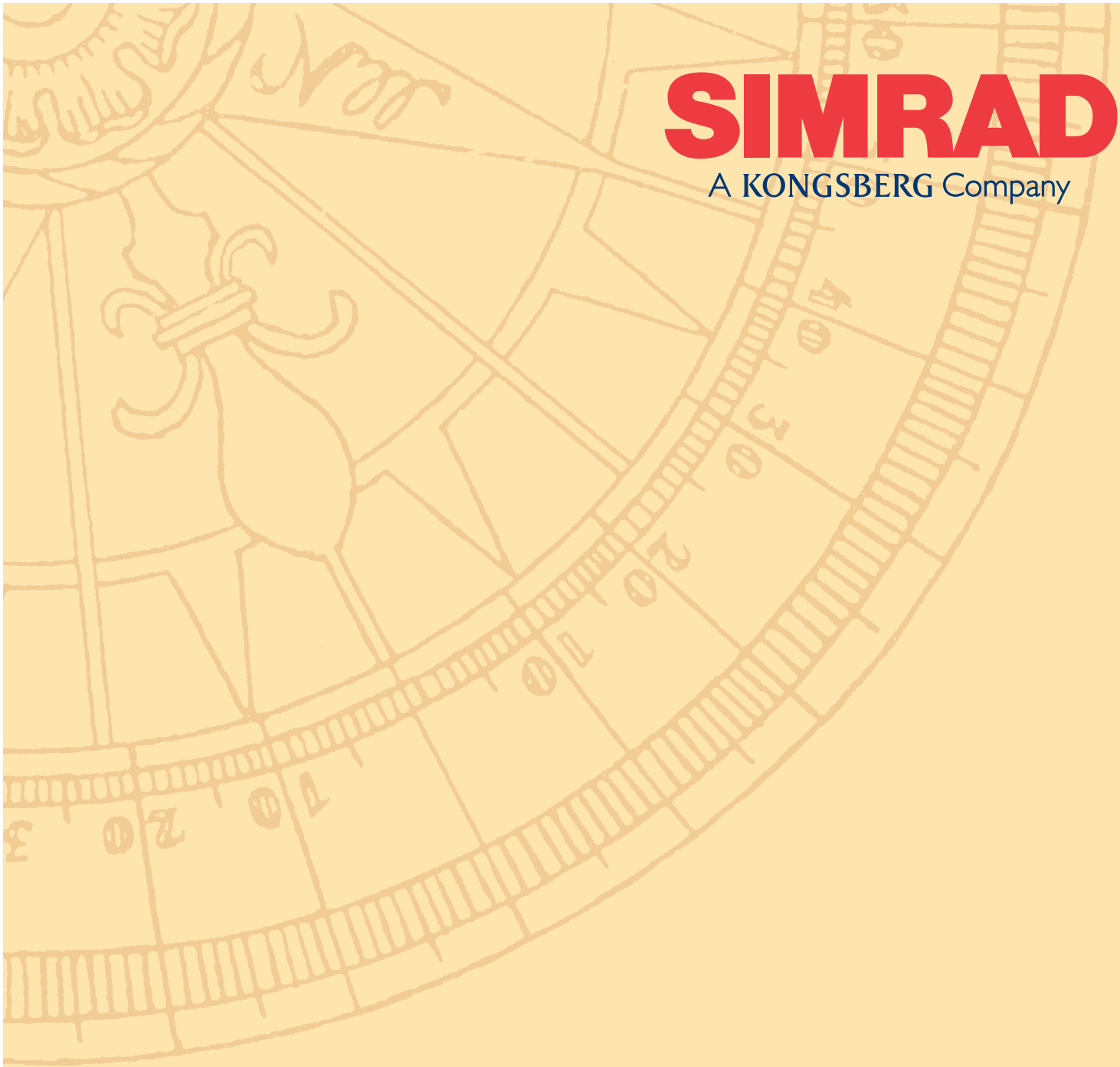

SIMRAD

A KONGSBERG Company

TP10, TP20 & TP30 Tillerpilot
Dealer Information

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Contents

TP10, TP20, TP30 Tillerpilots

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Simrad Navico's Tillerpilots, the TP10, TP20 and TP30 offer the benefits of high thrust, low power consumption and quiet operation, together with the weatherproof protection and user friendly operation that Simrad Navico have become renowned for. This makes the Simrad Tillerpilots the most powerful in their price range.

The **TP10** is a high power tiller autopilot which delivers up to 65kg (143lbs) peak thrust, with a lock to lock speed of 10 seconds (30kg load). This pilot comfortably outperforms all other tiller autopilots in its class, and is suitable for vessels up to 9m (29 ft) in length.

TP10 Principal Functions -
Steer To Compass (Inbuilt) **Autotack**

The **TP20** has a peak thrust of 70kg (154 lbs) and a lock to lock time of 9.5 secs with a 30kg load. The inbuilt NMEA0183 interface (4800 baud) means that any NMEA compatible GPS can be directly connected to the pilot, allowing the vessel to be steered to GPS (NavLock Mode). NMEA compatible windvanes can also be connected allowing the vessel to be steered to wind. Data from an external fluxgate compass **ATC600** allows more accurate course keeping and also enables the pilot to be installed on ferrous hulled vessels.

TP20 Principal Functions -
Steer To Compass (Inbuilt or external) **Steer To Wind** **Steer To GPS (NavLock)**
Autotack **NMEA0183 Direct Connection**

The **TP30** is the most powerful Tillerpilot in the range. With an impressive peak thrust of 85kg (187 lbs) and a lock to lock time of 5.3 secs (30kg load), the TP30 offers unparalleled performance together with all the features offered by the TP20.

TP30 Principal Functions -
Steer To Compass (Inbuilt or external) **Steer To Wind** **Steer To GPS (NavLock)**
Autotack **NMEA0183 Direct Connection**

Hand remote options available to the **TP20** & **TP30** (not available for TP10) include a low cost hand remote, the **HR20** which is linked to the pilot via the NMEA input, and the fully functioned **HC30** programmer which duplicates all functions of the TP20 control pad, but includes additional functions such as an off course alarm and the ability to adjust the autotack angle. The HC30 also includes a clear LCD display. This unit is connected via the 75kBaud CANBUS input.

Tillerpilot standard features -
Storm Proof **Night Illumination** **Non-Volatile Memory**
Adjustable Gain **Auto Trim** **Auto Seastate (can be set manually)**

TP10, TP20, TP30 Specification

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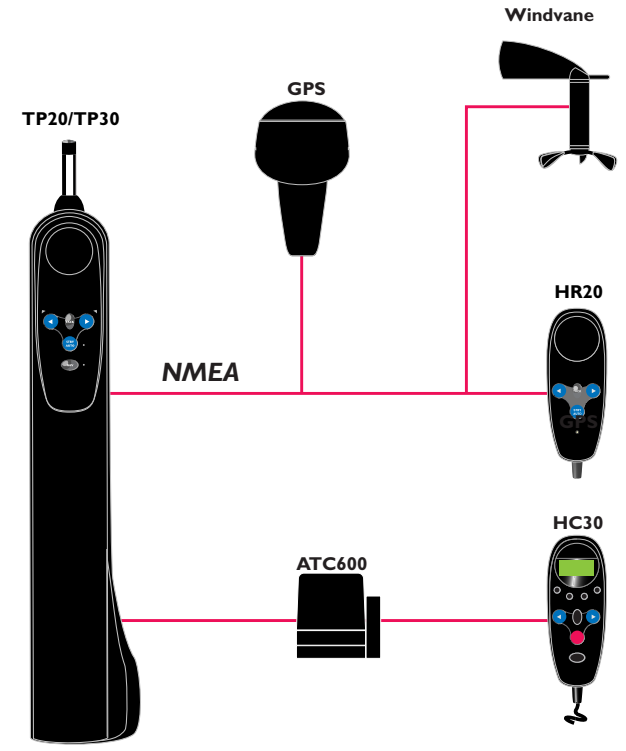
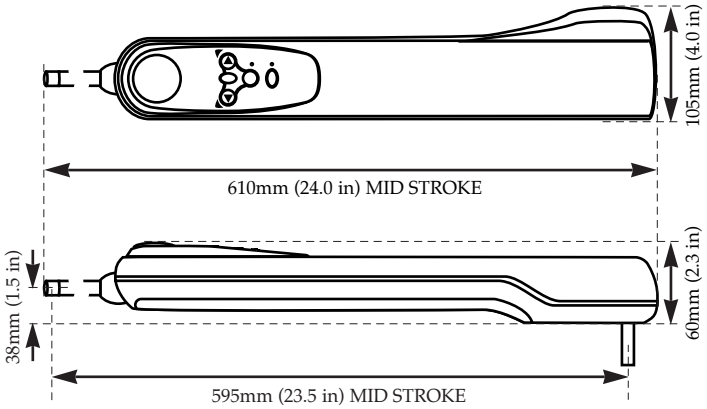
Tillerpilots Specification

	TP10	TP20	TP30
Drive System	*Screw Thread*	*Screw Thread*	*Recirculating Ballscrew*
Hardover time 0kg	*6.9 secs*	*6.9 secs*	*4.0 secs*
10kg	*7.0 secs*	*7.0 secs*	*4.3 secs*
20kg	*8.0 secs*	*8.0 secs*	*4.7 secs*
30kg	*10.0 secs*	*9.5 secs*	*5.3 secs*
40kg	-	*12.0 secs*	*6.0 secs*
50kg	-	-	*8.0 secs*
Peak Thrust	*65kg (143 lbs)*	*65kg (143 lbs)*	*85kg (187 lbs)*
Operating Stroke	*250mm (10 in)*	*250mm (10 in)*	*250mm (10 in)*
Supply Voltage	*12v DC (10-16v)*	*12v DC (10-16v)*	*12v DC (10-16v)*
Power Consumption (Typical)	*0.06A (stby) 0.5A (auto)*	*0.06A (stby) 0.5A (auto)*	*0.06A (stby) 0.5A (auto)*
Mounting	*Reversible, Port or Starboard (default)*	*Reversible, Port or Starboard (default)*	*Reversible, Port or Starboard (default)*

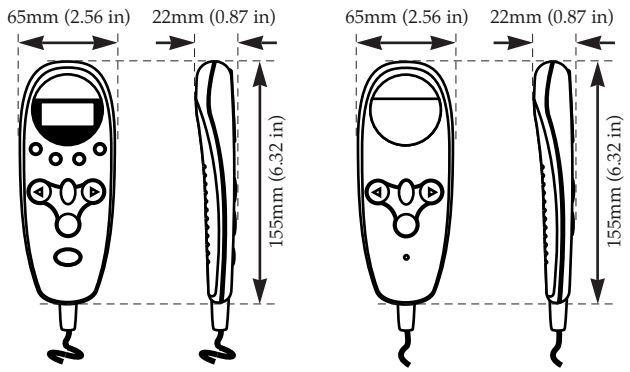
Installation Options



TP10,TP20 & TP30 Dimensions



HC30 & HR20 Dimensions



TP10, TP20, TP30 Performance

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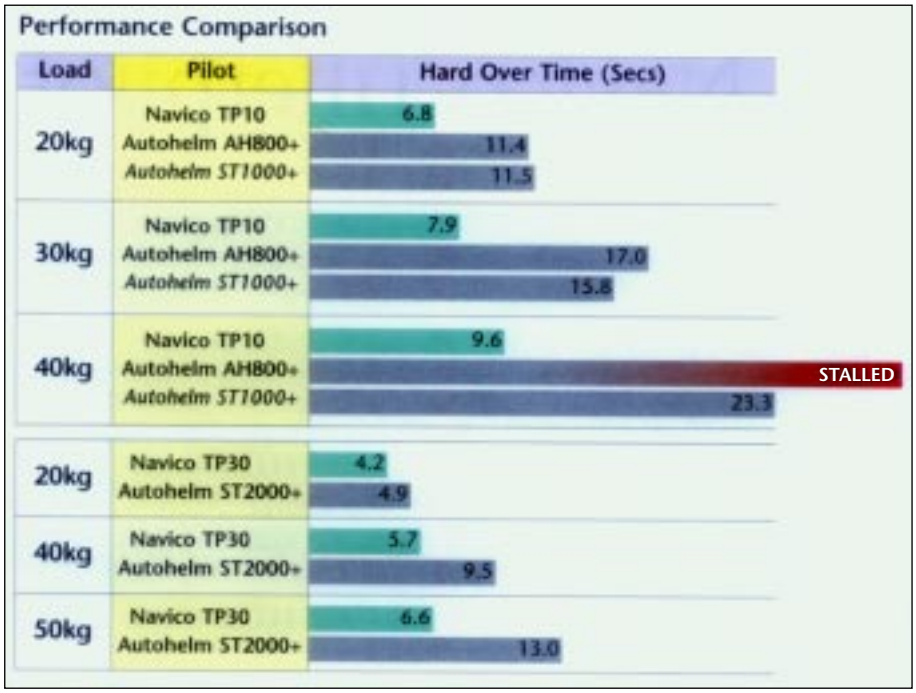
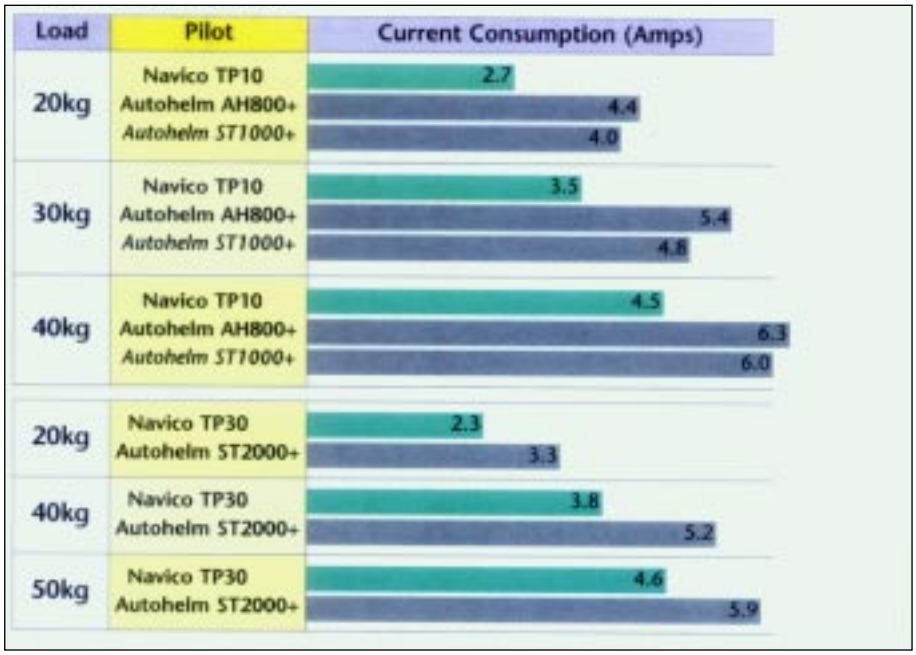
The performance advantage of the Simrad Tillerpilots over their Raytheon equivalents is clearly seen from the results of these independently audited tests (carried out at 13.2v). With no load, the TP30 and ST2000+ have a similar lock to lock time of around 5 seconds. But apply a load, and the difference becomes immediately apparent.

Loaded to 40kg, the ST2000+ takes 9.5 seconds to go from lock to lock. The Tillerpilot does the same in under 6 seconds. Similarly, with a load of 20kg, the AH800+ takes almost 12 secs lock to lock, while the TP10 takes less than seven seconds, in fact it even outperforms the supposedly higher spec ST1000+. Increase the load to 40kg and the TP10 takes 9.5 secs from lock to lock - the same as the top spec Raytheon ST2000+. The TP10 is aimed at the same level as the bottom of the range AH800+, which as you can see couldn't manage 40kg at all, and stalled.

Higher performance doesn't come at higher power consumption. As the graph on the right shows, the Simrad pilots consistently drew less current than their Raytheon equivalents, even though they were driving harder and faster.

The Tillerpilots used here were standard units literally picked off the shelf. Even the tests themselves were standard production test performed as a matter of course on all units built before they are packed. It is interesting to note that had the Raytheon pilots used been built in our factory, they all would have been rejected on the basis of these tests.





Pushrod seal system

Drive bulkhead seal

Double Sealed Electronics

To test their weatherproofing, a Tillerpilot was immersed in salt water, with the steering arm set to drive continuously in and out. 24 hours later the piulot was still operating and when opened, there was not a drop of water inside the unit. This test demonstrates how resilient Tillerpilots are, thanks to the cleverly designed seals - on the main casing, the steering arm and around the keypad (which is heat welded to the case using the same procedure as the waterproof Axis handheld VHF). Inside, for added protection the vital components are all housed in a separate sealed compartment - well away from the bottom of the casing in case any water did get in.

The performance of Simrad Navico Tillerpilots have been testified by sailors and yachting journalists world wide. In terms of performance, reliability and design they are second to none.

TP10, TP20, TP30 Accessories

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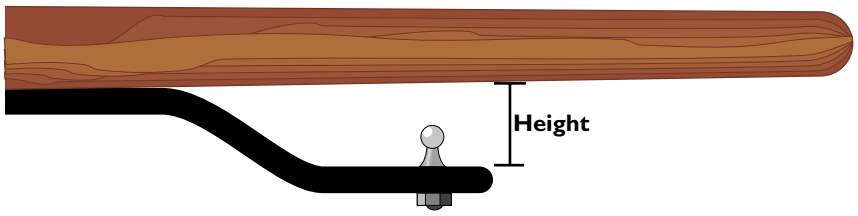
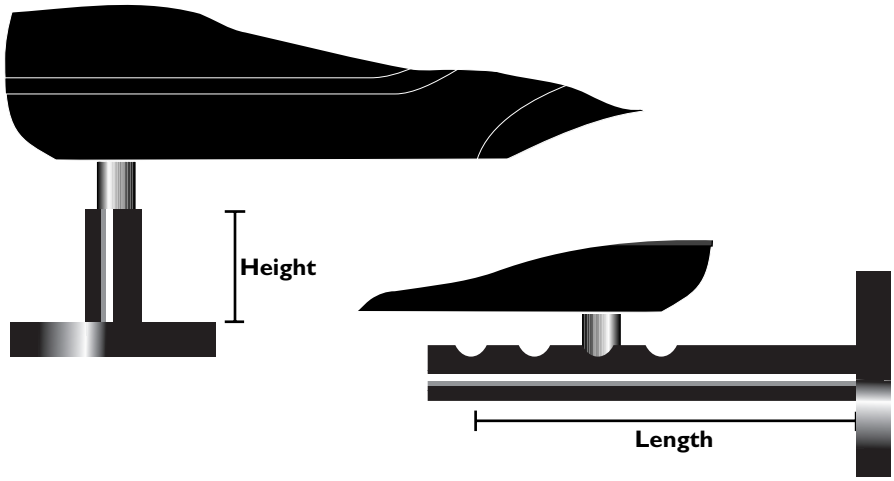
Tiller Brackets



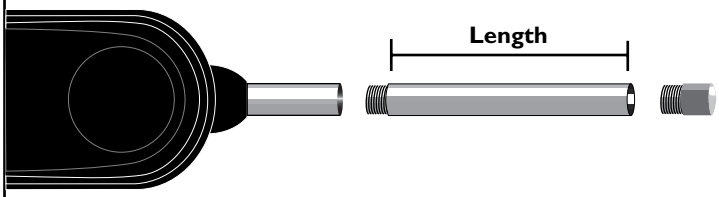
Part No.	Height
TB30	30mm (1.18 in)
TB60	60mm (2.36 in)
TB90	90mm (3.54 in)
TB120	120mm (4.72 in)

Pedestal & Cantilever Brackets



Part No.	Height
PB30	30mm (1.18 in)
PB60	60mm (2.36 in)
PB90	90mm (3.54 in)
CB1	195–240mm (5.31–9.44 in)

Push Rod Extensions



Part No.	Height
PRE30	30mm (1.18 in)
PRE60	60mm (2.36 in)
PRE90	90mm (3.54 in)
PRE120	120mm (4.72 in)
PRE120	150mm (5.90 in)

TP10, TP20, TP30 Installation

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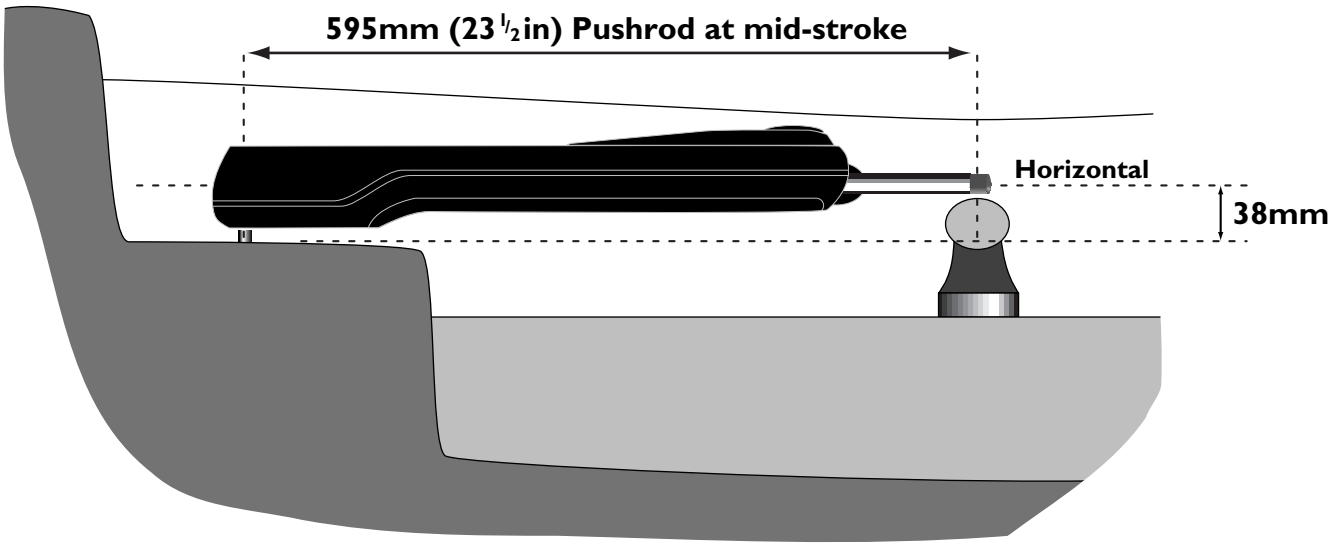
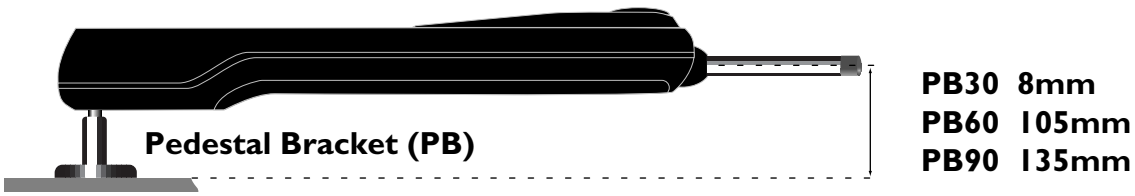
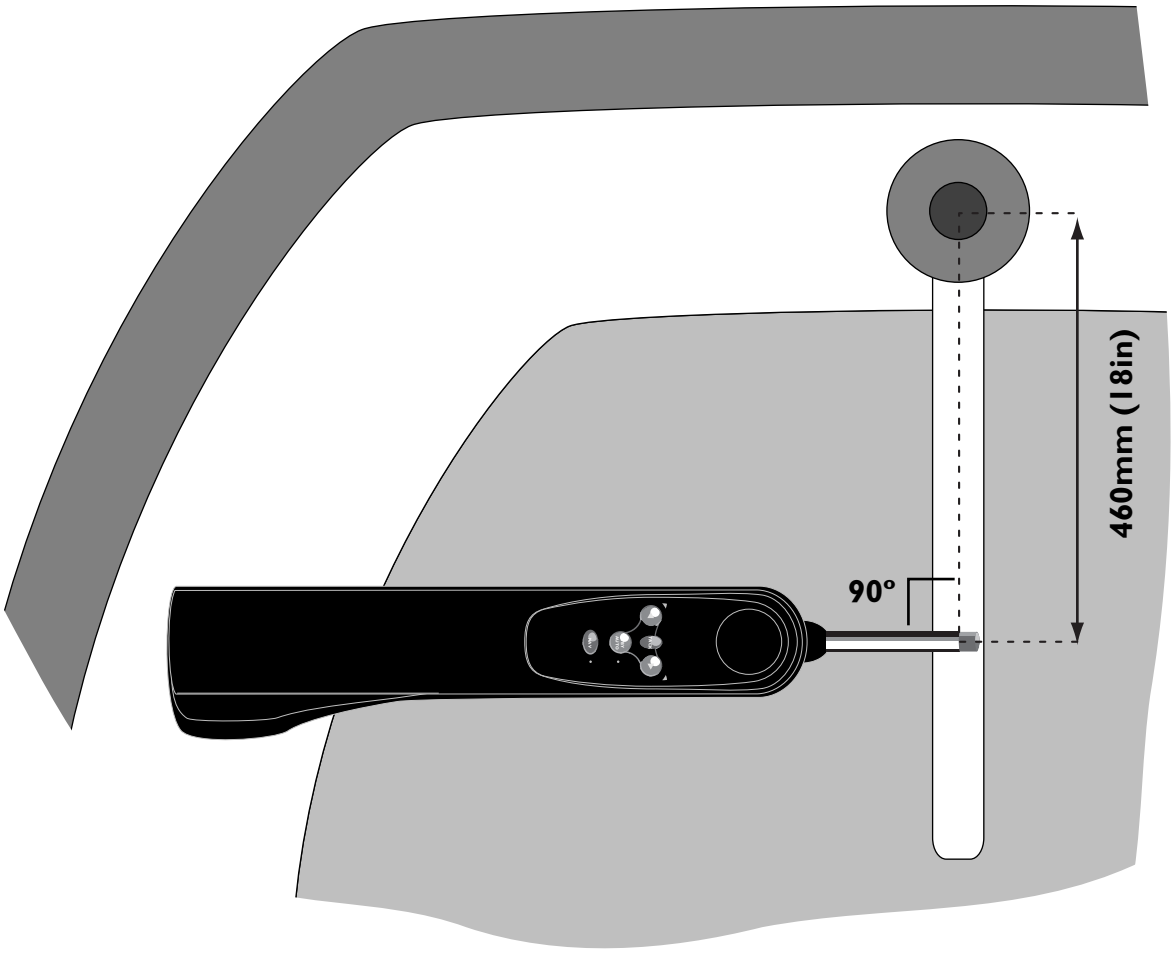






Steer To Compass Mode

This is the default mode of operation. As a stand alone unit, the Tillerpilot will keep the vessel on the same magnetic bearing, using the internal fluxgate compass as a reference.

Steer To Wind Mode

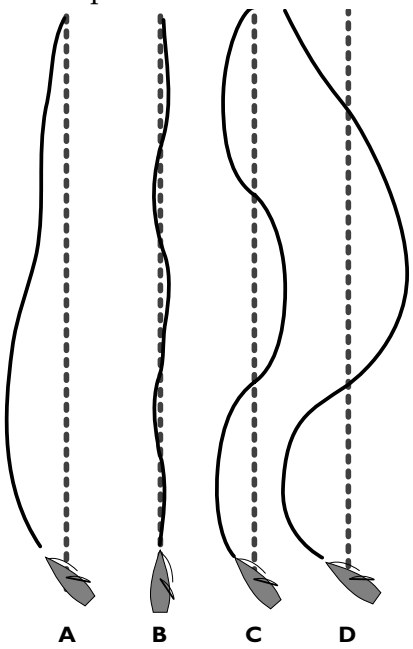
This mode of operation is accessed by pressing both the Port and Starboard keys simultaneously while the pilot is in Auto (Compass) Mode. Both Port and Starboard LEDs will be lit while in Steer To Wind Mode, where the pilot will steer the vessel to the same Apparent Wind Angle instead of a compass course. Note that wind data must be available to the Tillerpilot for this mode, using an NMEA0183 Windvane linked to the direct NMEA input. See NMEA section for details of sentences processed. This mode is not available to the TP10.

Steer To GPS (NavLock) Mode

This mode is available if an NMEA0183 navigational receiver (GPS, Loran, Plotter etc) is connected to the TP20 or TP30 NMEA input. By activating a waypoint or route in the GPS/Chartplotter and pressing the NAV key on the Tillerpilot, the pilot will steer the vessel along the track plotted by the GPS/Plotter to the target waypoint. On reaching the waypoint, and alarm will sound and the next waypoint will be loaded when the NAV key is pressed again. See NMEA section for details of sentences processed. This mode is not available to the TP10.

Tiller Movement (Gain)

The Tillerpilot will apply adjustments to the tiller in order to compensate for heading variations, the amount of movement being proportional to the heading error detected by the compass unit. The amount of movement is set by the **Gain** (sometimes referred to as the rudder ratio). The Gain setting can be likened to driving a car - at high speeds, very little wheel movement is necessary to steer the car (LOW gain). When driving at slow speeds, more wheel movement is necessary (HIGH gain). **A** shows the effect of setting the Gain too low: the vessel takes a long time to return to the correct heading. **B** shows the ideal setting, where errors are quickly corrected. **C** illustrates the effects of setting the Gain too high, which causes the vessel to oscillate around the correct heading. Excessive Gain (**D**) creates a tendency to instability of course, leading to increasing error.



Seastate

In rough weather, more variations in heading will be detected due to the heavy seas yawing the vessel. If no account of this was taken, then the Tillerpilot would be overworked, causing unnecessary strain on the unit and excessive drain on the batteries. All Tillerpilots will continuously monitor corrections applied to the tiller over the course of a voyage, and allow a "dead band" within which the boat can go off course without corrections being made. The dead band is automatically set and updated by the Tillerpilot to give the best compromise between course holding and battery consumption. However, this can be manually set if so desired.

Autotrim

Under differing conditions a tiller 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 round head to wind if sailing close hauled. The Tillerpilot continuously monitors the average course error and applies a bias to the tiller 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 Tillerpilot. 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.

TP20, TP30 NMEA Sentences

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NMEA Sentences Received (TP20 & TP30 only)

The NMEA0183 information required for full functionality whilst in NavLock is as follows -

Cross track error

Bearing to destination waypoint

Arrival at waypoint indication

This information is extracted from the following NMEA0183 sentences -

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 NavLock, the Wheelpilot will sound an alarm, exit NavLock Mode and return to Compass Auto Mode.

The Tillerpilot also extracts the apparent wind angle from the following NMEA0183 sentences -

VWR Apparent Wind Speed & Angle

MWV Wind Speed & Angle

TP20, TP30 Hand Remote HR20

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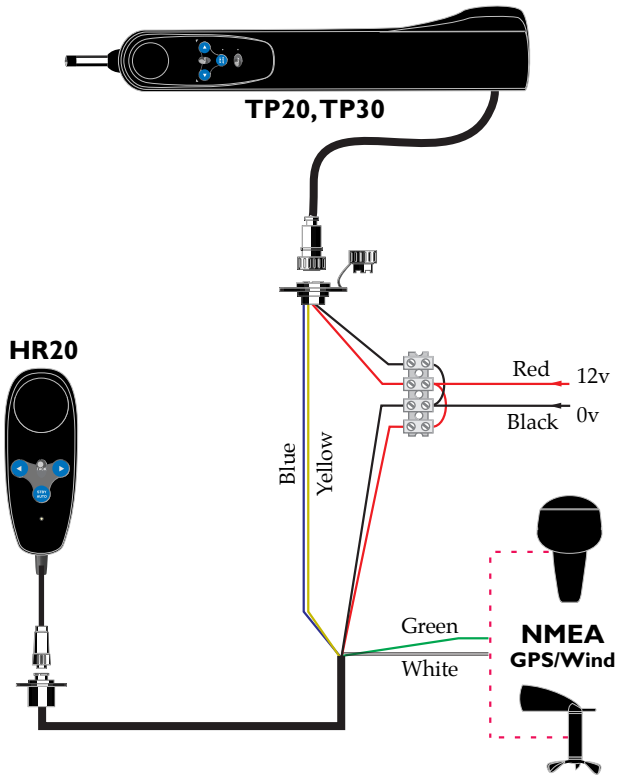
The **HR20** is a hand unit designed to allow remote operation of the TP20 and TP30 from elsewhere on the vessel.
To engage the pilot, steer the desired course and then press the **STBY/AUTO** button. The LED will light indicating that the Autopilot is activated. To disengage the Autopilot, simply press **STBY/AUTO** again.
While in Standby Mode, the arrowed **Port** and **Starboard** buttons can be used to "power steer" the vessel using the pilot. In Auto Mode, pressing the **Port** and **Starboard** buttons once will alter course by 1° in the desired direction. Pressing and holding the buttons will alter course in 10° increments.
The Autotack facility allows the Autopilot to automatically tack the vessel through a preset angle. Press and hold the **TACK** button, and while keeping it held, press the **Port** or **Starboard** button, depending on which direction the vessel is tacking.
NOTE - If in Sail To Wind Mode, the vessel will tack onto the same apparent wind bearing, but on the opposite tack. In this mode, the Autopilot will only allow a tack in the correct direction, and the facility is disabled if sailing downwind.

Installation & Wiring

The HR20 is linked to the Tillerpilot via the NMEA input terminals. To enable a neat installation, the HR20 is supplied with a socket and cable assembly. This is connected to the power and NMEA terminals of the pilot.
If a GPS/Navigational Receiver is already interfaced to the Tillerpilot via the NMEA terminals, these wires should be disconnected and re-linked to the green (Com) and white (Data) wires of the HR20 socket assembly. The blue and yellow wires should be connected to the NMEA Com and Data terminals respectively of the Autopilot to replace the removed NMEA cable. The red and black wires should be connected to the incoming 12v supply cable.
Note that the Tillerpilot to NMEA link will still function with the HR20 unplugged.

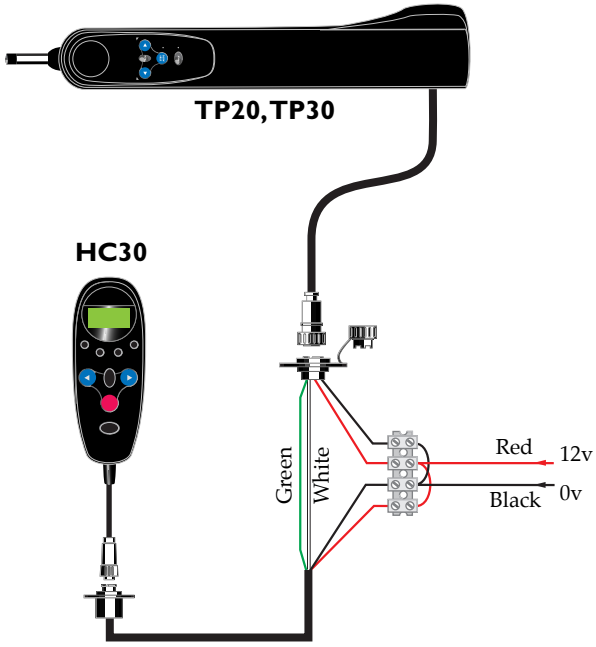


4 Pin Socket Wiring	
Wire	**Wire To**
Green	NMEA Com from GPS/Windvane
White	NMEA Data from GPS/Windvane
Red	12v+ DC
Black	0v
Blue	Terminal 5 - Tillerpilot
Yellow	Terminal 6 - Tillerpilot

TP20, TP30 Hand Controller HC30 SIMRAD

The **HC30** hand controller offers additional features to the HR20 hand remote for the TP20 and TP30 -

- Clear, backlit LCD display showing course & pilot status
- Compass, Wind or NavLock mode select
- Off course alarm
- Adjust gain, seastate
- Adjust autotack angle (default setting is 100°)
- Set default boat speed (for NavLock if boat speed not available via NMEA)



Installation & Wiring

The HC30 is linked to the Tillerpilot via the Corus CANBUS input terminals. Like the HR20, the HC30 is supplied with a bulkhead socket and cable assembly. This is connected to the power and CANBUS terminals of the pilot. The CANBUS connection is also used to link the ATC600 external compass to the Tillerpilot

4 Pin Socket Wiring	
Wire	**Wire To**
Red	12v+ DC
Black	0v
Green	Terminal 3 - Tillerpilot
White	Terminal 4 - Tillerpilot