DEEP SEA ELECTRONICS PLC

DSE701 MKII CONTROLLER OPERATORS MANUAL

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Author: Ashley Senior



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: support@deepseaplc.com
Website: www.deepseaplc.com

DSE Model DSE701 MkII Operators Manual

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Amendments since last publication

Issue no.	Comments
1	First Release

Clarification of notation used within this publication.

NOTE:	Highlights an essential element of a procedure to ensure correctness.
CAUTION!	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
WARNING!	Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.

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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
053-132	DSE701 MkII Installation Instruction

1.2 MANUALS

DSE PART	DESCRIPTION
057-145	DSE701 MkII Configuration Suite Lite Software Manual

2 INTRODUCTION

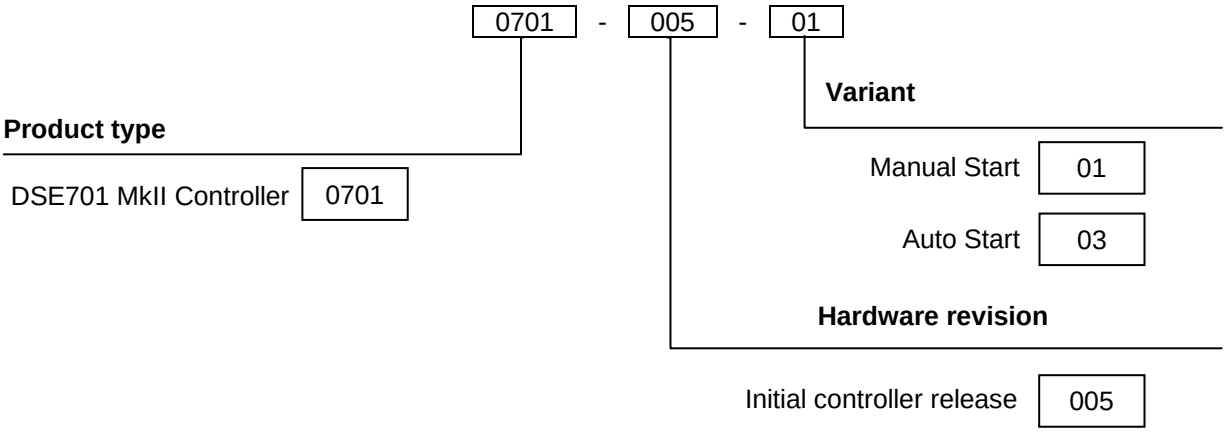
This document details the installation and operation requirements of the DSE701 MKII controller is part of the DSEGenset ® range of products.
The manual forms part of the product and should be kept for the entire life of the product. If the product is passed or supplied to another party, ensure that 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 included on the DSE website at www.deepseaplc.com

The DSE701 MkII controller is used to start and stop a engine and indicate fault conditions. The DSE701 MkII will automatically shut the engine down upon fault.

Using a PC and the Configuration Suite Lite software along with the DSE813 interface allows configuration of selected operating sequences and parameters.

3 SPECIFICATIONS

3.1 PART NUMBERING



The standard DSE701 MkII is configured to sense the speed of the engine through an AC Frequency Hz or RPM. Using the DSE813 interface and DSE Configuration Suite Lite Software the module can be configured to sense speed through an MPU sensor.

At the time of this document production, there are no variants of DSE701 MkII product.

3.2 TERMINAL SPECIFICATION

Connection type	Two part connector. • Male part fitted to module • Female part supplied in module packing case - Screw terminal, rising clamp, no internal spring.	 Example showing cable entry and screw terminals of a 10 way connector

3.3 POWER SUPPLY REQUIREMENTS

Minimum supply voltage	8V continuous
Cranking dropouts	Able to survive 0V for 50mS providing the supply was at least 10V before the dropout and recovers to 5V afterwards. This is more than sufficient to allow the controller to operate during engine cranking where the battery supply often falls as low as 4V (on a 12V system!) This is achieved without the need for internal batteries or other external requirements.
Maximum supply voltage	35V continuous (60V protection for surges)
Reverse polarity protection	-35V continuous
Maximum operating current	27mA at 24V 26mA at 12V
Maximum standby current	21mA at 24V 20mA at 12V

3.4 INPUTS

3.4.1 DIGITAL INPUTS

Number	3
Arrangement	Contact between terminal and ground
Low level threshold	2.1V minimum
High level threshold	6.6V maximum
Maximum input voltage	+50V DC with respect to plant supply negative
Minimum input voltage	-24V DC with respect to plant supply negative
Contact wetting current	2.5mA typical
Open circuit voltage	12V typical

3.4.2 FREQUENCY SENSING INPUT HZ , RPM

Measurement type	Frequency
Input Impedance	900kΩ L-N
Phase to Neutral	15V to 333V AC (max)
Minimum frequency	3.5Hz
Maximum frequency	75.0Hz
Frequency resolution	0.1Hz
Frequency accuracy	±0.2Hz

3.4.3 MAGNETIC PICKUP

Type	Differential input
Minimum voltage	0.6V RMS
Max common mode voltage	±2V
Maximum frequency	10,000Hz
Resolution	6.25 RPM
Accuracy	±25 RPM

NOTE : DSE can supply a suitable magnetic pickup device, available in two body thread lengths :
DSE Part number 020-012 - Magnetic Pickup probe 5/8 UNF 2½" thread length
DSE Part number 020-013 - Magnetic Pickup probe 5/8 UNF 4" thread length

Magnetic Pickup devices can often be 'shared' between two or more devices. For example, one device can often supply the signal to both the DSE701 MkII speed switch and the engine governor. The possibility of this depends upon the amount of current that the magnetic pickup can supply.

3.5 CHARGE FAIL INPUT/OUTPUT

Minimum voltage	0V
Maximum voltage	35V (plant supply)
Resolution	0.2V
Accuracy	±1% of max measured voltage (±0.35V)
Excitation	Active circuit constant power output
Output Power	2.5W Nominal @12V and 24V
Current at 12V	210mA
Current at 24V	104mA

The charge fail input is actually a combined input and output.
Whenever the generator is required to run, the terminal provides excitation current to the charge alternator field winding.
When the charge alternator is correctly charging the battery, the voltage of the terminal is close to the plant battery supply voltage. In a failed charge situation, the voltage of this terminal is pulled down to a low voltage. It is this drop in voltage that triggers the *charge failure* alarm. The level at which this operates and whether this triggers a warning or shutdown alarm is configurable using the DSE Config Suite Lite Software.

3.6 OUTPUTS

3.6.1 FUEL & CRANK

Number	2
Type	Negative switching Fuel and Crank outputs.
Rating	1.2A resistive @ 35V

3.6.2 PRE-HEAT/CONFIGURABLE

Number	1
Type	Negative switching Fully configurable
Rating	1.2A resistive @ 35V

3.7 PC CONFIGURATION

DSE813 USB Interface	USB 2.0 Device for connection to PC running DSE Configuration Suite Lite PC Software Max distance 6m (yards)

3.7.1 PC COMMUNICATION

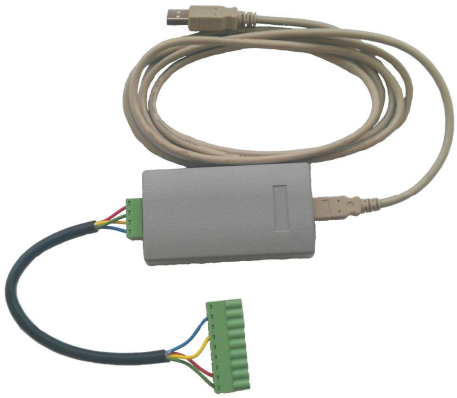
Using the DSE813 interface, the DSE701 MkII controller can connect to a computer to enable simple configuration of parameters. Connection details for the DSE813 USB Interface are documented in DSE publication: *057-145 DSE701 MkII Configuration Suite Lite Software Manual*

To connect a DSE701 MkII controller to a PC, the following items are required:

- DSE701 MkII Controller



- DSE813 PC Interface (USB) DSE Part number 016-125



- DSE Configuration Suite Lite PC Software
- Available from the DSE Website www.deepseaplc.com
- The software CD will be supplied with the DSE813 PC Interface (USB)



NOTE:- For further details on connecting the DSE813 to the DSE701 MkII Controller, please refer to DSE publication: *057-145 DSE701 MkII Configuration Suite Lite Software Manual*

3.8 DIMENSIONS AND MOUNTING

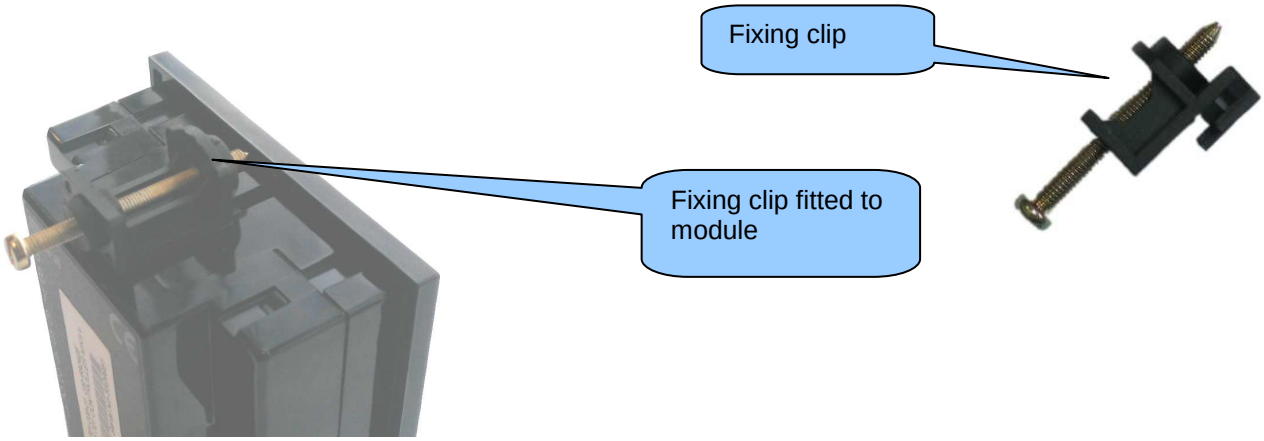
3.8.1 DIMENSIONS
72 mm x 72 mm x 38 mm
(2.8” x 2.8” x 1.5”)

3.8.2 PANEL CUTOUT
68 mm x 68 mm
(2.7” x 2.7”)

3.8.3 WEIGHT
0.08 kg
(0.176 lb)

3.8.4 FIXING CLIPS
The module is held into the panel fascia using the supplied fixing clips.

- Withdraw the fixing clip screw (turn anticlockwise) until only the pointed end is protruding from the clip.
- Insert the three ‘prongs’ of the fixing clip into the slots in the side of the module case.
- Pull the fixing clip backwards (towards the back of the module) ensuring all three prongs of the clip are inside their allotted slots.
- Turn the fixing clip screws clockwise until they make contact with the panel fascia.
- Turn the screws a little more to secure the module into the panel fascia. Care should be taken not to over tighten the fixing clip screws.



NOTE:- In conditions of excessive vibration, mount the panel on suitable anti-vibration mountings.

3.9 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)	+70°C (158°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)
BS EN 60529 (Degrees of protection provided by enclosures) (see overleaf)	IP41 (front of controller when installed into the control panel WITHOUT being sealed to the panel)
UL508 NEMA rating (Approximate) (see overleaf)	2 (Front of controller when installed into the control panel WITHOUT being sealed to the panel)
IEEE C37.2 (Standard Electrical Power System Device Function Numbers and Contact Designations)	Under the scope of IEEE 37.2, *function numbers can also be used to represent functions in microprocessor devices and software programs*. As the controller is configurable by the generator OEM, the functions covered by the controller will vary. Under the controller's factory configuration, the device numbers included within the controller are : 2 – Time delay starting or closing relay 6 – Starting circuit breaker 30 – annunciator relay 54 – turning gear engaging device 62 – time delay stopping or opening relay 63 – pressure switch 74– alarm relay 81 – frequency relay 86 – lockout relay

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

3.9.1 ENCLOSURE CLASSIFICATIONS

IP CLASSIFICATIONS

DSE701 MkII **BS EN 60529** Degrees of protection provided by enclosures

IP41 (front of controller when controller is installed into the control panel WITHOUT being sealed to the panel)
IP54 Rear of controller(suitable grease should be applied to terminals if exposed to a harsh environment

First Digit Protection against contact and ingress of solid objects	Second Digit Protection against ingress of water
0 No protection	0 No protection
1 Protected against ingress solid objects with a diameter of more than 50 mm. No protection against deliberate access, e.g. with a hand, but large surfaces of the body are prevented from approach.	1 Protection against dripping water falling vertically. No harmful effect must be produced (vertically falling drops).
2 Protected against penetration by solid objects with a diameter of more than 12 mm. Fingers or similar objects prevented from approach.	2 Protection against dripping water falling vertically. There must be no harmful effect when the equipment (enclosure) is tilted at an angle up to 15° from it s normal position (drops falling at an angle).
3 Protected against ingress of solid objects with a diameter of more than 2.5 mm. Tools, wires etc. with a thickness of more than 2.5 mm are prevented from approach.	3 Protection against water falling at any angle up to 60° from the vertical. There must be no harmful effect (spray water).
4 Protected against ingress of solid objects with a diameter of more than 1 mm. Tools, wires etc. with a thickness of more than 1 mm are prevented from approach.	4 Protection against water splashed against the equipment (enclosure) from any direction. There must be no harmful effect (splashing water).
5 Protected against harmful dust deposits. Ingress of dust is not totally prevented but the dust must not enter in sufficient quantity to interface with satisfactory operation of the equipment. Complete protection against contact.	5 Protection against water projected from a nozzle against the equipment (enclosure) from any direction. There must be no harmful effect (water jet).
6 Protection against ingress of dust (dust tight). Complete protection against contact.	6 Protection against heavy seas or powerful water jets. Water must not enter the equipment (enclosure) in harmful quantities (splashing over).

NEMA CLASSIFICATIONS

DSE701 MkII NEMA Rating (Approximate)

2 (front of controller when controller is installed into the control panel WITHOUT being sealed to the panel)
2 Rear of controller (suitable grease should be applied to terminals if exposed to a harsh environment)

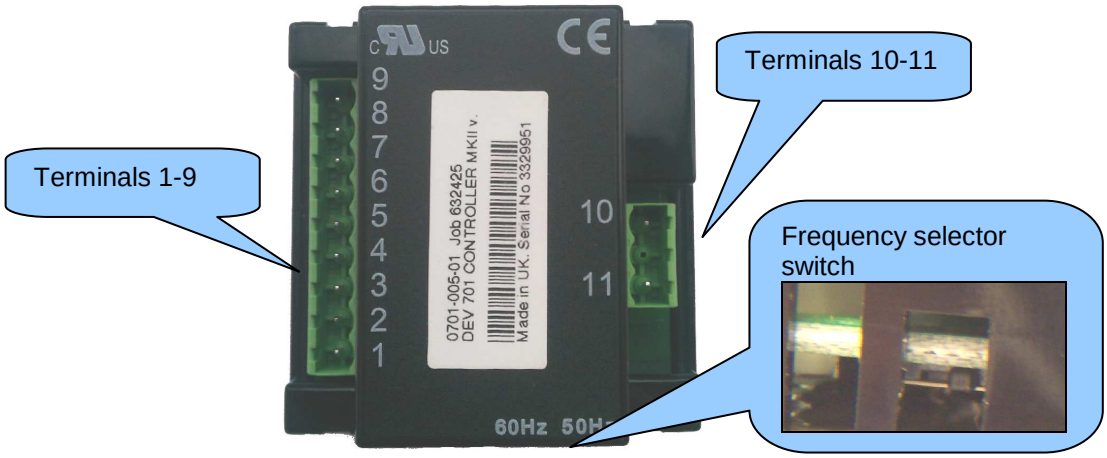
NOTE: - There is no direct equivalence between IP / NEMA ratings. IP figures shown are approximate only.

1 **IP30**	Provides a degree of protection against contact with the enclosure equipment and against a limited amount of falling dirt.
2 **IP31**	Provides a degree of protection against limited amounts of falling water and dirt.
3 **IP64**	Provides a degree of protection against windblown dust, rain and sleet; undamaged by the formation of ice on the enclosure.
3R **IP32**	Provides a degree of protection against rain and sleet:; undamaged by the formation of ice on the enclosure.
4 (X) **IP66**	Provides a degree of protection against splashing water, windblown dust and rain, hose directed water; undamaged by the formation of ice on the enclosure. (Resist corrosion).
12/12K **IP65**	Provides a degree of protection against dust, falling dirt and dripping non corrosive liquids.
13 **IP65**	Provides a degree of protection against dust and spraying of water, oil and non corrosive coolants.

4 INSTALLATION

The DSE701 MkII controller is designed to be mounted on the panel fascia. For dimension and mounting details, see the section entitled *Specification, Dimension and mounting* elsewhere in this document.

4.1 USER CONNECTIONS



4.2 TERMINAL DESCRIPTION

4.2.1 DC SUPPLY, FUEL AND START OUTPUTS

Icon	PIN No	DESCRIPTION	CABLE SIZE	NOTES
− +	1	DC Plant Supply Input (Negative)	1.0 mm² AWG 18	
	2	DC Plant Supply Input (Positive)	1.0 mm² AWG 18	(Recommended Maximum Fuse 15A anti-surge) Supplies the module (2A anti-surge requirement) and all output relays
	3	Output A (FUEL)	0.5mm² AWG 20	Plant Supply Negative from terminal 1 1.2 A rated.
	4	Output B (CRANK)	0.5mm² AWG 20	Plant Supply Negative from terminal 1 1.2 A rated.
	5	Output C (PRE-HEAT)	0.5mm² AWG 20	Plant Supply Negative from terminal 1 1.2 A rated.
	6	Configurable Digital Input	0.5mm² AWG 20	Configurable Input
D + W/L	7	Charge fail / excite	1.0mm² AWG 18	
	8	Oil Pressure	0.5mm² AWG 20	Connect to Oil Pressure Switch
	9	Coolant Temperature	0.5mm² AWG 20	Connect to Coolant Temperature switch
Hz	10	Signal +	1.0 mm² AWG 18	Magnetic pickup Positive / Frequency Hz or RPM sensing
	11	Signal -	1.0 mm² AWG 18	Magnetic pickup Negative / Frequency Hz or RPM sensing

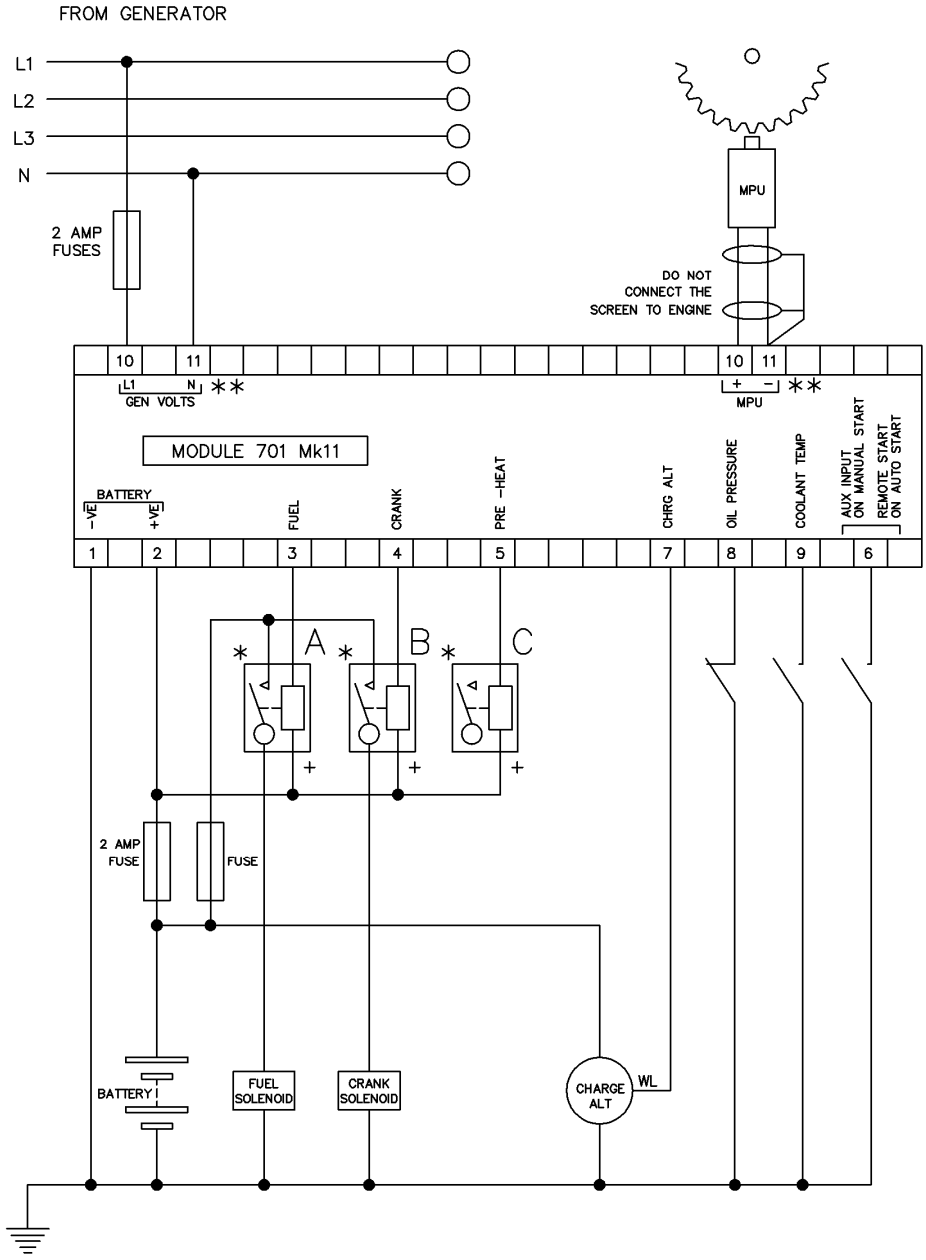
NOTE: - If you use PTFE insulating tape on the Oil pressure or Temperature switch thread when using earth return switches, ensure you do not insulate the entire thread, as this will prevent the switch body from being earthed via the engine block.

NOTE:- Screened cable must be used for connecting the Magnetic Pickup, ensuring that the screen is earthed at one end ONLY other wise the cable will act as an aerial.

4.3 TYPICAL WIRING DIAGRAMS

As every system has different requirements, these diagrams show only a TYPICAL system and do not intend to show a complete system.

Further wiring suggestions are available in the following DSE publications, available at www.deepseaplc.com to website members.



BATTERY NEGATIVE MUST BE GROUNDED

TERMINALS SUITABLE FOR 22–16 AWG (0.6mm^2– 1.3mm^2) FIELD WIRING

TIGHTENING TORQUE = 0.8Nm (7lb–in)

* NOTE. ALL THE OUTPUTS ARE SOLID STATE AND ARE NEGATIVE SWITCHING

** NOTE. CONNECT EITHER MPU OR AC VOLTS FOR SPEED REFERENCE

4.3.1 EARTH SYSTEMS

4.3.1.1 NEGATIVE EARTH

The typical wiring diagrams located within this document show connections for a negative earth system (the battery negative connects to Earth)

4.3.1.2 POSITIVE EARTH

When using a DSE controller with a Positive Earth System (the battery positive connects to Earth), the following points must be followed:

- Follow the typical wiring diagram as normal for all sections EXCEPT the earth points
- All points shown as Earth on the typical wiring diagram should connect to BATTERY NEGATIVE (not earth).

4.3.1.3 FLOATING EARTH

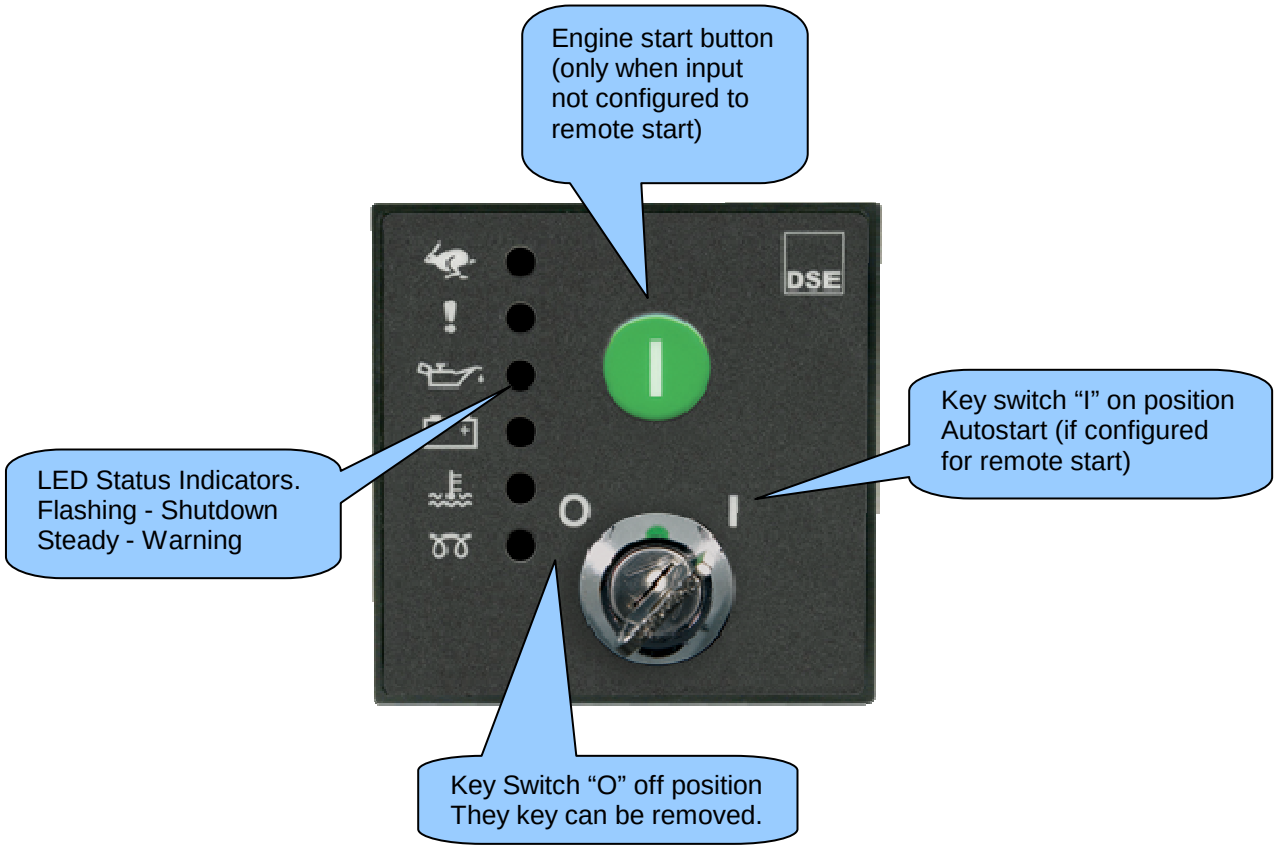
Where neither the battery positive nor battery negative terminals are connected to earth the following points must to be followed

- Follow the typical wiring diagram as normal for all sections EXCEPT the earth points
- All points shown as Earth on the typical wiring diagram should connect to BATTERY NEGATIVE (not earth).

4.4 DESCRIPTION OF CONTROLS

The following section details the function and meaning of the various controls on the controller.

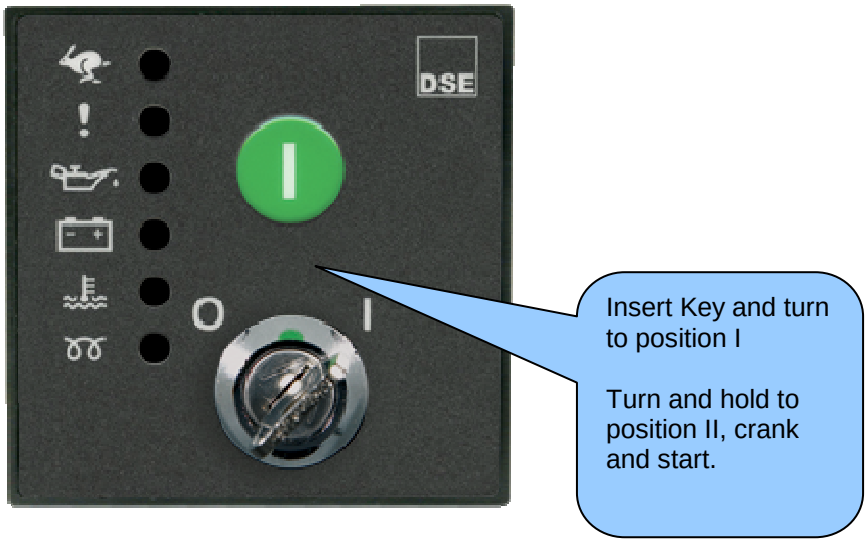
4.4.1 DSE701 MKII KEYSWTICH CONTROLLER



ICON	DESCRIPTION	
	OVERSPEED	The engine speed has risen above the over speed pre alarm setting
	ALARM CONDITION	An external alarm condition has occurred. Example: Fail to Start
	LOW OIL PRESSURE	The controller detects that the engine oil pressure has fallen below the low oil pressure pre-alarm setting level after the *Safety On* timer has expired.
	BATTERY UNDER VOLTAGE / BATTERY OVER VOLTAGE	The auxiliary charge alternator voltage is low as measured from the W/L terminal.
	ENGINE HIGH TEMPERATURE	The controller detects that the engine coolant temperature has exceeded the high engine temperature pre-alarm setting level after the *Safety On* timer has expired.
	PRE HEAT	The led becomes illuminates when the Pre-heat/configurable output is activate.

4.4.2 QUICKSTART GUIDE

This section provides a quick start guide to the controller's operation



4.4.3 CONTROLS

Stop /Reset This key switch position places the module into its Stop/Reset mode. This will clear any alarm conditions for which the triggering criteria have been removed. If the engine is running and the key switch is placed in Stop mode, the module will automatically de-energises the fuel output and the engine comes to a standstill. Should a **remote start signal** be present while operating in this mode, a remote start will not occur.	
Run This key switch position places the module into its RUN MODE. If the module has no input configured for a **remote start signal** this will place the module in the **'Manual'** mode. The pre-heat output will become active for the duration of the set time once placed in this position. If the module has an input configured for **remote start signal** this will place the module in the **'Automatic'** mode. To start the engine the input for **remote start signal** must be activated.	
Start Pressing this button in RUN MODE  with no **remote start signal** configured the engine will start and run.	

NOTE:- For further details, see the section entitled 'OPERATION' elsewhere in this manual.

5 OPERATION

5.1 AUTOMATIC MODE OF OPERATION

NOTE:- The user configurable digital input must be configured to remote start for this mode of operation.

Activate auto mode by turning the key switch to the position.

Auto mode will allow the generator to operate fully automatically, starting and stopping as required with no user intervention.

5.1.1 WAITING IN AUTO MODE

If a starting request is made, the starting sequence will begin.
Starting requests can be from the following sources:

- Activation of an auxiliary input that has been configured to *remote start*

5.1.2 STARTING SEQUENCE

When the auxiliary input configured to *remote start* has been activated, the fuel relay is energised and if configured, the preheat output will become active for the configured time. Once the pre heat has finished the engine will be cranked.

If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the *crank rest* duration after which the next start attempt is made. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated **ALARM CONDITION** LED will start flashing.

When the engine fires, the starter motor is disengaged. Speed detection is factory configured to the customers specification upon ordering but can changed using the DSE Configuration Suite Lite PC Software in conjunction with the DSE813 USB Interface.

Additionally, rising oil pressure can be used to disconnect the starter motor (but cannot detect underspeed or overspeed).

After the starter motor has disengaged, the *Safety On* timer activates, allowing Oil Pressure, High Engine Temperature, Under-speed, Charge Fail and any delayed Auxiliary fault inputs to stabilise without triggering the fault.

5.1.3 ENGINE RUNNING

There is no indication on the module to depicted if the engine is running.

If all start requests are removed, the *stopping sequence* will begin.

5.1.4 STOPPING SEQUENCE

As soon as the auxiliary input configured to *remote start* has been de-activated, the engine will stop instantly.

5.2 MANUAL OPERATION

NOTE:- The user configurable digital input must NOT be configured to remote start for this mode of operation.

Manual mode allows the operator to start and stop the set manually. Manual mode is active when the key switch it turned to the position.

As soon as the key switch is in the position, the Fuel Relay is energised and the Pre Heat Relay if configured will become energised for the configured time.

5.2.1 WAITING IN MANUAL MODE

To begin the starting sequence, press the button, the start sequence begins immediately.

5.2.2 STARTING SEQUENCE

The engine will start to crank.

If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the *crank rest* duration after which the next start attempt is made. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated and the **ALARM CONDITION** LED will start flashing.LED will start flashing.

When the engine fires, the starter motor is disengaged. Speed detection is factory configured to the customers specification upon ordering but can changed using the DSE Configuration Suite Lite PC Software in conjunction with the DSE813 USB Interface.

Additionally, rising oil pressure can be used to disconnect the starter motor (but cannot detect underspeed or overspeed).

After the starter motor has disengaged, the *Safety On* timer activates, allowing Oil Pressure, High Engine Temperature, Under-speed, Charge Fail and any delayed Auxiliary fault inputs to stabilise without triggering the fault.

5.2.3 ENGINE RUNNING

There is no indication on the module to depicted if the engine is running.

If the key switch is turned to the position, the *stopping sequence* will begin.

5.2.4 STOPPING SEQUENCE

As soon as the key switch is turned to the position, the engine will stop instantly.

6 PROTECTIONS

6.1 SHUTDOWN

A flashing LED indicates a shutdown alarm. Shutdowns are critical alarm conditions that stop the engine and draw the operator's attention to an undesirable condition.

Shutdown alarms are latching. The fault must be removed and the key switch turned to the O position to reset the module.

6.2 WARNING

A steady LED indicates a warning alarm. Warnings are non-critical alarm conditions and do not affect the operation of the generator system, they serve to draw the operators attention to an undesirable condition.
Warning alarms are self-resetting when the fault condition is removed.

NOTE:- The alarm condition must be rectified before a reset will take place. If the alarm condition remains, it will not be possible to reset the unit (The exception to this is the Low Oil Pressure alarm and similar 'active from safety on' alarms, as the oil pressure will be low with the engine at rest).

LEDs	Reason
LOW OIL PRESSURE	The engine oil pressure has fallen below the low oil pressure trip setting level after the *Safety On* timer has expired.
ENGINE HIGH TEMPERATURE	The engine coolant temperature has exceeded the high engine temperature trip setting level after the *Safety On* timer has expired.
OVERSPEED	The engine speed has exceeded the pre-set trip
UNDERSPEED	The engine speed has fallen below the pre-set trip after the ***Safety On*** timer has expired.
BATTERY UNDER VOLTAGE / BATTERY OVER VOLTAGE	The DC supply has fallen below or risen above the low/high volts setting level.

7 COMMISSIONING

7.1 PRE-COMMISSIONING

Before the system is started, it is recommended that the following checks are made:-

- The unit is adequately cooled and all the wiring to the controller is of a standard and rating compatible with the system. Check all mechanical parts are fitted correctly and that all electrical connections (including earths) are sound.
- The unit **DC** supply is fused and connected to the battery and that it is of the correct polarity.
- Make all checks on the engine and alternator as detailed by their respective manufacturer documentation.
- Check all other parts in the system according to the manufacturer documentation.
- Thoroughly review the configuration of the DSE controller and check that all parameters meet the requirements of your system.
- +To check the start cycle operation, take appropriate measures to prevent the engine from starting (disable the operation of the fuel solenoid). After a visual inspection to ensure it is safe to proceed, connect the battery supply. Turn the key switch into the position and then press the button and the start sequence will commence.
- The starter will engage and operate for the pre-set crank period. After the starter motor has attempted to start the engine the explanation mark will illuminate.
- Restore the engine to operational status (reconnect the fuel solenoid). Turn the key switch to the position and then to the and press the button. This time the engine will start and the starter motor will disengage automatically. If not then check the engine is fully operational (fuel available, etc.) and the fuel solenoid is operating. The engine will now run up to operating speed. If not, and an alarm is present, check the alarm condition for validity, and check input wiring. The engine will continue to run for an indefinite period.
- Fully commission the engine/alternator and any other parts in the system as detailed in the respective manufacturer documentation. This could includes load bank testing, load acceptance, breaker control and more
- If despite repeated checking of the connections between the **DSE701 MKII** controller and the customer's system, satisfactory operation cannot be achieved, then the customer is requested to contact the factory for further advice on:-

INTERNATIONAL TEL: +44 (0) 1723 890099
INTERNATIONAL FAX: +44 (0) 1723 893303
E-mail: support@deepseaplc.com
Website: www.deepseaplc.com

8 FAULT FINDING

SYMPTOM	POSSIBLE REMEDY
Unit is inoperative Read/Write configuration does not operate	Check the battery and wiring to the unit. Check the DC supply. Check the DC fuse.
Unit shuts down	Check DC supply voltage is not above 35 Volts or below 9 Volts Check the operating temperature is not above 70℃. Check the DC fuse.
Intermittent Magnetic Pick-up sensor fault	Ensure that Magnetic pick-up screen only connects to earth at one end, if connected at both ends, this enables the screen to act as an aerial and will pick up random voltages. Check pickup is correct distance from the flywheel teeth.
Low oil Pressure fault operates after engine has fired	Check engine oil pressure. Check oil pressure switch and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed)
High engine temperature fault operates after engine has fired.	Check engine temperature. Check switch and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) .
Common fault operates	Check relevant switch and wiring of fault indicated by LED. Check configuration of input.
Fail to Start is activated after pre-set number of attempts to start	Check wiring of fuel solenoid. Check fuel. Check battery supply. Check battery supply is present on the Fuel output of the controller. Check the speed-sensing signal is present on the controller's inputs. Refer to engine manual.
Continuous starting of generator when in **RUN**	Check that there is no signal present on the "Remote Start" input. Check configured polarity is correct.
Generator fails to start on receipt of Remote Start signal.	Check signal is on "Remote Start" input. Confirm correct configuration of input Check that the oil pressure switch is indicating low oil pressure to the controller. Depending upon configuration, then set will not start if oil pressure is not low.
Pre-heat inoperative	Check wiring to engine heater plugs. Check battery supply. Check battery supply is present on the Pre-heat output of controller. Check pre-heat configuration is correct.
Starter motor inoperative	Check wiring to starter solenoid. Check battery supply. Check battery supply is present on the Starter output of controller. Ensure that the Emergency Stop input is at Positive. Ensure oil pressure switch or sensor is indicating the "low oil pressure" state to the controller.
Controller appears to 'revert' to an earlier configuration	When editing a configuration using the PC software it is vital that the configuration is first 'read' from the controller before editing it. This edited configuration must then be "written" back to the controller for the changes to take effect.

NOTE:- The above fault finding is provided as a guide check-list only. As the controller is configurable for a range of different features, always refer to the source of your controller configuration if in doubt.

9 MAINTENANCE, SPARES, REPAIR AND SERVICING

The DSE701 MKII controller is *Fit and Forget*. As such, there are no user serviceable parts within the controller. In the case of malfunction, you should contact your original equipment manufacturer (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)

Directive 2002/96/EC
If you use electrical and electronic equipment you must store, collect, treat, recycle and dispose of WEEE separately from your other waste.



11.2 ROHS (RESTRICTION OF HAZARDOUS SUBSTANCES)

Directive 2002/95/EC: 2006
To remove specified hazardous substances (Lead, Mercury, Hexavalent Chromium, Cadmium, PBB & PBDE´s)

Exemption Note: Category 9. (Monitoring & Control Instruments) as defined in Annex 1B of the WEEE directive will be exempt from the RoHS legislation. This was confirmed in the August 2005 UK´s Department of Trade and Industry RoHS REGULATIONS Guide (Para 11).

Despite this exemption, DSE has been carefully removing all non RoHS compliant components from our supply chain and products.
When this is completed, a Lead Free & RoHS compatible manufacturing process will be phased into DSE production.

This process is almost complete and is being phased through different product groups.

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