

# OCEANLINK 85MM MASTER GAUGES

TACHOMETER / SPEEDOMETER

USER MANUAL  
rev. AA



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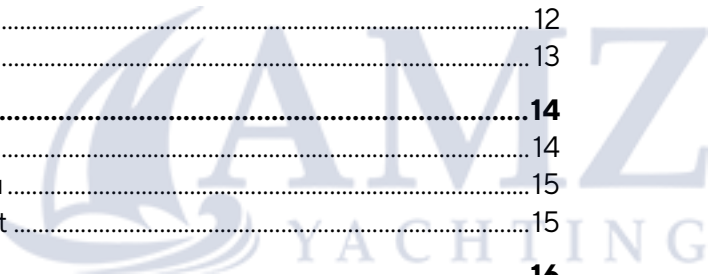
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# CONTENT

- Introduction ..... 3**
  - Packaging Content ..... 3
  - Description ..... 3
- Safety Information ..... 4**
- Mechanical Installation ..... 6**
  - Installation with Spinlock ..... 6
  - Flush Mounting ..... 7
- Electrical Installation ..... 8**
  - Pinout ..... 8
  - Electrical Schematic ..... 9
  - Analog Sensor Connection (RES 1, RES 2, RPM) ..... 9
  - External Buzzer Connection (B1) ..... 9
  - Illumination Switch (S1) ..... 10
  - Connection to the NMEA 2000® Network ..... 10
  - Connection to EasyLink Satellites ..... 10
  - Connection to SAE J1939 ..... 11
- Display ..... 12**
  - Screen Layout ..... 12
  - Displayable Datatypes ..... 13
- Settings Menu ..... 14**
  - Menu Structure ..... 14
  - Using the Settings Menu ..... 15
  - Configure a Sensor Input ..... 15
- Alarms ..... 16**
  - Alarm Signal ..... 16
  - Managing Alarms ..... 16
  - Configure Local alarms ..... 16
  - Minimum RPM ..... 16
  - List of Local Alarms ..... 17
  - List of Managed CAN Bus Alarms ..... 17
- Troubleshooting ..... 18**
  - Display Problems ..... 18
  - Problems on Connected 52mm Gauges ..... 18
- Technical Data ..... 19**
- Accessories ..... 20**
- Variants ..... 20**



# INTRODUCTION

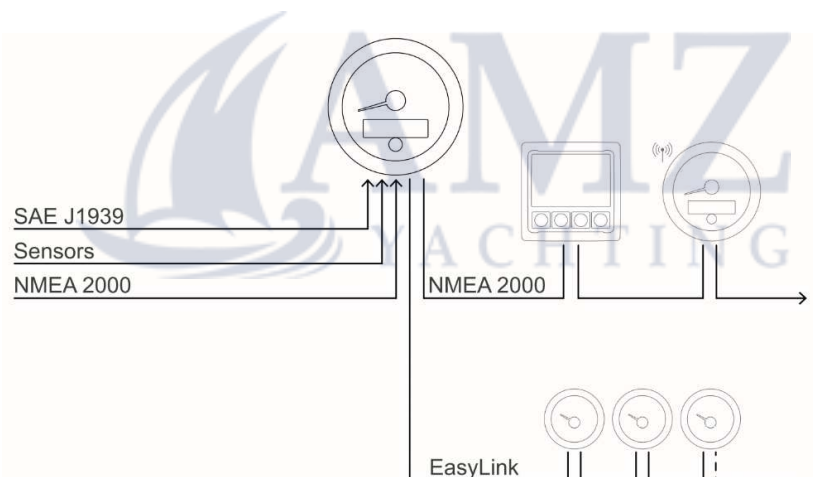
## PACKAGING CONTENT

Article	Part Number
1x OceanLink 85mm Master Gauge	depends on gauge type, color and dial range (See section "VARIANTS")
1x Spinlock	A2C1376090001
1x Pigtail Cable	A2C1433330001
1x Safety Instructions	B000100

## DESCRIPTION

In addition to indicating RPM / (GPS) speed, the OceanLink® Master gauge automatically presents all the key data ranging from oil pressure and fuel consumption to operating hours – on a generously proportioned inverted dot matrix digital display.

Besides a CAN interface with NMEA 2000® certified and SAE J1939 data protocol it features two inputs for analog sensors. The innovative EasyLink data connection makes the installation easy and cost effective.



OceanLink® is available in various designs and with a number of bezel color options. The instruments can also be conveniently integrated into customer-specific panel solutions.

The OceanLink Master gauge displays all important engine related data and distributes it to up to 16 52mm satellite gauges. It also works as a NMEA2000 gateway, by distributing the information from the analog inputs to the digital network.

# SAFETY INFORMATION

## WARNING

- No smoking! No open fire or heat sources!
- The product was developed, manufactured and inspected according to the basic safety requirements of EC Guidelines and state-of-the-art technology.
- The instrument is designed for use in grounded vehicles and machines as well as in pleasure boats, including non-classified commercial shipping.
- Use our product only as intended. Use of the product for reasons other than its intended use may lead to personal injury, property damage or environmental damage. Before installation, check the vehicle documentation for vehicle type and any possible special features!
- Use the assembly plan to learn the location of the fuel/hydraulic/compressed air and electrical lines!
- Note possible modifications to the vehicle, which must be considered during installation!
- To prevent personal injury, property damage or environmental damage, basic knowledge of motor vehicle/shipbuilding electronics and mechanics is required.
- Make sure that the engine cannot start unintentionally during installation!
- Modifications or manipulations to veratron products can affect safety. Consequently, you may not modify or manipulate the product!
- When removing/installing seats, covers, etc., ensure that lines are not damaged and plug-in connections are not loosened!
- Note all data from other installed instruments with volatile electronic memories.

## SAFETY DURING INSTALLATION

- During installation, ensure that the product's components do not affect or limit vehicle functions. Avoid damaging these components!
- Only install undamaged parts in a vehicle!
- During installation, ensure that the product does not impair the field of vision and that it cannot impact the driver's or passenger's head!
- A specialized technician should install the product. If you install the product yourself, wear appropriate work clothing. Do not wear loose clothing, as it may get caught in moving parts. Protect long hair with a hair net.
- When working on the on-board electronics, do not wear metallic or conductive jewelry such as necklaces, bracelets, rings, etc.
- If work on a running engine is required, exercise extreme caution. Wear only appropriate work clothing as you are at risk of personal injury, resulting from being crushed or burned.
- Before beginning, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.
- If working on gasoline boat motors, let the motor compartment fan run before beginning work.
- Pay attention to how lines and cable harnesses are laid so that you do not drill or saw through them!
- Do not install the product in the mechanical and electrical airbag area!
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- When working underneath the vehicle, secure it according to the specifications from the vehicle manufacturer.
- Drill small ports; enlarge and complete them, if necessary, using taper milling tools, sabre saws, keyhole saws or files. Deburr edges. Follow the safety instructions of the tool manufacturer.
- Use only insulated tools if work is necessary on live parts.

## SAFETY INFORMATION

- Use only the multimeter or diode test lamps provided, to measure voltages and currents in the vehicle/machine or boat. Use of conventional test lamps can cause damage to control units or other electronic systems.
- The electrical indicator outputs and cables connected to them must be protected from direct contact and damage. The cables in use

must have enough insulation and electric strength and the contact points must be safe from touch.

- Use appropriate measures to also protect the electrically conductive parts on the connected consumer from direct contact. Laying metallic, uninsulated cables and contacts is prohibited.

## SAFETY AFTER INSTALLATION

- Connect the ground cable tightly to the negative terminal of the battery.
- Reenter/reprogram the volatile electronic memory values.

- Check all functions.
- Use only clean water to clean the components. Note the Ingress Protection (IP) ratings (IEC 60529).

## ELECTRICAL CONNECTION

- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cables, use the provided cable ducts and harnesses; however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Use only a soft soldering process or commercially available crimp connector to solder new cable connections!

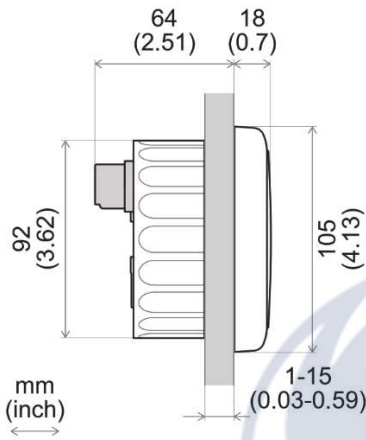
- Make crimp connections with cable crimping pliers only. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and be sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

# MECHANICAL INSTALLATION

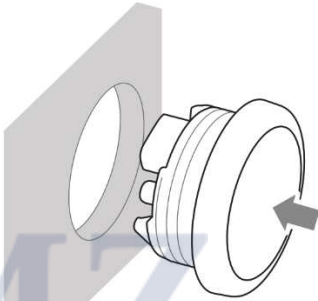
## INSTALLATION WITH SPINLOCK

1. Create a circular hole in the panel considering the device dimensions. [A]
2. Remove the spinlock and insert the device from the front. [B]
3. Adjust the spinlock as shown in picture [C] according to the panel thickness
4. Carefully screw in the spinlock by hand at least two turns and install the connector.

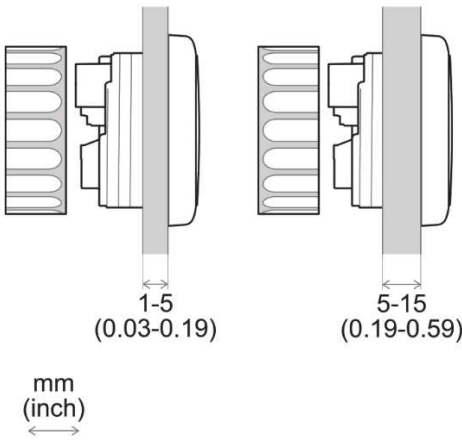
**A**



**B**

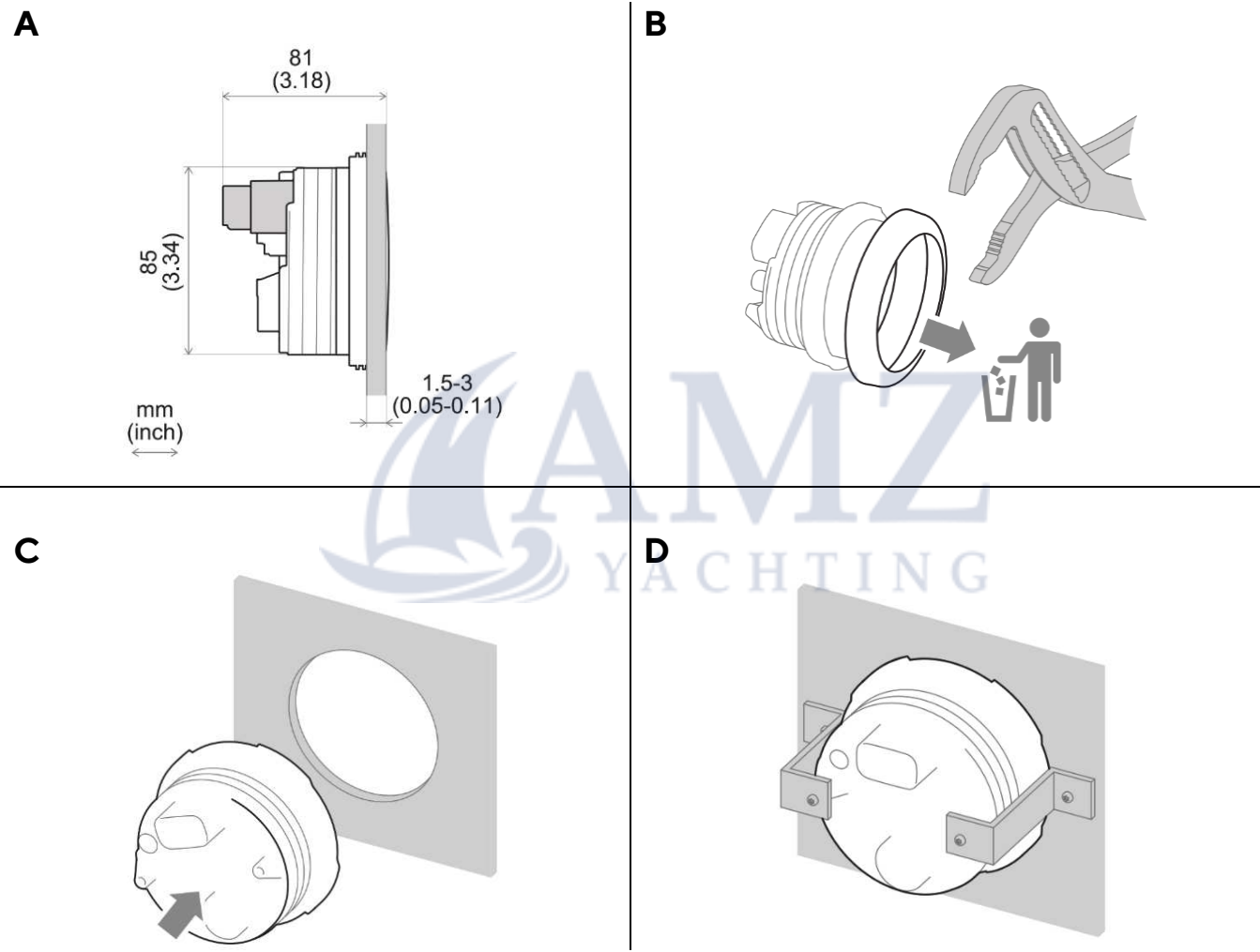


**C**



FLUSH MOUNTING

- 1. Create a circular hole in the panel considering the device dimensions. [A]
- 2. Remove the spinlock.
- 3. Remove the bezel using slip joint pliers. [B]  
**Note:** *the bezel cannot be used after removal since it might be damaged.*
- 4. Insert the instrument into the drill hole from the back. [C]
- 5. Adjust the instrument so that the gauge is level and fasten it to the stud bolts on the rear side of the panel, using the assembly kit accessories. [D]
- 6. Insert the connector



# ELECTRICAL INSTALLATION

## PINOUT

### ⚠ WARNING

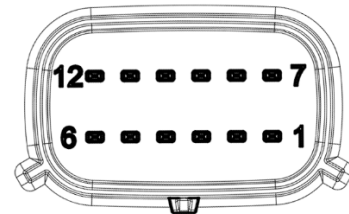
- Refer to the safety rules described in the electrical connections section of the safety information chapter of this document!

Depending on the configuration, insert the cable into the 12-pin contact enclosure according to the following pin assignment.

The contacts must audibly lock into place.

Now insert the plug into the gauge.

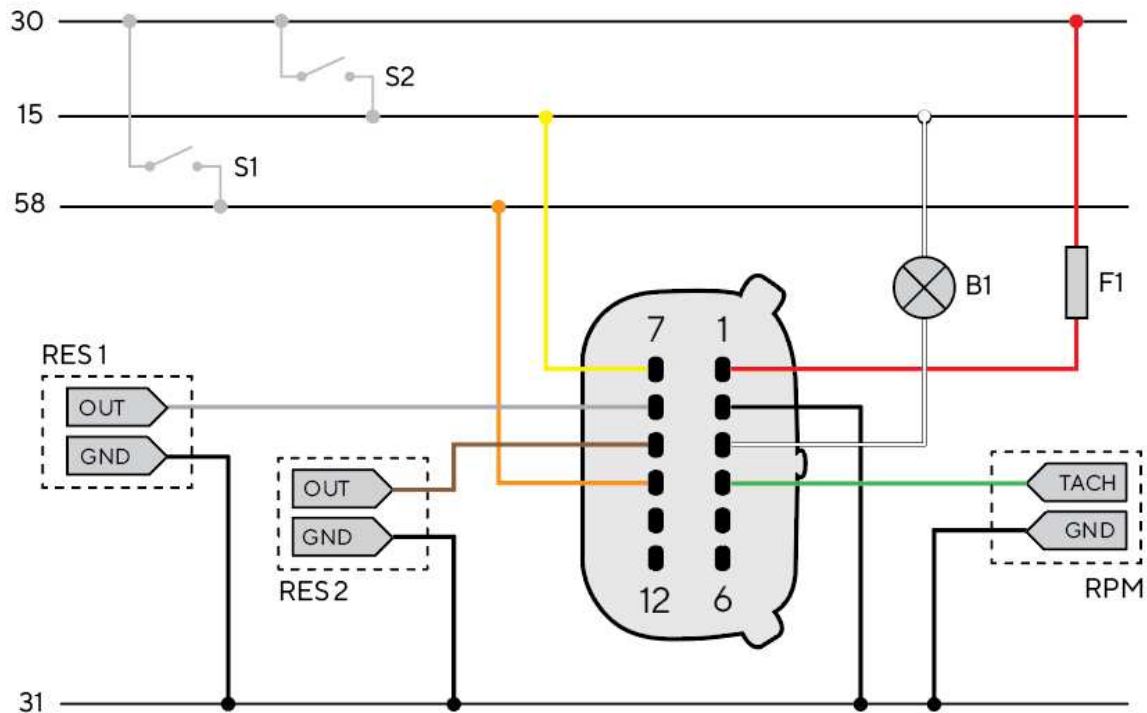
Note the inverse polarity protection noses in the process.



Pin No.	Wire color	Description
1	Red	Term. 30 - Power (12V/24V)
2	Black	Term. 31 - Ground
3	White	Alarm output (max. 500 mA, open collector)
4	Green	RPM sensor input
5	Blue	SAE J1939 - CAN Low
6	Blue / White	SAE J1939 - CAN High
7	Yellow	Term. 15 - Ignition plus
8	Gray	Sensor input 1 (0-400 Ohm)
9	Brown	Sensor input 2 (0-400 Ohm)
10	Orange	Term. 58 - Illumination
11	Red	EasyLink Power (leads to 3 pole connector)
12	Yellow	EasyLink Signal (leads to 3 pole connector)



## ELECTRICAL SCHEMATIC

**Designations in the circuit diagram:**

30 - Term.30 - Battery Power 12V

15 - Term. 15 - Ignition positive

31 - Term. 31 - Ground

58 - Term.58 - Illumination positive

S1 - Day/Night mode switch (not included)

S2 - Ignition key

F1 - 3A fuse (not included)

B1 - External buzzer (not included)

RES 1 - Resistive analogue input 1

RES 2 - Resistive analogue input 2

RPM - Frequency Analog Input

**ANALOG SENSOR CONNECTION (RES 1, RES 2, RPM)**

Any sensor connected to an analog input (RES 1, RES 2, RPM) of the 85mm device must be connected as shown in the figure.

It is advisable to use sensors with isolated ground, and it is necessary to ensure that the sensor ground is connected to the master gauges ground to avoid incorrect readings.

**EXTERNAL BUZZER CONNECTION (B1)**

The OceanLink device supports the connection of an external buzzer (B1) via the dedicated alarm output. This buzzer can be powered at different voltages (consult the buzzer manufacturer's manual), as the alarm output is connected to ground inside the tachometer or speedometer (Open collector output).

It is important to note that the maximum current supported is 500mA.

**ILLUMINATION SWITCH (S1)**

To turn the backlight illumination ON or OFF, add an external switch (S1) to the power supply (Term.30), or use the lights signal onboard (Term.58), if there’s one available.

**CONNECTION TO THE NMEA 2000® NETWORK**

Once the installation is complete, you can interface the device to the NMEA 2000® network through the dedicated socket on the wiring harness.

Be sure to tighten the M12 connector by screwing it onto its counterpart in order to preserve its watertightness.

The total length of the connection can be extended using one of the accessory drop cables.

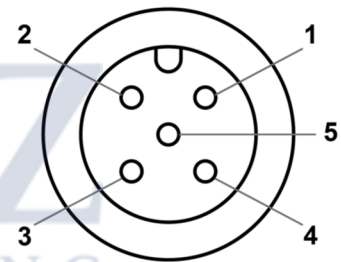
Note that NMEA 2000® does not allow drop cables longer than 6 meters.

Refer to the NMEA 2000® standard for proper network design.



**NMEA 2000® CONNECTOR**

Pin No.	Description
1	Shield
2	NET-S (V+)
3	NET-C (V-)
4	NET-H (CAN H)
5	NET-L (CAN L)



Micro-C M12 5 poles plug male, cable view

**CONNECTION TO EASYLINK SATELLITES**

The OceanLink 85mm Tachometers and Speedometers can be used as a master gauge to some other 52mm OceanLink satellite gauges. Those satellites must be all connected in a single row (daisy chain). The master then provides the information it gets over NMEA2000, SAE J1939, GPS or from its own analog inputs to the devices in the daisy chain.

This bus system is called EasyLink. It allows up to 16 satellites in one row and a total length of maximum 20 meters.

**EASYLINK CONNECTOR**

Pin No.	Wire color	Description
1	Red	12V Power
2	Blue	Ground
3	Yellow	EasyLink Data



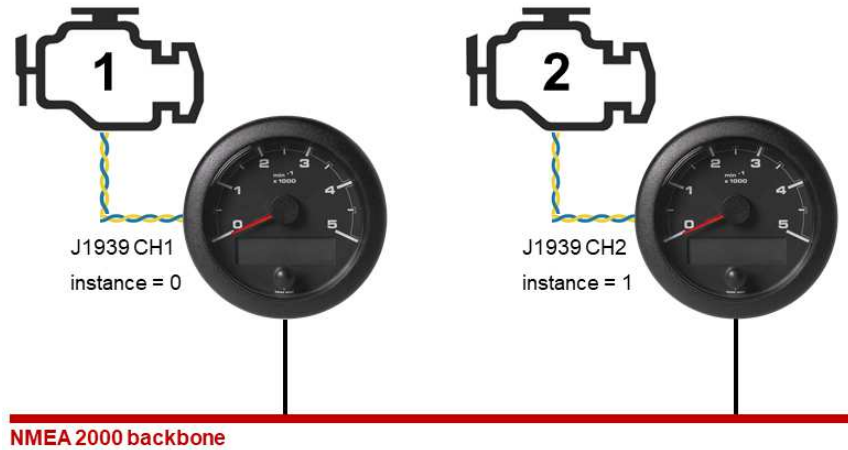
AMP SuperSeal 1.5 3 poles plug female, cable view

**CONNECTION TO SAE J1939**

The OceanLink Master is equipped with a SAE J1939 port to connect your CAN engine to the device and displaying the digital data coming from them.

Make sure to properly setup the J1939 gateway so that all the engine data are transmitted on NMEA 2000 with the correct instance.

Note that the instancing starts at zero. Therefore engine 1 gets instance 0, engine 2 gets instance 1, and so on.



# DISPLAY

The display can present a variety of different engine-, battery- and vessel data. To scroll through the different pages, showing the different values, briefly press the push button.

By default, all the possible screens are enabled. To select, which ones to hide and which to display go to the submenu "SCREENS ON/OFF" in the settings menu. (See chapter "SETTINGS MENU" in this document)

If there are any alarms active, there will be an additional page giving information about the current alarms. Also, there is a symbol showing "AL" displayed on every data page.

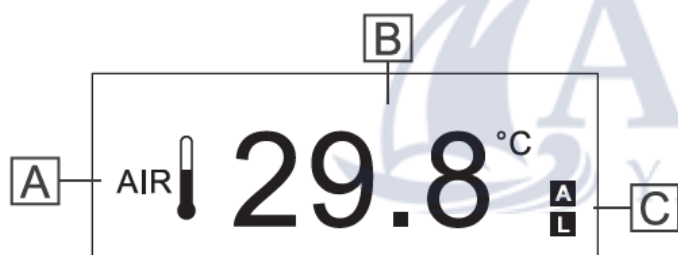
When powering the device on, the last screen displayed before shutting down, will be shown again.

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

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

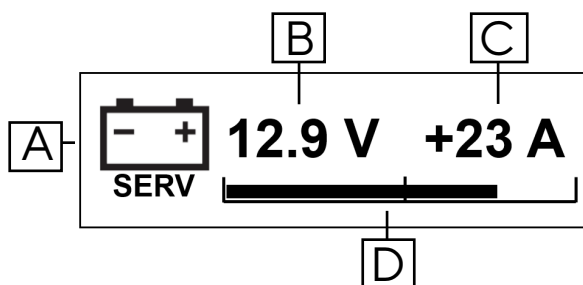
## SCREEN LAYOUT

Most data pages follow this layout:



Part	Description
A	Data symbol
B	Current value with relevant unit of measure
C	"AL" indicates that at least one alarm was triggered. The current alarm list is available after the last data page. (see "MANAGING ALARMS")


























The only data pages looking different from that are the battery monitoring screens. There are two of those screens available. One for the starter battery and the other one for a service battery.



This battery monitoring data pages contain of the following items:

Part	Description
A	Data symbol (with "SERV" for service battery and "START" for starter battery)
B	Battery Voltage
C	Current flow (negative, if power is drawn from the battery, positive if the battery is being charged)
D	Bar graph representing the state of charge (SOC).

## DISPLAYABLE DATATYPES

Icon	Information	Input Signal			Output Signal		Unit
		NMEA	J1939	Analog	NMEA	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
	Engine rpm	x	x	x	x	-	rpm
	Fuel consumption	x	-	-	-	-	gal/h, 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
SOC	Battery state of charge*	x	-	-	-	-	%
SOH	Battery state of health	x	-	-	-	-	%
AUTO	Battery autonomy	x	-	-	-	-	days, hours
TEMP	Battery temperature	x	-	-	-	-	°C / °F
	Speed through water (STW)	x	-	-	-	-	mph / kn or km/h
	Speed over ground (SOG)	x	-	-	-	-	mph / kn or km/h
HDG	Magnetic heading	x	-	-	-	-	°M
COG	Course over ground (COG)	x	-	-	-	-	°T (true North)
	Depth below transducer	x	-	-	-	-	m / ft
	Trim	x	-	x	x	x	%
	Rudder angle	x	-	x	x	x	°
	Room temperature	x	-	-	-	-	°C/°F
	Sea water temperature	x	-	-	-	-	°C/°F
	Time	x	-	-	-	-	12h / 24h

\*Values can also be displayed on combined "battery monitoring screen".

# SETTINGS MENU

## MENU STRUCTURE

Submenu	Description	Possible values/commands
<b>Units</b>	Select the measurement units for the different types of measurements.	<b>Speed:</b> km/h, mph, kn <b>Temperature:</b> °C, °F <b>Pressure:</b> bar, PSI, kPa <b>Volumes:</b> L, gal <b>Depth:</b> m, ft
<b>Engine instance</b>	Define, which engines data should be displayed on this 85mm master device and the attached 52mm satellites.	0, 1, 2, 3
<b>Battery instance</b>	Define, which batteries data should be displayed on this 85mm master device and the attached 52mm satellites.	0, 1, 2, 3
<b>Analog inputs</b>	Define, what kind of sensor is connected to the analog inputs and calibrate those inputs with either a sensor curve for the resistive inputs or a "number of pulses per engine revolution" for the frequency input.	<p><b>Resistive Inputs</b> (Pin 8, 9):</p> <ul style="list-style-type: none"> <li>○ Off</li> <li>○ Trim</li> <li>○ Fresh water level</li> <li>○ Fuel level</li> <li>○ Rudder angle</li> <li>○ Engine oil pressure</li> <li>○ Transmission oil pressure</li> <li>○ Boost pressure (turbo)</li> <li>○ Engine coolant temperature</li> <li>○ Engine oil temperature</li> </ul> <p>Define sensor curve (select standard curve or follow the onscreen instructions to make a 3 point call)</p> <p><b>Frequency Input</b> (Pin 4): Off, On (define pulses per revolution)</p>
<b>Depth</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>Wind</b>	Define your settings for the wind damping and choose an offset for the case, that the sensor installation is not aligned with the direction of the boat.	<b>Damping:</b> None, Low, Med, High <b>Offset:</b> -180° / +180°
<b>Clock</b>	Offset to add on the GPS-received time (Time zone/ UTC offset) and time format.	<b>Time zone:</b> -12h / + 12h <b>Time format:</b> 12h / 24h
<b>Screens ON/OFF</b>	Which data screens should be displayable on the LCD. Choose "YES" to display and "NO" to hide them.	See section "Display – Displayable Datatypes"

Submenu	Description	Possible values/commands
<b>Alarms</b>	Which alarms from NMEA should be displayable on the screen and should trigger the external buzzer?	See section "List of Local Alarms"
<b>Simulator Mode</b>	Display shows some random, moving data to demonstrate the function of the gauge when activated	<b>Yes</b> (activated) <b>No</b> (deactivated)
<b>Exit Settings</b>	Exit the Settings menu	<b>Yes</b> <b>No</b>

## USING THE SETTINGS MENU

To...	Then...
open the settings menu	turn on the device while holding down the push button until "SETTINGS" appears on the screen. After that you will see the first field "Config. Units".
scroll through the different options	briefly press the button.
confirm the value or command and move to the next step in the menu	hold down the button until the value or command blinks once.
move through the menu.	answer every question with "NO" until you reach the submenu you are looking for. <i>Note: The settings can only be scrolled forward. To go back you have to click through the hole menu or exit and then enter again.</i>
exit the menu	select the setting "EXIT SETTINGS" and confirm with "YES".

### Example procedure

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

1. Turn on the device while holding down the button until "Settings" appears: the "Configure Units" setting appears first.
2. Push and hold down the button until NO blinks once to scroll to the next submenu: 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.
6. Exit the menu by scrolling to the last submenu called "Exit the Menu". Confirm this with YES and you will get back to the normal data pages.

## CONFIGURE A SENSOR INPUT

Open the "Analog Input Configurations" in the settings menu and select the input you want to configure. (See chapter "Using the Settings Menu") Choose the sensor type that is connected to the according pin and define the sensor curve.

Depending on the sensor type, you can either select from some standard sensor curves or you can make a custom 3-point call.

To configure the personalized sensor curve, follow the instructions on the display. It will ask you to fill your tank to a certain level / put the engine or rudder in a defined position and then ask you to confirm that it should save the currently measured resistive value.

For the frequency input one has only to define the number of pulses the sensor delivers per engine revolution. Note the transmission ration between engine and alternator, when using that as a input source.

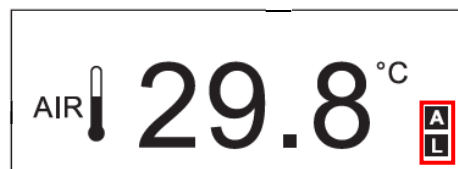
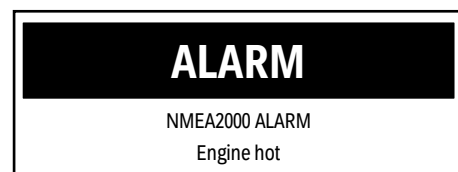
# ALARMS

## 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.



For more information on how to connect an external buzzer see section "External Buzzer Connection (B1)" in the chapter "Electrical Installation" of this document.

## 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.
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 see the alarm list again, scroll all data pages until "Alarm" appears and hold down the button for 3 seconds.

## CONFIGURE LOCAL ALARMS

1. Open the "Settings Menu" and move to the submenu "Configure Alarms". (See chapter "Settings Menu")
2. Klick through the available alarms until you find the one, you want to activate.
3. Push the button briefly to change the YES or NO. Select YES to enable the alarm and NO to disable it. Hold the button down to confirm.
4. Set the threshold at which the alarm should be triggered.
5. Define, whether the buzzer should be triggered, when this alarm occurs or whether only the warning on the display should be indicated. Hold the button down again to confirm.
6. Klick through all the alarms to exit the alarms menu and then scroll through the remaining submenus to exit the settings menu.

## MINIMUM RPM

The default value for minimum RPM is 300. This value can be changed in the alarm settings.

If the engine is below this range, certain alarms are not triggered. This prevents the misleading occurring of alarms during the start up of the engine. Also, the engine hours are only counted while the engine speed exceeds this value.



## LIST OF LOCAL ALARMS

Alarm	Possible values	Triggered above or below threshold	NMEA2000-output
Depth shallow	0 - 9.9 m	below	No
Low voltage	0-31.9 V	below	Yes
Low SOC	0 - 99 %	below	No
Battery Temperature High	0 - 99 °C	above	No
Exhaust gas temp	0 - 999 °C	above	No
Engine coolant temperature	0 - 139 °C	above	Yes
Engine oil temperature	0 - 149 °C	above	Yes
Engine oil pressure	0 - 9.9 bar	below	Yes
Fuel level	0 - 99 %	below	No
Fresh water level	0 - 99 %	below	No
Waste water level	0 - 99 %	above	No
min RPM	0 - 999 RPM	-	-

## LIST OF MANAGED CAN BUS ALARMS

## NMEA2000 - Engine Parameters, Dynamic (PGN 127489)

- Check engine
- Hot engine
- Low oil pressure
- Low oil level
- Low fuel pressure
- Low voltage
- Low cool level
- Water flow
- Water in fuel
- Charge indicator
- Preheat indicator
- Boost pressure
- Over rev
- EGR system
- Main throttle
- Emergency stop
- General warn 1
- General warn 2
- Power reduction
- Maintenance
- Engine com error
- Sub throttle
- Neutral protection
- Engine shut down

## NMEA2000 - Transmission Parameters, Dynamic (PGN 127493)

- Check gear
- Gear oil temperature
- Gear oil pressure
- 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

# TROUBLESHOOTING

## DISPLAY PROBLEMS

Problem	Cause	Solution
The displayed values are not those expected	Incorrect sensor configuration	Check parameter settings in the settings menu, in Config analog inputs
	Incorrectly connected sensor	Check the connection, 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
"----" and not the expected value appears on the display	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 52MM GAUGES

Problem	Cause	Solution
The gauges backlight works, 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	Check master connections Connect the power supply
	No 52 mm chain gauge is connected to the master	Connect a 52 mm gauge to the master

# TECHNICAL DATA

<b>Nominal Voltage</b>	12 V / 24 V
<b>Operating Voltage</b>	9 – 32 V with overvoltage and reverse polarity protection
<b>Current consumption</b>	< 100 mA (@12V)
<b>Absorption (LEN)</b>	2
<b>Protection class</b>	IP 65
<b>Lens</b>	PMMA double lens
<b>Housing</b>	Ø85 mm – Polycarbonate (PC)
<b>Installation depth</b>	75 mm
<b>Bezels</b>	PC (black, white) or ABS (chrome)
<b>Dial</b>	Backlit, different colors (black, white)
<b>Pointer</b>	Backlit, white on black dials; red on white dials 90° and 270° deflection angle
<b>Illumination</b>	Dial: LED amber (605 nm) Pointer: LED red (632 nm)
<b>Operating temperature</b>	-20°C to +70°C
<b>Storage temperature</b>	-35°C to +85°C with chrome bezel -30°C to +70°C
<b>Flammability</b>	flame retardant acc. UL94-V0
<b>Connectors</b>	Molex MX-150 12Pin (With EasyLink Connector built in the pigtail cable) NMEA2000 Micro-C M12
<b>Mounting</b>	Spinlock Nut – locking height 0.5 – 20 mm Optional Studs and Brackets – locking height 2 – 15 mm
<b>Certifications</b>	CE, Reach, RoHS

# ACCESSORIES

Description	Part Number
Adapter cable 8-poles	A2C59512947
Spinlock Nut 52 mm	A2C5205947101
Flush mount mounting kit	A2C59510864
Flush mount seal	A2C53215640
Bracket assembly mounting kit	A2C59510854
Connector set 8 pins	A2C59510850
Blind plug for 52 mm	A2C5312164501
Make-Point switch	A2C59510886
Bezel - Round Black	A2C1111380001
Bezel - Round White	A2C1352140001
Bezel - Round Chrome	A2C1141580001

Visit <http://www.veratron.com> for the complete list of accessories.

# VARIANTS

Variant Description	Part Number
OL GPS Speedometer 85mm - <b>14</b> kn, km/h, mph <b>Black</b>	A2C1351970001
OL GPS Speedometer 85mm - <b>14</b> kn, km/h, mph <b>White</b>	A2C1352010001
OL GPS Speedometer 85mm - <b>35</b> kn, km/h, mph <b>Black</b>	A2C1351980001
OL GPS Speedometer 85mm - <b>35</b> kn, km/h, mph <b>White</b>	A2C1352080001
OL GPS Speedometer 85mm - <b>70</b> kn, km/h, mph <b>Black</b>	A2C1351990001
OL GPS Speedometer 85mm - <b>70</b> kn, km/h, mph <b>White</b>	A2C1352090001
OL Tachometer 85mm - <b>3'000</b> RPM <b>Black</b>	A2C1065660001
OL Tachometer 85mm - <b>3'000</b> RPM <b>White</b>	A2C1065670001
OL Tachometer 85mm - <b>5'000</b> RPM <b>Black</b>	A2C1065720001
OL Tachometer 85mm - <b>5'000</b> RPM <b>White</b>	A2C1065800001
OL Tachometer 85mm - <b>7'000</b> RPM <b>Black</b>	A2C1065810001
OL Tachometer 85mm - <b>7'000</b> RPM <b>White</b>	A2C1065820001



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