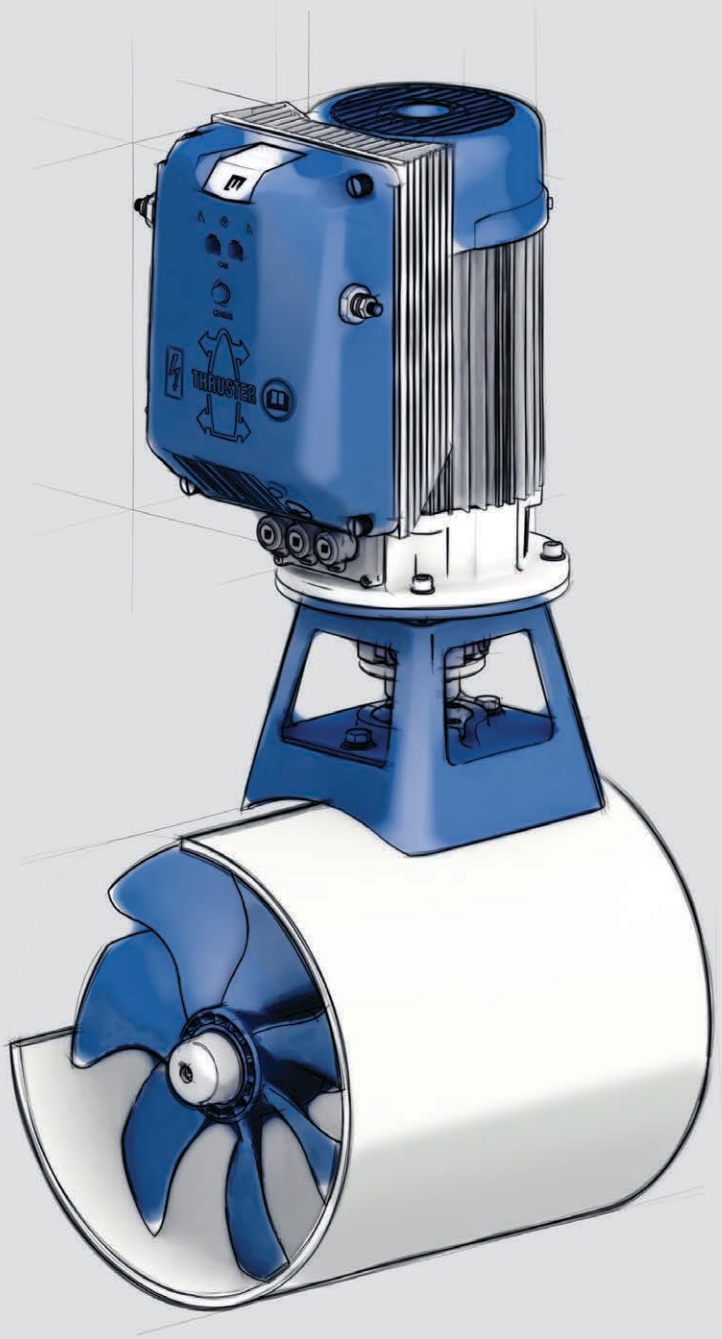
Thruster systems



The world of VETUS thrusters

BOW PRO proportional brushless bow and stern thrusters

The new leading edge of thruster development, utilizing well proven components and technology. For boats ranging from 20 to 130 feet.

- Proportional control allows you to vary the power output of the thruster for more precise control
- Digitally controlled by a (patented) VETUS V-CAN CAN bus motor controller
- Resistant to damage from misuse and overuse, with heat sensing and self-regulating electronics
- Simple and intuitive to operate, with a short self learning curve on adjusting the thrust
- Control panel with lock and hold function to make single handed docking much easier
- A range of more than twenty thrusters, from 30 kgf to 420 kgf
- Battery powered at 12, 24 and 48 VDC
- Longer run time: 10 minutes (minimum) at full power and even longer runtimes at reduced power, ultimately limited by battery capacity and recharge rate
- Motor technology: efficient, sealed, brushless induction motors giving maximum run time on a charged battery bank

Turn to page 222 for detailed information.

DC bow and stern thrusters

The original recreational boat thruster, developed and refined over 40 years of hard work on boats ranging from 20 to 80 feet. These DC thrusters have been a proven concept and affordable thruster solution for many years.

- On-off, port-starboard controls
- Simple and intuitive to operate
- Lowest cost, simplest installation, easy retrofit
- A range of nineteen thrusters, with thrust outputs ranging from 25 kgf to 285 kgf
- Battery powered at 12, 24 and 48 VDC
- Run time: 2-4 minutes continuous or combined in one hour
- Motor technology: direct current, series wound with carbon brushes

Turn to page 228 for detailed information.

RIMDRIVE proportional permanent magnet thrusters

If you treasure peace, perfect peace, on calm waters, or need to move with stealth on rough waters, the world's quietest thrusters are for you. For boats ranging from 40 to 65 feet.

- Proportional control allows you to vary the power output of the thruster for more precise control
- Extremely quiet thruster due to its unique design without gears
- Digitally controlled by a (patented) VETUS V-CAN CAN bus motor controller
- Resistant to damage from misuse and overuse, with heat sensing and self-regulating electronics
- Simple and intuitive to operate, with a short learning curve on adjusting the thrust
- Control panel with lock and hold function to make single handed docking much easier
- A thruster with a power output of 160 kgf
- Battery powered at 48 VDC
- Longer runtime: 10 minutes (minimum) at full power and even longer runtime at reduced power, on minimum recommended battery bank, but easily extended by increasing battery capacity
- Motor technology: highly efficient permanent magnet motors giving maximum run time on a charged battery bank

Turn to page 231 for detailed information.

Ignition protected DC bow and stern thrusters

An extension of the well-known DC thruster, which makes this the only electric thruster type suitable for use in compartments containing gasoline / petrol engines, tanks and fuel lines, propane tanks and lines, jet skis / pwcs or outboard engines and their fuel tanks, as the motor is encased to prevent explosive fumes reaching its interior. For boats ranging from 20 to 60 feet.

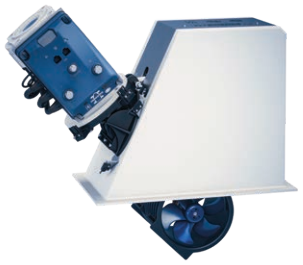
- Ten models with power outputs ranging from 25 kgf to 160 kgf
- Battery powered at 12 and 24 VDC
- Run times 2-4 minutes continuous or combined in one hour
- Motor technology: direct current, series wound with carbon brushes

Turn to page 232 for detailed information.

COMING SOON!

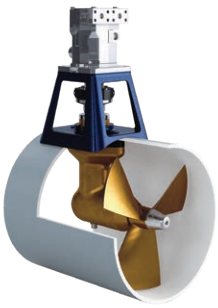
Retractable BOW PRO thrusters

Ideal for shallow-draft boats where conventional tunnel thrusters can't be fully submerged, this thruster is built on the proven BOW PRO platform. It features a swing-out mechanism that deploys below the hull during use and retracts afterward. Suitable for vessels from 25 to 50 feet in length.



- Proportional controls with automatic deployment and retraction
- Simple and intuitive to operate
- Four models with power outputs ranging from 57 kgf to 90 kgf
- Battery powered at 12 and or 24 VDC
- Unlimited runtime
- Motor technology: brushless induction motor with zero maintenance

Turn to page 233 for detailed information.



Hydraulic thrusters

Thrust whenever you need it, for as long as you need it -, is the defining characteristic of these powerful machines and their systems. Built with industrial grade components and ideal for commercial and recreational heavy-duty applications. For boats ranging from 35 to 150 feet.

- Controls can be simple on-off port-starboard, dual stage with half power or proportional control to full power
- Made for very hard work - long lived, reliable, accustomed to abuse and highly resistant to damage
- Seven models with power outputs ranging from 55 kgf to 550 kgf
- Powered by propulsion engine(s) or generator
- Continuous runtime with proper setup
- Motor technology: hydraulic

Turn to page 235 for detailed information.

Thruster systems

Thrusters can take the stress out of docking and manoeuvering by giving you sideways control of the movement and position of the bow and the stern of your boat. They work by rotating a propeller in a submerged tunnel or a housing mounted athwartships and located near the bow and/or the stern. A control panel allows you to push the bow and/or stern sideways, to resist the force of a crosswind and cross current, while you are manoeuvring in close quarters.

What thrusters will do for you and your boat

- Allow you to maintain control while docking and manoeuvering, even into a very tight slip in a crowded marina
- Allow a single crew member to pick up and secure the dock lines while you move the boat sideways from one piling or mooring buoy to the next - slowly, carefully, quietly and with very little pushing, pulling or shouting
- Allow you and your one-person crew to handle and control a much bigger and more comfortable boat
- Avoid the possibility of hitting another boat, a dock or a piling, that might cause expensive damage to your boat, another boat or the marina facilities
- Minimize the risk of a crew member being injured during docking manoueuvres in difficult conditions
- Allow you to handle your boat with the same expertise, grace and panache as the other captains whose boats are equipped with VETUS thrusters

How to choose the correct bow and stern thruster

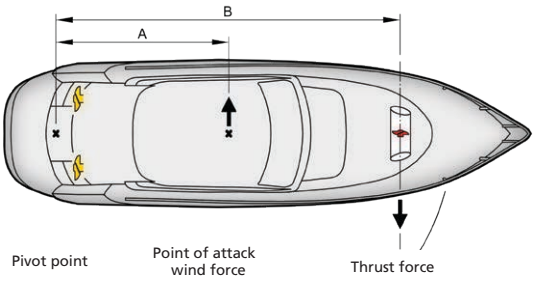
After you have selected your type of thruster, the following tools can be used to calculate and select the required thrust force for your boat.

The influence of the wind
The force applied to the boat by the wind is determined by the wind speed, the wind angle and the lateral wind draft area of the boat. If the wind blows at right angles to the boat, this wind pressure is most difficult to counter. However, this is seldom the case and as most boat superstructures are fairly streamlined, a reduction factor of 0.75 is generally applied, when calculating the wind pressure.

The turning moment
The turning moment is calculated by multiplying the wind force by the distance (A) between the centre of effort of the wind and the pivot point. In order to simplify this: for the vast majority of boats a rule of thumb may be applied that the turning moment is calculated by multiplying the wind force by half of the boat's overall length.

The thrust force
It is the thrust force which is the true measure of a bow thrusters usefulness and not the output of the electric or hydraulic motor in kW or HP. The nominal thrust force is a combination of the motor power, the shape of the propeller and the efficiency losses inside the tunnel. VETUS electrical bow thrusters have a very high thrust of between 17 and 23 kgf per kW motor power.

The required thrust force to counter the effects of the wind is calculated by dividing the turning moment by the distance (B) between the centre of the bow thruster tunnel and the pivot point of the boat.



Centres of rotational effort

Wind force Beaufort	Description	Wind speed m/s	Wind pressure N/m² - (kgf/m²)
4	moderate breeze	5,5 to 7,9	20 to 40 - (2,0 to 4,1)
5	fresh breeze	8,0 to 10,7	41 to 74 - (4,2 to 7,5)
6	strong breeze	10,8 to 13,8	75 to 123 - (7,7 to 12,5)
7	near gale	13,9 to 17,1	125 to 189 - (12,7 to 19,2)
8	gale	17,2 to 20,7	191 to 276 - (19,4 to 28,2)

Calculation example
The boat has an overall length of 11 m and the lateral wind draft measures 18 m². It is required that the bow can be controlled easily when wind force Beaufort 5 applies, which gives a wind pressure is: Rho= 41 to 74 N/m², i.e. Rho (average) = 60 N/m².

The required torque is
T = wind pressure x wind draft x reduction factor x distance centre of effort to pivot point, (= approx. half the length of the vessel)
T = 60 N/m² x 18 m² x 0,75 x (11 x 0,5) m = 4455 Nm

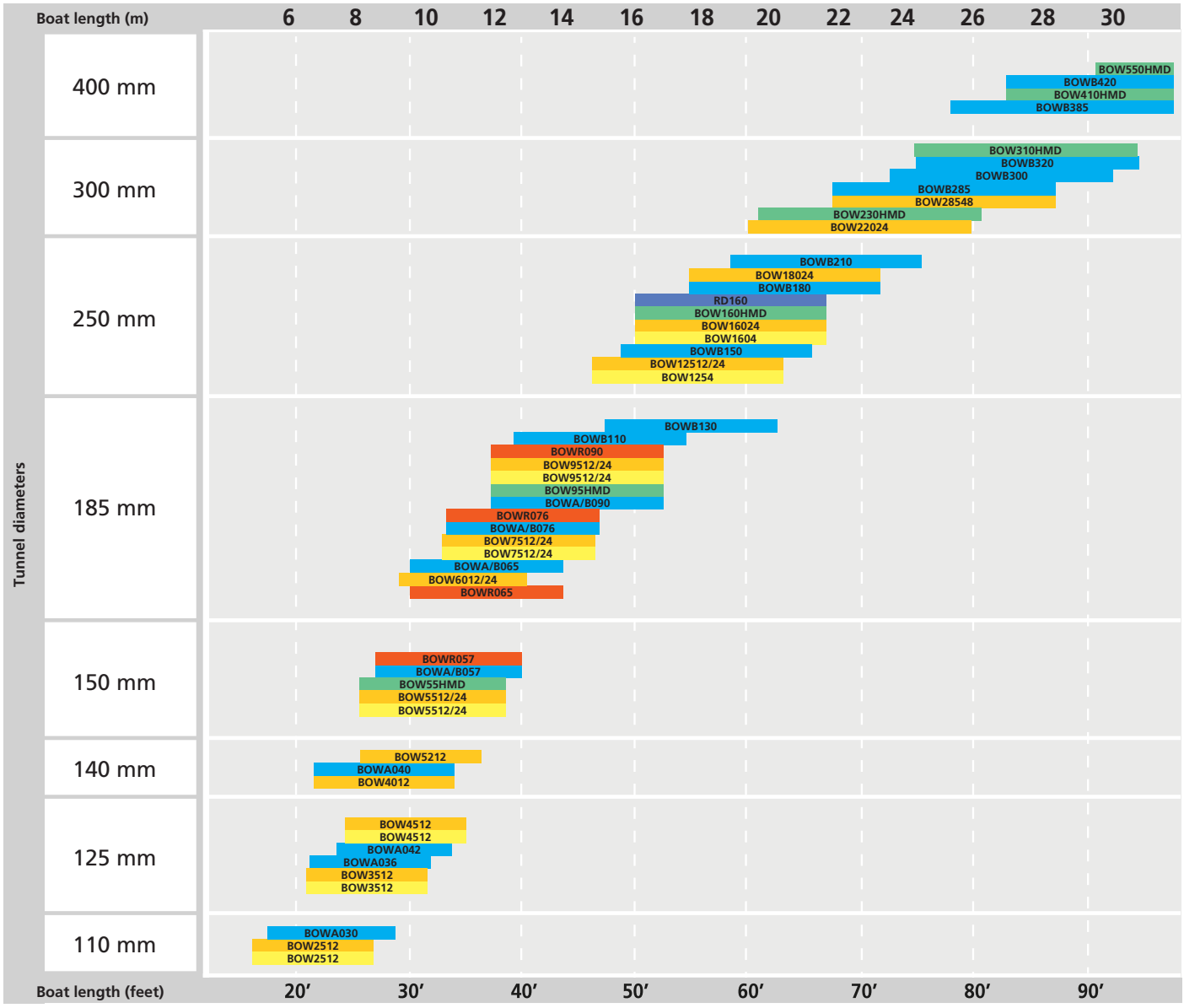
The required thrust force is calculated as follows

$$F = \frac{\text{torque}}{\text{distance between centre of bow thruster and the pivot point of the boat (with the transom as pivot of the boat)}} = \frac{4455\ \text{Nm}}{10{,}5\ \text{m}} = 420\ \text{N (42 kgf)}$$

The most suitable VETUS bow thruster for this vessel with a wind force of Beaufort 5 is our 45 kgf (99 lbf) unit. For a wind force of Beaufort 4, the 25 kgf (55 lbf) can be used. A wind force of Beaufort 6 would require our 75 kgf (156 lbf) thruster. Always bear in mind that the effective performance of a bow thruster will vary with each particular boat, as the displacement, the shape of the underwater section and the positioning of the bow thruster will always remain variable factors. As a rule of thumb it can be assumed that the stern thruster may be "one model smaller" than the bow thruster model, as it has been calculated. Therefore, in this case a stern thruster type 35 kgf will be the correct model with a wind force of Beaufort 5.

On the next page there is a selection table of all VETUS thruster models against recommended boat length. Please note that this table is given for general guidance only and the calculation shown above prevails.

Overview per tunnel



Specifications	BOW PRO THRUSTERS	DC THRUSTERS	RIMDRIVE THRUSTERS	IGNITION PROTECTED DC THRUSTERS	RETRACTABLE BOW PRO THRUSTERS	HYDRAULIC THRUSTERS
Sound	dB	dB	dB	dB	dB	dB
Commercial use						
Proportional	✓	×	✓	×	✓	✓
Maintenance						

BOW PRO proportional bow and stern thrusters

Revolutionary concept matched with proven technology

Our new BOW PRO is a one of a kind thruster, which is standard fully proportional controlled. This thruster is equipped with brushless induction motors. Therefore the bow / stern thruster motor is maintenance-free and has much longer runtimes compared to conventional DC thrusters.
The BOW PRO thruster is V-CAN CAN bus controlled by the patented VETUS motor controller (MCV), which features built-in over temp and low battery protection. Those built-in safeties combined with the brushless induction motor make the BOW PRO thruster series perfectly suitable for intensive use and hence ideal for every boater in the most difficult maneuvering situations.

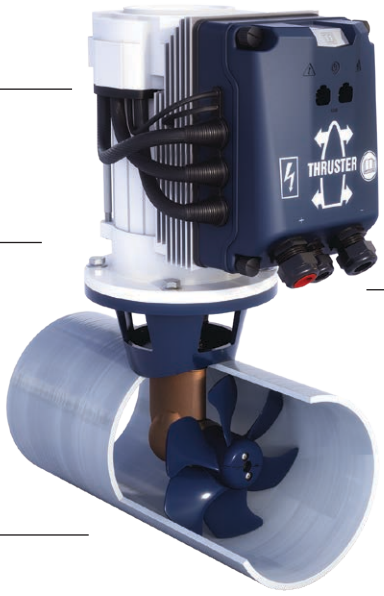
BOW PRO thrusters utilize the same propellers and gearboxes proven in VETUS thrusters for over 40 years. Upgrading a boat with an existing thruster to a BOW PRO thruster is easily accommodated as the BOW PRO thruster was made to share tunnel sizes with current VETUS thrusters as well as many other brands.

Fully proportional control

Digitally controlled by (patented) MCV motor controller

Maintenance-free brushless induction motor

Built-in over-temp and low battery protection



*Unlimited runtimes**

Connectivity to devices with CAN bus carrying signals possible

Available with lock-and-hold controls

Highly efficient thruster system

Interchangeable with existing thrusters (shared tunnel sizes)

* BOW PRO thrusters will run continuously for 6 or 10 minutes (depending on thruster model) at full power, after that the power may be reduced. At less than full power setting, run time is greatly enhanced. To achieve these results installation instructions must be adhered.

V-CAN control panels

The BOW PRO thruster is digitally controlled by proprietary CAN bus protocol V-CAN. There are three fully proportional control panels available for the BOW PRO thruster series; one basic paddle panel and one panel with lock-and-hold function. With the press of a button, you are able to lock the thrust at any desired speed, freeing you to step away from the control panel to tie up your boat. A feature that makes single handed docking much easier.

VETUS also offers a double control panel with lock-and-hold function which controls the bow and stern thruster simultaneously. See page 240 for detailed information.

BOW PRO series: BOWA

The complete BOW PRO thrusters range starts with the BOWA series.

- A range of thrusters with thrust outputs ranging from 30 kgf to 76 kgf
- Battery powered at 12 VDC
- Runtime of 10 minutes at full power and even longer runtimes at reduced power

Battery state of charge, battery cable size, ambient temperature and other factors can affect thruster performance. Advice for battery cable length per model see page 237.

BOWA0361

BOWA0761

BOW PRO series - Type	BOWA0301	BOWA0361	BOWA0401	BOWA0421	BOWA0571	BOWA0651	BOWA0761
Thrust at 12/24 VDC (kgf)*	30	36	40	42	57	65	76
Power (kw-hp)	1,2 - 1,6	1,2 - 1,6	2,7 - 3,7	2,7 - 3,7	2,7 - 3,7	2,7 - 3,7	2,7 - 3,7
Brushless AC motor	✓	✓	✓	✓	✓	✓	✓
Advised boat length (ft - m)	<24' / <7	20'-30'/6-10	23'-36'/7-11	26'-37'/8-11,5	26'-39'/8-12	27'-40'/8-12,5	30'-45'/10-14
Tunnel diameter (mm - inch)	110 - 4,33"	125 - 4,92"	140 - 5.5"	125 - 4,92"	150 - 5,9"	185 - 7,3"	185 - 7,3"
Weight excl. tunnel (kg)	24	24	31	35	35	35	35
Operating time, continuously max per hour in minutes**	10	10	10	10	6	10	6
For DC system V	12	12	12	12	12	12	12
Battery main switch: model BATSW / type BPMAIN	250/12	250/12	250/12	250/12	250/12	250/12	250/12
Internal thruster fuse (Amp)	200	300	300	300	300	250	300
Battery Ah value (C20)	90	170	145	145	185	170	200

BOW PRO series: BOWA 48 VDC

The increasing popularity of environmentally friendly boats with 48 VDC electric propulsion required the development of thrusters running at the same voltage, and these BOW PROs are designed to meet that need. The 48 VDC BOW PRO thrusters offers all the advantages of the standard BOW PRO; available in several propeller and tunnel diameters and are more than powerful enough to turn your runabout in the desired direction.

- A range of smaller thrusters with thrust outputs ranging from 30 kgf to 76 kgf
- Battery powered at 48 VDC
- Runtime of 10 minutes at full power and even longer runtimes at reduced power

BOW PRO series - Type	BOWA0304	BOWA0364	BOWA0574	BOWA0764
Thrust at 48 VDC (kgf)*	30	36	57	76
Power (kw-hp)	1,2 - 1,6	1,2 - 1,6	3,1 - 4,2	3,1 - 4,2
Brushless AC motor	✓	✓	✓	✓
Advised boat length (ft - m)	<24' / <7	20'-30'/6-10	26'-39'/8-12	30'-45'/10-14
Tunnel diameter (mm - inch)	110 - 4,33"	125 - 4,92"	150 -5,9"	185 - 7,3"
Weight excl. tunnel (kg)	24	24	35	35
Operating time, continuously max p/h in minutes full power**	10	10	10	10
For DC system (Volt)	48	48	48	48
Battery main switch: model BATSW / type BPMAIN	250	250	250	250
Internal thruster fuse (Amp)	80	100	100	100
Battery Ah value (C20)	60	60	60	60

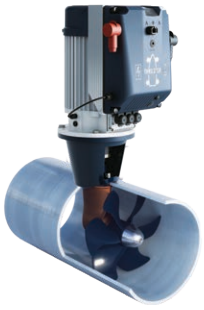
* When the BOW PRO is operating within the set boundaries, the thrust output is not affected by voltage drop (10.5-15V, 21-30V, 41-60V).

** BOW PRO thrusters will run continuously for 6 or 10 minutes (depending on thruster model) at full power, after that the power may be reduced. At less than full power setting, run time is greatly enhanced. To achieve these results installation instructions must be adhered.

BOW PRO Boosted series: BOWB

BOWB150

BOWB180



BOWB300

All the features of the phenomenal BOWA series with a bonus. All BOW PRO Boosted (BOWB) include an exclusive built in DC-to-DC smart charger function that allows 24 VDC thruster battery banks to be charged by a 12 VDC power supply and in the case of 48 VDC BOWB, to be charged from an existing 24 VDC power supply. BOWB thrusters do this through a third charge connection on the thruster. This charge connection is constantly monitored and is only activated once the voltage level of the charging source reaches a suitable level. This feature prevents the charging source from being depleted, such as the engine starting bank. They then boost that input to a higher voltage and regulate it in a smart way to charge the thruster supply bank. In practice, this means you are able to connect the 24 VDC BOW PRO Boosted with a 12 VDC power supply to charge its battery bank. The built in smart three stage charging process ensures that the thruster batteries are kept at their optimum level.

Connecting the BOW PRO Boosted directly to a 24 or 48 VDC power supply is also possible.

- A range of thrusters with thrust outputs ranging from 57 kgf to 420 kgf
- Battery powered at 24 VDC (or 48 VDC)
- Runtime of 10 minutes at full power and even longer runtimes at reduced power
- Patented MCV motor controller with integrated boost charger 12/24 VDC (or 24/48 VDC)

BOWB420

BOW PRO Boosted - Type	BOWB057	BOWB065	BOWB076	BOWB090	BOWB110	BOWB130
Thrust at 12/24 VDC (kgf)*	57	65	76	90	110	130
Power (kw-hp)	3,1 - 4,1	3,1 - 4,1	3,1 - 4,1	5,7 - 8	5,7 - 8	5,7 - 8
Brushless ac motor	✓	✓	✓	✓	✓	✓
Advised boat length (ft - m)	26'-39'/8-12	27'-40'/8-12,5	30'-45'/10-14	36'-55'/11,5-17	36'-56'/11,5-18	40'-60'/12,5-18
Tunnel diameter (mm - inch)	150 -5,9"	185 - 7,3"	185 - 7,3"	185 - 7,3"	185 - 7,3"	185 - 7,3"
Weight excl. tunnel (kg)	28	29	29	33	33	33
Operating time, continuously max per hour in minutes**	10	10	10	10	10	10
For DC system (Volt)	12/24	12/24	12/24	12/24	12/24	12/24
Battery main switch: model BATSW / type BPMAIN	250/24	250/24	250/24	250/24	250/24	250/24
Internal thruster fuse (Amp)	200	160	200	200	300	300
Battery Ah value (C20)	90	90	90	145	170	185

BOWHPCK

High power connection kit

The BOWHPCK is a connection kit for bow thrusters in the VETUS BOW PRO series. This connection kit is used to simplify the implementation of big diameter supply wires. When using diameters 95 mm² (AWG 0) or above this kit is required.
Only applicable for BOW PRO models up until BOWB210.

BOW PRO Boosted series: BOWB

BOW PRO Boosted - Type	BOWB150	BOWB180	BOWB210	BOWB285	BOWB300	BOWB320
Thrust at 12/24 VDC (kgf) [1]	150	180	210	285	300	320
Power (kw-hp)	5,7 - 8	11 - 15	11 - 15	18,4 - 25	18,4 - 25	18,4 - 25
Brushless ac motor	✓	✓	✓	✓	✓	✓
Advised boat length (ft - m)	40'-60'/12,5-18	44'-68'/15-20	50'-75'/16-22	65'-90'/20-28	80'-100'/25-30	80'-105'/25-32
Tunnel diameter (mm - inch)	250 - 9,8"	250 - 9,8"	250 - 9,8"	300 - 11,8"	300 - 11,8"	300 - 11,8"
Weight excl. tunnel (kg)	38	45	45	95	95	95
Operating time, continuously max per hour in minutes [2]	6	10	10	10	10	10
For DC system (Volt)	12/24	24/48	24/48	24/48	24/48	24/48
Battery main switch: model BATSW / type BPMAIN	250/24	250	250	600	600	600
Internal thruster fuse (Amp) [3]	300	250	250	425	425	425
Battery Ah value (C20)	170	185	185	220	220	220

BOW PRO Boosted - Type	BOWB385	BOWB420
Thrust at 12/24 VDC (kgf) [1]	385	420
Power (kw-hp)	18,4 - 25	18,4 - 25
Brushless ac motor	✓	✓
Advised boat length (ft - m)	100'-120'/30-35	110'-130'/33-40
Tunnel diameter (mm - inch)	400 - 15,7"	400 - 15,7"
Weight excl. tunnel (kg)	120	120
Operating time, continuously max per hour in minutes [2]	6	6
For DC system (Volt)	24/48	24/48
Battery main switch: model BATSW / type BPMAIN	600	600
Internal thruster fuse (Amp) [3]	500	500
Battery Ah value (C20)	220	220

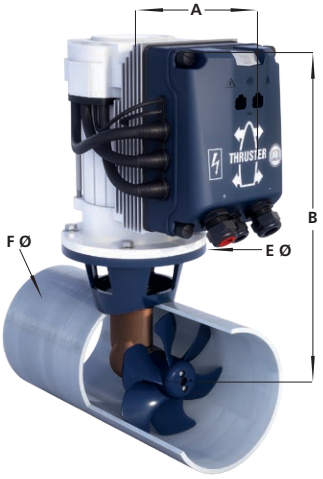
[1] When the BOW PRO is operating within the set boundaries, the thrust output is not affected by voltage drop (10.5-15V, 21-30V, 41-60V).
[2] BOW PRO thrusters will run continuously for 6 or 10 minutes (depending on thruster model) at full power, after that the power may be reduced. At less than full power setting, run time is greatly enhanced. To achieve these results installation instructions must be adhered.
[3] For models BOWB285 / 300/ 320 / 385 / 420 the fuse is mounted externally

Battery state of charge, battery cable size, ambient temperature and other factors can affect thruster performance. Advise for battery cable length per model see page 237.

Dimensions of all BOW PRO's (in mm)

SERIES	BOWA	BOWA	BOWA	BOWA BOWB	BOWA BOWB
Output	30 kgf	36 kgf	42 kgf	57 kgf	65 kgf
A	210	210	210	210	210
B	350	358	378	434	413/ 450
E Ø	200	200	200	200	200
F Ø	110	125	125	150	185

SERIES	BOWA BOWB	BOWA BOWB	BOWB	BOWB	BOWB
Output	76 kgf	90 kgf	110 kgf	130 kgf	150 kgf
A	210	282	282	282	282
B	450	452	452	452	507
E Ø	200	200	200	200	200
F Ø	185	185	185	185	250



SERIES	BOWB	BOWB	BOWB	BOWB	BOWB	BOWB	BOWB
Output	180 kgf	210 kgf	285 kgf	300 kgf	320 kgf	385 kgf	420 kgf
A	282	282	250	250	250	300	300
B	528	528	740	740	740	830	830
E Ø	240	240	258	258	258	258	258
F Ø	250	250	300	300	300	400	400

BOW PRO: Seamless integration with leading joystick systems

VETUS BOW PRO thrusters are built for smooth, proportional control and connect effortlessly with advanced joystick systems like Yamaha Helm Master® EX, Mercury Joystick Piloting for Outboards (JPO), Honda Outboards & Ultraflex Controls and YANMAR. Through CAN bus integration, the thruster responds precisely to joystick input, delivering intuitive 360-degree maneuverability in any condition. Whether your vessel runs on inboard or outboard engines, BOW PRO becomes a fully integrated part of your helm.

Fully compatible with both inboard and outboard engine installations, the BOW PRO seamlessly integrates into new builds as well as retrofit projects, ensuring a flexible and efficient fit in many different configurations.

Integration with YANMAR latest joystick systems

The latest YANMAR Inboard Joystick Control System offers superior maneuvering and docking by combining easy and intuitive joystick control for single and twin inboard engine installations. This joystick system paired with a VETUS BOW PRO thruster makes it easier to control your boat, even in challenging conditions.

Integrating a VETUS BOW PRO thruster into a boat equipped with a Yanmar joystick significantly enhances low speed control and docking simplicity, boosting safety and overall boat functionality. This level of combined control provides unparalleled confidence, especially during previously challenging maneuvering situations.

Integration with YAMAHA HELM MASTER® EX

Yamaha Helm Master® EX is a fully integrated boat control system that makes navigating and getting to your destination easier, and once you arrive, gives a whole new level of control to precisely manoeuvre your craft to exactly where and how you want it. The addition of a VETUS BOW PRO thruster to a Yamaha Helm Master® EX equipped boat dramatically improves the slow speed authority and ease of berthing, increasing safety and vessel usability. There is nothing quite like the confidence that this level of integrated control gives you during what were previously the most stressful aspects of boat handling.

All BOW PRO thrusters are suitable for integration with single or multi-engine boats using Yamaha's upgraded Helm Master® EX control system.

Integration with MERCURY MARINE® JPO

VETUS and Mercury Marine® have partnered to integrate all BOW PRO thrusters with Mercury Joystick Piloting for Outboards (JPO). This compatibility ensures a seamless connection between systems, delivering a superior joystick piloting experience with enhanced control for any vessel equipped with single or multi-engine Mercury Verado outboards.

The integration between VETUS and Mercury Marine® empowers boaters to take full advantage of the unique features of the VETUS BOW PRO thruster range. Thanks to the NMEA 2000-certified CAN bus interface, a single joystick provides intuitive, simultaneous control of both engines and thrusters.

Integration with HONDA Outboards & ULTRAFLEX Controls

Expanding the integration program to enhance the boating experience for even more users, VETUS is now partnering with Honda Marine and Ultraflex to enable the full integration of BOW PRO thrusters with Honda outboard engines and Ultraflex controls.

This collaboration introduces an optimized communication system, seamlessly connecting your engine, steering, and bow thruster into one easy-to-use joystick control, transforming docking and close-quarter maneuvering into a smooth and effortless process. Boaters can now maneuver with absolute confidence and precision in any docking situation. The integration of VETUS BOW PRO thrusters, Honda outboard engines, and Ultraflex controls ensures effortless boat handling - even in the most challenging docking situations - and is suitable for both single and multi-engine installations.

Integration with Suzuki Marine

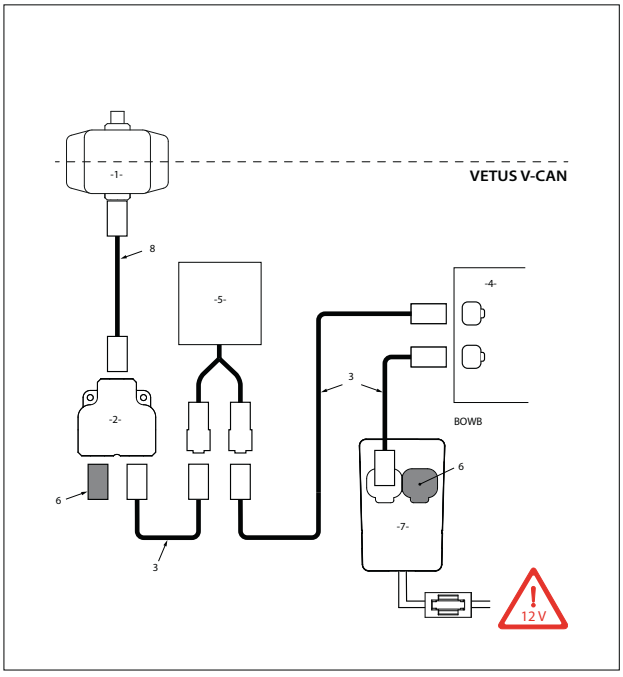
VETUS and Suzuki Marine have joined forces to ensure full compatibility between all BOW PRO and RIMDRIVE thrusters and Suzuki's advanced integrated steering models, the 300BMD and 350AMD. This collaboration introduces a cutting-edge communication system that elevates the boating experience by enhancing safety, simplifying operation, and optimizing overall vessel performance. The system seamlessly connects engine, steering, and bow thruster controls through a streamlined joystick interface. With this partnership, VETUS and Suzuki Marine reaffirm their commitment to making boating easier and more enjoyable, particularly in demanding docking situations where precision and control are crucial.

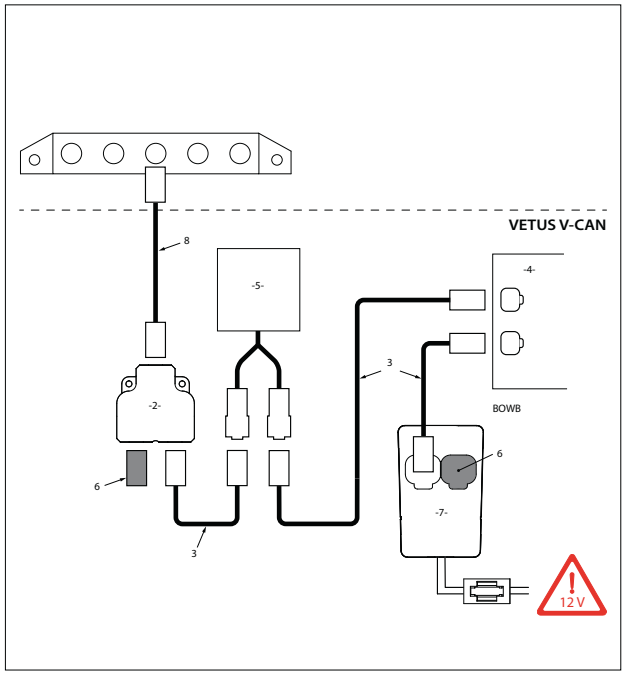
More integrations are to come official! Be ready!

BOW PRO: Seamless integration with leading joystick systems

Connection Diagrams

Each of the integrations mentioned functions differently. Some require the use of a VETUS CANverter, while others may need additional components from the engine or control system manufacturer. For more information, please contact VETUS or your authorized engine dealer.





Label	Type	Description
1	**CANV2N2**	CANverter bi directional NMEA2000 to V-CAN
2	**CANVHUB**	V-CAN bus 3-point hub
3	**BPCABxxHF**	V-CAN cable Halogen free
4	**BOW PRO**	BOW PRO thruster
5	**BPPPA / BPPJA**	Proportional control for BOW PRO (CAN bus) / Proportional control for the BOW PRO with lock and hold function (CAN bus)
6	**CANVT**	V-CAN Terminating resistor
7	**CANVPS**	V-CAN Power supply incl. safety
8	**CANVM12A**	CANverter M12 adapter cable (Included with CANverter)

CANVERTER

The CANverter is a plug-and-play gateway that allows you to combine different CAN (Controller Area Network) protocols. The NMEA 2000 / J1939-certified CAN bus interface (CANVERTER) enables the integration of all BOW PRO thrusters to 3rd party controls that can carry CAN bus signals. This compatible system joins seamlessly to create a compelling solution that enhances the docking experience and overall performance by connecting engine-, steering- and thruster controls with 3rd party control devices.

NMEA 2000 ⟷ V-CAN

Type	Description
CANV2N2	CANverter bi directional NMEA2000 to V-CAN
CANV2Y2	CANverter bi directional J1939 to V-CAN
CANV2N1	CANverter mono directional V-CAN to NMEA2000
CANR	CANrepeater
CANVM12A	CANverter M12 adapter cable

CANVERTER

DC bow and stern thrusters

Proven concept, optimum flow

These original VETUS DC bow and stern thrusters are the base of an extensive range of DC electric thrusters such as the standard DC thrusters, extended runtime thrusters and ignition protected thrusters. Developed and refined over 40 years of hard work, installed on boats world wide and operating in every possible condition.

The advantages of VETUS bow thrusters are endless, however below we highlight the most important characteristics.

Minimal noise because of its unique six blade propeller design, spiral gears and flexible coupling

Optimum flow due to the streamlined tailpiece

Eliminated corrosion and reduced weight with the synthetic propeller

Easy installation and clear instructions

High quality control panels made of aluminum and interchangeable with older panels

Integrated thermal switch to prevent overheating

High performance, efficient and reliable series wound carbon brushed electric DC motor

Simple and intuitive to operate

The standard VETUS DC thruster comes in a range of fourteen thrusters for boats from 15 to 90 feet and has become a proven concept and affordable solution in the thruster market.

- On / off, port-starboard controls
- Lowest costs, simplest installation, easy retrofit
- A range of fourteen thrusters with thrust outputs ranging from 25 kgf to 285 kgf
- Battery powered at 12, 24 and 48 VDC
- Run time of 2-4 minutes continuous or combined in one hour
- Motor technology: direct current, series wound with carbon brushes

A complete overview with technical specifications and dimensions of the DC bow and stern thrusters are shown on the next page.

Bow thruster control panels

VETUS has different bow thruster panels available in both deluxe or compact versions. All of these control panels easily fit in a 52 mm diameter cut-out and are waterproof to IP 66.

A complete overview and more information on control panels for DC bow and stern thrusters are shown on page 241.

DC bow and stern thrusters

BOW2512

BOW3512

BOW4012

BOW6012

DC series - Type	BOW2512E(I)**	BOW3512E(I)**	BOW3512F(I)**	BOW4012**	BOW4512D(I)
Thrust at 12/24 VDC (kgf)*	25	35	35	40	45
Available ignition protected (I)	✓	✓	✓	✓	✓
Power (kw-hp)	1,5 - 2	1,5 - 2	1,5 - 2	1,5 - 2	3 - 4
Motor DC	12	12	12	12	12
Advised boat length (ft - m)	<24' / <7	20'-30'/6-10	20'-30'/6-10	26'-34'/ 8-10,5	26'-37'/8-11,5
Tunnel diameter (mm - inch)	110 - 4,33"	150 - 5,9"	125 - 4,92"	140 - 5,5"	125 - 4,92"
Weight excl. tunnel (kg)	10	12	12	12	16
For DC system V	12	12	12	12	12
Battery main switch: model BATSW / type BPMAIN	250/12	250/12	250/12	250/12	250/12
Battery CCA value EN (min / **max**)	333 / **667**	367 / **733**	367 / **733**	367 / **733**	625 / **1250**

DC series - Type	BOW5212	BOW5512D(I)	BOW5524D(I)	BOW6012D	BOW6024D
Thrust at 12/24 VDC (kgf)*	52	55	60	65	70
Available ignition protected (I)	✓	✓	✓	-	-
Power (kw-hp)	3 - 4	3 - 4	3 - 4	3 - 4	3 - 4
Motor DC	12	12	24	12	24
Advised boat length (ft - m)	26'-39'/8-12	26'-39'/8-12	26'-39'/8-12	27'-40'/8-12,5	27'-40'/8-12,5
Tunnel diameter (mm - inch)	140 - 5,5"	150 - 5,9"	150 -5,9"	185 - 7,3"	185 - 7,3"
Weight excl. tunnel (kg)	17	17	17	17	17
For DC system V	12	12	24	12	24
Battery main switch: model BATSW / type BPMAIN	250/12	250/12	250/24	250/12	250/24
Battery CCA value EN (min / **max**)	625 / **1250**	625 / **1250**	342 / **683**	500 / **1000**	275 / **550**

DC series - Type	BOW7512D(I)	BOW7524D(I)	BOW9512D(I)	BOW9524D(I)	BOW12512D
Thrust at 12/24 VDCV (kgf)*	80	85	95	105	125
Available ignition protected (I)	✓	✓	✓	✓	✓
Power (kw-hp)	4,4 -6	4,4 -6	5,7 - 8	5,7 - 8	5,7 - 8
Motor DC	12	24	12	24	12
Advised boat length (ft - m)	30'-45'/10-14	30'-45'/10-14	36'-55'/11,5-17	36'-55'/11,5-17	40'-60'/12,5-18
Tunnel diameter (mm - inch)	185 - 7,3"	185 - 7,3"	185 - 7,3"	185 - 7,3"	250 - 9,8"
Weight excl. tunnel (kg)	19	19	26	26	32
For DC system V	12	24	12	24	12
Battery main switch: model BATSW / type BPMAIN	250/12	250/24	600/12	250/24	600/12
Battery CCA value EN (min / **max**)	917 / **1833**	525 / **1050**	1083 / **2166**	533 / **1067**	1400 / **2800**

* All VETUS DC thrusters are rated at a battery voltage of 10,5 or 21 VDC. This takes into account the voltage drop caused by the thruster.
** Fuse is supplied as standard.

Battery state of charge, battery cable size, ambient temperature and other factors can affect thruster performance and operating time.
For advice on battery cable length per model, see page 237.

DC bow and stern thrusters

DC series - Type	BOW12524D(I)	BOW16024D(I)	BOW18024D	BOW22024D	BOW28548D
Thrust at 12/24 VDCV (kgf)*	140	160	180	220	285 (48V)
Available ignition protected (I)	✓	✓	-	-	-
Power (kw-hp)	5,7 - 8	7 - 9,5	7 - 9,5	11 - 15	17,5 - 23,5
Motor DC	24	24	24	24	48
Advised boat length (ft - m)	40'-60'/12,5-18	44'-68/15-20	46'-70/14-22	50'-75'/16-22	60'-100'/20-30
Tunnel diameter (mm - inch)	250 - 9,8"	250 - 9,8"	250 - 9,8"	300 - 11,8"	300 - 11,8"
Weight excl. tunnel (kg)	32	38	38	68	68
For DC system V	24	24	24	24	48***
Battery main switch: model BATSW / type BPMAIN	250/24	600/24	600/24	600/24	600/24
Battery CCA value EN (min / **max**)	783 / **1567**	933 / **1866**	668 / **1336**	1267 / **2533**	933 / **1866**

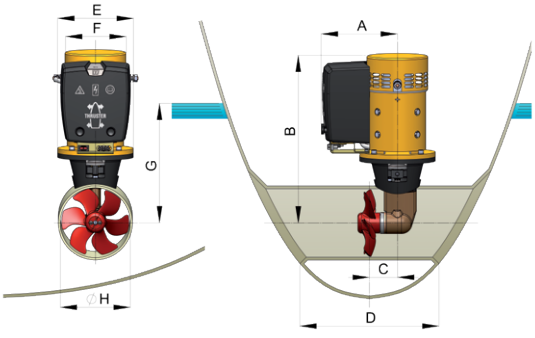
* All VETUS DC thrusters are rated at a battery voltage of 10,5 or 21 VDC. This takes into account the voltage drop caused by the thruster.
*** Thruster model BOW28548D is supplied as standard with a series/parallel switch to permit connection to a 24 VDC battery bank.

Battery state of charge, battery cable size, ambient temperature and other factors can affect thruster performance and operating time. For advice on battery cable length per model, see page 237.

Dimensions of DC bow and stern thrusters (in mm)

Code	BOW2512E	BOW3512E	BOW3512F	BOW4012	BOW4512D	BOW5512D	BOW5524D	BOW6012D BOW6024D
A	138	138	138	138	143	143	143	143,5
B	323	343	330	338	365	377	377	397
C	73	79	79	79	79	79	79	77
D min./max.	220 / 440	300 / 600	300 / 600	300 / 600	250 / 500	300 / 600	300 / 600	370 / 740
E	149	149	149	149	160	160	160	160
F Ø	112	112	112	112	130	130	130	130
G min.	110	150	125	140	125	150	150	185
H Ø	110	150	125	140	125	150	150	185

Code	BOW7512D BOW7524D	BOW9512D BOW9524D	BOW12512D BOW12524D	BOW16024D	BOW18024D	BOW22024D	BOW28548D
A	155	209	209	222	247	247	247
B	435	443	500	548	600	627	627
C	77	77	108	108	108	136	136
D min./max.	370 / 740	370 / 470	500 / 1000	500 / 1000	500 / 1000	600 / 1200	600 / 1200
E	200	200	200	240	258	258	258
F Ø	135	150	150	185	212	212	212
G min.	185	185	250	250	250	300	300
H Ø	185	185	250	250	250	300	300



RIMDRIVE thrusters

The RD160

Peaceful power at your fingertips

The RIMDRIVE is unique in its design; when operating, this thruster is *extremely quiet*! The propeller forms the rotating part of the electric motor (rotor) and the fixed winding (stator) is mounted in the tunnel. Therefore gears are not used in this design. Secondly a ring mounted around the propeller, prevents the propeller from cavitating.

The RIMDRIVE is available in 160 kgf and needs a thruster supply voltage of 48 VDC. The panel should be ordered separately.

Unique features

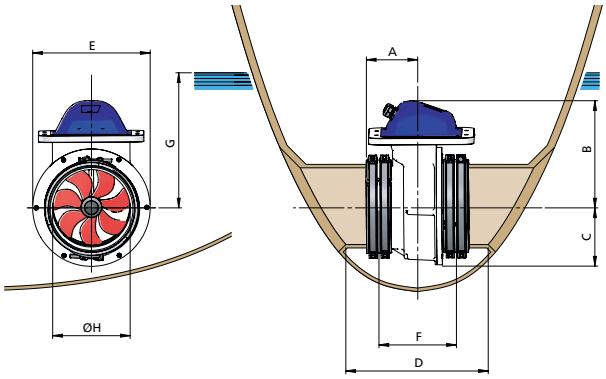
- Permanent magnet induction motor design, no carbon brushes
- Quiet operation due to a virtually cavitation free propeller and no use of gears
- Proportional control as standard via V-CAN
- Runtime only limited by the supply bank
- Easy to install
- Maintenance free
- IP67 top cover / ISO 8846 ignition protection compliant
- Lock the thruster at any speed and hold the boat alongside the dock
- Can be used as a stern thruster
- Suitable for aluminum, steel and GRP boats
- Suitable for V-CAN integrations (see page 15).

RIMDRIVE series	RD160
Thrust at 48 VDC (kgf)*	160
Power (kw-hp)	9,5 -12,9
Motor DC	48
Advised boat length (ft - m)	44'-65/15-20
Tunnel diameter (mm - inch)	250 - 9,8"
Weight excl. tunnel (kg)	37
For DC system (Volt)	48
Battery main switch: model BATSW / type BPMAIN	250
Internal thruster fuse (Amp)	250
Battery Ah value (C20)	145

* When the RIMDRIVE is operating within the set boundaries, the thrust output is not affected by voltage drop (41-60 VDC).

Battery state of charge, battery cable size, ambient temperature and other factors can affect thruster performance. Advise for battery cable length per model see page 237.

Model number (dimensions in mm)	RD160
A	170
B	341
C	190
D min/max.	400/1000
E	380
F	247
G min.	250
H	250



The RIMDRIVE is V-CAN controlled and uses the same control wiring and panels as the BOW PRO series. See page 15 for detailed information.

VETUS strongly advises the use of original V-CAN connection cables to ensure optimal connection between controls and thruster.

Ignition protected DC bow and stern thrusters

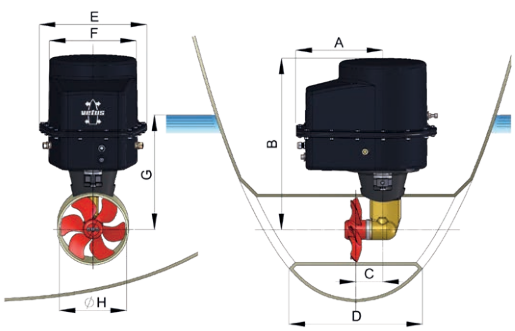
Watertight and ignition protected motor housing

In compartments with a gasoline/petrol engine, tank or fuel line, or propane gas storage, a thruster must be ignition protected to avoid the possibility of fumes or gas reaching the internal mechanism of the thruster and creating the risk of a fire. All models come with the required seals, electrical connectors, fastening components and an automatic fuse which can be reset externally without having to open the housing. Furthermore the housing is an excellent protection against corrosion.

Characteristics

- The housing enables thrusters to comply with ISO 8846 Marine 'Ignition protection' standard
- Can be used as a stern thruster in combination with the appropriate kit
- Supplied with all the required seals, electrical connectors and fastening components
- Has an automatic fuse for the control loom that can be reset from the outside

Model nr (dim. in mm)	BOW 2512EI	BOW 3512EI	BOW 3512FI	BOW 4512DI	BOW5512DI BOW5524DI	BOW7512DI BOW7524DI	BOW9512DI BOW9524DI	BOW 1254DI	BOW 1604DI
A	136	136	136	195	195	238	238	238	254
B	352	371	350	400	412	460	460	517	586
C	73	79	79	79	79	77	77	108	108
D min./max.	220/440	300/600	300/600	250/500	300/600	370/740	370/470	500/1000	500/1000
E	181	181	149	250	250	296	296	296	318
F	157	157	112	195	195	240	240	240	280
G min.	110	150	125	125	150	185	185	250	250
H Ø	110	150	125	125	150	185	185	250	250



BOW PRO retractable thruster

COMING SOON!

BOW PRO Boosted series now features retractable technology

Total control at your fingertips even when your hull is too shallow for a tunnel thruster

For optimal performance, a thruster's propeller and tunnel must be properly submerged. Otherwise, the thruster will create a whirlpool at the water's surface on the suction side of the boat and pump a mixture of air and water - instead of all water - with a great reduction in thrust.

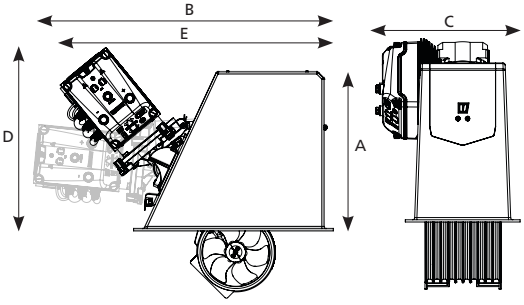
Designed for vessels where traditional tunnel thrusters aren't an option, the BOW PRO Boosted Retractable Series delivers award-winning proportional control, enhancing your manoeuvring capability, without adding drag when retracted. With improved safety mechanisms, it offers efficient, maintenance-free operation, and extended run times - ideal for all hull types.

The advantage of a VETUS BOW PRO retractable thruster:

- Can be installed in a shallow draft boat including a sailing boat with a cutaway forefoot and raised stern
- Unlimited runtime**
- Constructed around our high-performance, proven VETUS BOW PRO thruster platform
- A swing mechanism with minimum moving parts. The thruster pivots on a permanently lubricated and substantial bearing
- The propeller revolves in a short duct, creating focused flow and minimum energy losses
- The hull bottom plate (lid) is attached directly to the propeller duct so no additional or complex mechanism is required to open or close. It swings in and out with the thruster
- When the thruster is retracted and the bottom plate closed, a retractable thruster creates much less drag than a standard tunnel thruster, which may be significant on a sailing boat
- Fiberglass housing and electronic control mechanism (excl. the control panel and cables) are supplied in the base package
- The thruster deploys and retracts automatically, as the control panel is deactivated, so no separate controls need to be operated
- It will also retract automatically if the thruster has not been used for a while
- Improved electronic sensors protect the actuator and swing mechanism
- The thruster and control panels are V-CAN connected

Retractable series - Type	BOWAR0571	BOWAR0651	BOWAR0761	BOWBR090
Thrust at 12/24 VDC (kgf)*	57	65	76	90
Power (kw-hp)	2,7 - 3,7	2,7 - 3,7	2,7 - 3,7	5,7 - 8
Brushless ac motor	✓	✓	✓	✓
Advised boat length (ft - m)	26'-39'/8-12	27'-40'/8-12,5	30'-45'/10-14	36'-55'/11,5-17
Tunnel diameter (mm - inch)	150 -5,9"	185 -7,3"	185 -7,3"	185 -7,3"
Weight excl. tunnel (kg)	35	35	35	33
Operating time, continuously max per hour in minutes**	6	10	6	10
For DC system (Volt)	12	12	12	12/24
Battery main switch: model BATSW / type BPMAIN	250/12	250/12	250/12	250/24
Battery main fuse (amp)	355	355	425	250
Battery Ah value (C20)	185	170	200	145

Dimensions (mm)	BOWAR0571	BOWAR0651	BOWAR0761	BOWBR090
A	397	432	432	432
B	737	769	769	810
C	349	357	357	389
D	451	462	462	496
E	672,9	712	712	737



* When the BOW PRO is operating within the set boundaries, the thrust output is not affected by voltage drop (10.5-15V, 21-30V, 41-60V).

** BOW PRO thrusters will run continuously for 6 or 10 minutes (depending on thruster model) at full power, after that the power may be reduced. At less than full power setting, run time is greatly enhanced. To achieve these results installation instructions must be adhered.

Thruster systems

Hydraulic bow and stern thrusters

Type BOW..HMD

These are the thrusters for the most demanding maneuvering situations and are available in power outputs of 55 Kilograms Force (kgf), 95 kgf, 160 kgf, 230 kgf, 310 kgf, 410 kgf and 550 kgf. They operate in hydraulic systems delivering flow rates ranging from 13 L / 3.4 U.S gallons per minute to 91 L / 24 U.S. gallons per minute, at pressures ranging from 165 bar/ 2393 p.s.i to 280 bar / 4061 p.s.i., all depending on thruster model selected.

VETUS hydraulic thrusters are able to run continuously, although not as primary propulsion units. They deliver high power and great reliability, with no electrical connections at the thruster or pump(s) and they need little routine maintenance. These thrusters are available with several control heads including proportional control.

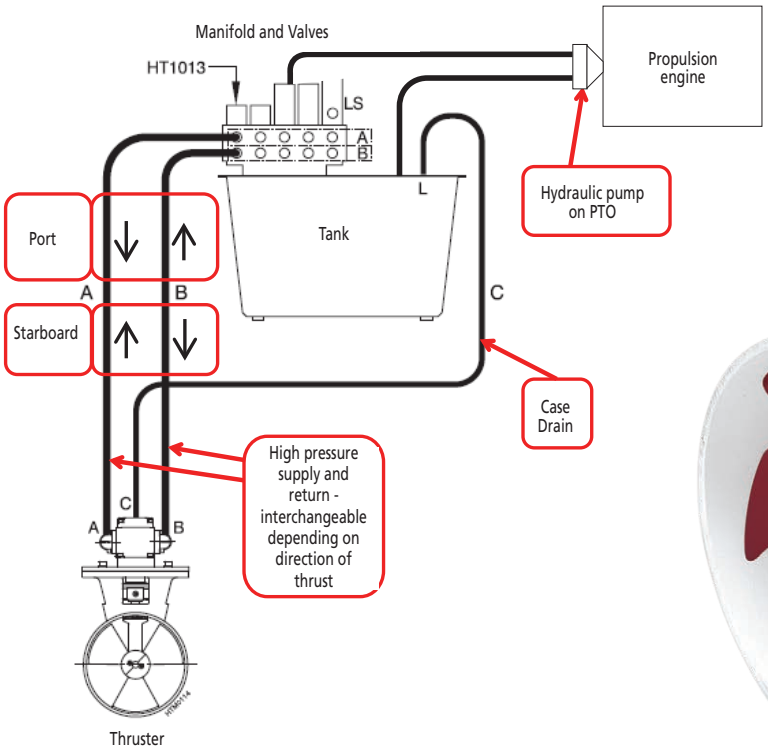
The skill and knowledge set required to plan, integrate and implement a hydraulic installation work is extensive, and includes all of the skills required to install electric thrusters and a lot more. Such work should not be undertaken by persons who are not trained in power hydraulics theory and practice. Access to local hydraulic hose and fitting suppliers is also essential for a well-organized and successful installation.

If an existing hydraulic system can deliver the flow and allows the working pressure required by the thruster(s) appropriate for your vessel, it is often possible to add VETUS thrusters to the system. VETUS also offers complete hydraulic systems as described in this catalogue section.

Whether you buy a complete hydraulic system from VETUS, or just the thrusters, a VETUS customer support team member will review the entire system with you to ensure that your thrusters work according to our specifications after installation.

See the next page for specifications.

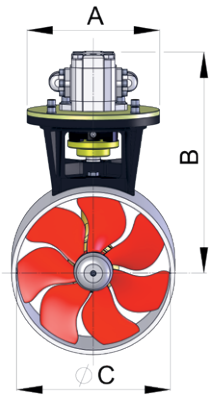
The connections and flow of oil for a thruster



Hydraulic bow and stern thrusters

Type BOW...HMD

Specifications	BOW55HMD	BOW95HMD	BOW160HMD	BOW230HMD	BOW310HMD
Thrust N (kgf) (power output)	**550 (55)**	**950 (95)**	**1600 (160)**	**2300 (230)**	**3100 (310)**
Hydraulic motor power kW	3,5	6,0	9,5	12,5	20
Hydraulic motor speed rpm	3000	4100	3300	1900	2000
Hydraulic motor capacity cm³/rev	4,2	4,2	7	16,8	26,4
Flow rate l/min	13	18	28	40	70
Operating pressure bar	165	230	250	230	225
Internal tunnel diameter mm	150	185	250	300	300
A mm Ø	160	200	240	258	258
B mm	258	276	345	431	455
C mm Ø	150	185	250	300	300
Connection kit*	HT3057	HT3057	HT3056	HT3061	HT3058



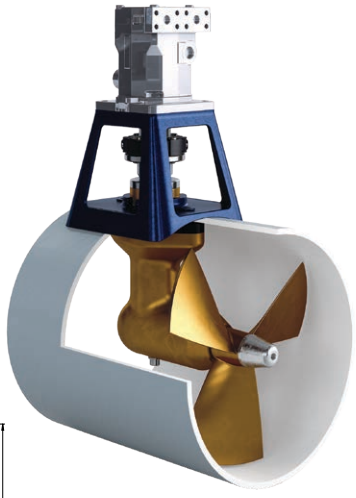
* The connection kit consists of couplings required for the correct size hydraulic hoses.

Type	Specifications	Tunnel diam. (mm)
BOW55HMD	Hydraulic bow thruster 55 kgf incl. hydraulic motor 3,5 kW	150
BOW95HMD	Hydraulic bow thruster 95 kgf incl. hydraulic motor 6,0 kW	185
BOW160HMD	Hydraulic bow thruster 160 kgf incl. hydraulic motor 12,3 kW	250
BOW230HMD	Hydraulic bow thruster 230 kgf incl. hydraulic motor 16,4 kW	300
BOW310HMD	Hydraulic bow thruster 310 kgf incl. hydraulic motor 26,8 kW	300
BP1053	Bronze propeller for BOW22024D / BOW230HM	
BP1182	Bronze propeller for BOW310HM	

Type BOWH410 - BOWH550

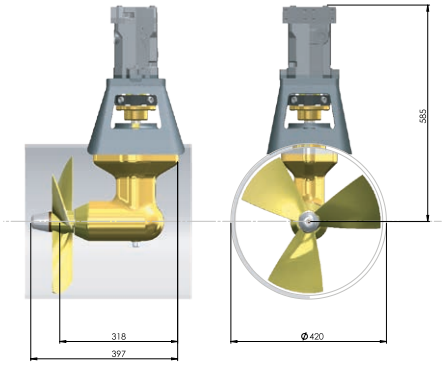
Type	Specifications
BOWH410	Hydraulic bow thruster 410 kgf, incl. hydro motor 29,5 kW, for tunnel diam. 400 mm
BOWH550	Hydraulic bow thruster 550 kgf, incl. hydro motor 39 kW, for tunnel diam. 400 mm
BP1259	Bronze propeller for BOWH410
BP1260	Bronze propeller for BOWH550

Specifications	BOWH410	BOWH550
Thrust N (kgf) (power output)	**4100 (410)**	**5500 (550)**
Hydraulic motor power kW	29,5	39
Hydraulic motor speed rpm	2650	2900
Hydraulic motor capacity cm³/rev	24	35,6
Flow rate l/min	63,6	103
Operating pressure bar	250	250
Internal tunnel diameter mm	400	400



BOWH410

BOWH550

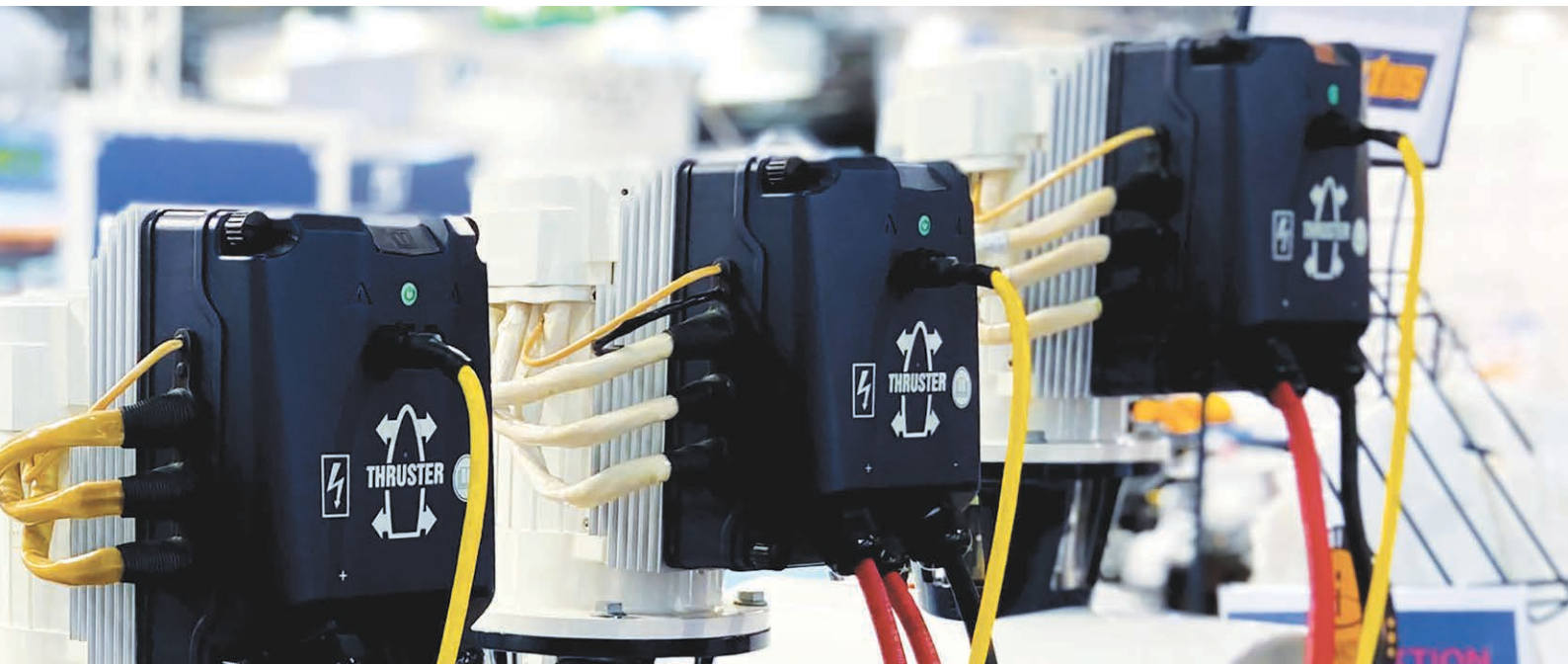


Electrical installation specifications for bow and stern thrusters

For the VETUS DC thrusters and IP DC thrusters, a battery advise is given based on the fact that all DC thrusters have a big inrush current when initiated. For this reason the Cold Cranking Amperage value (CCA) of a battery is the most important characteristic. The battery must be able to handle these big currents. The VETUS SMF, AGM and deep cycle batteries all have the CCA value mentioned on the batteries. Choose the correct one for your thruster on page 274 - 275.

The max. advised CCA values are stated also, since the window of operation for a DC thruster is always around 10,5/21,0/42VDC under full load. Using batteries with greater capacities will cause the thruster to operate outside the window of operation, and have greater wear, and heat up faster!

Thruster	Current min.	Voltage (DC)	Min. batt CCA	Max. batt CCA	Total length of positive and negative cables (m)										
			(EN)	(EN)	25 mm²	35 mm²	50 mm²	70 mm²	95 mm²	120 mm²	2x 70 mm²	150 mm²	2x 95 mm²	2x 120 mm²	2x 150 mm²
BOW2512	200	12	333	667	4,2m	6m	8,5m	12m	16m	20,5m	24m	25,7m	30,8m	41,1m	51,4m
BOW3512	220	12	367	733	3,8m	5,5m	7,7m	10,9m	14,8m	18,7m	21,8m	23,4m	29,6m	37,4m	46,8m
BOW4512	375	12	625	1250	2,3m	3,2m	4,5m	6,4m	8,7m	11m	12,8	13,7m	17,3m	22m	27,4m
BOW5512	375	12	625	1250	2,3m	3,2m	4,5m	6,4m	8,7m	11m	12,8	13,7m	17,3m	22m	27,4m
BOW5212	370	12	625	1250	2,3m	3,2m	4,5m	6,4m	8,7m	11m	12,8	13,7m	17,3m	22m	27,4m
BOW5524	205	24	342	683	8,4m	11,7m	16,7m	23,4m	31,7m	40,1m	46,8m	50,2m	63,5m	80,3m	100m
BOW6012	300	12	500	1000	2,9m	4m	5,7m	8m	10,8m	13,7m	16m	17,2m	21,7m	27,4m	34,3m
BOW6024	165	24	275	550	10,3m	14,5m	20,8m	29m	39,5m	49,8m	58m	62,3m	79m	99,7m	124,6m
BOW7512	550	12	917	1833	NA	NA	3,1m	4,4m	5,9m	7,5m	8,7m	9,4m	11,8m	14,9m	18,7m
BOW7524	315	24	525	1050	5,4m	7,6m	10,9m	15,2m	20,6m	26,1m	30,5m	32,6m	41,3m	52,2m	65,3m
BOW9512	650	12	1083	2166	NA	NA	2,6m	3,7m	5m	6,3m	7,4m	7,9m	10m	12,7m	15,8m
BOW9524	320	24	533	1067	5,4m	7,5m	10,8m	15,m	20,5m	26m	30,4m	32,5m	41,2m	52,1m	65,2m
BOW12512	840	12	1400	2800	NA	NA	2m	2,9m	3,9m	4,9m	5,7m	6,4m	7,8m	9,8m	12,8m
BOW12524	470	24	783	1567	NA	NA	7,3m	10,2m	13,9m	17,5m	20,4m	21,9m	27,7m	35m	43,8m
BOW16024	560	24	933	1866	NA	NA	6,2m	8,6m	11,6m	14,7m	17,1m	18,4m	23,2m	29,3m	36,7m
BOW1804	400	24	668	1336	NA	NA	8,5m	12m	16,2m	20,5m	24m	25,7m	32,6m	41,1m	51,4m
BOW2204	760	24	1267	2533	NA	NA	4,5m	6,3m	8,6m	10,9m	12,6m	13,5m	17,1m	21,6m	27,1m
BOW285	560	48	933	1866	NA	NA	6,2m	8,6m	11,6m	14,7m	17,1m	18,4m	23,2m	29,3m	36,7m
BOW95DE	680	12	1133	2267	NA	NA	2,5m	3,5m	4,8m	6m	7m	7,6m	9,6m	12,1m	30,3m
BOW954DE	340	24	567	1133	5m	7m	10m	14,1m	19,2m	24,2m	28,2m	30,3m	38,3m	48,4m	60,5m
BOW125DE	470	24	783	1567	NA	NA	7,3m	10,2m	13,9m	17,5m	20,4m	21,9m	27,7m	35m	43,8m
BOW160DE	400	24	667	1333	NA	NA	8,5m	12m	16,2m	20,5m	24m	25,7m	32,6m	41,1m	51,4m
BOW220DE	680	24	1133	2267	NA	NA	5m	7m	9,5m	12,1m	14,1m	15,1m	19,2m	24,2m	30,3m



Electrical installation specifications for bow and stern thrusters

For the VETUS BOW PRO and RIMDRIVE thrusters, a battery advise is given based on the fact that these thrusters have a no inrush current, but an endurance run capability. For this reason the batteries Ah (C20) value is the most important characteristic. The battery must be able to handle longer endurance runs.

The CCA value is important since the max. current should still be delivered, but these CCA values are less important compared to the DC thrusters. The VETUS SMF, AGM and deep cycle batteries all have the AH C20 value mentioned on the batteries. Choose the correct one for your thruster on page 274 - 275.
For these thrusters no maximum battery capacity is advised. Extra capacity (C20) allows the thrusters to operate longer.

Thruster	Current min.	Min. batt Ah	Total length of positive and negative cables (m)											Internal thruster fuse	Battery switch
		(C20)	25 mm²	35 mm²	50 mm²	70 mm²	95 mm²	120 mm²	2x 70 mm²	150 mm²	2x 95 mm²	2x 120 mm²	2x 150 mm²		
BOWA0301	199	(1x) 90Ah	NA	6m	8,6m	12m	16,4m	20,6m	24m	25,8m	32,7m	41,3m	51,6m	200A	250A
BOWA0304	50	(4x)60Ah	48,2m	67,6m	96m	135m	183m	231m	---	---	---	---	---	80A	150A
BOWA0361	273	(1x)170Ah	NA	NA	6,3m	8,8m	11,9m	15m	17,6m	18,8m	23,8m	30m	37,6m	300A	250A
BOWA0364	71	(4x)60Ah	42m	60m	91m	120m	162	211m	---	---	---	---	---	100A	150A
BOWA0401	260	(1x) 145Ah	NA	5m	7m	10m	12,5m	17m	18m	19m	24m	31m	39m	300A	250A
BOWA0421	250	(1x) 145Ah	NA	4,8m	6,9m	9,6m	13m	16,5m	19,2m	20,5m	26m	33m	41,1m	300A	250A
BOWA0571	337	(1x) 185Ah	NA	NA	5m	7,1m	9,7m	12,2m	14,2m	15,2m	19,3m	24,4m	30,5m	300A	250A
BOWA0574	90	(4x) 60Ah	38m	53,3m	76,2m	106,7m	144,8m	182,9m	213,3m	---	---	---	---	100A	150A
BOWA0651	271	(1x) 125Ah	NA	NA	6,3m	8,9m	11,9m	15,1m	17,6m	18,9m	23,9m	30m	37,9m	250A	250A
BOWA0761	368	(1x) 200Ah	NA	NA	4,5m	6,5m	8,7m	11,1m	12,8m	13,9m	17,4m	22m	27,9m	300A	250A
BOWA0764	93	(4x)60Ah	37,7m	53,1m	76m	106,3m	144,4m	182,5m	213m	---	---	---	---	100A	150A
BOWB057	189	(2x)90Ah	NA	7m	9m	13m	17m	22m	25m	27m	34m	43m	53m	200A	250A
BOWB065	137	(2x)90Ah	NA	17,5m	25m	35m	47,5m	60m	70m	75m	95m	120m	150m	160A	150A
BOWB076	184	(2x) 108Ah	NA	7m	9m	13m	17m	22m	25m	27m	34m	43m	53m	200A	250A
BOWB090	220	(2x) 145Ah	NA	NA	8m	11m	15m	18m	22m	24m	31m	36m	47m	200A	250A
BOWB110	330	(2x) 170Ah	NA	NA	5m	7,1m	9,7m	12,2m	14,2m	15,2m	19,3m	24,4m	30,5m	300A	250A
BOWB130	350	(2x) 185Ah	NA	NA	4,9m	6,8m	9,3m	11,8m	13,7m	14,7m	18,6m	23,5m	29,4m	300A	250A
BOWB150	276	(2x) 170Ah	NA	NA	6,3m	8,7m	11,8m	14,7m	17,4m	18,7m	23,5m	29,2m	37,6m	300A	250A
BOWB180	289	(4x) 185Ah	NA	NA	6m	8m	11m	14m	17m	18m	23m	30m	37,6m	250A	250A
BOWB210	300	(4x) 185Ah	NA	NA	5,5m	7,5m	10m	13m	15m	16m	21m	25m	31m	250A	250A
BOWB285	415	(4x) 220Ah	NA	NA	4m	6m	8m	10,5m	11,5m	13m	16m	20m	24m	425A [2]	600A
BOWB300	432	(4x) 220Ah	NA	NA	3,5	5m	7m	9m	11m	12,5m	15m	19m	23m	425A [2]	600A
BOWB320	445	(4x) 220Ah	NA	NA	NA	4,5m	6m	8m	10,5m	12m	14m	18m	22m	425A [2]	600A
BOWB385	540	(4x) 220Ah [1]	NA	NA	NA		NA	NA	2m	2m	6m	8m	10m	500A [2]	600A
BOWB420	595	(4x) 220Ah [1]	NA	NA	NA	NA	NA	NA	2m	2m	6m	8m	10m	500A [2]	600A
BOWB boost charge															
12V	80	NA	40m	55m	80m	103m	140m	190m	--	--	--	--	--	100A [2]	150A
24V	80	NA	40m	55m	80m	103m	140m	190m	--	--	--	--	--	100A [2]	150A
BOWB XL boost charge 24V [3]	120	NA	20m	45m	60m	80m	100m	120m	--	--	--	--	--	125A [2]	150A
RIMDRIVE															
RD160	225	4x 145Ah	NA	5,2 m	7,8 m	10,5 m	14,2 m	19 m	21,8 m	23 m	30 m	39 m	48 m		

[1] Minimum capacity. For full S2 runtime enlarge capacity.
[2] Fuse mounted externally.
[3] Applicable to BOWB285 / 300 / 320 / 385 / 420

Conversion table mm² to AWG

MM²	AWG	MM²	AWG	MM²	AWG	MM²	AWG
25	4	50	0 (1/0)	95	000 (3/0)	150	300 MCM
35	2	70	00 (2/0)	120	0000 (4/0)	185	350 MCM

Tunnels for bow and stern thrusters

Our tunnels are available in several lengths and diameters and purpose built for all VETUS thrusters. They are available in GRP, steel and aluminum and provide ultimate strength and accuracy to easily install the tunnel for your VETUS thruster system. An overview of all available tunnels is shown below.

Important note: Installer must measure actual external diameter of the tunnel before cutting the hull.

Glassfibre reinforced polyester

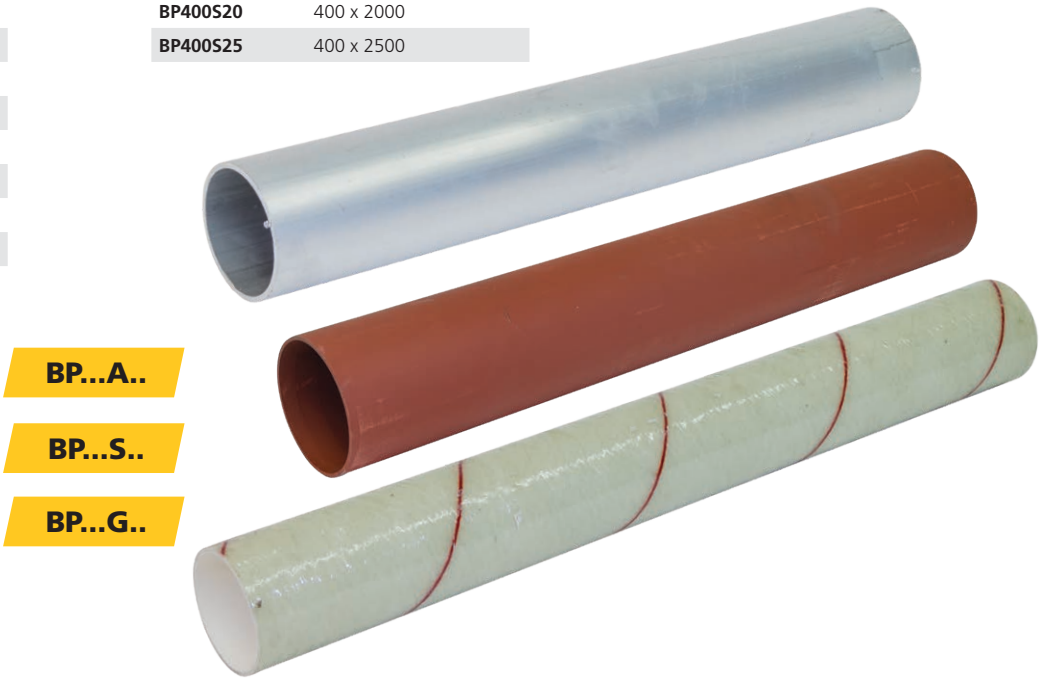
Type	Internal diameter and length (in mm)
BP110G75	110 x 750
BP110G10	110 x 1000
BP110G15	110 x 1500
BP110G20	110 x 2000
BP110G30	110 x 3000
BP125G75	125 x 750
BP125G10	125 x 1000
BP125G15	125 x 1500
BP125G20	125 x 2000
BP125G30	125 x 3000
BP140G75	140 x 750
BP140G10	140 x 1000
BP140G15	140 x 1500
BP150G75	150 x 750
BP150G10	150 x 1000
BP150G15	150 x 1500
BP150G20	150 x 2000
BP150G30	150 x 3000
BP185G75	185 x 750
BP185G10	185 x 1000
BP185G15	185 x 1500
BP185G20	185 x 2000
BP185G30	185 x 3000
BP250G10	250 x 1000
BP250G15	250 x 1500
BP250G20	250 x 2000
BP250G30	250 x 3000
BP300G10	300 x 1000
BP300G15	300 x 1500
BP300G20	300 x 2000
BP300G30	300 x 3000
BP400G20	400 x 2000
BP400G25	400 x 2500

Steel

Type	Internal diameter and length (in mm)
BP110S75	110 x 750
BP110S10	110 x 1000
BP110S15	110 x 1500
BP110S30	110 x 3000
BP125S10	125 x 1000
BP125S15	125 x 1500
BP125S30	125 x 3000
BP150S10	150 x 1000
BP150S15	150 x 1500
BP150S20	150 x 2000
BP150S30	150 x 3000
BP185S10	185 x 1000
BP185S15	185 x 1500
BP185S20	185 x 2000
BP185S30	185 x 3000
BP250S10	250 x 1000
BP250S15	250 x 1500
BP250S20	250 x 2000
BP250S25	250 x 2500
BP250S30	250 x 3000
BP300S10	300 x 1000
BP300S15	300 x 1500
BP300S20	300 x 2000
BP300S25	300 x 2500
BP300S30	300 x 3000
BP400S20	400 x 2000
BP400S25	400 x 2500

Aluminium

Type	Internal diameter and length (in mm)
BP110A75	110 x 750
BP110A10	110 x 1000
BP110A15	110 x 1500
BP110A30	110 x 3000
BP125A75	125 x 750
BP125A10	125 x 1000
BP125A15	125 x 1500
BP125A20	125 x 2000
BP125A30	125 x 3000
BP150A10	150 x 1000
BP150A15	150 x 1500
BP150A20	150 x 2000
BP150A30	150 x 3000
BP185A10	185 x 1000
BP185A15	185 x 1500
BP185A30	185 x 3000
BP250A10	250 x 1000
BP250A15	250 x 1500
BP250A30	250 x 3000
BP300A10	300 x 1000
BP300A15	300 x 1500
BP300A30	300 x 3000

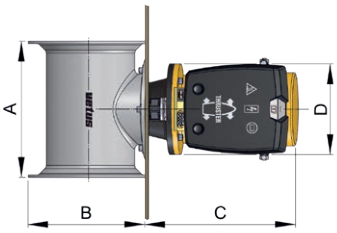


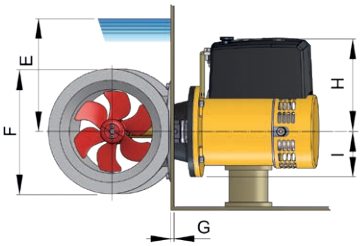
Stern thruster tunnels for transom mounting

Combining a VETUS stern thruster with a VETUS bow thruster, will provide an even greater manoeuvrability of your boat in locks or harbours. By placing a side-directional thruster in the bow and another one at the transom, docking, sailing away, finding a spot on the dock or marina, becomes child's play! Even the effects of wind and current can be effectively countered. Installation of a VETUS stern thruster is simple, the electric motor and other electric components are fitted internally to the transom of the boat. The stern thruster tunnel and the propeller are installed externally on the transom.

Type	Tunnel Ø (mm)
STERN110P	110
STERN125P	125
STERN150P	150
STERN185P	185
STERN250P	250
STERN300P	300
STERN250R*	250

* RIMDRIVE thruster



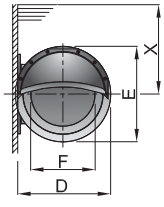


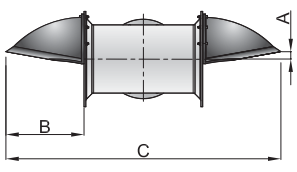
	STERN110P	STERN125P	STERN150P			STERN185P				STERN250P			STERN300P			
			COMBINED WITH													
Model number (dim. in mm)	BOW25	BOW35F BOW45 BOWA0361 BOWA0364 BOWA0421	BOW35E / BOW55 BOW55HYDR. BOWB0571 BOWB057			BOW60 / BOW75 / BOW95 BOW95HYDR. / BOWA0651 BOWA0761 / BOWA0764 BOWB065 / BOWB076 BOWB090 / BOWB110 BOWB130				BOW125 / BOW160 BOW160HYDR. BOWB150 BOWB180 BOWB210			BOW220 / BOW230HYDR. BOW285 / BOWB285 / BOWB300 / BOW310HYDR. BOWB320			
A	230	250	270	270	270	300	300	300	300	460	460	460	540	540	540	540
B	155	192	215	215	215	268	268	268	268	360	360	360	437	437	437	437
C	232	275	219	282	163	267	305	313	151	313	373	168	416	242	416	242
D	149	160	149	160	160	160	200	200	200	200	240	240	258	258	258	258
E min.	110	125	150	150	150	185	185	185	185	250	250	250	300	300	300	300
F Ø	180	205	240	240	240	275	275	275	275	370	370	370	450	450	450	450
G max.	25	40	19	47	47	33	26	26	26	58	92	92	50	50	50	50
H	138	143	138	143	80	143	155	209	100	209	222	120	237	192	237	129
I	87	117	117	117	117	111	111	111	111	111	154	154	172	172	172	172

Extension kit for stern thruster tunnels

If the openings of the stern thruster are too close to the waterline, then it will suck air and considerable loss of thrust will occur. This can be prevented by using an extension kit which ensures both tunnel openings are adequately submerged.
By installing these deflector shells, the flow of water can also be directed away from transom mounted obstructions including outdrives, trim tabs and swim-platform brackets, maintaining stern thruster effectiveness. The kit consists of two fiberglass shells and stainless steel (AISI 316) fastenings. It can easily be retrofitted to existing installations. The SDKIT is available for stern thrusters tunnels of Ø 125, 150, 185, 250 or 300 mm.

Type	A	B	C	D	E	F Ø	X (= ½ F + A) (mm)
SDKIT125	10	107	464	190	205	125	Min. 73
SDKIT150	27	195	650	220	232	150	Min. 102
SDKIT185	17	237	774	268	275	185	Min. 110
SDKIT250	28	303	1066	360	370	250	Min. 153
SDKIT300	39	365	1270	437	450	300	Min. 189





Control panels for bow and stern thrusters

Control panels for BOW PRO thrusters

The BOW PRO thruster is digitally controlled by proprietary CAN bus protocol V-CAN. There are three fully proportional control panels available for the BOW PRO thruster series; one paddle panel and one panel with lock-and-hold function. With the press of a button, you are able to lock the thrust at any desired speed, freeing you to step away from the control panel to tie up your boat. A feature that makes single handed docking much easier.

VETUS also offers a double control panel with lock-and-hold function which controls the bow and stern thruster either individually or simultaneously. Rotating the joystick will operate them in opposite directions to rotate the boat on its axis.

Specifications

- Compact design and high quality materials
- Safe and easy proportional control of your vessel
- Aluminium bezel
- Quick installation in Ø 75 mm cut-out hole
- Waterproof housing IP65
- V-CAN CAN bus protocol compliant
- Twin connector for multiple stations
- Status indicator
- Can be flush mounted
- With thruster lock and hold function (BPPJA and DBPPJA)

BPPJA

BPPPA

DBPPJA

BPPJACV.

Type	Description	Voltage (DC)	Front panel (mm)	Bezel	Ingression protected	Built-in depth (mm)	Cut-out size (mm)	Child protection	Control panel cover
BPPJA	Proportional control for the BOW PRO with lock and hold function (CAN bus)	12 (V-CAN)	85 x 85	Aluminium	IP65	120	Ø 75	✓	BPPJACV3
BPPPA	Proportional control for the BOW PRO (CAN bus)	12 (V-CAN)	85 x 85	Aluminium	IP65	90	Ø 75	✓	BPPJACV2
DBPPJA	Double thruster panel (proportional, CAN)	12 (V-CAN)	85 x 85	Aluminium	IP65	120	Ø 76	✓	BPPJACV1

CANVXCSP - CANVXCJP

The CANVXCSP and CANVXCJP modules allow for more discreet and modern control of VETUS BOW PRO and RIMDRIVE thrusters: the CANVXCSP enables the use of push buttons (e.g. integrated into an engine control lever) to activate the thruster at full power after a short ramp-up, while the CANVXCJP connects a frameless proportional joystick, providing smooth and precise thrust control.

Type	Specifications
CANVXCSP	BOW PRO Pushbutton control interface
CANVXCJP	BOW PRO Joystick control interface

CANVXCSP

CANVXCJP

Control panels for bow and stern thrusters

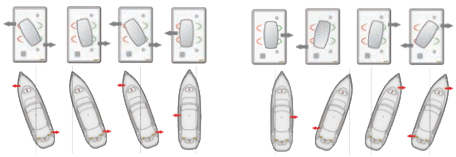
Control panels for DC thrusters

Control panels type BPSR, BPJR, BPAS and BPAJ can be easily fitted in a 52 mm diameter hole. The panels are waterproof to IP65 and provided with a switched outlet (max. 3A) to connect extra equipment. All panels are backwards compatible with other VETUS bow thruster panels and shut down automatically after thirty minutes of inactivity. The thruster switches off after continuous running for more then two minutes and resets itself after five seconds.

Control panels type 2 (EZDOCK2, BPSE2, BPJE2 & BPJDE2) are protected against accidental or unauthorised operation and circuit overload. They have a panel power indicator and warning LED and buzzer in case of continuous running for more than two minutes. These panels are easily interconnected and can be fitted at any helm position.

The EZDOCK2 combines twin joysticks into one easy operating knob, see the picture on the right.

Note: For optimum safety and performance we recommend using VETUS control panels with VETUS thrusters.



BPSR **BPJR**

BPAS

BPAJ

BPJSTA

EZDOCK2

BPSE2

BPJE2

BPJDE2

BPA

Type	Description	Voltage (DC)	Front panel (mm)	Bezel	Ingression protected	Built-in depth (mm)	Cut-out size (mm)	Child protec-tion
BPSR	Thruster touch panel with time delay	12 / 24	Ø 63	White/Black/Chrome	IP65	90	Ø 52	✓
BPJR	Thruster panel with joy-stick and time delay	12 / 24	Ø 63	White/Black/Chrome	IP65	90	Ø 52	✓
BPAS	Thruster touch panel with time delay	12 / 24	97 x 95	Aluminium	IP65	90	Ø 52	✓
BPAJ	Joystick with time delay	12 / 24	97 x 95	Aluminium	IP65	90	Ø 52	✓
BPJSTA	Joystick without time delay device (excl. connection cable)	12 / 24	N/A	N/A	IP65	50	Ø 22	-
EZDOCK2	Easy docking system for thrusters, with time delay	12 / 24	85 x 138	Synthetic	IP65	90	130 x 75	✓
BPSE2	Thruster touch panel with time delay	12 / 24	85 x 85	Synthetic	IP65	90	Ø 75	✓
BPJE2	Thruster panel with joy-stick and time delay	12 / 24	85 x 85	Synthetic	IP65	90	Ø 75	✓
BPJDE2	Thruster panel with two joy-sticks and time delay	12 / 24	85 x 138	Synthetic	IP65	50	130 x 75	✓
BPA	Adapter plate to replace the old BPS/BPJ panels with the new BPSE2/BPJE2 panels							

Thruster systems

Control panels for hydraulic bow and stern thrusters

Two stage controls
Model BPJ5B has 5 positions - Off and first/second step to either port or starboard. The first detent step will permit continuous hands-off operation at partial power. The second stage will provide full power. Model DBPJ5B is a dual joystick with 5 positions.

Fully proportional control
Model HT1034 is a fully proportional joystick with a twistlock and must be used in conjunction with proportional valves HT1032 or HT1035.

Single stage controls
Model BPJSTA is a single stage On-Off control.

Specifications
- Type BPJ5B and DBPJ5B: Hydraulic thruster control panel with a single and dual joystick for bow and stern thrusters (5 positions)
- Type BPJSTA: Joystick without time delay device

Note: All models are watertight to IP65.

BPJ5B

DBPJ5B

HT1034

BPJSTA

Type	Specification
BPJ5B	Hydraulic thruster control panel with a joystick (5 positions)
DBPJ5B	Hydraulic thruster control panel with dual joystick (5 positions)
HT1034	Proportional bow thruster panel with twistlock for HT1032 and HT1035
BPJSTA	Joystick without time delay device

Control panels for bow and stern thrusters

Electric remote control

Type RECON can be used for the operation of DC and DC extended runtime bow and stern thrusters, anchor windlasses, remote controlled gangways, electric cranes, hydraulic steering systems etc. This electric remote control has a stainless steel (AISI 316) hanger loop which is fitted on the back.

Specifications
- Suitable for 12 or 24 VDC
- Max switching capacity of 6 A
- Supplied with three-core spiralled wire of 3,5 m
- Complete with watertight plug and socket

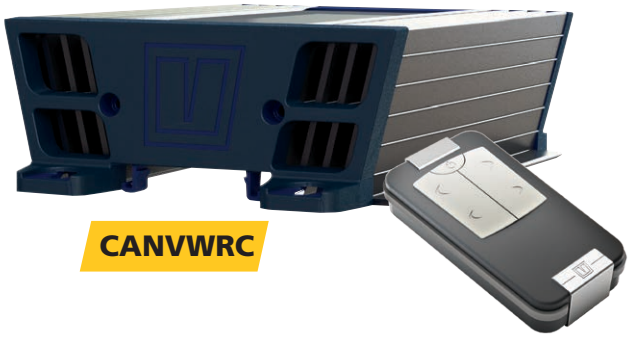
Type	Specifications
RECON	Hand held remote control for operation of bow and stern thrusters, windlasses, etc.

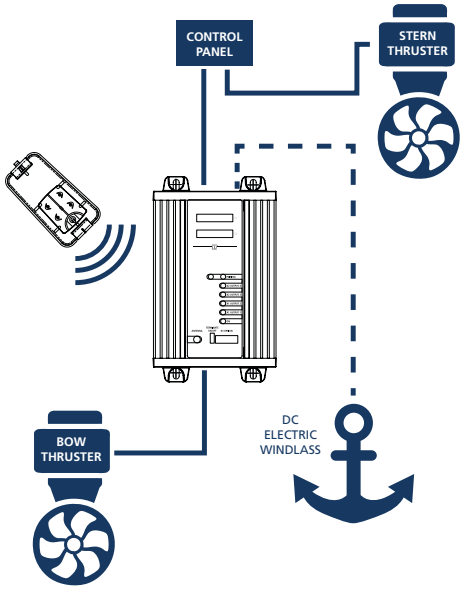
Wireless remote control

The CANVWRC is designed for operation with on-off devices but is also compatible with VETUS V-CAN devices, which will likewise be controlled in an on-off manner. The CANVWRC allows for flexible setups: a combination of DC-connected and V-CAN devices, DC-only, or V-CAN-only configurations.

Specifications receiver
- Receiver accepts 12 or 24 VDC power supply
- Connections for one or two DC electric or hydraulic thrusters, or for one DC electric or hydraulic thruster and one DC electric or hydraulic windlass
- Maximum five hand-held remote transmitters
- Detachable antenna
- Protection class IP40 (for use in dry locations only)

Specifications hand-held remote control transmitter
- Power supply - 3 V battery type CR2032
- Maximum distance to receiver 10 - 15 m
- Protection class IP66 (resistant to high pressure water from any direction)





Type	Description	Dimensions
CANVWRC	Base unit for wireless remote control + hand held remote control also suitable for V-CAN	208 mm x 124 mm x 50 mm
WRCKF	Additional hand held remote control	42 mm x 78 mm x 16 mm

Accessories for bow and stern thrusters

Bow thruster control panel for DC thrusters

For side mounting - ideal for sailing boats.

Specifications
- With on/off switch and rocker switch
- Diameter 102 mm
- Build-in depth 79 mm
- Watertight to IP 65
- Without time delay device

Type	Description
BPSM	Bow thruster control panel for side mounting with toggle switch Ø 102 mm

BPSM

Time delay device

Eliminates the risk of the bow thruster being switched over too quickly. It is highly recommended for rental craft to prevent motor damage. Applicable for external switches, or BPJSTA and BPSM panels only. Standard VETUS DC thruster panels are already equipped with a time delay.

Type	Description
BPTD12	Time delay unit for 12 VDC bow thruster panel BPSM and BPJSTA
BPTD24	Time delay unit for 24 VDC bow thruster panel BPSM and BPJSTA

BPTD..

Panel connection cables

These panel connection cables are supplied with multi-plugs and available in five different lengths. They can be used with all VETUS electric thrusters except BOW PRO, RIMDRIVE and retractable thrusters.

Type	Description
BP29	6 m control panel/bow thruster
BP2910	10 m control panel/bow thruster
BP2916	16 m control panel/bow thruster
BP2918	18 m control panel/bow thruster
BP2920	20 m control panel/bow thruster

BP29..

V-CAN connection cables

Available in six different lengths for use with BOW PRO and RIMDRIVE installations.

Type	Description
BPCAB1HF	CAN cable 1 m Halogen free
BPCAB5HF	CAN cable 5 m Halogen free
BPCAB10HF	CAN cable 10 m Halogen free
BPCAB15HF	CAN cable 15 m Halogen free
BPCAB20HF	CAN cable 20 m Halogen free
BPCAB25HF	CAN cable 25 m Halogen free

BPCAB..HF

Accessories for bow and stern thrusters

Installation set BPROSET*

When installing a BOW PRO a few components are required to activate V-CAN communication. These components are put together in an installation set and include the following items:

Type	Description
CANVPS	V-CAN Power supply incl. safety
CANVT	2x CAN bus termination resistor
BPCAB1HF	CAN cable 1 m - Halogen free

* When installing an older BOWPRO unit with only one V-CAN connection, a V-CAN HUB (CANVHUB) and an additional CAN cable (BPCAB1HF) are required for the installation.

BPROSET

In addition to this installation set a V-CAN connection cable between the thruster unit and control panel is required. These cables are shown on page 244.

Battery main switches type BATSW

May be connected to either the positive or the negative electric cable. Two positions: “ON” and “OFF”. In the “OFF”position the key may be removed (except models 150 and 600). Provided with two M10 connectors. Model 250T is a twin pole switch to make/break both the positive and negative cables. Model 600 is watertight according to IP 67.

BATSW075

BATSW100

BATSW150R

BATSW250

BATSW250T

BATSW600

Type	BATSW075	BATSW100	BATSW150R	BATSW250	BATSW250T	BATSW600
Nominal operational (V)	max. 48	max. 48	max. 48	max. 48	max. 48	max. 48
Current max.:						
- Continuous operation	75 A	100 A	150 A	250 A	2 x 250 A	450 A
- 3 minutes’ load						800 A
- 5 seconds’ load	350 A	500 A	1000 A	2500 A	2 x 2500 A	3500 A

Fuses and fuse holder type ZE

Type ZEHC is suitable for VETUS fuses of 40 - 500 Amp. The fuses to match are encapsulated in glass to prevent splatter and fire. The fuse holder comes with a protector cover. **Note:** Can be used in combination with strip fuses type ZE (slow-blow fuse).

Type	Description	Amp.
ZE040	Strip fuse C20	40
ZE050	Strip fuse C20	50
ZE063	Strip fuse C20	63
ZE080	Strip fuse C20	80
ZE100	Strip fuse C20	100
ZE125	Strip fuse C20	125
ZE160	Strip fuse C20	160
ZE200	Strip fuse C20	200

Type	Description	Amp.
ZE250	Strip fuse C20	250
ZE300	Strip fuse C20	300
ZE355	Strip fuse C20	355
ZE425	Strip fuse C20	425
ZE500	Strip fuse C20	500
ZE700	Strip fuse C20	700
ZEHC100	Fuse holder, type C100 including cover	

ZE

ZEHC100

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