



## About your new NAVTEC Integral Backstay Adjuster

### **Congratulations on the purchase of your new Integral Hydraulic Backstay Adjuster by Navtec.**

More than a decade ago, we pioneered the Integral concept: a backstay adjuster that enables better sailing performance through superior engineering, mechanics, and ergonomics. Since then, we've continued to refine this product. Your integral backstay adjuster represents all of our experience and efforts to craft a perfect backstay solution for sailors.

The new integral backstay adjuster is designed to help you point higher, relieve unnecessary hull stresses while on the mooring, and ease use of your roller furling system.

Your integral combines a high-pressure hydraulic cylinder and pump in one convenient package for ease of installation. Once installed, should service be required, Navtec has the largest worldwide network of marine hydraulic service centers.

## Avoiding Damage

### **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 that 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.



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## Specifications

	Navtec-6 Integral	Navtec-10 Integral	Navtec-12 Integral	Navtec-17 Integral	Navtec-22 Integral
Piston Rod Size	1/2" / 13mm	1/2" / 13mm	5/8" / 16mm	5/8" / 16mm	3/4" / 19mm
Max Wire Size	7/32" / 5.6mm	9/32" / 7mm	5/16" / 8mm	3/8" / 9.6mm	7/16" / 11.2mm
Pin Diameter	7/16" / 11.2mm	1/2" / 12.46mm	5/8" / 15.9mm	5/8" / 15.9mm	3/4" / 19mm
Length Open	44.64" / 1.134m	44.64" / 1.134m	47.7" / 1.212m	47.7" / 1.212m	50.52" / 1.283m
Length Closed	31.14" / 791mm	31.1" / 791mm	33.45" / 850mm	33.45" / 850mm	35.52" / 902mm
Stroke	13.5" / 343mm	13.5" / 343mm	14.25" / 362mm	14.25" / 362mm	15" / 381mm
Weight	7.8lb. / 3.5kgs	8.3lb. / 3.8kgs	16.4lb. / 7.4kgs	16.4lb. / 7.4kgs	23.3lb. / 10.6kgs

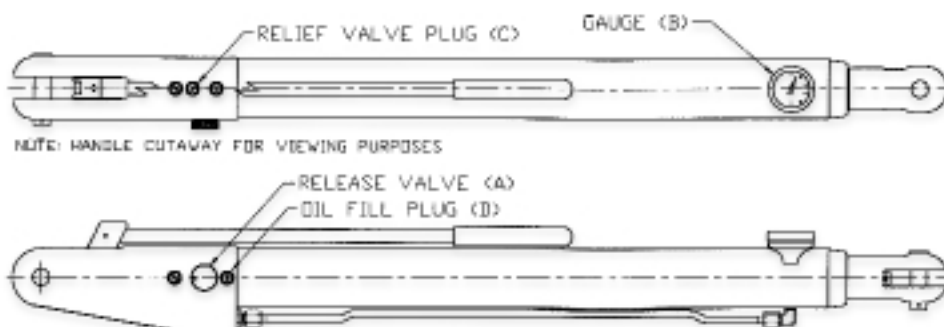
## Installation Instructions

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 done by attaching the backstay adjuster to the chainplates, opening the release valve (A), and using a halyard attached to the upper clevis to extend the rod. If you wish to rotate the Integral 90 degrees for more convenient operation, a special eye/jaw toggle (A371-20AXX) 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 needed to close the valve. If tension bleeds off over time, the unit must be returned to an authorized Navtec service agent for repair. Over-tightening the valve will only damage the unit further.



## How and when to bleed the pump

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.

## How to adjust the relief valve

The relief valve arrives 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. With the unit vertical, pump the cylinder until it is completely retracted.
2. Lay the unit down so that the handle faces up. Put a rag under the unit, as there will be oil leakage.
3. Open the release valve to depressurize unit, then close release valve.
4. Remove plug (C). A slotted screw under this plug controls the relief valve tension.
5. To increase relief valve setting, rotate the 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.
6. Replace plug.

## Reading the gauge

The Navtec gauge (B) reads oil pressure within the cylinder in thousands of pounds per square inch. See chart below to convert oil pressure into actual pull force.



Size	Tube Od (in)	Rod Dia (in)	Press Area (sq-in)	Integral Cylinder Force in Pounds					
				Pressure (gage) (psi)					
				500	1,000	2,000	3,000	4,000	5,000
-10	1.660	0.500	1.160	600	1,200	2,300	3,500	4,600	5,800
-12	2.000	.0625	1.525	800	1,500	3,000	4,600	6,100	7,600
-17	2.250	.0625	2.173	1,100	2,200	4,300	6,500	8,700	10,900
-22	2.500	0.750	2.785	1,400	2,800	5,600	8,400	11,100	13,900

Size	Tube Od (in)	Rod Dia (in)	Press Area (sq-in)	Integral Cylinder Force in Kilograms Force					
				Pressure (gage) (psi)					
				500	1,000	2,000	3,000	4,000	5,000
-10	1.660	0.500	1.160	270	550	1,050	1,590	2,090	2,640
-12	2.000	0.625	1.525	360	680	1,360	2,090	2,770	3,500
-17	2.250	0.625	2.173	500	1,000	1,950	2,950	4,000	5,000
-22	2.500	0.750	2.785	640	1,270	2,550	3,800	5,000	6,300

## How and when to add oil

The reservoir is filled at the factory and should not need filling. However, if the cylinder fails to respond to bleeding instructions 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, lay the unit down on its side with the oil fill plug (D) facing up.
3. Remove the black oil fill plug (D) (see diagram). Keeping the unit level, add clean, non-detergent hydraulic oil with a viscosity grade of ISO 32 (Navtec uses Texaco Rando oil 32) 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. Lay the integral down on its side with the oil fill plug facing up. Wrap screwdriver with a rag and remove the oil fill plug. Keeping the unit level, fill the reservoir unit 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.

### To correct overfilling, follow this procedure:

- 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 the 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 is 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.