



**North Sea
Electronics**

Product Specification

Product:

200V Stepper Motor Controller

NSE 5001-04

REVISION HISTORY

REV	DATE	DESCRIPTION	PREP	CHECK	APPR	COMPANY
00	16.08.2012	Initial Release	EEN	RFY		NSE
01	30.10.2013	Minor revisions	BCM			NSE
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03						
04						

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NSE-500104-001

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1 Purpose of Document

This document describes the system specifications for the 200V Stepper Driver

2 Abbreviations

Mar-In	Marin-Innovasjon AS
NSE	North Sea Electronics
BLDC	BrushLess Direct Current
PWM	Pulse Width Modulation
bps	Bit Per Second
RPM	Revolutions Per Minute
CRC	Cyclic Redundancy Check

3 System Specifications

Parameter	Conditions / Comments	Min	Typ	Max	Unit
Supply voltage <i>Input Voltage driver</i> <i>Input Voltage gate-driver</i> <i>Input Voltage logic</i>		50 20 3.2	140 24 3.3	200 36 3.5	Vdc Vdc Vdc
Stepper Driver <i>Drive mode</i> <i>Maximum speed</i> <i>Maximum motor speed</i> <i>Motor Current</i> <i>Acceleration</i>	(200step/rev motor)		Sinusoidal	10.000 3.000 7.5 10.000	Steps/sec RPM Arms Steps/sec ²
CAN port <i>Baud rate</i>			83.3 / 125		kbits/s
Environment <i>Op. Temperature Range**</i> <i>Op. Pressure Range***</i>		-20		177 T.B.D	°C psi
Physical board dimension: <i>Height</i> <i>Width</i> <i>Length</i> <i>Mount holes</i>	<i>Excluding Connector</i>		17 55 145 6xM3		mm mm mm

* *Optional – Not implemented in current firmware*

** *Consult NSE for mounting guidance.*

*** *Consult NSE for pressure ratings on this board.*

3.1 Sensors, Connectors and Communication Interface

On board sensor:	2 temperature sensor (ambient and driver stage) 1 off – Supply current measurement 1 off – Driver voltage measurement 1 motor current sensor (One for each driver stage)
Motor temperature sensor:	KTC Thermocouple Amplifier
Communication interface:	CAN bus, Mar-In Protocol
Input Connector:	Glenair MIL-DTL-83513/10-B01NW
Motor Connections:	Flying Leads

4 Functional Description

4.1 Block Diagram

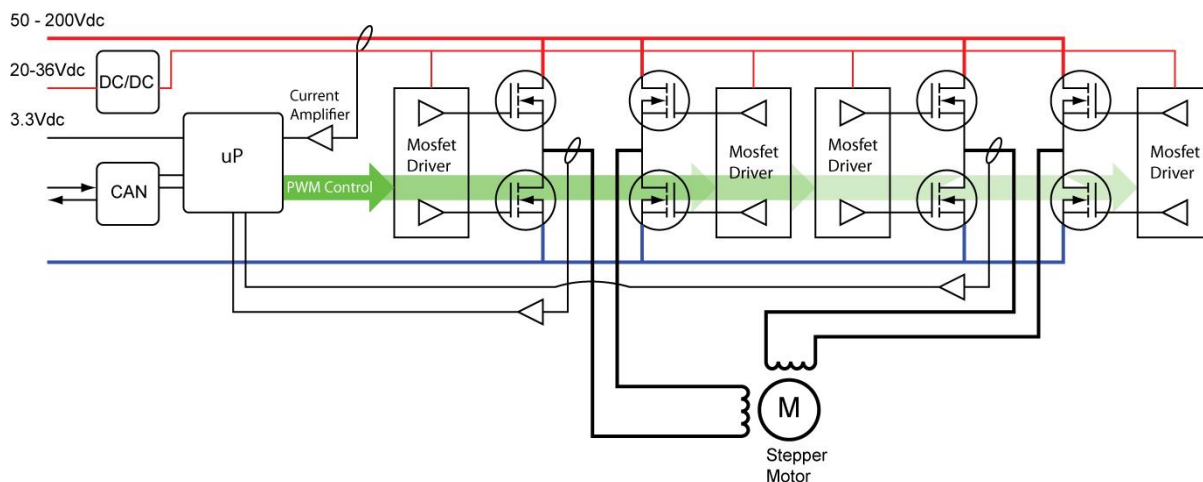


Figure 1 Block Diagram

4.2 Stepper Motor Driver Stage

The Stepper Motor Driver Stage is a current-controlled, sinusoidal driver for two-phase stepper motors. Sinusoidal motor currents are produced, using current feedback and hysteric control. The output bridges use an adaptive control strategy of fast and slow decay modes to provide good performance while improving efficiency.

At higher speeds the resolution of the output currents is reduced, to reduce processing overhead, and "full step" equivalent operation is reached at 5000 steps/sec (1500rpm). Positioning control via the CAN interface is limited to full motor steps, while the positioning speed, acceleration, and deceleration can be set.

Fault parameters may be set to required levels, or disabled, via the CAN interface.

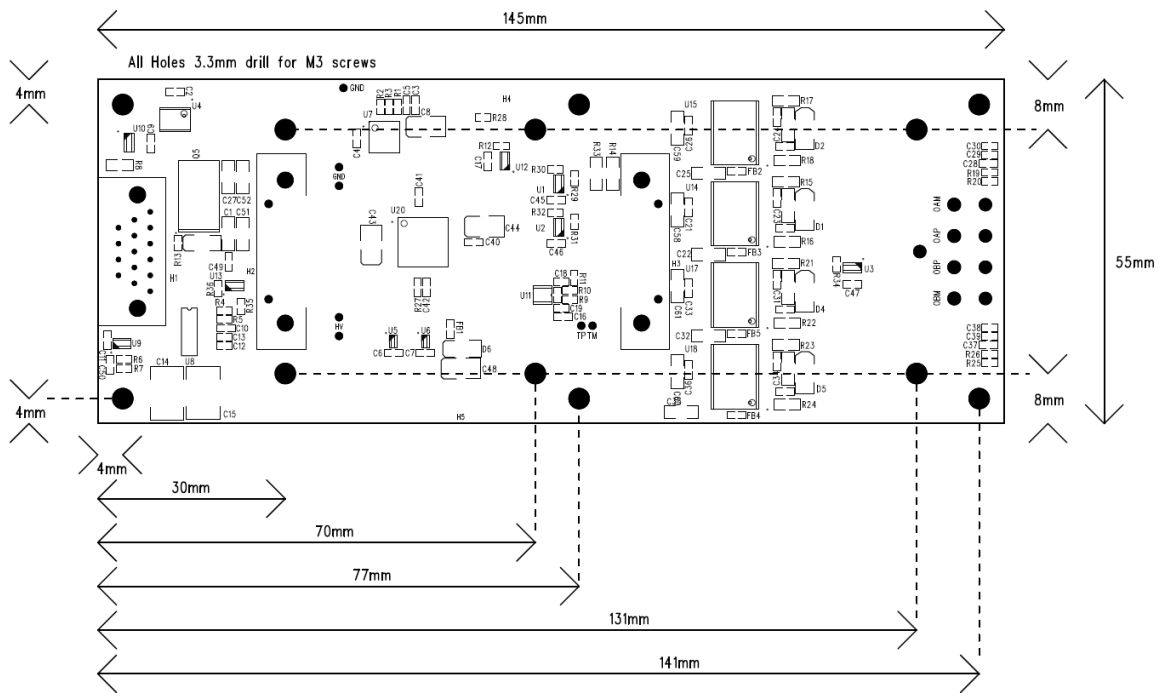
4.2.1 Stepper Motor Control Parameters

Stepper Motor Control Parameters	Range
Motor speed	0 – 10.000 steps / sec
Motor Current	0 – 7.5A
Acceleration	0 – 10.000steps/sec ²
Motor Start	
Motor Position	32bit signed position Absolute or relative
Fault condition levels	Defined fault conditions

4.2.2 Stepper Motor Feedback Parameters:

Stepper Motor Feedback Parameters	Range
Motor speed	0 – 10.000 steps/sec
Supply Current	0 – 7.5A
Motor Position	32bit signed integer step position, Absolute
Alarm State	Over-temperature (motor or driver) Over-current
Running / position State	Running or in position feedback (1 bit)

5 Mechanical



The 6 holes that are 8 mm from board edge in y-direction are for mounting the capacitor board.