

# Power-IO™

## C Family of Solid State Contactors Up to 100 Amps per channel Up to 575 Vac switched AC Control Inputs

- New, high density POWER-IO, up to 100 amps every 1.6 inches
- 2 power channels for: 2 independent single phase loads, DPST 2-leg break single phase loads, or 2-leg break delta loads
- Multiple C family units can be installed edge-to-edge for highly efficient use of your panel space.
- For 3 leg break 3 phase applications, achieve up to 100 amp switching on each leg in less than a 7x7x7 inch cube.
- Replaces electro-mechanical or mercury contactors
- Fourth generation **Maximum Surge Survival™** technology for triple-layer surge protection and long life
- Internal, oversized components + advanced direct copper bonding capability = increased reliability, less thermal rise, and longer life
- The integral Ultra Power Cooler™ heat sink offers optimum thermal performance in a minimum space
- Optically isolated for 4000 volt isolation
- International green input status LED for each channel
- International terminal markings
- 1400 volt transient blocking voltage
- Precise zero voltage turn-on for low EMI (noise)
- Internal, rugged, snubber circuit and internal power MOVs for robust performance on all channels



The C family is a modular solid state power controller that is designed to easily replace mercury or electro-mechanical contactors in applications from 50-100 amps per leg. With flow-through power wiring and an overall, "installed width requirement" of only 80 mm (3.15 inches), you have 2 power switching channels in less width than a typical 2 pole contactor. Large power terminals accept up to a 2 AWG wire while protecting your operators from exposed power connections. The 2 power channels offer 4000 volt optical isolation from each other, from each control input, and from the aluminum base. By inserting a single jumper wire, both control channels can be activated from a single control input for use in many DPST applications or 3 phase delta load applications.

The C family has a universal mounting bracket for DIN rail or bolt-on installations. The integral Ultra Power Cooler™ heat sink is fan assisted in order to achieve maximum performance, even when installed in tightly packed electrical cabinets or warm industrial environments. When multiple C family contactors are installed on the same horizontal DIN rail, there is NO need to leave space between products for cooling purposes. The industry-standard 120 VAC fan is also available in other voltages, contact Power-IO for more information.

For applications requiring a heat sink outside of the electrical enclosure, the Ultra Power Cooler heat sink can be installed outside the cabinet, directly behind the Power-IO's modular contactor unit. This split contactor installation method is often used in applications that require completely sealed electrical enclosures such as food processing facilities, PVC plastic manufacturing facilities, or medical applications. As an alternative, different external heat sinks can be custom designed for an application. In these cases, the maximum amperage capability of the C family will be de-rated accordingly.

### Control Input Wiring:



For AC control input signals, the four position terminal block accepts the fan power, control input #1, control input #2, and the neutral connection. For American installations, the default fan voltage is 120 VAC. Other fan voltages are available upon special request. The control input range is 100-264 VAC. For simplicity, the control inputs and the fan input should be the same voltage. For 3 phase applications or any other “simultaneous 2 leg switching application”,

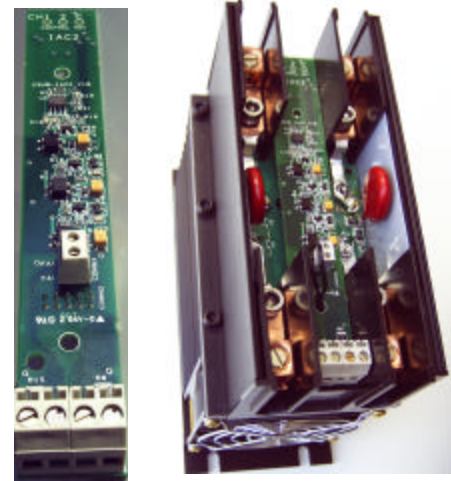
you can install a jumper so control #1 and control #2 activate and deactivate at the same time. The fan should be wired as always ON. If the fan power is disabled or if the internal thermal measurement circuit senses an over-temperature problem, the unit will automatically disable control input #1 and #2 until the warm condition is corrected.

### Internal Construction:

**The safety cover should ONLY be removed by Power-IO trained and authorized personnel.**

The control input board is field replaceable as an IAC2 (Input AC, 2 Channel), IDC2, and other input combinations. The fan wiring is factory installed to the mid-board, 2 position connector. American 120 VAC fans or European 240 VAC fans would be connected to this screw connection.

The red MOVs are standard but they can be factory removed for switching 600 VAC, such as for Canadian installations.



### Diagnostic LEDs and board label:



The IAC2 board has three LEDs at the top edge. These represent:

- Channel 1 control input “on”: GREEN
- Channel 2 control input “on”: GREEN
- HOT, unit in thermal shutdown : RED

The red LED will flicker momentarily when the IAC2 control input board is first powered as a diagnostic confirmation that the fan input power is present.

Model Numbers	AC Control input	CZ2H-IAC2
Number of Power Switching Channels		2

### Output Specifications (All shown at 40°C)

Operating Voltage (47-63 Hz) [Vrms]	24-575 volts switched
Max Load Current [Arms]	100 amps/channel
Min Load Current [Arms]	0.25 amps
Maximum Motor Starter Size, Single Phase *	30 FLA, such as: 7.5HP @230vac, 12HP @460vac,
Maximum Motor Starter Size, 3 Phase, Using 2 of CZ2H Models*	30 FLA / Leg such as: 10HP @230vac, 25HP @460vac
* Confirm The Maximum Motor Inrush, <180 Amps for 2 Seconds	
Transient Overvoltage [Vpk]	1400 volts
Max Surge Current for 16.7ms [Apk]	1650 amps
Max On-State Voltage Drop @ Rated Current [Vpk]	1.2
Max I <sup>2</sup> T Per Channel (8.3 msec) [A <sup>2</sup> sec]	22,678 A <sup>2</sup> sec
Max I <sup>2</sup> T for Fusing Per Channel (10 msec) [A <sup>2</sup> sec]	11,200 A <sup>2</sup> sec
Max. Off-State Leakage @ Rated Voltage [mArms]	15mA
Min Off-State dv/dt @ Max Rated Voltage [V/μsec] *	>3000
* High dv/dt values = better false triggering protection	
Max Turn-On Time	1 sinewave, max imbalance = 1/2 sinewave
Max Turn-Off Time	1 sinewave, max imbalance = 1/2 sinewave
Recommended I <sup>2</sup> T fuse (AC-1, resistive loads)*	Finger safe: FUSE-KIT-22-100, or stand alone: FWP-125A
* Contact Power-io for I <sup>2</sup> T fuses for AC-3, high inrush, or inductive loads	

### Input Specifications (All shown at -40°C to +85°C)

AC Control Input Voltage Range	100-280 Vac, 47 - 63 Hz
Min Turn-Off Voltage *	40 Vrms / 2mA
* > than most PLC's triac leakage = eliminates false activation	
* C family contactors can be activated by triac output PLCs, PID controllers, etc. typically WITHOUT the extra burden resistor.	
Nominal Input Impedance of 18K @ 120 Vac	6.7 mA
Input Thermal Shutdown Temperature	105C Typical
Input Thermal Shutdown Recovery Temperature	90C Typical

### Fan Specifications (Premium, Dual Ball Bearing Fan)

Standard Fan Voltage Requirement *	120 VAC +/- 15%, 9 watts
* contact Power-io for other voltage fans	
Size	Industry Standard, 80mm x 20mm, Field Replaceable
L 10 rating	60,000 hours, 40 degrees C intake temperature
MTBF	300,000 hours

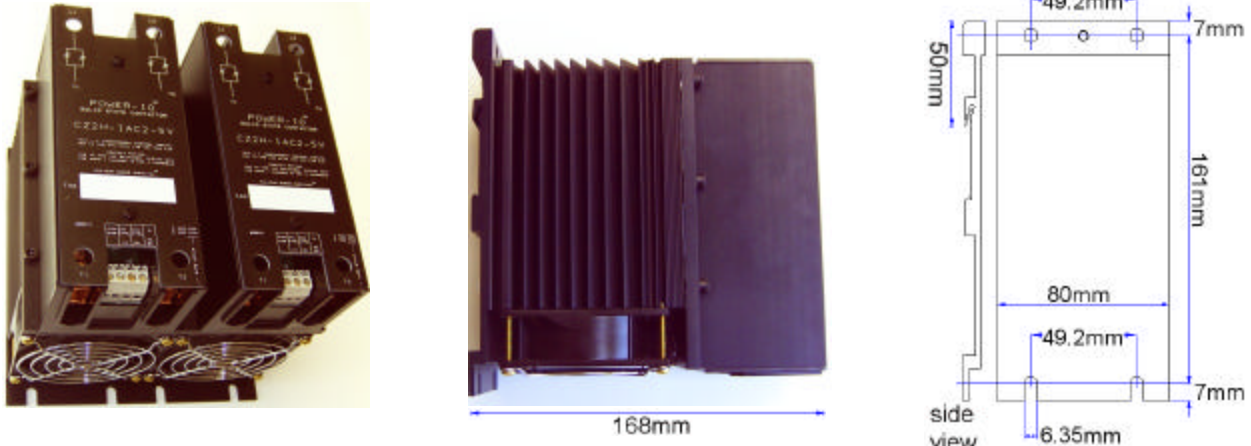
### General Specifications

Dielectric Strength: Inputs-Output 1-Output 2-Base	4000 Vrms
Ambient Operating Temperature Range	-40°C to 85°C, when used with unrestricted air flow
Ambient Storage Temperature Range	-40°C to 125°C
Power Terminal Wire Size (Copper Wire Only)	2-8 AWG, torque to 40-60 in/lbs
Control Input or Fan Wire Size	12-24 AWG, torque to 7-9 in/lbs
RoHS Compliance Information, by weight	<0.1% lead, 0% mercury, 0% cadmium, 0% hexavalent chromium, 0% PBB, 0% PBDE
Shipping	6.3 lbs weight typical.

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Up to 100 Amps per channel  
Up to 575 Vac switched

## Recommended mounting:



For surface mounting installations: drill and tap for # 10 screws

For standard 35mm din rail installations: firmly attach the din rail to the sub-plate every 100-150mm..

Leave a minimum of 25mm (one inch) above and below the unit for air circulation. If multiple C Family units are installed next to each other, the horizontal spacing requirement is zero for those units, as shown in the first picture.

## FAQ answers:

- 1) The power switching channels are totally independent. They do not have to be wired to any particular phase. They do not have to be in phase with the fan power or the control input power.
- 2) The power switching channels can switch 2 independent single phase loads, 2 legs of a single phase load, 2 leg delta loads, resistive heaters, motors, and similar products.
- 3) The power connection terminals are standard copper T&B electrical connectors for 2-8 AWG wire. The wire should be prepared in accordance with all recommendations from Thomas and Betts. Only use copper wire for connections.
- 4) All systems require fuses or circuit breakers in accordance with local electrical codes. In addition, an I<sup>2</sup>T fuse is a special, high speed semiconductor protection fuse that protects the solid state contactor.

## Custom products:

Power-IO is also able to produce solid state relays for other amperage ranges, control inputs, line frequencies, or voltage ranges. The relays can be built as pre-assembled packages including heat sinks, thermal pads, and other components. Please contact us for a quotation for custom products.

## Precautions:

The products that are designed, manufactured, or sold by POWER-IO are intended to be installed and serviced by trained personnel. In addition, there are local, national, factory, and other regulations (sometimes referred to as the National Electrical Code, NEC, OSHA, or equivalent) that must be strictly followed during the installation and use of any POWER-IO product. Failure to follow all of these regulations can result in downtime, damage, injury, or death. It is important that the customer anticipate the temperature requirements of the product. To ensure the longest possible life, it is customary that the electrical design not exceed 80% of the max amperage for relays, circuit breakers, fuses, wiring and other electronic components in an installation, when at the full operating temperature. Power-IO warrants its products for a period of 2 years from the date of manufacture to be free from defects in both workmanship and materials. See [www.power-io.com](http://www.power-io.com) for further information.