

HYDRAULIC SYSTEMS

IF YOU PUSH, PULL, TENSION OR SUPPORT, NAVTEC

HAS AN INNOVATIVE WAY TO HANDLE THE JOB

HEADSTAY LOADCELL

View the changing pressure from a cockpit read out and adjust the backstay for improved windward performance

FLATTENER/OUTHHAUL

Flatten the mainsail fast, from the cockpit

INNER FORESTAY TENSION

BABYSTAY TENSION

Trim tension to induce mast bend, especially when reefed

CONTROL PANEL

Choice of Systems 50 (4 function) System VII, or Custom System

VANG

Push button quick release

HALYARD TENSION

Adjust between strong or light wind conditions

MAIN SHEET TRAVELER

A special dual action cylinder allows you to play the boom athwartships for increased speed to windward

CUNNINGHAM

Fine tune the mainsail luff tension

CHECKSTAYS

Fine trim to change the depth of camber in the mainsail

CENTERBOARD CYLINDER

Adjust height with a hydraulics system

BACKSTAY

Control mast tip tension and upper leech shape

MAST JACK

Tension the rig for sailing, or lower it for unstepping, but with repeatable accuracy

VANG

Trim the boom height for strong or light winds to improve mainsail performance. It pulls and pushes!

GENOA CAR PULLERS

Change the headsail shape by adjustment to the clew sheeting position

TRANSOM DOOR CYLINDERS

SYSTEM 50 HYDRAULIC PANELS

Supplied By;
www.americanriggingsupply.com

The System 50 Panel is the heart of the standard Navtec hydraulic system and has been completely re-designed to suit the changing needs of both racing and cruising yachts from 35' to 70'.

FEATURES INCLUDE:

1. ERGONOMIC DESIGN

The 4-function design is more compact and lighter than ever before, and positions all controls - gauge, function and power - in one line, making the selection quick and easy. Function selection can be 'felt' through the selector, an especially important feature at night.

2. EASY OPERATION

Reliable, controlled flow; needle-type release valve.

3. INCREASED SPEED

Offering faster response. New valves and high pressure piping allow for an increased flow rate, increasing the oil flow speed, and in turn the power response. This is an important factor when large adjustments, such as boom vang or backstay control need to be made.

4. LARGER GAUGE

Now more easily read, the gauge monitors system pressure on the selected function enabling you to accurately repeat settings for best boat speed.

5. AUTO-SHIFT PUMP

A two speed auto-shift pump can be fitted to the system for higher performance. This is the fast, efficient method when power is required quickly, often in a racing environment. From coarse pump (high volume) the auto-shift feature switches to fine pump (high pressure) automatically for quick, seamless operation.

6. POWER INTERFACE

Now easily interfaced with all leading winch powerpacks - Lewmar Commander and Harken Hydro. Hydraulic power is then supplied from the power source which is accurately controlled through the System 50 panel. Further high pressure trimming can be added by hand pumping when required.

7. PROTECTION

Navtec's relief valve provides immediate pressure relief protection for the selected function when the system experiences excessive overloads.

8. SAFETY

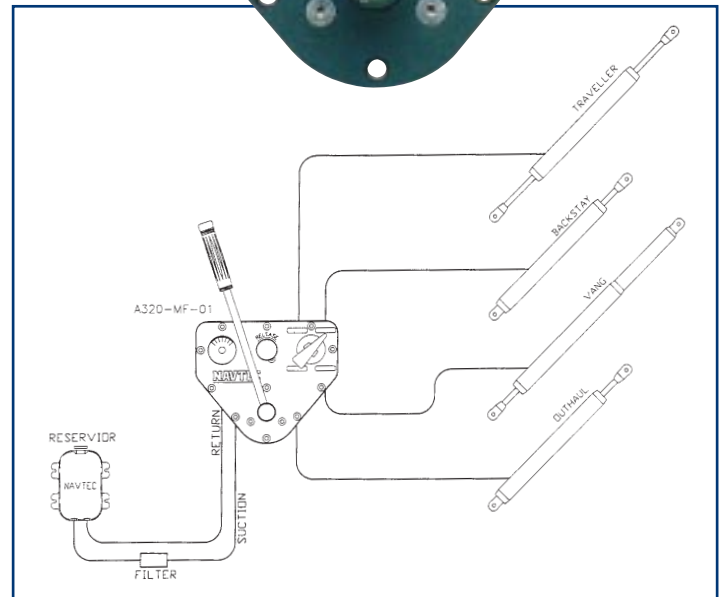
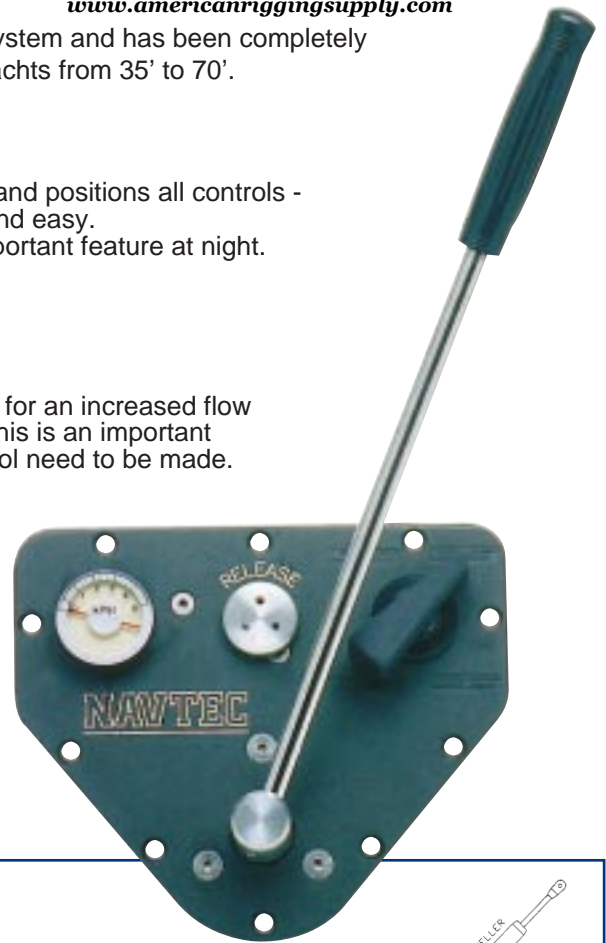
The pump is operated from the safety of the cockpit.

9. FINISH

Panel faces are available in black anodised finish, or stainless steel (custom order).

10. RESERVOIR

System includes standard 2 quart reservoir. (4 quart reservoir available for additional capacity.)



SYSTEM 50 - MAXIMUM 4 FUNCTIONS

DESCRIPTION	PART #	MAXIMUM DIMENSIONS		DEPTH	
		(in)	(mm)	(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

SYSTEM VII LIGHTWEIGHT HYDRAULIC PANELS

System VII Lightweight Hydraulic Panels (A360) are the heart of the hydraulic systems aboard ULDB, IMS, Whitbread Round The World, Grand Prix and America's Cup yachts. These panels feature the two-speed, automatic shift pump. In addition, System VII Panels use the lightweight FAC valves (Fast Acting Control) for higher flow. FAC valves have three positions: pump, hold tension and release, which are indicated by the knob position.

Navtec achieves lightweight by meticulously sculpting excess material from valve blocks and pumps, a titanium pump shaft, and in some cases by removing the gauges. Non-titanium versions are available where class rules prohibit its use, such as IMS and W-60.



SYSTEM VII HYDRAULIC PANELS

PANEL NUMBER	DESCRIPTION	PANEL DIMENSION (6)		DEPTH		WEIGHT	
		(in)	(mm)	(in)	(mm)	(lbs)	(kgs)
SYSTEM							
A360-L00-01	Single Function	8.2	208 x 171	6	153	9.1	4.1
A360-L00-02	2 Function	11.5	292 x 171	6	153	11.9	5.4
A360-L00-03	3 Function	14.8	376 x 171	6	153	15.5	7.0
A360-L00-04	4 Function (3)	17.6	447 x 171	6	153	18.3	8.3
COMPONENTS (5)							
A360-PO-02	Autoshift Pump-only panel	4.75	121 x 165	6	153	3.8	1.7
VALVE/GAUGE MANIFOLD (4)							
A360-VGM-01	Single Function	5.75	146 x 171	5.5	140	3.0	1.4
A360-VGM-02	2 Function	9.0	229 x 171	5.5	140	5.8	2.6
A360-VGM-03	3 Function	12.3	311 x 171	5.5	140	8.6	3.9
A360-VGM-04	4 Function (3)	15.5	394 x 171	5.5	140	11.4	5.2

1. Panels of other configurations available.
2. Includes pump, 2 quart reservoir, filter and reservoir hose.
3. Additional function controls available.
4. Does not include pump.
5. These do not include reservoir, filter or hose.
6. For cutout dimension, subtract 1.5" (38 mm) from panel dimension.

Supplied By:
American Rigging Supply, Inc.
www.americanriggingsupply.com

NAVTEC CYLINDERS Supplied By; American Rigging Supply, Inc. www.americanriggingsupply.com

With over 20 years of experience and an on-going research and development program, Navtec is uniquely qualified to produce the highest quality, most durable cylinders available. Tighter tolerances, the added control of in-house design and manufacture, specification of only the highest grade materials and finishes all combine to give the yacht owner the lightest, smallest, most attractive cylinders, as well as the best long term value. Custom length cylinders can be made to order.



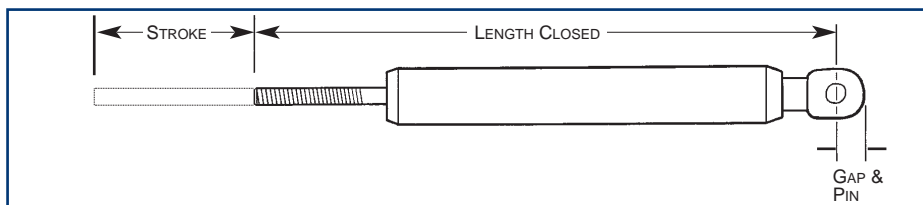
STANDARD & STAINLESS STEEL CYLINDERS

Navtec Cylinders are designed to help minimize weight and windage, without sacrificing reliability. The Standard range is available in sizes -6 through -150 in a standard (SE) and long versions (LE). Longer stroke flattening reef cylinders (FE) are also available in sizes -6 through -40. The flattener comes complete with a black hard-coated alloy rod jaw.

Navtec's standard range of cylinders is made from the highest quality components suitable for the marine environment. The cylinder rods are made from a highly polished 316 stainless steel. The cylinder tube, lower clevis and cap are all black hard-coated aluminum. The cylinder bores are specially polished for longer seal life.

Navtec also offers a range of Stainless steel cylinders. Stainless steel cylinders are available in the standard and long configuration in sizes -6 through -90. Larger sizes are also available, please contact Navtec with your specific needs.

Navtec can also provide custom cylinders for any application. Using titanium parts on special order basis can save weight. Please contact Navtec with your specific needs.



HP CYLINDER SPECIFICATIONS

PART NUMBER ³	CYLINDER SIZE	PISTON ROD SIZE		FORCE AT MAX RELIEF VALVE SETTING ¹		BREAKING STRENGTH		MAX. WIRE SIZE		GAP & PIN		LENGTH CLOSED ²		LENGTH EXTENDED		STROKE	
		(in)	(mm)	(lb)	(kg)	(lb)	(kg)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)
A250-SE-006	-6	7/16	11.2	3195	1449	9400	4263	7/32	5.6	7/16	11.2	18.7	475.0	27.7	703.6	9.0	228.6
A250-LE-006	-6	7/16	11.2	3195	1449	9400	4263	7/32	5.6	7/16	11.2	23.2	589.3	36.7	932.2	13.5	342.9
A250-FE-006	-6	7/16	11.2	3195	1449	9400	4263	7/32	5.6	7/16	11.2	29.9	759.5	49.9	1247.5	20.0	508.0
A250-SE-010	-10	1/2	12.7	5809	2634.5	12000	5442.2	9/32	7.0	1/2	12.7	19.3	490.2	28.3	818.8	9.0	228.6
A250-LE-010	-10	1/2	12.7	5809	2634.5	12000	5442.2	9/32	7.0	1/2	12.7	23.8	604.5	37.3	947.4	13.5	342.9
A250-FE-010	-10	1/2	12.7	5809	2634.5	12000	5442.2	9/32	7.0	1/2	12.7	31.0	787.4	51.0	1295.4	20.0	508.0
A250-SE-012	-12	5/8	15.9	7635	3462.6	18000	8163	5/16	8.0	5/8	15.9	20.9	530.9	30.9	784.9	10.0	254.0
A250-LE-012	-12	5/8	15.9	7635	3462.6	18000	8163	5/16	8.0	5/8	15.9	25.6	650.2	39.8	1010.9	14.2	360.7
A250-FE-012	-12	5/8	15.9	7635	3462.6	18000	8163	5/16	8.0	5/8	15.9	36.1	916.9	60.1	1526.5	24.0	609.6
A250-SE-017	-17	5/8	15.9	10880	4934.2	21000	9524	3/8	9.6	5/8	15.9	21.0	533.4	30.5	774.7	9.5	241.3
A250-LE-017	-17	5/8	15.9	10880	4934.2	21000	9524	3/8	9.6	5/8	15.9	25.7	652.8	39.9	1013.5	14.2	360.7
A250-FE-017	-17	5/8	15.9	10880	4934.2	21000	9524	3/8	9.6	5/8	15.9	42.9	1089.7	72.9	1851.7	30.0	762.0
A250-SE-022	-22	3/4	19.0	13942	6322.9	30000	13605	7/16	11.2	3/4	19.0	23.0	584.2	33.0	838.2	10.0	254.0
A250-LE-022	-22	3/4	19.0	13942	6322.9	30000	13605	7/16	11.2	3/4	19.0	28.0	711.2	43.0	1092.2	15.0	381.0
A250-FE-022	-22	3/4	19.0	13942	6322.9	30000	13605	7/16	11.2	3/4	19.0	49.4	1254.8	84.4	2143.8	35.0	889.0
A250-SE-030	-30	7/8	22.2	22090	10018	40000	18141	1/2	12.7	7/8	22.2	26.3	668.0	37.3	947.4	11.0	279.4
A250-LE-030	-30	7/8	22.2	22090	10018	40000	18141	1/2	12.7	7/8	22.2	31.8	807.7	48.3	1226.8	16.5	419.1
A250-FE-030	-30	7/8	22.2	22090	10018	40000	18141	1/2	12.7	7/8	22.2	56.4	1432.6	96.4	2448.6	40.0	1016.0
A250-SE-040	-40	1	25.4	32198	14602	52000	23583	5/8	15.9	1	25.4	28.3	718.8	40.3	1023.6	12.0	304.8
A250-LE-040	-40	1	25.4	32198	14602	52000	23583	5/8	15.9	1	25.4	34.3	871.2	52.3	1328.4	18.0	457.2
A250-FE-040	-40	1	25.4	32198	14602	52000	23583	5/8	15.9	1	25.4	63.1	1602.7	108.1	2745.7	45.0	1143.0
A250-SE-048	-48	1	25.4	32198	14602	77000	34921	3/4	19.0	1 1/8	28.4	28.84	732.5	40.84	1027.3	12.0	304.8
A250-LE-048	-48	1	25.4	32198	14602	77000	34921	3/4	19.0	1 1/8	28.4	34.84	884.9	58.84	1494.5	18.0	457.2
A250-SE-060	-60	1 1/4	31.8	42881	19447	85000	38549	3/4	19.0	1 1/4	31.8	32.1	815.3	46.1	1170.9	14.0	355.6
A250-LE-060	-60	1 1/4	31.8	42881	19447	85000	38549	3/4	19.0	1 1/4	31.8	39.1	993.1	60.1	1526.5	21.0	533.4
A250-SE-090	-90	1 1/4	31.8	57737	26185	144000	65306	1	25.4	1 3/8	35.1	35.8	909.3	51.8	1315.7	16.0	406.4
A250-LE-090	-90	1 1/4	31.8	57737	26185	144000	65306	1	25.4	1 3/8	35.1	43.8	1112.5	67.8	1722.1	24.0	609.6
A250-SE-110	-110	1 3/8	35.1	73268	33228	177000	80272	1 1/8	30.8	1 1/2	38.1	39.8	1010.9	57.8	1468.1	18.0	457.2
A250-LE-110	-110	1 3/8	35.1	73268	33228	177000	80272	1 1/8	30.8	1 1/2	38.1	48.8	1239.5	75.8	1925.3	27.0	685.8
A250-SE-150	-150	1 1/2	38.1	90639	41106	210000	95238	1 1/4	31.6	1 3/4	44.5	41.3	1049.0	59.3	1506.2	18.0	457.2
A250-LE-150	-150	1 1/2	38.1	90639	41106	210000	95238	1 1/4	31.6	1 3/4	44.5	50.3	1277.6	77.3	1963.4	27.0	685.8

1. At 5000 PSI
 2. Length from the end of the cylinder rod to the center of the cylinder clevis pin.
 3. Light cylinder part numbers are denoted SL, LL and FL instead of SE, LE and FE.
 SE Standard LE Long FE Flattener

CYLINDER TERMINALS

Supplied By;
American Rigging Supply, Inc.
www.americanriggingsupply.com

Navtec offers a variety of cylinder terminals, each suited to specific needs.

THE ADJUSTABLE EYE WITH TOGGLE

The D530 screws onto the cylinder piston rod and provides small length adjustments. Not to be tensioned under load.



THE EYE/JAW TOGGLE

Used at the lower end of the cylinder to help prevent excessive side loads, the J100 is frequently used on backstay and inner forestay cylinders.

THE FIXED CLEVIS

The H120 Screws onto the cylinder piston rod and provides no length adjustment.

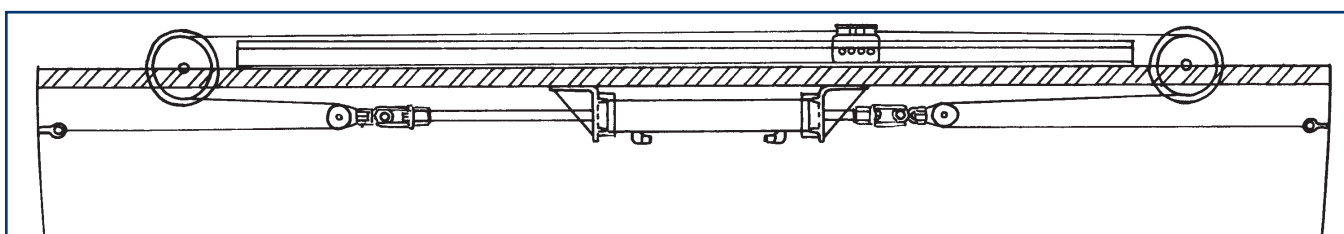
CYLINDER TERMINAL SPECIFICATIONS												
CYL. SIZE	PISTON ROD SIZE		PIN DIA.	ADJUSTABLE EYE WITH TOGGLE			FIXED CLEVIS		EYE JAW TOGGLE			
	in	mm		in	mm	in	mm	in	mm	in	mm	
-6	7/16	11	7/16	11	D530-1414	4.88	124	3.13	79	J100-1414	2.00	51
-10	1/2	13	1/2	13	D530-1616	6.00	152	4.00	102	J100-1616	2.19	56
-12	5/8	16	5/8	16	D530-2020	6.50	165	4.25	108	J100-2020	2.50	64
-22	3/4	19	3/4	19	D530-2424	7.63	194	5.00	127	J100-2424	2.88	73
-30	7/8	22	7/8	22	D530-2828	8.75	222	5.63	143	J100-2828	3.31	84
-40	1	25	1	25	D530-3232	9.25	235	6.25	159	J100-3232	3.69	94
-60	1 1/4	32	1 1/4	32	D530-4040	11.50	292	9.50	216	J100-4040	4.50	114
-90	1 1/4	32	1 1/4	32	D530-4444	15.00	381	9.50	241	J100-4444	5.63	143

Note: FE Cylinders are provided with alloy jaws

TRAVELER CYLINDER

Developed for large cruising yachts these cylinders control athwartships mainsheet position with the minimum of effort. Conventional ropes and winches can also be removed from deck layouts if required for a clean deck arrangement.

These traveler cylinders are cockpit controlled.



BOOM VANGS

Supplied By;
American Rigging Supply, Inc.
www.americanriggingsupply.com

SERIES 85A VANG

Navtec's Series 85A Vang is more powerful, more cost effective, safer and easier to use than its competitors, including mechanical vang. It features a larger than normal piston rod to resist buckling. Benefits include:

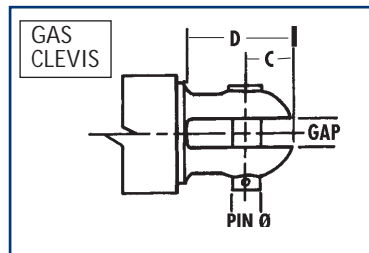
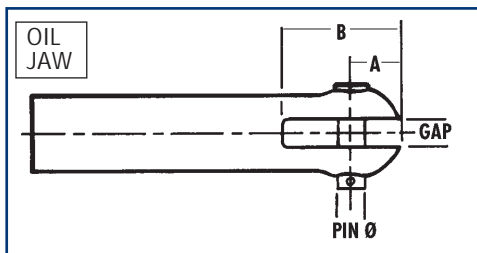
- MORE POWERFUL:** Higher mechanical advantage.
- SAFER:** You can remotely operate the vang from the cockpit. Built-in protection of the relief valve. The gas return pressure enables the vang to serve as a topping lift when furling, flaking or reefing. It also provides boom lift in light air conditions.
- EASIER TO USE:** All the control is within arms reach. There is no clutter or weight from blocks, control lines, fairleads or cams associated with solid mechanical vang.
- FAST:** With the addition of a Navtec Push button Quick Release Valve, the vang can be instantaneously dumped to help prevent an imminent broach from the safety of the cockpit or the convenience of the rail.



VANG SPECIFICATIONS

PART NUMBER	PISTON ROD SIZE		MAXIMUM PULL FORCE (1)		RETURN FORCE (3)		PCLC RANGE AVAILABLE (4)		STROKE		WEIGHT	
	(in)	(mm)	(lb)	(kg)	(lb)	(kg)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
A850-VC-006	5/8	16	2400	1088	394	179	46-60	1168-1524	9.0	229	9.3	4.2
A850-VC-010	3/4	19	4550	2063	678	307	55-72	1397-1829	9.0	229	10.3	4.7
A850-VC-012	7/8	22	6150	2789	916	415	55-89	1397-1829	9.5	241	13.0	5.9
A850-VC-017	1	25	8450	3832	1240	562	55-100	1397-2540	9.5	241	21.0	9.5
A850-VC-022	1	25	12200	5533	1613	732	55-104	1397-2642	10.0	254	25.0	11.3
A850-VC-030	1 1/4	32	21200	9615	2508	1137	55-107	1397-2718	11.0	279	35.3	16.0
A850-VC-040A	1 1/4	32	29900	13560	3610	1637	N/A	N/A	12.0	305	46.6	21.1
A850-VC-060B	1 1/2	38	40000	18141	4899	2222	N/A	N/A	14.0	356	116.9	52.6
A850-VC-090B	1 3/4	45	51800	23492	6400	2902	N/A	N/A	16.0	406	147	66.7
A850-VC-110B	2 1/8	51	65000	29478	8000	3628	N/A	N/A	18.0	457	N/A	N/A
A850-VC-150A	2 3/8	60	77300	35057	10000	4535	N/A	N/A	18.0	457	N/A	N/A

- At maximum relief valve setting of 5000 PSI.
- These strengths have been revised since the issue of the 1993 catalog to reflect design updates.
- At 500 PSI gas pressure. return force can vary from zero to twice the standard return force by varying the gas pressure.
- Standard PCLC is 60 in (1524 mm) for -6 vang and 72" (1829 mm) for -10, -12 and -17 vang. Lengths other than this will be subject to additional charge. for larger vang there is no extra charge for lengths within the specified range. Vangs -60 and above are manufactured on a custom basis. There is no charge for specifying PCLC.



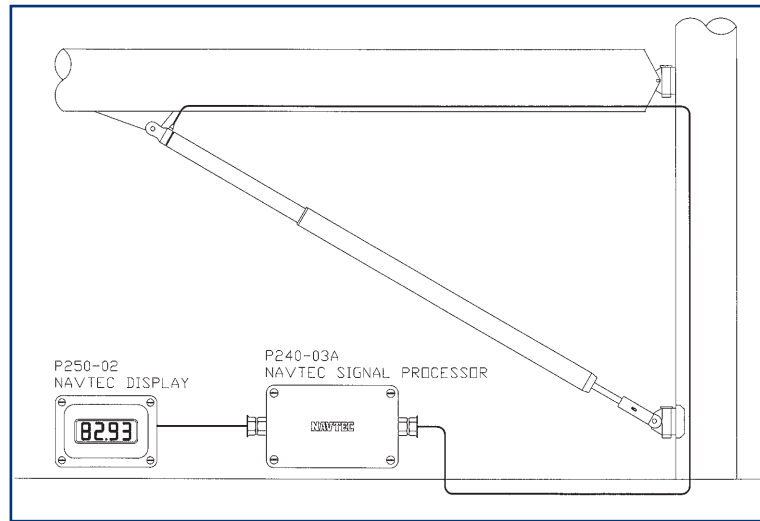
VANG JAW DIMENSIONS

PART NUMBER	PIN GAP		OIL JAW				GAS CLEVIS			
	(in)	(mm)	PIN CTR DEPTH (in) (A) (mm)		SLOT DEPTH (in) (B) (mm)		PIN CTR DEPTH (in) (C) (mm)		SLOT DEPTH (in) (D) (mm)	
A850-VC-006	7/16	11	0.73	18.5	1.73	43.9	0.85	21.6	2.15	54.6
A850-VC-010	1/2	13	0.88	22.4	2.20	55.9	0.85	21.6	2.22	56.4
A850-VC-012	5/8	16	1.00	25.4	2.37	60.2	0.95	24.1	2.32	58.9
A850-VC-017	5/8	16	1.00	25.4	2.37	60.2	0.95	24.1	2.32	58.9
A850-VC-022	5/8	16	1.12	28.4	2.62	66.5	1.10	27.9	2.47	62.7
A850-VC-030	3/4	19	1.32	33.5	2.82	71.6	1.25	31.8	3.75	95.3
A850-VC-040A	7/8	22	1.50	38.2	3.44	87.4	1.50	38.2	3.30	83.9
A850-VC-060B	1	25	1.70	43.1	3.70	94.0	1.70	43.1	3.70	94.0
A850-VC-090B	1 1/4	32	2.07	52.6	4.57	116.1	2.07	52.5	4.57	116.1
A850-VC-110B	1 3/8	35	2.33	59.1	5.33	135.3	2.45	62.2	5.45	138.4
A850-VC-150A	1 1/2	38	2.70	68.5	6.08	154.4	2.70	68.5	6.08	154.4

POSITION INDICATING VANGS A850-PI

Supplied By;
www.americanriggingsupply.com

Developed for modern furling boom systems, this Vang has an electronic read-out indicating the vang's position. Accurate and repeatable boom positioning is required for furling boom systems. Originally for Superyachts, this system is now available for boats 40' and larger. Please contact Navtec for more details.



MECHANICAL LOCK A260

The Mechanical Lock Cylinder (A260-SE or -LE) is most useful for extended passages and allows you to release the hydraulic pressure on the backstay cylinder while still maintaining tension. Because your backstay tension is now mechanical rather than hydraulic, there is no relief valve protection from sudden overloads. The mechanical lock is available for Navtec's cylinders from -10 to -150. Retrofit kits are available (A260-SK or -LK).



MECHANICAL LOCK CYLINDER SPECIFICATIONS

PART NUMBER	CYLINDER SIZE	PISTON ROD SIZE		FORCE AT MAX RELIEF VALVE SETTING ¹		GAP & PIN		LENGTH CLOSED ²		STROKE		WEIGHT	
		(in)	(mm)	(lb)	(kg)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
A260-SE-010	-10	1/2	12.7	5609	2634	1/2	12.7	32.9	835.7	9.0	228.6	5.0	2.3
A260-LE-010	-10	1/2	12.7	5809	2634	1/2	12.7	41.9	1064.3	13.5	342.9	6.6	3.0
A260-SE-012	-12	5/8	15.9	7635	3463	5/8	15.9	35.4	899.2	9.5	241.3	9.0	4.1
A260-LE-012	-12	5/8	15.9	7635	3463	5/8	15.9	44.8	1137.9	14.2	350.7	11.0	5.0
A260-SE-017	-17	5/8	15.9	10880	4934	5/8	15.9	35.7	906.8	9.5	241.3	9.6	4.4
A260-LE-017	-17	5/8	15.9	10880	4934	5/8	15.9	45.1	1145.5	14.2	360.7	12.0	5.4
A260-SE-022	-22	3/4	19	13942	6323	3/4	19.0	37.7	957.6	10.0	254.0	12.2	5.5
A260-LE-022	-22	3/4	19	13942	6323	3/4	19.0	47.7	1211.6	15.0	381.0	15.0	6.8
A260-SE-030	-30	7/8	22.2	22030	10018	7/8	22.2	42.9	1068.7	11.0	279.4	19.9	9.0
A260-LE-030	-30	7/8	22.2	22030	10018	7/8	22.2	53.9	1369.1	16.5	419.1	24.2	11.0
A260-SE-040	-40	1	25.4	32198	14602	1	25.4	47.0	1193.8	12.0	304.8	33.0	15.0
A260-L3-040	-40	1	25.4	32198	14602	1	25.4	59.0	1498.6	18.0	457.2	40.2	18.2
A260-SE-060	-60	1 1/4	31.8	42881	19447	1 1/4	31.8	54.4	1381.8	14.0	355.6	52.2	23.7
A260-LE-060	-60	1 1/4	31.8	42881	19447	1 1/4	31.8	58.4	1737.4	21.0	533.4	62.0	28.1

1. At 5000 PSI

2. Length from the end of the cylinder rod to the center of the cylinder clevis pin

SE = Standard
LE = Long