



DEEP SEA ELECTRONICS PLC

DSE9701 & DSE9702 OPERATOR MANUAL

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DSE9701 & DSE9702 Operator Manual

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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.

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1 INTRODUCTION

This document details the installation requirements of the DSE9701 & DSE9702 Battery Chargers. 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 are not automatically informed of updates. Any future updates of this document will be added to the DSE website at www.deepseapl.com.

The DSE9701 & DSE9702 are intended for mounting within a customer enclosure or panel, fastened by the integral DIN rail mounting point or by screws / bolts.

The battery chargers include protected outputs, automatic charging and power supply operation and 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.deepseapl.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
053-170	DSE9701 & DSE9701 Battery Charger Installation Instructions

2 SPECIFICATIONS

2.1 ELECTRICAL SPECIFICATIONS

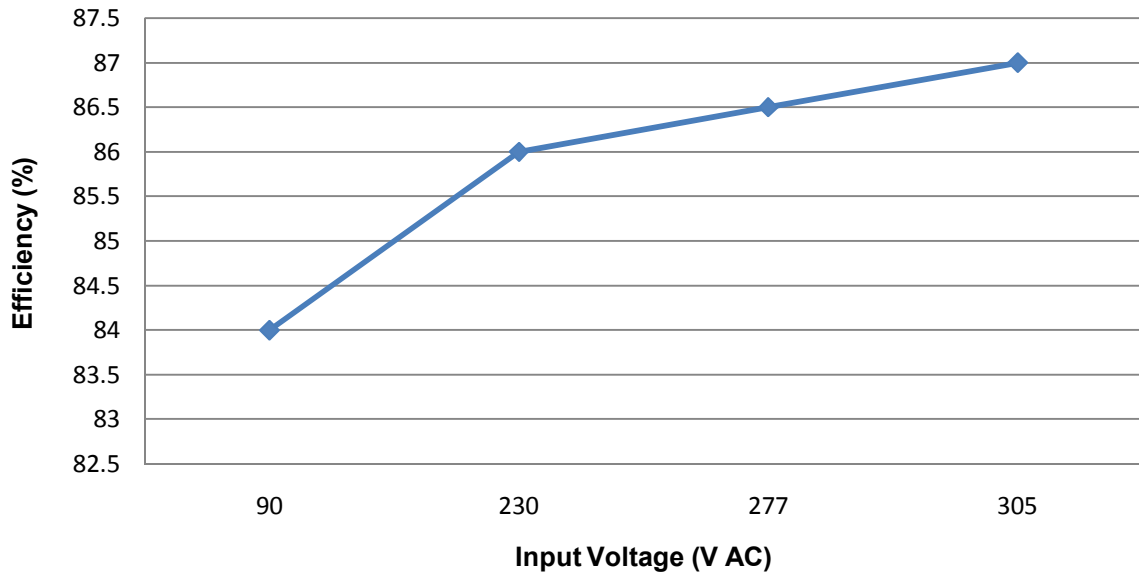
Parameter	Min	Nominal	Max
AC Input Voltage (V)	90 V	110 V - 277 V	305 V
Operating Temperature	-30 °C		55 °C
Input Frequency (Hz)	48 Hz		64 Hz
Output Ripple and Noise		2% V_o	
Load Regulation		2% V_o	
Line Regulation		<0.01% V_o	
Output Voltage Overshoot %		<5% V_o	
Transient Response Peak Deviation (mV) (at 50% to 100% load step)		<4% V_o	
Warm Up Voltage (V)		<1% V_o	
Output Voltage Rise Time (ms)		<100 ms	
Short Circuit Protection		Hiccup	
Switching Frequency (kHz)		65 kHz	
Efficiency % (See section entitled ' <i>output specifications</i> ' elsewhere in this manual)		>80%	

2.2 OUTPUT SPECIFICATIONS

2.2.1 DSE9701 24V 5A

Parameter	Min	Nom.	Max	Comments
Output Voltage (24 V DC Battery)	25.0 V	27.4 V	30.0 V	Specify float voltage on ordering.
Output Charging Current (A)	0 A	5 A		
Current Limit Threshold (A)	4.75 A	5.0 A	5.25 A	Thermal foldback above 55 °C
Recovery From Current Limit (A)	5 A	5.2 A		
Full Load AC Input Current (A)	0.65 A		2.5 A	With output at 27.6 V DC
AC Input Inrush (10ms) Current (A)		50 A		With AC input 230 V

DSE9701 Efficiency Curve at 5 A

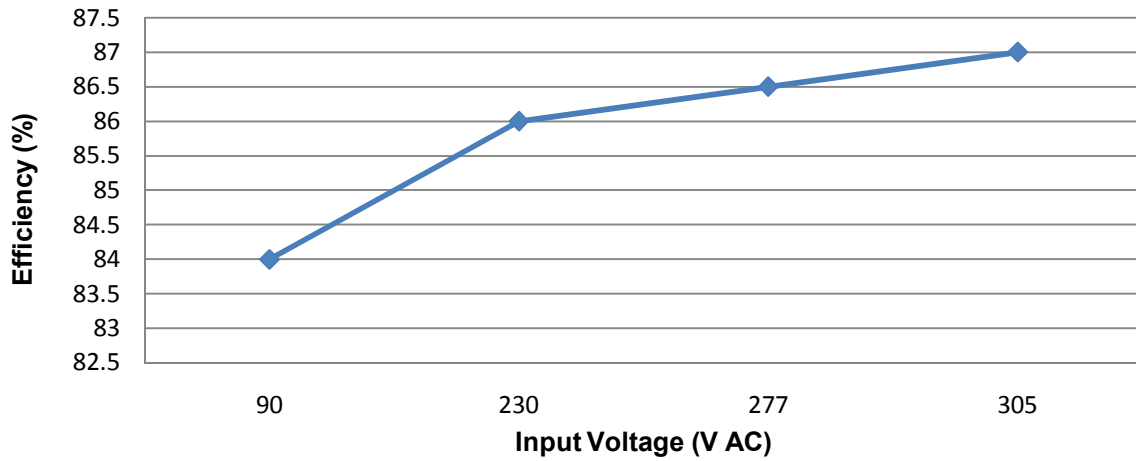


Specifications

2.2.2 DSE9702 12V 5A

Parameter	Min	Nom.	Max	Comments
Output Voltage (12 V DC Battery)	12.5 V	13.7 V	14.5 V	Specify float voltage on ordering.
Output Charging Current (A)	0 A	5 A		
Current Limit Threshold (A)	4.75 A	5.0A	5.25 A	Thermal foldback above 55 °C
Recovery From Current Limit (A)	5 A	5.2 A		
Full Load AC Input Current (A)	0.65 A		1.5 A	With output at 14.5 V DC
AC Input Inrush (10ms) Current (A)		50 A		With AC input 230 V

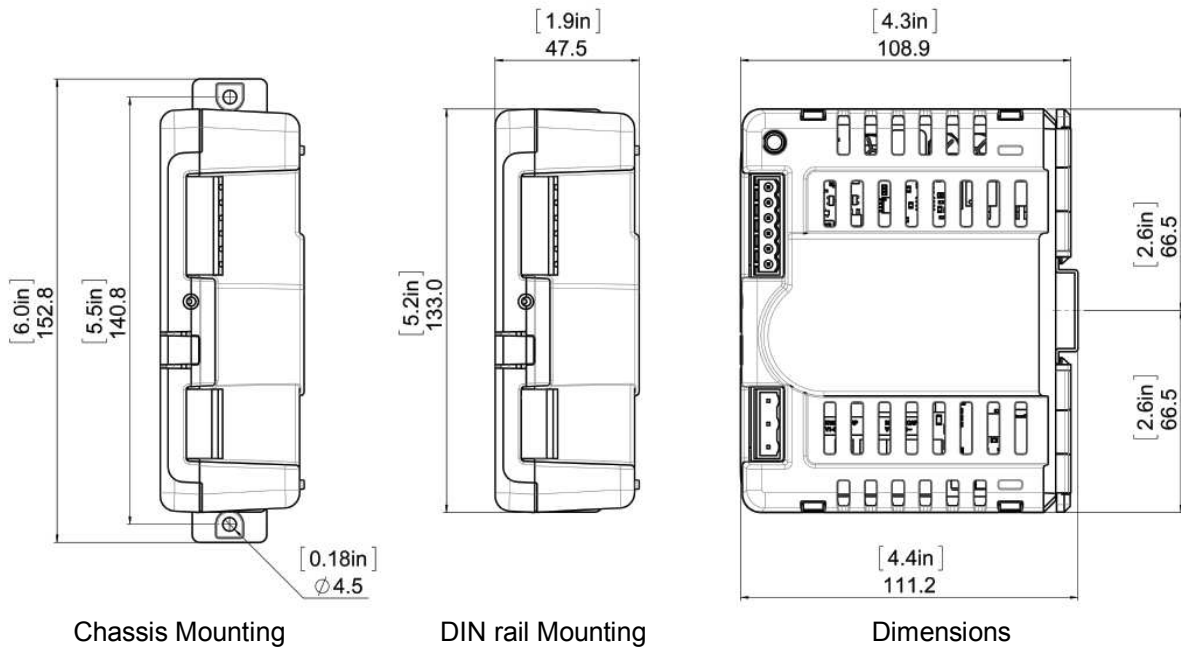
DSE9702 Efficiency Curve at 5 A



2.3 DIMENSIONS AND MOUNTING

NOTE: DSE9701 & DSE9702 is designed to be mounted with the base to a vertical surface with the terminal strips running vertically.

Parameter	Comment
Overall size for DIN Rail mounting	47.5 mm x 152.8 mm x 111.2 mm (1.9" x 6.0" x 4.4")
Overall size for chassis mounting	47.5 mm x 133.0 mm x 111.2 mm (1.9" x 5.2" x 4.4")
Weight	0.4 kg
Mounting type	DIN rail or chassis mounting
Din rail type	EN 50022 35 mm type only
Mounting holes (DIN rail clips pushed outwards to reveal mounting holes)	Suitable for M4
Mounting hole centres	140.8 mm (5.5")



Dimensions in mm unless stated

2.4 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.

3 INSTALLATION

The DSE9701 & DSE9702 Battery Charger are designed to be mounted within a control panel, on the panel DIN rail utilising the integral mounts or on a chassis 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 should be taken to ensure the batteries connected to the charger are of the correct 'technology' to suit the setting of the charger.


3.2 USER CONNECTIONS

Parameter	Comment	
Connection Type	Screw terminal, rising clamp, no internal spring	
Min Cable Size	0.5 mm ² (AWG 20)	
Max Cable Size	2.5 mm ² (AWG 14)	
Recommended AC Fuse DSE9701 24 V 5 A Charger DSE9702 12 V 5 A Charger	230 V AC Input 3.5 A anti-surge 3.5 A anti-surge	110 V AC Input 6.3 A anti-surge 6.3 A anti-surge

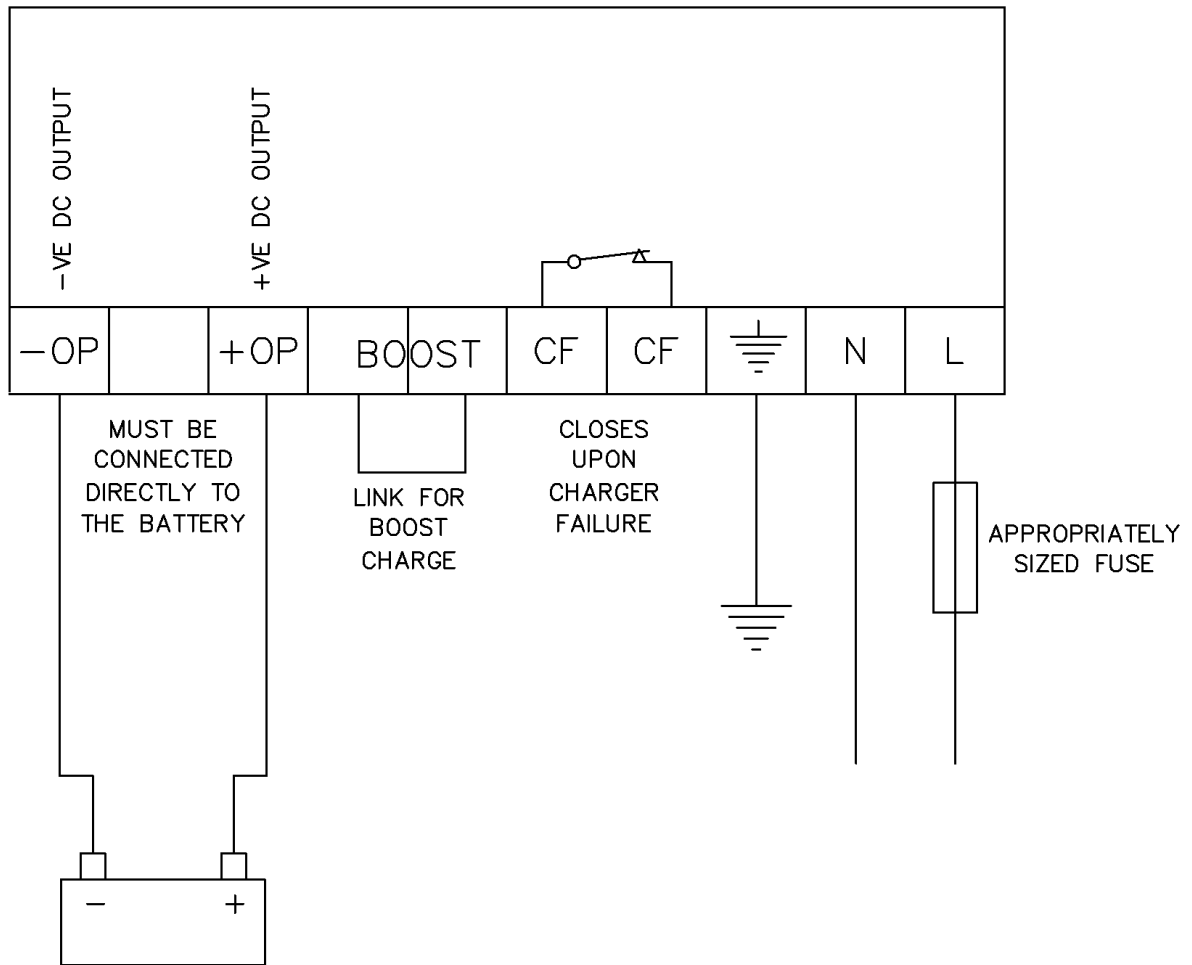
3.2.1 DC CONNECTIONS

Terminal	Function	Recommended size	Comments
-OP	Load Negative	1 mm ² (AWG 16)	Battery Negative Terminal
+OP	Load Positive	1 mm ² (AWG 16)	Battery Positive Terminal
BOOST	Boost Mode	1 mm ² (AWG 16)	Link for Boost Charge
BOOST	Boost Mode	1 mm ² (AWG 16)	
CF	Contact of the Charge Failure Relay	1 mm ² (AWG 16)	Changes State Under Charge Fail Conditions
CF	Contact of the Charge Failure Relay	1 mm ² (AWG 16)	

3.2.2 AC CONNECTIONS

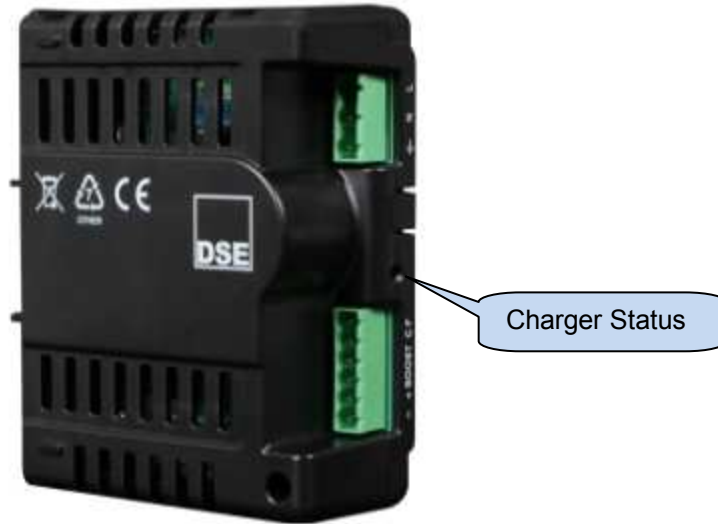
	Earth	1 mm ² (AWG 16)	Earth
N	AC Neutral	1 mm ² (AWG 16)	Neutral
L	AC Live	1 mm ² (AWG 16)	Live

3.3 TYPICAL WIRING DIAGRAM



4 INDICATIONS

 **DANGER OF DEATH : LIVE PARTS** exist within the DSE9701 & DSE9702 enclosure. The enclosure cover must not be removed when connected to an AC supply.



LED Indication

Function	Colour	Action
Charger Status	Red	<ul style="list-style-type: none">• Off when AC supply is not present or output volts are too low.• Steady during normal operation with AC supply above minimum operating voltage.• Flashing when connected to an operating charging alternator.• Pulsing during overload conditions.

5 OPERATION

The DSE9701 & DSE9702 Battery Charger is able to be used as a battery charger, DC power supply, or both at the same time. For example, the unit can be used to power local control panels and charge panel batteries or generator engine starter batteries at the same time.

With no AC input to the charger, the *Fault* relay is in it's inactive state. This volts-free change over relay is used to provide indication of alarms as detailed in the *Protection* section below.

5.1.1 PROTECTION

Under the following conditions, the Fault Relay de-energises and charging is stopped (DC output is disabled) until the fault is rectified.

- AC Supply is removed.
- Short circuit of the DC output.
- Reverse Polarity of the DC output.

5.1.2 PSU MODE

If no battery is connected to the output terminals, the battery charger operates as a DC power supply only, current limit is 5A.

5.1.3 CHARGE MODE

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 maximum current rating of the charger, the charging current is limited to the maximum rating of the charger and the voltage is reduced.

The voltage rises to the rated voltage once the load drops below the maximum rating of the charger. This occurs naturally as the battery charges.

The Float Voltage is set to match the requirement of the battery under charge. With a fully charged battery, this provides 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.

5.1.3.1 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 DSE9474 Battery Charger continues to recharge the battery until it is fully charged.

Typically a battery will charge from flat to 80% capacity in 16 hrs when when charged at C/10. For example charging a 50 Ah battery for 16 hrs at 5 A charges 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.

5.1.3.2 MANUAL BOOST

Manual boost raises the float voltage by 0.15 V per cell.

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.

6 FAULT DIAGNOSIS

Nature of problem	Suggestion
The charger is not operating	<p>Check that the incoming AC supply is correctly connected and within limits and check the integrity of any external fuse that may be fitted.</p> <p>Ensure the charger is not being operated above the maximum temperature specification.</p> <p>Check the LED indications against the LED descriptions listed elsewhere in this document.</p>
Charge fail relay continuously operated	Check the connected load of the charger is not reverse connected or short circuit.
Batteries fail to charge	Check the batteries using the battery manufacturers recommendations.
Charge time is too long	<p>Typically a battery charges from flat to 80% capacity in 16hrs when when charged at C/10.</p> <p>For example charging a 50 Ah battery for 16 hrs at 5 A charges the battery to 80% of its full capacity.</p> <p>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.</p>

7 MAINTENANCE, SPARES, REPAIR AND SERVICING

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 the original equipment supplier.

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 the original equipment supplier.

9 DISPOSAL

9.1 WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)

Waste Electrical and Electronic Equipment must be stored, collected, treated, recycled and disposed of separately from other waste.

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