



Features

- 150-650Vdc input voltage range
- 20-30V output voltage range
- Up to 60W output power
- High temperature 177°C
- 900V transient survival
- Compact and rugged aluminium housing
- CANbus interface
- SW configurable CANbus termination
- High shock and vibration resistance



Product Description

The **NSE HT-DCDC-LP2** family is a rugged, high performance, DC/DC converter targeted downhole wireline applications and other high voltage DC transmission systems. The unit supports input voltage up to 650V. It is also very well suited for other industrial and automotive applications.

To operate reliably at high temperature, the converter has been designed to have extremely high efficiency to reduce the loss to a minimum. Typically the unit achieves above 90% efficiency at full load over the entire temperature range.

The **NSE HT-DCDC-LP2** is equipped with output short circuit protection that will protect the converter from failing even if the output is directly short circuited.

The PCB layout is designed with ruggedness in mind. A CNC machined aluminium chassis provides maximum mechanical support to allow the board to operate in an environment where very high shock and vibration may occur. The board is equipped with rugged high-temperature connectors.

STP (3D) file is available on request and custom housings can be designed if required.

**Consult NSE for other output voltage versions*

1 Product Specification

Parameter	Conditions / Comments	Min	Typ	Max	Unit
Supply voltage					
Input High Voltage	Operational	150		650	Vdc
Overvoltage trigger	Exceeding this voltage will enable overvoltage protection		700		Vdc
Output voltage					
Output Voltage		20		30	Vdc
Output Current	@177°C			2.0	Adc
Output Power	@177°C @20V output @30V output			40 60	W W
Output Ripple	Typical value @full load, 177°C, 650V		15		mV RMS
Step Load regulation	Typical values @full load @Load step ON-OFF or OFF-ON			+/- 0.6	V
Galvanic isolation	No				
Efficiency					
Converter efficiency	@25°C and full load	90			%
Capacitive load					
Max. capacitive load				1000	uF
Protection features					
Reverse Polarity Protection			NO		
Overvoltage protection	Survival max 1 sec pulse @ 900V		YES		
Short Circuit Protection			YES		
Thermal shutdown			NO		
CAN Bus Interface					
Baud rate	Default: 125kbit/s Option: 83.3, 125, 250, 500kbit/s	83.3	125	500	kbits/s
CANBus termination (136 Ohm differential)	Termination resistor configurable from menu		YES		
Temperature Sensor					
Sensor range		0		190	°C
Accuracy		+/- 3			°C
OPERATIONAL LIFETIME					
Expected Lifetime	< 125°C Ambient Temperature	2000			Hours
	125 – 150°C (4 x acc. Factor)	500			Hours
	150- 177°C (8 x acc. Factor)	250			Hours

ENVIRONMENTAL AND THERMAL				
<i>Ambient temperature</i>	<i>Min and Max temperature on the surface of the outer housing</i>	-20	177	°C
<i>Thermal Resistance</i>	<i>Surface of OUTER HOUSING to NSE UNIT. Refer to the Section "Thermal properties" for further definition</i>		0.1	°C/W

1.1 Thermal properties

The NSE-5002-24 DCDC is designed to operate in environments with temperatures up to 177°C.

In a typical assembly, the **NSE UNIT** is mounted to a **MOUNTING PROFILE** that is located inside an **OUTER HOUSING**.

The **OUTER HOUSING** surface temperature should not rise above the specified maximum ambient temperature, and the mechanical design and interface between the **OUTER HOUSING, MOUNTING PROFILE** and the **NSE UNIT** should be such that the thermal resistance specification is achieved.



1.2 Conformal Coating

This product is delivered without conformal coating.



1.3 Environmental requirements

NSE boards must be installed in dry air at atmospheric pressure (1atm). Avoid humid atmosphere or under / overpressure. Refer to general NSE installation guidelines for more information.

2 Connections

2.1 Input

DCDC Connector: **Harwin M80-5000000M5-02-333-00-000 2 pin connector.**
 Mating connector: **Harwin M80-4000000F1-02-325-00-000**
 NSE connector kit: **NSE-5002-03-CON**

Pin	Signal name	Description / Function	NSE Connector kit wire type	NSE Connector kit wire color
A	GND	GROUND	120cm 20AWG 600V	BLACK 
B	HV in	HV Input Voltage	120cm 20AWG 600V	RED 

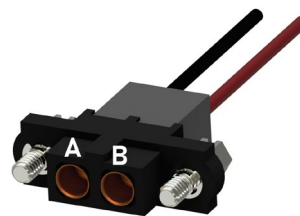
DCDC connector

(Note – the guide slot is facing down)









Mating cable connector

(NOTE - the guide slot is facing up)



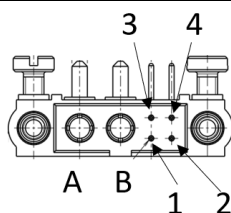
2.2 Output

DCDC Connector: **Harwin M80-5L10405M5-02-333-00-000 - 6 pin connector**
 Mating connector: **Harwin M80-4C10405F1-02-325-00-000**
 NSE connector kit: **NSE-5002-03-CON**

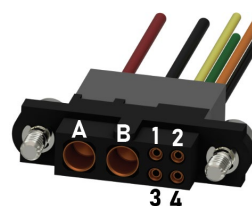
Pin	Signal name	Description / Function	NSE Connector kit wire type	NSE Connector kit wire color
A	Vmain	Main output voltage	120cm 20AWG 600V	RED 
B	GND	Ground	120cm 20AWG 600V	BLACK 
1	CAN H	CAN High	120cm 26AWG 600V	YELLOW 
2	N.C	Not Connected	120cm 26AWG 600V	ORANGE 
3	CAN L	CAN Low	120cm 26AWG 600V	GREEN 
4	N.C	Not Connected	120cm 26AWG 600V	BLACK 

DCDC connector

(Note – the guide slot is facing down)



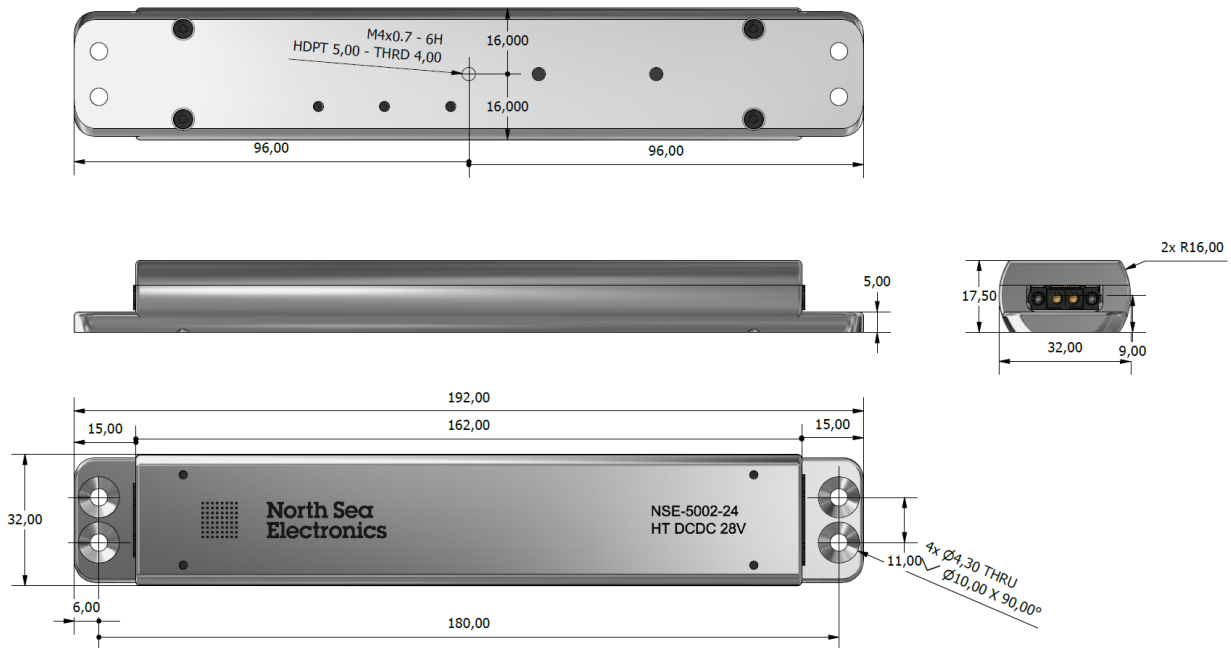
Mating cable connector



3 Features

Feature	Description
Output voltage	<p>The unit has a fixed regulated output voltage, nominally set to 28Vdc. The unit can be delivered with other output voltage settings.</p> <p>Consult NSE for non-standard output voltage.</p>
Over Voltage Protection	<p>The over-voltage protection will activate if the input voltage goes above the threshold voltage of the over-voltage circuit. When the over voltage is activated the circuit will cut off the power to the board and thereby shut it down.</p> <p>When the board has been shut down by the over-voltage circuit, the input voltage has to decrease into the valid operational voltage range before the unit will attempt restart.</p> <p>After re-start the unit will resume normal operation.</p>
Output Short Circuit Protection	<p>The unit is protected against overload and short circuits with a current limiting feature and a short circuit detect.</p> <p>If the current rises above the current triggering limit, the converter will turn off its output switch in order to protect its circuitry.</p> <p>If a short circuit is detected (output voltage drop below the short circuit triggering level) the output switch will be turned off.</p> <p>In both cases (current protection and short circuit detection), the unit will try to restart and resume to normal operation when the short circuit or overload is removed.</p>
Voltage and current sensing	<p>The unit monitors:</p> <ul style="list-style-type: none"> • Input voltage • Output voltage • Output current
Temperature sensing	<p>There is one embedded temperature sensor on the PCB. The internal temperature of the unit can be read out through the CAN communication interface.</p>
Bootloader	<p>The NSE-5002-24 DCDC can be firmware upgraded through its CANbus interface using the NSE bootloader software. Bootloader is activated during startup when a low voltage, typically 50Vdc is applied on the input terminals.</p> <p>Consult NSE for further information.</p>
Graphical User Interface	<p>The “NSE Node Manager” software (graphical user interface) is a free of charge software that can be used to monitor the DC/DC. This software uses the standard NSE protocol to communicate with the controller and allows the user to set up and run the system in short time.</p>

4 Mechanical Dimensions



Consult NSE for STEP files.

5 Datasheet Revision History

REV	DATE	DESCRIPTION	PREP	APPR
A	12.06.2022	Initial release	RFY	GLK
B	10.05.2023	Updated – Product code update	TKK	GLK
C	11.05.2023	Updated – Added info on galvanic isolation	TKK	GLK

6 Product Code

Product code:		NSE-5002-24	-XXV	-A
Category	= NSE DC/DC converters			
Model	20-30V	= Output voltage		
Option	A	= Standard version		

7 Where to buy

Email: sales@nse.no
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