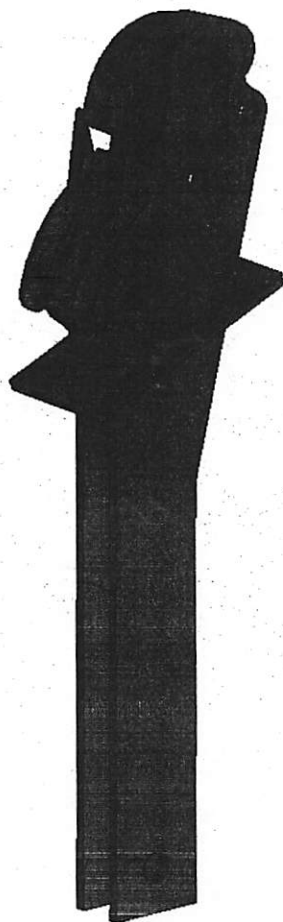


INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Hook type:
**LHR12M2, LHR9M2, LHR6M2,
LHR3,5M2**

Doc.no. K781.000.522



Rev.	Date	Reason for issue	Prep.	Check.	Appr.
7	2012-11-28	Label singel fall	IJH	LH	TA
6	2012-11-07	6.1 Singel fall and Service comments	IJH	LH	TA
5	2012-10-22	7.4 5-years Overhaul /7.5 Spar Parts	IJH	LH	TA
4	2012-08-24	7.1 Hanging Off Eye	IJH	LH	TA
3	2011-12-15	Corr acc LR, page 12,14,19, 29 & 33	IJH	LH	TA
2	2010-12-17	Third Edition, New Labels	IJH	EK	AL
1	2010-04-29	Second edition, page 8 and 22	IJH	LH	TL
-	2010-01-03	First edition	MC	IJH	AL

Table of Contents	Page
<u>1 INTRODUCTION TO UMOE SCHAT-HARDING EQUIPMENT AS</u>	<u>3</u>
<u>2 THE MANUAL</u>	<u>4</u>
<u>3 GENERAL SAFETY GUIDELINES</u>	<u>5</u>
<u>4 TRANSPORT AND LIFTING OF LIFEBOAT AWAY FROM THE DAVITS</u>	<u>6</u>
<u>5 DESCRIPTION</u>	<u>8</u>
5.1 INTRODUCTION	8
5.2 END LINKS DIMENSIONS FOR LHR M2 HOOK RANGE	8
5.3 LABELS	9
<u>6 INSTALLATION & OPERATION</u>	<u>15</u>
6.1 GENERAL INSTALLATION OF LHR M2 HOOKS IN LIFEBOAT SINGLE AND DOBBEL FALL	15
6.2 LIFEBOAT OUT OF WATER, HYDROSTATIC LOCK CLOSED	16
6.3 LIFEBOAT SEABORNE, HYDROSTATIC LOCK OPEN	17
6.4 DESCRIPTION OF THE HOOK IN CLOSED CONDITION	18
6.5 DESCRIPTION OF THE HOOK IN RELEASED CONDITION	19
6.6 DESCRIPTION OF HYDROSTATIC INTERLOCK	20
6.7 RELEASING HOOKS – INSTRUCTIONS	21
6.8 EMERGENCY RELEASE OF HOOKS USING CENTRAL RELEASE UNIT	22
6.9 RESETTING THE HOOKS	24
<u>7 MAINTENANCE AND LUBRICATION</u>	<u>26</u>
7.1 PROCEDURE FOR “HANGING OFF” THE LIFEBOAT	27
7.2 WEEKLY INSPECTION	29
7.3 MONTHLY INSPECTION AND MAINTENANCE	30
7.4 YEARLY AND 5-YEARS OVERHAUL	31
7.5 ONE AND FIVE YEAR SPARE PART LIST	35
7.6 LUBRICATION	35
7.7 PROBLEM CHECK LIST	36
<u>8 SCHAT-HARDING SERVICE STATIONS AND PARTNERS</u>	<u>37</u>

1 INTRODUCTION TO UMØE SCHAT-HARDING EQUIPMENT AS

Schat-Harding is the global market leader in marine life saving systems and offers the largest worldwide service network in the industry with headquarters for Umoe Schat-Harding Services AS located at Fornebu, Lysaker, Norway. Headquarter for Umoe Schat-Harding Equipment AS in Rosendal, Norway.

Umoe Schat-Harding combines the original thinking and first-class products of: the Davit Company, Fiskars, Harding, Schat Watercraft, Waterman, Mills and Mulder & Rijke.

This family of trusted brands enables Schat-Harding to offer fully integrated packages of lifeboats, davits, hooks, winches, cruise tenders, and rescue boat, which is backed up by the largest worldwide service network in the industry.

The product range includes:

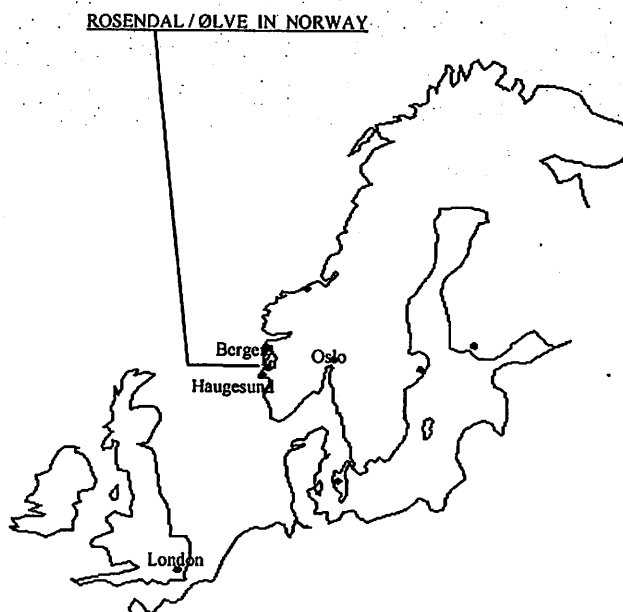
- Rescue boats
- Partially enclosed lifeboats
- Totally enclosed lifeboats
- Combined cruise tenders/lifeboats
- Free fall lifeboats
- Davits, Winches and Hooks for lifeboats, tenders, rescue boats and liferafts.

Lifeboats are manufactured in Norway, USA and China, while the davits, winches and hooks are manufactured in Slany, Czech Republic and China.

schat-harding

The name Harding has implied quality and innovation in safety and rescue equipment for years. Schat-Harding has developed a comprehensive and entirely new generation of survival crafts, winches and davits. Development is a continuous process and our products are continually updated based on the experience derived from thousands of deliveries to cruise ships, freighters, drilling rigs and production platforms around the world.

Safety and quality are the hallmarks of our products. We hope that you are pleased with the equipment as well as with the manual.



2 The Manual

This manual has been prepared in accordance with applicable regulations. The plans and data have been examined for compliance with the following:

- SOLAS 74 as amended to date, Revised Chapter III Resolutions 4, 34, 35 and 36.
- LSA Code as amended by resolution MSC 218(82) and MSC320(89)
- IMO Resolution MSC.81(70) Part 1 as amended by resolution MSC 226(82) and MSC321(89)

The purpose of the Manual is to ensure that the entire crew of the ship or installation becomes acquainted with the safety equipment, and knows how to proceed in the event of an emergency. In addition to the procedures for entering, lowering and manoeuvring, correct conduct aboard the lifeboat, assistance and the use of the equipment in the boat are emphasised.

Although trained personnel will operate the lifeboat, everyone is urged to acquaint himself or herself with the Manual. A copy should therefore be placed in the crew mess and living quarters, in addition to one in each lifeboat.

The Manual must not be copied, reproduced or otherwise employed without first obtaining written permission from Umoe Schat Harding Equipment A/S

Umoe Schat Harding Equipment A/S does not assume any responsibility for damages resulting from the use of the Manual.

Umoe Schat Harding Equipment A/S reserves the right to make changes in the Manual without giving any form of notice.

Enquiries for service may be directed to one of our Service Stations. A detailed contact list of our Service Stations can be found in chapter 8 of this manual or on our web-site www.schat-harding.com

NOTE!

Due to the many different types in our range of products, some of the sketches may not correspond exactly to the system described in the manual. The principles and procedures are however correct.

3 General safety guidelines



Warning

Important safety notice

The following warning and safety information is intended to prevent accidents and injury

Prior to operating any of the equipment

- The manufacturer's maintenance and operation manual must be read and all operators should be fully conversant with the safe operation of the Davit and Boat systems.
- Operator training should be performed – preferably by the manufacturer's qualified personnel.
- Damaged parts need to be replaced by authorized personnel before operating the system.
- Personnel should stay clear of rotating equipment.
- All loose equipment should be stowed so as to avoid any hazards.
- Safety lines must be used as required.
- All lock procedures must be followed according to current regulations.
- Replace / Repair any equipment showing signs of wear.
- If the Equipment operation and maintenance procedures are not strictly observed, Death, Injury or Long Term Health hazards to personnel could occur.
- If the operation and maintenance procedures are not strictly observed, Damage, Loss of effectiveness or Destruction to the equipment could occur, causing the vessel to become inoperative.
- UMOE Schat-Harding can be contacted to provide regular safety inspection, maintenance checks and repairs on the equipment.
- UMOE Schat-Harding services have agents in most of the countries throughout the world where you can be assured of receiving professional service.
- Before the ship leaves port and at all times during the voyage, all life-saving appliances shall be in working order and ready for immediate use.

4 Transport and Lifting of Lifeboat Away From the Davits

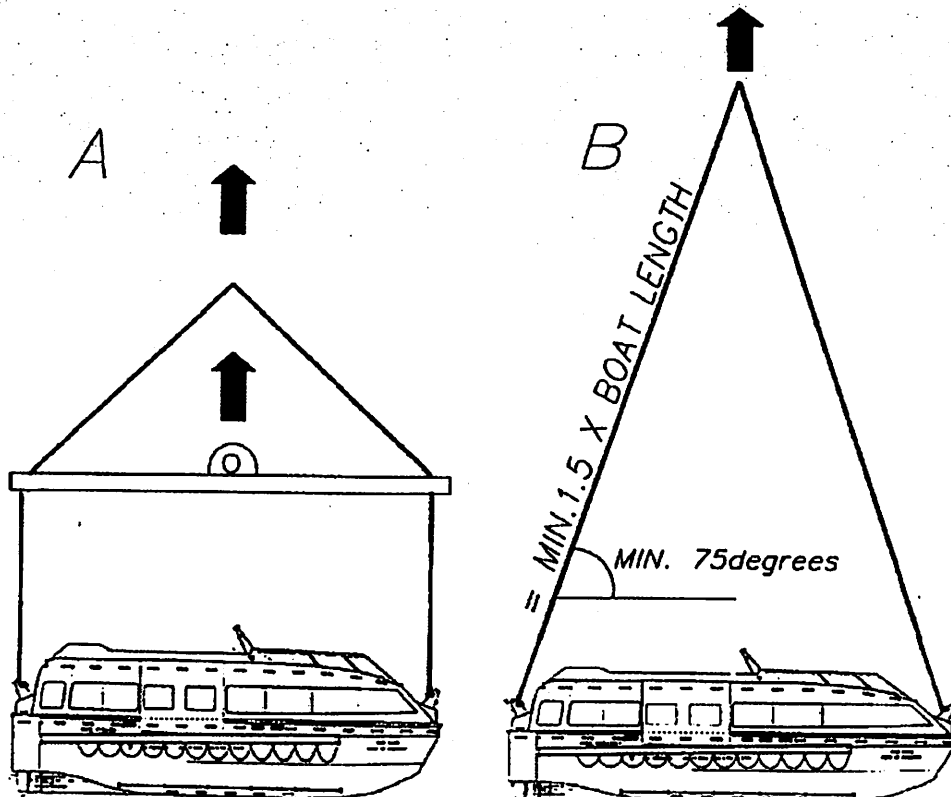
The following criteria must be followed when transporting and lifting lifeboats/tenders:

- The hooks of the lifeboat are designed for the lifeboat hanging in the davits, and therefore all load calculations have been done for vertical tension.
- Neither the hooks nor hook foundations will tolerate loads from lifting with short lifting straps.
- The angle between the strap and horizontal must be at least 75 degrees.
- Schat-Harding recommends that the boat, when not hanging in the davits, should be lifted as in diagram A below, using a "yoke" to give vertical loading of the hooks.
- If a "yoke" is not available, long straps or chains must be used. We recommend the following formulae for the length of each leg of the strap.
- Slings and shackles should be dimensioned according to the actual force. The force is dependant on boat size and angle of straps.

$L = \text{Minimum } 1.5 \times \text{LENGTH OF BOAT}$

Recommended length of lifting straps (empty boat):

MPC32:	14.4 m	CTL 38SV:	17.0 m
MPC 36SV:	16.2 m	MCB 24:	11.8 m
CTL1200:	18.1 m	20 TECB:	8,9 m
MPC29:	13.2 m	22 TECB:	10.1 m
CTL 38:	18.1 m	24 TECB:	11.4 m



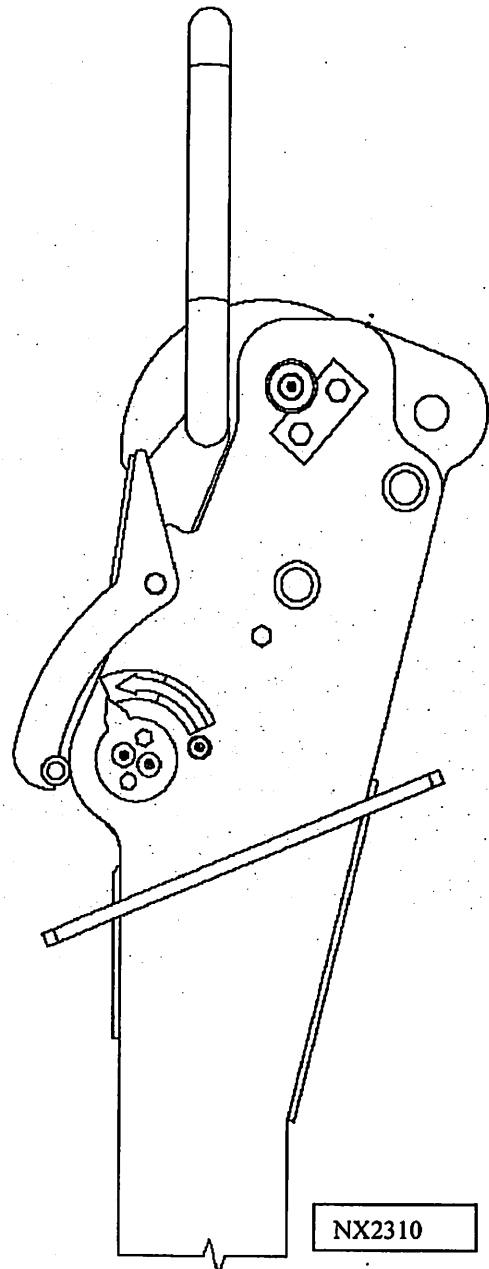
Recommendations for transport away from the davits

Remember that your first responsibility is to give safety priority. Before you begin any lifting operation, we suggest you go through a **mental checklist**. Ask yourself questions like the following:

- ⇒ What is the weight of the load?
- ⇒ What type of accessory is required?
- ⇒ Will the lift be a straight lift - or is an angled rig required? This determination will affect the lifting capability of the accessory.
- ⇒ Are the slings free of kinks, knots and broken strands?
- ⇒ Is proper clearance available to carry out the lift safely?

Since the type of hoisting equipment at each customer's facility is unknown to *Schat-Harding*, these instructions are general rather than specific; however the safety rules will apply. Here are recommendations for **lifting** operations:

- ⇒ Never lift more than the rated capacity of the hoisting equipment.
- ⇒ If in doubt, have the hoisting equipment inspected for safe operating conditions. Inspect all slings. Do not take chances. Possibly check with the proper authority.
- ⇒ Balance load in sling before lifting more than a few centimetres. Distribute load evenly.
- ⇒ Use a sling large enough for the load.
- ⇒ Clarify hand signals with co-workers. If signals are not understood, make no move until they are clarified.
- ⇒ Always ensure you have connected the slings to the correct sling attachment point; check the lifeboat manual.



5 DESCRIPTION

5.1 Introduction

This instruction manual will in detail give the necessary information on how to operate and maintain the lifeboat hook type LHR M2 and its release system.

It is a requirement for safety reasons that the operator and maintenance personnel should be qualified to operate and repair the hook system respectively.

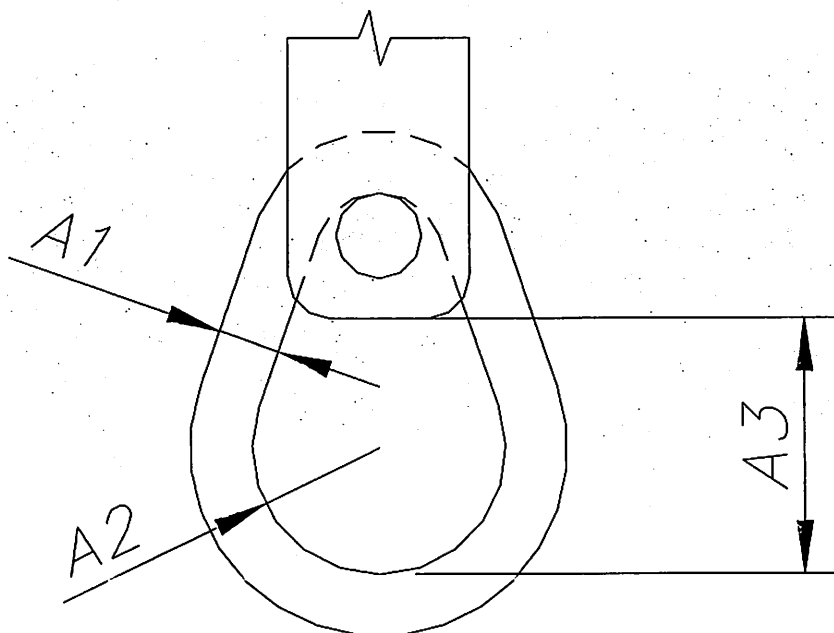
This manual covers the functions of all *Schat-Harding's* LHR M2-hooks.

For the time being, the following hook has been developed:

LHR12M2: max. load: 12 tonnes
LHR9M2: max. load: 9 tonnes
LHR6M2: max. load: 6 tonnes
LHR3,5M2: max. load : 3,5 tonnes

5.2 End links dimensions for LHR M2 hook range

Note: Link must have FOS=6

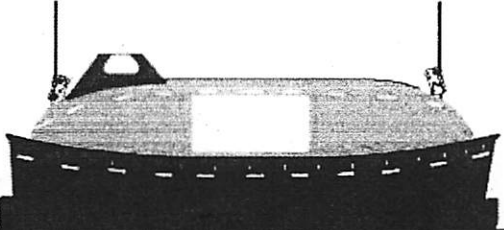
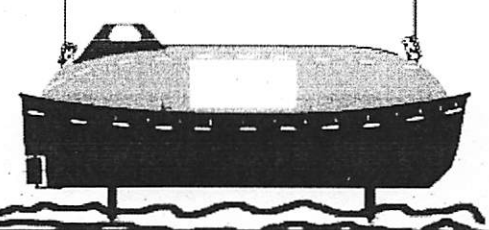



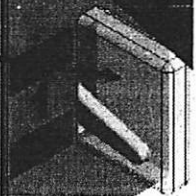
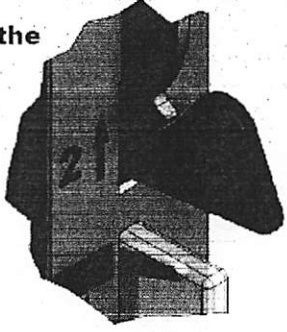
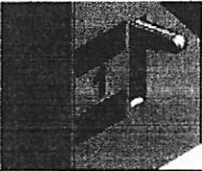

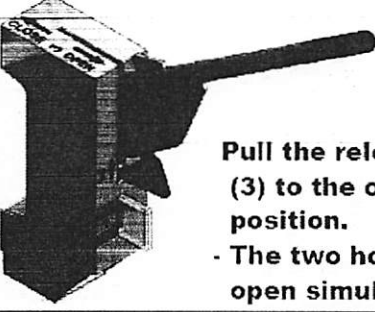
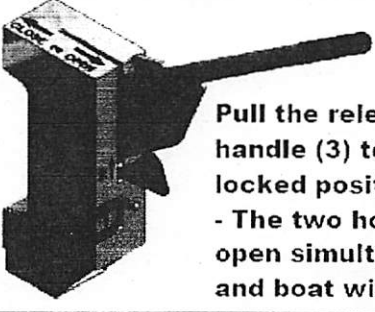


	SWL [T]	MAX. Φ A1 [mm]	MIN. A2 [mm]	MAX. A2 [mm] Max A3/2	MIN. A3 [mm]	MAX. A3 [mm]
LHR3.5M2	3.5	30	52.5	65	91	130
LHR6M2	6	30	50	80,5	95	161
LHR9M2	9	38	65.5	105	130	210
LHR12M2	12	38	67.5	112,5	125	225

Note: Maximal Link rotation $\pm 45^\circ$. Reference sketch: NX2372

5.3 Labels

Mounted on steering console: D20593 art. No 0770.02957 for two hook system:

<p>NORMAL RELEASE DRILL/TRAINING</p>	<p>EMERGENCY RELEASE Incorrect operation can result in Death or serious injury</p>
<p>OFF-LOAD RELEASE</p> 	<p>ON-LOAD RELEASE</p> 
 <p>Confirm before operation: The lifeboat is fully waterborne and that the fall wires are slack</p>	 <p>WARNING! Operate the release handle only upon confirmation of safety by the officer in charge! Release of the lifeboat from a height can cause injury or death.</p> <p><u>Warning</u></p>
<p>- Check that hydrostatic lock (1) has moved to GREEN ZONE</p> 	<p>Break the hydrostatic interlock cover to gain access</p> 
<p>- Lift up and hold the safety lock (2).</p> 	<div style="display: flex;"> <div style="flex: 1;">  <p>Lift the hydrostatic lock (1) to GREEN ZONE Hold until safety lock (2) is lifted</p> </div> <div style="flex: 1;">  <p>Lift and hold safety lock. Pull the release handle to keep safety lock open</p> </div> </div>
 <p>Pull the release handle (3) to the open locked position. - The two hooks will open simultaneously</p>	 <p>Pull the release handle (3) to the open locked position. - The two hooks will open simultaneously and boat will drop.</p>

RESETTING PROCEDURE



Before the release handle is pushed back to closed position, make sure that the lifeboat is free from the falls at both hooks



**Incomplete resetting may result in death or serious injury
Due to dropping of the lifeboat in the water from a height.**

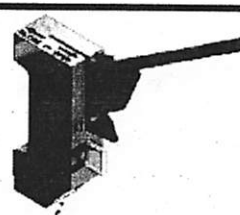
Warning



One person each
to be stationed
for the fore
and aft hook.



One person to be arranged.



The hooks have to be closed manually.

**Make sure that the tail of the hook is
INSIDE the locking shaft.**



**Lock the hooks by using the central
release unit:**

- a) **Lift the safety lock (2).**
- b) **Push the release handle until it
returns to CLOSED position.**
- c) **Push safety lock down to close.**



Release
handle

Verify that hooks are properly locked.

**Verify that safety lock has been reset
and release handle locked.**

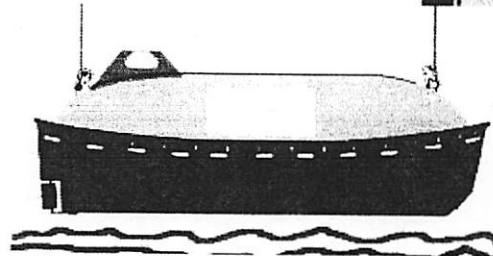
Fit in the suspension links in the hooks.

Hoist the lifeboat just clear of water.

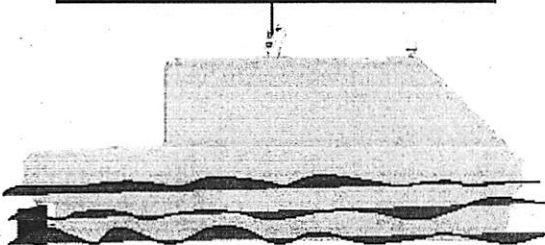
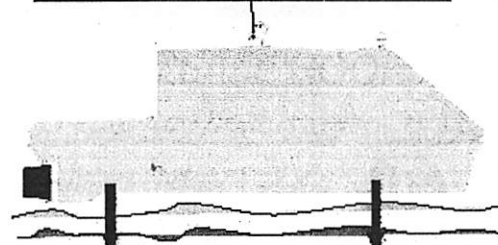



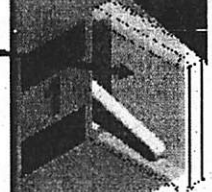
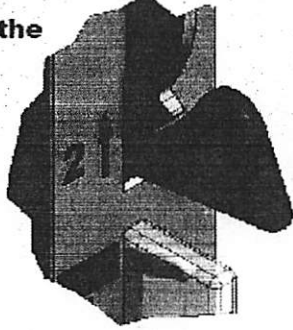


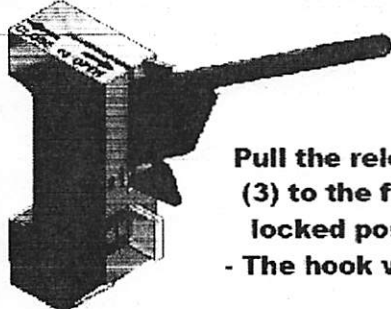
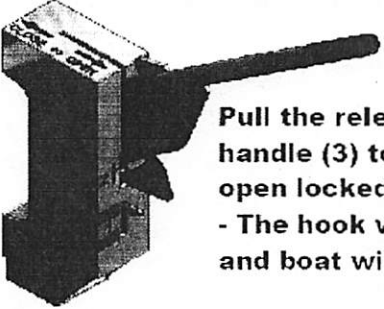
Confirm the complete reset.



Indicator



Mounted on steering console: D20876 art. No 0770.02963 for singel hook system:

<h2>NORMAL RELEASE DRILL/TRAINING</h2>	<h2>EMERGENCY RELEASE</h2> <p>Incorrect operation can result in Death or serious injury</p>
<h3>OFF-LOAD RELEASE</h3> 	<h3>ON-LOAD RELEASE</h3> 
 <p>Confirm before operation: The lifeboat is fully waterborne and that the fall wire is slack</p>	 <p>WARNING! Operate the release handle only upon confirmation of safety by the officer in charge! Release of the lifeboat from a height can cause injury or death.</p> <p><u>Warning</u></p>
<p>- Check that hydrostatic lock (1) has moved to GREEN ZONE</p> 	<p>Break the hydrostatic interlock cover to gain access</p> 
<p>- Lift up and hold the safety lock (2).</p> 	<div style="display: flex;"> <div style="flex: 1;">  <p>Lift the hydrostatic lock (1) to GREEN ZONE Hold until safety lock (2) is lifted</p> </div> <div style="flex: 1;">  <p>Lift and hold safety lock. Pull the release handle to keep safety lock open</p> </div> </div>
 <p>Pull the release handle (3) to the fully open locked position. - The hook will open</p>	 <p>Pull the release handle (3) to the fully open locked position. - The hook will open and boat will drop.</p>

RESETTING PROCEDURE



Before the release handle is pushed back to closed position, make sure that the lifeboat is free from the falls at both hooks



**Incomplete resetting may result in death or serious injury
Due to dropping of the lifeboat in the water from a height.**

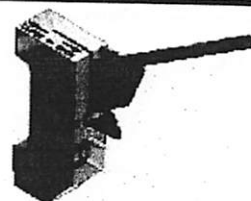
Warning



One person
to be stationed
for the hook.



One person to be arranged
for the Release Unit.



The hook have to be closed manually.

**Make sure that the tail of the hook is
INSIDE the locking shaft.**



**Lock the hook by using the central
release unit:**

- Lift the safety lock (2).**
- Push the release handle until it
returns to CLOSED position.**
- Push safety lock down to close.**



**Release
handle**

Verify that hook are properly locked.

**Verify that safety lock has been reset
and release handle locked.**

Fit in the suspension link in the hook.

Hoist the lifeboat just clear of water.

Confirm the complete reset.



Indicator



DANGER! Misuse of this release gear can injure or kill!

0770.35002

Mounted on all steering console:

Danger!

Misuse of this release gear can injure or kill!

To release hooks:

Ensure that boat is waterborne!

- ⇒ Lift up safety lock and hold
- ⇒ Pull release handle to open

Emergency release:

If NOT waterborne!

- 1 Break safety glass
- 2 Lift up hydrostatic lock to green zone and hold
- 3 Lift up and hold safety lock
- 4 Pull release handle to open

Mounted on release unit:

Closed – hook is closed

Open – hook is released

TO RELEASE HOOKS

Ensure that boat is waterborne!

- Lift up Safety Lock and hold.
- Pull Release Handle to open.

EMERGENCY RELEASE

If NOT waterborne!

1. Break Safety Glass
2. Lift up Hydrostatic Lock to Green Zone and hold.
3. Lift up and hold Safety Lock
4. Pull Release Handle to open.

N42924

CLOSED



RELEASE
HANDLE

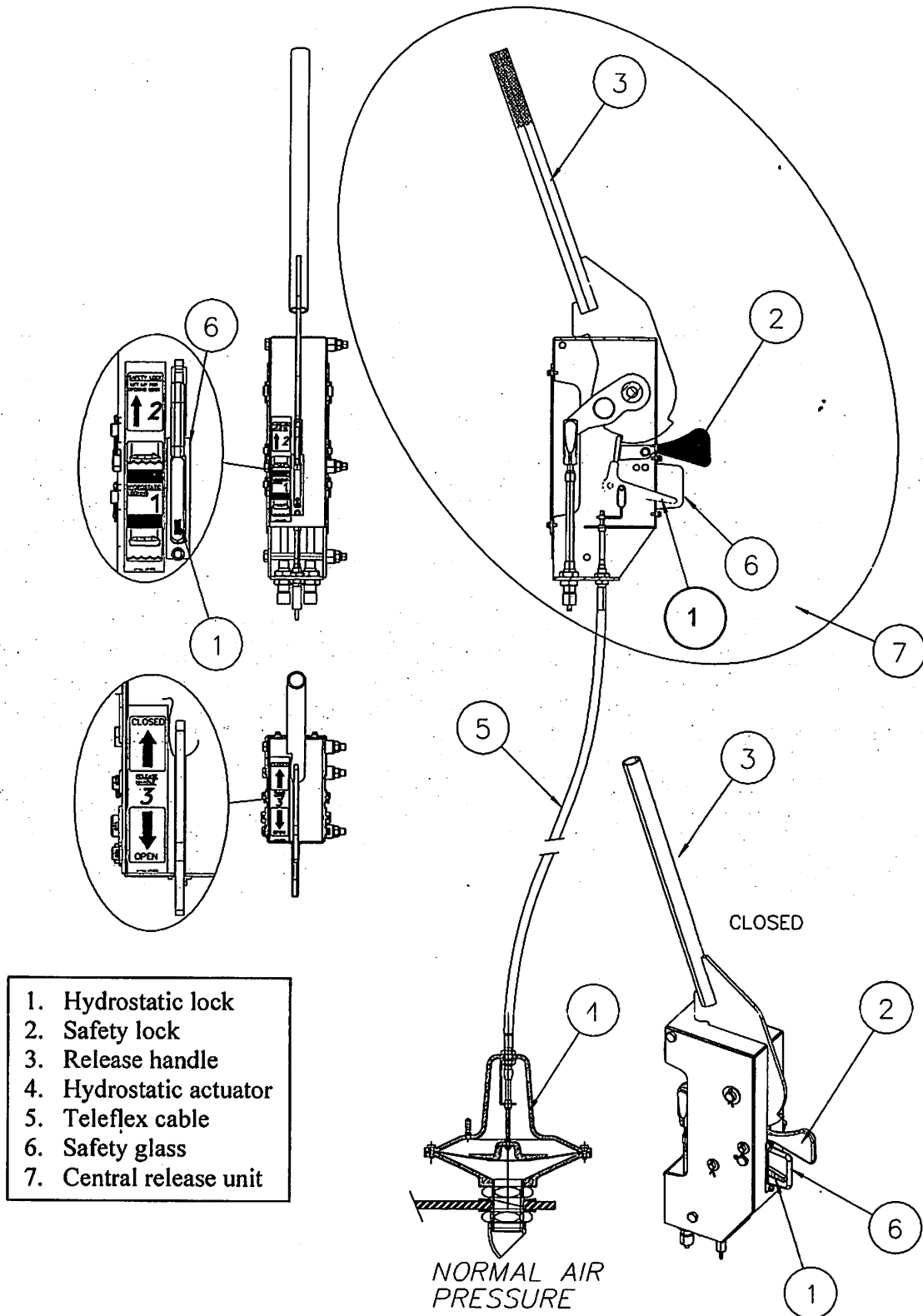
3



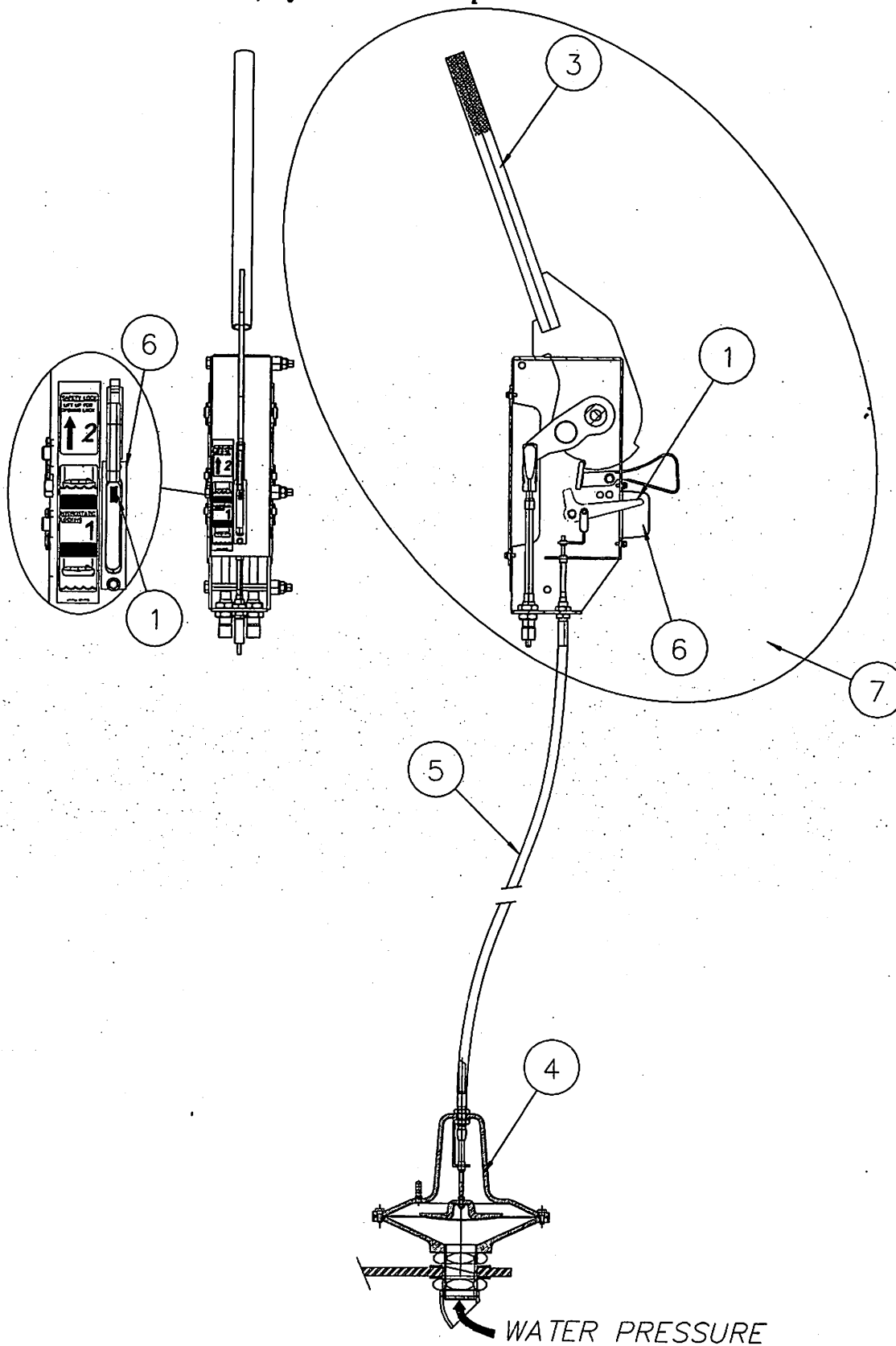
OPEN

Art.No.: H04950

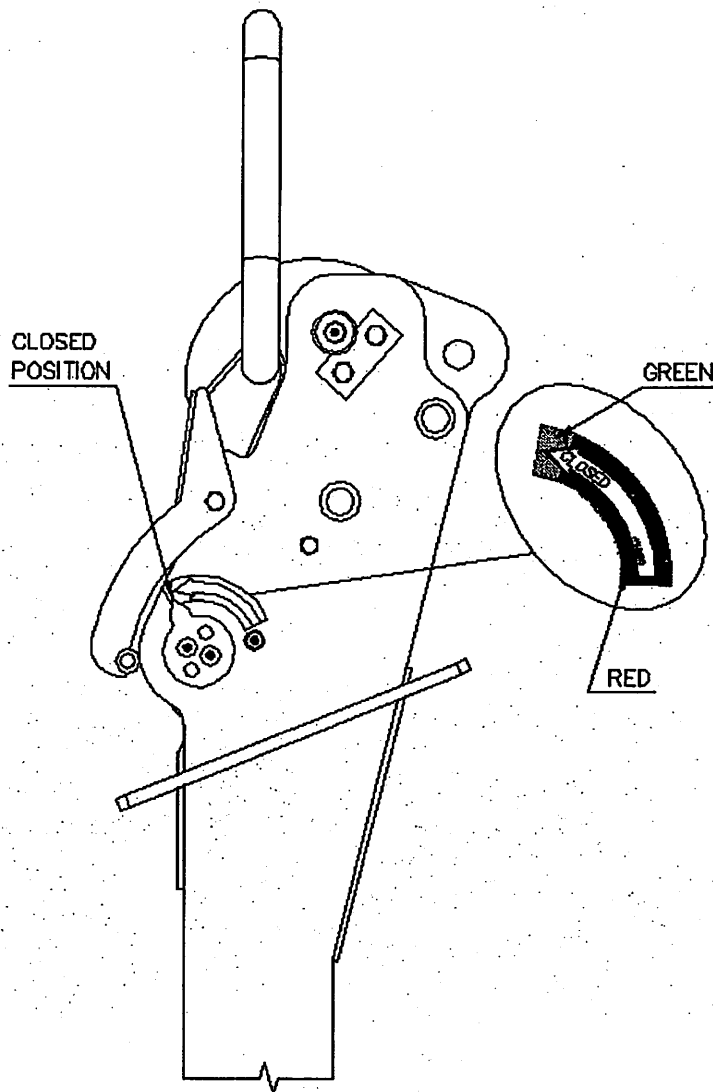
6.2 Lifeboat out of Water, Hydrostatic Lock Closed



6.3 Lifeboat Seaborne, Hydrostatic lock Open



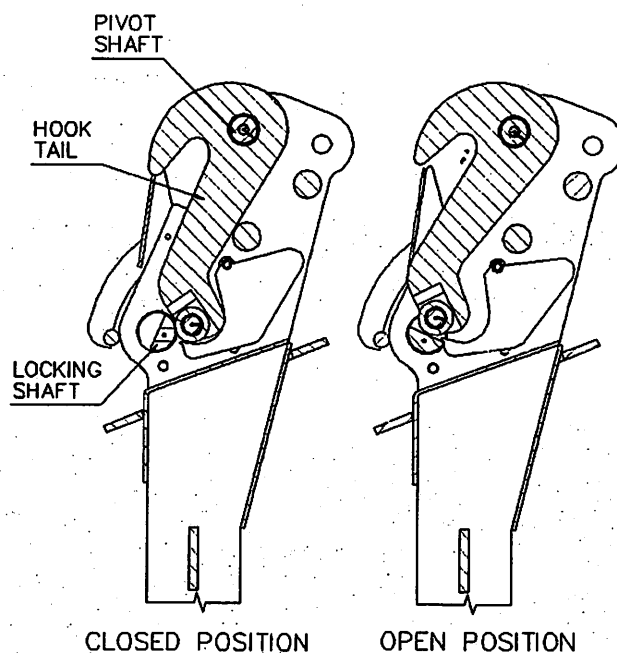
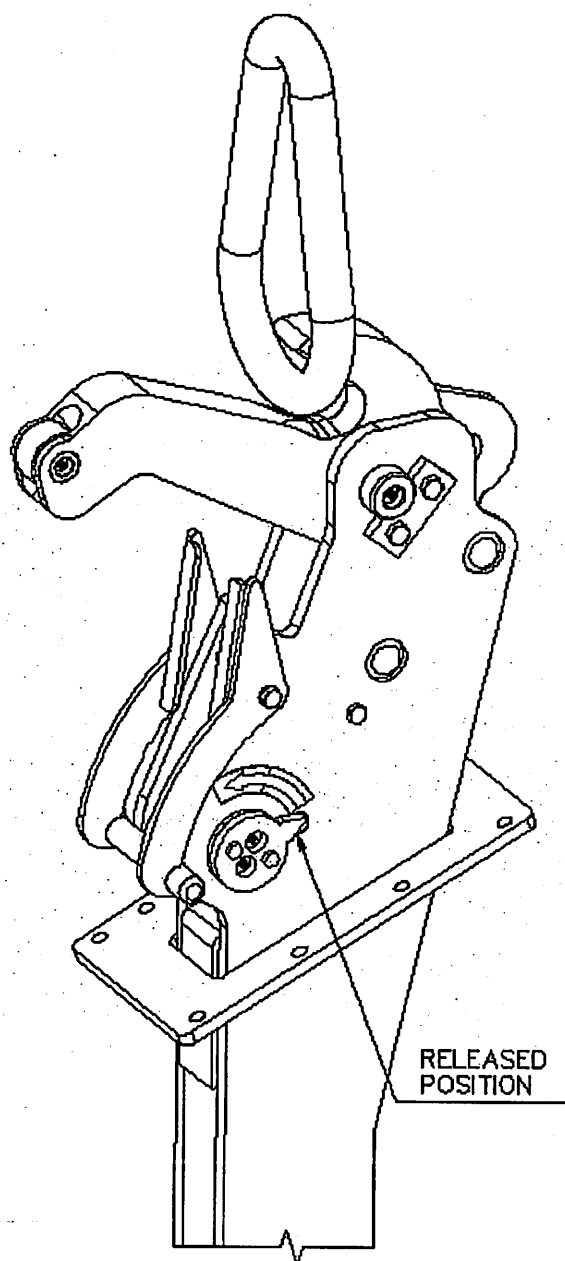
6.4 Description of the Hook in Closed Condition



NX2310

Hook is closed when arrow is pointing towards the green area and it is not possible to move the hook tail.

6.5 Description of the Hook in Released Condition



NX2310

The figure above to the left shows the hook in released position. The sequence of events is as follows:

- ◇ The locking shaft is rotated to fully open position, and allows the tail of the hook to move freely out of the locking shaft.
- ◇ Any tension in the fall wire link will cause the hook to rotate to an open position around its pivoting shaft.

6.6 Description of Hydrostatic Interlock

Lifeboat hanging in fall wires

Under normal working conditions the hydrostatic interlock will prevent operation of the safety lock (item 2) which is blocking the release handle (item 3) until the lifeboat/tender is seaborne. When there is normal atmospheric air pressure on the hydrostatic actuator (item 4), i.e. when the lifeboat is hanging from the fall wires, the hydrostatic lock (item 1) will be in the red zone.

The hydrostatic lock locks the safety lock (Item 2) in closed position and prevents the Release handle (Item 3) from pulling to release of the two hooks. The safety lock (item 2) functions as a safety mechanism in the sense that it has to be released (lifted up) prior to pulling the release handle.

Lifeboat Seaborne

When the lifeboat/tender is seaborne, the air trapped inside the hydrostatic actuator (item 4) will be compressed by the action of seawater and the weight of the lifeboat/tender. This will operate the membrane of the hydrostatic actuator, and push up the Teleflex cable (item 5), which in turn will disengage the hydrostatic lock (item 1). Then the release handle can be operated after lifting up the safety lock (item 2).

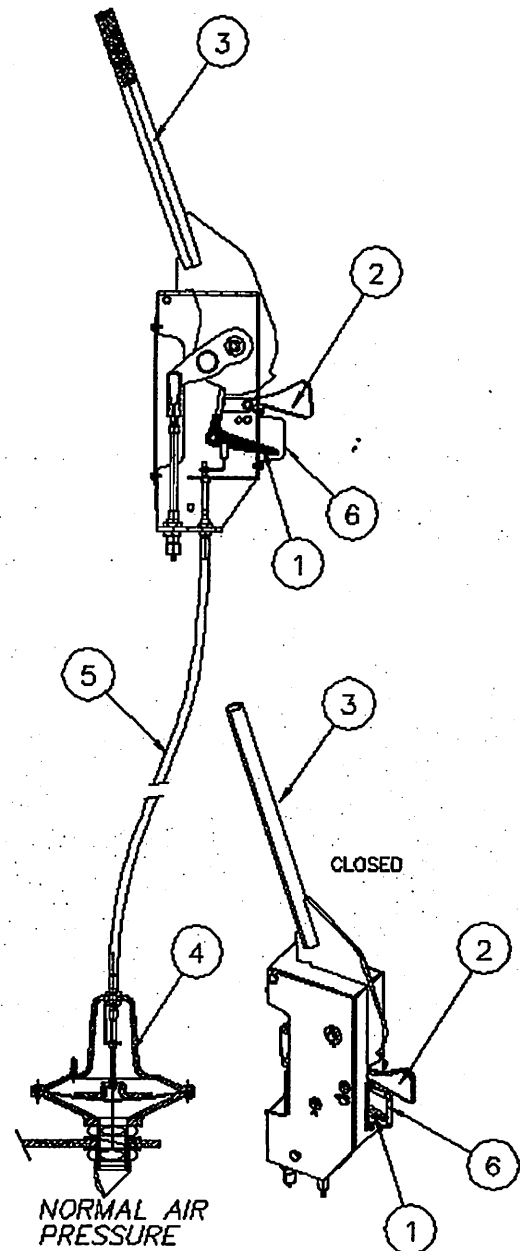


Figure above shows the Hydrostatic interlock

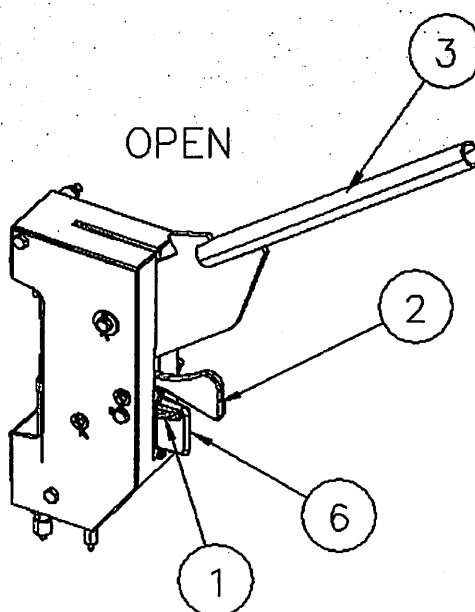
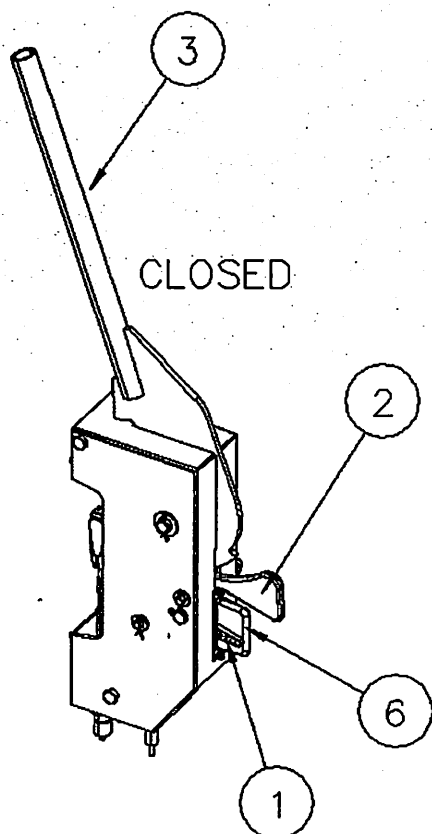
6.7 Releasing Hooks – Instructions



Only trained and authorised personnel should operate the Hook System. Before the hooks are under tension always make sure that the release cables are intact and that the release mechanism/locking mechanism are in correct position. Incorrect use can result in death or serious injury.

NORMAL RELEASE OF HOOKS

1. Ensure that the lifeboat/tender is seaborne and that the fall wires are slack. Check that the hydrostatic lock (item 1) has moved to **Green Zone**.
2. Lift up safety lock (item 2) – and hold while operating the release handle (item 3), safety lock will then stay in upper/open position.
3. Pull the release handle (item 3) from closed to open position. The release handle will be locked in open position automatically by the safety lock.
4. The two hooks will release simultaneously.
5. During boat drill and training, care must be taken to ensure that the fall wires, links and floating blocks do not come in contact with lifeboat/tender superstructure and cause damage.



6.8 Emergency Release of Hooks Using Central Release Unit

CASE A “BOAT IS SEABORNE”

There is a safety glass (item 6) on the central release unit through which the hydrostatic lock can be monitored visually to be either in:

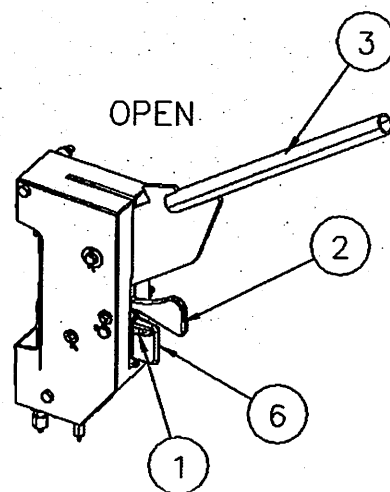
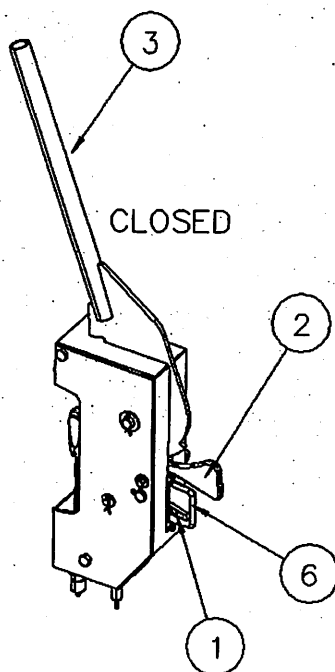
Red Zone = Locked Position = Boat is not seaborne
Or Green Zone = Unlocked Position = Boat is seaborne

Emergency Release Procedure:

- ◇ The lifeboat/tender is seaborne
- ◇ Due to some possible malfunction of the hydrostatic actuator the hydrostatic lock (item 1) is still in the red zone instead of moving to the green zone. The release handle is locked.

Then this procedure must be followed:

1. Break the safety glass (item 6) to gain access.
2. Lift up the hydrostatic lock (item 1) into the **Green Zone** and hold until safety lock is lifted (point 3).
3. Lift up and hold the safety lock (item 2). Pull the release handle (item 3) to ensure that the safety lock stays lifted up.
4. Pull the release handle (item 3) from closed to open position.
5. The two hooks will release simultaneously.



CASE B “BOAT STUCK IN FALLS ON its WAY TO THE WATER”

If the boat is not waterborne but got stuck during lowering, the officer in charge of the boat should, after careful consideration, decide whether to proceed with emergency release or not. Extreme caution should be taken prior to this action being undertaken.

THE FOLLOWING ACTION MUST ONLY BE TAKEN WITH THE FULL KNOWLEDGE THAT SERIOUS DAMAGE TO THE CRAFT AND POSSIBLE FATAL INJURIES TO PERSONNEL MAY BE SUBSTAINED.

After taking the decision to emergency launch, shout warning to the occupants to brace for impact.

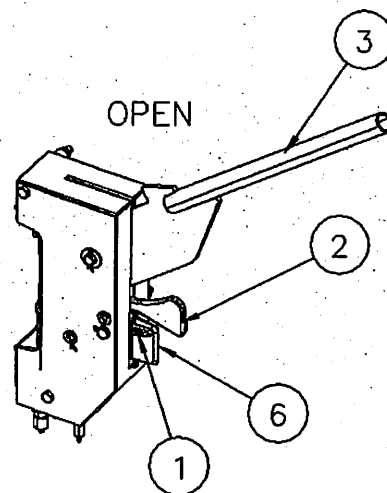
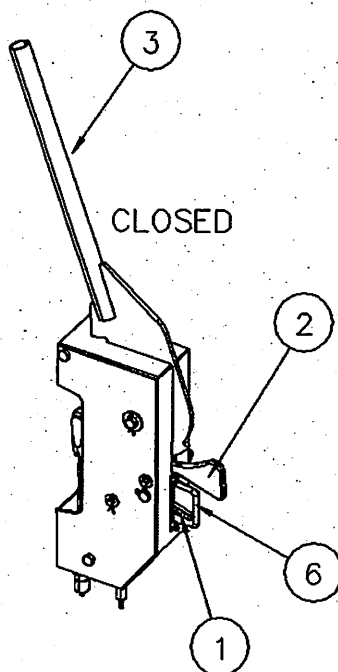
1. Break the safety glass to gain access.

2. Lift up the hydrostatic lock (item 1) into the **Green Zone** and hold until safety lock is lifted (point 3)

3. Lift up and hold the safety lock (item 2). Pull the release handle (item 3) to ensure that the safety lock stays lifted up.

4. Pull the release handle (item 3) from closed to open position.

5. The two hooks will release simultaneously and boat will drop.



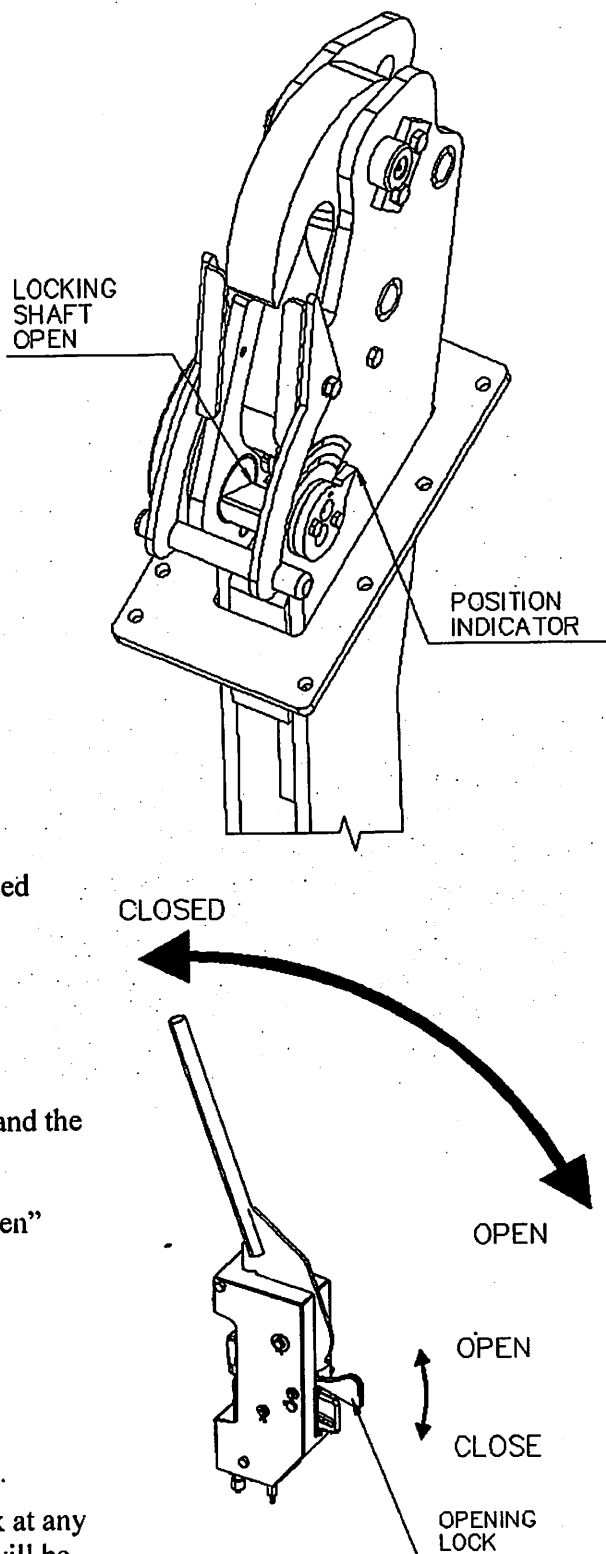
6.9 Resetting the Hooks

Note: Before release handle is pushed back to closed position, make sure that the boat is free from the falls at both hooks. Shortly after the boat is released, closing of the hooks should be carried out as a preparation for hoisting the boat. This action should not be delayed to coincide with the engaging of falls and hooks.

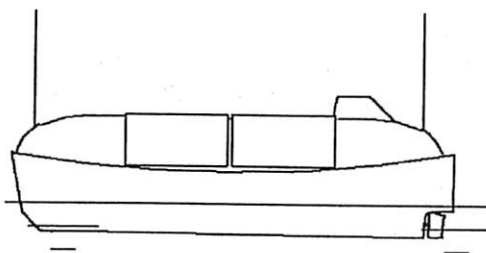
1. The hook is designed to be rotated manually to the correct locking position, where it will remain stable. Both hooks must be rotated to achieve this position. (For more details about the hook in locked – and open position, see section 6.4 and 6.5). **It is essential to confirm that the tail of the hook is INSIDE the locking shaft.**
2. Lock the hooks by using the central release unit:
 - a. Lift up the opening/safety lock.
 - b. Push the release handle until it returns to closed position.
 - c. Push safety lock down to close.
3. Verify that the hooks are locked properly.
4. Make sure that the safety lock has been reset and the release handle is locked.
5. Verify that hook indicators are in correct “green” position.

Retrieval of Lifeboat

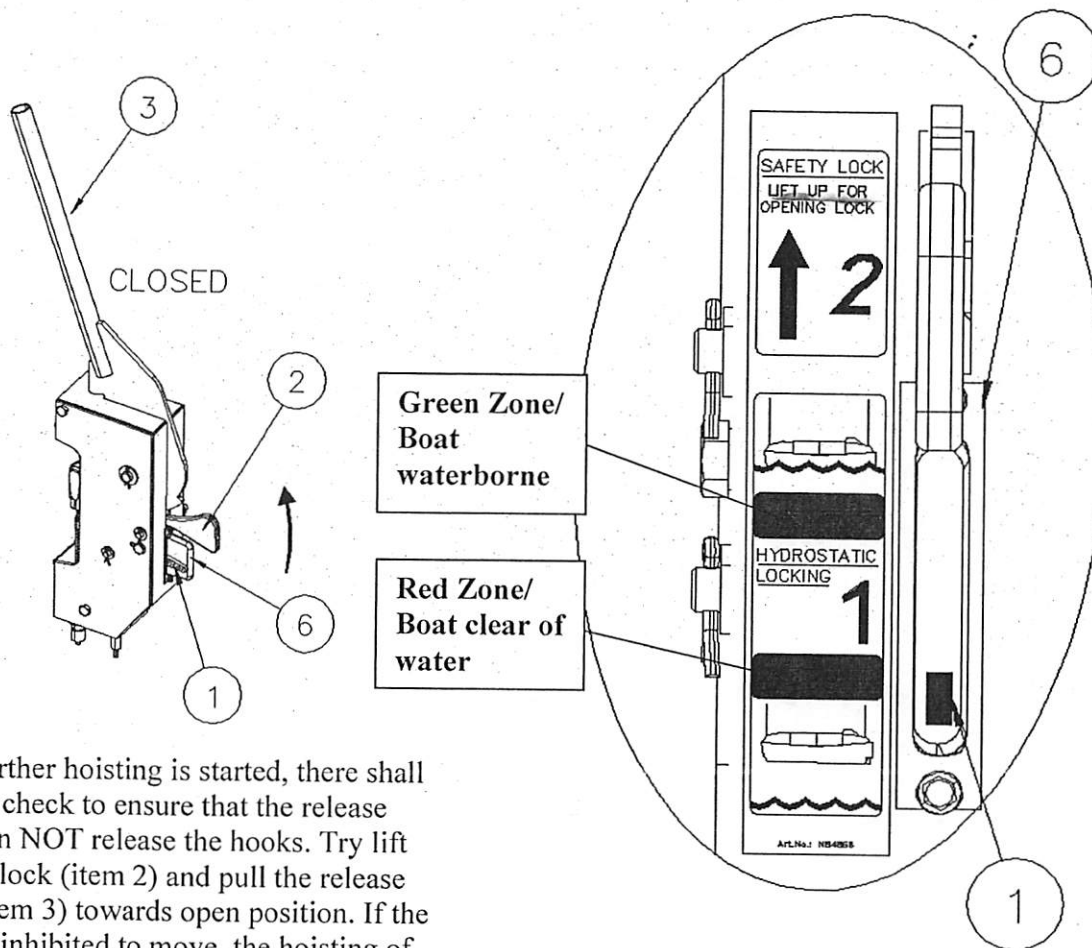
6. Fall links can now be connected into the hook at any time. By pushing the locking lever the links will be engaged in the hooks. The lifeboat/tender is ready for hoisting.



As soon as the lifeboat is just clear of the water, hoisting should be **STOPPED** and a visual check must be made to ensure that the hook release system is in fully locked position.



Visually verify that the hydrostatic lock (item 1) is in the **Red Zone/ Boat clear of water**.



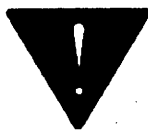
Before further hoisting is started, there shall be a final check to ensure that the release handle can NOT release the hooks. Try lift up safety lock (item 2) and pull the release handle (item 3) towards open position. If the release is inhibited to move, the hoisting of the boat is safe. The hooks must also be re-checked and the observation reported to the helmsman before the boat is hoisted further.

Note: This test must be done only when the boat is just clear of the water.

7 MAINTENANCE AND LUBRICATION

General

Lifeboat hooks are mechanical devices. Like other machines if they are to retain their efficiency they must be regularly maintained. The following recommended maintenance and control routines should be followed when maintaining the hook.

**Warning**

Safety requirements

1. Ensure Hanging off System is correctly connected.
2. To avoid damage to equipment and bearings, the hook must be kept clean at all time.

**Mandatory**

Service to be performed by Schat-Harding trained and certified personnel in accordance with MSC.1/Circ 1206 Rev1. In order to carry out a proper inspection the correct S-H work instructions will have to be used which, for the LHR M2 hook range, is GSWI.10.031.

Prior to monthly and yearly inspection - maintenance on the hooks and release mechanism, the hooks shall be unloaded.

This may be achieved either by:

- A: Lowering the boat to seaborne condition / landing ashore on quayside, or
- B: Engaging the “hanging off” slings

**Caution**

The hook mechanism is manufactured from corrosion resistant stainless steel.

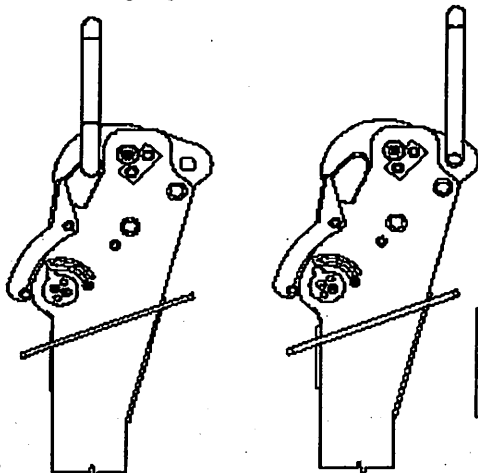
Do not paint the hook assembly

Painting will prevent the hook from functioning correctly.

7.1 Procedure for “hanging off” the lifeboat



Warning



**Hanging Off eye to be
used during maintenance.**

**Only the proper lifeboat hooks are constructed
to carry the whole weight of lifeboat.**

The following procedure shall be strictly followed. No personnel is allowed to be onboard the boat during transfer of boatload to the “hanging off” slings.

1. Before entering the lifeboat verify that hook indicators are in locked (green) position.
2. When entering the lifeboat first check if both hooks are in closed position and if hydrostat lock is in red zone.
3. An extra sling and shackle **must** be fitted between the main davit construction and the designated position on the hook. This must be carried out on **both** hooks.
2. The slings and shackles must be certified to the required load. These are normally supplied with the davit system.
3. The sketch on the following page shows the position for the shackle. This is the **only** position the shackle can be fitted.
4. Lifeboat lashings must be released. The weight of the lifeboat/tender should be transferred gradually to the slings, i.e. no sudden jerks. There must be no crew or personnel onboard the lifeboat during this operation.

Before the hooks are released, the fall wire links **must** be checked to see that there is no load on them, i.e. they are slack.

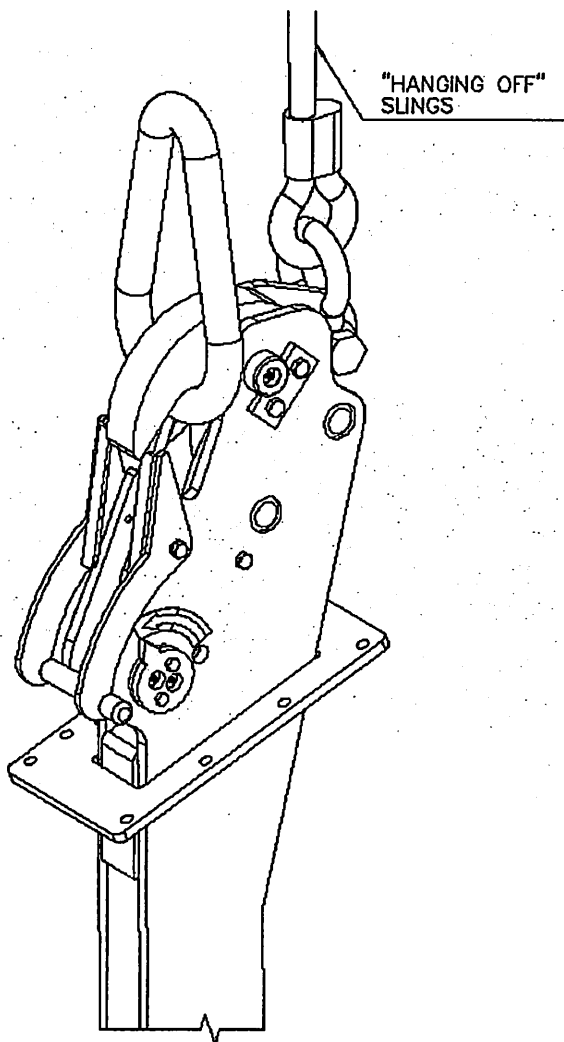
Hanging Off eye on the hooks should only be used during maintenance, repair or inspection of the boat and to transfer the rescue boat weight with 6 persons during recovery with foul weather straps.

Hanging Off eye is tested with a load six times the working load for the hanging-off condition. Working load on Hanging Off eye is maximum (includes fully equipped boat, 3 persons and equipment of 1000 kg):

<u>Hanging Off eye on Hook types</u>	<u>Max. SWL</u>
LHR12M2	7 tonnes
LHR9M2	7.2 tonnes
LHR6M2	3,5 tonnes
LHR3,5M2	2,17 tonnes

Recommended dimensions for “hanging off” shackle and slings:

<u>Hook types</u>	<u>Min. SWL*</u>	<u>Diameter of hole for shackle</u>
LHR12M2	7 tonnes	ø 30 mm
LHR9M2	7.2 tonnes	ø 30 mm
LHR6M2	3,5 tonnes	ø 25 mm
LHR3,5M2	2,17 tonnes	ø 20 mm

Use certified equipment only!***Min Breaking Load = 6x SWL**

NX2310

**Warning** Read the instructions carefully.**FATAL accidents may happen if this procedure is not followed.**

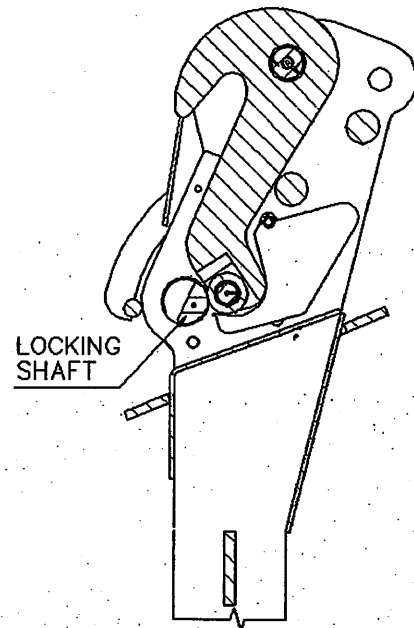
Maintenance schedule

Weekly and monthly inspections, and routine maintenance as defined by the manufacturer, should be conducted under the direct supervision of a senior ship's officer in accordance with the instructions provided by the manufacturer

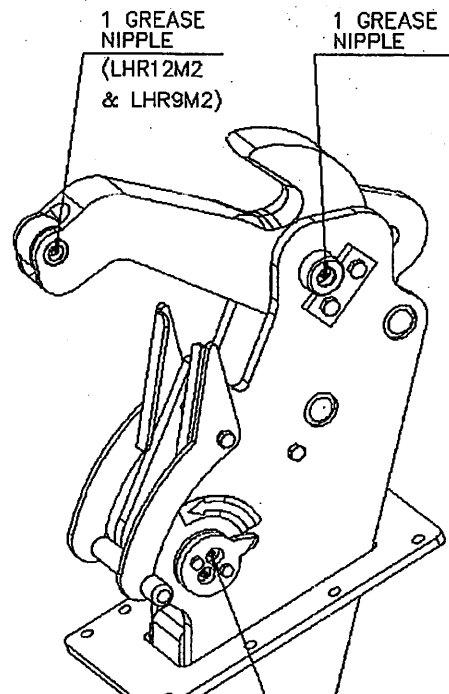
7.2 Weekly Inspection

The inspection may be executed with boat in operational condition. Visual inspection should be carried out once a week. Special attention to be paid to the following items:

1. Before entering the lifeboat verify that hook indicators are in locked (green) position.
2. When entering the lifeboat first check if both hooks are in closed position and if hydrostat lock is in red zone.
3. If necessary clean the hook parts with fresh water for dirt and dust that may influence proper operation.
4. Check for damage and corrosion.
5. Check that the hook is not blocked, or that there is no foreign element which can cause jamming.
6. Check the teleflex cables for external damage. Pay special attention to the movable part between connection at the tension lock and the mantle of the cable.
7. Check the connection between torsion arm and teleflex cable.
8. Check the screw connection between teleflex cable and fixing bracket.



CLOSED POSITION



OPEN POSITION

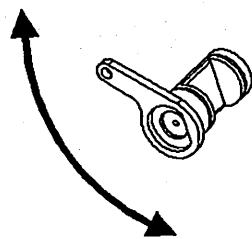
7.3 Monthly Inspection and Maintenance

Important!

Prior to this inspection the release hooks shall be unloaded according to procedure for “hanging off” or the boat seaborne.

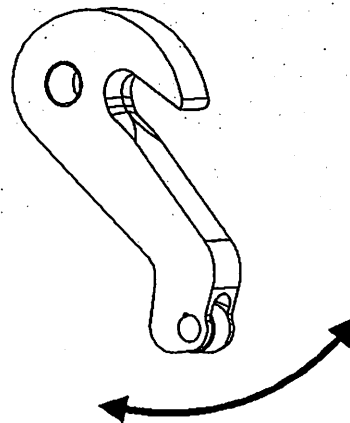
In addition to the weekly inspection, following items shall, as a minimum, be carried out:

1. Remove the safety glass on the Release Unit.
2. Open the hook using the release handle. Check all functions.
3. Check that the locking shaft rotates and is not damaged. (Apply grease if needed).
4. Rotate the hook and check for any slack in the bearings. (Apply grèase if needed).
5. Check hydrostatic interlock. With the hooks released, check the operation of the interlock, it should be smooth when the override lever is raised and the lever should return by the power of the force in the hydrostatic unit.
6. Check and inspect the hook tails.
7. If necessary clean and oil, each end of the teleflex cables.



MAX. ± 1 mm

LOCKING SHAFT



MAX. ± 1 mm

HOOK TAIL

7.4 Yearly and 5-years Overhaul



Mandatory

Annual & 5-yearly inspections to be performed by Schat-Harding trained and certified personnel in accordance with MSC.1/Circ 1206 Rev1. In order to carry out a proper inspection the correct S-H work instructions will have to be used which, for the LHR M2 hook range, is GSWI.10.031.

In case the inspection has to be performed while the lifeboat is still hanging in the davit system the lifeboat has to be secured (hanging-off) prior to commencing the annual or 5-yearly inspection.

Every year

1. Check Covers
2. Replace Diaphragm
3. Check the hook and the foundations visually. If major corrosion, the hook should be taken out off the boat, and parts to be checked with NDT**.
4. Visual inspection of hook release system and "Hanging Off eye".
5. Check roller on Hook Tail.
6. Test on loads function of hooks.
7. Test hooks for simultaneous opening.
8. Check hydrostatic unit functions correctly when boat is waterborne.
9. If more than 50 on-load releases, than the cables to be replaced.

Every five-year

In addition to the yearly inspection, following items shall, as a minimum, be carried out:

1. Strip and clean all parts.
2. NDT** testing "Hanging Off eye".
3. Visual inspection of Bolt for Hook Tail.
4. Visual control of bearings in Hook Tail/ Pivoting shaft.
5. Visual control of bearings for locking shaft.
6. Check wear on cam, Radius to be R2(LHR3,5 & 6 M2), R2,5 (LHR9M2) or R3 (LHR12M2), tolerance is ± 0.5 mm.
7. Replace Cables and Torsion Spring.
8. Testing of lifeboat with 1,1 x SWL load, use either sandbags or small water-bags.
9. After every test the release cables to be checked. Pay special attention to the movable part for damage.

**** NDT testing method should be 'Liquid Penetrate Examination' (ref. ASME Section V – EN1289). For Mobile Offshore Units in Norwegian sector NDT testing is mandatory (ref. NMD Chap. 5 § 13 - Chap. 7 § 21 and NMD regulation 853).**

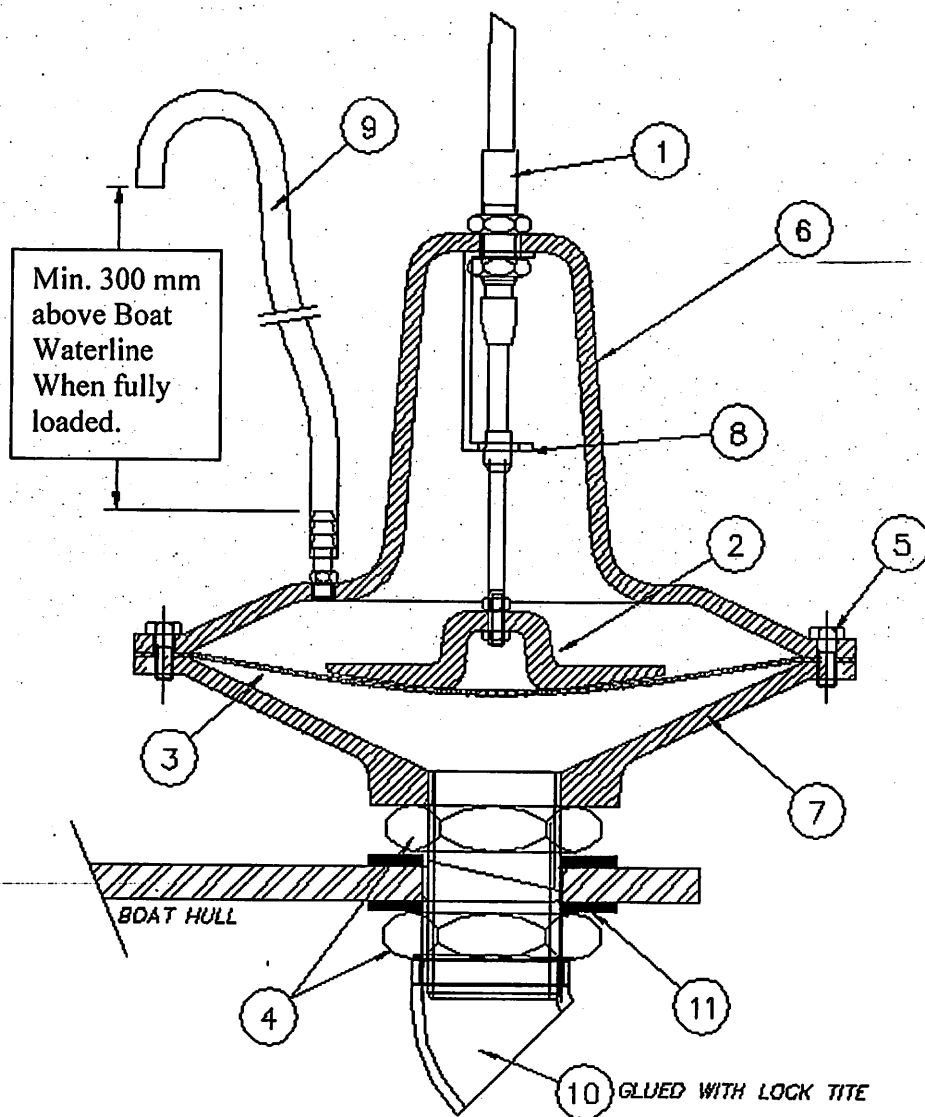
Hydrostatic unit

Strip, clean and Check parts. Replace Diaphragm:

1. At the central release unit disconnect the teleflex cable from the hydrostatic actuator, from its mounting on the hydrostatic lock.
2. Remove all head bolts (item 5, note their locations).

3. Disconnect the vent hose (item 9, if necessary).
 4. Lift off the upper part (item 6). Note the exact location of and examine the diaphragm for signs of damage or wear, particularly for water or signs of water entry into the upper part. If in doubt renew the diaphragm.
 5. Clean and dry all parts and apply corrosion inhabitant oil. Replace the diaphragm in exactly the same position as found.
 6. Mark the exact location of the upper nut; ideally **do not touch it at all** as it sets the correct position of the cable's outer sheath. Disconnect the operating cable from its mounting plate. Check its free operation and lubricate. Reassemble carefully applying "loctite" or similar to the lower nut, the one which cannot be reached once the unit is back in service again.
 7. Reassemble the upper part in the same order and into the same place, tighten bolts to the same torque all round 11 NM. Do not over tighten; otherwise the diaphragm can be damaged. Bolts should be fitted opposite to each other and tightened by hand only, then gradually and in the same order of opposite pairs, tighten to full torque.
 8. Refit vents hose, if disconnected.
-
9. Re-connect cable to the interlock override lever, outer sheath first. If the advice at stage 6 above was followed, then no adjustment will be necessary and only its upper nut will require tightening and locking. The inner wire should also fit exactly to the override lever.
 10. Check hydrostatic interlock. With the hooks released, check the operation of the interlock, it should be smooth when the override lever is raised and the lever should return by the power of the force in the hydrostatic unit.
 11. If the boat was "hanging-off" follow the instructions for transferring the boat's weight back to the falls and davits, and lower the boat to the water. As the boat enters the water observe the action of the interlock lever, it should move from red to green zone - and vice-versa when hoisting. Repeat as necessary to confirm satisfactory. Hoist the boat just clear of the water and carry out hook re-setting checks.
 12. Order new spare diaphragm.

Item	Description
1	Teleflex cable for Hydrostatic interlock
2	Piston plate
3	Diaphragm
4	Back nut
5	Head bolts
6	Upper part
7	Lower part
8	Guiding for cable
9	Vent hose (note minimum height - see instructions)
10	Inlet (Elbow)
11	Washer



Maintenance check list													
Period	Task	Comments	Date										
Weekly	Clean dirt & dust from the hook parts that may prevent proper operation.												
	Check for damage and corrosion.												
	Check that the hook is not blocked, or that there is no foreign element which can cause jamming.												
	Check that the locking shaft is in closed position.												
	Check the teleflex cables for external damage. Pay special attention to the movable part between connection at the tension lock and the mantle of the cable.												
	Check the connection between torsion arm and teleflex cable.												
	Check the screw connection between teleflex cable and fixing bracket.												
	Check that hydrostatic lock is in red zone. (Red zone when boat is out of water and Green zone when boat is seaborne).												
Monthly	Remove the safety glass on the Release Unit.												
	Open the hook using the release handle. Check all functions.												
	Check that the locking shaft rotates and is not damaged. (Apply grease if needed).												
	Rotate the hook and check for any slack in the bearings. (Apply grease if needed).												
	Check hydrostatic interlock. With the hooks released, check the operation of the interlock, it should be smooth when the override lever is raised and the lever should return by the power of the force in the hydrostatic unit.												
	Check and inspect the hook tails.												
3 Months	If necessary clean and oil, each end of the teleflex cables.												
	Grease	3/4 positions											

Period	Task	Comments	Date										
Annually	Check Covers												
	Replace Diaphragm												
	Check the hook and the foundations visually. If major corrosion, the hook should be taken out off the boat, and parts to be checked with NDT**.												
	Visual inspection of hook release system and "Hanging Off eye".												
	Check roller on Hook Tail.												
	Test on loads function of hooks.												
	Test hooks for simultaneous opening.												
	Check hydrostatic unit functions correctly when boat is waterborne.												
5 yearly	Strip and clean all parts.												
	NDT** testing "Hanging Off eye".												
	Visual inspection of Bolt for Hook Tail.												
	Visual control of bearings in Hook Tail/ Pivoting shaft.												
	Visual control of bearings for locking shaft.												
	Replace Cables and Torsion Spring.												
	110% overload test												

** NDT testing method should be 'Liquid Penetrate Examination' (ref. ASME Section V – EN1289). For Mobile Offshore Units in Norwegian sector NDT testing is mandatory (ref. NMD Chap. 5 § 13 - Chap. 7 § 21 and NMD regulation 853)

7.5 One and Five Year Spare part list

Recommended Spare Parts onboard for Schat-Harding Hook types:

Art. no	Qty	Part name
N96499	1	Hydrostatic diaphragm (membrane) LHR
0290.02097	1	Torsion Spring LHR12&9M2
0290.02096	1	Torsion Spring LHR6&3.5M2
0290.00659	4	Grease Nipple – M6 –SS

Note that the Hydrostatic Diaphragm is to be replaced each year.

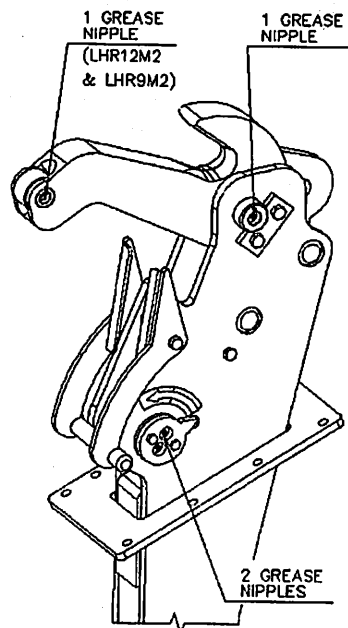
Mandatory to Replace the Release/Hydrosatic Cables and Torsion Spring every 5 year.

Type, size and length of cables depend on Hook type and Lifeboat.

If Maximum amount of on-load releases is 50 before 5-years, than the cables shall be replaced.

7.6 LUBRICATION

- The system is designed for the minimal maintenance and lubrication.
- The central release unit and teleflex cables are greased with lifetime grease on assembly, and require no further lubricating. (If for some reason the cables or control unit must be dismantled, contact Umoe Schat-Harding's service department).
- The LHR12M2 and LHR9M2 has four grease nipples
The LHR6M2 and LHR3.5M2 has three grease nipples (See figure below)
- All grease nipples are outside the boat.
- Greasing interval is 3 months.
- Use only a multigrade marine type water resistant grease to suit high and low temperatures. Recommended grease types are Shell Extrema EP2, Esso Cazar K2 and Beacon 3 or similar.



7.7 Problem Check List



Mandatory

Annual & 5-yearly inspections to be performed by Schat-Harding trained and certified personnel in accordance with MSC.1/Circ 1206 Rev1. In order to carry out a proper inspection the correct S-H work instructions will have to be used which, for the LHR M2 hook range, is GSWI.10.031.

PROBLEM	POSSIBLE CAUSES	SOLUTION(S)
One hook will not release	Teleflex cable is broken Teleflex cable not adjusted correctly	Replace the cable Adjust the cable
Both hooks will not release	Boat not seaborne Hydrostatic lock is stuck One or both Teleflex cable stuck	Lower the boat to sea Check hydr. actuator and teleflex cable Replace both cable(s)
One hook releases before the other	Teleflex cable not adjusted correctly	Adjust Teleflex cable
Central hook release jammed solid	Hydrostatic lock is stuck Parts broken inside Central release	Check hook lock
Hydrostatic Interlock will not release	Boat is not seaborne Teleflex cable from hydrostat broken Hydrostat actuator out of function	Lower the boat to sea Replace teleflex cable Fix hydrostatic actuator
Hydrostatic Interlock will not re-set	Mal function on lock arm/spring Teleflex cable broken Hydrostat actuator out of function	Fix lock arm/spring Replace teleflex cable Fix hydrostatic actuator
Central hook release is stiff to operate	Mal function of lock arm/spring Teleflex cables stretch	Fix lock arm/spring Replace both release cables and hydrostatic cable
Hook will not rotate easily	Shaft bearing damaged Lack of grease	Replace bearing Grease
Torsion arm will not rotate	Torsion arm bearing damage Lack of grease	Replace bearing Grease

8 SCHAT-HARDING SERVICE STATIONS AND PARTNERS

Schat-Harding Services has skilled authorized service personnel, all well trained and with great experience ready to assist our world wide customers that have equipment under our brand names. Our employees are ready to assist you with technical information, expedite delivery of spare parts, training of crew, quotations for refurbishing of old equipment, safety analysis or whatever your needs are with respect to lifesaving equipment.

We are here to maintain your safety onboard.

Address	e-mail	Phone	Fax
Norway Umoe Schat-Harding Services As 5470 ROSENDAL, NORWAY	spareparts@schat-harding.com service@schat-harding.com	(47) 53 48 36 00	(47) 53 48 36 01
The Netherlands Umoe Schat-Harding BV Wilgenkade 17-19 3992 LL HOUTEN THE NETHERLANDS	service@schat-harding.nl	(31) 30 26 44 200	(31) 30 26 44 299
Willem Pot BV	service@willempot.com	(+31) 10 591 2788	(+31) 10 591 3052
United Kingdom Umoe Schat-Harding Ltd. Mumby Road , Gosport , Hampshire PO12 1AR, U.K.	adminuk@schat-harding.com serviceuk@schat-harding.com sparesuk@schat-harding.com	(44) 2392 581 331	(44) 2392 582 565
Singapore Umoe Schat-Harding (F.E.) Pte Ltd. 20 MacTaggart Road #08-02 Khong Guan Industrial Building SINGAPORE 368079	customer.singapore@schat-harding.com	(65) 6 383 1067	(65) 6 383 1031
USA Umoe Schat-Harding Inc. 912 Highway 90 East, New Iberia, LOUISIANA 70560 -8764, USA	sales@schathardinginc.com	(1) 337 365 5451	(1) 337 367 2816
Canada Umoe Schat-Harding Inc. #120 - 20575 Langley By-Pass Langley, British Columbia V3A 5E8, Canada	colin.edwards@schat-harding.com	(1) 604 54 30 849	(1) 604 54 30 829
China Umoe Schat-Harding LSA Service (Shanghai) Co Ltd Building 1, No, 8 Yuan Shun Road, Nanhui Industry Zone Huinan Town, Pudong, Shanghai, 201300 CHINA	service.china@schat-harding.com	(86) 21 58309503	(86) 21 58309513
Czech Republic Umoe Schat-Harding spol.s.r.o. Po. box 115, ul. Netovická 353 , 274 01 SLANY, CZECH REPUBLIC	schathardingCZ@schat-harding.com	(420) 312 515 102	(420) 312 522 598
Germany Umoe Schat-Harding GmbH Kaddenbusch 3 25578 Dägeling , GERMANY	sales@schat-harding.de	(49) 4821 40393 0	(49) 3821 40393 20
Spain Umoe Schat-Harding SL Ctra, Sanlucar-Chipiona km 0,5 (P.O.Box 9)11550 Chipiona (Cadix), Spain	serviceSpain@schat-harding.com	(34) 956 376 042	(34) 956 377 355
Italy Umoe Schat-Harding SL - Venezia, Roma and Livorno	serviceItaly@schat-harding.com	(+39) 0586 887 004	(+39) 0586 211 489

For up to date information of Schat-Harding service network (Service Stations and Service Partners) please visit our web site www.schat-harding.com