

VMH 35 MARINE DISPLAY

USER MANUAL
rev. AA (DRAFT)



EN

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INTRODUCTION

VMH35 is a NMEA 2000 certified device designed for monitoring outboard engines.

Equipped with analogue inputs it is also well suited to refitting older engines allowing the direct connection of various sensors such as fuel, trim and tachometer, while the built-in NMEA 2000 gateway distributes these measurements to other digital network devices such as chartplotters, saving the need for an external converter.

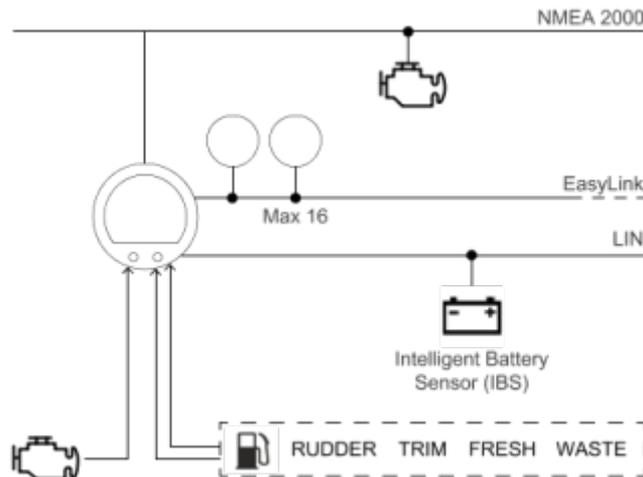
Its sleek black glass design is complemented by a stainless-steel frame crimped onto the mineral glass front where the sunlight-readable hybrid display is

glued.

The VMH35 has an IP X7 protection rating from the front and back to ensure the best performance in outdoor environments.

The built-in GPS makes the VMH35 the perfect standalone solution by integrating speed, compass and position data with engine information, while the dedicated IBS input allows you to interface an external 12V smart battery sensor to keep your boat's energy supply under control at all times

ARCHITECTURE



OPERATION

The VMH35 indicator is a versatile device. It allows the operation of all connected motors to be monitored at the same time. The selection of the motor whose data is to be displayed is made during the configuration of the data pages.

PRIORITY OF RECEIVED SIGNALS

Sensors and engine

- Two analogue resistive inputs
- Analog frequency input
- NMEA 2000
- LIN bus for Intelligent Battery Sensor (IBS)

GPS position

- Integrated GPS module
- NMEA 2000

SWITCHING ON AND OFF

The on/off mode depends on the connection made during installation.

At power up, the tachometer and warning lights come on for two seconds, the Veratron logo appears and then the last data page displayed before powering off.

You can customize the loading image displayed at power up using the Veratron Configuration Tool.

Note: Contact your veratron dealer for more information.

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 VDO 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.
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary, using taper milling tools, saber 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.
- 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.

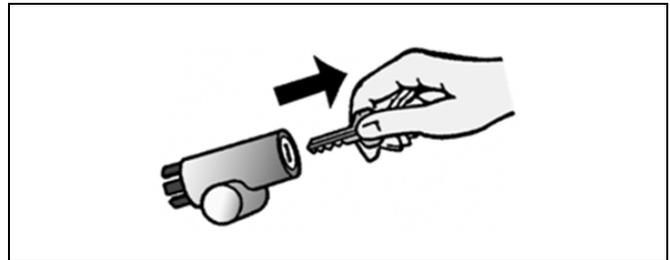
INSTALLATION

WARNING

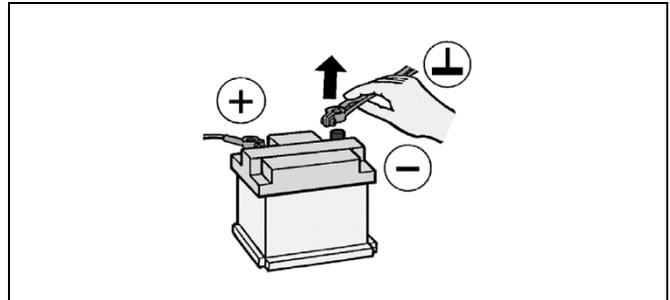
Before starting work, disconnect the negative terminal of the battery to avoid the risk of a short circuit. If the vehicle is equipped with additional batteries, the negative terminal of all batteries must also be disconnected if necessary. Short circuits can burn cables, explode batteries and cause damage to other electronic systems. Remember that by disconnecting the battery, all data entered in the temporary electronic memory will be lost and will have to be reprogrammed.

BEFORE THE ASSEMBLY

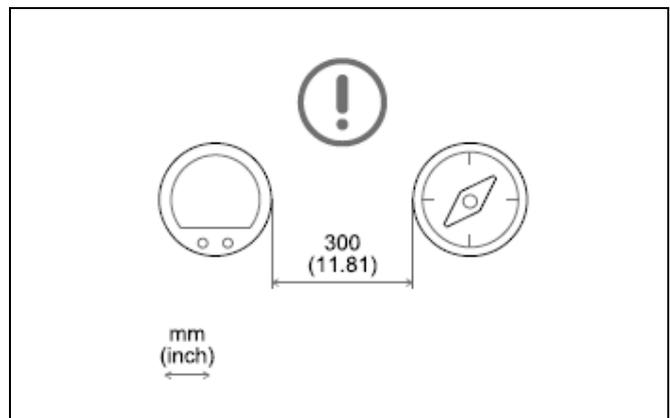
1. Before starting work, switch off the ignition and remove the ignition key. If necessary, remove the main power switch..



2. Disconnect the negative terminal of the battery. Do not allow the battery to be reconnected by mistake.



3. When mounting the device in the vicinity of a magnetic compass, maintain a protective distance from the compass.



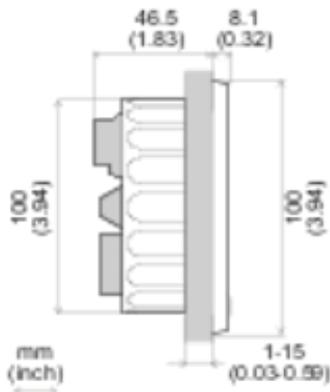
SPINLOCK MOUNTING

The panel thickness may be within a range of 2 to 20 mm.
The drill hole must have a diameter of 86 mm.

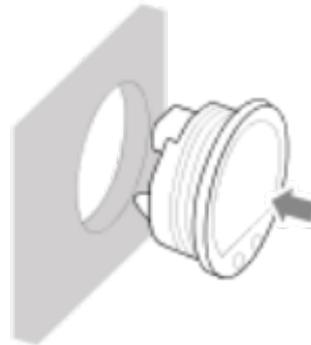
WARNING

- Do not drill holes or installation openings in supporting or stabilizing beams!
 - The mounting location must have sufficient clearance behind the mounting holes or openings. The required mounting depth is 65 mm.
 - Drill small holes with the drill, if necessary, enlarge them using a conical cutter, scroll saw, tail saw or file and finish them. Deburr the edges. It is essential to observe the safety instructions of the tool manufacturer.
-
- Create a circular hole in the panel considering the footprint of the device.
 - Remove the spinlock and insert the device from the front.
 - Orient the spinlock as shown according to the panel thickness.
 - Feed the cables through the spinlock and carefully screw it in for at least two turns.
 - Install the connector.

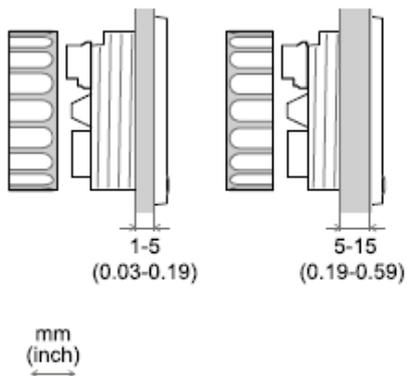
A.



B.



C.



CONNECTIONS

PINOUT

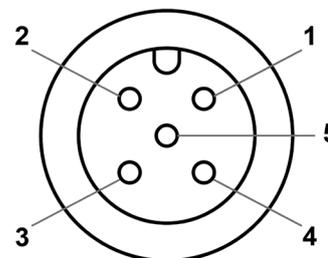
Pin No.	Wire color	Description
1	Red	KL. 30 - Battery power 12 / 24 V
2	Black	KL. 31 - Ground
3	White	Alarm output
4	Green	Frequency sensor signal - RPM
5	Blue	LIN bus - IBS sensor
6	Blue / White	N.C.
7	Yellow	KL. 15 - Ignition positive
8	Grey	Resistive sensor signal - RES 1
9	Brown	Resistive sensor signal - RES 2
10	Orange	Day/Night switch
11	-	EasyLink - Power
12	-	EasyLink - Signal



VMH 35 rear view
 Connettore Molex MX150 12-poles
 and DeviceNet 5-poles

NMEA 2000® CONNECTOR PINOUT

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

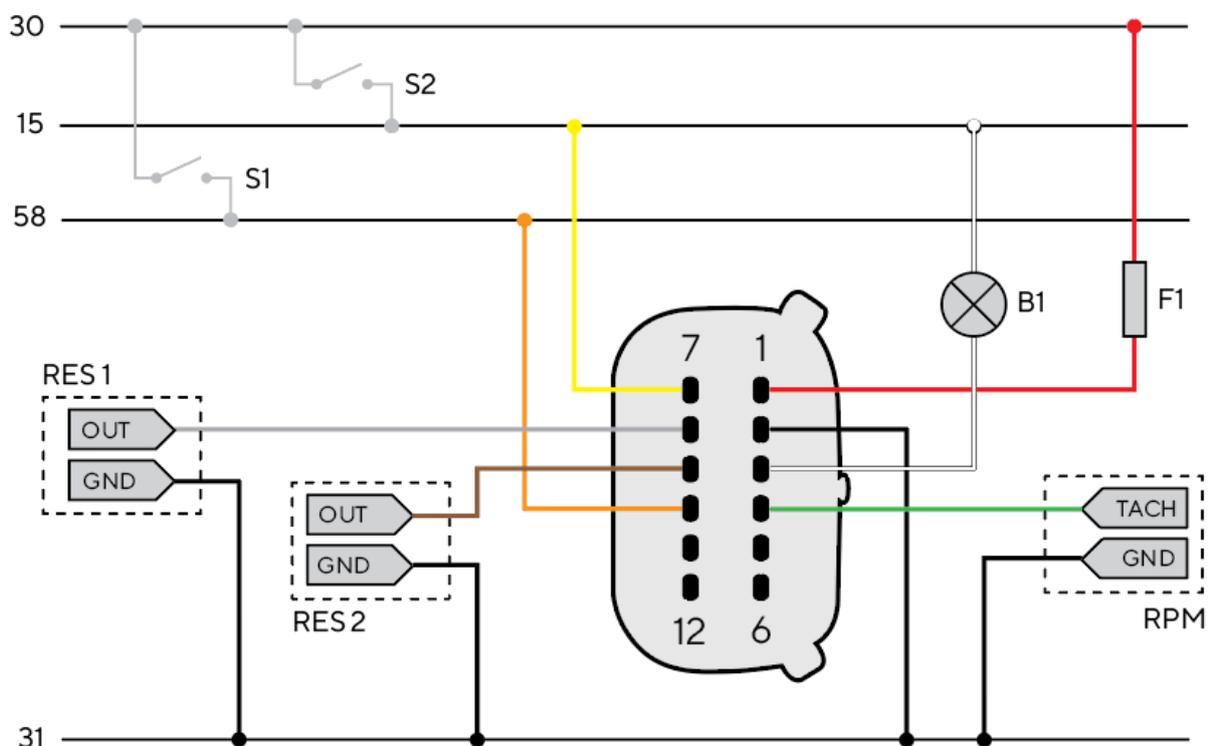


Micro-C M12 5 poles plug
 male, cable view

ELECTRICAL SCHEMATIC

WARNING

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



Designations in the circuit diagram:

30 - KL.30 - Battery Power 12/24 V
 15 - KL. 15 - Ignition positive
 31 - KL. 31 - Ground
 58 - KL.58 - Illumination positive

S1 - Day/Night mode switch (not included)
 S2 - Ignition key

F1 - 3A fuse (not included)
 B1 - External beeper (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 display 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 display ground to avoid incorrect readings.

EXTERNAL BUZZER CONNECTION (B1)

The display 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 display.

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

DAY / NIGHT MODE SELECTOR SWITCH (S1)

The display allows you to set two display illumination levels for day and night.

It is possible to switch from day mode to night mode (and vice versa) by means of a switch external to the display (S1) connected to the power supply (KL.30), or by connecting to the lights signal onboard KL.58, if present.

CONNECTING THE INTELLIGENT BATTERY SENSOR (IBS)

The display supports the direct connection of an intelligent 12V battery monitoring sensor.

This connection can be made through a special adapter cable (optional) that allows you to interface the display to the battery sensor and the battery itself.

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.

A drop cable is not required unless the total length of the supplied wiring is not sufficient to reach the NMEA 2000® backbone. In this case, the total length 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.
Fare riferimento allo standard NMEA 2000® per una corretta progettazione della rete.



DESCRIPTION

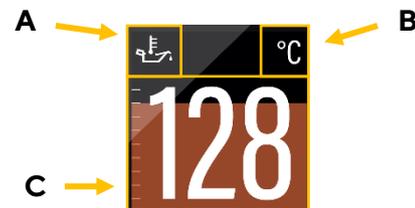
Part	Description
A	Display to show data pages and menu
B	Engaged gear
C	Current speed according to the selected unit of measurement
D	Rev counter
E	Alarm lights
SET / MODE	Buttons to interact with the data pages and the menu



DATA SCREENS

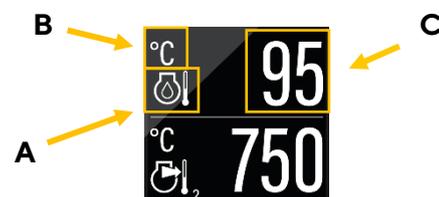
Single layout

A.	Data symbol
B.	Unit of measured value
C.	Current value



Dual layout

A.	Data symbol
B.	Unit of measured value
C.	Current value



SCREENS SCROLLING

To...	Then...
scroll through the pages	<ul style="list-style-type: none"> To return to the previous page, briefly press the MODE button. To go to the next page, briefly press the SET button.
adjust the backlight	briefly press the SET and MODE buttons simultaneously
reset a resettable value	Press and hold the SET button until the value resets.
acknowledge the alarm pop-up	press any button

SELECT THE PAGES TO DISPLAY

By default, all pages are displayed.

You can choose which pages to hide/show in the settings menu, under Show screen.

ELENCO DEI DATI GESTITI

Icon/Text	Information	Input signal					Output			Unit
		Internal	Frequency	Resistive	LIN	NMEA 2000	NMEA 2000	EasyLink		
 POS	Now	x *	-	-	-	x	x		hh:mm	
	GPS position	x *	-	-	-	x	x			
COG	Course over ground (COG)	x *	-	-	-	x	x		°T (nord geografico)	
Trim	Trim	-	-	x	-	x	x	x	°	
RUDDER	Rudder angle	-	-	x	-	x	x	x	°S (dritta) / °P (sinistra)	
DEPTH	Depth	-	-	-	-	x			m / ft	
SEA TEMP	Seawater temperature	-	-	-	-	x			°C / °F	
 ₁	Fuel level of the first tank	-	-	x	-	x	x	x	% / L / Gal	
 ₂	Fuel level of second tank	-	-	x	-	x	x	x	% / L / Gal	
 ₃	Third tank fuel level	-	-	x	-	x	x	x	% / L / Gal	
 ₄	Fourth tank fuel level	-	-	x	-	x	x	x	% / L / Gal	

GENERAL SETTINGS

Icon/Text	Information	Input signal					Output			Unit
		Internal	Frequency	Resistive	LIN	NMEA 2000	NMEA 2000	EasyLink		
 CONS	Total fuel used	x	-	-	-	-			L / gal.	
	Fuel flow	-	-	-	-	x			L / h / gph	
FRESH	Clear water	-	-	x	-	x	x	x	% / L / Gal	
WASTE	Dark waters	-	-	x	-	x	x	x	% / L / Gal	
	Voltmeter	x	-	-	x	x	x	x	V	
	Ammeter	-	-	-	x	x	x	x	A	
	Battery charging status	-	-	-	x	x	x		%	
	Battery life	x	-	-	-	x			d / h	
SOH 	Battery health status	-	-	-	x	x	x		%	
	Battery temperature	-	-	-	x	x	x		°C / °F	
	Engine coolant temperature	-	-	x	-	x	x	x	°C / °F	
	Engine coolant pressure	-	-	-	-	x			bar / psi	
	Engine oil temperature	-	-	x	-	x	x	x	°C / °F	
	Engine oil pressure	-	-	x	-	x	x	x	bar / psi	
	Turbine pressure	-	-	-	-	x		x	bar / psi	
 TRIP	Total engine operating hours counter	-	x	-	-	x	?		h	
	Trip hours counter	x	-	-	-	-			h	
TRIP	Distance travelled	x	-	-	-	-			Mi / km / nm	
	Motor speed		x			x	x		rpm	
	Speed through water (STW)		x			x	?		kmh / mph / kn	
	GPS speed (SOG)	x*				x	?		kmh / mph / kn	
-	Gear position					x			-	

Note*: data received from integrated GPS module.

ENGINE HOURS

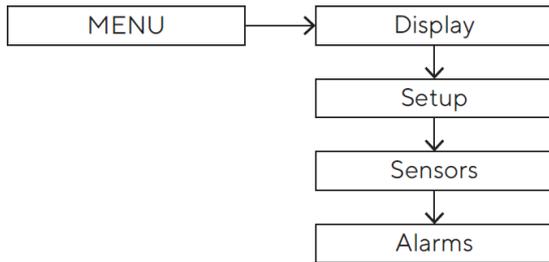
In the absence of data received from the NMEA 2000 network, the indicator considers the internal data if it is greater than 300 RPM. In the presence of data from the NMEA 2000 network, the indicator considers the data received from the network only if higher than the internal data.

DISTANCE TRAVELED

The indicator internally calculates the distance travelled based on the speed value set in Sensors > Speed.

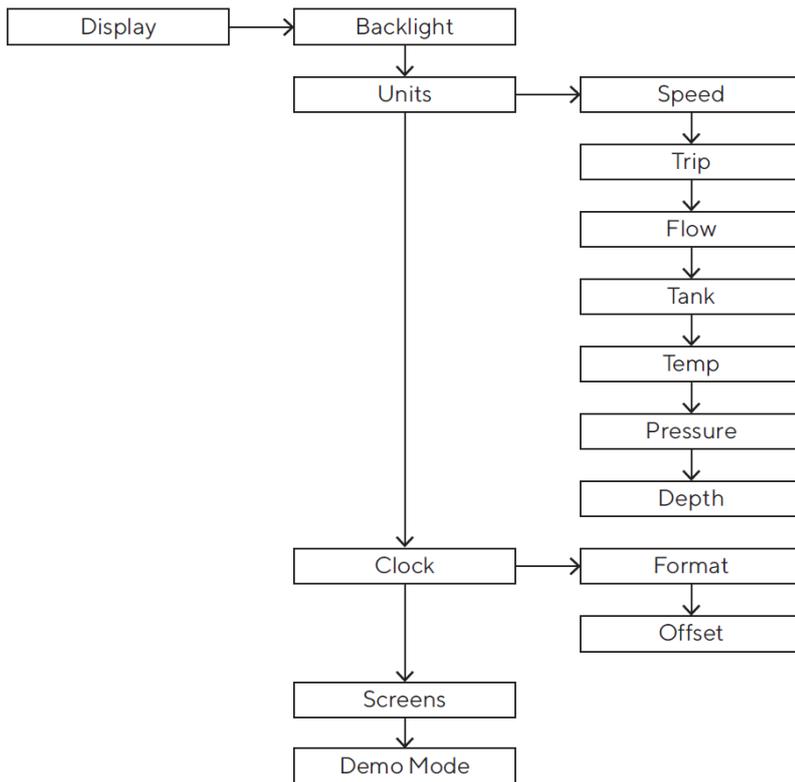
GENERAL SETTINGS

SETTINGS MENU STRUCTURE



OPERATE THE SETTINGS MENU

To...	Then...
enter the settings menu	Press the SET button until the first menu item appears.
scroll through the settings menu items and possible values	<ul style="list-style-type: none"> To go to the previous item/value, briefly press the MODE button. To go to the next item/value, briefly press the SET button.
confirm	Press the SET button until the data is confirmed.
come back	briefly press the MODE button
undo the change	Press the MODE button until the previous data appears.
exit the settings menu	press the SET and MODE buttons until the pop-up disappears, or the previous data page appears
delete an alarm pop-up	press any button



UNITS MENU

Setting	Description	Possible values/commands*
Speed	Speed units	kmh/ mph/ <u>kts</u>
TRIP	Unit of measurement of distance travelled	km / mile / <u>nm</u>
Flow	Flow measurement units ...	lh / <u>gph</u>
Tank	Unit of measurement of the liquid in the tank	l / <u>US gal</u>
Temperatures	Temperature units	°C/ <u>°F</u>
Pressure	Pressure units	bar/ <u>PSI</u>
Depth	Depth measurement units	m / <u>ft</u>

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

SET THE DAY/NIGHT MODE

To set the desired mode, act on pin 10 of the MX150 connector as follows:

To set the mode...	Then...
day	move the pin switch to GND/OPEN .

To set the mode...	Then...
night	move the pin switch to BATTERY PLUS .

CHANGE THE BRIGHTNESS OF THE DISPLAY

The change affects the set day or night mode.

- Press the **MODE** button until the **DISPLAY** menu appears with Backlight highlighted.
- Press the **SET** button to confirm the menu item.
- Press the **MODE** and/or **SET** buttons to increase or decrease the brightness.
- To exit the settings menu, press the **SET** and **MODE** buttons simultaneously until the previously displayed data page appears.

RESET A TRIP VALUE

- Press the **MODE** button until the **DISPLAY** menu appears.
- Briefly press the **MODE** and/or **SET** button to scroll through the pages to the one of interest.
- Press the **MODE** button until the page detail appears.
- Press and hold the **SET** button until the value resets.

UPLOAD A CUSTOM SPLASH LOGO

A custom splash logo can be loaded from a PC using the veratron Configuration Tool.

For more information, please refer to the veratron Configuration Tool user manual or contact your veratron reseller.

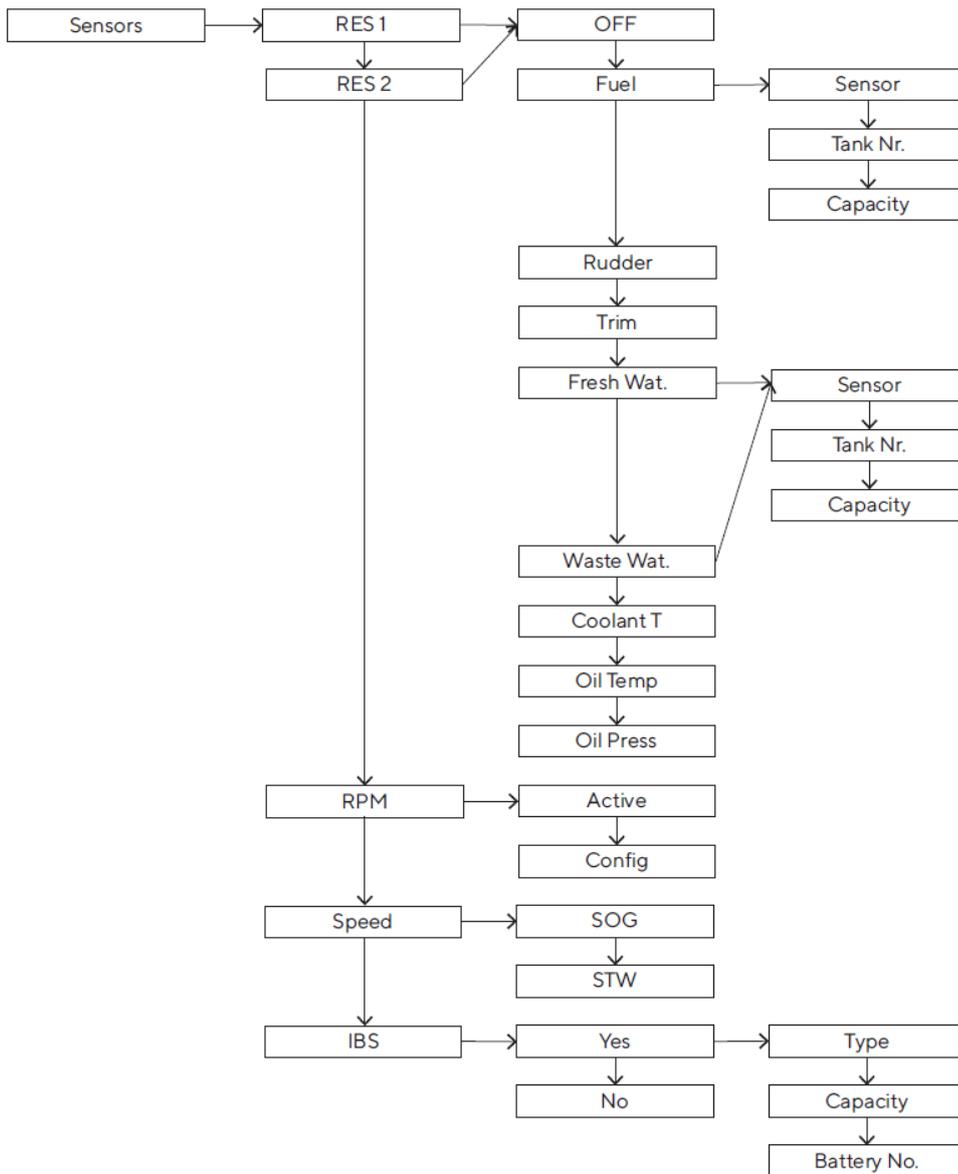
SENSORS' CONFIGURATIONS

TYPES OF CALIBRATION

Calibration of analog sensors can be:

- **Standard:** only for veratron sensors. You define the type of sensor and the device reads with good approximation the value of the sensor without the need of calibration.
- **Manual:** For non-Veratron sensors or to obtain a more accurate indication from a Veratron sensor. A three- or five-point procedure instructs the system to detect the sensor value.

SENSORS MENU STRUCTURE



CALIBRATE THE SENSORS

Fuel level sensor

- Connect the sensor of interest. See Connecting an analogue sensor.
- Under **Sensors** select the resistive input to which the sensor is connected.
- Under **Fuel > Sensor**, choose the desired configuration type.
- If you have chosen the **CUSTOM** configuration, follow the wizard on the display to create the sensor curve.
- Under **Sensors** select the resistive input of step 2.
- Under **Fuel > Tank no.**, select the ID to be assigned to the tank to which the sensor is connected.

Fresh water level sensor

- Connect the sensor of interest. See Connecting an analogue sensor.

- Under **Sensors** select the resistive input to which the sensor is connected.
- In **Fresh water > Sensor** choose the desired configuration type.
- If you have chosen the **CUSTOM** configuration, follow the wizard on the display to create the sensor curve.
- Under **Sensors** select the resistive input of step 2.
- Under **Fresh water > Tank no.**, select the ID to be assigned to the tank to which the sensor is connected.

Waste water level sensor

- Connect the sensor of interest. See Connecting an analogue sensor.
- Under **Sensors** select the resistive input to which the sensor is connected.
- In **Waste water > Sensor** choose the desired configuration type.
- If you have chosen the **CUSTOM** configuration, follow the wizard on the display to create the sensor curve.
- Under **Sensors** select the resistive input of step 2.
- Under **Fresh water > Tank no.**, select the ID to be assigned to the tank to which the sensor is connected.

Rudder angle sensor

- Connect the sensor of interest. See Connecting an analogue sensor.
- Under **Sensors** select the resistive input to which the sensor is connected.
- In **Rudder** choose the desired configuration type.
- If you have chosen the **CUSTOM** configuration, follow the wizard on the display to create the sensor curve.

Trim sensor

- Connect the sensor of interest. See Connecting an analogue sensor.
- Under **Sensors** select the resistive input to which the sensor is connected.
- In **Trim** follow the wizard on the display to create the sensor curve.

RPM sensor

- Connect the sensor of interest. See Connecting an analogue sensor.
- In **Sensors > RPM > Config** enter the value of pulses/revolution required for a correct reading of the signal.

Temperature and pressure sensors

- Connect the sensor of interest. See Connecting an analogue sensor.
- Under **Sensors** select the resistive input to which the sensor is connected.
- In ... Choose the desired configuration type.
- If you chose the **CUSTOM** configuration, create the sensor curve using the veratron Configuration Tool.

Intelligent Battery Sensor (IBS)

- Connect the sensor of interest. See Connecting the Intelligence Battery Sensor.
- In **Sensors > IBS** select **YES**.
- In **Type** select the battery type.
- In **Capacity** select the battery capacity.
- In **Battery** select the battery number

SENSOR CURVES

FUEL LEVEL SENSORS

Here are the possible alternatives:

Selectable value	Curve
ABYC-US	240-33 Ω
EUROPE	3-180 Ω
YAMAHA	105-5 Ω
CUSTOM	Five-Step Calibration Wizard

WATER LEVEL SENSORS

Here are the possible alternatives:

Selectable value	Curve
ABYC-US	240-33 Ω
EUROPE	3-180 Ω
CUSTOM	Five-Step Calibration Wizard

RUDDER ANGLE SENSORS

Here are the possible alternatives:

Selectable value	Curve
Single	10-180 Ω
Dual	5-90 Ω
CUSTOM	Three-step calibration wizard

COOLANT TEMPERATURE SENSORS

Here are the possible alternatives:

Selectable value	Curve
120°	291-22 Ω
CUSTOM	Calibration via veratron Configuration Tool

OIL TEMPERATURE SENSORS

Here are the possible alternatives:

Selectable value	Curve
150°	197-11 Ω
CUSTOM	Calibration via veratron Configuration Tool

OIL PRESSURE SENSORS

Here are the possible alternatives:

Selectable value	Curve
5 bar	10-184 Ω
10 bar	10-184 Ω
CUSTOM	Calibration via veratron Configuration Tool

ALARMS

ALARMS NOTIFICATION

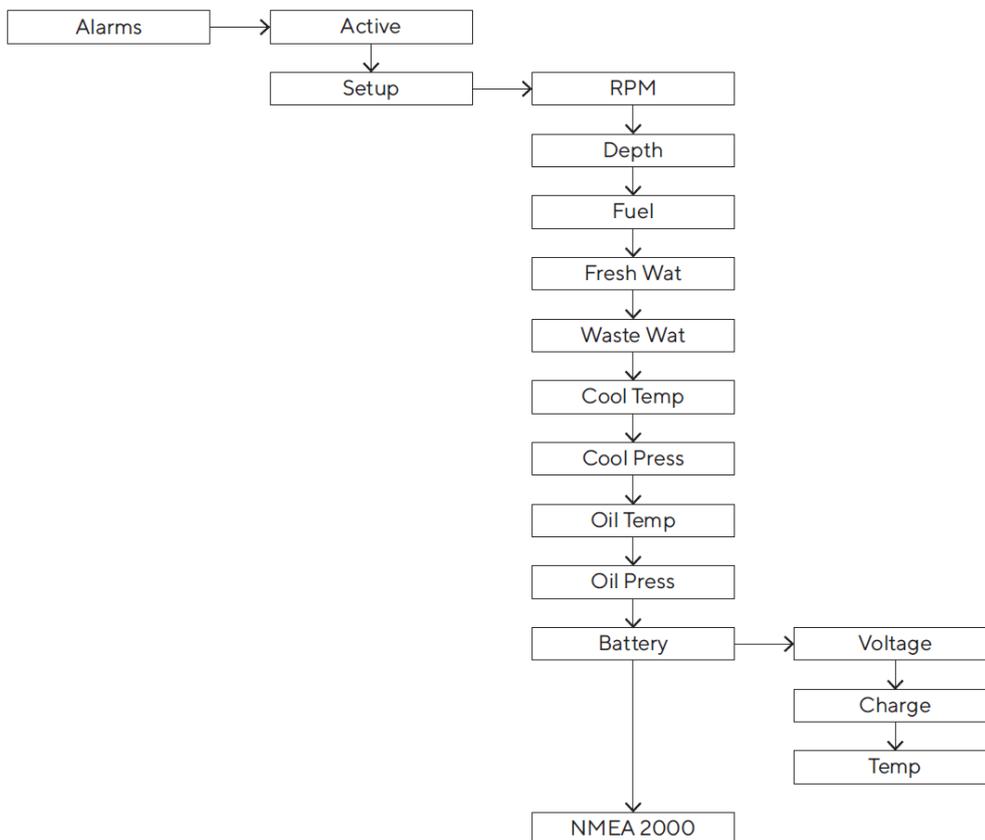
The VMH35 indicator shows internal active alarms and those coming from NMEA 2000. The **ALARMS** item allows you to set the alarms that can be generated by the indicator and the relative alarm thresholds.

In the event of an alarm, the following appears on the display:

- The alarm popup appears.

- The corresponding alarm lamp will light up, if present.
- The buzzer is activated, if connected and set.
- If supported, the alarm is forwarded over the NMEA 2000 network.

Alarm details are available in **Alarms**.



SET AN ALARM

- In ALARMS > Setup select the value to activate the alarm and then Active.
- Set the desired alarm threshold.

LIST OF MANAGED ALARMS

Local alarms

- Engine Overtemp
- Battery low
- Overvoltage
- Battery low charge
- Battery overtemp
- Low Oil Pressure
- Low Coolant Pressure
- Low Fuel #
- Low Fresh Water
- Waste Water Full
- Shallow Water
- Engine overspeed

NMEA 2000

- Water in fuel
- Engine Overtemp
- Battery low
- Low Oil Pressure
- Check Engine
- Check Transmission
- Engine overspeed

ALARM TELLTALES

Icon	Information
	Fuel level
	Engine failure
	Engine coolant pressure
	Oil pressure
	Engine coolant temperature
	Battery voltage

TROUBLESHOOTING

DATA DISPLAY

Problem	Root cause	Solution
The values displayed are not as expected.	Incorrect sensor configuration.	Check the configuration in the Sensors menu.
	Sensor connected incorrectly.	Check the connection, refer to the Installation Instructions.
	The NMEA 2000 network backbone has not been created correctly.	Check the connections and that there is a termination at both the beginning and end of the backbone.
Not available on the network.	Not available on the network.	Check that the sensor is functioning correctly.
	Sensor not connected.	Connect the sensor, refer to the <i>Installation Instructions</i> .
	The NMEA 2000 network backbone has not been created correctly.	Check the connections and that there is a termination at both the beginning and end of the backbone.

EASYLINK 52 MM GAUGES

Problem	Root cause	Solution
The indicator is backlit, but the pointer does not move.	Data not received by master	Check that the 52 mm indicator is compatible with the master. If it is, check that the data is present on the master display.
The hand does not move, and the indicator is not backlit.	Master not powered	Check the connections of the master. Connect the power supply.
	No 52 mm chain indicator is connected to the master.	Connect a 52 mm indicator to the master.

INTERNAL GPS

Problem	Root cause	Solution
The displayed speed is "--"	GPS module in search state (GPS search)	Wait. The search operation takes about one minute, then the GPS is ready (GPS valid).

TECHNICAL DATA

GENERAL FEATURES

Material	Mineral glass front lens Stainless steel frame
Connectors	<ul style="list-style-type: none"> • Molex MX150 (with EasyLink connector integrated in the pigtail cable) • NMEA 2000 Micro-C M12
Input data	<ul style="list-style-type: none"> • 2 analogue resistive inputs (0-400 Ω) • 1 frequency input (0-4 kHz) • 1 LIN bus
Output data	<ul style="list-style-type: none"> • NMEA 2000 • EasyLink
Degree of protection (according to IEC 60529)	Front: IPX6 Back: IPX7
Display	Hybrid with 1.44" central TFT and color IBN
GPS Antenna	Integrated, 10 Hz, 72 channels

ENVIRONMENTAL FEATURES

Operating temperature	From -20 to +60 °C
Storage temperature	From -30 to +80 °C

ELECTRICAL FEATURES

Rated voltage	12 V
Operating voltage	9-16 V
Current consumption	< 100 mA @ 12 V
Absorption (LEN)	2

COMPLIANCE

Compliance	
Directives	2014/30/EU (Electromagnetic compatibility) 2011/65/EU (Hazardous substances in electrical and electronic equipment)
Reference standards	IEC 60945: 2002-08 (environmental class: exposed)

DISPOSAL RESPONSIBILITY



Dispose of by separate collection through government or local government designated collection facilities. Proper disposal and recycling will help prevent potentially negative consequences for the environment and people.

SPARE PARTS, SENSORS AND ACCESSORIES

SPARE PARTS

Product	Part Number
Pigtail cable with MX150 connector	A2C14333300
Spin lock	A2C13760900
EasyLink extension cable	A2C59500139
Rubber gasket	A2C14624100

ACCESSORIES

Product	Part Number
Wiring harness for outboard engines	B00106601
IBS (Intelligent Battery Sensor) 12 V Gen II	B00084201
Adapter cable for IBS	B00090601

For all available accessories, visit www.veratron.com.



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