

EV Interlock Control Center (EVICC) Wiring Instructions

How It Works

The EVICC simplifies the connections between the stock vehicle wiring and the high voltage contactors added during the conversion process. All wiring connections for the individual interlocks are made to the EVICC, and outputs for a main and a run contactor are provided, as well as an additional output for a high-pedal disable to a controller. Status outputs are also provided for connection to dash lights.

When the key is turned to the 'Ignition' position, the main contactor closes (usually connecting the negative side of the traction battery pack) and any high voltage accessories (such as the heater) are powered for use. Once the key is turned to the 'Start' position and released, the vehicle is ready to operate, provided that all of the interlocks are in their normal state. When the interlock string is complete, the run contactor (usually connecting the positive side of the traction battery pack) and additional high-pedal disable output to the controller will close, allowing the motor to run.

The EVICC also offers a high level of flexibility. Many different combinations of interlocks can be connected, and these interlocks can be expanded or multiplied using external relays. The contactor interface can also be connected so that only one contactor is used, or the input power connection made for a different ignition key setup that does not include a start position.

Installation

Install the EVICC in as dry and temperate of a location as possible. The best place is inside of the passenger area, but high on the firewall or on the strut tower are also good under hood installation locations. If the environment is particularly dusty or wet, the push in grommets used can be replaced with cord grip style connectors to cinch around the wires.

All wire connections are made with .250" female spade (flag) connectors. Use a high quality crimping tool to ensure a quality connection. Wires should be kept neat and free of stress, using wire ties as needed. Keep the 120VAC and 240VAC connections separate both in and out of the EVICC, using service cord, armored cable, or flexible conduit with stranded conductors. Do not use solid conductors. A separate grommet is provided for the input of the AC wiring.

Connections - Power Inputs

- Ignition:** Connect a source of power that is hot when the ignition is turned on, such as the wire that originally went to the fuel pump.
- Starter:** Connect to the wire that originally went to the starter solenoid. This can also be connected to a momentary switch, or connected in parallel with the 'Ignition' terminal above if there is only a simple on/off switch.
- Ground:** Connect to the vehicle frame or battery negative post.

Connections – Charger AC Inputs

- 120VAC:** Connects to 120VAC power from an on-board charger to prevent vehicle operation during charging. It is recommended that the DC charger interlock be used with an external relay for off-board chargers, or chargers that are physically too remote from the EVICC for practical and safe connection. This input locks out when power is applied, so not connecting this input will not lock out the run contactor. If this interlock is not used, leave it unconnected.
- 240VAC:** Connects to 240VAC power from an on-board charger as outlined above for the 120VAC connection.
- Neutral:** Common neutral connection for both AC inputs.

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Connections – Interlocks

Note that these interlocks are only suggestions. Many different combinations are possible.

- C1 & N.C.: Connects to an interlock that has a closed switch during the run state. This interlock would normally be connected to the switch indicating that the throttle is being applied, on the N.O. and C poles. The connection and jumper information is as outlined for C3 & N.C., except that the changes are made to J1. If this interlock is not used, then the two terminals must be connected together.
- C2 & N.C.: Connects to an interlock that has a closed switch during the run state. This interlock could be connected to a Ford inertia switch, on the N.C. and C poles. The connection and jumper information is as outlined for C3 & N.C., except that the changes are made to J2. If this interlock is not used, then the two terminals must be connected together.
- C3 & N.O.: Connects to an interlock that has an open switch during the run state. This interlock could be connected to a clutch switch or a neutral safety switch on a automatic. C3 normally provides a negative power source, and that signal is returned to N.O. to indicate a switch closure. If the switch already provides the negative power source, leave C3 unconnected. The polarity of the input may be changed by reversing both jumpers on J3, so that positive power is connected instead of negative power, if the clutch switch provides a positive power output. The jumper does not need to be changed if the switch it is connected to has a dry contact. If this interlock is not used, leave it unconnected.
- C4 & N.O.: Connects to an interlock that has an open switch during the run state. This interlock could be connected to the parking brake switch. The connection and jumper information is as outlined for C3 & N.C., except that the jumper changes are made to J4. If this interlock is not used, leave it unconnected.
- C5 & N.O.: Connects to an interlock that has an open switch during the run state. This interlock could be connected to the brake switch. The connection and jumper information is as outlined for C3 & N.C., except that the jumper changes are made to J5. If this interlock is not used, leave it unconnected.
- C6 & N.O.: Connects to an interlock that has an open switch during the run state. This interlock could be connected to an auxiliary stop switch. Note that this would not replace a hard wired kill switch. It could also be connected to the motor thermal switch if so equipped. The connection and jumper information is as outlined for C3 & N.C., except that the changes are made to J6. If this interlock is not used, leave it unconnected.

C7 & Charger: Connects to auxiliary relay contacts that indicate that a charger is connected. The connection and jumper information is as outlined for C3 & N.C., except that the changes are made to J7. If this interlock is not used, leave it unconnected.

Connections – Contactor Outputs

Main +: Connects to the positive power terminal on the main contactor. This is the switched connection. If the terminals are not marked in any way, then the polarity is not important. It is recommended that a 5A diode is installed across the contactor coil as close to the contactor as possible, with the striped end connecting to the positive power side. Many contactors come with this already wired.

Main -: Connects to the negative power terminal on the main contactor. This connection is not switched, and can also be made directly to the vehicle chassis closer to the contactor.

Run +: Connects to the positive power terminal on the run contactor. The connection should be made as outlined above for the main contactor. If only one contactor is used, it should be connected to these terminals, not the main contactor terminals.

Run -: Connects to the negative power terminal on the run contactor. The connection should be made as outlined above for the main contactor.

Connections – Auxiliary Run Output

Run/KSI (Dry): Connect this un-powered contact to the high-pedal disable input on the controller. Note that the contacts are only rated for 30VDC. This is standard on most relays, even those commonly used to switch 120VDC or more for this purpose. Over the long term, the relay contacts can break down if the switched voltage exceeds the ratings. The safest universal solution is to tap the positive terminal of the first or second battery for a +12VDC connection to the controller. Note that the auxiliary battery or DC-DC converter output is not usable because many controllers use the traction battery pack negative connection for the high-pedal disable reference, and it is not desirable to connect any part of the traction battery pack to the vehicle frame.

Connections – Status Outputs

Chg On (Dry): This un-powered contact indicates that one of the charger interlocks is active. This can be used to light a ‘Charger On’ instrument light, or enable a safety contactor that connects charger voltage to the traction battery pack whenever the charger is connected. To use with an instrument light, switch the positive or negative lead through this contact.

Main On: This output is powered whenever the main contactor is closed. Normally this output is a negative power signal. The polarity of all of the status outputs can be changed by reversing both jumpers on J8, so that positive power is output instead of negative power. If the jumpers are changed, then the ‘Common’ terminal will output a negative power signal instead of a positive power signal.

Run On: This output is powered whenever the run contactor is closed. The polarity is set by J8 as outlined above for ‘Main On’.

Start: This output is powered whenever the starter latch is closed. The polarity is set by J8 as outlined above for ‘Main On’.

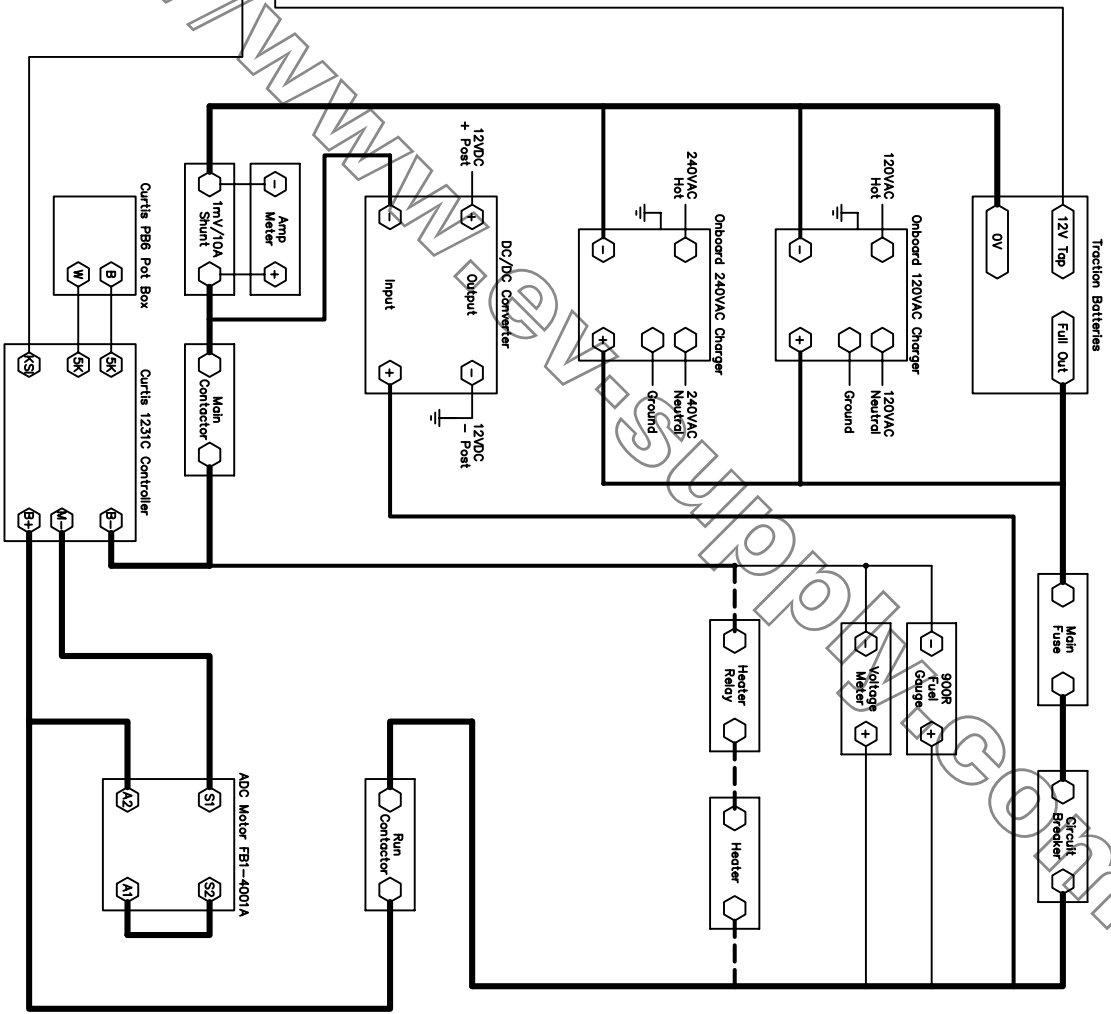
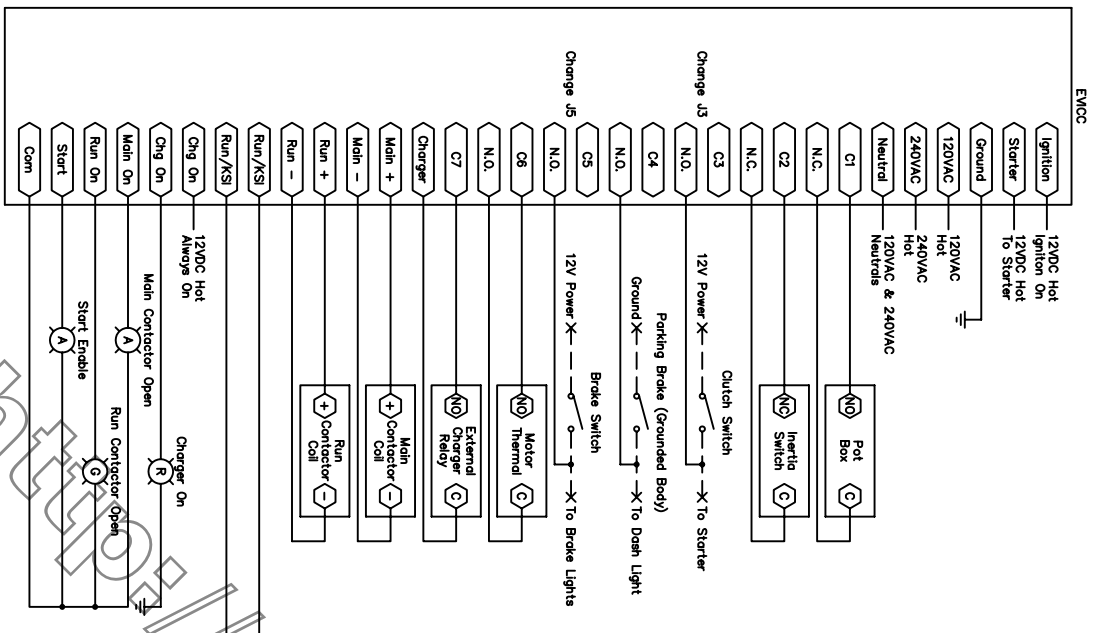
Com: This is the reference voltage for the powered status outputs. The polarity is set by J8 as outlined above for ‘Main On’.

Note On Jumpers

The jumpers for J1-J8 will normally face in opposite directions. To change polarity, the positions of both of the jumpers need to be changed.

Final Testing

Make sure that all functionality is tested before the motor and controller are connected to the contactors. The run contactor should cycle on and off with each interlock, and the auxiliary run output should be tested as well with a test light or continuity tester. Check that all status outputs work as intended. Only when the system has been fully tested should the power be connected to the motor and controller.



TITLE	DRAWN BY
EMCC Wiring Example	CAZ
DESCRIPTION	DATE
High Voltage Wiring (Curtis 1231C, ADC 97) & Interlocks	10/16/2007

_____ = 16 AWG
 _____ = 8 AWG
 _____ = 2/0 AWG