IsoBoost
Transformer

Owners Manual

ENERGY SOLUTIONS
Efficient Sustainable Electrification

Models

IsoBoost 7 kVA - US

IsoBoost 12 kVA - US

IsoBoost 15 kVA - US

IsoBoost 15 kVA - EU

IsoBoost 24 kVA - US

IsoBoost 24 kVA - EU

Rev04. September 2025

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INTRODUCTION

Dear Customer,

Thank you for purchasing an Energy Solutions IsoBoost transformer.

Energy Solutions designs and builds products to strict specifications and quality control procedures and with proper use and maintenance this product should bring you years of satisfactory service.

We want to help you get the best results from this product and ask that you spend a small amount of time reading this manual before operating the IsoBoost.

All information in this manual is based on the latest product information at the time of printing. Energy Solutions reserves the right to make changes at any time without obligation.

All pictures in this manual are for reference purposes only.

This manual should stay with the unit at all times.

Figure 1 - IsoBoost 24 kVA

IMPORTANT SAFETY INFORMATION

Operator Manual

WARNING

You and others can be killed or seriously injured if you operate or maintain the unit without first studying the Owner's Manual. You must understand and follow the instructions in the Owner's Manual. If you do not understand anything, ask your supplier or Energy Solutions to explain it.

Do not operate the unit without an Owner Manual, or if there is anything on the unit you do not understand. Treat the Owner's Manual as part of the unit. Keep it clean and in good condition. Replace the Owner's Manual immediately if it is lost, damaged or becomes unreadable.

Safety Warnings

This safety alert system identifies important safety messages in this manual. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.

In this publication and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

DANGER

Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.

WARNING

Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.

CAUTION

Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the IsoBoost.

ABOUT THIS MANUAL

Model and Serial Number

This manual provides information for the following models:

Isoboost 7 kVA - US

IsoBoost 12 kVA - US

IsoBoost 15 kVA - US

IsoBoost 15 kVA - EU

IsoBoost 24 kVA - US

IsoBoost 24 kVA - EU

Although the above models differ in size, output power or output voltage form, they are otherwise similar in design and operation. Where necessary, differences between the versions will be explained in the text and images. The serial number can be found on the unit.

Using This Manual

This manual is arranged to give you a good understanding of the unit and its safe operation. It also contains maintenance information and specification data. Read this manual from front to back before using the unit for the first time. Particular attention must be given to all the safety aspects of operating and maintaining the unit.

If there is anything you are not sure about, ask your supplier.

General warnings in this chapter are repeated throughout the manual, as well as specific warnings.

The illustrations in this manual are for guidance only. Where the units differ, the text and or the illustration will specify.

All optional equipment included in this manual may not be available in all territories.

SAFETY

The following safety checklist is intended to help remind you of safety procedures and practices.

SAFETY IS YOUR RESPONSIBILITY

You must also refer to local regulations in the country your equipment is being used in. Some of the information may be repeated in the following warnings and cautions pages and in the main text.

- Do not change the application or specification of the IsoBoost.
- Do not lift heavy objects on your own, use lifting equipment or obtain the help of an assistant.
- Use the right tools for the job.
- Always make the unit is safe before completing any maintenance tasks.

CAUTION

Injury may occur when lifting. Do not lift heavy objects on your own. Use lifting equipment or the help of an assistant.

Operating Safety

WARNING

Product Condition

A defective product can injure you or others. Do not operate an IsoBoost which is defective or has missing parts. Make sure the maintenance procedures in this manual are completed before using the IsoBoost.

WARNING

Product Limits

Operating the product beyond its design limits can damage the IsoBoost, it can also be dangerous. Do not operate the IsoBoost outside its limits.

Maintenance Repairs

WARNING

If your IsoBoost does not function correctly in any way, get it repaired straight away. Neglect of necessary repairs could cause further damage or make the unit unsafe. Do not try to do repairs or any other type of maintenance work you do not understand. To avoid injury and/or damage get the work done by a specialist engineer.

Modifications

WARNING

This unit is manufactured in compliance with legislative and other requirements. It should not be altered in any way which could affect or invalidate any of these requirements. For advice consult Energy Solutions.

Cleaning

CAUTION

Fully isolate the supply of power to the unit before cleaning. Clean the outside of the unit with a damp cloth. Do not spray water into the vents.

Handling

CAUTION

Do not drop or shock the unit. Severe internal damage may occur. Do not use the unit if it has been dropped, even if it appears to be undamaged.

WARNING

If the boat is out of the water, it is in general safer to bypass the isolation by linking the shore earth to the ships earth. This can be done outside of the transformer with a suitable link sized to match the incoming earth cable.

PRODUCT FEATURES

All versions of the IsoBoost have the following features:

- A fully isolating, hand-built transformer, built and dipped for long life.
- A soft start system to minimise the risk of tripping the shore side breaker when first connecting.
- A sophisticated control system that will automatically select between boost (voltage increasing) and straight through mode on US versions.
- A sophisticated control system that will automatically select between buck (voltage reducing) and straight through mode on EU versions.
- Modbus data for optionally remote monitoring the IsoBoost.

Six versions are currently available.

- 07 kVA US - A hull isolation transformer rated for a 30A 120/208/240V shore cord.
- 12 kVA US - A hull isolation transformer rated for a 50A 208/240V shore cord.
- 15 kVA US - A hull isolation transformer rated for a 63A 208/240V shore cord.
- 15 kVA EU - A hull isolation transformer rated for a 63A 208/240V shore cord.
- 24 kVA US - A hull isolation transformer rated for a 100A 208/240V shore cord.
- 24 kVA EU - A hull isolation transformer rated for a 100A 230V shore cord or 63A 400-voxlt cord.

The IsoBoost is packaged in a robust steel enclosure, powder coated for longevity. Care should be taken to lift the unit on a pallet or by lifting from points on the transformer frame.

The IsoBoost is designed to operate automatically with no user intervention.

On the US model the IsoBoost starts in 1:1 mode. If the output voltage is below 215 volts, the unit will switch to boost mode. If the output voltage rises above 255 volts, the unit will drop back to 1:1 mode.

On the EU model the control system will start the IsoBoost in 1:1 mode if the incoming voltage is between 190 and 255 volts. The control system will start the IsoBoost in buck mode if the incoming voltage is between 340 and 440 volts.

All versions of the IsoBoost include a sophisticated multifunction meter built into the front of the case. It provides comprehensive monitoring of the output from the IsoBoost, including voltage, current, frequency, power and more.

All versions are fitted with a cooling fan. Air is drawn in through the front of the unit below the meter and expelled out the rear right hand side. Do not block any cooling vents. If the fan fails, it must be replaced.

A thermal overload switch is incorporated within the transformer windings. If the transformer overheats, this will operate and switch off the supply. Once it cools, it will reconnect. If this ever happens, check the cooling fan and seek advice. The unit is designed and tested to work at full load in 50°C/122°F ambient conditions - as long as clearances are maintained, and ventilation is not restricted.

SETUP AND CONNECTIONS

Setup

Placement

The IsoBoost should be fixed to a structural part of the ship that can accept the weight of the unit. It should be fixed down using the clearance holes in its feet.

The product is heavy and suitable lifting equipment must be used. Do not attempt to lift the IsoBoost manually. The IsoBoost will reject some heat. Do not block vents. You must leave 150mm clearance on all sides of the unit.

The IsoBoost transformer is not waterproof. Do not expose to rain or water.

Preparing For Installation

Remove the front panel of the IsoBoost unit. You will need a 4mm hex (Allen) key to remove the fixings.

A removable gland plate is situated on the right-hand side of the unit. This plate will need to be drilled to install cable glands (not supplied).

Electrical Connections

WARNING

The installation of the IsoBoost should be carried out by a qualified electrician. This unit case must be earthed in all modes of operation.

If you have any doubt about the connections or application of this unit, please contact your supplier.

AC Input

The unit should be wired to the shore supply receptacle with cable with a suitable rating to satisfy the relevant standards for the vessel. If the IsoBoost is more than 3 metres or 10 ft from the inlet an inline circuit breaker may be required to meet relevant standards:

Model	Cable Current	Cable Type
IsoBoost 7 kVA US	30A single phase	3 core – L1, L2, Gnd Or 3 core – L1, N, Gnd
IsoBoost 12 kVA US	50A single phase	3 core – L1, L2, Gnd
IsoBoost 15 kVA US	63A single phase	3 core – L1, L2, Gnd
IsoBoost 15 kVA EU	63A single phase	3 core – L, N, Gnd (Earth)
IsoBoost 24 kVA US	100A single phase	3 core – L1, L2, Gnd
IsoBoost 24 kVA EU	63A in buck mode – 100 amp in 1:1 mode	3 core – L, N, Gnd (Earth) Or L1, L2, Gnd from a 400V supply

AC Output

The unit should be connected to the ships distribution system using cable with a suitable rating to satisfy the relevant standards for the vessel:

Model	Cable rating required	Cable Type
IsoBoost 7 kVA US	30A	4 core – L1, L2, N, Gnd
IsoBoost 12 kVA US	50A	4 core – L1, L2, N, Gnd
IsoBoost 15 kVA US	63A	4 core – L1, L2, N, Gnd
IsoBoost 15 kVA EU	63A	3 core – L, N, Gnd (Earth)
IsoBoost 24 kVA US	100A	4 core – L1, L2, N, Gnd
IsoBoost 24 kVA EU	100A	3 core – L, N, Gnd (Earth)

Other Connections

Terminals A, B, and S are a Modbus RTU connection to the multifunction meter, or shore combining unit. Remote displays are available - please contact your supplier for details. See the Modbus section of this manual for the registers to allow integration into your ships monitoring system.

This section is only applicable to the 12 kVA, 15 kVA and the 24 kVA transformers.

Terminals 101 and 102 are a dry contact indicating the state of boost mode.

The contact rating is 6A at 230VAC, 4A at 24VDC.

Contacts open	Passthrough mode – boost not active
Contacts closed	Boost active

Terminals 42, 43, 44, 45, 46 are used for connection to an optional shore combining unit. This unit can take supplies from two IsoBoost transformers and connect them in parallel if conditions allow. Contact your supplier for more information.

Earthing/Grounding

The IsoBoost must be grounded/earthed. An earthing terminal is provided for this purpose.

The typical arrangement for an isolation transformer is as follows.

- All versions - Input earth or ground (from shoreline) - connects to the interwinding screen between the input and output windings of the transformer.
- US versions - Output earth or ground is connected to the ships earth, the case of the IsoBoost, and the centre tap of the output winding.
- EU versions - Output earth or ground is connected to the ships earth, the case of the IsoBoost, and one pole (the neutral) of the output winding.

Other arrangements are possible, depending on local regulations, and the design of the boat.

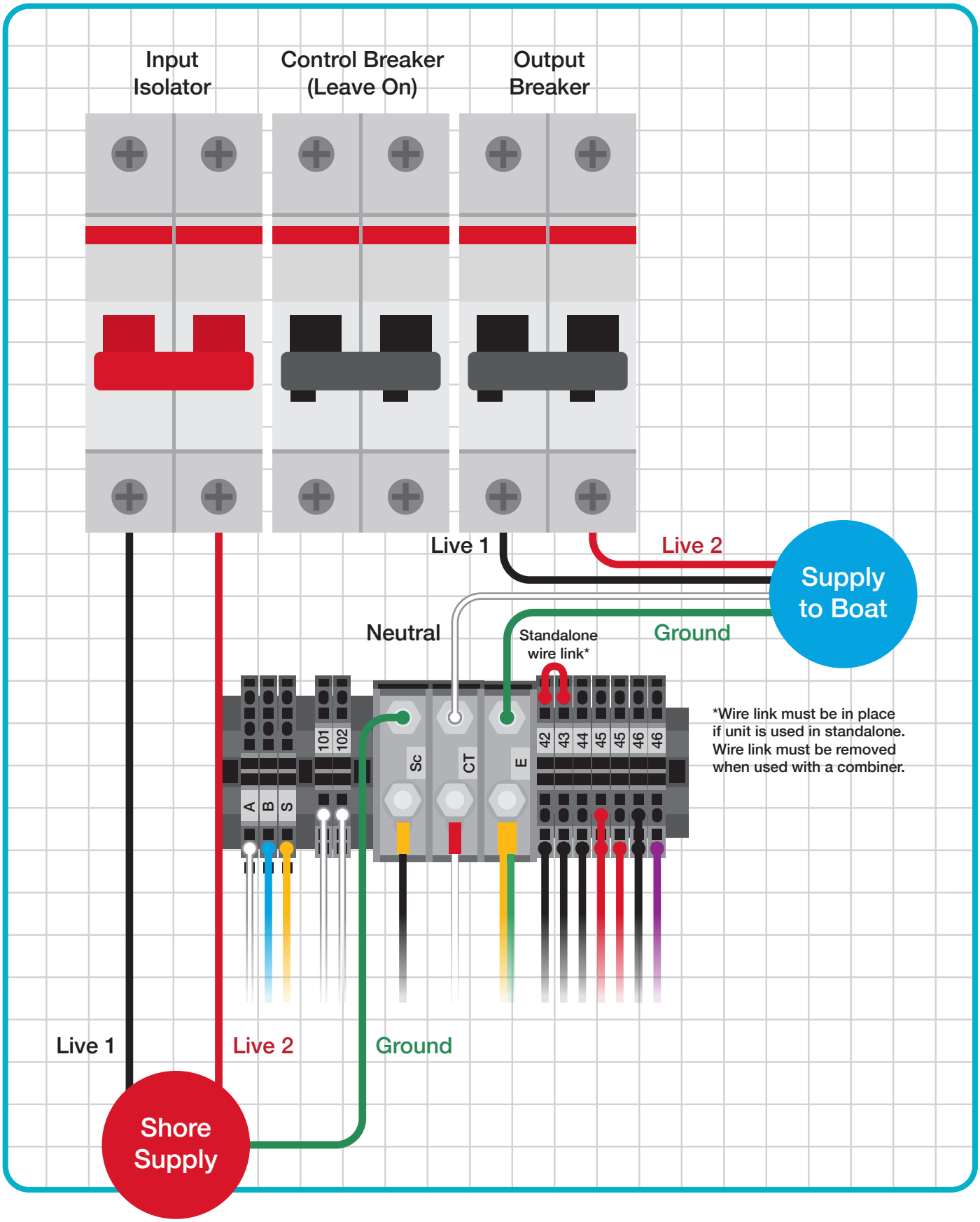
WARNING

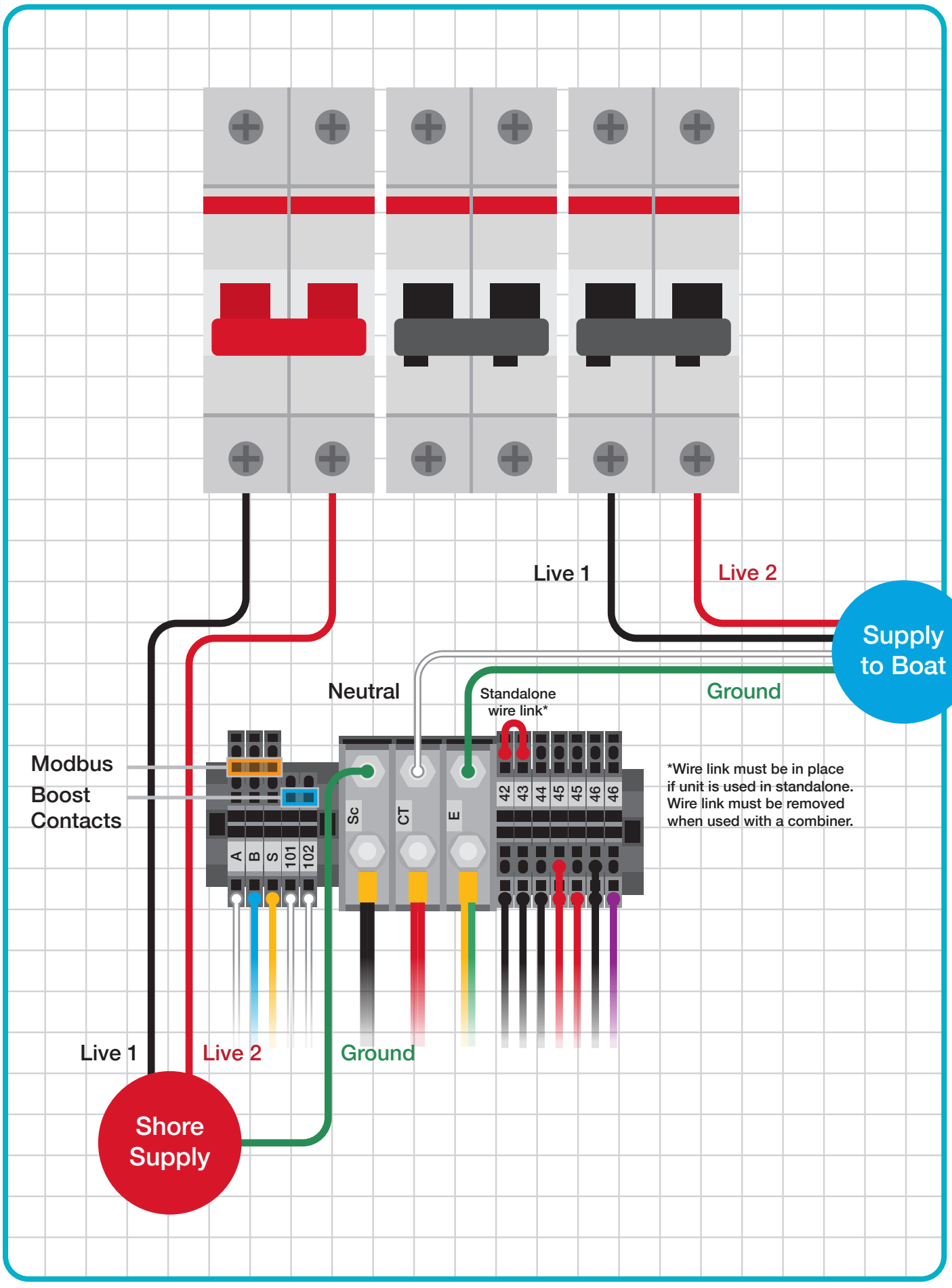
If the boat is out of the water, it is in general safer to bypass the isolation by linking the shore earth to the ships earth. This can be done outside of the transformer with a suitable link sized to match the incoming earth cable.

Typical US Connections (7 kVA, 12 kVA, 15 kVA and 24 kVA Versions)

When used as an Isolating Transformer, for a typically wired US boat:

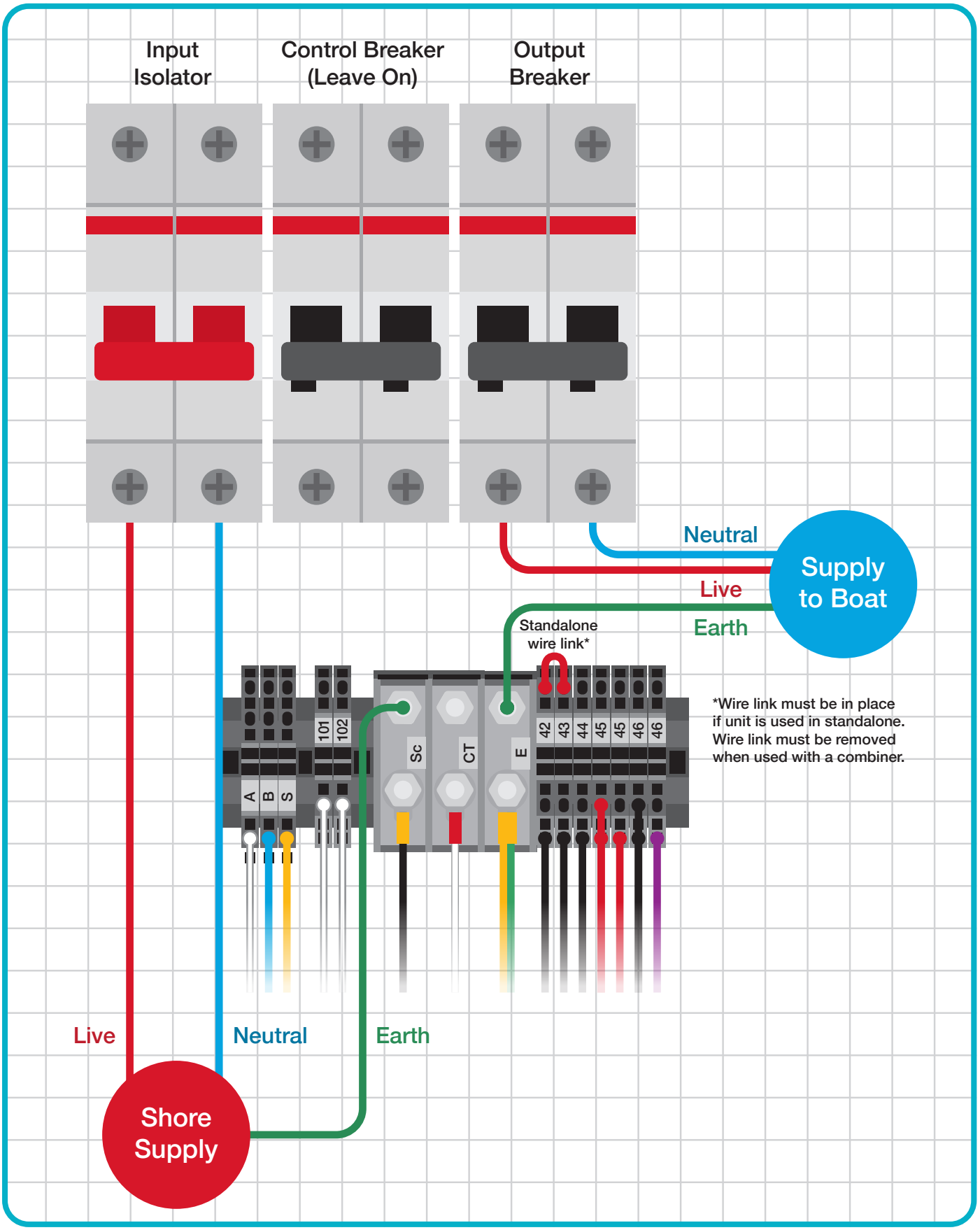
Please note that the incoming Neutral (White), if present, is not required and should be safely terminated.




Live 1
Live 2
Supply to Boat
Neutral
Standalone wire link*
Ground
Modbus
Boost Contacts
A
B
S
101
102
Sc
CT
E
42
43
44
45
45
46
46
*Wire link must be in place if unit is used in standalone. Wire link must be removed when used with a combiner.
Live 1
Live 2
Ground
Shore Supply

Typical EU Connections

When used as an Isolating Transformer, for a typically wired EU boat:



OPERATION

WARNING

The IsoBoost does not change the frequency of the incoming electrical supply.

If your vessel is built for 50Hz operation, do not connect it to a 60Hz supply.

If your vessel is built for 60Hz operation, do not connect it to a 50Hz supply.

Some vessels may be built to operate on either 50 or 60Hz supplies. Consult your vessel owner's manual or the manufacturer to confirm this.

7 kVA - US

1. The shore cord of the vessel will be a 3-wire cord (2 current carrying conductors and an earth).
2. Turn off the input isolator and output breaker of the IsoBoost.
3. Plug the shore-cord into either:
4. Any two phases of a three phase 208 volt supply - Or -
5. L1 and L2 of a US 240 volt supply - Or -
6. L1 and N of a US 120 volt supply.
7. Switch on the input isolator on the IsoBoost.
8. The IsoBoost will immediately connect and soft start the transformer in 1:1 mode.
9. If a 120V supply is detected it will switch into 1:2 mode. If not, it will stay in 1:1 mode.
10. If a 208/240V supply is low, (less than 215 volts) then, after a short delay, the IsoBoost will switch to boost mode.
11. If, during use, the voltage of the supply increases, then the IsoBoost will drop out of boost mode when the output voltage reaches 255 volts.
12. Once the output voltage is stable and within an acceptable range, the output contactor will energise and power will become available.
13. The inbuilt display will show output volts, amps, frequency, power, energy, and more.
14. Confirm that the supply indicated on the meter is correct, and then switch on the IsoBoost output breaker.

12, 15 and 24 kVA - US

1. The shore cord of the vessel will be a 3-wire cord (2 current carrying conductors and an earth).
2. Turn off the input isolator and output breaker of the IsoBoost.
3. Plug the shore-cord into either:
4. Any two phases of a three phase 208 volt supply - Or -
5. L1 and L2 of a US 240 volt supply - Or -
6. L1 and N of a European 230 volt supply (if the boat is suitable for 50Hz operation).
7. Switch on the input isolator on the IsoBoost.
8. The IsoBoost will immediately connect and soft start the transformer in 1:1 mode.
9. If the voltage is low (less than 215 volts) then, after a short delay, the IsoBoost will switch to boost mode.
10. If, during use, the voltage of the supply increases, then the IsoBoost will drop out of boost mode when the output voltage reaches 255 volts.
11. The inbuilt display will show output volts, amps, frequency, power, energy, and more.
12. Confirm that the supply indicated on the meter is correct, and then switch on the IsoBoost output breaker.

15 kVA - EU

1. The shore cord of the vessel will be a 3-wire cord (2 current carrying conductors and an earth).
2. Turn off the input isolator and output breaker of the IsoBoost.
3. Plug the shore-cord into either:
4. Any two phases of a three phase 208 volt supply (if the boat is suitable for 60Hz operation) - Or -
5. L1 and L2 of a US 240 volt supply (if the boat is suitable for 60Hz operation) - Or -
6. L1 and N of a European 230 volt supply.
7. Switch on the input isolator on the IsoBoost.
8. The IsoBoost will immediately connect and soft start the transformer in 1:1 mode.
9. If the voltage is low (less than 215 volts) then, after a short delay, the IsoBoost will switch to boost mode.
10. If, during use, the voltage of the supply increases, then the IsoBoost will drop out of boost mode when the output voltage reaches 255 volts.
11. The inbuilt display will show output volts, amps, frequency, power, energy, and more.
12. Confirm that the supply indicated on the meter is correct, and then switch on the IsoBoost output breaker.

24 kVA - EU

1. The shore cord of the vessel will be a 3-wire cord (2 current carrying conductors and an earth).
2. Turn off the input isolator and output breaker of the IsoBoost.
3. Plug the shore-cord into either:
4. Any two phases of a three phase 400-volt supply - Or -
5. Any L and N of a European 230-volt supply - Or -
6. Any L1 and L2 of a US 240-volt supply (if the boat is suitable for 60Hz operation).
7. Switch on the input isolator on the IsoBoost.
8. The IsoBoost will detect the incoming voltage and start in either 1:1 mode or buck (reducing) mode.
9. Whichever mode is selected by the IsoBoost it will use a dedicated soft start when entering that mode.
10. If the input voltage falls outside either the low voltage range or high voltage range the unit will disconnect from the supply.
11. The inbuilt display will show output volts, amps, frequency, power, energy, and more.
12. Confirm that the supply indicated on the meter is correct, and then switch on the IsoBoost output breaker.

TROUBLESHOOTING

WARNING

If you are unsure, contact a professional electrician. Do not take risks and do not modify your IsoBoost to solve a problem.

Symptom	Suggestions
No AC power from IsoBoost	Check the INPUT ISOLATOR is on.
	Check the shore cord is correctly wired to suit the marina supply.
	Check that there are no tripped breakers either at the shore or on the boat prior to the IsoBoost.
	Check the IsoBoost display. It should be on and showing the boat supply voltage.
	Check the control circuit breaker on the IsoBoost. These power the display and the control system.
	The unit has overheated and thermal protection has activated. Switch it off and wait for it to cool. Check ventilation and loading
Nothing on control panel display	Backlight is off - press any button to wake it up.
	Input isolator is off.
	Control circuit breakers are off.
	Fuse tripped - these are located on the side panel of the unit.
Output circuit breaker trips	This indicates an overload. Reduce the loads on the boat and reset.

For parts and service, contact your supplier. Have the model and serial number available to ensure that you purchase the correct parts.

MODBUS

Data can be read from the Isoboost power meter over Modbus RTU using the addresses and comms settings below. The address may need to be set initially – please contact Energy Solutions for instructions.

Please note that all monitoring is on the transformer output.

Comms Settings

Modbus Address: 11 (12 for second IsoBoost transformer when used as a pair)

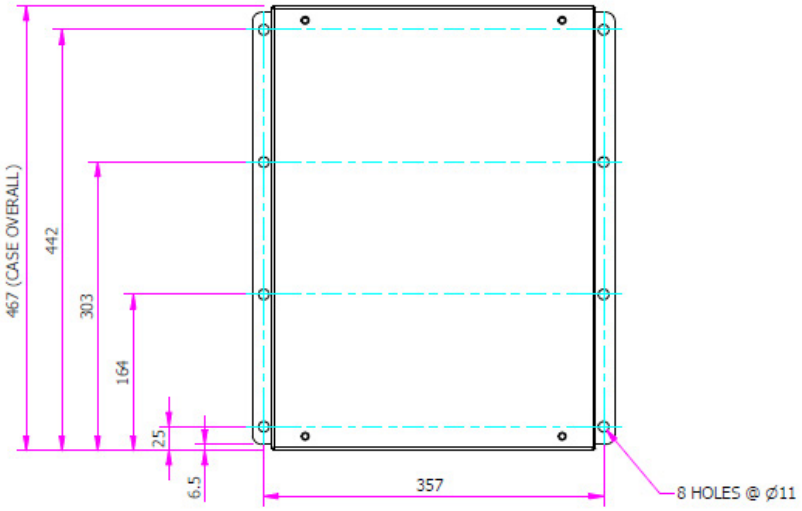
Baudrate: 9600
Parity: None
Data Bits: 8
Stop Bits: 1

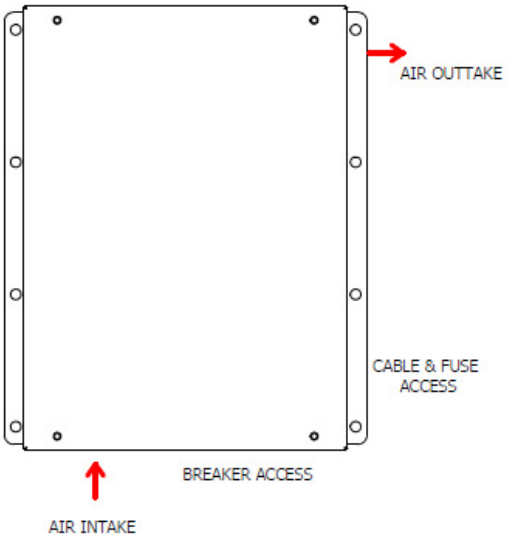
Modbus Addresses

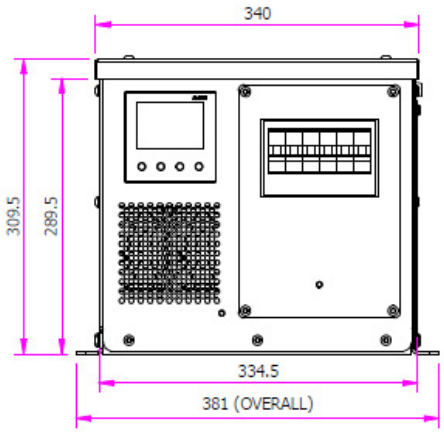
Name	Format	Units	Start Address Hex	Start Address Dec	Note
Voltage L1	Float	V	06	06	
Voltage L2	Float	V	08	08	Only on US models.
Voltage L1 L2	Float	V	0C	12	Only on US models.
Current L1	Float	A	12	18	
Current L2	Float	A	14	20	Only on US models.
Power	Float	kW	20	32	
Frequency	Float	Hz	3A	58	
Energy	Float	kWh	3C	60	
Relay State	Int32bit		F4	244	Bit0: 0:Off, 1:On (Boost Active).

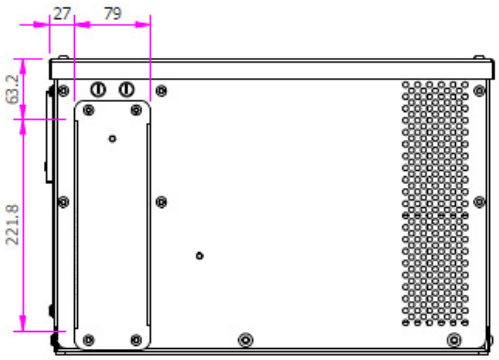
DIMENSIONAL DRAWINGS

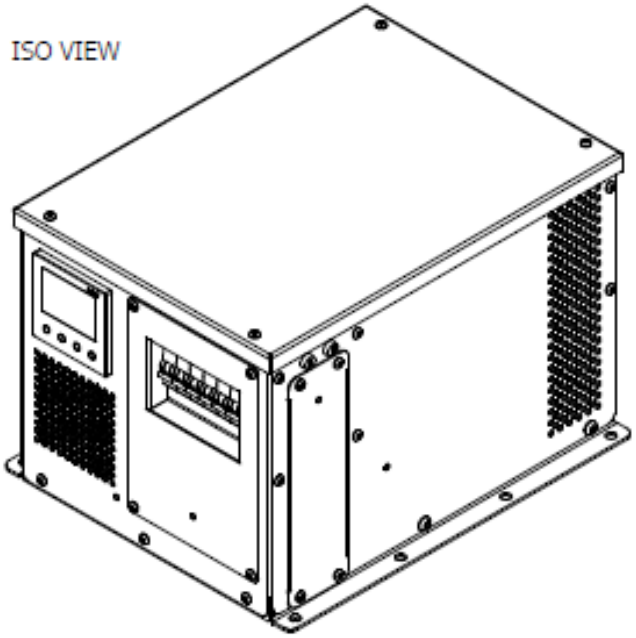
IsoBoost 7/12/15 kVA - US and EU Versions



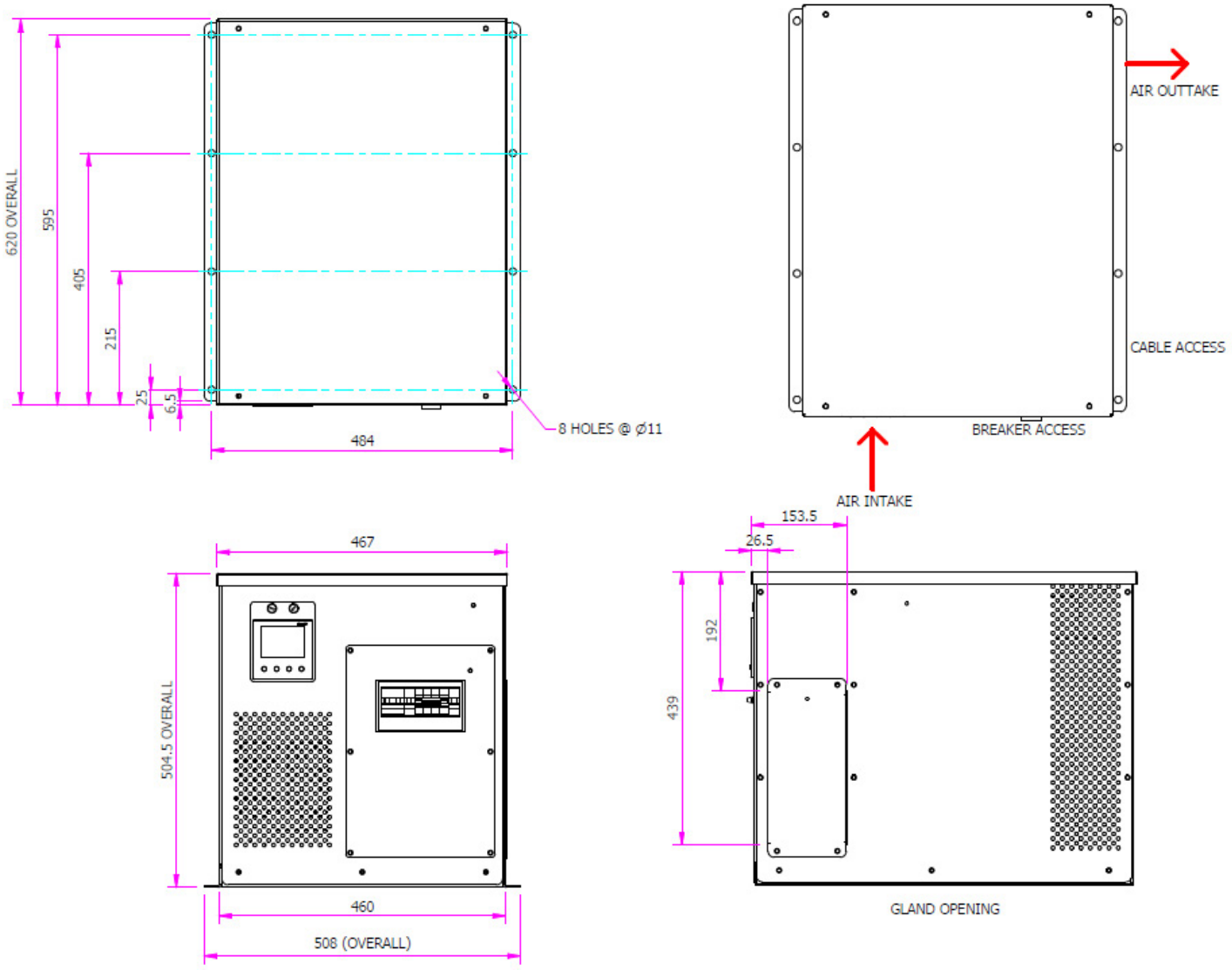


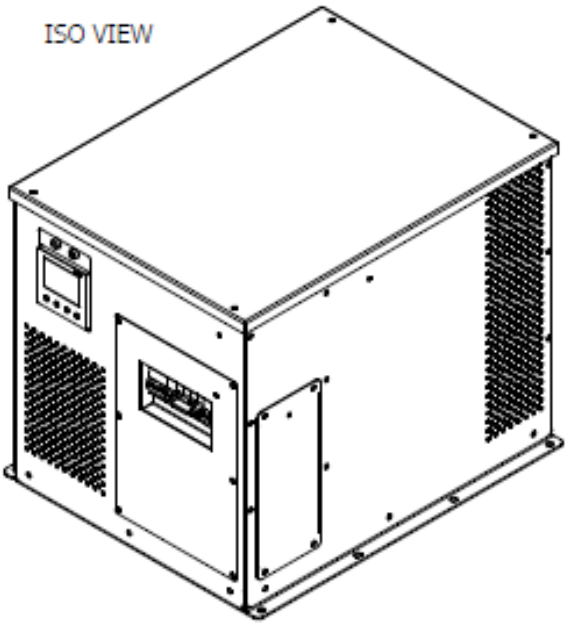






IsoBoost 24 kVA - US and EU Versions





TECHNICAL DATA

Specifications

	IsoBoost 7 kVA US	IsoBoost 12 kVA US	IsoBoost 15 kVA US	IsoBoost 15 kVA US	IsoBoost 24 kVA US	IsoBoost 24 kVA EU
Power rating	7 kVA	12 kVA	15 kVA	15 kVA	24 kVA	24 kVA
Input form	Single Phase or any two phases of a three-phase supply, 50 or 60Hz (no frequency conversion)					
Input voltage range	120V or 176 – 255V	176 – 255V	176 – 255V	210V – 230V	176 – 255V	176 – 255V & 340 – 440V
Input connection type	L1, L2/N - Circuit breaker tunnel terminals. Screen – M6 terminal.					
Output connection type	L1, L2/N - Circuit breaker tunnel terminals. Centre tap, Earth - M6 terminals.					
ModBus connection	Terminal blocks, max wire size 2.5mm^2.					
Remote signals connection	Terminal blocks, max wire size 2.5mm^2.					
Metering fuses	5x20mm, 0.5A, 250VAC (2 required).					
Operating temperature	-10°C to 60°C.					
IP protection	IP20					
Construction	Powder coated Zintec steel. RAL9016 (Traffic White).					
Total size L x W x H (mm)	467 x 381 x 310				620*508*505	
Approximate weight	90kg	104kg	110kg		183kg	

Warranty Information

This product is warranted for a period of 12 months from date of purchase and applies only to the original purchaser.

The warranty only applies to defects arising from defective materials and faulty workmanship that become evident during the warranty period and does not include consumable items.

This warranty covers replacement parts only and does include the cost of any labour. In addition, this will not apply if the IsoBoost is found to have been subjected to misuse, abuse, used for a purpose it was not intended for or tampered with in any way.

In the event of any failure the IsoBoost must be returned to the supplying dealer who will take the necessary action.

Declaration of Conformity

CE

Manufacturer:	Energy Solutions (UK) Ltd
Address:	Broadmead House, Bellingham Way, Aylesford, Kent, ME20 6XS
Authorised Representative:	Energy Solutions Electronics Ltd
Address:	Suite 31, The Pottery, Pottery Road, Dun Laoghaire, Dublin, Ireland, A96EV18

Declares that the following products:

Product type: **Isolation Transformer**

Brand: **Energy Solutions**

Models:

IsoBoost 7 kVA US	IsoBoost 15 kVA US	IsoBoost 24 kVA US
IsoBoost 12 kVA US	IsoBoost 15 kVA EU	IsoBoost 24 kVA EU

Are in conformity with the requirements of the following Directives of the European Union:

EMC Directive 2014/30/EU with the following harmonized standards:

EN 55014-1:2017+A11:2020
EN 55014-2:1997/+A1:2001+A2:2008
EN 61000-3-3:2013
EN 61000-3-2:2014

Low Voltage Directive 2014/35/EU with the following harmonized standards:

IEC60076-1:2011

Restriction of the use of certain hazardous substances (RoHS) 2011/65/EU with the following harmonized standards:

EN 50581:2012

Signed: Paul Holland

Authority: Managing Director
Date: January 2025