iVario Breakout Manual

PN OE-565

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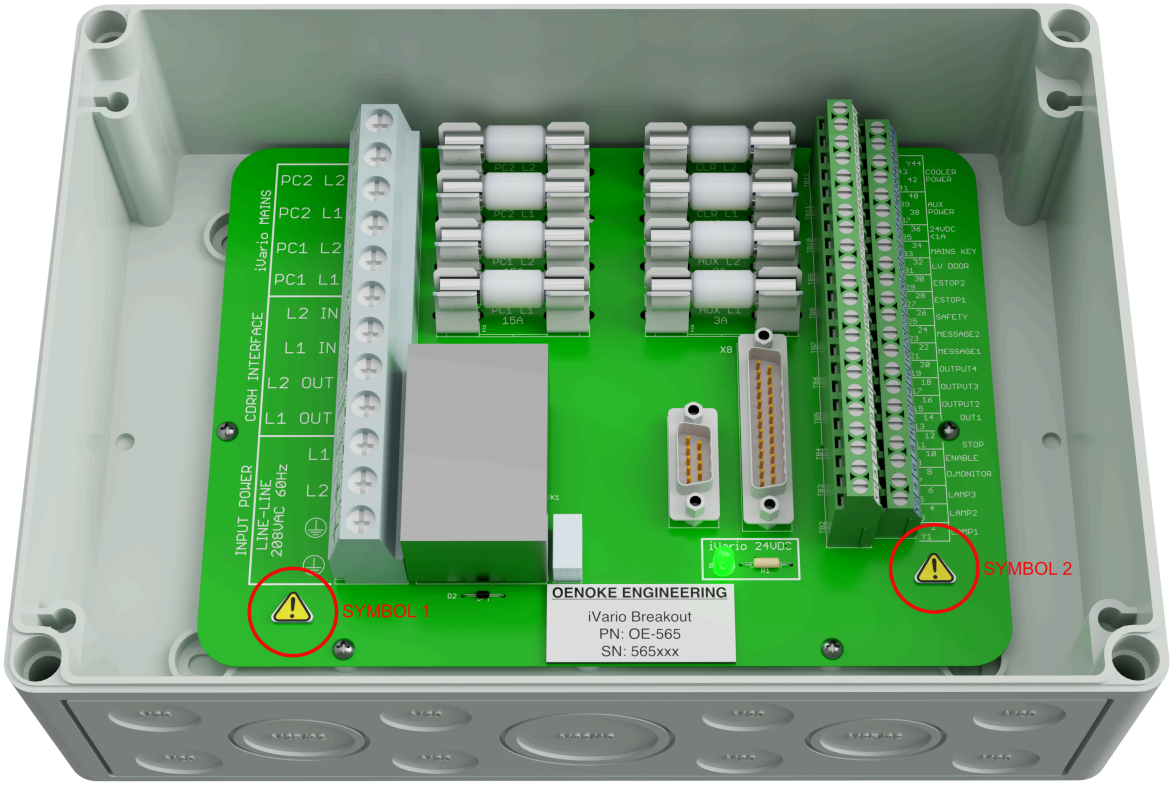
Warning Symbols



SYMBOL	DESCRIPTION
	Hazardous voltage warning symbol for the OE-565-PCB circuit board. This symbol is located on the physical circuit board to warn of terminal blocks that contain hazardous live voltages (208VAC). The service person working on OE-565 should never remove the lid, install/uninstall any wires, install/uninstall any fuses, or tighten/loosen any terminal blocks with the board powered. Hazardous voltage warning symbol for the OE-565 manual. Risk of electrical shock

There are two hazardous voltage warning symbols on the OE-565-PCB circuit board. These symbols are for the following:

Symbol	Voltage	Terminal Blocks
SYMBOL 1	208VAC	L1, L2, L1 OUT, L2 OUT, L1 IN, L2 IN, PC1 L1, PC1 L2, PC2 L1, PC2 L2
SYMBOL 2	208VAC	Y37, Y39, Y41, Y43

Overview

The iVario Breakout [PN OE-565] is an electrical interface that significantly eases the setup of the iVario platform by providing a terminal block interface between the iVario high voltage generator and in-field x-ray cabinets/rooms, safety devices/interlocks, and manufacturing equipment. The iVario breakout is meant to be a quick and permanent solution to get x-ray systems using COMET Technologies iVario platform up and running in the field with minimal effort and resources.

Highlights

- Compatible with iVario 100kV, 160kV, 225kV, 320kV, 450kV, 600kV models
- Compatible with iVario 2250W and 4500W models
- Single 208VAC facility input power connection
- Power Outputs:
  - iVario Mains Power
  - iVario Auxiliary Power
  - Cooler/Chiller Power
- Fuses (13/32 x 1-1/2 in [10x38mm]):
  - iVario Mains Power 15A
  - iVario Auxiliary Power 3A
  - Cooler/Chiller 10A
- Safety Features:
  - High Voltage Door Interlock (CDRH)
  - Low Voltage Door Interlock
  - Two Emergency Stop Buttons
  - Enable Button
  - Stop Button
  - Series Safety Interlock
  - Three Current Monitored Warning Lamps (24VDC)
- System Key Switches:
  - Mains Key Switch - to turn power on/off to iVario Mains power
- iVario X8 Cable
  - Enable/Stop Buttons
  - Customer Safety Interlock
  - Customer Messages
  - iVario Outputs 1-4
  - 24VDC Supply ≤1A
- iVario X10 Cable
  - All three 24VDC monitored warning lamps
  - Customer dynamic monitoring
- Electrical Enclosure
  - M20-M40 Knockouts (40 total)
  - Rated up to IP66
  - Wall, Panel or Standalone mountable
  - Can mount directly to iVario generator with available bracket
  - Dimensions: 10 x 7 x 3.5 inches

IP Enclosure Details

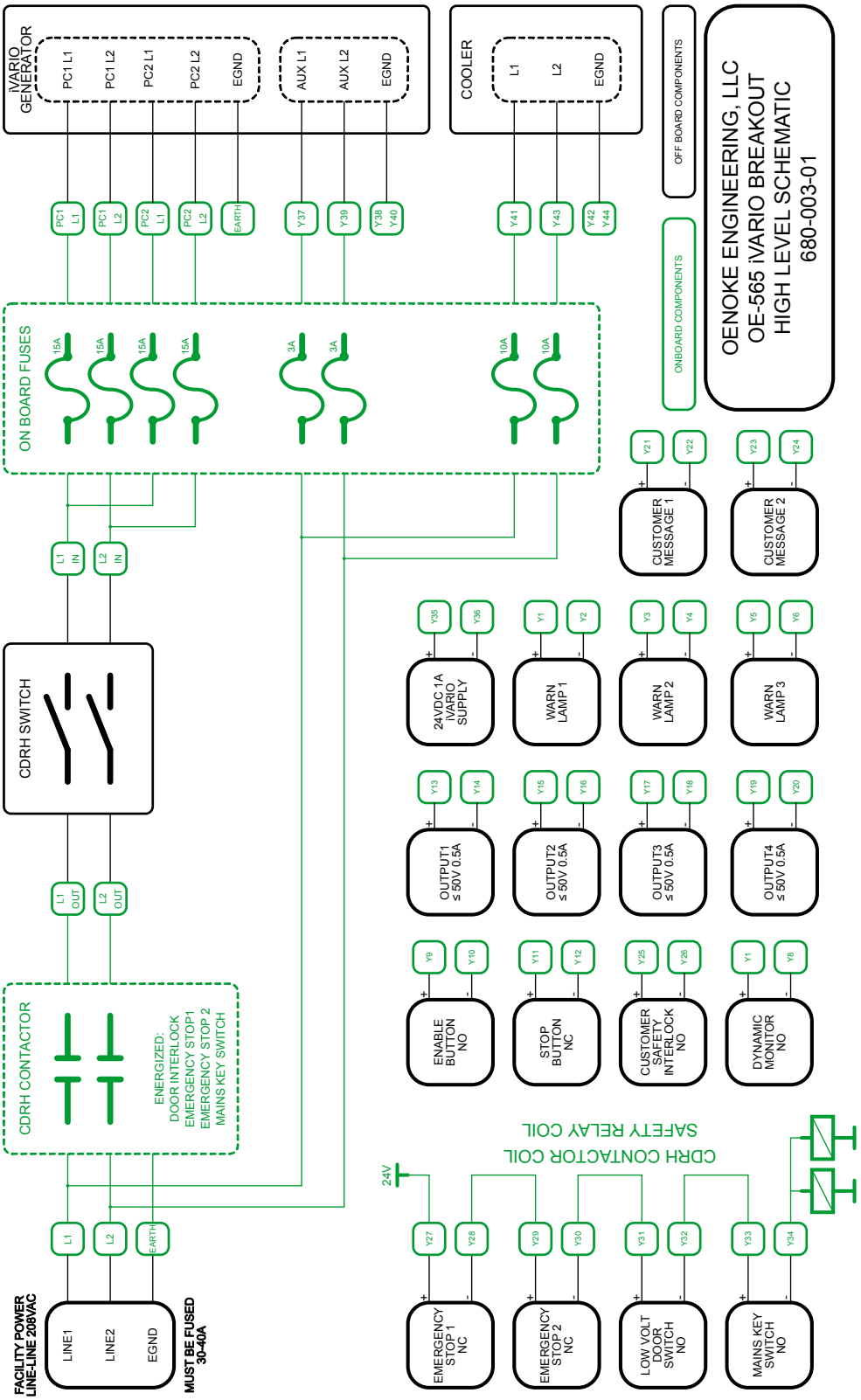
The iVario Breakout comes standard with an electrical enclosure [PN: OE-565-BOX] which has an IP rating up to IP66. By default, the DB9/DB25 connectors for iVario X8/X10 mounted on the cover of the electrical enclosure are not IP rated and therefore reduce the overall enclosure rating to IP60. In order to achieve a rating of IP66, Oenoke Engineering can supply panel mount DB9/DB25 connectors rated for IP66-IP67.

- UL 508, type 4X & 12K specifications
- Up to IP66 rating, default IP60
- IK08 impact rating
- Knockouts
  - 24 x M20
  - 4 x M25/32
  - 4 x M32/40

Ordering & Part Numbers

Part Number	Description
OE-565	iVario Breakout, standard package. Includes: OE-565-PCB, OE-565-BOX, OE-565-DB9, OE-565-DB25
OE-565-PCB	iVario Breakout circuit board. Use for field replacements or when no electrical enclosure is necessary
OE-565-BOX	Electrical enclosure for circuit board. Can be wall mounted, panel mounted or used standalone on table/equipment
OE-565-DB9	Standard DB9 extension cable from circuit board to electrical enclosure
OE-565-DB25	Standard DB25 extension cable from circuit board to electrical enclosure
OE-565-DB9IP	DB9 extension cable from circuit board to lid of electrical enclosure. For use when an IP rating of IP66 is required
OE-565-DB25IP	DB25 extension cable from circuit board to lid of electrical enclosure. For use when an IP rating of IP66 is required
Replacement Fuses	Replace with UL248-4 Class CC, 600VAC, 200,000A interrupting rating. Fuses are 4x 15A, 2x 10A, and 2x 3A.

High Level Wiring Diagram



Installation Guide

Intended Use of iVario Breakout

The iVario Breakout is intended for easing the permanent installation and setup of the COMET iVario generator platform at a customers site. iVario Breakout is only approved for installations on COMET iVario generators rated for ≤4500W operation. Generator operation over 4500W is not approved and can lead to damage to the product and connected components including the iVario.

Manufacturer Information

OE-565 iVario Breakout is manufactured by:
Oenoke Engineering, LLC
32 Noble Street
Stamford, CT 06902

Environmental Ratings

Parameter	Max Rating
Ambient Air Temperature	-20 - 45°C
Relative Humidity	90% non-condensing
Altitude	2000m

Mounting

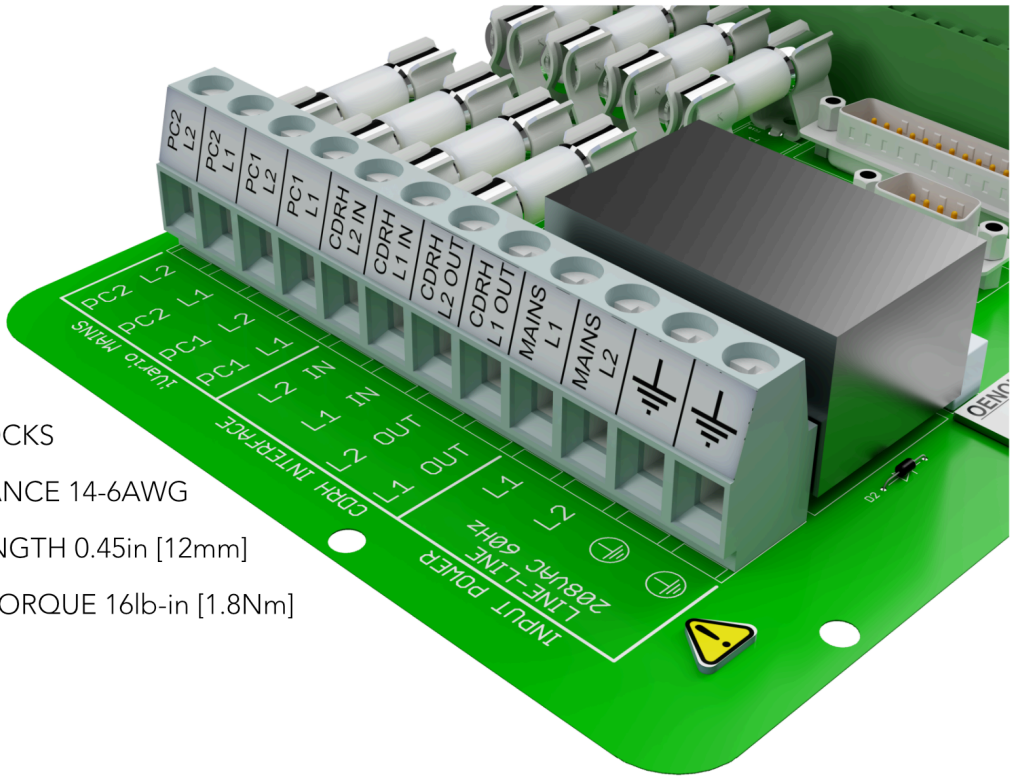
The iVario Breakout can be mounted in one of many ways including:

- Simply placed on top of iVario generator, table, or other equipment with no fastening
- Fastening to a wall or table via the four mounting holes located on the bottom of enclosure
- Fastening to an electrical panel, including inside an electrical enclosure, via the four mounting holes located on the bottom of the OE-565-BOX
- For mounting dimensions please see *Dimensions* section

Other Considerations

- A switch or circuit breaker or disconnect box, powering the iVario Breakout but is not part of the iVario Breakout, must be located in an easily reached location. The switch/breaker/disconnect must be marked as a disconnect for the iVario Breakout
- All electrical installations are to be performed in accordance with local codes (ANSI/NFPA 70, National Electrical Code (NEC)); designed to b installed in accordance with the Canadian Electrical Code (CEC), Part 1, CSA C22.1, and CSA C22.2 No.0; or designed to comply with both the NEC and CEC
- For overcorrect devices outside of the iVario Breakout:
    - Multiple-pole circuit breakers interrupts all neutral and ungrounded connectors of the mains supply simultaneously
    - Single fuse is connected in the ungrounded supply conductor
    - Fuseholders for fuses used in both conductors mounted adjacent to each other are fuses of the same ratings and characteristics
    - The screw shell of a plug fuse holder and the ACCESSIBLE contact of an extractor fuse holder connected to the ungrounded supply conductor is connected towards the load. The ACCESSIBLE contact or screw shell of fuse holders connected in the neutral (grounded) conductor is located towards the grounded supply line.

Terminal Block Specifications

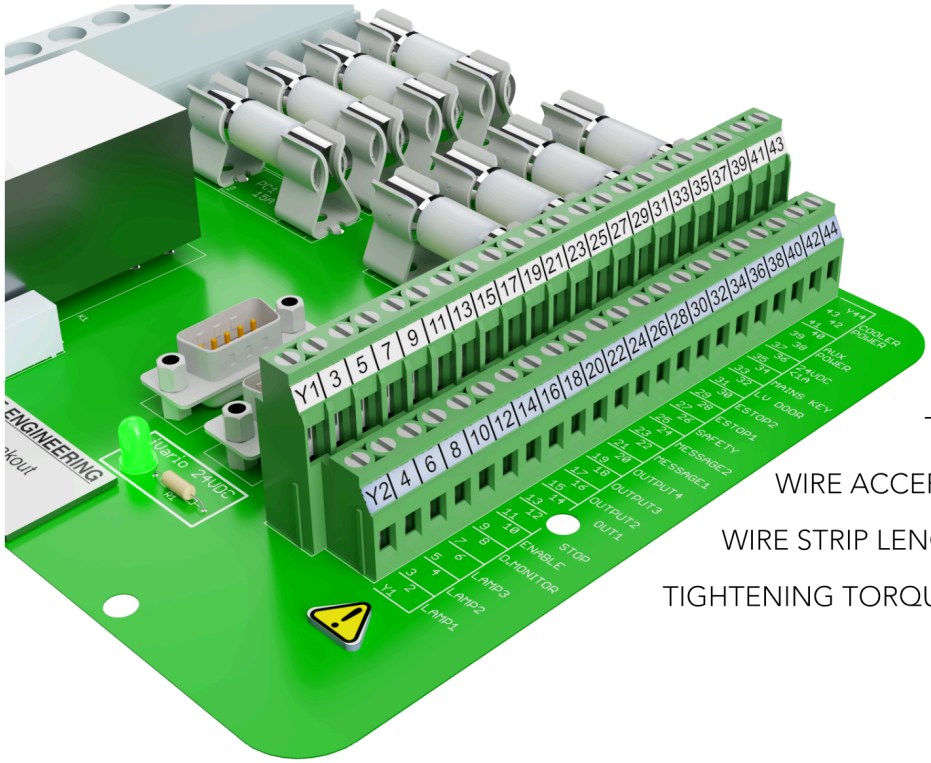


POWER
TERMINAL BLOCKS

WIRE ACCEPTANCE 14-6AWG

WIRE STRIP LENGTH 0.45in [12mm]

TIGHTENING TORQUE 16lb-in [1.8Nm]



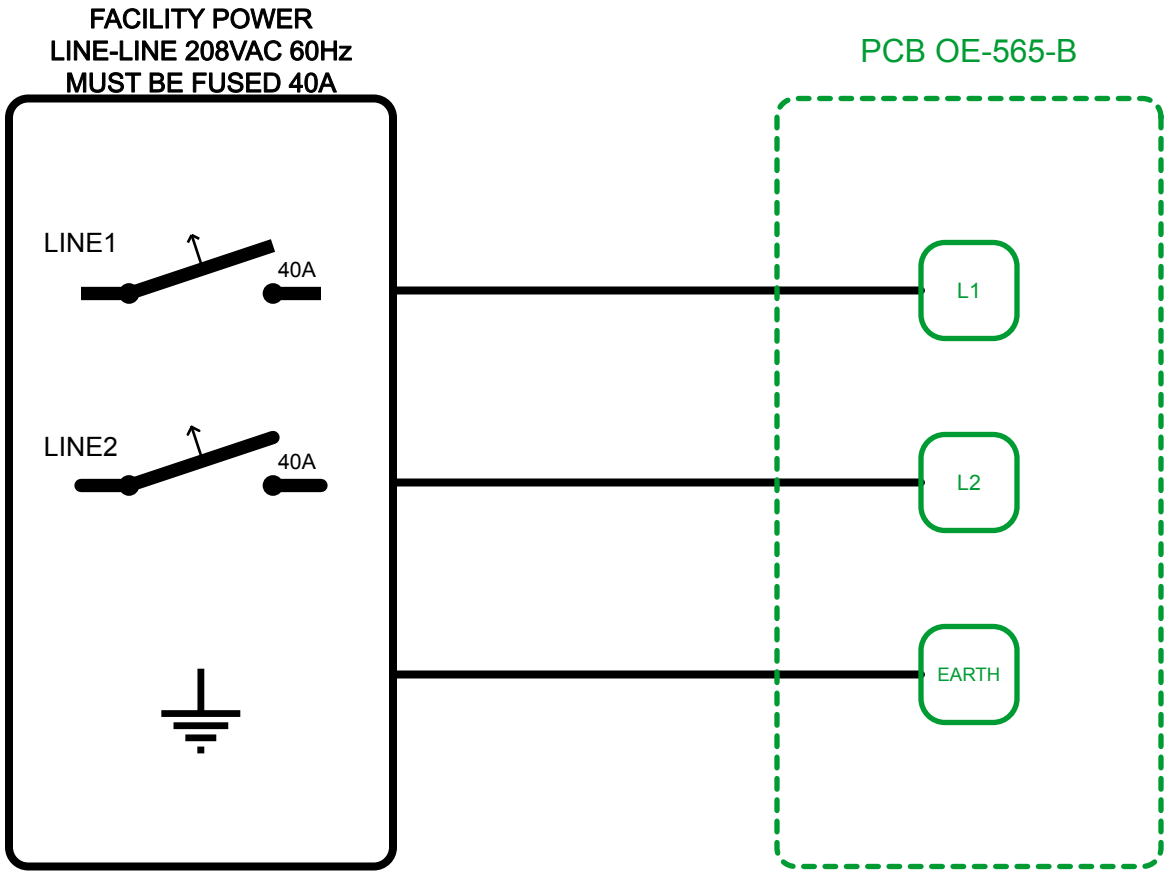
INPUT/OUTPUT
TERMINAL BLOCKS

WIRE ACCEPTANCE 24-14AWG

WIRE STRIP LENGTH 0.25in [6-7mm]

TIGHTENING TORQUE 4.3lb-in [0.49Nm]

Facility Input Power

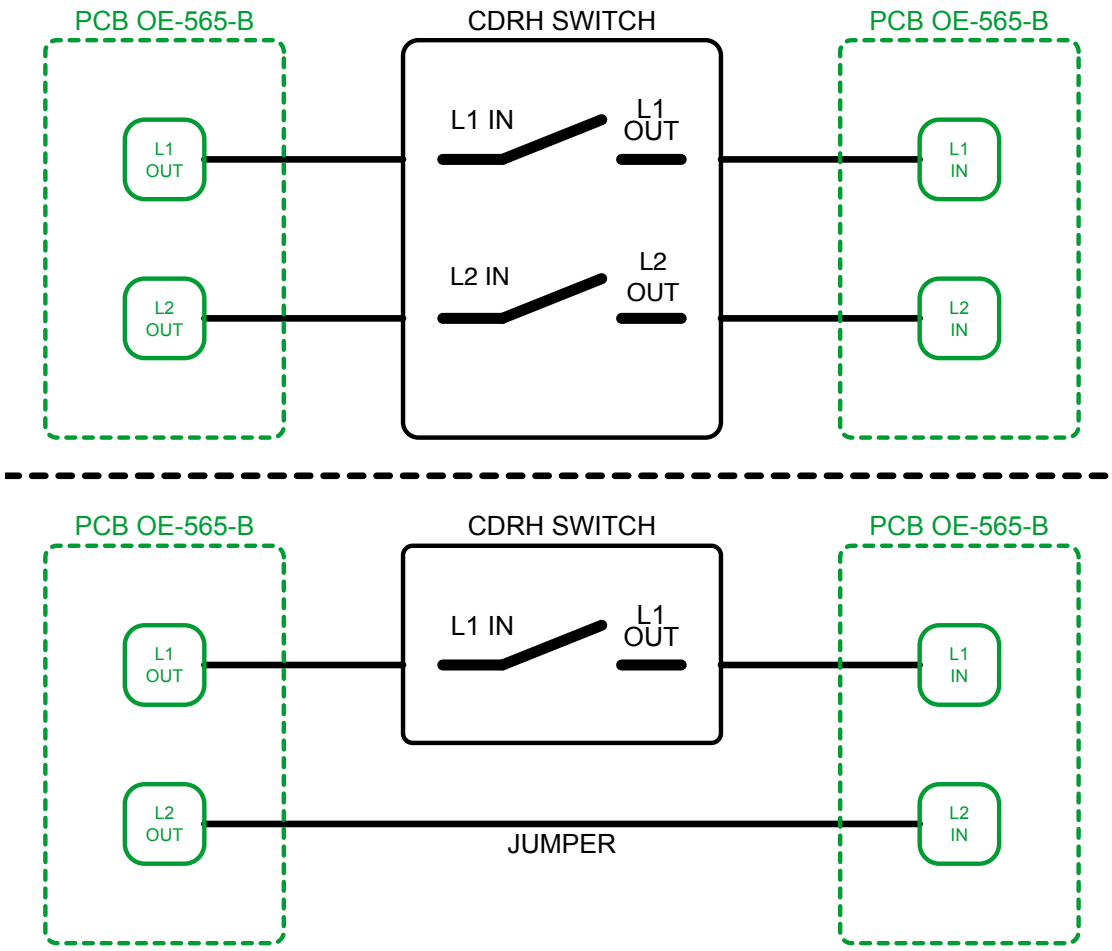


Connect the MAINS power cable to iVario Breakout Board as shown above. **NOTE - Each Line must be fused at 40A by the customer. Failure to provide 40A fuses may result in damage to the iVario Breakout Board and connected hardware!** Cables/wires should be rated for ambient temperatures 60°C and above.

Refer to *Terminal Block Specifications* section, *POWER TERMINAL BLOCKS* subsection for proper wire insertion specifications

⚠	**HAZARDOUS VOLTAGE - RISK OF ELECTRICAL SHOCK - DISCONNECT INPUT POWER BEFORE INSTALLING CABLING**

CDRH Switch

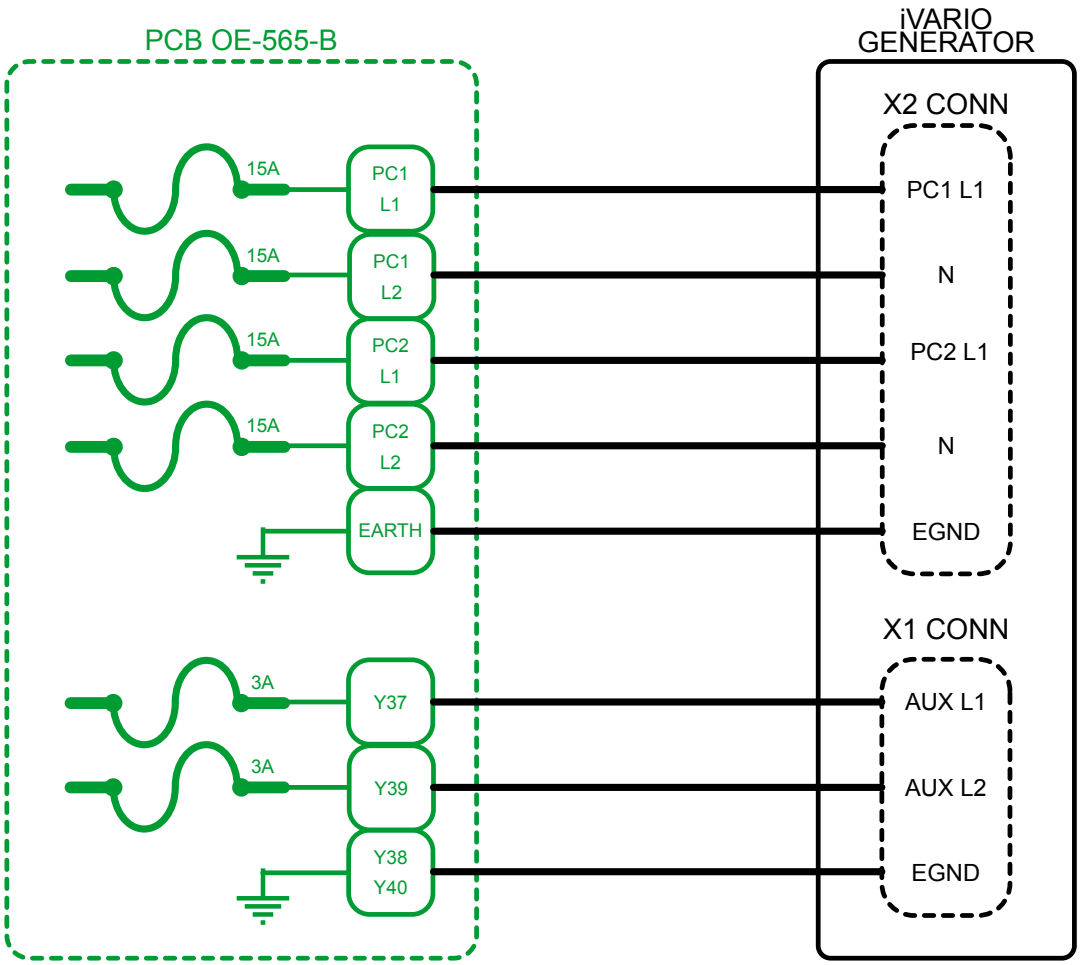


Connect CDRH switch to the iVario Breakout Board as shown above. It is recommended both *L1* and *L2* be broken through the switch. If only *L1* is broken, *L2* must be shorted/jumped as shown in the lower diagram.

Refer to *Terminal Block Specifications* section, *POWER TERMINAL BLOCKS* subsection for proper wire insertion specifications

	**HAZARDOUS VOLTAGE - RISK OF ELECTRICAL SHOCK - DISCONNECT INPUT POWER BEFORE INSTALLING CABLING**

Generator Power

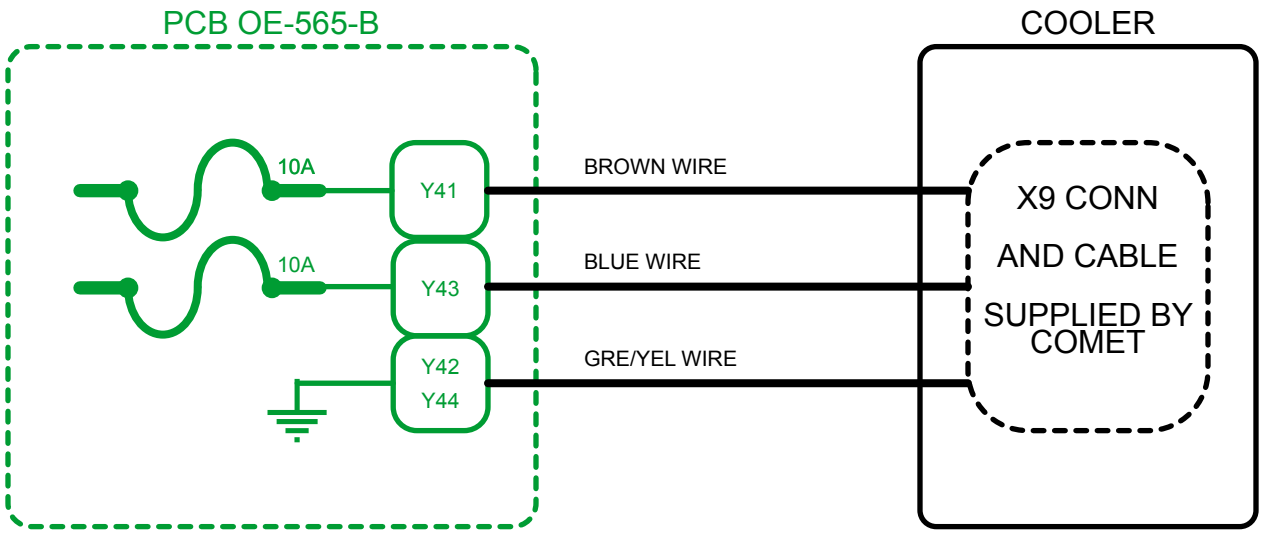


Wire the iVario *X2* MAINS power connector and *X1* AUXILIARY power connector to iVario Breakout Board as shown above. Replacement fuses are to be UL248-4 Class CC, 600VAC, 200,000A interrupting rating.

Refer to *Terminal Block Specifications* section, *POWER TERMINAL BLOCKS* and *INPUT/OUTPUT TERMINAL BLOCKS* subsection for proper wire insertion specifications

	**HAZARDOUS VOLTAGE - RISK OF ELECTRICAL SHOCK - DISCONNECT INPUT POWER BEFORE INSTALLING CABLING**

Cooler Power Cable (X9)

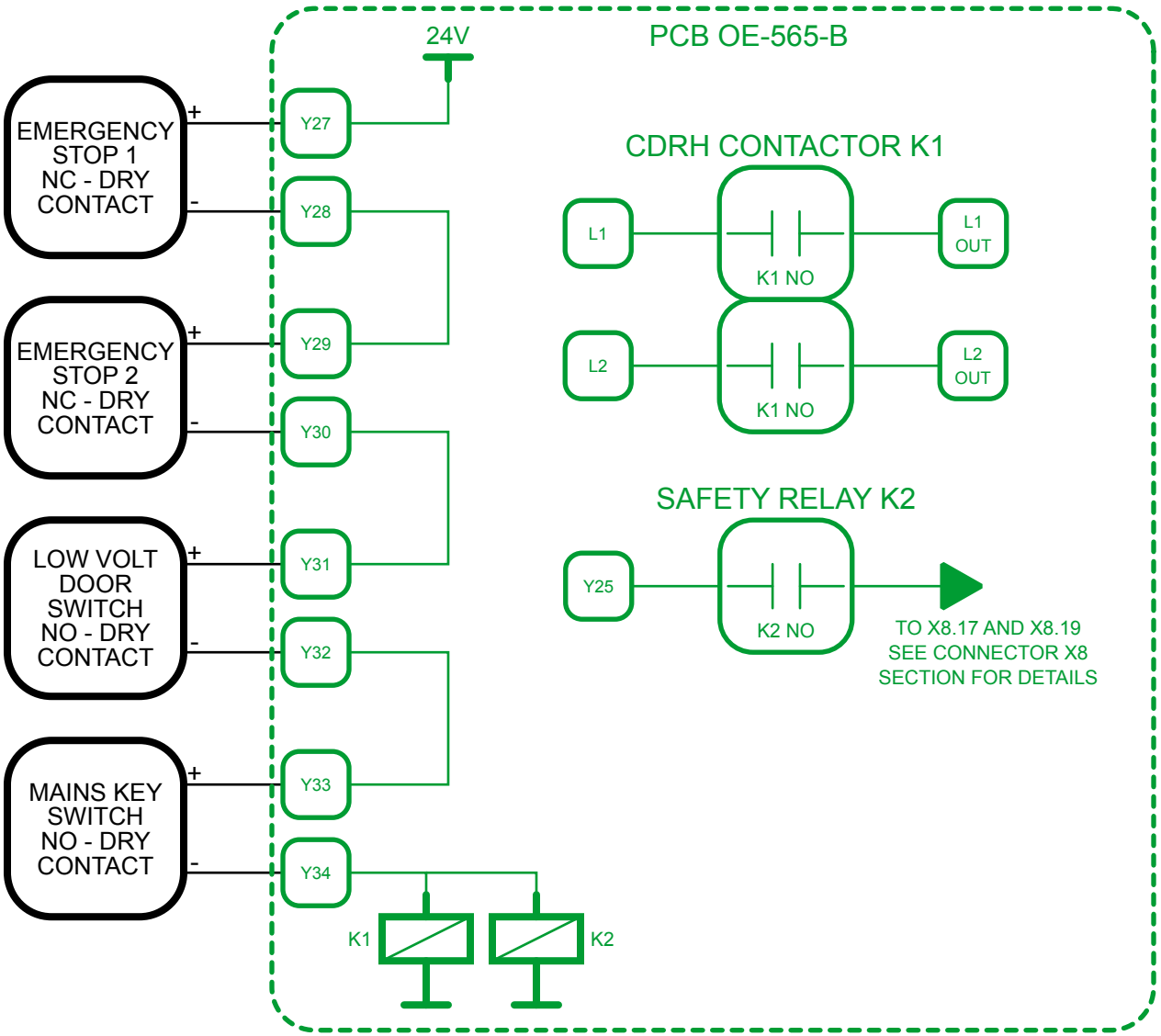


Connect Cooler Power Cable *X9* to the iVario Breakout Board as shown above with the COMET supplied cooler power cable. Replacement fuses are to be UL248-4 Class CC, 600VAC, 200,000A interrupting rating.

Refer to *Terminal Block Specifications* section, INPUT/OUTPUT *TERMINAL BLOCKS* subsection for proper wire insertion specifications

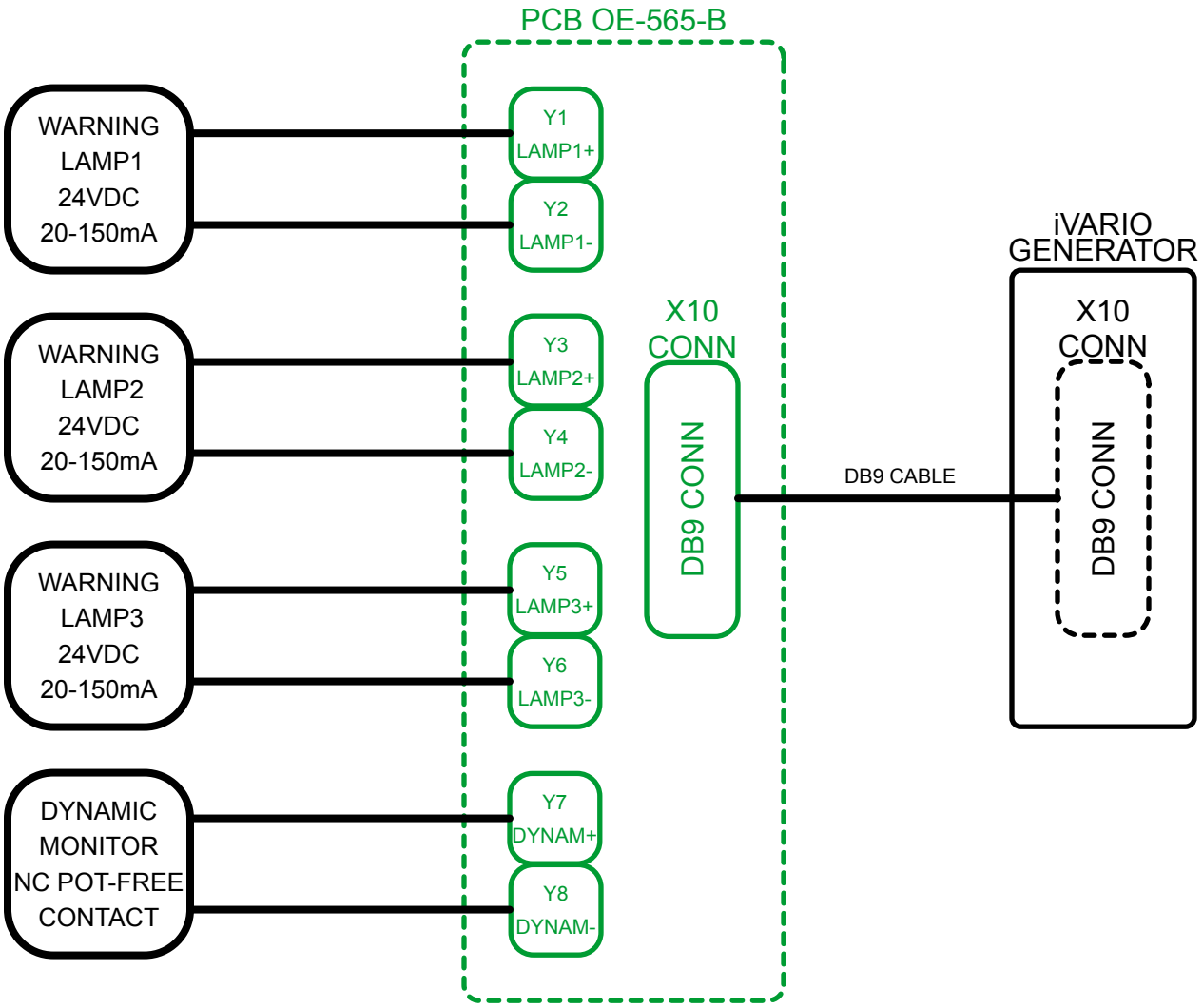
⚠	**HAZARDOUS VOLTAGE - RISK OF ELECTRICAL SHOCK - DISCONNECT INPUT POWER BEFORE INSTALLING CABLING**

Safety Circuit



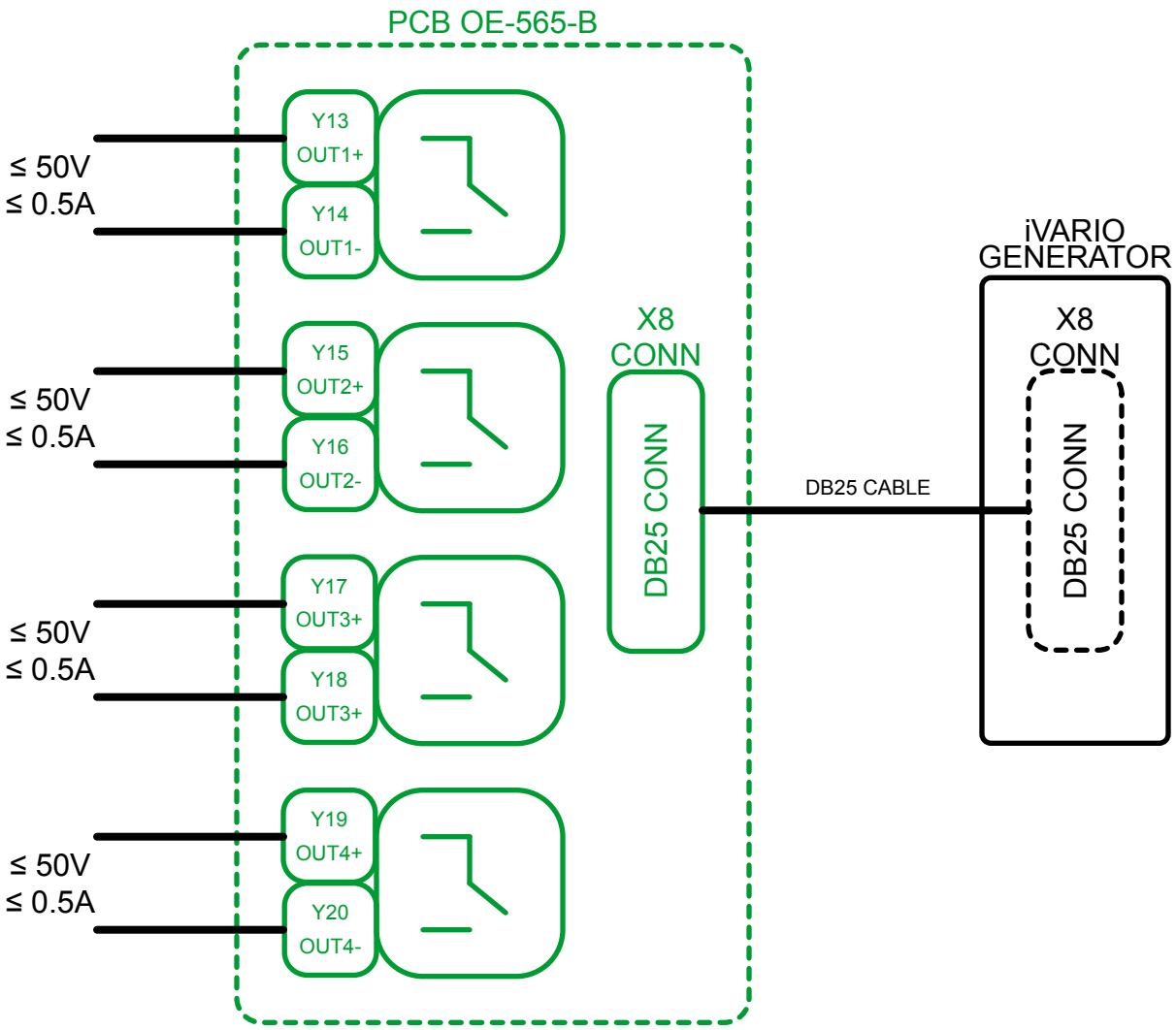
The safety circuit provides a means to break the MAINS power going to the iVario generator MAINS connector *X1*. When one of the safety interlocks is opened, power to the CDRH Contactor K1 coil is broken causing the contactor to open and power to the CDRH switch and iVario generator MAINS is broken. The *LOW VOLT DOOR SWITCH* should make after the high voltage contacts and break before the high voltage contacts to ensure switch integrity and safety. This circuit is also tied into the iVario *Customer Interlock* via *K2* such that the EMERGENCY STOPs, LOW VOLT DOOR SWITCH, and MAINS KEY will trigger an interlock fault on the generator thus turning off the cooler.

Warning Lamps (X10)



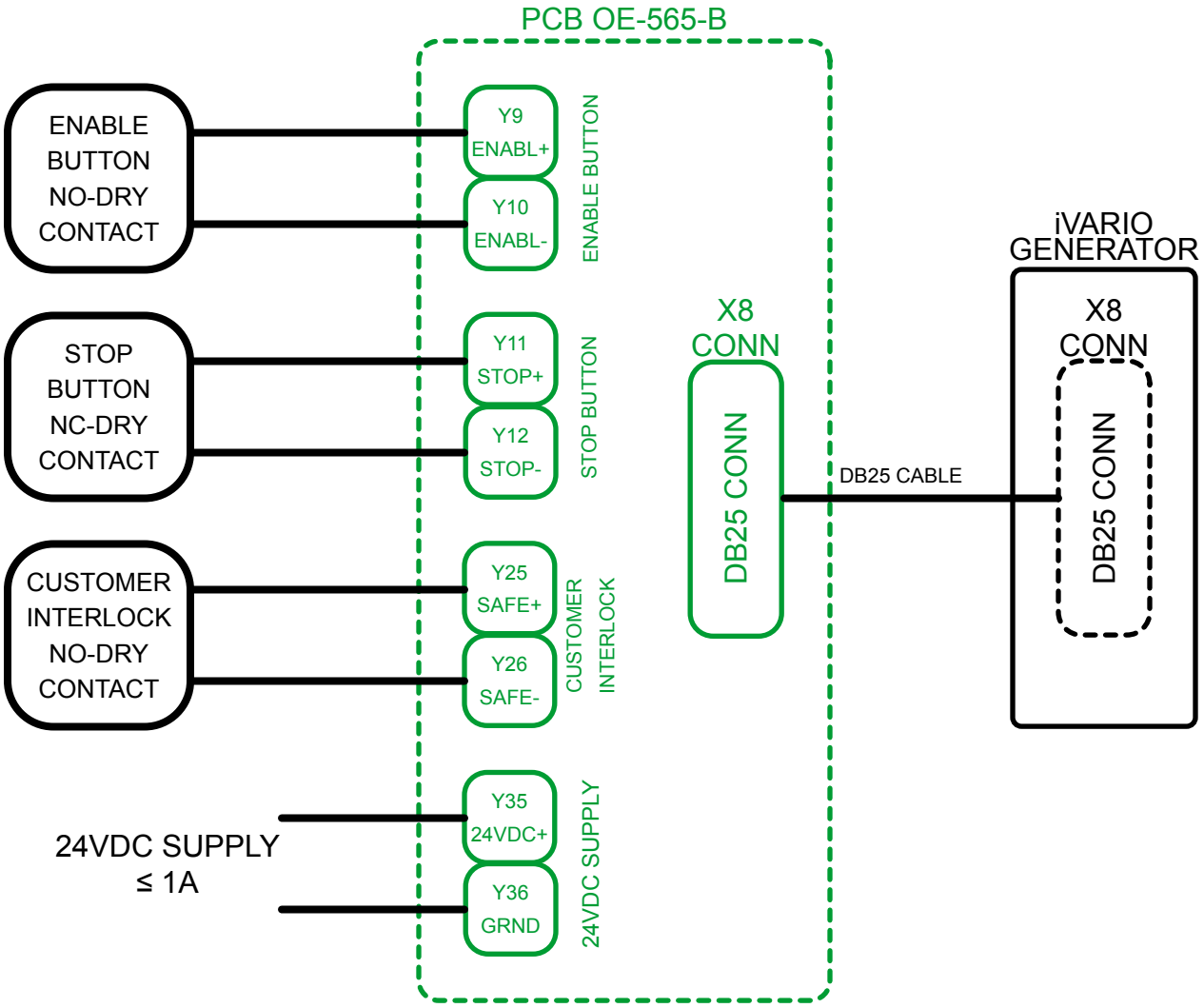
Connect a DB9 cable from iVario generator connector *X10* to iVario Breakout Board connector *X10*. Wire in needed warning lamps as shown above. Each warning lamp is monitored by the iVario generator and can be programmed for different operation via the iVario Web UI.

iVario Outputs (X8)



Connect a DB25 cable from iVario generator connector *X8* to iVario Breakout Board connector *X8*. Wire in needed outputs as shown above. Each output can be programmed for different operation via the iVario Web UI.

Other Inputs (X8)

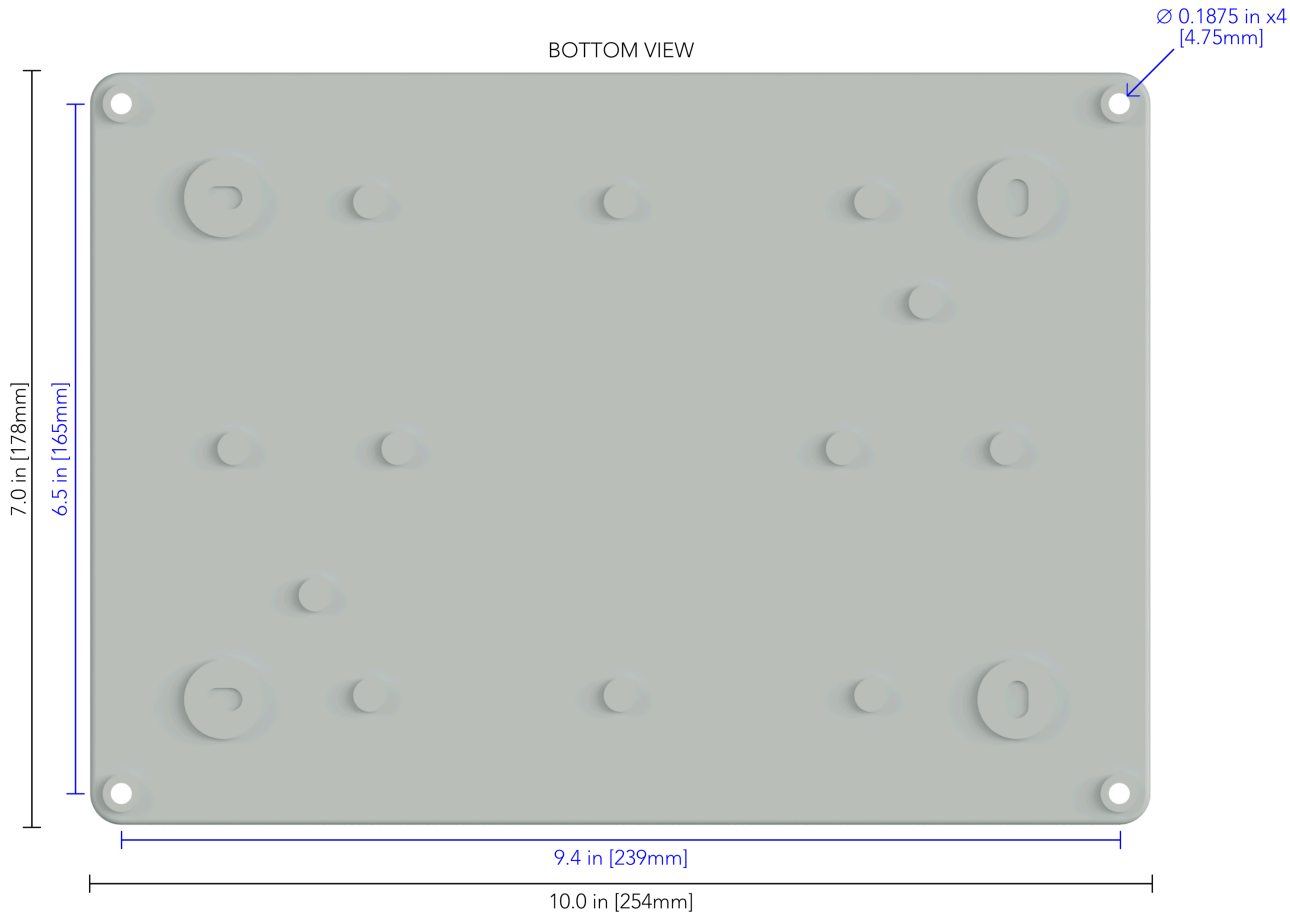


Wire in an ENABLE BUTTON (if needed) as shown above. Wire in a STOP BUTTON as shown above. If no STOP BUTTON is used, it must be shorted/jumped in order to make x-rays. Wire in an auxiliary customer interlock as shown above. This interlock is wired into the safety circuit of the iVario but it does not break the MAINS power to the iVario like the EMERGENCY STOPs and MAINS KEY SWITCH.

A 24VDC power supply is available for customer use, as shown above, with a current output limit of 1A. This supply is sourced from the iVario generator.

Dimensions


SIDE VIEW
3.5 in [89mm]
3.7 in [94mm]
M20
M25/32
M32/40


BOTTOM VIEW
Ø 0.1875 in x4
[4.75mm]
7.0 in [178mm]
6.5 in [165mm]
9.4 in [239mm]
10.0 in [254mm]

Service Manual

HAZARDOUS VOLTAGE - RISK OF ELECTRICAL SHOCK - DISCONNECT INPUT POWER BEFORE SERVICING

Any service performed on the iVario Breakout should be done so with the input power disconnected. There are no serviceable parts that need maintaining while the input power is connected. Input power should always be disconnected before the lid is removed as there is an electrical shock hazard from the exposed fuses.

The iVario Breakout requires only one type of service: replacing blown fuses. There are no other services of any kind required other than replacing blown fuses. In the event that a fuse blows the following steps in the proceeding section must be followed for replacement:

Fuse Replacement

1. DISCONNECT INPUT POWER TO iVario Breakout. Power must be off when the lid is removed!
2. Remove the lid by using a large slotted (flathead) screwdriver to loosen each screw in the four corners of the enclosures lid. The screws will back out to a certain point and then remained captured - the screws do not need to be completely removed.
3. While holding the circuit board down against the enclosure, remove the desired fuse using specialty fuse remover or pliers
    3.1. Oenoke Engineering recommends using a specialty fuse remover for 13/32" diameter fuses such as PN HCTR8 from AutomationDirect.com [see side image for reference]

4. Install the new fuse with specialty fuse remover or pliers
5. Reinstall the lid and tighten the four screws using a large slotted (flathead) screwdriver

Revision History

Revision	Description
01	Original Release
02	07/07/19 - Changed MAINS terminal block wire gauge acceptance from 6-10AWG to 6-14AWG - In Service Manual, removed any reference to replacing fuses without fuse removed/ pliers - Replaced high level wiring diagram with 680-003-01 - Slight formatting changes - Added revision history table, slight formatting changes
03	10/29/19 - Replaced circuit breaker references to fuses - Added new dimensions drawings and removed old ones - Added new terminal block specification section - Updated fonts