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Welcome to the world of *OmniTHRUSTER*[™] . . . Where It Pays To Compare!

For 25 years *OmniTHRUSTER*[™] has been a world leader in the development of waterjet maneuvering systems. Our unique patented designs, which provide diverse maneuverability and auxiliary propulsion, have been the installation choice on vessels worldwide.

The OmniThruster produces thrust *continuously*. . . with nozzles in or out of the water . . . in rough seas . . . in strong currents . . . while pitching, yawing, rolling, or heaving. The OmniThruster can even produce thrust while the vessel is underway at several knots, a condition in which conventional propeller tunnel thrusters are subject to cavitation and do not effectively produce thrust, if at all.

OmniThruster's patented system consists of five basic proprietary building blocks:

- **Kinetic Converter** takes input shaft energy and produces usable hydraulic energy by the use of a mixed flow impeller.
- **Steering Valves** continuously meter or proportion a percentage of the fluid flow to one or both sides of the vessel.
- **Nozzles** accelerate the mass of water creating a thrust force at the hull interface.
- **Thrust Directors** (*optional*) deflect the water flow forward or aft producing slow speed auxiliary propulsion.
- **Electronic Control System** controls the 360° thrust vector resultant from a fixed or variable speed prime mover rotating continuously in one direction. There are no rotating parts that have to be stopped or started as thrust direction and/or magnitude changes.

No other thruster can provide the superior advantages of incomparable maneuverability, as well as supplementary propulsion, which is available with OmniThruster systems.

The HT Series, built from the fabric of our world renowned JT custom technology, engages all the elements of the OmniThruster principle in a compact, competitively priced package. When your vessel is your livelihood, it pays to compare!

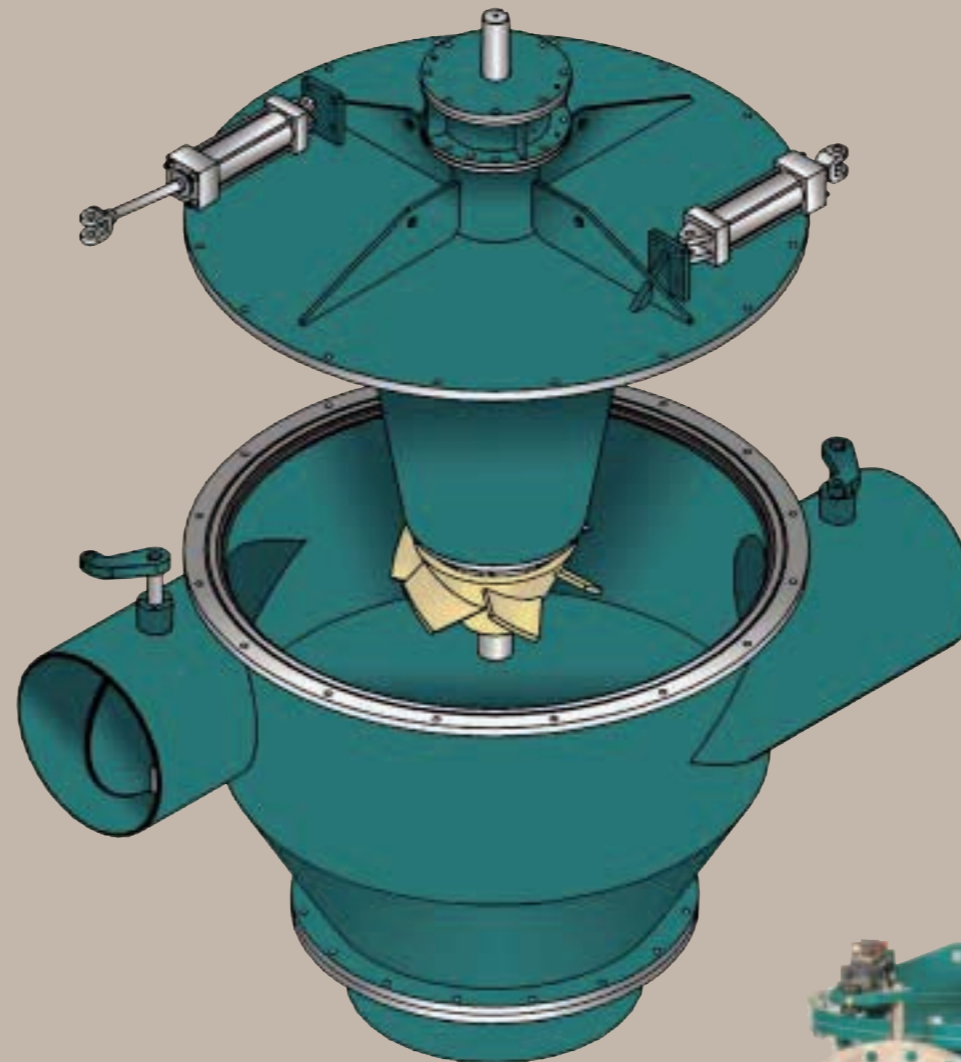
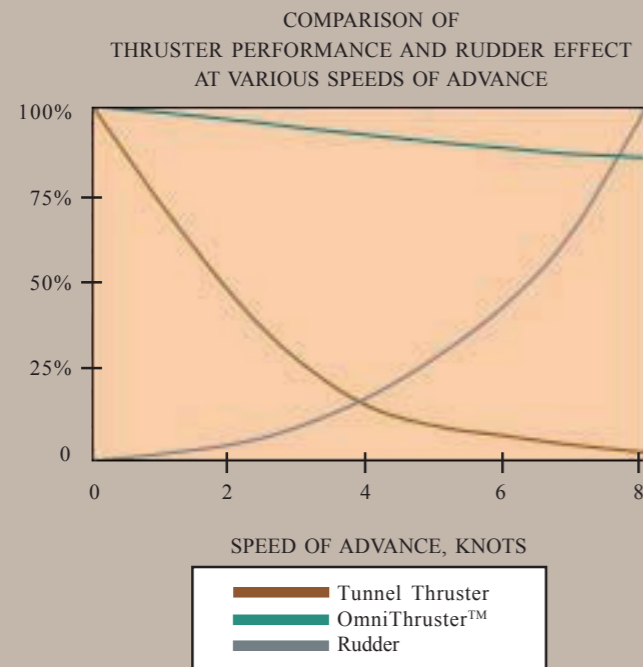
"The Heart of the Matter" - OmniTHRUSTER[™] Mixed-Flow Impeller

Presenting the *OmniTHRUSTER*TM HT Series . . .

The HT Series was developed to provide small vessels maneuvering and auxiliary propulsion capabilities. The unique design features a compact, conical chamber which generates a helical flow pattern resulting in efficient energy conversion. This “Heliconic” approach effectively decreases submergence requirements for full power operation, appealing for shallow draft vessels. The system can be installed either horizontally or vertically making it suitable for SWATH, catamaran, ferry, barge, fishing, research, and small cargo applications.

Thrust Underway

The waterjet velocity of the OmniThruster system is less effected by speeds of advance than conventional thrusters. The result is effective thrust while the vessel is underway. Additionally, the vessel’s rudder is very ineffective at low speeds of advance which can render a ship uncontrollable. The OmniThruster system puts you back in control.



Small Hull Penetrations

The relatively small hull penetrations required for an OmniThruster system reduces the drag on a vessel and subsequently lowers the fuel consumption while cruising. As an example, a 600hp tunnel thruster would require hull openings of approximately 54 inches in diameter. OmniThruster’s *HT600* installation will require only two nozzle openings of 20 inches in diameter with an inlet opening of approximately 29 inches in diameter. The inlet is located towards the keel of the vessel where the effects of drag are at a minimum. This combined with the ability to place the thruster system in hydraulic lock while cruising will result in drag reduction of approximately 3½%! This can add up to substantial fuel savings every year.

COMPARATIVE HULL PENETRATIONS



Maintainability and Serviceability

OmniThruster has designed our *HT Series* with service personnel in mind. All seals and routine maintenance items are accessible and serviceable while the vessel is afloat. In the unlikely event that major repairs are required on the rotating mechanical system, the entire inner casing which houses the thrust/radial bearings, drive shaft, water lubricated cutless bearing and impeller can be removed by breaking one bolted flange. This removal could actually be accomplished afloat by ballasting. The assembly can be repaired in hull, at dock side or completely replaced.

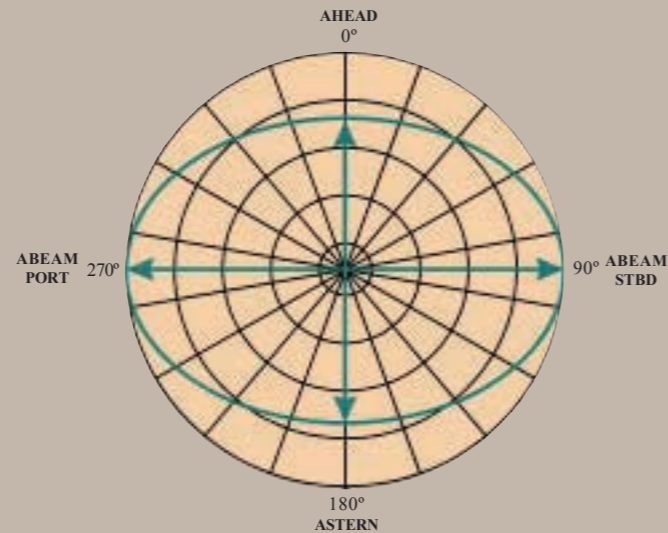
Environmentally Sensitive

OmniThruster is as concerned with the environment as our customers are. With the increase in laws protecting the environment in mind, OmniThruster has designed the *HT Series* to “tread softly” on our oceans and waterways. The *HT Series* utilizes water lubricated bearings and an external thrust bearing, with no submerged gearboxes. Additionally, the low intake velocity reduces the possibility of ingesting foreign objects and is well below dredging velocity.

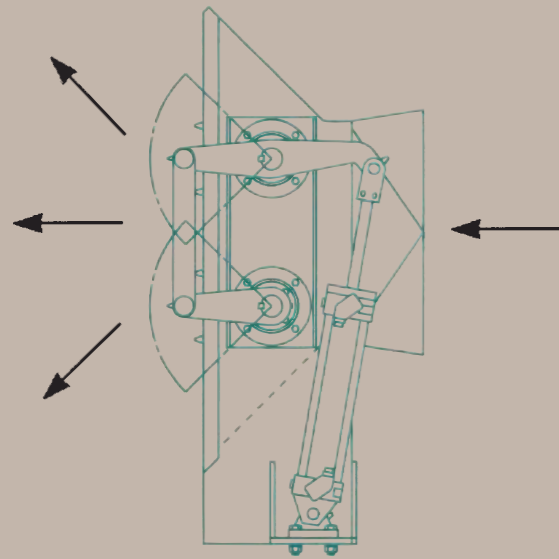
HT Series

STEERING AND PROPULSION OPTIONS

OmniThruster's unique and patented Thrust Directors add forward and aft auxiliary propulsion to the standard port/starboard system. This is physically accomplished by deflecting the waterjet to the fore or aft which produces an equal and opposite reaction. When the Thrust Directors are coupled with an upgraded control system, a fully proportional 360° maneuvering system results. The polar thrust diagram gives the resultant thrust vectors/magnitudes that can be achieved with the fully proportional system.

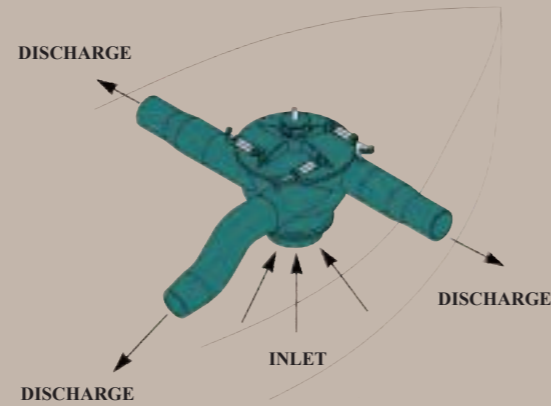


PROPULSION OPTION



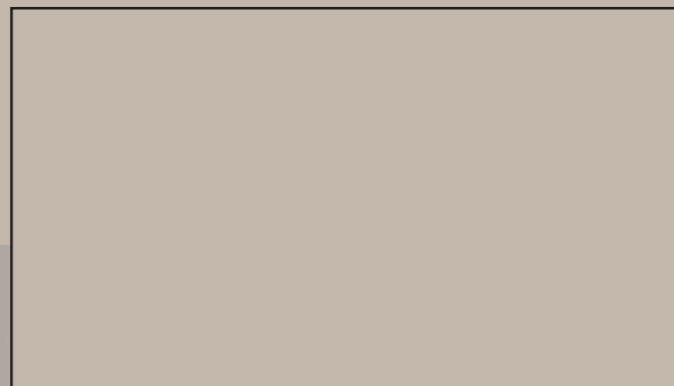
THRUST DIRECTOR™

Port and starboard thrusting with Thrust Director™ provides 360° propulsion.



The Propulsion Option adds a third discharge to the standard HT unit providing full forward thrust ("Take Home" capability).

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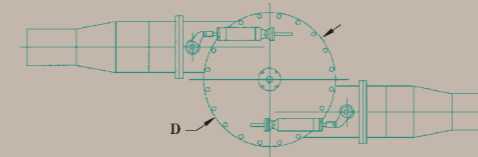


HT Series

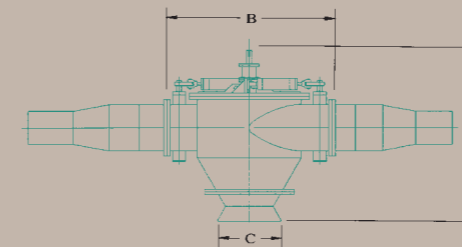
SPECIFICATIONS

TABLE OF DIMENSIONS

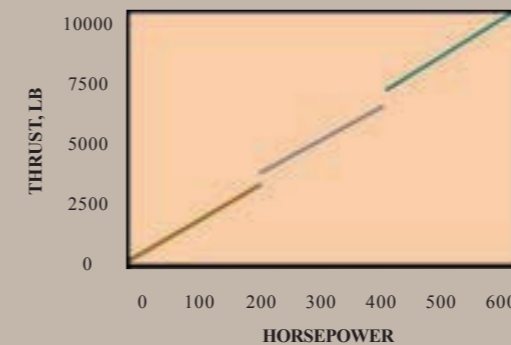
HT MODEL NO:		200	400	600
Maximum Power Rating	KW	150	300	450
	HP	200	400	600
Height "A"	MM	1316	1770	1975
	INCH	52	70	78
Width "B"	MM	1320	1727	2058
	INCH	52	68	81
Intake "C"	MM	480	609	737
	INCH	19	24	29
Submergence Requirement	MM	723	890	1016
	INCH	29	35	40
Nozzle Diameter	MM	235	391	483
	INCH	10	16	20
Housing Diameter "D"	MM	933	1220	1525
	INCH	37	48	60
Dry Weight (less nozzles)	KGS.	725	1587	2360
	LBS.	1600	3500	5200



PORT AND STARBOARD THRUSTING



HT SERIES POWER RANGES



HT200, 200HP at 650 RPM
HT400, 400HP at 820 RPM
HT600, 600HP at 678 RPM

To supplement the design and installation activity, OmniThruster offers customers and Naval Architects three dimensional, computer generated outline drawings on request.

STANDARD DESIGN / CONSTRUCTION

Design	Standard	ABS, DNV, Lloyds Register
	Impeller Type	Mixed Flow
	Rotation	CCW (as viewed from input shaft)
Features	Thrust Bearing	Tapered Roller
	Shaft Bearing	Water Lubricated Cutless, Rubber
	Shaft Seal	Mechanical Seal
	Steering Vane Shaft Seal	Lip Type Seal
	Coating	Scotchcoote® 134 Internal / External
Materials	Orientation	Horizontal or Vertical Installation
	Drive Shaft	17-4 / Nitronic 50
	Casing	A36, Aluminum, NI-AL-BRZ
Controls	Impeller	316 SS, NI-AL-BRZ
	Standard	"PLC" Based Jogging
	Optional	"PLC" Based Fully Proportional
Auxiliary	Wing Stations / Auxiliary Panels Available	



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The World of *OmniTHRUSTER*™ . . . Uncompromised Control!



OmniThruster™, the leader in the development of the water jet thruster, has taken the simple function of side thrusting to a new level — total vessel maneuverability. For years propulsion and maneuvering was accomplished by propellers for forward and aft movement and a ducted propeller for port and starboard thrusting. The marine industry entered a new era with the development of the *OmniThruster* Jet Thruster and its implementation of a mixed flow impeller.

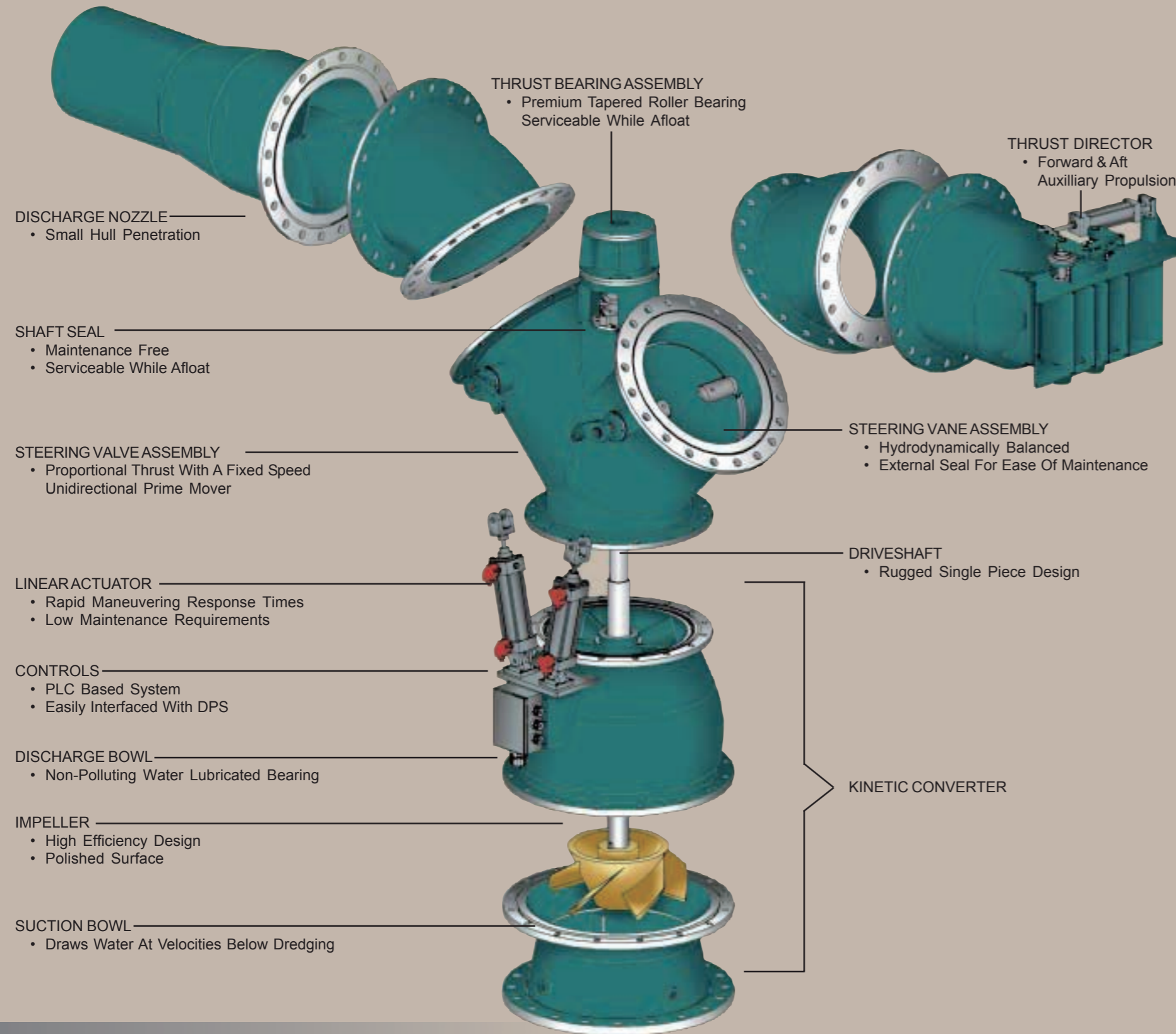
The patented *OmniThruster* system utilizes the principle of Newton's third law of motion which states, "to every action there is an equal and opposite reaction."

With an *OmniThruster*, water is drawn in at relatively low velocity, absorbs energy imparted by the Kinetic Converter, then passes through specially designed nozzles at which time the mass flow is optimally accelerated and dispatched at a high velocity. This accelerated water mass produces the reactive force which acts upon the vessel's hull.

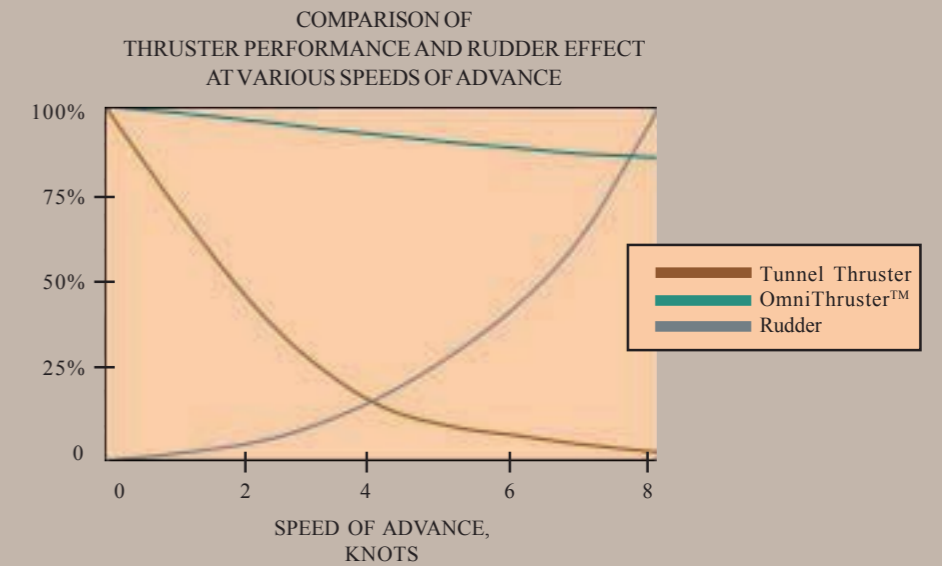
The maneuvering and auxiliary propulsion capabilities of the *OmniThruster* have proven suitable for numerous military applications. Years of research and development of custom systems for governments worldwide have resulted in the many options available to the commercial market today.

When considering a new build, or a retrofit, don't settle for yesterday's technology when the proven technology of today's modern navies is available in the *OmniThruster* JT Series.

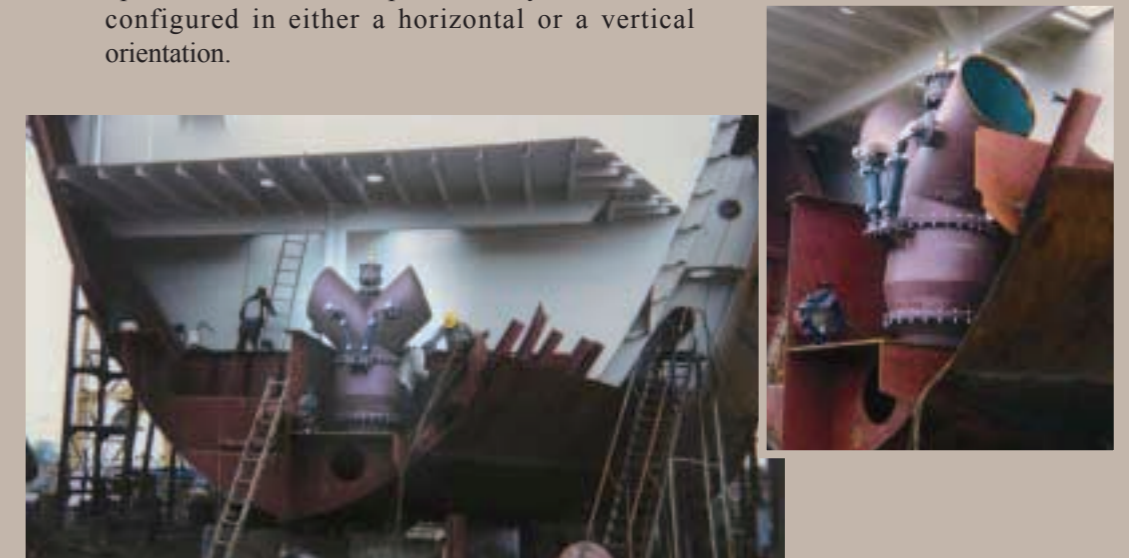
Presenting the *OmniTHRUSTER*[™] JT Series . . .



The OmniThruster JT is a scientifically designed and patented system for maneuvering and auxiliary propulsion. The JT utilizes a mixed-flow impeller that draws water in through an intake, located at the bottom of the vessels hull, then dispatches it through the steering valve assembly. The steering valve directs the flow continuously, rapidly, and proportionally to the nozzles for neutral, port or starboard thrust. Optional Thrust Directors give complete control of thrust for forward or aft auxiliary propulsion. As long as the intake remains fully submerged, the nozzles may be completely out of the water and still generate thrust. The resulting high velocity waterjet delivers effective thrust while the vessel is underway, in rough seas, or in strong currents.



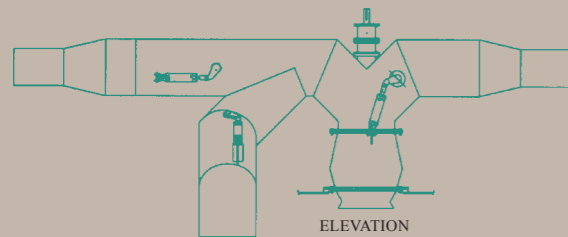
The system consists of five basic building blocks — the *Kinetic Converter*, *Steering Valve*, *Nozzles*, *Thrust Directors* (optional), and *Electronic Controls*. These blocks can be easily assembled within the space constraints of a new vessel or a retrofit. To further optimize installation space, the system can be configured in either a horizontal or a vertical orientation.



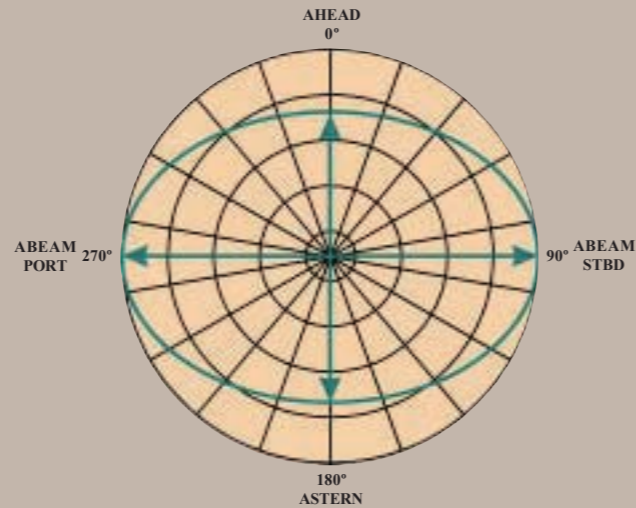
Unparalleled Maneuverability!

Auxiliary Propulsion

OmniThruster's unique and patented Thrust Directors add forward and aft auxiliary propulsion to the standard port/starboard system. This is physically accomplished by deflecting the waterjet to the fore or aft which produces an equal and opposite reaction. When the Thrust Directors are coupled with an upgraded control system, a fully proportional 360° maneuvering system results. The polar thrust diagram gives the resultant thrust vectors/magnitudes that are possible with the fully proportional system.



Port, Starboard and Forward Thrusting Provides "Take Home" Capability.



Full "Take Home" capability is available with the use of a dedicated forward thrusting nozzle. This vane type nozzle, located towards the keel of the vessel, ejects water to the aft at a shallow discharge angle. The result is slow speed auxiliary propulsion that can be used to keep the vessel headed in the right direction.

The ability of the OmniThruster JT to provide auxiliary propulsion and steering, totally independent of the main propulsion and steering systems, provides a fully redundant back up. In effect, a built-in tug!

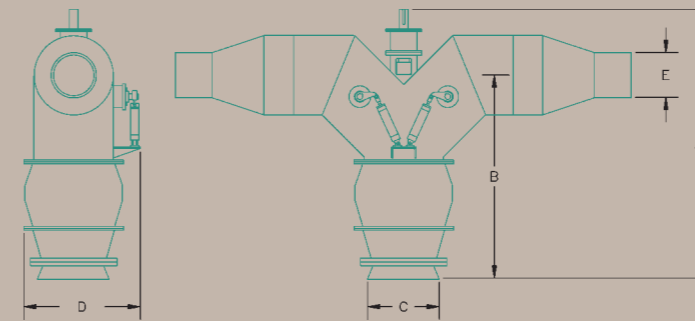
Economically and Environmentally Sound

In today's competitive market it pays to look beyond the bottom line. The OmniThruster JT offers long-term fuel and maintenance savings.

The OmniThruster JT system is economical while cruising. This is accomplished by utilizing relatively small hull penetrations, locating the intake toward the low drag region of the keel, and the elimination of drag intensive protrusions. These features, coupled with the ability to place the thruster system in hydraulic lock while underway, result in an overall drag reduction of approximately 3%. All of this adds up to substantial long-term fuel savings!

The OmniThruster JT is mechanically simple and easy to maintain. Lubrication points and the main thrust bearing are completely serviceable from within the hull, while afloat. Also, the elimination of submerged gearboxes and the use of water lubricated bearings alleviates the fear of pollution due to leaking seals.

JT Series

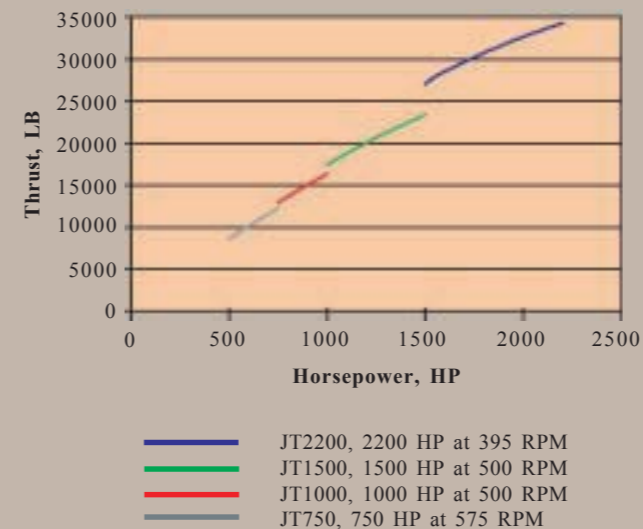


SPECIFICATIONS

TABLE OF DIMENSIONS

JT MODEL NO:		750	1000	1500	2200
Maximum Power Rating	KW	560	746	1120	1640
	HP	750	1000	1500	2200
Overall Height "A"	MM	3023	3404	4140	4674
	INCH	119	134	163	184
Height to Exit "B"	MM	2108	2795	3200	3759
	INCH	83	110	126	148
Intake "C"	MM	838	889	1041	1524
	INCH	33	35	41	60
Width "D"	MM	1372	1651	1930	1930
	INCH	54	65	76	76
Nozzle Diameter "E"	MM	430	600	735	865
	INCH	17	24	29	34
Dry Weight (Less Nozzles)	KGS.	3645	4355	6490	9091
	LBS.	7800	9800	15000	20000

JT SERIES POWER RANGES



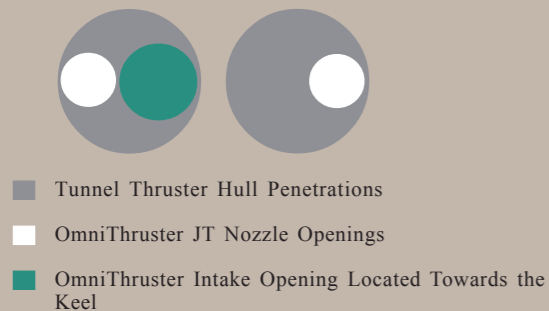
Note: Thrust Estimates Dependant on System Losses

STANDARD DESIGN / CONSTRUCTION

DESIGN	Standard	ABS, DNV, Lloyds Register
FEATURES	Impeller Type	Mixed Flow
	Rotation	CCW (as viewed from input shaft)
	Thrust Bearing	Tapered Roller
	Shaft Bearing	Water Lubricated, Rubber / Composite
	Shaft Seal	Packing / Lip or Mechanical Seals
MATERIALS	Steering Vane Shaft Seal	Lip Type Seal
	Coating	Scotchcote® 134 Internal / External
	Orientation	Horizontal or Vertical Installation
	Drive Shaft	17-4 / Nitronic 50
CONTROLS	Casing	A36, Aluminum, NI-AL-BRZ
	Impeller	316 SS, NI-AL-BRZ
	Standard	"Solid-State" Full Port / Full Stbd.
Optional	"PLC" Based Fully Proportional	
Auxiliary	Wing Stations / Auxiliary Panels Available	

To supplement the design and installation activity, OmniThruster offers customers and Naval Architects three dimensional, computer generated outline drawings on request.

COMPARATIVE HULL PENETRATIONS



For over 30 years **OmniThruster** has been a world leader in the development of waterjet bow thrusters and maneuvering systems. Our unique, patented designs, which provide diverse maneuverability and auxiliary propulsion, have been the installation choice on vessels worldwide.

An **OmniThruster** bow thruster produces thrust continually... with nozzles in or out of the water... in rough seas... in strong currents... while pitching, yawing, rolling, or heaving. An **OmniThruster** can even produce thrust while the vessel is underway at several knots, a condition in which conventional propeller tunnel thrusters are subject to cavitation and do not effectively produce thrust, if at all.

No other bow thruster can provide the superior advantages of incomparable maneuverability, as well as auxiliary propulsion, which is available with the **OmniThruster** systems.

Key Benefits

1. Small Hull Penetrations
2. Low Submergence Requirement
3. Effective Thrust in Current
4. Emergency/Auxiliary Propulsion
5. Serviceable While Afloat
6. Non-Polluting
7. Compact Design(For HT Series)
8. Worldwide sale and service



Installation List (Partial)

HT Thrusters:

Owner/Operator	Country	Vessel Type	System	Quantity in Service
Andrie Inc.	USA	Tankbarge	HT600	1
Aztar Corp.	USA	Casino Gaming	HT400	1
Chatham Towing	USA	Inland Tank Barges	HT400	6
Delaware River and Bay Authority	USA	Passenger/Car Ferries	HT600	5
Emsea Marine	Sweden	Chemical Tanker	HT400WP	1
IFA – Alaska	USA	Passenger/Car Ferries	HT400TD	2
KMY	Finland	Ice Classed Barge	HT600TD	1
Monterey Bay Research Institute	USA	SWATH Research Vessel	HT400	2
NOAA	USA	Fisheries Research	HT400TD	1
Nordic Tankers	Denmark	Chemical Tankers (Nadja Class)	HT600	3
North Carolina DOT	USA	Passenger/Car Ferries	HT400	3
North Carolina DOT	USA	Passenger/Car Ferries	HT600	1
Purvis Marine	Canada	Lake Barge	HT400	1
Raytheon	USA	Research Vessel	HT400TD w/Noise Masking	1
Seacor/Seabulk	USA	Oil Tank Barge	HT400	1
Seacor/Seabulk	USA	Oil Tank Barge	HT600	2
Seaways Int.	UAE	Ocean Tug	HT400	1
Tropical Shipping	USA	Container Ship	HT400	1
US Navy	USA	Torpedo Test Craft	HT600TD	2

JT Thrusters:

Owner/Operator	Country	Vessel Type	System	Quantity in Service
Augusta Due SLR	Italy	Chemicals Tanker	JT750 w/Take Home Option	1
Brostrom	Sweden	Chemical Tankers (Axel Class)	JT750 w/Take Home Option	3
Allied Tran.	USA	Tank Barge	JT1000	1
General Dynamics	USA	Pre-Positioning RO/RO	JT1000	6
Japanese Defense Agency	Japan	Mine Sweeper Coastal	JT575AM Tactical w/Noise Masking	15
Japanese Defense Agency	Japan	Mine Sweeper Ocean	JT750AM Tactical w/Noise Masking	4
Japanese Defense Agency	Japan	Ocean Surveillance	JT1000TD	4
Maritrans	USA	Petroleum Barge	JT1750TD	1
Penn Maritime	USA	Asphalt Barge	JT750TD	4
US Coast Guard	USA	Ice Breaker	JT2200IB	1
US Navy	USA	Ocean Surveillance	JT1000TD	2
US Navy	USA	Mine Countermeasures	JT750AM Tactical w/Noise Masking	14



JT Series Military Installations



USNS MCM Class
JT750AM



Japanese Maritime Self Defense Force
MSC Class
JT575AM



USNS T-AGOS 23 Impeccable
(2) JT1100TD



Japanese Maritime Self Defense Force
AOS Class
(2) JT950TD



US Coast Guard Cutter Healy
JT2200IB w/Hull Lubrication System



Japanese Maritime Self Defense Force
MSO Class JT750AM



JT Series Military Installations



USNS T-AK 3008-3012
Positioning RO-RO
JT1100



Canadian Coast Guard Ship Earl Grey
Medium NAVAIDS Tender/Light
Icebreaker JT950



USNS T-AGM 23 Observation Island
JT1700WP



CCGS Provo Wallis
Ice Classed NAVAIDS Tender
JT700



Installation List (Partial)

HT Thrusters:

Owner/Operator	Country	Vessel Type	System	Quantity in Service
Andrie Inc.	USA	Tankbarge	HT600	1
Aztar Corp.	USA	Casino Gaming	HT400	1
Chatham Towing	USA	Inland Tank Barges	HT400	6
Delaware River and Bay Authority	USA	Passenger/Car Ferries	HT600	5
Emsea Marine	Sweden	Chemical Tanker	HT400WP	1
IFA – Alaska	USA	Passenger/Car Ferries	HT400TD	2
KMY	Finland	Ice Classed Barge	HT600TD	1
Monterey Bay Research Institute	USA	SWATH Research Vessel	HT400	2
NOAA	USA	Fisheries Research	HT400TD	1
Nordic Tankers	Denmark	Chemical Tankers (Nadja Class)	HT600	3
North Carolina DOT	USA	Passenger/Car Ferries	HT400	3
North Carolina DOT	USA	Passenger/Car Ferries	HT600	1
Purvis Marine	Canada	Lake Barge	HT400	1
Raytheon	USA	Research Vessel	HT400TD w/Noise Masking	1
Seacor/Seabulk	USA	Oil Tank Barge	HT400	1
Seacor/Seabulk	USA	Oil Tank Barge	HT600	2
Seaways Int.	UAE	Ocean Tug	HT400	1
Tropical Shipping	USA	Container Ship	HT400	1
US Navy	USA	Torpedo Test Craft	HT600TD	2

JT Thrusters:

Owner/Operator	Country	Vessel Type	System	Quantity in Service
Augusta Due SLR	Italy	Chemicals Tanker	JT750 w/Take Home Option	1
Brostrom	Sweden	Chemical Tankers (Axel Class)	JT750 w/Take Home Option	3
Allied Tran.	USA	Tank Barge	JT1000	1
General Dynamics	USA	Pre-Positioning RO/RO	JT1000	6
Japanese Defense Agency	Japan	Mine Sweeper Coastal	JT575AM Tactical w/Noise Masking	15
Japanese Defense Agency	Japan	Mine Sweeper Ocean	JT750AM Tactical w/Noise Masking	4
Japanese Defense Agency	Japan	Ocean Surveillance	JT1000TD	4
Maritrans	USA	Petroleum Barge	JT1750TD	1
Penn Maritime	USA	Asphalt Barge	JT750TD	4
US Coast Guard	USA	Ice Breaker	JT2200IB	1
US Navy	USA	Ocean Surveillance	JT1000TD	2
US Navy	USA	Mine Countermeasures	JT750AM Tactical w/Noise Masking	14