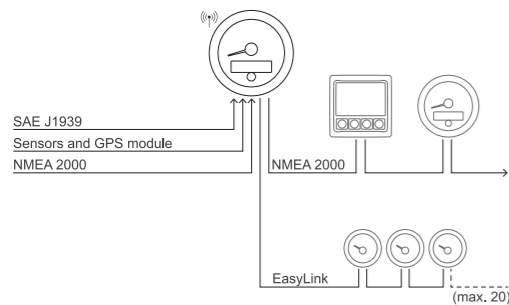




**INTRODUCTION**

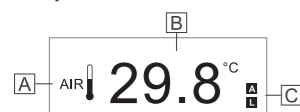
**Description**

The GPS speedometer is a master gateway that collects data received from analog sensors and CAN bus network and makes them available on NMEA 2000 bus and OceanLink 52 mm gauges. In addition to indicate the speed (over ground, SOG or through water, STW), it displays real-time engine, environment and navigation values. A built-in GPS module accurately calculates the position and automatically reads the date/time.



**DATA PAGES**

**Description**



Part	Description
A	Data symbol
B	Current value with relevant unit of measure
C	"AL": indication that at least one alarm was triggered. The current alarm list is available after the last data page, see "Managing alarms".

**List of managed data**

Icon	Information	Input signal			Output signal		Unit of measure
		NMEA 2000	SAE J1939	Analog sensor	NMEA 2000	EasyLink	
	Total engine operating hours	x	x	x	x	-	h
	Engine coolant temperature	x	x	-	x	x	°C/ °F
	Engine coolant pressure	x	x	-	x	-	bar / psi/ kPa
	Transmission oil temperature	x	x	-	x	-	bar / psi/ kPa
	Transmission oil pressure	x	x	-	x	x	bar / psi/ kPa
	Engine oil temperature	x	x	-	x	x	°C/ °F
	Engine oil pressure	x	x	-	x	x	bar / psi/ kPa
	Engine oil level	-	x	-	-	-	%
	Boost pressure	x	x	-	x	x	bar / psi/ kPa
	Exhaust gas temperature	x	x	-	x	x	°C/ °F

**Received signal priority**

If the same data is available from more than one source, the received signal priority is the following:

**Sensors and engine**

1. Analog sensor
2. NMEA 2000
3. SAE J1939
4. Battery (for power voltage)
5. Self counting (for engine operating hours)

**GPS position**

1. Built-in GPS module
2. NMEA 2000

**Note:** the speed source can be manually set.

**Transmission via EasyLink**

Data transmission to 52 mm gauges is automatic every 20 ms, no settings are required.

**On/Off**

The on/off mode depends on the power line connection. Typically, it is sufficient to simply turn the engine ignition key or turn on the service switchboard. The VDO logo and software version are displayed when turned on.

**Displaying pages**

When turned on the device displays the last page selected before it was turned off. Briefly press the button to scroll the pages.

**Note:** the page with the total engine operating hours is displayed by default the first time the device is turned on.

**Select the pages to be displayed**

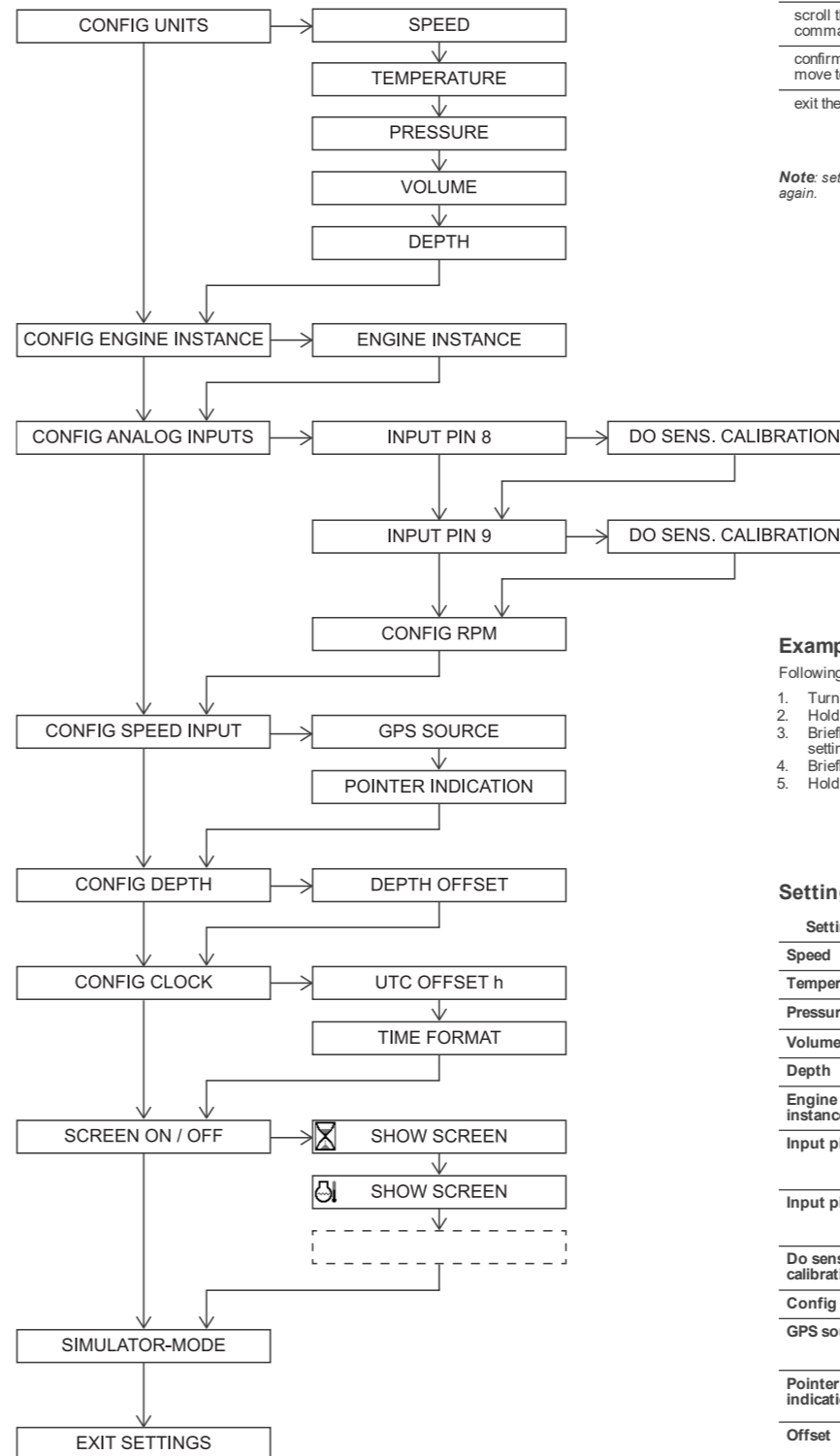
All pages are displayed by default. You can select which pages to be displayed/hidden in the settings menu in **Show screen**.

Icon	Information	Input signal			Output signal		Unit of measure
		NMEA 2000	SAE J1939	Analog sensor	NMEA 2000	EasyLink	
	Engine rpm	x	x	x	x	-	rpm
	Fuel consumption	x	-	-	-	-	gal/h or l/h
	Fuel level	x	x	x	x	x	%
	Fresh water level	x	-	x	x	x	%
	Waste water level	x	-	-	x	x	%
	Battery voltage	x	x	x	x	x	V
	Battery current	x	x	-	x	x	A
	Speed through water (STW)	x	-	-	-	-	mph / kn or km/h
	Speed over ground (SOG)	x	-	x*	x	-	mph / kn or km/h
	Magnetic heading	x	-	-	-	-	°M (magnetic North)
	Course over ground (COG)	x	-	x*	x	-	°T (true North)
	Depth below transducer **	x	-	-	-	-	m / ft
	Trim	x	-	x	x	x	%
	Rudder angle	x	-	x	x	x	°S (starboard) / °P (port)
	Room temperature	x	-	-	-	-	°C/ °F
	Sea water temperature	x	-	-	-	-	°C/ °F
	Time	x	-	x*	x	-	12h / 24h
	GPS module information ***	-	-	x*	x	-	-

**Note\***: data received by the built-in GPS module.  
**Note\*\***: the displayed value depends on any set offset. It is the depth below transducer by default (offset = 0).  
**Note\*\*\***: data only displayed if **GPS source = Int**, see "Settings description".

**GENERAL SETTINGS**

**Settings menu description**



**Using the settings menu**

To...	Then....
open the settings menu	turn on the device holding down the button until "Settings" appears: the <b>Config units</b> setting appears
scroll the possible values or commands <b>Yes</b> and <b>No</b>	briefly press the button
confirm the value or command and move to the next setting	hold down the button until the value or command blinks once
exit the settings menu	select the setting <b>Exit settings</b> and then the command <b>Yes</b> or turn the device off and back on: the first data page appears.

**Note:** settings can only be scrolled forward. To change a previous setting, exit the settings menu and open it again.

**Example procedure**

Following is the procedure to set **Engine instance = 3**

1. Turn on the device holding down the button until "Settings" appears: the **Config units** setting appears.
2. Hold down the button until **No** blinks once: the **Config engine instance** setting appears.
3. Briefly press the button to view **Yes**, then hold it down until **Yes** blinks once: the **Engine instance** setting appears with the current value.
4. Briefly press the button to scroll values until 3 is displayed.
5. Hold down the button until it blinks once: the **Config analog inputs** setting appears.

**Settings description**

Setting	Description	Possible values/commands*
<b>Speed</b>	Speed units of measure	kmh/ mph/ kts
<b>Temperature</b>	Temperature units of measure	°C/ °F
<b>Pressure</b>	Pressure units of measure	bar/ PSI/ kPa
<b>Volume</b>	Volume units of measure	Ltr/ gal
<b>Depth</b>	Depth units of measure	ft/ mtr
<b>Engine instance</b>	Displayed data engine, NMEA 2000 code.	0/ 1/ 2/ 3
<b>Input pin 8</b>	Type of sensor data on input 1	<ul style="list-style-type: none"> <li>• <b>Off</b>: no connected analog sensor</li> <li>• <b>Trim</b>: trim, propeller tilt</li> <li>• <b>Fresh</b>: fresh water level</li> <li>• <b>Fuel</b>: fuel level</li> <li>• <b>Rudder</b>: rudder angle</li> </ul>
<b>Input pin 9</b>	Type of sensor data on input 2	<ul style="list-style-type: none"> <li>• <b>SOG</b>: speed over ground</li> <li>• <b>STW</b>: speed through water</li> </ul>
<b>Do sens. calibration</b>	Start sensor calibration	For information on sensor calibration, see "Sensors calibration".
<b>Config RPM</b>	Impulses per engine revolution	From 0.0 to 999.9 (default = 1.0)
<b>GPS source</b>	Speed source	<ul style="list-style-type: none"> <li>• <b>Int</b>: built-in GPS module</li> <li>• <b>Ext</b>: via NMEA 2000</li> </ul>
<b>Pointer indication</b>	Speed displayed by the device pointer	<ul style="list-style-type: none"> <li>• <b>SOG</b>: speed over ground</li> <li>• <b>STW</b>: speed through water</li> </ul>
<b>Offset</b>	Value to be added/subtracted from the depth to compensate for the transducer position compared to the waterline or keel	From -99.9 to + 99.9
<b>UTC offset</b>	Time zone	From -12 to +12 h
<b>TimeFormat</b>	Time format	<ul style="list-style-type: none"> <li>• 12 h</li> <li>• 24 h</li> </ul>
<b>Show screen</b>	Data to hide/show	For each data: <ul style="list-style-type: none"> <li>• <b>Yes</b></li> <li>• <b>No</b></li> </ul>
<b>Simulator-mode</b>	Simulation mode	<ul style="list-style-type: none"> <li>• <b>Yes</b>: the device displays random values. Data is also transmitted to connected 52 mm gauges.</li> <li>• <b>No</b>: turn off simulation mode</li> </ul> <b>NOTICE:</b> simulation mode remains enabled even after the device is turned off and back on until set to <b>No</b> .
<b>Exit settings</b>	Exiting the settings menu	<ul style="list-style-type: none"> <li>• <b>Yes</b></li> <li>• <b>No</b></li> </ul>

**Note\***: the underlined value/command is the default value/command.

**Customer service and warranty**

In the event of malfunction, fault or for information on the warranty, contact a VDO partner. To find a partner, visit [www.vdo-partner.com](http://www.vdo-partner.com).

**Instructions available in multiple languages**

These instructions are available in several languages at [www.marine.vdo.com](http://www.marine.vdo.com).

Continental Automotive Switzerland AG reserves the right to make modifications or improvements to the relative documentation without notice.



## SENSORS CALIBRATION

### Calibration types

Analog sensors calibration can be:

- standard: for VDO sensors only. The type of sensor is set and the device reads the sensor value with good approximation without requiring calibration.
- manually: for non VDO sensors or to obtain more accurate indication from a VDO sensor. A three step procedure instructs the system to read the sensor value.

### Starting calibration



To start calibration, select the **Do sens. calibration** setting and then **Yes**: the **Set default cal** setting appears. Running the required calibration procedure.

### Running manual calibration

1. In **Set default cal**, select **No**.
2. Run the operation displayed on the first row on the display.
3. Select **No**: the device reads the sensor value and updates the last row on the display with the value read.
4. If the value read is correct, select **Yes**: the cursor moves on to the next calibration point. Otherwise select **No** to take another reading and obtain a correct value.
5. Repeat steps 2-3-4 for the other two calibration points.
6. To confirm changes, in **Save changes**, select **Yes**: a message confirms that calibration settings have changed.

## DISPLAY SETTINGS

### Introduction

Display brightness and contrast can be adjusted. The display brightness applies to all masters on the NMEA 2000 bus and on connected 52 mm gauges.

### Running standard calibration

1. In **Set default cal**, select **Yes**.
2. Scroll the possible values and select the required one: the selected value blinks once.
3. To confirm changes, in **Save changes**, select **Yes**: a message confirms that calibration settings have changed.

### Adjusting display brightness and contrast

1. From any data page, hold down the button until "Light" appears.
2. If necessary, adjust the brightness level by briefly pressing the button.  
**Note:** if "Light off" appears, brightness cannot be changed since the external lighting is off.
3. To confirm the brightness level, hold down the button until the bar blinks once: "Contrast" appears.
4. If necessary, adjust the contrast level by briefly pressing the button.
5. To confirm the contrast level, hold down the button until the bar blinks once: the last page displayed reappears.

## ALARMS

### Alarm signal

When an alarm is triggered, "New alarm" briefly appears on the display followed by the specific alarm message and buzzer (if connected). The message remains on the screen and the buzzer sounds until the alarm is acknowledged.

**Note:** alarms are not signaled when setting up the device.

If, after acknowledgment, at least one alarm is still active, "AL" blinks in the data pages.

### Managed alarms list

NMEA2000 - Engine Parameters, Dynamic (PGN 127489)

- Check engine
- Hot engine
- Low oil pres
- Low oil level
- Low fuel pres
- Low voltage
- Low cool level
- Water flow
- Water in fuel
- Charge indicat
- Preheat indic
- Boost pressure
- Over rev
- EGR system
- Main throttle
- Emergency stop
- General warn 1
- General warn 2
- Pwr reduction
- Maintenance
- Eng com error
- Sub throttle
- Neutral prot
- Eng shut down

NMEA2000 - Transmission Parameters, Dynamic (PGN 127493)

- Check gear
- Gear oil temp
- Gear oil pres
- Gear oil level
- Sail drive

SAE J1939 - Active Diagnostic Trouble Codes (DM1)

- Water in fuel indication
- Engine speed
- Engine Turbocharger boost pressure
- Exhaust gas temperature
- Engine oil pressure
- Engine Coolant Pressure
- Engine Coolant Temperature
- Engine oil temperature
- Transmission oil temperature
- Transmission oil pressure
- Fuel Level

### Managing alarms

1. To acknowledge an alarm, briefly press the button: if other alarms were triggered (new or already acknowledged), the next alarm message appears. For the alarm display order, see "Managed alarms list".
2. To scroll alarms, briefly press the button: "Exit alarms" appears after the last alarm in the list.
3. To scroll the alarm list again, select **No**. To exit the alarm list, select **Yes**: the data page displayed before the new alarm was triggered appears.
4. To scroll the alarm list, scroll all data pages until "Alarm" appears and hold down the button for 3 seconds.

## TROUBLESHOOTING

### Display problems

Problem	Cause	Solution
The displayed values are not those expected	Incorrect sensor configuration	Check parameter settings in the settings menu, in <b>Config analog inputs</b>
	Incorrectly connected sensor	Check the connection, see installation instructions
"..." and not the expected value appears on the display	The NMEA 2000 network backbone was incorrectly created	Check connections and make sure there is a termination at the beginning and end of the backbone
	Data not available on the network	Wait
	Sensor not connected	Connect the sensor, see installation instructions
	The NMEA 2000 network backbone was incorrectly created	Check connections and make sure there is a termination at the beginning and end of the backbone

### Problems on connected 52 mm gauges

Problem	Cause	Solution
The gauge is backlit but the pointer does not move	Data not received from master	Check whether the 52 mm gauge is compatible with the master
	The pointer does not move and the gauge is not backlit	Master not powered Connect the power supply
	No 52 mm chain gauge is connected to the master	Connect a 52 mm gauge to the master

### Problems with GPS (GPS speedometer only)

Problem	Cause	Solution
The displayed speed is "..."	GPS module searching ( <b>GPS search</b> )	Wait. The search takes about one minute, then the GPS is ready ( <b>GPS valid</b> ).

## TECHNICAL SPECIFICATIONS

### General features

<b>Material</b>	PBT and plastic lens
<b>Connectors</b>	<ul style="list-style-type: none"> <li>• Molex MX150 (with EasyLink connector built into the pigtail cable)</li> <li>• NMEA 2000 Micro-C M12</li> </ul>
<b>Input data</b>	<ul style="list-style-type: none"> <li>• via CAN bus (NMEA 2000 and SAE J1939)</li> <li>• 2 resistive analog inputs (0–400 Ω)</li> <li>• 1 frequency input (0-4 kHz)</li> <li>• 1 built-in GPS module</li> </ul>
<b>Output data</b>	<ul style="list-style-type: none"> <li>• via CAN bus (NMEA 2000)</li> <li>• via EasyLink (VDO proprietary protocol) to 52 mm gauges</li> <li>• output alarm (500 mA)</li> </ul>
<b>Protection grade</b>	IP65
<b>Available variations</b>	0–14 / 0–35 / 0–70 kn / km/h / mph
<b>Display</b>	Dot matrix LCD 132 x 33 px
<b>GPS antenna</b>	Built-in, 10 Hz

### Environmental specifications

<b>Working temperature</b>	From -20 to +70 °C
<b>Storage temperature</b>	From -30 to +85 °C

### Electrical specifications

<b>Rated voltage</b>	12 / 24 V
<b>Voltage tolerance</b>	9-32 V
<b>Working current</b>	< 100 mA @ 12 V
<b>Absorption (LEN)</b>	2

### Conformity

<b>Conformity</b>	
<b>Directives</b>	2014/30/EU (Electromagnetic compatibility) 2011/65/EU (Electrical-electronic equipment hazardous substances)
<b>Reference standards</b>	IEC 60945: 2002-08 (Environmental class: exposed)

## SPARE PARTS, SENSORS AND ACCESSORIES

### Available spare parts

Product	Part number
Pigtail cable with MX150 connector	A2C1433330001
White bezel	A2C1352140001
Black bezel	A2C1111380001
Chrome bezel	A2C1141580001
Spin lock	A2C137609000
EasyLink extension cable	A2C1650700001

### Available accessories

To view available accessories, visit [www.marine.vdo.com](http://www.marine.vdo.com).

## APPENDIX

### Supported NMEA 2000 messages

PGN	Description
126992	System time
127250	Vessel heading
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127505	Fluid level
127508	Battery status
128259	Speed: Water referenced
128267	Water depth
129026	COG and SOG: Rapid update
129033	Local Time Offset
130310	Environmental parameters
130311	Environmental parameters
130312	Temperature
130316	Temperature, Extended Range
127245	Rudder
129025	Position: Rapid update

### Supported SAE J1939 messages

PGN	SPN	Description
61444	190	Engine Speed
65253	247	Engine Total Hours of Operation
65262	110	Engine Coolant Temperature
65262	175	Engine Oil Temperature 1
65263	98	Engine Oil Level
65263	100	Engine Oil Pressure
65263	109	Engine Coolant Pressure
65266	183	Engine Fuel Rate
65270	102	Engine Turbocharger Boost Pressure
65270	173	Engine Exhaust Gas Temperature
65271	114	Net Battery Current
65271	115	Alternator Current
65271	158	Battery Potential (Voltage), Switched
65271	167	Charging System Potential (Voltage)
65271	168	Electrical Potential (Voltage)
65272	177	Transmission Oil Temperature
65272	127	Transmission Oil Pressure
65276	96	Fuel Consumption
65279	97	Water In Fuel Indicator