

NM-251D-VV

Speed over Ground Converter

User Guide

V1.00



Introduction

The NM-251D-VV is a member of the NM-251 Series family and is programmed to function as a speed over ground converter.

It converts the speed over ground data received from the GPS to the \$VWVHW format.

Operation

The NM-251D-VV acquires the NMEA-0183 strings from the Ina port provided that they follow the 4.800/8/n/1 serial format. The NM-251D-VV will detect if the input string is the \$GPVTG or \$GPRMC, it will extract the speed over ground data value and will create and output to all five ports and the RS232 the \$VWVHW completed string:

\$VWVHW,,T,,M,x.x,N,y.y,K*CS

Where:

x.x: Speed in Knots

y.y: Speed in Km

The selection of the input string to be processed (\$GPVTG and/or \$GPRMC) is selected with the configuration of the SW-1 and SW-2 in the dip switch array as shown in the table 2 below.

The NM-251D-VV can relay or filter out all input NMEA-0183 strings with the configuration of the SW-3 and SW-4 in the dip switch array as shown in table 2 below.

Input Ports (listeners)

The NM-251D-VV uses one of the two input ports. The input port Inb is not available at the NM-251D-VV custom interface and should not be connected. The listener port Ina is optically isolated as specified in NMEA-0183 protocol, thus data(-) pole should never be connected to NM-251D-VV ground. If the instrument's talker port is single ended, connect that terminal to the Ina(+) input and tie the Ina(-) to instrument's ground. If an RS-232 level signal is connected, the ground pole (GND) should be connected to Ina(+) and the data pole (TXD) to Ina(-) respectively. The listener port Ina can acquire NMEA sentences carried in TTL, RS-232 and RS-485/422 signal levels.

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Output Ports (Talkers)

Each of the four general purpose talker ports can output NMEA sentences in both RS422 and TTL signal levels, depending on the connection topology chosen (see figure 1, 2 and 3), and can fan out one instrument. Current drawn from all port can be up to 40mA (maximum rating 60mA @ 24VDC power supply) simultaneously, efficient enough to drive any NMEA compatible instrument.

The RS-232 port can deliver NMEA sentences to any modern computer running the appropriate software on Windows 98 and above. The RS-232 port is not optically isolated and should be used for testing purposes only to avoid DC leakage. It can be used though to interface a computer system if proper isolation is achieved or if the computer is supplied from an isolated power source.

The Out5 port has two functionality modes that can be selected via jumper J6 located inside NM-251D-VV (see figure 4). By shorting poles 1-2 on J6, the Out5 converts signals received from computer to RS-422 signal level. This functionality is independent from the rest of the NM-251D-VV circuits. By shorting poles 1-3 on J6, Out5 is configured as a fifth output of the NM-251D-VV. Further details on how to configure the functions of the NM-251D-HDT are shown on table 1.

The NM-251D-VV can be connected as shown in figures 1,2 and 3 using all RS-422 outputs (figure 1), all TTL outputs (figure 2) or using either the RS-422 or TTL output of each port taking care not to connect the same port for both signal level outputting (figure 3).

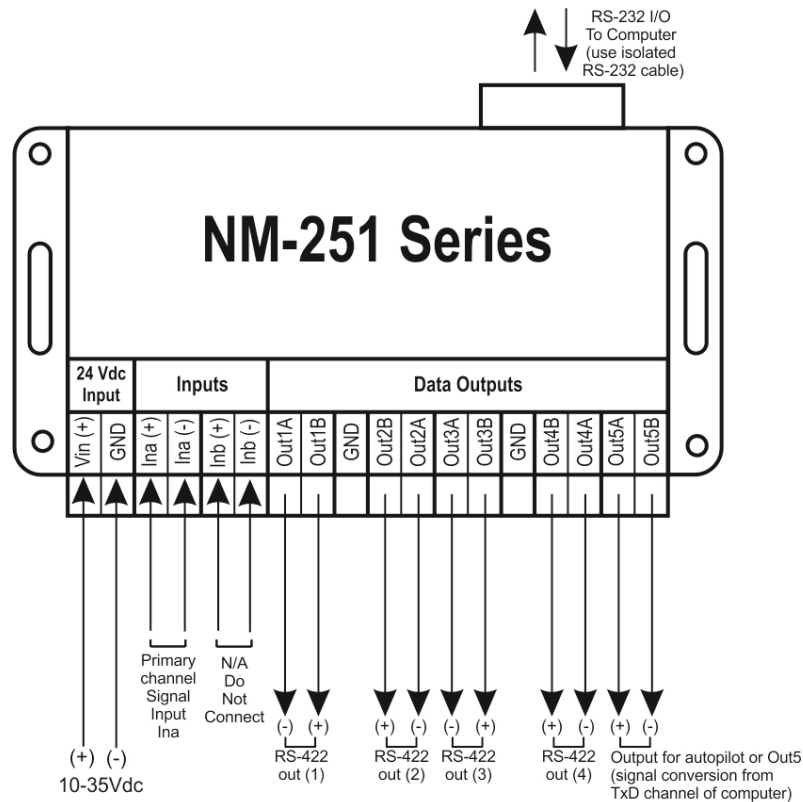


Figure 1: Connection to RS-422 Outputs

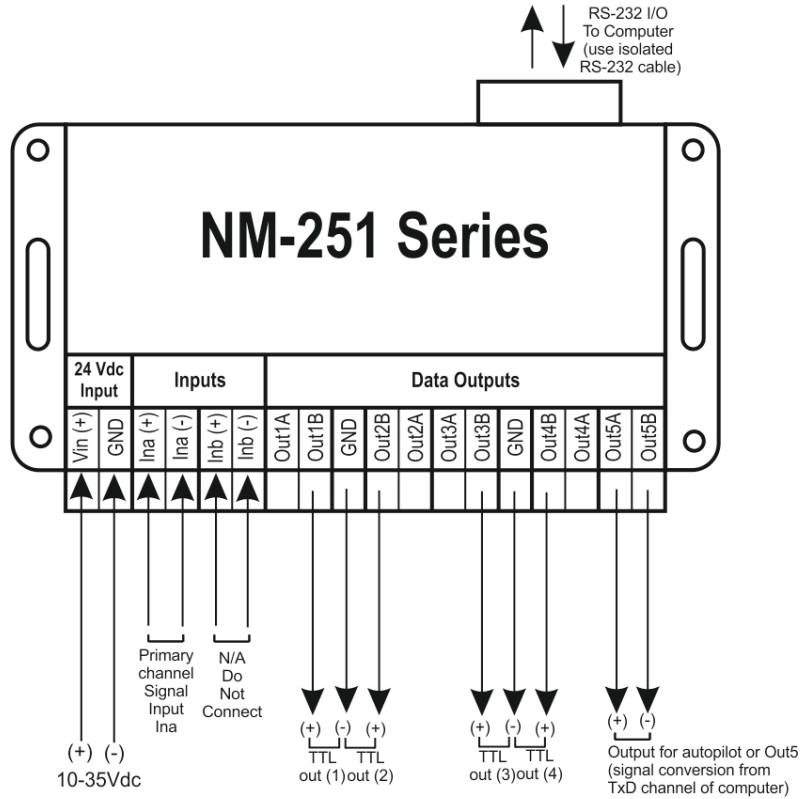


Figure 2: Connection to TTL outputs

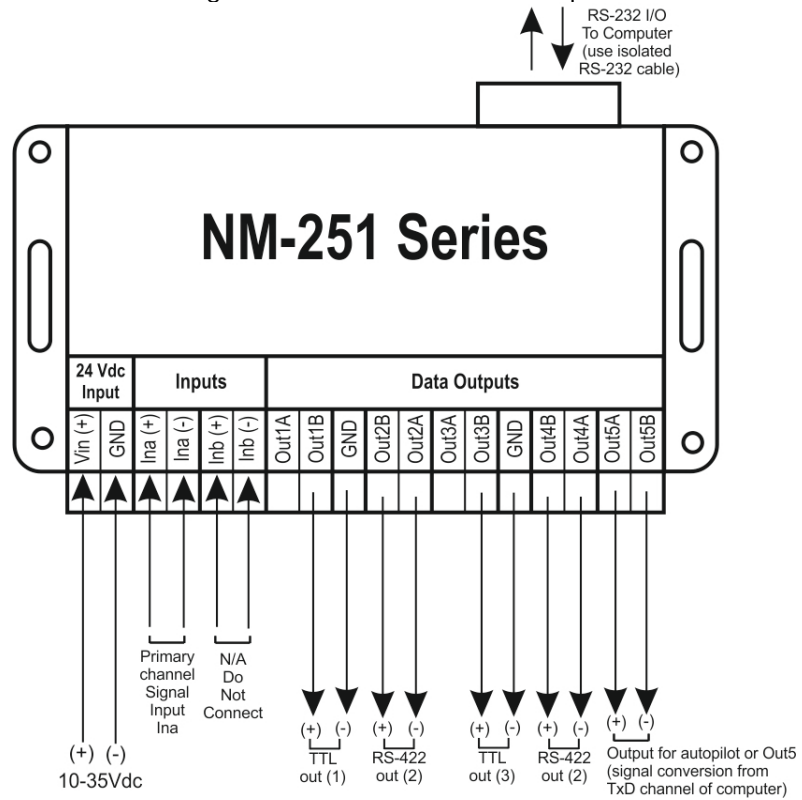


Figure 3: Combined use of TTL and RS-422 outputs

Power Supply

The NM-251D-VV can be powered within the range of 10-35 VDC. The nominal voltage of 24 VDC is advised for powering the device in normal operation.

Power input port has a protection for incorrect polarity connection of the supplying voltage.

LED Indicator sequence

Inb LED	ON: Indicates normal state. Microcontroller is executing the custom firmware
Ina LED	
Out 3/4 LED	Flashing indicates data transmission to output port 3 and 4
Out 1/2 LED	Flashing indicates data transmission to output port 1 and 2
Out5 LED	Flashing indicates reception from RS-232 port and transmission to Out5 port if J6@1-2 or flashing indicates data transmission to Out5 port if J6@1-3 (configured as general purpose)

Jumper Settings

Configuration		Functionality Description
J5	J6	
1-2	X	Input Signal at Ina is processed from the CPU. Baud rate and functionality at the output ports are defined from the software executed in the CPU (factory default)
1-3	X	Input Signal at Ina is not processed from the CPU. Signal output baud rate is the same as input (maximum 38.400 baud)
X	1-2	Output port Out5 converts signals received from a computer at the RS-232 (pin3 of the D-SUB9 connector) to RS-422 signal level
X	1-3	Output port Out5 is functioning as a general purpose output

Table 1: NM-251D-VV Jumper configuration

Dip Switch Settings

Configuration						Output routing				Functionality Description
SW-1	SW-2	SW-3	SW-4	J5	J6	Out 1/2	Out 3/4	RS 232	Out 5	
ON	X	X	X	1-2	1-3	\$VWVHW,,T,,M,x.x,N,y.y,K*CS x.x : Speed knots y.y : Speed Km				Converts input signal \$xxVTG to \$VWVHW. All input strings are filtered out. (Factory Setting)
X	ON	X	X	1-2	1-3					Converts input signal \$xxRMC to \$VWVHW. All input strings are filtered out.
ON	ON	X	X	1-2	1-3					Converts input signals \$xxVTG and \$xxRMC to \$HEHDT (note 1) All input strings are filtered out.
X	X	ON	OFF	1-2	1-3					Converts \$xxVTG and/or \$xxRMC (setting selected with SW-1 and SW-2) to \$VWVHW at increased refresh rate.
X	X	OFF	ON	1-2	1-3					Converts \$xxVTG and/or \$xxRMC (setting selected with SW-1 and SW-2) to \$VWVHW. All input strings are relayed to the output ports (pass thru)

Notes:

- Switching two or more dip switches to the ON position would result multiple conversions
- Checksum is generated and added to the output string at all times
- Dip Switched configuration not indicated in this table are not applicable and should not be selected

Table 1: NM-251D-VV Configuration

Printed Circuit Board composite layout

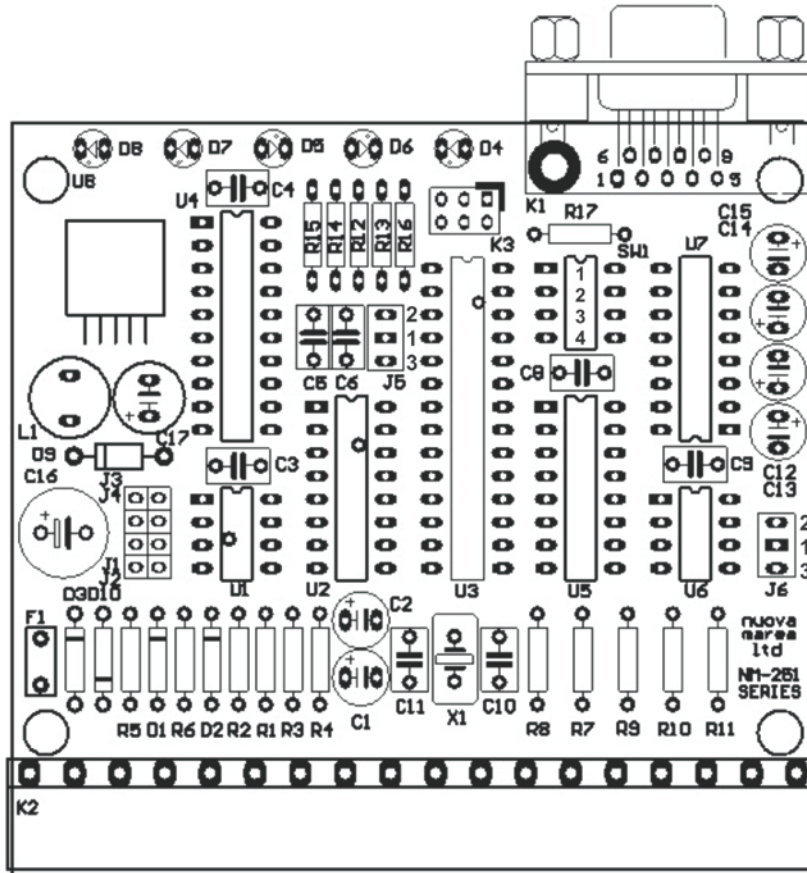


Figure 4: Composite layout of NM-251D-VV printed circuit board

Specifications

Supply Voltage	9 to 35 VDC
Power Supply Protection	PTC Resettable Fuse Vmax: 60V, Imax: 40A, Ihold: 0,25A (23°C), Itrip:0,5A (23°C), Max time to trip (23°C): 2,2sec for 1,25A
Current Consumption	20mA in idle state @ 24VDC / 60mA in full output mode @ 24VDC
Inputs	1 x NMEA-0183, optically isolated Common Mode Rejection: 10kV/usec, Isolation: 480 Vrms
Input Resistance	1,5 KOhm
Outputs	4 x buffered RS-422/TTL (general purpose) 1 x RS-232 1 x RS-422 signal conversion from RS-232 RXD channel or as fifth output
Output protection	Buffered for all RS-422 outputs
Indicators	Input (Ina) & Input (Inb) – Always ON indicates custom firmware Data transmission from output ports 1 and 2 (Out 1/2 LED) Data transmission from output ports 3 and 4 (Out 3/4 LED) Data reception from RS-232 interface or output 5 port (Out 5 LED)
Dimensions	Width = 110mm/134,80 mm Depth = 82 mm Height = 43 mm



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Port ID	Wire ID / Color	Cable ID	Signal Description
Vin(+)			
GND			
Ina(+)			
Ina(-)			
Inb(+)	N/A	N/A	N/A
Inb(-)	N/A		
Out1A			
Out1B			
GND			
Out2B			
Out2A			
Out3A			
Out3B			
GND			
Out4B			
Out4A			
Out5A			
Out5B			

SETTINGS

J5*

2	1	3

J6*

2	1	3

Dip Switches**

ID	OFF	ON
1		
2		
3		
4		

* Mark the positions that are occupied by the jumper

** Mark the position for every switch

NOTES:



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CERTIFICATE NUMBER

DATE

08-PR299432-1-PDA

01 March 2013

ABS TECHNICAL OFFICE

Piraeus Engineering Department

CERTIFICATE OF DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of
NUOVA MAREA LTD - PIRAEUS

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

PRODUCT: **Programmable Controller, I/O Units, Operator & Communication Interfaces**

MODEL: **NM-251 Series**

This Product Design Assessment (PDA) Certificate 08-PR299432-1-PDA, dated 01/Mar/2013 remains valid until 19/Mar/2018 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

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Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

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