HLS

INSTALLATION MANUAL

HUMPHREE LARGE SYSTEM

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HUMPHREE®

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The contents of this document are subject to revision without notice due to continuous product improvement. Humphree shall have no liability for any inaccuracies or omissions contained in this document or any differences between the product and the document. Deviations from the installation manual will void your warranty.

1. SAFETY INFORMATION

Please read the manual carefully before installing or operating the Humphree Large System (HLS). Pay extra attention to the safety notices listed under section 1.1 Warnings and Important Notices.

1.1 WARNINGS AND IMPORTANT NOTICES

Three types of warning or notification signs are used in this manual. The signs are listed as follows in order of severity:

WARNING!

Information shown with the WARNING! sign can lead to serious personal injuries or death if it is disregarded.

IMPORTANT!

Information shown with the IMPORTANT! sign can lead to system or property malfunctions or damage if it is disregarded.

NOTE!

Notes contain important information regarding the Humphree system.

1.2 INTERCEPTOR SAFETY PRECAUTIONS

WARNING!

Design and fabrication of the transom mounting structure is the responsibility of the installer. The installer must determine an appropriate mounting arrangement capable of safely distributing HLS interceptor loads.

WARNING!

Disconnect electrical power before performing installation, maintenance, or adjustment work.

WARNING!

All welding operations are solely the responsibility of the installer. Improper welding may result in water ingress and vessel damage.

2. ABOUT THIS MANUAL

The purpose of this manual is to provide instructions for the correct installation of the Humphree Large System (HLS).

This manual is available digitally as a PDF file, and can be downloaded in the following ways: Scan the QR code that is displayed on the product packaging and attached documentation. Use the following Humphree URL address: https://humphree.com/downloads

2.1 INTENDED PRODUCT USE

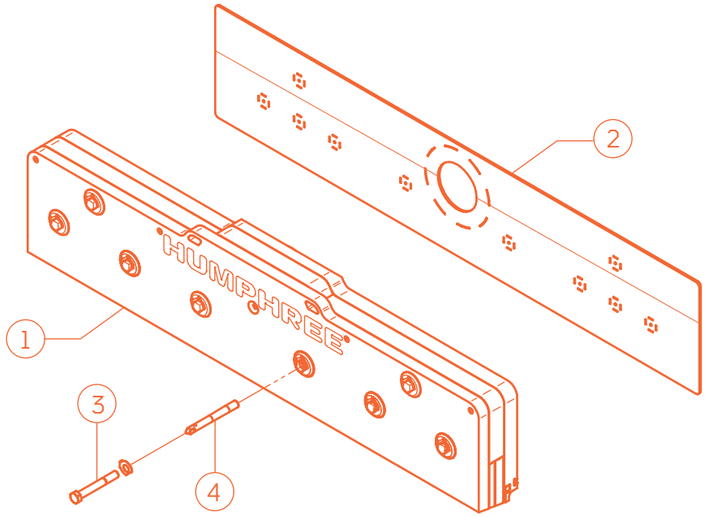
The Humphree Large System (HLS) is a marine stabilization system designed for larger vessels. The system must not be used for any purpose other than its intended use.

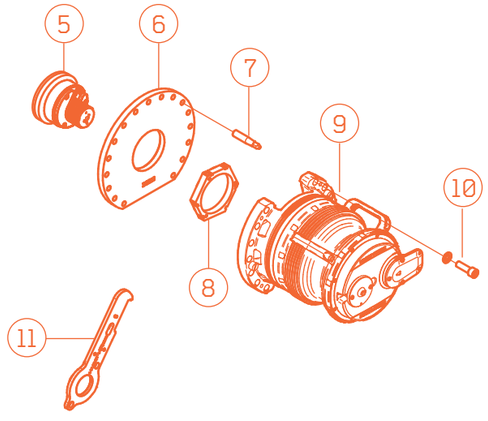
2.2 INTENDED AUDIENCE

This manual is intended for installers of Humphree Large System, including shipbuilders and authorized workshops with qualified personnel. The following installation instructions are intended for professionals only.

3. PRODUCT OVERVIEW

3.1 COMPONENTS





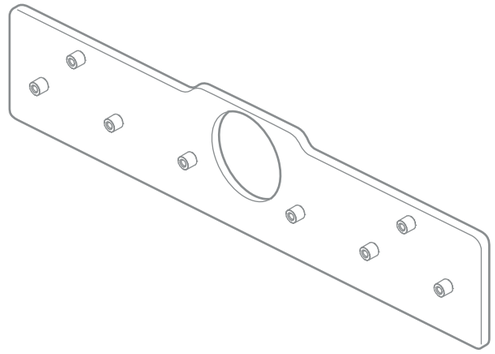
1	HLS Interceptor
2	Installation template
3	8× Interceptor mounting bolts and washers
4	2× Interceptor guide pins
5	Interceptor shaft sleeve
6	Servo weld flange
7	2× Servo guide pins
8	Transom nut
9	Servo unit
10	8× Servo unit mounting bolts and washers
11	2× Humphree wrenches

3. PRODUCT OVERVIEW

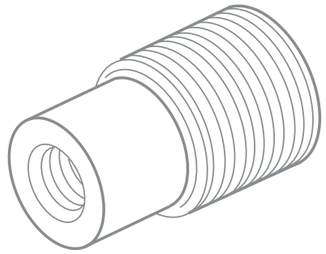
OPTIONAL COMPONENTS

Upon request, Humphree can supply mounting plates with adjustable weldnuts or single adjustable weldnuts (outer thread).

This can help achieve correct installation and is particularly recommended for aluminum hulls.



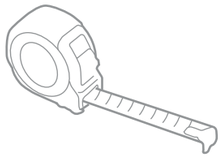
MOUNTING PLATE WITH ADJUSTABLE WELDNUTS



SINGLE ADJUSTABLE WELDNUT

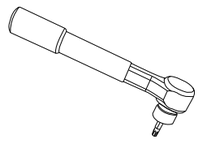
3.2 REQUIRED TOOLS

MEASURING TOOLS



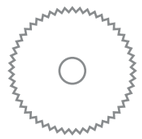
TORQUE WRENCH

With socket set

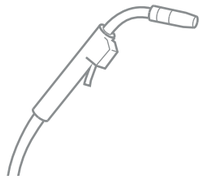


CUTTING TOOL

Ø200 mm
(Hull opening for interceptor shaft)



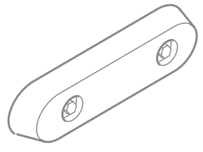
WELDING EQUIPMENT



MASKING TAPE

ANODES

At least 1 kg per interceptor

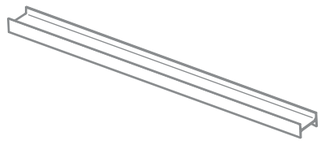


LIFTING DEVICE

HULL MARKING TOOL

RULER OR STRAIGHT EDGE

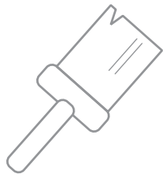
The length of the interceptor



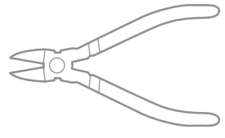
MARINE GREASE

CORROSION PROTECTION COMPOUND

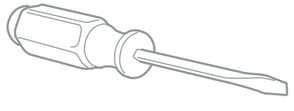
PAINTING EQUIPMENT



A PAIR OF NIPPERS



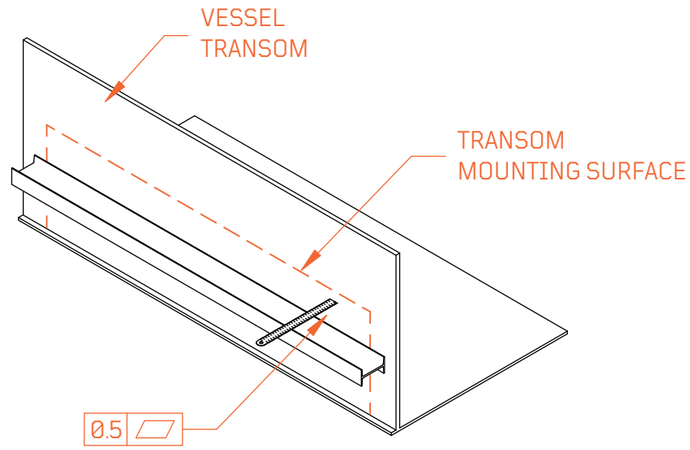
STANDARD HAND TOOLS



4. MOUNTING GUIDELINES

4.1 TRANSOM FLATNESS REQUIREMENT

Verify that the transom mounting surface is flat within ±0.5 mm.

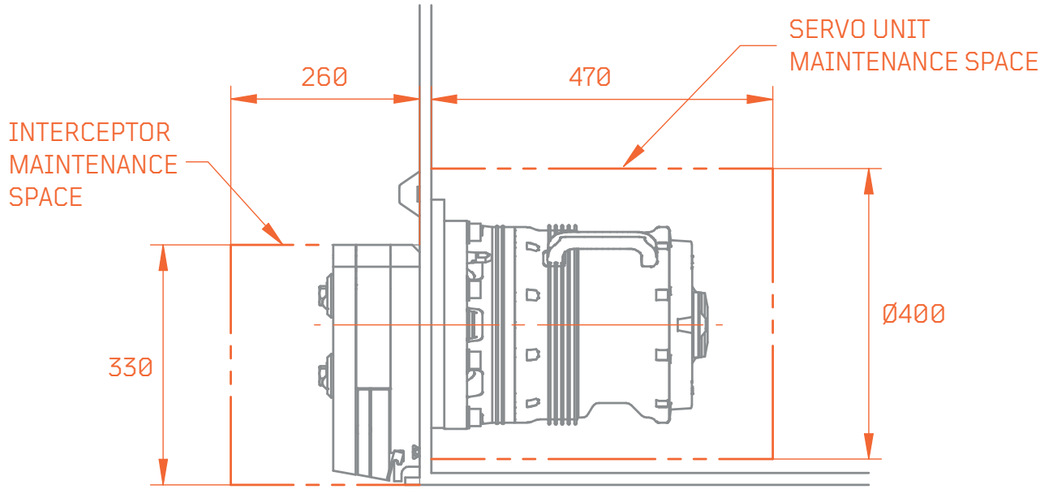


WARNING!

The transom mounting arrangement must not introduce significant force between the interceptor transom plate and the vessel transom.
Bolt force shall be transferred through the weld nuts and interceptor mounting surfaces only.

4.2 MAINTENANCE SPACE REQUIREMENTS

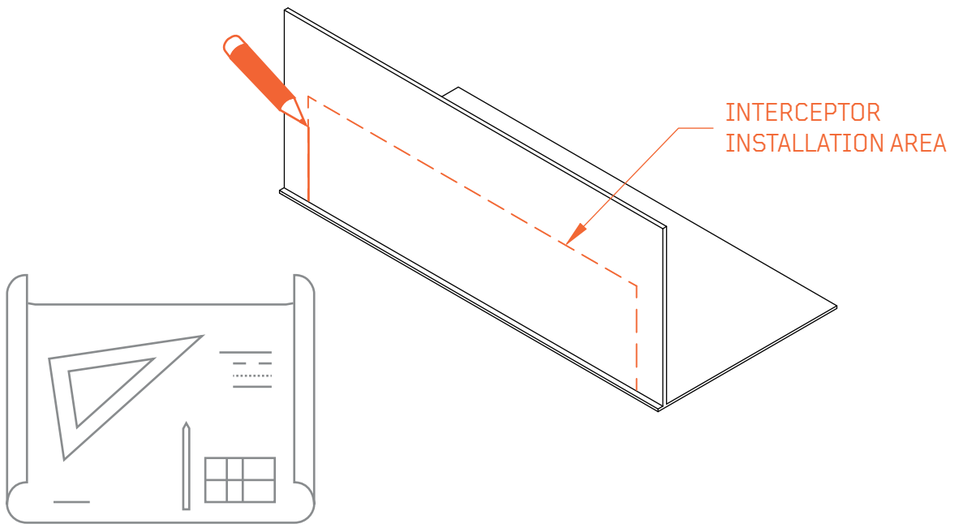
The servo unit must remain accessible after installation. Provide maintenance space according to the drawing below.



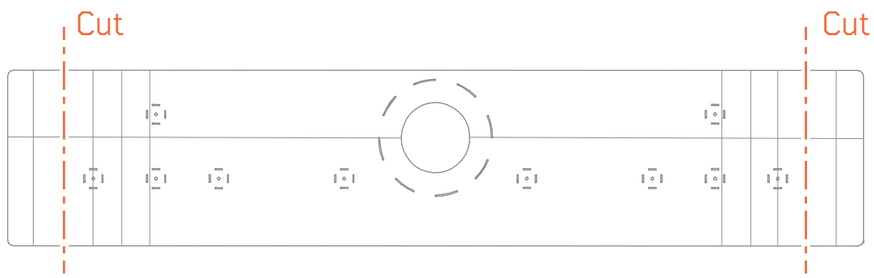
5. PREPARATIONS

5.1 MARK INSTALLATION POSITIONS

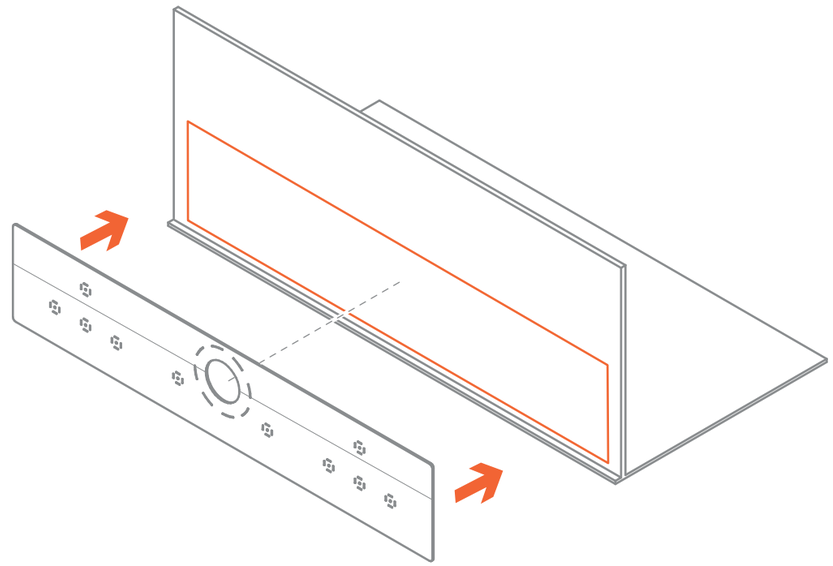
1 **MARK THE INSTALLATION AREA** on the transom according to the transom installation drawing supplied by Humphree.



2 **CUT THE INSTALLATION TEMPLATE** according to the interceptor length. The required length depends on the interceptor model.

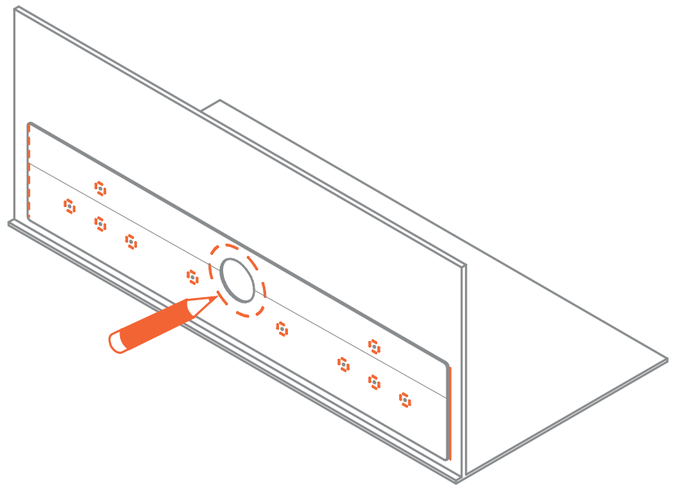


3 **POSITION THE TEMPLATE** on the transom and secure with tape. Verify the position against the transom installation drawing.



4 **MARK THE POSITIONS OF**:

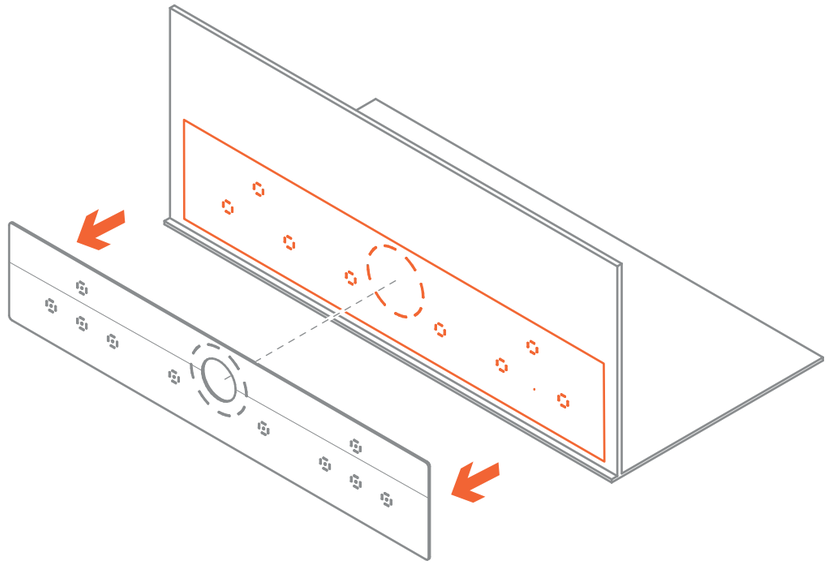
- the Ø200 mm opening
- all weld nuts
- the reference lines on both sides of the template



NOTE!

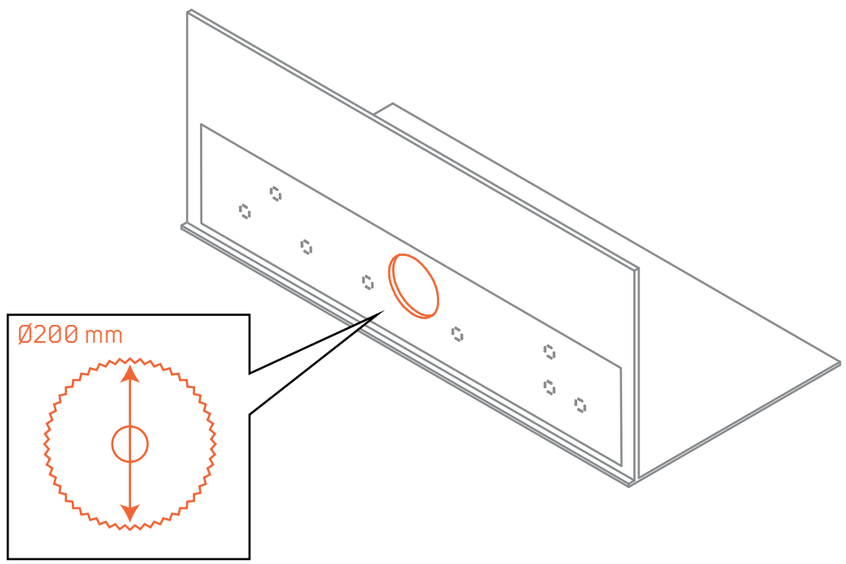
Verify proper spacing between interceptors.

5 **REMOVE** the installation template.



5.2 CUT THE TRANSOM OPENING

6 **CUT OR DRILL** the Ø200 mm opening in the transom.



6. INSTALLATION

6.1 SPOT WELD COMPONENTS

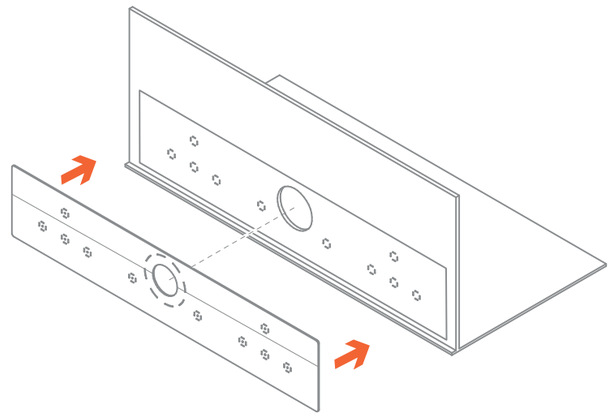
IMPORTANT!

IMPORTANT!

It is the responsibility of the installer to source correct welding method, materials and consumables. See the *HLS installation arrangement drawing* (022565) for further welding details.

The weld nut and the servo weld flange materials are:
For steel vessels: EN 1.4462
For aluminum vessels: EN AW 5083 H111

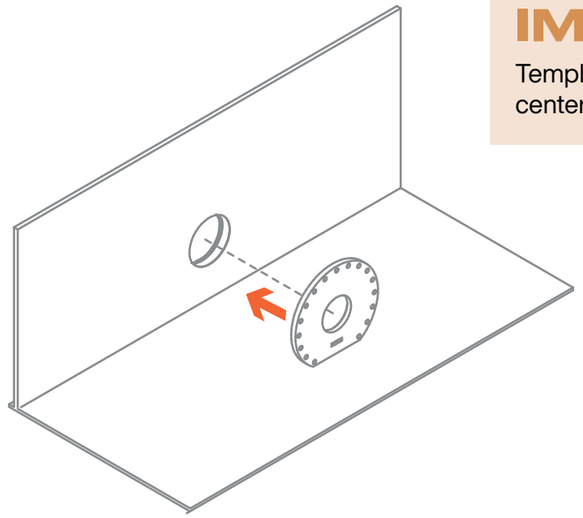
1 **REINSTALL** the installation template.



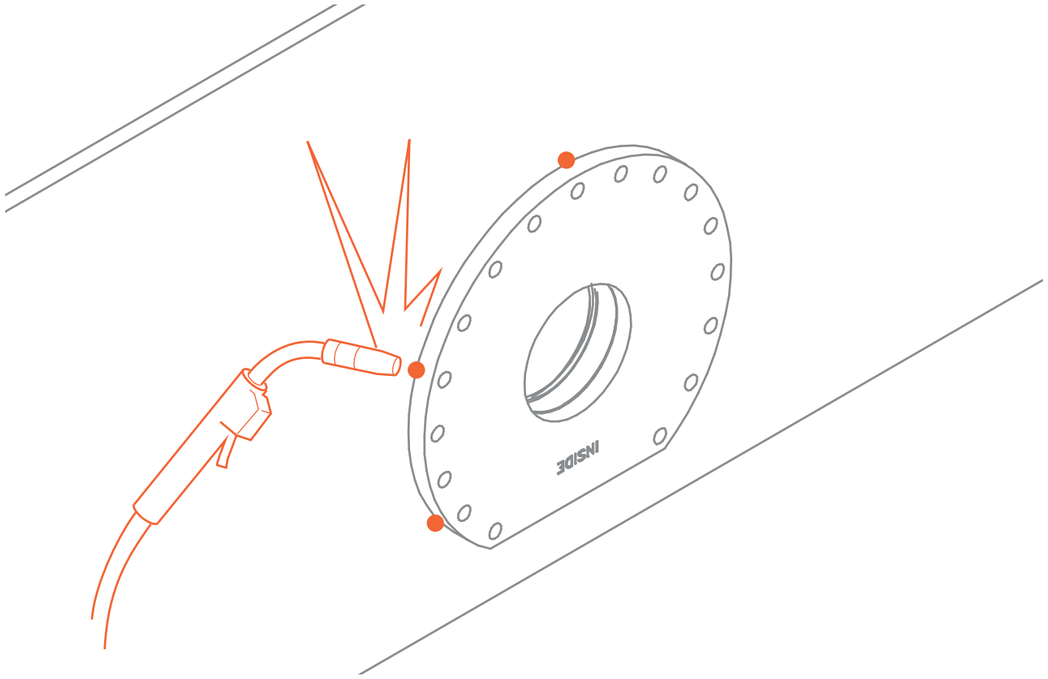
2 **CENTRE THE SERVO WELD FLANGE** within the Ø200 mm opening. The marking “INSIDE“ should face the inside of the vessel.

IMPORTANT!

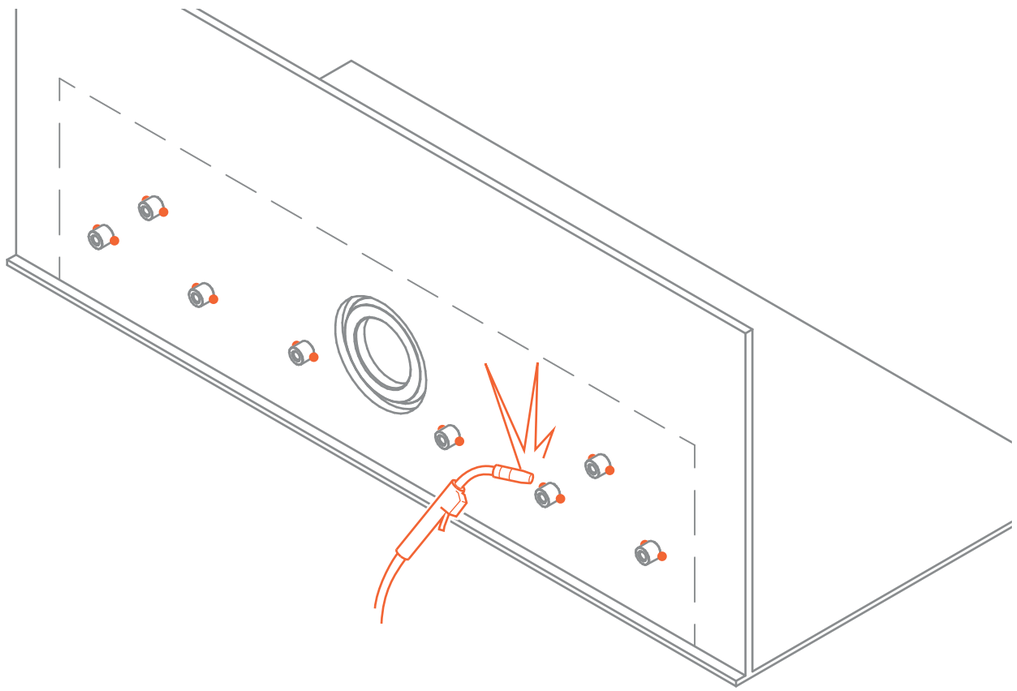
Template center and servo weld flange center must align within ±0.5 mm.



3 **SPOT WELD** the servo weld flange from the inside of the vessel.

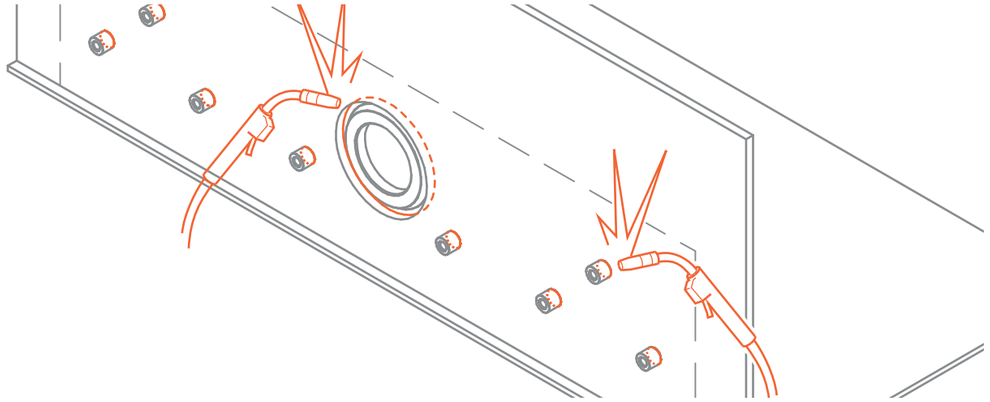


4 **SPOT WELD** the weld nuts in the marked positions after removing the template.



6.2 COMPLETE WELDING

1 **CONTINUE WELDING** until the weld is continuous around all weld nuts and the outside of the servo weld flange.



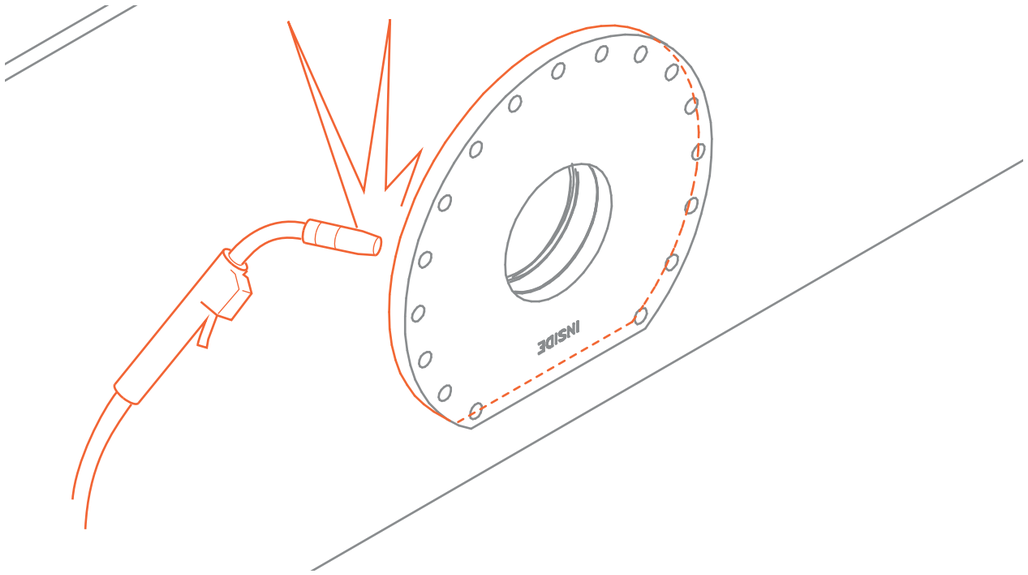
WARNING!

A continuous weld is required to ensure watertightness and corrosion protection.

IMPORTANT!

Use a welding technique (e.g. backstep) that is deforming the interceptor mounting surfaces as little as possible,

2 **CONTINUE WELDING** until the weld is continuous around the servo weld flange from inside the vessel.



6.3 SURFACE PREPARATION

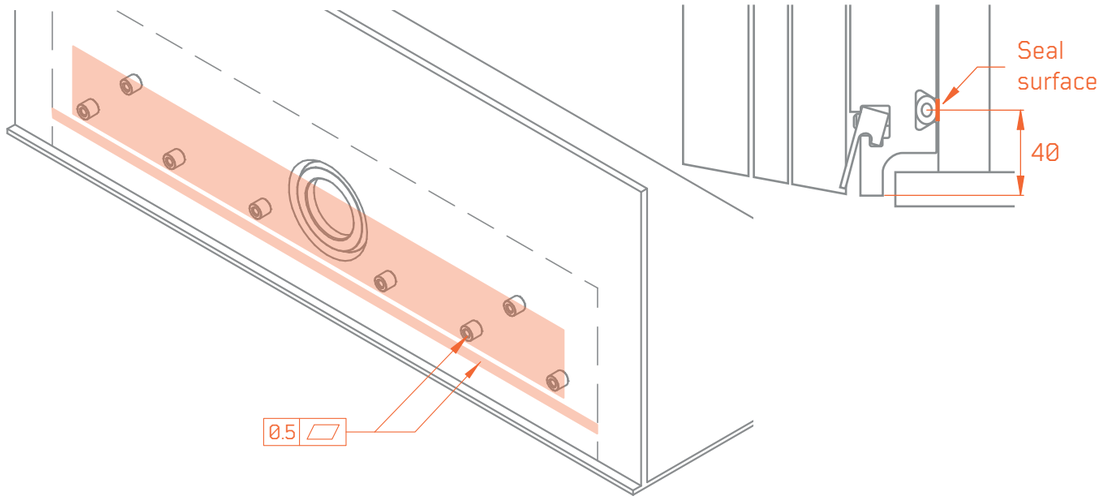
IMPORTANT!

IMPORTANT!

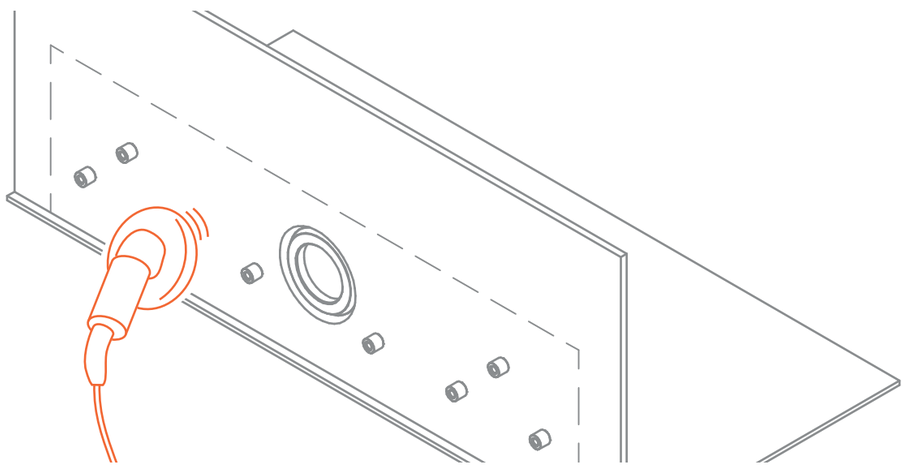
The installer is responsible for ensuring that the transom mounting surface does not introduce significant force between the HLS transom plate and the vessel transom or doubling plate.

The HLS transom plate must remain free from installation-induced mechanical loads.. The mounting design shall ensure that bolt loads are transferred only between the HLS weld nuts and the interceptor mounting surface.

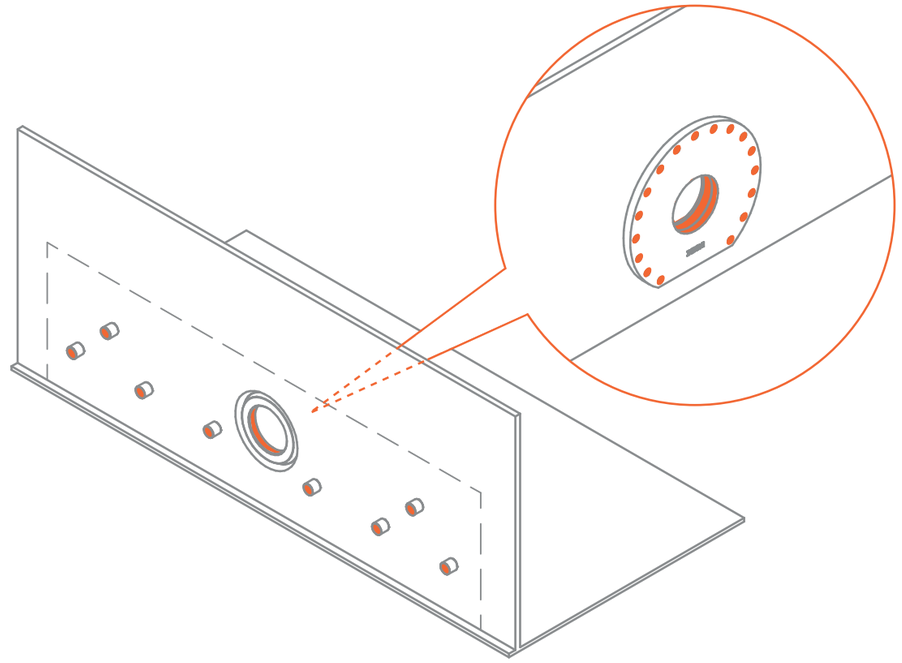
1 **VERIFY** that all weld nut mating surfaces are within ±0.5 mm relative to each other. Verify that the seal surface under the weld nuts is flat within ±0.5 mm.



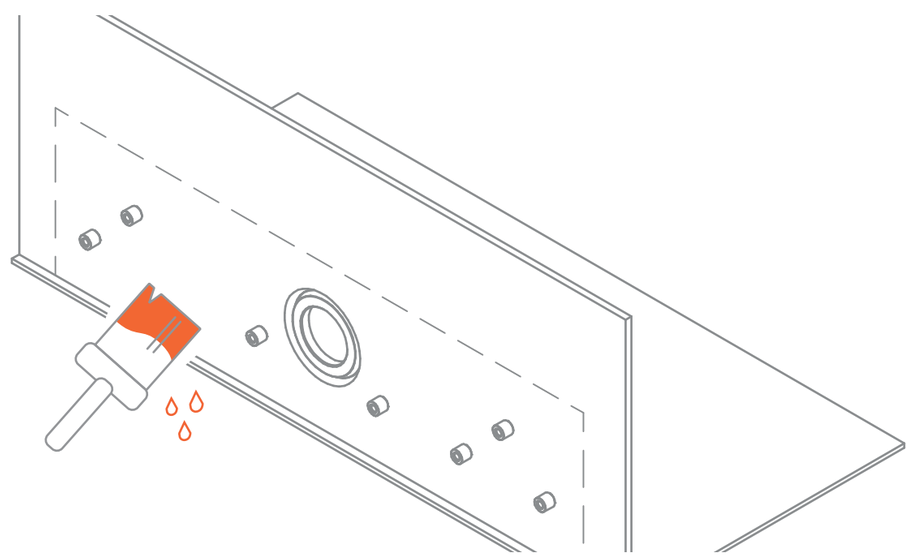
2 **GRIND MOUNTING SURFACES SMOOTH** and remove any weld splatter from the servo weld flange and the weld nuts.



4 **MASK** all threads, contact surfaces and sealing surfaces marked in orange below.



5 **PAINT** according to vessel paint specification.



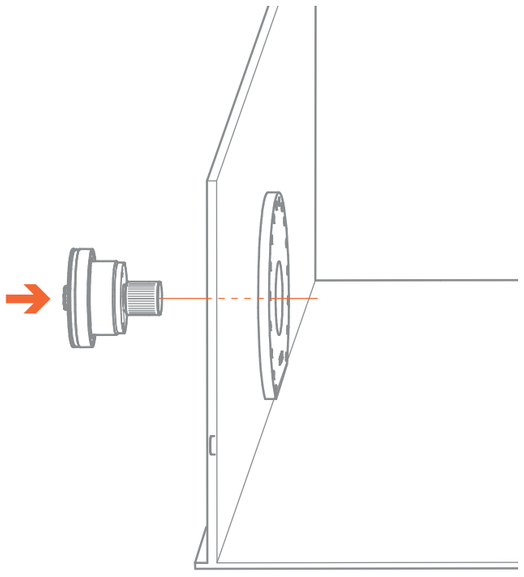
IMPORTANT!

IMPORTANT!

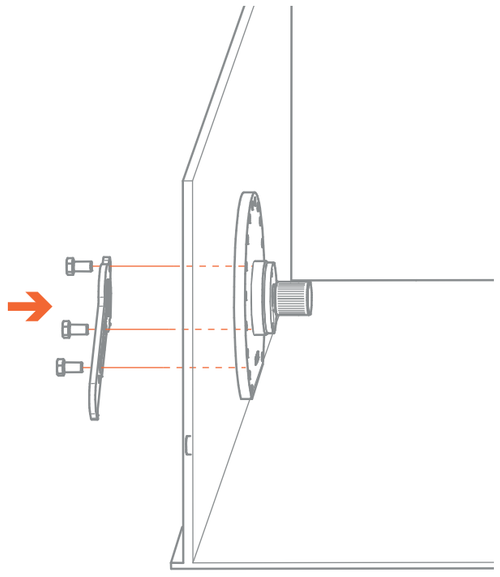
The sealing surface of the servo weld flange must remain smooth and undamaged.

6.4 INSTALL TRANSOM SHAFT ASSEMBLY

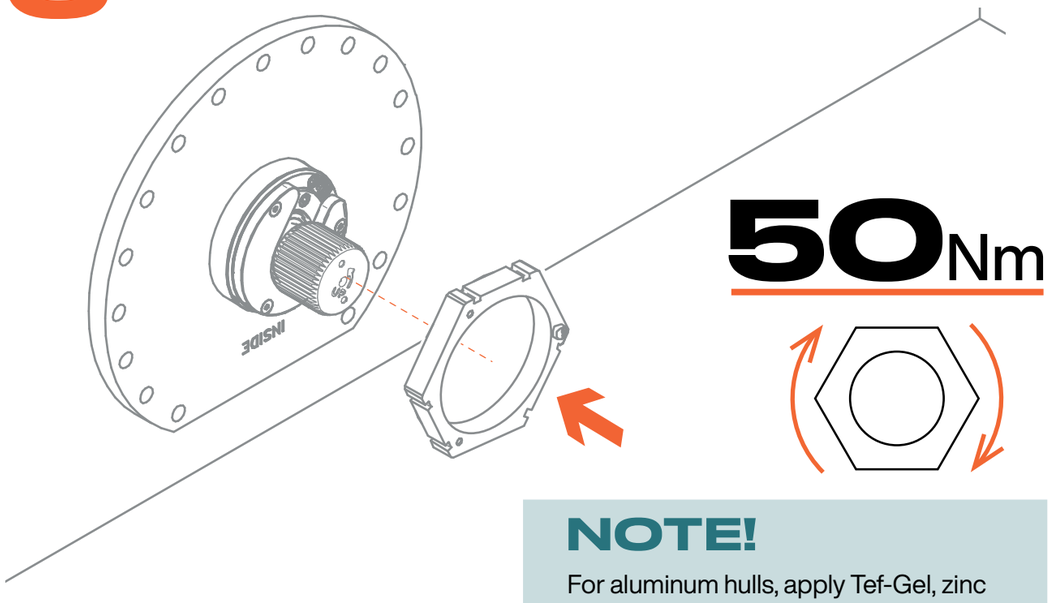
1 **INSERT THE INTERCEPTOR SHAFT SLEEVE** into the transom opening.



2 **TEMPORARILY LOCK THE ROTATION OF THE SHAFT SLEEVE** with a Humphree wrench fastened with three M16 bolts.



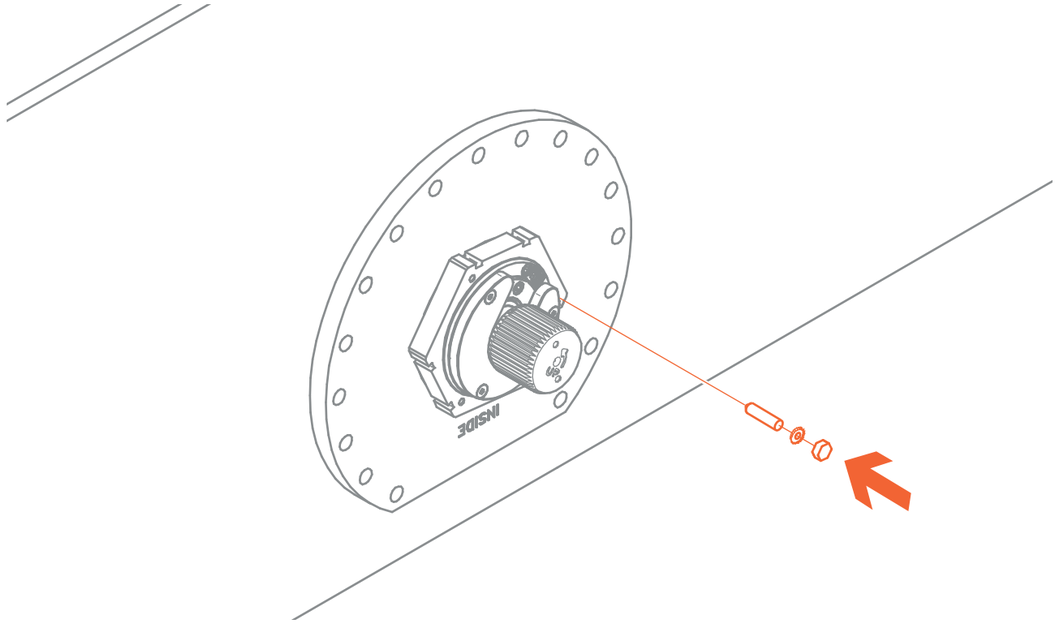
3 **INSTALL THE TRANSOM NUT** and tighten to 50 Nm.



NOTE!

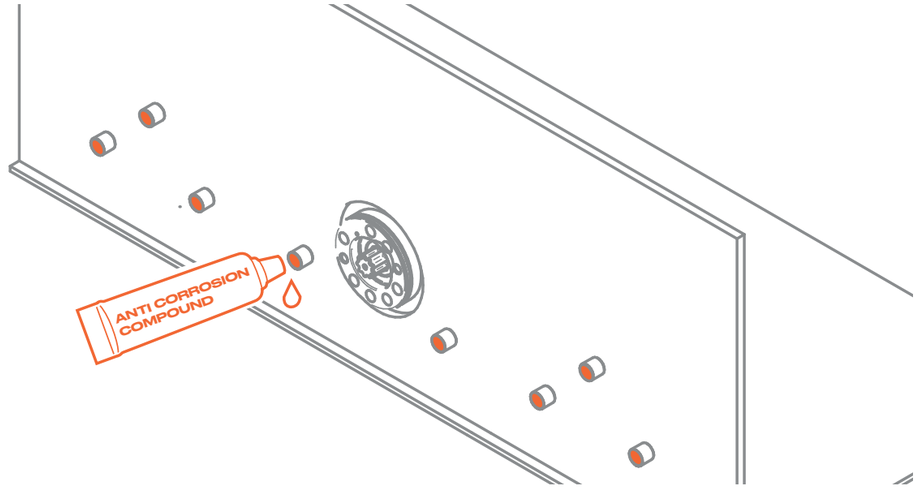
For aluminum hulls, apply Tef-Gel, zinc paste, or approved yard corrosion protection compound between the servo weld flange and the transom nut.

4 **LOCK THE TRANSOM NUT** with its supplied locking screw, teeth washer and nut.



6.5 MOUNT THE INTERCEPTOR

1 **APPLY CORROSION PROTECTION COMPOUND** (Tef-Gel, zinc paste or yard specified compound) to the weld nut threads, mating surfaces and interceptor shaft.



IMPORTANT!

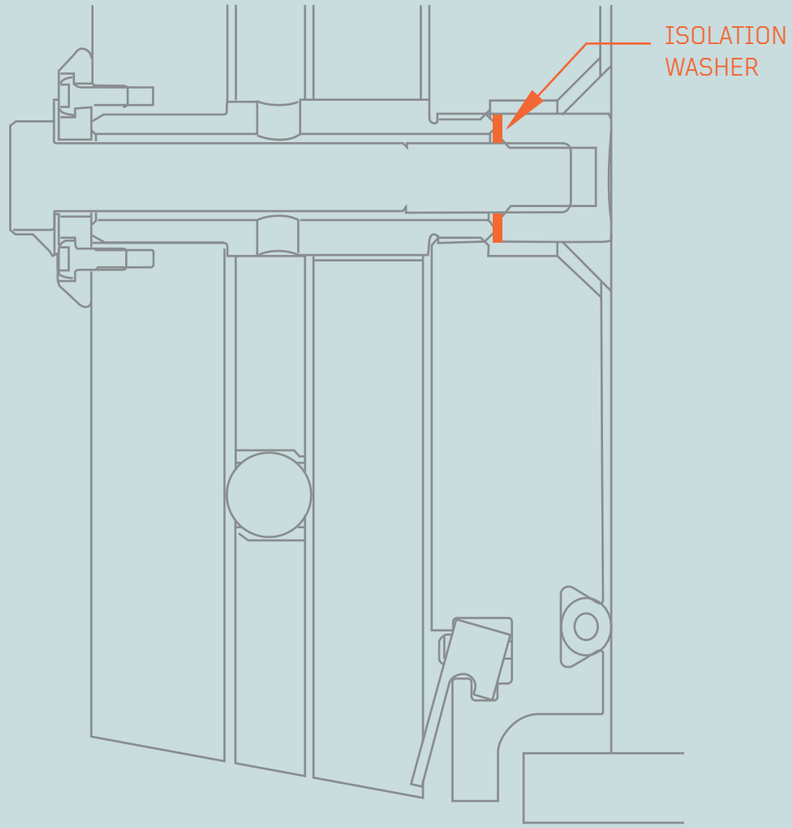
IMPORTANT!

Do not apply any **marine sealant** to mounting bolt threads.
Marine sealant may affect bolt preload and tightening torque.

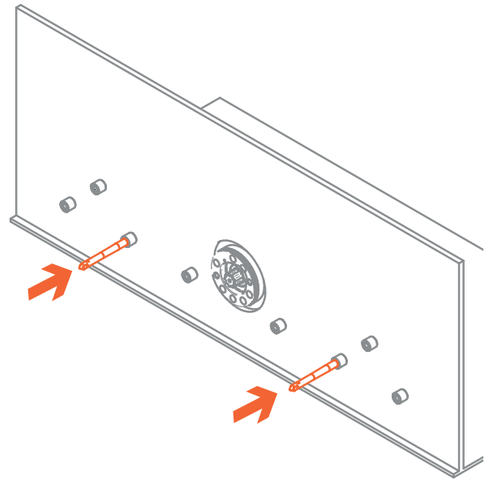
NOTE!
ISOLATION WASHER FOR ALUMINUM HULLS

Aluminum hulls have an additional isolation washer to prevent corrosion.

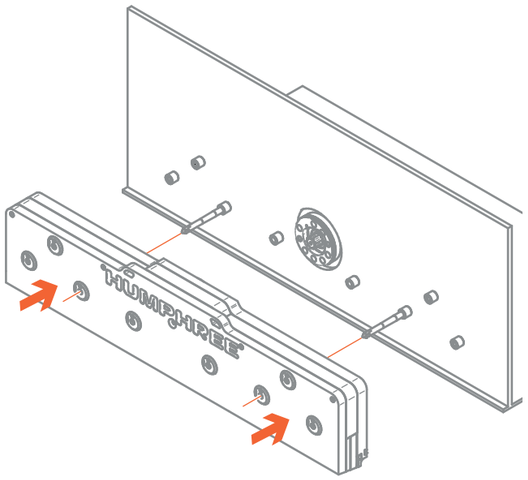
Apply corrosion protection compound to both sides of the isolation washer.



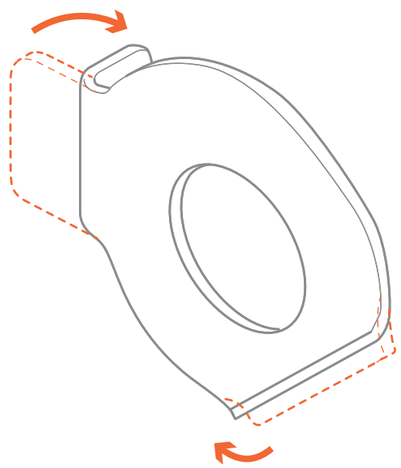
2 **INSTALL THE GUIDE PINS** into the lower weld nuts.



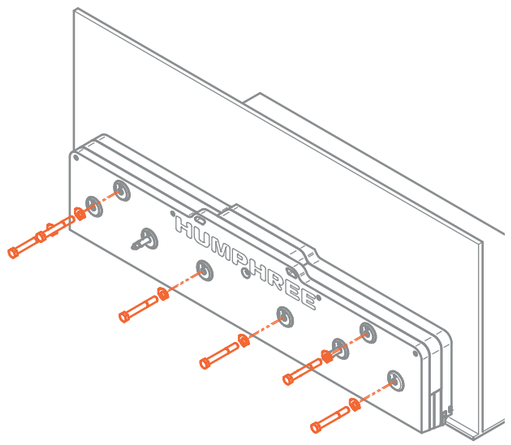
3 **GUIDE THE INTERCEPTOR INTO POSITION** using the guide pins.



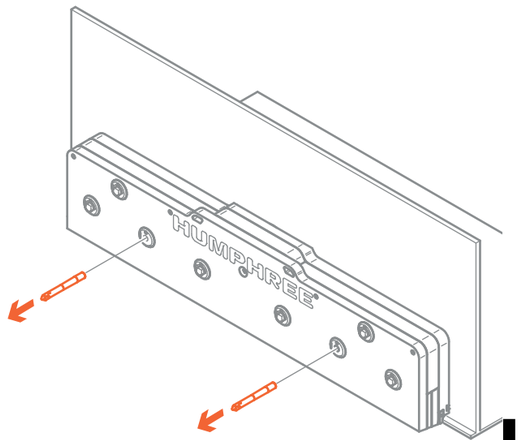
4 **BEND THE TABS AND FLANGES OF ALL LOCKING WASHER** into their corresponding locking slots.



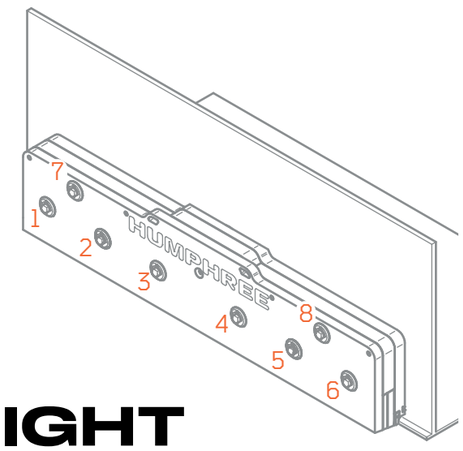
5 **INSTALL THE M16 × 120 BOLTS** with locking washers.



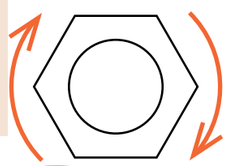
6 **REMOVE THE GUIDE PINS** and replace them with mounting bolts and locking washers.



7 **APPLY LIGHT TIGHTENING** using the following sequence:
3 → 4 → 7 → 8 → 2 → 5 → 1 → 6



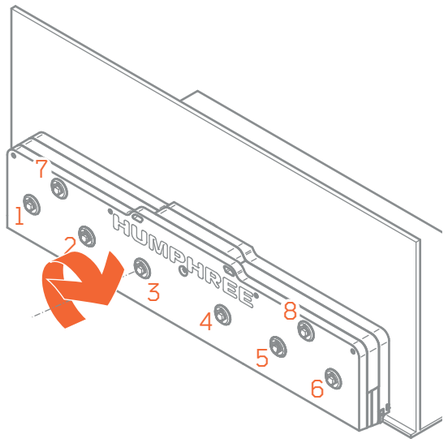
LIGHT



IMPORTANT!

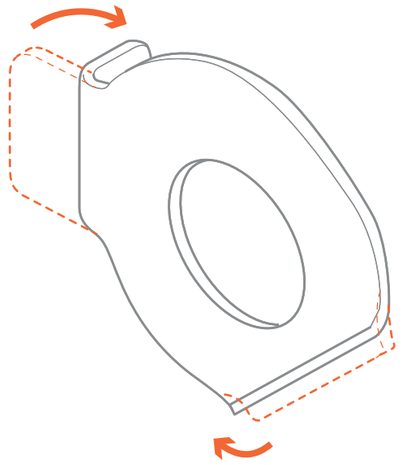
Verify that the interceptor sits flat against the transom.

8 **TIGHTEN ALL THE BOLTS** to **100 Nm** using the following sequence:
3 → 4 → 7 → 8 → 2 → 5 → 1 → 6



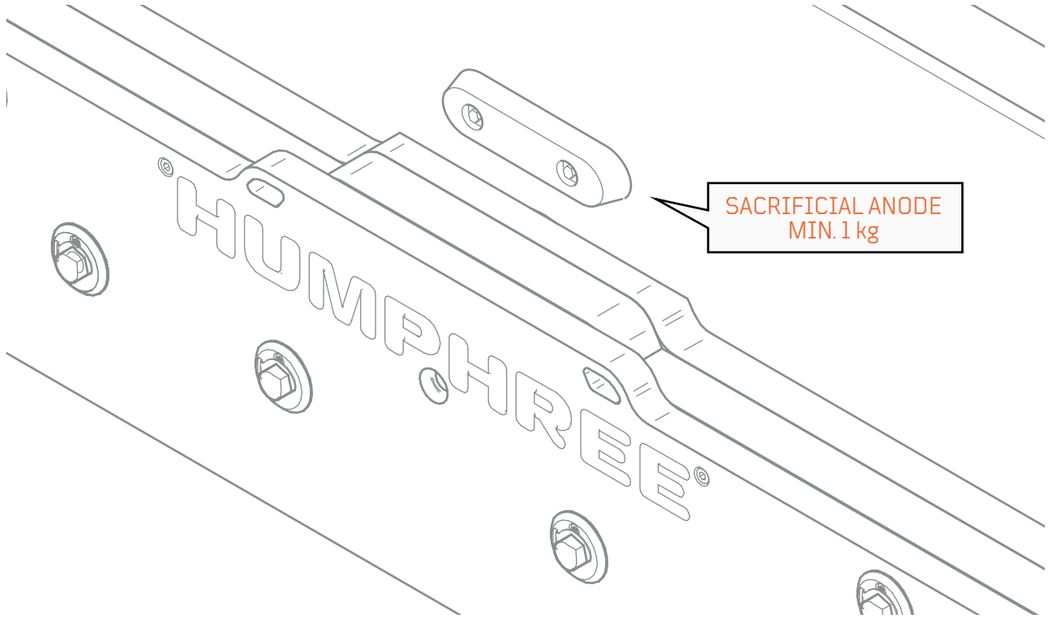
100Nm

9 **MAKE SURE TO LOCK ALL** the pre-bent tabs of the locking washers.



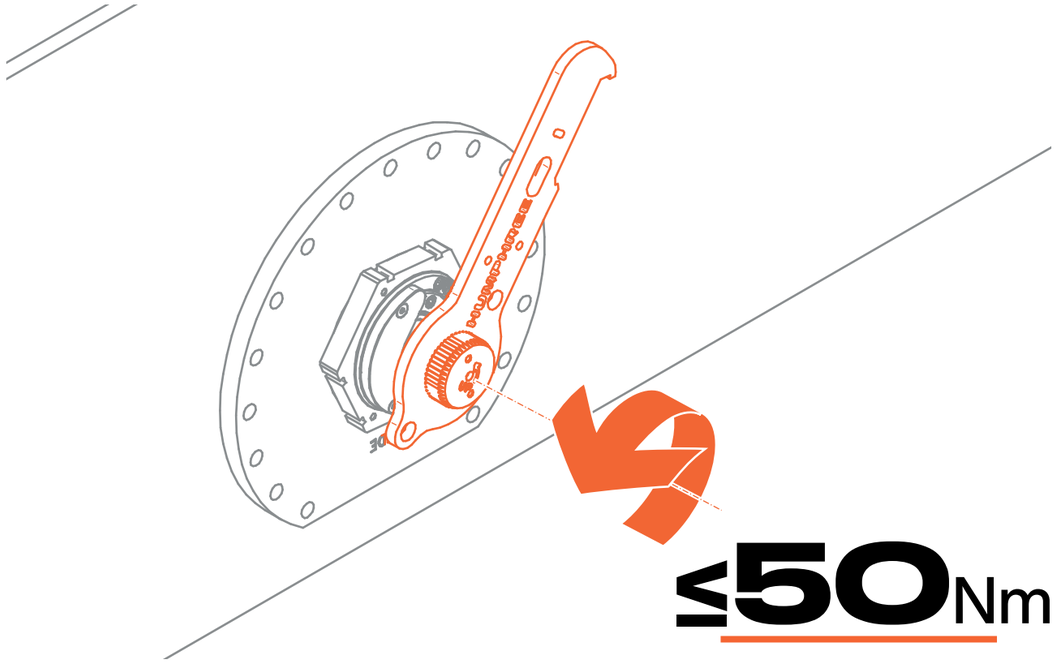
6.6 INSTALL ANODES

Install sacrificial anodes near each interceptor. Humphree recommends a minimum of 1 kg of sacrificial anode material per interceptor. Replace anodes when approximately 50% consumed.



6.7 VERIFY OPERATIONAL SHAFT TORQUE

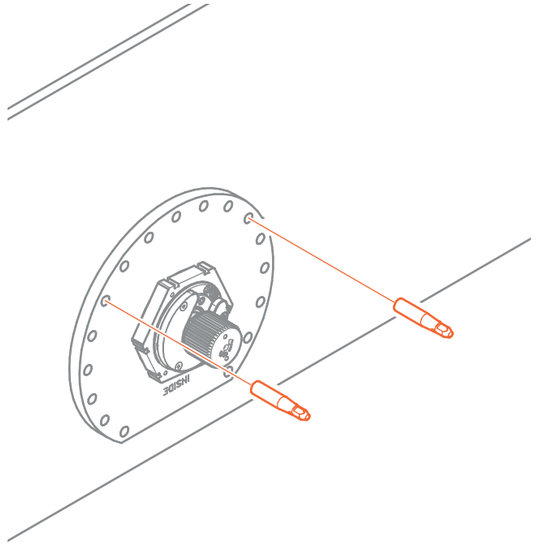
Test the interceptor blade movement using the Humphree wrench. Verify that the torque required to turn the shaft does not exceed 50 Nm.



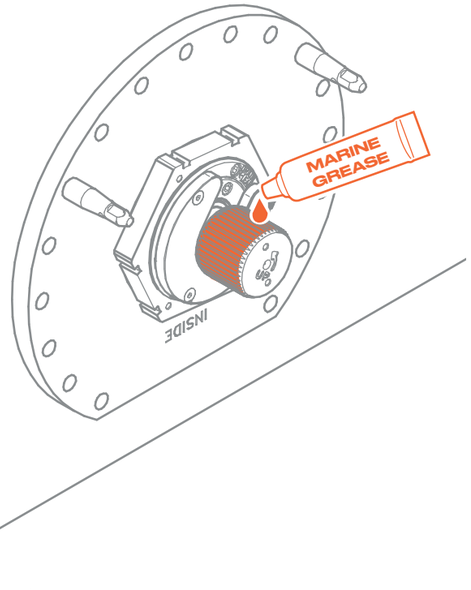
≤50Nm

6.8 INSTALL SERVO UNIT

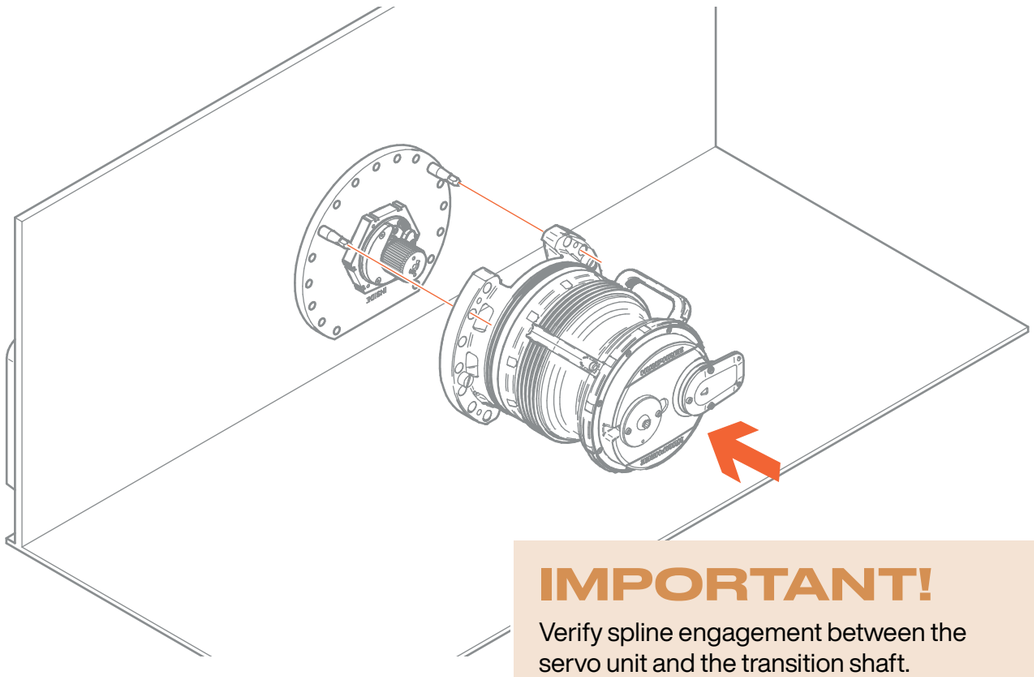
1 **INSTALL THE SERVO GUIDE PINS** into the weld flange.



2 **APPLY MARINE GREASE** to the transition shaft splines.



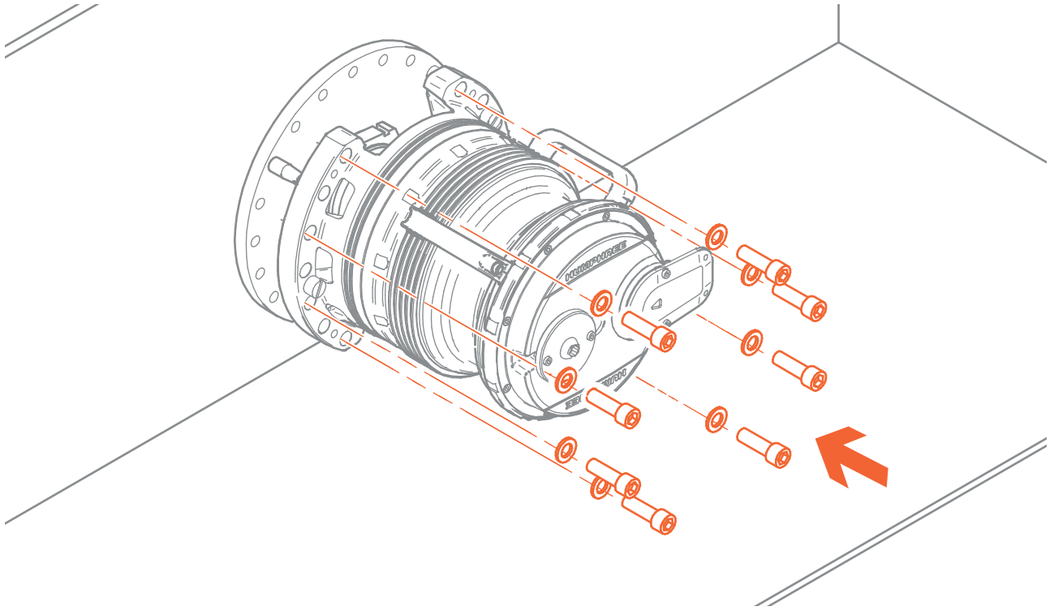
3 **POSITION THE SERVO UNIT** on the weld flange.



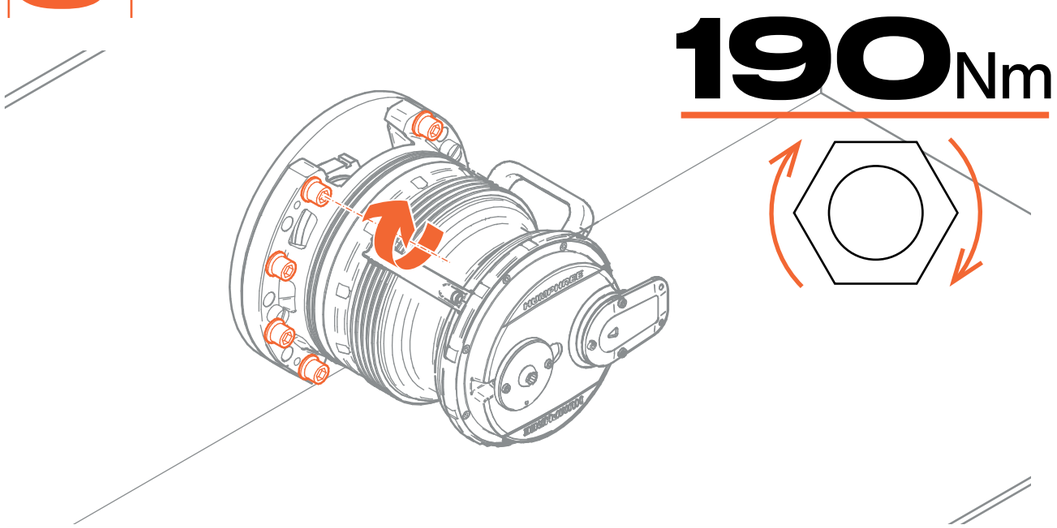
IMPORTANT!

Verify spline engagement between the servo unit and the transition shaft.

4 **INSTALL EIGHT M16 BOLTS AND WASHERS.** (M16 × 50 hex socket bolts, class A4-80, waxed)



5 **TIGHTEN ALL SERVO MOUNTING BOLTS** to **190 Nm.**



INSTALLATION DONE!

You are done with the HLS installation. If you haven't done so already, install the remaining interceptors the same way.

Ready to install the wiring and interface? → Continue to the *Control system installation manual.*