

## Mac N Hom, always supporting your technical needs.

At Mac N Hom systems, we are focussed on diverse range of products and fully devoted to meet the ever increasing demands of customers in terms of sophistication and diversification. Established in 1995, Mac N Hom has brought to market innovative products, one after another to provide only the highest quality goods and services for your requirements and offers customised solutions and challenging applications quickly and cost effectively.

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**MAC N HOM**  
**SYSTEMS**  
 An ISO 9001:2008 Certified Company



### Hydraulic Steering System for Large Vessels



#### A) Salient Features :

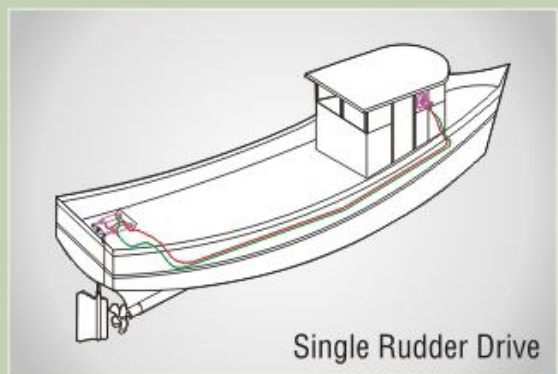
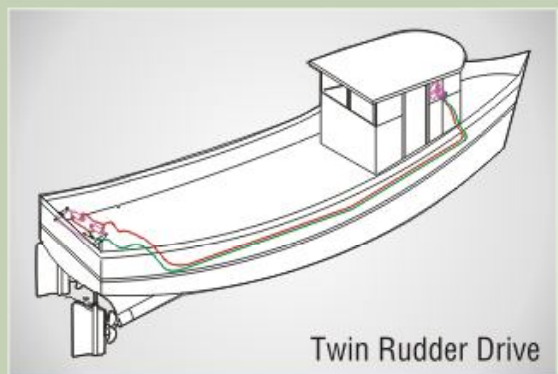
- 1) Twin-Actuators based robust Drive.
- 2) Hydraulic Systems with overload Protection.
- 3) Strain-free operation of Steering Unit.
- 4) Long Maintenance Free service life.
- 5) Upto 45 degree turning from centre to both sides
- 6) Automatic holding of rudder plate position.
- 7) Frictionless, Rust resistant, Coated Seamless Steel tube for oil transmission.
- 8) One time charging of Hydraulic Oil.

#### A) Drive Varients

- 1) Electro Hydraulic Power pack with Joy Stick Control having optional fully Manual Steering system for emergency.
- 2) Electro-Hydraulic Power pack with Helm Pump and steering wheel drive with built-in manual mode for emergency.

#### B) Torque Varients

- 1) JumboZ-500                      2 ) JumboZ – 2800
- 3) JumboZ-4000



### **C) Introduction**

Water borne vessels, big or small, need navigation control to cruise through water and to move through a controlled path. As vessels move forward by pushing the water backward, the guidance of the vessel by turning it right or left can be controlled by directing the pushed water towards respective direction.

Refer schematic on page 1. A plate of steel, connected to a rod, which is extended to a convenient height of the boat deck, is used to deflect water to both sides, according to the requirement of turning. This plate is called RUDDER PLATE and the shaft extending to the deck, connected to the rudder plate is called RUDDER-STOCK. The boat driver will use mechanical or Hydraulic system to turn a arm connected to the rudder-stock to do the turning job.

This arm, used to turn the rudder plate is called TILLER-ARM. Though control of Tiller-Arm is easy for small boats running slow in backwaters /lakes, it requires high effort and skill to hold tiller-arm in right position or turn to required direction in sea, as well as during fast movement in backwaters.

In fast moving, large modern vessels, heavily powered engines are used for propeller rotation, to push of high volume of water backwards. To control the turning of rudder plate against this heavy load of water, modern hydraulic controls are used. These hydraulic systems control the tiller arm movement effortlessly, resulting in precise angular movement of rudder plate and total control over navigation of vessels.

**Mac-N-Hom Systems, with twenty two years of experience in designing and developing Hydraulic systems for various industrial applications, developed six models of hydraulic rudder control systems for In-Board vessels and Two models for Out-Board vessels.**

### **D) Description of Hydraulic Steering System for Rudder Control**

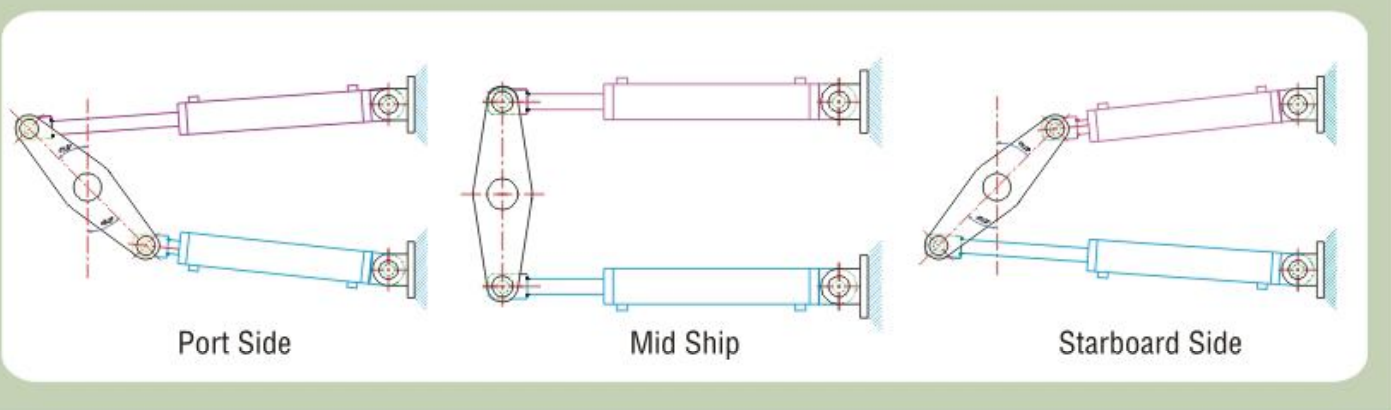
Mac-N-Hom make Hydraulic Steering System for Rudder Control has four sub-sections :

- 1) Heavy Duty Twin Hydraulic Linear Actuators / Rams
- 2) Electro Hydraulic Drive System
- 3) Oil Transmission System
- 4) Instrumentation & Controls

#### **1) Heavy Duty Twin Hydraulic Linear Actuators / Rams**

Twin Hydraulic Linear Actuators are planned, to turn the Tiller-Arm to both sides, smoothly and precisely. Oil supply ports are provided on both sides of this actuators, through which, oil can be supplied to the piston of the actuators.

As pressurised oil is supplied from the Electro-Hydraulic Power Pack to the Linear Actuator, the piston-rods will move forward or backward, depending on, to which supply ports, oil is provided. The Pistonrod-ends / Ram-end of these actuators have flexible connectors and heavy pins which can be coupled to the Tiller-Arm.



## 2) Electro-Hydraulic Drive System

Our Engine driven Electro-Hydraulic System is provided with reliable, built-in systems for Pressure Control, Temperature control and volume control of pressurized hydraulic oil. Thus the system is planned for years of trouble free operation with minimum maintenance effort.

All Mandatory circuit components like Pressure Gauges, Non-Return valves, Pressure Relief Valves, Filler Breather, Suction Strainer, Drain Plugs are provided.



**Joy Stick**



**Steering**



**Electro-Hydraulic Power Pack**

## 3) Oil Transmission system

Thermo Plastic Flexible hoses are used for connections at Linear actuators for frictionless, smooth movement of oil. If the distance between Electro-Hydraulic Powerpack and Hydraulic linear actuators is more than 5 metres, coated seamless steel Tubes will be provided upto connector junctions near Hydraulic Actuators.

Double taper Ferruled Fittings are used to connect all hydraulic elements and piping throughout the system. All control valves are sub-base mounted ( not in-line connectors) for ease of maintenance without disturbing the oil lines.



## 4) Instrumentation and Controls

Customers can select the following Alarms-Audio/Visual

**Power failure alarm**

**Low Pressure Alarm**

**Angular position Extrems-Port & Starboard Alarms**

All control circuit elements are of reputed make like Telemecanique /Schneider / Seimens and wiring details are well documented with ferruled identification. Laminated circuit diagrams will be provided along with supply.

Electronic Rudder Position Indicator can be provided for all versions.

### **Electronic Rudder Position Indicator**

This unit will indicate the angular position of rudder plate and guide the driver through out the travel. The rudder - stock is mounted with a rotary encoder and the angular position of rudder plate is indicated on the display unit. References of zero position, and maximum angular positions on both sides are indicated.



## Endurance- Test-Rig

Quality control system of our Company demands endurance test with cyclic operations of Hydraulic Actuator at various hydraulic pressure levels. We are employing electro hydraulic system based **Endurance-Test-Rig** to ensure quality of balanced hydraulic actuator, that every cylinder supplied is in accordance with highest quality level for long service life. We ensure each and every element supplied to the customer exceeds the demanded service requirements of the system. The system assembled in our **Assembly-Test-Rig**, undergoes rigorous testing before it reaches the customer.



| Specification                                       | JumboZ-500                 | JumboZ -2800               | JumboZ -4000                 |
|---|----------------------------|----------------------------|------------------------------|
| 1. Hydraulic Actuator Ram Size(mm)                  | 40 x 2 Nos                 | 50 x 2 Nos                 | 50 x 2 Nos                   |
| 2. Hydraulic Actuator Thrust (Kgf)                  | 1400@ 50kg/cm <sup>2</sup> | 9590@ 70kg/cm <sup>2</sup> | 13700@ 100kg/cm <sup>2</sup> |
| 3. Hydraulic Torque with Tiller Arm of 300mm (kg.m) | 500                        | 2800                       | 4000                         |
| 4. Hydraulic Actuator Stroke (mm)                   | 440                        | 440                        | 440                          |
| 5. Tiller Arm Type                                  | Double Ended               | Double Ended               | Double Ended                 |
| 6. Tiller Arm Turn                                  | Upto45° both sides         | Upto45° both sides         | Upto45° both sides           |
| 7. Steering System                                  | Steering Wheel             | Joy Stick                  | Joy Stick                    |
| 8. Emergency Manual Steering                        | Built-in                   | Optional                   | Optional                     |
| 9. Low Pressure Alarm                               | Provided                   | Provided                   | Provided                     |
| 10. Temperature Alarm                               | Provided                   | Provided                   | Provided                     |
| 11. Port/Starboard End Alarm                        | Provided                   | Provided                   | Provided                     |
| 12. Rudder Position Indicator                       | Optional                   | Provided                   | Provided.                    |

## Certifications



## Other Models Offered

- JUMBO** : For Fishing Vessels, Barges with In-Board Engine
- BHIMA** : For House Boats, Barges, Large Passenger Boats with In-Board Engine
- CETO** : For Medium size Passenger Boats with In-Board Engine.
- TUNA** : For Ambulance Boats, Honeymoon Boats with In-Board Engine.
- RAPID** : For Medium and Small size boats with Out-Board Engine

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