

Jet Thruster

DOCK YOUR
BOAT EASILY

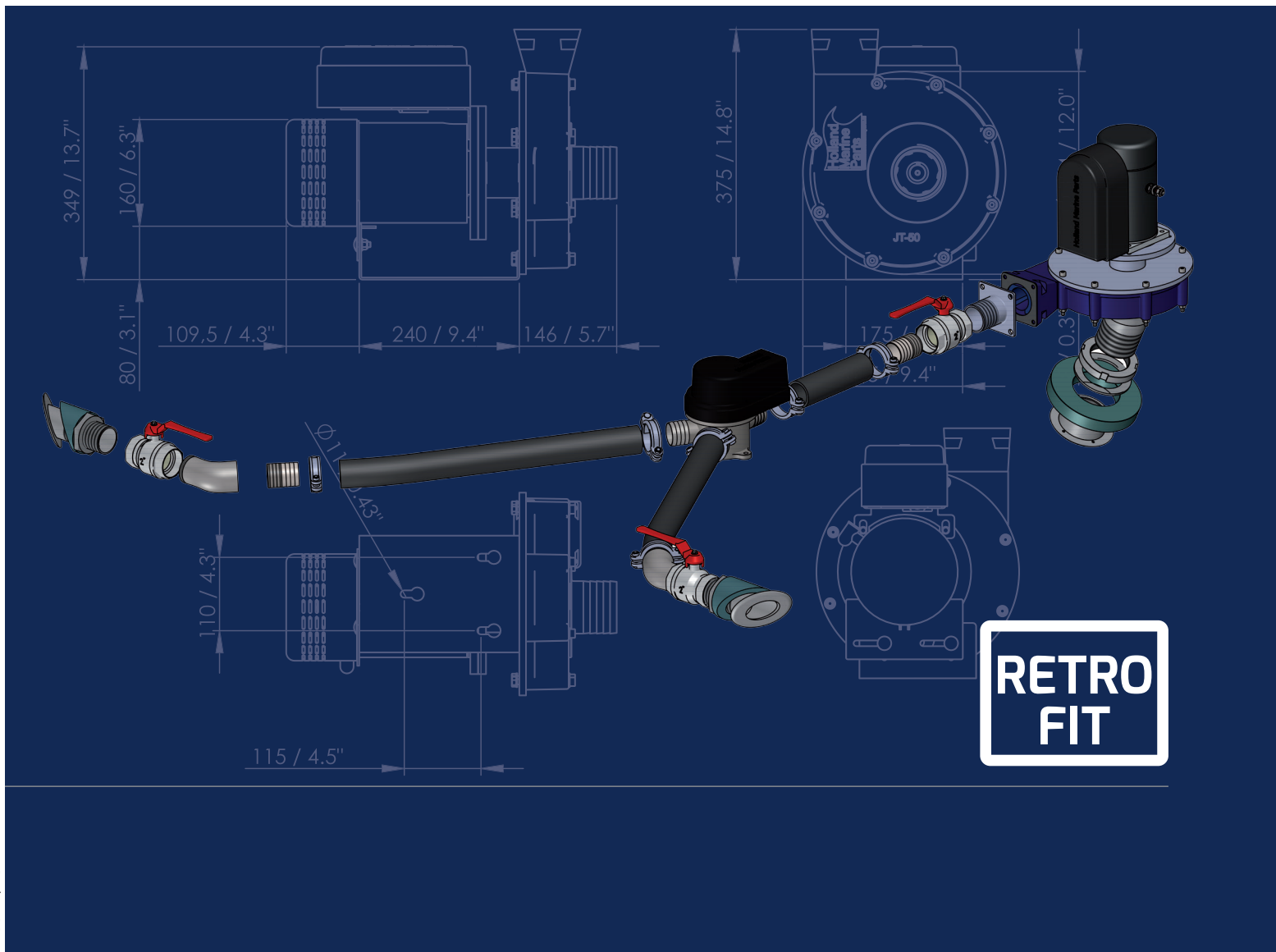
Manufactured by
Holland Marine Parts B.V.

KEEP THIS MANUAL
ONBOARD!

Installation manual & user guide

Jet Thruster Retrofit installation for SKI-boats

www.jetthruster.com



01 (11 2014)

All our products are manufactured according to CE regulations.
We keep the rights to change descriptions, graphs or statements,
which are required for technical development of our Jet Thruster systems.



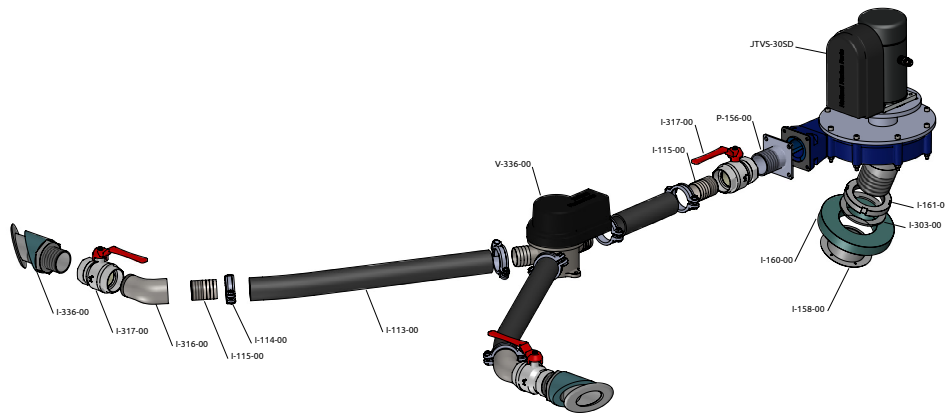
**HOLLAND
MARINE PARTS**

WE KEEP YOU MOVING!

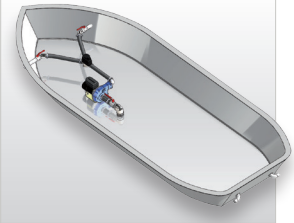
“A Jet Thruster will add maneuverability to your single prop. SKI-boat”

Complete installation kit available!

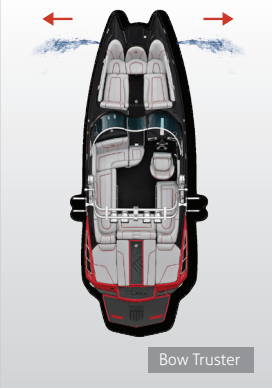
The operation of the Jet Thruster Single is based on the sucking in of outside water. It is subsequently expelled through nozzles in the bow and/or stern side. To this end the Jet Thruster has been fitted with a powerful centrifugal pump, a three-way valve and electrical controls. These parts are included for a Jet Thruster Single setup:



Boat view single:



Manoeuvring:



Main components:

Water inlet



I-302-00

Pump unit



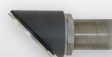
JTS-30-00/JTS-50-00

3-Way valve



V-100-00

Nozzles



I-318-00

Joystick panel



I-150-00

Optima Battery



B-55-L

Jet Thruster

DOCK YOUR
BOAT EASILY



RETROFIT

MasterCraft: X-30

“There isn’t a single boat where this thruster can’t go in”

“We have been looking for many years for a thruster system to install in the bigger Mastercraft fleet, finally with the new Jet Thruster we can offer a incredible hassle and noise free maneuverability to our customers and it becomes also a factory Option in all the bigger Models!

DIETER HOFER
MASTERCRAFT IMPORTER SWITZERLAND

MasterCraft



RETROFIT

MasterCraft: X-star



Preface:

Holland Marine Parts keeps you moving!

Thank you very much for your purchase of the Jet Thruster.

The Jet Thruster system greatly simplifies the manoeuvring of your boat!

The extensive development process of the Jet Thruster guarantees a complete and innovative system that will make operating your boat a breeze!

The Jet Thruster systems by Holland Marine Parts are made of quality materials. For the correct and safe operation of the Jet Thruster you have purchased, we recommend having it professionally installed. A professional installation taking into account the recommendations in this installation / user manual guarantees a well-working system.

This installation manual has been prepared with the utmost care. If you experience installation trouble please contact your Jet Thruster dealer. We point out that some boats require adjustments to assure their integrity. For all your questions about this please contact your boatbuilder.

Holland Marine Parts

Warranty provisions

On all its newly manufactured products Holland Marine Parts provides quality assurance regarding their proper operation, both with regard to the material and the work done, including latent defects, for a period of 24 months after the invoice date to the first receiver.

In case of defects in material and/or defects caused by inadequate work done, as covered under warranty by Holland Marine Parts, the relevant part or the whole device will be either repaired or replaced at the discretion Holland Marine Parts, free of charge.

The warranty periods specified in the first paragraph are not extended by the implementation of repairs under warranty.

Any costs associated with travel, transportation and installation and/or disassembly with regard to repairs covered under warranty will be borne by the owner of that device.

Damage to the product caused by improper installation, by intentional or unintentional misuse, lack of maintenance, normal wear and/or repair by third parties without the written permission of Holland Marine Parts are not covered by warranty.

Holland Marine Parts shall under no circumstances be liable for any consequential damages of any nature whatsoever or howsoever caused by the part or the whole product covered by warranty by Holland Marine Parts.

Please note: Exclusion of warranty: The pump head of the pump unit and the seals on the 3-way valve are tested to be waterproof. If they are opened/removed/damaged this will void all liability towards Holland Marine Parts in the occurrence of damage as a result of these actions.



This is the safety alert symbol. It is used to alert you to potential hazards. Obey all safety messages that follow this symbol to avoid possible injury, damage. This Installation Manual and User Guide provides advice and instructions towards the mechanical and electrical installation of the Jet Thruster system. Remember: Always use common sense when installing, using and servicing the Jet Thruster and it's components. In case anything is not clear: Contact your dealer or Holland Marine Parts BV for assistance.

In this manual the installation of the JT-30 Jet Thruster retrofit installation for SKI boats is explained. Choose the installation procedure that applies to the system you have purchased.



Damage to system components due to Galvanic corrosion, Electrochemical corrosion and Stray current corrosion are excluded from warranty. Install cathodic protection as advised in this manual.



Read prior to operating the Jet thruster system

Your boat is equipped with a Holland Marine Parts electric Jet Thruster. For the safe and correct operation of this system Holland Marine Parts recommends every user to carefully study this operating guide. Familiarise yourself with the system by trying it out in various weather conditions. The windage and draft as well as the weight of your boat are factors contributing to how well the system operates.

Warnings:

- The Jet Thruster is not a replacement of the main controls but assists with the execution of difficult manoeuvres.
- Familiarise yourself with the way your boat responds to your operation of the system.
- The electric motor produces heat. A thermal protection limits continuous operation.
- The water inlet is located on the bottom of your boat. Inquire about the exact location of the water inlet grating.
- Prevent the system from sucking in large amounts of sand and dirt. Do not activate it when you have less than 30cm (12") of ground clearance.
- The nozzles of the Jet Thruster are located beneath the water line. Do not activate the system and do not operate the Jet Thruster when there are people, animals or vulnerable items in the vicinity of your boat and the inlet and orifices.
- Close all the valves when you are not aboard. Inquire about the local regulations in ports with regard to closing the valves.



Engage the Jet Thruster in pulses of maximum 10 seconds.

Do not continuous run the Jet Thruster system: it is designed to operate in pulses.

Operation:

Make sure all valves are open before the system is activated. You operate the Jet Thruster by activating the system on the front plate of the control panel by pressing the button (A). This switch is illuminated in blue when the system is active. Operate the Jet Thruster by moving the joystick(s) (B) left or right, moving the bow or stern to port or starboard, respectively. When equipped with push buttons, the same procedure applies, the push buttons being illuminated in green or red light.

Duration of activation:

Move your boat by means of pulses that last a maximum of 10 seconds. The efficiency of the system is determined in part by the battery capacity present. The overheating protection will activate when the system is active for an extended period of time. After the engine has cooled sufficiently this protection is removed. The cooling time is determined in part by the ambient temperature. It can take up to 30 minutes to cool down.

Jet Thruster Combi:

The control panel is equipped with two joysticks or push buttons. You can move sideways by operating both push buttons for bow and stern at the same time. You can manoeuvre the boat around the centre of rotation by manoeuvring the bow to port and the stern to starboard, or the other way around.

Safety and operating recommendations.



Follow all instructions in this manual. All installers and users of the system must be aware of the mandatory safety regulations as explained in this manual:

- In rare conditions it might be possible that the pump unit of the Jet Thruster does not prime. If you notice a high rpm from the pump unit and no thrust force, do not attempt to prime the pump unit by continuous activating the system. In this situation the Electrical air valve from Holland Marine Parts should be installed to release the air from the pump head. This will prime the pump. **Do not run the pump unit without the presence of water!**
- Engage the Jet Thruster in pulses of maximum 10 seconds.
- Leave maintenance of the system to qualified technicians.
- Do not touch any moving parts of an active system.
- Parts such as the DC pump motor may become hot: do not touch them and do not cover them under any circumstances.
- Avoid having flammable products near the DC pump motor.
- Do not conduct any inspection or maintenance of the system when it is active or activated.
- Do not close any valves of an active system.
- The system is located beneath the water line. Do not remove any parts of the system before all valves have been closed.
- Close all valves when you are not aboard.
- Leave system maintenance to specialists.
- Disconnect the battery cables when conducting maintenance and in the event of long-term absence (e.g. when the boat is not being used in winter).
- Protect the high-pressure hoses from heat / penetration / sunlight / chemicals / chafing. Check on regular basis.
- Avoid physical contact with the water inlet when the system is active.
- Avoid physical contact (swimmers!) with the nozzles and the water expelled by an active system.
- Keep system components dry. Protect system components from contact with (sea) water, humidity.
- Conduct inspections as stipulated in this manual towards the overall integrity of the components on regular basis.
- Check and replace protective anodes on annual basis.
- Annually check if all battery cable connections are tightened securely.

Important:

Protect your Jet Thruster system from corrosion:

Sea- or brackish water, even polluted fresh water conducts electricity very well. Stainless steel can suffer from corrosion (pitting/ crevice corrosion) when there is a lack of oxygen to restore the protective film that gives the stainless steel its natural protection:

Takes these following recommendations into account to assure corrosion is discovered, detected, removed, and prevented.



- Do not paint the stainless steel surfaces of the water intake and nozzle flanges present on the outside of the hull
- Remove barnacles, marine- and all other possible fouling from stainless steel surfaces as soon as possible, when present.
- Do not use steel tools (other than stainless steel) or steel wool when cleaning any stainless steel surface. Use Scotchbrite.
- Connect all stainless steel parts to a sacrificial anode, follow recommendations in this manual.
- Do not paint Anodes.
- When using copper- or tin-based anti-fouling (if not prohibited by local law) electrical interconnection must be avoided between the Stainless steel Jet Thruster components and the anodic blocks. Make sure to keep 40mm unpainted area around these items.
- If you use shore power, you should have an approved galvanic isolator or separator installed to protect against Stray Current Corrosion (electrolysis) from your dock.
- Your particular boating environment may require that you install additional anodes or other protective devices
- Corrosion is often induced by certain types of bacteria present in the water (world wide) and leaking electricity from false- or damaged electrical equipment. (Stray current)
- Galvanic or electrochemical corrosion to your stainless steel Jet Thruster components is minimized with a sacrificial anode if correct connected.
- Corrosion can be caused by many factors, such as wrong type or improper application of anti-fouling paint, marine growth, stray electrical current (electrolysis)
- **Why can unpainted flanges of the water inlet and nozzles get rusty?**
- Stainless steel can discolor and form areas of light rust. Brushed finished stainless steel surfaces are more susceptible than brightly finished stainless steel. Rust stains can occur from polluted water, galvanic corrosion from the boat or marina, or from oxygen depletion. The stainless steel surfaces can be easily cleaned with rubbing compound or Scotchbrite. **DO NOT USE STEEL WOOL.** After cleaning use chrome polish to protect the finish. Stainless steel surfaces can also turn white from calcium or lime in the water. In this case clean the stainless steel surface with household mineral bath and tile cleaner.
- Important: Never use Steel Wool or any other metal parts or tools on the stainless steel Jet Thruster parts and surfaces. Do not grind or weld near stainless steel parts.
- Always avoid contact between stainless steel parts and other metal parts to avoid rust, or other types of corrosion to the stainless steel.
- Be vigilant for signs of corrosion and act if noticed to avoid (further) damage or dangerous situations.

Winterising:

Preferably have the system winterised by a specialist.

Please note: Frost can do a lot of damage if you fail to drain the system. Use a compressor to remove the water present in the system by means of air pressure.

Please note: Excessive pressure may damage the system. Check the operating pressure you use to pressurise the system with. This operating pressure must not exceed 2 bar (30 psi).

Step 1: Disconnect the + cable from the battery.

Step 2: Close ball valves at nozzle side.

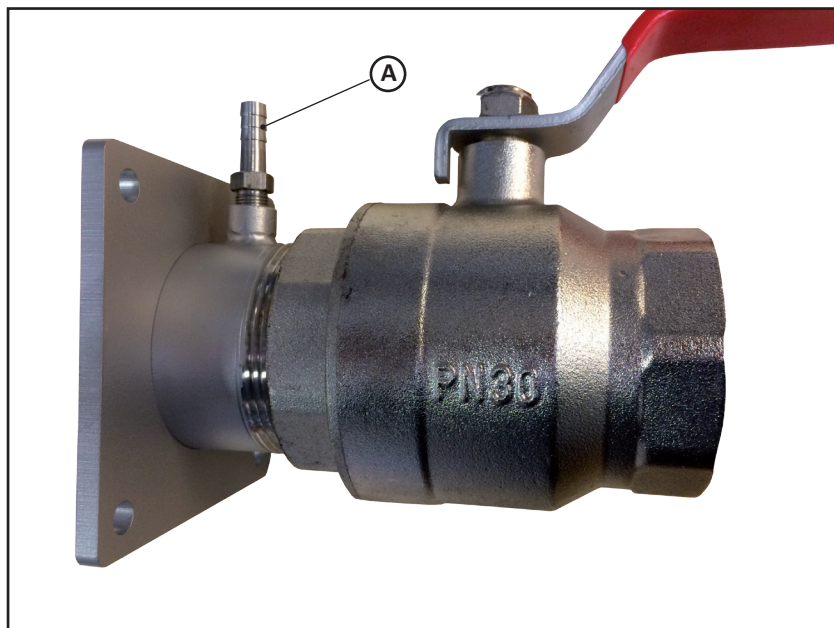
Step 3: Remove the air valve hose from the pump outlet hose connector (A)

Step 4: Connect your 8 mm compressor hose to (A)

Step 5: Pressurise the system. **MAX 2 BAR (30 psi)!**

Step 6: Open the ball valves one by one and close them the instant you hear a bubbling sound. Repeat this procedure for every ball valve.

Step 7: Place back air valve hose



When you take the boat out of the water, automatically water will drain from the system. Despite that, it is important to check no water remained in the system to avoid damage in freezing weather conditions.

Troubleshooting:

If the system is not functioning:

Problem	Cause	Solution
1.1 System is not working (power indicator off)	Joystick not receiving power	Press the switch
1.2 System is not working (power indicator off)	Joystick not receiving power	Check fuse 15A behind joystick
2.1 System is not working (power indicator on)	Battery dead or main fuse broken	Check / replace fuse
2.2 System is not working (power indicator on)	Overheating protection activated	Leave engine to cool
	Damaged relay	Contact your dealer
3.1 Engine running, no activity	Valves closed	Check whether or not valves are closed
3.2 Engine running, no activity	Engine does not draw water	Place pump unit inlet below water line
3.3 Engine running, no activity	Polluted system (shallow water)	Run engine in deep water until clean
3.4 Engine running, no activity	Damaged impeller	Contact your dealer
4.1 Engine running, no activity	System operates inverted	Cabling fault Exchange A and B on the pump unit
4.2 System is not efficient enough	Low battery voltage	Charge batteries, Check actual voltage at meter.
4.3 Not enough power (JT-50 24V, JT-70 and JT-90)	Series-parallel does not activate, system runs at 12V	Check connections series-parallel switch



You  **Tube**

watch our installation video's!
www.youtube.com/user/hollandmarineparts



Safety and installation recommendations:

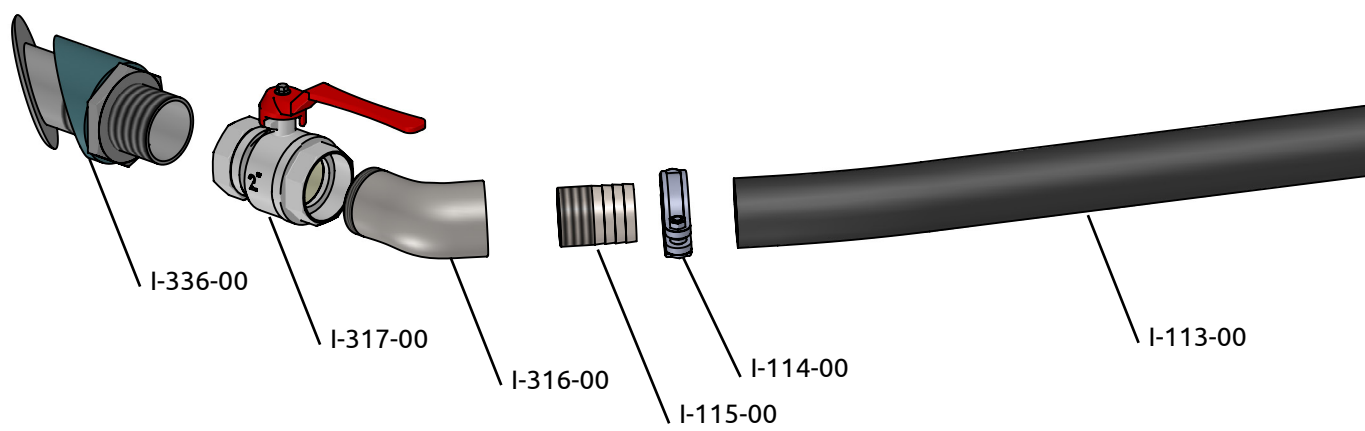
Read prior to installation!

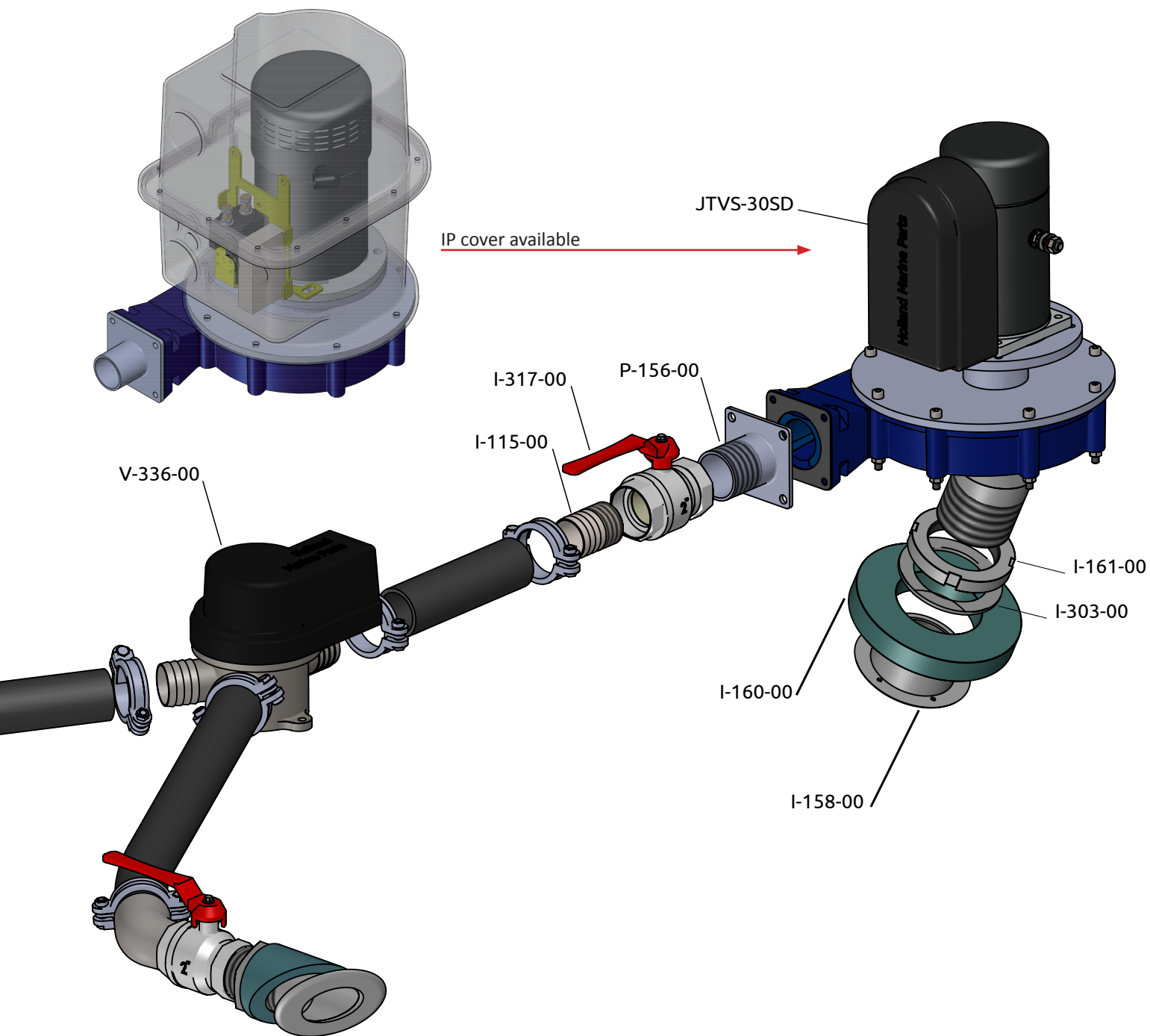


Follow all instructions in this manual. All installers and users of the system must be aware of the mandatory safety regulations as explained in this manual:

- In rare conditions it might be possible that the pump unit of the Jet Thruster does not prime. If you notice a high rpm from the pump unit and no thrust force, do not attempt to prime the pump unit by continuous activating the system. In this situation the Electrical air valve from Holland Marine Parts should be installed to release the air from the pump head. This will prime the pump. **Do not run the pump unit without the presence of water!**
- Use appropriate tools for the installation and maintenance of the Jet Thruster.
- Provide the Jet Thruster separate battery(s). **Place the battery(s) as close to the pump unit of the Jet Thruster as possible.**
- Always use a Holland Marine Parts control panel.
- Do not touch any moving parts of an active system.
- Parts such as the DC pump motor may become hot: do not touch them and do not cover them under any circumstances.
- Avoid having flammable products near the DC pump motor.
- Do not conduct any inspection or maintenance of the system when it is active or activated.
- Do not close any valves of an active system.
- The system is located beneath the water line. Do not remove any parts of the system before all valves have been closed.
- Close all valves when you are not aboard.
- Disconnect the battery cables when conducting maintenance and in the event of long-term absence (e.g. when the boat is not being used in winter).
- The hoses are under pressure in an active system: high-pressure hoses are to be attached to the boat to prevent movement along e.g. sharp edges.
- Protect the high-pressure hoses from heat / penetration / sunlight / chemicals / chafing.
- Avoid physical contact with the water inlet when the system is active.
- Danger! Protect pump unit and 3-way valve from petrol fumes. Provide sufficient ventilation. Ignition proof covers are available.
- Keep system components dry. Protect system components from contact with (sea) water, humidity.
- Connect Sacrificial anodes as explained in this manual to all sections of the Jet Thruster system to reduce the effects of pitting and crevice corrosion to stainless steel parts

Exploded View Jet Thruster JTVS-30SD





Pumpunit JT-30
3-Way valve

Water inlet
Ring 3"
Nut 3"
Nylon washer
Pump outlet

JTVS-30SD
V-100-00

I-158-00
I-160-00
I-161-00
I-303-00
P-156-00

Pressure hose 2" / 51 mm
Hose clamp 48-60 mm
Elbow 45° 2" BSP M/F
Hose connector 2" / 51 mm
Ball valve 2" BSP
Nozzles 45°

I-113-00
I-114-00
I-316-00
I-115-00
I-317-00
I-336-00

System components

Vertical pump position and absence of intake valve

Because of the shallow draft, there is no butterfly valve. This is to keep the pump house as close to the hull as possible. The pump is directly installed on angled intake flange which is connected with the hull.

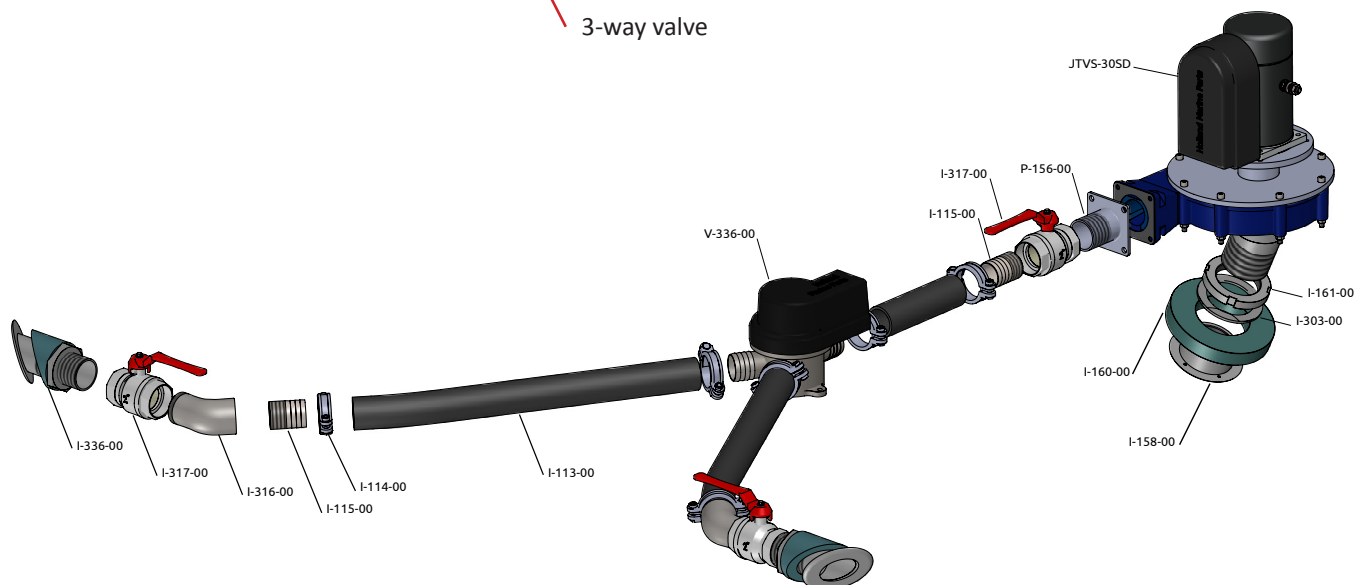
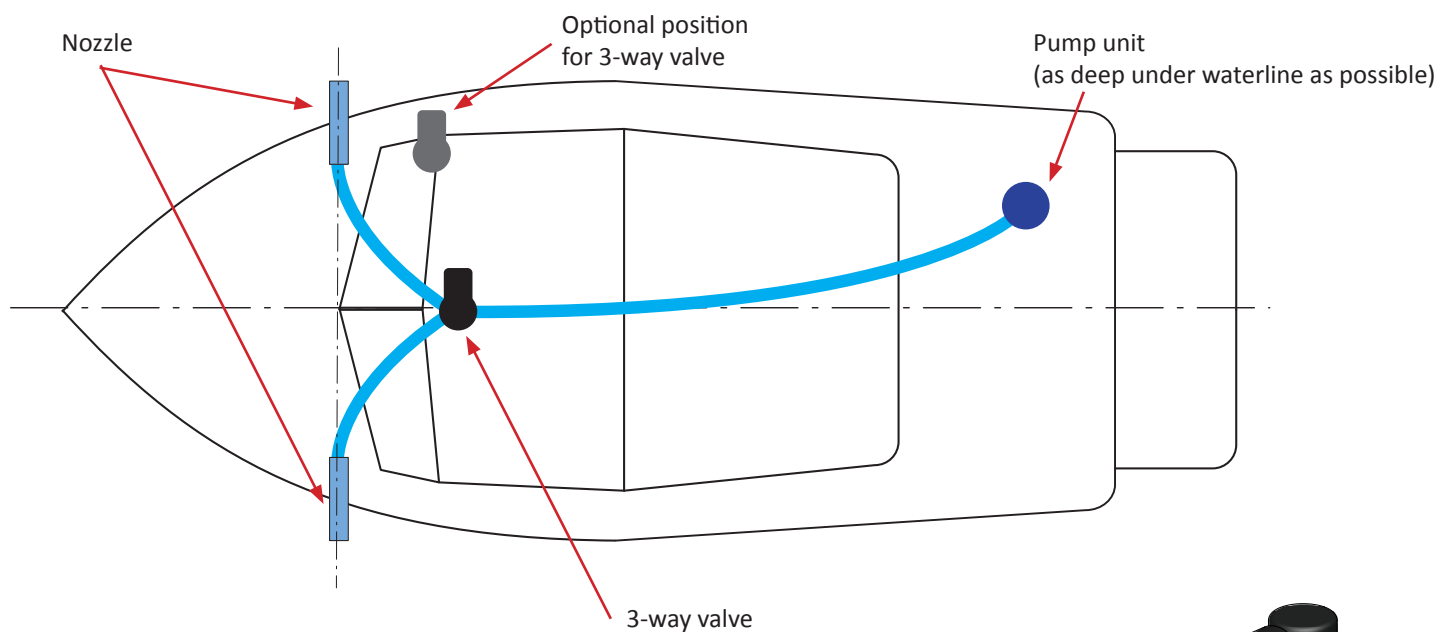
A ball valve is directly installed behind the pump outlet.



Use your technical creativity to find the best place for the Jet Thruster components

This instruction is a guide to install the Jet thruster system in your SKI-boat boat. Locations for the pump, nozzles and valves and routing of hoses may vary depending on the boat's configurations and options!

Please dry fit all components for fit and location before drilling holes!



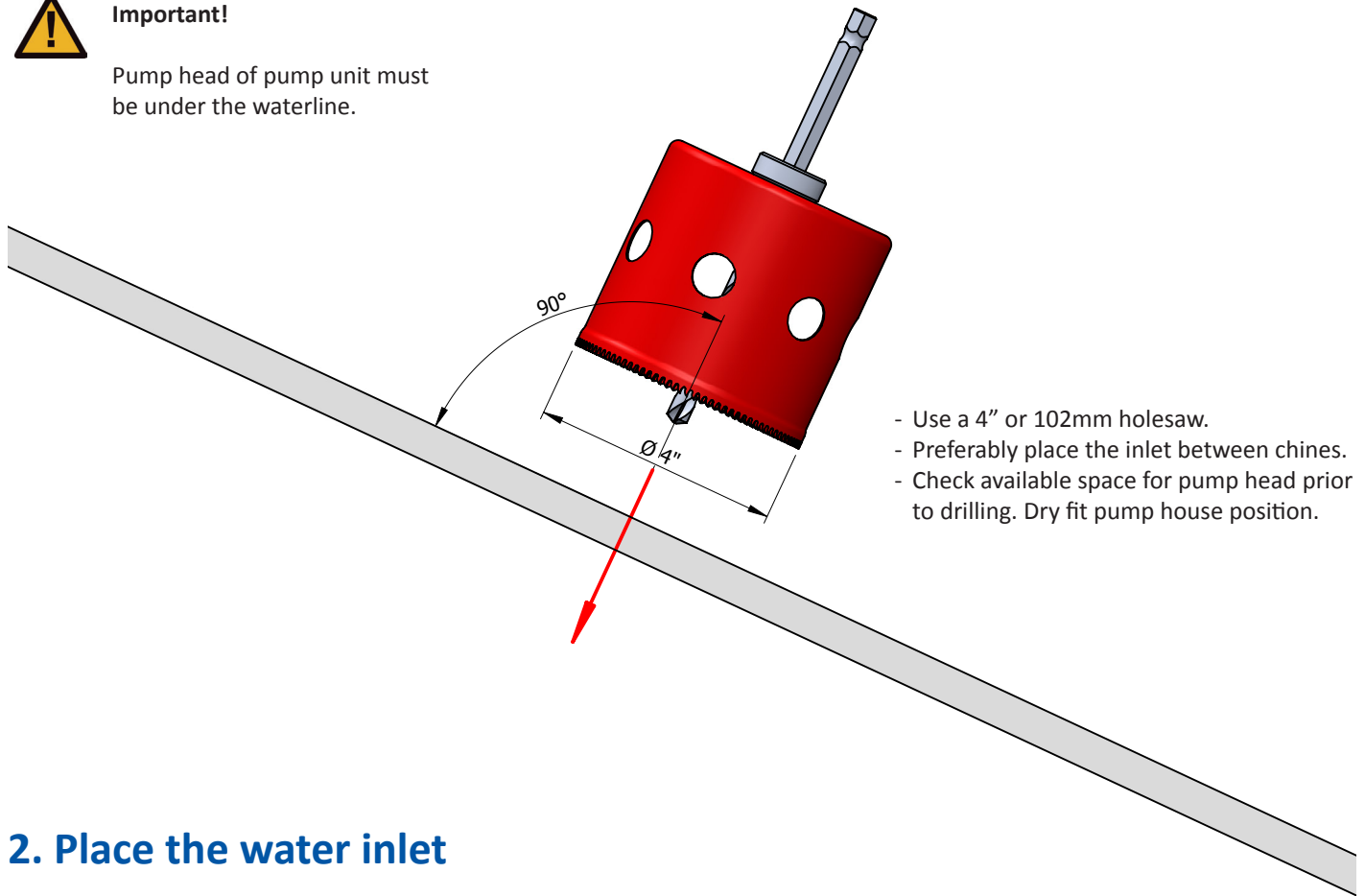
1. Drilling the inlet hole

You Tube watch our installation video's!
www.youtube.com/user/hollandmarineparts



Important!

Pump head of pump unit must be under the waterline.



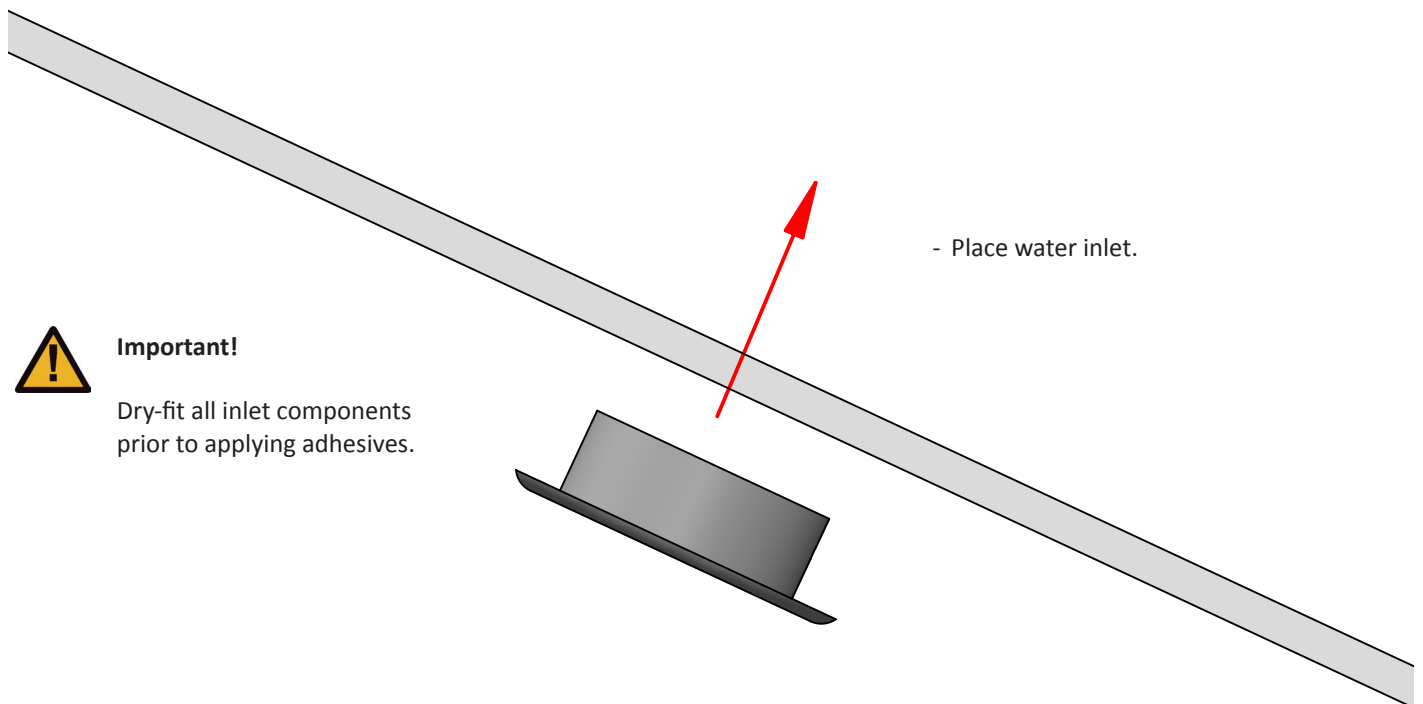
- Use a 4" or 102mm holesaw.
- Preferably place the inlet between chines.
- Check available space for pump head prior to drilling. Dry fit pump house position.

2. Place the water inlet



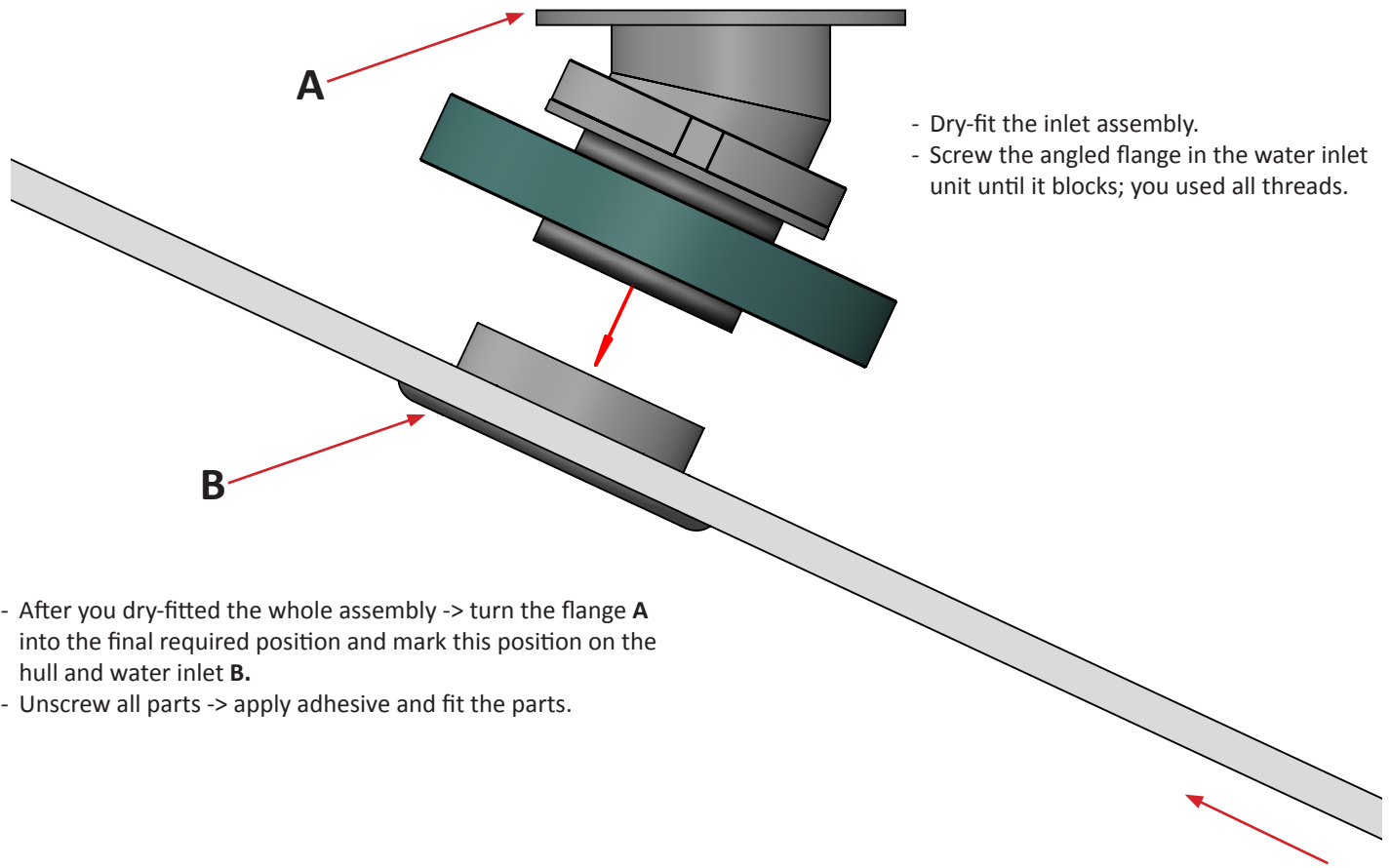
Important!

Dry-fit all inlet components prior to applying adhesives.

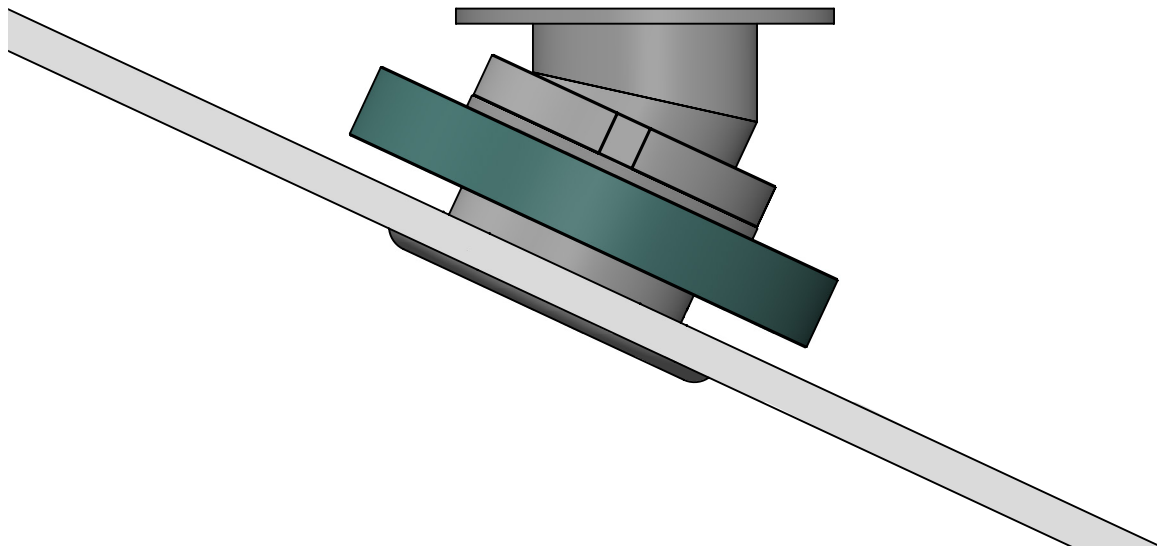


- Place water inlet.

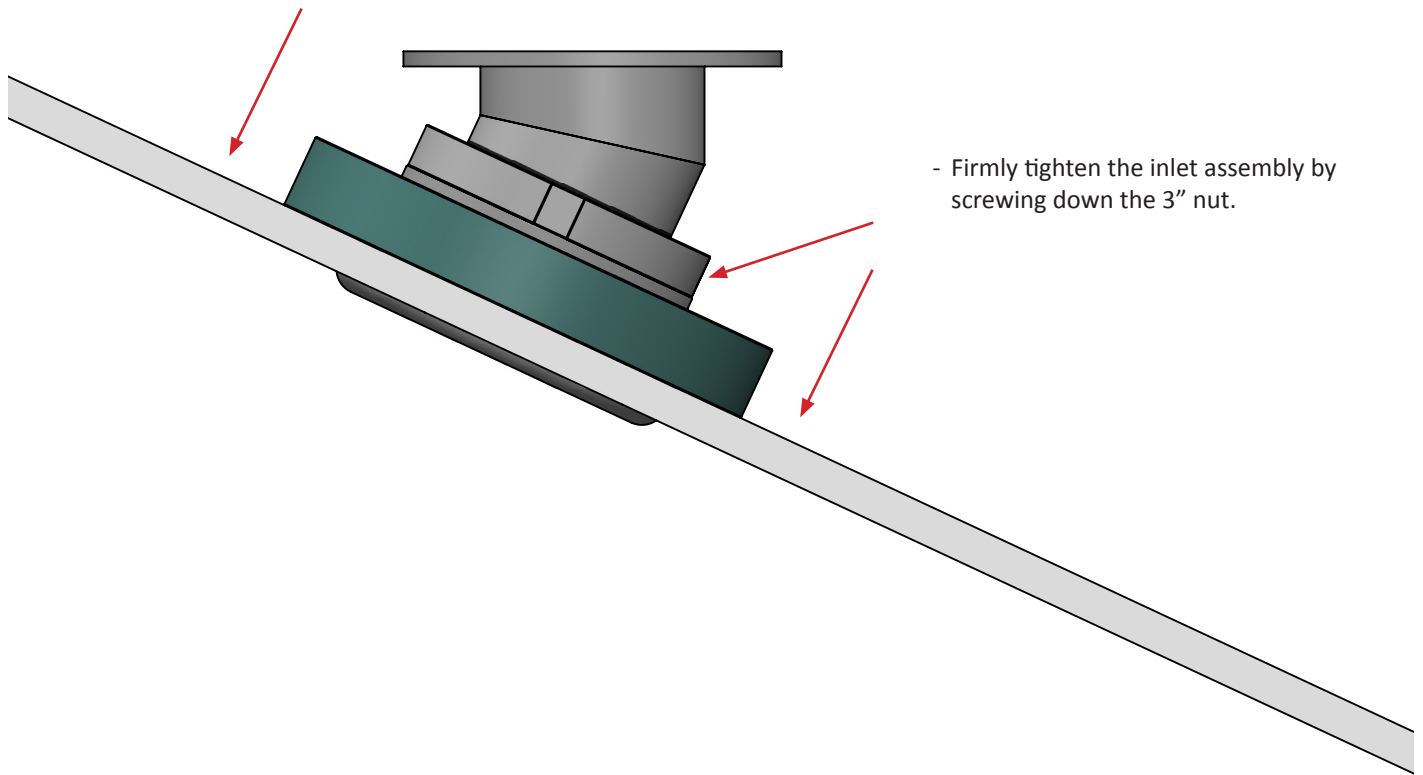
3. Place the angled flange assembly



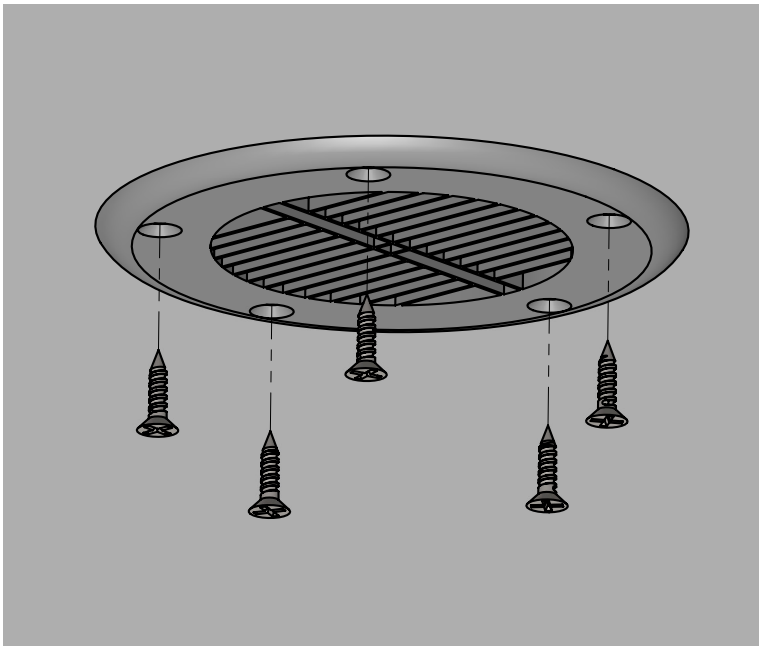
- After you dry-fitted the whole assembly -> turn the flange **A** into the final required position and mark this position on the hull and water inlet **B**.
- Unscrew all parts -> apply adhesive and fit the parts.



4. Tighten the inlet assembly



5.



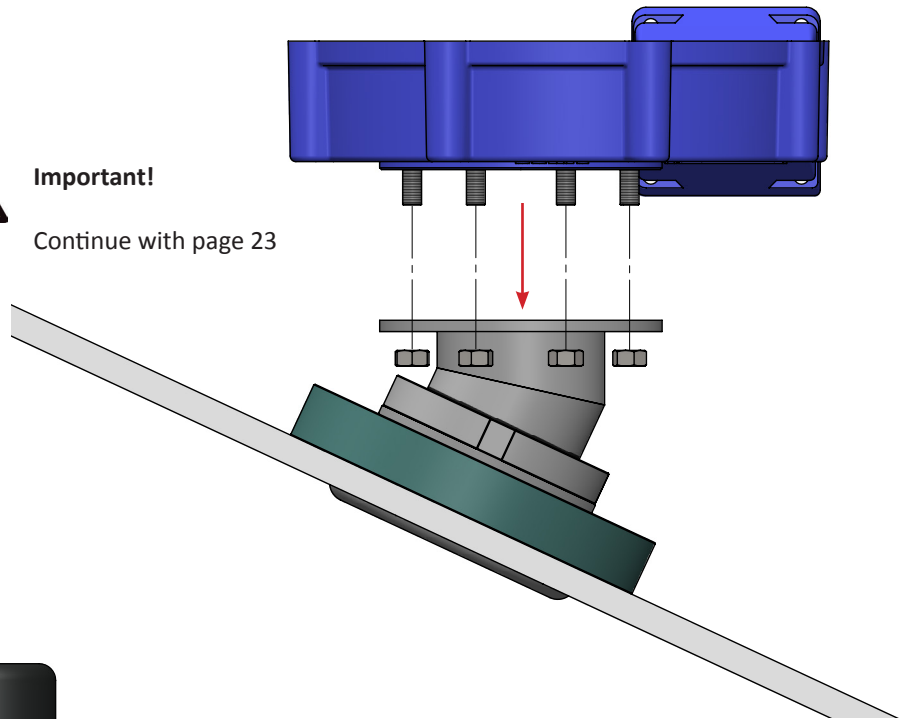
Visual inspect if the angled flange is screwed in place all the way to the filter.

6. Place the pump head



Important!

Continue with page 23

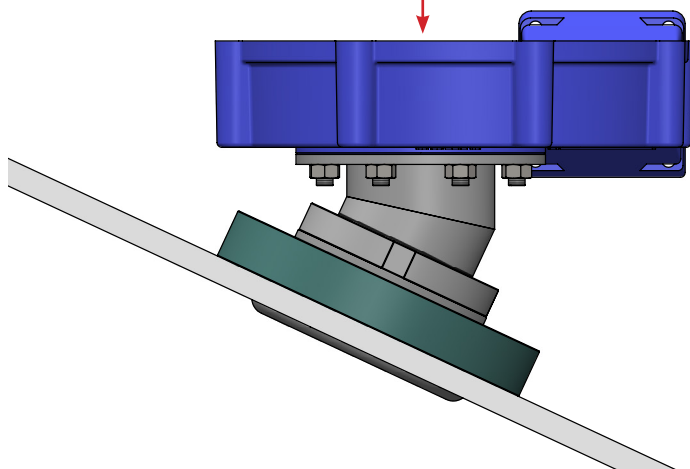


7. Placing the pump motor

Continue with page 24



Check if O-ring is in place.



6. Preparation of the Pump Head

The pump head will mate with the Angled flange. Between the Angled flange and the pump head there is a o-ring to provide sealing.

Caution: 8 holes with conical shaped cavities are cut the pump head. Each hole has a thread cut into the plastic. Tighten thoroughly, but not over-tighten to prevent damage to this thread.



- Apply Sikaflex 291i to each hole and on the treads
 - Make sure to provide Sikaflex to the thread of all 8 bolts that screw in the pump head
 - Do not use any other sealant than Sikaflex 291i for this job
- Leaks will occur if this procedure is not performed perfectly!**

- Place provided o-ring to Angled Flange



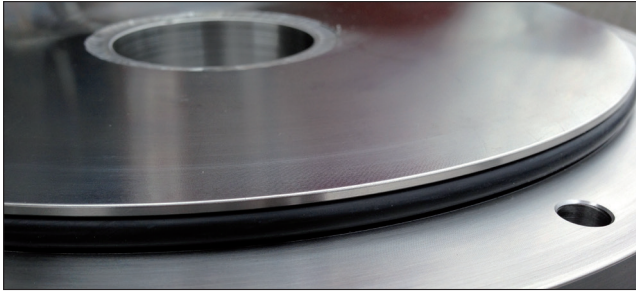
- Mate pump head to Angle Flange
- Apply washers and nut

Caution: When tightening the nuts: Apply the hexagon tool to give counter pressure. Prevent the bolts from rotating when nuts get tightened. Rotating nuts will damage the treads in the plastic pump house and may cause leaks if Sikaflex 291i seal is broken.

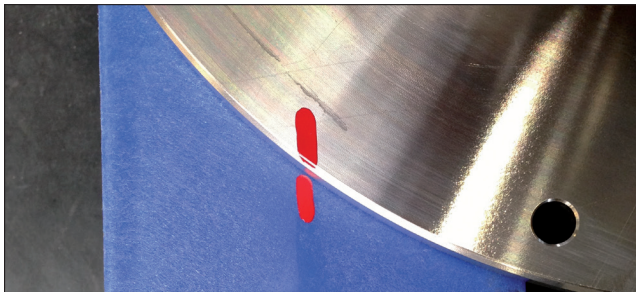


- Use the hexagon tool to give counter pressure only!

7. Placement of the pump motor



Look for the marks on pump head and pump motor when you slide the pump motor and flange in the blue pump housing. These must mate!



Make sure the O-ring is attached to the impeller flange of the motor



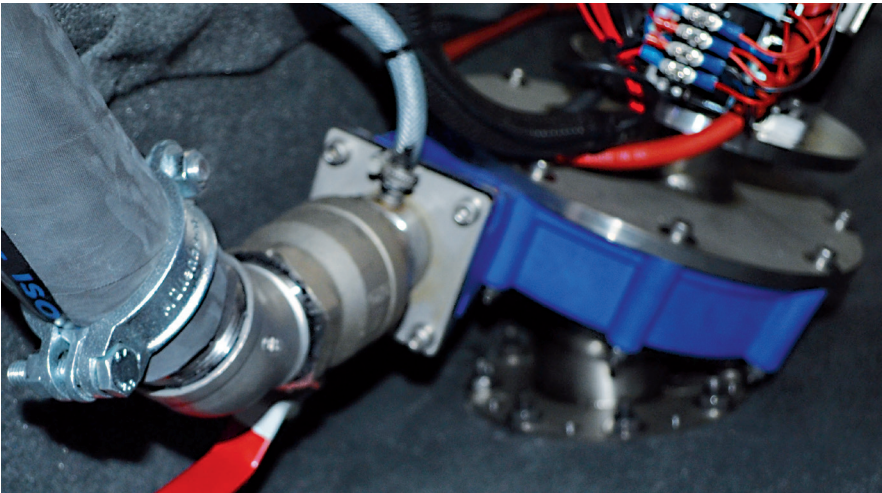
Carefully slide the pump motor in the pump head, check for the marks to mate them correctly.



Apply provide pump house bolts and nuts and tighten with 9 Nm max.

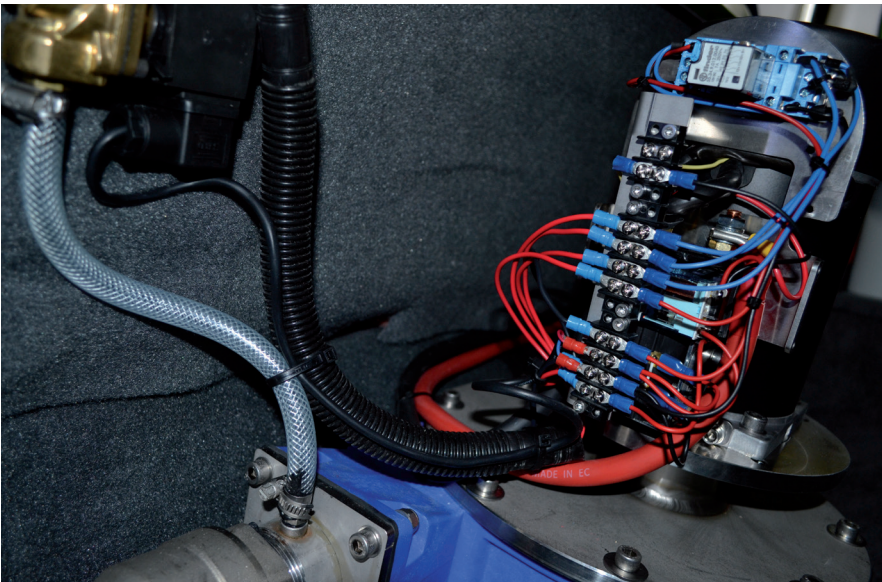
8. Placing pump outlet and valve

- Directly to the pump outlet side: Attach pump outlet part with air nipple socket on top side.
- Place 2" BSP ball Valve



9. Placing the Air Valve

- Connect the Air Valve with the socket on pump outlet.
- Make sure the electrical solenoid of the Air Valve is placed well above the waterline.



- Continue with positioning of 3-Way Valve.
- Continue with installation of nozzles and hoses
- Continue with Electrical installation.

10. Position of 3-way valve

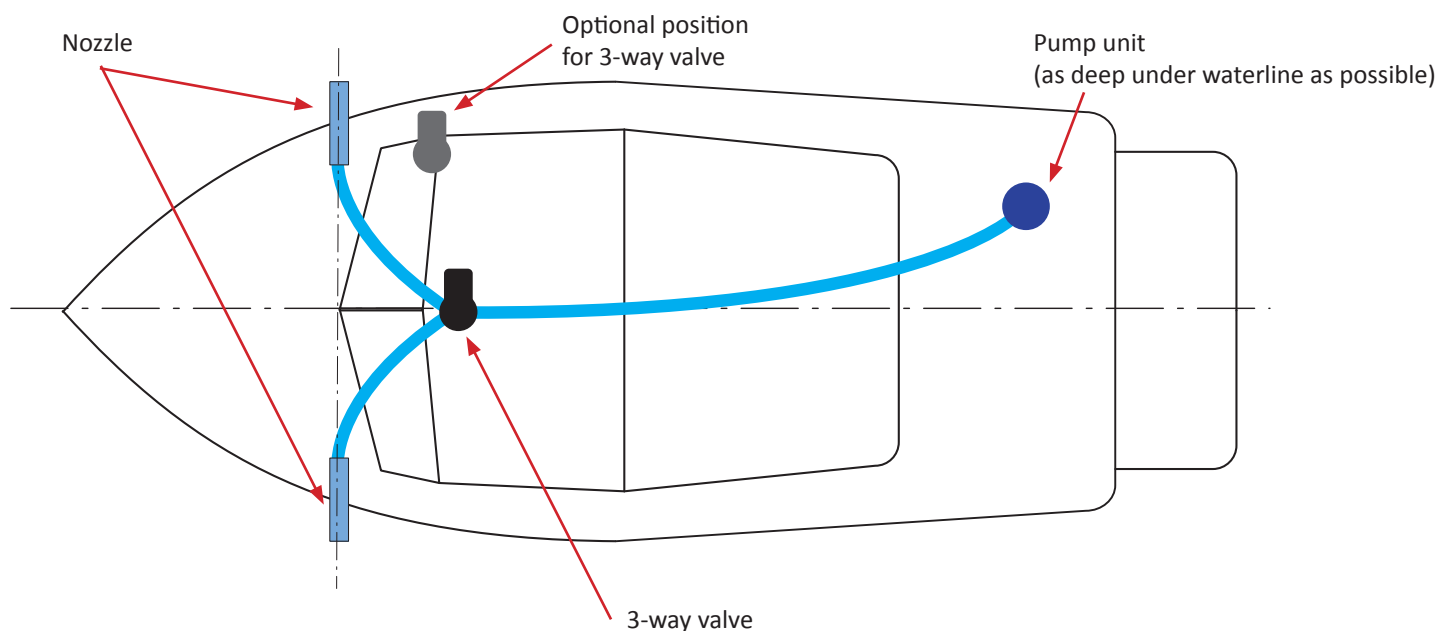


CAUTION: Prevent physical injury! When electrically turning the plunger present in the valve body, considerable force occurs. Prevent any body parts from getting trapped during installation.

Please note: By opening the lid of the valve, the watertight seal and bearing is broken. Opening the valve will void your warranty.

- Place of the 3-way valve as close to the nozzles as possible.
- Mount the 3-way valve to the boat. Use the recesses at the bottom of the valve body for this. (m8)
Position not necessary horizontal.
- Always use the protective cover to protect the electrical parts.

Dirt that builds up in the system, will be flushed out during use. The function of the 3-way valve allows for an amount of water flowing through, even when the valve is not in use. In a system that is in operation, water flowing out will be observed in all of the nozzles. This is normal and indicates that the system is functioning correctly.



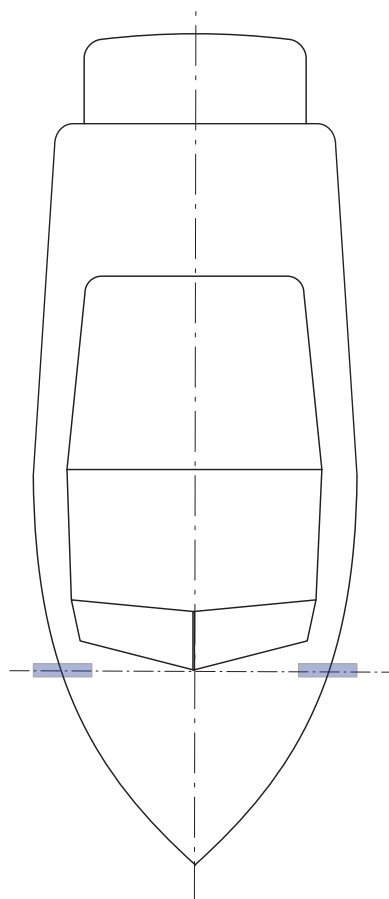
11. Installing the nozzles



- The Jet Thruster will be most effective when the nozzles are placed **AS FAR AS POSSIBLE TO THE FRONT OF THE BOW.**
- Top side of nozzle just below waterline.
- Keep in mind that when the nozzles rise above the waterline, it is possible that the powerful Jet of water expelled by the Jet Thruster can cause inconvenience: So keep them just below the waterline.

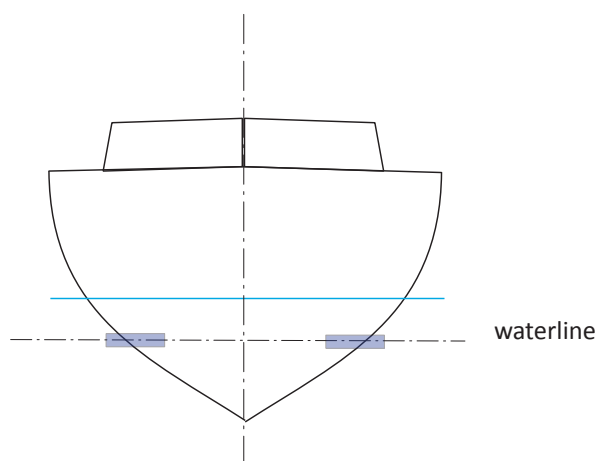
Principle for optimum installation:

- Nozzles at 90° angle to the centre line of the boat
- Nozzles horizontal
- Top side of nozzle below the waterline. It is realistic to indicate that the topside of the nozzle in optimum position will be just below the waterline.



This does not affect the function at all, but may causes spray. Be aware of that. Preferably keep the nozzles ad deep under the waterline as possible, but keep them horizontal and in 90 degree angle to the centre line.

If you not feel comfortable about the position of the waterline, we advise you to take the boat in the water, and mark the line before you continue the Jet Thruster installation process.



This picture is a suggestion for the nozzle position to MasterCraft Waterskiing boats.

As each boat is different, the above mentioned recommendations/principals must be verified and taken into account when determining the optimum nozzle position!

12. Installing the nozzles

In case of steel or aluminum boat plating weldable nozzles are available.
For polyester and wooden boat plating flange treaded nozzles are available.



1: Place boat horizontal. Select optimum position for nozzle: As far to the front of bow or stern as possible, top side of nozzle 10cm / 4" below water line. Nozzle horizontal and in 90° angle to the heart line of the boat.

Note: *Not placing the nozzles as far to the front or aft as possible reduces the overall effectiveness of the system!*

Laser equipment can assist selecting optimum position and determine if boat is placed perfectly horizontal.



2: Make sure the position of both nozzles and the components like the ball valves, elbows, hose connector, hoses and hose clamp are not in conflict with available space before a hole is made.

Drill a pilot hole. Keep drill horizontal!

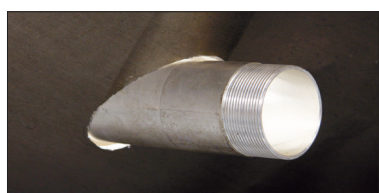
Nozzles can be positioned shifted horizontal and vertical in case of a narrow bow. Hoses can be crossed in order to place the nozzles further to the front of the bow. See image at point 8 for visible explanation.



3-4: Use a 60mm / 2 3/8" hole saw to drill the holes for the nozzle.
Keep drill horizontal and in 90° position to the boat's heart line.



5: Smoothen edges



6: Dry-fit in the nozzle and check if nozzle is placed horizontal and in 90° angle to the heart line of the boat e.g. by inserting the nozzle from the inside out to determine if hole is drilled correct.

7: Outside the boat



Do not use Teflon tape to connect the parts! Use a PU (Poly-Urethane) Marine Sealant such as Sikaflex 291i to connect the stainless steel parts.

-Thoroughly clean and degrease the surface surrounding the hole you drilled for the nozzle.

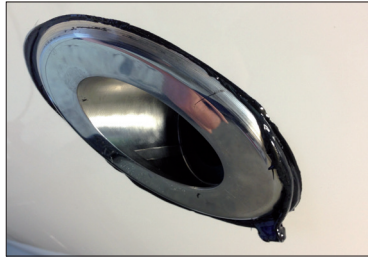
-Thoroughly clean nozzle flange and water inlet flange and all threads using acetone

-Apply sufficient PU sealant (e.g. Sikaflex 291i)

-After tightening the parts: Remove spilled PU Sealant



nozzle



nozzle



nozzle

7: Inside the boat



Prior to the process of fixing the nozzle: Dry-fit all parts and make sure the hose (holes prepared) is already in place. After applying sealant to the parts, and fixing the nozzle: Immediately place the 2" hose to the hose connector. This will avoid movement to the entire nozzle assembly when the sealant is curing.

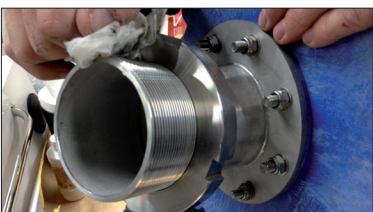
- Thoroughly clean and degrease every thread that has to be connected. Make sure to use sufficient sealant on the threads: At least 6 threads, and smoothen with e.g. finger over entire thread surface. Apply sealant to both parts that have to be connected. Remove spilled sealant immediately. Use acetone to remove Sikaflex-291i stains

-Place the Black PVC spacer, Nylon washer and 2" Stainless steel nut to the nozzle:

-Make sure the nozzle remains horizontal and in 90 degree to the heart line of the boat

-Place hose to hose connector, and prior to tightening the hose clamp, make sure hose is not twisted or applying unwanted forces to itself or the nozzle assembly

-Use large pliers to fix the nut.



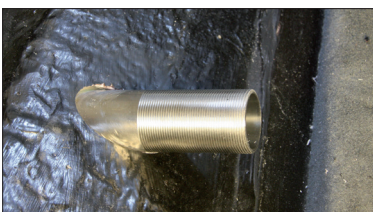
pump flange



hose connector



ball valve



nozzle



nozzle assembly



nozzle assembly & hose

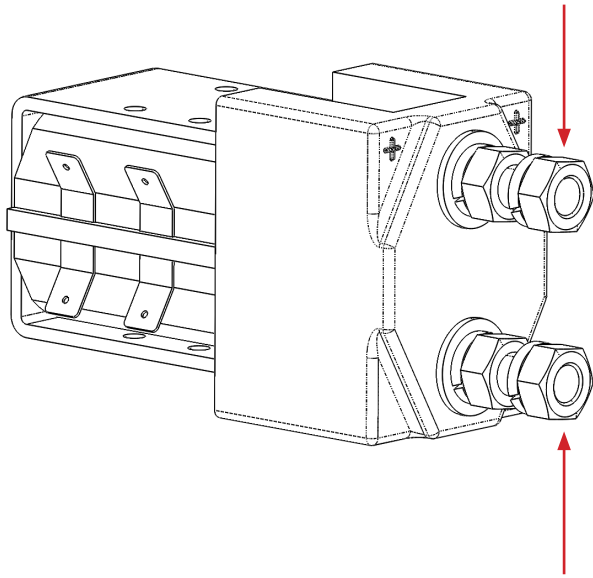
Torque on battery cable connections and pump outlet



Warning: Loose or insufficient tightened battery connections can cause damage or fire. Make sure to tighten the nuts of the connections as mentioned. Use quality terminals and right crimping tools to ensure a quality electrical installation. Safety!

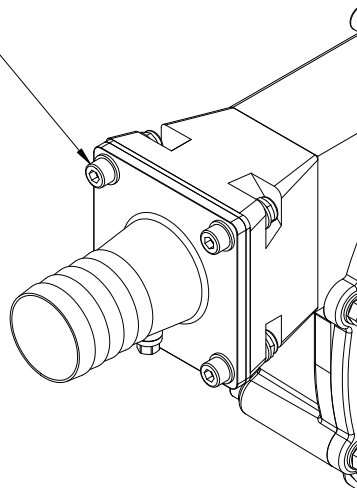
Battery cable terminals contactor SW-200

M10 main terminals to be tightened within the range 13.4 to 14.6 Nm



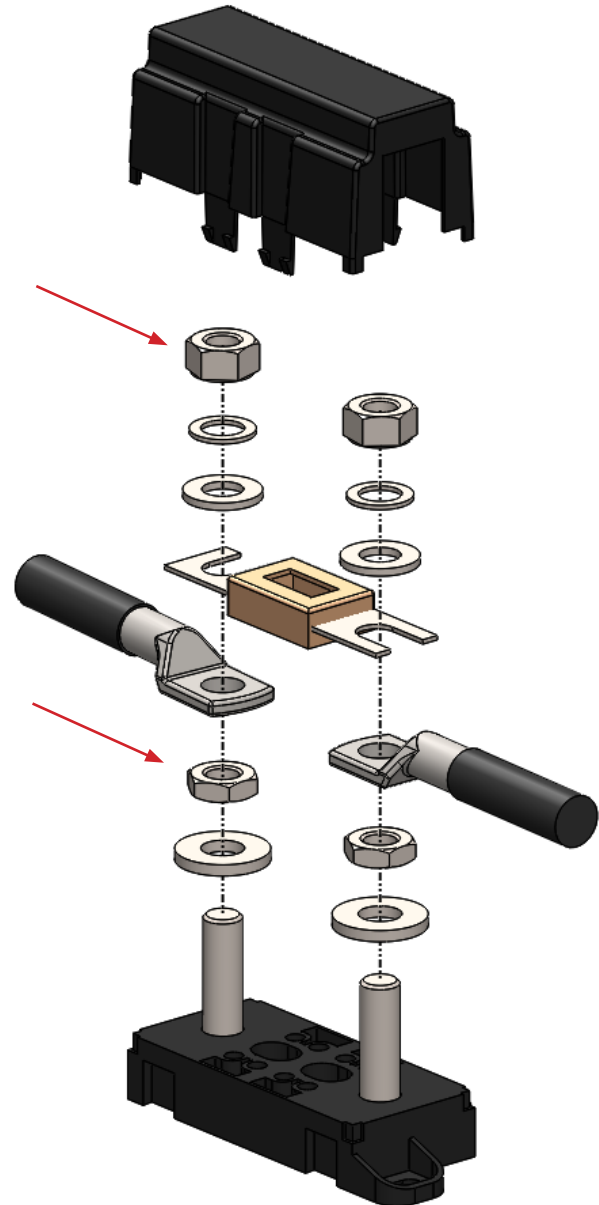
pump outlet

Torque max. 9Nm



Note: Overtightening will press out the seal!

Fuse holder: torque 15Nm to nuts.



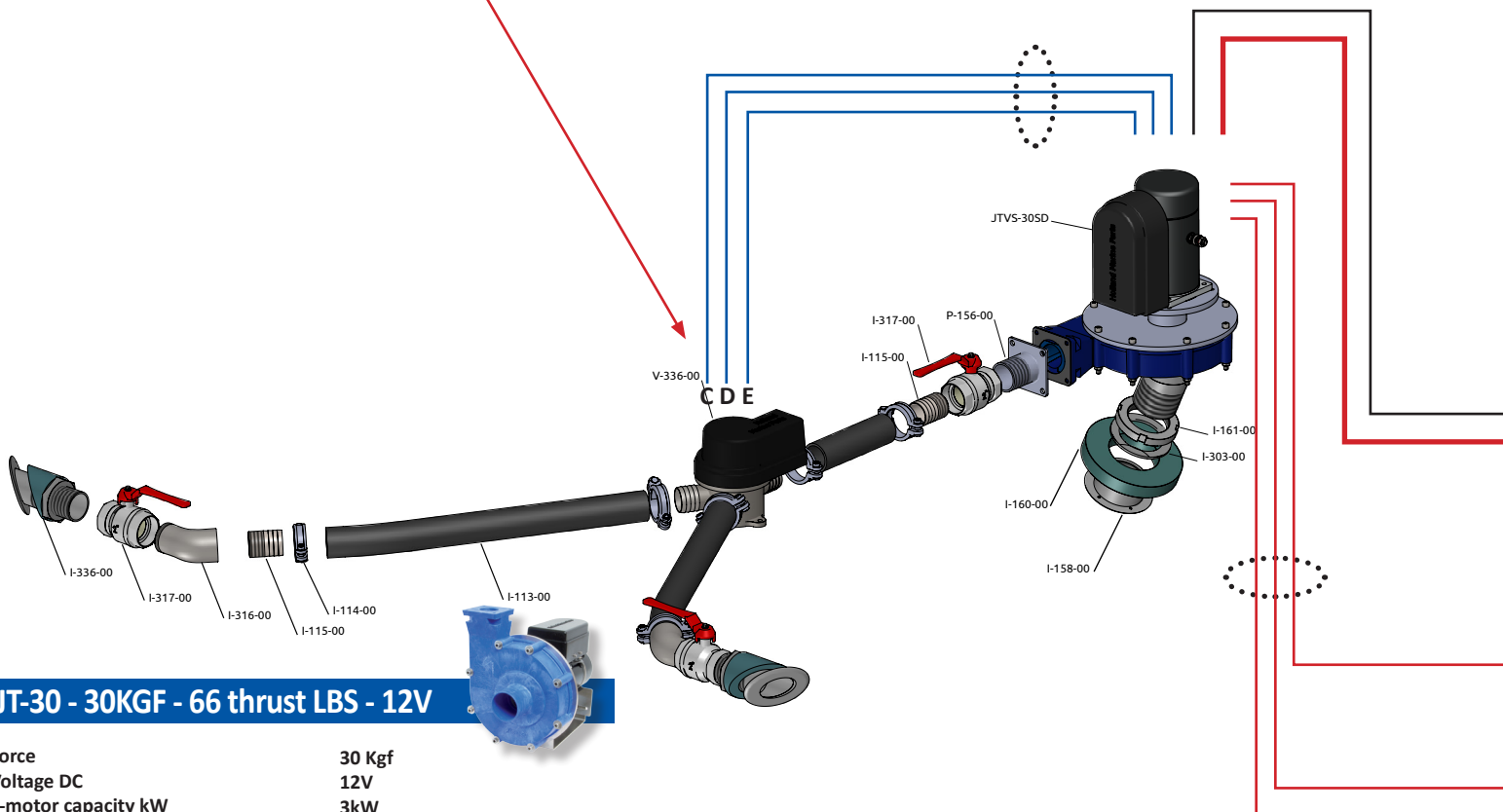
Electrical installation JT-30

connection at 3-way valve



Never run the pump without the presence of water!

This will damage the mechanical seal.



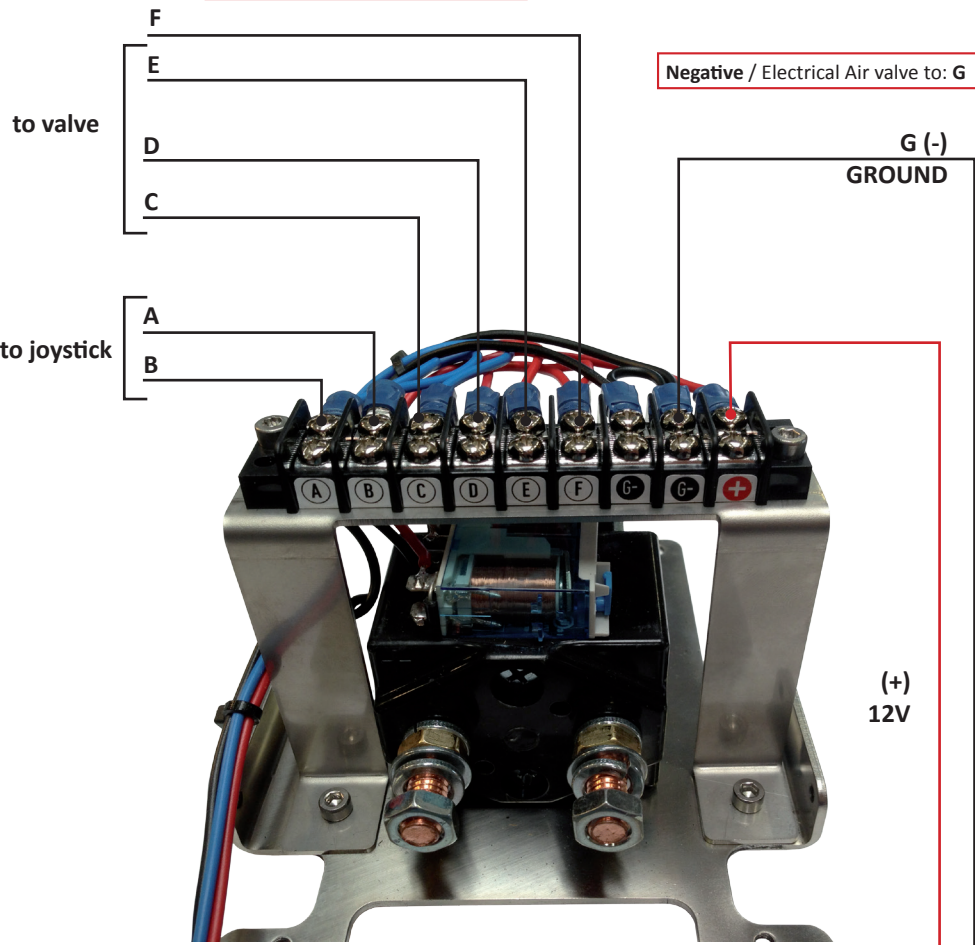
JT-30 - 30KGF - 66 thrust LBS - 12V

Force	30 Kgf
Voltage DC	12V
E-motor capacity kW	3kW
Current	480A
Master fuse	500A
Recommended battery capacity 12V	1 x Optima Yellow Top 75Ah
Battery cable +/-	1m -> 50mm ² / 3ft -> 1/0 AWG
Pressure hose diameter	2" / 51 mm
Weight pump	29kg/64LB

G: Connect with battery minus

Positive / Electrical Air valve to: F

Negative / Electrical Air valve to: G



Battery Cable connection to Pump unit:

- Battery Positive to free contact at contactor relay
- Connect **A** cable from pump unit to battery negative

Contactor support on pump unit

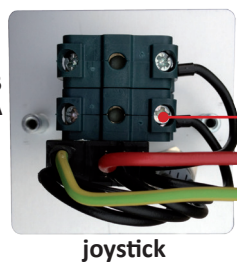
Fuse 425A

Note:
Battery cable length max. 1m/3.3ft



Note:
Use a battery with high cold cranking amps.

Switch **A** and **B** wires at contactor support if joystick control needs to be reversed.



Fuse 15A

+ Ignition
- Ground

12V

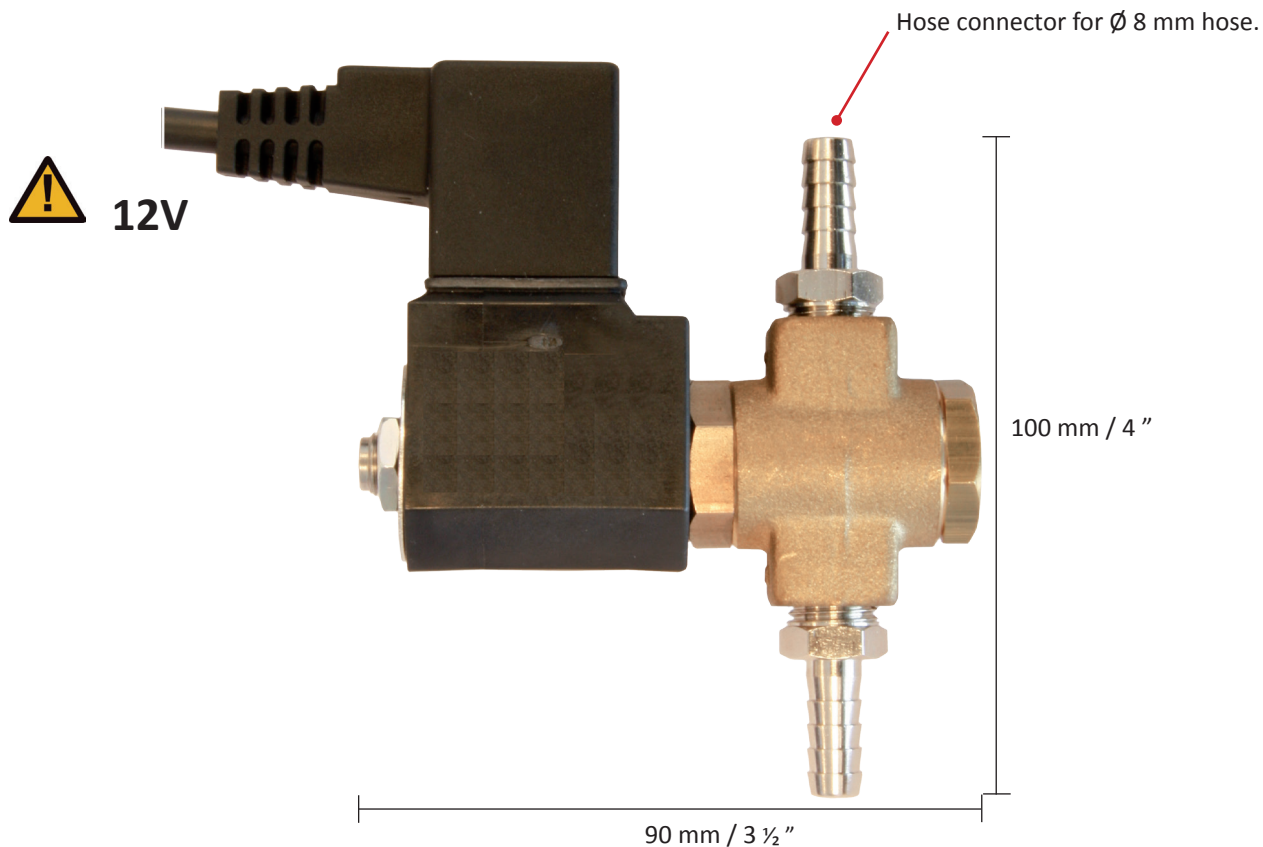
Note:
Do not use the dedicated Jet Thruster battery to power the 12V control circuit.

Installing the electrical air valve

Operation:

The pump head of the Jet Thruster system must be installed under the water line in order to prime this centrifugal pump. In some limited cases of fast moving boats a vacuum can be produced when the nozzles rise above the waterline and the intake remains in the water. The suction under the fast moving hull will retract the present water from the Jet Thruster system. When the boat slows down or stops the water will automatically flow into the system due to the fact that the pump head and nozzles are under the waterline.

However, it is possible that an air pocket can be trapped in the pump head preventing the pump from self priming. In this unique situation an Electrical Air valve can be installed, this will release the present air from the pump head allowing the pump to rapidly prime. Giving the operator immediate thrust pressure for maneuvering.

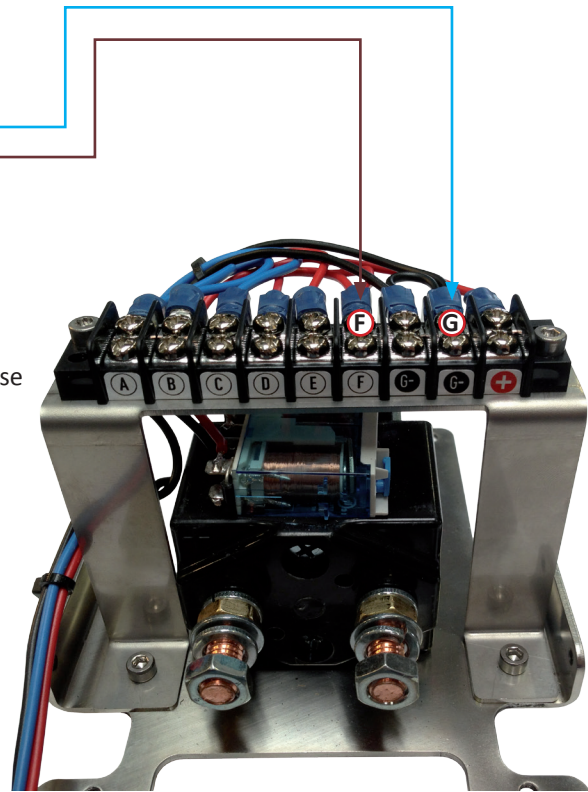
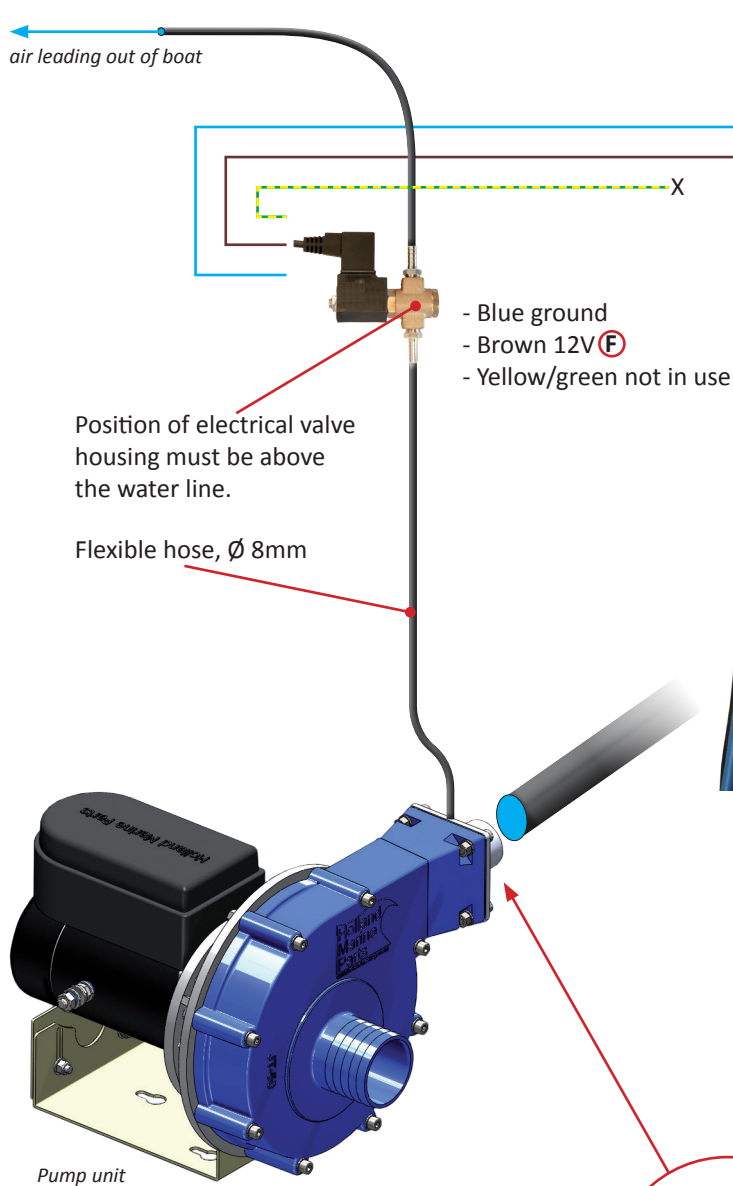


How to install the Electrical Air Valve:

- A. Remove the winterization plug located on the pump outlet fitting. **(A)**
- B. Install the provided $\frac{1}{8}$ hose connector.
- C. Make sure to install the Electrical Air Valve housing above the waterline!**
- D. Apply the supplied flexible hose and hose clamps between the pump unit and Electrical Air Valve.
- E. Apply the supplied flexible hose from the Air valve to outside of the boat. In case of a technical failure, water that comes from the pump unit when the Jet Thruster system is engaged, will be pumped outside the boat.

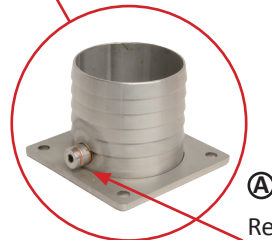
Follow diagram complete the electrical installation.

Example of a contactor support on pump unit



Picture of contactor support is example.

Select applied contactor support and position of **F (+12V)** and **G (Ground)** according to the pump unit the installation is applied for. See appendix A1 - F1



A
Remove plug from pump outlet to connect flexible hose.

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Holland Marine Parts
Heijningen
Report

Inspection and Maintenance Jet Thrusters

Materials Selection and Corrosion

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		01	26 juni 2014
Ing. Jan J.M. Heselmans	Esther de Valck	00	20 mei 2014

Content

1	Scope of Work	2
2	Materials Selection and Possible Corrosion Mechanism	2
	2.1 Nozzles	2
	2.2 Valves	2
	2.3 Galvanic corrosion Nozzles/Valves	2
	2.4 Pumpunit2	
3	Maintenance and Inspection	3
	3.1 Nozzles	3
	3.2 Valves/Nozzles Threading	3
	3.3 Pump	3
4	Frequently Asked Questions (faq)	3

Scope of Work

Holland Marine Parts Jet Thrusters have been made of corrosion resistant alloys. However, under extreme conditions corrosion problems might occur. For this reasons it's important that a regular inspection is done.

This report will describe which type of corrosion might occur on which locations. And how to inspect on corrosion.

Materials Selection and Possible Corrosion Mechanism

1.1 Nozzles

The nozzles have been made of cast alloy 1.4408. This is a 316 type stainless steel (19 Cr, 10 Ni and 2 Mo). In seawater and brackish water, 1.4408 may corrode by pitting corrosion and crevice corrosion on the threading with the valves. The pitting corrosion might be accelerated by MIC (Microbiological Influenced Corrosion). MIC mainly occurs at higher temperatures of the water, during summer time or in (sub)tropical waters.

1.2 Valves

The valves have been made of brass alloy Cu58Zn38 and have been coated with a Chromium layer of 2-3 μm thickness. Such valves are suitable for ships in marine conditions (seawater condition). Corrosion might occur if the chromium layer has been damaged or has been worn out.

1.3 Galvanic corrosion Nozzles/Valves

Galvanic corrosion between nozzles and valves is unlikely. Both have the same rest potential (same nobleness). Both contain a surface layer of chromium oxides.

1.4 Pump unit

The pump house has been made of a plastic with a stainless steel back sheet. The impeller (JT70 and JT90) has been made of a bronze cast alloy. In well conducting waters, such as seawater, galvanic corrosion of the pump impeller caused by the stainless steel back sheet is possible. (JT30 and JT50 have non corrosive composite impeller)

Maintenance and Inspection

All parts have been made of corrosion resistant materials. However under extreme conditions corrosion is possible. For that reason we advise an inspection interval of 6 month.

1.5 Nozzles

Inspect the nozzles once every six month on corrosion and fouling from the outside of the vessel. If corrosion or fouling can be seen, remove it with a brush and inspect the surface (and welds if applicable) again on pitting corrosion.

1.6 Valves/Nozzles Threading

Inspect once every six month the threading of the couplings on leakages. If leakages are found, possibly crevice corrosion of the threading occurs. Loose the coupling and inspect it on corrosion of the threading's internal and external.

1.7 Pump

During longer stand still periods it is recommended to store the pump internals in air, or in fresh water. If seawater or brackish water is in the pump for a longer time (month), we recommend to inspect the impeller on corrosion problems.

Frequently Asked Questions (faq)

Q: For the nozzles: Can a coating help to avoid corrosion?

A: Yes, a coating can help on the external part. Internally the nozzles cannot be coated as the water flow is too high. A coating will loosen from the stainless steel surface.

Q: How should stainless steel be coated?

A: Stainless steel can be coated, but the adhesion of the coating always will be less good compared to carbon steel. The coating procedure is similar to carbon steel:

1. Proper surface preparation by grid blasting. High roughness is of great importance.
2. The surface must be completely clean, particularly free of chlorides (salt).
3. Use several layers of (primer) epoxy, according to marine coating specs.

Q: What protection will polishing the stainless steel surface guarantee?

A: Polishing always is good for two reasons:

1. Corrosion resistance will improve.
2. Biofouling and MIC will be reduced.

Q: Can biofouling promote corrosion, such as crevice corrosion or MIC?

A: Yes, biofouling preferably must be removed.

Q: How can pitting corrosion be repaired?

A: If the pits are not deep, they can be grinded out smoothly succeeded by polishing the surface. If the pits are deep, they need to be welded and the surface must be grinded again.

Q: How can crevice corrosion be repaired?

A: If the corrosion is not deep, the can be grinded out smoothly succeeded by polishing the surface. If the pits are deep, they need to be welded and the surface must be grinded again.

Q: How can MIC be stopped?

A: MIC is a biofilm problem. The biofilm is bio fouling, or a slimy layer of micro organism. MIC can be stopped by removing the fouling and biofilm. I.e. by cleaning the surface.

Q: Can 'free iron', or 'iron oxide' cause corrosion to stainless steel?

A: Yes, this should be avoided. For example, don't grind steel near stainless steels.

Q: How can a contaminated or activated stainless steel surface be repaired?

A: This can be done with a 'pickling and passivation' paste. Be careful, this are toxic acids (containing Hydrogen Fluoride). Read manual carefully, take safety precautions. Be careful with acids on other materials such as marble. Always rinse all acids out using clean tap water.

Q: Can stainless steel be protected with sacrificial anodes (Zinc or Aluminium)?

A: Yes, cathodic protection will stop the corrosion of stainless steel. If the nozzles are contacted with the steel hull, the anodes on the hull will protect the nozzles (if anodes are present). It will not be possible to attach anodes to the nozzles if they are insulated in a GRP (polyester and other) hull.

Q: Can galvanic corrosion cause corrosion to the stainless steel nozzles?

A: Normally not because stainless steel is high (noble) in the galvanic range. If stainless steel is connected to carbon steel, the ignoble carbon steel will corrode, and the noble stainless steel will be cathodically protected by the steel.

Q: Can stray currents cause corrosion to the nozzles?

A: Only if the stray current runs through the water from one electrode to the other one (the nozzle). An electrical circuit must be drawn in order to explain this. Stray currents causing corrosion are rare.

Project info

Owner:

Adress:

Boat type:

Build by:

CIN code:

Date of installation:

Date of system activation:

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Date OK:

Name :

Signature / stamp:

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HOLLAND MARINE PARTS

WE KEEP YOU MOVING!

GENERAL COMMERCIAL TERMS AND CONDITIONS

General Commercial Terms and Conditions of

Holland Marine Parts B.V.

Donker Duyvisweg 297

3316 BL Dordrecht

The Netherlands

I Applicability of the Present General Terms and Conditions

1. The present General Terms and Conditions shall apply to all offers and to all agreements concerning engines, machines and components. Unless the opposite appears explicitly, the present General Terms and Conditions shall equally apply to the assembly, disassembly, repair and other activities. The General Terms and Conditions of the customer shall not be binding on us, unless we have agreed to the contrary in writing.
2. The stipulations of the present General Terms and Conditions shall always remain in force, unless otherwise agreed upon in writing.
3. Each and every assignment or offer given orally or in writing by staff in the service of the contracting party, be they authorised to do so or not, on behalf of the contracting party, shall be binding on the contracting party. If the contracting party is not bound, then the party that concluded the agreement is deemed to be the contracting party.
4. In the present General Terms and Conditions "us" and "we" shall always refer to Holland Marine Parts B.V., whereas contracting party shall refer to our other party.
5. The nullity or annulment of any clause in the present General Terms and Conditions shall not prejudice the validity of the other clauses.

II Offer and Confirmation of the Order

1. Our offers shall be without obligation in every respect, unless explicitly stated otherwise. We shall only be bound, having due regard to the stipulations hereinafter in the present General Terms and Conditions, when we have confirmed the order in writing. The same shall apply to potential additions and/or changes to the order.
2. The text of our order confirmation shall determine the contents of the order. Arrangements or agreements with employees shall not be binding on us, to the extent they have not been confirmed in writing by us.
3. All technical data can only be deemed to have been given to the contracting party as an approximation.
4. All drawings, illustrations, dimensions and weights given, shall remain our property under explicit reservation of copyrights and patent rights. Subject to our consent in writing, the contracting party shall not be allowed to copy said documents, to make them available for inspection to any third party or to make them otherwise available to any such third party. The contracting party shall hold us harmless against claims of third parties, including all extra judicial and judicial costs, that we have to make or pay to claimants, if the contracting party violates the provisions of this subsection.

III. Prices and Packaging

1. Unless otherwise agreed upon in writing, prices shall be based on delivery at our enterprise in Dordrecht (ex Works).
2. The prices given, shall be exclusive of value added tax, unless stated otherwise.
3. If so required, packaging shall be charged at cost price and shall not be taken back. The decision as to the necessity to use packaging or not shall be made at our sole discretion.
4. If there are any changes in price, currency fluctuations, devaluation or revaluation of the Euro compared to any foreign currency or any changes to salaries, import duties or other taxes, social contributions or government levies, freight, etc., even if these changes occur due to circumstances that could already have been foreseen when the offer was made or accepted in writing, we shall be entitled to modify the sales prices and the costs for assembly, disassembly, repair and other costs, accordingly.

IV Delivery and Delivery Period

1. Goods shall be delivered at our enterprise in Dordrecht (ex Works). Delivery periods shall be determined approximately.
2. The delivery period shall commence when we have confirmed the order in writing, when all formalities required to start the activities have been complied with, when all necessary documents are in our possession and when the contracting party has provided us with all the data concerning the order. In the event of instalments, the delivery period shall only commence following receipt of the first instalment.
3. The delivery period shall be determined on the assumption that the necessary materials in the broadest sense of the word, be delivered to us in due time.
4. Exceeding the delivery period can never lead to any claim to damages, not even following a notice of default.
5. With respect to the delivery period, the goods shall be deemed to have been delivered when they are ready at our enterprise in Dordrecht and/or at the location referred to in our order confirmation and/or are made available at another location to be specified, all this after we have informed the contracting party thereof in writing. If we have accepted to assemble the goods, the goods shall be deemed to have been delivered in respect of the delivery period, when they have been made available at the place of delivery agreed upon.
6. From the moment the goods are deemed to have been delivered by virtue of section 5 of the present article, the risk of all direct and indirect damage to or in connection with said goods, sustained by the contracting party, shall be for the latter's account.

V Transport

1. From the moment they are shipped by or to us, all goods and materials shall be transported for the risk of the contracting party. Even in the case delivery carriage paid has been agreed upon, the contracting party shall be liable for all damage (such as damage caused by transport, fire and water, theft or embezzlement) to the goods during transport. The contracting party shall be under the obligation to take out an insurance to cover said risk, with the exclusion of recourse by the insurer(s) against us, our employees and/or supporting personnel.
2. The contracting party shall have to verify the condition the goods are in upon their arrival.
3. Without prejudice to the above, we shall not be liable for any damage whatsoever caused to the goods or not in connection with the transport.

VI Assembly

1. Unless otherwise agreed upon in writing, the assembly of the goods shall not be included in the delivery.
2. If an order to assemble the goods is given without a complete listing in writing of the activities the contracting party wants us to carry out, and if such activities are equally not referred to in the order confirmation, the agreement shall be deemed to include the activities we deem necessary.
3. The staff charged by us with the assembly, shall limit themselves to the assembly of the material supplied by us and/or the material that was included in the order. We shall not be responsible for assembly or repair work beyond the scope of the agreement or for any work done by third parties to materials, machines and/or machine components delivered by us.
4. When, through no fault of ours, the assembly work cannot be arranged for or done without interruption or is delayed in any other way, we shall be entitled to charge on the corresponding additional costs to the contracting party at the normal rate.
5. All potentially extra costs shall be for the account of the contracting party, more in particular:
 - a travel and accommodation expenses and cost of living of the technician(s);
 - b costs arising due to the fact that the assembly work cannot be done during usual day hours.
6. Upon completion of the assembly and when the goods have been put into operation, the assembly shall be deemed to have been carried out properly.
7. If the contracting party wishes to call on our services after assembly of the goods and after they have been put into operation or afterwards wishes to call in our assistance to inspect the goods sold / delivered, we shall be entitled to a reimbursement of expenses at the usual rate, to be increased by travel and accommodation expenses.

VII Liability

1. Neither we, nor our employees and/or our supporting personnel, shall be liable for any damage whatsoever, be it direct or indirect, regarding work done in the broadest sense of the word or regarding goods delivered pursuant to the agreements to which the present General Terms and Conditions apply.
2. Without prejudice to the stipulations of section 1, we shall only be liable for damage if the contracting party proves that the damage is due to gross negligence or intent on the part of the directors of Holland Marine Parts B.V.. We shall not indemnify the contracting party against gross negligence or intent on the part of our personnel or our supporting personnel, neither shall we indemnify the contracting party vis à vis any third party. Damage that has not been established by an expert appointed by us, shall never be considered to be damage. Under no circumstances shall we be liable for any kind of indirect damage whatsoever, no matter by whom such damage is sustained, including in particular consequential loss and/or the loss of time.
3. The contracting party shall be liable for all damage sustained by us or by our subordinates or supporting personnel, caused through the fault of the contracting party, including but not limited to, damage resulting from defects to or the nature of the goods delivered or made available by the contracting party, or otherwise due to circumstances which are reasonably for the risk of the contracting party.
4. The contracting party shall be under the obligation to state special characteristics or characteristics that pose a risk, of material made available by the contracting party, without such statement releasing the contracting party from the liability resulting from section 3 and the contracting party shall be under the obligation to indemnify us at its expense against all claims or titles of third parties and the consequences thereof, including measures to seize property before judgement.

5. The contracting party shall have to forthwith inform us of shortcomings or defects to repairs or deliveries that have been discovered, at any rate not later than three working days from the day the shortcoming or defect was discovered, and to do all that is necessary to limit the damage, all this under penalty of the loss of any right to damages or warranty..
6. If the contracting party wants to carry out an expert's appraisal (have such carried out), it shall have to inform us thereof in due time in order to enable the latter to be present, together with the latter's own experts or not, all this under penalty of the loss of any right to damages or warranty.
7. Notwithstanding any other provision, our liability shall never exceed a maximum of (25.000) twenty five thousand Euros.

VIII Warranties

1. Having due regard to the restrictions to be listed hereinafter, we shall undertake to repair or replace the new engines or machines we have delivered, which show a defect within a period of 24 months from the day of delivery as referred to in article IV, provided the defect is forthwith reported to us by telephone or in writing and provided that the defect is caused solely by faulty material or a faulty construction. The warranty shall not apply if the goods malfunction due to other causes such as normal wear and tear, unsuited kinds of fuel, lubricants, sealing and insulation material, measuring equipment, overloading, poor foundations, aggressive cooling water, faulty air supply, faulty piping, incorrect conduits, improper handling or accidents as well as in those cases in which the cause is not evident beyond doubt. The obligations under warranty do not comprise the burden to carry costs of cramage, electricity, docking, diving, dismounting, or travel and boarding costs.
2. With respect to the assembly, disassembly, repair and other work done by us, a warranty shall only be given for the reliability of the execution of the work done, unless explicitly otherwise agreed upon.
3. The obligations under the warranty shall lapse if the contracting party has made any changes or has done any repair work to the goods delivered on its own initiative during the term of warranty, or has had such done by a third party, or if, in our opinion, the contracting party has failed to properly service the goods delivered.
4. None of the indirect or direct damage, including consequential damage, sustained due to the malfunctioning of the goods delivered, shall be compensated.
5. We shall not be held to fulfil any obligation under the warranty if the contracting party fails to comply in a proper or timely manner with its obligation to pay or with any other obligation that might result from any agreement the contracting party has concluded with us.
6. No warranty shall be given for used engines, machines and components, unless explicitly agreed upon otherwise.
7. The warranty given on engines, machines and components purchased from third parties, shall not exceed the warranty given to us by our supplier(s).
8. The fact that obligations under the warranty may still exist on our part, shall not entitle the contracting party to postpone any payment, no matter what such payment is intended to cover.
9. Goods in respect of which warranty claims are lodged have to be shipped carriage paid. Components that are replaced shall become our property.
10. The warranty period in respect of goods which have been repaired or replaced under the warranty shall be three (3) months from the date of repair or replacement, or until the expiration date of the original warranty period of those goods.
11. All stipulations set out hereinabove and to be set out hereinafter, shall apply to the activities to be carried out by us under the present warranty clause. The warranty as set forth in this clause is the only warranty for the goods or services supplied, and replaces expressly any other warranty or claim, express or implied, whether in law or in contract. The contracting party waives all other further-reaching rights, whether from law or from contract.

IX Conditions of Payment

1. Payment of engines, machines, components, assembly, repairs and other activities shall have to be made in cash upon delivery, completion respectively, unless otherwise agreed upon in writing.
2. Delivery, completion respectively, as referred to in the first section of the present article, shall be understood to be:
 - a. with respect to engines and machines, the moment they are made available in our enterprise in Dordrecht and/or at the location stated in the order confirmation, or at another storage location of our choice to be specified;
 - b. with respect to components, the moment they leave our warehouses, or are kept ready in them for shipment respectively;
 - c. with respect to assembly and repairs, the moment the work is finished in our opinion;
 - d. expenses we advance that are for the account of the contracting party, shall be settled in conformity with the stipulations of section 1 of the present article.
3. We shall reserve the right to demand interim payments and/or, in our opinion, valid securities for the delivery of engines and/or machines as well as for assembly work, repairs and other services. The refusal on the part of the contracting party to furnish the security required, shall entitle us to dissolve the agreement by means of a written statement, without prejudice to our rights to compensation of expenses and loss of profits as well as of all other damage.
4. All payments shall have to be made without any deduction or set-off, either at our offices in Dordrecht, or by transfer into a bank account to be specified by us, unless explicitly otherwise agreed upon.
5. Complaints (each and every claim further to any alleged delivery deviating from the contract) concerning the execution of work or deliveries as well as invoices, shall have to be filed in writing by registered letter under penalty of nullity of the complaint concerned, within 8 days from completion or delivery of the work or the good concerned or from the day the invoices were sent. Complaints shall not suspend the contracting party's obligation(s) to pay.

6. If the contracting party is in default with the payment, it shall be deemed to be in default by operation of law and we shall have the right without any notice of default, to charge an interest on the entire amount due still outstanding, equalling the statutory commercial interest increased by 3% on an annual basis commencing on the date the payment concerned becomes due and payable, or, in the case of instalments, commencing on the day the term of the instalment concerned expires, and furthermore to recover all collection costs, both the judicial and extrajudicial costs, from the contracting party, all this without prejudice to the other rights vested in us. The extrajudicial collection costs shall amount to 15% of the principal with a minimum of EURO 250.-.

7. All of the delivered goods shall remain our property until they have been paid in full. As long as payment in full has not yet been made, the contracting party shall not be entitled without our consent in writing to that effect, to dispose of the goods in any way whatsoever. In order to be able to exercise our property rights, the contracting party shall be under the obligation if it wishes to establish any mortgage right, right of pledge or any other restricted right to any immovable property, registered good or movable property for which the goods to be delivered by us are intended, to first inform the creditor that the goods delivered are still our property and that a mortgage right, right of pledge or any other restricted right first requires our consent in writing.

X Retention of Title

1. Up to the moment the contracting party has paid our claim concerning the goods delivered and/or the work done in full, the goods delivered, be they processed or not, shall remain our exclusive property for the account and the risk of the contracting party.

2. The contracting party shall not be authorised to give said goods as collateral, to let them or to transfer title to them to any third party.

3. If goods are taken back, we shall reserve the right to claim all damage, loss of profits and interest.

4. The contracting party shall be under the obligation to forthwith notify us of the fact that third parties enforce rights to goods falling under the retention of title pursuant to the present article.

5. If it is shown at any point in time that the contracting party has failed to fulfil any of aforementioned obligations, the contracting party shall owe a penalty to the amount of 15% of the unpaid part of the purchase price or the work done, without prejudice to the right to damages.

XI Dissolution / Cancellation

1. Each and every failure to comply with any obligation on the part of the contracting party, shall entitle us to dissolve the agreement(s) by means of a mere written statement, without prejudice to our right to damages. At our own discretion, we shall always be able to demand compliance with the agreement(s), without prejudice to the right to damages. Failure to comply with any obligation shall also count as a resolutive condition which we can invoke in writing at our own discretion, without prejudice to our right to claim compensation for all damage.

2. The contracting party shall waive all rights to dissolution of the agreement, unless cancellation of the agreement in conformity with the stipulations of section 3 of the present article is agreed upon.

3. The contracting party shall only be able to cancel the agreement if we consent to it. In that event, the contracting party shall owe us a compensation to the amount of 15% of the contracting / purchase price (exclusive of VAT), unless the damage, which shall include the costs and the loss of profits, exceeds 15% of the contracting / purchase price (exclusive of VAT), in which case the compensation shall cover the total amount of damage, interest and costs. In the event the agreement is cancelled, the contracting party cannot lay claim to anything that we have already done and everything that we have already done shall have to be undone at the expense of the contracting party, all this at our discretion.

XII Purchase Conditions

1. If and in so far as we, as a buyer, are bound, the following conditions shall apply instead of the stipulations of III, IV, VI and VIII through X, maintaining the other stipulations:

2. Prices shall be fixed prices and delivery periods shall always be terms to be observed on penalty of forfeiture of rights, unless otherwise stated.

3. In the event of late delivery, the contracting party shall be immediately in default and shall always owe us a penalty to the amount of the purchase price agreed upon exclusive of VAT, without prejudice to the right to damages to the extent the latter exceed said penalty. The penalty and the damages can be settled against any sum we may owe under any agreement whatsoever.

4. The contracting party shall undertake to give the warranty we are held to give our customers.

XIII Disputes

All disputes between us and the contracting party resulting from any agreement, preliminary agreement or any other legal relationship whatsoever, shall be exclusively referred to the judgement of the competent court in Dordrecht, subject to the absolute competence of the subdistrict sector. The court in Dordrecht, division for interim injunction proceedings, shall be exclusively competent for interim injunctions.

XIV Applicable Law

Dutch law exclusively, shall apply to all offers made and agreements concluded on the present General Terms and Conditions and the consequences thereof. The application of the Vienna Sales Convention shall be excluded.



All our products are manufactured according to CE regulations.
We keep the rights to change descriptions, graphs or statements,
which are required for technical development of our Jet Thruster systems.



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