HLS Interceptor

MAINTENANCE MANUAL

HUMPHREE LARGE SYSTEM

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HUMPHREE®

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DISCLAIMER

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 system. 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!

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

IMPORTANT!

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

NOTE!

NOTE!
Notes contain important information regarding the Humphree system.

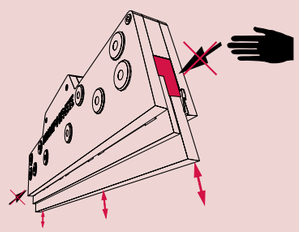
1.2 SAFETY PRECAUTIONS

WARNING!

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

WARNING!

WARNING!
Sharp edges, watch your fingers.



2. ABOUT THIS MANUAL

The purpose of this manual is to provide instructions for the correct maintenance and servicing of the Humphree Large System.

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 is a marine stabilization system designed for larger ships and vessels. The system must not be used for any purpose other than its intended use.

2.2 INTENDED AUDIENCE

This manual is intended for maintenance personnel servicing Humphree interceptors, including shipbuilders and authorized service workshops with qualified personnel. The following installation instructions are intended for professionals only.

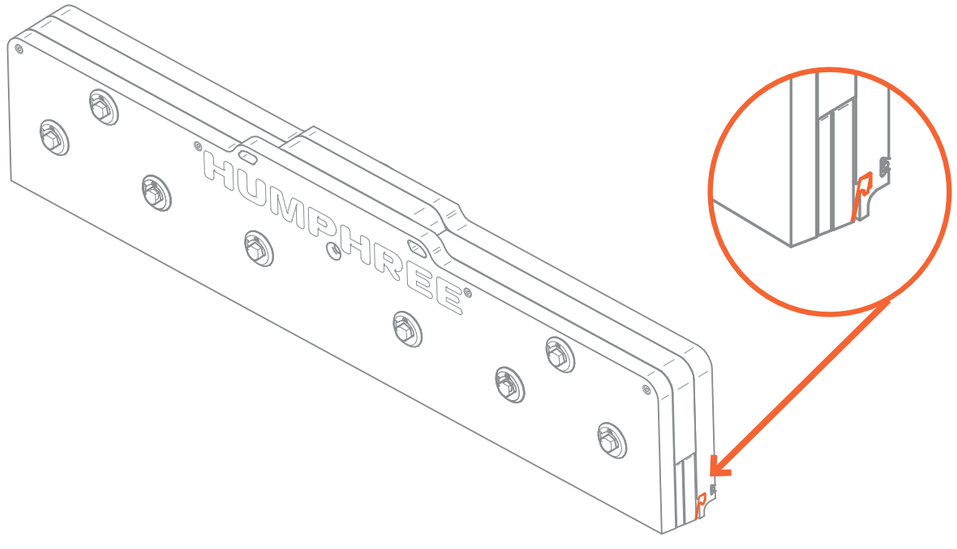
3. INSPECTIONS

3.1 MONTHLY INSPECTION

1. **ENSURE THAT ALL SERVOS INDICATE A GREEN LIGHT** from the inspection window that sits in the lid of the servo.
2. **ENSURE THAT THE CLEANING FUNCTION IS ACTIVATED** in the control panel (CP500-series). To activate see the *Operators Manual*.
3. **ENSURE THAT NO WATER LEAKS** from the interceptor shaft.

3.2 INSPECTION WHEN THE VESSEL IS IN DOCK

1. **ENSURE THAT ALL INTERCEPTORS ARE FREE FROM CRACKS OR OTHER DAMAGE.**
2. **CHECK THE SEAL STRIPS** on all interceptors to ensure that they are undamaged and not worn out.



3. **ENSURE THAT ALL THE INTERCEPTORS CAN COMPLETE A FULL STROKE** by running the system manually from the control panel.
4. **ENSURE THAT THE INTERCEPTOR BLADE IS FULLY RETRACTED** into the interceptor.
5. **ENSURE THAT A SUFFICIENT AMOUNT OF ZINC ANODE MATERIAL REMAINS** to protect the stainless-steel parts of the interceptor. If the zinc anode is running low, replace it.

4. SERVICE

4.1 SERVICE INTERVALS FOR THE SEALS IN THE SHAFT SLEEVE

The inner barrel and seals should be replaced at least every two years or after 2000 operating hours, whichever occurs first. Order the inner barrel spare part in advance from Humphree to carry out the replacement of seals for your HLS interceptor.

4.2 SERVICE SCHEDULE FOR THE HLS INTERCEPTOR AND SERVO UNIT SU530

Service intervals are based on main propulsion operating hours or years since installation or last service, whichever occurs first.

VISUAL INSPECTION

Check one of the installed units, i.e., one HLS interceptor or servo unit. If parts need to be replaced, make a visual check on all units (replace wearing parts).

Interval	
1	1 Years, 4000 h
2	2 Years, 8000 h
3	3 Years, 12 000 h
4	4 Years, 16 000 h
5	5 Years, 20 000 h
6	6 Years, 24 000 h

NOTE!

- Bolt washer screws may break during disassembly. Customer may always have spare parts during visual inspection/service.
- If any parts need to be replaced during an inspection the system needs to be re-calibrated.
- Service for the SU 530 must be performed at least every six years or every 24 000 h operating hours. Contact the service department at Humphree service@humphree.com for pricing and shipping instructions. There are three options to choose from. *Shipping cost is not covered by Humphree*.

Recommended service; Year/service (If Interceptor cleaning system is always on)	1	2	3	4	5	6	7	8	9
Visual inspection and function test of the system	X	X	X	X	X	X	X	X	X
Calibration of system	X	X	X	X	X	X	X	X	X
Visual inspection of blades, bolt washers, bolts	X	X	X	X	X	X	X	X	X
Visual inspection SU530	X	X	X	X	X	X	X	X	X
Re-tightening of interceptor bolts (190 Nm)	X	X	X	X	X	X	X	X	X
Visual inspection of HLS crank		X		X		X		X	
Visual inspection of guide strip		X		X		X		X	
Visual inspection of bearing roller		X		X		X		X	
Visual inspection of blade roller		X		X		X		X	
Visual inspection of all HLS bolt pin 022308		X		X		X		X	
Visual inspection of HLS- O-ring 022534		X		X		X		X	
Cleaning and polishing of interceptor blade		X		X		X		X	
Inspection one Hull transition 022487		X		X		X		X	
Visual inspection of weld nuts (only on aluminum hull)		X		X				X	
Replacement of Crank 022578			X			X			X
Replacement of Bearing roller 022315			X			X			X
Replacement of blade roller 022311			X			X			X
Replacement of seal strip			X			X			X
Oil change Klubersynth meg 4-680 (refill to 0,45 L)			X			X			X
Replacement of HLS bolts 022529 (190 Nm)				X				X	
Replacement of bolt washers				X				X	
Replacement of transom plate				X				X	
Replacement of blade				X				X	
Replacement of aft plate				X				X	
Replacement of bearing plate				X				X	
Replacement of seals, Hull transition				X				X	
Replacement of guide strip				X				X	
Replacement of servo Magnesium anode				X				X	
Service SU530 (24 000 h)						X			

NOTE!

1. If all SU530 are removed from the interceptors and sent to Humphree in Sweden for service, time of service is 3 weeks from delivery.

2. If you have access to a spare servo unit, remove one SU530 and replace it with the spare SU530 on the interceptor. Send the removed SU530 to Humphree Sweden for service. When the serviced SU530 returns, replace another unit and send the replaced unit for service. Repeat the procedure until all SU530 units have been serviced. Time of service is 1 week, shipping not included.

3. All requests for servo replacement or servicing must be handled by an authorized Humphree Service Center. The Humphree center will inspect and function test the installed servo(s) before contacting the Humphree Service Department. Delivery time is 1-2 weeks after approval.

5. REPLACEMENT OF INNER BARREL

IMPORTANT!

IMPORTANT!

Do not use detergent or solvent that can damage the plastic parts of the interceptor system.

1. **DISCONNECT THE POWER SUPPLY** to the servo unit SU530.

2. **REMOVE THE SERVO MOUNTING BOLTS AND WASHERS** and remove the servo from the interceptor shaft.

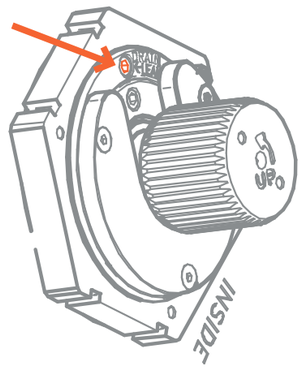
3. **REMOVE THE LEAK INDICATOR SCREW** to allow air to enter between the interceptor and the shaft sleeve. This will make the removal of the shaft sleeve easier. It is normal for a small amount of water to exit the pipex.

IMPORTANT!

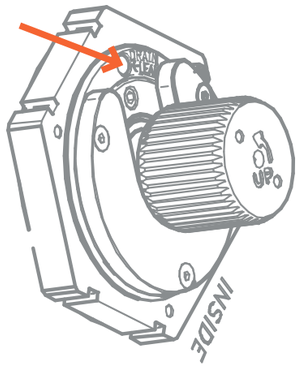
IF THE VESSEL IS STILL IN WATER

If the outer seals in the interceptor are functional, approximately 0.5 L of water may drain during the procedure.

If the outer seals are damaged, the responsible technician must determine whether the leakage is manageable before proceeding. If the leakage is deemed unacceptable, seal replacement should be postponed until the vessel is in dry dock.

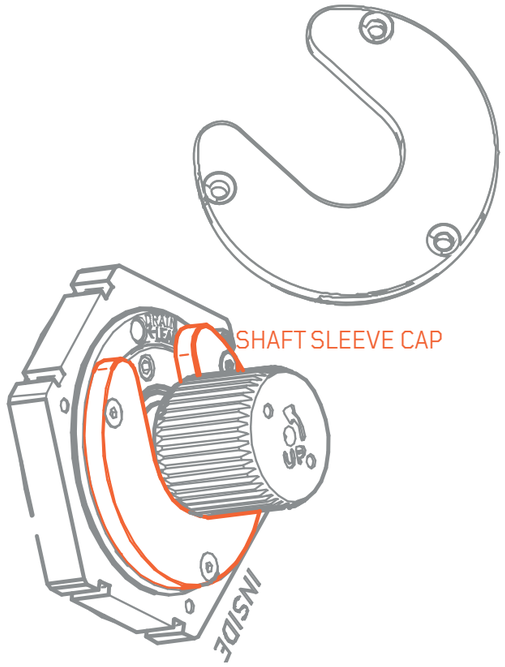


LEAK INDICATOR SCREW IN PLACE.

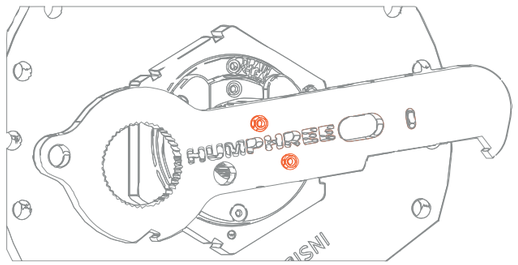


LEAK INDICATOR SCREW REMOVED.

4 **REMOVE THE SHAFT SLEEVE CAP** holding the shaft.



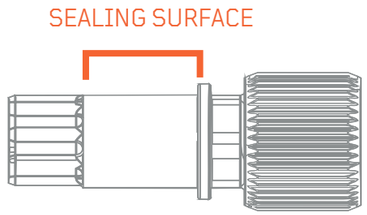
5 **REMOVE THE SHAFT** by pulling it straight out while gently wiggling the shaft.



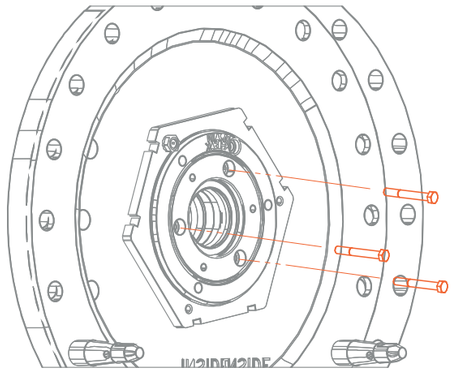
NOTE!

If it is difficult to remove the shaft, the HUMPHREE key can be used as a handle to apply extra force. Attach to the end of the shaft by using two M6 bolts.

6 **ENSURE THAT THE SHAFT SEALING SURFACE IS FREE FROM DAMAGE.**



7 **REMOVE THE THREE M6×30 SCREWS AND GENTLY PULL THE INNER BARREL OUT BY HAND.**

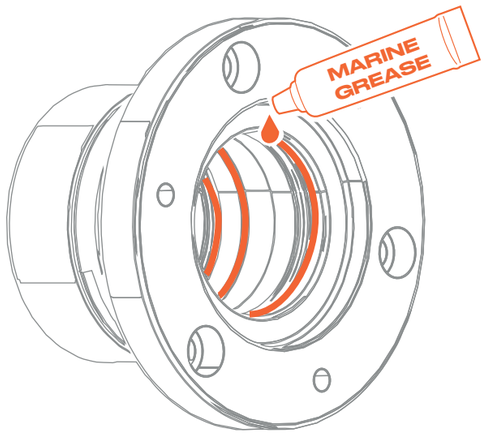


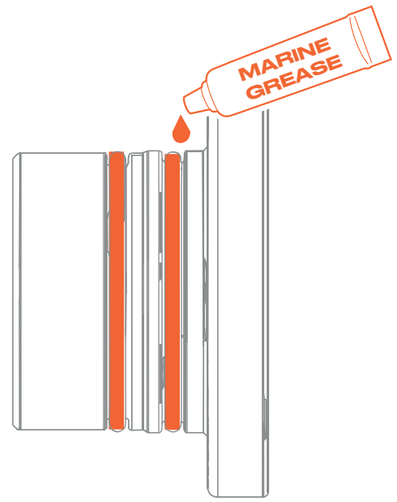
NOTE!

If the inner barrel is hard to remove place one to three M6 bolts in the threaded hole to jack the inner barrel out.

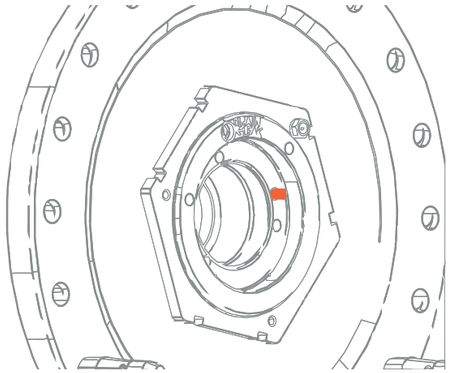
8 **CLEAN THE INSIDE OF THE SHAFT SLEEVE** with a cloth.

9 **APPLY A THIN LAYER OF GREASE** on the outside and the inside of the **NEW** inner barrel.

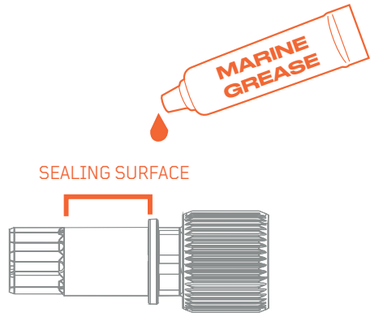




10 **ALIGN THE INNER BARREL** with the guide pin on the shaft sleeve. Press into place and fasten the inner barrel with the three M6x30.

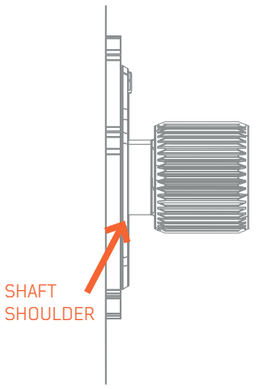


11 **APPLY A THIN LAYER OF MARINE GREASE (LITHIUM BASED)** on the sealing surface of the shaft.



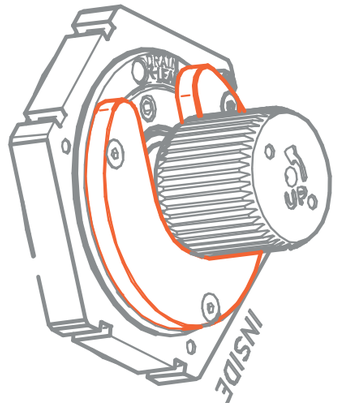
12

INSTALL THE SHAFT by turning it into the inner barrel.



13

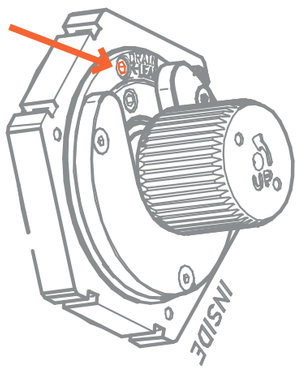
INSTALL THE SHAFT SLEEVE CAP using three M6x30 MF6S.



NOTE!
The shaft shoulder should be flushed when installed correctly.

14

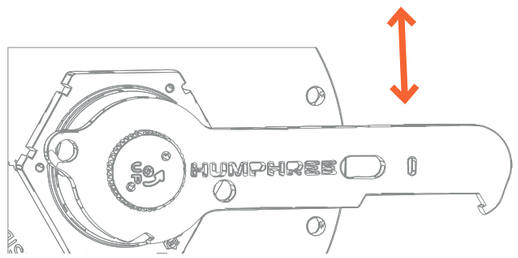
INSTALL THE LEAK INDICATOR SCREW.



LEAK SCREW IN PLACE.

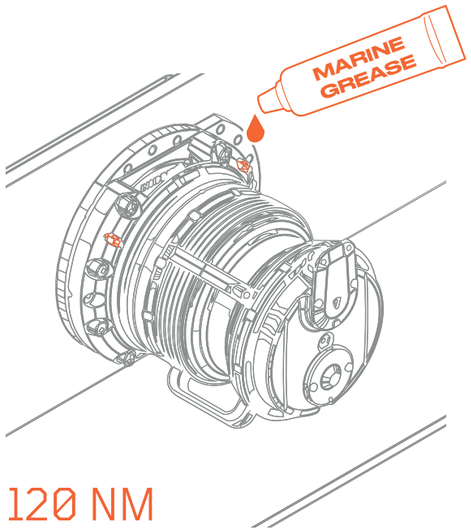
15

FUNCTION TEST THE SHAFT. Use the HUMPHREE key on the shaft spline and turn the shaft ±100° to assure that the interceptor blade is moving the complete stroke length.



16

APPLY A THIN LAYER OF MARINE GREASE (LITHIUM BASED) on the spline. Use the guide pins to align the servo unit and tighten the M16 bolts to 120 Nm.



17

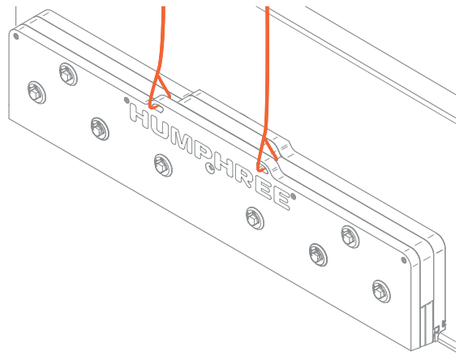
CONNECT THE POWER SUPPLY TO THE SERVO UNIT and start the system from the control panel.

18

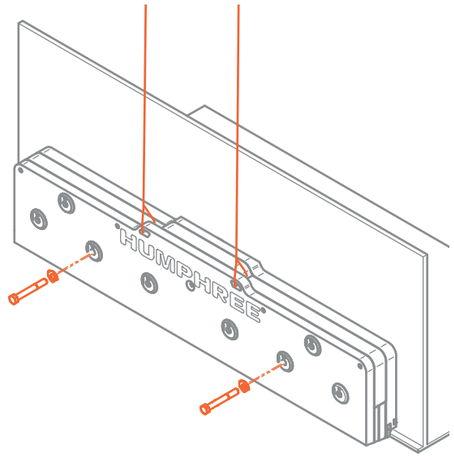
AFTER LAUNCHING THE VESSEL, ensure that all HLS shaft sleeves are watertight.

6. HLS INTERCEPTOR REPLACEMENT

1 **SUSPEND THE INTERCEPTOR** using the lifting holes.

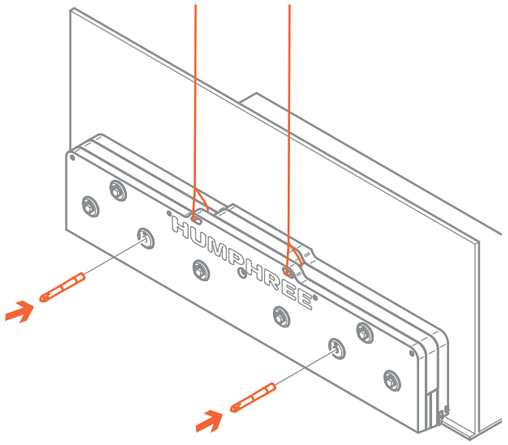


2 **REMOVE THE TWO** mounting bolts and locking washers.

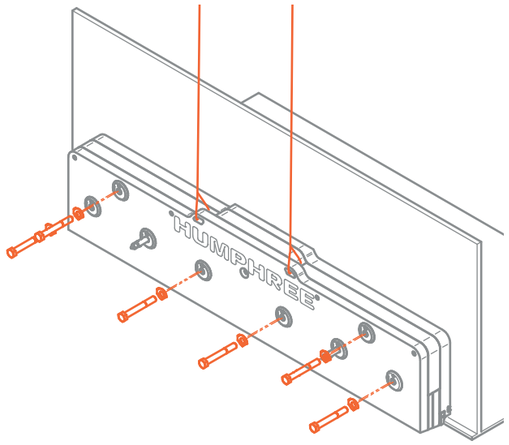


IMPORTANT!
Make sure the suspending device is properly tensioned and securely attached to prevent the interceptor from falling.

3 **INSTALL TWO HLS GUIDE PINS**. Do not overtighten.

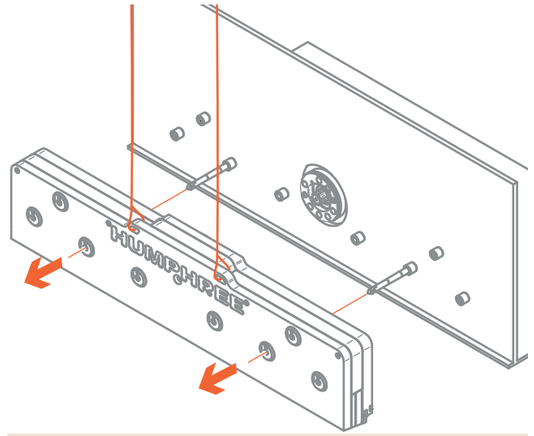


4 **REMOVE THE M16 × 120 BOLTS** and locking washers.



6. HLS INTERCEPTOR REPLACEMENT

5 **REMOVE THE INTERCEPTOR.**



IMPORTANT!
Make sure the suspending device is properly tensioned and securely attached to prevent the interceptor from falling.

6 **PLACE THE INTERCEPTOR** at a designated location.

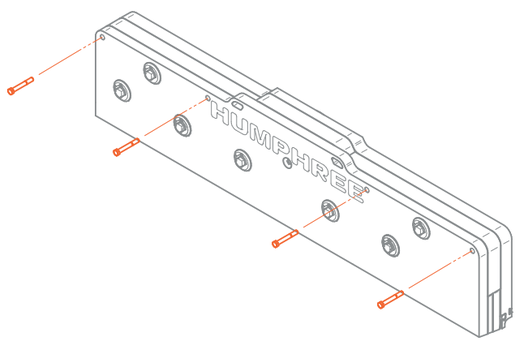
7. SPARE PART REPLACEMENTS

Crank, Crank seal, Seal strip and O-ring

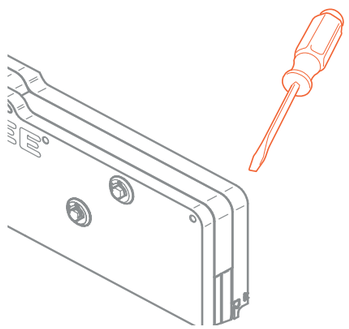
NOTE!

Use a workbench while disassembling the interceptor.

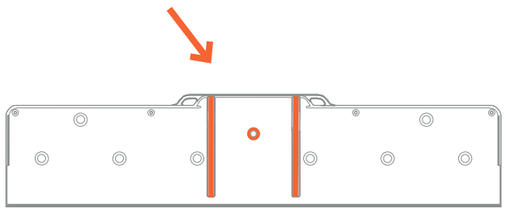
1 **REMOVE THE FOUR M8 TRANSPORTATION BOLTS.**



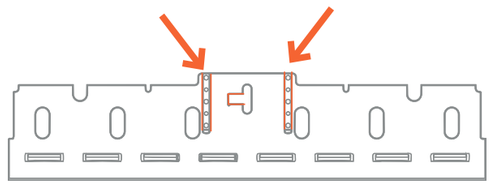
2 **OPEN THE AFT PLATE** using a flat screwdriver.



3 **REMOVE THE AFT PLATE AND ENSURE** it is free from damage. Clean from old grease, highlighted in orange.

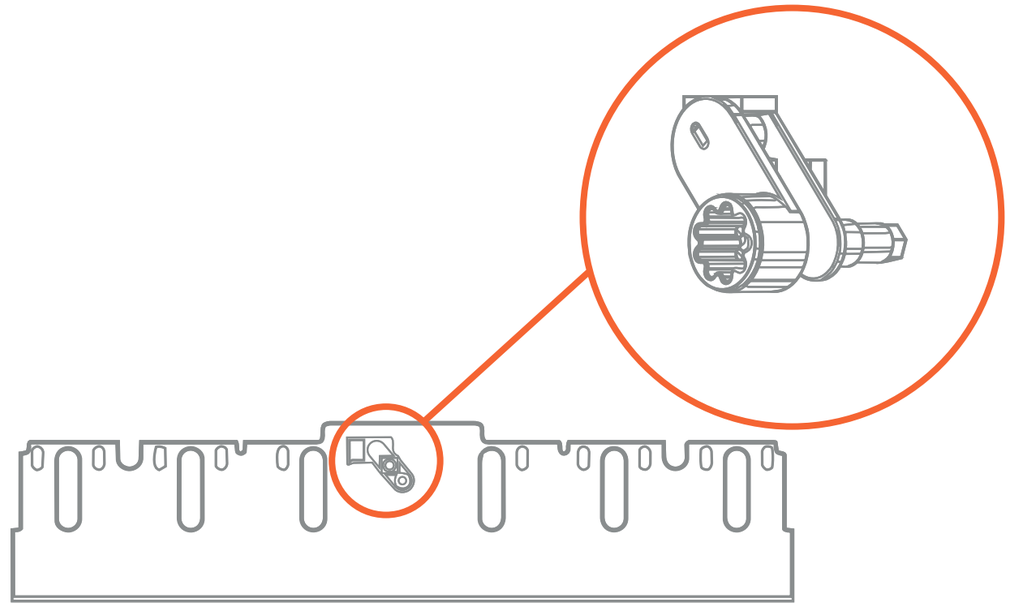


4 **REMOVE THE BEARING PLATE AND ENSURE** it is free from damage. Clean from old grease, highlighted in orange. Ensure that all the bearing rollers are in place and not damaged.

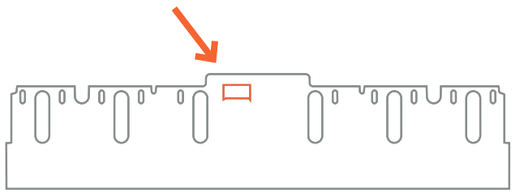


5 **REMOVE THE BLADE** by pulling it straight out together with the crank.

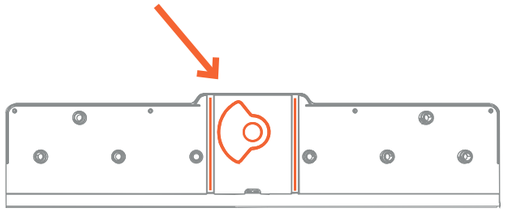
6 **REMOVE THE CRANK** from the blade.



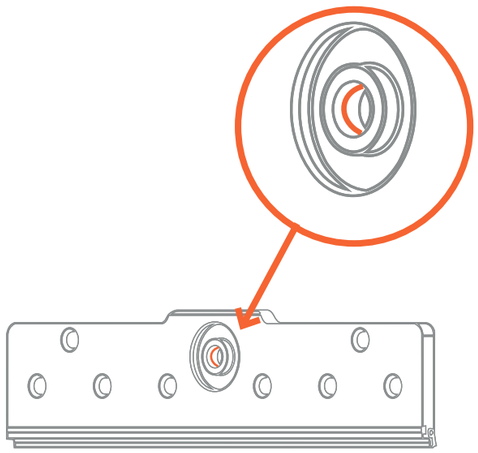
7 **ENSURE THAT THE BLADE IS FREE** from damage. Clean old grease, highlighted in orange. Ensure that all the blade rollers are in place.



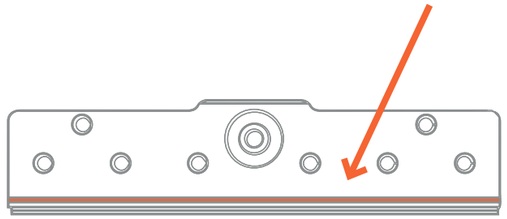
8 **ENSURE THAT THE TRANSOM PLATE IS FREE** from damage and clean old grease. Highlighted in orange.



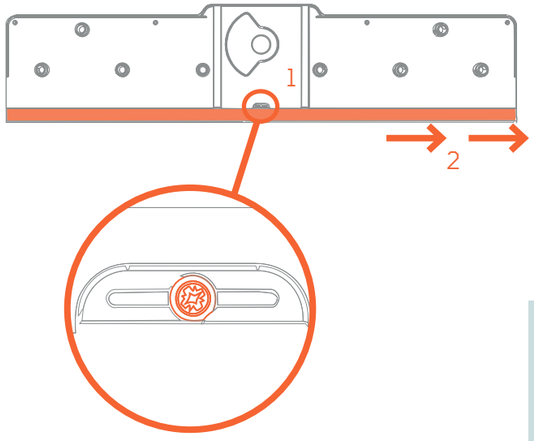
9 **REMOVE THE CRANK SEAL.**



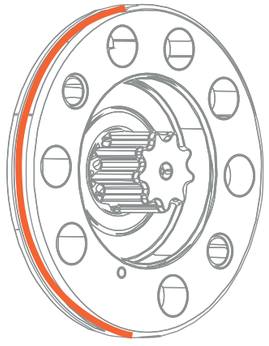
10 **REMOVE THE O-RING LINE SEAL** from the back of the transom plate.



11 **REMOVE THE RETAINING SCREW (1)** and then (2) remove the HLS seal strip by sliding it out from the side.



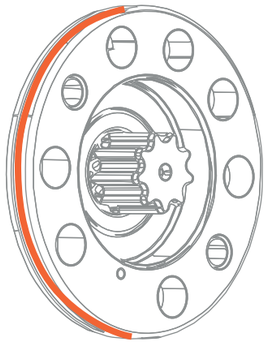
12 **REMOVE THE O-RING** on the shaft sleeve (150x7).



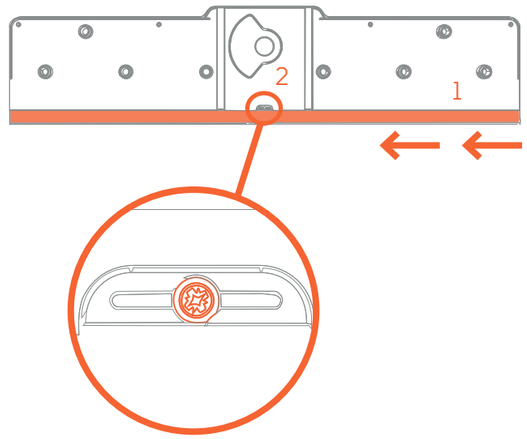
NOTE!
The shaft sleeve is still on the vessel.

7.1 REASSEMBLY OF THE HLS INTERCEPTOR

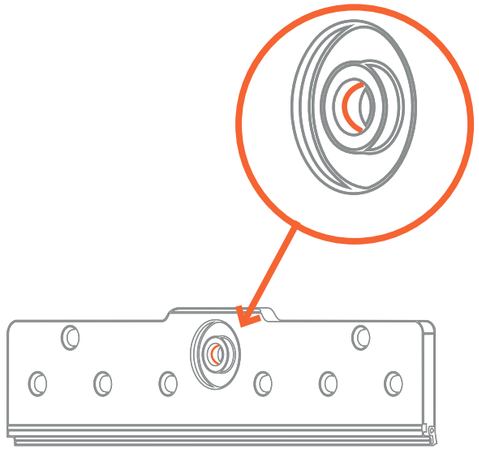
1 **INSTALL A NEW O-RING** on the shaft sleeve.



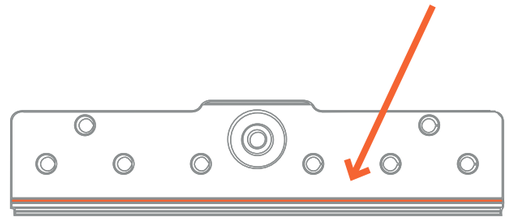
2 **INSTALL A NEW HLS SEAL STRIP (1)** from the side of the transom plate. Secure the seal strip with the screw (2).



3 **INSTALL A NEW O-RING** in the transom plates center groove.

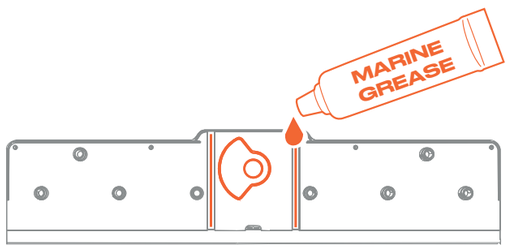


4 **INSTALL A NEW O-RING LINE SEAL** on the transom plate. Press it into place. Do not slide it in from the side.

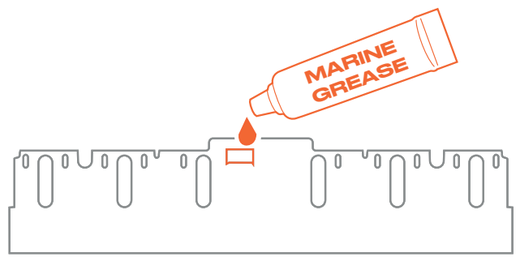


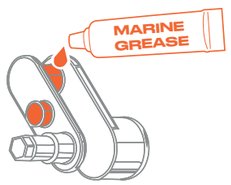
NOTE!
For easy installation: Shape the o-ring into a kidney form. When in place, make sure it returns to its original shape.

5 **APPLY MARINE GREASE** to the guide grooves on the transom plate. Highlighted in orange.



6 **APPLY MARINE GREASE ON THE CRANK AND ON THE BLADE.** Highlighted in orange.

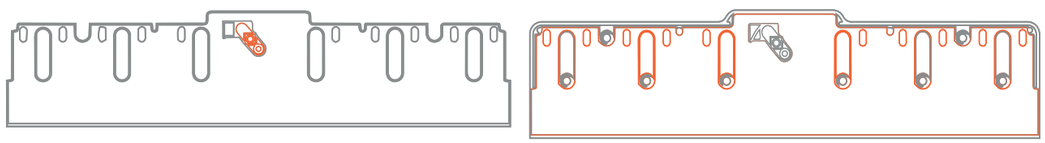




7 **INSTALL THE CRANK ON THE BLADE PLATE.**

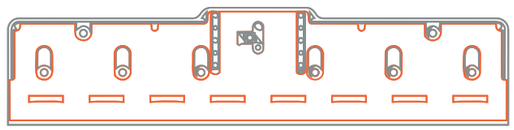
8 **INSTALL THE BLADE PLATE ON THE TRANSOM PLATE.**

IMPORTANT!
Make sure the guide strips align and that the crank enters its correct position in the center hole.



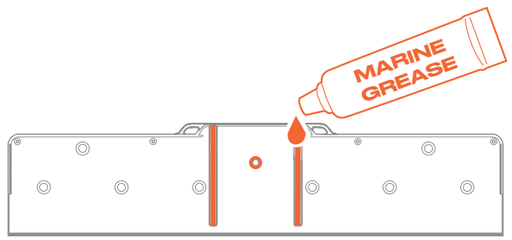
9 **INSTALL THE BEARING PLATE** on the blade plate facing the aft plate.

IMPORTANT!
Make sure that the crank is in its correct position.



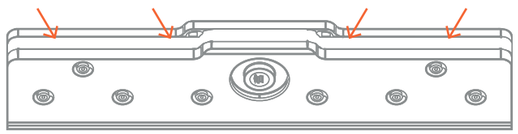
10 **APPLY MARINE GREASE** to the grooves of the aft plate. Highlighted in orange.

IMPORTANT!
Make sure the cover strips are in place before proceeding to the next step.

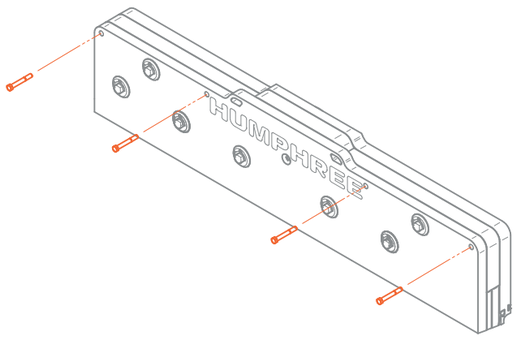


11 **INSTALL THE AFT PLATE ON THE BOLT PINS.** Press firmly in place.

IMPORTANT!
Make sure the cover strips enter the grooves on the aft plate correctly and that the crank shaft can enter the center hole.

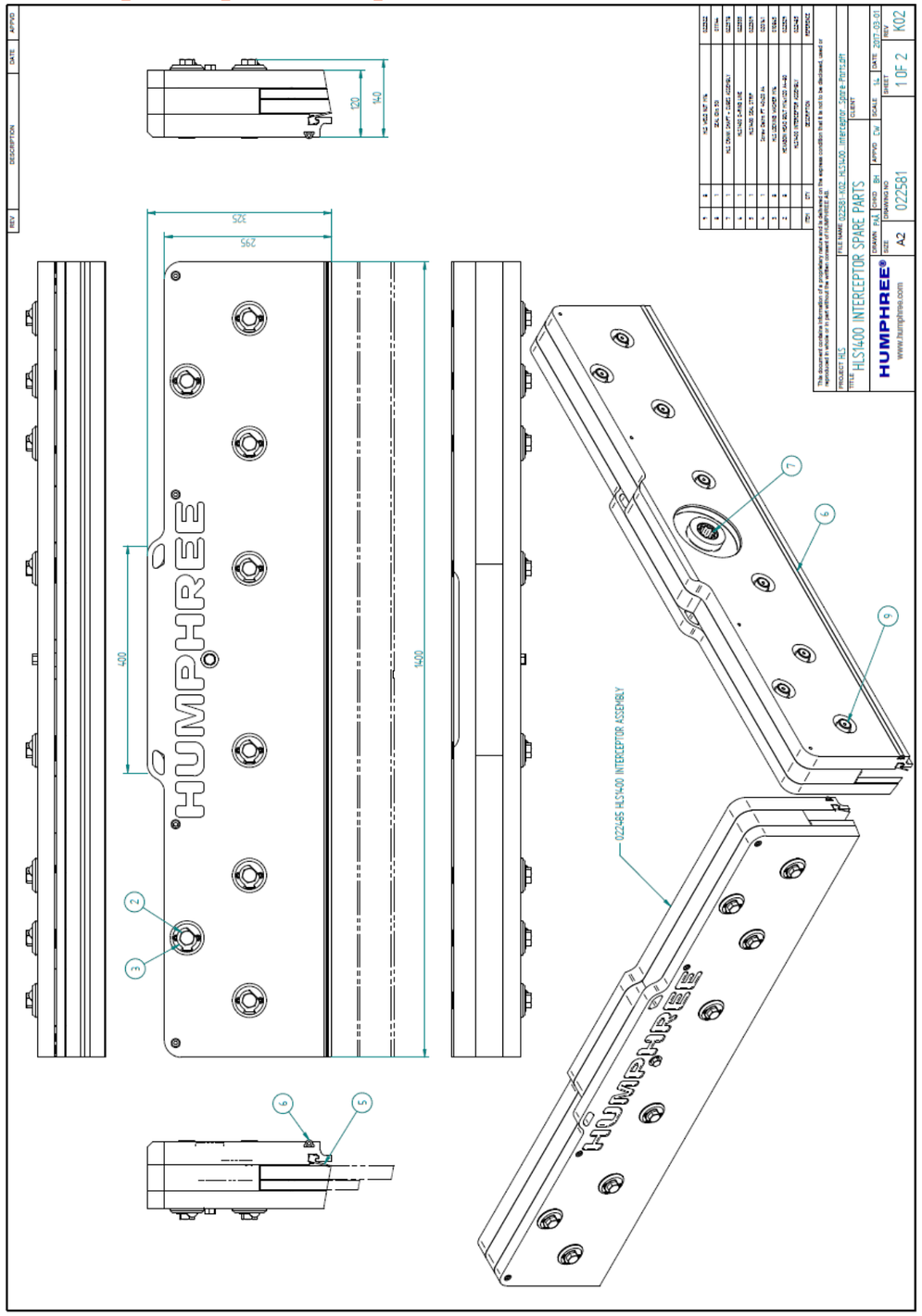


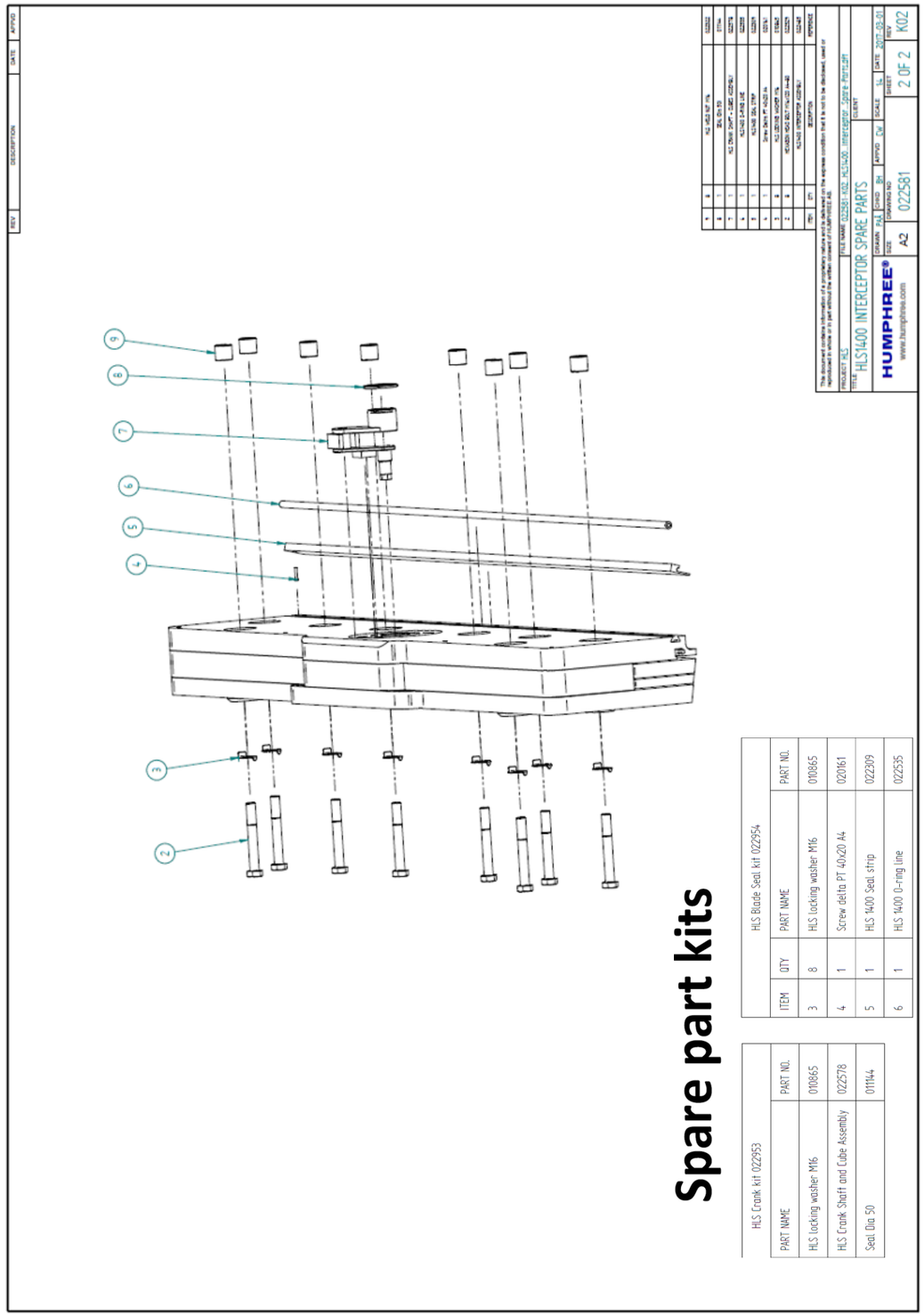
12 **INSTALL THE FOUR M8 TRANSPORTATION BOLTS.**



8. SPARE PARTS
8.1 HLS INTERCEPTOR

022581-K01_HLS1400_INTERCEPTOR_ASSY





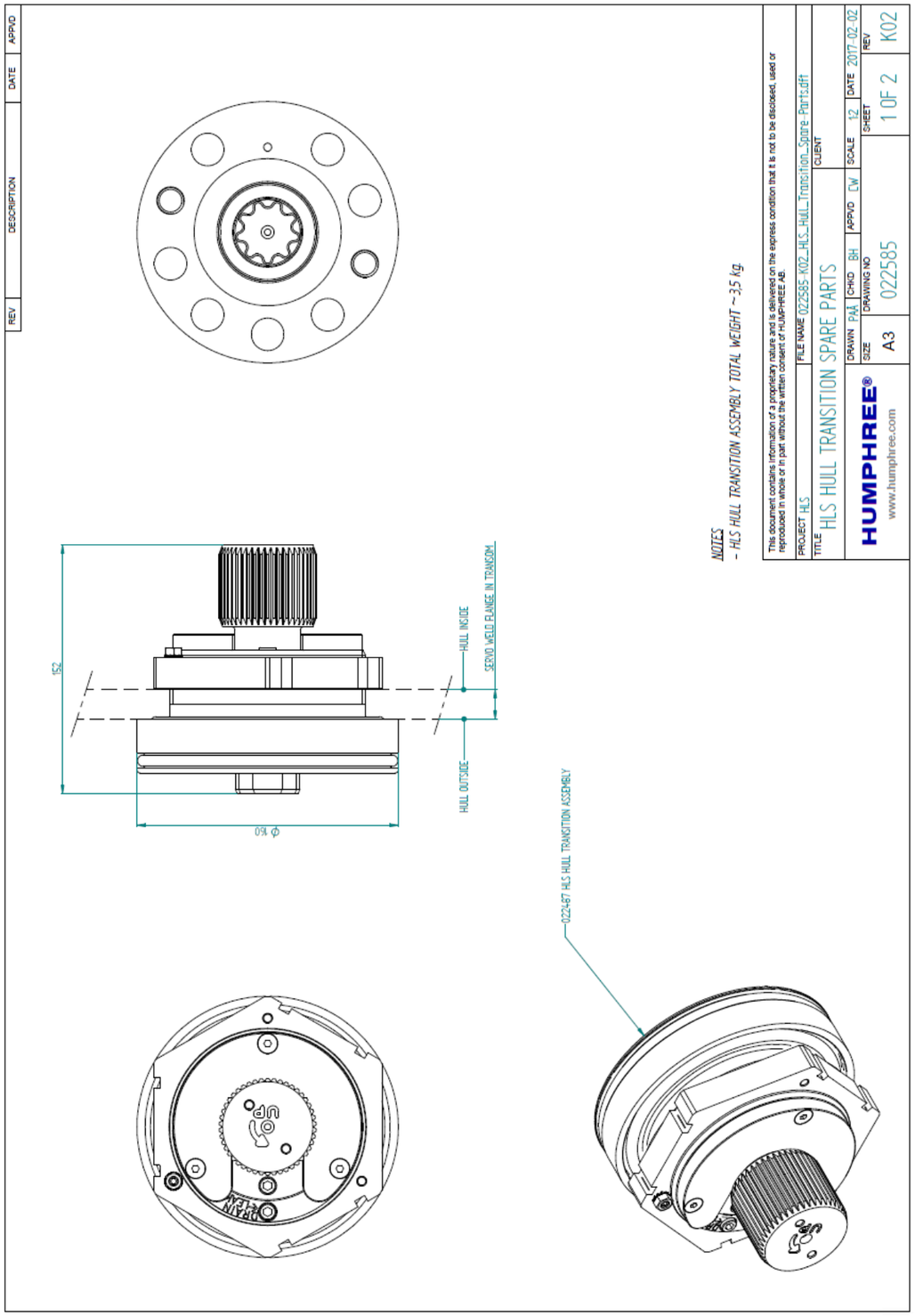
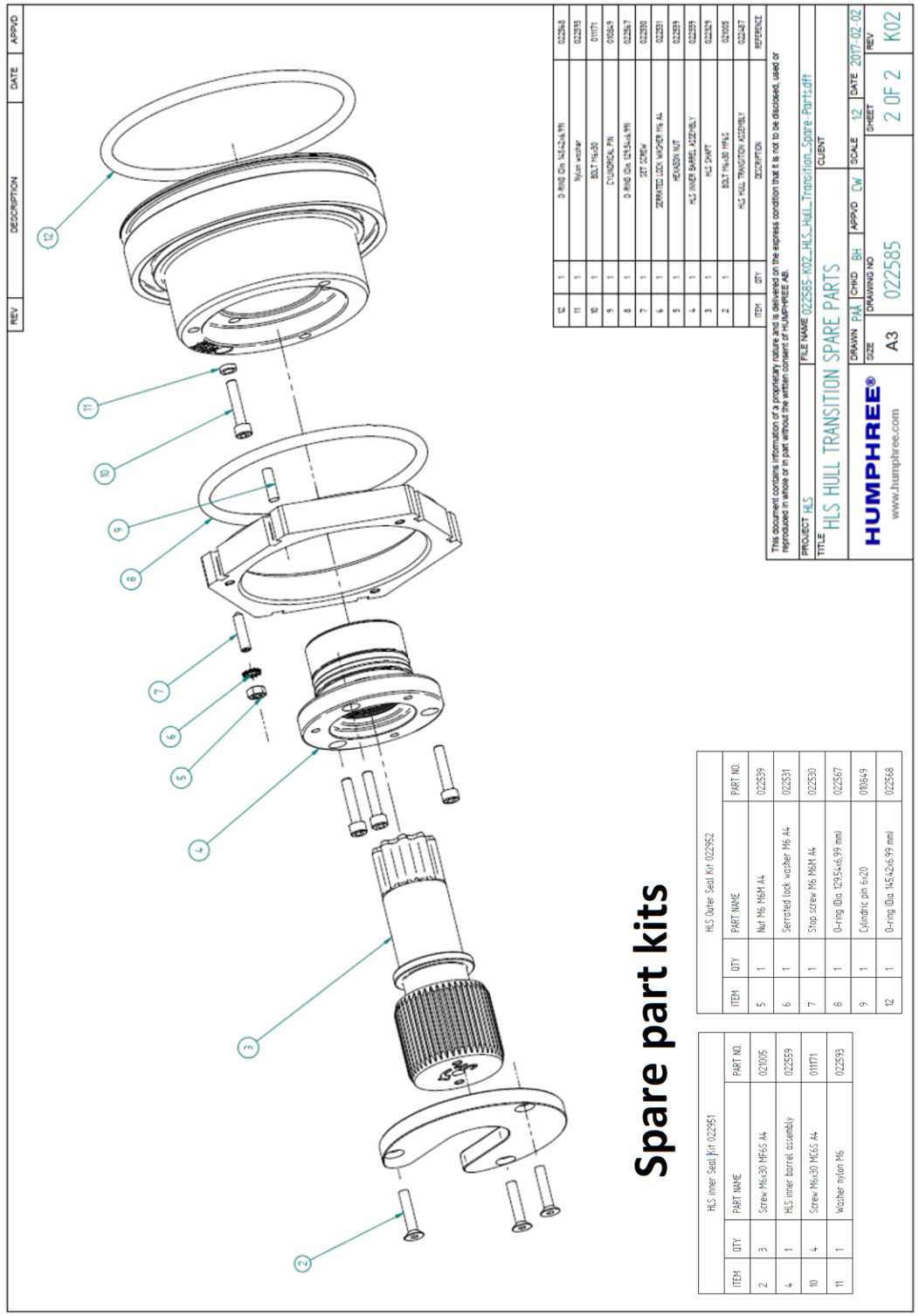
Spare part kits

HLS Blade Seal kit 0229154

ITEM	QTY	PART NAME	PART NO.
3	8	HLS locking washer M16	0108615
4	1	Screw delta PT 40x20 A4	020161
5	1	HLS 1400 Seal strip	022369
6	1	HLS 1400 O-ring line	022535

HLS Crank kit 0229153

PART NAME	PART NO.
HLS locking washer M16	0108615
HLS Crank Shaft and Cube Assembly	022578
Seal Dia 50	011144

8.2 HLS HULL TRANSITION

022585-K01_HLS_HULL_TRANSITION_ASSY