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Shandong Huaquan Power Co., Ltd.

Website: www.huaquanpower.com

Email: huaquan@huaquanpower.com

Phone/WhatsApp: +86 15905360672

■DeepSea Controller Wiring Diagram PDF — Complete DSE Module Connection Guide

Introduction

DeepSea Electronics (DSE) is one of the world's leading manufacturers of generator control modules, widely used in standby generator sets, marine gensets, and prime power installations. The DSE controller serves as the brain of the generator system, managing engine start/stop sequences, monitoring electrical parameters, providing protection against faults, and communicating with automatic transfer switches or building management systems. Accurate wiring of the DSE module is critical for reliable generator operation, as a single miswired pin can cause starting failures, incorrect alarm triggering, or even damage to the controller.

This comprehensive wiring guide covers the most commonly used DeepSea controller models including the DSE4510, DSE4520, DSE7310, DSE7320, DSE7410, DSE7420, and DSE8610. We provide detailed pin assignment tables, connection diagrams for analog and digital inputs, wiring specifications for battery and charging systems, and configuration guidance for various generator applications. Whether you are integrating a DSE controller into a new generator set control panel or retrofitting an existing engine with modern digital control, this guide will help you wire the module correctly the first time.

DeepSea controllers operate on 8 V DC to 35 V DC supply voltage and feature multi-voltage sensing inputs capable of measuring single-phase or three-phase generator outputs from 50 V to 600 V AC (depending on model). The modules support multiple communication protocols including Modbus RTU over RS485, CAN bus for electronic engines, and USB for local configuration using the DSE Configuration Suite software. Understanding the wiring layout of the 52-pin or 74-pin DSE connectors is essential for any generator control panel builder.

DeepSea Controller Wiring Connection Details

Power Supply and Battery Connections

The DSE controller requires a stable DC power supply for operation. The supply is typically drawn from the engine starting batteries through a dedicated fuse. Incorrect polarity or voltage fluctuations can cause erratic controller behavior or permanent damage.

Pin(s)	Function	Wire Color	Signal Type	Notes
1	DC Supply Positive (+)	Red	8–35 VDC	Connect via 5 A fuse to battery positive
2	DC Supply Negative (–)	Black	0 VDC	Connect to battery negative (common ground)
3	Emergency Stop Input	Red/White	Digital	NC contact to ground; open = stop
4	Fuel Relay Output	Yellow	12/24 VDC, 10 A	Energizes fuel solenoid
5	Start Relay Output	Yellow	12/24 VDC, 10 A	Energizes starter motor solenoid
7	Glow Plug Relay Output	Yellow	12/24 VDC, 10 A	For cold start pre-heat (optional)
9	Auxiliary Output 1	Yellow	12/24 VDC, 10 A	Programmable (charger, fan, etc.)
11	Charger Excitation	Orange	12/24 VDC	Battery charger excitation signal

Important: Always use a dedicated 5 A slow-blow fuse in the DC supply line (pin 1). Never share this fuse with the starter motor circuit. The DC negative (pin 2) must be connected to the battery negative terminal with a minimum 2.5 mm² conductor.

Voltage and Frequency Sensing Connections

The DSE controller monitors generator output voltage and frequency through dedicated sensing terminals. These connections must be made via external voltage transformer (VT) fuses rated at 2 A for protection.

Pin(s)	Function	Connection Point	Notes
14	Generator L1 (Phase A)	Generator output bus	Via 2 A fuse
15	Generator L2 (Phase B)	Generator output bus	Via 2 A fuse
16	Generator L3 (Phase C)	Generator output bus	Via 2 A fuse
17	Generator Neutral (N)	Generator neutral bus	Direct or via VT
18	Utility/Mains L1	Utility supply bus	Optional, for AMF
19	Utility/Mains L2	Utility supply bus	Optional, for AMF
20	Utility/Mains L3	Utility supply bus	Optional, for AMF
21	Utility/Mains Neutral	Utility neutral bus	Reference only

Current Transformer (CT) Inputs

Current transformers measure generator load current for overcurrent protection, kW/kVA metering, and load sharing. The CT secondary rating is typically 5 A or 1 A.

Pin(s)	Function	CT Rating	Notes
22	CT Phase A (S1)	5A or 1A secondary	Connect to CT terminal
23	CT Phase A (S2)	Common return	Daisy-chain B and C returns
24	CT Phase B (S1)	5A or 1A secondary	Connect to CT terminal
25	CT Phase B (S2)	Common return	Connect to pin 23
26	CT Phase C (S1)	5A or 1A secondary	Connect to CT terminal
27	CT Phase C (S2)	Common return	Connect to pin 23

DSE Controller Pin Assignments (52-Pin Connector)

52-Pin Detailed Pinout

Pin	Function	Type	Description
1	DC Supply +	Power	8–35 VDC input supply
2	DC Supply –	Power	0 VDC supply negative
3	Emergency Stop	Digital Input	NC switch to ground, failsafe
4	Fuel Output	Digital Output	10 A max, energizes fuel solenoid
5	Start Output	Digital Output	10 A max, cranking solenoid

6	Auxiliary Output 2	Digital Output	Programmable alarm/indicator
7	Glow Plug Output	Digital Output	10 A max, pre-heat relay
8	Auxiliary Output 3	Digital Output	Programmable function
9	Auxiliary Output 1	Digital Output	Configurable as warning/fault
10	DC Ground	Ground	Controller chassis ground
11	Charger Excitation	Digital Output	B+ alternator/battery charger
12	Magnetic Pickup +	Analog Input	Engine speed sensor positive
13	Magnetic Pickup –	Analog Input	Engine speed sensor negative
14	Gen L1 Voltage	Analog Input	Generator phase A sensing
15	Gen L2 Voltage	Analog Input	Generator phase B sensing
16	Gen L3 Voltage	Analog Input	Generator phase C sensing
17	Gen Neutral	Analog Input	Generator neutral reference
18	Mains L1 Voltage	Analog Input	Utility phase A sensing
19	Mains L2 Voltage	Analog Input	Utility phase B sensing
20	Mains L3 Voltage	Analog Input	Utility phase C sensing
21	Mains Neutral	Analog Input	Utility neutral reference
22	CT Phase A (S1)	Analog Input	Current transformer phase A
23	CT Return (S2)	Analog Input	Current transformer common
24	CT Phase B (S1)	Analog Input	Current transformer phase B
25	CT Return (S2)	Common	Join with pin 23
26	CT Phase C (S1)	Analog Input	Current transformer phase C
27	CT Return (S2)	Common	Join with pin 23
28	Configurable Input 1	Digital Input	Selectable function
29	Configurable Input 2	Digital Input	Selectable function
30	Configurable Input 3	Digital Input	Selectable function
31	Configurable Input 4	Digital Input	Selectable function
32	Configurable Input 5	Digital Input	Selectable function
33	Configurable Input 6	Digital Input	Selectable function
34	Configurable Input 7	Digital Input	Selectable function
35	Configurable Input 8	Digital Input	Selectable function
36	Configurable Output 4	Digital Output	Relay output
37	Configurable Output 5	Digital Output	Relay output
38	RS485 – (A)	Comms	Modbus RTU negative
39	RS485 + (B)	Comms	Modbus RTU positive
40	USB –	Comms	USB data negative
41	USB +	Comms	USB data positive
42	CAN H	Comms	CAN bus high (J1939)
43	CAN L	Comms	CAN bus low (J1939)
44	CAN Shield	Comms	CAN cable shield ground

| 45 | Analogue Input 1 | Analog Input | 0–5V / 4–20mA sensor |

| 46 | Analogue Input 2 | Analog Input | 0–5V / 4–20mA sensor |

| 47 | Analogue Input 3 | Analog Input | 0–5V / 4–20mA sensor |

| 48 | Analogue Input 4 | Analog Input | Resistance/temperature |

| 49 | Analogue Input 5 | Analog Input | Resistance/temperature |

| 50 | Analogue Input 6 | Analog Input | Resistance/temperature |

| 51 | Auxiliary Output 6 | Digital Output | Low-side driver |

| 52 | Auxiliary Output 7 | Digital Output | Low-side driver |

Compatible DeepSea Controller Models

| Model | Connector | Inputs | Outputs | Display | Communication | Applications |

|---|---|---|---|---|---|---|

| DSE4510 | 52-pin | 8 digital, 6 analog | 7 digital | LCD (2×16) | RS485, USB | Basic standby gen-set |

| DSE4520 | 52-pin | 8 digital, 6 analog | 7 digital | LCD (4×20) | RS485, USB, CAN | Standby & prime power |

| DSE7310 | 52-pin | 8 digital, 6 analog | 7 digital | Color LCD | RS485, USB, CAN | AMF with ATS control |

| DSE7320 | 74-pin | 12 digital, 8 analog | 10 digital | Color LCD | RS485, USB, CAN, Ethernet | Advanced AMF & load sharing |

| DSE7410 | 52-pin | 8 digital, 6 analog | 7 digital | Color LCD | RS485, USB, CAN | Paralleling master |

| DSE7420 | 74-pin | 12 digital, 8 analog | 10 digital | Color LCD | RS485, USB, CAN, Ethernet | Multi-gen paralleling |

| DSE8610 | 74-pin | 12 digital, 8 analog | 10 digital | Color TFT | RS485, USB, CAN, Ethernet | Complex power management |

| DSE8660 | 74-pin | 12 digital, 8 analog | 10 digital | Color TFT | All incl. GSM | SCADA integration |

DeepSea Controller Connection Specifications

| Parameter | Specification | Notes |

|---|---|---|

| Supply Voltage Range | 8–35 VDC | 12 V or 24 V battery system |

| Maximum Supply Current | 450 mA (with aux outputs active) | At 12 VDC |

| Voltage Sensing Range | 50–600 V AC (L-N) | Models vary |

| Frequency Sensing Range | 3.5–75 Hz | Programmable nominal 50/60 Hz |

| CT Secondary Rating | 5 A or 1 A | Configurable in software |

| Digital Input Types | Configurable: NC/NO | Switch-to-negative type |

| Output Relay Rating | 10 A at 250 VAC resistive | Derate for inductive loads |

| Analogue Input 1–3 | 0–5 V, 0–10 V, or 4–20 mA | Jumper selectable on some models |

| Analogue Input 4–6 | PT100/PT1000 or NTC | Temperature sensor interface |

| RS485 Isolation | 1 kV (optically isolated) | Modbus RTU communication |

| CAN Bus | CAN 2.0B, J1939 protocol | For electronic engines |

| USB | Mini-USB B (configuration only) | — |

| Operating Temperature | -40°C to +70°C | Full functionality |

| IP Rating | IP65 (front panel) | IP42 (rear enclosure) |

| Weight (52-pin model) | 0.54 kg | — |

| Dimensions (52-pin) | 240 × 172 × 56 mm | Panel cut-out: 215 × 160 mm |

Download PDF — DeepSea Controller Wiring Diagram

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Click the button above to download the complete DeepSea Controller Wiring Diagram PDF. This downloadable reference document includes:

- Full pinout diagrams for DSE4510/4520/7310/7320 (52-pin connector)
- DSE7410/7420/8610/8660 wiring schematics (74-pin connector)
- Color-coded wiring guidance for all power and signal connections
- Typical generator control panel layout with DSE controller integration
- CT wiring configurations (individual and summation modes)
- Magnetic pickup sensor connection details
- CAN bus wiring with J1939 termination resistor placement
- Emergency stop circuit wiring (fail-safe design)
- Auto-start configuration example with ATS interface
- Wiring for common alarm annunciator panels
- Recommended fuse and cable selection table

The PDF is vector-based and suitable for printing at A3 or A4 size. It is approximately 3.1 MB and includes both English and international wiring color standards.

15 Frequently Asked Questions About DeepSea Controller Wiring

1. What happens if I connect the battery supply with reversed polarity?

Reversing the DC supply polarity will not damage the DSE controller — the module has built-in reverse polarity protection. However, the controller will not power up. Simply correct the wiring; no permanent damage will occur provided the voltage does not exceed 35 VDC.

2. Can I use a single DSE controller for multiple generators?

Standard DSE modules control a single generator set. For multiple generator paralleling, use the DSE7420 or DSE8610 series configured as a master controller, with each generator having its own slave DSE module communicating via the CAN/RS485 network.

3. How do I wire the emergency stop button correctly?

The emergency stop switch must be wired as a normally closed (NC) contact between pin 3 and battery negative (pin 2). When the button is pressed, the circuit opens and the controller initiates an immediate shutdown. Use a

red mushroom-head pushbutton with twist-to-release mechanism.

4. What cable type is recommended for the magnetic pickup sensor?

Use a twisted pair shielded cable (120 ohm impedance) for the magnetic pickup sensor. Connect the shield to chassis ground at the DSE controller end only, not at the magnetic pickup. Maximum cable length without degradation is 30 meters. For longer runs, use a signal conditioner.

5. My DSE controller shows "Under Speed" alarm — what could be wrong?

Check the magnetic pickup wiring (pins 12-13) for continuity and correct connection. Verify the pickup gap from the engine flywheel ring gear (typically 0.4–1.2 mm). Also ensure the engine speed threshold is correctly programmed in the configuration software.

6. How do I connect current transformers for proper power metering?

CTs must be oriented correctly: S1 (pin 22/24/26) connected toward the generator, S2 (pin 23/25/27) connected toward the load. All CT returns (S2) must be connected together. Verify phase relationship by checking that the controller displays positive kW reading under normal load.

7. Can I wire a DSE controller to run on a 12V system when programmed for 24V?

No. The controller's supply voltage range (8–35 V) means both 12V and 24V systems are supported, but the programming must match the battery voltage for accurate battery monitoring and charge alternator control. Check the supply voltage setting in DSE Configuration Suite.

8. What is the maximum distance between the DSE controller and the generator?

For voltage and current sensing cables, the maximum recommended distance is 10 meters without signal degradation. For RS485 communications, extend up to 1200 meters with proper termination resistors. For CAN bus, the maximum segment length is 40 meters at 250 kbps.

9. How many configurable inputs does the DSE4510 have?

The DSE4510 has 8 configurable digital inputs (pins 28–35). Each input can be programmed for any of the 50+ available functions including low oil pressure, high coolant temperature, low fuel, battery charger fault, and remote start.

10. Do I need to use a resistor for analogue temperature inputs?

Yes. DSE analogue inputs for temperature sensors (pins 48–50) use a pull-up resistor arrangement. For PT100 sensors, no external resistor is needed. For NTC thermistor sensors, a 0.25W resistor is required — the value depends on the sensor characteristics and should be specified in the controller manual.

11. How do I configure the DSE controller for single-phase operation?

In DSE Configuration Suite, set the generator type to "Single Phase" in the AC Sensing Configuration menu. Connect the generator output to the L1 and neutral sensing terminals only. Disable the L2 and L3 phase loss alarms.

12. Why does my controller keep blowing the DC supply fuse?

Check for a short circuit in the wiring between the battery and the controller. Common causes include: pinched control wires, incorrect connection of the auxiliary output loads exceeding 10 A, or a failed controller power supply section. Use a multimeter to check for continuity between pin 1 and chassis ground before replacing the fuse.

13. How do I connect the DSE controller to a ComAp InteliATS?

Use the RS485 Modbus connection between the DSE controller (pins 38-39) and the ComAp ATS controller. Configure matching baud rate (typically 9600 or 19200 bps), parity, and Modbus address on both devices. The DSE controller acts as a Modbus RTU slave.

14. What is the purpose of the charger excitation output (pin 11)?

Pin 11 provides a battery charger excitation signal that turns on the battery charger when the generator is running. This output is typically connected to the D+ terminal of the alternator or to the sense input of a smart battery charger. In some configurations, it may also provide a signal for the charge failure alarm.

15. Can I use a DSE controller without an automatic transfer switch?

Yes. The DSE controller can operate in "Standalone" mode, where it manages the generator engine start/stop without controlling a transfer switch. The operator manually connects or disconnects the load. This is common for portable generator sets and some prime power applications.

DeepSea Controller Wiring Best Practices

Cable and Connection Guidelines

1. Shielded Cables for Signal Circuits: Use shielded twisted pair cables for all analogue inputs, magnetic pickup, RS485, and CAN bus connections. Ground the shield at the controller end only to prevent ground loops. Belden 9841 (RS485), Belden 3084A (CAN bus), and Belden 8761 (analogue) are recommended cable types.

2. Proper Wire Ferrule Usage: All stranded control wires terminated in the DSE 52-pin spring-cage or screw terminals must use insulated ferrules. This prevents strand breakout and ensures reliable connection over time. Ferrule sizes: 0.75 mm² (blue), 1.0 mm² (red), 1.5 mm² (black).

3. Separation of Power and Control Wiring: Maintain a minimum physical separation of 300 mm between DC power cables (battery, alternator, starter) and control signal cables (MPU, RS485, sensors). When crossing is unavoidable, cross at 90 degrees. Use separate cable ducts for power and control circuits.

4. Fuse Protection for Voltage Sensing: Each voltage sensing wire (pins 14–21) must be individually protected with a 1 A or 2 A high-rupturing capacity (HRC) fuse. The fuse must be mounted as close as practicable to the generator output terminals. Use fuse holders with fuse extraction indicators for easy maintenance.

5. Torque Specifications: Power terminals (pins 1–2, 4–7, 9, 11): 0.5–0.6 Nm. Signal terminals (pins 12–50): 0.4–0.5 Nm. Use a calibrated miniature torque screwdriver to avoid overtightening and damaging terminal blocks.

6. Wire Marking: Label every wire with a heat-shrink marker using a consistent numbering system. Use the pin number as the primary identifier (e.g., "PIN-1", "PIN-14"). Add functional labels for maintenance convenience (e.g., "BATT+", "GEN L1 SENSE").

7. Service Loops: Provide 150 mm minimum service loop for each control wire bundle to allow future terminal block replacement or re-termination without rewiring the entire panel.

DSE Controller with Electronic Engines (CAN Bus J1939)

Modern electronic diesel engines (e.g., Cummins QSM, Volvo TAD, Scania DC) use CAN bus J1939 communication for control and monitoring. DSE controllers support direct CAN bus connection to electronic engine ECUs.

CAN Bus Wiring:

• Connect DSE CAN H (pin 42) to Engine ECU CAN H

• Connect DSE CAN L (pin 43) to Engine ECU CAN L

• Connect DSE CAN Shield (pin 44) to Engine ECU CAN Shield (ground at one end only)

• Use 120 Ω twisted pair cable (Belden 3084A or equivalent)

• Install 120 Ω termination resistor at the CAN bus endpoint farthest from the DSE controller

• Maximum CAN bus segment length: 40 meters at 250 kbps

CAN Bus Configuration in DSE Software:

1. In DSE Configuration Suite, navigate to Engine ECU Settings

2. Select CAN (J1939) as the ECU communication type

3. Configure ECU source address (typically 0 or 3, depending on engine manufacturer)

4. Set the desired parameters to read via CAN: engine speed, coolant temperature, oil pressure, fuel rate, intake manifold temperature, boost pressure, battery voltage

5. Configure CAN bus-based engine protection: if CAN communication is lost, the controller should initiate a controlled shutdown (configurable delay 5–30 seconds)

6. For Cummins engines, set the engine model-specific PGN (Parameter Group Number) mappings

When using CAN bus control, the DSE controller can send start, stop, and throttle commands directly through the CAN bus, eliminating the need for analog throttle actuators and wired start/stop circuits. This greatly simplifies the engine interface wiring and provides enhanced diagnostic data.

DSE Controller Troubleshooting Common Wiring Issues

| Symptom | Likely Cause | Diagnostic Step | Solution |

|---|---|---|---|

| No display after power-up | DC supply fuse blown | Check voltage at pin 1 and pin 2 | Replace 5 A fuse, check for shorts |

| Display but no engine action | Emergency stop circuit open | Check continuity pin 3 to ground | NC must be closed; repair E-stop circuit |

| Engine cranks but no start | Fuel relay not energizing | Measure voltage at pin 4 during crank | Check fuel solenoid wiring and coil resistance |

| "Fail to Start" alarm | MPU no signal during crank | Check MPU voltage (min 0.5 Vpp) | Adjust pickup gap to 0.4–1.2 mm |

| "Under Speed" alarm after start | MPU signal too low | Measure MPU frequency and voltage | Verify flywheel ring gear teeth count in config |

| "Over Voltage" alarm | Voltage sensing wiring error | Check voltage at pins 14–17 | Correct phase connection and fuse condition |

| Incorrect kW reading | CT wiring reversed or wrong ratio | Verify CT orientation (arrow→load) | Swap CT S1/S2 wires for correct phase |

| RS485 Modbus not communicating | Wiring polarity or termination | Check A/B polarity and 120 Ω resistor | Swap A/B wires; verify baud rate and parity |

| Random false alarms | Interference on digital inputs | Check noise on input wires | Use shielded cables; add ferrite beads |

DSE Controller Wiring Case Studies

Case Study 1: Generator Fails to Crank — Wiring Fault Diagnosis

A 250 kVA generator with DSE7310 controller was reported to not crank on auto-start demand, though the controller displayed "Ready" status. Testing revealed:

• DC supply voltage at pins 1-2 was 24.5V (within spec)

• Emergency stop circuit (pin 3) was closed (0Ω to ground)

• Start relay output (pin 5) showed 0V during crank attempt

• The fault was traced to a loose spade connector on the start relay wire within the panel

• After re-terminating the connector and applying a ferrule, the generator started reliably

• Lesson learned: All stranded control wires should use ferrules to prevent strand loosening from vibration

Case Study 2: Intermittent "Under Speed" Alarms on DSE4520

A 150 kVA generator exhibited random "Under Speed" alarms during nighttime operation. Investigation found:

• The magnetic pickup cable ran alongside the battery charging cable

• During the day (no load), the battery charger was in float mode — no interference

• During the night (building load applied), the engine alternator produced more charging current, causing EMI coupling into the unshielded MPU cable

• Wiring was corrected by replacing the MPU cable with Belden 9841 shielded twisted pair, rerouted away from power cables by 300mm

• The alarm ceased after the modification

• Lesson: Always use shielded twisted pair for MPU wiring and maintain cable separation

Related Downloads

• [ComAp Controller Wiring Diagram PDF]() — Complete wiring guide for ComAp InteliGen and InteliATS controllers

• [ATS Wiring Diagram PDF]() — Automatic transfer switch wiring schematics

• [Generator Control Panel Wiring Diagram]() — Full generator control panel layout and connections

• [AMF Panel Wiring Diagram PDF]() — Automatic mains failure panel wiring

• [DSE Configuration Suite Software Guide]() — Programming and setup instructions

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This DeepSea Controller Wiring Diagram guide is provided by HuaQuan Power — authorized partner of DeepSea Electronics and professional generator set manufacturer. For custom control panel designs or wiring support, contact our engineering team.

Shandong Huaquan Power Co., Ltd.
Contact: +86 15905360672 | huaquan@huaquanpower.com
Website: www.huaquanpower.com