Contents

Note: This document has not been formally checked, it is for reference only.

Important

It is the owner's sole responsibility to install and use the instrument and transducer/s in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

The choice, location, and installation of all components in any autopilot system is critical. If installation is not correct, the unit can not perform at its designed potential. If in doubt, consult your Northstar dealer. Ensure that any holes that cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder.

Using the PILOT 3300 system :

- The PILOT 3300 system is intended as an aid to save a helmsman from having to steer for long periods of time, not as the main means of steering the boat.
- The PILOT 3300 system is not intended for use in extreme weather, in adverse conditions or in water near other boats, dangerous waters or land.
- The PILOT 3300 system can not control the boat better than a helmsman. In adverse conditions steer the boat manually.
- Never leave the helm unattended. Keep a watch at all times. The helmsman should always monitor the course of the boat and the PILOT 3300 system and be ready to resume steering the boat manually.
- The performance of the PILOT 3300 system can be affected by the failure of a part, environmental conditions, improper installation and use.

Northstar DISCLAIMS ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

As Northstar is continuously improving this product we retain the right to make changes to the product at any time which may not be reflected in this version of manual. Please contact your nearest Northstar office if you require any further assistance.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

1 Introduction

Using this manual

This manual describes how to install and set up the PILOT 3300 system. Refer to the separate *PILOT 3300 Reference manual* for information on how to operate the PILOT 3300 display unit.

To install a PILOT 3300 system, you must perform installation, dockside setup and sea trials (see sections 3, 4 and 5).

To fully set up a PILOT 3300 system after a part has been changed or if a problem is suspected, perform dockside setup and sea trials again (see sections 4 and 5).

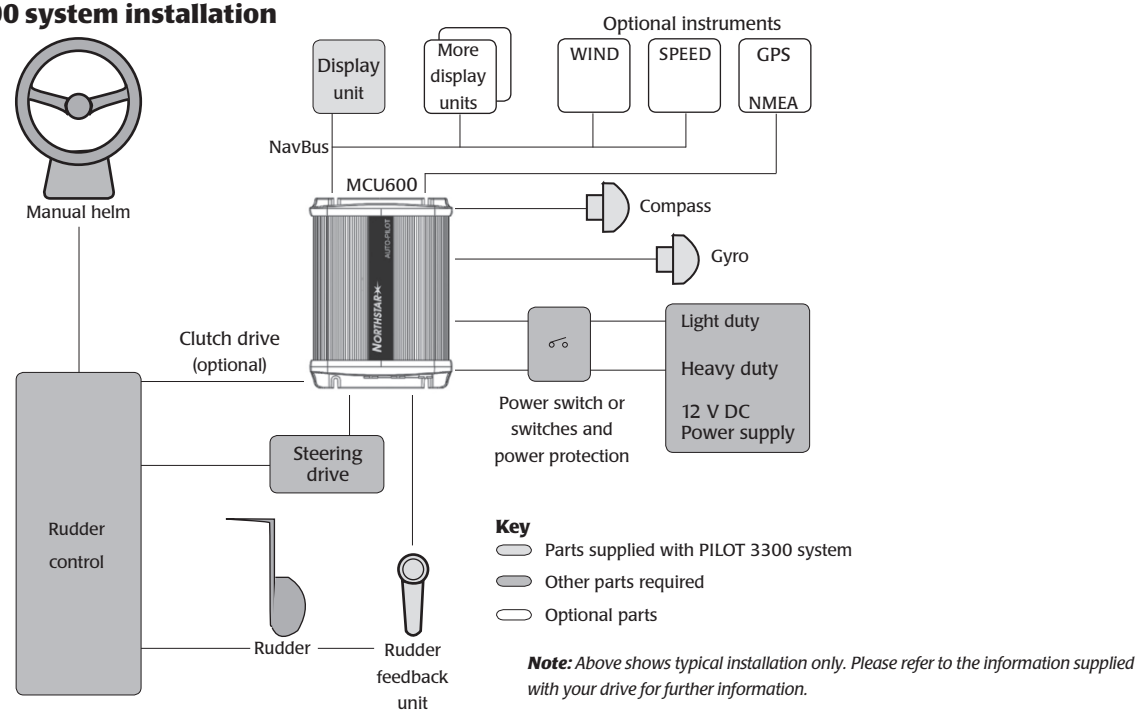
To verify that the PILOT 3300 system is operating correctly, perform sea trials (see section 5).

Cleaning and maintenance

Clean the parts of the PILOT 3300 system with a damp cloth or mild detergent. Avoid abrasive cleaners, petrol or other solvents.

Do not paint any part of the PILOT 3300 system except for the cables.

1-1 A typical PILOT 3300 system installation



Note: *Above shows typical installation only. Please refer to the information supplied with your drive for further information.*

1-2 Using the PILOT 3300 system with other instruments

1-2-1 Using other instruments

The PILOT 3300 system can use data from these instruments:

GPS: A GPS or chartplotter, such as a Northstar 6000i chartplotter must be connected to the PILOT 3300 system for the PILOT to operate in **GPS** mode (see the *PILOT 3300 Reference manual*).

Note: *GPS must be via NMEA input.*

WIND: A wind instrument, such as a Northstar WIND series, must be connected to the PILOT 3300 system for the PILOT to operate in **WIND** mode (see the *PILOT 3300 Reference manual*).

SPEED: A speed instrument, such as:

- Northstar's MULTI with a paddlewheel speed sensor
- or a GPS or chartplotter, such as Northstar's 6000i series can be connected to the PILOT 3300 system to increase steering accuracy.

Note: *The speed from a paddlewheel sensor is the speed that the boat is moving through the water. The speed from a GPS is the speed over the ground. If there is a water current then these two speeds will be different. If the PILOT 3300 system is connected to an instrument with a paddlewheel sensor and to a GPS, then the PILOT 3300 system will automatically use the speed from the paddlewheel sensor instrument.*

1-2-2 NavBus

NavBus is a Northstar proprietary system that allows systems of multiple instruments to be built using a single set of transducers. When instruments are connected by NavBus:

- If you change the units, alarms or calibration in one instrument, then the values will automatically change in all other instruments of the same type.
- Each instrument can be assigned to a group of instruments, called a NavBus group (see NavBus group in the *Setup > Comms* menu, *in the PILOT 3300 Reference manual*). If you change the backlight in an instrument in group 1, 2, 3 or 4 then the backlight will automatically change in the other instruments in the same group. If you change the backlight in an instrument in group 0 then no other instruments are affected.
- If an alarm sounds, mute it on any instrument which can display that alarm.

For more information, refer to the *NavBus Installation and Reference manual*.tt

Note: *GPS must be via NMEA input.*

NavBus and the PILOT 3300 system

- The PILOT 3300 system will automatically work with additional PILOT 3300 displays.
- The PILOT 3300 system can receive wind data from Northstar's WIND over NavBus.
- The PILOT 3300 system can receive speed data from Northstar's MULTI over NavBus.

1-2-3 NMEA

NMEA is an industry standard, but is not as flexible as NavBus as it requires dedicated connections between instruments. The PILOT 3300 system has one NMEA input port and one port that can be configured to be an input or an output (*See PILOT 3300 Reference manual*).

PILOT 3300 system NMEA inputs

GPS: The PILOT 3300 system can receive NMEA GPS data from a compatible GPS or chartplotter, such as Northstar's 6000i series chartplotter:

- XTE (from APA, APB or XTE sentences) is required for the PILOT 3300 system to use **GPS** mode
- BRG (from APA sentences) and BOD (from APA or APB sentences) are optional and improve performance
- COG (from VTG sentences) is optional and can be displayed.

WIND: The PILOT 3300 system can receive NMEA wind data from a compatible wind instrument:

- True or apparent wind direction (from MWV sentences) is required for the PILOT 3300 system to use **Wind** mode.

SPEED: The PILOT 3300 system can receive NMEA speed data from a compatible paddlewheel or GPS instrument:

- SOG (from VTG sentences) is optional and improves performance.

***Note**: If the PILOT 3300 system is connected to a Northstar series wind or speed instrument using NavBus, then the PILOT 3300 system will automatically receive and use the wind or speed data, and the NMEA connection need not be wired.*

PILOT 3300 system NMEA outputs

The NMEA 2 port can be configured to be an input or to be output:

- either heading (HDG & HDT) and rudder angle (RSA) at once per second
- or heading (HDG) at ten times per second

(see *NMEA mode* in the *Setup > Comms* menu, *See PILOT 3300 Reference manual*).

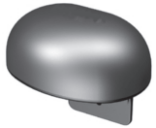
2 PILOT 3300 system hardware

2-1 What comes with your PILOT 3300 system

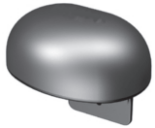
MCU600 (Main Control Unit)

RFU - Rudder feedback unit

PILOT 3300 Display unit



Compass, with 10 m (33 ft) attached cable



Gyro, with 10 m (33 ft) attached cable

Documentation

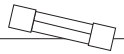
- Warranty
- Display unit mounting template
- This Installation manual
- Reference manual

Protective cover for display unit

2 mm (#14) twin stranded cable for high current wiring

Additional hardware

- Mounting hardware
- Cable cover
- Strain relief
- Spare fuses



2-2 Other parts required

Power supply: The PILOT 3300 system requires two power supplies, both nominally 12 V DC:

- A heavy duty supply for the steering drive
- A light duty supply for the PILOT 3300 system electronics and display unit; this supply also powers any additional display units and other instruments.

The power supplies require one or two switches and fuses or circuit breakers (see section 3-4).

Steering drive: The PILOT 3300 system can power a hydraulic pump, constantly running pump set, hydraulic linear drive or mechanical drive rated at 12 V DC and up to 20 A.

Rudder linkage: To link rudder to rudder feedback unit (see section 3-5).

For wiring, see *Select Wire Table* in section 3-4-2.

External beepers or lights (optional): The external output is switched to ground, 30 V DC and 250 mA maximum. If the beepers and lights require more than 250 mA total, fit a relay.

Other marine instruments (optional): Wind, speed or GPS instruments can be connected (see section 1-2).

Other parts: For systems of several instruments, wiring and connectors are required. Northstar junction boxes can simplify wiring several Northstar instruments together (see section 1-2 or the *NavBus Installation and Reference manual*).

Coupling connectors and 10 m (33 ft) extension cables are available to extend the rudder feedback unit, compass or gyro cables. Do not fit more than one extension cable to each unit.

For more information, consult your Northstar dealer.

3 Installation

Warning: Correct installation is critical to the performance of the unit. It is vital to read this manual and the documentation that comes with the other parts before starting installation.

Warning:

- The MCU600 is not waterproof. Mount the unit in a dry place.
- The PILOT 3300 system display unit is waterproof.
- The compass, gyro and rudder feedback unit are completely waterproof.

Warning: Ensure that any holes that you cut will not weaken the boat's structure. If in doubt, consult a qualified boat builder.

3-1 Installation sequence

The recommended installation sequence is:

1 Read this manual and the documentation that comes with the other parts.

2 Plan the installation: select where the equipment and wiring will be installed (see section 3-2).

3 Install the MCU600 (see section 3-3).

4 Install the steering drive and wire the heavy duty and light duty power supplies (see section 3-4).

5 Install the rudder feedback unit (see section 3-5).

6 Install the compass (see section 3-6).

7 Install the gyro (see section 3-7).

8 Install the display unit and any other marine instruments that will be used with the PILOT 3300 system (see section 3-8).

9 Carry out the dockside setup (see section 4).

10 Carry out the sea trials (see section 5).

If you are unsure where a part should be installed, mount and wire the part temporarily, without cutting holes in the boat. After the sea trials have been completed, install and wire the part permanently.

3-2 Installation guide

This is a general guide for locating and wiring the parts of the PILOT 3300 system. The instructions for a particular part may have additional requirements.

3-2-1 Location guide

- Do not mount any part where it can be used as a handhold, where it will interfere with the operation of the boat or where it might be submerged.
- Do not mount any part where it will interfere with launching or retrieving the boat.
- Do not mount any part within 0.5 m (20″) of the plane of a radar antenna.
- Mount the compass and gyro:
  - At least 1 m (3 ft) away from sources of electrical signals or noise, such as the batteries, high-current cables, other boat cables, engines, fluorescent lights, power inverters, radio or radar transmitters and antennas.
  - At least 1 m (3 ft) away from equipment containing a magnet, such as a compass or speaker.

3-2-2 Wiring guide

The PILOT 3300 system has two kinds of cables:

The heavy-duty power supply and steering drive usually require high-current cables:

- Select the wire gauge from the wire size table (see section 3-4-2).
- Fit high-current cables at least 1 m (3 ft) away from other electronic devices in the boat.
- Keep the cables as short as possible.
- Twin 2 mm (#14) cable is supplied with the PILOT 3300 system and can be used for the high current cable if its gauge is suitable.

All the other cables are low-current:

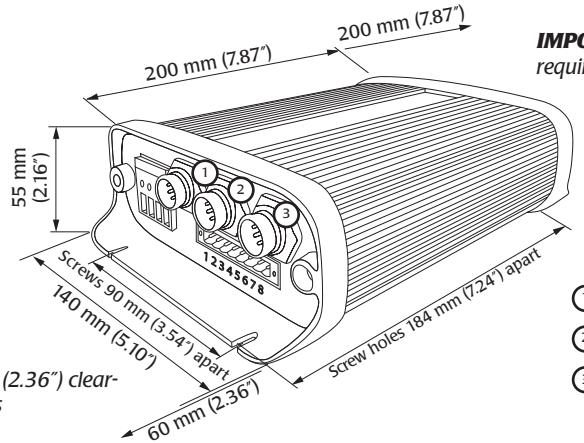
- Fit low-current cables at least 1 m (3 ft) away from sources of electrical signals or noise, such as the high-current cables, other boat cables, engines, fluorescent lights, power inverters and radio or radar transmitters and antennas.
- If the cable for the rudder feedback unit, compass or gyro is too long, do not shorten the cable; instead coil the cable up near the main control unit.
- The cable for the rudder feedback unit, compass or gyro can be extended by adding a 10 m (33 ft) extension cable and coupling connector. Do not fit more than one extension cable to each unit.

When fitting any type of cable:

- Do not crush, pinch or strain the cable.
- Secure the cable at regular intervals.
- Ensure no connectors or exposed terminals are in the bilge.

3-3 Installing the MCU600 (Main Control Unit)

Physical



IMPORTANT: *200 mm (7.87″) clearance required for cover removal*

IMPORTANT: *60 mm (2.36″) clearance required for cables*

1. RFU
2. Gyro
3. Compass / Heading Sensor

Installation

Find a suitable location for the unit:

- In a dry, cool place; if possible not the engine room.
- Close to the high-current power supply and the steering drive, to reduce the length of the high current wiring.
- Accessible for installation and service.
- If possible on a vertical panel which does not vibrate.
- Follow the location guide (see section 3-2-1).

Mount the unit with the cable connectors at the bottom or to one side, using the screws provided. Do not mount the unit with the connectors at the top, because dust or moisture might enter the unit.

3-4 Installing the power supplies and steering drive

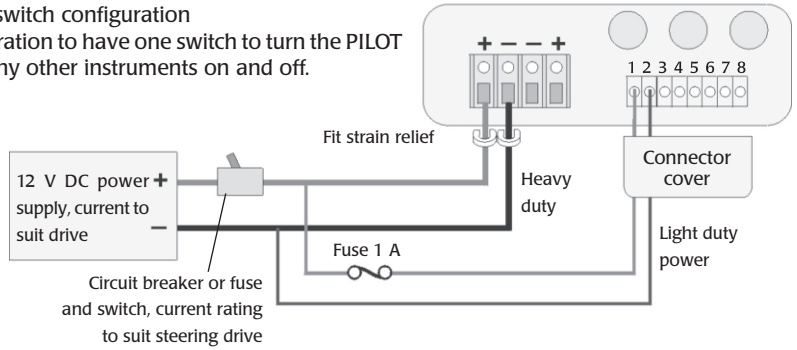
3-4-1 Installing the power supplies

The MCU 600 system requires a light duty and a heavy duty power supply, both 12 V DC.

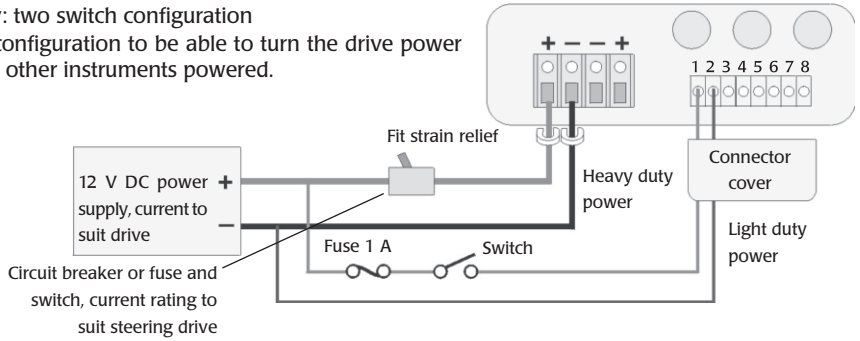
Note:

- *Keep all wiring as short as possible.*
- *For the heavy duty supply, use the wire size given in the table (see section 3-4-2).*
- *Follow the wiring guide (see section 3-2-2).*

Power supply: one switch configuration
Choose this configuration to have one switch to turn the PILOT 3300 system and any other instruments on and off.



Power supply: two switch configuration
Choose this configuration to be able to turn the drive power off and leave other instruments powered.



Note: *If powering more than three extra display units or other series instruments, fit another switch and fuse for the light duty power supply for these extra instruments*

3-4-2 Installing the steering drive

Install the steering drive according to one of the diagrams on the following pages.

Note

- *Keep all wiring as short as possible.*
- *Use the wire size given in the table below.*
- *Follow the wiring guide (see section 3-2-2).*
- *Wire less than #10 gauge will not fit directly into the four way terminal block. Fit ferrules or reterminate the wire with #10 gauge wire.*
- *If more than one wire is to be fitted to a terminal of the four way terminal block, join the wires together in a suitable*

Wire size table

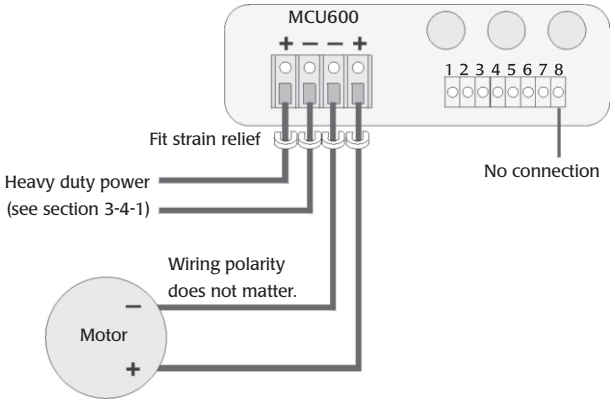
To choose a wire gauge for an installation:

1 Measure the length of twin cable required, i.e. the distance from the main control unit to the heavy duty power supply or to the drive.

2 Choose the column with the cable length and the row with the circuit current. The intersection of the row and column gives the preferred (minimum) cable wire gauge for less than 3% voltage drop in a 12 V system.

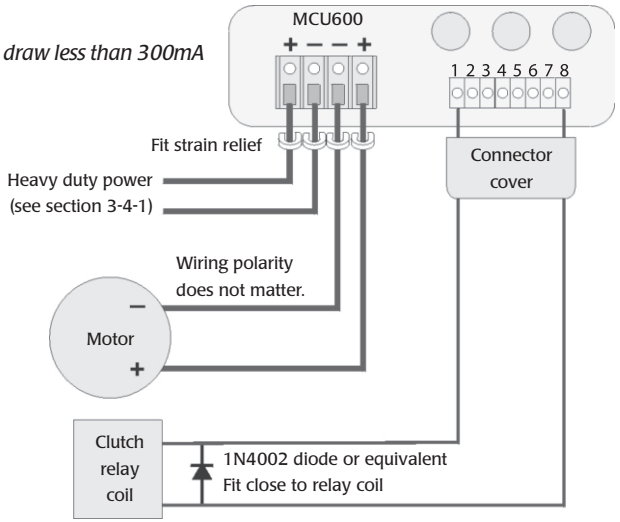
	Cable length (from main control unit to power supply or to drive)							
	0.7 m	**1.5 m**	**2.2 m**	**3 m**	**3.7 m**	**4.5 m**	**5.2 m**	**6 m**
Current	**2.5 ft**	**5 ft**	**7.5 ft**	**10 ft**	**12.5 ft**	**15 ft**	**17.5 ft**	**20 ft**
1 amp	#18	#18	#18	#18	#18	#18	#18	#18
2 amp	#18	#18	#18	#18	#18	#16	#16	#16
3 amp	#18	#18	#18	#16	#16	#16	#14	#14
4 amp	#18	#18	#16	#16	#14	#14	#14	#12
5 amp	#18	#18	#16	#14	#14	#12	#12	#12
6 amp	#18	#16	#16	#14	#12	#12	#12	#10
7 amp	#18	#16	#14	#14	#12	#12	#10	#10
8 amp	#18	#16	#14	#12	#12	#10	#10	#10
9 amp	#18	#16	#14	#12	#12	#10	#10	#10
10 amp	#18	#14	#12	#12	#10	#10	#10	#8
15 amp	#16	#12	#12	#10	#10	#8	#8	#6
20 amp	#14	#12	#10	#8	#8	#6	#6	#6

Example of hydraulic steering with hydraulic help pump.
In the *Setup > Vessel* menu (*See PILOT 3300 Reference manual*), set *Drive Type* to ***Motor***.



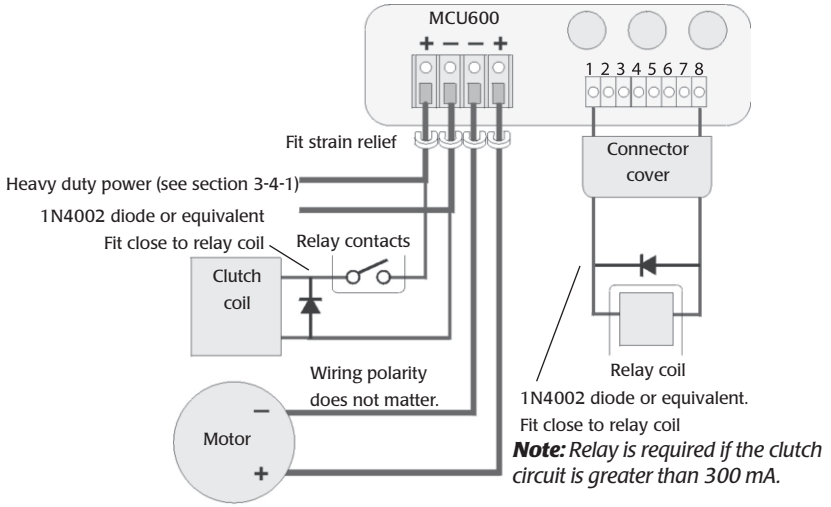
Example of mechanical steered power vessels with hydraulic linear drive for sailing boat
In the *Setup > Vessel* menu (*See PILOT 3300 Reference manual*), set *Drive Type* to ***Motor.***

Note: *Clutch relay coil must draw less than 300mA*



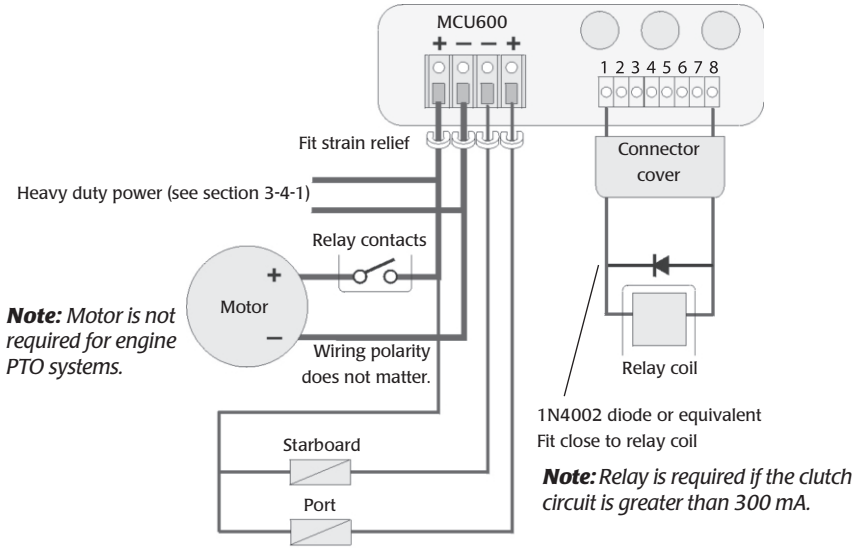
Installing a electric drive motor with clutch relay

In the *Setup > Vessel* menu (*See PILOT 3300 system Reference manual*), set *Drive Type* to ***Motor.***



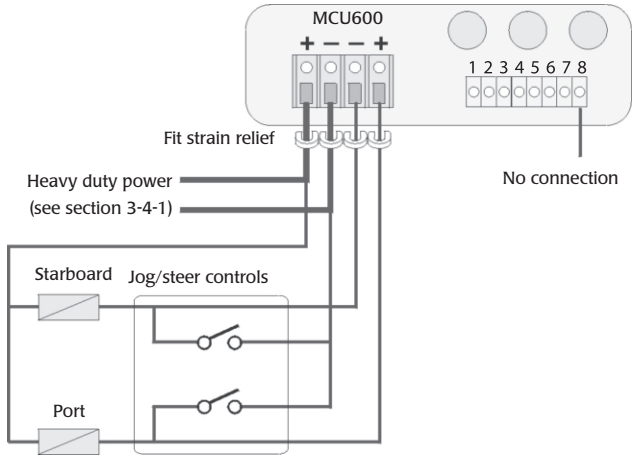
Installing a continuous running pump and solenoid valves.

In the *Setup > Vessel* menu (*See PILOT 3300 system Reference manual*), set *Drive Type* to ***Spool ground.***



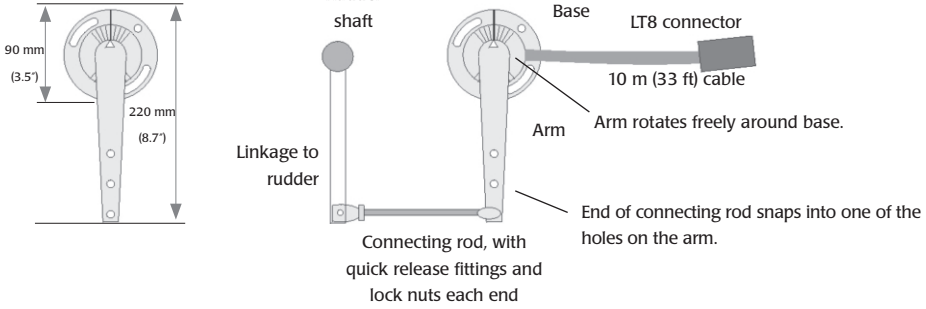
Installing solenoid valves or relays with jog or electric steering

In the *Setup > Vessel* menu (*See PILOT 3300 Reference manual*), set *Drive Type* to ***Spool ground.***

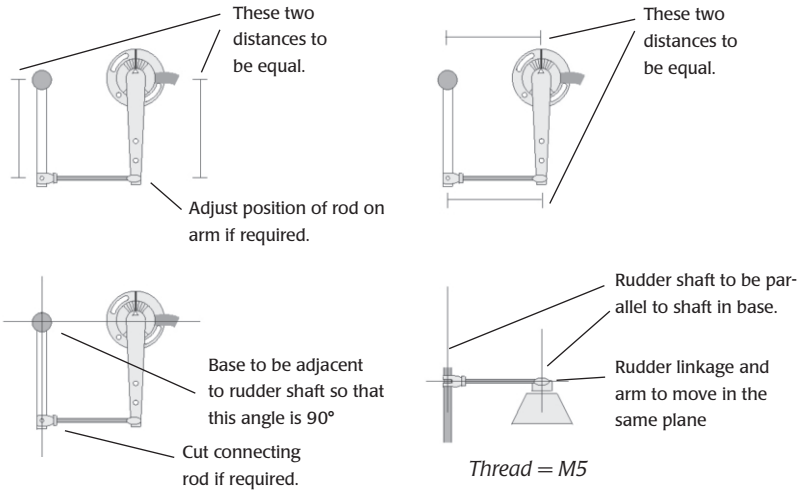


3-5 Installing the RFU (rudder feedback unit)

Physical



Mounting requirements

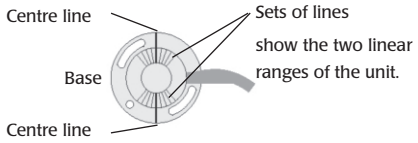


Note

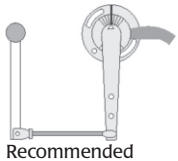
- *The unit is completely waterproof but should not be immersed.*
- *Mount the unit on a panel which does not vibrate.*
- *Follow the location guide (see section 3-2-1).*

Alignment

The arm can rotate freely around the base. When the rudder is amidships, the arrow on the arm must point to one of the centre lines on the base.



Therefore in an installation, the base can be rotated to two positions. We recommend the position that has the cable on the opposite side to the connecting rod.

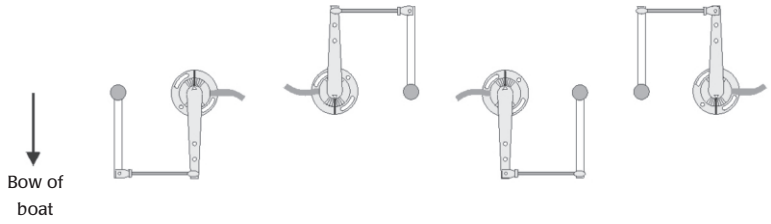


Recommended
(rudder amidships).

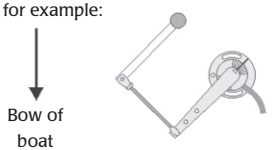
Not recommended, cable
can foul rudder linkage.

Arrangements

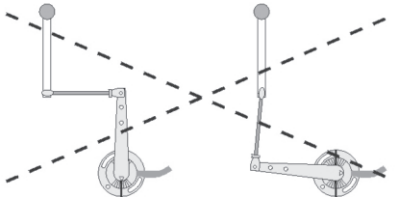
Recommended: U-shaped arrangement with the arm parallel to the length of boat:



Satisfactory: U-shaped arrangement with arm not parallel to length of boat, for example:



Not recommended: Z-shaped arrangement, for example:



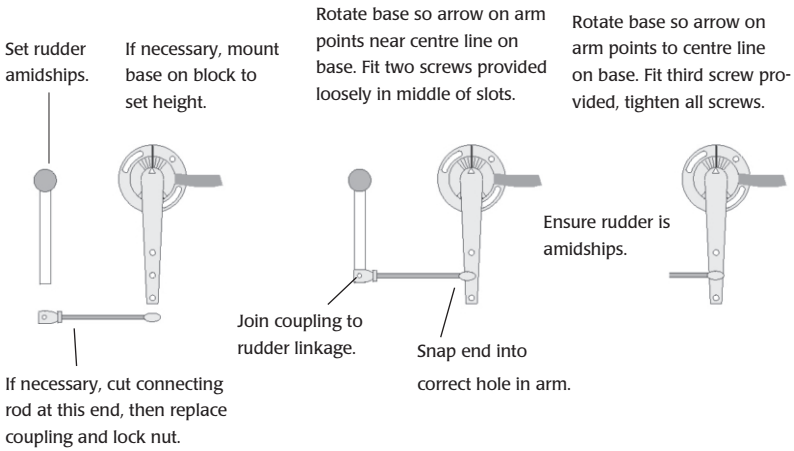
If rudder turns too far, the unit might not return to the Z shape.

Installation

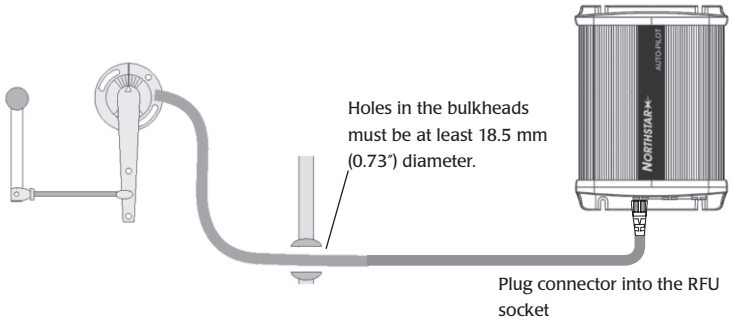
1 Find a suitable location and arrangement for the unit as described above.

2 Choose, assemble and fit a suitable rudder linkage.

3 Fit the unit as shown below:

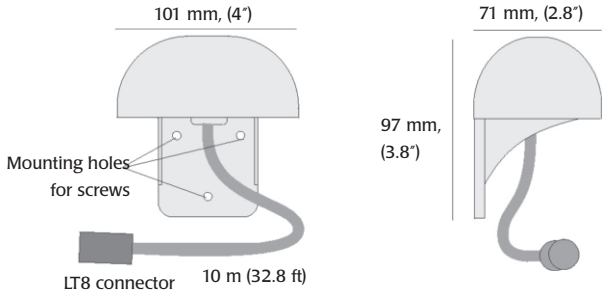


4 Wire the cable back to the MCU600, following the wiring guide (see section 3-2-2).



3-6 Installing the Compass

Physical



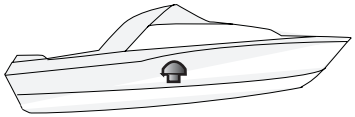
Location

Mount the compass:

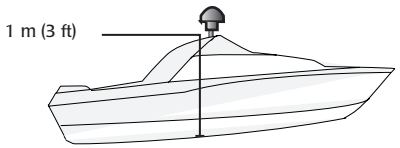
- At least 1 m (3 ft) away from any steel or iron boat part, such as:
  - a steel hull, deck, cabin or steel reinforcing in ferro-cement hulls
  - steel equipment such as motors and cooking equipment
  - places where steel objects are stored, such as the anchor locker and storage lockers
- At least 2 m (6 ft) away from equipment with a magnet and equipment which generates electromagnetic fields, such as a compass, a battery, high current wiring, an electric motor and a radio or radar transmitter or antenna.
- As close as possible to the centre of movement of the boat, to minimise how much the compass moves when the boat rocks and pitches. If the compass can not be mounted at the centre of movement, it is usually best to mount the compass as low as possible.
- On a vertical panel which does not vibrate.

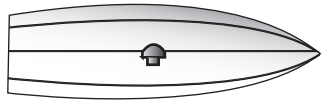
The unit is completely waterproof but should not be immersed. The compass is not affected by other metals, such as stainless steel, copper or brass. Follow the location guide (see section 3-2-1).

Fibreglass or wood hull and cabin: mount compass at the centre of movement (for planing hulls, the centre of movement is usually close to the stern):

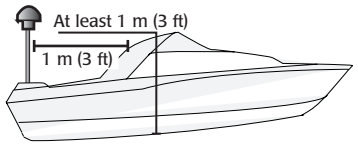


Steel hull, non-steel cabin: mount compass 1 m, (3 ft) above hull:





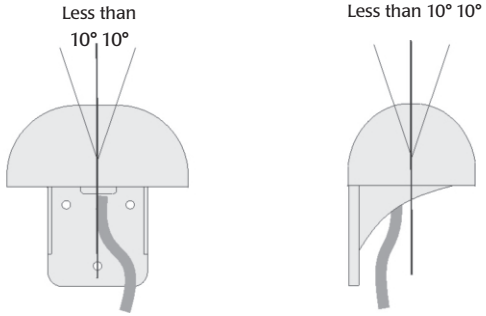
Steel hull and steel cabin: mount compass on a pole 1 m (3 ft) above the hull and at least 1 m (3 ft) from the cabin:



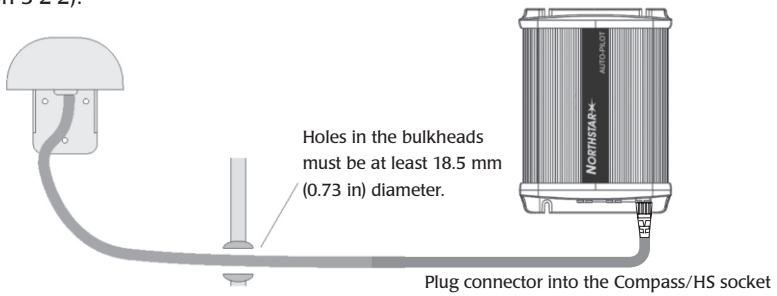
Installation

1 Find a suitable location for the unit as described above.

2 Mount the unit with the three screws provided. Use a level to ensure the unit is vertical to within 10°.



3 Wire the cable back to the MCU600, following the wiring guide (see section 3-2-2).

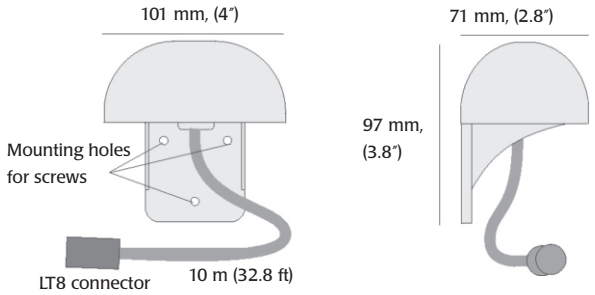


Note

- *If you move the compass with respect to the gyro while the power is on, wait for the heading to stabilize.*

3-7 Installing the Gyro

Physical



Location

Mount the gyro as close as possible to the centre of movement of the boat, to minimize how much the gyro moves when the boat rocks and pitches.

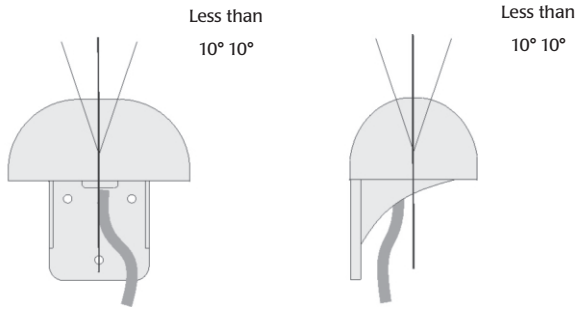
Mount the gyro on a panel which does not vibrate.

The unit is completely waterproof but should not be immersed. Follow the location guide (see section 3-2-1).

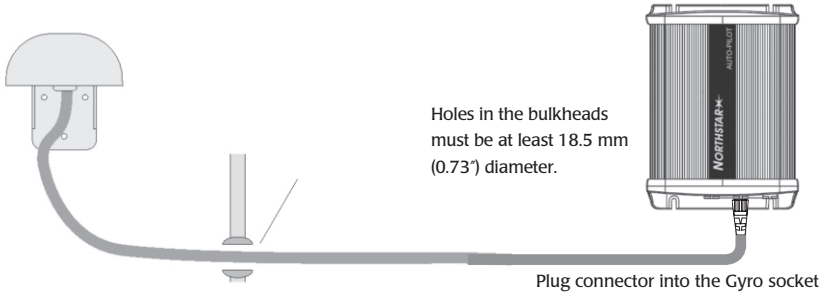
The Ideal location is at the centre of movement (for planing hulls, the centre of movement is usually close to the stern).

Installation

1 Find a suitable location for the unit as described above.
2 Mount the unit with the three screws provided. Use a level to ensure the unit is vertical to within 10°.



3 Wire the cable back to the MCU600, following the wiring guide (see section 3-2-2).



Note

- *If you move the gyro with respect to the compass while the power is on, wait for the heading to stabilise.*

3-8 Installing the PILOT 3300 display unit and other instruments

There are two mounting arrangements:

- **Flush mounting** requires a solid panel with access behind for wiring and mounting screws. After flush mounting, the display cannot be tilted or moved after installation to reduce any unwanted glare or reflections. Carefully select the best viewing position before installation. This would generally be in a shaded area.

Flush mounting directions

1 Cut a hole in the bulkhead for the display unit using the flush mount template as a guide.
2 Drill four holes for the mounting studs using the flush mount template as a guide.
3 Screw the four studs into the brass inserts in the back of the display unit.
4 Sit the display unit in place and fit the washers and nuts to the studs.

- **Bracket mounting** requires a panel for mounting the bracket. Ensure that the panel is not likely to deform and is not subject to excessive vibration. The bracket can be tilted and the dispaly can be removed after each use.

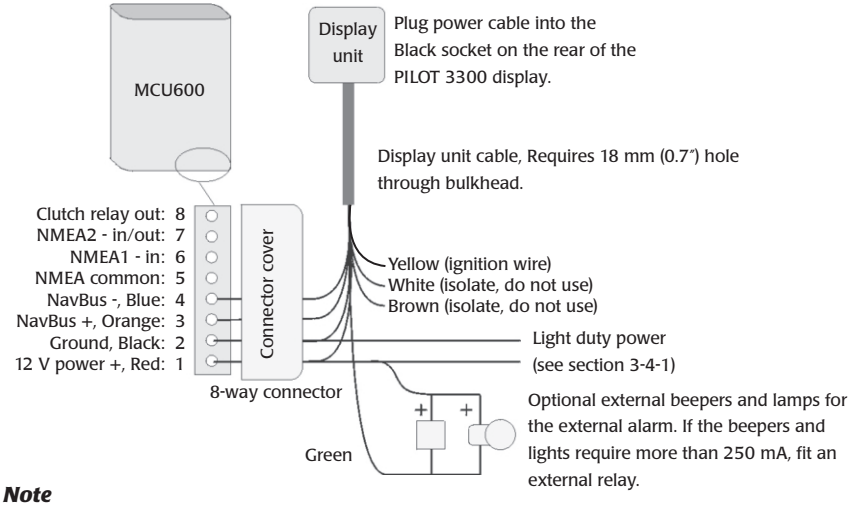
Select a position where the display unit will be:

- At least 4" (100 mm) away from the compass.
- At least 12" (300 mm) away from any radio transmitter.
- At least 4 ft (1.2 m) away from any antenna.
- Easy to read and operate. If possible, mount the display unit in front of the navigator or to the right of the navigator because the LCD display is more readable from these positions.
- Not exposed to the direct sun or water.
- Protected from physical damage during
  rough sea passages.
- Easy to access the DC power source.
- Convenient to route the transducer cables.

Bracket mounting directions

1 Fix the mounting bracket onto the boat using the four stainless steel screws.
2 Hold the display unit in place in the mounting bracket. Fit the mounting bracket knobs into the display unit and do up the knobs loosely.
3 Adjust the tilt of the display for best viewing, then hand tighten the knobs on the mounting bracket.

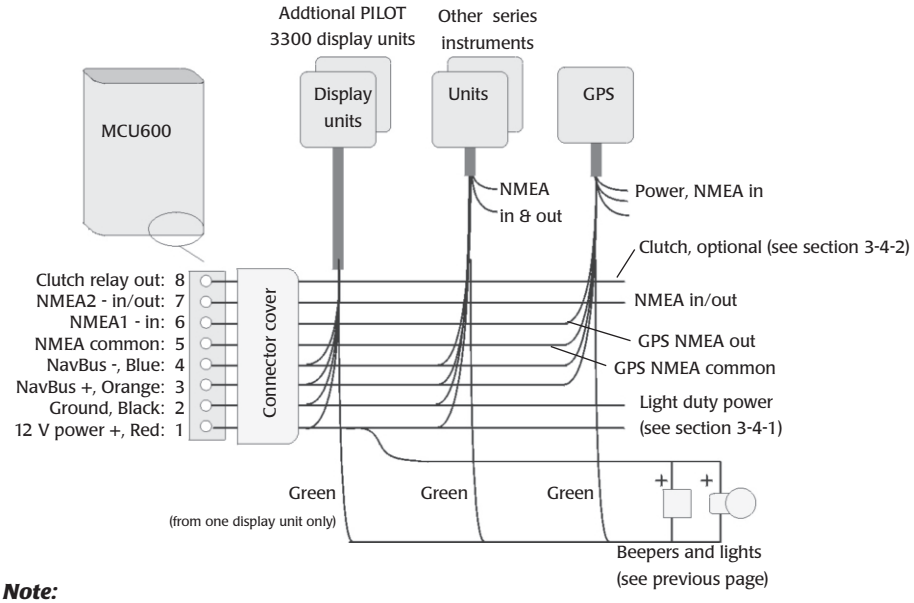
Wiring the display unit



Note

- *Wire the display unit power wires (red and black wires) to the eight way connector terminals 1 and 2 to ensure the display unit and main control unit have the same light duty power supply.*
- *Follow the wiring guide (see section 3-2-2).*

Wiring other instruments



Note:

- *Refer to the instrument's installation manual for more wiring information.*
- *If adding more than three display units or other series instruments, fit a separate light-duty power supply for the extra instruments (see section 3-4 or the instrument's installation manual)*
- *The external alarm outputs (green wire) of Northstar series instruments can be connected together to drive the external beepers and lights.*
- *In systems with several other instruments, we recommend using NavBus junction boxes to simplify wiring (see the Nav-Bus Installation and Reference manual).*
- *Follow the wiring guide (see section 3-2-2).*

4 Dockside setup

Perform the dockside setup:

- after installing a PILOT 3300 system (see section 3)
- after a part has been changed or if a problem is suspected

After dockside setup, perform the sea trials (see section 5).

4-1 Start dockside setup

1 Turn the PILOT 3300 system on (See PILOT 3300 Reference manual). If the rudder moves, immediately turn the power off.

If you try to enter AUTO and the rudder feedback unit or compass have not yet been calibrated, then the PILOT 3300 system will displays an error.

2 If the PILOT 3300 system has been used before, reset all user data to the factory defaults. Go to Factory reset > Both in the Setup System menu (See PILOT 3300 Reference manual).

3 Enter the user data listed in the User Data table below (See PILOT 3300 Reference manual to find what each data item means and how to enter the data). Beside each item, write the value of the user data that you enter.

4-2 Calibrating the rudder feedback unit

To calibrate the rudder feedback unit go to *Rudder* in the *Setup > Calibrate* menu. Follow the on-screen instructions presented by the calibration wizard (*See PILOT 3300 Reference manual*).

This procedure matches the rudder feedback unit to the rudder.

Note

- *To exit the calibration at any time, press **ESC**.*
- *If you do not move the rudder as prompted or the rudder feedback unit is not working then the PILOT 3300 system can not finish the calibration. The PILOT 3300 system will display an error. Press **ESC**, fix the problem and repeat the calibration.*
- *In normal operation, the PILOT 3300 system will not turn the rudder closer than 3° to an endstop.*

Warning: Until the rudder feedback unit is calibrated (see section 4-2), there is no rudder limit. The user must ensure that rudder is not driven onto an endstop when using the jog command (see PILOT 3300 Reference manual).

5 Sea trials

Perform the sea trials:

- After performing the dockside setup (see section 4).
- To check the operation of the PILOT 3300 system.

For the sea trials, sail in an open area where there are no other craft or obstructions. The sea should be calm, the wind speed as low as possible and there should be no currents.

5-1 Calibrating the compass

Note

To calibrate the Compass unit go to *Compass* in the *Setup > Calibrate* menu. Follow the on-screen instructions presented by the calibration wizard (*See PILOT 3300 Reference manual*).

- *To exit the calibration at any time, press **ESC**.*
- *If the boat is not turned as prompted or the compass is not working then calibration can not be completed, the PILOT 3300 system displays an error. Press **ESC**, fix the problem and repeat the calibration.*
- *Local disturbances in magnetic field may affect the compass. Calibration must be preformed away from large metal structures such as marinas, large ships etc.; this is the responsibility of the user.*
- *Ensure that both sources are referencing the same north (true or magnetic). If your magnetic compass has not been calibrated then you can use another source for heading. If using vessel's compass then ensure that the deviation tables are applied to check the autopilot's compass.*

5-2 Aligning the compass and the rudder

The compass or rudder can be aligned separately.

5-2-1 Aligning the compass (Align heading)

This aligns the PILOT 3300 system compass to display the correct heading.

The compass can be aligned either to a reference compass or to a GPS connected to the PILOT 3300 system. Ensure there is no cross-wind or current.

To align the Compass unit go to *Align heading* in the *Setup > Calibrate* menu. Follow the on-screen instructions presented by the calibration wizard (*See PILOT 3300 Reference manual*).

5-2-2 Aligning the Rudder (Centre rudder)

This sets the rudder setting to sail a straight course. Ensure there is no cross wind or current.

To align the rudder go to *Centre rudder* in the *Setup > Calibrate* menu. Follow the on-screen instructions presented by the calibration wizard (See PILOT 3300 Reference manual).

Appendix A - Specifications - MCU600

Electrical:
Drive power supply: 10.5 to 16.5 V DC, 20 A maximum

8-Way Terminal power supply: 10.5 to 16.5 V DC, 300 mA.

Other optional instruments: refer to the instrument's Reference manual.

Interfaces:
NavBus: connection to other Northstar instruments and PILOT 3300 display unit.

NMEA 0183 ports: NMEA 1: Input; NMEA 2: Can be programmed to be an input or output

NMEA 0183 output messages: HDG, HDT, RSA;

NMEA 0183 input messages: APA, APB, BOD, BWC, MWD, MWV, RMA, RMB, RMC, VHW, VTG, XTE

Standards compliance:

EMC compliance

USA (FCC): Part 15 Class B.

Europe (CE): EN301 843-1
New Zealand and Australia (C Tick): AS-NZS 3548.

Environment:

Compass: IPx6 and IPx7 - completely waterproof.
Gyro: IPx6 and IPx7 - completely waterproof.
Rudder feedback unit: IPx6 and IPx7 - completely waterproof.
MCU600 Main unit: Not waterproof - requires a cool, dry, clean environment.

MCU600 Main unit Drive connections:

	Signal
1	Heavy duty power positive, 10.5 to 16.5 V DC
2	Heavy duty power negative
3	Steering drive negative output
4	Steering drive positive output

MCU600 Main unit 8-way Terminal connections:

	Signal
1	Light duty power positive, 10.5 to 16.5 V DC
2	Light duty power supply common
3	NavBus +
4	NavBus –
5	NMEA common
6	NMEA in 1
7	NMEA in 2
8	Steering clutch relay drive output, switched ground to turn relay on, 30 V DC, 300 mA maximum

MCU600 Internal Fuse:

2x fuses - both fuses are the same

Type: ATC - Automotive blade

Rating: 20A

Appendix B - Specifications - NS3300 Display

Electrical:

Supply voltage: 10.5 to 30.5 V DC.
Supply current (at 13.8 V)**:**
Without backlighting: 160 mA.
With full backlighting: up to 390 mA.

Other optional instruments: refer to the instrument's Reference manual.

Interfaces

NavBus: connection to MCU and other Northstar instruments.

Standards compliance:

EMC compliance:

USA (FCC): Part 15 Class B

Europe (CE):IEC 60945:2002 Clause 9 & 10.
New Zealand and Australia (C Tick):
IEC 60945:2002 Clause 9.

Environment:

IPx6 and IPx7 - completely waterproof.

NS3300 Display unit power/data cable wires:		
Black connector - Power and MCU		
	Wire color	**Signal**
5	Red	Power positive, 10.5 to 30.5 V DC
1	Black	Power negative
6	Orange	NavBus +
4	Blue	NavBus -
7	Yellow	Factory use (isolate, do not cut)
3	White	Factory use (isolate, do not cut)
8	Green	External alarm, switched to ground, 30 V DC and 250 mA max.
2	Brown	+9V out
Green connector - NavBus expansion		
	Wire color	**Signal**
5	Red	Factory use (isolate, do not cut)
1	Black	Power negative
6	Orange	NavBus +
4	Blue	NavBus -
7	Yellow	Factory use (isolate, do not cut)
3	White	Factory use (isolate, do not cut)
8	Green	Factory use (isolate, do not cut)
2	Brown	+9V out

Appendix C - User data

User Data table (to record installation setup data)	
Menu > Setup > SYSTEM menu	
Language	
Night mode	
Key beep	
Auto power off	
SmartCraft	
Menu > Setup > OPTIONS menu	
Dodge angle	
Tack mode	
Tack angle	
Gybe mode	
Gybe angle	
Tack delay	
Turn rate	
Menu > Setup > VESSEL menu	
Vessel Type	
Drive Type	
Wind features selected	
Menu > Setup > ALARMS menu	
Course error	
XTE	
Waypoint akn	
Wind shift	
(sail only)	
Low battery	
High current	

Menu > Setup > UNITS menu	
Distance	
Compass	
Magnetic variation	
Wind	
Menu > Setup > COMMS menu	
NMEA mode	
NavBus group	
Menu > Setup > PROFILES menu	
Profile (user1)	
Parameters:	
Adaptive	
Response	
Ratio	
Advanced:	
Trim	
C-rudder	
GPS gain	
Wind gain	
Profile (user2)	
Parameters:	
Adaptive	
Response	
Ratio	
Advanced:	
Trim	
C-rudder	
GPS gain	
Wind gain	
Profile (user3)	
Parameters:	

Adaptive	
Response	
Ratio	
Advanced:	
Trim	
C-rudder	
GPS gain	
Wind gain	
Profile (user 4)	
Parameters:	
Adaptive	
Response	
Ratio	
Advanced:	
Trim	
C-rudder	
GPS gain	
Wind gain	
Profile (user5)	
Parameters:	
Adaptive	
Response	
Ratio	
Advanced:	
Trim	
C-rudder	
GPS gain	
Wind gain	

Notes

Note: This document has not been formally checked, it is for reference only.