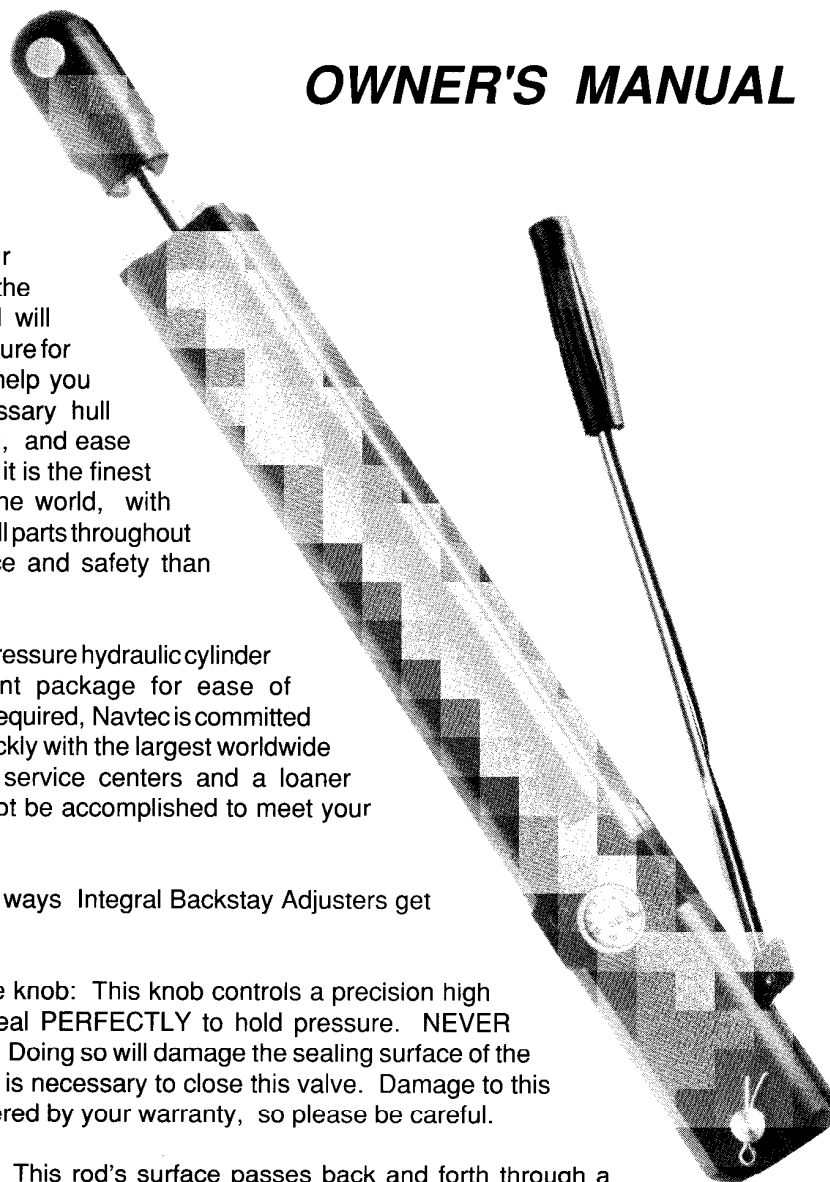


# OWNER'S MANUAL



Thank you for purchasing a Navtec Integral Backstay Adjuster. Navtec pioneered the Integral concept over a decade ago, and all of our experience has gone into your Series 7 Integral. It is made of the highest quality materials and will provide increased sailing pleasure for many years to come. It will help you point higher, relieve unnecessary hull stresses while on the mooring, and ease use of your furler. We believe it is the finest unit of it's type available in the world, with positive mechanical locking of all parts throughout for higher levels of confidence and safety than similar units.

Your integral combines a high pressure hydraulic cylinder and pump in one convenient package for ease of installation. Should service be required, Navtec is committed to getting you sailing again quickly with the largest worldwide network of marine hydraulic service centers and a loaner program in case repairs cannot be accomplished to meet your schedule.

**WARNING:** The two primary ways Integral Backstay Adjusters get damaged are:

1. Over tightening the release knob: This knob controls a precision high pressure valve which must seal **PERFECTLY** to hold pressure. **NEVER OVER TIGHTEN THIS KNOB:** Doing so will damage the sealing surface of the valve. Two fingers are all that is necessary to close this valve. Damage to this valve due to abuse is not covered by your warranty, so please be careful.
2. Damaging the piston rod: This rod's surface passes back and forth through a pressure seal in the cylinder of your integral unit. Any scratch or ding that you can feel by running your fingernail across the surface will damage the seal. Take the time to have **ANY** rod damage checked by your authorized Navtec hydraulic service center.

## INTEGRAL ADJUSTER SPECIFICATIONS

| Cylinder Size | Part Number  | Piston Rod Size |      | Force at Std. Relief Valve Setting |       | Force at Max. Relief Valve Setting <sup>3</sup> |       | Max. 1 x 19 Cable Size |      | Pin Diameter |      | Length Open |     | Length Closed |     | Stroke |     | Weight |     | Toggle Part Number if Required <sup>4</sup> | Toggle Pin Center Length |      |
|---------------|--------------|-----------------|------|------------------------------------|-------|---|-------|------------------------|------|--------------|------|-------------|-----|---------------|-----|--------|-----|--------|-----|---|--------------------------|------|
|               |              | in              | mm   | lb.                                | kg.   | lb.   | kg.   | in                     | mm   | in           | mm   | in          | mm  | in            | mm  | in     | mm  | lb     | kg  |   | in                       | mm   |
| -6-01         | A370-A-06-01 | 7/16            | 11.1 | 3,500 <sup>2</sup>                 | 1,587 | 3,500   | 1,587 | 7/32                   | 5.6  | 7/16         | 11.2 | 32.2        | 818 | 24.2          | 615 | 8.0    | 203 | 6.2    | 2.8 | A371-20A06-01                               | 2.00                     | 50.8 |
| -6            | A370-A-06    | 1/2             | 12.7 | 3,500 <sup>1</sup>                 | 1,587 | 5,809   | 2,634 | 7/32                   | 5.6  | 7/16         | 11.2 | 28.9        | 734 | 21.9          | 556 | 7.0    | 178 | 7.5    | 3.4 | A371-20A06                                  | 2.13                     | 54.1 |
| -10           | A370-A-10    | 1/2             | 12.7 | 4,600 <sup>2</sup>                 | 2,086 | 5,809   | 2,634 | 9/32                   | 7.0  | 1/2          | 12.7 | 28.9        | 734 | 21.9          | 556 | 7.0    | 178 | 7.5    | 3.4 | A371-20A10                                  | 2.13                     | 54.1 |
| -12           | A370-A-12    | 5/8             | 15.9 | 6,300 <sup>1</sup>                 | 2,857 | 10,880  | 4,934 | 5/16                   | 8.0  | 5/8          | 15.9 | 32.8        | 833 | 24.8          | 630 | 8.0    | 203 | 15.5   | 7.0 | A371-20A12                                  | 2.38                     | 60.5 |
| -17           | A370-A-17    | 5/8             | 15.9 | 8,600 <sup>2</sup>                 | 3,900 | 10,880  | 4,934 | 3/8                    | 9.6  | 5/8          | 15.9 | 32.8        | 833 | 24.8          | 630 | 8.0    | 203 | 15.5   | 7.0 | A371-20A17                                  | 2.38                     | 60.5 |
| -22           | A370-A-22    | 3/4             | 19.1 | 11,100 <sup>2</sup>                | 5,034 | 13,942  | 6,323 | 7/16                   | 11.2 | 3/4          | 19.0 | 34.7        | 881 | 26.2          | 665 | 8.5    | 216 | 20.0   | 9.1 | A371-20A22                                  | 2.63                     | 66.8 |

1 In pounds/kilograms at 3,000 psi. 2 In pounds/kilograms at 4,000 psi. 3. In pounds/kilograms at 5,000 psi. 4. Separate toggle available to rotate pump handle 90°. Purchase separately.

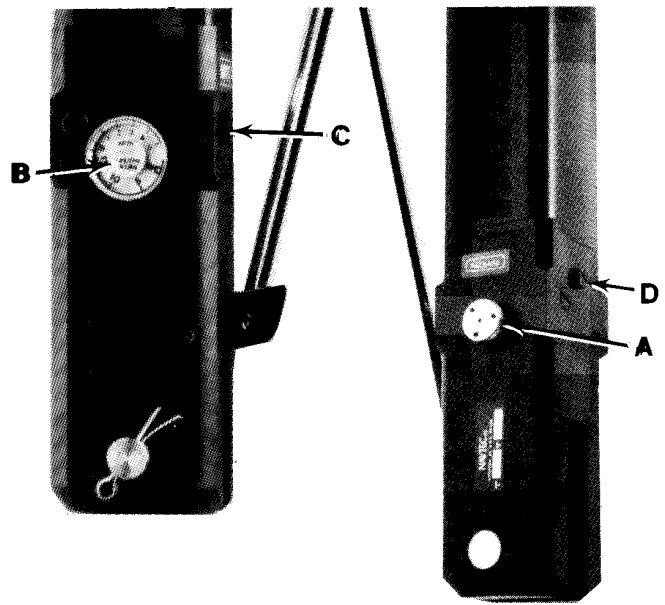


**NAVTEC**®

## INSTALLATION

In most cases, you will have to shorten the backstay to accommodate the adjuster. However, if there is a Navtec turnbuckle with an extra long screw in the backstay, this may not be necessary. The backstay should be long enough to allow easy hook-up with the cylinder approximately two-thirds open.

The cylinder must be mounted with the rod end up. Since the adjusters are shipped fully retracted, you must extend the rod prior to final installation. This is most easily done by attaching the adjuster to the chainplate, opening the release valve (A), and using a halyard attached to the upper clevis, extending the rod. If you wish to rotate the Integral 90 degrees for more convenient operation, a special eye/jaw toggle is available from your Navtec dealer.



## OPERATING INSTRUCTIONS

To increase tension, work the pump handle back and forth with the release valve closed (its normal position) until the desired tension or position is reached. The pump works on just one stroke; the other stroke is an intake stroke.

To reduce tension (slack off stay), open the valve marked RELEASE (A). It is a sensitive valve and a gradual release can be obtained by opening the valve slightly. When the desired tension or position has been reached, close the release valve. This valve (A) has been designed to seal tightly when the valve is closed gently. **DO NOT OVERTIGHTEN** the valve as this will greatly reduce its life. Two fingers are all that is need to close the valve. If tension bleeds off over time, the unit must be returned to Navtec for repair. Overtightening the valve will only damage the unit further.

## BLEEDING

If the cylinder fails to retract when operating the pump with the release valve shut, the likely cause is an air lock which can be solved by bleeding the pump as follows:

1. With the rod end up, fully extend the cylinder (see instructions above).
2. Open the release valve fully and pump slowly for approximately one minute. The pump and cylinder are now bled.

## RELIEF VALVE

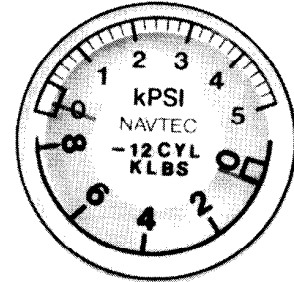
The relief valve is factory set at approximately 4,000 psi (3,500 if unit is a -6 or a -12). At that pressure, the force of a -10 integral is 4,625 pounds. The Relief Valve can be adjusted as follows:

1. Lay the unit down so that the handle faces up. Put a rag under the unit as there will be some oil leakage.
2. Open release valve to depressurize unit, then close release valve.
3. Remove plug (C) below the NAVTEC sticker. A slotted screw under this plug controls the relief valve tension.
4. To increase relief valve setting, rotate screw clockwise. After making a small adjustment, replace plug (C) and pump up unit until pressure fails to rise further while pumping. This pressure is the new relief valve setting. If further relief valve pressure change is desired, repeat steps 1 - 4.

5. Replace plug. Oil loss will probably be slight if plug is not left off for long periods. If oil loss exceeds about 1/2 cup, refill oil by following the oil filling procedures described below.

## GAUGE

The Navtec gauge (B) has double ended needle so that two scales can be used. The top scale which reads in thousands of pounds per square inch, indicates the pressure within the cylinder. The lower scale which reads in thousands of pounds force, indicates the force being exerted by the cylinder.



## OIL LEVEL

The reservoir is filled at the factory and should not need filling. However, if the cylinder fails to respond to bleeding instructions, or if excessive oil is lost changing relief valve pressure, you may wish to check the level. The correct level is achieved when the oil level just touches the bottom of the fill hole (D) when the adjuster is lying on its side.

1. Go through the bleeding procedure described above once.
2. With the cylinder rod still fully extended, lie the unit down on its side with the oil fill plug (D) facing up.
3. Remove the black oil fill plug (D) which is located nearest the top of the unit. Keeping the unit level, add clean #10 hydraulic oil or non detergent motor oil until the oil level in the reservoir reaches the bottom of the fill hole. NEVER use brake fluid as it will destroy the seals. DO NOT tip the unit while filling. Replace the oil plug.
4. Stand the unit up and pump it all the way down with the release valve closed.
5. Extend the unit halfway (3-4 inches) and pump it down again. Open Release Valve (A).
6. Extend the unit fully. Lie the unit down on its side with the oil fill plug up. Wrap screwdriver with a rag and remove the oil fill plug. Keeping the unit level, fill the reservoir until the oil level reaches the bottom of the fill hole as in step 3. Replace the oil fill plug (D).
7. Close the release valve and pump until retracted. **WARNING:** If the pump handle springs back after a pumping stroke, the reservoir is overfilled and you are trying to pump oil through the cylinder tube wall. Flexing of this wall causes the spring action. DO NOT continue pumping. If pumping is continued with the unit overfilled, the port plug seal may blow. Follow this procedure to correct for overfilling:
  - a) Release all pressure by opening the release valve.
  - b) Back off oil fill plug slowly until some oil leaks out .
  - c) Close release valve and pump very slowly and the excess oil will leak from the loose oil fill plug.
  - d) Once the rod is fully retracted, tighten the oil fill plug.

## MAINTENANCE

No regular maintenance is required other than keeping the unit clean. The piston rod should be inspected occasionally for dents or scratches. If piston rod is damaged, the unit should be returned to an authorized NAVTEC hydraulic service center for repair or replacement.

## WARRANTY

1. **WARRANTY:** Navtec warrants its products, in normal usage, to be free of defects in materials and workmanship for a period of one year from date of original purchase by the user, subject to the conditions and limitations below. Any part that proves to be defective in normal usage during that one year period will be repaired or replaced by Navtec. This warranty is subject to the following conditions and limitations.

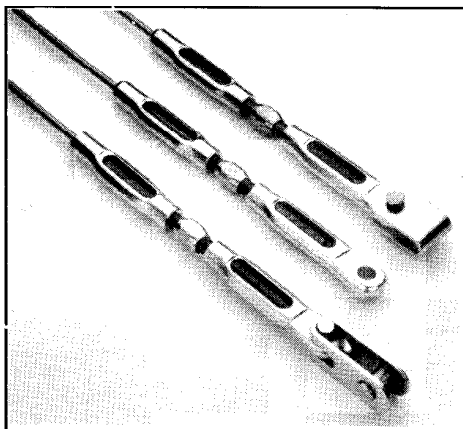
A. Navtec's liability shall be limited to repair or replacement ( choice of remedy at Navtec's option ) of goods or parts defective in materials or workmanship. This shall be the buyer's exclusive remedy in contract, tort or otherwise. B. Except as otherwise provided, quality shall be in accordance with Navtec's specifications. C. Determination of the suitability of the material for the use contemplated by the buyer is the sole responsibility of the buyer, and Navtec shall have no responsibility in connection with such suitability. D. Navtec shall not be liable for any harm resulting from: (1) failure due to use of products in applications for which they are not intended. (2) failure due to corrosion, wear and tear, or improper installation. In the case of rod rigging products, improper installation includes, but is not limited to, the use of rod rigging end fittings other than those manufactured by Navtec or meeting Navtec's specifications. Improper installation also includes, but is not limited to, the use of dies other than those leased by Navtec to Authorized Navtec Representatives, to form the head which is part of the patented Navtec Headed Rod Rigging System. E. Navtec shall not be responsible for shipping charges or installation labor associated with any warranty claims. F. Service by anyone other than Authorized Representatives shall void this warranty unless in accordance with Navtec guidelines and standards of workmanship.

2. **DISCLAIMER OF IMPLIED WARRANTIES.** There are no warranties of merchantability, fitness for purpose, or any other kind, expressed or implied, and none shall be implied by law. The duration of any such warranties that are nonetheless implied by law for the benefit of a consumer shall be limited to a period of one year from original purchase by the user. Some states do not allow limitations on how long an implied warranty lasts so the above may not apply to you.

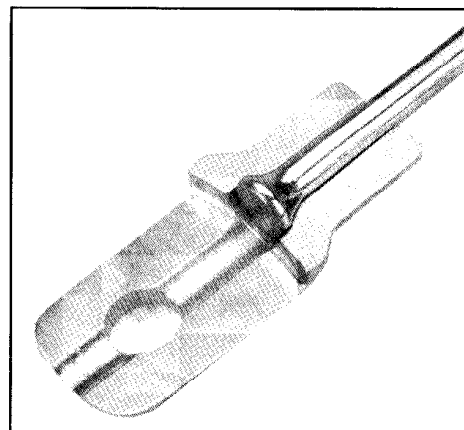
3. **LIMITATIONS OF CONSEQUENTIAL DAMAGES.** Navtec shall not be liable for consequential damages to yachts, equipment or other property, or persons due to any failure of Navtec equipment. Some states do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or inclusion may not apply to you.

4. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

## OTHER NAVTEC PRODUCTS



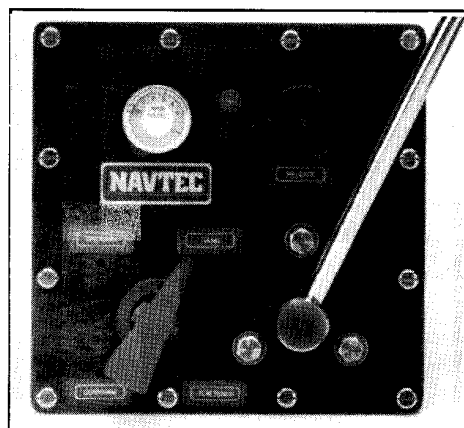
**TURNBUCKLES**



**ROD RIGGING**



**RIGGING MAINTENANCE  
SUPPLIES**



**MULTIFUNCTION PANELS**