MAC•N•HOM SYSTEMS

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

ISO 9001:2008 Certified by IRQS

Hydraulic Steering Systems for Boats & Vessels

Model: BHIMA

This model is suitable for Heavy House Boats, Cargo Boats, Passenger Boats with a capacity of 100/200, with IN-BOARD engine Torque on rudder stock upto 1300 Nm and angle of turn upto 45° on both sides .

Model: CETO

This model is suitable for medium & small house boats, Boats with passenger capacity of 20/50 with IN-BOARD engine. Rudder Torque requirement upto 820Nm and angular movement upto 45° on both sides.

Model: TUNA

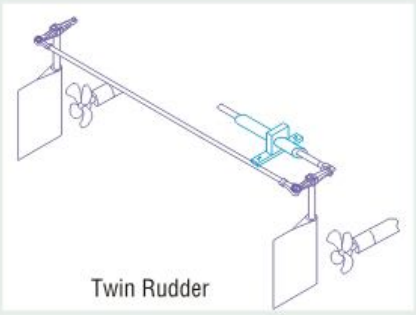
This model is offered to small boats with IN-BOARD engine, used as Ambulance boats, Rescue Boats and Honeymoon Boats with Passenger capacity of 4 to 6. Rudder Torque requirement of upto 520Nm and angular movement of 45° to both sides.

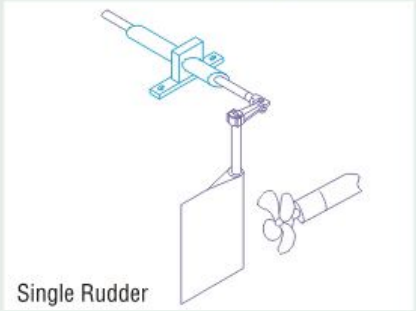
Model: RAPID

This model is offered to vessels with OUT-BOARD engine and it can be directly connected between engine unit and vessel, turn to both sides. Normally used for small high speed boats to carry 4 to 6 passengers.

Features

- Type Approval of IRS (Indian Register of Shipping)
- ISO 9001 : 2008 Certified Company
- Facility to witness testing in Test Rigs in our Inspection Department at Kochi, Kerala, India
- Training facility for installation and maintenance at our Training Centre at Kochi, Kerala, India
- In-House Design capability for development of any type of Hydraulic Steering System for Rudder Control to suit specific customer requirement.
- Availability of Spares
- At-sight installation and testing offered.


Twin Rudder


Single Rudder

Drive Variants

- Manual Hydraulic Drive
- Electro-Hydraulic through steering wheel
- Electro-Hydraulic Joy stick operation
- Electro-Hydraulic Drive - 230 v Ac/24 v Dc/36 vDc

How it works

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.

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 systems to turn a rod connected to the rudder-stock to do the turning job.

This rod, 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 in sea, as well as during fast movement in backwaters.

As the fast-moving / heavy modern vessels use an engine to run a propeller, to push water backwards, they use modern mechanisms to guide the vessel. In these vessels, angular movement of rudder-plate is precisely and efficiently controlled by Hydraulic actuators, driven by closed-loop manual/ diesel-run hydraulic systems.

Based on mounting position of the engine, vessels are classified into two. In-Board Vessel, with engine mounted inside the vessel, and Out-Board vessel with engine mounted outside the vessel, preferably backside of vessel.

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

Description of Hydraulic Rudder Control Systems

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

1) Hydraulic Drive system

a) Manual b)Electro/Engine

In manual drive system, which is opted by 95% of the medium and small vessels, a steering wheel drive with a Helm Pump is provided, to supply pressurized oil to the system. By rotating a steering wheel, a driver can effortlessly pump oil required, to the Linear Actuator to turn the Tiller-Arm.

In Electro/Engine drive system, an Electric Motor driven / Engine Driven Powerpack, is providing the pressurised oil to the system. Hydraulic pump is coupled to a shaft, driven by Engine/ Electric Motor.

2) Balanced Hydraulic Linear Actuator

A Balanced Hydraulic Linear Actuator is planned, to turn the Tiller-Arm to both sides of the vessel, smoothly and precisely. Oil supply ports are provided on both sides of this actuator, through which, oil can be supplied to the piston of the actuator. As pressurised oil is supplied from the Helm Pump to the Linear Actuator, the piston-rod will move forward or backward, depending on, to which supply port, oil is provided. The Pistonrod-end / Ram-end of this actuator has a flexible connector, which can be coupled to the Tiller-Arm.

As the driver rotates the steering wheel to one side, oil filled in the circuit flows from one side of the circuit to the other side of the circuit, enabling the Pistonrod of Actuator to move from one side to the other. When the driver rotates in opposite direction, the same process will repeat resulting Pistonrod movement in the opposite direction.

3) Oil Transmission system

Thermo Plastic Hoses, as well as Coated Seamless Steel Tubes are recommended for transmission of oil from the Helm Pump to the Hydraulic Actuator.
In small boats, Thermo Plastic hoses will be sufficient. But in longer vessels, Coated Seamless Steel tubes are recommended between Thermo Plastic hoses at the Helm Pump-end and Actuator-end.

4) Oil Feeding and Priming System

To feed oil in the circuit, a Filler Breather is provided on top of a Reservoir Unit mounted on the Helm Pump. After filling oil in the Reservoir, drive-shaft of the Helm Pump is rotated in one direction by a Steering Wheel. Oil will flow to that side of the circuit and air trapped in the other side will escape through a special attachment in the Reservoir. On rotating the Steering Wheel to the other side, any air trapped in the first side will escape through the attachment. Two repeated efforts will make the full driving system ready for driving.
An Oil Level Indicator is mounted on the Reservoir Unit for monitoring quantity of oil in the circuit.

Supporting Accessories for Rudder Control

1) Hydraulic Gear Shifting System

2) Electronic Rudder Position Indicator

This unit will indicate the angular position of rudder plate and guide the driver through out the travel.

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		Bhima	Ceto	Tuna
1. Hydraulic Actuator Ram Size(mm)		25	20	16
2. Hydraulic Actuator Thrust @40kg/cm²(Kgf)		588kgf (5768 N)	376kgf (3688 N)	240kgf (2350 N)
3. Hydraulic Torque @ Tiller arm length	180mm (45°)	105.8kgf (1038 N)	67.7kgf (664 N)	43.2kgf (424 N)
	220mm (35°)	129.4kgf (1270 N)	82.7kgf (811 N)	52.8kgf (518 N)
4. Hydraulic Actuator Stroke		260mm	260mm	260mm
5. Tiller Arm Turn		Upto45° both sides	Upto45° both sides	Upto45° both sides
6. Steering System		Steering Wheel /Joy Stick		
7. Number of turns Standard		4+4	2½ + 2½	2 + 2
Optional		2+2	1½ + 1½	1 + 1

Certifications


Indian Register of Shipping


IRCLASS
CERTIFICATE OF APPROVAL


Indian Register of Shipping

Other Models Offered

JUMBO : Balanced Hydraulic Actuator for Fishing Vessels

JUMBOZ : Twin Cylinder Hydraulic Actuator-3 versions:

JumboZ - 500 for fishing vessels

JumboZ - 2800 for Barges

JumboZ - 4000 for Heavy Vessels

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