

About your Model #C-50 new Navtec System 50 Hydraulic Control Panel.

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Congratulations on the purchase of your new System 50, by Navtec.

Navtec Hydraulic Systems are an industry standard and have been for more than a decade. The System 50 you've purchased represents the ongoing ergonomic and mechanical design program Navtec has initiated to address the changing needs of modern yachts and the people who sail them.

System 50 is designed for improved functioning at all levels – operational, mechanical, and ergonomic. It also is designed to accommodate a two-speed auto-pump or a hydraulic power pack. The end result is an advanced, flexible, intelligently designed hydraulic control system for yachts 35 to 70 feet long.



**NAVTEC®
HYDRAULICS**

www.NavtecHydraulics.com
Info@NavtecHydraulics.com

800 Flanders Road • Building 10, #5 • Mystic, CT 06355 • Tel (860) 245-4616 • Fax (860) 245-4351

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Installation Instructions

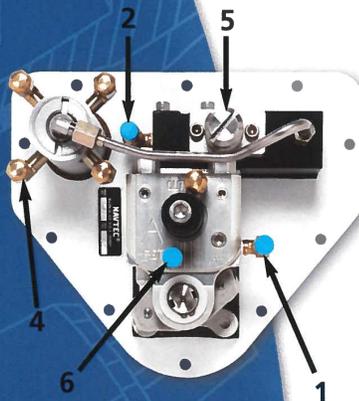
Locate the panel position keeping in mind normal position of crew members while pumping. Use a high-quality marine sealant between panel and bulkhead to prevent leaks.

Mount the separate reservoir with the hose fittings at the bottom. Be sure to leave room above the removable cap at the top of the reservoir for filling. See Table II for reservoir capacity and dimensions. If possible, the bottom of the reservoir should be above the pump as pump suction will be more positive, but this is not essential for satisfactory operation.

Place the reservoir as close to the pump as possible to minimize the effect of pitch and heel.



Single function/single speed pump



Multi-function/two speed pump

Installing plumbing.

Connect either hose barb at the bottom of the reservoir with the pump intake hose barb (#1), using the low pressure hose supplied. Be sure there is a plastic oil filter in this line. (part # H0-012)

Connect the other hose barb on the bottom of the reservoir with hose barb (#2) on the back of the panel for the return, using a second low-pressure hose.

A single high-pressure reinforced hose or stainless steel tube (rated for at least 5,000 psi) must be run from the valve on the central panel to each operating cylinder. High-pressure hose, cylinders and boom vangs are available from your Navtec distributor.

If the panel is single function the hose or tube runs from fitting (#3).

If multiple function, the hose runs from 1 of 4 ports on 4-way selector valve (#4).

For push-pull cylinders, when a 4-way valve is used (this is different than the 4-way selector valve), consult your Navtec distributor or Navtec Inc. for plumbing instructions.

For the System 50 with a two speed pump you have two returns to the reservoir. One from the manifold #2, the second from the pump #6. You will need a "t" fitting. (not included)

Information and advice on oil and filter.

Navtec recommends the following oils: Shell Tellus T15[®], Mobil DTE 11M[®], Texaco Rando HD215[®], Royal Purple Syndraulic 15[®]. Never use brake fluid because it will attack the seals. Oil should be checked periodically for cleanliness. Any particulate matter in the oil will decrease the life of the moving parts and may also cause malfunctions. The oil filter should be changed if there is any indication of pump skipping due to oil starvation. If using a system in cold climates contact Navtec.

SYSTEM 50 - MAXIMUM 4 FUNCTIONS

DESCRIPTION	PART #	MAXIMUM DIMENSIONS (in) (mm)	DEPTH (in) (mm)
Single-function	A320-SF-01	10 x 8.5 254 x 216	4.25 108
Multi-function ²	A320-MF-01	10 x 8.5 254 x 216	4.50 115
Single-function with 2 Speed Auto-Shift Pump ³	A320-SF-02	10 x 8.5 254 x 216	6.00 153
Multi-function with 2 Speed Auto-Shift Pump	A320-MF-02	10 x 8.5 254 x 216	6.00 153
Single-function with 4-Way Valve ⁴	A320-SF4-01	10 x 8.5 254 x 216	4.50 115
Single to Multi Conversion Kit	A320-SMC-01		4.50 115

1. System includes pump, valves, reservoir, filter, hose and handle.
2. Can be used as a 1, 2, 3 or 4 function panel.
3. Two-speed Auto-Shift pump has 300% greater low pressure flow rate of oil.
4. The 4-Way valve is to control push-pull cylinders.

• Stainless steel face plates can be ordered by adding an 'S' to the end of the part number; i.e., A320-MF-01S

Table II RESERVOIR CAPACITY & DIMENSIONS

SIZE	USABLE VOL		X		Y		DEPTH	
	(in ³)	(cm ³)	(in)	(mm)	(in)	(mm)	(in)	(mm)
2 Quart	60	983	6.88	174.8	8	203.2	4.88	124
4 Quart	120	1967	7.75	196.9	10.88	276.4	5.75	146.1

Pressurizing the cylinder.

Standard Navtec cylinders are equipped with an air pressure return. This return is pressurized through the 'tire' valve at the clevis end of the cylinder. A bicycle pump or service station air hose can be used to charge the return up to 100 psi. The air pressure should be adjusted to give the desired rate of return.

WARNING: Once charged, do not attempt to disassemble the cylinder. Only an authorized Navtec Hydraulic Service Center or Navtec Inc should do this.

How and when to bleed the system.

After installing the panel, cylinders, and plumbing, oil should be added to the reservoir and the system bled of all air. Each cylinder and line must be bled separately.

- Step 1.** Open release valve fully. If system is multi functioning, select function to be bled first.
- Step 2.** With hose attached to cylinder, extend cylinder fully. If there is air pressure in lower chamber the cylinder will extend automatically.
- Step 3.** Disconnect hose at cylinder. Note: Always disconnect slowly to allow remaining pressure to decrease slowly. Be prepared for possible oil drips.
- Step 4.** Close release valve and pump, holding the hose end in a can to collect oil. When oil is bubble-free, reconnect hose to cylinder.
- Step 5.** Pump cylinder all the way down (with cylinder detached from rigging). Then open release valve and allow cylinder to return fully. Check to be sure there is sufficient oil in the reservoir so that it won't run dry.
- Step 6.** Repeat above procedure for each cylinder and line.
- Step 7.** Check oil level / do not overfill.

Adjusting the relief valve.

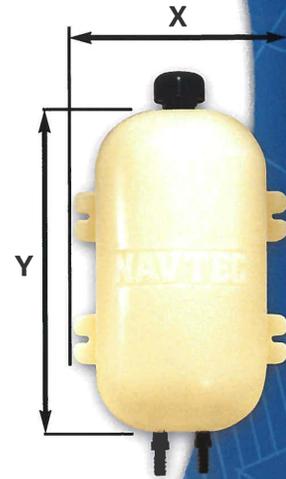
The relief valve (#5) is factory-set to approximately 4000 psi. Adjustment is provided by the 1" (25mm) round threaded cap in the aluminum valve block at the back of the panel. Maximum relief setting is 5000 psi. Turning the cap counter-clockwise will lower the setting. Clockwise will raise it. The adjustment is about 1000 psi per complete turn. To determine the setting without tensioning the rig, disconnect any cylinder from the rigging and pump that cylinder until it bottoms and the relief valve engages, which will be evident when continuous pumping fails to raise the gauge pressure. The maximum pressure observed is the relief valve setting.

Operating Instructions

For Single Function System (Without Selector Valve)

To increase tension in the cylinder, make sure that the release valve is closed. Do not over tighten. Doing so will shorten the life of the valve. Then pump. The valve body has a special zero-leakage check valve so no manual-locking valve is necessary. To reduce tension, open the release valve. Remember that it is not necessary to turn very hard to close the valve.

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(Operating Instructions cont.)

For Multi-Function System (With Selector Valve)

This system operates the same way that the single function system operates (see previous page), except that the selector valve must be positioned before pumping or releasing tension. To position, turn the selector valve handle in either direction to the desired function (at rear of valve) to which the appropriate hose is attached until you feel the knob click. Function labels are available from Navtec at no charge.

Note: The single-function panel can be converted to the multi-function panel at a later date. The conversion part number is A320-SMC-01.

Two-speed pump version

The two-speed pump will automatically shift down from the low (high flow) gear when the internal pressure shift point is reached. The shifting point is adjustable to suit the desired level of pumping pressure needed to physically operate the pump. To adjust the shifting point turn the set screw on the back of the pump counter clockwise to lower and clockwise to raise (#7). To check what pressure point the auto shift valve is set at, disconnect a cylinder from the rigging and pump it down until the pressure builds. Upon reaching the set pressure, the 2 larger pump pistons will close and the pump will suddenly become easier to operate. The shift pressure point can be noted by reading the gauge when it shifts. The standard pressure setting as set at the factory is 1800 lbs.

Reading the gauge.

The Navtec gauge has a double-ended needle so that two scales can be used. The top scale, which reads in thousands of pounds per square inch, is always included and indicates the pressure within the cylinder and the connecting plumbing. A lower scale, which reads in thousands of pounds of force, can be overlaid on the gauge face if the cylinder size is known. These gauge face overlays are available from Navtec. Please specify cylinder size when ordering. The pressure within the system can be converted to actual force exerted by the cylinder, using Table IV or the formula below:

Pressure (lbs/inch²) X Cylinder area (inch²) = Force (lbs)

Gauges have a backing card that is specially treated to provide night illumination. If backing card does not provide enough light, recharge by passing a flashlight beam slowly over the gauge.



Table III		Cylinder Force vs. Pressure								
CYL/VANG	ROD DIAM		CYL. AREA		"OBSERVED PRESSURE (from gauge, in psi)"					
	(in)	(mm)	(in ²)	(cm ²)	1000		3000		5000	
SIZE	(in)	(mm)	(in ²)	(cm ²)	(lbs)	(kg)	(lbs)	(kg)	(lbs)	(kg)
6 cyl.	0.437	11.1	0.639	4.12	640	290	1920	870	3190	1450
6 vang	0.625	15.9	0.482	3.11	480	220	1450	656	2410	1090
10 cyl.	0.5	12.7	1.16	7.48	1180	530	3480	1580	5800	2630
10 vang	0.75	19.1	0.914	5.89	910	410	2740	1240	4570	2070
12 cyl.	0.625	15.9	1.525	9.63	1525	690	4580	2080	7620	3460
12 vang	0.875	22.2	1.28	7.93	1230	560	3690	1670	6150	2790
17 cyl.	0.625	15.9	2.173	14.02	2170	990	6520	2960	10860	4930
17 vang	1	25.4	1.695	10.93	1690	770	5080	2300	8470	3840
22 cyl.	0.75	19.1	2.785	17.96	2780	1260	8350	3806	13920	6310
22 vang	1	25.4	2.442	15.75	2440	1110	7330	3320	12210	5540
30 cyl.	0.875	22.2	4.414	28.47	4410	2000	13240	6000	22070	10000
30 vang	1.25	31.8	3.778	24.37	3780	1710	11330	5140	18890	8570
40 cyl.	1	25.4	6.435	41.51	6430	2920	19300	8750	32170	14580
40 vang	1.25	31.8	5.993	38.66	5990	2720	17980	8150	29960	13590
60 cyl.	1.25	31.8	8.571	55.3	8570	3890	25710	11660	42850	19430
60 vang	1.5	38.1	8.031	51.81	8030	3640	24090	10930	40150	18210

NAVTEC® HYDRAULICS LIMITED 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 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) failures due to use of products in applications for which they are not intended. (2) failures 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 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 Navtec 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, express 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 limitations 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 or 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.