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veratron B001226 1.4 Inch Colour Multi Function Display

INTRODUCTION

PACKAGE CONTENTS

Part number	Description
B00186401 or B00127801	1x VMH Flex – NMEA 2000 or 1x VMH Flex – J1939
A2C5205947101	1x 52 mm Spinlock Nut
A2C53194838	1x Rubber Sealing Gasket
B001818 or B001817	1x Wiring Harness – NMEA 2000 or 1x Wiring Harness – J1939
-	1x Safety Instructions and Veratron Card

DESCRIPTION

Small but powerful, the VMH Flex is the perfect compromise to display a large amount of boat data in a compact device. The innovative laser touch-button allows you to scroll up to 5 different screens, no matter if you are wearing gloves or it’s raining on your deck. Every screen can be freely customized with your most important information, and the setup – including alarms – is easily done with your smartphone just with a “tab”. Capable of reading from both, sensors and CAN networks, the VMH Flex is further empowered by the LIN connectivity to get all the information from your battery thanks to the Intelligent

Battery Sensor.

CONTACTLESS CONFIGURATION

Thanks to contactless configuration, you can configure your all-in-one instrument with a simple “tap”! Start the smartphone app and define your settings via the user-friendly interface. Then simply hold your smartphone onto the VMH Flex to transfer the configuration immediately. Thanks to the built-in passive antenna, the configuration can be done without power supply!

USAGE

The usage of the VMH Flex is very intuitive. To scroll through the different screens, one must simply lay a finger on the infrared button which is located directly under the Veratron logo. After the fifth page the screen jumps back to the first.

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 damage 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 damage 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

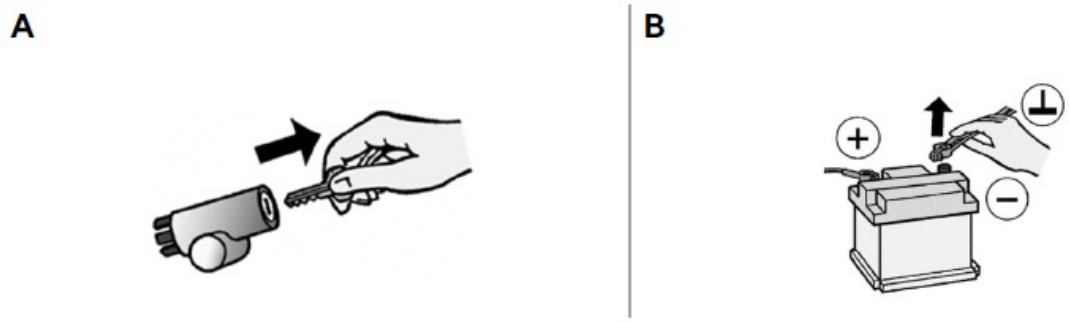
- Do not drill holes and installation openings in load-bearing or stabilizing struts or spars!
- For the installation location, ensure the necessary clearance behind the holes or the installation opening. Required installation depth 65 mm.
- Pre-drill small installation openings, enlarge with cone cutter, hole saw, jigsaw or file if necessary and finish. Deburr edges. Refer to the safety instructions of the hand tool manufacturer.

BEFORE THE ASSEMBLY

- A: Before beginning, turn off the ignition and remove the ignition key. If necessary,

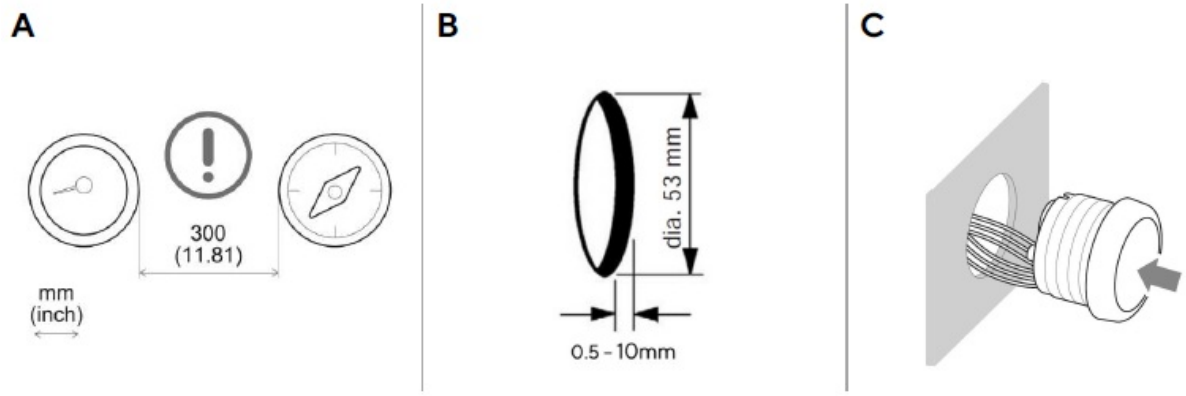
interrupt the main circuit switch.

- B: Disconnect the negative terminal on the battery. Make sure the battery can not restart unintentionally.



MOUNTING WITH SPINLOCK NUT

1. Place the device at least 300 mm away from any magnetic compass. [A]
2. Make a round hole, considering the external dimensions of the device. [B] The panel thickness can be in the range of 0-10mm.
3. Remove the spinlock nut and insert the device from the front. [C]
4. Screw in the spinlock at least two turns.
5. Connect the plugs.

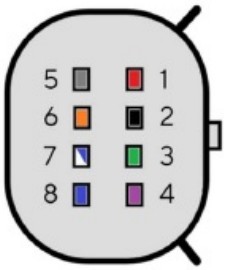


CONNECTIONS

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 damage to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

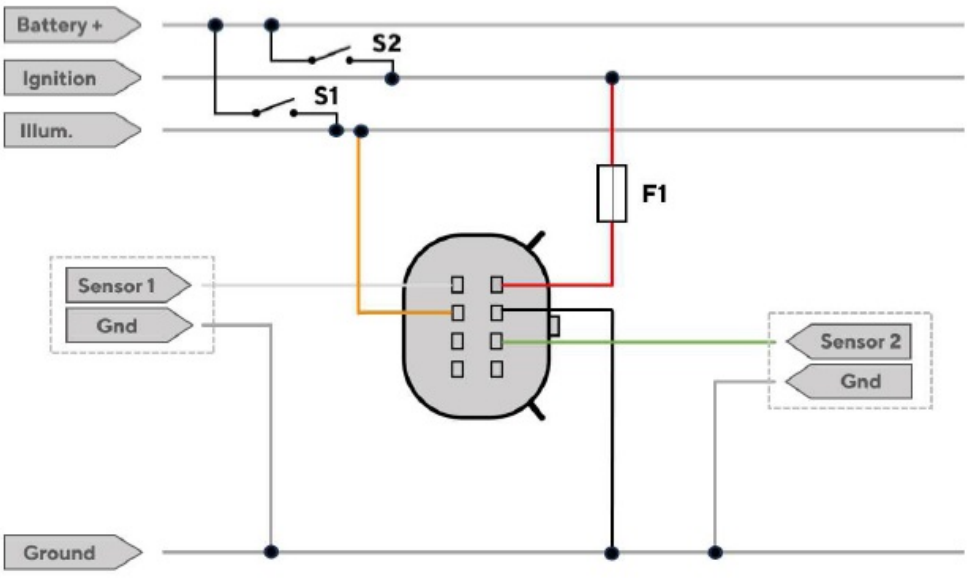
PINOUT

Pin	Cable color	Description
1	Red	Term. 15 - Power 12 / 24 V
2	Black	Term. 31 - Ground
3	Green	Analog Sensor - Resistive 2 (1.5 kOhm)
4	Violet	LIN Bus
5	Gray	Analog Sensor - Resistive 1 (400 Ohm)
6	Orange	Illumination day/night
7	Blue/White	CAN high
8	Blue	CAN low



Rear view VMH Flex
Molex MX 150, 8 poles-connector

ELECTRICAL SCHEMATIC

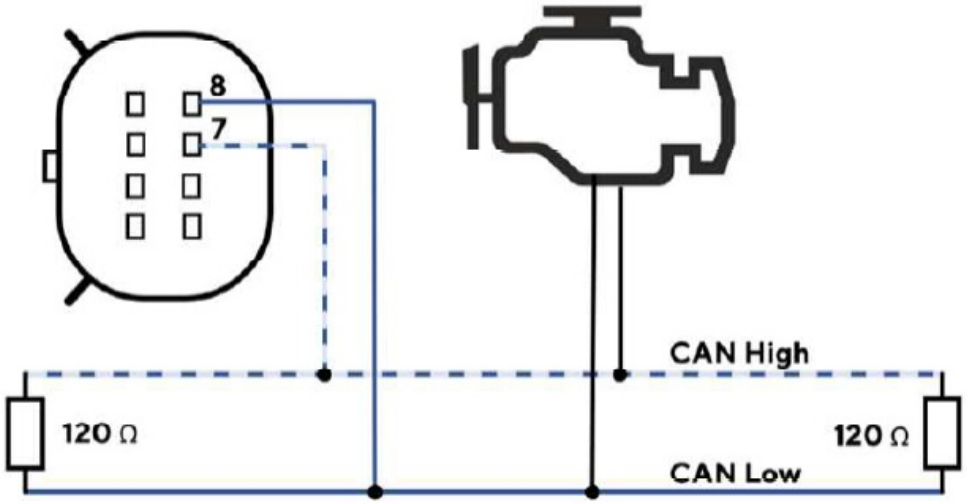


Designations in the circuit diagram:

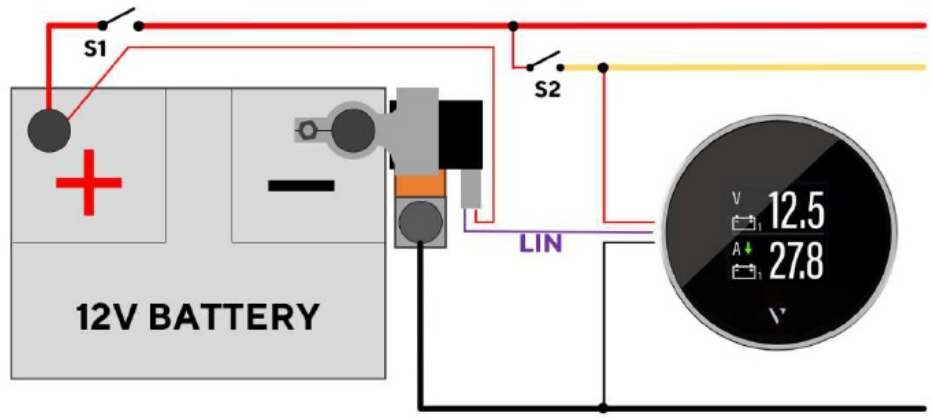
- S1 – Day/Night Mode switch (not included)
- S2 – Ignition Key
- F1 – Fuse (not included)
- Illum. – Illumination

CONNECTION TO THE SAE J1939 NETWORK

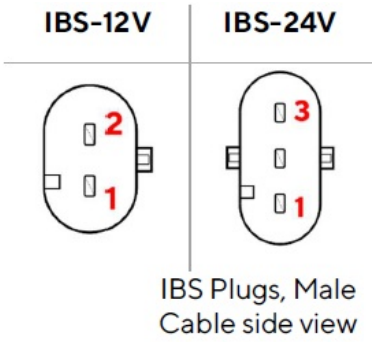
The VMH Flex J1939 cable does not include a connector on the CAN wires so it can be used with different engine manufacturers. Connect pin 8 (blue wire) to the CAN Low- and pin 7 (blue/white wire) to the CAN High signal. The data lines must be terminated by resistors as shown in the schematic.



CONNECTING THE IBS



S1: Main Power Switch **S2:** Ignition Key



IBS Plugs, Male
Cable side view

Pin	Function
1	+12 V Supply
2	LIN Bus
3	+24 V Supply

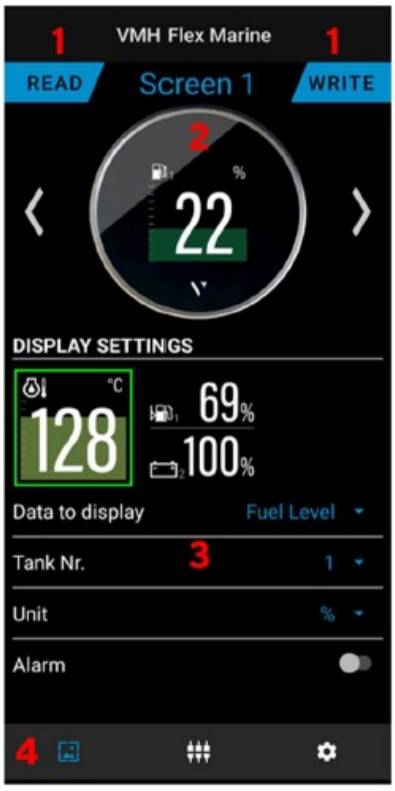
The Intelligent Battery Sensor (IBS) is to be installed on the negative pole of the battery. The main ground connection of the vessel's wiring must be attached to the pole adapter provided with the IBS. Currents on the wires that are connected to the pole of the battery directly, will not be measured by the sensor and will corrupt the calculated results like capacity, battery autonomy and battery health. The 12V-/24V connection for the IBS must be connected to the positive pole of the battery. This connection may not be interrupted by the main switch.

CONFIGURATION

VMH FLEX CONFIGURATOR APP

To configure the VMH Flex, some parameters must be configured, e.g. the display type, the connected sensor and its calibration or the alarm threshold. This is possible with the smartphone app “VMH Flex J1939”, which can be downloaded free of charge from the stores for both Android and iOS devices. Thanks to the passive NFC receiver, the VMH Flex device can be configured as described below without the need for a power supply.

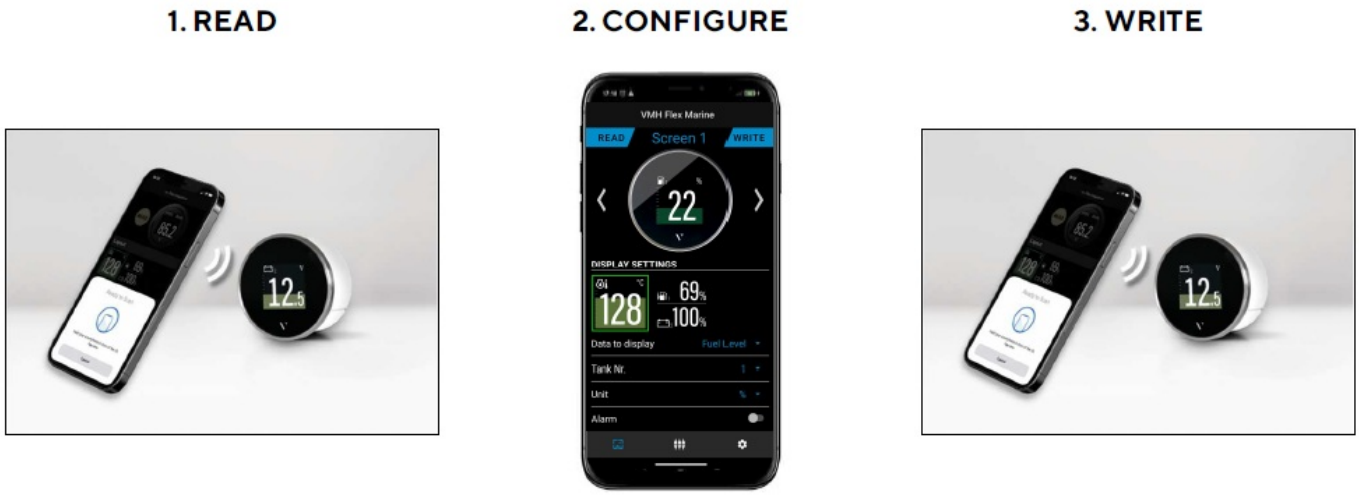
APP LAYOUT



1. Read / Write buttons Press before connecting with display
2. Screen preview with screen number Shows how the current setting will look on the VMH Flex
3. Parameter selection Define to see the correct data
4. Tab selection screen tab | input tab | settings tab

THE CONFIGURATION PROCESS

Before defining any settings, the current configuration must be read from the VMH Flex by pressing the read button and holding the smartphone's NFC interface directly on the screen of the gauge.



The configurations are distributed over the three tabs accessible through the tab selection on the bottom of the screen.

- Define which data should be visible with the options in the Screen Tab. (More information in section "Setting up the Data Pages")
- Enable the required analog inputs and disable the others in the Input Tab.. (More information in section "Configure an Analog Sensor" and "Configure the IBS Input")
- Choose the basic screen settings in the Settings Tab. (More information in section "Screen Settings")

Once all configurations have been defined, press the write button and hold the smartphone again onto the screen.

SETTING UP THE DATA PAGES

In the Data Tab use the arrow buttons to scroll through the previews of the different screens. For each of the five screens, the following configurations shall be defined.

- **Layout:** Choose between the single or dual layout by pressing the according preview in the section “Display Settings”.
- **Gauge Type:** Select the desired value, that should be visible through the dropdown menu “Data to display”.

Depending on the selected gauge type, it is possible to define some more parameters. Not all of them are available for every type.

- **Number:** Select the appropriate instance. The instance describes which of the engines, tanks or sensors is meant if there is more than one in the system (e.g.: Tank1/Tank2/…). (Note that the numbering starts at 1. Some manufacturers will call the first device “instance 0”)
- **Unit**: Selection between metric, imperial or nautical measurement units.
  Bargraph: Define the range of values displayable on the bar graph.
- **Alarm**: For some gauge types, the VMH Flex can display alarm messages. This function must be enabled or disabled for each individual data field. When receiving a value via CAN, the alarm is only displayed, if the according DM1 alarm message is received. By deactivating the switch in the alarm section, the DM1 alarms for this datatype will be ignored. When getting the information from an analog sensor, the alarm is triggered internally when the threshold value is reached. The desired threshold must be entered in the text field next to the alarm switch.

If the dual layout is selected, all these settings are doubled for the second dataset as well.

CONFIGURE A RESISTIVE INPUT

The settings for the analog data inputs can be found in the input tab. The switches enable or disable the different sensor inputs. When enabling an input the following menu entries will be expanded.

- **Sensor:** Defines which type of sensor is connected to the input.
- **Number:** Selection of the sensor’s instance. The instance describes which of the engines, tanks or sensors is meant if there is more than one available in the system (e.g.: Tank1/Tank2 …).
- **Characteristics:** The sensor’s characteristics must be entered into the table. For

Veratron sensors the curves are predefined and can be imported to the table by selecting the according option from the dropdown menu “Characteristics”.

The VMH Flex – NMEA 2000 includes a gateway function. Therefore, the values measured on the analog inputs will be shared on the NMEA 2000 network. The gateway function can also be used on sensors without their values being shown on the VMH Flex display. The VMH Flex J1939 does not send out the data from the analog inputs. The data will only be displayed on the screen.

CONFIGURE THE IBS INPUT

When an Intelligent Battery Sensor (IBS) is connected to the LIN-Bus (Pin 5 – Blue/White), the Input “IBS Sensor” must be enabled in the “Inputs” tab. For the sensor to work, these parameters must be defined:

- **Sensor**: Selection of the exact type of Intelligent Battery Sensor.
- **Battery Type**: Selection of the fitting battery type. (Gel, AGM or Flooded)
- **Capacity**: Type in the capacity of the battery. The number can be found written on the battery. On a battery pack, add up the numbers of the different batteries.

SCREEN SETTINGS

To change the illumination levels, the clock offset and the time format, use the configurations in the settings tab.

- **Illumination**: Use the sliders to define the brightness levels for the day and night mode. The day or night mode depends on the applied signal on the illumination input (Pin 6 – Red/White).
- **Clock Offset**: The time is not counted internally. It can only be received via CAN (NMEA 2000 or J1939). On NMEA 2000, only the UTC+00:00 time is sent. This means the device must be configured to match the time in your current time zone. To do so select the according offset in this menu.
- **Clock Format**: Select whether the time should be displayed in a 12h or 24h format.

SUPPORTED CONFIGURATIONS

Display type	Unit	Analog Sensor	LIN	Analog Alarm	NMEA PGN	J1939 SPN
Air temperature	°C °F	-	-	No	130316	171
Ammeter	A	-	-	No	127508	114
Battery autonomy	h, days	-	✔	No	127506	-
Battery charge	%	-	✔	Yes	127506	-
Battery health	%	-	✔	Yes	127506	-
Battery potential	V	measured on supply voltage	✔	Yes (CAN only)	127508	168
Battery temperature	°C °F	-	✔	Yes	127508	-
Boost pressure	bar psi	✔	-	Yes (above)	127488	102
Brake pressure	bar psi	-	-	No	-	117
Catalyst tank level	%	✔	-	Yes (below)	-	1761
Clock	hh:mm	-	-	No	126992	959-964
Coolant level	%	-	-	No	-	111
Coolant pressure	bar psi	✔	-	Yes (below)	127489	109
Coolant temperature	°C °F	✔	-	Yes (above)	127489	110
Course over ground	deg	-	-	No	129026	-
Depth	m ft	-	-	No	128267	-
Engine hours	h	-	-	No	127489	247
Engine oil level	%	-	-	No	-	98
Engine oil pressure	bar psi	✔	-	Yes (below)	127489	100
Engine oil temp.	°C °F	✔	-	Yes (above)	127489	175

CONFIGURATION

Display type	Unit	Analog Sensor	LIN	Analog Alarm	NMEA PGN	J1939 SPN
Engine speed	rpm	-	-	No	127488	190
Exhaust gas temp.	°C °F	-	-	Yes	130316	173
Fresh water level	%	✔	-	Yes (below)	127505	-
Fuel level	%	✔	-	Yes (below)	127505	96
Fuel pressure	bar psi	-	-	No	127489	94
Fuel rate	L/h gal/h(US) gal/h(UK)	-	-	No	127489	183
Gear oil level	%	-	-	No	-	124
Gear oil pressure	bar psi	✔	-	Yes (below)	127493	127
Gear oil temperature	°C, °F	✔	-	Yes (above)	127493	177
Inst. fuel economy	L/100km mpg(US) mpg(UK) mpL(UK)	-	-	No	-	184
Percent load	%	-	-	No	127489	92
Power takeoff speed	rpm	-	-	No	-	186
Rudder position	deg	Only on NMEA version	-	No	127245	-
Speed	kn km/h mph	-	-	No	128259	84
Speed over ground	kn km/h mph	-	-	No	129026	-
Total distance	nm km mi	-	-	No	-	171
Total fuel	L gal(US) gal(UK)	-	-	No	-	250
Trim	%	Only on NMEA version	-	No	127488	-
Trip distance	nm km mi	-	-	No	-	224
Trip fuel	L gal(US) gal(UK)	-	-	No	-	182
Water level	%	Only on J1939 version	-	No	-	-
Waste water level	%	Only on NMEA version	-	No	127505	-

DISPLAY LAYOUT

SINGLE LAYOUT

- **A. Symbol**

  Indicates, which data type is displayed right now. For the data types, which support this function, there is also the instance indicated here.

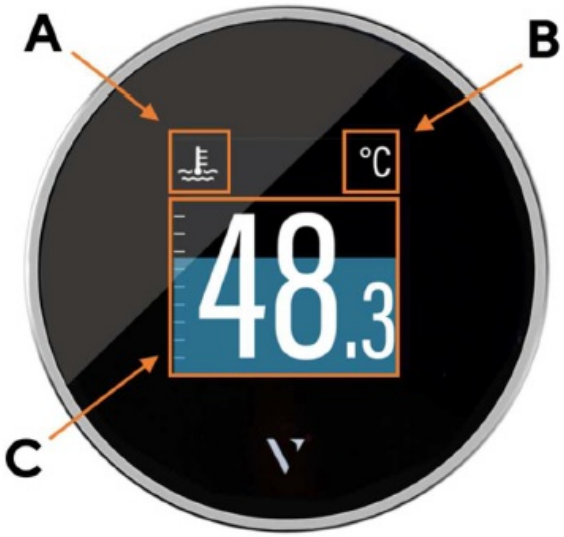
- **B. Unit**

  Shows the unit of the currently displayed data. For some data types it’s possible to change the unit in the settings. (See table “Supported Configurations”)
- **C. Measured value**

  This shows the numeric value of the dedicated measured data. If there aren’t any values received for this data type or they are out of range, the display will show “—“.

  Colored Graph

  The coloured graphic in the background is a bar diagram that puts the measured value in perspective. This function isn’t supported for all data types. The white lines on the left side show the scalation.



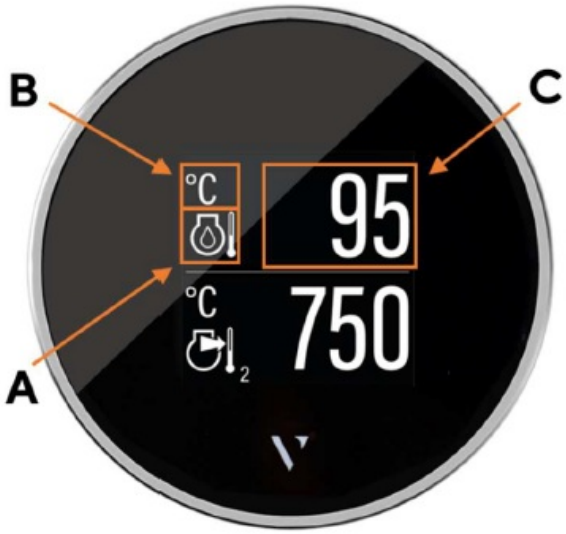
DUAL LAYOUT

- **A. Symbol**

  Indicates, which data type is displayed right now. For the data types, which support this function, there is also the instance indicated here.
- **B. Unit**

  Shows the unit of the currently displayed data. For some data types it’s possible to change the unit in the settings. (See table “Supported Configurations”)
- **C. Measured Value**

  This shows the numeric value of the dedicated measured data. If there is any data received for this data type or the values are out of range, the display will show “—“. The bar graph can’t be displayed in the dual layout for any value.



ALARM DISPLAY

Single data layout

When an alarm is active the bar-graph for the affected data screen turns red, and a red alarm symbol is displayed in the top part of the display between the data symbol and the unit. The display returns to normal operation mode once the alarm is not detected anymore.

Dual data layout

When an alarm is active on any of the two displayed data fields, the numeric digits of the affected field become red. In the example, the data at the bottom of the screen (Exhaust Gas Temperature) has an alarm active. The display returns to normal operation mode once the alarm is not detected anymore.

Alarm pop-up

If a new alarm occurs, a pop-up appears looking like the example shown on the left. The pop-up appears even if the affected data is currently not visible on the screen and stays

active until it is confirmed by activating the touch button. The pop-up contains a description of the alarm type and, depending on the type, also a number indicating the instance of the affected engine or tank.

TECHNICAL DATA

DATASHEET

Screen	1.44-inch TFT color display, sun-readable, transmissive
Screen resolution	125 x 125 Pixel
Rated voltage	12 V / 24 V
Operating voltage	8 - 32 V with overvoltage and reverse polarity protection
Current consumption	65 mA (at full brightness, @12V)
Analog inputs	2x Resistive (1x 0-400 Ohm / 1x 0-1'500 Ohm)
Digital inputs	CAN (NMEA 2000® or J1939), LIN bus
Wireless interface	Airwave (NFC-Based)
Protection class	IP X7
Installation diameter	Ø52 mm
Flammability	Flame retardant (UL94-V0)
Connection	Molex MX150 - 8 Pole (Molex 334724806 / Molex 330122004)
Mounting	Spinlock nut 52mm; clamping height 0.5mm - 20mm
Materials	Housing: PBT-FR (Black) Front: Soda Lime Glass (chemically strengthened) Bezel: Stainless steel (brushed)
Operating temperature	-20°C to +70°C
Storage temperature	-30°C to +80°C
Standards	CE, Reach, RoHS

SUPPORTED NMEA 2000® PGNS

Description	PGN
System Time	126992
Heartbeat	126993
Rudder	127245
Fluid level	127505
DC Detailed Status	127506
Battery status	127508
Engine Parameters, Rapid Update	127488

Description	PGN
Engine Parameters, Dynamic	127489
Transmission Parameters, Dynamic	127493
Speed, Water Referenced	128259
Water Depth	128267
COG & SOG, Rapid Update	129026
Temperature	130316

SUPPORTED SAE J1939 SPNS

Description	SPN
Wheel-Based Vehicle Speed	84
Engine Percent Load at Current Speed	92
Engine Fuel Delivery Pressure	94
Fuel Level 1	96
Engine Oil Level	98
Engine Oil Pressure	100
Engine Intake Manifold #1 Pressure	102
Engine Coolant Pressure	109
Engine Coolant Pressure	110
Engine Coolant Level	111
Alternator Current	115
Brake Primary Pressure	117
Transmission Oil Level	124
Transmission Oil Pressure	127
Battery Potential / Power Input 1	168

Description	SPN
Ambient Air Temperature	171
Engine Exhaust Gas Temperature	173
Engine Oil Temperature	175
Transmission Oil Temperature	177
Engine Trip Fuel	182
Engine Fuel Rate	183
Engine Instantaneous Fuel Economy	184
Power Takeoff Speed	186
Engine Speed	190
Trip Distance	244
Total Vehicle Distance	245
Engine Total Hours of Operation	247
Engine Total Fuel Used	250
Catalyst Tank Level	1761
Time	959-964

ACCESSORIES

Accessory Part	Part Number
Spinlock nut 52 mm	A2C5205947101
Wire harness – J1939 Version	B001817
Wire harness – NMEA Versions	B001818
NMEA 2000® Cable 6m	A2C9624400001
NMEA 2000® Cable 2m	A2C9624380001
NMEA 2000® Cable 0.5m	A2C9624370001
NMEA 2000® Terminator Male	A2C3931100001
NMEA 2000® Terminator Female	A2C3931060001
NMEA 2000® T-Splitter	A2C3931270002
NMEA 2000® 4 Ways T-Splitter	B00054101

- Visit http://www.veratron.com for the complete list of available accessories.

REVISION HISTORY

Version	Changes	Date
Rev. AA	– Initial Release	12.12.2024
Rev. AB	– Adapted manual to changes before product release	15.04.2025

- veratron AG Industriestrasse 18 9464 Rüthi, Switzerland T +41 71 7679 111 info@veratron.com veratron.com

FAQ

Q: How do I reset the VMH Flex to factory settings?

A: To reset the VMH Flex to factory settings, press and hold the power button for 10 seconds until the device restarts.

Documents / Resources

	veratron B001226 1.4 Inch Colour Multi Function Display [pdf] User Manual B001226, B001226 1.4 Inch Colour Multi Function Display, B001226, 1.4 Inch Colour Multi Function Display, Colour Multi Function Display, Multi Function Display, Function Display, Display

References

- User Manual

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