

Custom Commercial Hydraulic Steering

DESIGN • ENGINEERED • INSTALLATION • MAINTENANCE



Skipper has long been a major supplier of quality electro-hydraulic steering systems.

It its entirety, a complete steering system is made up of:

- **Hydraulic Power Unit (HPU):** Consists of electric motor driven pumping units, a divided reservoir with tank accessories, directional control valves, system motion control relief and check valves, gauges and suction and return line filtration.
- **Controls:** Follow up controls, non follow up controls, rudder angle indicator systems. All easily adaptable to the style of any type vessel.
- **Electrical:** Wheel house logic control panel, integrated alarms, engine room and engineers station ancillary equipment, magnetic starters and system junction boxes.
- **Cylinders:** Hydraulic cylinders and all mounting and installation accessories.
- **Installation Items:** Hoses and adapters, isolation ball valves, dual crossport relief valves.
- **Technical Instruction:** Piping schematic, electrical wiring one-line diagram, recommended cylinder/tiller arm arrangement.

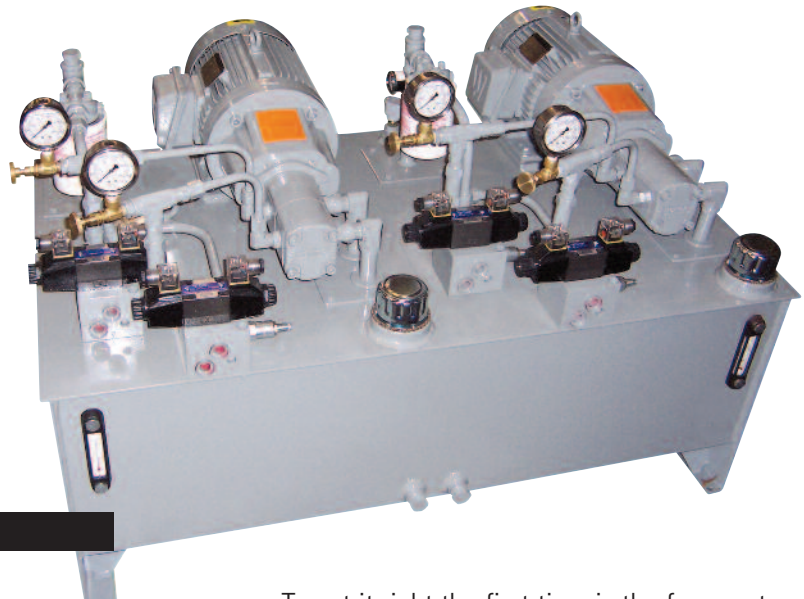
Here in this catalog, in addition to assimilating the information required for your system, we have tried to pinpoint the individual components involved in steering systems, to appeal to and assist our customers in the repair and maintenance of their existing systems.





Hydraulic Power Units

Independent Rudder - DP Ready System



The heart of every steering system is the Hydraulic Power Unit. It must be sized properly. The HPU must develop the required torque, deliver the right rudder speed and degree of travel and perform at a pressure that will maximize the system's components - both hydraulic and mechanical.

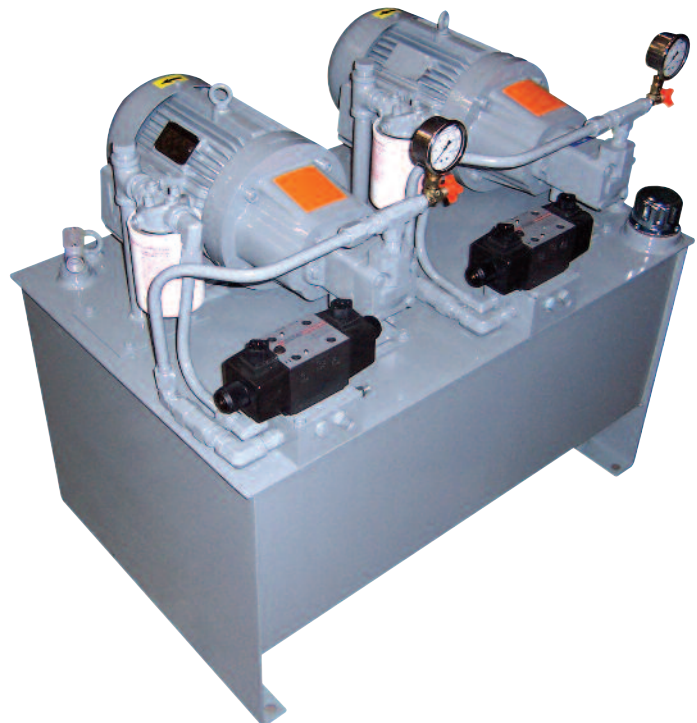
- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
- Instruments, Navigation
- Electrical
- Maintenance, Fuel, Ventilation
- General Acc.
- Vessel Control System
- Fendering, Push Knees
- Deck Fittings, Equip.
- Windows, Doors
- Close Outs, Insulation
- Tech Drawings
- Engineered Products

Triplex Steering/Flanking/Auxiliary



To get it right the first time is the foremost responsibility of the steering specialist. Gathering and analyzing and implementing the available information to design and size the system is job one. Meeting the needs of the customer is, of course, essential and coordinating with the installation contractor to achieve the maximum efficiency of the system as designed.

Standard Steering Duplex



The designer has to be right about the horsepower of his system - it is the one thing that cannot be altered (without disastrous impact) after the installation. Rudder speed and adequate component and line sizing are two factors that can unexpectedly waste horsepower.

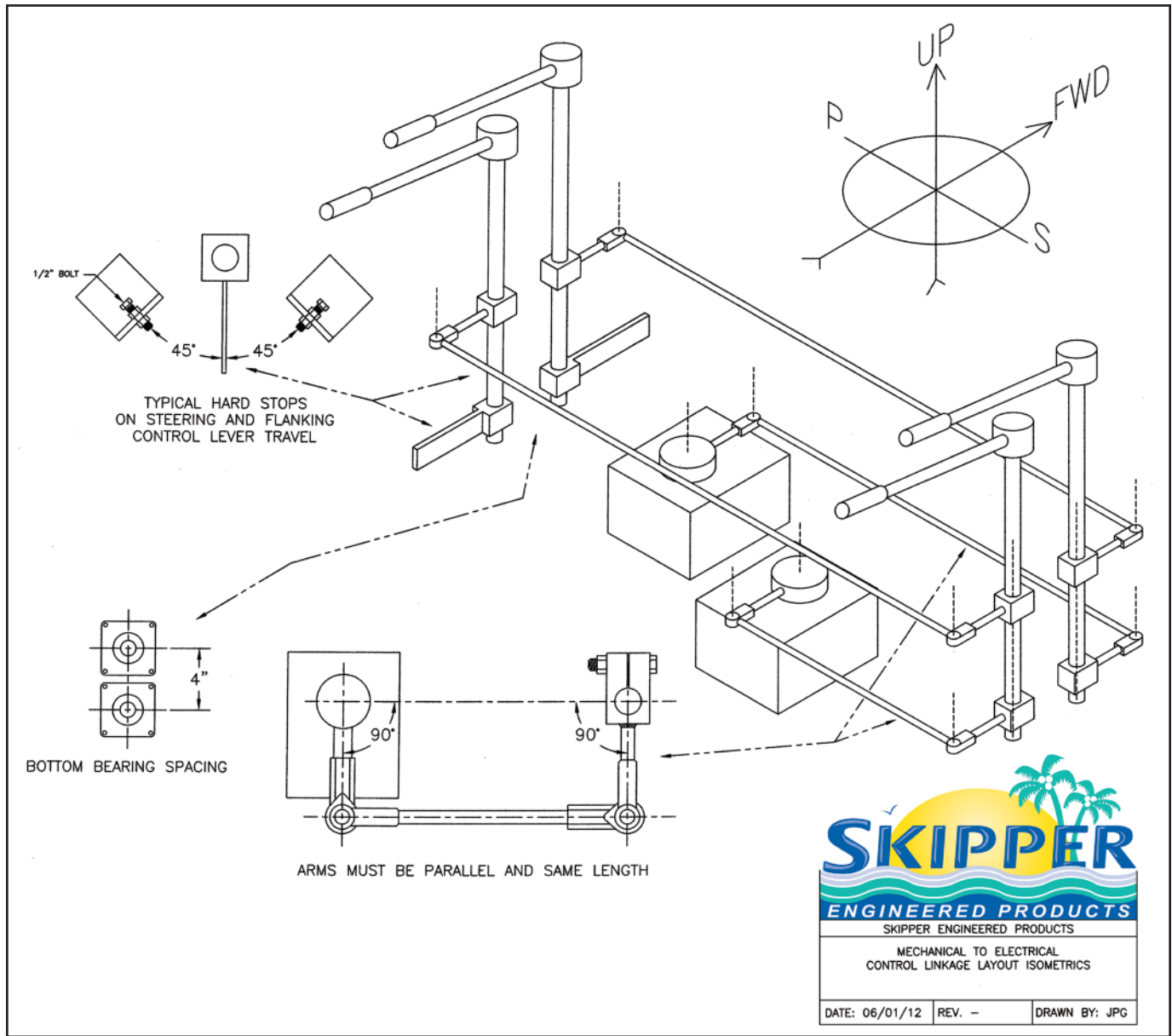
Skipper's Power Units Feature:

- Motor-Pump-Directional Unit Redundancy.
- Divided Reservoirs.
- Level/Temp Gages.
- Return Line Filtration.
- Gauge Isolators.
- Shockless, Slow Shift Directional Valves.

Electro-Hydraulic Steering Components



Electro-Hydraulic Steering Components. Today's vessels require the precision control and ease of electro-hydraulic controls, featuring the ability to interface with auto-pilots and dynamic positioning, with redundant systems that meet USCG & ABS Requirements.



- Anchors, Horns, Safety
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SKIPPER
ENGINEERED PRODUCTS
SKIPPER ENGINEERED PRODUCTS
MECHANICAL TO ELECTRICAL
CONTROL LINKAGE LAYOUT ISOMETRICS
DATE: 06/01/12 REV. - DRAWN BY: JPG

Steering and Flanking Stacked Levers

- Skipper Wheelhouse Hardware: Make your workboat wheelhouse look old school.
 - These stainless and wood steering levers adapt beautifully to today's electro-hydraulic controls and still maintain that classic pushboat look and feel.
- | | |
|---------------|--|
| Skipper No. | Description |
| 362400 | 18" Stainless Steering Levers with Mahogany Finish Grips |
| 362424 | Black Anodized Dual Escutcheon Plate |
- Installation accessories.
- | | |
|---------------|--|
| Skipper No. | Description |
| 362917 | Set of 4 Machined Lever Shafts, 1-1/4" Diameter, 5' Long |
| 253461 | 1-1/4" Diamond Flange Floor Bearing |



Place Your Order with Donovan Today: **877.366.2366**

Non Follow Up, Jog, Bang-Bang Steering Levers

Call 'em whatever you like, they all feature heavy duty sealed micro switches with years of cycles built in.

Skipper Dual NFU Lever - Flush Mount Style



- For over 30 years, the jog lever of choice for wheelhouse console stations.

Skipper No.	Description
266580	Skipper NFU Jog Lever Kit

Kobelt Watertight and Weatherproof Jog Levers



- For those who prefer all brass constructions.
- Available in single microswitch and two speed versions.

Skipper No.	Description
441042	(7170A2) NFU Jog Lever
441129	(7196) Dual NFU Jog Lever, 2 Speed

Jastram Watertight and Weatherproof Jog Levers



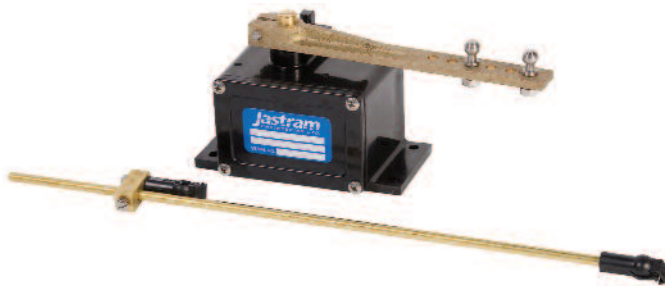
- Ideal for indoor and outdoor stations.
- Available in single and double microswitch versions.

Skipper No.	Description
400101	(JA-701005-1) Jastram Jog Lever JO-100-1
419110	(JA-701005-2) Jastram Jog Lever JO-100-2

Follow Up Steering Levers and Wheels

Follow Up Control is the preferred method of vessel handling - your wheelhouse input device controls and maintains the desired rudder position, effortlessly.

Jastram 3 Wire Rudder Input



- Single 1K potentiometer.
- 45°/45° Swing and movement with proportionality.
- For linking to Skipper classic wheel house hardware.

Skipper No.	Description
419160	(RFU300)
419134	(RFU400) Includes: RAI Translator Board

Jastram Watertight and Weatherproof Follow Up Levers



- Suitable for indoor and outdoor stations.
- Available in single and double potentiometer versions.
- 45°/45° Swing and movement with proportionality.

Skipper No.	Description
419130	(LC100-1) Lever - Single 1K Potentiometer
419132	(LC100-2) Lever - Two 1K Potentiometer, for Redundant or Split Systems

- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
- Instruments, Navigation
- Electrical
- Maintenance, Fuel, Ventilation
- General Acc.
- Vessel Control System
- Fendering, Push Knees
- Deck Fittings, Equip.
- Windows, Doors
- Close Outs, Insulation
- Tech Drawings
- Engineered Products

Follow Up Steering Levers and Wheels

Follow Up Control is the preferred method of vessel handling - your wheelhouse input device controls and maintains the desired rudder position, effortlessly.

Kobelt Follow Up Helm



- Featuring (3) 1K potentiometers, for redundant or split systems.
- Requires 3 wheel turns lock-to-lock.
- Note: Wheel not included.
- Adapts to customer's wheel or Skipper #436534 - 24" Diameter Wheel as shown in photo.

Skipper No.	Description
441016	(7172BP PP) Follow Up Helm

Kobelt Follow Up Lever/Helm



- For that classic helmsman approach, especially well suited for higher speed vessels.
- 45°/45° Swing and movement.
- Two 1K potentiometers for redundant or split systems.
- Self contained half-wheel.

Skipper No.	Description
441105	(7171SW PP) Follow Up Lever/Helm

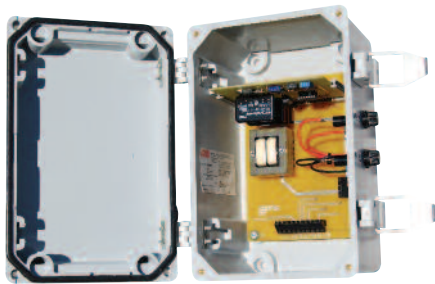
System Power Accessories



Skipper No.	Description
419122	Jastram Dimmer - Regulates Rudder Angle Indicator, Brightness for Nighttime Viewing
362678	(PR4.5) Power Supply - Excellent 110V AC to 12 VDC Converter for RAI Systems
256138	(N2412-12) Astron 24 VDC to 12 VDC Converter

Follow Up Control System Amplifiers

The Brain Box that makes your Follow Up work. Comparative signals between input, hydraulic power unit and system feedback happen within this enclosure, at multiple voltages.



- Custom Control Amplifier.
- This little mule, at 110V AC in and out, is a workboat staple and as trouble free as it gets.

Skipper No.	Description
271320	(FUA-500) Custom Control Amplifier



- Sentinel Amplifier.
- A supply vessel sweetheart, two speed capable and versatile enough to adapt to most DP systems.

Skipper No.	Description
246505	(SCA-01) Sentinel Amplifier, 220 VDC In/Out



- Sentinel Amplifier - 12 VDC (Also available 24 VDC).
- No AC power? No problem and still 1K pot compatible.

Skipper No.	Description
241199	(SCT0795) Sentinel DC Amplifier

- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
- Instruments, Navigation
- Electrical
- Maintenance, Fuel, Ventilation
- General Acc.
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Rudder Feedback Units

Feedback Units are the backbone of any Follow Up System. All these models have been field tested and proven to withstand the demanding environments.

Reyby Corp. Telcor Rudder Feedback Unit



- Complete with dual (4) limit switches and two potentiometers.

Skipper No. Description
437043 (7304-1K) Reyby Corp. Telcor Rudder Feedback Unit

Kobel Rudder Feedback Unit



- Complete with dual (4) limit switches and two potentiometers.

Skipper No. Description
441028 (7174BG) Kobelt Rudder Feedback Unit

Jastram Rudder Feedback Unit



- Complete with dual (4) limit switches and two potentiometers.

Skipper No. Description
419184 (RFU2000-2210) Jastram Rudder Feedback Unit

Rudder Angle Indicator Systems

Great for use with either Non Follow Up or Follow Up Systems. Know where your rudders are. Remember, you need a Feedback Unit for your meter(s) to work.

Kobel Meters



- Kobelt Master RAI.
- 12 or 24 VDC, illuminated, span adjustable.
- Requires no meter module.
- Works directly from your 1K potentiometer.

Skipper No. Description
441064 (7175-MA) Kobelt Master RAI

- Kobelt Slave Meter.
- 12 or 24 VDC, illuminated, span adjustable.
- Requires no meter module. Works directly from your master meter.

Skipper No. Description
441054 (7175-SA) Kobelt Slave Meter

Jastram 1K Potentiometer with Gear



Skipper No. Description
439350/419401 Jastram 1K Potentiometer with Gear

Kobel Small Feedbacks



- Kobelt Small Feedback (1K).
- Single 1K potentiometer.
- No switches.
- Great for rudder angle indicator driving.

Skipper No. Description
441066 (7168P) Kobelt Small Feedback (1K)

- Kobelt Small Feedback.
- Twin 1K potentiometers.
- Redundant or split rudder angle indicator systems.

Skipper No. Description
441079 (7168PP) Kobelt Small Feedback

Skipper Slotted 1K Replacement Potentiometer



Skipper No. Description
419223 (SP22G 3173-1K) Skipper Slotted 1K Repl. Potentiometer

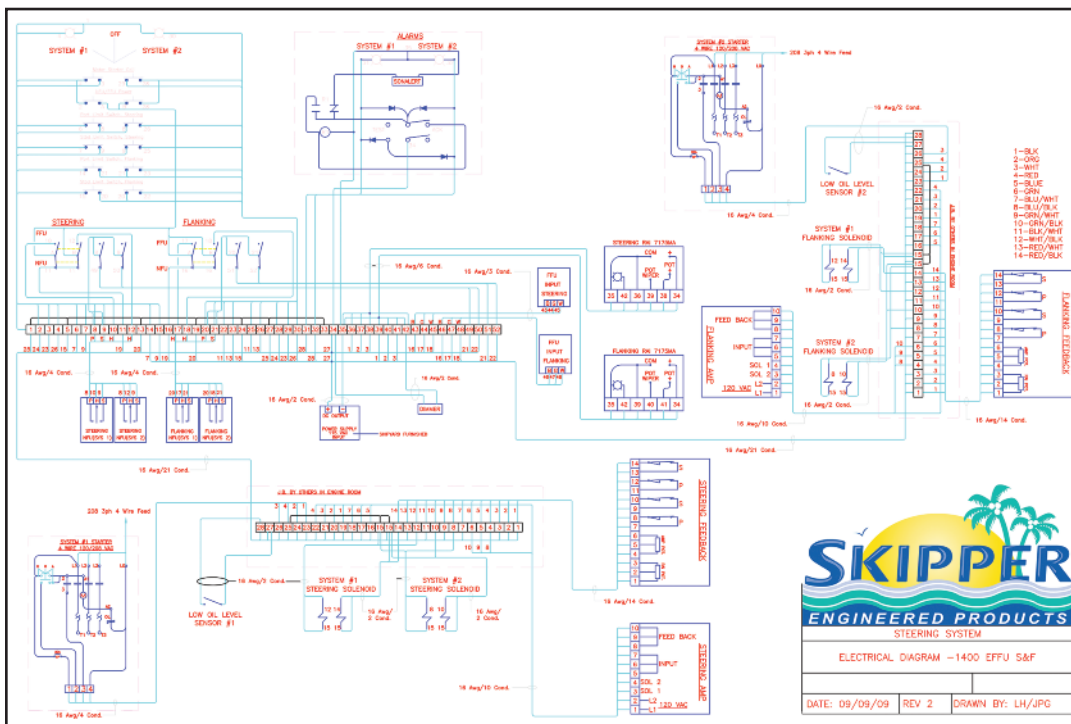
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Generic Electrical System Schematic



Skipper Electro-Hydraulic Logic Switch Panels are the center of the steering system. The Logic: System, Station and Mode Select, as well as any system alarms are integrated into the wheelhouse control panel of the steering system and are typically powered by the steering system's magnetic starters through 110 VAC starting coils.

- Custom Panels are no problem for the Skipper Team. Rapid design and delivery times are offered. Flexibility is Key!



- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
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Skipper Triplex Control Panel



- Main/Auxiliary/Flanking System.
- Complete with (3) Pump Unit Control, FFU/NFU Mode Select and Low Level Alarms.

Skipper No. Description
305006 Triplex Control Panel

Skipper S & F Control Panel



- Standard Skipper Main/Flanking System
- Complete with (2) Pump Unit Control, FFU/NFU Mode Select and Low Level Alarms.

Skipper No. Description
702577 (EFFU) S & F Control Panel

Skipper Triplex Superredundant Control Panel

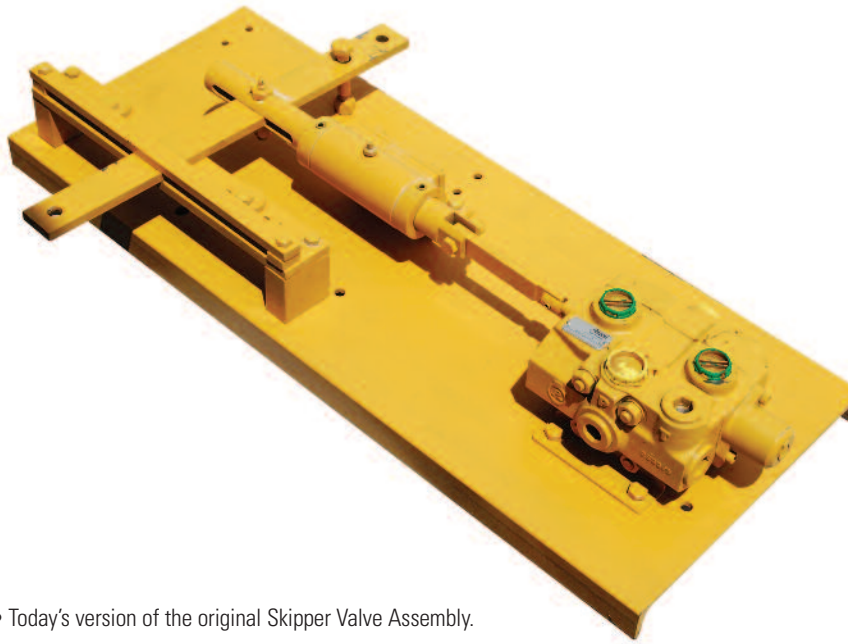


- Superredundant Main/Auxiliary/Flanking System.
- Complete with (3) Pump Unit Control, FFU/NFU Mode Select and Low Level Alarms.
- Equipped to transfer redundant amplifiers and feedback units.

Skipper No. Description
814120 Triplex Superredundant Control Panel

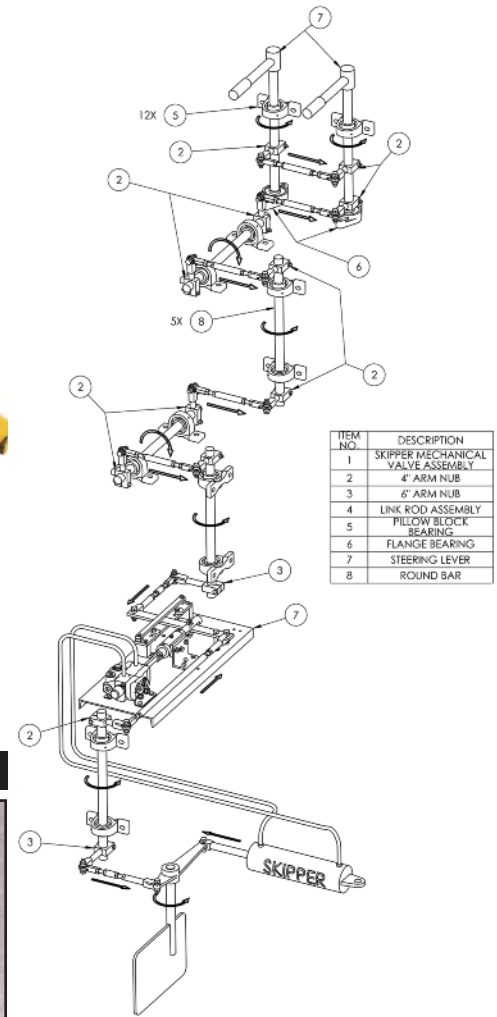
Skipper Full Follow Up Control Valve Assembly

Skipper began in 1959, with the first, the original mechanical Full Follow Up Control Valve Assembly. Still crafted today and stocked at our Harahan Location, along with the required, modern day version of the linkage pieces and parts it was installed with.



- Today's version of the original Skipper Valve Assembly.

Skipper No.	Description
305068	Full Follow Up Control Valve Assembly



Skipper Linkage Components

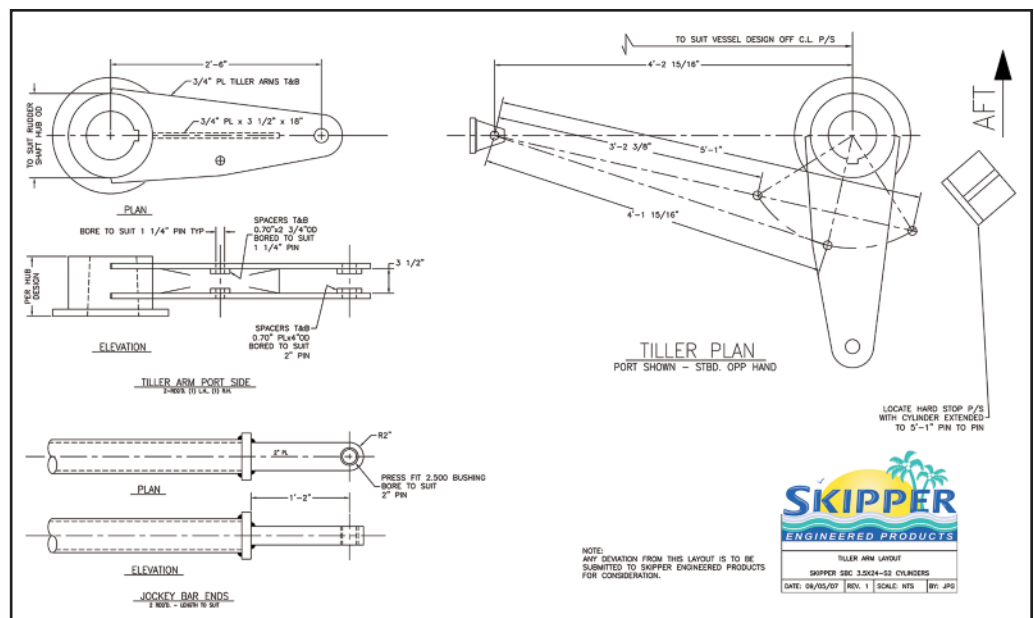
Skipper No.	Description
238003	Knub 1-1/4" Blank
703187	(YA008) 1/2" Brake Yoke, 1/2"-20
305056	Skipper - 1-1/4" x 4" Linkage Unit Complete
305070	Kit Welded Knub
254502	1/2" Female Rod End with Zerk



Cylinder/Tiller Arrangement Drawing



Technical: How about a recommended cylinder layout to utilize your new cylinders with your old tiller arrangement or mount? Skipper can do it as fast anybody.



- Anchors, Horns, Safety
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Skipper Welded Body Cylinders

Skipper Cylinders have become the dimensional standard for inland pushboats, complete with 2500 PSI Rating and 303 marine grade stainless, chrome plated rods. Skipper stocks the complete line of 3", 3.5" and 4" bore cylinders. Along with all their accessories at our Harahan Location.

Skipper Standard Cylinders



- Featuring 303 SS Piston Rods, 2500 PSI Rating and Skipper Accessories.

Skipper No.	Description
233801	(SBC3018-S1) Cylinder Complete with Clevis
233813	(SBC3524-S2) Cylinder
233825	(SBC4024-S3) Cylinder
233837	(SBC4030-S3) Cylinder

Skipper Standard Cylinder Accessories



- The following cylinder accessories are made to those same standard Skipper dimensions.
- Clevises, Rodeyes and Mounting Brackets are fabricated from cut steel to ease field modifications and re-boring.
- All pins are machined from 17-4PH stainless (boat shaft).

Skipper No.	Description
361016	(3018) Clevis, 1"-14
233851	(B3) Eye Bracket
233863	1" SS 17-4 Clevis Pins with Cotter
254792	(E8) Rodeye Assembly Complete
254691	(WWC-435B) Clevis Threaded, 1.25-12
254805	(B4) Eye Bracket
233875	1-1/4" SS 17-4 Clevis Pins with Cotters
254780	(E10) Rodeye Assembly Complete
254689	(WWC-435) Clevis Threaded, 1.50-12
254805	(B4) Eye Bracket
305101	(E10) 1-1/2" SS 17-4 Rodeye Pin

Skipper Cylinders - Made to NFPA JIC Dimensions



- The following welded body cylinders and accessories are made to NFPA JIC dimensions, to replace your long lead time, high priced JIC, NFPA Tie-Rod Type Cylinders.
- These cylinders are manufacturer by Hanna Corp., a long time leading manufacturer of JIC Cylinders.
- Comes complete with a 2500PSI rating and 303 marine grade stainless, chrome plated rods.

Skipper No.	Description
401264	Hanna - MP1-NON-NC-5 x 24 KIM 1G
401276	Hanna - MP1-NON-NC-5 x 30 KIM 1G
401288	Hanna - MP1-NON-NC-5 x 36 KIM 1G
256075	Cylinder JIC SBC 6030 KIM SS
256087	Cylinder JIC SBC 6036 KIM SS
256063	Cylinder JIC SBC 6042 KIM SS

Skipper Cylinder Accessories



- The following cylinder accessories are made to JIC, NFPA dimensions.
- Clevises, Rodeyes and Mounting Brackets are fabricated from cut steel to ease field modifications and re-boring.
- All pins are machined from 17-4PH stainless (boat shaft).

Skipper No.	Description
601078	(Y7/E15) Best Rodeye 2.25-12
260036	(BDC-25) 2.25-12 Clevis
601080	(B5) Best Eye Bracket, JIC
601092	1.75 x 6" Heel Pin SS 17-4
362359	2.5" x 7" Rodeye Pin
256099	(B6) Eye Bracket
361005	2" x 6" Heel Pin SS 17-4
362359	2.5" x 7" Rodeye Pin

Telcor Instruments

Skipper has long been a distributor for Reyby Corporation and is proud to stock a full line of Telcor Steering Products. Again, many of which are old Skipper Standards. Want parallel or series hook-up without that symbiotic master-slave nuisance? Then, Telcor is your choice. And, you cannot touch a 5" meter for less than twice the Telcor price.

Skipper No.	Description
437017	(7003R) Rudder Angle Rep 3.8" Std.
437029	(7005R) Rudder Angle Rep 5.1" Std.
437067	(7000-1K) Meter Module
437031	(7100-1K) 3 Wire Rudder Angle Sender
437055	(7100-1K) Rudder Angle Sender with RAI Translator Board



437017



737067

Skipper maintains a flexible hydraulic components inventory, geared to repairs and modifications of existing systems, as well as new applications for the do-it-yourselfer.

Reservoirs and Reservoir Accessories



• Complete with (2) suction strainers, return line filter, filler breather, sight level gauge with temp and optional low level sensor.

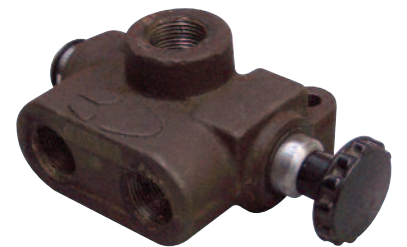
Skipper No.	Description
254595	Skipper Reservoir, 50 Gallon
211300	(B1000N) A.C.T. Level Float Sensor
254350	(ABB-40-N) Donaldson Filler Breather Assembly
255085	(SMBB-80-N-0) Stauff Filler Breather with Adjustable Dipstick
254665	(LHA LG5T) Sight Gauge, C/W Thermometer
255112	(HSG55) Hydrocraft Sight Gauge, C/W Thermometer
694807	(SWS N04 A2) Stauff Gauge Isolator
254831	(P169015) Donaldson In Tank Sump Strainer, SEH-20-1-1-1/4-100
253423	(CF-1P-140-A-SAE) 0-2000 PSI Pressure Gauge
260012	(JSM0-2000PS) McDaniels Pressure Gauge
398316	(WIKA 213.53) 2.5 LM 0-2000 K Pressure Gauge
398328	(WIKA 213.53) 2.5 LM 0-3000 K Pressure Gauge

Filters



Skipper No.	Description
692411	(0160MA010P) Hydac 10M Element
254970	(RTF48N25) Stauff D10B/S1/V Return Filter with Indicator
255263	(CI-20) Stauff Indicator Gauge
694718	(MFP160G1A10) Hydac Return Line Filter
695544	(0080MA010P) Hydac Elements RF

Valves



Skipper No.	Description
253409	(SS-2A1D) Prince Single Selector Valve
253411	(S-75) Gresen 3-Way Selector Valve
253396	(CP410-1-B6S0) Sauer Lock Valve, For your Orbitrol and Auto Pilot Interface Systems

Sun Relief Cartridges



• Relief valve system protection: Sun offers the highest reset values and cartridge technology too.

Skipper No.	Description
694251	(RPGC-LAN) Sun Relief Cartridge, 0-3000 PSI
694427	(RPEC-LAN) Sun Relief Cartridge, 0-3000 PSI

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Donaldson In-Line Check Valves



- Check valves isolate and protect.
- Selector valves direct flow to either of two locations.
- Dual pilot operated check valves "lock" out back pressure from other stations.

Skipper No.	Description
255023	(CV08P-65) Donaldson 1" 65# Check Valve
255035	(CV10P-65) Donaldson 1-1/4" 65# Check Valve
255073	(CV10P-5) Donaldson 1-1/4" 5# Check Valve
255097	(CV08P-5) Donaldson 1" 5# Check Valve

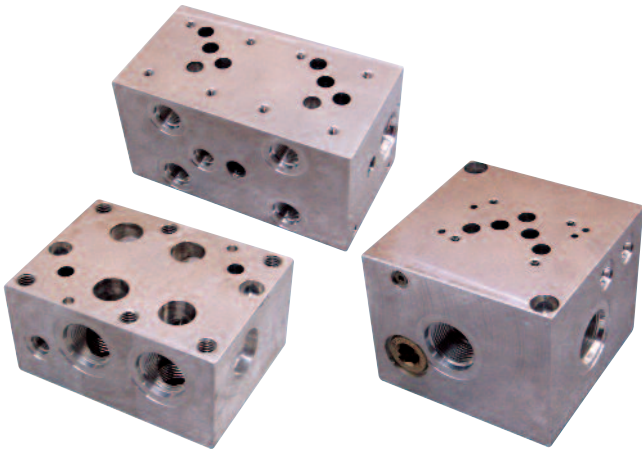
Quadrant Isolation Ball Valves



- A great assist in component isolation, system adjustment and trouble shooting.

Skipper No.	Description
235196	Quadrant 1/2" NPTF Stainless Ball Valve
236201	Quadrant 3/4" NPTF Stainless Ball Valve

Daman Subplates



- Daman, long a leading manufacturer of manifolds and subplates have long been a mainstay of Skipper Systems and come in ductile iron for regulatory body approval.
- They make an excellent match for Sun Hydraulic's Cartridge Technology.

Skipper No.	Description
694326	(AD05SPRVS8S) Subplate
695037	(AD05S023SS) Dual Subplate
253118	(AD08SPRVS16S) Subplate
253283	(AD08SPST16P) Subplate
253297	(AD08SPS016S) Subplate
694100	(DD05SPRVS8S) Ductile Iron Subplate
694338	(AD05JSPRVS16) Subplate
694340	(AD05JSPS16S) Subplate
694352	(AD05HSPRV12S) Subplate
694364	(AD05HSPS12S) Subplate

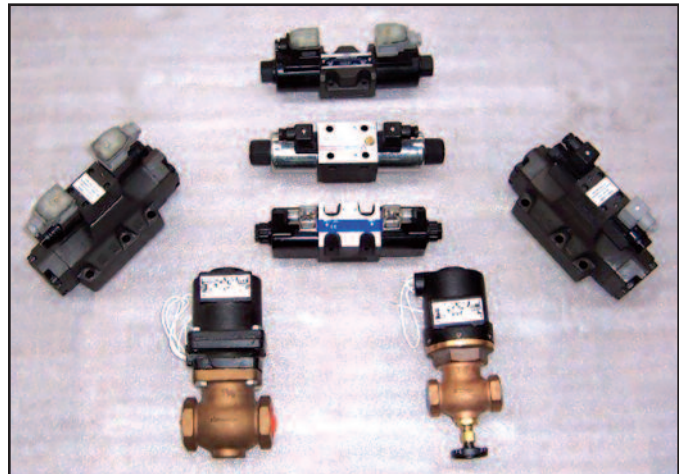
Brand Hydraulic's Classic Bypass Type Flow Controls



- Invaluable in those engine driven pump applications.

Skipper No.	Description
694403	(FC51) Brand 1/2" Flow Regulator
264983	(FC51) Brand 3/4" Flow Regulator

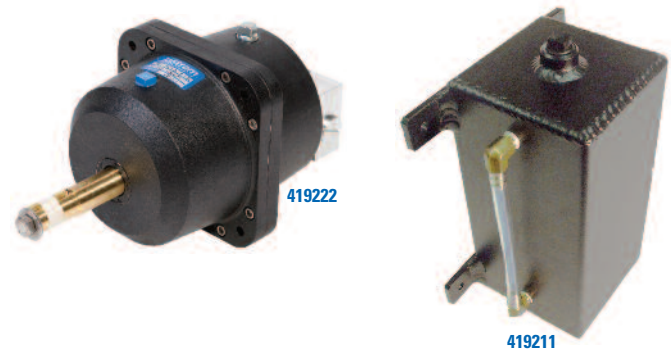
Solenoid Operated Directional Control Valves



- Solenoid operated directional control valves and subplates in multiple spool configurations and operating voltages and featuring modern system improvements like slow shift and shockless operation.

Skipper No.	Description
253282	(D08) Open Center Directional Valve
255249	(D08) Tandem Center Slow Shift Directional Valve
255124	(D05) Tandem Center Slow Shift Directional Valve
695102	(D05) Tandem Center Shockless Directional Valve
694768	(D05) Tandem Center Directional Valve, 12 VDC
255047	(D03) Pilot Valve, 110V AC
255059	(D03) Pilot Valve, 110V AC
240096	Magnatrol Poppet Valve, 1" NPT, 24 VDC, N.O., 500 PSI
240109	Magnatrol Poppet Valve, 1-1/4" NPT, 24 VDC, N.O., 500 PSI

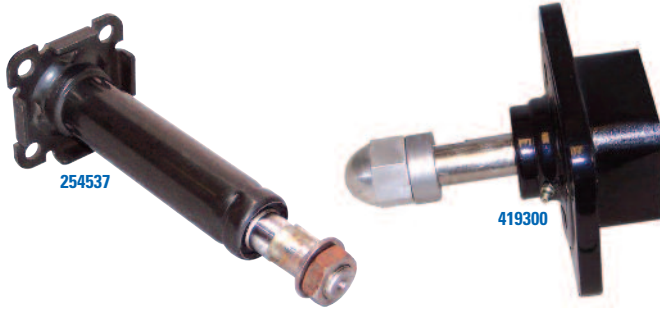
Jastram Manual Steering Helms



- Manual steering helms: Jastram makes the larger displacement helms for use on smaller workboats and larger pleasure vessels.

Skipper No.	Description
419211	(JA-521011) Jastram Header Tank, Aluminum
419222	(H110) Jastram 11.0 CID Helm

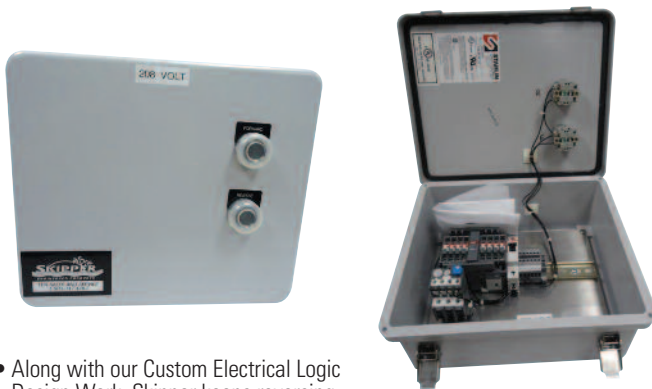
Actuating Column



- Actuating Column; Takes the hassle out of building a behind-console mount.

Skipper No.	Description
254537	(150-5066) Orbitrol Actuating Column
419300	Lauterback Helmster - The Beginner's Orbitrol Column

Deck Machinery Control Logic



- Along with our Custom Electrical Logic Design Work, Skipper keeps reversing magnetic starters in stock. Complete with additional remote control pendants. All NEMA 4X. Stainless enclosures are available on request.
- Reversing Magnetic Starters in NEMA 4X Enclosures with remote pendants.

Skipper No.	Description
507105	Reversing Magnetic Starter - 5 HP @ 208V AC
507117	Reversing Magnetic Starter - 7.5 HP @ 208V AC

Schmitt Steering Wheels and Accessories



- For a super sleek appearance in your wheelhouse, why not finished stainless?

Skipper No.	Description
436534	(153-24-17) 1" Straight Bore, 24" SS Wheel
602790	(153-24-1-C) 1" Char Lynn Bore, 24" SS Wheel

Skipper Magnetic Motor Starters



- Included in all Skipper Steering Packages.
- Across the line motor starters, complete with 110V AC starting coils, ABB Brand, in NEMA 4X enclosures.
- All pre-wired.

Technical Concerns:

- **Cooling** is a major concern in every hydraulic system. For steering, the reservoir should be sized for adequate cooling during its 24/7 operation cycle. The industry standard of 3 times the pump flow GPM (60 gallon capacity for a 20 GPM pump) is usually more than adequate, given a tolerable ambient temperature condition. Temperatures below 160° F are the goal; under no circumstances can you allow temperatures as high as 180° F, as seals will begin to fail.

Two important factors under the installer's control are location and environment. Care and thought must be taken to ensure the hydraulic power unit is placed in a favorable position to minimize the threat of high ambient temperatures.

Air exchange is the simplest solution to any heat problem - that is, air circulation. Our Delta T "Redneck" Fans offer a simple solution. A typical application consists of a pair of fans, one intake and the other exhaust - again, air circulation.

- **Filtration** - In-tank sump strainers are standard practice to protect pumps from "Nuts & Bolts" contamination. They are usually only 100 mesh filtration - enough to catch large pieces of trash and protect (without restriction) the suction capabilities of the fixed volume pumps - gear or vane type, typical of steering systems.

The emphasis on system filtration can be most economically placed on return line filtration, either spin-on or in-tank. A 10 micron filtration element is recommended, used in conjunction with an integral 25 PSI bypass incorporated into the filter head, along with an inexpensive visual indicator to display the element change warning.

- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
- Instruments, Navigation
- Electrical
- Maintenance, Fuel, Ventilation
- General Acc.
- Vessel Control System
- Fendering, Push Knees
- Deck Fittings, Equip.
- Windows, Doors
- Close Outs, Insulation
- Tech Drawings
- Engineered Products



DESIGN DATA SHEET- HYDRAULIC STEERING SYSTEM

COMPANY NAME: _____

VESSEL NAME: _____

VESSEL TYPE: TUG MODEL BOW PUSHBOAT FERRY
 PASSENGER VESSEL SUPPLY VESSEL CREWBOAT
 FISHING VESSEL OTHER _____

LENGTH _____ WIDTH _____ DRAFT _____

SPEED (KNOTS) AHEAD _____ ASTERN _____

RUDDER SPEED (HARDOVER TO HARDOVER) STEERING _____ SEC FLANKING _____ SEC

RUDDER ANGLE MAX STEERING _____ ° FLANKING _____ °

PROPELLER SIZE _____ KORT NOZZLES (Y/N) _____

ENGINE MAKE _____ MODEL _____ HP _____ QTY _____

ELECTRIC POWER AVAILABLE _____ VAC, _____ PHASE
 _____ VDC

STEERING CONTROLS DESIRED:

TYPE AND # OF STATIONS
 FILL IN QUANTITIES BELOW

STATION 1 STATION 2 STATION 3

FULL FOLLOW UP ELECTRICAL (WHEEL): _____ _____ _____

FULL FOLLOW UP ELECTRICAL (LEVER): _____ _____ _____

FULL FOLLOW UP MECHANICAL: _____ _____ _____

NON FOLLOW UP JOG: _____ _____ _____

RUDDER ANGLE INDICATORS: _____ _____ _____

AUTOPILOT INTERFACE:

BRAND _____

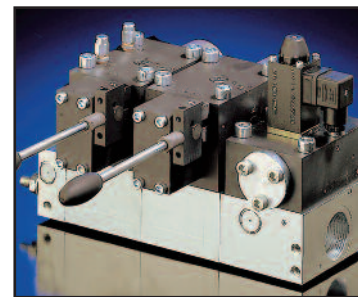
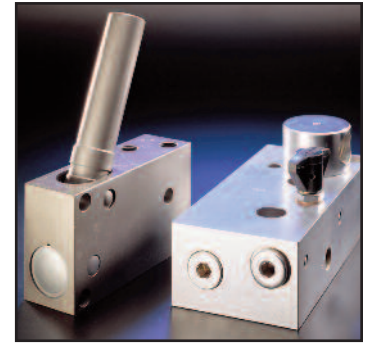
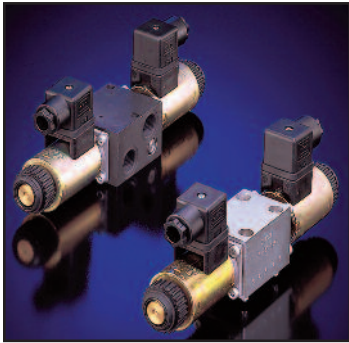
TYPE _____

VESSEL CLASSIFICATION: ABS, USCG, OTHER _____

EXISTING STEERING (PLEASE DESCRIBE): _____

- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
- Instruments, Navigation
- Electrical
- Maintenance, Fuel, Ventilation
- General Acc.
- Vessel Control System
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Hawe Hydraulik



High end systems, requiring high flows and/or pressures, demand better delivery times. Our newly acquired line, Hawe - delivers!

Agriculture, mobile cranes, digging and drilling, oilfield, mining, machine tools, alternative energy - Hawe has the equipment you need. Pumps, valves, electronic logic controls.

Sixteen years ago, North America was introduced to Hawe Hydraulik through its american subsidiary, Hawe Hydraulics. Today, many of america's most rugged industries rely on 60 years of Hawe's dependable german engineering and experience to help them build equipment with extremely robust hydraulic systems.

Hawe's broad and varied product line is designed with a modular approach, where components can be combined to create any number of systems and solutions. An essential component of our flexibility is in the development of our own state-of-the-art electronics. These devices increase the number of applications and expand the system's capacity as easy as plug-and-play.

Hawe hydraulics extensive modular product offering contains high-quality components that provide precision controls, whether implemented as a standalone unit or together as a complete system. These products include variable displacement axial piston pumps, proportional directional spool valves, load-holding valves and programmable logical valve controls. All hydraulic components are compact, manufactured from steel and designed to handle pressures to 6,000 PSI, thus allowing system components to be flexible in a variety of applications.

When all the components of a hydraulic system are designed to work together seamlessly, the result is a safe and efficient control system for any crane. A wide range of pumps, directional-control valves and electronic controls allow precise control, optimum vibration dampening and smart system design.

Because different crane functions have different hydraulic requirements, all Hawe products come in a wide choice of finely graded sizes. We offer control hydraulics for: Outriggers, Telescopic Booms, Slewing Gear, Steering, Counterbalance, Raising and Lowering Cabs, Attachments and Winches.

- Anchors, Horns, Safety
- Lighting
- Pumps, Sanitation
- Instruments, Navigation
- Electrical
- Maintenance, Fuel, Ventilation
- General Acc.
- Vessel Control System
- Fendering, Push Knees
- Deck Fittings, Equip.
- Windows, Doors
- Close Outs, Insulation
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- Engineered Products

Delta T Systems



Redneck Fans



Economy Line

Fan Size	Model Number	Motor HP	Motor RPM	MAX AIRFLOW RATES (CFM) UNDER STATIC PRESSURE (in. H ₂ O)									
				Free Air	0.25"	0.5"	0.75"	1.0"	1.25"	1.5"	1.75"	2.0"	
12 Inch	500 - 312000 - 01	0.5	3450	1510	1420	1340	1250	1140	934	768			
	500 - 312000 - 02	0.75	3450	1870	1790	1700	1600	1500	1370	1050	838		
	500 - 312000 - 03	1.0	3450	2580	2410	2220	2010	1790	1530				
14 Inch	500 - 314000 - 01	0.5	1740	2110	1770	1360							
	500 - 314000 - 02	1.0	3450	2720	2580	2410	2250	2000	1880	1680	1450	1740	
	500 - 314000 - 03	2.0	3450	3730	3570	3430	3290	3120	2950	2790	2560	2270	
18 Inch	500 - 318000 - 01	0.5	1740	3190	2900	2570	1950	1300					
	500 - 318000 - 02	1.0	1740	5080	4600	4100	3440	1570					
20 Inch	500 - 320000 - 01	1.0	1740	6080	5370	4500	2730	1640					
	500 - 322000 - 02	2.0	1740	7190	6690	6120	5350	2650					
24 Inch	500 - 324000 - 01	1.5	1740	8570	7580	6540	5020	3020					
	500 - 324000 - 02	2.0	1740	9320	8290	7140	5720	3440					
	500 - 324000 - 03	3.0	1740	11600	10800	10100	9130	7980	4760	3610			
500 - 324000 - 04	5.0	1740	12400	11900	11300	10600	9940	8910	7350				

Standard Line

Fan Size	Model Number	Motor BHP	Motor RPM	MAX AIRFLOW RATES (CFM) UNDER STATIC PRESSURE (in. H ₂ O)									
				Free Air	0.25"	0.5"	0.75"	1.0"	1.25"	1.5"	1.75"	2.0"	
12 Inch	500 - 412000 - 01	0.5	3450	1450	1310	1190	1050	869					
	500 - 412000 - 02	0.75	3450	1970	1880	1780	1670	1530	1400	952			
	500 - 412000 - 03	1.0	3450	2280	2170	2050	1930	1800	1630	1390			
	500 - 412000 - 04	1.5	3450	2480	2370	2240	2110	1940	1740	1520	890		
15 Inch	500 - 415000 - 01	0.25	1740	1850	1620	1160	581						
	500 - 415000 - 02	0.5	1740	2950	2610	2140	1050						
	500 - 415000 - 03	1.0	3450	2980	2770	2560	2350	2070	1740	1350	994		
	500 - 415000 - 04	2.0	3450	4440	4280	4060	3860	3650	3410	3170	2880	2590	
	500 - 415000 - 05	3.0	3450	5740	5580	5360	5150	4940	4740	4450	4150	3670	
18 Inch	500 - 418000 - 01	0.5	1740	3080	2780	2270	1580						
	500 - 418000 - 02	1.0	1740	5050	4590	3940							
24 Inch	500 - 424000 - 01	1.5	1740	8790	7870	6830	5370	3330					
	500 - 424000 - 02	2.0	1740	9500	8930	8340	7650	6790	5570	3440			
	500 - 424000 - 03	3.0	1740	11700	10900	10300	9470	8520	7150				
	500 - 424000 - 04	5.0	1740	13300	12700	12200	11500	10700	9710	8140			
30 Inch	500 - 430000 - 01	5.0	1740	18600	17700	16800	16000	14900	13700	12600	10500		
	500 - 430000 - 02	7.5	1740	20300	19800	19100	18300	17600	16700	15800	14500		
	500 - 430000 - 03	10.0	1740	25400	24500	23700	22700	21600	20300	18900	17300	14900	

Delta T Systems is the world leader in marine engine room ventilation systems. Originally established in 1992, the company was born out of a critical need to provide a reliable supply of clean, dry, salt-free air to the engine rooms of commercial vessels, pleasure yachts and U.S. Military vessels, as well as the offshore oil and gas industry.

Delta T Systems offers the unique service of complete engine room ventilation design from inlet to outlet. The cornerstone of our approach is a database of heat and air requirements from virtually every marine diesel engine and generator manufacturer along with our own extensive database from actual installations. Delta T Systems provides ventilation design and engineering, and is also your single source for all major ventilation system components.