.5 Vdc to activate, <+2.5 Vdc to deactivate
- IN1 Positive Voltage Controls OUT1
- IN2 Positive Voltage Controls OUT2
- IN3 *Not Used*
- BAT+ to LOAD Terminal
- Leakage Current: 10 nano amps maximum

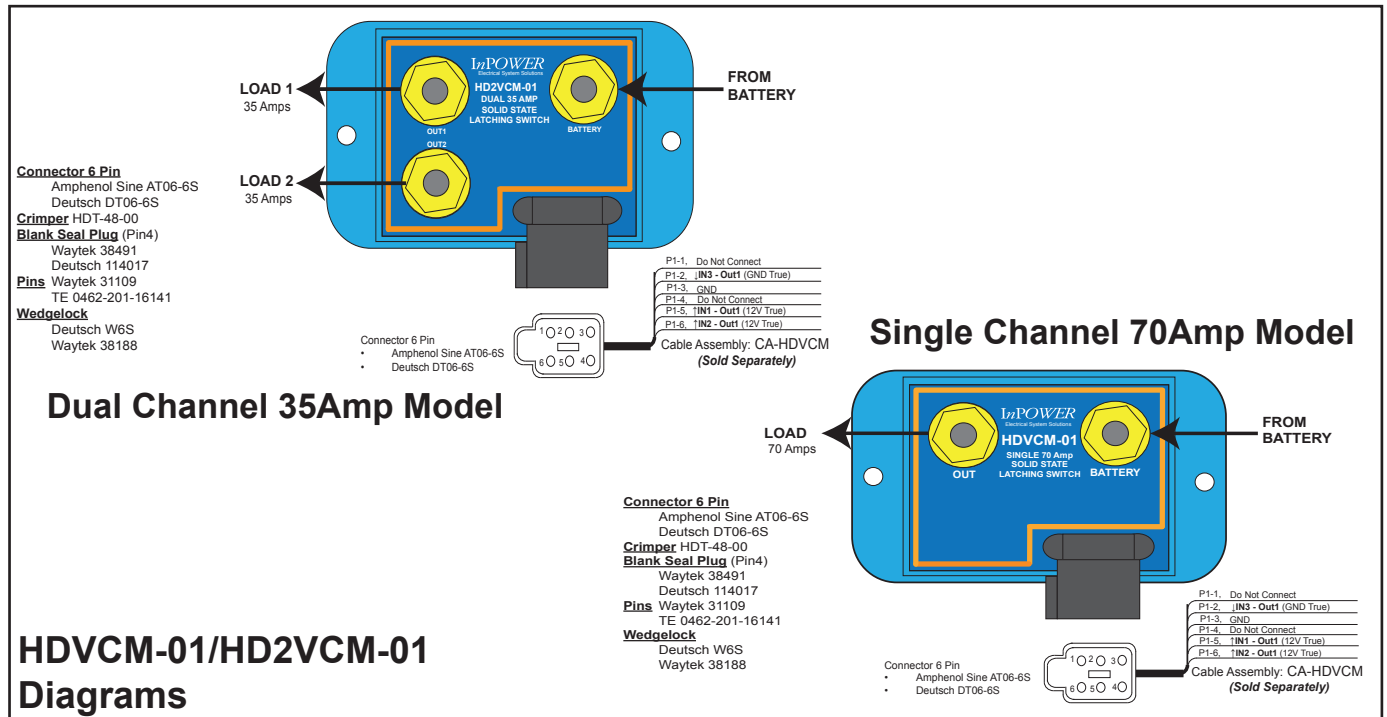
HDVCM-15/HD2VCM-15 Interface and Control

- Battery - Fused Power from the **BATTERY** (J1)
- Pin 1 - No Connection
- Pin 2 - No Connection
- Pin 3 - Ground
- Pin 4 - No Connection
- Pin 5 - IN1 Control (+12V True) Interface
- Pin 6 - IN2 Control (+12V True) Interface (Not used on HDVCM-15)

Output Specifications

- Output Drive: 70 amps at 12Vdc *
- 12V Switched Output: **OUT** (J2)

HDVCM-01 HD2VCM-01 System Description



The HDVCM-01/HD2VCM-01 Solid State Switches are controlled by transitions on the control terminals - IN1, IN2, IN3. The must operate voltage is **+5.5Von** Vdc. The must release voltage is **+2.5Voff** Vdc. **Note that the input voltage must drop to under +2.5Voff volts, then increase to +5.5Von volts to turn on again. This Resets the Output.**

HDVCM-01 Specifications

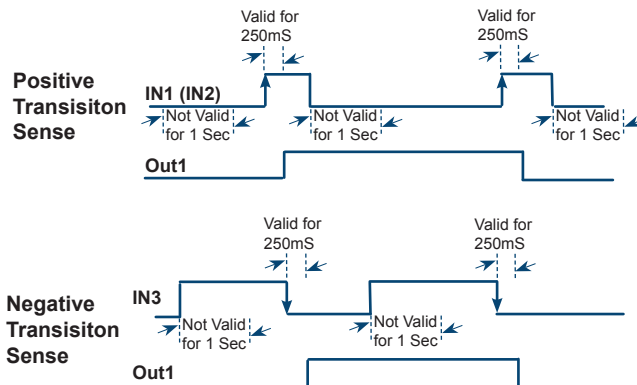
The HDVCM-01 has 3 inputs and 1 Output (one 70Amp 12V channel) where transitions on the INn inputs affect OUT1. IN1, IN2 and IN3 Control OUT1. IN1 and IN2 respond to a positive going transition and IN3 responds to a negative going transition.

“↑+12” means Transition to 12V will trigger change (IN1, IN2)

“↓GND” means Transition to GND will trigger change (IN3)

It should be noted that time transition level must be valid for at least 250ms for the transition on IN1, IN2, or IN3 to be recognized.

Additionally, the Input must **not be valid for at least 1 second** before a new transition is recognized.



HDVCM-01 Interface and Control

Battery - Fused Power from the **BATTERY** (J1)
Pin 1 - No Connection
Pin 2 - IN3 Control Neg (\downarrow GND) Interface
Pin 3 - Ground
Pin 4 - No Connection
Pin 5 - IN1 Control Pos (\uparrow +12V) Interface
Pin 6 - IN2 Control Pos (\uparrow +12V) Interface

Output Specifications

Output Drive: 70 amps at 12Vdc *
12V Switched Output: **OUT** (J2)

*Fault conditions (such as Over Current or Over Temp) will cause the power switch to turn off and remain latched off until the fault is cleared and the control input voltage is removed, then re-applied. If a channel is in a Fault condition, the OUTPUT will be OFF even though the Correct Control Voltage is applied. There is no indication that the unit is in a Fault Condition.

Input Timing Requirements:

Transition Valid Time needs to be a minimum of 250ms for any of the Inputs to be recognized.

Time between Transitions: The input must be FALSE for at least 1 second prior to a new transition to be recognized.

HD2VCM-01 Specifications

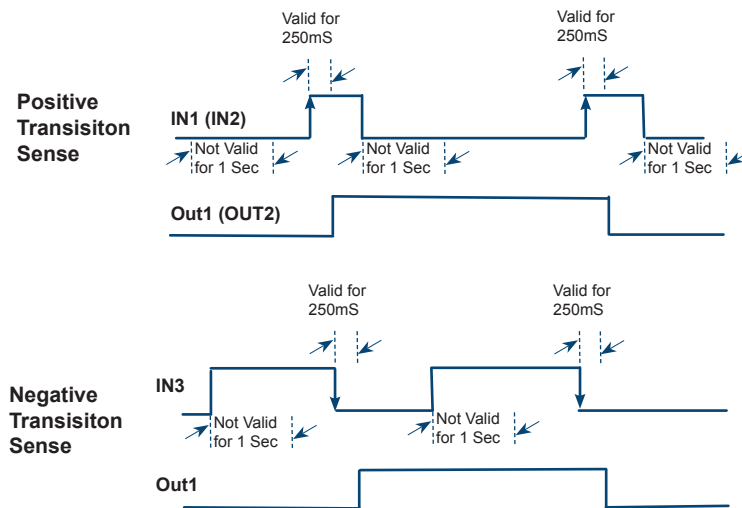
The HD2VCM-01 has 3 inputs and 2 Outputs (two individually controlled 35Amp 12V power channels) where the Control Inputs are Transition responsive. IN1 and IN3 Control Output 1, and IN2 Controls OUT2

" \uparrow +12" means Transition to 12V will trigger change on Output

" \downarrow GND" means Transition to GND will trigger change on Output

It should be noted that time transition level must be valid for at least 250ms for the transition on IN1, IN2, or IN3 to be recognized.

Additionally, the Input must **not be valid for at least 1 second** before a new transition is recognized.



HD2VCM-01 Interface and Control

Battery - Fused Power from the **BATTERY** (J1)
Pin 1 - No Connection
Pin 2 - IN3 Control Neg (\downarrow GND) Interface (OUT1)
Pin 3 - Ground
Pin 4 - No Connection
Pin 5 - IN1 Control Pos (\uparrow +12V) Interface (OUT2)
Pin 6 - IN2 Control Pos (\uparrow +12V) Interface (OUT1)
Output Drive: 35 amps at 12Vdc
12V Switched Output (\uparrow IN1): **OUT1** (J3)
12V Switched Output (\uparrow IN2): **OUT2** (J2)

Input Timing Requirements:

Transition Valid Time needs to be a minimum of 250ms for any of the Inputs to be recognized. **Time between Transitions:** The input must be FALSE for at least 1 second prior to a new transition to be recognized.

Installation



Do not weld on the vehicle with the solid state contactor installed as damage to the product may result. If electric welding is necessary, disconnect the control terminal and the cables attached to the LOAD and BAT+ terminals. Damage due to electric welding while the unit is installed will void InPower's warranty.

Installation Procedure

Introduction

This manual provides instructions for installing InPower HDVCM/HD2VCM Family of Solid State Switches. It is important that you follow these instructions carefully and contact InPower if you need assistance or more information. You can reach InPower at:

**InPower LLC
Customer Support
740-548-0965**

Safety Precautions

This product requires the installer to be trained for installation and work on vehicle electrical systems. We recommend that all wiring meet the SAE and applicable vehicle manufacturer's wiring specifications. Inspect the product and all other components for damage before starting the installation. Do not perform the installation if any problems exist.

Make sure that the vehicle battery power is disconnected during installation of the solid state switch. Reconnect the battery when the installation is complete. Wear appropriate safety equipment such as eyeglasses, face shield and clothing when installing the equipment and handling the battery. Be careful when working near a battery. Make sure the area is well ventilated and that there are no flames near the battery. Never lay objects on the battery that can short the terminals together or to ground. If battery acid gets in your eyes immediately seek first aid. If acid gets on your skin immediately wash it off with soap and water.

Mounting Location

First determine where the unit will be mounted. We recommend mounting it to a flat metal surface that can absorb heat produced by the unit. Also take into consideration the maximum current needed and the maximum mounting surface temperature (See Specification Section). **The unit should not be mounted in the engine compartment or any location near the engine's heat. It is important that the unit be mounted in a dry environment where it is not exposed to water or chemicals.** For maximum thermal efficiency the mounting surface should be a thick metal surface such as an aluminum plate 1/8 x 12 x 12 inches or larger. Secure the unit to the flat metal surface using two screws (Zinc Self Drilling #10 (10-16 Hex Washer Head)). **Do not drill out the units' mounting pad holes to use a larger bolt size - to do so may compromise the integrity of the enclosure.**

Connect the Power Cables

First, make sure that the battery is disconnected. Prepare the cable to the battery using a suitable size cable for the current required and install a crimped lug terminal on the end. **Be sure that you have installed a protection device (fuse, fuse link, or circuit breaker) at the battery end of the cable. Torque the nut to the torque specification for these nuts (4 ft/lbs Min, 5.5 ft/lbs Max).** Connect the Output Cable(s) to the load and install the cable(s) as you did with the battery cable.

Control Circuit

The control wires must provide an appropriate control signal to IN1, IN2, and IN3. Depending on the model, it could be a Voltage (level or transition to) or a Ground (level or transition to).

Ground

The Grounding Pin for the HDVCM/HD2VCM in the Deutch Connector (Pin 3) must be connected to a SOLID Battery Ground to insure proper operation (refer to the vehicle Upfitter's guide for location). Crimp a female Ring Terminal or Spade lug on the grounding wire and attach it to the Stud Ground terminal.

HDVCM/HD2VCM Mechanical and Installation

IMPORTANT!
Torque Power nuts to:
Minimum: *TBD* Foot pounds
Maximum: *TBD* Foot pounds
Do Not Over Torque!!

IMPORTANT!
Torque mounting screws to 5 Inch Pounds

Brass nuts 1/4-20 on studs (furnished with product)

Accepts up to a 0.20" dia Screw

Mounting Surface - Unpainted Aluminum for Full Rated Power
Minimum size of 1/8 thick x 12 x 12"

HD2VCM Mechanical and Installation

IMPORTANT!
Torque Power nuts to:
Minimum: 4 Foot pounds
Maximum: 5.5 Foot pounds
Do Not Over Torque!!

IMPORTANT!
Self Drilling #10 Screws
10-16 Hex Washer Head

Brass nuts 1/4-20 on studs (furnished with product)

Accepts up to a 0.20" dia Screw

Mounting Surface - Unpainted Aluminum for Full Rated Power
Minimum size of 1/8 thick x 12 x 12"

Harness Information:

(Functions on blunt cut wires will vary with the module model)

Connector 6 Pin

Amphenol Sine AT06-6S
Deutsch DT06-6S

Crimper HDT-48-00

Blank Seal Plug (Pin4)

Waytek 38491
Deutsch 114017

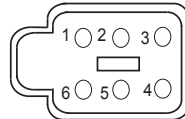
Pins Waytek 31109

TE 0462-201-16141

Wedgelock

Deutsch W6S
Waytek 38188

Dual Channel Harness

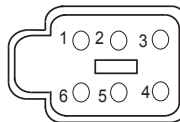


P1-1,	Do Not Connect
P1-2,	IN3 - GND True
P1-3,	GND
P1-4,	Do Not Connect
P1-5,	IN1 - 12V True
P1-6,	IN2 - 12V True

Cable Assembly: CA-HDVCM
(Sold Separately)

***IN1, IN2, IN3 Functional Description will vary
depending on Software***

Single Channel Harness



P1-1,	Do Not Connect
P1-2,	IN3 - GND True
P1-3,	GND
P1-4,	Do Not Connect
P1-5,	IN1 - 12V True
P1-6,	IN2 - 12V True

Cable Assembly: CA-HDVCM
(Sold Separately)

Contact Information:

Contact Us

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