MAXIMIZING YOUR PERFORMANCE AT SEA

SIMRAD
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M A N U A L

Simrad WP30

Wheelpilot

Part No. E03549 Issue 1.3 MDL/CR 01/12/03

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1 General

1.1 Introduction

The Simrad Wheelpilot WP30 is a self-contained automatic pilot suitable for a wide variety of wheel steered sailing yachts up to 12.8m (42ft) in length. Combining highly sophisticated electronics with advanced software and a powerful mechanical drive, it is capable of providing reliable and accurate steering performance under a variety of different conditions with minimal current consumption.

The WP30 has been designed so that, while it represents the state of the art in marine autopilots with many advanced features, it remains very simple to operate, using only five keys to access all functions.

Sophisticated functions available include Sail To Wind mode and Nav mode (Steer To GPS) using external equipment linked directly to the Wheelpilot via its inbuilt NMEA0183 interface.

There is also the option to operate the Wheelpilot remotely, using the HR20 Hand Remote.

To ensure the best results from your Wheelpilot, it is essential that the unit is installed correctly. Please read this manual thoroughly before installation.

Thank you for choosing Simrad!

If you are pleased with your Wheelpilot, we hope you will be interested in our range of marine electronic equipment, which is manufactured to the same high standards as the Wheelpilot.
Please contact your nearest Simrad Agent for a catalogue showing our increasing range of high-tech navigational instruments, GPS, Autopilots, Radar, Chartplotters, Fishfinders and VHF radio sets.

Simrad operate a policy of continual development and reserve the right to alter and improve the specification of their products without notice.

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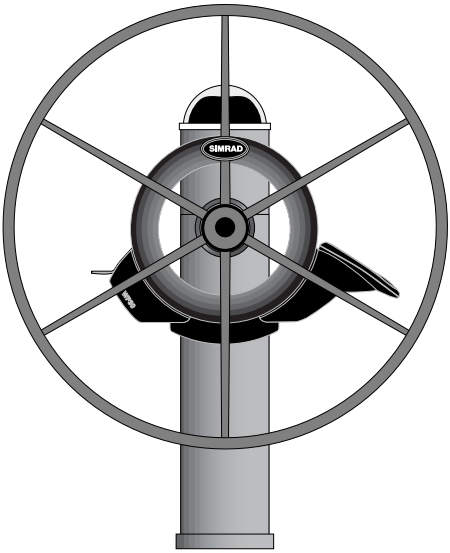


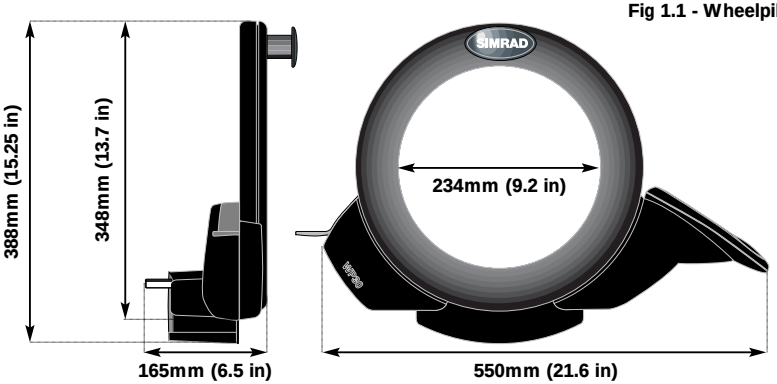
Wheelpilot WP30

1.2 Technical Summary

WHEELPILOT WP30 SPECIFICATIONS

Supply Voltage	12v DC (10v-16v)
Power Consumption	0.06A (Standby)
(Typical)	0.75A (Auto)

Fig 1.1 - Wheelpilot dimensions



2 Operation

2.1 General

The WP30 powers up in Standby mode, indicated by a flashing LED next to the **STBY/AUTO** key. The two direction LEDs above the Port and Starboard keys are always dimly lit, which provides night illumination for the keypad. All functions are confirmed audibly by a "beep" and visually by the LEDs, so the status of the unit can always be confirmed at a glance.

2.2 Engaging the clutch

The Wheelpilot will not drive in any mode unless the drive clutch is engaged first. The clutch is controlled by the lever on the left side of the unit (Fig 2.1). When the lever is in the upward position, the clutch is disengaged, and the wheel is free to turn by hand. To engage the clutch, push the lever down fully until it is flush with the motor housing. The wheel will then be held firmly by the Wheelpilot – hand steering will not be possible until the clutch is disengaged.

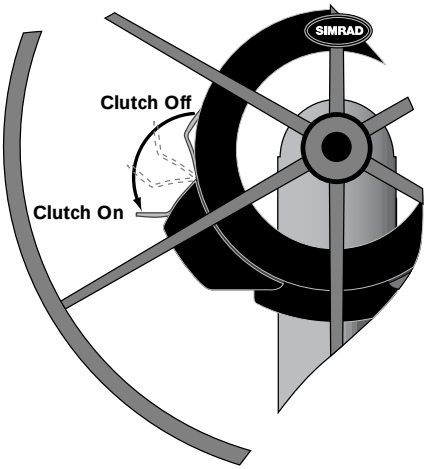


Fig 2.1 - Engaging clutch

2.3 Autopilot Mode

To lock the vessel onto the current heading, simply steer a straight course, engage the clutch and press the **STBY/AUTO** key to switch to Auto Mode, indicated by the LED next to the **STBY/AUTO** key lighting permanently (Fig 2.2).

Fig 2.2 - Engaging autopilot mode

To lock the pilot onto the desired course, simply steer the correct course and then engage the autopilot. **The wheel should always be in the centreline position before engaging the Wheelpilot.**

If the **STBY/AUTO** key is pressed and held, the pilot will beep a second time and lock onto the previously used heading (this feature will not be available if the unit has just been switched on).

To disengage the pilot, press the **STBY AUTO** key and lift the clutch lever. **Always switch the pilot to Standby mode when disengaging the clutch.**

2.4 Adjusting Course

While in Autopilot mode, precise course adjustments can be easily made -

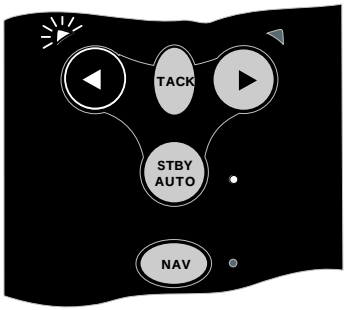


Fig 2.3 - Course adjustment to Port

To make a 1º adjustment, press either the **Port** or **Starboard** key once. This is confirmed by a single beep, and the relevant Port or Starboard LED will flash once.

To make a 10º adjustment, press and hold the key, which is confirmed by a double beep and a double flash of the Port or Starboard LED (Fig 2.3).

N.B. – When in Nav mode (see section 3.1), the Wheelpilot will gradually return to the original track.

2.5 Autotack

The Wheelpilot has a built-in autotack facility, allowing easy tacking of the vessel when single or short handed. An autotack is only possible when in Autopilot mode.

To initiate autotack, press and hold the **TACK** key, followed by either the **Port** or **Starboard** key, depending on which direction you wish to tack (Fig 2.4).

The operation of the Wheelpilot will differ during an autotack depending on whether the pilot is in Sail To Compass or Sail To Wind mode:

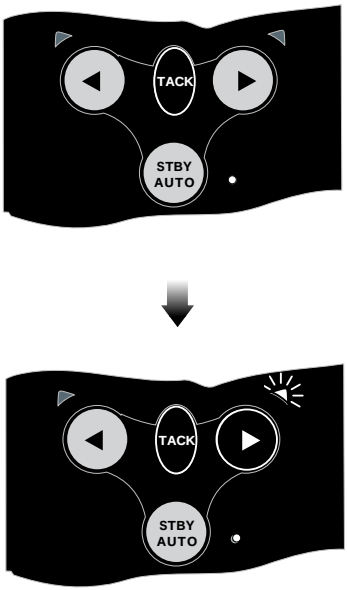


Fig 2.4 - Initiating Starboard autotack

2.5.1 Autotacking in Compass Mode

If in Sail To Compass Mode (default), the Wheelpilot will then tack the vessel in the selected direction. The WP30 has a factory preset autotack angle of 100º.

2.5.2 Autotacking in Wind Mode (cf. section 3.2)

The Wheelpilot will only allow an autotack if the apparent wind is less than 90º i.e autotack is disabled if sailing downwind. The Wheelpilot will tack the vessel through to the same apparent wind angle, but on the opposite tack.

N.B. – In this mode, the Wheelpilot automatically prevents tacking in the wrong direction, e.g. if on Port tack, only an autotack onto Starboard tack will be possible.

In all cases, the autotack is confirmed by a long beep, with the relevant Port or Starboard LED flashing during the course change.

2.5.3 Nav Mode (cf. section 3.1)

The autotack facility is disabled while in Nav mode.

2.6 Rudder Movement (Gain)

The Wheelpilot uses highly advanced steering software, which constantly assesses how the vessel is being affected by the prevailing conditions. By adjusting its own performance, the pilot is able to maintain the most accurate course for these conditions, just as a human pilot would. Thus, in a rough sea the pilot is not overworked and battery drain is kept to a minimum.

The pilot will make corrections to compensate for heading errors, in order to keep the boat on course. The amount of rudder correction made is set by the Gain (sometimes referred to as the rudder ratio).

The Gain setting can be compared to driving a motor vehicle – at high speeds, very little wheel movement is necessary to steer the vehicle (LOW Gain). When driving at slow speeds, more wheel movement is necessary (HIGH Gain).

Fig 2.5**A** shows the effect of setting the Gain too low: the boat takes a long time to return to the correct heading. Fig 2.5**B** is ideal, where errors are quickly corrected. Fig 2.5**C** occurs when the Gain too high, causing the boat to "S", or oscillate around the correct heading. Excessive Gain (Fig 2.5**D**) causes instability of course, leading to increasing error.

To adjust Gain, please refer to section 4.3.

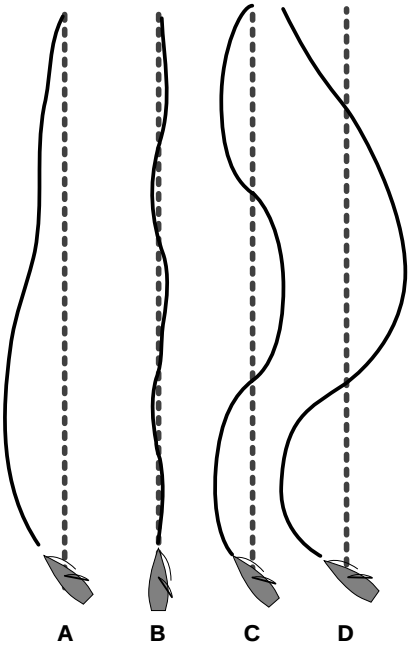


Fig 2.5 - Effects of Gain setting

2.7 Seastate

In rough weather, more variations in heading will be detected by the Wheelpilot due to the heavy seas yawing the vessel. If no account of this was taken, then the Wheelpilot would be overworked, causing unnecessary strain on the unit and excessive drain on the batteries. All Simrad Wheelpilots will continuously monitor corrections applied to the wheel over the course of a voyage, and allow a "dead band" within which the boat can go off course without corrections being made (Fig 2.6).

The dead band is automatically set and updated by the Wheelpilot to give the best compromise between course holding and battery consumption. However, this can be manually set if so desired.

To manually adjust the Seastate, please refer to section 4.4.

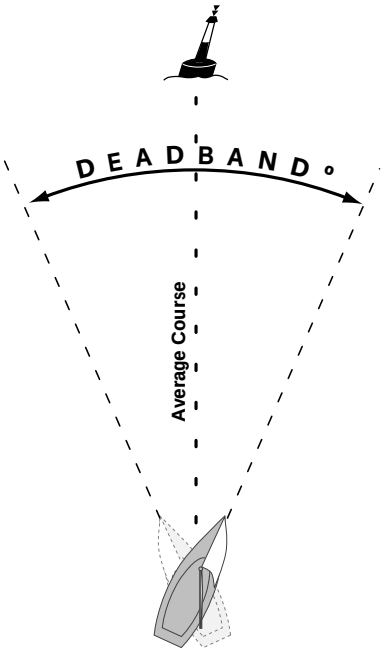


Fig 2.6 - Seastate "deadband"

2.8 Autotrim

Under differing conditions a rudder bias (sometimes known as standing helm or rudder trim) is applied in order to steer a straight course. An example is when sailing close hauled, where the vessel will normally pull into the wind, and the helmsman applies a standing helm to leeward in order to maintain course. The amount of this standing helm varies according to factors such as strength of wind, boat speed, sail trim and amount of sail set. If no account of these were taken, then the vessel would tend to veer off course, or pull around head to wind if sailing close hauled.

The Wheelpilot continuously monitors the average course error and applies a bias to the wheel to compensate until the optimum condition is reached. This bias or standing helm is applied gradually, so as not to upset the normal performance of the Wheelpilot. Thus, it may take up to a minute or so to fully compensate after changing tack. Once optimum trim is reached, the pilot will still monitor for changes in the prevailing conditions and update the trim accordingly.

3 Advanced Features

The Wheelpilot WP30 contains many advanced features, one of which is the ability to accept course data from a variety of sources apart from the internal fluxgate compass, including NMEA-compatible navigational receivers (GPS, etc) and windvanes. An external compass option is also available via the inbuilt network connection.

Section 3 describes in detail the advanced facilities available with the Wheelpilot when interfaced with other equipment.

3.1 Nav Mode

The WP30 Wheelpilot has a built-in NMEA interface which allows direct connection with NMEA-0183-compatible equipment, such as GPS, Chartplotters, etc.

Once interfaced with navigation equipment via NMEA, the Wheelpilot can steer using data from this source in addition to the internal compass, allowing a highly accurate course to waypoint.

To access Nav mode the unit must be in Autopilot mode. Simply activate a waypoint or route programmed into the navigational receiver, and press the **NAV** key. The LED next to the **NAV** key will light and the Wheelpilot will steer to the first waypoint, using Cross Track Error and Bearing To Waypoint information from the navigational receiver to maintain an accurate course.

On arrival at the target waypoint an intermittent alarm will sound. As a safety feature to avoid an unexpected course change, the next waypoint will not be automatically loaded until the **NAV** key is pressed. When the vessel reaches the final waypoint, the Wheelpilot will continue its current course under Compass mode.

Note, that some of the standard key stroke functions may have a different effect in Nav mode than when in Compass mode. Please refer to sections 2.5.2 and 2.5.3.

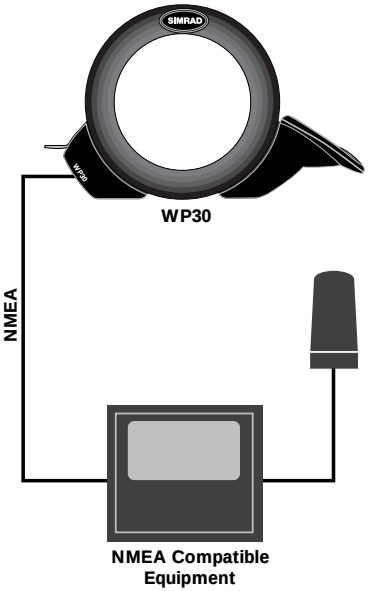


Fig 3.1 - Nav interfacing

Fig 3.2 - Initiating Nav Mode

3.2 Sail To Wind

The WP30 is able to sail to the apparent wind angle rather than a compass course, using wind data via the NMEA interface. The use of the Simrad IS15 Wind instrument is recommended.

If no wind information is present, the Wheelpilot will not enter Sail To Wind mode.

To select Sail To Wind mode, the unit must be in Autopilot mode. To enter Sail To Wind mode, press and hold both the **Port** and **Starboard** keys together, until a double beep is heard (Fig 3.3). Both the Port and Starboard LEDs will flash simultaneously while the pilot is in Sail To Wind mode.

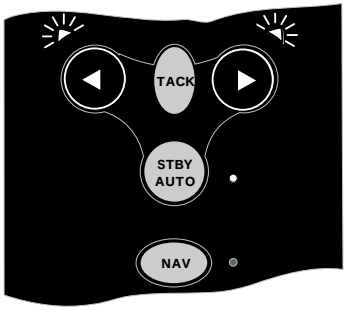


Fig 3.3 - Selecting Sail To Wind Mode

To switch back to Compass mode, simply press and hold the **Port** and **Starboard** key together again until a double beep is heard.

While in Sail To Wind mode, engaging the autopilot will lock the Wheelpilot onto the current apparent wind angle being sailed. Any course adjustments made will be relative to the apparent wind angle, rather than the compass heading as when in Compass mode. Please note, that some of the standard key stroke functions may have a different effect in Sail To Wind mode than when in Compass or Nav mode. Please refer to section 2.5.3 for more details.

Note, that Nav mode cannot be selected while in Sail To Wind mode – to initiate, first return to Compass mode.

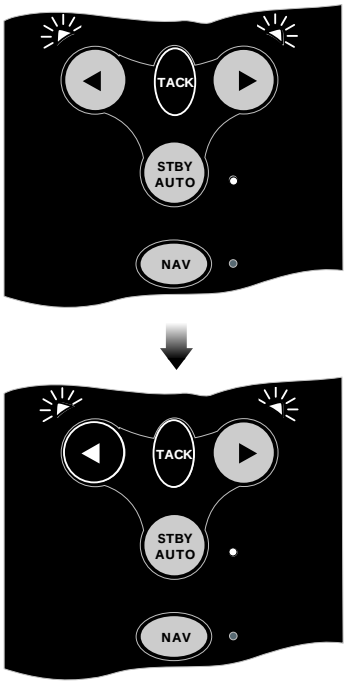


Fig 3.4 - Initiating Port Autotack in Sail To Wind Mode

3.3 Using an External Compass

Normally, the accurate operation of a self-contained autopilot is very difficult on a ferrous hulled boat (steel, ferro cement, etc), as the hull will affect the bearing read by the internal fluxgate compass.

Although the WP30 Wheelpilot operates using a built-in fluxgate compass, it has the facility to accept data from an external source – the ECP30 compass.

On a steel or ferro hulled boat, the correct location for the ECP30 would be on the mast, between 1 and 2 metres above the deck (Fig 3.5). On a non-ferrous hulled boat, the ECP30 should be situated low down, as near the centre point of the boat as possible, but away from any sources of magnetic interference such as speakers etc.

Note, that in order to operate, the ECP30 will require a separate 12v power supply through a CPC02 or CPC05 power cable.

Once connected, the Wheelpilot will automatically accept bearing data from the ECP30 active compass transducer in preference to the internal fluxgate compass.

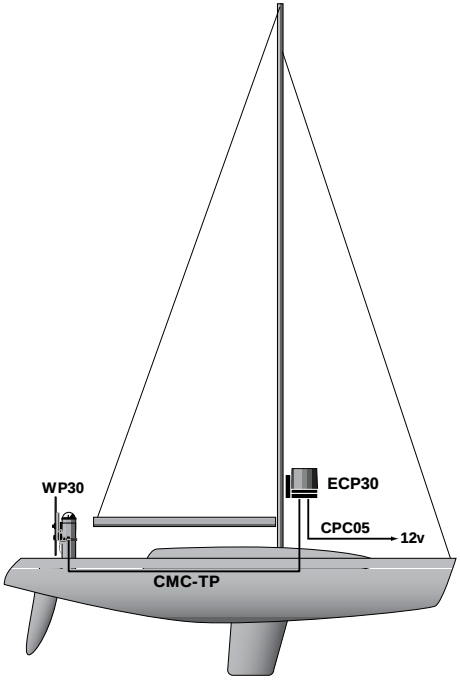


Fig 3.5 - Using WP30 with external compass

4 Configuration

4.1 Scaling

Before using the Wheelpilot, it is necessary to program in the steering sensitivity, which is related to the number of turns that the wheel makes between end stops. This will determine the amount of steering correction the Wheelpilot applies.

With the power ***off***, press and hold the **TACK** and **NAV** keys, and switch on the power. Both Port and Starboard LEDs will illuminate, the Nav LED will flash, and a repeated sequence of beeps will be heard. The number of flashes and beeps in the sequence indicates the current scaling factor.

The scaling factor is the total number of **half turns** from lock to lock. ***For example***, if the wheel has three complete turns from lock to lock, the scaling factor will be 6. If there are 1½ turns from lock to lock, then the factor will be 3.

Setting (No. beeps/flashes)	Turns Lock To Lock
2	1
3	1½
4	2
5	2½
6	3
7	3½
8	4
9	4½
10	5

Press the **Starboard** key to increase the scaling factor by one, to a maximum value of 10 (= 5 turns lock-to-lock). Press the **Port** key to decrease the scaling factor by one, to a minimum value of 2 (= 1 turn lock-to-lock).

To confirm scaling setting and return to Standby mode, press the NAV key.

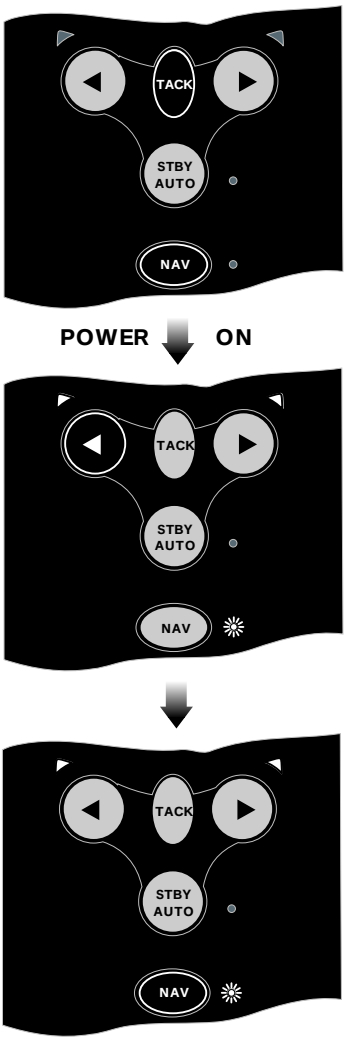


Fig 4.1 - Reducing scaling factor by one

4.2 Calibration Mode

The Gain and Seastate settings of the Wheelpilot can be adjusted in Calibration mode, which can be done whilst the Wheelpilot is in either Standby or Auto-pilot mode.

Press and hold the **TACK**, followed by **NAV** (Fig 4.2). The Starboard LED will illuminate to indicate that the pilot is in Gain mode. To toggle between Gain and Seastate Mode, press **TACK** (Fig 4.3). The Port LED will illuminate to indicate Seastate mode.

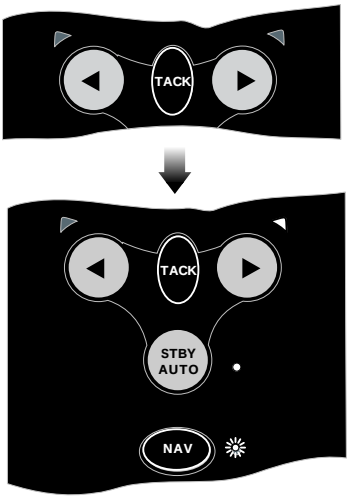


Fig 4.2 - Entering Calibration Mode

4.3 Adjusting Gain

When Gain Mode is selected (indicated by the Starboard LED illuminated), the Nav LED will flash and a repeated sequence of beeps will be heard. The number of flashes and beeps in the sequence indicates the level of the Gain setting.

Press the **Starboard** key to increase the Gain, to a maximum level of 9 (Fig 4.4). To decrease the Gain press the **Port** key the required number of times, to a minimum level of 1.

For example, if the Gain was set at 4 (indicated by a sequence of four flashes of the Nav LED and four beeps) and needed to be increased to 7, pressing the **Starboard** key three times would adjust the Gain accordingly. The Nav LED would then flash seven times and seven beeps would be heard.

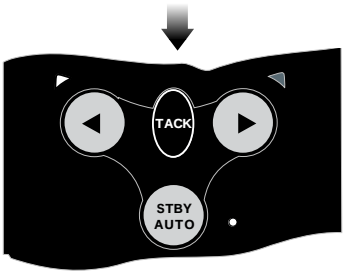


Fig 4.3 - Toggling between Adjust Gain and Seastate

4.4 Adjusting Seastate

When adjusting Seastate (indicated by the Port LED illuminated), the Seastate level is indicated by the number of audible beeps and flashes of the Nav LED. No beeps or flashes of the Nav LED indicates that the Wheelpilot is set to automatic Seastate (see section 2.7).

To switch from auto to manual Seastate and increase the Seastate level, press the **Starboard** key the required number of times to a maximum level of 9. To decrease the Seastate press the **Port** key the required number of times, to a minimum level of **0**, this will switch the Wheelpilot back to Auto Seastate.

To confirm Gain/Seastate settings and return to normal operation, press the NAV key.

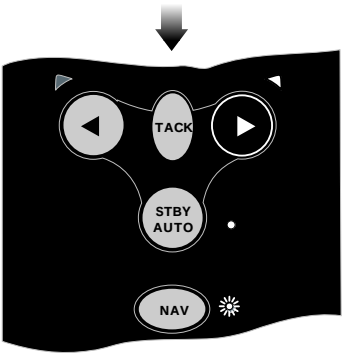


Fig 4.4 - Increasing Gain level

5 Installation

5.1 Fitting the Wheelpilot

With correct preparation, the Wheelpilot can be installed in under an hour. However, it is important that it is fitted correctly to operate to its maximum efficiency. – **Please read this section thoroughly before attempting installation.**

The fixing point of the Wheelpilot is the pedestal mount, which is fixed to the pedestal using two band clamps. The Wheelpilot unit attaches to this mount using two metal guide rods, which slide into slots on either side of the clamp. Thus, no holes need to be drilled to install the pilot, and it can be easily and quickly removed if necessary.

The pedestal mount supplied will fit most pedestals 100–140mm (4.0–5.5in) in diameter. Two packing pieces are supplied for use with a standard 100mm (4.0in) pedestal (Fig 5.1).
The pedestal mount has three sets of slots for the band clamps to suit the pedestal being fitted to (Fig 5.2). For pedestals over 140mm (5.5in) diameter, a larger clamp is available as a separate accessory (part no. **PED200:BK**).

The two guide rods are not fitted to the Wheelpilot itself when supplied and will need to be attached. As these will support any loads the Wheelpilot is subjected to, it is important that they are securely fitted. The ends of the rods have flats on them, which will allow a 12mm spanner to be used to tighten them (Fig 5.3).

1. Remove the wheel.

2. Position the pedestal mount on the front of the pedestal. The vertical distance between the centres of the circular slots and the centre of the wheel shaft should be 125mm (5.0in) and the clamp should be exactly parallel with the wheel in both planes (Fig 5.4).

3. The exposed section of the band clamps are slotted through the sleeving provided which covers the clip and also prevents it form scratching the pedestal when tightened. It is recommended that the sleeving length is reduced to approx. 25mm (1.0in) shorter than the length of the band clamps when tightened around the pedestal to avoid fouling the slots in the pedestal mount.

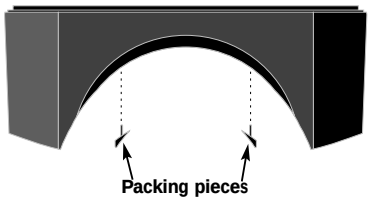


Fig 5.1 - Fitting to 250mm (4.0 in) pedestal

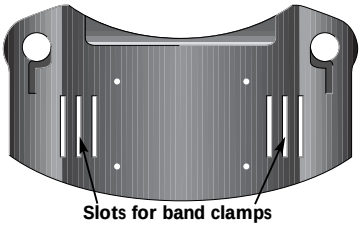


Fig 5.2 - Rear view of pedestal mount

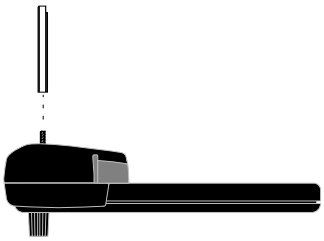


Fig 5.3 - Attaching guide rods

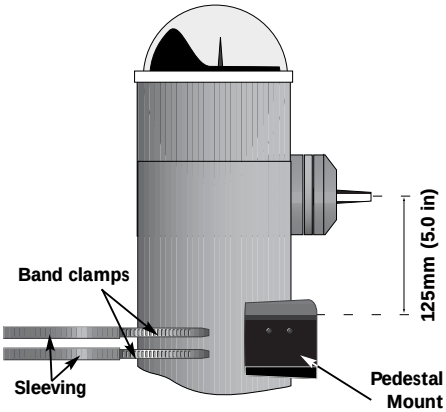


Fig 5.4 - Correct positioning of pedestal mount

Note, that if the sleeving has already been fitted to the clamps, it will need to be removed to facilitate fitting.

4. The self-adhesive neoprene pad supplied should be attached to the inside face of the pedestal mount. This not only increases the grip of the pedestal mount, but also protects the pedestal from being scratched by the mount.

5. Slide the sleeving over the band clamps and thread the first clamp through the pedestal mount (using slots appropriate to the pedestal), around the pedestal and back in through the corresponding slot on the other side of the mount (Fig 4.5). Locate the clamp in either the top or the bottom of the slot in the pedestal mount to ensure that there is room to fit the second clamp.

6. Tighten the band clamp as far as possible until the pedestal mount is held firmly in place and cannot be moved. Fit the second clamp following the same procedure. Fit the front plate, but do not tighten the four socket head bolts at this point.

7. Fit the Wheelpilot to the pedestal mount by inserting the two guide rods into the slots on the pedestal mount. Check that the Wheelpilot ring is centralised around the wheel shaft (Fig 5.6). If necessary, reposition the pedestal mount by removing the pilot and the front plate and loosening the band clamp.

8. With the clutch lever disengaged, rotate the Wheelpilot ring until the two spoke pillars are at the top.

9. Refit the wheel, ensuring that the top spoke sits between the two spoke clamps.

10. Two rubber clamps are supplied, that fit over the toothed spoke pillars. The holes in the clamps are offset so that by rotating them the gap between the pillars can be increased or decreased, until the wheel spoke is held securely (Fig 5.7).

11. If necessary, move the Wheelpilot forward or back along the guide rods, until the wheel spoke fits equally between the clamps.

12. Clip the badge to the spoke clamps (Fig 5.8).

13. Spin the wheel from lock to lock and check that the Wheelpilot rotates freely and smoothly.

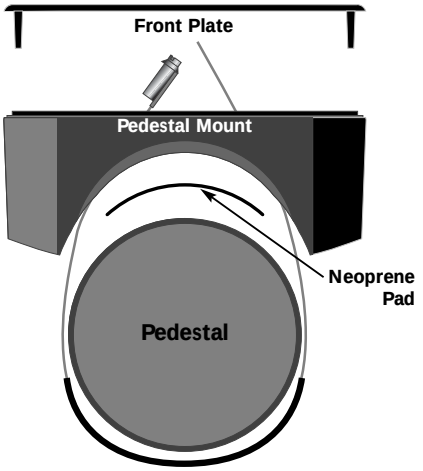


Fig 5.5 - Attaching clamp using band clamps

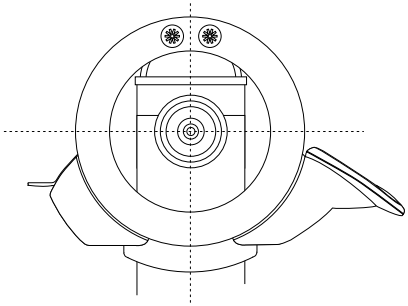


Fig 5.6 - Pilot should be central to wheel shaft

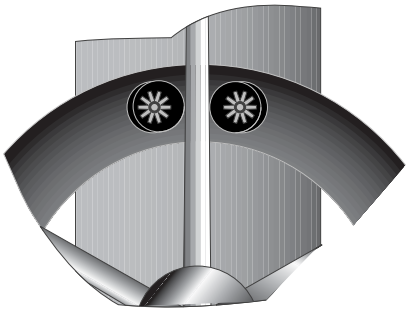


Fig 5.7 - Offset rubber spoke clamps

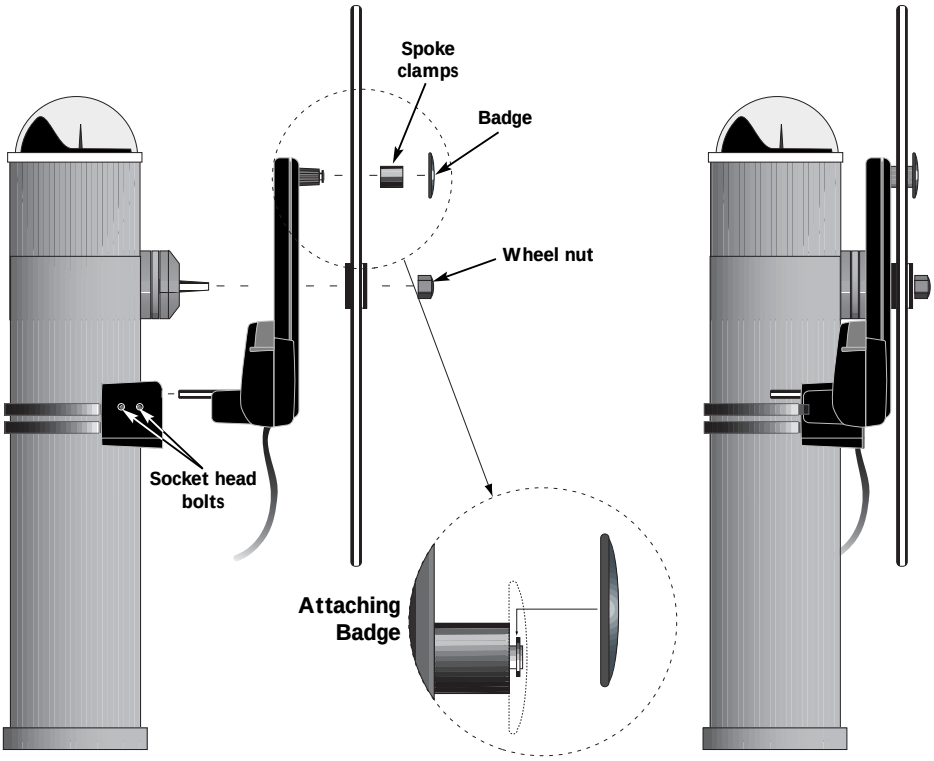


Fig 5.8 - Fitting of Wheelpilot

If there is any oscillation at any point of rotation, this is due to the Wheelpilot being mounted slightly off-centre. Check that the pedestal clamp is not too low or too high, and that the pedestal mount and the pilot are exactly parallel to the wheel.

14. Tighten the four socket head bolts on each side of the pedestal mount, so that the guide rods are held firmly in place. Do not overtighten.

The Wheelpilot is supplied with a clip-on sun cover (Fig 5.9) to protect the keypad and control unit from the elements and the effects of UV light while the pilot is not in use.

Apart from this cover, the Wheelpilot is fully protected from the elements due to its weatherproof design, and can be left fitted to the pedestal without requiring any additional protection.

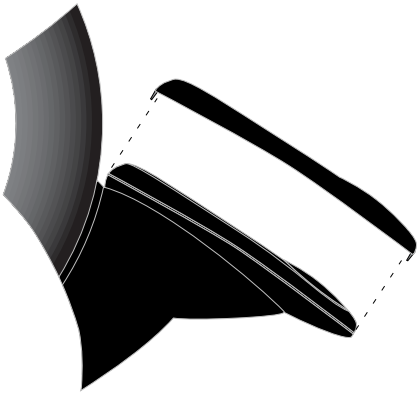


Fig 5.9 - Keypad sun cover

5.2 Electrical Installation

The Wheelpilot WP30 operates from a 12v DC supply. It is designed to be permanently wired into the vessel's 12v supply using a six-core cable, which also allows connection to NMEA and other data sources. If required, a six-pin waterproof plug and socket kit is available as a separate accessory (part no. **SKT300**).

The WP30 should be wired to the 12v power supply, NMEA data (where appropriate) in accordance with Fig 5.10. A terminal strip is supplied with the pilot for this purpose.

IMPORTANT – If the vessel has more than one separate battery bank, when connecting the WP30 to the power supply, always ensure that the Wheelpilot and all interfaced equipment are connected to the same battery bank, even though they each have independent connections to the switch panel. This is to avoid a possible voltage drop between the interfaced equipment, which would render the equipment inoperative.

• Run the cable through the pedestal using a suitable grommet. If running the cable through the deck, use a good quality cable gland to prevent water ingress (Fig 5.11).

• Use a suitable gauge cable if an additional cable run is required to link the pilot to the power supply (see Fig 5.12).

• Connect to the vessel's switch panel via a 10 Amp fuse or breaker.

• Do not fit other electronic or electrical equipment to this cable, or "tap into" the supply from a nearby cable – always wire each piece of equipment to its own breaker in the switch panel.

• Ensure all wire ends are tinned, and any connections are well made. Poor contact will result in loss of torque from the Wheelpilot and slower speed of response.

If in any doubt, employ a qualified engineer to install the equipment.

Core	Wired To
Red	+12v DC
Black	0v
Blue	NMEA Common
Yellow	NMEA Data
(Green	*Ext Compass)*
(White	*Ext Compass)*

Fig 5.10 - Wiring connections - WP30

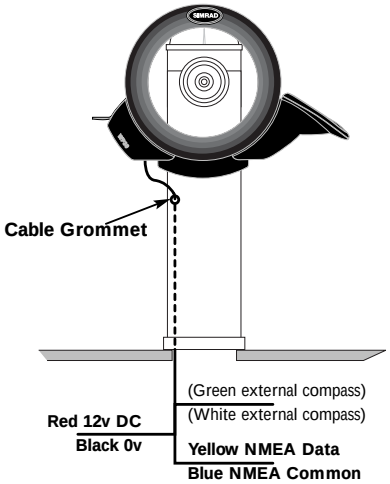


Fig 5.11 - Cable runs

Extra Cable Run	Cross Section Area	Conductor Type	AWG
Under 4M (13Ft)	1.5mm^2	30/0.25	16
4-8M (27Ft)	2.5mm^2	50/0.25	14

Fig 5.12 - Cable selection table

The WP30 is linked to the ECP30 external compass via a connecting lead CMC-TP (not supplied), which is wired to the Wheelpilot's green & white wires and plugged into the Compass.

The CMC-TP is used purely to supply compass data to the WP30 – the ECP30 must always have it's own 12v power supply.

5.3 Interfacing via NMEA

The WP30 Wheelpilot's state-of-the-art electronics include a built-in NMEA processor, which means that NMEA0183-compatible equipment can be connected directly to the Wheelpilot without any need for a separate interface unit (Fig 5.13).

Due to the vast number of different manufacturers and models of navigational equipment, Simrad cannot guarantee correct operation and installation of this equipment. Therefore, before connecting any equipment to the Wheelpilot, it is important that the unit's manual is referred to with regard to interfacing via NMEA.

When connecting to the Wheelpilot's NMEA interface, two wires are used – a DATA wire and a COMMON (Com) wire. These should be linked to the Wheelpilot cable as follows:

Core	Wired To
Blue	NMEA Common (-)
Yellow	NMEA-Data (+)

It should be noted, that some manufacturers' equipment does not have a dedicated Common connection. In this case, the DATA connection will usually be labelled NMEA OUT, and the NMEA Common connection on the Wheelpilot (Blue) should be connected directly to 0v (Black).
If in any doubt, refer to the manufacturer, or Simrad technical support for advice.

If a navigational receiver (GPS, etc) is connected to the Wheelpilot, it can extract the NMEA sentences necessary for the Nav function to operate. Other functions such as Sail To Wind may also be available if NMEA0183-compatible equipment transmitting the correct NMEA sentences is interfaced.

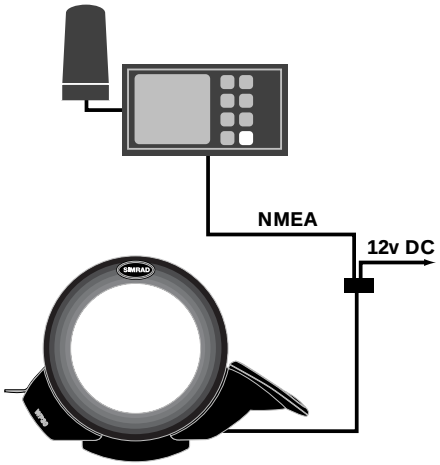


Fig 5.13 - Interfacing to Wheelpilot via NMEA

5.4 NMEA Sentences Received

The NMEA0183 information required for full functionality whilst in Nav mode is as follows:

– Cross track error

– Bearing to destination waypoint

– Arrival at waypoint indication

– Magnetic Variation

This information is extracted from the following NMEA0183 sentences :

Received	Data
XTE	Cross Track Error and Arrival At Waypoint
BWC	Bearing To Destination Waypoint and Arrival At Waypoint (Great Circle)
BWR	Bearing To Destination Waypoint and Arrival At Waypoint (Rhumb Line)
APA	Cross Track Error, Bearing To Destination Waypoint and Arrival At Waypoint
APB	Cross Track Error, Bearing To Destination Waypoint and Arrival At Waypoint
RMA	Speed Over Ground (SOG) & Magnetic Variation
RMB	Cross Track Error, Bearing To Destination Waypoint and Arrival At Waypoint
RMC	Speed Over Ground (SOG) & Magnetic Variation

NOTE – The Cross Track Error (XTE) information has a maximum value of 1.21 Nautical Miles. If the XTE exceeds this while using Nav mode, the Wheelpilot will sound an alarm, exit Nav mode mode and return to Compass Auto mode.

The WP30 also extracts the apparent wind angle from the following NMEA0183 sentences:

Received	Data
VWR	Apparent Wind Speed & Angle
MWV	Wind Speed & Angle

6 Appendix

6.1 Advice On Operation

The Simrad Wheelpilot, when used correctly, can maintain as good a course, on most points of sail as a skilled helmsman, with the advantage that they never lose concentration where a human may begin to show lapses of concentration after as little as ten minutes.

There are certain circumstances, however, a human pilot has the advantage in being able to anticipate events which no autopilot can sense, typically in a heavy following sea. The following advice should improve efficiency when sailing using Wheelpilot:

1. When sailing close to the wind, it is easy to forget to trim the mainsail, allowing excessive weather helm to build up. Where a human helmsman would quickly complain, the autopilot will struggle on, and the boat will be sailed less efficiently. Whereas a human normally likes to feel some weather helm, this is not necessary for the functioning of the Wheelpilot. Power consumption, wear and drag will be greatly reduced if the mainsail is freed or reefed a little sooner than normal when sailing manually.

2. It is also advisable, when sailing close hauled, to set a course a few degrees free of that normally sailed under manual control, to avoid luffing into the wind.

3. When running dead downwind, a human pilot can see visual signs warning him if the boat is about to gybe, which the Wheelpilot cannot sense. Therefore, when under autopilot it is advisable not to sail as close to the gybe as you may do when sailing manually.

4. When broad reaching or running fast, particularly with quartering waves, a helmsman will naturally apply periodic larger angles of helm than when beating or sailing slowly. This is the equivalent of increasing rudder Gain, and it may be a good idea to adjust the Gain on the Wheelpilot. Many people prefer to find a compromise setting which is used for all sailing, but with practice it can be optimised for different conditions, e.g. low for motoring in a calm sea or high for running fast. If the Gain is set too low, the boat will yaw, because insufficient rudder is applied in time; if the Gain is too high, the boat will continually overcorrect on each deviation, increasing power consumption.

5. While the clutch is engaged, the wheel cannot be turned manually. In an emergency situation, manual control can only be achieved by lifting the clutch lever. Do not attempt to force the wheel while the clutch is engaged, as you may damage the Wheelpilot or break the internal drive belt.

6. The Wheelpilot is a highly advanced piece of equipment – as such, it is a valuable aid to enjoyable sailing. However, it would be a mistake to become complacent. As with all electronic navigational equipment, it is an **aid** to navigation and should not be used as a substitute for conventional navigational practice. **Remember – Maritime Law* requires that you keep a good look out at all times.**

*IMO International Regulations for Preventing Collisions at Sea, Part B Rule 5 (1972)

6.2 Fault Finding

Symptom	Probable Cause	Remedy
Pilot consistently over or under compensates when a course error is detected	* Gain setting is respectively too high or too low. * Steering sensitivity scaling has been incorrectly set	* Adjust gain setting (see section 4.3). * Enter the correct scaling for the vessel (see section 4.1).
After functioning normally course is suddenly lost and the Wheelpilot goes into Standby Mode.	* Power interrupted briefly, or low voltage. * Supply cable used too small. * Intermittent connection.	* Increase size of cable. * Check all connections. * Charge batteries. * Uprate batteries.
Helm is hard over and alarm is continuously on.	* Steerage way insufficient to control course, or sails are aback. * Steering scaling set too high	* Reset the vessel on course and re-engage pilot * Enter the correct scaling for the vessel (see section 4.1).
Power supply is live, but pilot is not on.	* Wheelpilot is wired incorrectly.	* Check wiring of pilot (see section 5.2).
Loss of course under Sail To Wind Mode.	* Apparent wind has become too light to give a consistent direction.	* Change to Compass Mode.
Cannot select Sail To Wind Mode.	* Masthead unit is not connected. * Required NMEA sentence not being transmitted.	* See section 5.5.
Cannot select Nav Mode.	* Navigational receiver not connected. * No waypoints have been programmed. * Wrong NMEA format is being used.	* Check NMEA interface connections. * Check NMEA0183 format is being transmitted by navigational receiver.
Autotack function not working.	* Pilot is in NavMode. * Pilot is in Steer To Wind Mode and a) apparent wind is >90° b) autotack being attempted is in the wrong direction.	* Exit NavLock. * Luff up until apparent wind is less than 90°.
Pilot exits Nav Mode before waypoint is reached.	* Cross Track Error has exceeded 1.21 Nm.	* Reset the vessel on course and re-engage Na Mode
Pilot does not hold accurate course in auto mode	* Fluxgate compass is being affected by interference from nearby magnetic influences (binnacle compass, speakers) or metallic objects (winches, deck hardware etc)	* Check compass has been calibrated (see section 5.3). * Fit ECP30 external fluxgate compass instead. * Replace binnacle compass with bulkhead compass. * Relocate objects that are causing interference.

6.3 Auto Compass Calibration

Although the Wheelpilot internal compass is extremely accurate, after installation it is necessary to calibrate the compass to compensate for any deviations caused by objects surrounding it on board the vessel.

With the vessel motoring along slowly (2–3 knots) in calm conditions and the Wheelpilot in Standby mode, press the **Starboard** key a number of times to induce a slow clockwise rotation of the vessel. Press and hold the **TACK** key, followed by the **Port** and **Starboard** keys simultaneously to enter Auto Compass Calibration mode (Fig 6.1). The Port and Starboard LEDs will both light. Allow the vessel to turn through a minimum of $1^1/_4$ turns (450º) in approximately two minutes, during which time the fluxgate compass will automatically calibrate itself.

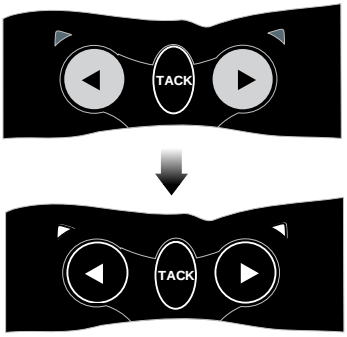


Fig 6.1 - Auto Compass Calibration

If the rate of turn or the boat speed is too high, the Port LED will flash (Fig 6.2) indicating that it is necessary to either slow the boat or decrease the angle of turn. If the rate of turn or boat speed is too slow, the Starboard LED will flash, indicating that it is necessary increase to either the boat speed or the angle of turn. A **short beep (3 seconds)** will indicate that the calibration has been successful and the Wheelpilot will return to Standby mode. If the calibration has been unsuccessful, after a period of four minutes a **long beep (6 seconds)** will sound. Try again, carefully following the above directions.

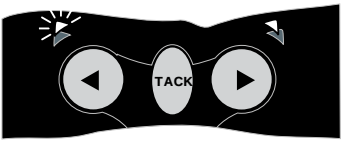


Fig 6.2 - Rate of turn too fast

Note, that this function is only available for autocalibrating the internal fluxgate compass.

6.4 Adjusting Belt Tension

The belt tension is set when the Wheelpilot is assembled, however, it may be necessary to adjust this during the lifetime of the pilot.

The tension is adjusted by means of a screw situated underneath the clutch lever. This screw is only accessible when the lever is in the up (disengaged) position. To decrease the clutch tension, turn the screw clockwise. To increase the tension, turn the screw anticlockwise. The scale next to the screw indicates the current tension setting. When the pointer is at the top, the clutch is at maximum tension. Minimum tension is indicated when the pointer is at the bottom.

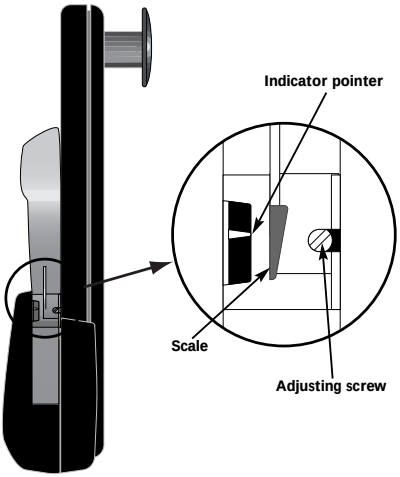


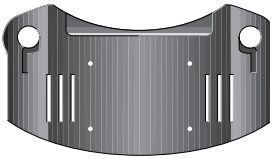
Fig 6.3 - Belt tensioner

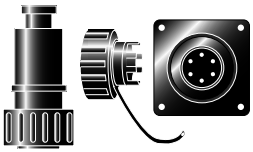
6.5 Spares & Accessories

The following spares and accessories are available through your local Simrad agent. Please quote the correct part number when ordering.

E03011
Spare spoke clamps
(supplied individually)

PED200:BK
Large Pedestal Mount kit
for pedestals 175 to 200mm
diameter (7.0 to 8.0 in).



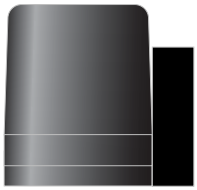


SKT300
6-Way Waterproof
Plug and Socket kit

E03529
Replacement badge

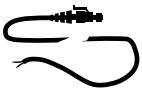
HR20
Hand Remote Unit

E03235
Extra long guide rods



ECP30
External
Compass

CMC-TP
ECP30 interface cable
(5m)



6.6 Servicing

Although your Wheelpilot should seldom need servicing, for optimum performance we recommend that the belt is replaced every three or four seasons. Replacement belts are available from your local Simrad agent, and we recommend that the belt is replaced professionally to ensure correct fitment and calibration.

The Wheelpilot will also benefit from an application of silicone or Teflon grease to the connectors each season, and by keeping the control unit and the connector's protective cover in place when not in use.

6.7 Warranty

The unit is guaranteed for 24 months from date of retail sale. If it is necessary to have the unit repaired, return it carriage prepaid to the agent in the country of purchase with a copy of the receipted invoice showing the date of purchase. Where possible, return all the components unless you are certain that you have located the source of the fault. If the original packing is not available, ensure that it is well cushioned in packing; the rigours of freight handling can be very different from the loads encountered in the marine environment for which the unit is designed.

For Worldwide Warranty details, please refer to the Warranty Card supplied with this unit.

A list of official worldwide Simrad dealers is included in the Warranty Card.

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