



DEEP SEA ELECTRONICS PLC DSE ENCLOSED INTELLIGENT BATTERY CHARGER OPERATOR MANUAL

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DSE Enclosed Intelligent Battery Charger Operator Manual

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1	First Release
2	Added new FPE table
3	Added new FPE item to table

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 **BIBLIOGRAPHY**

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

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
053-147	DSE9460 / DSE9461 Enclosed Intelligent Battery Charger Installation Instructions
053-154	DSE2541 Remote Battery Charger Display Installation Instructions

1.2 MANUALS

DSE PARTDESCRIPTION057-159DSE9400 Series Configuration Suite PC Software Manual

2 INTRODUCTION

This document details the installation requirements of the DSE range of enclosed intelligent 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 will not be automatically informed of updates. Any future updates of this document will be added to the DSE website at <u>www.deepseaplc.com.</u>

The enclosed intelligent battery chargers fulfill the most common functions required of a charger in the generating set industry. Combining a range of display options, protected outputs, intelligent charging and power supply operation with a robust enclosure.

3 SPECIFICATIONS

3.1 PART NUMBERING

	946	0 - 0	01 - (20	
Product type				v	ariant
DSE9460 12V/24V 5A	9460			12V With LCD Display	01
DSE9461 12V/24V 10A	9461			12V With LCD Display and analogue meters	02
Hardware revisions				12V With LED Indicators and Analogue Meters	03
First version hardware		001		12V With LED Indicators	04
				24V With LCD Display	11
				24V With LCD Display and analogue meters	12
				24V With LED Indicators and Analogue Meters	13
				24V With LED Indicators	14

NOTE: DSE9460 Chargers are factory preconfigured for max 5A charging. However the maximum current can be adjusted between 1A and 5A using DSE Configuration Suite PC Software.

ANOTE: DSE9461 Chargers are factory preconfigured for max 10A charging. However the maximum current can be adjusted between 2A and 10A using DSE Configuration Suite PC Software.

ANOTE: Chargers are factory preconfigured to suit 12V or 24V batteries (see part numbers above). However a charger can be freely changed from 12V to 24V using DSE Configuration Suite PC Software.

ANOTE: Chargers are supplied configured to be suitable for Lead Acid batteries. Configuration to suit other battery types is performed using DSE Configuration Suite PC Software.

3.2 PROTECTION

- High Output Voltage (DC) detection.
- High / Low Input Voltage (AC) detection.
- Current limit to charger specification (5A or 10A depending upon charger model) with High Output Current detection.
- High Ambient Temperature detection.
- High Battery Temperature detection (when enabled).
- Short circuit protection. Charger automatically restarts operation after the fault is removed.
- Reverse battery polarity protection. Charger automatically restarts operation after the fault is removed.
- Battery Charger Failure. Informs of an internal fault with the battery charger.
- Common Fault Relay output.

3.3 ELECTRICAL SPECIFICATIONS

Min	Nominal	Max
95V	110V-277V	305V
-30°C		85℃ with de-ratings
48Hz		64Hz
	1% Vo	
	1% Vo	
	<0.01% Vo	
	<5%Vo	
	<1% \/o	
	<4 <i>/</i> 0 VU	
	<1% Vo	
	<200ms	
	Hiccup	
	67kHz	
	>85%	
	PT1000	
	VIIn 95V -30°C 48Hz	Wiln Nominal 95V 110V-277V -30°C

ANOTE: Check the de-rating and efficieny curves in the following sections of this manual.

3.4 OUTPUT SPECIFICATIONS

3.4.1 DSE9460 24V/12V 5A

Parameter	Min	Nominal	Max	Comments
Output Voltage	9V	Configurable	29.5V	
Output Charging Current (A)	2A	5A	6A	
Current limit threshold (A)		5A	6A	
Recovery from current limit (A)	5A		6A	
Full load AC input current (A)			1.5A	At Vin=230 V, Vo=28.2 V, Io=5 Amp
Full load AC input current (A)			2.5A	At Vin=110 V, Vo=28.2 V, Io=10 Amp
AC Input Inrush (10ms) current (A)		60A		For 10ms



iput voit



De-rating Curve 110V < Vin < 305V Charger De-rating Curve

De-rating Curve 90V < Vin < 110V Charger De-rating Curve



3.4.2 DSE9461 24V/12V 10A

Parameter	Min	Nominal	Max	Comments
Output Voltage	9V	Configurable	30.5V	
Output Charging Current (A)		10A	11A	
Current limit threshold (A)		10A	11A	
Recovery from current limit (A)	10A		11A	
Full load AC input current (A)			1.2A	At Vin=230V, Vo=14.4V, Io=10Amp
Full load AC input current (A)			2.2A	At Vin=110V, Vo=14.4V, Io=10Amp
AC Input Inrush (10ms) current (A)		60A		For 10ms

92% 91% 91% 90% 90% 89% 89% 89% 88% 88% 88% 87% 110 230 277 Input Voltage (V)

Efficiency Curve at 10A



De-rating Curve 110V < Vin < 305V Charger De-rating Curve

De-rating Curve 90V < Vin < 110V Charger De-rating Curve



3.5 COMMUNICATION PORTS

Communication	Specification
USB Port	USB2.0 Device for connection to PC running DSE Configuration Suite Max distance 6m (20 feet)
RS485 Serial Port	Isolated Data connection 2 wire + common Half Duplex Data direction control for Transmit (by s/w protocol) Max Baud Rate 19200 External termination required (120Ω) Max common mode offset 70V (on board protection transorb) Max distance 1.2km (¾ mile)
Display Communication Port	Reserved for connection to fascia mounted LCD display module.

3.5.1 USB CONNECTION

The USB port is provided to give a simple means of connection between a PC and the DSE9400 series battery charger. Using the DSE Configuration Suite Software, the operator is then configure and monitor the state of the battery charger.

To connect a DSE9400 series battery charger to a PC by USB, the following items are required:

- DSE Enclosed Intelligent 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



ONOTE: - Refer to Enclosed Intelligent Battery Charger PC Software Configuration Manual for further details on configuring and monitoring.



3.5.2 RS485

The RS485 port on the battery charger supports the Modbus RTU protocol.

RS485 is used for point-to-point cable connection of more than one device (maximum 32 devices) and allows for connection to PCs, PLCs and Building Management Systems (to name just a few devices).

One advantage of the RS485 interface is the large distance specification (1.2km) when using Belden 9841 (or equivalent) cable. This allows for a large distance between the battery charger and a PC running the DSE Configuration Suite software. The operator is then able to view the various operating parameters.

NOTE: - For distances up to 6m (8yds) the USB connection method is more suitable and provides for a lower cost alternative to RS485 (which is more suited to longer distance connections).

Cable Type	Two core screened twisted pair
Cable Characteristic	120Ω
Impedance	
Recommended Cable	Belden 9841
	Belden 9271
Maximum Cable Length	1200m (¾ mile) when using Belden 9841 or direct equivalent.
_	600m (666 yds) when using Belden 9271 or direct equivalent.
RS485 Topology	"Daisy Chain" Bus with no stubs (spurs)
RS485 Termination	120 Ω . Termination resistor must be fitted externally to the 'first' and
	'last' expansion module by the customer as required by the RS485
	specification.

3.5.2.1 RECOMMENDED RS485 EXPANSION FOR DESKTOP AND LAPTOP PC'S

- Brainboxes PM154 PCMCIA RS485 card (for laptops PCs) Set to 'Half Duplex, Autogating" with 'CTS True' set to 'enabled'
- Brainboxes VX-023 ExpressCard 1 Port RS422/485 (for laptops and nettop PCs)
- Brainboxes UC320 PCI Velocity RS485 card (for desktop PCs) Set to 'Half Duplex, Autogating" with 'CTS True' set to 'enabled'
- Brainboxes PX-324 PCI Express 1 Port RS422/485 (for desktop PCs)









Supplier: Brainboxes Tel: +44 (0)151 220 2500 Web: http://www.brainboxes.com Email: Sales: sales@brainboxes.com

3.7 DIMENSIONS AND MOUNTING

Parameter	Comment
Cabinet type	Custom cabinet for indoor use only
Overall size	165 mm x 305 mm x 110 mm
(see below for diagram)	(6.5" x 12" x 4.3")
Material:	Sheet steel enclosure of all-round solid construction
Surface finish:	Powder-coated black
Protection estagon/	IP20
Protection category.	NEMA 1
Weight	2.3 kg
weight	(5 lb 1 oz)
Mounting type	Wall mounting
Mounting holes	Diameter 6 mm (0.2")
Mounting holes	63 mm x 284 mm (3.4" x 11.2") centres
Operating Temperature	-30 °C to +85 °C with deratings
	(-22 °F to +185 °F with deratings)



Measurements in mm

3.8 APPLICABLE STANDARDS

BS 4884-1	This document conforms to BS4884-1 1992 Specification for presentation of essential information.
BS 4884-2	This document conforms to BS4884-2 1993 Guide to content.
BS 4884-3	This document conforms to BS4884-3 1993 Guide to presentation.
BS EN 60068-2-1 (Minimum temperature)	-30°C (-22°F)
BS EN 60068-2-2 (Maximum temperature)	+85°C (185°F)
BS EN 60950	Safety of information technology equipment, including electrical business equipment.
BS EN 61000-6-2	EMC Generic Immunity Standard (Industrial).
BS EN 61000-6-4	EMC Generic Emission Standard (Industrial).
	IP20
BS EN 60529 (Degrees of protection provided by enclosures)	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
	Enclosure type 1
NEMA rating	Provides a degree of protection against contact with the enclosure equipment and against a limited amount of falling dirt
UK WEEE REGULATIONS	Producer Registration Number WEE/BE0052TQ

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

4 INSTALLATION

The DSE 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).

4.1 BATTERY SUITABILITY

The charger is factory set by DSE to suit Lead Acid batteries but can be adjusted to suit other battery types using the Configuration Suite PC Software.

Care should be taken to ensure the batteries connected to the charger are of the correct 'technology' to suit the setting of the charger.

ANOTE: Ensure any Standing Load (loads connected to the battery charger other than the battery) are less 75% of the battery charger configured rating. This helps to ensure the charger correctly detects the battery charge state.

4.2 USER CONNECTIONS

Parameter	Comment		
Connection type	Screw terminal, rising clamp, no internal spring		
Min cable size	0.5mm ² (AWG 20)		
Max cable size	2.5mm ² (AWG 14)		
Recommended AC fuse	230V AC Input 110V AC Input		
DSE9461 24V/12V 10A charger DSE9460 24V/12V 5A charger	3.5A anti-surge 2.0A antisurge	6.3A anti-surge 3.5A anti-surge	

4.2.1 BATTERY CHARGER



Battery Charger connections are available by removing the screws identified below and hinging the cover down.

'Push Outs' are available on the side of the charger case to enable the installer to fit rubber grommets to facilitate cable entry.





Cover hinged open

4.2.1.1 CONNECTOR A

A NOTE: - Connection from battery charge must be directly connecte	d to the battery.

Terminal	Function	Recommended size	Comments
$\overline{\bigcirc}$	Load negative	1mm² (AWG 16)	Battery negative terminal
+	Load Positive	1mm² (AWG 16)	Battery positive terminal

4.2.1.2 CONNECTOR B/C

ANOTE: Screened 120 Ω impedance cable specified for use with RS485 must be used for the RS485 link.

DSE stock and supply Belden cable 9841 which is a high quality 120Ω impedance cable suitable for RS485 use (DSE part number 016-030)

Terminal	Function	Recommended size	Comments
0V	Supply for a remote	1mm² (AWG 16)	Do not connect to these terminals on variants with LCD displays
12V	(locally fitted) DSE2541 display	1mm² (AWG 16)	(9460-01, 9460-02, 9461-01, 9461- 02)
SCR	RS485 screen	N/A	
В	RS485 +ve	0.5mm² (AWG20)	Use only 120 Ω RS485 approved cable
A	RS485 -ve	0.5mm² (AWG20)	
LK	Connect together to	0.5mm² (AWG20)	Function Configurable using DSE
LK	activate Digital Input	0.5mm² (AWG20)	Configuration Suite PC Software
NTC	PT1000 connection	0.5mm² (AWG20)	Lice only PT1000
NTC	terminals	0.5mm² (AWG20)	
N/C	Fault relay Normally Closed terminal	0.5 mm² (AWG 22)	
Common	Fault relay Common Terminal	0.5 mm² (AWG 22)	De-energises under Fault Conditions
N/O	Fault relay Normally Open terminal	0.5 mm² (AWG 22)	

4.2.1.3 CONNECTOR D

CAUTION: Ensure Earth Terminal is connected to Battery negative (for negative earth systems) or Battery positive (for positive earth systems) Where no system earth exists, Earth Terminal must be connected to battery negative

Parameter	Comment	
Recommended AC fuse	230V AC Input	110V AC Input
DSE9461 24V/12V 10A charger DSE9460 24V/12V 5A charger	3.5A anti-surge 2.0A antisurge	6.3A anti-surge 3.5A anti-surge

Terminal	Function	Recommended Size
L	AC Live	1mm² (AWG 16)
N	AC Neutral	1mm² (AWG 16)
Ţ	Earth	1mm² (AWG 16)

4.2.2 TYPICAL CONNECTION DIAGRAM



TERMINALS SUITABLE FOR 22–16 AWG (0.6mm² – 1.3mm^2) FIELD WIRING TIGHTENING TORQUE = 0.5Nm (4.5lb-in)

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

NOTE 2	
AC INPUT	ANTI-SURGE FUSE RATING
110∨	6.3A
230V	3.5A

FUSE APPROPRIATELY WHEN CURRENT LIMIT IS CONFIGURED BELOW 10A AND AS CLOSE TO THE BATTER CHARGER AS POSSIBLE TO PROTECT THE CABLES

NOTE 3 FACTORY FITTED WITH 6.3A ANTI-SURGE FUSE, FUSE APPROPRIATELY

NOTE 4 FUSE APPROPRIATELY AND AS CLOSE TO THE BATTERY AS POSSIBLE TO PROTECT THE CABLES AND BATTERY

4.3 DSE2541 ENCLOSURE MOUNTED DISPLAY MODULE

NOTE: LCD display is fitted only to the following model numbers : 9460-01, 9460-02, 9461-01, 9461-02

NOTE: Where factory fitted to the enclosure, the DSE2541-01 must not be removed. Should an external, remote display be required, use DSE Part Number 2541-02 suitable for remote location up to 1.2km from the host battery charger.

NOTE: These connections are made by the DSE factory and are included for information only.

Terminal	Function	Recommended Size	Comments
1	Plant Supply Negative	1mm² (AWG16)	
2	Plant Supply Positive	1mm² (AWG16)	
3	RS485 (Screen)	N/A	Lies only 1200 DC 195 enproved
4	RS485 (B)	0.5mm² (AWG20)	Use only 12002 R5485 approved
5	RS485 (A)	0.5mm ² (AWG20)	Cable

ANOTE: Screened 120Ω impedance cable specified for use with RS485 must be used for the RS485 link.

DSE stock and supply Belden cable 9841 which is a high quality 120Ω impedance cable suitable for RS485 use (DSE part number 016-030)

5 INDICATIONS

5.1 LCD DISPLAY

NOTE: LCD display is fitted only to the following model numbers : 9460-01, 9460-02, 9461-01, 9461-02

NOTE: For details of controls and LCD indication, see the section entitled *Operation* elsewhere in this document.



5.1.1 CHARGER STATUS

Condition	LED State
Charger off	OFF
Charger on	Constant Red

5.1.2 FAULT STATUS

Condition	LED State
No Fault	OFF
Warning Fault	Constant Red
Shutdown Fault	Flashing Red

5.1.3 BOOST MODE

Condition	LED State
No Boost	OFF
In Boost Mode	Constant Red

5.2 ENCLOSURE MOUNTED LEDS

ANOTE: - Enclosure mounted LED indicators are fitted only to the following model numbers : 9460-03, 9460-04, 9461-03, 9461-04



5.2.1 STATUS

	LED DESIGNATION		
Condition	OPE	FAULT 1	FAULT 2
	Yellow/Green	Yellow	Red
Charger Off	Off	Off	Off
Pattery pat Datastad (Pattery Datastian Mada)	Green	Yellow	Red
ballery not Delected (ballery Delection Mode)	Flashing	Flashing	Flashing
Rattony Connected (Rattony Detection Mode)	Green	Yellow	Red
Ballery Connected (Ballery Delection Mode)	Constant	Constant	Constant
Not Charging (Charger is operating correctly but the ouput has been disconnected from the battery)	Off	Yellow Constant	Red Constant

5.2.2 CHARGE MODE

Mode	LED DESIGNATION OPE
Bulk Charge in progress	Yellow Constant
Absorption Charge in progress	Yellow Flashing
Float Charge in Progress	Green Constant
Storage Charge in Progress	Green Flashing

5.2.3 FAULT CONDITIONS

Condition	LED DESIG FAULT 1	NATION FAULT 2
High Output Voltage (DC)	Red Constant	Off
High / Low Input Voltage (AC) or High Output Current (DC)	Red Flashing	Off
High Ambient / Charger Temperature, High Battery Temperature (if enabled)	Off	Red Constant
Short Circuit/ Reverse Polarity (DC Output Connection)	Off	Red Flashing

5.3 ENCLOSURE MOUNTED ANALOGUE METERS

NOTE: - Enclosure mounted analogue meters are fitted only to the following model numbers : 9460-02, 9460-03, 9461-02, 9461-03



6 OPERATION

The DSE battery charger can be used as a battery charger, DC power supply, or both at the same time. For instance, the unit can be used to power the generator control panels and charge the panel batteries or starter batteries at the same time.

With no AC input to the charger, the *Charge fail* relay is de-energised. This can be used to provide indication of charger failure which operates upon mains supply AC supply failure or battery charging failure.

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

Battery connected – The charging operation will begin (Charge mode) No Battery connected – The output voltage will be enabled. (PSU mode) Reverse connected battery – The charger will remain in charge fail mode. Short circuit – The charger will remain in charge fail mode. AC under/over voltage – The charger will remain in charge fail mode. DC over current/voltage – The charger will remain in charge fail mode. Over temperature - The charger will remain in charge fail mode. Battery Charger Failure - The charger will remain in charge fail mode.

Depending upon the model variant, the battery charger can be operated using either the remote or enclosure mounted DSE2541.

Operation of the LCD display module is covered later in this section.

6.1 OPERATING MODES

6.1.1 PSU MODE

If no battery is connected to the output terminals, the DSE battery charger will operate as a DC power supply only, current limit is factory set. See the section entitled *Specification* elsewhere in this manual for output specifications.

6.1.2 CHARGE MODE

ANOTE: Ensure any Standing Load (loads connected to the battery charger other than the battery) are less 75% of the battery charger configured rating. This helps to ensure the charger correctly detects the battery charge state.

Constant Voltage

The DSE battery charger operates in *Constant voltage current limited* mode.

The charger output voltage is maintained at a constant level to allow the battery to charge while the load does not exceed the maximum rating of the charger.

Once the battery is fully charged, the battery charger switches to *ECO-POWER* mode. This is a low power use *standby* mode.

Current Limit

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 will rise to the rated voltage again once the load drops below the maximum rating of the charger.

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 battery charger continue sto recharge the battery until it is fully charged.

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

6.1.3 BOOST MODE

Boost mode is operated automatically or by activation of the digital input (if configured to perform this function). This raises the battery charger voltage to the *boost* voltage setting. It will stay in boost mode until the current drawn from the charger drops below 75% of the rated output, it will then go into a timed run-on charge.

The battery charger will go back into boost mode, if the charge voltage is detected to drop below 1.8V per battery cell.

6.1.4 TEMPERATURE COMPENSATION

If temperature compensation is enabled through configuration, and remote temperature sensor is connected, the output voltage automatically varies by a configured mV per cell per 1°C deviation from 20°C, within the range of -20°C to 60°C. Increasing temperature give decreasing outputs and decreasing temperatures give increasing outputs.

The battery temperature will be measured by a temperature sensor (2 wire PT1000 sensor) which will be placed on the battery











6.2 OPERATION OF LCD DISPLAY

NOTE: LCD display is fitted only to the following model numbers : 9460-01, 9460-02, 9461-01, 9461-02

ANOTE: An external remotely connected LCD display can be added to models without the enclosure mounted display. DSE Part Number 2541-02.

6.2.1 BACKLIGHT

The LCD backlight is ON while the module is powered and flashes up detection of an alarm condition.

6.2.2 LED

The Display Module has three integral LEDs to show operation status and fault conditions. Full details are contained in the section entitled *Indications* elsewhere in this document.

6.2.3 CONTROL BUTTONS

The LCD display has five control buttons :



6.2.4 SUMMARY SCREEN

The Summary Screen is initially displayed when the charged is turned on, and subsequently after a period of inactivity.



6.2.5 LINK ICON

The link icon indicates a successful link to the battery charger over the RS485 link. If there is no link active the icon is not shown.

Alarm Condition	lcon
RS485 Active	

6.2.6 BATTERY ICON

The battery icon indicates the current state of charging.

Battery State	Icon graphic
Not Charging	Ū
Charging animation	
Floating	
Fault	!

6.2.7 CHARGE GRAPHIC

The LCD shows the charge graphic to show the selected charge curve. The currently active mode is shown flashing in the module display.

6.2.7.1 THREE STAGE CHARGE PROFILE



ANOTE: - A description of each charge mode is given earlier in this manual.

Operation

6.2.7.2 FOUR STAGE CHARGE PROFILE



ANOTE: - A description of each charge mode is given earlier in this manual.

6.2.8 VIEWING THE INSTRUMENTATION

Press the navigation buttons (up) and (down) to cycle through the available instrumentation screens.

All instrumentation screens have the following common icons :



An icon is used to show the meaning of the currently visible screen as shown in the following sections.

6.2.8.1 BATTERY







Operation

6.2.8.3 PRODUCT INFO



6.2.8.4 CONTROL MODE



Control State	Icon displayed
On	\bigcirc
Off	\odot
Boost	BOOST

6.2.8.5 ALARMS

When a new alarm is detected, the LCD displays the alarm screen and the LCD backlight flashes.

Press the (\checkmark) button to accept the alarm, exit the alarm screen and return to the summary screen.



Alarm condition	Icon displayed
DC Over Volts	⊡Î
DC Over Current	m
AC Under or Over Volts	圍, 圍
Over Temperature	***
Short Circuit or Reverse polarity	(
Battery open circuit	
Battery Charger Failure	

6.3 FRONT PANEL EDITOR

6.3.1 ACCESSING THE FRONT PANEL EDITOR

The front panel editor (FPE) is accessed by pressing and holding the \mathbf{W} (\mathbf{v}) button.

During the transfer of the configuration file from the battery charger to the display module, the *File Transfer* progress screen is displayed.

When the transfer is completed the first parameter is displayed:

File Transfer 42%

The first parameter is displayed.



6.3.2 SELECTING A PARAMETER

- Press (+) or (-) to change between parameter pages (listed overleaf).
- Press (up) or (down) to cycle through the available parameters (listed overleaf).

6.3.2.1 EDITING A PARAMETER

- Press (✓) to edit a parameter when it is being viewed on the screen. The value flashes to show edit mode is in progress.
- Press (+) or (-) to change the parameter to the required value.
- Press ^(√) to save the currently selected value. The value ceases flashing to show editing is complete.

Other parameters can now be selected and edited in the same manner.

6.3.2.2 EXITING THE EDITOR

- Press and hold \bigcirc (\checkmark) to exit the editor.
- The *File Transfer* screen shown progress as the configuration is uploaded from the display module to the battery charger.

6.3.3 FRONT PANEL EDITOR PARAMETERS

6.3.3.1 PAGE 1 – MISCELLANEOUS

Index	Configuration item	lcon
100	Contrast	•
101	Temperature Units	
102	Slave ID	Ē
103	Baud Rate	[]
104	Enable Alarm Splash Screen	\leq
105	Page Timout Screen	Ë
106	Page Timeout	ËÜ
107	Sleep Mode Timeout	
108	Digital Input Function	Ë
109	Battery Voltage	C:
110	Battery Self Test Enabled	≈ 5 -3
111	Battery Self Test Timer	≈ 5 -3
112	Battery Detection Enabled	
113	Battery Detection Rate	
114	Display Remote Sense	Ē

Parameter 105 – Page Timeout Screen selects the 'main' display screen. This is the screen that is displayed after a period of inactivity (no buttons are pressed for the duration of *Page* Timeout (parameter 106). It has the following possible selections :

Value	Function
0	Summary Page
1	Battery Information.
2	Mains Information.
3	Product Information.
4	Control Mode

Parameter 108 – Digital Input Function has the following possible selections :

Value	Function
0	Lamp Test
1	Charger Off
2	Enable Battery Detection
3	Manual Boost
4	Switch Voltage Mode (12V / 24V)

6.3.3.2 PAGE 2 – BATTERY TEMPERATURE

Index	Configuration item	lcon
200	Battery Temperature Sensor Enable	ł
201	Battery Temperature Warning Alarm Enable	I+
202	Battery Temperature Warning Alarm Trip	Į,
203	Battery Temperature Warning Alarm Delay	Į,
204	Battery Temperature Warning Return	Į,
205	Battery Temperature Warning Return Delay	Į,

6.3.3.3 PAGE 3 – BATTERY OPTIONS

Index	Configuration item	lcon
300	Battery Current Limit	Ē
301	Battery Profile Stages	Ē

6.3.3.4 PAGE 4 – ALARMS

Index	Configuration item	lcon
400	Over Current Alarm Enable	
401	Over Current Alarm Trip	
402	Over Current Alarm Trip Delay	
403	Over Current Alarm Return	Ē
404	Over Current Alarm Return Delay	Ê
405	Over Voltage Alarm Trip Enable	Ē
406	Over Voltage Alarm Trip	Ē
407	Over Voltage Alarm Trip Delay	Ē
408	Over Voltage Alarm Return	¶† Ľ
409	Over Voltage Alarm Return Delay	¶÷ L
410	Under Voltage Alarm Trip Enable	Ē
411	Under Voltage Alarm Trip	Ē
412	Under Voltage Alarm Trip Delay	Ē
413	Under Voltage Alarm Return	Ē
414	Under Voltage Alarm Return Delay	Ē

6.3.3.5 PAGE 5 - MAINS

Index	Configuration item	lcon
500	Mains Over Voltage Enable	ţ₿
501	Mains Over Voltage Alarm Trip	ţ₿
502	Mains Over Voltage Alarm Trip Delay	t\$ ₩
503	Mains Over Voltage Alarm Return	ţ₿
504	Mains Over Voltage Alarm Return Delay	ţ ≜
505	Mains Under Voltage Enable	ţ₿
506	Mains Under Voltage Alarm Trip	ţ₿
507	Mains Under Voltage Alarm Trip Delay	ţ₿
508	Mains Under Voltage Alarm Return	ţ₿
509	Mains Under Voltage Alarm Return Delay	; ₿

7 MODBUS

The DSE Battery Charger supports the modbus RTU protocol over half-duplex RS485 communications.

RS485 parameter	Setting
Start Bits	1
Data Bits	8
Parity	None
Stop Bits	2
Baud Rate	Configurable using DSE Configuration Suite PC Software (1200, 2400/4800, 9600, 19200, 28800, 38400, 57600, 115200) Factory setting : 9600
Modbus Slave ID	Configurable using DSE Configuration Suite PC Software (1-247) Factory Setting : 10

7.1 READING VALUES

Values must bre read using Modbus Function Code 3 – Read Multiple Registers.

Using the DSE Configuration Suite PC Software, modbus registers are defined by the system designer in modbus Page 166.

An example of customer configuration is shown below, the screen image is take from the SE Configuration Suite PC Software.

Configurable Gencom Page 166											
Regist	er Value		Register	Value		Register	Value		Register	Value	
0-1	Charge Output Off		64-65	<not used=""></not>		128-129	<not used=""></not>		192-193	<not used=""></not>	*
2-3	Fault LED	٣	66-67	<not used=""></not>		130-131	«Not Used»		194-195	«Not Used»	*
4-5	Fault LED 2	٠	68-69	<not used=""></not>		132-133	<not used=""></not>	•	196-197	«Not Used»	-
6-7	OPE Green LED	٠	70-71	<not used=""></not>		134-135	<not used=""></not>	٠	198-199	«Not Used»	
8-9	OPE Yellow LED	٠	72-73	<not used=""></not>		136-137	<not used=""></not>	٠	200-201	<not used=""></not>	
10-11	Relay Healthy	٠	74-75	<not used=""></not>		138-139	«Not Used»	٠	202-203	«Not Used»	*
12-13	Battery Temperature		76-77	<not used=""></not>		140-141	<not used=""></not>	٠	204-205	«Not Used»	
14-15	Active Current Limit		78-79	<not used=""></not>	-	142-143	<not used=""></not>	Ŧ	205-207	«Not Used»	. w
16-17	<not used=""></not>	٠	80-81	<not used=""></not>		144-145	«Not Used»	٣	208-209	<not used=""></not>	*
18-19	<not used=""></not>	٠	82-83	<not used=""></not>	*	146-147	<not used=""></not>	¥	210-211	<not used=""></not>	
20-21	<not used=""></not>	٠	84-85	<not used=""></not>		148-149	<not used=""></not>	٠	212-213	«Not Used»	*
22-23	«Not Used»	4	86-87	<not used=""></not>		150-151	<not used=""></not>	Ť	214-215	«Not Used»	-
24-25	<not used=""></not>	٠	88-89	<not used=""></not>		152-153	<not used=""></not>	+	216-217	«Not Used»	-
26-27	<not used=""></not>	1	90-91	<not used=""></not>		154-155	«Not Used»	٣	218-219	«Not Used»	
28-29	<not used=""></not>	Ŧ	92-93	<not used=""></not>	-	156-157	<not used=""></not>	٠	220-221	«Not Used»	-
30-31	<not used=""></not>	٣	94-95	<not used=""></not>	-	158-159	<not used=""></not>	٣	222-223	«Not Used»	-
32-33	<not used=""></not>	٠	96-97	<not used=""></not>		160-161	«Not Used»	٣	224-225	«Not Used»	*
34-35	<not used=""></not>	٠	98-99	<not used=""></not>		162-163	<not used=""></not>	٠	226-227	«Not Used»	-
36-37	<not used=""></not>	٠	100-101	<not used=""></not>	٣	164-165	<not used=""></not>	٠	228-229	«Not Used»	
38-39	«Not Used»		102-103	«Not Used»	-	166-167	«Not Used»	Ŧ	230-231	<not used=""></not>	
40-41	«Not Used»	٠	104-105	«Not Used»		168-169	«Not Used»	Ŧ	232-233	«Not Used»	
42-43	«Not Used»	٠	106-107	<not used=""></not>	*	170-171	<not used=""></not>	*	234-235	«Not Used»	÷
44-45	<not used=""></not>	-	108-109	<not used=""></not>		172-173	<not used=""></not>	*	236-237	«Not Used»	

Operation

Modbus parameter	Value
Modbus Register	Address Page 166
Start	Absolute HexaDecimal Address A600
	Absolute Decimal Address 42496 (166 x 256).
	A NOTE: Some Legacy Modbus Master devices may require a suffix of 40,000 to the address, making the base address 82496.
	A NOTE: Some Modbus Master devices may require '1' to be added to the address.
Modbus Register Size / Sign	32 bit, signed
Modbus Register	Holding Registers
Туре	(modbus function code 3 supported)

7.2 WRITING VALUES

Writing values to the battery charger is used to perform functions below. Two values must be written using the same write function.

Using Modbus *Function Code 16 – Write Multiple Registers*, write the required Control Key and One's Compliment of the Control key to the specified registers:

7.2.1 TOGGLE BOOST MODE

Writing this control key enables or disables boost mode. When in boost mode, the battery is charged at the configured *boost voltage*.

Single Modbus Write using Modbus Function Code 16 - Write Multiple Registers

Address to write to	Control Key	One's Compliment of Control Key
Decimal Address 4104 & 4105	35772	27963
(Hexadecimal 1008 & 1008)		

7.2.2 TOGGLE CHARGER ON/OFF

Writing this control key enables or disables the charger's DC output.

Single Modbus Write using Modbus Function Code 16 – Write Multiple Registers.

Address to write to	Control Key	One's Compliment of Control Key
Decimal Address 4104 & 4105	35773	29762
(Hexadecimal 1008 & 1008)		

8 FAULT DIAGNOSIS

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

9 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 you should contact your original equipment supplier (OEM).

10 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).

11 DISPOSAL

11.1 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.

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