About Thrustmaster of Texas, Inc.

Thrustmaster of Texas, Inc. is based in Houston, Texas USA with offices in Rotterdam, Dubai, Singapore, Brazil, and India. As the world’s leading manufacturer of marine thrusters Thrustmaster has maintained its reputation over the years by strictly adhering to its mission statement of both quality and customer service.

Thrustmaster is ISO 9001 certified by the ABS. Thrustmaster field service engineers and technicians provide worldwide support 24 hours a day. Thrustmaster maintains a large inventory of all essential spare parts in Houston, Texas, backed up by a computer controlled inventory system, ensuring same-day shipping of breakdown spares to any destination in the world.

Agent Locations: Argentina - Australia - Brazil - Canada - Colombia – Egypt - England - Greece - India - Korea - Mexico - New Zealand - Pakistan - Peru - South Africa - Taiwan - Turkey - Venezuela

Other Thrustmaster Products

Contact your Thrustmaster agent for help in choosing the correct thruster for you
Thrustmaster of Texas, Inc. designs and manufactures the widest variety of tunnel thrusters in the marine industry. To answer the needs of diverse vessel designs and many applications Thrustmaster offers;

- Hydraulic and Mechanical Gear Driven Transverse Tunnel Thrusters
- Hydraulic Outboard Propulsion
- Hydraulic and Mechanical Gear Driven Retractable Azimuth Thrusters
- Z and L Drive Hydraulic Azimuth Propulsion and Thrusters
- Z and L Drive Mechanical Gear Driven Azimuth Propulsion and Thrusters
- Patented Portable Dynamic Positioning System

This brochure is designed for those needing **STANDARD MECHANICAL GEAR DRIVEN TRANSVERSE TUNNEL THRUSTERS**. For applications requiring **HYDRAULIC TRANSVERSE TUNNEL THRUSTER or RETRACTABLE AZIMUTH THRUSTERS** please see the appropriate brochure(s).

**All Thrustmaster Thrusters Offer Unparalleled Precision Control When You Need It Most**

Tunnel thrusters are primarily used for docking and undocking, slow speed maneuvering, emergency steering, and station-keeping at zero or slow forward speed. Tunnel thrusters provide a significant advantage to vessels where adjustments in their heading at zero speed are critical to their operation, where maneuvering in light quarters is required or where frequent docking occurs.

Thrustmaster tunnel thrusters are highly effective at very slow vessel speeds and are available from 35hp to 5,000hp (26kW to 3730kW) with tunnel diameters of 16 to 84 inches (400 to 2130 mm). Larger thrusters up to 10,750hp (8MW) can be engineered by our state-of-the-art engineering department in Houston, Texas USA.

Thrustmaster maintains a staff of highly qualified Design Engineers to assist you with your selection and answer any questions. Thrustmaster Service Engineers provide worldwide service and support for installation, start-up and sea trials. Visit our web site, or feel free to contact one of our many offices or agents around the world.

The Aaron McCall (below) and Ms Netty (right) use 3 Thrustmaster 30TT200ML thrusters to create a tunnel thruster at zero speed are critical to their operation, where maneuvering in tight quarters is required or where frequent docking occurs.

Thrustmaster tunnel thrusters are highly effective at very slow vessel speeds and are available from 35hp to 5,000hp (26kW to 3730kW) with tunnel diameters of 16 to 84 inches (400 to 2130 mm). Larger thrusters up to 10,750hp (8MW) can be engineered by our state-of-the-art engineering department in Houston, Texas USA.

Thrustmaster maintains a staff of highly qualified Design Engineers to assist you with your selection and answer any questions. Thrustmaster Service Engineers provide worldwide service and support for installation, start-up and sea trials. Visit our web site, or feel free to contact one of our many offices or agents around the world.

Both vessels also use Thrustmaster’s electric VFD arrangement to deliver precise speed control while standing off of a rig to deliver supplies and transfer personnel safely.

The Aaron McCall is outfitted with fore and aft bridge controls integrated into a DP-2 system. Variable Frequency Drive cabinets are located in the thruster room adjacent to each thruster for convenience.

Thrustmaster’s Tyson Griffin shows vessel operators the procedures for transferring thruster control to the aft control stations. These drop-in controls are easily installed or removed for quick access.

### Specifications

**Aluminum Tunnel Thrusters**

<table>
<thead>
<tr>
<th>Model</th>
<th>Tunnel Data</th>
<th>HP/RPM</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>30TT150ML</td>
<td>30 36 150</td>
<td>1800 1200</td>
<td></td>
</tr>
<tr>
<td>30TT200ML</td>
<td>30 36 200</td>
<td>1800 1200</td>
<td></td>
</tr>
<tr>
<td>36TT200ML</td>
<td>30 40 200</td>
<td>1800 2100</td>
<td></td>
</tr>
<tr>
<td>36TT300ML</td>
<td>30 40 300</td>
<td>1800 2100</td>
<td></td>
</tr>
<tr>
<td>42TT400ML</td>
<td>42 54 400</td>
<td>1800 2600</td>
<td></td>
</tr>
</tbody>
</table>

**ABS Carbon Steel Tunnel Thrusters**

<table>
<thead>
<tr>
<th>Model</th>
<th>Tunnel Data</th>
<th>HP/RPM</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>30TT150ML</td>
<td>30 36 150</td>
<td>1800 1200</td>
<td></td>
</tr>
<tr>
<td>30TT200ML</td>
<td>30 36 200</td>
<td>1800 1200</td>
<td></td>
</tr>
<tr>
<td>36TT200ML</td>
<td>36 40 200</td>
<td>1800 2100</td>
<td></td>
</tr>
<tr>
<td>36TT300ML</td>
<td>36 40 300</td>
<td>1800 2100</td>
<td></td>
</tr>
<tr>
<td>42TT400ML</td>
<td>42 54 400</td>
<td>1800 2600</td>
<td></td>
</tr>
</tbody>
</table>

### Note/Disclaimer

1. Values shown are for General Arrangements Only. Many conditions will affect your engineered thruster(s). Only the values and conditions under written contract will apply. All values are subject to change without notice or comment. Contact Thrustmaster’s highly qualified engineers to determine your project requirements.

**Visit our web site, or feel free to contact one of our many offices or agents around the world.**

**Ordering and Design Information**

Thrustmaster’s model code is easy to understand. The first two digits are the outside diameter of the tunnel in US inches. The letters “TT” stand for “Transverse Tunnel”. Trailing digits represent the nominal power rating of the thruster in horsepower.

**L-Drive TT Configuration**

The ML designates a mechanical L-Drive. Outside diameter and minimum tunnel length are listed in inches. The tunnel can not be shorter without a portion of the thruster housing or the propeller nut extending beyond the tunnel. Longer tunnels can be provided at additional cost to facilitate easy installation. Alternatively, the shipyard can extend the tunnel by butt welding extensions to either end.

**Power Values**

Power values listed in the table represent US horsepower delivered to the thruster at rated thrust conditions. The values are based on short tunnel length with faired inlets, no inlet grating, and proper submergence.

**Z-Drive TT Configuration**

A designator of MZ would mean that a right angle gear box is located atop the thruster for the attachment of a cardan shaft leading from the prime mover. The prime mover can be a horizontal mounted diesel engine.

**Input Must Match Output**

In all cases the output speed of the electric motor, or, a marine gear (diesel) must match the input RPM of the thruster.
THRASTMAR MEANS QUALITY

Fixed Pitch vs. Controllable Pitch Propellers

Any captain or pilot worth their salt will easily learn the nature of their transverse thruster system and how to make it respond as they wish. The most important factors are the amount of thrust, response time, and reliability.

Controllable Pitch Propellers (CPP) have their place but one tenant of Thrustmaster is that a Fixed Pitch Propeller (FPP) will easily out perform the CPP in cost and service life. Long term use proves them efficient and cost effective due to the absence of seals, push-rods, and bearings. The root of the blades on the FPP are much less susceptible to cracking and breakage, reducing the potential for downtime and drydocking fees.

The ability to quickly change directions with a robust four blade, high thrust Nickel-Aluminum-Bronze propeller and to respond to speed controls are simply good design work. Fixed pitch propellers used in Thrustmaster thrusters have been proven over and again in the harshest of environments.

How to Select Your Tunnel Thruster

A bow thruster used for docking and undocking should be capable of producing thrust in pounds of force (lbf) equal to twice the lateral cross section of the area below the water in square feet, or, two to three times the lateral cross section of the area of the superstructure above the water, whichever is greater.

Sizing of tunnel thrusters for slow speed maneuvering and station keeping depends greatly on the vessel operating parameters. Before making your final selection, consult your naval architect or one of Thrustmaster's application engineers.

When using tunnel thrusters in waters with high current or while the vessel has forward speed, the thruster becomes less effective. At vessel speeds of 3 knots, the tunnel thruster may lose as much as 25 percent of its thrust. At speeds of 7 knots, the thruster may only produce half of its rated thrust. A Thrustmaster retractable azimuthing thruster may be more appropriate for these applications.

If space does not allow proper submergence with a single tunnel thruster on a shallow draft vessel, two or more smaller tunnel thrusters, installed side by side, may be used. Multiple Thrustmaster tunnel thrusters can be powered by a single prime mover with a common hydraulic system making the thrusters act in unison as if they were a single thruster.

The tunnel openings in the shell plating increase the resistance of the vessel. In addition to fairing the tunnel entrances for thruster performance improvement, the aft section of the tunnel entrances may be faired back conically to reduce drag.

For high speed applications such as ferries, supply vessels and crew boats, Thrustmaster can provide hydraulically actuated covers which completely close off the tunnel entrances when the thruster is not in use, eliminating tunnel drag.

Dedicated Engineers and Production Staff

Thrustmaster is dedicated to the total engineering and manufacturing process of building thrusters and ONLY thrusters. The new 200,000 sq/ft factory and office was built to deliver thrusters to our customers. The first floor of the office supports operations and running the factory while the second floor houses the departments of training, finance, project managers, and top engineers, many with PhD's, who delve into the intricate and complicated sciences related to long term reliability and efficiency of your thruster design.

Thrustmaster engineers continue to invent new thruster concepts and improve existing designs using state-of-the-art design and analysis tools such as SolidWorks®, AutoCAD®, ANSYS®, STARCCM+ and Magma.

Make Them Work Better

Successful thruster applications require more than just a hole through the hull. This photo shows two "rules of thumb" that are common design principles for your thruster application.

- Use two tunnel thrusters if the draft is too shallow to maintain at least one propeller diameter below the water line.
- Fairing the tunnel helps reduce drag at normal operating speed while increasing efficiency of the thruster during slow speed maneuvering.

When you are ready to choose your thruster make sure to call on the experts for advise and leadership. The ones that make thrusters and only thrusters. Thrustmaster!
SIZING YOUR THRUSTERS

**Thrust, Force, Horsepower, Bollard Pull, Kilonewtons?**

Architects might need assistance from our professional engineering department because sizing a thruster can be a challenge. One reason is the confusion about how to determine the size of a thruster needed for the application. Is it thrust, horsepower or kilowatts, or kilonewtons and how do those terms relate to the size thruster you will need?

**Bollard Pull - Not a Factor for Transverse Thrusters**

Bollard pull refers to the amount of constant pulling power available. It can be shown on a scale between a vessel’s towing bit and a fixed anchor point on the shore. It is used to determine that particular vessel’s ability to pull or push a tow and is not relevant when discussing a bow or stern thruster.

The kN or Kilonewton

The SI unit for force is the newton. For every action there is an equal and opposite reaction. The newton is used to describe the amount of force expelled by the propeller. Newton’s law of motion explains that the force expelled by the propeller will result in an equal force that will push the vessel in the opposite direction. Knowing the “newton” factor (or force available) of a thruster is useful in determining what size thruster is needed to move the vessel bow (or stern) sideways. However, it is not the only factor affecting the architect’s decisions. With design variations the forces or thrust referred to in the form of newtons at the propeller can vary widely. The size and pitch of the propeller, the speed of rotation, obstacles such as the motor or gear housing and gratings, all of these can affect the amount of useful force exerted so that one 200hp thruster might produce more thrust than another 200hp thruster. The power demands on the ship’s systems can be the same but the thrust exerted by the propeller can be different.

**Horsepower (US) or Watts (Metric)**

In order to create the forces necessary to move the vessel we need power. Horsepower (US) or watts (Metric) refers to the amount of power available to, or consumed by, the system. When we describe a 200hp thruster we are providing useful information the design engineer will need to determine specific demands on power plants or prime movers (generator, electric motors, engines, etc…) for which they must accommodate in their design.

**Power**

1 horsepower equals 0.7457 kW of power. Horsepower (US) or kilowatt (Metric) refers to the amount of energy generated by the power plant or consumed by the prime mover and all of those components in between.

The motor which turns the propeller is the prime mover.

**Variable Frequency Drive Systems**

The Variable Frequency Drive System cabinet (a) is located near the electric motor (b), usually in the same compartment to minimize bulkhead penetrations. The cabinet contains the controller, transformers, relays, and local interface connections. A J-Box (c) is positioned in-line between the bridge controls above and the cabinet below. The DP System (if used) (d) and Vessel Monitoring System (e) will also connect to this J-Box. High voltage power connections from the ship’s power plant (f) will connect to the bow thruster motor through the VFD module located in the cabinet. A soft start device is not used since the VFD module eliminates the need for such.

Low voltage signals (g) communicated between the joystick control or DP system will control the direction and speed of the motor and provide an emergency stop.

**Force**

1 kilonewton equals 224.8089 pounds (101.9716 kilograms) of force. This force (or thrust) is that which is applied at the propeller to push the vessel sideways when docking, or, to hold a steady position during dynamic positioning. The propeller in this bow thruster is designed to produce thrust equally in both directions.