Power-IO™

C Family of Solid State Contactors
Up to 100 Amps per channel
Up to 575 Vac switched
DC 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 edge-to-edge for highly efficient use of your panel space.
- Advanced diagnostics and ALERT output
- For 3 leg break 3 phase applications, achieve up to 100 amp switching on each leg in less than a 7x7x7 inch cube.
- Replaces DC activated contactors
- Fourth generation **Maximum Surge Survival**™ technology for triple-layer surge protection and long life
- Optically isolated for 4000 volt isolation
- International green input status LED for each channel
- Red LEDS for problem conditions
- International terminal markings
- 1400 volt transient blocking voltage
- The integral Ultra Power Cooler™ heat sink offers optimum thermal performance in a minimum space
- Precise zero voltage turn-on for low EMI (noise)
- Internal, oversized components + advanced direct copper bonding capability = increased reliability, less thermal rise, and longer life
- Internal, rugged, snubber circuit and internal power MOVs for robust performance on all channels

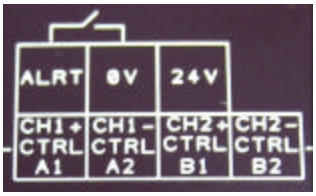
The C family is a **modular, intelligent power controller** that is designed to easily integrate into existing control systems. With flow-though power wiring and an overall, “installed width requirement” of only 80 mm (3.15 inches), you have 2 power switching channels in less width than a typical 2 pole 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 delta load applications.

The internal diagnostic circuit monitors the conditions regarding the health of the contactor. An ALERT output is generated whenever a problem occurs so the control system can take preventative measures immediately.

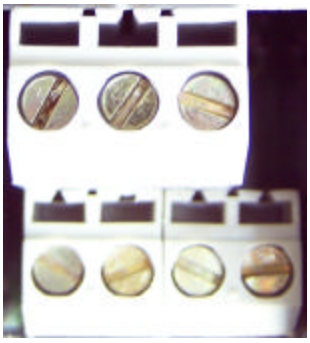
The C family has a universal mounting bracket for DIN rail or bolt-on installations. The integral Ultra Power Cooler™ heat sink is fan assisted in order to achieve maximum performance, even when installed in tightly packed electrical cabinets or warm industrial environments. When multiple C family contactors are installed on the same horizontal DIN rail, there is NO need to leave space between products for cooling purposes. The industry-standard 24 VDC fan is part of an internal temperature monitoring system that activates the fan as needed and provides a thermal shutdown of the inputs in case of excessive temperatures.

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 DC control input signals, the bottom four position terminal block accepts the control input #1 and control input #2. These accept any control signal between 4-32 VDC and greater than 2 mA. The low mA requirement is very beneficial with smaller control systems, PLCs, and USB outputs from a PC based control system. Terminals A1 and A2 are the control inputs for Channel 1 (L1 and T1 switching). Terminals B1 and B2 are the control inputs for Channel 2 (L2 and T2 switching).



The upper 3 position terminal block is used for the 24 VDC power supply connection and the ALERT output. The diagnostics are always active, even when the two control inputs are "off". The ALERT output can be used independently or connected in parallel with other C Family units. The ALERT can be connected to a Power-IO HDA "hockey puck" relay or connected to a Power-IO I/O module for use in any PLC or PC based application.

For 3 phase applications or any other "simultaneous 2 leg switching application", you can install external jumper wires so control #1 and control #2 activate and deactivate at the same time.

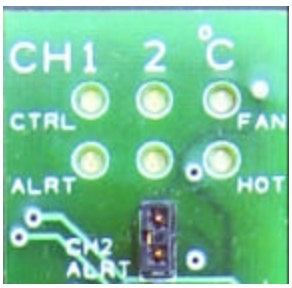
The fan is activated by an internal temperature measurement circuit, as needed. In case of thermal overload, the inputs will be disabled and a red LED will illuminate until the condition is corrected.

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 IDC2 (Input DC, 2 Channel), IAC2, and other input combinations. The fan wiring is factory installed to the mid-board, 2 position connector. The DC activated fan is a standard 80mm size fan.

The red MOVs are standard but they can be removed for 600 VAC Canadian installations.



6 Diagnostic LEDS and jumper:

- Channel 1 control input "on": GREEN
- Channel 2 control input "on": GREEN
- Temperature measurement requests fan "on": GREEN
- Channel 1 Alert: RED
- Channel 2 Alert: RED
- Hot, unit in thermal shutdown : RED

ALERT conditions:

The Alert output will become active based up:

- Channel 1 SCR failed in "ON" mode, or failed in "OFF" mode, or incapable of switching in the future
- Channel 2 SCR failed in "ON" mode, or failed in "OFF" mode, or incapable of switching in the future
- Open external fuse, tripped circuit breaker, or open load, even when the SCR is in "OFF" state*
- Shorted SCR detection, even when the SCR is in the "ON" state*
- Thermal shutdown, control input #1 and #2 automatically turned off

*For example: on machine start-up, all SCRs might be requested to be "ON". If a machine failure damages the SCR, the diagnostics alert will activate because the SCR is not capable of turning "OFF". Power-IO's exclusive diagnostics circuit monitors the status of the unit — immediate and future health capability.

Model Numbers	DC Control input	CZ2H-IDC2
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^2T Per Channel (8.3 msec) [A^2sec]	22,678 A^2sec
Max I^2T for Fusing Per Channel (10 msec) [A^2sec]	11,200 A^2sec
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^2T fuse (AC-1, resistive loads)*	Finger safe: FUSE-KIT-22-100, or stand alone: FWP-125A
* Contact Power-io for I^2T fuses for AC-3, high inrush, or inductive loads	

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

DC Control Input Voltage Range	3-32 VDC, 2mA each
Min Turn-Off Voltage	1 VDC / 0.5mA
Control inputs are **current limited** (consistent mA) and include the green "input status" LED requirements	
Input Thermal Shutdown Temperature	105C Typical
Input Thermal Shutdown Recovery Temperature	90C Typical

Alert Output Specifications

Open Collector	32 V Max, -8mA max
Onstate Saturation Voltage (Vdrop)	<2 volts
Compatible with Power-IO Products Such As:	Models HDA, HDD, DDA, IO-IDC, IO-ODC, or IO-OAC

External Power Supply Specifications

	Standard 24 VDC Power Supplies +/- 15%
For Example: www.power-io.com/products/powersupply.htm	This 75 watt unit is ideal for up to 25 CZ2H contactors

Fan Specifications (Premium, Dual Ball Bearing Fan)

Standard Fan Voltage Requirement *	24 VDC +/- 15%, 100mA
* contact Power-io for other voltage fans	
Size	Industry Standard, 80 x 80 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
Dielectric Strength: Inputs 1-Input 2-Power Supply	2500 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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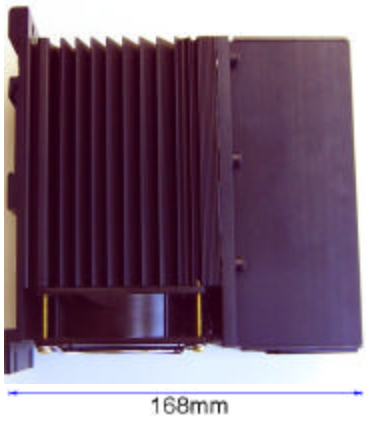
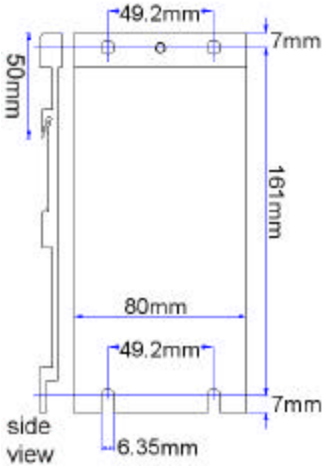
Recommended mounting:





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.
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, municipal lighting 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^2T 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 2 years from the date of manufacture to be free from defects in both workmanship and materials. See www.power-io.com for further information.

Power-IO 537 Braemar Avenue Naperville, IL 60563 USA Tel: 630-717-7335 www.power-io.com email: sales@power-io.com
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