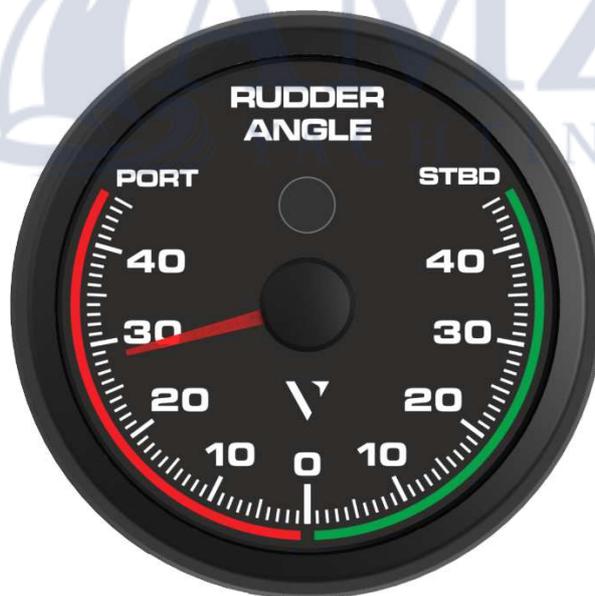


# PROFESSIONAL RUDDER ANGLE INDICATOR

OPERATING INSTRUCTIONS  
rev. AB



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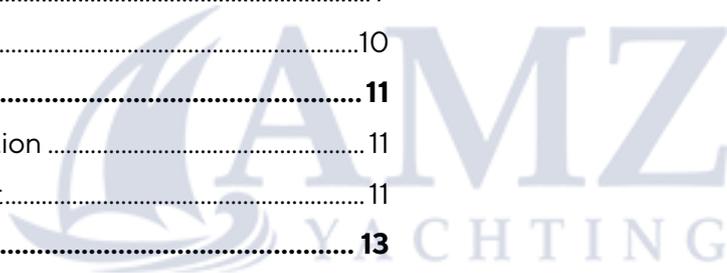
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# INTRODUCTION

## PACKAGING CONTENT



**1x Rudder Angle Indicator gauge**  
B00067401



**1x Wire Harness**  
A2C1507870001



**1x Mounting Spinlock**  
A2C1376090001



**1x Safety Instructions**  
B000100



# 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 jewellery 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!

## SAFETY INFORMATION

- 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.
- 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

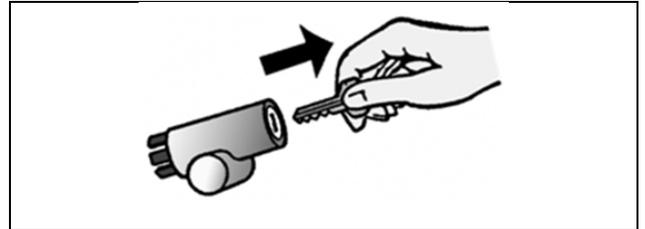
- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cables, use the provided cable ducts and harnesses; however, do not run cables parallel to 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.

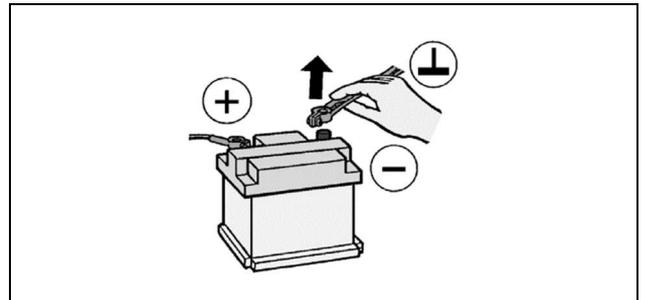
# MECHANICAL INSTALLATION

## BEFORE THE ASSEMBLY

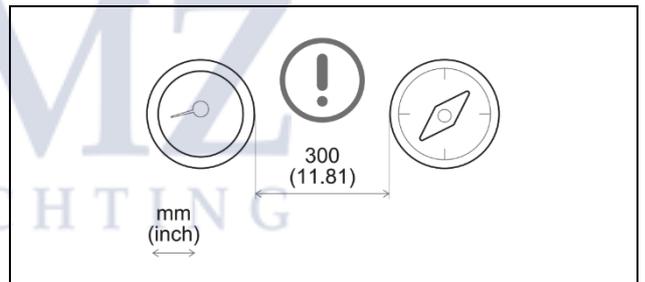
1. Before beginning, turn off the ignition and remove the ignition key. If necessary, remove the main circuit switch



2. Disconnect the negative terminal on the battery. Make sure the battery cannot unintentionally restart.



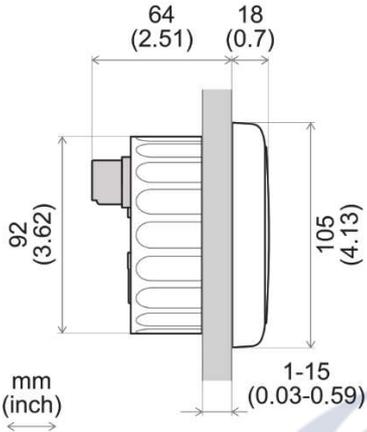
3. Place the device at least 300 mm away from any magnetic compass.



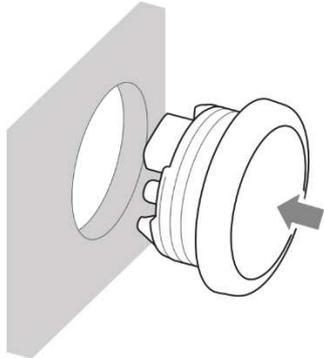
**INSTALLATION WITH SPINLOCK**

- 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.

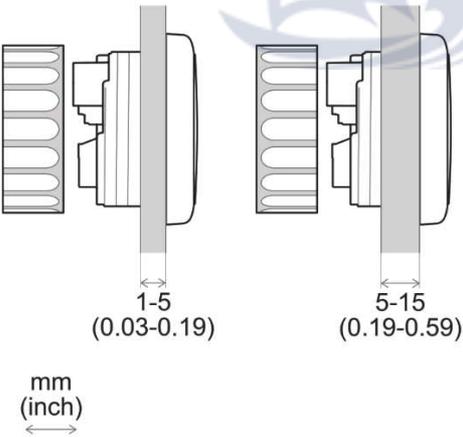
**A**



**B**



**C**

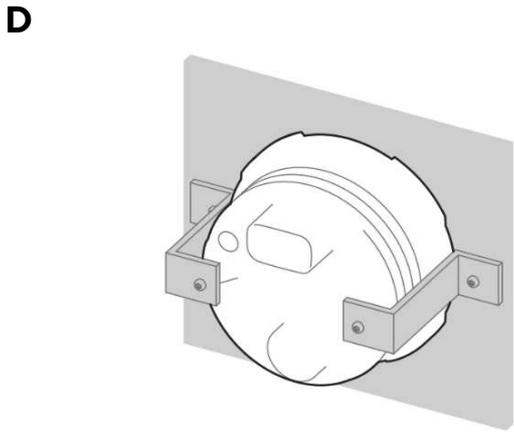
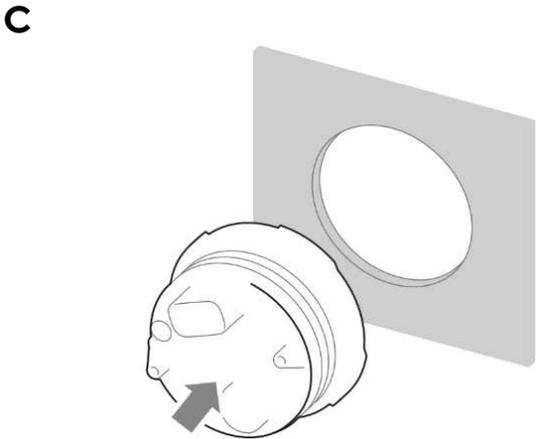
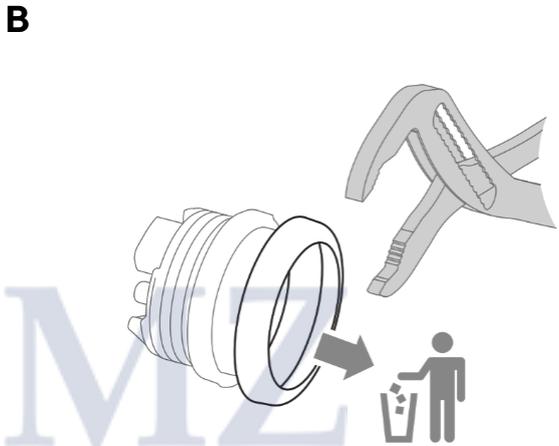
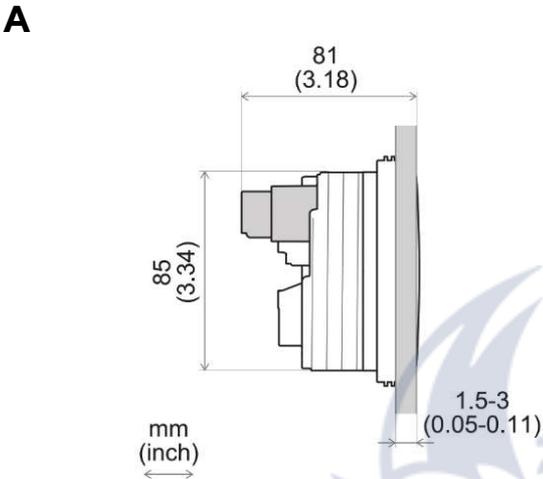


FLUSH MOUNTING

- 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 can 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



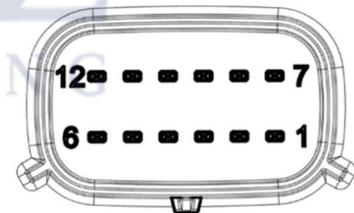
# ELECTRICAL INSTALLATION

## PINOUT

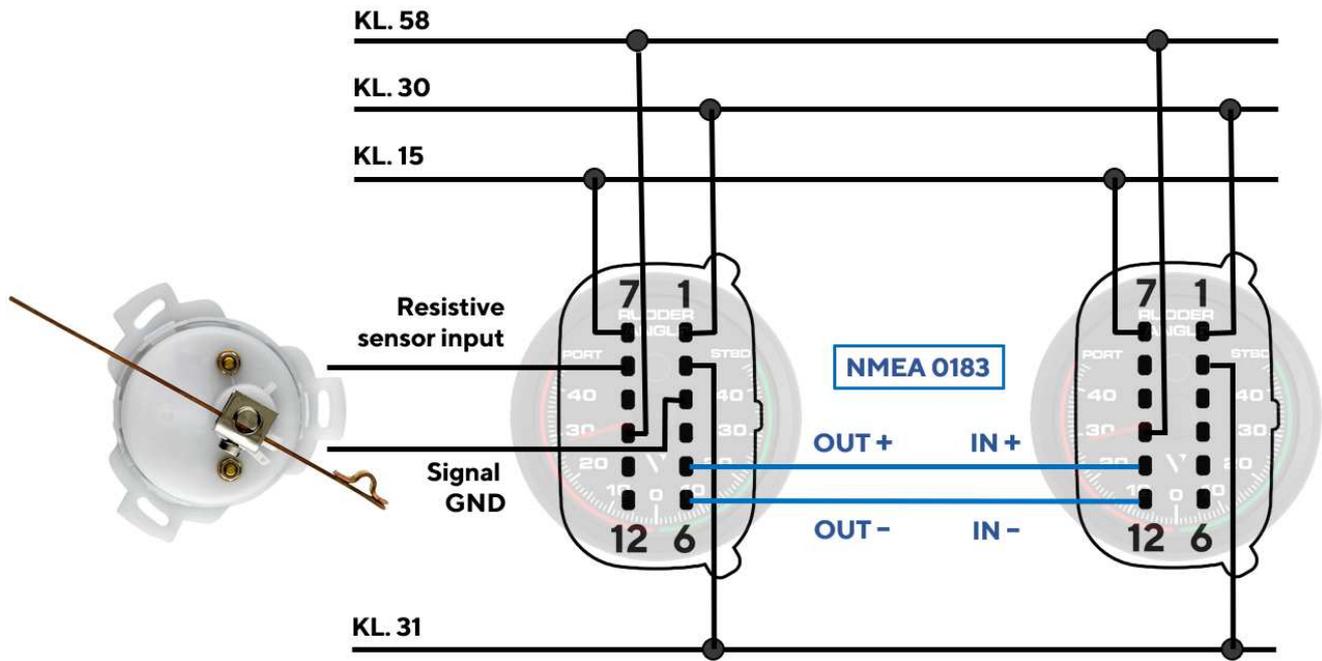
| Pin No. | Wire color   | Description                             |
|---------|--------------|---|
| 1       | Red          | KL. 30 - Battery Power 12 / 24 V        |
| 2       | Black        | KL. 31 - Ground                         |
| 3       | White        | Signal GND                              |
| 4       | Green        | 5 V output (Sensor feed)                |
| 5       | Blue         | NMEA 0183 OUT +                         |
| 6       | Blue / White | NMEA 0183 OUT -                         |
| 7       | Yellow       | KL. 15 - Ignition                       |
| 8       | Grey         | Resistive sensor input 0 - 400 $\Omega$ |
| 9       | Brown        | 0-5 V sensor input                      |
| 10      | Orange       | KL.58 - Illumination                    |
| 11      | Light Blue   | NMEA 0183 IN +                          |
| 12      | Purple       | NMEA 0183 IN -                          |



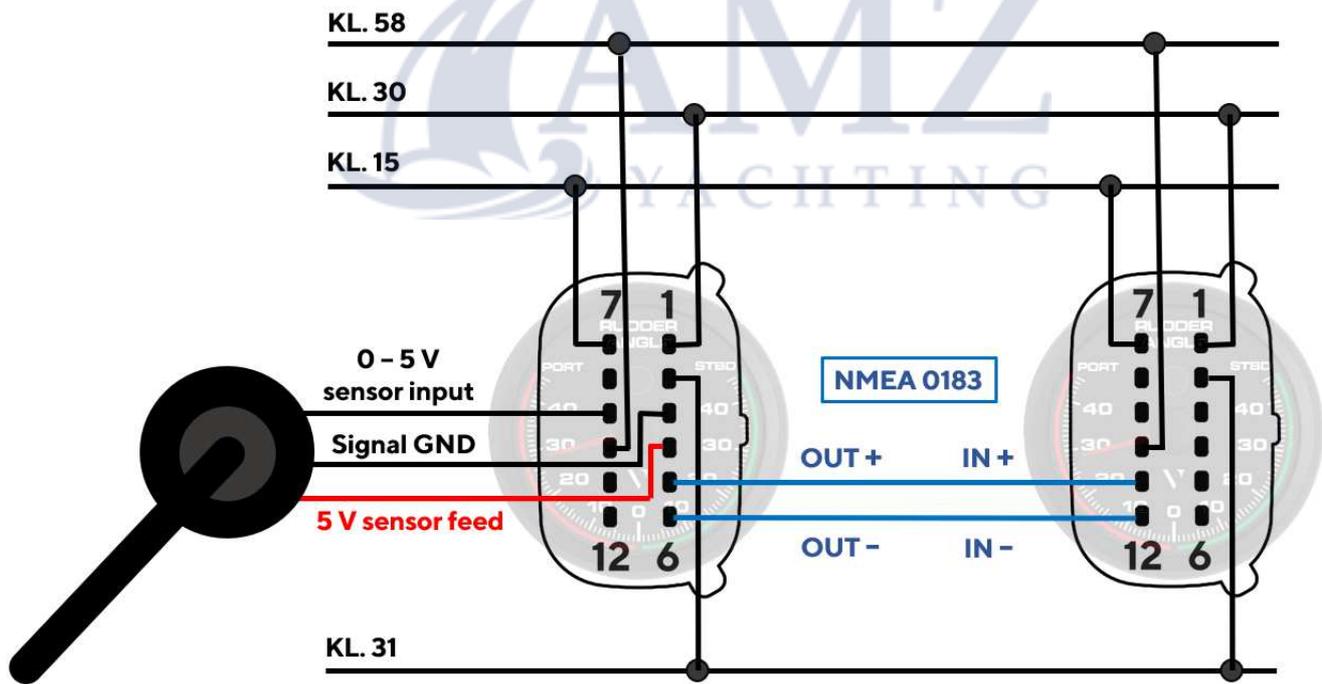
Device rear view

Molex MX150 12-poles plug  
Male, product side view

CONNECTIONS DIAGRAMS



Connections diagram for resistive rudder angle sensor and second gauge connected via NMEA 0183



Connections diagram for 0 - 5 V rudder angle sensor and second gauge connected via NMEA 0183

# CONFIGURATION

## DEFAULT SENSOR CALIBRATION

| 0 - 5 V Sensor | Rudder Position |
|----------------|-----------------|
| 0 V            | 40° PORT        |
| 2.5 V          | Center          |
| 5 V            | 40° STBD        |

| Resistive Sensor | Rudder Position |
|------------------|-----------------|
| 3 $\Omega$       | 40° PORT        |
| 90 $\Omega$      | Center          |
| 180 $\Omega$     | 40° STBD        |

## CALIBRATION ADJUSTMENT

In order to adjust the default calibration of the sensor, a simple three-steps procedure is implemented.

It is required to steer the rudder angle sensor to three key positions (20° STBD, CENTER and 20° PORT) in order to store the sensor reading at these points.

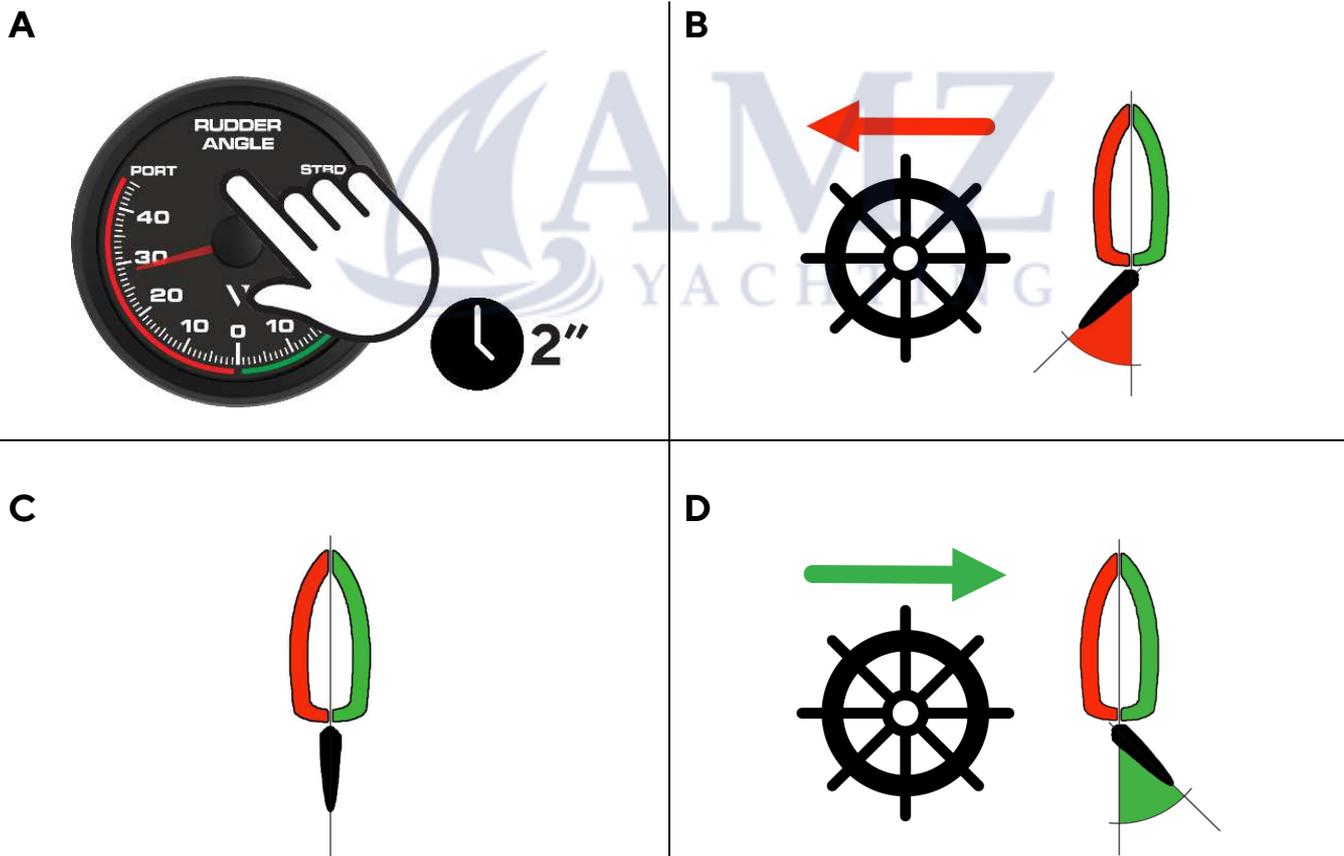
The embedded infrared pushbutton placed above the pointer (see picture) must be used to confirm each step.

Simply near your finger to the infrared sensor area for more than two seconds [A] to activate the pushbutton.



## CONFIGURATION

1. Keep pushing the infrared pushbutton (IR) to start the calibration process. [A]
2. The illumination now blinks every 1 sec and the pointer indicates 20° PORT
3. Move the rudder to 20° PORT. [B]
4. Keep “pushing” the IR button to store the PORT reading. [A]
5. The illumination will blink twice every 1 sec and the pointer indicates the center position (0°).
6. Move the rudder to the center. [C]
7. Keep “pushing” the IR button to store the CENTER reading. [A]
8. The illumination will blink three times every 1 sec and the pointer indicates the 20° STBD.
9. Move the rudder to 20° STBD. [D]
10. Keep “pushing” the IR button to store the STBD reading. [A]
11. The gauge resets and the adjusted calibration is now stored.



# TECHNICAL DATA

## DATASHEET

|                              |  |
|------------------------------|--|
| <b>Nominal Voltage</b>       | 12 V / 24 V  |
| <b>Operating Voltage</b>     | 8 - 32 V   |
| <b>Current consumption</b>   | Max. 100 mA  |
| <b>Protection class</b>      | IP X7  |
| <b>Illumination</b>          | Red LED  |
| <b>Dial</b>                  | Black with graphics                                  |
| <b>Pointer</b>               | Red illuminated, translucent backlighting, black cap |
| <b>Lens</b>                  | Plastic double lens anti-reflection                  |
| <b>Housing</b>               | Plastic (flame-retardant) acc. UL94                  |
| <b>Operating temperature</b> | -30°C to 80°C  |
| <b>Storage temperature</b>   | -40°C to 85°C  |
| <b>Connector</b>             | Molex MX150 12 pin                                   |

## SUPPORTED NMEA 0183 DATA

| <b>Data</b>         | <b>NMEA 0183 sentence</b> |
|---------------------|---------------------------|
| Rudder Sensor Angle | \$RSA                     |

# ACCESSORIES

| Accessory                            | Part Number   |
|--------------------------------------|---------------|
| Pigtail cable with MX 150 connector  | A2C15078700   |
| Spinlock Nut                         | A2C1376090001 |
| Flush Mount kit                      | N05-800-792   |
| Rudder Angle Sensor - Single Station | A2C1102950001 |
| Rudder Angle Sensor - Dual Station   | A2C1102960001 |

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





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