



GRA™ 10 Installation and Configuration Instructions

Use the Garmin® GRA 10 adapter to adapt analog information provided by a rudder-angle sensor on your boat to your NMEA 2000® network. Your GRA 10 allows you to observe rudder-angle information on compatible Garmin display devices connected to your NMEA 2000 network. For a list of compatible Garmin chartplotters and devices, visit www.garmin.com.

Compare the contents of this package with the packing list on the box. If any pieces are missing, contact your Garmin dealer immediately.

Product Registration

Help us better support you by completing our online registration today. Go to <http://my.garmin.com>. Keep the original sales receipt, or a photocopy, in a safe place.

Contact Garmin

Contact Garmin Product Support if you have any questions while using your GRA 10. In the USA, go to www.garmin.com/support, or contact Garmin USA by phone at (913) 397.8200 or (800) 800.1020.

In the UK, contact Garmin (Europe) Ltd. by phone at 0808 2380000.

In Europe, go to www.garmin.com/support and click **Contact Support** for in-country support information, or contact Garmin (Europe) Ltd. by phone at +44 (0) 870.8501241.



See the *Important Safety and Product Information* guide in the compatible Garmin display device box for product warnings and other important information.



CAUTION: Always wear safety goggles, ear protection, and a dust mask when drilling, cutting, or sanding.



NOTICE: When drilling or cutting, always check the opposite side of the drilling or cutting surface.

Needed Tools and Supplies

- Heat-shrink tubing and a heat gun
- Cable ties
- Additional NMEA 2000 cabling and connectors (optional)

Determining an Installation Location

When you are selecting a location to install the GRA 10 adapter, consider the following:

- During installation, you connect the GRA 10 adapter to the analog gauge (or directly to the engine-tilt sensor), and to the NMEA 2000 network. Therefore:
 - Choose a location that is within 173 in. (4.4 m) of the analog gauge (or the engine-tilt sensor) to avoid splicing bare wires.
 - Choose a location between the NMEA 2000 backbone and the analog gauge (or the engine-tilt sensor).
 - If you cannot connect the adapter directly to the NMEA 2000 network, add a drop cable. See [page 3](#) for more information.
- The adapter is IEC 60529 IPX7 waterproof, and can be submerged up to 30 minutes at 1 meter. Do not install the adapter in a location where it will be submerged regularly, though the location can be subject to wash-down.
- You can use cable ties (not included) to secure the adapter to an existing structure on your boat.
- You can use mounted-head cable ties (not included) and screws (not included) to secure the adapter to a bulkhead or other suitable surface on your boat.
- Install the adapter at least 2 in. (5 cm) from a magnetic compass to prevent electromagnetic interference, which can cause inaccurate compass readings.

Wiring the GRA 10 Adapter

Connect the GRA 10 adapter either to an analog gauge or to the sensor directly using the bare wires on the wiring harness.

Wiring the GRA 10 Adapter to an Analog Gauge

If your boat has an analog gauge representing the rudder angle, you can wire the GRA 10 adapter directly to the gauge. Consult the owner's manual provided by your boat or sensor manufacturer to determine the ground, sensor, and power (ignition) connections on the gauge. Typically, the power (ignition) connector is labeled with a "+", a "+12V", an "I", or an "IGN" marking. The ground connector is typically labeled with a "-", a " \perp ", or a "G" marking, and the sensor connector is typically labeled with an "S" or a "G" marking. Do not remove any wires from the back of the gauge, and wire the GRA 10 adapter to the gauge according to the following table.

Wiring the GRA 10 Adapter Directly to a Rudder-Angle Sensor

If your boat does not have an analog gauge representing the rudder angle, or if you choose not to wire the adapter to an analog gauge, you can wire the adapter directly to the sensor. Consult the owner's manual provided by your boat or sensor manufacturer to determine the type of sensor (resistive or generic voltage) in use, and the sending and ground terminals on the sensor. Typically, the sending terminal is labeled with an "S" marking for sensor or a "G" marking for gauge, and the ground terminal is typically labeled with a negative sign (-). Wire the GRA 10 adapter to the sensor according to the following table.

Connection Type	Wire Color	Gauge or Sensor Terminal
Analog Gauge	Blue	Sensor (S, G)
	White	Gauge power (+, +12V, I, IGN)
	Yellow	Unused
	Black	Ground (-, \perp , G)
	Red	Unused
Resistive Sensor	Blue	Sensor (S, G)
	White	Unused
	Yellow	Unused
	Black	Ground (-, \perp , G)
	Red	Unused
Generic Voltage (0–5 Vdc) Sensor	Blue	Unused
	White	Unused
	Yellow	Sensor (S, G)
	Black	Ground (-, \perp , G)
	Red	5 V power



NOTICE: After connecting the adapter to the gauge or sensor, cover any exposed wires with heat-shrink tubing.

Connecting the GRA 10 to a NMEA 2000 Network

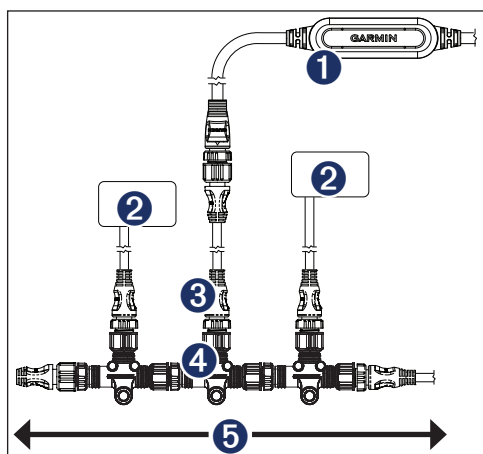
After you have connected the GRA 10 adapter to the analog gauge or to a sensor, connect it to the existing NMEA 2000 network on your boat. If you do not have a NMEA 2000 network on your boat, you must build one. For more information on NMEA 2000 and to purchase additional connectors and cables, go to www.garmin.com.

To connect the GRA 10 adapter to your existing NMEA 2000 network:

1. Determine where to connect the GRA 10 adapter to your existing NMEA 2000 backbone.
2. Disconnect one side of a NMEA 2000 T-connector from the backbone. To extend the NMEA 2000 backbone, connect a NMEA 2000 backbone extension cable to the side of the disconnected T-connector.
3. Add the included T-connector for the GRA 10 adapter to the NMEA 2000 backbone by connecting it to the side of the disconnected T-connector.
4. Connect the NMEA 2000 connector on the GRA 10 adapter to the T-connector added in step 3.
5. (Optional) If the GRA 10 adapter cannot connect directly to the NMEA 2000 backbone, route a NMEA 2000 drop cable (not included) to the bottom of the T-connector added in step 3. Use a drop cable with a length up to 20 ft. (6 m). Connect the drop cable to the T-connector and to the NMEA 2000 connector on the adapter.



NOTICE: If you have an existing NMEA 2000 network on your boat, it should already be connected to power. Do not connect an additional NMEA 2000 power cable to an existing NMEA 2000 network, because only one power source should be connected to a NMEA 2000 network.



- ① GRA 10 adapter
- ② NMEA 2000 device (not included)
- ③ Drop cable (optional - not included)
- ④ T-connector (one included)
- ⑤ Existing NMEA 2000 network

Connecting the GRA 10 Adapter to an Existing NMEA 2000 Network

Configuring the GRA 10

NOTE: This section provides specific configuration information for the GRA 10 adapter using your compatible Garmin display device. To access the NMEA 2000 configuration menu on your display device, consult the documentation provided with your display device.

Calibrating the Rudder Angle

To use the GRA 10 adapter, you must calibrate the angle of the rudder that the adapter is associated with.

1. Turn the boat ignition key to the On position (not Start).
2. From the NMEA 2000 Devices list, select the GRA 10 device.
3. Select an option:
 - For most Garmin chartplotters, select **Review > Rudder Angle Calibration**.
 - For other Garmin marine devices, select **Config > Rudder Angle Calibration**.
4. Follow the on-screen instructions to calibrate the starboard and port rudder angles.
5. Select **OK** when the calibration is complete.

Troubleshooting the Gauge Type

When connected to a gauge, the GRA 10 adapter gauge type is set to **Auto Detect** by default, and the adapter automatically detects the type of gauge it is connected to. If the rudder-angle reading on a connected Garmin chartplotter or marine instrument changes with the engine RPM, the adapter may be detecting the wrong type of gauge.

To test the gauge-type setting:

1. When the boat is not moving, put the engine in neutral.
2. Use the throttle to increase the engine RPM. If the rudder-angle reading changes with the engine RPM, change the gauge type.

To change the gauge type:

1. From the NMEA 2000 Devices list, select the GRA 10 device.
2. Select an option:
 - For most Garmin chartplotters, select **Review > Gauge Type**.
 - For other Garmin marine devices, select **Config > Gauge Type**.
3. Select an option:
 - To automatically detect the gauge type, select **Auto Detect**.
 - To indicate a one-coil gauge, select **1 Coil**.
 - To indicate a two-coil gauge, select **2 Coil**.
4. Perform the gauge-type setting test.

Configuring the GRA 10 Adapter if the Rudder Angle Calibration and Gauge Type Selections Are Not Displayed

Depending on the version of software loaded on your Garmin marine instrument, the specific configuration options may not be displayed on the configuration screens.

To calibrate the rudder angle if the menu option is not displayed:

To use the GRA 10 adapter, you must calibrate the angle of the rudder that the adapter is associated with.

1. Turn the boat ignition key to the On position (not Start).
2. From the NMEA 2000 Devices list, select the GRA 10 device.
3. Select an option:
 - For most Garmin chartplotters, select **Review > Generic Config**.
 - For other Garmin marine devices, select **Config > Generic Configuration**.
4. Move the rudder fully to starboard and observe the angle of the rudder position, in degrees.
5. Enter the following command: **"RUDDERPOS="**
6. After the command, enter the angle of the starboard rudder position as a whole number greater than **0** and less than **180**, in degrees, followed by **Done**. For example, **RUDDERPOS=45Done**.
7. Center the rudder.
8. Enter the following command: **"RUDDERPOS=0Done"**
9. Move the rudder fully to port and observe the angle of the rudder position, in degrees.
10. Enter the following command: **"RUDDERPOS="**
11. After the command, enter the angle of the port rudder position as a whole number less than **0** and greater than **-180**, in degrees, followed by **Done**. For example, **RUDDERPOS=-45Done**.

To configure the gauge type if the menu option is not displayed:

When connected to a gauge, the GRA 10 adapter gauge type is set to **Auto Detect** by default, and the adapter automatically detects the type of gauge it is connected to. When you troubleshoot the gauge-type setting, if the rudder-angle reading on a connected Garmin chartplotter or marine instrument changes with the engine RPM, the adapter may be detecting the wrong type of gauge.

1. From the NMEA 2000 Devices list, select the GRA 10 device.
2. Select an option:
 - For most Garmin chartplotters, select **Review > Generic Config**.
 - For other Garmin marine devices, select **Config >Generic Configuration**.
3. Enter the following command: **“GAUGRAYPE=”**
4. After the command, enter one of the following options:
 - To automatically detect the gauge type, enter **0**, followed by **Done**. For example, **GAUGRAYPE=0Done**.
 - To indicate a one-coil gauge, enter **1**, followed by **Done**. For example, **GAUGRAYPE=1Done**.
 - To indicate a two-coil gauge, enter **2**, followed by **Done**. For example, **GAUGRAYPE=2Done**.

Restoring Factory Default Settings

You will lose all custom configuration settings when you restore factory default settings.

1. From the NMEA 2000 Devices list, select the GRA 10 device.
2. Select an option:
 - For most Garmin chartplotters, select **Review > Generic Config**.
 - For other Garmin marine devices, select **Config >Generic Configuration**.
3. Select **Yes**.

Specifications

Physical

Weight: 12.85 oz. (365 g)

Size: (W × H × L) $3\frac{1}{32} \times 4\frac{3}{64} \times 3\frac{3}{32}$ in. (24.7 × 17.0 × 78.6 mm)

Total Cable Length: 16 ft. (4.9 m)

Case Material: Thermoplastic rubber (PCB overmold); PVC jacket (cable); PVC overmold (connectors/strain reliefs). Waterproof to IEC 529 IPX7 standards.

Temperature Range: From 5°F to 158°F (from -15°C to 70°C)

Compass Safe Distance: 2 in. (5 cm)

Electrical

Power Input Source: 9–16 Vdc from the NMEA 2000 bus

NMEA 2000 Power Usage: 1.1 W max

NMEA 2000 Load Equivalency Number (LEN): 2 (100 mA)

Communications

Use this table to determine the approved NMEA 2000 PGN information that is transmitted and received by a GRA 10 during communication with a NMEA 2000-compliant device.

Transmit		Receive	
059392	ISO Acknowledgment	059392	ISO Acknowledgment
060928	ISO Address Claim	059904	ISO Request
126208	NMEA - Command/Request/ Acknowledge Group Function	060928	ISO Address Claim
126464	Transmit/Receive PGN List Group Function	126208	NMEA - Command/Request/ Acknowledge Group Function
126996	Product Information		
127245	Rudder		



The GRA 10 is NMEA 2000 certified

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