

B O W T H R U S T E R S

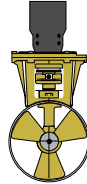


 **TRANS-AUTO OY**





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Production plants in Limite sull'Arno



**From concept to production:**

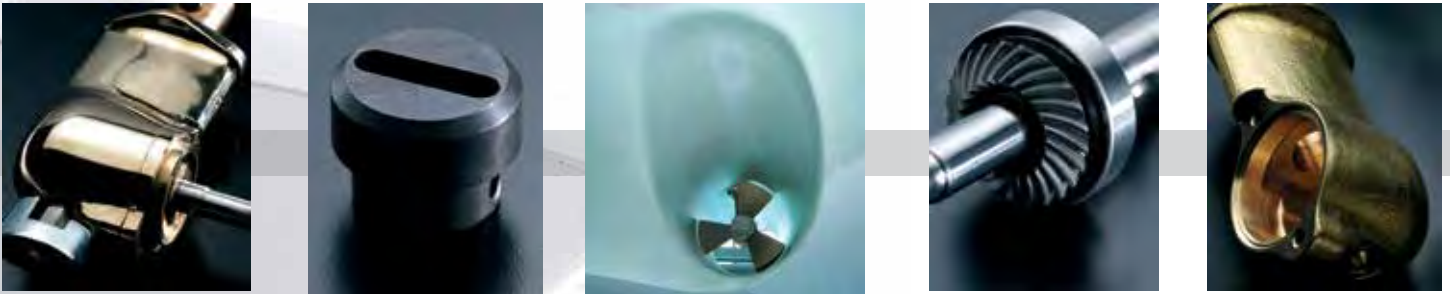
Throughout our nearly sixty years of experience, BCS has become a leading company in the production and worldwide distribution of high quality marine equipment. The acquisition by Twin Disc, Inc. – leader in several different areas such as marine and industrial, heavy duty transmissions and the oil extraction industry – has consolidated its position on the market as part of a multinational group.

Twin Disc SRL combines BCS, BCS Service, Twin Disc Technodrive and Twin Disc Propulsion. Twin Disc SRL is also supported by a sister-company, Rolla SP Propellers.

#### **Global “Package”**

Twin Disc SRL offers to boat builders and design engineers a complete “package” of products, from propulsion systems to gearboxes and transmissions up to control and steering systems, together with customized solutions and efficient technical support. Also global customer service for the development and realization of the whole kinematics system.

A dynamic team of engineers, technicians and professional people is devoted to support the customer in any step: from concept of the project to the planning, through prototype development and design definition, up to bench and field testing, production, assembly, installation and service also on board.



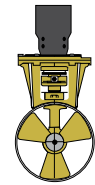
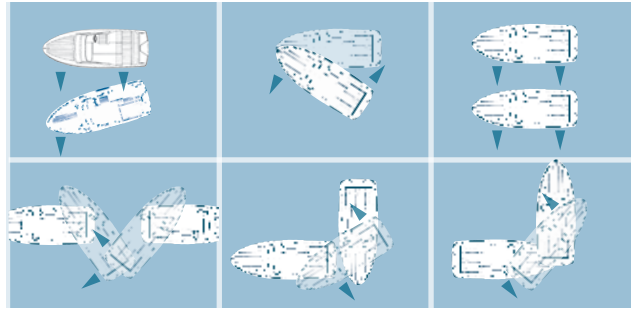
### **prototype development, care for design, field testing, product definition**

Twin Disc SRL works alongside the customer every day. We have established a unique worldwide system dedicated to the marine industry based on our ability to acknowledge and anticipate market requests, the certified reliability of our products, skilled service and the continuous research of technological innovation.

The production plant of Limite sull' Arno produces equipment covering several application fields: Hydraulic and electronic steering systems, complete shaft lines for boats up to 40 meters, trim tab systems in stainless steel or aluminum, electric and hydraulic bow and stern thrusters, electrohydraulic gangways and side ladders for large applications, as well as a large variety of stainless steel hydraulic actuators and multi-function electrohydraulic power units.

# INTRODUCTION

## HYDRAULIC THRUSTER



Whether in strong winds or streams, harbors or marinas, mooring or setting sail, Twin Disc bow and stern thrusters become absolutely necessary to ensure the best maneuverability and total comfort. Simply push a button or move the joystick on the control panel of the dashboard to maneuver the bow or stern thrusters.

Twin Disc thrusters' compact design allow them to be installed in limited spaces. Our many years of production and large number of applications are a guarantee of high quality and trouble-free performance.

Twin Disc offers a wide variety of bow and stern thrusters (hydraulic), covering a large range of applications from very small up to 40 mt.



marine currents



wind attack



marine currents



wind attack

## HYDRAULIC THRUSTERS

### HOW TO CHOOSE THE RIGHT MODEL

A hydraulic thruster combines higher thrust and longer working cycles with the builders' need for low total weight, dimensions and the final system cost.

To choose the most suitable model it is important to determine: the total thrust amount necessary - such as the boat dimensions and the weight - as well as the total surface exposed to the wind and the marine currents (see page 4 for a more detailed explanation). It is equally important to evaluate the boat use (i.e. pleasure or commercial).

The final performance of the system depends on the type and the power of the main engines, the type of system configuration, and the size of the different hydraulic components.

Every hydraulic thruster system should be designed and sized specifically for each individual application. Please consult the Twin Disc Technical Department for the necessary support for the best configuration.

The suggestions shown in the Order Guide on page 9 shall be intended as indicative.

A hydraulic thruster is independent from the battery sets and takes all necessary power from either the main engine or a generator set installed on board, that can be:

- main engine, must have sufficient power at the minimum rpm (\*)
- PTO (power take off) on the gearbox
- generator set, also having a sufficient power (\*)
- an electro-hydraulic set suitable for the specific application (not included in the Twin Disc range)

Twin Disc marine gears are provided with a PTO which transmits the necessary power to the system and provides a connection for the hydraulic pump.

(\*) For the minimum power required by each model, please consult the Order Guide table on page 17.

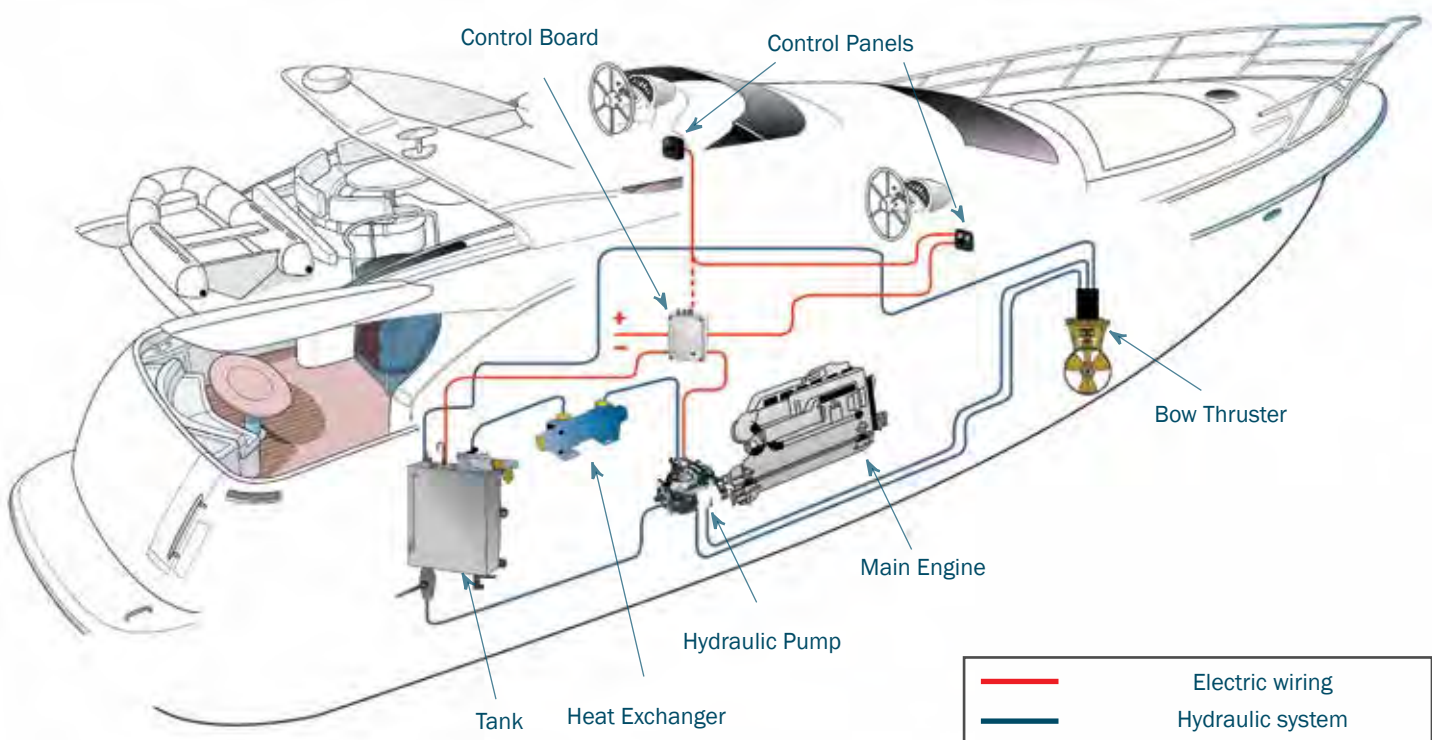
# MAIN FEATURES

- Available for applications up to 40 mt - 131'
- Design for a low hydrodynamic resistance
- Double counter-rotating propeller
- Transmission gears built in high tensile materials
- Quiet operation
- High quality materials suitable to the marine environment
- Wide range of hydraulic components in different sizes for a complete system and different configurations
- Bow and stern mounting options
- Easy installation
- Conforming to the highest production standards
- Easy access to spare parts

## WORKING PRINCIPLE OF CLOSED-CIRCUIT SYSTEM

The closed-circuit bow thruster system represents the right solution when there is no need to add other applications (i.e. stern thruster).

1. By actuating the control panel in the desired direction, an electrical impulse is sent to the control board.
2. This signal is then transmitted to the electro-valve of the pump coupled to the main engine.
3. The pump, going in stroke, suctions oil from the tank and sends it to the hydraulic motor of the thruster. The propeller starts to turn.
4. A part of the oil flow from the pump goes back to the tank passing through the heat exchanger in order to be cooled. The oil coming out from the thruster goes back directly to the tank.

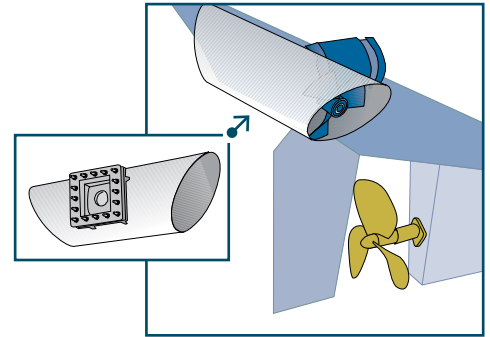




# COMPLETE FREEDOM OF MOVEMENT

All Twin Disc hydraulic thrusters can be installed either in front or at rear of the boat, placed in any position, either vertically or horizontally.

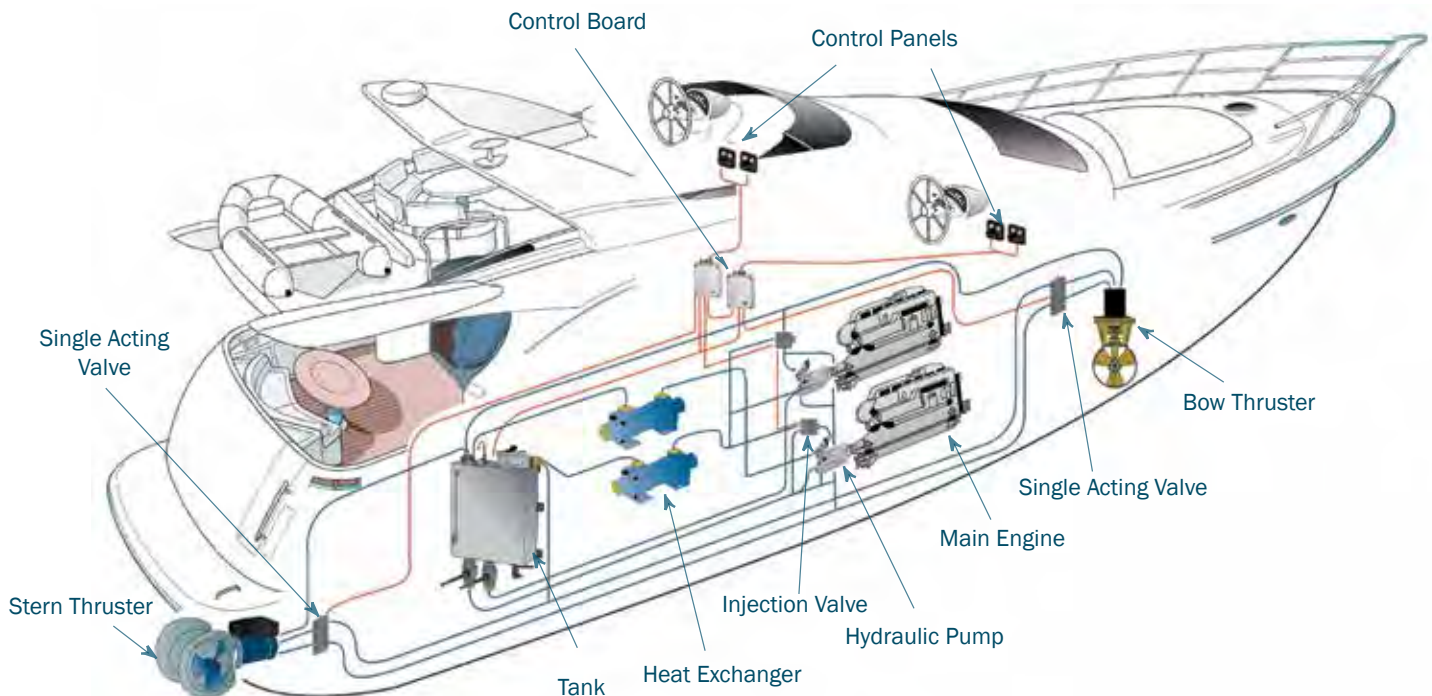
The stern thruster is installed horizontally through the transom by means of a special resin tunnel of stainless steel fixed to the boat itself. The stern tunnels are available in two models for each diameter, (please see the section "Accessories" on pages 18-21) having a different shape and length for maximum flexibility in mounting on the transom and minimum interference with other equipment on board.



## WORKING PRINCIPLE OF OPEN-CIRCUIT SYSTEM

The open circuit system has a more complex configuration that offers many advantages such as the integration of a stern thruster or stabilizer, as well as the possibility of passing from one engine to the other. The working principle is as follows:

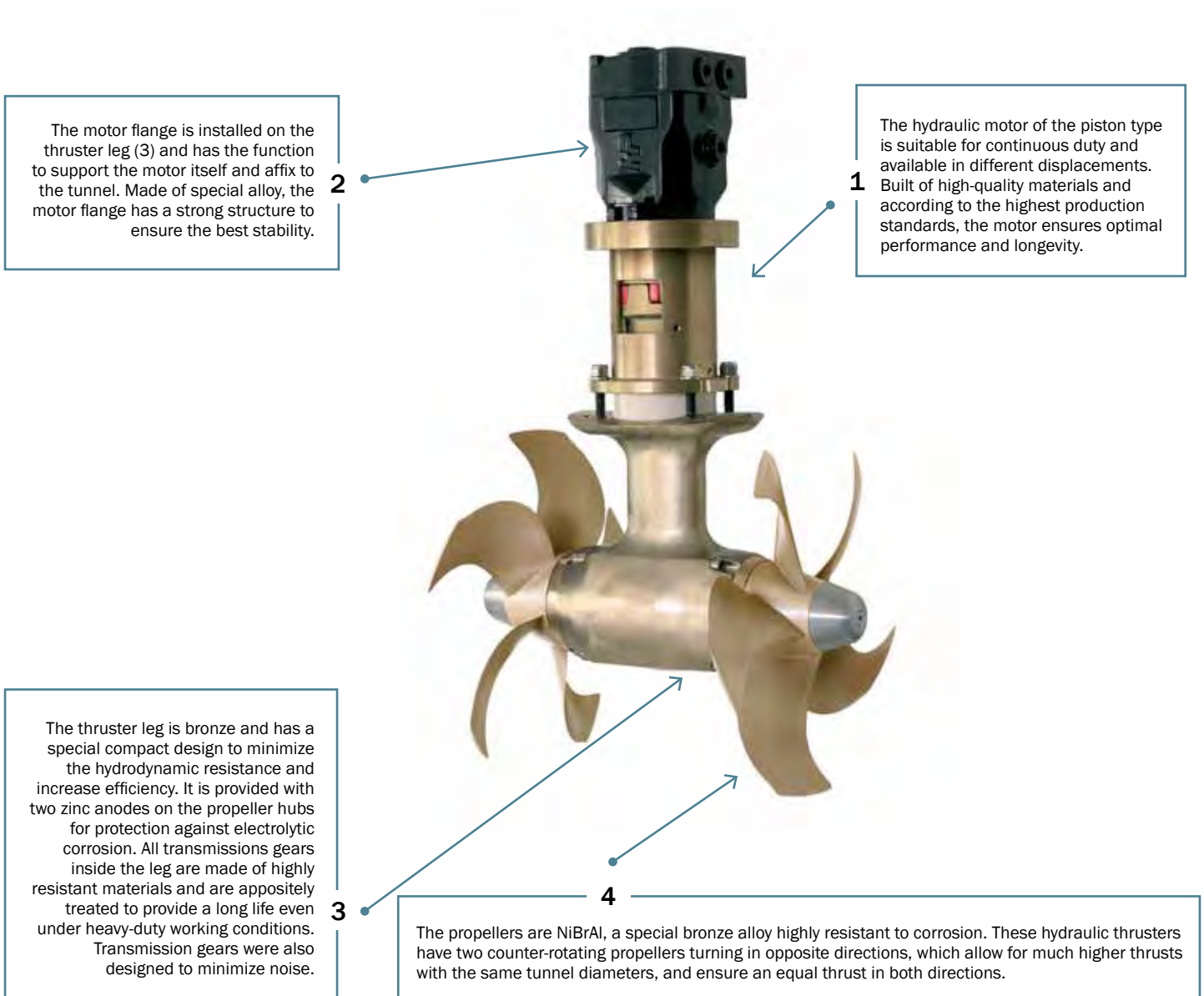
1. By actuating the control panel of the thruster, an electrical impulse is sent to the relative control board.
2. This signal is transmitted to both the single acting valve which determines the rotation direction, and to the injection valve that makes the pump go in stroke and activate the circuit.
3. The pump suctions oil from the tank and sends it to the single acting valve that allows it to flow to the hydraulic motor of the thruster. The propeller starts to turn.
4. A part of the oil flow from the pump goes back to the tank passing through the heat exchanger in order to be cooled. The oil coming out from the thruster goes back directly to the tank.



# SYSTEM COMPOSITION

All hydraulic components to complete the system such as pumps, tanks, tunnels, stern-thruster kits, heat exchangers, control boards and control panels are available in several models and sizes for a wide variety of configuration possibilities to satisfy many applications. See pages 18-21.

Twin Disc hydraulic thrusters include two counter-rotating propellers. The basic composition is as follows:



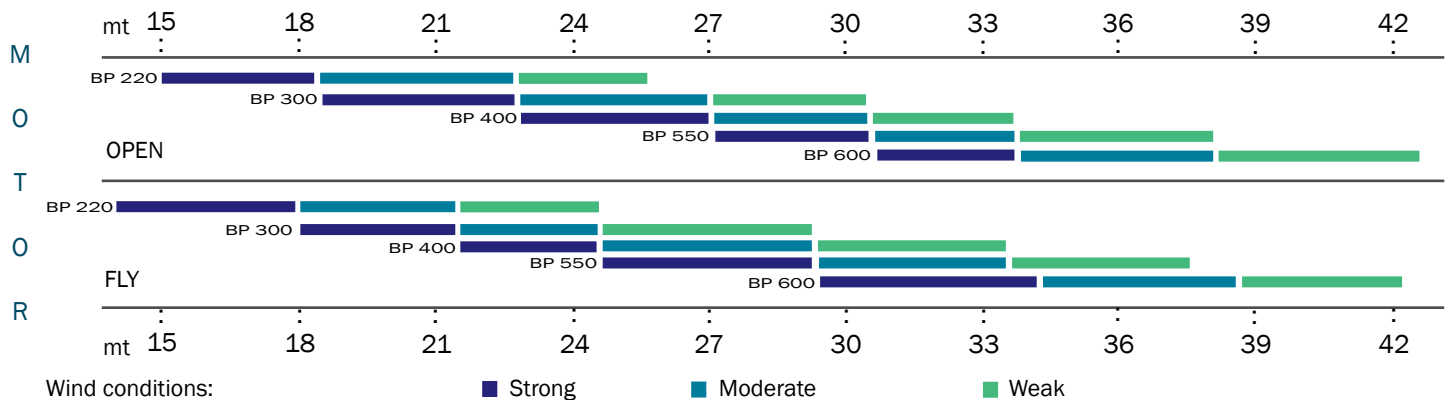
# ORDER GUIDE



		Measure	BP 220	BP 300	BP 400	BP 550	BP 600
Typical boat size*	Open	mt	13 - 24	17 - 31	20 - 35	27 - 38	29 - 43
	Fly		15 - 23	18 - 28	21 - 33	28 - 36	30 - 41
Nominal thrust		Kgf • N	220 • 2158	300 • 2943	400 • 3924	550 • 5886	600 • 5886
Tunnel I.D.		mm	250	300	355	400	450
Nominal Power		KW	18,7	28,5	35	48,5	60
		Hp	25	38	47	65	82
Hydraulic motor		cc	11 / 14	18 / 21	21 / 26	50 / 58	50 / 58
Weight		Kg	24	35	45	75	85

\* These values shall be intended as merely indicative. The performances of each thruster depend on several different factors and on the sizing of the hydraulic components. Ask the Twin Disc Technical Department for suggestions on the most suitable configuration.

## WIND INFLUENCE



# ACCESSORIES

## CONTROL PANELS

Twin Disc offers two different types of control panels for thrusters:

- ON/OFF Panel - Switch on and perform the needed maneuvers. This is also available with a dual joystick in order to control both bow and stern thrusters.
- Proportional Speed Panel - Increase or decrease total thrust control by adjusting operator pressure on the joystick. Its small dimensions allow a dual mounting configuration either horizontally or vertically, in case of a bow and stern thrusters system.

- Warning lights and acoustic alarm for temperature or oil level
- Waterproof (IP65)
- Power on/off
- Compact design
- Reduced dimensions for easy installation anywhere
- Easy installation
- Conforming to the highest production standards
- Easy access to spare parts

ON/OFF PANEL



PROPORTIONAL PANEL

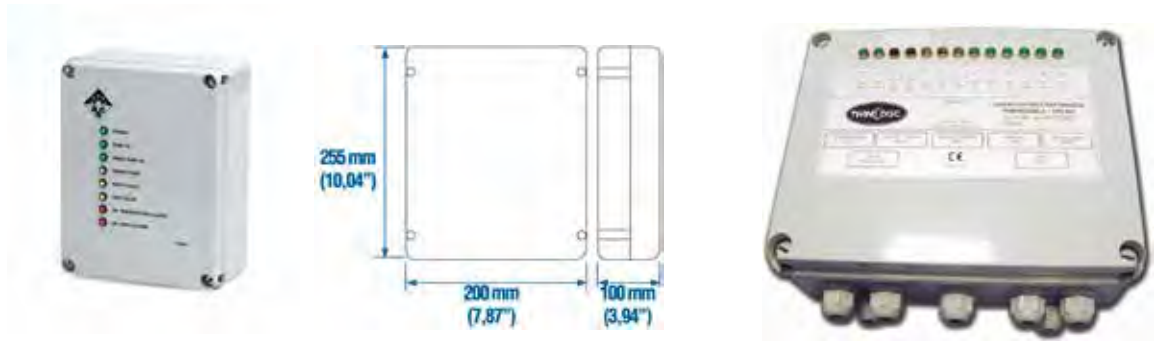


Description	Code
ON/OFF single control panel for bow thruster for BP 220 - BP 300 - BP400 - BP 550 - BP 600	IT23530
ON/OFF double control panel for thrusters for BP 220 - BP 300 - BP400 - BP 550 - BP 600	IT23531

Description	Code
Single proportional control panel for thruster for BP 220 - BP 300 - BP 400 - BP 550 - BP 600	IT30043

## CONTROL BOARD

The control board contains the electric terminal block for the wiring of the system and the connection to the control panels. The control panel is provided with lights on the cover relating to the different functions.



Description	Code
Electric control board for BP 220 - BP 300 - BP 400 - BP 550 - BP 600 with ON/OFF control panels	IT10436
Electric control board for BP 220 - BP 300 - BP 400 - BP 550 - BP 600 proportional	IT30042

## BOW THRUSTER LEG

Bronze thruster leg with a compact and effective design for the minimum hydrodynamic resistance. It is provided with two counter-rotating propellers and two zinc protection anodes placed on the propeller hubs.



Model	Description	Code
BP 220	Bow thruster leg 220 Kgf - d. 250 mm - 14cc/rev motor - without tunnel	IT27898
BP 300	Bow thruster leg 300 Kgf - d. 300 mm - 21cc/rev motor - without tunnel	IT27485
BP 400	Bow thruster leg 400 Kgf - d. 355 mm - 28cc/rev motor - without tunnel	IT27486
BP 550	Bow thruster leg 550 Kgf - d. 400 mm - 58cc/rev motor - without tunnel	IT29965
BP 600	Bow thruster leg 600 Kgf - d. 450 mm - 50cc/rev motor - without tunnel	IT23882

## BOW THRUSTER TUNNEL

The bow-thruster tunnel is in reinforced GRP and is available in the diameters of 250 mm - 300 mm - 355 mm - 400 mm - 450 mm in combination with several different lengths. It is pre-drilled for the mounting of the thruster leg.



Description		Code
Bow thruster tunnel in GRP d. 250 mm	sold per meter - for BP 220	IT15304
Bow thruster tunnel in GRP d. 250 mm with pre-drilling	L= 1,5 mt for BP 220	IT21348
Bow thruster tunnel in GRP d. 250 mm with pre-drilling	L= 2 mt for BP 220	IT21349
Bow thruster tunnel in GRP d. 300 mm with pre-drilling	L= 1,5 mt for BP-300	IT28443
Bow thruster tunnel in GRP d. 300 mm with pre-drilling	L= 2 mt for BP-300	IT27498
Bow thruster tunnel in GRP d. 300 mm with pre-drilling	L = 2,5 mt for BP 300	IT31467
Bow thruster tunnel in GRP d. 355 mm with pre-drilling	L= 2 mt for BP 400	IT27499
Bow thruster tunnel in GRP d. 355 mm with pre-drilling	L= 2,5 mt for BP 400	IT27500
Bow thruster tunnel in GRP d. 400 mm with pre-drilling	L= 2 mt for BP 550	IT30033
Bow thruster tunnel in GRP d. 400 mm with pre-drilling	L= 2,5 mt for BP 550	IT30034
Bow thruster tunnel in GRP d. 400 mm with pre-drilling	L= 3 mt for BP 550	IT30035
Bow thruster tunnel in GRP d. 450 mm with pre-drilling	L= 2 mt for BP 600	IT23834
Bow thruster tunnel in GRP d. 450 mm with pre-drilling	L= 2,5 mt for BP 600	IT23835
Bow thruster tunnel in GRP d. 450 mm with pre-drilling	L= 3 mt for BP 600	IT23836

## STERN THRUSTER TUNNEL

The stern thruster tunnel is completely in AISI316 stainless steel and is available in the diameters of 250 mm - 300 mm - 355 mm - 400 mm - 450 mm. It is available in two different shape/ length combinations (models "S" and "P") in order to satisfy any requirement and offer minimum interference with other equipment on board. A mounting flange is provided for connection to the transom.



**Model S**



**Model P**

Description		Code
Stern thruster tunnel in AISI316 stainless steel - mod. S - d. 250 mm	for BP 220	IT20694
Stern thruster tunnel in AISI316 stainless steel - mod. P - d. 250 mm	for BP 220	IT19977
Stern thruster tunnel in AISI316 stainless steel - mod. S - d. 300 mm	for BP 300	IT30023
Stern thruster tunnel in AISI316 stainless steel - mod. P - d. 300 mm	for BP 300	IT30027
Stern thruster tunnel in AISI316 stainless steel - mod. S - d. 355 mm	for BP 400	IT27911
Stern thruster tunnel in AISI316 stainless steel - mod. P - d. 355 mm	for BP 400	IT27909
Stern thruster tunnel in AISI316 stainless steel - mod. S - d. 400 mm	for BP 550	IT30031
Stern thruster tunnel in AISI316 stainless steel - mod. P - d. 400 mm	for BP 550	IT30028
Stern thruster tunnel in AISI316 stainless steel - mod. S - d. 450 mm	for BP 600	IT23884
Stern thruster tunnel in AISI316 stainless steel - mod. P - d. 450 mm	for BP 600	ITBP0150600P

## PUMPS



The piston pumps for hydraulic bow thrusters have a variable displacement and are available in a wide range from 46 cc/rev to 115 cc/rev. Certain models are suitable for closed circuit and others for open circuit applications. All can work at high pressures. Pumps are provided with built-in relief valves and several models have built-in filters. Twin Disc can supply a wide variety of coupling flanges type SAE for the connection of the pump to the PTO, to be selected according to the different engine makes and system configurations.



### MAIN FEATURES

- Reduced dimensions
- Built-in relief valves
- Low noise emission
- Short response time
- High rotation speed
- Multiple pumps mounting possibility
- High quality and reliability

## HEAT EXCHANGER

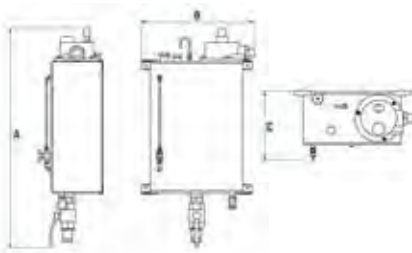


The heat exchanger has the important function of cooling oil. The heat exchanger actually transfers a certain heat amount from a warmer fluid, like oil of the hydraulic system, to a colder one, like sea water, without any contact. The two fluids never touch due to a metal wall dividing them. It is provided with two input sections and two output sections. The heat exchanger is available in two models.

## STAINLESS STEEL TANK



The stainless steel tank contains the hydraulic fluid necessary for the system. It is available in three capacities: 35 - 50 - 90 liters according to application type, system configuration, and single or double connection for the installation of other equipment. It is provided with a filter on the return line, as well as a high temperature sensor and a low level device connected to the dashboard control panel.

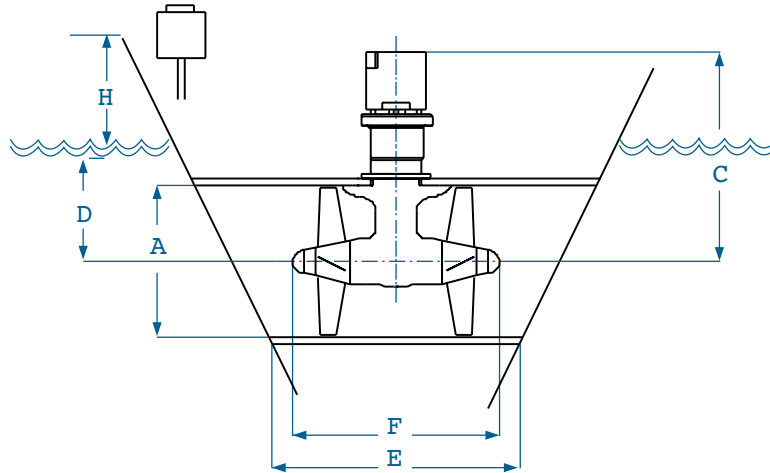


### DIMENSIONS

Code	Description	A	B	C
IT15565	Vertical mounting tank 35 lt single connection	780 mm 30,70 in	490 mm 19,29 in	287 mm 11,30 in
IT11236	Vertical mounting tank 50 lt single connection	950 mm 37,40 in	490 mm 19,29 in	287 mm 11,30 in
IT11237	Vertical mounting tank 50 lt double connection	950 mm 37,40 in	490 mm 19,29 in	287 mm 11,30 in
IT19128	Horizontal mounting tank 90 lt double connection	936 mm 36,85 in	730 mm 28,74 in	386 mm 15,19 in

# DIMENSIONS AND TECHNICAL SPECIFICATIONS

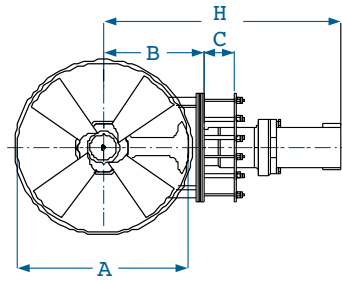
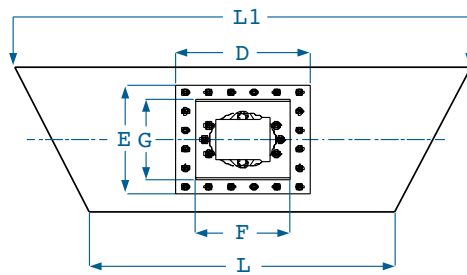
## HYDRAULIC THRUSTERS



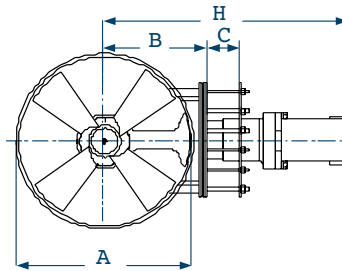
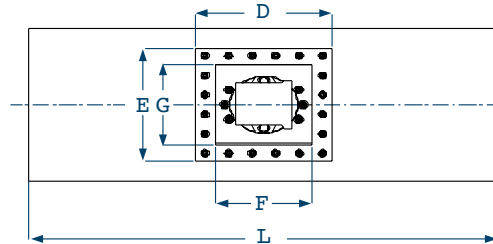
Model	BP 220	BP 300	BP 400	BP 550	BP 600
A (mm • in)	250 • 9,83"	300 • 11,8"	355 • 14"	400 • 15,75"	450 • 17,72"
C (mm • in)	352 • 13,8"	465 • 18,30"	495 • 19,5"	600 • 23,6"	625 • 24,61"
D (mm • in) minimum	250 • 9,83"	300 • 11,81"	360 • 14,17"	400 • 15,75"	450 • 17,72"
E (mm • in)	500 - 1000 19,68" - 39,37"	580 - 1160 22,83" - 45,6"	700 - 1360 27,56" - 53,54"	800 - 1600 31,5" - 63"	800 - 1600 31,5" - 63"
F (mm • in)	348 • 13,7"	425 • 16,73"	425 • 16,73"	498 • 19,6"	508 • 20,00"
H (mm • in) minimum	500 • 19,68"	500 • 19,68"	500 • 19,68"	500 • 19,68"	500 • 19,68"
Technical Details					
Thrust (kg • lbs • N)	220 • 485 • 2158	300 • 661 • 2943	400 • 881 • 3924	550 • 1322 5886	600 • 1333 5886
Power (Kw • Hp)	18,7 • 25	28,5 • 38	35 • 47	48,5 • 65	60 • 82
Weight (Kg • lb)	24 • 53	35 • 77	45 • 99	75 • 165	85 • 189
Standard length of tunnel (mm • in)	1500 - 2000 78,74"	1500 - 2000 78,74"	2000 - 2500 78,74" - 98,42"	2000 - 2500 3000 78,74" - 98,42" 118,11"	2000 - 2500 3000 78,74" - 98,42" 118,11"



# DIMENSIONS OF STERN THRUSTER TUNNELS



**MODEL "P"**



**MODEL "S"**

Model	BP 220/S	BP 220/P	BP 300/S	BP 300/P	BP 400/S	BP 400/P	BP 550/S	BP 550/P	BP 600/S	BP 600/P
A mm ft	250 9,83"	250 9,83"	300 11,81"	300 11,81"	355 13,98"	355 13,98"	400 15,75"	400 15,75"	450 17,72"	450 17,77"
B	162 6,38"	162 6,38"	187 7,36"	187 7,36"	214,5 8,44"	214,5 8,44"	239 9,41"	239 9,41"	264 10,39"	264 10,39"
C	80 3,15"	80 3,15"	80 3,15"	80 3,15"	80 3,15"	80 3,15"	80 3,15"	80 3,15"	80 3,15"	80 3,15"
D	345 13,58"	345 13,58"	270 10,63"	270 10,63"	270 10,63"	270 10,63"	350 13,78"	350 13,78"	350 13,78"	350 13,78"
E	345 13,58"	345 13,58"	250 9,83"	250 9,83"	250 9,83"	250 9,83"	350 13,78"	350 13,78"	350 13,78"	350 13,78"
F	250 9,83"	250 9,83"	165 6,50"	165 6,50"	165 6,50"	165 6,50"	250 9,83"	250 9,83"	250 9,83"	250 9,83"
G	250 9,83"	250 9,83"	150 5,91"	150 5,91"	150 5,91"	150 5,91"	250 9,83"	250 9,83"	250 9,83"	250 9,83"
H	390 15,35"	390 15,35"	465 18,31"	465 18,31"	492,5 18,70"	492,5 19,39"	600 23,62"	600 23,62"	625 24,61"	625 24,61"
L	500 19,68"	500 19,68"	600 23,62"	550 21,65"	700 27,56"	700 27,56"	700 27,56"	700 27,56"	1000 39,37"	804 31,65"
L1	/	850 33,46"	/	950 37,4"	/	1000 39,37"	/	1000 39,37"	/	1200 47,24"

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## WARRANTY CONDITIONS

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