



*Partner with us in  
Hydraulic Steering  
to Make Sailing Safer*



# Quality Policy



We, Mac-N-Hom Marine Equipments (P) Ltd., are committed to providing quality products and systems related to Marine Hydraulics and Marine Automation to our customers, in line with their applications.

We will deliver quality service in technical consultancy, training, installation, and maintenance of Marine Hydraulic and Automation products for our partners.

We will ensure that our products are economically viable and meet customer requirements.

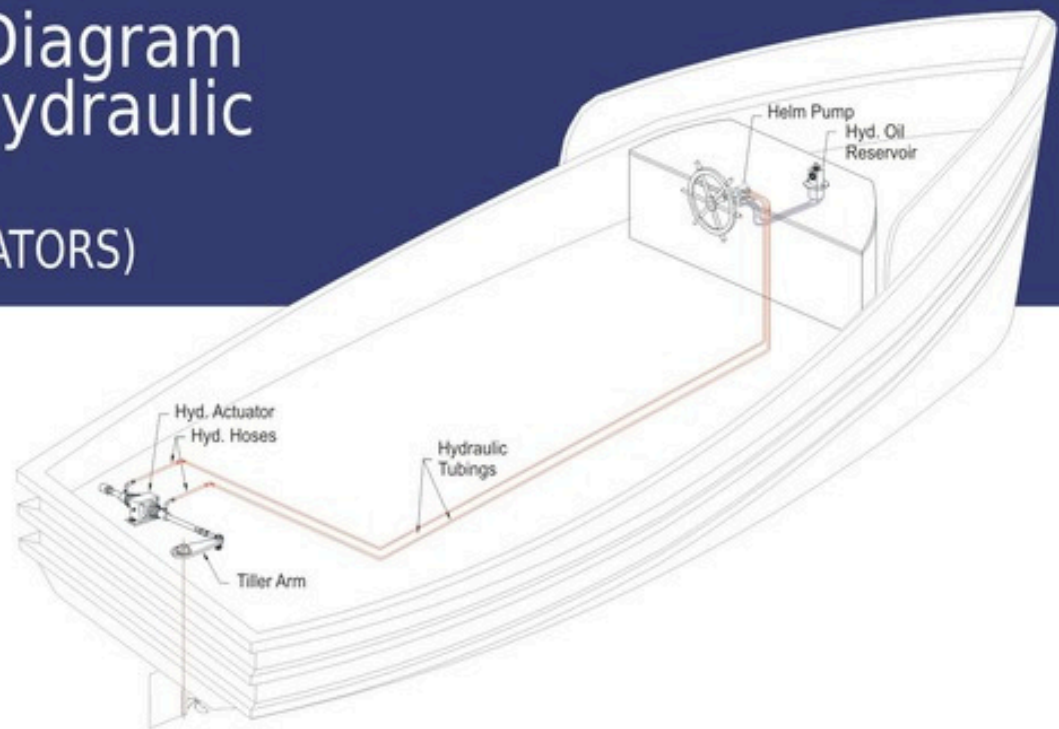
We believe in maintaining the highest level of ethics in business and strive to impart knowledge-based awareness among our employees, customers, and business associates to create goodwill and promote good business practices.

We will put in continuous efforts to create better products and provide better services by improving our creative skills and enhancing our service practices, while complying with safety, standards, and regulatory requirements.

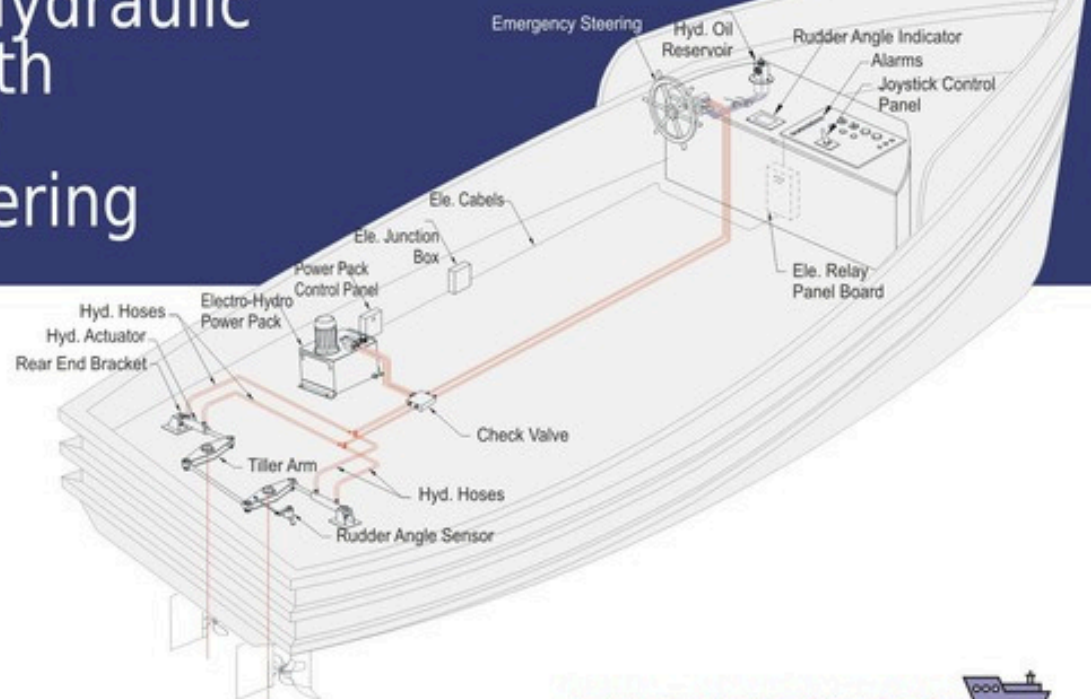
Team Mac · N · Hom



# Schematic Diagram of Manual-Hydraulic Steering (BALANCED ACTUATORS)



# Schematic Diagram of Electro-Hydraulic Steering with Emergency Manual steering

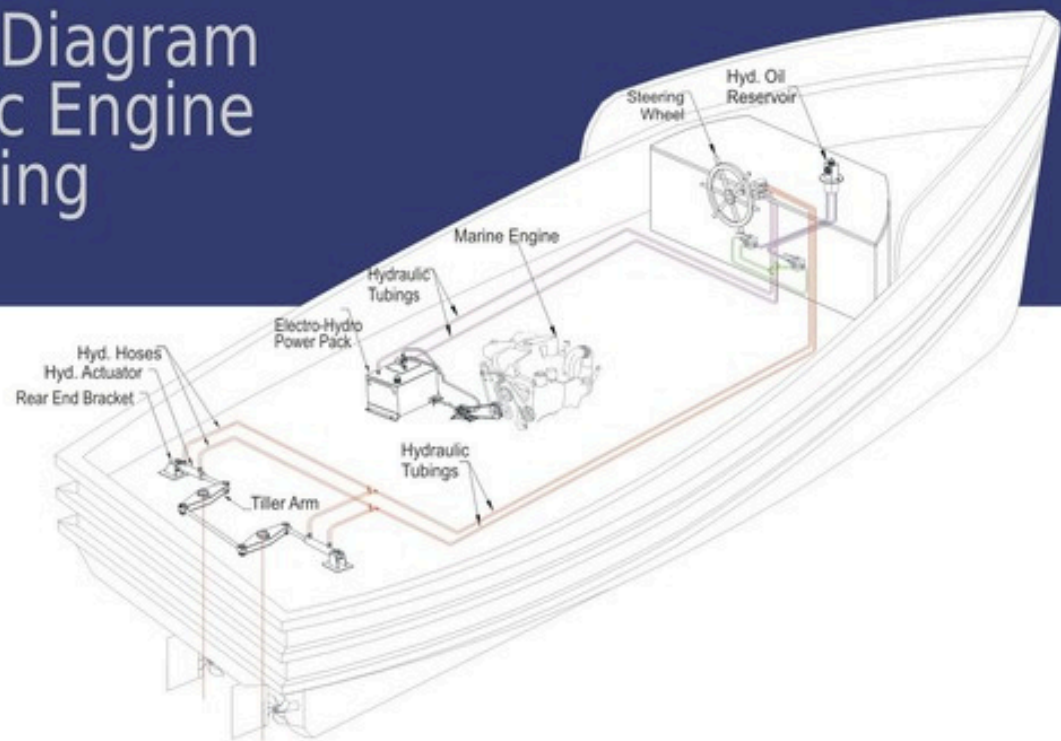


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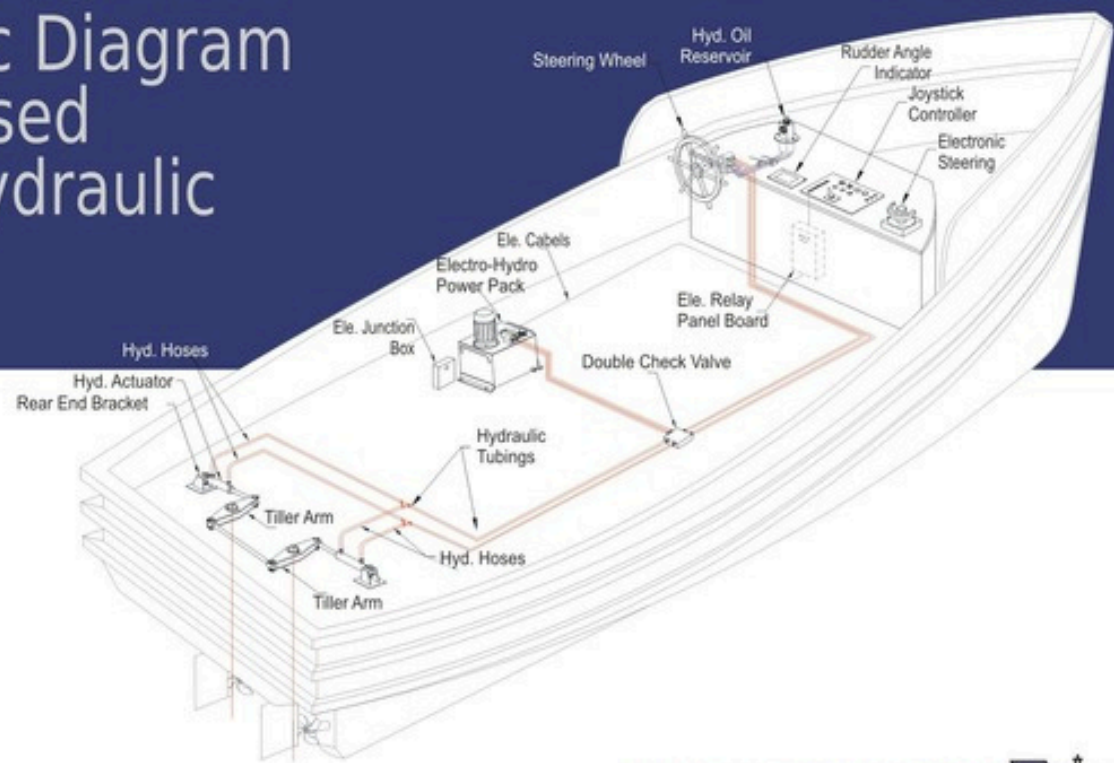




# Schematic Diagram of Hydraulic Engine Drive steering



# Schematic Diagram of PLC Based Electro-Hydraulic Steering



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# Hydraulic Steering Actuators

Model : JumboZ-2800



**For Heavy Cargo Barges | Heavy Duty Fire Floats | Tugs & Landing Craft**

- Torque rating up to 2854 Kg.m
- Tiller Arm turn up to 45 degrees on both sides
- Used in Catamaran & Mono Hull vessels
- Used in Deep Sea Ambulances / Cargo Barges & Water Barges
- Heavy Duty Ram Size: 50mm x 2nos

## Electro-Hydraulic Package:

- ★ Joystick Control Panel with Audio Visual Alarms
- ★ Hydraulic Power pack & Sensors
- ★ Emergency Manual-Hydraulic Steering
- ★ Marine Painted Ferruled seamless steel Tubes & Hoses
- ★ Hydraulic Actuators- **JumboZ-2800** 1set

**Model Type : Twin- Actuators**

**(IRS Type Approved)**

**Ram Dia : 50 mm x2**

**Stroke : 440 mm**

**Torque : 2854 Kg.m for a Tiller Arm having Radius 300 mm**



**Fire Floats-2 Nos**  
Khulna Shipyard, Bangladesh



**Bollard Pull Tug-Sambhavya**  
Kakinada, Andhra Pradesh



**69 M Landing Craft**  
Water Ways Shipyard P. Ltd.,



**Special Purpose Barges**  
Shreeji Shipping, Jamnagar

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# Hydraulic Steering Actuators

Model : JumboZ-1500



**Tugs & Bollard Pullers | Medium Barges | Heavy Duty  
Purse-sein Trawler | Fishing Vessels**

## 1. Electro-Hydraulic Package:

**Model: JumboZ-1500-E**

- Joystick Control Panel • Relay panel
- Powerpack panel • Junction box
- Hydraulic Power pack & Sensors
- Emergency Manual-Hydraulic Steering
- Marine Painted Ferruled Tubes & Hoses
- Hydraulic Actuators-**JumboZ-1500** - 1set

## 2. Engine Driven-Hydraulic Package:

**Model: JumboZ-1500-ED**

- Jacketed Hydraulic Power pack with sea water cooling provision
- Steering Wheel-Wooden (Dia. 27") / SS (Dia.24")
- Helm Pump, Steering Column & Self priming unit
- Marine Painted Ferruled Seamless steel Tubes & Hoses
- Emergency Manual-Hydraulic Steering
- Hydraulic Actuators-**JumboZ-1500** - 1set

**Model Type : Twin - Actuators  
(IRS Type Approved)**

**Ram Dia : 45 mm x 2**

**Stroke : 440 mm**

**Torque : 1778 Kg.m for a Tiller Arm having  
Radius 300 mm**

- Torque rating up to 1778kg.m
- Tiller Arm turn up to 45 degrees on both sides
- Used in Catamaran & Single Rudder vessels  
Cargo barges / water barges & deep sea vessels
- Heavy Duty Ram Size: 30mm x 2nos



**Tug Vessel-'Rudra Pride'**  
Venture Sea Transport-Mumbai



**MV LGT Navya Barge-2 Nos**  
Konkan Barge Builders Pvt. Ltd.,



**AL Sharqiyyah-2,**  
Oman

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# Hydraulic Steering Actuators

Model : JumboZ-500



**Tugs & Bollard Pullers | Medium Barges | Heavy duty  
Purse-seins Trawler | Fishing Vessels**

- Torque rating up to 714 Kg.m
- Tiller Arm turn up to 45 degrees on both sides
- Used in Catamaran & Single Rudder vessels
- Used in Cargo Barges/Water Barges & Deep sea Ambulances
- Heavy Duty Ram Size: 40mm x 2nos

## **Electro-Hydraulic Package:**

### **Model: JumboZ -500-E**

- Joystick Control Panel with Audio Visual Alarms
- Hydraulic Power pack & Sensors
- Emergency Manual-Hydraulic Steering
- Marine Painted Ferruled seamless steel Tubes & Hoses
- Hydraulic Actuators-**JumboZ-500** - 1set

## **Manual-Hydraulic Package:**

### **Model: JumboZ -500-M**

- Steering Wheel-Wooden/SS
- Helm Pump & Steering Column
- Marine Painted Ferruled Seamless Steel Tubes & Hoses
- Hydraulic Actuators- **JumboZ- 500** - 1set

## **Model Type : Twin-Actuators**

(IRS Type Approved)

**Ram Dia** : 40 mm x 2

**Stroke** : 440 mm

**Torque** : 714 Kg.m for a Tiller Arm having  
Radius 300 mm



Tug Vessel  
Maya Marine, Bhavanagar



Inspection Barges for Indian Navy  
Valeth Hightech Composites P. Ltd.,



'KVU QUEEN' Cruise Vessel  
Afrinest Eng. Ltd-Rwanda

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# Hydraulic Steering Actuators

Model : JumboZ-300



## Medium Barges | High Speed Passenger Boats Purse-Seins & Trawler Fishing Vessels

- Torque rating up to 300kg.m
- Tiller Arm turn up to 45 degrees on both sides
- Used in Catamaran & Single Rudder vessels
- Used in Purse-sein & fishing Trawler vessels
- Heavy Duty Ram Size: 30mm x 2nos

### Electro-Hydraulic Package:

#### Model: JumboZ 300-E

- Joystick Control Panel with Audio Visual Alarms
- Hydraulic Power pack & Sensors
- Emergency Manual-Hydraulic Steering
- Marine Painted Ferruled seamless steel Tubes & Hoses
- Hydraulic Actuators- **JumboZ-300** -1 set

### Manual-Hydraulic Package:

#### Model: JumboZ 300-M

- Steering Wheel-Wooden/SS
- Helm Pump, Steering Column & Self priming unit
- Marine Painted Ferruled Seamless Steel Tubes & Hoses
- Hydraulic Actuators- **JumboZ- 300** -1 set

### Model Type : Twin-Actuators

Ram Dia : 30 mm x 2

Stroke : 260 mm

Torque : 300 Kg.m for a Tiller Arm having  
Radius 180 mm



Gajalakshmi Industries  
Mumbai



Catamaran Cruise Boat  
Goa



Fishing Vessel  
Mangalore



Fishing Vessel  
Mangalore

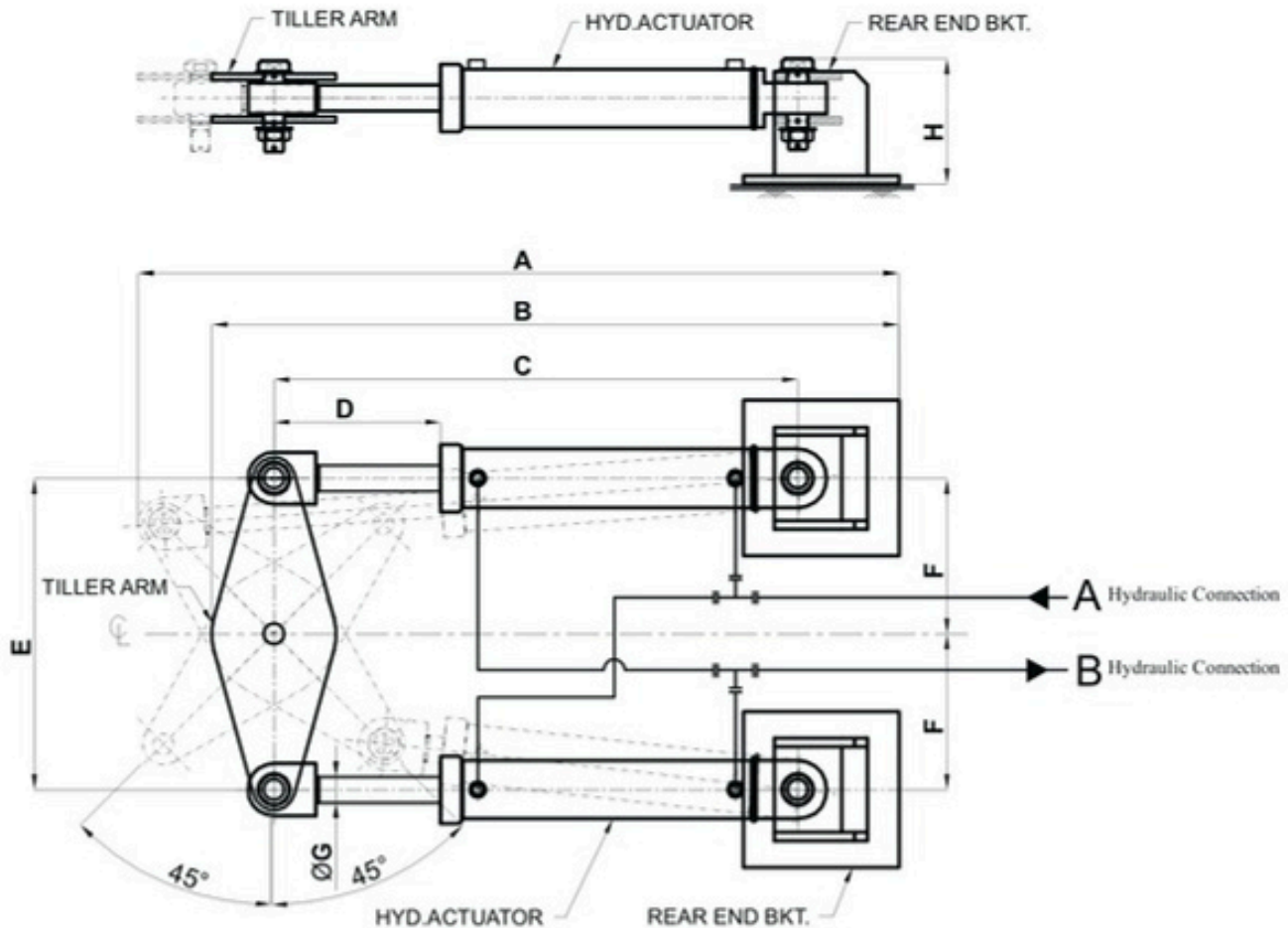
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# Mounting Arrangements of Hydraulic Actuators-Jumboz series

JUMBOZ	A	B	C	D	E	F	ØG	H
2800	1472	1330	1015	322	600	300	50	241
1500	1414	1297	1015	320	600	300	45	192
500	1423	1291	1015	323	600	300	40	192
300	942	844	710	210	440	150	30	XX

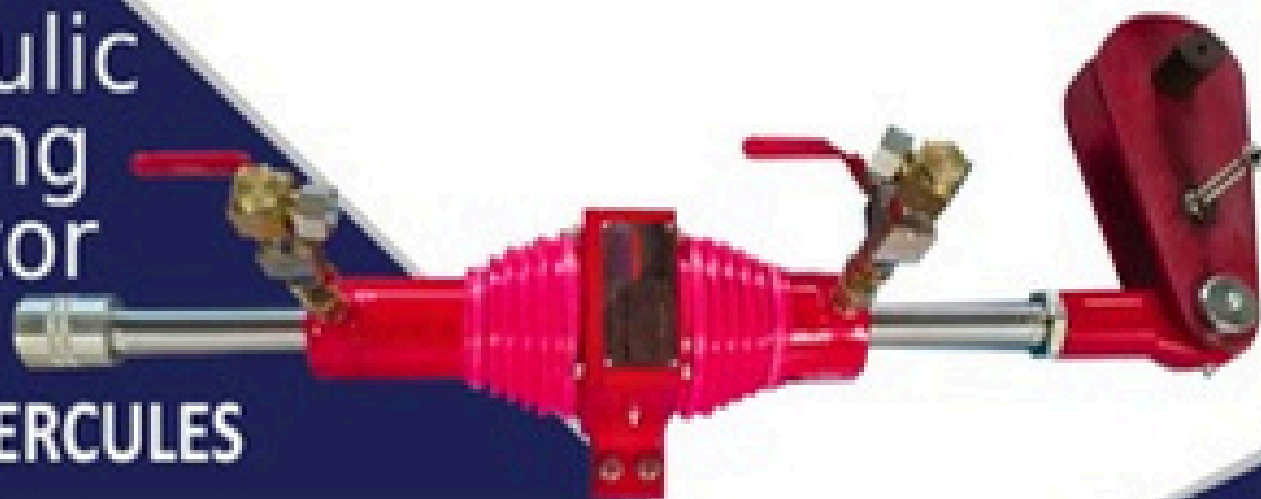


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# Hydraulic Steering Actuator

Model : HERCULES



Balanced Hydraulic actuators-

**Model: HERCULES** With Swivel Rod Eye to Connect with Tiller Arm

**Manual-Hydraulic Package:**

**Model: Hercules-M**

- Steering Wheel - Wooden/SS
- Helm Pump, Steering Column & Self priming unit
- Marine Painted Ferruled Seamless steel Tubes & Hoses
- Hydraulic Actuators-**HERCULES**

**Electro-Hydraulic Package:**

**Model: Hercules-E**

- Joystick Control Panel
- Hydraulic Power pack & Sensors
- Emergency Manual-Hydraulic Steering
- Marine coated Ferruled Tubes & Hoses
- Hydraulic Actuators-**HERCULES**

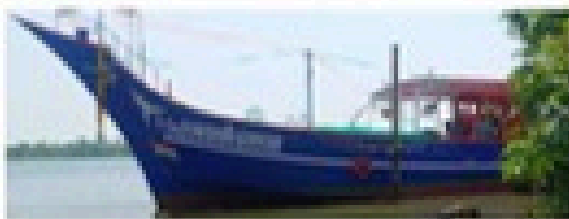
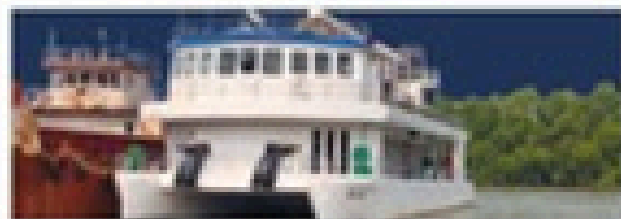
**Model Type : Balanced Actuator (IRS Type Approved)**

**Ram Dia : 40 mm**

**Stroke : 260 mm**

**Torque : 317 Kg.m for a Tiller Arm having Radius 220 mm**

- More than 150 installations in Passenger Ferries of 100/200 pax, Medium Barges, Patrol Boats.
- Torque Rating of 3111Nm (with 220mm Tiller Arm)
- Heavy Duty Ram size: 40mm
- Second Thread on other end Piston Rod for Emergencies.
- 12 Months Warranty against Manufact. Defects
- On-Line Installation and Service Support
- Spares including Seal kits readily available



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# Hydraulic Steering Actuators

## Model : BHIMA



Balanced Hydraulic actuators- **Model: BHIMA**  
With Swivel Rod Eye to Connect with Tiller Arm

Ferry boats of 75-200 Pax. | Concrete Transportation  
Barges | Large House Boats | Solar Ferries |  
Propulsion Barges

**Manual-Hydraulic Package:**

**Model: Bhima-M**

- Steering Wheel - Wooden/SS
- Helm Pump, Steering Column & Self priming unit
- Marine Painted Ferruled Seamless steel Tubes & Hoses
- Hydraulic Actuators-**BHIMA**

**Electro-Hydraulic Package:**

**Model: Bhima-E**

- Joystick Control Panel
- Hydraulic Power pack & Sensors
- Emergency Manual-Hydraulic Steering
- Marine coated Ferrules Tubes & Hoses
- Hydraulic Actuators - **BHIMA**

**Model Type : Balanced Actuator (IRS Type Approved)**

**Ram Dia : 25 mm**

**Stroke : 260 mm**

**Torque : 76.5 Kg.m for a Tiller Arm having  
Radius 180 mm**

- More than 150 installations in Passanger Ferries of 100/200 pax, Rescue Boats, Medium House Boats.
- Torque Rating of 750Nm (with 180mm Tiller Arm)
- Heavy Duty Ram size: 25mm
- Second Thread on other end Piston Rod for Emergencies.
- 12 Months Warranty against Manufact. Defects
- On-Line Installation and Service Support
- Spares including Seal kits readily available



100 Pax Passenger Ferries-52 Nos  
SWTD-Kerala



Aditya- India's First Solar  
Powered Ferry-Kerala



DHEU-NG-Electric Ferry  
Garden Reach Ship Builders- Kolkata



100 Pax Solar Hybrid Passenger  
Boats-Kochi Water Metro-23 Nos

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# Hydraulic Steering Actuators

Model : CETO



Balanced Hydraulic actuator- **Model: CETO** With Swivel Rod Eye to Connect with Tiller Arm

For Passenger boats upto 50 Pax | Survey Vessels | Ambulance/Rescue Boats | Shikkara Boats

## Manual-Hydraulic Package:

### Model: Ceto-M

- Steering Wheel - Wooden/SS
- Helm Pump, Steering Column & Self priming unit
- Marine Painted Ferruled Seamless steel Tubes & Hoses
- Hydraulic Actuators-**CETO**

## Electro-Hydraulic Package:

### Model: Ceto-E

- Joystick Control Panel
- Hydraulic Power pack & Sensors
- Emergency Manual-Hydraulic Steering
- Marine coated Ferrules Tubes & Hoses
- Hydraulic Actuators - **CETO**

## Model Type : Balanced Actuators (IRS Type Approved)

Ram Dia : 20 mm

Stroke : 260 mm

Torque : 51 Kg.m for a Tiller Arm having Radius 180 mm

- More than 100 installations in Passanger Ferries of 50 pax, Rescue Boats, Medium House Boats.
- Torque Rating of 500Nm (with 180mm Tiller Arm)
- Heavy Duty Ram size: 20mm
- Second Thread on other end Piston Rod for Emergencies.
- 12 Months Warranty against Manufact. Defects
- On-Line Installation and Service Support
- Spares including Seal kits readily available



Suryamshu Cruise Vessel  
KSINC-Kochi



Akshar River Cruise  
Wadia Boats-Bilimora



Rescue Boat  
SWTD, Kerala



Passanger Boat  
Sheba Marine-Pondicherry

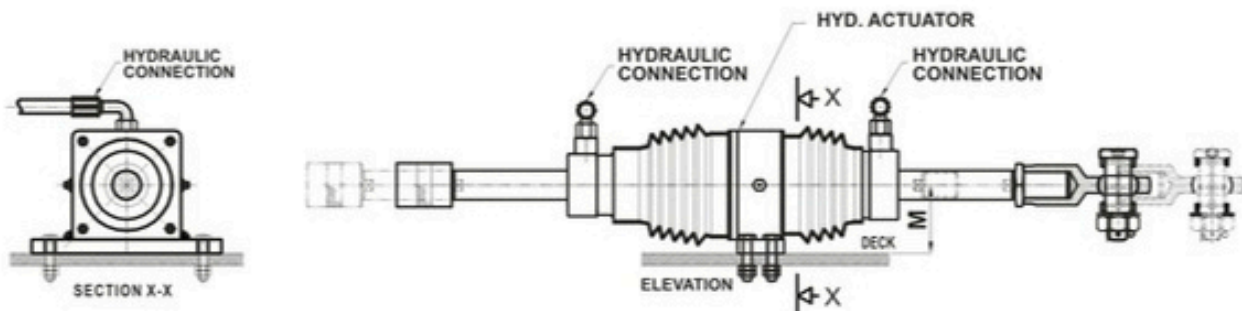
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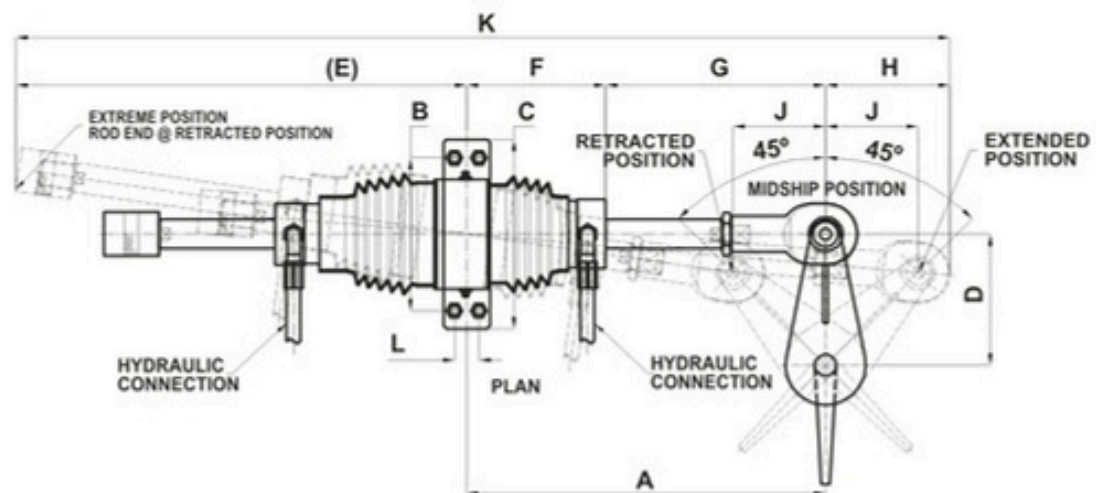


# Mounting Arrangements of Balanced Hydraulic Actuators

Balanced Actuators	A	B	C	D	E	F	G	H	J	K	L	M
Hercules	493	210	260	180 (220 in 35°)	620	191	302	169	127	1281	34	94
Bhima	449	190	235	180	604	183	266	155	127	1209	0	80
Ceto	420	185	230	180	444	198	222	123	103	1066	0	68



## TILLER ARM FOR $\pm 45^\circ$ TURN FROM MIDSHIP



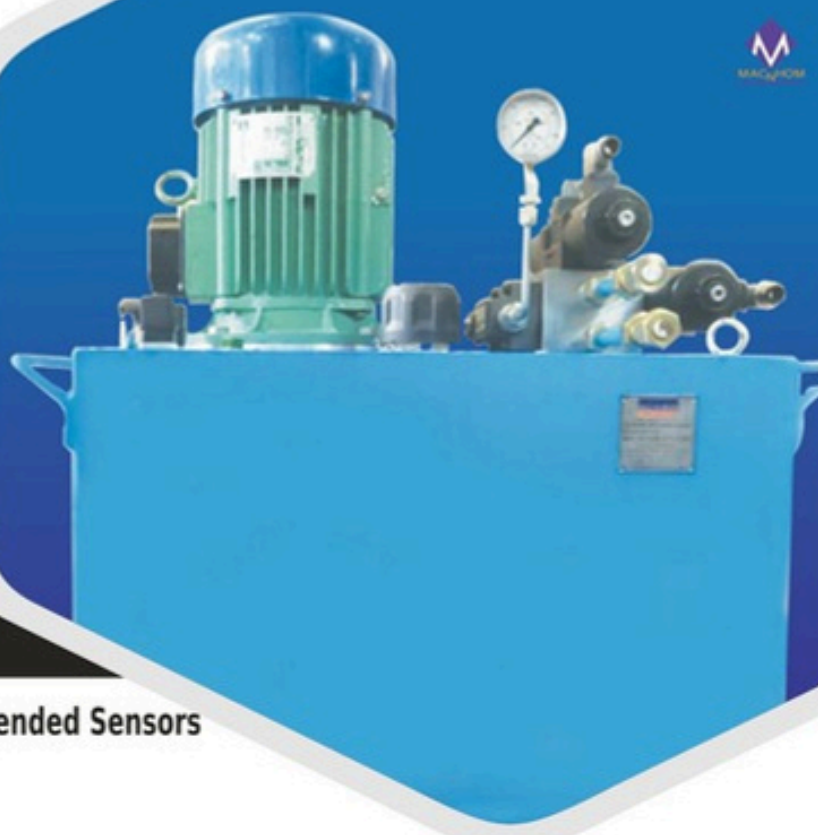
All dimensions in mm

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# Marine Electro- Hydraulic Power Packs

Single Electric Motor (AC) Type with IACS recommended Sensors



**Twin-Electric Motor (AC) Type  
with IACS recommended Sensors**

Joystick operated control panel for Twin-Motor Electro-Hydraulic Power Pack can be offered.  
Automatic Switch over from One motor to other can be offered.



**Twin-Motor Aluminium Construction  
Power Pack with IACS recommended  
Sensors**

- Aluminium Reservoir
- Aluminium Body Electric Motor
- Aluminium Body Manifold for Valves
- Low weight, Lesser draft, Better cooling

Joystick operated control panel for Twin Motor Electro-Hydraulic Power Pack can be offered.  
Automatic Switch over from One motor to other can be offered.



**DC (Direct Current) Type  
Hydraulic Power pack**

- Battery / Solar Boat Applications
- DC Motor
- DC Control Valves etc...



**Jacketed Hydraulic  
Power pack**

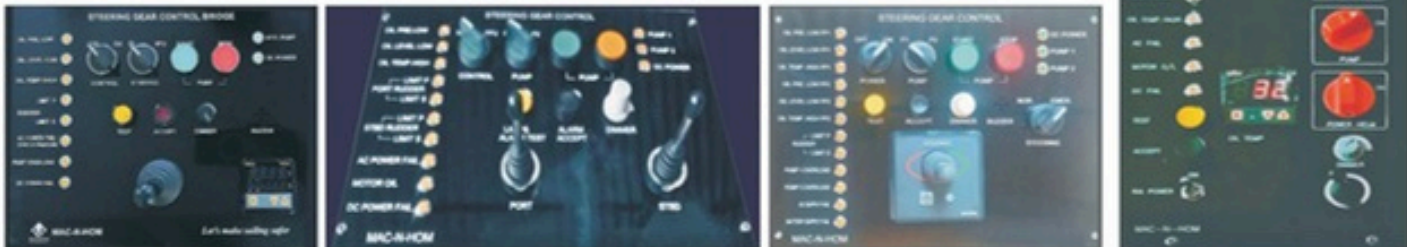
- Sea water inlet & outlet facility for Efficient Oil Cooling
- Engine-Driven Steering Applications

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# Marine Control Panels



**Joystick - Steering Gear Control Panel versions with Class Approved Alarms**

We manufacture Steering Gear System related Standard and Customised **CONTROL PANELS**.

- 0.5 to 2HP 1 Phase Single Motor or Twin Motors.
- 0.5 to 5HP 3 Phase Single Motor or Twin Motors.



**Relay Panel**



**Power Pack Panel**



**Junction Box**

## Full Follow Up (FFU)

FFU Control in a vessel is a critical part of closed-loop Electro-Hydraulic steering Systems, Ensuring precise and automatic alignment of Rudder, according to Helm Commands.



**Electronic Steering**



**Control Panel**



**Feedback System**

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# Rudder Angle Sensor & Analogue Indicator-RAI



## Wiring Guidelines

- To prevent the risk of electric shock power supply to the equipment must be kept off while doing the wiring arrangement. Do not touch the terminals while power is being supplied
- Cable used for connection to power source must have a cross section of 1mm<sup>2</sup> or greater. These wire shall have insulation capacity made of at least 1kV.
- Fuse protection: The unit is normally supplied without a power switch and fuses. Make wiring so that the fuse is placed between the main power supply switch and the controller

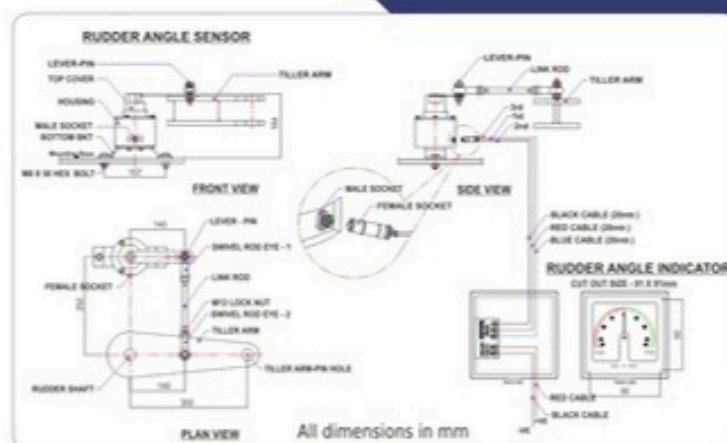
## Connection Procedure

1. Supply Voltage:24VDC
2. 3 core cable provided should be laid as the end with connector comes near to Rudder Feedback Unit / Rudder Angle Sensor, the connector should be connected to Rudder Feedback unit /Rudder Angle Sensor.
3. Connect positive 24 VDC to terminal no.4, negative 24VDC to terminal no.5.
4. 3 core cable from sensor to be connected to indicator as mentioned. Brown wire to terminal no.2, black wire to terminal no.1 and blue wire to terminal no.3.

## Specifications:-RAI

Supply Voltage : 24VDC  
 Total Power : 3.5Watt  
 Meter Angle : 45-0-45  
 Meter Dimension: 96 X 96 X 82 mm  
 Cut out size : 91 X 91mm

Terminal Connection		
1	2	3
Servo Pot		
2nd	1st	3rd
4	5	
+VE	Com	
Supply 24V DC		



## Maintenance

1. The equipment, should be cleaned regularly to avoid blockage of ventilating parts.
2. Clean the equipment with a clean soft cloth. Do not use isopropyl alcohol or any other cleaning agent

## Rudder Angle Sensor (RAS) Installation Guidelines

1. Ensure the top side of both sensor and tiller arm are at same height level and form right angle with respect to connection rod assembly.
2. Ensure both ends of the connection rod assembly are at same height level.
3. Mounting bolt of sensor tightened properly.
4. Grease should be applied at every moving part of the sensor and connection rod.





- To prevent the risk of electric shock power supply to the equipment must be kept off while doing the wiring arrangement.

- Braid Shielded Cable used for connection to power source must have a cross section of  $0.5\text{mm}^2$  or greater. These wire shall have insulation capacity made of at least 1kV.

[illegible]

1. Supply Voltage:24VDC

2. 3 core cable provided should be laid as the end with connector comes near to Rudder Feedback Unit / Rudder Angle Sensor, the connector should be connected to Rudder Feedback unit /Rudder Angle Sensor.
3. Connect: As per sketch MME/EL-26
4. Ensure 24 VDC supply-R-RED (+ve), B-Black (-ve), Green (Earth). Plug as per Tag. 3pin-Tag, 5pin round connector as per sketch

Supply Voltage : 24VDC  
Total Power : DRI-HP.. 4 W,  
DRI-H.. 1W  
Meter Angle : 45-0-45  
Meter Dimensions : 170 X 140 X 165 mm  
Cut out size : 145<sup>+1</sup> X 100<sup>+1</sup> mm

1. The equipment, should be cleaned regularly to avoid blockage of ventilating parts.
2. Clean the equipment with a clean soft cloth. Do not use isopropyl alcohol or any other cleaning agent

1. Ensure the top side of both sensor and tiller arm are at same height level and form right angle with respect to connection rod assembly.
2. Ensure both ends of the connection rod assembly are at same height level.
3. Mounting bolt of sensor tightened properly.
4. Grease should be applied at every moving part of the sensor and connection rod.



# Bilge Water & Smoke Alarm Unit (Model : MM-BS-1X1)



Fig.1: Front view of Alarm Unit

## Description

Bilge Water & Smoke Alarm unit is designed to detect water and smoke. The primary purpose of this controller is to detect water that can be in boat bilges as well as smoke that may appear in the boat engine room. In case of detection, an LED will indicate light and alarm will give sound. The unit can also be used for various safety applications that require detection of water and smoke.

## SPECIFICATION

Model number	: MM-BS-1X1
Power supply	: 12 to 24 VDC
Ready	: LED indication (ready)/ Buzzer on/off
Input	: By Bilge Water sensor (1no) : By Smoke sensor (1 no)
Reset	: To reset the smoke sensor
Test	: Push switch to test unit buzzer ready
Output	: By LED status display
(a) On Water level	: LED glows with alarm
(b) On Smoke detection	: LED glows with alarm
Operating temperature	: 5-50 °C
Panel dimension (w x h x d)	: 144 x 72 x 90 mm
Application	: For detection of water and smoke in boats (Bilge Area & Engine Room)

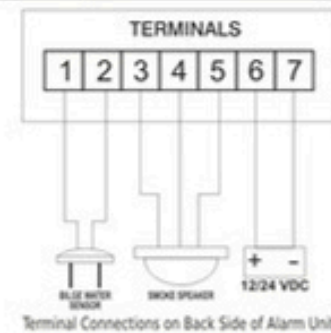


## The main features of the equipment:

- ❖ Easy to install- no expertise required.
- ❖ The controller operates on 12V/24V DC power source.
- ❖ Easy to operate.
- ❖ High accuracy.
- ❖ Compact and Portable

## Terminal Details

TERMINAL NUMBER	DESCRIPTION	
1	LEVEL SENSOR	INPUT
2		COM
3	SMOKE SENSOR	VCC
4		GND
5		LOAD
6	12 - 24 VDC	VCC
7		GND



Terminal Connections on Back Side of Alarm Unit

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# Out Board Hydraulic Actuators



## Hydraulic Steering Systems for Out Board Boats

### Selection of Hydraulic Helm Pump

Hydraulic Helm Pump Assembly is selected based on number of Turns of steering wheel, from Port Side Hard to star board side Hard movement of Outboard Engine. "Lesser the Number of Turns, More the Effort to turn" is the Rule of Manual-Hydraulic Steering. Please refer the Technical Data Chart to know the details.

### Selection of Hydraulic Hose/Stainless Steel Fittings

We recommend, Flexible Braided Hydraulic Hoses for transmission of Oil for Small Boats, and a combination of small length Hydraulic Braided hoses at the Helm Pump and Actuator ends for flexibility and Marine Protective coated Seamless Steel Tube in the Middle area of vessel. We recommend and Supply Hydraulic Fittings with SS316L material

### Other factors to be considered during selection

**Propeller selection:** Larger The Propeller, Heavier Actuator to be selected Sea Going/Inland Vessel. Sea Going Heavier Actuators



### Rapid - Emperor:

Planned for Outboard engines above 115HP to 400HP. Ideal for Twin Outboard Engine Configurations.

### Rapid - Prince:

Planned for Outboard engines upto 115HP. A Cute Model for Small and Medium HP Boats. Very Compact and Quick Responding Type

### Speed of Vessel:

Our Model: Rapid-Prince has a Limiting Speed of 35 Knots  
Our Model: Rapid-Emperor has a limiting speed of 50 Knots

### Features:

- ❶ IACS member M/s Indian Register of Shipping (IRS) Approved Design
- ❷ Compact, Zero-leak Hydraulic System.
- ❸ Smooth and Firm Steering, while "Stay-where-you-stop" facility.
- ❹ Hands-free experience.
- ❺ Zero maintenance for long service years

### Technical Data Chart

Description	Prince	Emperor
1. Axial Thrust	207 Kgf @ 50Kg/Cm <sup>2</sup>	471 Kgf @ 50Kg/Cm <sup>2</sup>
2. Torque (Pivot to Tillerpin -180mm)	37Kg.m	84 Kg.m
3. Turns of Steering with		
42cc/rev Helm Pump (Approx.)	1+1	2½ + 2½
20cc/rev Helm Pump (Approx.)	2+2	5 + 5

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