

Inboard Manual Hydraulic Steering

- Tillers
- Cylinders
- Helm Pumps
- Accessories

For vessels from
5 to 16m



Work



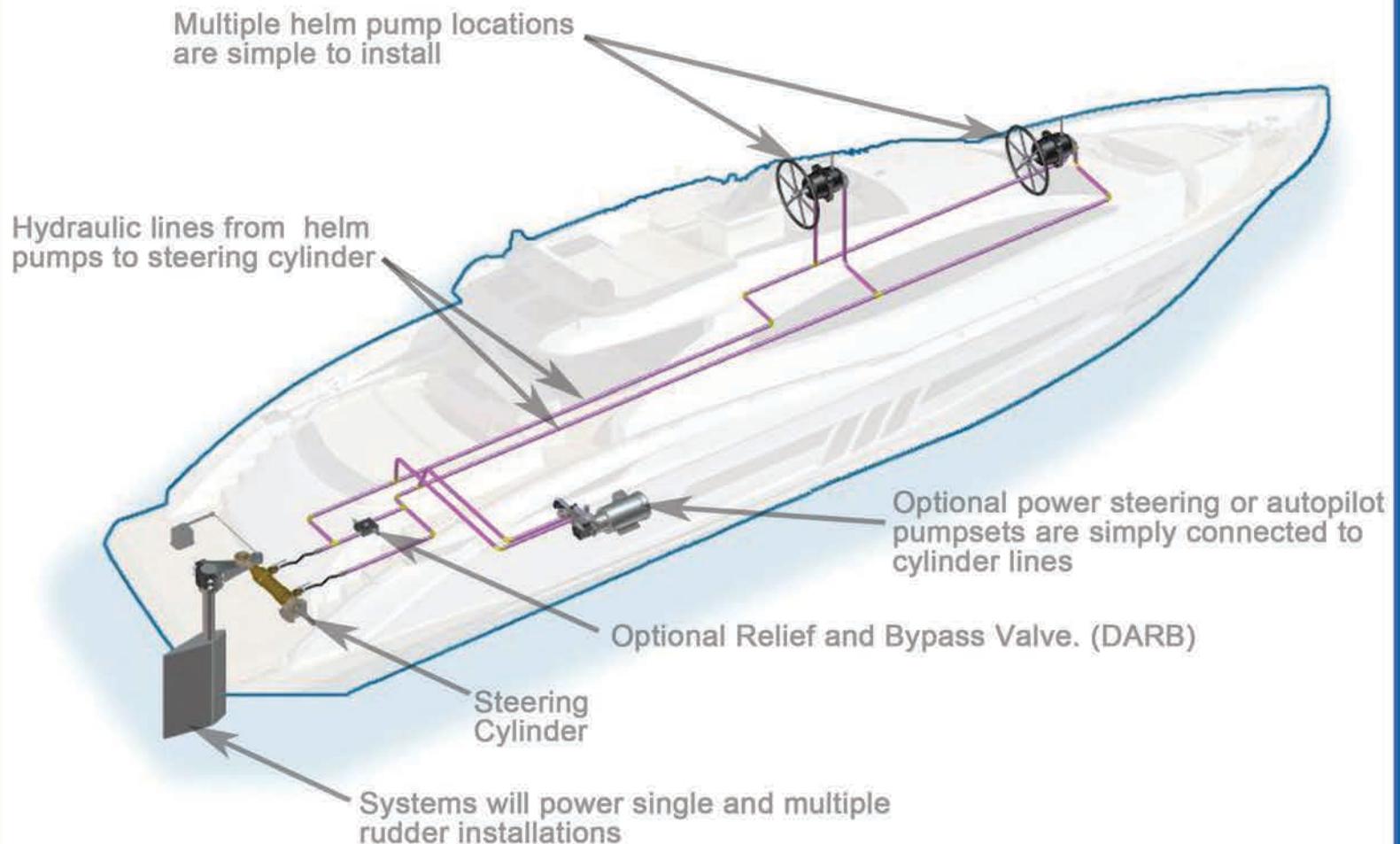
Recreation



Inboard Manual Hydraulic Steering

Jastram manual steering systems are available in 12 sizes to ensure the perfect fit for any vessel between 5m (17 feet) and 16m (53 feet). Jastram steering is ideal for new vessels and makes retrofitting old vessels simple and easy.

Jastram steering incorporates many features to produce steering systems that will enhance your boating experience while being tough, durable and reliable.



Jastram's components are designed to work well with one another. Combining different makes of steering components may lead to sub-optimal results.

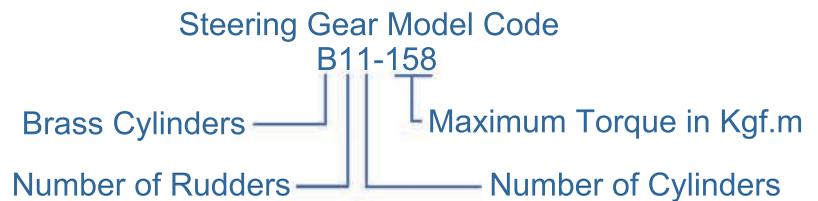
Get Started Selecting Your System.....

Use the table below to select your system. Selecting your system will provide you with our recommended tiller, cylinders and helm pump for a basic, single station manual steering system.

Start using the table by picking the category that fits your vessel and then use the length and installed power to identify an appropriate steering system for your vessel.

EXAMPLE

For a single rudder pleasure boat with a displacement hull and a length of 12 m with 160 horsepower installed then you will select a B11-158 system as shown.



Displacement Hulls								Planing Hulls		Steering Gear Model
Tug Boats		Work and Pleasure Boats		Sailboats						
●Length	HP	●Length	HP	Balanced Rudder		Unbalanced Rudder		●Length	HP	
				●Length	□Area	●Length	□Area			
5 - 9	125	8 - 12	140	8 - 12	0.3 - 1.0	8 - 11	0.3 - 0.7	8 - 14	400	B11-085
6 - 9	130	9 - 12	150	10 - 14	0.5 - 1.2	9 - 12	0.4 - 0.8	10 - 15	450	B12-108
7 - 9	140	12 - 14	160	12 - 15	0.9 - 1.4	11 - 15	0.6 - 0.9	12 - 16	500	B11-158
8 - 12	160	12 - 15	170	14 - 17	1.3 - 1.6	12 - 15	0.8 - 1.1	13 - 17	600	B12-170
8 - 12	200	12 - 20	190	15 - 20	1.5 - 2	14 - 18	1 - 1.5	14 - 19	700	B12-250
9 - 12	250	15 - 22	200	16 - 21	1.6 - 2.4	15 - 19	1.1 - 1.7	17 - 21	750	B11-317
10 - 14	300	18 - 24	250	16 - 22	1.8 - 2.8	15 - 20	1.2 - 1.8	18 - 22	850	B12-500
11 - 16	350	18 - 25	300	17 - 24	1.9 - 3.0	16 - 22	1.3 - 2.0	18 - 24	900	B12-500

●Overall length in meter (1 foot = .3 meter)
□Area in sq. meter (1 sq. foot = .09 sq. meter)

TABLE 1: Basic System Selection

Once you have selected an appropriate system please go to table 2 on the next page which will enable you to see which tillers, cylinders and helm pumps are recommended.

Please Note: The selection table above is a guide only as selection is dependant on factors such as rudder torque, desired feel at the helm and other factors. You should consult Jastram customer support, a boat builder or naval architect to confirm your selection.

See what is in your recommended system.....

For a single rudder installation refer to table 2 below:

Steering Gear Model	Rated Torque at 35° kgf.m	Suggested Helm Pump		Suggested Cylinder Model	Suggested Tiller Model
		Model	Turns		
B11-086	86	H36	3	1x B-38-190	BT1-500
B12-108	108	H36	4	2x B-38-120	BT2-500
B11-158	158	H58	3	1x B-50-190	BT1-500
B12-170	170	H36	6	2x B-38-190	BT2-500
B11-250	250	H58	5	1x B-50-300	BT1-500
B12-317	317	H58	7	2x B-50-190	BT2-500
B12-500	500	H58	10	2x B-50-300	BT2-500

Torque rating is determined at 69 bar (1000 psi), maximum rudder angle is 37°.
Tillers can be used with rudder stock up to 105mm in diameter.

TABLE 2: Recommended Steering System Content for Single Rudder System

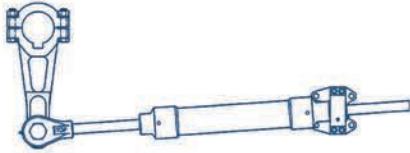
For a dual rudder installation refer to table 3 below:

Steering Gear Model	Rated Torque at 35° kgf.m	Suggested Helm Pump		Suggested Cylinder Model	Suggested Tiller Model
		Model	Turns		
B21-086	86	H36	3	1x B-38-190	2x BT1-500
B22-108	108	H36	4	2x B-38-120	2x BT1-500
B21-158	158	H58	3	1x B-50-190	2x BT1-500
B22-170	170	H36	6	2x B-38-190	2x BT1-500
B21-250	250	H58	5	1x B-50-300	2x BT1-500
B22-317	317	H58	7	2x B-50-190	2x BT1-500
B22-500	500	H58	10	2x B-50-300	2x BT1-500

Torque rating is determined at 69 bar (1000 psi), maximum rudder angle is 37°.
Tillers can be used with rudder stock up to 105mm in diameter.

TABLE 3: Recommended Steering System Content for Dual Rudder System

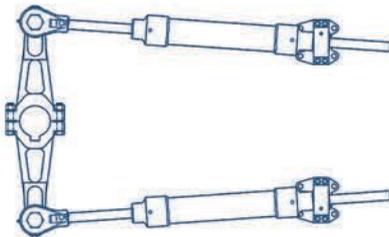
Single Actuator & One Rudder



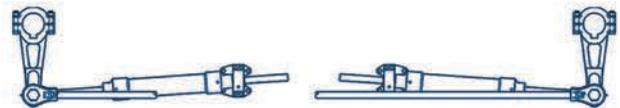
Single Actuator & Two Rudders



Two Actuator & One Rudder



Two Actuator & Two Rudders



Recommended:

A steering system ^{*1} from Jastram includes all the matched components you require to get your basic manual steering functional:

- Tiller with pilot bore ready for final machining.
- Cylinder(s) complete with tiller bolts, shutoff valves and 18" flex hose.
- Helm pump matched to the cylinder size to provide a comfortable balance between number of helm turns and steering effort.
- Clear installation instructions.
- Attractive package pricing

System Variations:

- Increase or reduce the number of turns lock-to-lock by using an alternative helm pump.
- Increase or reduce the effort at the wheel by using an alternative helm pump.

A larger capacity helm pump will simultaneously increase the effort required to turn the wheel and decrease number of turns lock-to-lock, the opposite is true with a smaller capacity helm pump.

*1 You do not need to purchase a complete system, individual tillers, cylinders and helm pumps are available. Jastram does not recommend mixing Jastram components with those from other steering gear manufacturers

In addition to the basic steering hardware, Jastram offers all the accessories needed to equip your vessel with a complete, professional steering system installation.

- **A Jastram RAI 300 rudder angle indicator** will provide accurate, real-time display of your vessel's rudder position to assist in maneuvering and navigating. The RAI 300 requires an input signal from a rudder feedback unit such as the RFU 400 (see below). To order, select part number JA-950034-1 on the order form.



- **The Jastram RFU 400 rudder feedback unit** connects mechanically to the rudder using a rudder clamp and provides an analog signal to the rudder angle indicator for visual display. The RFU 400 is designed to work with the RAI 300. To order, select part number JA-701009-1 on the order form.



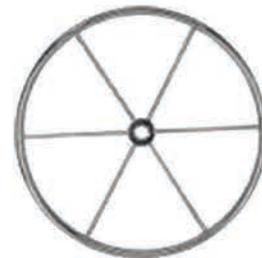
- **Double Acting Relief and Bypass (DARB) valve** will help prevent damage to the rudder and steering gear from underwater objects. The bypass feature integrated into Jastram's DARBs will assist in bleeding the system and can be useful to enable the rudder to be repositioned by hand. To order, select part number JA-401003-1 on the order form.



- **Tie-bar stud kits** are designed to simplify the job of fitting a tie-bar in twin rudder installations. Simply choose the right stud kit using the information provided on page 8.



- **Wheels:** Every vessel needs a comfortable, functional and durable wheel. Jastram carries a range of quality approved wheels to suit most needs



- **Autopilot:** To add an autopilot to your steering system you will need to equip your vessel with an autopilot pumpset. Jastram offers an oversized autopilot pumpset, the HPU-600, that will accept outputs from most autopilots. The pumpset comes complete with fittings necessary to connect to your hydraulic system.



Additional information on all these components is provided on pages 5 to 10.

Jastram customer support is available to help you select a hydraulic power unit or connect to an engine driven hydraulic pump.

Jastram Helm Pumps

All Jastram's 'H' series helm pumps are positive displacement axial piston pumps ideally suited to deliver precise amounts of hydraulic oil at very slow turning rates. The pumps are designed to operate in 'non-pressurized' hydraulic systems requiring only two lines from the helm pump to the cylinder. The pump has sufficient internal capacity to act a small vented reservoir and filling the helm pump housing with oil is all that is required to get the pump operational.



The right steering wheel will make all the difference to how your steering system feels and the pleasure that you derive from your boating. Jastram is able to supply steering wheels and recommends the following sizes for each application.

Helm Pump Model	Steering Wheel Size	
	Min. Diameter	Max. Diameter
H20	356 mm	610 mm
H26, H36	508 mm	762 mm
H58	762 mm	914 mm

TABLE 4: Recommended Steering Wheel Sizes.

For the best results, Jastram recommends the use of seamless hydraulic steel tubing, or copper tubing (minimum working pressure of 1000 psi (69 bar)). The correct size of tubing is dependant on the size of the helm pump and the distance between the helm pump and cylinder/s. Please use following table as a guideline for tubing size:

Helm Pump Model	Distance Between Helm and Cylinder		
	15 m	20 m	30 m
H20/H26/H36	12 mm	16 mm	16 mm
H58	16 mm	16 mm	20 mm

TABLE 5: Nominal Tube Outside Diameter.

Min. Wall Thickness	
Tube Dia.	Wall
12 mm	1.0 mm
16 mm	1.5 mm
20 mm	2.0 mm
25 mm	2.0 mm

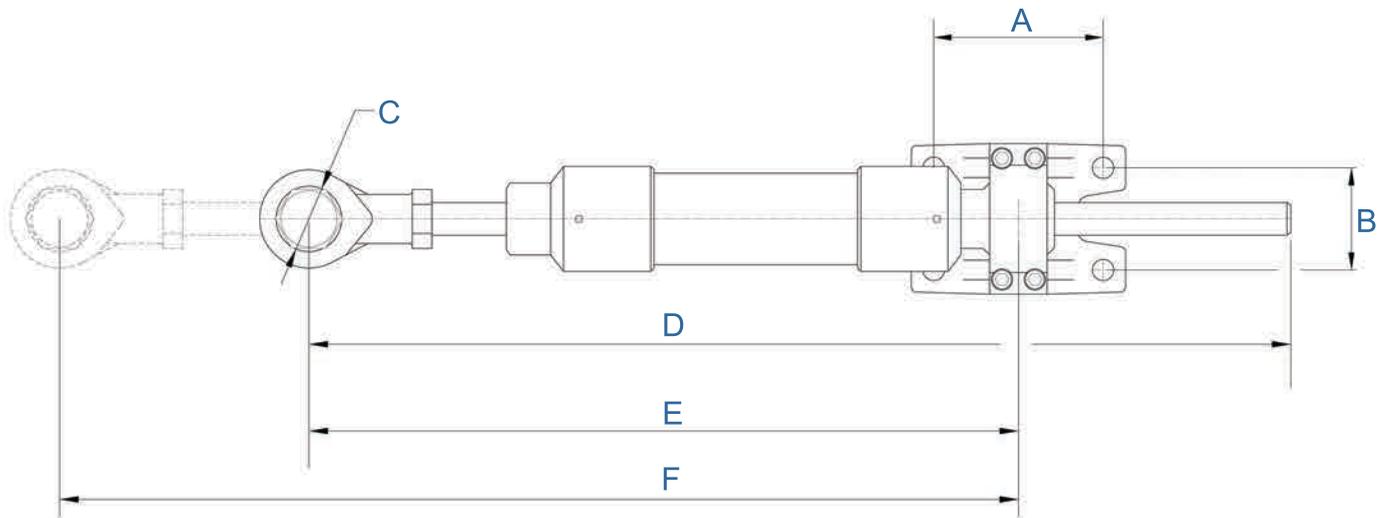
TABLE 6: Nominal Tube Wall Thickness.

Jastram Brass Cylinders

Jastram's 'B' series cylinders are compact and strong. 'B' model cylinders incorporate many features to achieve exceptional durability and extreme reliability including:



- Corrosion free brass and stainless steel
- Rod wipers to ensure long life of seals
- Oversize bearing surfaces for durability
- Low part count
- U-cup dynamic seals
- Type certified by ABS



Cylinder Model	Displacement (cm ³)	Rated Torque (N.m)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
B-38-120	108	230	82	50	16	475	343	464
B-38-190	170	841	82	50	16	628	413	603
B-50-190	316	1552	90	62	22.2	650	445	635
B-50-300	498	2451	90	62	22.2	869	552	852

General installation dimensions and specifications are shown above but a full set is provided in Jastram's installation manual.

TABLE 7: Basic Cylinder Specifications and Dimensions.

Jastram Tillers

Jastram's 'B' series tillers are manufactured from tough and durable ductile iron.

- Type certified by ABS

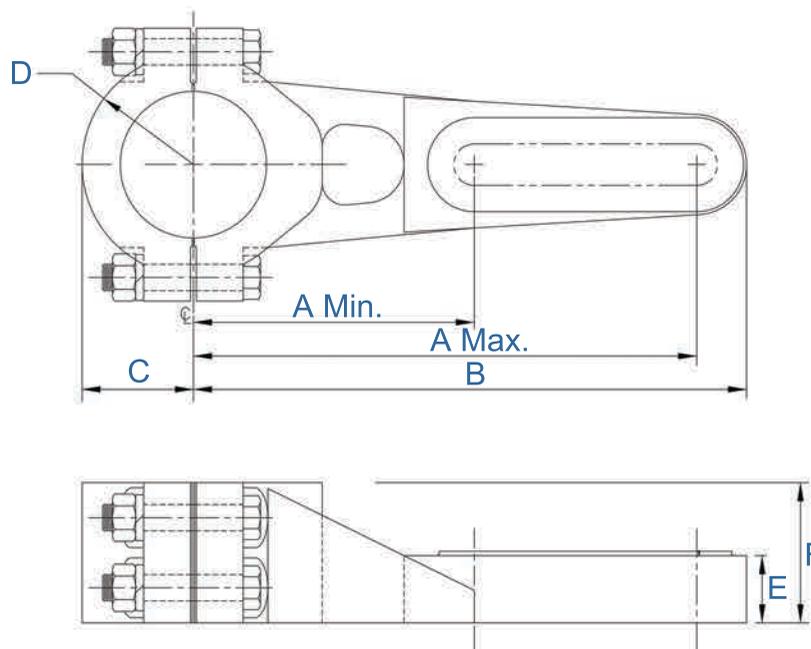


'B' series tillers are supplied ready for final machining to the equipment in your particular vessel – with pilot bore for rudder stock and dimpled for the location of the tiller pin.

Final machining can be done by most competent machine shops.

A drawing showing machining requirements for optimal performance is provided with every tiller. Basic dimensions of Jastram's tillers are provided below for reference.

- Tiller dimension and options:



Tiller Model	Tiller Dimensions (mm)							
	A Min.	A Max.	B	C	D Min.	D Max.	E	F
BT1-500	152.40	273.05	300.04	60.33	31.75	79.38	36.51	76.20
BT2-500	152.40	273.05	601.66	-	31.75	79.38	36.51	76.20

TABLE 8: Basic Tiller Dimensions.

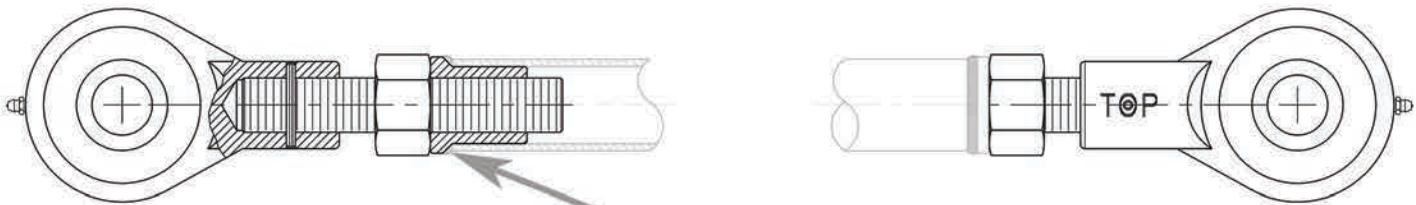
Jastram Tie-Bar Kits for Twin Rudder Installations

Jastram's tie-bar kits include everything you need to manufacture your own tie-bar except the pipe. Simply purchase steel pipe to our specifications below and weld the studs to the pipe.

The rod-ends can then be adjusted to enable you to achieve an exact fit.

Our stud kits are manufactured from corrosion resistant stainless steel and brass. They include rod-ends, locking nuts and pins as well as shoulder bolts for attachment to your tiller.

The tie-bar stud kit and pipe diameter depends on the cylinder model being used and the distance between rudder stock centres.



Stud kit welded to your Tie-Bar.
See installation manual for details.

To select your tie-bar stud kit, simply use the table below:

Cylinder Model		Centre-to-Centre Distance Between Rudder Stocks (m)					
		Up to 1.6	Up to 1.8	Up to 2.0	Up to 2.2	Up to 2.4	Up to 3.0
B38-XX	Tie-Bar Kit	SK-38-1	SK-38-1	SK-38-1	SK-38-1	SK-38-2	SK-38-2
	Pipe Size (mm)	32	32	32	32	38	38
B50-XX	Tie-Bar Kit	SK-50-1	SK-50-1	SK-50-1	SK-50-2	SK-50-2	SK-50-2
	Pipe Size (mm)	38	38	38	50	50	50

NOTE: These sizes are based on the use of schedule 40 SS pipe.

TABLE 9: Tie-Bar Stud Kit Selection Table.

Jastram is able to provide complete custom made Tie-Bars for your specific vessel.

Please call Jastram customer support agent for pricing and delivery.

Jastram RAI 300 Rudder Angle Indicator.

The RAI 300 Rudder Angle Indicator accurately displays the rudder angle on a clear backlit analog display. It is designed to be used with the RFU 400 Rudder Feedback Unit.

These indicators are designed to be flush-mounted into any convenient panel or console on your vessel. The water resistant front face allows for mounting in exposed outdoor locations.

An optional water-proofing kit is available for installations where the rear of the indicator is exposed to moisture.

Backlighting can be with 12VDC or 24VDC. An optional dimmer kit is available for purchase.



Jastram RFU 400 Rudder Feedback Unit.

The RFU 400 is mechanically linked to the vessel rudder and converts the position of the rudder into an electronic signal that can be output to a rudder angle indicator to display the rudder position.

This unit contains all the circuitry to regulate its own power supply, so it operates on a wide range of input supply voltages.

FEATURES:

Will indicate rudder angles from -47° to $+47^{\circ}$

Will run on any voltage between 12VDC and 32VDC

Enclosure is splash-proof



Jastram DARB 10

Double Acting Relief and Bypass Valve

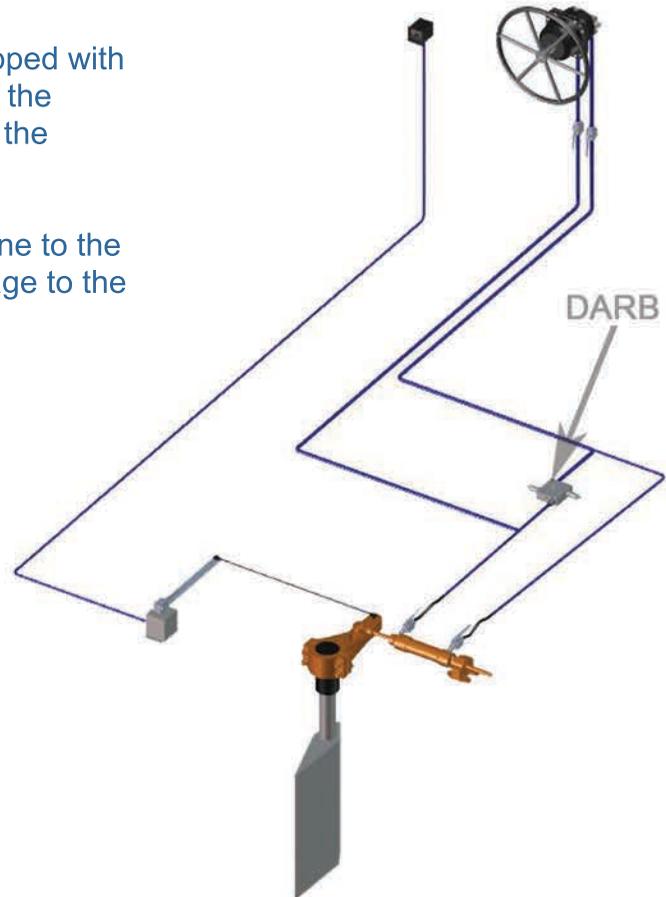
Jastram suggests that all steering systems be equipped with Double Acting Relief and Bypass (DARB) to protect the steering gear from hydraulic shock that may arise if the rudder impacts an underwater object.

The DARB will allow oil to bypass the pressurized line to the non-pressurized line thus preventing possible damage to the steering gear, its lines and flexible hoses.

When used in bypass mode, the DARB can enable emergency steering capability.

FEATURES & CHARACTERISTICS:

- Maximum flow rate: 10 gpm (38L/min.)
- Maximum pressure: 1875 psi
- Weight: 8 lbs (3.6 Kg)



Ordering Information

Please insert the part numbers corresponding to the recommended system from table 2 into the ordering form below, along the quantity of each part that you require.

Description	Part Number	Quantity
Tiller		
Tie-bar stud kit		
Cylinder		
Helm pump		
Steering wheel		
Rudder angle indicator	JA-950034-1	
Waterproof housing kit	JB-801009	
RAI dimmer control	JA-950095-1	
Rudder feedback unit	JA-701009-1	
Rudder clamp	JB-801016	
Double acting relief and bypass valve	JA-401003-1	

Your Local Jastram Dealer is:

