MASTERVOLT

USER'S MANUAL

MasterBus NMEA 2000® Interface

Interface from MasterBus to NMEA 2000® and vice versa

MASTERVOLT
Snijdersbergweg 93,
1105 AN Amsterdam
The Netherlands
Tel.: +31-20-3422100
Fax.: +31-20-6971006
www.Mastervolt.com

1 GENERAL INFORMATION

1.1 USE OF THIS MANUAL

This manual serves as a guideline for the safe and effective operation of the MasterBus NMEA 2000® Interface, to be called *NMEA Interface* further in this manual.

Keep this manual at a secure place!

1.2 GUARANTEE SPECIFICATIONS

Mastervolt guarantees that this product was built according to the legally applicable standards and stipulations. If you fail to act in accordance with the regulations, instructions and stipulations in this user's manual, damage can occur and/or the product will not fulfil the specifications. This may mean that the guarantee will become null and void.

IMPORTANT: Additional warranty agreements, like "Mastervolt system warranty" may contain restrictions which forbid resetting of historical data The standard guarantee period is two years after date of purchase.

1.3 LIABILITY

Mastervolt can accept no liability for:
- consequential damage due to use of the NMEA Interface;
- possible errors in the manuals and the results thereof;
- Use that is inconsistent with the purpose of the product.

CAUTION!
Never remove the identification label.

2 HOW IT WORKS

2.1 COMMUNICATION

Via the NMEA Interface, PGN's information is made available to the MasterBus network and vice versa. The NMEA and MasterBus variables have their own address protocols.

2.1.1 NMEA to MasterBus

For using NMEA information in your MasterBus network, you only need to check the desired variables in the interface menu. These variables can be used to display. Refer to chapter 4 for more information.

2.1.2 MasterBus to NMEA

For using MasterBus information in your NMEA network, you need to define the addresses of the desired variables in both the MasterBus and NMEA network. The interface links these addresses. Refer to chapter 5 for explanation.

3 OPERATION

3.1 MASTERBUS CONFIGURATION

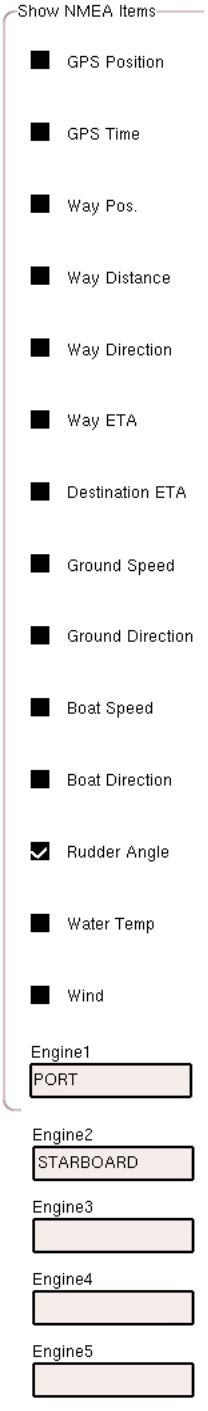
This interface is configured via MasterBus in the Configuration tab. Configuration is done on a MasterView display or via the MasterView System software on your pc.

The items to display are shown in the MasterBus Monitoring tab.
The table below shows the general MasterBus configuration. NMEA to MasterBus configuration and vice versa are discussed in chapters 4 and 5 respectively.

Configuration Tab page			
GENERAL			
Language	Set the NMEA Interface menu language	English	See specifications
Name	Any name with 12 characters max	INT NMEA	12 characters max
Time offset	Enter your local time relative to the Greenwich Mid Time (GMT)	GMT + 0	GMT-12 GMT+12 in 0.5 h steps
Sleep enable	If checked, MasterBus can go in idle mode. Other conditions: no NMEA monitoring and no MasterBus activity.	Off (unchecked)	
Show NMEA items	Check boxes to show these items on the monitoring page. Engine 1 to 5 can be named here (16 characters max).	On (checked); Engine: blank	

4 NMEA TO MASTERBUS

If you want to use NMEA information in MasterBus, check one or more of the items in the NMEA interface configuration menu, see figure 1. In this example the rudder angle was checked. Engine items are shown in MasterBus only if you named the engine. The table at the right explains the MasterBus names for the NMEA items. For the PGN tables, refer to chapter 6.



Monitoring tab	Description	Range
Position	*GPS position and time*	
Longitude	Longitude of the GPS position in degrees	180 °W- 180 °E
Longitude	Longitude of the GPS position in minutes	0.000-59.999 ‘
Lattitude	Lattitude of the GPS position in degrees	90 °S- 90 °N
Lattitude	Lattitude of the GPS position in minutes	0.000-59.999 ‘
GPS Time	GPS time in hh:mm:ss	
GPS Date	GPS date in dd-mm-yyyy	
Waypoint	*GPS position of destination*	
Longitude	Longitude of destination in degrees	180 °W- 180 °E
Longitude	Longitude of destination in minutes	0.000-59.999 ‘
Lattitude	Lattitude of destination in degrees	90 °S- 90 °N
Lattitude	Lattitude of destination in minutes	0.000-59.999 ‘
Way Distance	Distance to destination in m	
Way Direction	Direction towards destination in compass degrees	0-359 °
ETA	Estimated time of arrival	
ETA Destination	Estimated time of arrival at destination	
Direction	*Ship or vehicle motion*	
Ground speed	Speed relative to the ground in knots	-
Ground course	Direction relative to the ground in compass degrees	0-359 °
Boat speed	Speed in knots relative to the water	-
Boat heading	Bow pointing angle in compass degrees	0-359 °
Environment	*Measured environmental data*	
Water Temp.	Water temperature in °C	-
Wind speed	Apparent wind speed in knots	
Wind Angle	Apparent Wind angle relative to ship length axis	-180 ° - +180 °
Wind Dir. (N)	Wind direction relative to true north	0-359 °
Engine X	*X* is the engine device instance. The items below are shown in the Monitoring tab.	0 (engine 1) - 4 (engine 5)
Speed	Rotation speed in RPM	
Oil Pressure	Lubrication oil pressure	
Water Temp.	Cooling water temperature	
Gear Direction	Direction forward/ reverse of propellor	
Engine battery	Engine battery voltage	

Figure 1: NMEA items available for MasterBus, table with MasterBus monitoring items

5 MASTERBUS TO NMEA

To use MasterBus information in the NMEA network, per variable you need to define both the NMEA and MasterBus addresses in the configuration screen. This way the interface is able to link MasterBus items to NMEA 2000® PGN's so that the NMEA network "knows" the value of the MasterBus variable concerned.

For defining the addresses, you need to log in *at the NMEA Interface* as an installer. Refer to the MasterView System manual. The installer login code is available on request.

5.1.1 NMEA Variable

The NMEA 2000® variable consists of:

- PGN (Parameter Group Number). The PGN name appears after this number;
- Applicable Instances (applications);
- Fields (device variables).

Note all instances start to count at 0.

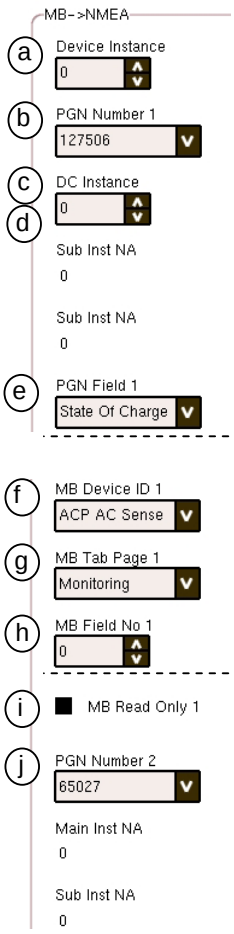
If a PGN does not have instances and you still wish to display more than one variable, you need to add an extra NMEA Interface. This interface can be distinguished by means of the Device Instance (figure 2, point a).

5.1.2 MasterBus Variable

The MasterBus variable consists of:

- MasterBus Device ID (device name);
- MasterBus Tab page of the selected device (monitoring, history, alarm or configuration page of this device);
- MasterBus Index (see figure 3).

See figure 2. The two addresses are defined in the same screen. The interface connects these addresses. One interface can only show one AC instance. To show more AC instances, you need more interfaces. Enter the Device Instance to distinguish between these interfaces.



NMEA address

a. If more NMEA Interfaces are in the network, the Device Instance corresponds with the NMEA Interface used. 253 interfaces can be entered, selectable from 0-252.
b. First PGN number.
   Select the PGN number from the list (refer to section 6.1 for PGN names)
c. Instance name (depends on the PGN number, for PGN 127506 there is one instance name: DC Instance).
d. Instance number (the number of the device for which the instance is shown, selectable 0-8). In the example the DC instance of device 0 is selected.
   Sub instances are selectable if available.
e. Field of PGN 1, name selectable from the list.

MasterBus address

f. MasterBus device ID,
   name selectable from the list
g. MasterBus Tab page, selectable from device list.
   Tabs are Monitoring, Alarm, History, Configuration
h. MB Field No is the **index** of the corresponding MasterBus variable, see figure 3.
i. MB Read Only: checked means NMEA cannot change a MasterBus value. NMEA can only read from MasterBus, not write then.
j. Number of the second PGN (PGN name: section 6.1)

Figure 2: NMEA Interface configuration example and explanation

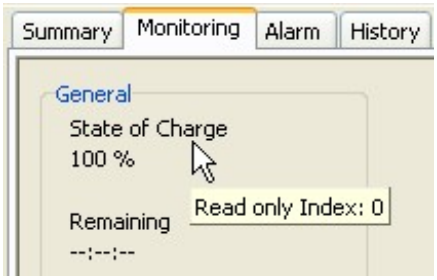


Figure 3:
*Monitoring page of the MasterShunt, State of Charge **Index** is 0*

5.1.3 Example MasterBus to NMEA configuration

The tables below show the NMEA variable battery *State of charge* and the corresponding MasterBus variable: the MasterShunt measured battery *State of charge*. Shown are the NMEA 2000® variable and below that, the MasterBus variable. For an overview of all supported PGN's, refer to section 6.2.

NMEA 2000®

PGN #	PGN Name	Applicable instances	Fields
127506	DC detailed status	DC Instance	State of charge

MasterBus

MasterBus Device ID	MasterBus Tab Page	MasterBus Field number	MasterBus Read Only
MSH MasterShunt 1	Monitoring	0 (State of charge)	Checked

6 PGN TABLES

6.1 PGN TABLE, NMEA TO MASTERBUS

This table shows NMEA variables (PGN's) with information available for MasterBus.

PGN #	PGN Name	Available information for MasterBus
129025	Position, Rapid Update	Position Longitude, Lattitude
129029	GNSS Position Data	Time, Date
129284	Navigation Data	Destination waypoint Longitude and Lattitude, Distance, Direction, ETA
129794	AIS Class A Static and Voyage related data	Estimated time of arrival
129026	COG & SOG Rapid update	Ground Speed, Ground Course
130577	Direction Data	Boat speed, Boat heading
127245	Rudder	Rudder Angle
130322	Current Station Data	Water Temperature
130306	Wind Data	Wind Speed, Wind Angle, Wind Direction
127488	Engine parameters, Rapid update	Engine Speed
127489	Engine parameters, Dynamic	Engine Temp, Oil pressure
127493	Transmission parameters, Dynamic	Gear Direction
127508	Battery Status	Engine Battery

6.2 PGN TABLE, MASTERBUS TO NMEA

The table below shows the PGN variables to which the MasterBus variables are to be connected. Some applicable instances have sub instances, like for example PGN #127507 Charger status. The applicable instance is the Charger status here and the sub instance is the Battery status.

PGN's according to NMEA 2000® Database version 1.210

PGN #	PGN Name	Applicable instances	Fields (Name)
127501	Binary switch bank status	Indicator bank instance	Indic1 – Indic28
127502	Switch bank control	Switch bank instance	Switch1 -Switch28
65018	Generator Total AC Energy	Not available *	Tot kW Hrs Imp (KWh Import) Tot kW Hrs Exp (KWh Export)
65025	Generator Phase A AC Reactive Power	Not available *	Phs A Rect Pwr (Phase A Reactive Power) Phs A Power Fact (Power Factor) Phs A Power Lag (Power Factor Lagging)
65026	Generator Phase A AC Power	Not available *	Phs A Real Power Phs A Appr Power (Apparent power)
65027	Generator Phase A AC Basic quantities	Not available *	Phs A Ln Ln Vlt (Line-to-line AC RMS Voltage) Phs A Ln Neu Vlt (Line-to-Neutral AC RMS Voltage) Phs A AC Freq (AC Frequency) Phs A Rms Crnt (AC RMS Current)
127505	Fluid level	Fluid instance	Fluid type Fluid level Tank capacity
127506	DC detailed status	DC Instance	DC Type State of charge State of health Time remaining Ripple voltage
127507	Charger status	Charger instance Battery instance	Operating state Charge Mode Charger En/Dis Eq pending Eq time remaining
127508	Battery status	Battery instance	Batt voltage Batt current Batt case temp
127509	Inverter status	Inverter instance AC Instance DC Instance	Operating state Inverter En/Dis
127510	Charger configuration status	Charger instance Battery instance	Charger En/Dis Chrg curr limit Chrg algorithm Chrg Mode Est. batt temp Equalize En/Dis Over chrg En/Dis Equalize time

127511	Inverter configuration status	Inverter instance AC Instance DC Instance	Inverter En/Dis Inverter Mode Ld Sense En/Dis Ld Sense Pwr Thr Ld Sense Int.
127513	Battery configuration status	Battery instance	Battery type Supp Equalize Nominal volt Batt Chem. Batt Cap. Batt Temp Coeff Peukert Exp. CEF

* This PGN has no instance, which is an exception within NMEA 2000®.

Three PGN's are always sent from MasterBus to NMEA, regardless the device settings, see table.

PGN #	PGN Name
59904	ISO Request
60928	ISO Address Claim
126996	Product Information

7 INSTALLATION

See figure 4 for the NMEA Interface connections.

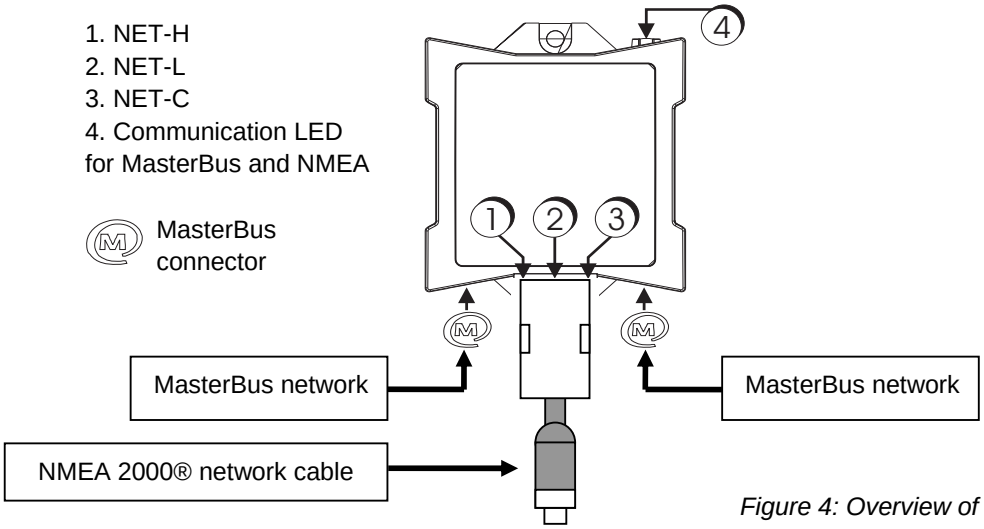


Figure 4: Overview of the NMEA Interface

8 SPECIFICATIONS

Model:	MasterBus – NMEA 2000® interface
Article number:	77031800
Delivery also includes:	NMEA cable, MasterBus cable, MasterBus Terminating device, User's manual
Function of instrument:	Interface between MasterBus and NMEA 2000® and vice versa
Languages available:	English,Nederlands,Deutsch,Français,Castellano,Italiano,Norsk,Svenska, Suomi,Dansk
Current consumption:	<40 mA
MasterBus Powering:	No
NMEA 2000® LEN:	0
Din rail mounting:	Yes, Din rail 30 mm [1.2 inch]
Protection degree:	IP 21
Dimensions:	66 x 78 x 32 mm [2.6 x 3.1 x 1.3 inch]; see drawing below
Weight:	Approx. 70 gr [0.15 lb] excluding cable
NMEA Certified	NMEA 2000® certified

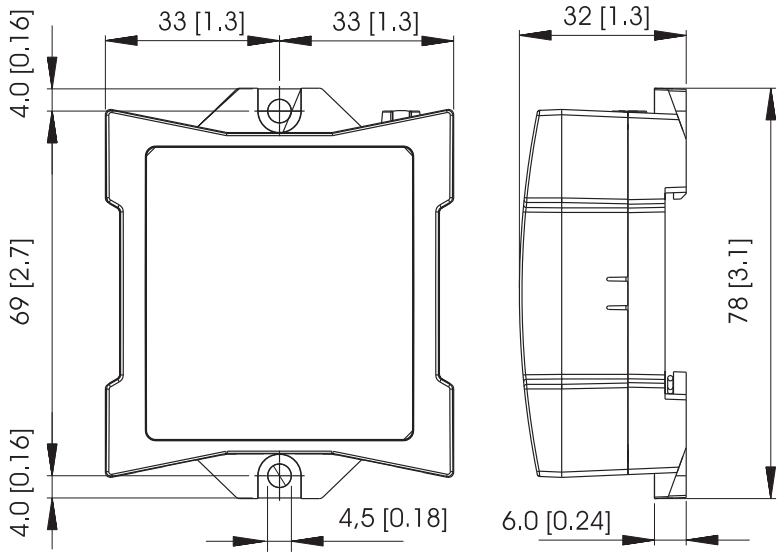


Figure 5: Dimensions in mm [inch]

9 EC DECLARATION OF CONFORMITY

This product is in conformity with the provision of the EC, EMC directive 2004/108/EC,
Low voltage standard: EN 60950: 2000

Standards applied:
Generic emission standard: EN 50081-1:1992,
Generic Immunity standard: EN 50082-1:1997,
Safety directive 2006/95/EC

MASTERVOLT

Snijdersbergweg 93, 1105 AN Amsterdam, The Netherlands
Tel : + 31-20-3422100
Fax : + 31-20-6971006
Email : info@mastervolt.com