DEEP SEA ELECTRONICS PLC

DSE9462 OPERATOR MANUAL

Document Number: 057-255

Author: Anthony Manton

ISSUE: 2



Deep Sea Electronics PLC
Highfield House
Hunmanby
North Yorkshire
YO14 0PH
ENGLAND

Sales Tel: +44 (0) 1723 890099
Sales Fax: +44 (0) 1723 893303

E-mail: sales@deepseaplc.com
Website: www.deepseaplc.com

DSE9462 Operator Manual

© Deep Sea Electronics PLC
All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means or other) without the written permission of the copyright holder except in accordance with the provisions of the Copyright, Designs and Patents Act 1988.
Applications for the copyright holder's written permission to reproduce any part of this publication must be addressed to Deep Sea Electronics PLC at the address above.

DSEPower is a registered trademark of Deep Sea Electronics PLC.

Any reference to trademarked product names used within this publication is owned by their respective companies.

Deep Sea Electronics Plc reserves the right to change the contents of this document without prior notice.

Amendments since last publication

Issue. No.	Comments
1	Initial release
2	Removing DC Over Volts Warning

Typeface : The typeface used in this document is *Arial*. Care should be taken not to mistake the upper case letter I with the numeral 1. The numeral 1 has a top serif to avoid this confusion.

TABLE OF CONTENTS

Section **Page**

1 INTRODUCTION 4
1.1 BIBLIOGRAPHY 4
1.1.1 INSTALLATION INSTRUCTIONS 4
1.1.2 MANUALS 4
2 SPECIFICATIONS 5
2.1 ELECTRICAL SPECIFICATIONS 5
2.2 SPECIFICATIONS 6
2.2.1 DSE9462 AC INPUT 6
2.2.2 DSE9462 BATTERY 1 OUTPUT 6
2.2.3 DSE9462 BATTERY 2 OUTPUT 6
2.2.4 VOLTAGE DROP COMPENSATION 7
2.2.5 BATTERY TEMPERATURE COMPENSATION 8
2.2.6 AMBIENT TEMPERATURE DEPENDENT CURRENT DERATING 9
2.2.7 DSE9462 INPUT POWER TO OUTPUT POWER EFFICIENCY 11
2.3 DIMENSIONS 12
2.4 MOUNTING INSTRUCTIONS 13
2.5 APPLICABLE STANDARDS 14
2.6 COMMUNICATION PORT USAGE 14
2.6.1 USB CONNECTION 15
3 INSTALLATION 16
3.1 BATTERY SUITABILITY 16
3.1.1 BATTERY CHARGE TIME 16
3.2 USER CONNECTIONS 17
3.2.1 AC SUPPLY 17
3.2.2 CAN AND DIGITAL INPUT CONNECTIONS 18
3.2.3 TEMPERATURE SENSOR AND REMOTE SENSING CONNECTIONS 19
3.2.4 BATTERY CONNECTIONS 19
3.3 TYPICAL WIRING DIAGRAM 20
4 INDICATIONS 21
4.1 STATUS 21
4.2 FAULT CONDITIONS 22
5 OPERATION 23
5.1 PROTECTION 23
5.1.1 FACTORY PRE-SET ALARMS 23
5.1.2 USER CONFIGURABLE ALARMS 23
5.2 DIGITAL INPUTS 24
5.3 PSU MODE 24
5.4 CHARGE MODE 25
5.4.1 BULK CHARGE 25
5.4.2 ABSORPTION 25
5.4.3 FLOAT CHARGE 26
5.4.4 STORAGE 26
5.4.5 CHARGING TIME 26
5.4.6 MANUAL BOOST 26
5.4.7 TEMPERATURE COMPENSATION 27
6 FAULT DIAGNOSIS 28
7 MAINTENANCE, SPARES, REPAIR, AND SERVICING 29
8 WARRANTY 29
9 DISPOSAL 29
9.1 WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT) 29

1 INTRODUCTION

This document details the installation requirements of the DSE9462 Dual Output Intelligent Battery Charger.
The manual forms part of the product and should be kept for the entire life of the product. If the product is passed or supplied to another party, ensure that this document is passed to them for reference purposes.
This is not a *controlled document.* You will not be automatically informed of updates. Any future updates of this document will be added to the DSE website at www.deepseaplc.com.

The battery charger is designed for vertical surface mounting with the terminal strips running horizontally.

The battery charger includes protected outputs, intelligent charging and power supply operation with a robust enclosure.

1.1 BIBLIOGRAPHY

This document refers to and is referred to by the following DSE publications, be obtained from the DSE website www.deepseaplc.com

1.1.1 INSTALLATION INSTRUCTIONS

Installation instructions are supplied with the product in the box and are intended as a ‘quick start’ guide only.

DSE Part	Description
053-189	DSE9462 Installation Instructions.

1.1.2 MANUALS

DSE Part	Description
057-159	DSE9400 Series Battery Charger Configuration Suite Manual.

2 SPECIFICATIONS

2.1 ELECTRICAL SPECIFICATIONS

NOTE: For output current derating refer to derating curves elsewhere in this document.

Parameter	Min	Nominal	Max
AC Input Voltage (V)	90 V	230 V	305 V
Operating Temperature	-30 °C		70 °C
Input Frequency (Hz)	45 Hz		65 Hz
Output Ripple and Noise		1% Vo	
Load Regulation		2% Vo	
Line Regulation		1% Vo	
Output Voltage Overshoot %		<5%Vo	
Transient Response Peak Deviation (mV) (at 50% to 100% load step)		<4% Vo	
Warm Up Voltage (V)		<1% Vo	
Output Voltage Rise Time (ms)		<1000 ms	
Short Circuit Protection		Hiccup Mode	
Switching Frequency (kHz)	30 kHz	40 kHz	80 kHz
Efficiency % (See section entitled '*output specifications*' elsewhere in this manual)		>90%	
Temperature Sensor Input		PT1000	

2.2 SPECIFICATIONS

2.2.1 DSE9462 AC INPUT

Parameter	Min	Nom	Max	Comments
Full load AC input current (A) at 230 V AC		3 A		At Vin = 230 V: Vo1 = 29.5 V, Io1 = 15 A Vo2 = 14.75 V, Io2 = 10 A
Full load AC input current (A) at 110 V AC		6 A		At Vin = 110 V, Vo = 59 V, Io = 30 A
AC Input Inrush (10 ms) current (A)			60 A	For 10 ms at 230 V AC (Max = 277 V AC)

2.2.2 DSE9462 BATTERY 1 OUTPUT

Parameter	Min	Nom	Max	Comments
Output Voltage (24V DC Battery)	26 V		29.5 V	Voltage Drop Compensation is provided when using Voltage Sensing Wires. Battery Temperature Compensation is provided when using PT1000 sensor.
Output Charging Current (A)	0 A	15 A	15.5 A	Current derating depends on the operating ambient temperature conditions and supply voltage.
Current limit threshold (A)	7.5 A		15 A	Configurable by DSE Configuration Suite PC Software.

2.2.3 DSE9462 BATTERY 2 OUTPUT

Parameter	Min	Nom	Max	Comments
Output Voltage (12V DC Battery)	13 V		14.75 V	Voltage Drop Compensation is provided when using Voltage Sensing Wires. Battery Temperature Compensation is provided when using PT1000 sensor.
Output Charging Current (A)	0 A		10 A	Current derating depends on the operating ambient temperature conditions and supply voltage.
Current limit threshold (A)	5 A	10 A	10 A	Configurable by DSE Configuration Suite PC Software.

2.2.4 VOLTAGE DROP COMPENSATION

WARNING!: Ensure the Sensing Wires are connected to the correct battery to prevent damage caused by overcharging.

The battery voltage (Battery 1 and Battery 2) is monitored by means of the Sensing Wires. These wires carry only a small sensing current and as such are not affected by the voltage drop experienced by the high current carrying battery connection wires.
This provides for an accurate reading of both battery voltages and enables the battery charger to increase output voltage to maintain the correct charging voltage “at the battery terminals” (Maximum output 29.5 V for Battery 1 and 14.75 V for Battery 2).

Example:

Float Voltage configuration of the battery charger = 27.3 V
Charger output = 27.3 V
Battery voltage measured by Sensing Wires = 27.0 V

The battery charger increases the output voltage until the Sensing Wires measure 27.3 V. The voltage drop in the charging cables is eliminated.

2.2.5 BATTERY TEMPERATURE COMPENSATION

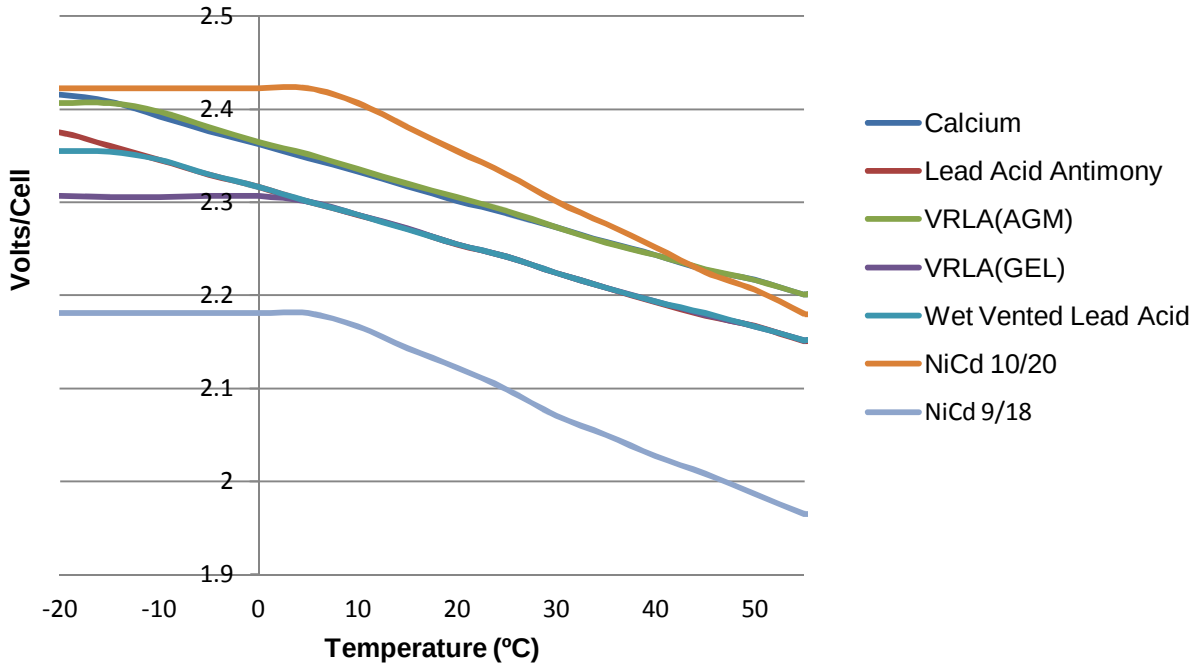
NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

When suitably configured, the external PT1000 temperature sensor is used to monitor battery temperature. Each output (Battery 1 and Battery 2) has an individual PT1000 sensor.
As battery temperature increases, the output voltage is lowered as configured to suit the battery requirements.

For example, the following Temperature to Voltage compensation curves are used for the pre-set battery types. For custom battery types, the temperature compensation curve is user configurable.

NOTE: In the below chart, VRLA (Gel), Lead Acid Antimony and Wet Vented are superimposed on each other for most of the curve.
Calcium and VRLA (AGM) are superimposed on each other for most of the curve.

Battery Temperature Float Voltage Compensation



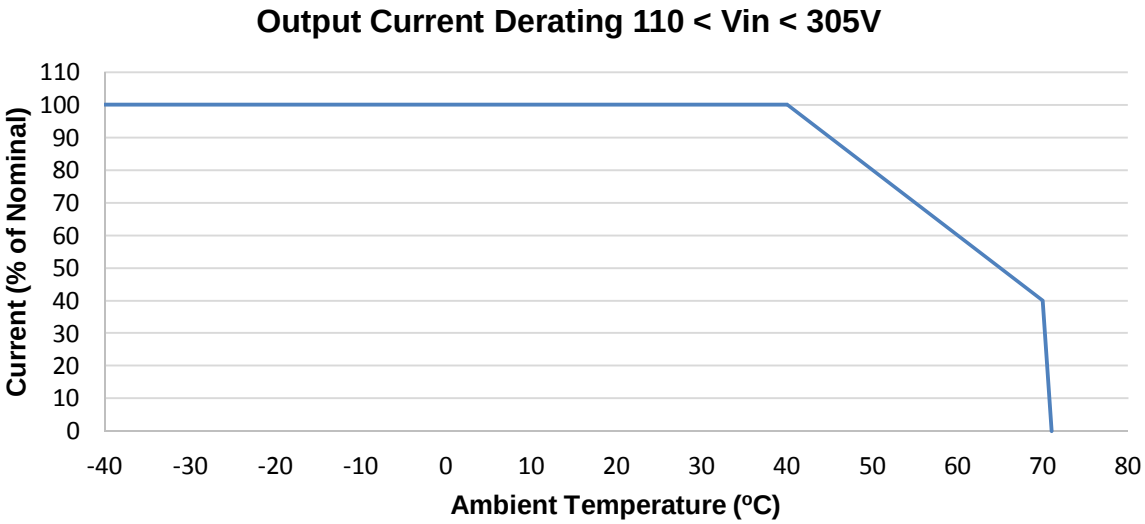
Example:

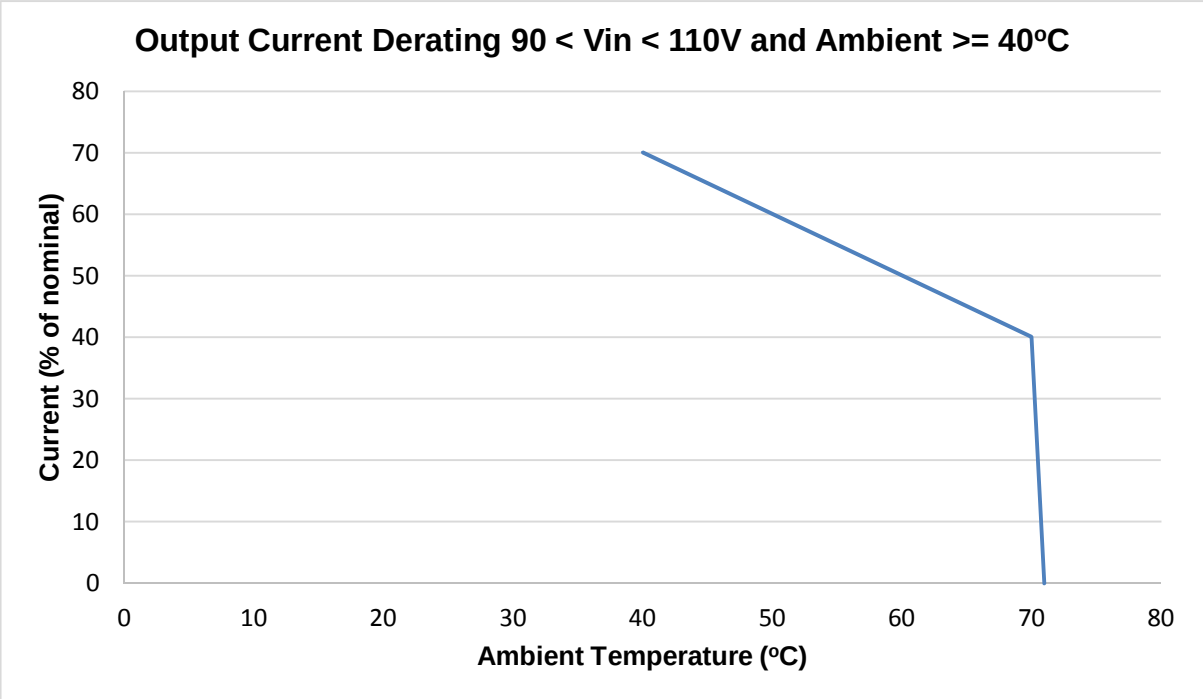
A Lead Acid battery at 40 ºC is charged at 2.18 V DC per cell.
The same Lead Acid battery at 0 ºC is charged at 2.30 V DC per cell.

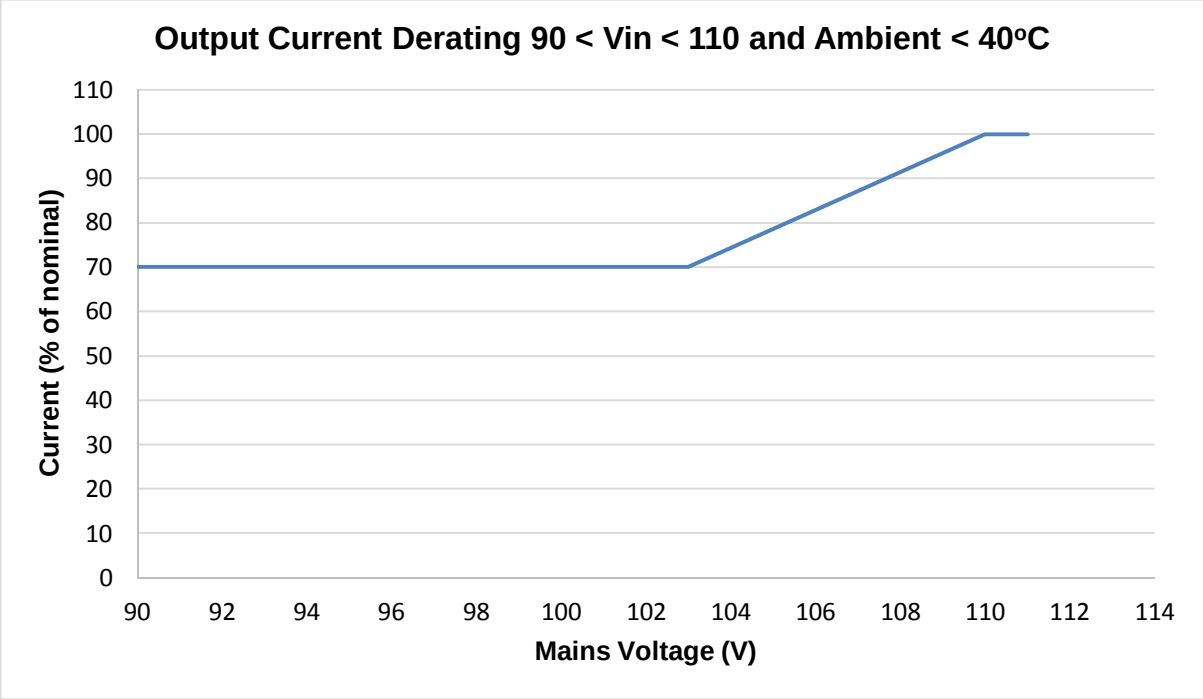
2.2.6 AMBIENT TEMPERATURE DEPENDENT CURRENT DERATING

NOTE: To ensure the best operating conditions, check the *Mounting Instructions* and *Required Ventiliation Spacing* elsewhere in this document.

The battery charger derates its current outputs when its temperature exceeds 40 °C. The battery charger shuts down when the temperature reaches 70 °C.



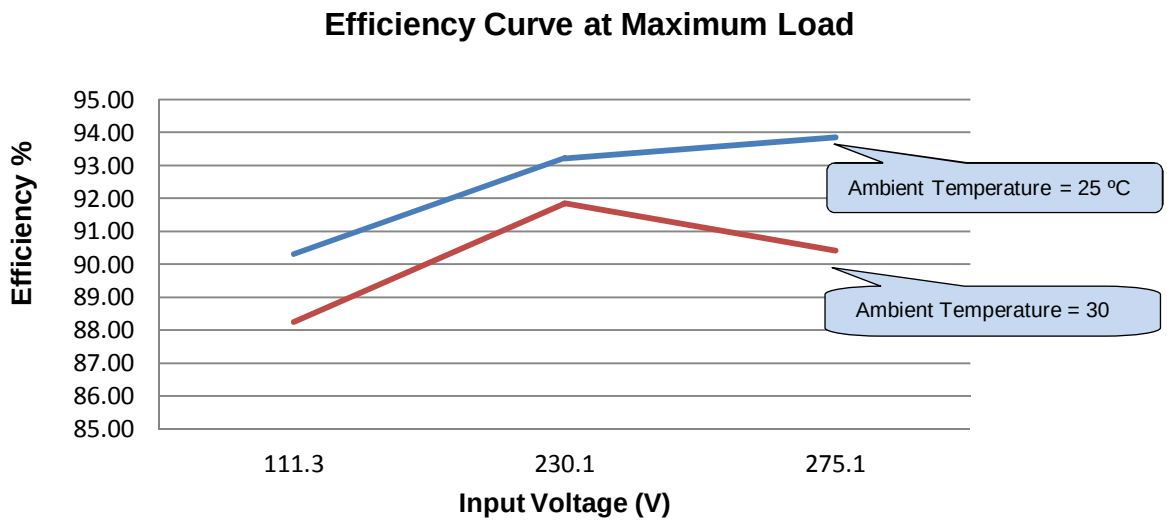



Output Current Derating 90 < Vin < 110 and Ambient < 40ºC
Current (% of nominal)
110
100
90
80
70
60
50
40
30
20
10
0
90
92
94
96
98
100
102
104
106
108
110
112
114
Mains Voltage (V)

2.2.7 DSE9462 INPUT POWER TO OUTPUT POWER EFFICIENCY

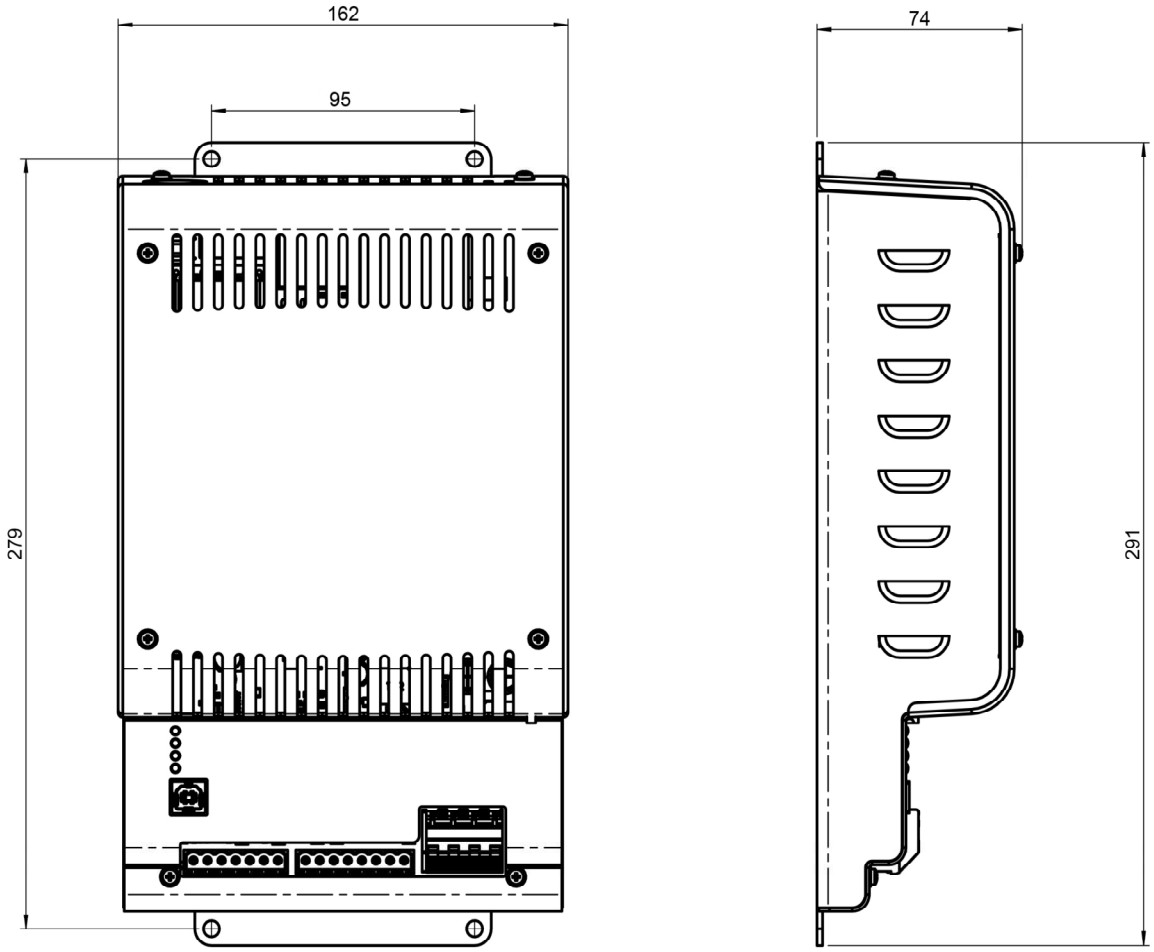
Efficiency of the battery charger is important in terms of minimising power losses in the battery charger and also in terms of the heat generated by the battery charger.

The following chart shows the high efficiency of the DSE9462.



2.3 DIMENSIONS

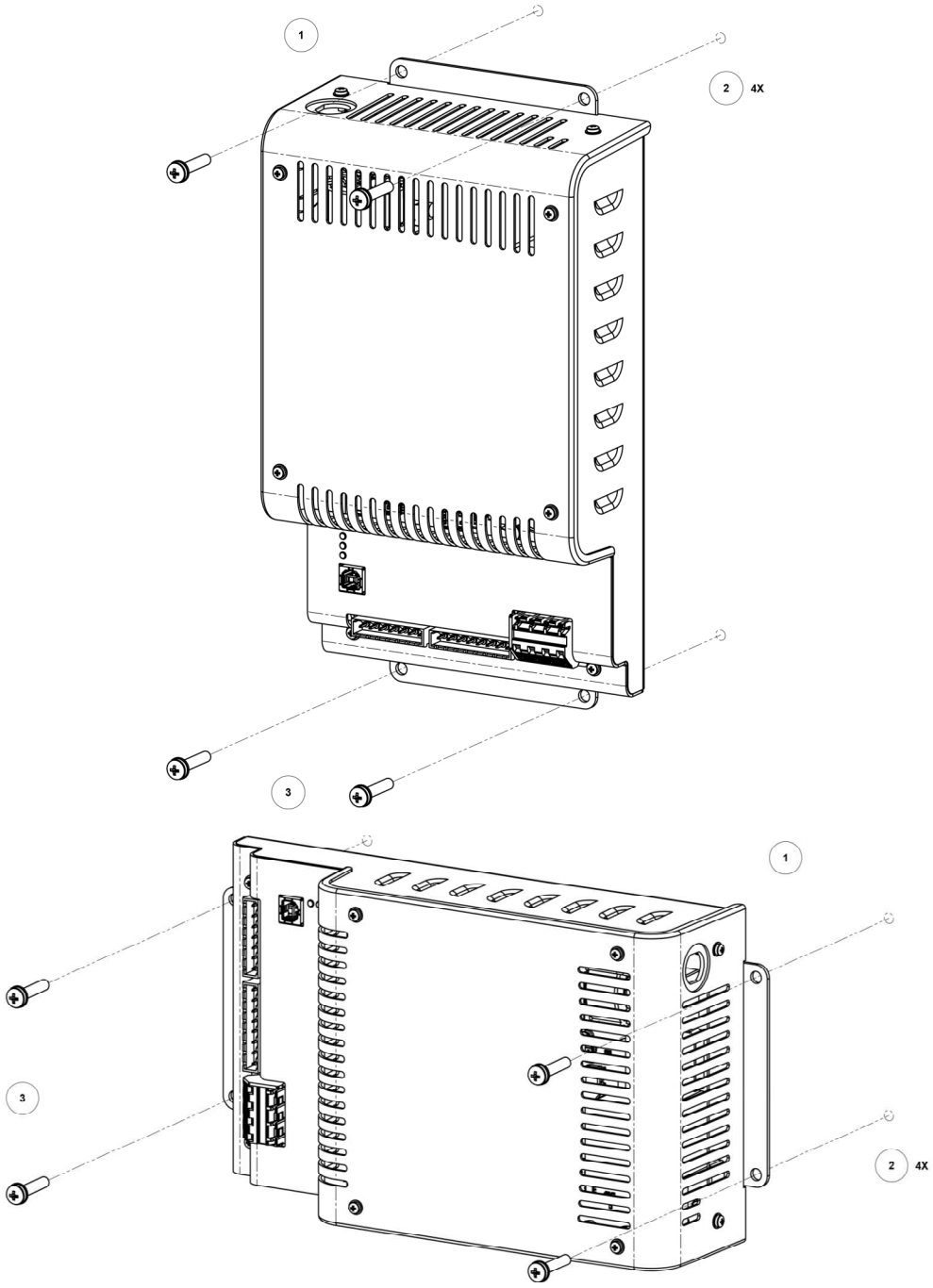
Parameter	Comment
Weight	1.85 kg
Case Dimensions	162 mm x 291 mm x 74 mm (6.39” x 11.46” x 2.92”)
Mounting Holes Dimensions	Suitable for M5 (3/16” diameter)
Mounting Hole Spacing	95 mm x 279 mm (3.74” x 10.98”)
Required Ventilation Spacing	100 mm (3.9”) air space around the battery charger subject to temperature specifications and battery charger temperature dependant derating.



Dimensions stated in mm.

2.4 MOUNTING INSTRUCTIONS

1. Secure the battery charger in of the two following orientations only.



2.5 APPLICABLE STANDARDS

Standard	Description
BS EN 60529 (Degrees of protection provided by enclosures)	IP20 Protected against penetration by solid objects with a diameter of more than 12 mm. Fingers or similar objects prevented from approach. No protection against water
NEMA rating	Enclosure type 1 Provides a degree of protection against contact with the enclosure equipment and against a limited amount of falling dirt

In line with our policy of continual development, Deep Sea Electronics, reserve the right to change specification without notice.

2.6 COMMUNICATION PORT USAGE

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

Communication	Specification
USB Port	USB 2.0 Device for connection to PC running DSE Configuration Suite Max distance 6 m (20 feet)
CAN	**NOTE: For additional length, the DSE124 CAN Extender is available. Please refer to DSE Publication: 057-116 DSE124 Operator Manual for more information.** J1939 at fixed baud rate of 250 kHz External termination resistor required (120 Ω) Max distance 40m (133 feet) CAN source address is user configurable

2.6.1 USB CONNECTION

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

The USB port is provided to give a simple means of connection between a PC and the battery charger. Using the DSE Configuration Suite Software, the operator is then configure and monitor the state of the battery charger.

To connect the battery charger to a PC by USB, the following items are required:

- DSE9462 Battery Charger



- DSE Configuration Suite Software
  (Supplied on configuration suite software CD or available from www.deepseaplc.com).



- USB cable Type A to Type B.
  (This is the same cable as often used between a PC and a USB printer)

  DSE can supply this cable if required :
  PC Configuration interface lead (USB type A – type B) DSE Part No 016-125



3 INSTALLATION

The DSE9462 is designed to be mounted within a control panel utilising the mounting holes. For dimension and mounting details, see the section entitled *Specification, Dimensions & Mounting* elsewhere in this document.

The battery charger is *fit-and-forget.* It can be permanently connected to the supply and the load, with no requirement to disable the charger during times of heavy load (such as engine cranking) or when the generator is running (even when a DC charging alternator is fitted).

3.1 BATTERY SUITABILITY

The *standard* charger is factory set by DSE to suit Lead Acid batteries but can be adjusted at the time of ordering to suit other battery types. Care must be taken to ensure the batteries connected to the charger are of the correct 'technology' to suit the setting of the charger.
For details of other supported battery types and *float voltages* see the section entitled *Specifications, Part Numbering* elsewhere in this document.

3.1.1 BATTERY CHARGE TIME

NOTE: It is acceptable to charge larger batteries, however charging time increases above 10 hours.

NOTE: Where the Output Current Limit has been adjusted below the factory set levels, charging time is longer.

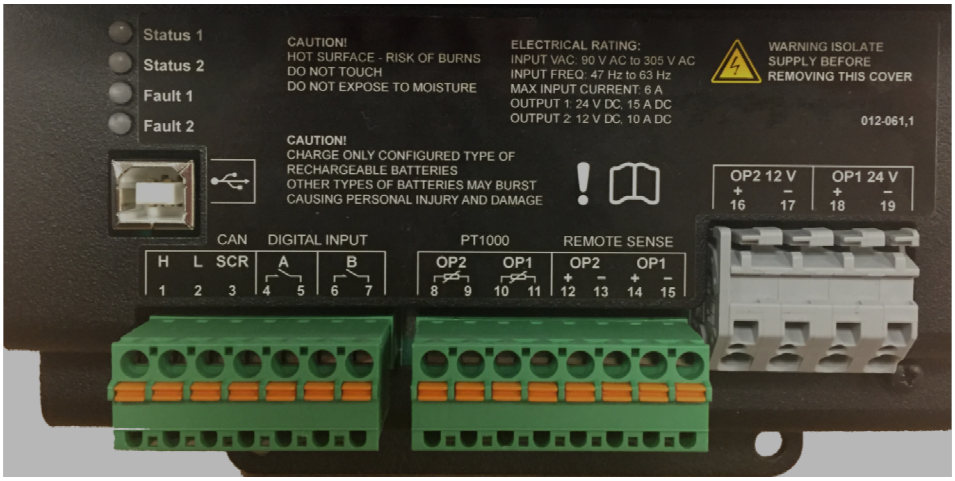
To ensure battery charging occurs within 10 hours, use batteries with maximum capacity as stated below.

Charger Output	Max Battery Capacity (see notes above)
Battery Charger Output 1 24 V 15 A	150 Ah
Battery Charger Output 2 12 V 10 A	100 Ah

3.2 USER CONNECTIONS

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

A photograph showing the location of the user connections is included below. Detailed descriptions of the connections are overleaf.



3.2.1 AC SUPPLY

The battery charger is provided with an attached AC Supply Cable and protected by an internal fuse. However to protect the A.C. supply cables should a fault arise between the supply and the connection to the battery charger, it is recommended to fit a fuse in the supply line as close to the source of supply as possible.
As the fuse is for cable protection only, the same fuse may be used regardless of the supply voltage.

AC Input Voltage	Recommended Fuse Size
110 V AC	15 A anti-surge
230 V AC	15 A anti-surge

Cable Colour	Function
Blue	AC Neutral
Brown	AC Live
Green/Yellow	Earth

3.2.2 CAN AND DIGITAL INPUT CONNECTIONS

NOTE: Screened 120 Ω impedance cable specified for use with CAN must be used for the CAN link.
DSE stock and supply Belden cable 9841 which is a high quality 120 Ω impedance cable suitable for CAN use (DSE part number 016-030)

	Terminal	Function	Recommended Size	Comments
1	**CAN H**	CAN H Terminal.	0.2 mm² (AWG 24)	Recommended Belden 9841 cable. Ensure correctly fitted 120 Ω termination resistors at the first and last devices on the CAN link.
2	**CAN L**	CAN L Terminal.	0.2 mm² (AWG 24)	
3	**CAN SCR**	CAN Screen Terminal.	0.2 mm² (AWG 24)	
4	**A**	Configurable Input	1 mm² (AWG 16)	Connect the two terminals together to activate the input. The Factory Setting for the digital input provides the *Lamp Test* function. Customer configurable using DSE Configuration Suite PC Software.
5				
6	**B**	Configurable Input	1 mm² (AWG 16)	Connect the two terminals together to activate the input. The Factory Setting for the digital input provides the *Stop Charging* function. Customer configurable using DSE Configuration Suite PC Software.
7				

3.2.3 TEMPERATURE SENSOR AND REMOTE SENSING CONNECTIONS

WARNING!: Ensure the Sensing Wires are connected to the correct battery to prevent damage caused by overcharging.

Terminal		Function	Recommended Size	Comments
8	**OP2**	PT1000 Sensor	As fitted to the PT1000 Sensor	Battery Temperature Sensing for Battery 2. Used for Battery 2 Temperature Compensation.
9				
10	**OP1**	PT1000 Sensor	As fitted to the PT1000 Sensor	Battery Temperature Sensing for Battery 1. Used for Battery 1 Temperature Compensation.
11				
12	**OP2 +**	REMOTE SENSE	1 mm² (AWG 16)	Remote Sensing Wires for Battery 2.
13	**OP2 -**	REMOTE SENSE	1 mm² (AWG 16)	
14	**OP1 +**	REMOTE SENSE	1 mm² (AWG 16)	Remote Sensing Wires for Battery 1.
15	**OP1 -**	REMOTE SENSE	1 mm² (AWG 16)	

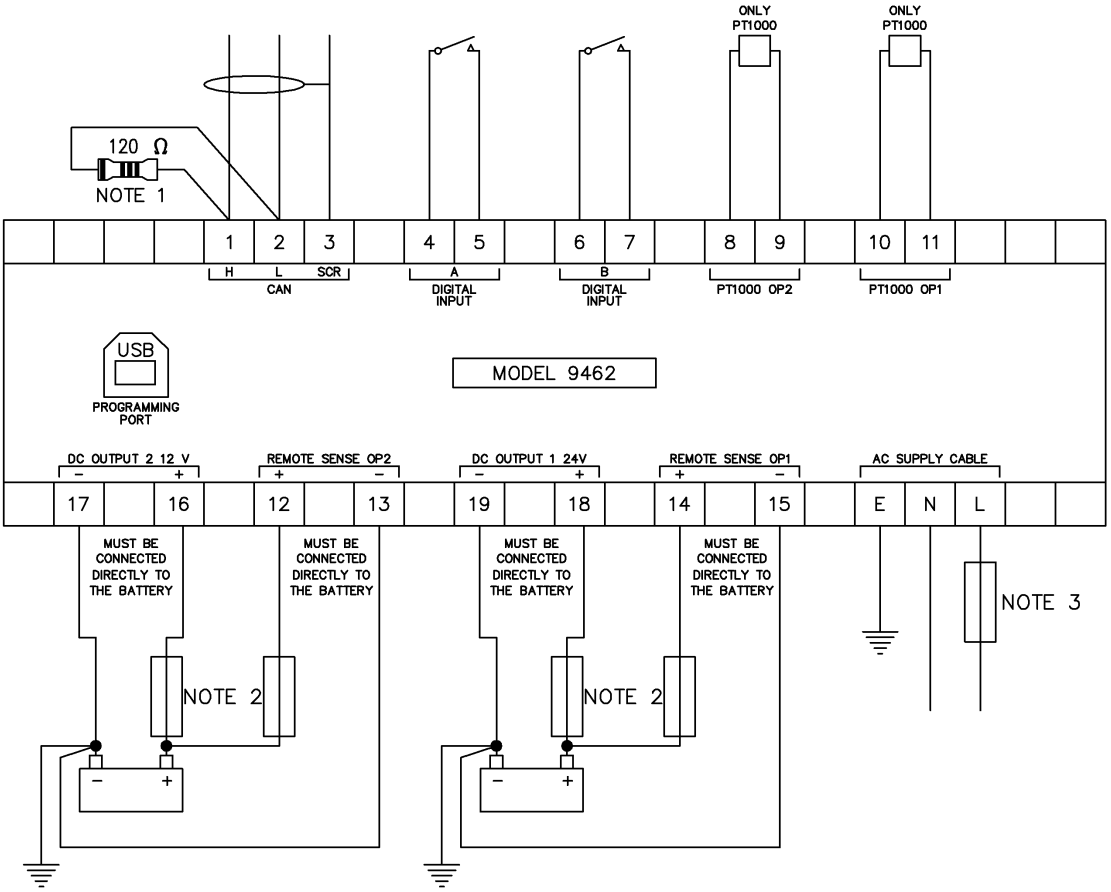
3.2.4 BATTERY CONNECTIONS

NOTE: Use as short a cable as possible for the battery connection to ensure minimum voltage drop.

Terminal		Function	Recommended Size	Comments
16	**OP2 12V +**	Load Positive	4 mm² (AWG 12)	Battery 2 positive terminal
17	**OP2 12V -**	Load Negative	4 mm² (AWG 12)	Battery 2 negative terminal. This terminal is not internally connected to Earth.
18	**OP1 24V +**	Load Positive	4 mm² (AWG 12)	Battery 1 positive terminal
19	**OP1 24V -**	Load Negative	4 mm² (AWG 12)	Battery 1 negative terminal. This terminal is not internally connected to Earth.

3.3 TYPICAL WIRING DIAGRAM

WARNING!: Ensure the Sensing Wires are connected to the correct battery to prevent damage caused by overcharging.



NOTE 1
A 120 OHM TERMINATION RESISTOR MUST BE FITTED IF IT IS THE FIRST OR LAST DEVICE ON THE CANBUS OR RS485 LINK

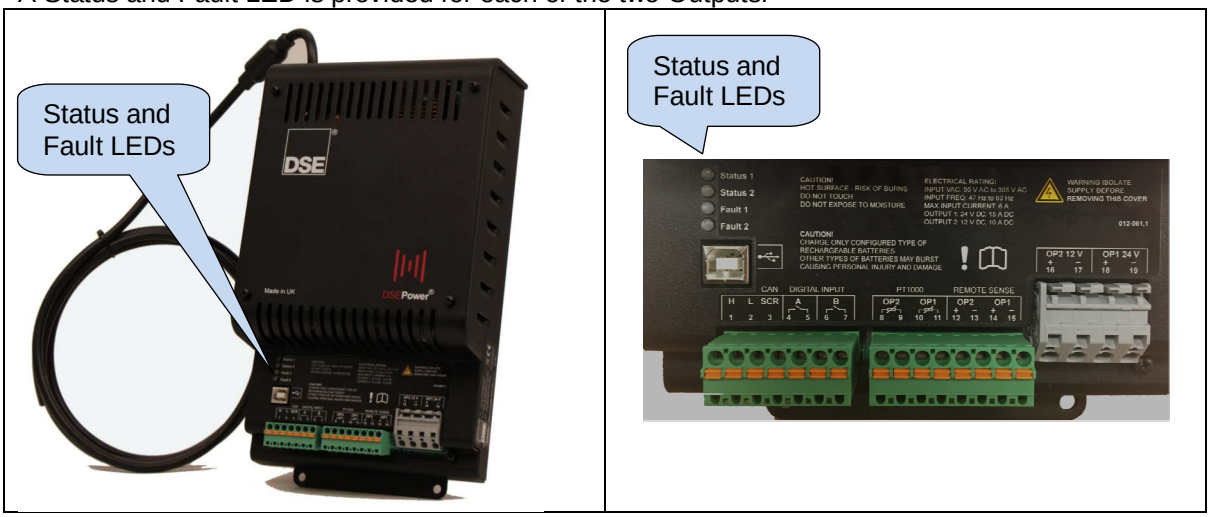
NOTE 2
FUSE APPROPRIATELY AND AS CLOSE TO THE BATTERY AS POSSIBLE TO PROTECT THE CABLES AND BATTERY

NOTE 3
FUSE APPROPRIATELY AND AS CLOSE TO THE SUPPLY AS POSSIBLE TO PROTECT THE CABLES

4 INDICATIONS

DANGER OF DEATH: LIVE PARTS exist within the battery charger enclosure. The enclosure cover must not be removed when connected to an AC supply.

A Status and Fault LED is provided for each of the two Outputs.



4.1 STATUS

Each output has its own dedicated LED to show charge status.

***Status 1*: Charge status of Output 1.**
***Status 2*: Charge status of Output 2.**

Condition	Status LED
Output not charging (due to fault or charger off)	Off
Battery Battery Detection Mode	Green Constant
Bulk (Boost) Charge in progress	Yellow Constant
Absorption Charge in progress	Yellow Flashing
Float Charge in Progress	Green Constant
Storage Charge in Progress	Green Flashing

4.2 FAULT CONDITIONS

Two Fault LEDs, ***Fault 1*** and ***Fault 2*** are used to indicate faults. Output 1 and Output 2 share these indications. Where two alarms are present at the same time, the most critical is displayed.

Condition	LED Designation	
	FAULT 1	FAULT 2
DC Over Volts Trip Alarm DC Under Volts Warning Battery Detection Warning DC Over Current Battery Reverse Polarity Short Circuit Protection Battery Detection Warning	Red Constant	Off
Input Fuse Failure AC Under Voltage Warning and Trip AC Over Volts Warning and Trip DC Over Current Warning Cable Voltage Drop Alarm	Red Flashing	Off
Battery Over Temperature Warning and Trip Battery Temperature Sensor (PT1000) Fail Ambient Over Temperature	Off	Red Constant
Battery Charger Failure	Red Constant	Red Constant
Battery Detection Mode - Battery not detected	Red Flashing	Red Flashing

5 OPERATION

The DSE9462 is a battery charger, DC power supply, or both at the same time. For example,one application is to power local control panels and charge panel batteries or generator engine starter batteries at the same time.

When a suitable AC supply is connected, operation of the unit will depend upon the load connected to the unit's output terminals:

5.1 PROTECTION

Alarms fall into two categories:

- Factory pre-set, non-ajustable alarms.
- User Configurable Alarms, adjustable by DSE Configuration Suite PC Software.

5.1.1 FACTORY PRE-SET ALARMS

Under the following conditions, charging is stopped (DC output is disabled):

- Mains voltage V_{in} > 310 V AC
- Mains voltage V_{in} < 85 V AC
- Battery temperature > 60 ºC (if temperature compensation is enabled)
- Battery Charger ambient temperature> 70 ºC
- DC output voltage > 110 % of Boost Voltage
- Short circuit / reverse polarity of the DC output.
- Output current >100 % of output current limit.

5.1.2 USER CONFIGURABLE ALARMS

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

The following alarms are user configurable using DSE Configuration Suite PC Software.

- DC Overcurrent alarm.
- DC Undervoltage alarm.
- Battery Temperature alarm. Activation of this alarm places the charger into Float mode.
- Mains Over Voltage alarm. Activation of this alarm places the charger into Float mode.
- Mains Under Voltage alarm. Activation of this alarm places the charger into Float mode.
- Battery Detection Alarm.
- Cable Voltage Drop Alarm.
- Battery Charger Failure Alarm (Self Test).

5.2 DIGITAL INPUTS

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

The DSE9462 is fitted with two configurable digital inputs. Configuration is made using the DSE Configuration Suite PC Software.

The Factory Setting for the digital inputs are as follows:

Input	Factory Setting
Digital Input A	Lamp Test
Digital Input B	Stop Charging

NOTE: When configured to provide the *Battery Detection* function, the digital input must be activated, then deactivated again for the detection process to complete.

5.3 PSU MODE

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

If no battery is connected to the output terminals, the battery charger will operate as a DC power supply only, current limit is factory set to 15 A (Output 1) and 10 A (Output 2) and is adjustable using the DSE Configuration Suite PC Software.
Output current is derated based upon ambient temperature and AC supply voltage as detailed in the section entitled *Ambient Temperature Dependent Current Derating* elsewhere in this document.

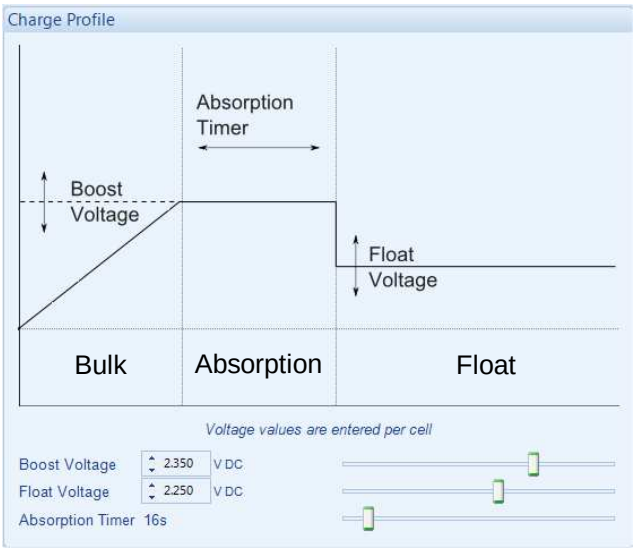
See the section entitled *Specification* elsewhere in this manual for further output specifications.

5.4 CHARGE MODE

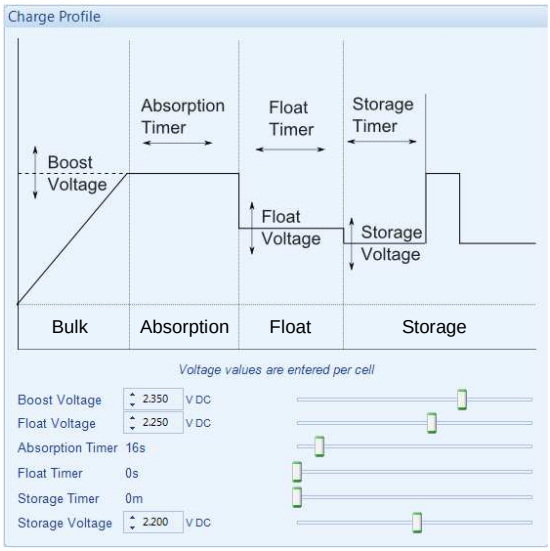
NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

NOTE: Should a 2-Stage charging profile be required, select a 3-Stage profile and configure *Boost Voltage* and *Float Voltage* to the same value.

Using DSE Conifiguration Suite PC Software, the battery charger is configured to use either a 3-Stage Charge or 4-Stage Charge profile as shown below. The description of each charge mode is given in the following sections.



3-Stage Charge Profile Configuration



4-Stage Charge Profile Configuration

5.4.1 BULK CHARGE

The battery charger operates in *Constant voltage current limited* mode.
The charger output voltage is maintained at a constant level (*boost voltage)* to allow the battery to charge while the load does not exceed the maximum rating of the charger.
If the load on the battery charger (*battery charge demand+standing load*) exceeds the set current rating of the charger, the charging current is limited to the maximum rating of the charger and the voltage is reduced.
The voltage will rise to the rated voltage again once the load drops below the maximum rating of the charger. This may occur naturally as the battery charges.
As the battery charges and the charge current drops below 75% of the current rating, *Absorption* mode is entered.

5.4.2 ABSORPTION

This mode is active for the duration of the *Absorption Timer,* factory set to 1 hour. This is adjustable using the DSE Configuration Suite PC Software.
Absorption mode is used to complete the charging process, bringing the battery to 100% charged status.
After the *Absorption timer*, *float charge* mode is entered.

5.4.3 FLOAT CHARGE

The battery charger DC voltage is lowered to the configured *float voltage*.
Float Charge is used to provide a small amount of current to the battery, to overcome internal losses and keep the battery at it's 100% charged state. The battery can be left in this mode indefinitely.

5.4.4 STORAGE

When configured to use a four stage charging profile, a time limited storage charge is periodically entered (*storage timer*) to maintain the battery charge at optimum levels. This occurs at the level of the *storage voltage*. This is adjustable using the DSE Configuration Suite PC Software.
When the *storage timer* expires, the charger re-enters the *Bulk* charge mode.

Additionally, this is used as an 'Automatic Boost' facility, to periodically attempt to remove sulfation from the battery plates.

5.4.5 CHARGING TIME

Charge time is often of little consequence when the battery is used in a *standby* operation. An example of this is when the battery is used to supply the starting system of a diesel generator. During normal operation, the battery is at full capacity and the battery charger is used to maintain the float voltage of the battery. The battery is only drained when the generator is called to start. As the generator has a DC charging alternator fitted, the battery is quickly recharged when the generator is running. Should the generator stop before the battery is fully recharged, the DSE9462 Battery Charger will continue to recharge the battery until it is fully charged.

Typically a battery will charge from flat to 80% capacity in 16 hrs when charged at C/10.
For example charging a 500 Ah battery set for 16 hrs at 50 A will charge the battery to 80% of its full capacity.
Remember to take into account any other standing load such as control panel requirements when calculating how much power is 'left' to charge the battery.

5.4.6 MANUAL BOOST

NOTE: The Digital Input must be configured to *Manual* Boost to provide this function. For further details, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

NOTE: Manual Boost is not terminated automatically. The digital input must be switched off by the user. Excessive use of the boost function potentially causes damage to the battery and causes the battery to gas, presenting a safety hazard. Therefore it is recommended to operate this function for no more than twenty four hours.

Manual boost places the charger into *Bulk* Charge mode, charging at the level of the *boost voltage*.
A typical use of manual boost is with Lead Acid type batteries. When the battery is fully charged, placing the charger into boost mode raises the output voltage. This has the effect of *gassing* the battery, helping to remove sulfation from the battery plates and helping the cells to *equalise* in voltage.

5.4.7 TEMPERATURE COMPENSATION

NOTE: For further details of PC Configuration, refer to DSE Publication: *057-159 DSE9400 Configuration Suite PC Software Manual.*

If temperature compensation is enabled through configuration, and remote temperature sensor is connected, the output voltage automatically varies by a configurable voltage per cell for each 1 ℃ deviation from 20 ℃, within the range of -20 ℃ to 60 ℃. Increasing temperature gives decreasing output voltage and decreasing temperatures gives increasing output voltage.
The battery temperature is measured by a 2 wire PT1000 sensor placed on the battery itself.

6 FAULT DIAGNOSIS

Nature of Problem	Suggestion
The charger is not operating.	Check that the incoming AC supply is correctly connected and within limits and check the integrity of any external fuse that may be fitted. Ensure the charger is not being operated above the maximum temperature specification. Check the LED indications against the LED descriptions listed elsewhere in this document.
Charge fail relay continuously operated.	Check the connected load of the charger is not reverse connected or short circuit. Check the LED indications against the LED descriptions listed elsewhere in this document.
Batteries fail to charge.	Check the batteries using the battery manufacturers recommendations.
Charge time is too long.	Typically a battery will charge from flat to 80 % capacity in 16 hrs when when charged at C/10. For example charging a 500 Ah battery set for 16 hrs at 50 A will charge the battery to 80 % of its full capacity. Remember to take into account any other standing load such as control panel requirements when calculating how much power is 'left' to charge the battery. Check the batteries using the battery manufacturers recommendations.
Reverse Polarity Alarm Upon Connection to Batteries	Check the polarity of the wiring to the batteries and ensure it's not reversed. Check the batteries voltage level with a DC voltmeter. When the batteries voltage is much lower than the charger output voltage, a high current flows between the charger and the batteries. This is a similar case of connecting the batteries with a reverse polarity. The charger switches its output ON and OFF until the batteries voltage rises to a suitable level, at this point the alarm does not activate.

7 MAINTENANCE, SPARES, REPAIR, AND SERVICING

DANGER OF DEATH: LIVE PARTS exist within the DSE9462 enclosure. The enclosure cover must not be removed when connected to an AC supply.

The DSE battery chargers are designed to be *Fit and Forget*. As such, there are no user serviceable parts. In the case of malfunction, contact your original equipment supplier (OEM).

8 WARRANTY

DSE provides limited warranty to the equipment purchaser at the point of sale. For full details of any applicable warranty, you are referred to your original equipment supplier (OEM).

9 DISPOSAL

9.1 WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)

If you use electrical and electronic equipment you must store, collect, treat, recycle, and dispose of WEEE separately from your other waste.



This Page Intentionally Left Blank.