

Smart Precharger v1.2

*Two-stage soft start / inrush protection
for your motor controller*

INTRODUCTION

Motor controllers for electric vehicles typically have a large internal capacitor bank on their input with very low ESR (Equivalent Series Resistance). As such they require inrush protection when first powering up to prevent a large current spike which can damage components – most commonly, welding contactors shut or blowing fuses.

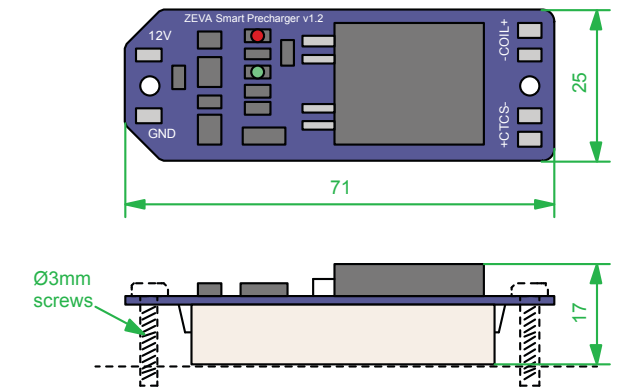
The ZEVA Smart Precharger is designed to offer a 2-stage soft start for motor controllers, limiting inrush current via a resistive circuit to charge up the internal capacitors before automatically closing the main contactor when the process is complete. It can also detect faults and safely discontinue precharge if it fails to start correctly (usually due to an external wiring fault or no battery voltage), or fails to complete within 5 seconds (usually due to unexpected loads after the main contactor).

SPECIFICATIONS

- Power supply: 8-18VDC (12V nominal, 3A max)
- Two models for 12-160V or 160-320V nominal packs
- Precharge resistance: 48Ω (LV) or 200Ω (HV)
- Internal coil spike suppression
- Dimensions: 71x25x18mm

INSTALLATION

The precharger should be securely attached to the vehicle using two 3mm or 1/8" screws, through the two holes on the circuit board. Be careful not to over-tighten the screws as it may risk damaging the board. Ensure that the heads of the screws are not so large that they are not touching the solder pads either side (most M3 screws should be fine).



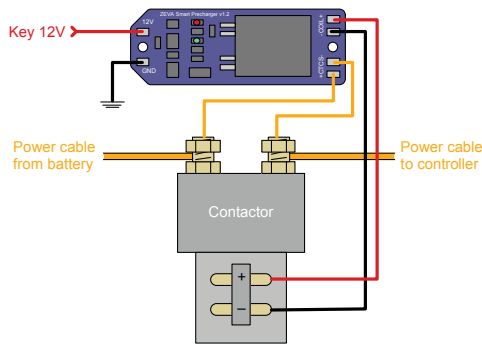
The circuit board has an acrylic conformal coating over the electronics so is fairly tolerant to weather and water, but is best installed in a protected location if possible.

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WIRING

The diagram below shows the typical wiring of the precharger with your main contactor.



For more complete EV wiring diagrams, please consult the Tech Info section of our website at www.zeva.com.au

There are six solder pads to attach wires to:

- A key-switched 12V input to turn the device on, plus a ground (typically chassis grounding).
- Two wires to the power terminals of the main contactor. Take note of polarity – the positive terminal should be on the battery side.

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- Two wires to the contactor coil. Again, take note of polarity if marked on your contactor.

Ensure that your wiring has sufficient insulation rating for the voltage. For sufficient current rating and mechanical strength, we recommend around 18AWG / 1sqmm size.

The supply to the precharger should be fused. Most vehicles will already have a fuse on their key signal which is usually sufficient. If your vehicle does not, we recommend installing a fuse on the precharger supply rated at about 5 amps.

OPERATION

If your wiring is correct, when voltage is applied to the 12V input, you should see a flashing red light on the board, indicating that precharge is in progress. If precharge completes successfully (determined by the voltage differential across the contactor being less than 5V), a green light will come on instead and your main contactor should engage.

If an error was detected, such as an external wiring fault or if precharge takes too long to complete, the device will disable the precharge circuit and the red light will stay lit, indicating an error.

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TECH NOTE ABOUT PRECHARGING

Prechargers can only work correctly if there are no continuous loads on the output side of the main contactor. Your main contactor should *only* be switching power to the motor controller. Other loads such as DC/DC converters, chargers etc should be wired in before the main contactor. If you do not wish to have these in circuit permanently, a second contactor is recommended (typically these do not require precharge).

TECHNICAL SUPPORT

If you have any queries not covered by this manual, feel free to contact us via our website: www.zeva.com.au

Products are covered against manufacturing faults for a period of 12 months from date of purchase. If you believe your device may be faulty, please contact us for RMA information.

ZEVA is a carbon neutral business. All products proudly designed and manufactured in Australia.

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