

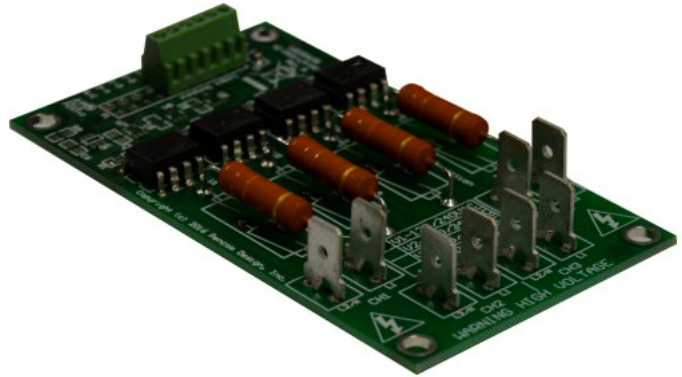


Features

Optically isolated AC voltage line voltage monitor circuit board to TTL logic output. This board is used to detect when the line voltage is active or failed, may also be used for ON/OFF sensing applications as a closed loop monitor for relay contacts, motors, or as a fuse monitor. Logic output is 5VDC TTL logic.

Although this is designed as an AC line monitor it will also detect high voltage DC as well, using the same voltage specifications as shown below.

P/N: I4-V1-LM-STA is shown in the photo to the right, a 4 channel standalone unit - with the standard 120/240V line voltage sensing and no logic options installed.



Applications

- 1 - Detect AC line operation/failure or monitor high voltage DC.
- 2 - Closed loop detector to monitor relay contacts, solenoids, motors, etc.
- 3 - Fuse or circuit breaker monitor
- 4 - Monitor ON/OFF AC or DC operation in remote locations, detect when a device is activated or deactivated locally.

Voltage Options

- V1** - Standard 120/240VAC 50/60/400Hz (81 to 252VAC)
- V2** - High Voltage 240/347VAC 50/60/400Hz (216 to 381VAC)
- V3** - High Voltage 415/480VAC 50/60/400Hz (375 to 504VAC)
- V4** - High Voltage 600VAC 50/60/400Hz (540 to 660VAC)

Warning!
Do not exceed these voltages as damage may occur!

Channel Options

1 to 4 channels per board (high voltage sides are isolated from each other) - One 5VDC TTL logic output per channel. (Active low) This output is normally held high (+5VDC) and drops low when a valid voltage is applied to the high voltage inputs.

Note: The logic output drive current is limited and designed for microprocessor input pins or an input port. It does not have the capability to drive a LED directly, for visual indication. This would require additional external components.

Additional Logic Options

Each individual phase detector has a corresponding logic output that can be read by an input port or a microprocessor pin. However when using multiple channels to detect 2 or 3 phases, additional input port pins or microprocessor pins are needed, and may not be available in some applications.

The optional on-board 2 or 3 phase logic versions are available to detect multiple phase failures using less logic pins. These include logic to detect whether one phase has dropped out or both phases on the 2 phase option, and on the 3 phase option whether one, two or all phases drop out. A separate output pin is available for these logic options. See the part number format document to see the options that are available. Note: the normal logic output pins CH1-CH4 are still active and could be used, with any of the logic option chips installed on the board.

Please Note: In some 3 phase applications, when monitoring the power to a **running three phase motor**, if a phase opens during this condition, it might run **single phase**. The motor might then generate enough back EMF on the open phase to maintain enough voltage and input current to the AC monitor Board, and under such a condition - the board will not detect the failed phase condition.

Operating Temperature and Humidity

-30 to +85° Centigrade, 90% Relative

Galvanic Isolation between the line voltage and logic circuits

2500V RMS or 3500V DC

Board Type Options

2 types of board options are available

Pluggable daughterboard option:

The daughterboard plugs directly into our I/O option board jack that is available on specific relay or other types of our boards. The daughterboards are powered by the main board which also handles the communications.

Standalone board option:

The standalone boards can connect to our relay boards, or our other types of boards with a TTL I/O port option. the VCC (5VDC) output available on our I/O boards may be used to power this boards.

These standalone boards may also connect directly to a microprocessor input pin or other brand board with a 5VDC TTL input port, this also requires a regulated 5VDC source to power the board.

Includes

Pluggable Version:

The logic and board power are fed through a 20 Pin plug that mates with the on-board I/O connector available on some of our units. The connection to the line voltages are male (.250) spade quick disconnect connectors.

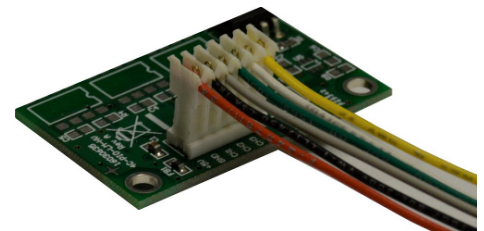
Standalone Version:

The logic and board power have a 6 position .100 terminal block for 20-30 AWG wire or an optional 6 position IDC connector 24AWG for connection to the input port. The connection to the line voltages are male (.250) spade quick disconnect connectors.

When ordered with any of the additional Logic options, a larger 10 position terminal block or optional 10 position IDC connector is supplied for connection to the input port - to allow for the extra logic output pins.

Optional IDC connector for the standalone board

An optional pluggable polarized IDC (insulation-displacement connector) is available instead of the standard terminal block for connections to the logic and DC power for the board. These connectors have a polarized header on the board and a wire housing that plugs into the header. The wires are pushed into the housing and the insulation is pierced making contact with the wire. These wires are typically inserted with a special T-handle tool <\$35 retail, however they can be inserted with a small screwdriver if only making a few connections.



The connectors we stock are for 24AWG wire, as this is a common size wire easily used for the low voltage connections, but there are other wire housings available for other gauge wires. We can also insert wires into the connectors, at additional cost with the lengths you require in 24AWG conductors, in multiple colors.

Enclosure and Temperature Rise

These units must be mounted in an enclosure due to the high voltage detection. In normal operation the resistors on the board will dissipate heat - and temperature rise in the enclosure must be considered. When mounting in an enclosure, allow ample clearance for wiring connections and air circulation around the board. Keep wiring from touching the power resistors as the wires may be damaged by the heat from the resistors.

Voltage versions V1-V3 can dissipate up to 3 watts of power per channel 10.24 BTUs/hour, at the maximum voltage. Voltage versions V4 can dissipate up to 4 watts of power per channel 13.65 BTUs/hour, at the maximum voltage.

These are the maximum watts per channel and can be considerably less depending on the voltage applied to the board.

In addition when the power is removed - the resistors will retain enough heat that may burn the skin, allow several minutes of cool down time before working around the board.

Voltage and Current

AC Input Current (high voltage side of the board)

The AC RMS current will vary between the different voltage versions of the board. Typical minimum current is 4mA and maximum design current is <15mA per channel.

AC Input Voltage (high voltage side of the board)

Minimum-maximum voltage levels depend on the board version and voltage tolerance as specified on page 1. Make sure the maximum voltage is not exceeded as damage may result!

The minimum voltage levels listed are the smallest voltage the board was designed to detect. Below these voltage levels the board may detect the ON voltage, but may not be reliable.

Logic Voltage (Standalone Version)

This is the voltage that powers the circuits on the board.

5VDC \pm 5% @20mA max and will vary by the number of channels on the board.

Frequency

The line monitor board is designed for AC applications for 50,60 & 400Hz it will also detect other frequencies and DC voltages as well.

Switching Time

The AC line monitor board responds to changes in AC voltage over a few milliseconds, and is designed to ignore the short zero-cross switching time that occurs every half-cycle of the power line.

Logic and Board Power Connection Pinouts

Logic Terminal Block for 20-30 AWG wire, a 6 position standard or 10 position with logic options

Pin Number	Designation	Description
1	+5V	Positive voltage connection (board power) (commonly a red wire is used)
2	GND	DC Ground (negative) connection (board power) (commonly a black wire is used)
3	CH1	Logic channel 1 output
4	CH2	Logic channel 2 output
5	CH3	Logic channel 3 output
6	CH4	Logic channel 4 output
7	1-2	One 2-phase logic output (channels 1 & 2) *
8	1-3	One 3-phase logic output (channels 1,2 & 3) *
9	3-4	Second 2-phase logic output (channels 3 & 4) *
10	N/C	NO connection (Pin not used) *

* Grey color on the table above indicates additional pins on the units with logic options.

The above table displays all the available pinouts, however the active pins depend on the number of channels on the board and whether there are additional logic options on the board .

High Voltage Connections

WARNING Hazardous High Voltages!

The high voltage connections are male (.250) spade quick disconnect connectors which are located near the high voltage symbol as shown on the right, (and visible on the photo on the first page of this document).

Pin Designation	Channel #	Description
L1	CH1	Line 1 - Hot side of the AC line
L2/N	CH1	Line 2/Neutral - Hot side of the AC line or neutral for 120VAC
L1	CH2	Line 1 - Hot side of the AC line
L2/N	CH2	Line 2/Neutral - Hot side of the AC line or neutral for 120VAC
L1	CH3	Line 1 - Hot side of the AC line
L2/N	CH3	Line 2/Neutral - Hot side of the AC line or neutral for 120VAC
L1	CH4	Line 1 - Hot side of the AC line
L2/N	CH4	Line 2/Neutral - Hot side of the AC line or neutral for 120VAC



Board Mounting

These units must be mounted in a suitable enclosure to prevent electrical shock! Exposed areas of the board have a high voltage potential risk. Choose an enclosure that allows ample clearance to run wires around the unit and permits heat dissipation.

In normal operation these units generate heat, and temperature rise in the enclosure may affect operation of this device or other devices in the same enclosure. See the specifications above for details.

When mounting these units use a minimum of 3/8" standoffs to allow clearance, from any metal surface to the back of the board. The back of these boards have exposed areas that are at high voltage potential. Do not run any wires under the board.

A hardware kit (P/N HDW-K01) is available to purchase that includes the standoffs, machine screws and nuts for mounting the board, to a flat removable panel typically found in larger enclosures. The board mounting holes are designed to fit #6 machine screws.

Dimensions

Pluggable version (w/o IDC Connector)

Board Dimensions 2" Width X 3.5" Length X 0.810" High
(0.346 below the board and 0.402 above the board + 0.062 board thickness).

Standalone version (w/o IDC Connector)

Board Dimensions 2" Width X 3.5" Length X 0.464" High
(includes .062 board thickness).

