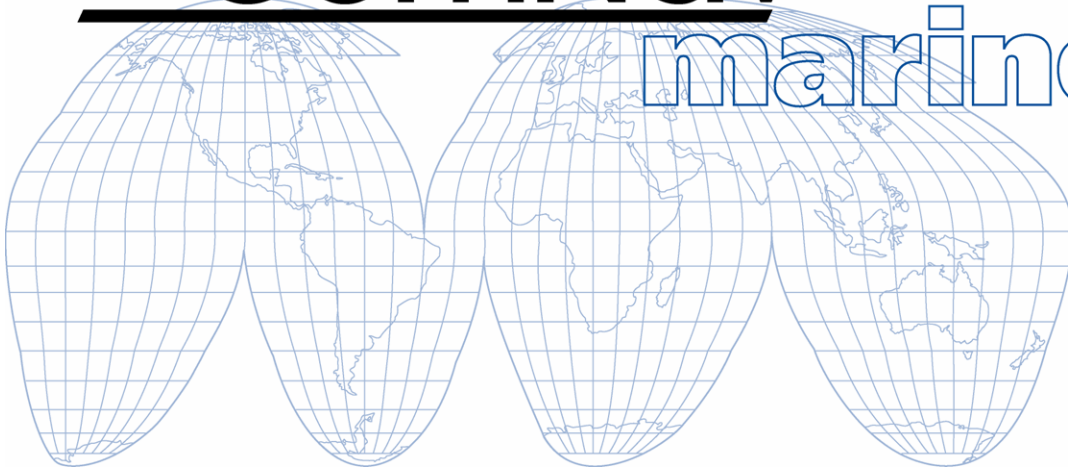


ComNav[®]

marine ltd



TS-203 Remote *for P Series Autopilot Systems*

Installation & Operation Manual



Welcome

Congratulations on your purchase of ComNav Marine's TS-203 Remote for P Series Autopilot Systems! At ComNav, we are proud of our prominence as a leader in the design and manufacture of marine autopilot systems. Our dedication to performance and reliability will ensure your satisfaction with the TS-203 Remote.

ComNav Marine Ltd.

Warranty Notice

The Warranty for the TS-203 Remote is contained within the Warranty of your P Series Autopilot System. Prior to the installation and/or operation of the TS-203 Remote, ensure that you read, understand, and accept the conditions of the P Series Autopilot System warranties as detailed in the **Warranty Information** of that system,

Operator's Warning

The P Series Autopilot System (with or without the TS-203 Remote) will steer your vessel. However it is only an aid to navigation. Its performance can be affected by many factors including equipment failure, environmental conditions, and improper handling or use. An autopilot system does not reduce your responsibility for the control of the vessel when underway. You must always be in a position to monitor the course, supervise the autopilot, and resume manual control if the need to do so arises.

Whenever underway, your vessel must be under the control of a qualified and alert person.

General Notice

This document, ComNav part number 29010076 Version 3 Revision 1, is the approved Installation and Operation Manual for use with TS-203 Remote for P Series Autopilot Systems. Where versions of this manual exist in other languages, the English version shall be considered authoritative.

Document History

Revision	Date	By	Description
1R0	05 July 2005	DC	First release
1R1	16 March 2006	DC	- added a description of the Station Lock feature
1R2	28 November 2006	DTO	- changed Figure 5 to show alternative colour coding
2Rx	n/a	n/a	(version number skipped)
3R0	14 December 2007	DTO	- brand name change - corrected dimension drawings to show longer handle
3R1	21 January 2009	DTO	- updated QMI logo - added dimensions for Ball Knob Lever to Specifications - corrected page number errors - minor edits for clarity

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Introduction

Overview of the TS-203 Remote

The TS-203 Remote is designed to work with ComNav’s Admiral P3 Wheelmark Autopilot System, or the Commander P2 Advanced Autopilot System. It is based on the same well-proven, rugged design and enclosure as ComNav’s previous Full Follow-Up Remote products, but with features specific to the P Series autopilots, including **Special Turns** and a unique **TILLER** Mode.

The TS-203 Remote allows the vessel operator to control the P Series Autopilot’s steering functions from a workstation, flying bridge, on the side or stern decks, or any other remote location on the vessel.

Features included in the TS-203 Remote:

- Tiller Lever handle, with detent at centre position
 - an 18 cm (7”) tapered-handle Lever is standard
 - a 12 cm (5”) ball knob lever is available as an optional accessory (PN 30310011)
- Direct switch selection of the P Series’ **STANDBY**, **AUTO**, and **NAV** modes, and the unique **TILLER** mode (also supports **WORK** mode), and of **Special Turns**
- Colour-coded PORT & STARBOARD Turn/Dodge buttons
- Vertical or horizontal surface mount
- Flush or straight mount cable routing, through or on surface panels, decks and bulkheads
- Fully watertight case, made of high-impact material which has excellent resistance to most chemicals, with a cable strain relief and button, switch & Tiller handle seals
- Standard cable lengths:
 - PN 20310025 has a 12 metre (40 feet) cable
 - PN 20310030 has an 18 metre (60 feet) cable*(Optional cable lengths to 30 metres (100 feet) are available on special order – contact your ComNav Dealer for information)*

The block diagram below shows how the TS-203 Remote is used in a P Series system:

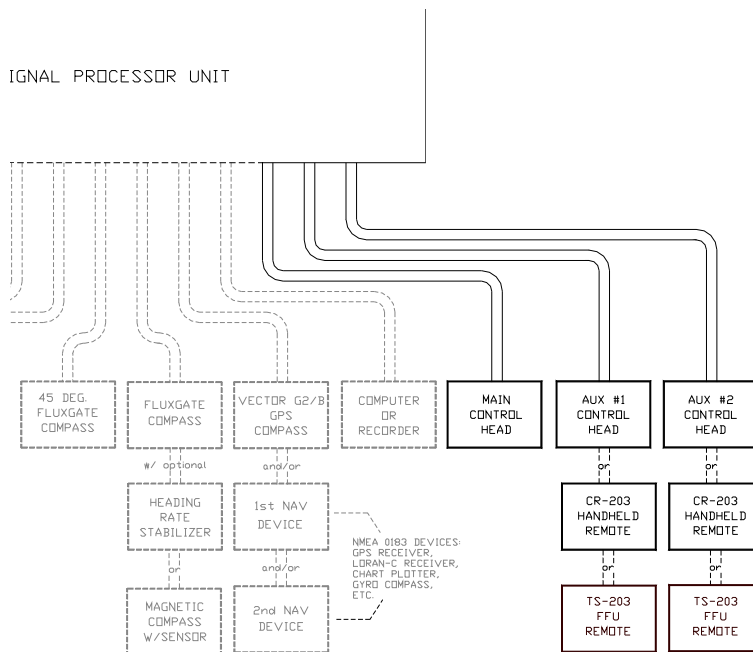


Figure 1 – P Series Autopilot System (partial diagram)

About this Manual

This manual provides essential information for the safe and reliable operation of the ComNav TS-203 Remote for P Series Autopilot Systems. You are urged to read this manual in its entirety before you use your autopilot for the first time, and to keep it handy until you become thoroughly familiar with the operation of your autopilot.

A number of steps in this manual require use of the setup menus and operational displays on the Control Head of the P Series Autopilot System. Please refer to your P Series *Installation and Operation manual* for instructions.

Typefaces, Common Phrases & Terms

Throughout this manual, you will see a number of different typefaces used, and several commonly-used words & phrases with very specific meanings, to describe concepts & actions that are fundamental to the operation of the autopilot. Please take a moment to become familiar with the following items:

Modes of Operation

Specific “modes of operation” are placed in bold uppercase lettering.

Example: **POWER STEER** mode.

Button

TS-203 Remote buttons and controls are placed in uppercase lettering.

Example: the **TURN** switch.

System Component

Specific System Components are capitalized.

Example: The **Control Head**.

press or momentary press

Press and release the indicated button.

double-press

Press and release the indicated button twice in rapid succession.

Although this sounds a little complicated, it is actually very easy to do – it is very similar to the “double-click” action on a button of a Personal Computer Mouse.

press and hold

Press and hold the indicated button for a minimum of one-half of a second.

This time delay is purposely programmed into the system’s response to some buttons, to prevent casual or accidental activation of the button’s function. For example, pressing the **FN** button can, depending on system configuration, drastically alter the steering performance of the P Series Autopilot System.

maintain

Hold the indicated button for as long as required to achieve a given result.

Example: To dodge an obstacle in the water, press either the **PORT ARROW** or **STARBOARD ARROW** button, and maintain it in that position until the vessel has dodged clear of the obstacle in its path.

Manual Format

This manual has been formatted to be printed on both sides of the pages of the manual, and on standard Letter-sized paper (8.5" x 11").

If you have obtained this manual as a soft-copy, please note that it is in Adobe® Portable Document Format ("pdf"), and so may be viewed & printed with Adobe Reader®, or compatible pdf-format viewers.

When printing this manual with Reader, you should select "duplex printing" (or the equivalent term used by your printer's software driver), in order to print it double-sided on the paper. If your printer does not have built-in duplexing capability, you can still print this manual double-sided by following the instructions that came with your printer for doing "hand duplexing".

You should also select the Auto-Rotate and Centre option in the Print Dialog box, de-select the Choose Paper Source by PDF page size option, and set Page Scaling to None (normally, Reader's default setting is Shrink to Printable Area, and is printer-dependant, usually ~95%, but that is not needed here).

Installation

Installation

General Requirements

The following are the general requirements that should be met before installation of the TS-203 Remote on your vessel.

For information regarding the installation of the complete P Series Autopilot System, consult your P Series Installation & Operation Manual.

*Please refer to the **Warranty Information** document that accompanies your P Series manual before proceeding with installation of the TS-203 Remote.*

Hazard warning!

CAUTION!

*Extreme caution is advised when using tools powered by alternating current (AC) from main AC supply circuits, regardless of whether the supply circuits are “indoor”, “outdoor”, “marine” or “industrial” rated. Water, especially sea water, is an **EXCELLENT** conductor of electricity, and can complete a path to AC Ground through a person’s body, causing injury or death, if a tool malfunctions or short-circuits.*

⇒ Battery powered tools are STRONGLY recommended ⇐

*If AC tools are used, they **MUST** be plugged into a circuit that is adequately protected against Ground Faults and other safety hazards, in accordance with local electrical codes.*

Power Supply

For reliable operation of your P Series Autopilot with the TS-203 Remote, your vessel’s power supply system must have an adequately-breakered, or fused, DC (direct current) power supply at a nominal voltage of either 12 or 24 volts. If the circuits are fused, a switch should also be provided. Ensure that adequate wire sizes are used to handle the expected maximum currents.

Special Tools

A slot screwdriver with a tip size of ~2.5 mm (0.1”) is required, for tightening the small screws of the wire clamps in the plugs which mate with the P Series SPU’s pin-receptacle connectors.

Other general-purpose tools such as a portable drill, pliers, wire cutters, screwdrivers, wire, mounting bolts and wrenches will also be required.

Mounting the TS-203 FFU Lever Remote

- 1) Tools required
 - Drill and drill bit selection
 - Screw driver
 - Small wrench (depending on hardware used)
- 2) Fasteners
 - Customer supplied, non-Corrosive screws, washers and nuts (used to mount the FFU)
- 3) Mounting

See Figure 2 for Dimension Details of the TS-203 FFU Lever Remote.

BEFORE mounting the TS-203 FFU, take the following into consideration:

- Is the FFU to be mounted vertically or horizontally?
- Will the cabling go through a bulkhead or deck, or will it be routed along the surface? See figures 2 and 3, next page.
- Is there adequate mounting space to ensure all that all 4 mounting holes are used?
- Is there sufficient clearance for cable routing through bulkhead (if applicable)?
- Is there sufficient clearance for the cable plug?
- Will the switches and buttons be easily accessible?
- Will the lever be free to swing from one end to the other without obstruction?

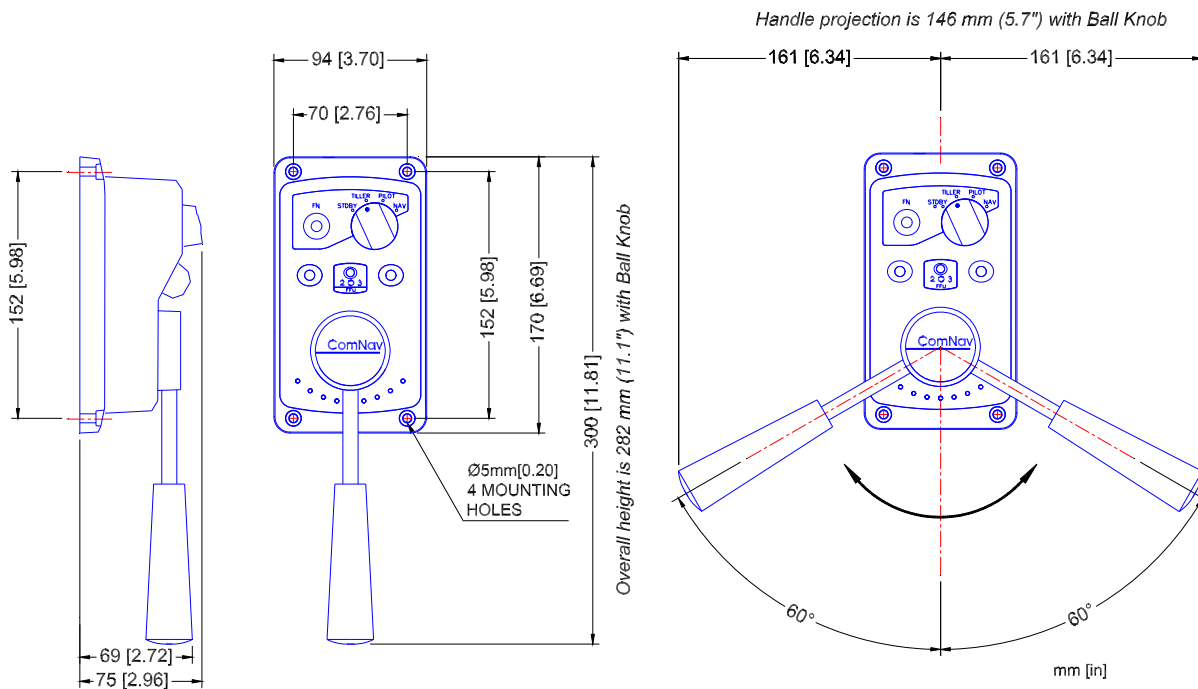
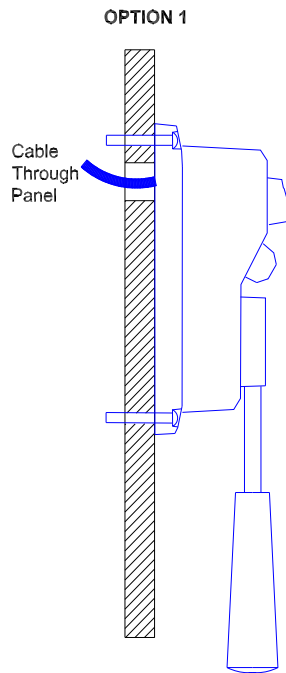


Figure 2 – Dimensions of the TS-203 FFU Lever Remote (in mm [in])

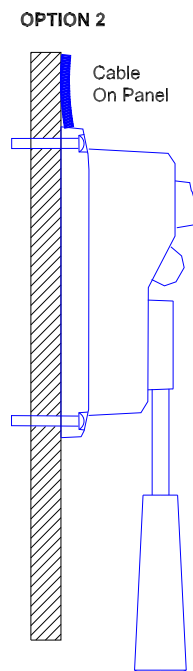
OPTION 1 – Cable through Bulkhead or Deck



1. Place the FFU in the desired location. Mark the centre position of the four mounting holes and approximate location for the cable through panel (see Figure 1 for Detail Dimensions).
2. Drill the four mounting holes (using a drill bit appropriate to the mounting hardware you are using). The TS-203 FFU Remote will accept mounting hardware up to 5mm (just over 3/16") in diameter. Be sure to check that you will not be drilling through wires or plumbing that may be hidden in bulkhead walls or underneath decks.
3. Drill through surface panel or bulkheads using an 8mm (5/16") drill bit to allow sufficient clearance for the cable plug.
4. Route the cable through the panel.
5. Using customer-supplied fasteners, fasten the FFU to the bulkhead or deck.

Figure 3 – Cable Through Bulkhead or Deck

OPTION 2 – Cable on Surface of Bulkhead or Deck



1. Place the FFU in the desired location. Mark the centre position of the four mounting holes (see Figure 1 for Detail Dimensions).
2. Drill the four mounting holes (using a drill bit appropriate to the mounting hardware you are using). The TS-203 FFU Remote will accept mounting hardware up to 5mm (just over 3/16") in diameter. Be sure to check that you will not be drilling through wires or plumbing that may be hidden in bulkhead walls or underneath decks.
3. Route the cable along the channel located in the bottom of the unit.
4. Using customer-supplied screws, fasten the FFU to the bulkhead or deck.

Figure 4 – Cable on Surface of Bulkhead or Deck

Electrical Connections

- 1) Route the TS-203 Remote cable to the P Series SPU (Signal Processing Unit).
- 2) Remove the Wiring Cover from the SPU. It is held in place by two knurled nuts.
- 3) Remove one of the spare nine-position plug-in connectors (supplied with the SPU) from **J12 - AUX 1** or **J13 - AUX 2**.
- 4) Wire the end of the cable onto the nine-position plug-in connector according to the following diagram:

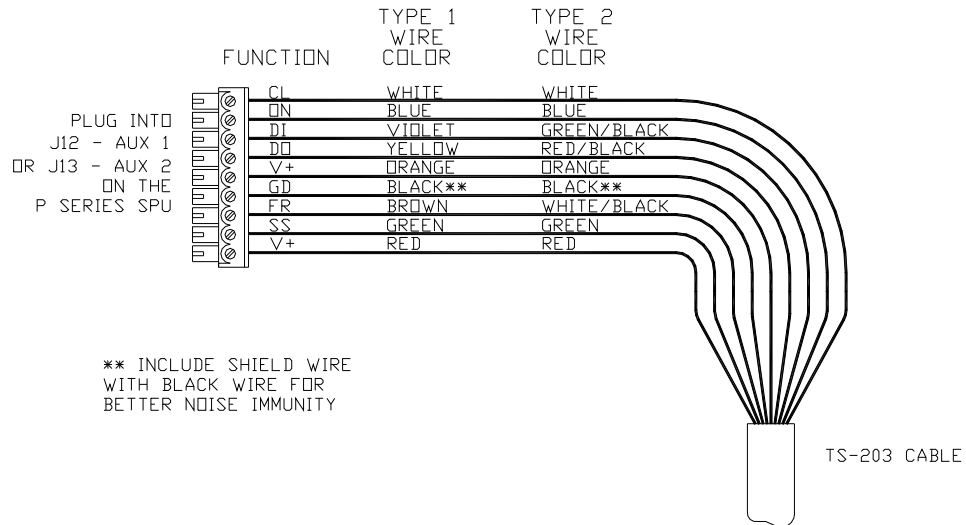


Figure 5 – Wiring for TS-203 Remote at SPU

- 5) Plug the nine-position connector back into the same SPU receptacle (**J12 - AUX 1** or **J13 - AUX 2**) that you removed it from in step 3).
- 6) Replace the Wiring Cover on the SPU and secure it with the two knurled nuts.

Calibration Check

Once your TS-203 Remote is installed and wired, you may wish to perform a re-calibration of the unit's Tiller lever.

Tools required:

- None

Other requirements:

- Commander P2 or Admiral P3 Installation & Operation Manual

Important! Be sure that you read the P Series Installation & Operation Manual, and understand how the Autopilot System operates, before proceeding.

Important! Be sure to complete the Drive Setup function in the Dockside menu of the P Series system before proceeding. Refer to the Setup Procedures section in the P Series Installation and Operation manual for details.

- 1) Turn the P Series System on (at the Control head), and leave it in STANDBY mode.
- 2) Switch the TS-203's SELECTOR KNOB to the STANDBY position.
- 3) Ensure that the TS-203's TILLER lever is at the centre (detent) position.
- 4) Press and hold the PORT and STARBOARD buttons, and then move the SELECTOR KNOB to TILLER. The TS-203 should respond by rapidly blinking the LED lamp 4 times. Then it will continue to flash the LED lamp at a much slower pace of about once per second. This indicates that the unit has successfully been placed into SETUP mode.
- 5) Switch the SELECTOR KNOB to STANDBY. The LED lamp should blink rapidly 4 times in response. Then it will revert to blinking about once per second.
- 6) Swing the TILLER lever to hard-over Starboard.
- 7) Press the STARBOARD button. The LED lamp should blink rapidly 4 times in response. Then it will revert to blinking about once per second again.
- 8) Swing the TILLER lever to hard-over Port.
- 9) Press the PORT button. The LED lamp should blink rapidly 4 times in response. Then it will revert to blinking about once per second again.
- 10) After a few seconds, the LED will stop blinking and remain steadily lit. This indicates that the unit has successfully completed its calibration measurements, stored the necessary calibration data in non-volatile memory, and then returned to normal operating mode.

If an error occurs during the calibration process:

The LED will begin to blink in a distinctive pattern: one long, one short, and one long. This pattern will repeat itself until you take control away from the TS-203 by pressing the PORT and STARBOARD buttons on P Series Control Head. Once this is done, you may re-take control with the TS-203 again, but you must begin the SETUP process all over again. If you do not complete the Setup process all the way through to step 10, the TS-203 will retain its factory default settings.

Operation

Normal Usage

Taking Command

In order to use the TS-203 Remote, it is first necessary to “take command” away from the P Series Control Head.

Check to see that the Station Lock setting on the Control Head is set to “Unlock”. Then press and hold both PORT and STARBOARD buttons on the TS-203 Remote until the Blue LED lamp on the TS-203 lights up. The Control Head will now have a large letter “R” in the upper right portion of the display, indicating that it is in “Repeater” mode.

Important! Always remember that the TS-203 Remote is “in command” any time the Blue LED lamp is lit.

To take command away from the TS-203 Remote, go back to the Control Head (or another Remote) and press the PORT and STARBOARD DODGE buttons on the Head (or Remote). The “R” in the upper right of the Control Head’s display will disappear and you will then have command of the Autopilot at that Control Head (or Remote). Also, the Blue LED lamp on the TS-203 Remote will be off.

The P Series Autopilot Systems have a feature called Station Lock that prevents repeater stations and remotes such as the TS-203 Remote from taking command. If Station Lock is set to “Lock”, the TS-203 Remote will respond by flashing the blue LED and sounding the audible alarm three times when you try to take command. The blue LED will then be extinguished, letting you know that the TS-203 is not in command.. Refer to your P Series Installation and Operation manual for details on setting and removing Station Lock.

Modes of Operation

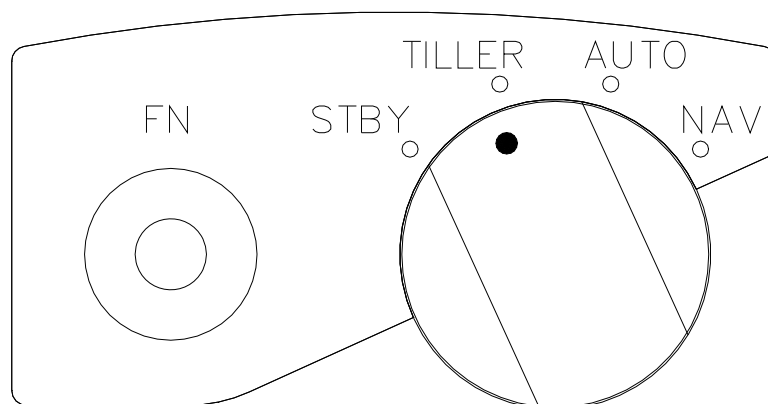


Figure 6 – Mode Selector Switch

STANDBY (STDBY) Mode

If the TS-203 Remote is In-Command and the Mode Selector Switch is in the “STANDBY” position, then the entire Autopilot System will be in **STANDBY** Mode. No controls on the TS-203 will have any effect on the vessel’s rudder.

TILLER Mode

If the TS-203 Remote is In-Command and the Mode Selector Switch is moved to the “TILLER” position, then the Autopilot will immediately begin moving the vessel’s rudder to a position that is proportional to the angle of the TS-203’s TILLER Lever. Thereafter, the Autopilot will move the vessel’s rudder so as to follow the relative position of the Tiller Lever.

The PORT and STARBOARD buttons have no effect in TILLER Mode.

The TURN and DODGE/FN switch has no effect in TILLER Mode.

AUTO Mode

If the TS-203 Remote is In-Command and the Mode Selector Switch is moved to the “AUTO” position, the Autopilot will lock on to the present course and maintain it.

The PORT and STARBOARD buttons on the TS-203 can be used to make course changes in one-degree increments for every push of the button. Pressing and holding either the PORT or STARBOARD button will cause the commanded course to change at a rate of approximately 10 degrees per second.

The TILLER Lever has no effect in **AUTO** Mode.

Course Recall

To recall the autopilot’s last commanded course, activate the DODGE/FN switch while rotating the Mode Selector Switch from “TILLER” to the “AUTO” position.

NAV Mode

If the TS-203 Remote is In-Command and the Mode Selector Switch is moved to the “NAV” position, the Autopilot will lock on to the commanded course given by the NMEA Navigation device connected to the Autopilot. For more information on **NAV** Mode, refer to the appropriate sections in the P Series Installation & Operation manual.

The TILLER lever has no effect in **NAV** Mode.

The PORT and STARBOARD buttons have no effect in **NAV** Mode.

Alarm Clear

Should an alarm condition occur within the P Series system, an audible alarm within the TS-203 Remote will sound. Activating the DODGE/FN switch will suppress the alarm.

The audible alarm also sounds whenever a switch or pushbutton is activated.

Appendices

Care & Maintenance

There are no user-serviceable parts or adjustments inside the TS-203 Remote enclosure. Should the unit become damaged in any way, return it to an authorized ComNav Dealer.

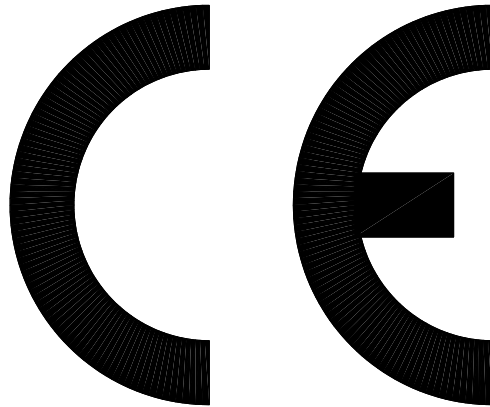
A few precautions will keep the unit in prime condition and result in years of trouble-free service:

- The TS-203 Remote housing does not require any special maintenance other than an occasional cleaning.
- Avoid exposing the housing to solvents, acids, and bases as some of these may weaken the casing.
- Although the TS-203 Remote is watertight, it is not designed for submersion under water.

Specifications

Supply Voltage	10-14 VDC
Supply Current	60 mA nominal 100mA maximum
Operating Temperature	-20°C to +70°C
Storage Temperature	-30°C to +85°C
Mounting	Keyhole Screw
Dimensions (maximum, without cable)	
Body, excluding Tiller Lever:	170 mm x 94 mm x 75 mm (L x W x H) (6.69" x 3.70" x 2.96") 75 mm height (3.70")
Body & Tapered-handle Lever combined:	300 mm (11.81") length when Lever is centred 322 mm (12.68") width when Lever is swung through the full Port-Starboard arc (120°)
Body & Ball Knob Lever combined:	282 mm (11.1") length when Lever is centred 2922 mm (11.4") width when Lever is swung through the full Port-Starboard arc (120°)
Weight (without cable)	410 grams (14.4 ounces)
Safe Distance To Compass	30 cm (12")

CE COMPLIANCE



This product has been tested and is in compliance with the Electro-Magnetic Compatibility (EMC) standards of the European Community, and bears the CE label. It has been tested according to the applicable sections outlined under:

**Technical standard #IEC945/EN60945,
Marine Navigation Equipment,
General Requirements**

Applicable sections for methods of testing and required test results are:

Section 4.5.4:	Radiated Interference
Section 4.5.4:	Immunity to Electro-Magnetic Environment
Annex A, Section A.3:	Immunity to Conducted Audio Frequencies
Annex A, Section A.4:	Immunity to Earth Lead Coupling
Annex A, Section A.6:	Immunity to Radiated Interference

Test results and a declaration of conformity are on file at the ComNav Head Office.

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User Notes

