

HUMPHREE®

MAINTENANCE MANUAL

HLS INTERCEPTOR

1.05

Content

| | |
|---|----|
| Safety information..... | 2 |
| Inspection monthly..... | 3 |
| Inspection when the ship is in dock | 3 |
| Service intervals for the seals in the shaft sleeve | 3 |
| Service schedule for the HLS Interceptor and Servo unit SU530 | 4 |
| Replacement of Inner Barrel | 6 |
| Replacement of Interceptor | 10 |
| Replacement of spare parts in the interceptor | 11 |
| Spare parts for HLS interceptor | 19 |
| Spare parts for HLS Hull transition | 21 |

Safety information

Installation procedures performed incorrectly could lead to personal injury, damage to the Humphree Interceptor System or damage to other property.

Please read the installation manual carefully before starting to install the Humphree Interceptor system and pay extra attention to the safety information.

Safety information in this manual is presented in the way shown and explained below.



WARNING!

Failure to pay attention to a warning or follow any instructions included in the warning could lead to personal injury or death.



IMPORTANT!

Failure to pay attention to important information or follow an important instruction could lead to damage or malfunction of the Humphree Interceptor System or other property.

NOTE!

A note contains information that will facilitate the work during the installation of the Humphree Interceptor System.

General safety information



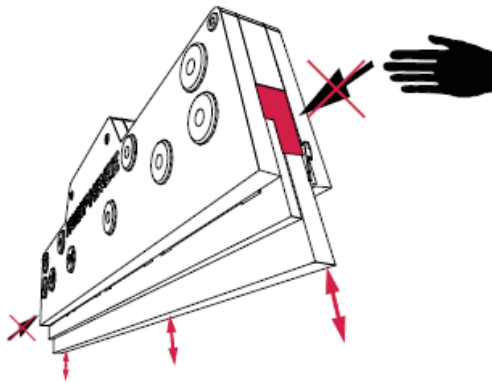
WARNING!

When installing the Humphree Interceptor System make sure that there is no current connected to the system. (Isolate shore current to the engine block, battery charger or accessories mounted on the engine.)



WARNING!

Sharp edges, watch your fingers.

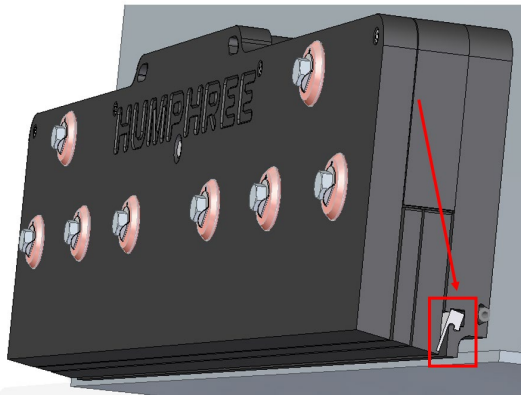


Inspection monthly

1. Inspect so that all servos indicate a green light from the inspection window that sits in the lid of the servo.
2. The Interceptor System has a cleaning function that helps to prevent long term marine growth. Ensure that the cleaning function is activated in the control panel (CP 502), see Operators Manual for how to activate cleaning function.
3. Inspect so that is no water leakage from the interceptor shaft.

Inspection when the ship is in dock

1. Inspect all interceptors so that there are no cracks or other damage to the Interceptor.
2. Inspect the seal strip in all interceptors to ensure that it is undamaged and not worn out.



3. Check that all the interceptors can make a full stroke by running the system manually from the control panel.
4. Inspect so that the interceptor blade is fully retracted into the interceptor.
5. Inspect so that sufficient amount of zinc anodes are left to protect the stainless-steel parts of the interceptor. If the zinc anode is running low, replace it.

Service intervals for the seals in the shaft sleeve

Inner Barrel with seals should be changed at least, every two years or after 2000 ship operation hours, whichever occurred first. Order Inner Barrel in advance from HUMPHREE to carry out the change of sealing for your HLS interceptor.

Service schedule for the HLS Interceptor and Servo unit SU530

Service interval based on main propulsion running hours and years since installed product or last service, whichever comes 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).

| Intervall | |
|-----------|-------------------|
| 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 |

| Recommended service; Year/service (cleaning system interceptor 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 (190Nm) | X | X | X | X | X | X | X | X | X |
| Visual inspection of HLS crank | | X | | X | | X | | X | |
| Visual inspection guide list | | X | | X | | X | | X | |
| Visually inspection bearing roller | | X | | X | | X | | X | |
| Visually inspection of blade roller | | X | | X | | X | | X | |
| Visually inspect all HLS bolt pin 022308 | | X | | X | | X | | X | |
| HLS- O-ring 022534, visual inspection every 2 year | | X | | X | | X | | X | |
| Cleaning and polishing of interceptor blade | | X | | X | | X | | X | |
| Inspection one Hull transition 022487 | | X | | X | | X | | X | |
| Visually inspect weld nuts (only on aluminium hull) | | X | | X | | X | | X | |
| Change Crank 022578 | | | X | | | X | | | X |
| Replace Bearing roller 022315 | | | X | | | X | | | X |
| Replace blade roller 022311 | | | X | | | X | | | X |
| Replace seal strip | | | X | | | X | | | X |
| Oil change Klubersynth meg 4-680 (fill to level of 0,45l) | | | X | | | X | | | X |
| HLS bolts 022529 replace (190Nm) | | | | X | | | | X | |
| Bolt washers replace | | | | X | | | | X | |
| Replace transom plate | | | | X | | | | X | |
| Replace blade | | | | X | | | | X | |
| Replace aft plate | | | | X | | | | X | |
| Replace bearing plate | | | | X | | | | X | |
| Change sealings Hull transition | | | | X | | | | X | |
| Replace guide list | | | | X | | | | X | |
| Replace servo Magnesium anode | | | | X | | | | X | |
| Service SU530 (24 000h) | | | | | | X | | | |

Notes:

- Bolt washer screws may break during disassembly. Customer may always have spares during visual inspection/service.
- If any parts need to be changed during an inspection the system needs to be recalibrated.
- Service for the SU 530 must be made at least every 6 years or 24.000 h operating hours. Contact the service department at HUMPHREE service@humphree.com for price and shipping address. There are 3 options to choose from.
Freight cost is not covered by Humphree

1. All SU530 are removed from the interceptors and sent to HUMPHREE in Sweden for maintenance. Time of service when the SU530 are at HUMPHREE is about 3 weeks from delivery date to Humphree.
2. If you have a spare servo, remove one SU530 and replace it with the spare SU530 on board the ship. Send the removed SU530 to HUMPHREE Sweden for service. When the reconditioned SU530 returns to the vessel changed next SU530 and transport it to Sweden. Repeat until all the SU530 have been serviced. Service at Humphree 1 week, shipping time not included.
3. Request of reconditioned servos, exchange servos and get reconditioned servos, the request of exchanged servos needs to be done by a Humphree center, the Humphree center needs to inspect the installed servos, function test and then contact Humphree service department. After inspection and function test been done, request of reconditioned servos can be done through Humphree center. Delivery time 1-2 weeks after the request been approved.

Replacement of Inner Barrel

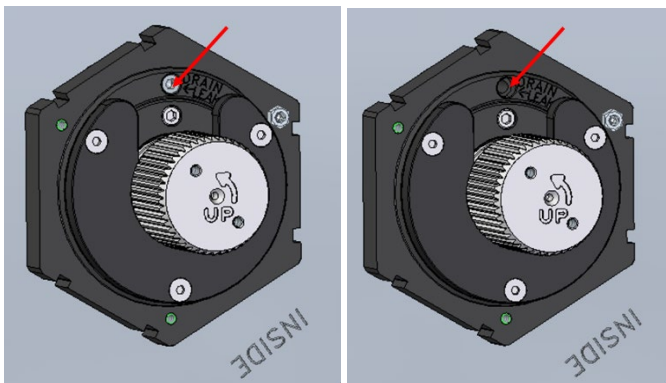
Attention! Do not use detergent or solvent that can damage the plastic parts of the interceptor system.

1. Remove the power supply to the servo unit SU530.
2. Remove the screws for the servo unit and remove the servo from the interceptor shaft.
3. Remove the screw for the leak indicator to allow air to enter between the interceptor and the shaft sleeve. This will make the removal of the shaft easier. Its normal to have a small amount of water to exiting the pipe.

Important: If changing the inner barrel while the ship still in the sea.

If the outer seals in the interceptor is still functional the amount of water that might be drained out is around 0,5 L.

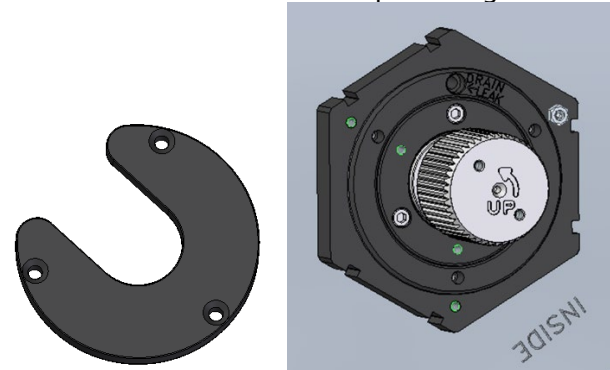
If the outer seals in the interceptor is damage the personal responsible for the replacement sealing must make a judgment if the leakage is manageable to proceed with the seal replacement or NOT. If NOT judge ok to change the seals the replacement of the seals should wait until the ship is in dock.



Leak screw in place.

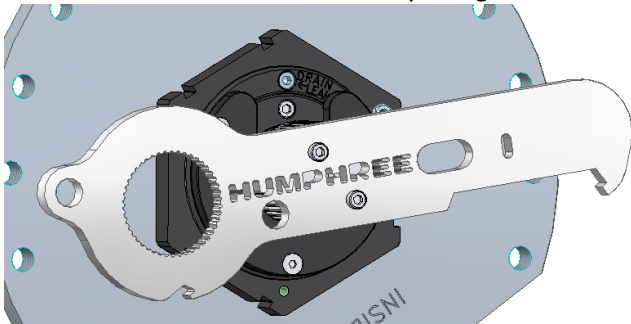
Leak screw removed.

4. Remove the shaft sleeve cap holding the shaft.



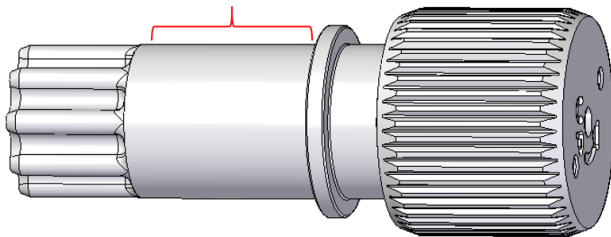
Shaft sleeve cap

5. Grasp around the splines with a glove and pull straight out while gently wiggling the shaft. If it is difficult to pull out the shaft, the HUMPHREE key can be used as handle to apply extra force if attached to the end of the shaft by using 2XM6.

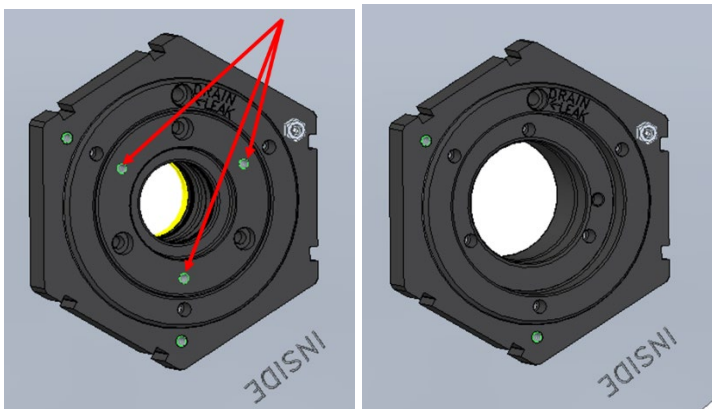


6. Inspect shaft sealing surface to assure that surface is free from damage.

Sealing surface

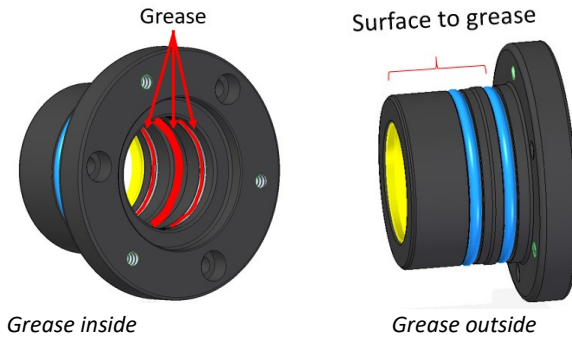


7. To remove the Inner Barrel, unscrew the 3XM6x30 and by hand gently pull the barrel out. If the Inner Barrel is hard to remove place one to three M6 bolts in the threaded hole to jack the barrel out.

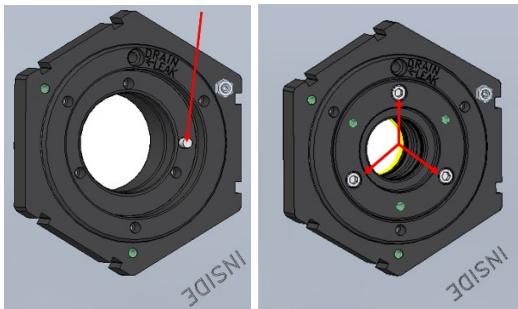


8. Wipe the inside of the shaft sleeve clean with a cloth.

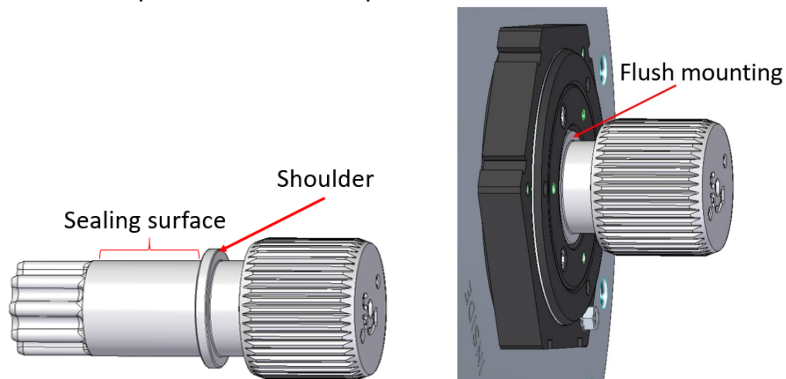
9. Take the NEW inner barrel and apply a thin layer of grease on the seals and surfaces located inside the barrel. Grease the outside of the inner barrel for easier installation in the shaft sleeve.



10. Align the inner barrel with the guide pin in the shaft sleeve. Press into place and fasten the inner barrel with 3XM6X30.



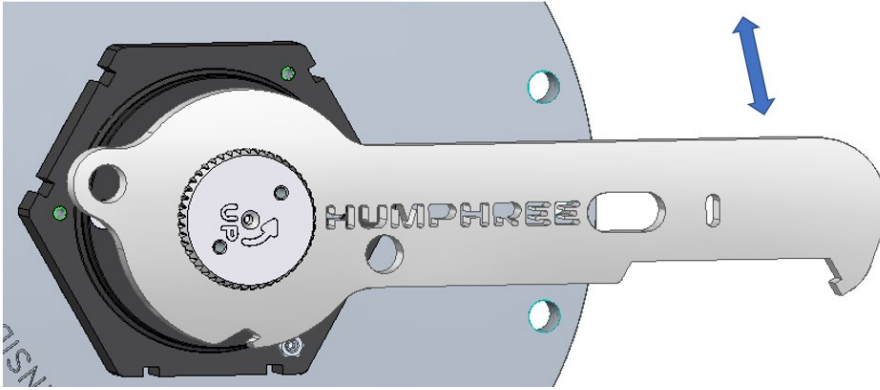
11. Apply a thin layer of marine grease (lithium based) on the sealing surface of the Shaft. Mount the shaft by turning it into the inner barrel. The shaft should be pushed until the shoulder has landed on the saddle in the inner barrel. The shaft might have to be rotated into the barrel to slide into the crank spline of the interceptor on the outside.



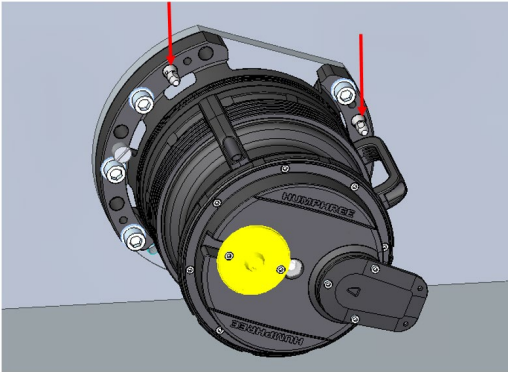
12. Mount the Shaft cap and lock the cap with 3XM6x30 MF6S.

13. Mount the screw for the leak indicator.

14. Make a function test by placing the HUMPHREE key on the shaft spline and turn the shaft $\pm 100^\circ$ to assure that the interceptor blade is moving the complete stroke length.

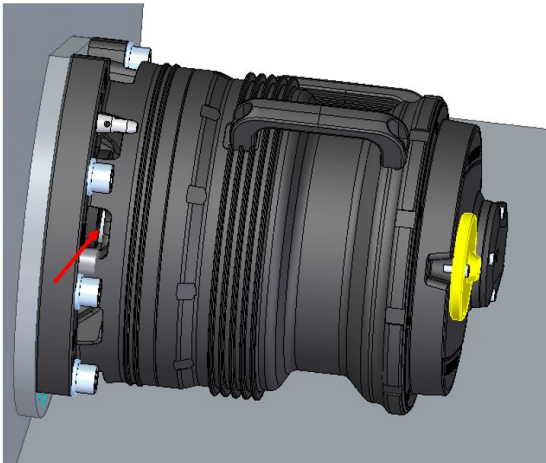


15. Apply a thin layer of marine grease (lithium based) on the spline. Use the guide pins to align the servo unit and tighten the M16 bolts to 120 Nm.



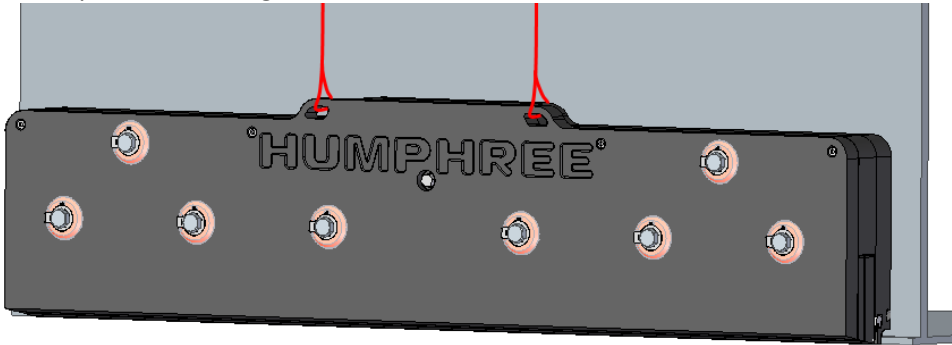
16. Connect the power to the Servo unit and start the system from the control panel.

17. After launching the boat, all HLS shaft sleeves shall be examined so that they are watertight.

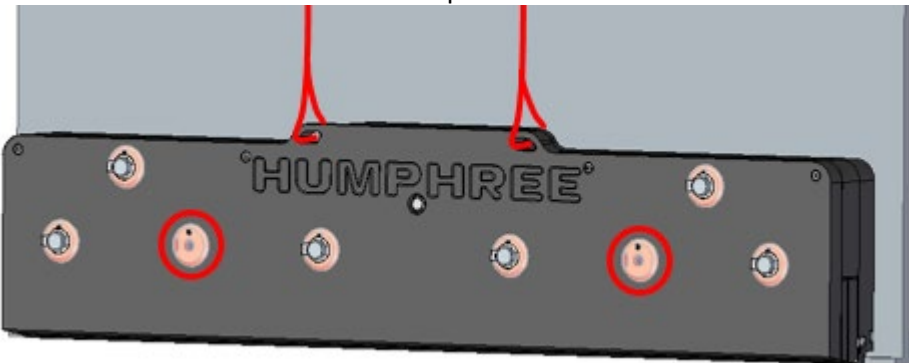


Replacement of Interceptor

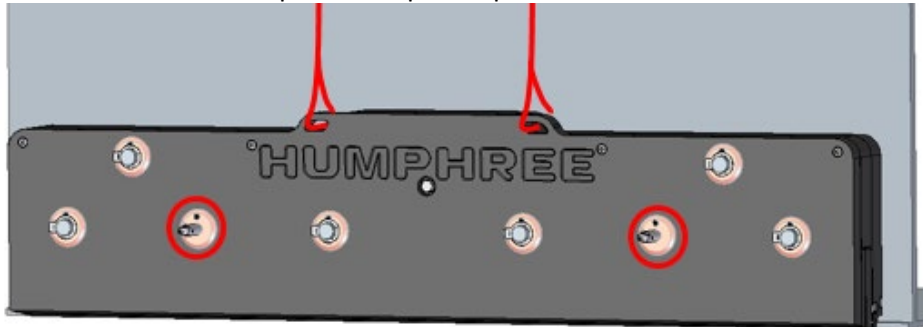
1. Secure a fabric slings device to the lifting holes of the interceptor. Tighten the slack to secure the interceptor from falling off.



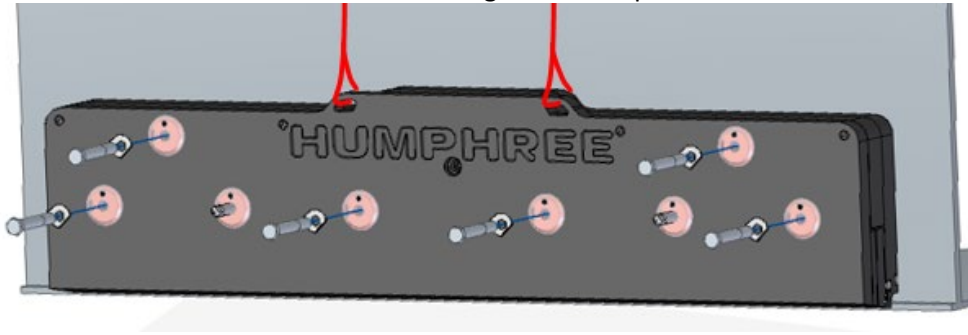
2. Unscrew two M16 bolts of the interceptor.



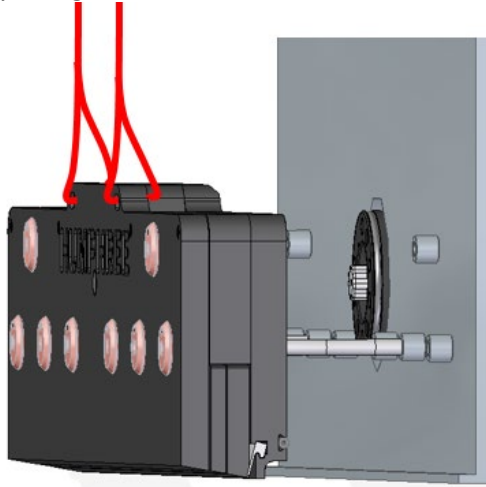
3. Screw in two HLS Guide pin interceptor in place of the M16 bolts. Do not over tighten.



4. Unscrew the rest of the M16 bolts holding the interceptor.



5. Make sure the lifting device is holding the weight of the interceptor and pull the interceptor firmly straight out.



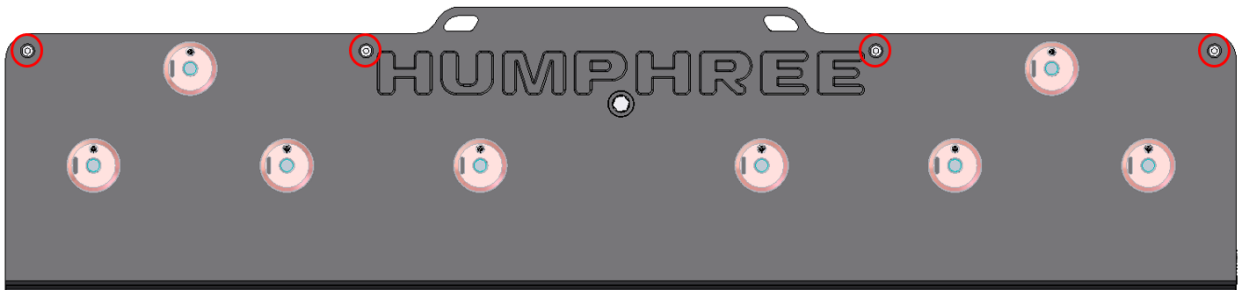
6. When the interceptor is free it can be lifted to a desired location.

Replacement of spare parts in the interceptor

Crank, Crank seal, Seal strip and O-ring seal.

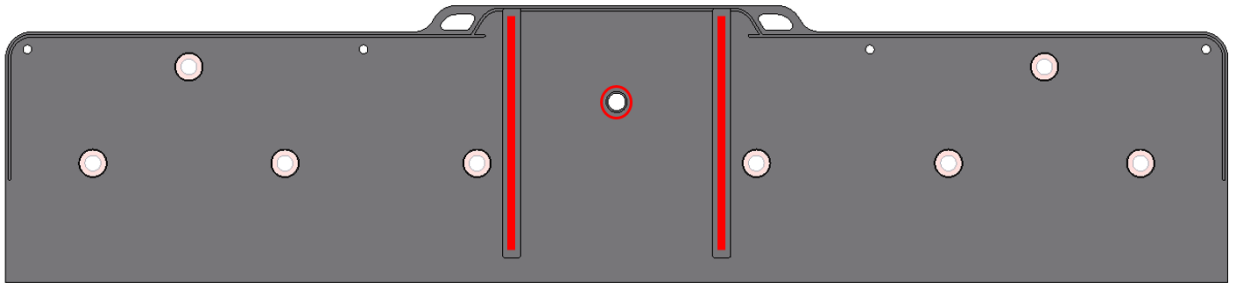
Disassembly of interceptor lying on a workbench.

1. Remove the four M8 transportation bolts of the interceptor.

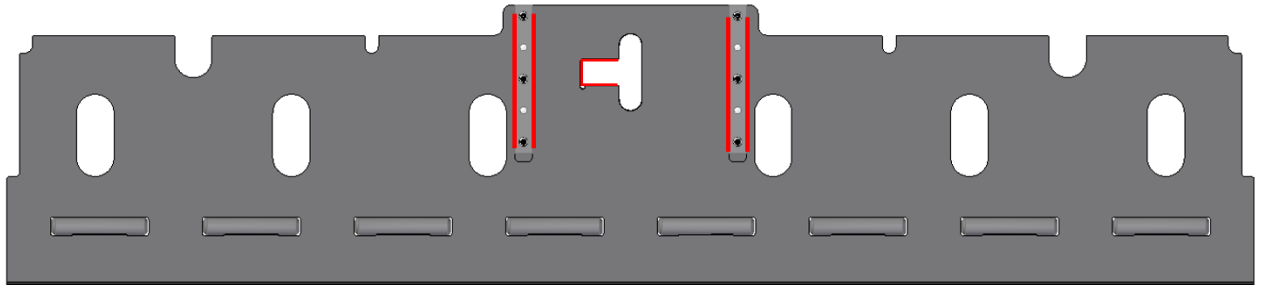


2. Place a flat screw driver between the blades and bend it to open the aft plate of the interceptor.

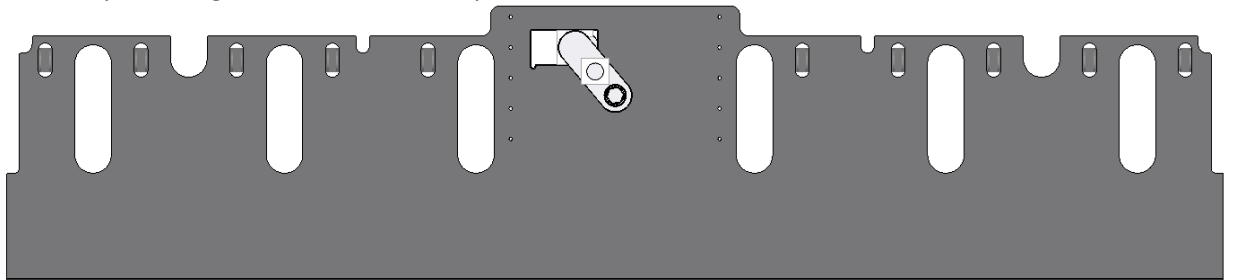
3. Remove the aft plate and inspect it for damage. Clean from old grease, highlighted in red.



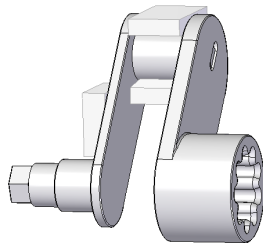
4. Remove the bearing plate and inspect it for damage. Clean from old grease, highlighted in red. Check that all the bearing rollers are in place and not damaged.



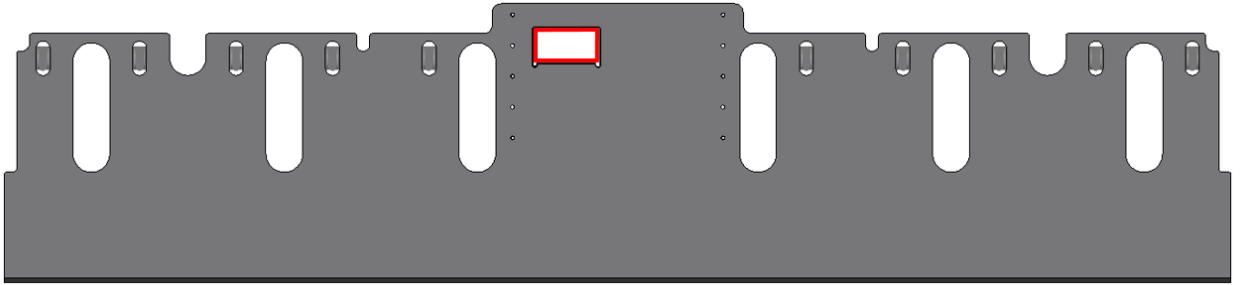
5. The crank is connected to the blade and can only be taken out when the blade plate is removed. Remove the blade plate by pulling it straight out. The crank is guided by the center hole and must be pulled together with the blade plate to be removed.



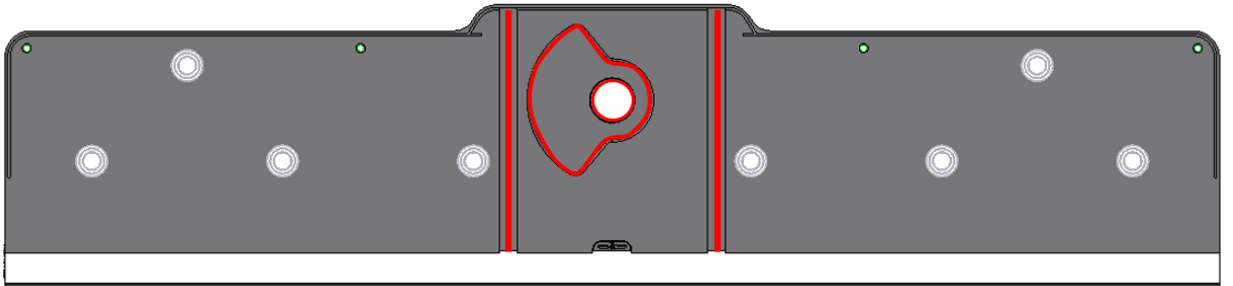
6. Remove the crank from the blade plate.



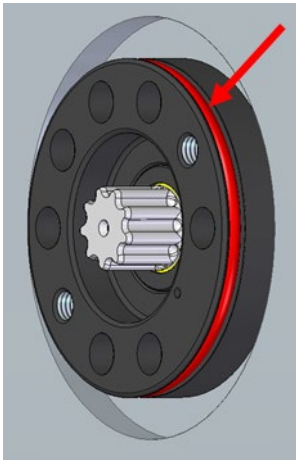
7. Inspect the blade for damage. Clean from old grease, highlighted in red. Check that all the blade rollers are in place.



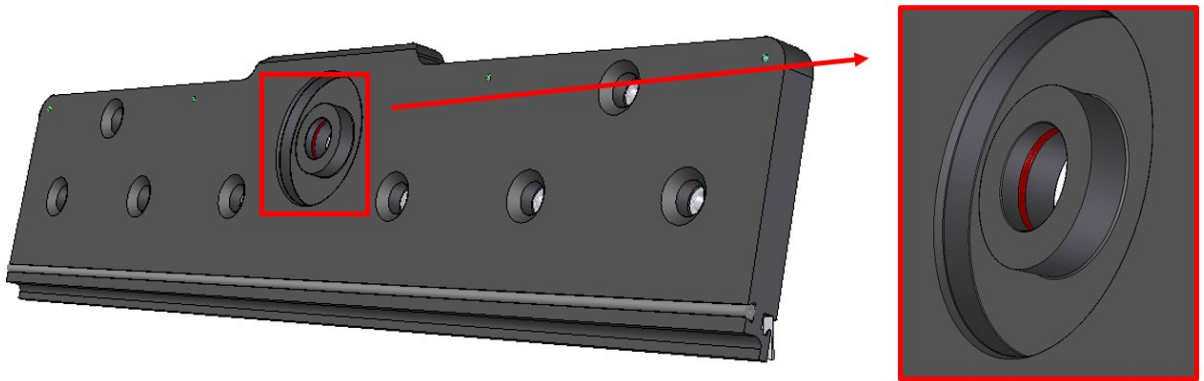
8. Inspect the transom plate for damage. Clean from old grease, highlighted in red.



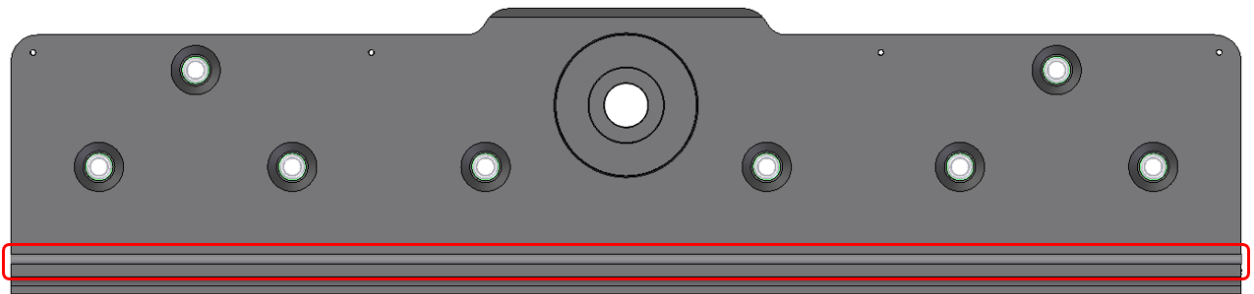
9. Remove the O-ring on the shaft sleeve (150X7), highlighted in red. The shaft sleeve is still sitting on the vessel.



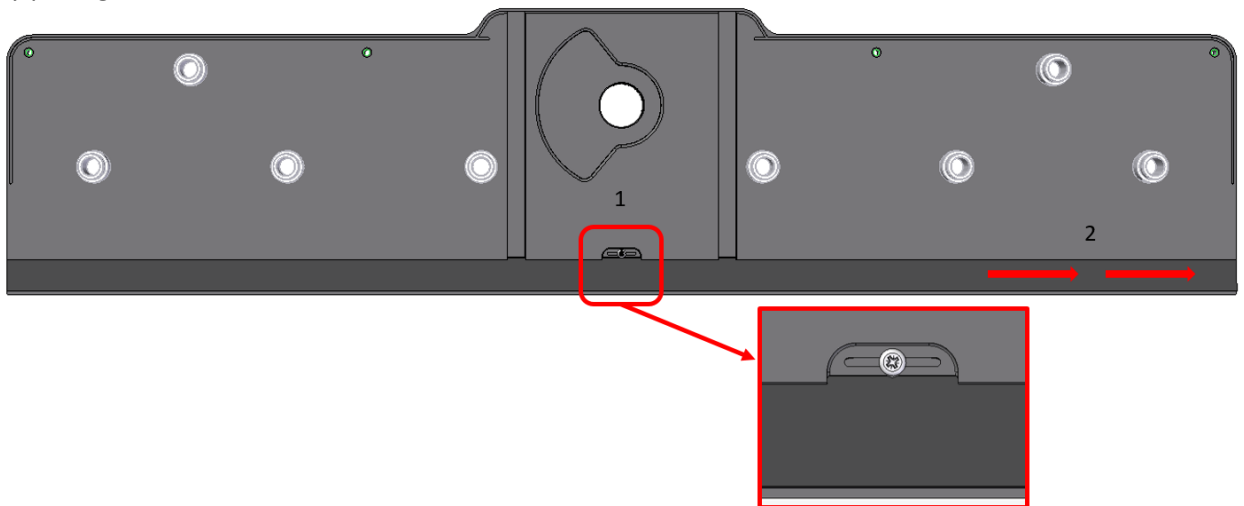
10. Remove the crank seal, highlighted in red.



11. Pull out the O-ring seal on the back of the transom plate.

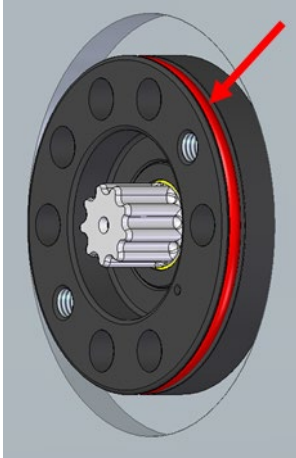


12. Remove the screw (1) which is securing the HLS seal strip and the remove (2) the HLS seal strip by pulling it to the side.

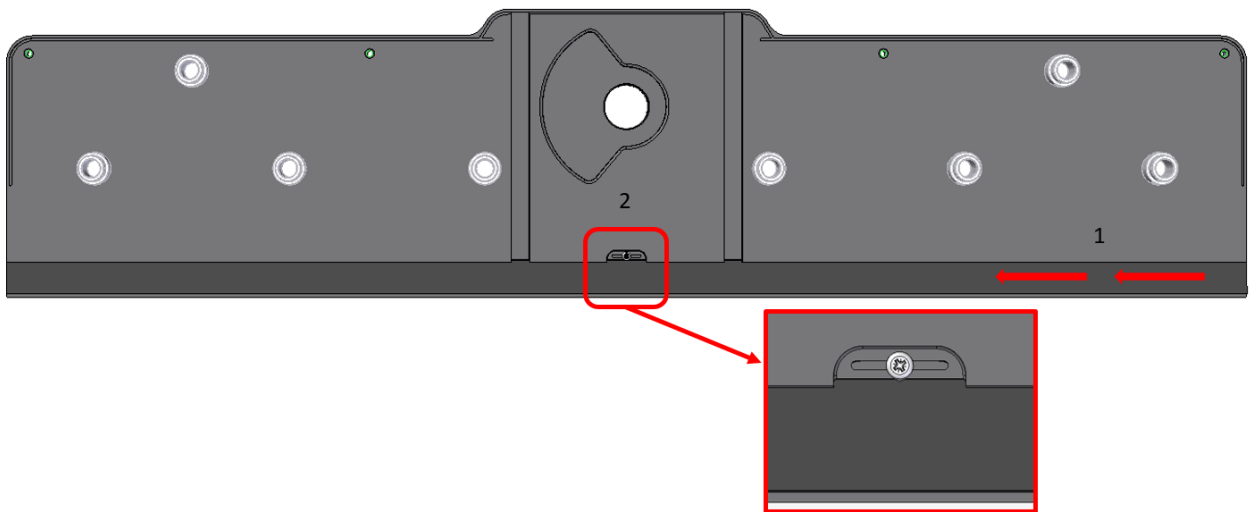


Reassembly of HLS interceptor

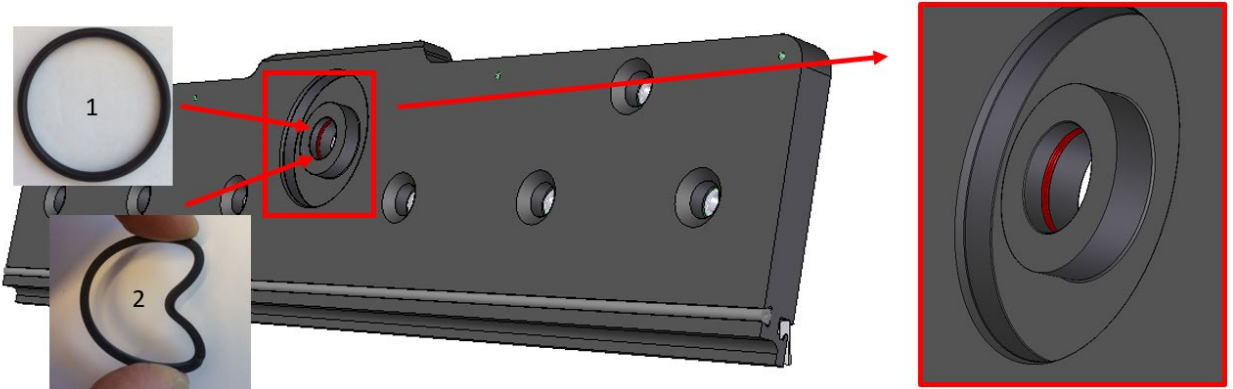
13. Place a new O-ring 150x7 in its groove.



14. Slide in a new HLS seal strip (1) in the transom plate from one side. Secure it with the screw (2).

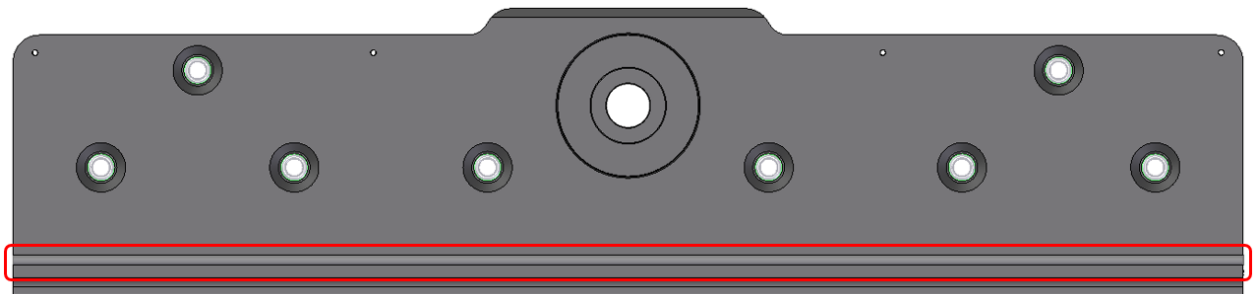


15. First place a new O-ring in the transom plate centre groove. Make a Kidney shape of the seal when mounting it on top of the O-ring. Press with the fingers in a circular motion around the inner surface of the seal to get the seal to return to its original shape.

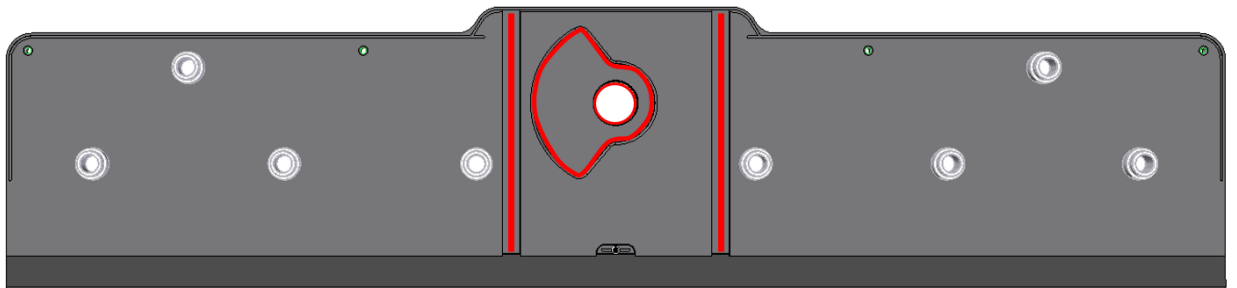


Seal in Kidney shape to allow fitting.

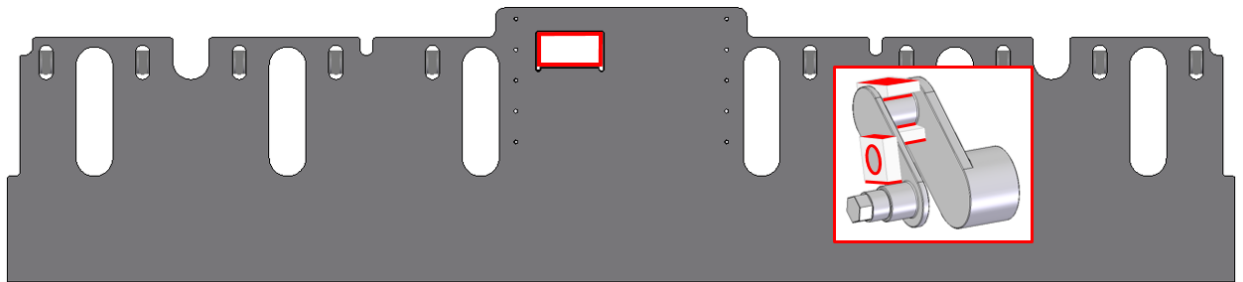
16. Replace the O-ring seal on the back of the transom plate it with a new one. Push it in place from the back. Do not pull it from the side.



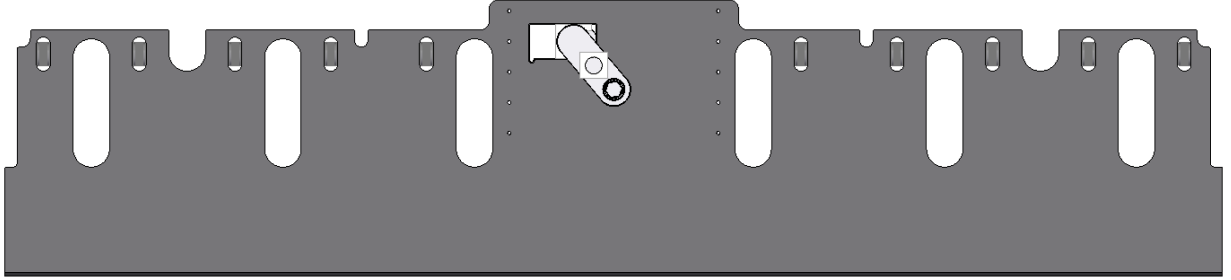
17. Grease the guide grooves with some marine grease in the transom plate, highlighted in red.



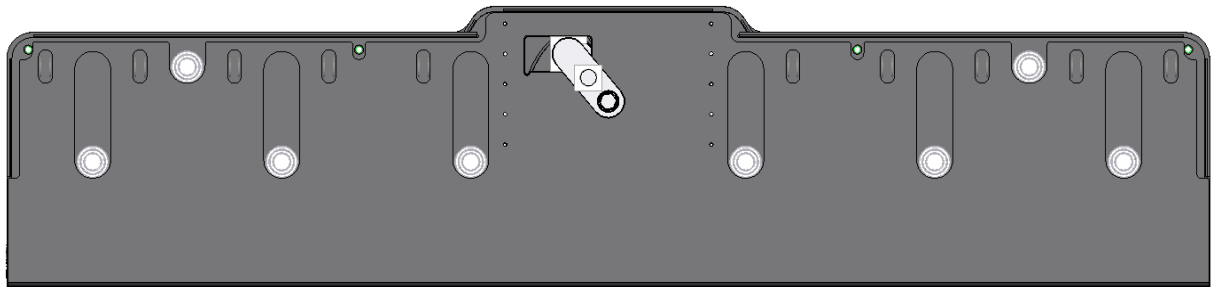
18. Grease the cube of the crank and the hole in the blade with marine grease, highlighted in red.



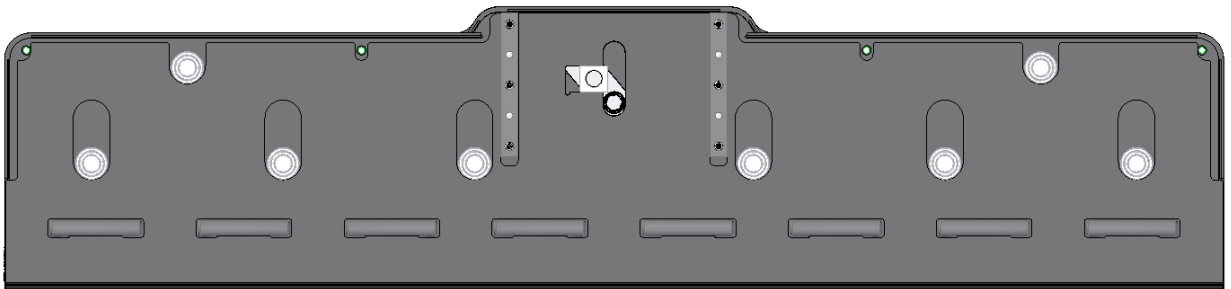
19. Replace the crank in the blade plate.



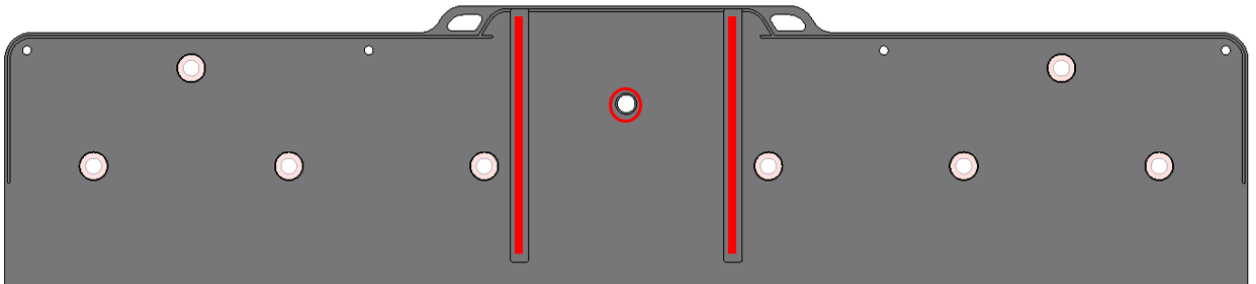
20. Place the blade plate on the transom plate with the guide lists facing the transom plate. Make sure the guide lists align and the crank enters the center hole correctly.



21. Place the bearing plate on the blade plate with the guide lists facing the aft plate. Make sure the cube of the crank fits the bearing plate.



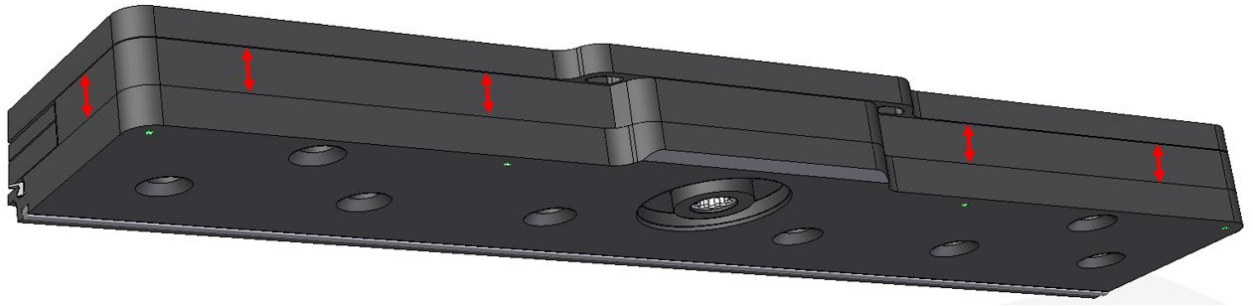
22. Grease the grooves of the aft plate with marine grease.



23. Make sure the cover strips are in place.

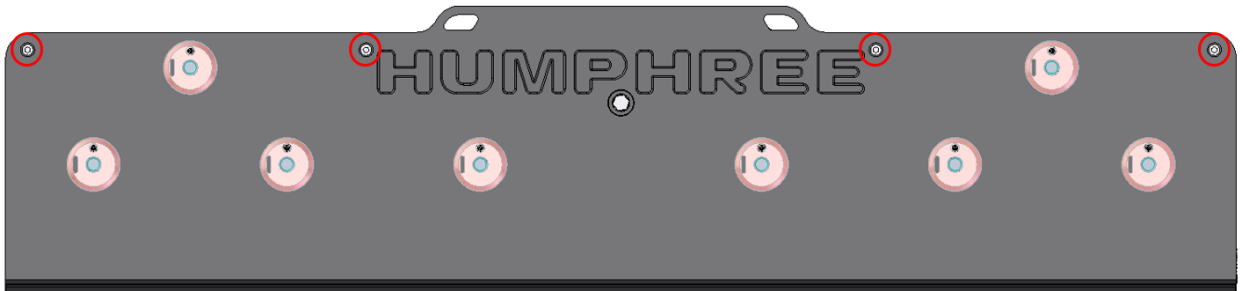
HUMPHREE®

24. Place the aft plate on the bolt pins and press it firmly into place. Make sure the cover strips enter the grooves of the aft plate.



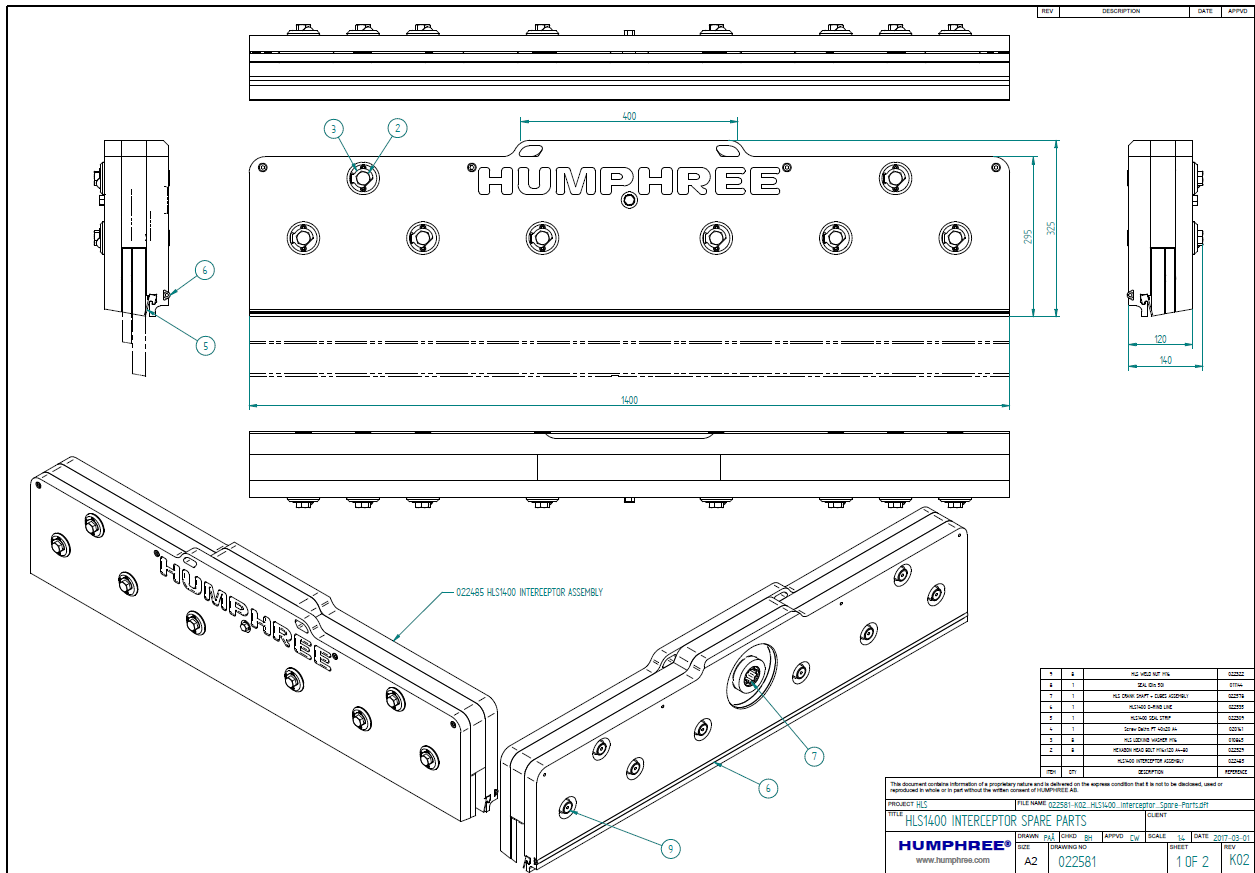
25. Make sure the crank shaft goes through the center hole and that the guides lists fit in the grooves of the aft plate.

26. Secure the plate with the four M8 transportation bolts of the interceptor.



Spare parts for HLS interceptor

022581-K01_HLS1400_Interceptor_Assy



| REV | DESCRIPTION | DATE | APPROV |
|-----|-------------|--------|--------|
| 1 | ASSEMBLY | 022581 | |
| 2 | REVISED | 022581 | |
| 3 | REVISED | 022581 | |
| 4 | REVISED | 022581 | |
| 5 | REVISED | 022581 | |
| 6 | REVISED | 022581 | |
| 7 | REVISED | 022581 | |
| 8 | REVISED | 022581 | |
| 9 | REVISED | 022581 | |
| 10 | REVISED | 022581 | |
| 11 | REVISED | 022581 | |
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| 22 | REVISED | 022581 | |
| 23 | REVISED | 022581 | |
| 24 | REVISED | 022581 | |
| 25 | REVISED | 022581 | |
| 26 | REVISED | 022581 | |
| 27 | REVISED | 022581 | |

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| | | | |
|---------|---------------------------------|------------|--|
| PROJECT | HLS | FILE NAME | 022581-K01_HLS1400_Interceptor_Spare-Parts.dwg |
| TITLE | HLS1400 INTERCEPTOR SPARE PARTS | | |
| CLIENT | | | |
| DRAWN | PL | CHECKED | BR |
| DATE | 2017-03-01 | SCALE | 1:1 |
| APPVED | CW | DATE | 2017-03-01 |
| SIZE | A2 | DRAWING NO | 022581 |
| WEBSITE | www.humphree.com | SHEET | 1 OF 2 |
| | | REF | K02 |

| REV | DESCRIPTION | DATE | APPROV |
|-----|-------------|----------|--------|
| 1 | REV A2 | 02/25/21 | |
| 2 | REV A1 | 01/14/21 | |
| 3 | REV A1 | 02/25/21 | |
| 4 | REV A1 | 02/25/21 | |
| 5 | REV A1 | 02/25/21 | |
| 6 | REV A1 | 02/25/21 | |
| 7 | REV A1 | 02/25/21 | |
| 8 | REV A1 | 02/25/21 | |
| 9 | REV A1 | 02/25/21 | |

Spare part kits

| HLS Crank kit 022953 | | | | HLS Blade Seal kit 022954 | | | |
|----------------------|-----|-----------------------------------|----------|---------------------------|-----|-------------------------|----------|
| ITEM | QTY | PART NAME | PART NO. | ITEM | QTY | PART NAME | PART NO. |
| 3 | 8 | HLS locking washer M16 | 010865 | 3 | 8 | HLS locking washer M16 | 010865 |
| 7 | 1 | HLS Crank Shaft and Cube Assembly | 022578 | 4 | 1 | Screw delta PT 40x20 A4 | 020161 |
| 8 | 1 | Seal Dia 50 | 011144 | 5 | 1 | HLS 1400 Seal strip | 022309 |
| | | | | 6 | 1 | HLS 1400 O-ring line | 022535 |

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Product Name: **HLS400 INTERCEPTOR SPARE PARTS**

Revision: **A2**

Scale: **2 OF 2**

Date: **02/25/21**

Sheet: **K02**

Spare part kits

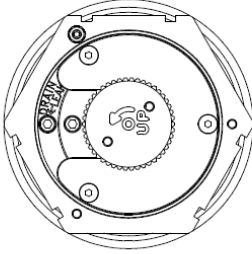
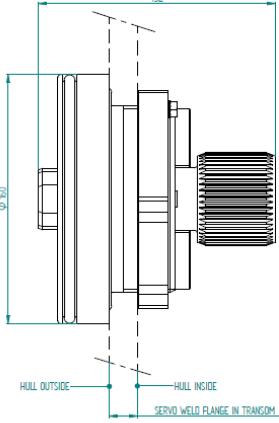
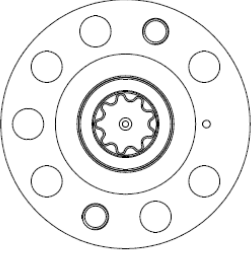
| HLS Crank kit 022953 | | | |
|----------------------|-----|-----------------------------------|----------|
| ITEM | QTY | PART NAME | PART NO. |
| 3 | 8 | HLS locking washer M16 | 010865 |
| 7 | 1 | HLS Crank Shaft and Cube Assembly | 022578 |
| 8 | 1 | Seal Dia 50 | 011144 |

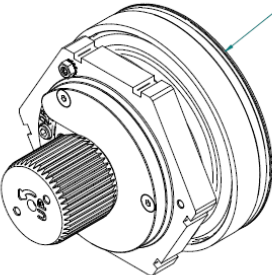
| HLS Blade Seal kit 022954 | | | |
|---------------------------|-----|-------------------------|----------|
| ITEM | QTY | PART NAME | PART NO. |
| 3 | 8 | HLS locking washer M16 | 010865 |
| 4 | 1 | Screw delta PT 40x20 A4 | 020161 |
| 5 | 1 | HLS 1400 Seal strip | 022309 |
| 6 | 1 | HLS 1400 O-ring line | 022535 |

Spare parts for HLS Hull transition

022585-K01_HLS_Hull_Transition_ASSY

| REV | DESCRIPTION | DATE | APPROV |
|-----|-------------|------|--------|
| | | | |



022467 HLS HULL TRANSITION ASSEMBLY

NOTES
 - HLS HULL TRANSITION ASSEMBLY TOTAL WEIGHT ~3.5 kg

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| | | | |
|---------------------------------------|--------------|--|-----------|
| PROJECT HLS | | FILE NAME 022585-K02_HLS_Hull_Transition_Spare-Parts.dft | |
| TITLE HLS HULL TRANSITION SPARE PARTS | | | CLIENT |
| DRAWN PAJ | CHKD BH | APPROV CW | SCALE 1:2 |
| DATE 2017-02-02 | SHEET 1 OF 2 | | REV K02 |

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| REV | DESCRIPTION | DATE | APPV |
|------|------------------------------|-------------|-----------|
| 12 | 0-RING Dia 145,42x6,99 | 022568 | |
| 11 | Washer nylon | 022593 | |
| 10 | BOLT M6x20 | 011171 | |
| 9 | CYLINDRICAL PIN | 010849 | |
| 8 | 0-RING Dia 129,54x6,99 | 022567 | |
| 7 | STOP SCREW | 022530 | |
| 6 | SERRATED LOCK WASHER M6 A4 | 022531 | |
| 5 | NUT M6 | 022539 | |
| 4 | HLS INNER BARREL ASSEMBLY | 022559 | |
| 3 | HLS SHIRT | 022629 | |
| 2 | BOLT M6x30 | 021005 | |
| | HLS HULL TRANSITION ASSEMBLY | 022487 | |
| ITEM | QTY | DESCRIPTION | REFERENCE |

Spare part kits

| HLS inner Seal Kit 022951 | | | | HLS Outer Seal Kit 022952 | | | |
|---------------------------|-----|---------------------------|----------|---------------------------|-----|-----------------------------|----------|
| ITEM | QTY | PART NAME | PART NO. | ITEM | QTY | PART NAME | PART NO. |
| 2 | 3 | Screw M6x30 MF6S A4 | 021005 | 5 | 1 | Nut M6 M6M A4 | 022539 |
| 4 | 1 | HLS inner barrel assembly | 022559 | 6 | 1 | Serrated lock washer M6 A4 | 022531 |
| 10 | 4 | Screw M6x30 MC6S A4 | 011171 | 7 | 1 | Stop screw M6 M6M A4 | 022530 |
| 11 | 1 | Washer nylon M6 | 022593 | 8 | 1 | O-ring (Dia 129,54x6,99 mm) | 022567 |
| | | | | 9 | 1 | Cylindric pin 6x20 | 010849 |
| | | | | 12 | 1 | O-ring (Dia 145,42x6,99 mm) | 022568 |

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PROJECT: HLS FILE NAME: 022585-K02_HLS_Hull_Transition_Spare_Parts.dft

TITLE: HLS HULL TRANSITION SPARE PARTS CLIENT:

HUMPHREE® DRAWN: PAM CHKD: BH APPVD: CW SCALE: 1:2 DATE: 2017-02-02

www.humphree.com SIZE: A3 DRAWING NO: 022585 SHEET: 2 OF 2 REV: K02

Spare part kits

| HLS inner Seal Kit 022951 | | | |
|---------------------------|-----|---------------------------|----------|
| ITEM | QTY | PART NAME | PART NO. |
| 2 | 3 | Screw M6x30 MF6S A4 | 021005 |
| 4 | 1 | HLS inner barrel assembly | 022559 |
| 10 | 4 | Screw M6x30 MC6S A4 | 011171 |
| 11 | 1 | Washer nylon M6 | 022593 |

| HLS Outer Seal Kit 022952 | | | |
|---------------------------|-----|-----------------------------|----------|
| ITEM | QTY | PART NAME | PART NO. |
| 5 | 1 | Nut M6 M6M A4 | 022539 |
| 6 | 1 | Serrated lock washer M6 A4 | 022531 |
| 7 | 1 | Stop screw M6 M6M A4 | 022530 |
| 8 | 1 | O-ring (Dia 129,54x6,99 mm) | 022567 |
| 9 | 1 | Cylindric pin 6x20 | 010849 |
| 12 | 1 | O-ring (Dia 145,42x6,99 mm) | 022568 |