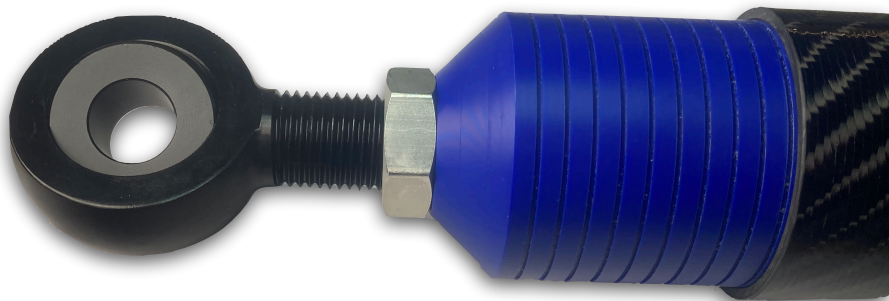


E - B A R

INSTALLATION / USER MANUAL

The following installation/user manual should be completed and retained on board the vessel once the E-BAR has been installed and commissioned.



The E-BAR has been developed and produced by FourthCape, it combines a lightweight carbon fibre tube with precision engineering and advanced electronics to allow smooth toe in/out adjustment of twin rudders whilst sailing.

Optimal adjustment minimises windward rudder drag and maximises control, delivering improved handling, and reduced drag - all elements that increase average speeds.

A proven design with race success onboard Jeanneau Sun Fast, JPK twin rudder ranges, as well as custom one offs.

SAFETY



This equipment must be installed in accordance with the instructions provided in this manual. Failure to do so will seriously affect its performance and reliability. It is strongly recommended that a trained technician installs and configures this product.



Do not attempt to service this equipment as doing so may cause fire, electric shock or malfunction and will invalidate the warranty. If any malfunctions are detected contact your supplier or service agent.

GETTING STARTED

With the existing, installed rudder link bar(s) in place, set the rudders to your base settings. Typically trailing edges of the rudder blades aligned with the manufacturer's engravings on the transom/hull, from your own experience, or acknowledged class settings.

In the above conditions, measure the rudder link bar to be replaced.

The ease of taking measurements varies from boat to boat, often it's easier to measure from the inside bearing surface of the rose joint to the same on the other end. This will give you an overall active bar length, **[BASE]** which you can record in the table on Page 8.

BAR INSTALLATION

Once the existing bar has been measured, it can be removed. Move the rose joints to the E-BAR (unless supplied) **DO NOT ROTATE THE ACTIVE END** - [graduated blue part of the E-BAR] when screwing in the rose joint. Set up the rose joints to give the **BASE** measurement, with 35mm of extendable blue bar showing. Once fitted ensure the rose joint locking nut and all connecting bolts are securely fastened.

Lead the E-BAR cable to the Control Box. From cable exit on the bar, back to the rudder stock and up to the deck-head, then routed to the Control Box, this limits the amount of movement the cable makes as the steering system articulates.

CONTROL BOX & KEYPAD INSTALLATION

Choose a location on the cockpit side where you will operate the bar from (each side on a two Keypad installation), typically this is either close to the helm position. The Keypad is IP68 rated, however, it's best to avoid areas subject to direct pressurised water!

Ensure that the mounting location of the Keypad is accessible below decks.

For a single Keypad installation, the Keypad is plugged directly into the control box, or can be extended using a standard N2k drop cable (max 6m).

For a double Keypad installation the N2k style T-piece should be installed with the short cable connected to the control box and the Keypads connected to the T-piece. A typical installation would see 1 Keypad connected to the T-Piece directly, and 2nd connected via a N2k drop cables(max 6m) to the T-Piece

Once the location is decided, drill the holes for the Keypad connector, and securing bolts (Drill template guide is provided), Tighten the Keypad panel up against the cockpit side. The Keypad will seal against a smooth, flat cockpit side.

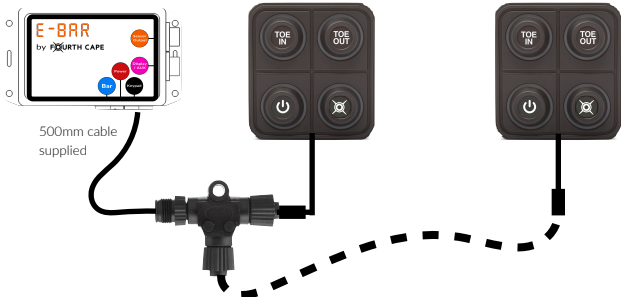
Mount the Control Box below decks planning the cable runs from the Keypad and the end of the E-BAR, together with Power, Sensor Output and Display (option)

SINGLE KEYPAD INSTALLATION

DOUBLE KEYPAD INSTALLATION



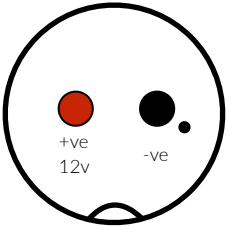
400mm direct connection
Can be extended with N2k drop cable
(not included)



Max 6m N2k drop cable not included
(option)

POWER CONNECTION

Make up a power supply lead, with the provided connector, a 12v supply with 5A fuse is required, the included connector will need to be soldered. Please **note carefully** the +ve / -ve in the diagram below.



Solder buckets
from cable side
connector

SENSOR TO INSTRUMENT CONNECTION (OPTIONAL SUPPLIED CABLE)

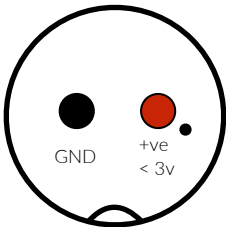
The sensor output provides a feed of 0-3v depending on the extension of the bar. The connector is supplied and should be wired as per the below diagram.

NOTE THE POLARITY & TEST BEFORE CONNECTING TO INSTRUMENT SYSTEM.

Max IN will be low voltage, Max OUT the higher voltage. The output is analogue and linear. MAX and MIN values for calibration can be read on your instrument system or a voltmeter. This can be calibrated to show desired numbers within instrument display systems.

Setting 0.3v (or measured minimum) to be **7** and 3v (or measured maximum i.e. 2.97v) to be **-3** gives a Zero value at **BASE** (if bar is set up at **BASE** with 35mm showing).

The bias towards greater Toe In values is because it's less likely to use high values of Toe Out.



Solder buckets
from cable side
connector

Values		Typical Instrument set up
Bar	Volts	
IN	0.3v	7
OUT +50mm	3.0v (2.97v)	-3

OPERATION

KEYPAD USE

With the control box powered (12v 5A fused supply) press Standby to power the system on

- > Press and hold Standby will dim the back lights of the keypad, long hold will switch the system off
- > Press and hold TOE IN to shorten the E-BAR, press and hold TOE OUT to lengthen the E-BAR
- > Press and hold TOE IN and TOE OUT together (long press) E-BAR will return to 'BASE'
- > Press Aux/Display (option dependant) to power that output, press and hold to switch off
- > 5 sec Press Aux/Display (option dependant) to temporarily set new 'BASE'

Long simultaneous press to return to saved BASE Setting



Button	Illumination	Status
All	'Hello' Blink Multiple Colours Show	Power to Control Box
TOE IN/OUT	Amber Flash	Control Box powered system not on - power on with standby button
Standby	Red	System on and ready to adjust
TOE IN/OUT	Red	E-BAR is moving
TOE IN & OUT	Green	E-BAR is returning to BASE value
Symbol/Display	Red	Display/Aux on
All	Red Rotation / Green Rotation	New BASE value set
All	Goodbye' Blink Rotation of Blue	E-BAR System is switching off

OPERATION

SETTING THE BASE VALUE

The intelligence built into the control box allows for the saving of a new BASE value which enables the user to quickly return to this preset adjustment. To set a new BASE adjust the E-BAR to the desired position. Press and long hold the FourthCape Compass/Display button on the Keypad - the system will store your setting and display a rotation of Red and Green lights signalling success.

You can then continue using the E-BAR as normal, to then return to the new BASE setting, Long Press the TOE IN and TOE OUT buttons simultaneously - the TOE IN/OUT buttons will illuminate green until the BASE setting is reached.

EXAMPLE INSTRUMENT INTEGRATION B&G H5000

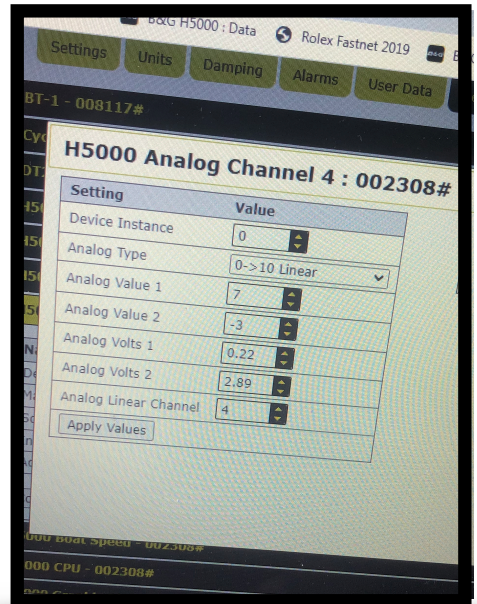
The E-BAR system can be integrated into a B&G H5000 instrument system. By connecting the E-BAR to an analogue channel (in this case C4) of the H5000 processor it can be identified by the B&G system and shown on displays.

Example of Analogue Channel configured in the B&G System Interface.

'User 1' Channel with a Long Caption [RudderTOE] and a Short Caption [TOE]

In the 'Device List' tab the 'H5000 Analog Channel 4' can be calibrated with the sensor outputs (max and mins)

[See page 3, Sensor To Instrument Connection.]



NKE INTEGRATION

Integration with the NKE instrument system is possible via an NKE Analogue Box which can be purchased directly from NKE Marine Electronics.



TYPICAL RANGES OF ADJUSTMENT

Current experience has shown that although the full range of adjustment available is 50mm a likely maximum range is 24mm, with only a few mm of Toe Out from BASE used, and the main balance used to Toe In. The way you trim the sails, and other factors will change how you set up the Toe In/Out. Rather than trying to 'hit a number', with experience, the feel on the helm will help guide you to have a bit more or less Toe In, if you are tired, or do not have enough boat speed or heel to feel the correct setting, then returning to BASE setting is a safe setting. The output values are good to add to your instrument log files so that you can analyse numbers later.

PRODUCT CARE

The E-BAR, its Control Box and Connectors should not be submerged in water. Whilst the button panel and optional dedicated Display is IP68 rated, it's best to avoid areas subject to direct pressurised water. When adjusting the rose joint on the active end of the E-BAR, care should be taken to hold the blue 'active end' to prevent it from turning.

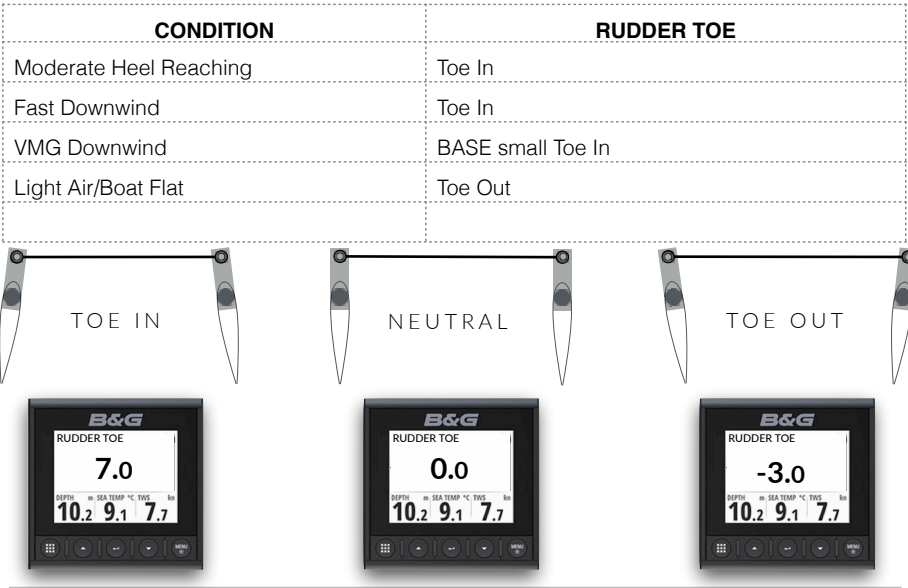
The E-BAR and Control Box do not require any specific maintenance, however, we would advise that you clean and dry lubricate the active end of the bar once a season.

To do this, adjust the bar to maximum Toe Out which will expose the greatest amount of blue active end - clean this with a small amount of solvent [white spirit, brake cleaner or acetone] Once cleaned spray some dry PTFE lubricant or silicon spray and motor bar fully in and out a few times to disperse the lubricant.

DO NOT USE: Any form of Grease or wet lubricant such as WD40 or Oil.

TUNING GUIDE

Hydrodynamic flow much like aerodynamic flow requires trimming, as you would trim a sail you can now also trim your rudders to the heel and speed of the boat. With time your feel and experience with the system will advance, to get you started below is a generic guide.



DEDICATED DISPLAY (option)

The E-BAR Dedicated Display allows the adjustment of the E-BAR to be constantly viewed. This can also be a great option for those boats that do not have a B&G H5000 processor onboard and the ability to easily display sensor output on the boats instruments.

INSTALLATION

Identify where you want to position your display - this should be within 500mm of the E-BAR Control Box, [extension cable available should you want to position the display on the opposite side of the cockpit for example.]

Like the Keypad the Display is IP68 rated, however, it is best to avoid areas subject to direct pressurised water.

- > Using the Display 'low tack drill template' as a guide, carefully measure and drill the large central hole for the Display securing thread.
- > Centrally position the display in the hole using a small amount of sealant and tighten the display to the mounting surface with the large retaining nut.
- > Connect the Display to the Control Box with the supplied cable.



85mm x 65mm

OPERATION

- > Press the Display button to switch on the Display
(3 sec delay whilst it starts up)
- > Press & hold the Display button to switch off the Display

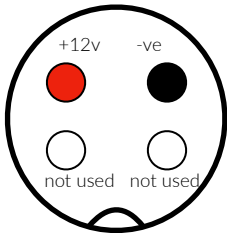
NOTE: The E-BAR can be adjusted without the Display being switched on.
This saves power when you don't need to see the position of the rudder Toe In/Out.



Display Button

AUX BUTTON (non Display version)

Where the Dedicated Display is not used, an AUX switch output is available. This is controlled by the bottom right button on the Keypad. (FourthCape Compass symbol) **It must be linked to a relay** but could be used to switch on/off a deck light or navigation lights if correctly wired.
Connector is supplied, wired as diagram below.



Solder buckets
from cable side
connector

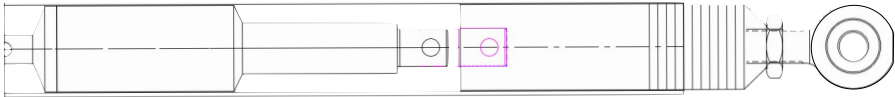


AUX Button

INSTALLATION RECORD

The following installation record should be completed and retained on board the vessel once the E-BAR has been installed and commissioned.

Base Settings	Record Your Settings Here
Existing bar length (BASE)	
E-BAR Rose Joint centre to lock nut	
E-BAR exposed length at base setting	Default 35mm
E-BAR Serial Number:	



Thank you for purchasing this E-BAR. This product has been engineered for the highest level of performance and durability and will provide many years of reliable service. We constantly strive to achieve the highest possible quality standards, should you encounter any problems with this product, please contact the FourthCape team via the website.



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