

# 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, 2-leg break single phase loads, or 2-leg break delta loads
- Multiple C family units can be installed with just 1 inch between them 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 7x7x8 inch cube.
- Replaces mercury contactors and other AC activated contactors
- **Maximum Surge Survival™** technology for triple-layer surge protection and long life
- Internal, oversized components = 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) without the need for CE filters or other external components



The C family is a modular power controller that is designed to easily replace mercury or mechanical contactors. With flow-through power wiring and an overall width of only 80 mm (3.15 inches), you have 2 power switching channels in less width than a typical 2 pole mercury 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 one control input for use in many delta or 3-wire wye applications.

The C family has a mounting bracket for bolt-on installations. An optional Din Rail Clip is available. 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, only 1 inch is needed between units. 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 can be used in applications that require completely sealed electrical enclosures such as food processing facilities, PVC plastic manufacturing facilities, or medical applications.





### 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 120VAC. The control input range is 100-264VAC. 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 that control #1 and control #2 activate and deactivate at the same time. 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 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 clipped for 600 VAC Canadian installations.



### Diagnostic LEDS and board label:



The IAC2 board has three LEDS. These represent:

- Channel 1 control input is “on” = GREEN
- Channel 2 control input is “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]                           | 24-480 volts switched nominal            |
| Max Load Current [Arms]                                       | 100 amps/channel                         |
| Min Load Current [Arms]                                       | 0.25 amps                                |
| Maximum Motor Starter Size, Single Phase * (<30 FLA / Leg)    | 2 HP @120vac, 5HP@230vac, 8HP @480vac    |
| Maximum Motor Starter Size, 3 Phase, Using 2 of CZ2H Models * | 4HP @120vac, 7.5HP@240vac, 15HP @480vac  |
| * Confirm The Maximum Motor Inrush <180 Amps for 2 Seconds    |  |
| Transient Overvoltage [Vpk]                                   | 1400 volts                               |
| Max Surge Current for 16.7ms [Apk]                            | 1510 amps                                |
| Max On-State Voltage Drop @ Rated Current [Vpk]               | 1.2                                      |
| Thermal Resistance Junction to Case [°C/W]                    | 0.11                                     |
| Max I²T for fusing (8.3 msec) [A²sec]                         | 9,800 Itsm² x 10mSec                     |
| 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   | 2 sinewave, max imbalance = 1/2 sinewave |

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

|   |                                     |
|---|-------------------------------------|
| AC Control Input Voltage Range  | 100-280 Vac, 47 - 63 Hz, 100mA each |
| 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. |                                     |
| Control inputs are <b>current limited</b> (consistent mA) and include the green "input status" LED requirements                 |                                     |
| Nominal Input Impedance of 18K @ 120 Vac  | 12 mA                               |
| Nominal Input Impedance of 12K @ 240 Vac  | 20 mA                               |

### Fan Specifications

|   |   |
|---|---|
| Standard Fan Voltage Requirement *        | 120 VAC +/- 15%, 9 watts                          |
| * contact Power-io for other voltage fans |   |
| Size                                      | Industry Standard, 80mm x 20mm, Field Replaceable |
| MTBF                                      | 100,000 hours                                     |

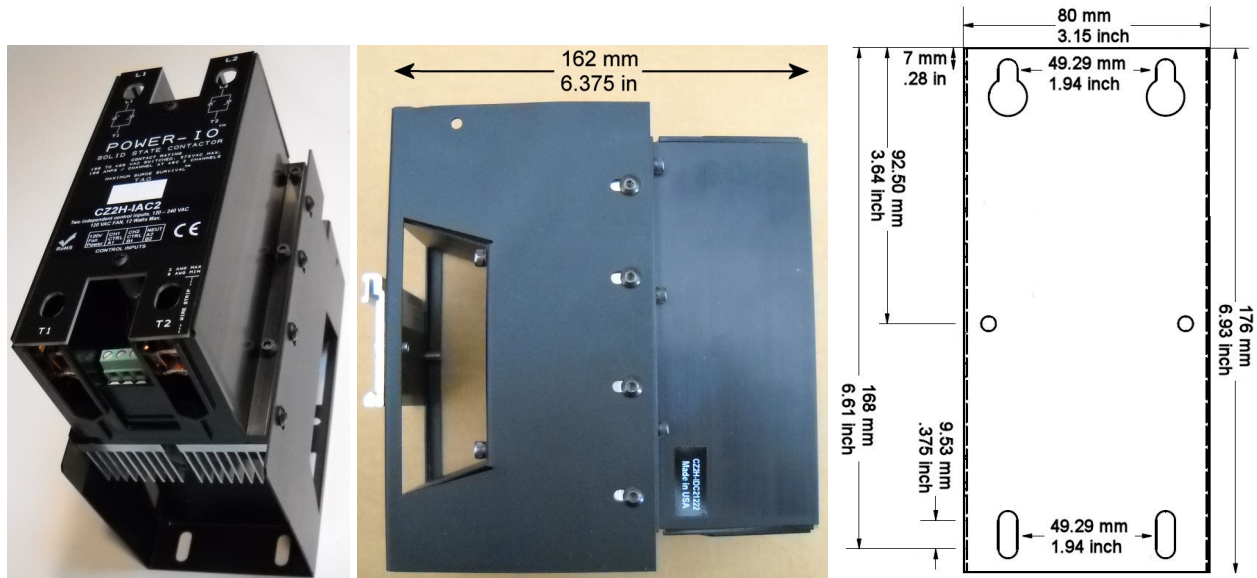
### General Specifications

|  |   |
|--|---|
| 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 in/lbs                        |
| Control Input or Fan Wire Size                     | 12-24 AWG, torque to 15 in/lbs                      |
| Shipping   | 3.8 lbs weight typical.                             |



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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. Clip the CZ2H-IAC2 on the top of the din rail, push down on the unit, and push in, to clip the bottom of the din rail. The din rail clip adds 9.5 mm (.375 inches) to the total depth dimension.

Leave a minimum of three inches above and below the unit for air circulation and wire routing. If multiple C Family units are installed next to each other, the horizontal spacing requirement is one inch for those units. Using the din rail clip provides additional air-flow cooling capability.

## FAQ answers:

- 1) The power switching channels are totally independent. They do not have to be wired to any particular phase.
- 2) The power connection terminals are standard, copper, Panduit electrical connectors for 2-8 AWG wire. The wire should be prepared in accordance with all recommendations from Panduit. Only use copper wire for connections.
- 3) 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 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 1 year 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.