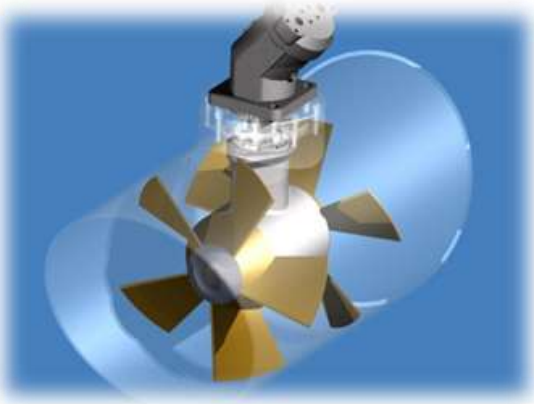
PT. Marine Propulsion Solutions

BTM Thruster Series

Dual Propeller / Counter Rotating Systems



- **Bow and Stern Thruster Systems**
- **Retractable - Rotatable & Swing Thrusters**
- **Variable Speed Electric Drives**
- **Hydraulic Drive Systems**
- **Direct Engine Drives**

Specifications are subject to change without notice **2017**

MPS Dual Propeller – Contra Rotating Thruster Systems

PT. Marine Propulsion Solutions (MPS) Thruster Systems are offered for Work Boats, Crew Boats, Fishing Vessels, Yachts and vessels ranging from 15 to 75 meters … ***designed to provide any vessel maximum Maneuverability with "Silent" and Reliable operation.***

PT. Marine Propulsion Solutions, is recognized as one of the world's leading Electric Podded Thruster and Propulsion Systems Manufacturer. It now introduces its unique Dual Propeller-Contra Rotating Transverse Tunnel Thruster Systems designed for all types of Marine vessels*.*

Owner/Operator benefits:
• Propeller speed is independent of engine speed leading to better maneuverability
• Maximum System Efficiency
• Reduced noise & vibration levels

Shipyard & Construction benefits:
• Flexible machinery arrangement
• Modularized design
• Simpler vessel machinery installation
• No Alignments required

Design:

MPS Propulsion Systems' through-hull Electric Podded Drives are engineered products of European design based on the latest marine propulsion technologies, ANSYS Finite Element Analysis and the most modern manufacturing technologies available. They are of very heavy duty design and incorporate many unique features to optimize reliability, longevity and easy maintenance.

Designed for Hydrostatic Hydraulic Drives (Open or Closed Loop) and…Variable Speed Electric AC Drives.

"A Thruster System that is Efficient and Reliable"

Using the **Dual Propeller–Counter Rotating design**, a highly efficient thruster system has been developed that recovers rotational lost energy and maximizes thrust in a smaller tunnel diameter.

The drive motor is mounted directly to the thruster by using a hollow shaft configuration (standard SAE/DIN sizes) for input shafts from electric or hydraulic motors or from an optional stub shaft configuration (for direct drives), eliminating the need of the adapter housing and coupling; it uses an isolation rubber foundation to eliminate vibration. The complete thruster unit is compact, efficient, "SILENT" … and ruggedly designed for the Marine ***Vessel of today.***

This system has been designed for today's Marine Vessel, meeting all Class Requirements for vessels ranging from 45 to 250 feet (14 to 75 meters).

Thrusters are designed with spiral beveled, right angle gears suitable for electric, diesel engine or hydraulic drives. The versatile series of MPS Thrusters allows installation with the drive vertical or horizontal. Installation may be varied therefore, to suit the needs of a specific, vessel design, providing possible space savings and convenient maintenance access.

The thruster hollow-shaft splined drive and propeller shafts are made of high strength stainless steel, and contain anti-friction taper roller bearings.

The gears are spiral beveled, case hardened. The thruster Pod is removable from the tunnel.

Hydraulic Thruster Systems *are* designed around ***closed or open loop*** hydraulic circuits using piston type pumps and motors for maximum efficiencies. Variable speed systems can be employed through the use of variable displacements pumps or a variable flow control valve.

The closed loop system requires a small oil reservoir for oil makeup and cooling.

Open Loop Hydraulic Control Circuits are used for Hydraulic System Integration where other hydraulic sub-systems are operated from a common hydraulic system. Components often used in this configuration are: passerelles, windlasses, stabilizers, cranes, winches, bilge pumps, generator drives and back-up propulsion systems.

Stay on Course with MPS Thruster Systems

Thruster Specifications							
Dual Propeller-Counter Rotating Systems							
Model No.	**Power**		**Input Speed**	**Thrust Developed**		**Tunnel Diameter**	
	Hp	Kw	RPM	Lbs-F	Kgs-F	Inch	MM
D14BTM	47	35	1500/1800	1,175	535	14.0	335.6
D16BTM	67	50		1,675	762	16.0	406.4
D20BTM	100	75		2,515	1,145	20.0	508.0
D24BTM	134	100		3,355	1,525	24.0	609.6
D28BTM	167	125		4,190	1,905	28.0	762.0
D32BTM	201	150		5,030	2,285	32.0	812.8
D34BTM	268	200		6,705	3,050	34.0	863.6
D38BTM	335	250		8,380	3,810	38.0	965.2
Note: 1500 rpm (input rpm) units available for 50 cycle electric drives							

The BTM Series is introduced as a Dual Propeller-Counter Rotating bow thruster system designed around AC E-Motor drives utilizing variable speed frequency motor controllers or Hydrostatic Hydraulic Drives. They are designed to minimize noise and cavitation. The thruster tunnel diameters to pod ratios are idealized for maximum flow conditions. Dual Propellers are four (4) bladed, Kaplan style with skewed propeller technology available. The propeller rpm is chosen to provide propeller tip speeds of 30 meters per second or less.

Hydrostatic Bow Thruster Systems include …

Optimum Maneuverability and Reliability with Simplified Installations and Operation

- *Complete Bow Thruster Assembly*
- *Variable Displacement Hydraulic Pump and Displacement controller*
- *Hydraulic Motor mounted to the Thruster foundation*
- *Hydraulic Reservoir with filtration and required items*
- *Full Bridge Controls*

Hydraulic Drive System - IPU

MPS Propulsion's modular series hydraulic systems move the power pack components into the smallest possible packages for use in tight machinery spaces. Separating the reservoir and pump/motor combination maintains all the functionality of a stand-alone system, but with much greater flexibility when it comes to the installation.

MPS achieves noise and vibration reduction using flexible mounts and noise suppressors mounted directly to the outlet of each pump. Each system is engineered to provide quiet, dependable power tailored to the machinery space, and to the application.

Hydraulic System:

The Hydraulic System is of the closed loop design (Hydrostatic Drive System) with one (1) variable displacement pump sized to operate at 1500 rpm. The hydraulic system will include an electrical variable flow control valve for port / starboard full proportional (rpm) control.

The hydraulic motor is mounted directly to the thruster pod reducing misalignment problems.

Integrated Hydraulic System

The Integrated hydraulic power unit provides the fluid power necessary to operate the following:

- 1x Bow Thruster rated at XXX Kw (XXX Hp) – (X1- pump)
- Optional equipment if required (note: not in system costing)
- Design Pressure – 230 Bar
- Pressure Relief valve set at 250 Bar

PT. Marine Propulsion Solutions power units are designed to consolidate maximum machinery output into a small footprint, this compact unit can be easily positioned into tight machinery spaces. The integrated power unit consolidates on a single skid the hydraulic drive train on an aluminum frame with drip tray, stainless steel oil reservoir with associated gauging and sensors, as well as return filtration and oil cooler.

The IPU is designed to incorporate maximum hydraulic function within a single “plug and play” assembly. Thus, straight-forward connections for mechanical installation, as well as hydraulic and cooling pipe work are at the heart of the design.

The power unit only draws the minimum power necessary to operate the hydraulic components on demand, thus reducing the load on the vessel’s power and cooling systems.

The power units utilize a three-point isolation system to bring both noise and vibration levels down. Hydraulic noise suppressors are attached directly at pump discharge to minimize hydraulic noise in the pipes.

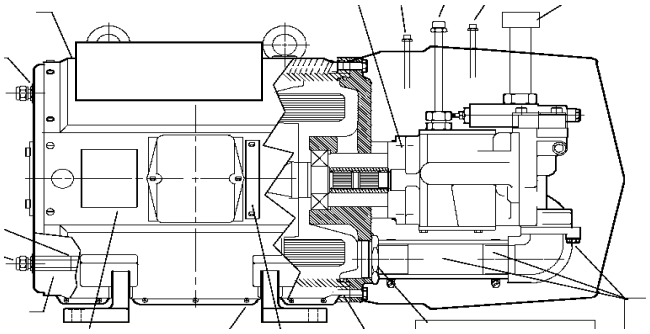
1. Maximum System Pressure 250 Bar
2. Control (Solenoids) Voltages 24vdc

MPS will furnish the equipment with all required valves mounted to the manifolds for installation near the operating equipment. The shipyard has only to provide the hydraulic and electric hooks-ups.

The Integrated Hydraulic / Electric Motor Module

The PT. Marine Propulsion Solutions Integrated Motor Pump is a unique combination of a conventional AC induction motor cooled with system hydraulic oil and a variable displacement hydraulic pump, piston type, housed in a special sound reduction enclosure.

This combination provides an exceptionally quiet and small pumping package for any marine application requiring up to 125 horsepower (92 kilowatts) of continuous hydraulic power.



Circulating the hydraulic oil through the motor, bathing both the rotor and stator, makes it possible to obtain twice the normal continuous output power from the motor windings. Physical size reductions of 35% to 50% compared with conventional pumping packages are possible as a result. Normal operation of the motor is not affected by circulating oil through it, nor is the system's hydraulic oil damaged.

Heat generated within the electric motor is carried away by the hydraulic fluid and dissipated by the hydraulic cooling system. A motor fan is not needed, which makes it practical to cover the entire assembly (motor and pump) with a compact sound reduction enclosure.

This reduces the sound from the pump as well as the motor, resulting in a noise level reduction that is unsurpassed in the industry.

A complete line of standard hydraulic pumps can be fitted to the Integrated Motor Pump including single fixed vane pumps, single variable piston pumps, double vane pumps, double piston pumps or mixed vane and piston combinations.

Features & Benefits

- Smaller package size because of oil cooled electric motor.
- Heat generated by the electric motor is carried away by the hydraulic fluid.
- 70% reduction in sound compared to conventional power unit systems (approximately 10 dBA).
- All external leakage points for both oil leaking out and air leaking in are sealed by static O-rings.
- External leakage from dynamic shaft seals has been eliminated.
- The specially designed coupling connecting the pump and motor drive shafts is oil lubricated and factory installed. This eliminates labor to align and install the coupling.
- Only normal filtration practices are required.
- Motor bearings are continuously lubricated by hydraulic fluid.
- System sound is significantly reduced by eliminating the fan and enclosing the motor and pump.

Marine Propulsion Solutions - Electric Thruster Systems …

MPS Propulsion offers the dual-propeller-contra rotating design using ***AC electric motor drives***, utilizing variable speed frequency converter technology. They are designed to minimize noise and cavitation. The thruster system comes complete with a variable speed electric drive and full bridge controls.

The complete thruster unit is compact. Efficient… Silent… and ruggedly designed for the marine vessel of today.

"Silent Running" Electric Thruster Drives

Optimum Maneuverability and Reliability with Simplified Installations and Operation

MPS Propulsion Thruster Systems Offer

High Thrust to Power Ratio
Variable Speed Operation in either Direction
High Efficiency
Quite Operation
Low Maintenance
Guaranteed Reliability
Easy Installation
Complete Package
Sea Water Resistant Materials

Electric Yacht Bow Thruster Systems include …

Complete Bow Thruster Assembly

- ***Electric Vertical TEFC Electric Motor Mounted to the Thruster foundation***
- ***Electric Motor Variable Frequency Controller***
- ***Full Bridge Controls***
- ***Optional Remote Stations***

E-Motor Controller

The E-Motor variable-speed controller is of the variable torque type providing full speed control to the bow thruster in both directions. Through use of the inverter motor controller “no motor in-rush current problems exist” and therefore the soft start (no load condition) insures that the generator can handle the starting current problems inherent to other types of motor controllers.

The motor controller is remotely operated by the bridge-mounted variable-speed Joy Stick Controller. Remote stations are available.

Control Consoles (Bridge Mounted)

The Electric Bow Thruster System comes complete with a fully operational bridge mounted control console. This system provides power ***“On/Off”*** Main or Remote Switch, alarms and ***a fully operational Joy Stick Controller*** for variable speed “port and starboard control”.

- Standard control voltages are 12/24 volts DC with other voltages available as optional supply.
- Remote control stations can be furnished (in-house or watertight) for wing stations or the fly bridge.

We offer tailored designed systems to suit any application. This, in combination with evolutionary designs, will fulfill your every need for propulsion and effective side-power.

RTH Series Retractable / Rotatable and Swing Thruster Systems...

A series of tunnel type thruster systems designed as retractable units with the optional feature of 360-degree rotation. Units are offered with retractable / extension cylinders and Full bridge controls.

A swing configuration is also available. The retractable thruster series is best suited for high performance sailing yachts, fast planning yachts, fast and planning semi displacement hulls, where the thruster, in its raised position, gives a completely clean-faired hull section with little or no drag. They can be mounted forward in vessels with a shallow forefoot. Its retraction strut allows deep immersion, increasing thruster efficiency.

The thruster is driven–raised lowered hydraulically and locked in its drive position. **Available from 35 to 250 Kw.**

Off Course ...

Your Reliable Partner in Propulsion - Bow Steering and Dock Assistance

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