

# HYDRAMARINE

## PROJECT DOCUMENT

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**Maritime Partner AS**

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**SP 1451**

Project name.:

Equipment:  
  
**Hydramarine Davit type HMD G80**

Title:  
  
**INSTALLATION PROCEDURE**

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## 1 INTRODUCTION

### 1.1 General

This procedure is extract of the complete User Manual for the davit and gives necessary information on how to install, start up and operate the davit.

Operators and maintenance personnel has to read and understand this procedure prior to installation, testing and operation of the equipment. The owner of the equipment is responsible to ensure no unauthorised personnel operates or maintain the equipment.

### 1.2 Purchase Information

Equipment :           Hydramarine Davit  
Type:                   HMD G80  
Machine number :    SP 1451-0902

### 1.3 If Problems occur

In case of any problems, please contact:

**HYDRAMARINE AS**  
Andøyveien 23  
N-4623 Kristiansand S. NORWAY  
Tel: +47 380 18700, Fax: +47 380 18701  
E-post: [aftersales@hydramarine.no](mailto:aftersales@hydramarine.no)

**Remember to refer to actual equipment machine number for exact identification of components and service advice.**

### 1.4 General Security Conditions

No personnel are allowed in the equipment working area.  
All use of the equipment must comply with the company security regulations.

### 1.5 Training

Hydramarine AS can provide tailor-made operation- and maintenance courses to all Hydramarine equipment.

For more information, contact our Head-office in Kristiansand. We recommend all our customers to attend our courses.

## 1.6 Restriction in Guarantee

*During the warranty period, all spare parts must be supplied by HYDRAMARINE AS. The use of spare parts supplied by an other supplier violates and forfeits the warranty.*

## 2 MAIN DATA

## 2.1 Main Technical Data

### General

Type:	HMD G80
Machine number:	SP 1451-0902
Weight:	Approximately 12,5 tons
Dimensions:	L=5050 mm W=2500 mm H=7100 mm
Control system:	Normal and emergency operation from control panel
Pendulum dampening system:	Hydraulic Accumulator dampening system

### Capacity:

Lifting capacity:	SWL = 8000 Kg
Number of wire falls:	1
Jib outreach:	4000 mm from vessel side
Hoisting height:	20 m
Hoisting speed:	0 – 1 m/sec. (linear)
Jib swing out time:	Max. 38 sec. (linear)

### Winch data:

Wire diameter:	Ø24 mm
Wire length:	37 m
Wire type:	35 LS, Galvanised & non-rotating
Wire end termination:	Open spelter socket
Wire operating capacity:	20 m, maximum 2 layers
Winch drum dia.:	Ø450 mm
Winch drum width:	500 mm
Winch gearbox:	1 X W 1250, oil filled
Winch gear ratio:	73 : 1

### Hydraulic system:

Type of system:	Open centre
Oil tank capacity:	Approximately 700 litres
Main pump:	Variable displacement.
Normal hoisting pressure:	220 bar
Normal jib out/in pressure:	60 bar
Max pump pressure:	300 bar

### Emergency system:

Diesel motor	SUN 3105
Power	46 kW
Speed	2600 r.p.m.
Number of cylinders	3
Volume	2987 ccm
Cooling	Air cooled
Fuel tank capacity	15 litres
Duration w7full tank	2 hours
Weight	312 kg (dry)

## 2.2 Electric Data

Electrical system:

Power:	440 V / 60 Hz. / 3 phases
Consumption:	156 kW
Power rating:	S6-40% ID
Current:	252 A (S6-40%)
Starting method:	Star/delta configuration.
Start current:	131 A
Rotation:	1765 r.p.m. , clockwise viewed from fanside
Heating element:	220 V AC, 80 W
Remote starter:	Yes

**SEE ALSO ELECTRIC DIAGRAM, Ch 6.4.**

### **3 TECHNICAL DESCRIPTION**

## 3.1 General Technical Description

The davit type HMD G80 is designed for long-time operation, handling and stowing of a daughtercraft (D.C) in a tough and corrosive marine/offshore environment.

The davit system is delivered factory tested and approved. Its design is composed with major structural and mechanical over-capacity for heavy operation. Also, the compact shape and size permit convenient, safe and reliable stowing on the starboard or port side deck on any offshore or passenger vessel.

Safe and accurate handling of the D.C. vessel is provided with the implementation of the following systems:

- Constant tension system
- Hydraulic dampened docking system (HDD-system)
- Wire shock damping system
- Emergency system
- Towing boom

### \* Constant tension system

This system is designed to compensate movement between a fixed winch position and the D.C. when sea-borne. The constant tension force can be adjusted by means of a regulator valve. (on the winch control block) The tension force is adjusted to a weight less than the weight of the D.C. Therefore, when the D.C. is sea-borne and waves are present, the winch will pay out and take in wire as the D.C. ride the waves. An advantage of this system is the elimination of slack-wire when connecting D.C. during rough-sea environment. This provides better control and safer handling. Increase of tension force on the regulator, will hoist the D.C., and a reduction of tension force on the regulator will lower the D.C. The regulator valve can control the lifting capacity of the winch. When this system is in use the winch-brake system in the gearbox is OFF, which means that special attention by the operator is required.

### \* Hydraulic dampening docking system.

This system reduces the pendulum motion during the jib out/in phase under significant pitch/roll movements of the main vessel. This hydraulic dampening dock system is a part of the outer jib section and is directly connected to the D.C. to dampen swing motion during the jib in/out phase. This system consists of a telescopic docking gripper device, designed to fit into the D.C. mounted docking/hook system. The docking gripper is able to rotate in both x & y-plan. Each motion direction is dampened by a double acting hydraulic cylinders.

**\* Wire shock dampening system**

This system includes a hydraulic cylinder, wire sheaves and accumulator. This system is used to absorb any sudden, extra load induced during hoisting and lowering. For example, the extra load induced due to a sudden stop during a winch down operation will be absorbed by the cylinder and accumulator arrangement, instead of directly into the winch gearbox and motor. The shock dampener arrangement provides safer handling and comfort for passengers.

**\* Emergency system**

The davit is equipped with an emergency system making it possible to operate the davit during dead-ship conditions. The system consists of a diesel engine with integrated fuel tank and an auxiliary hydraulic pump. The system makes it possible to operate all the davit functions.

**\* Towing boom**

The davit system is equipped with a telescopic towing boom system to keep the D.C. in correct position for launch and recovery. The towing boom is operated from the davit control panel.

**\* General**

The G80 davit is operated by a control panel which can be located near the vicinity of the davit. Hydraulic hoses connected between the davit and control console provide the opportunity to place the control panel in the best location to attain visual contact of the davit and D.C. when in operation. The G80 davit is delivered in two parts, the lower jib section assembled to the foundation and the upper jib section with the docking head arrangement. These two parts need to be bolted properly before the wire can be installed.

**HMD G80 davit advantages:**

- Low pendulum height during launch and recovery of D.C.
- Less wear and tear on D.C. during rough conditions due to the support of the hydraulic dampened docking system.
- The docking device prevents unexpected movements during the jib in/out phase.
- The docking device provides better control of the boat during launch and recovery.
- The emergency system enables the davit to be fully independent of the main-ship's power supply.
- Tow boom for positioning of D.C.

## **4 PRESERVATION, STORAGE AND INSTALLATION**

## 4.1 Introduction

The purpose with this procedures is to:

- 1.) Ensure that the units is handled / lifted in a safe and correct way to avoid damages at personnel and equipment.
- 2.) Ensure up to 2 years storage without loosing any performance and/or quality that may reduce the working performance or total lifetime of the unit.
- 3.) Ensure that the installation/ first time start up is performed in a safe and correct way.

## 4.2 Unloading and Handling:

The davit is delivered in four parts:

- A) Lower part of davit with mounted winch and cylinders.
- B) Upper part of davit.
- C) Pallet with starter box.
- D) Towing boom

**Please check that that delivered goods contains all parts stated in the supply list.**

**Weight of davit is app 12,5 tons.**

The davit structure is normally delivered without packaging.  
If the cylinders are covered with densotape, be sure to remove it before taken into use.

### 4.3 Storage

The davit and pallet may be stored for 6 months without any preservation when stored inside or protected against weather.

For storage exceeding 6 months, we recommend that the davit is preserved.

### 4.4 Preservation

Storage exceeding 6 months, please follow these preservation instructions:

#### **A Storage not exceeding 12 months:**

Lubricate all lubrication points every 6 month according to lubrication sheet.

Run the 220V-1ph ca. 80 W consumption heating element at the electric motor to avoid condensation in the el. motor.

Loose gear to be stored in heated indoor conditions to avoid condensation at electric components.

#### **B Storage exceeding 12 months:**

Contact **Hydramarine** for instructions.

## 4.5 Installation of Davit

Installation of the G80 davit requires a safe location with reference to the ship's working environment and the davit's accessibility. Consider adequate space for the operator and his/her line of vision to the davit and D.C. during launch and recover operations when installing the operator's control panel. Requirements mentioned in this document should be followed after completing a proper installation.

### 4.5.1 Installation

The G80 davit has been assembled, operated and tested at Hydramarine's plant prior to delivery. However, oil leaks may result due to improper storage and/or handling during transportation. Therefore, inspect the entire davit structure and all hydraulic components (hoses, pipes, valves, pumps, and winch motor) for damage. Correct any defects or damages before first-time start-up.

The davit is delivered with no oil in tank.

The oil tank have to be filled up. Use oil specified on oil data sheet in section for lubrication. Tank volume up to middle of upper level glass is **700 litres**.

Check the oil level in the tank and top up if necessary.

Make sure that oiltypes recommended in this manual are used.

HYDRAMARINE davits are normally delivered for welding or bolting directly onto deck-structure/substructure. As a minimum requirement, the structure must be designed to withstand the maximum loads and bending moment induced from the davit.

Installation of the G80 davit should be carried out by qualified personnel. The assembly is to be completed in the following sequence:

- Install the lower jib section (with foundation) onto the ship's deck or substructure.
- Tightened the M20-8.8 bolts to a torque of 385 Nm.
- Apply sealing onto the connection flanges on the upper and lower jib sections.
- Install the upper jib section to the lower jib section with M20 bolts and torque (385Nm).
- Clean the flanges for any excess sealant.
- Connect the hydraulic hoses between the lower and upper jib sections.
- Install the control console properly by welding to the deck.
- Connect all hydraulic hoses between the control console and the G80 davit. (if disconnected)
- Connect all hydraulic lines between the towing boom system and the davit system.
- Connect all electrical cables between the panel and the davit. (if disconnected)
- Complete installation with main electrical supply hook-up.

**After installation of G80 davit and control panel, the following steps are required for safe start up:**

- 1.) Double check all electrical connections.
- 2.) Assure that all hydraulic connections are tightened and connected correctly according to the hose end markings and hydraulic flow diagram.
- 3.) Fill approximately 700 litres of hydraulic oil in the tank ( LSS NO:05).
- 4.) Ensure that the 2" ball valves (MH 16) located outside bottom of the hydraulic tank is open.

- 5.) After start-up, allow the pump to run for a few minutes to eliminate air in the hydraulic system. Inspect for leaks and loose connections.
- 6.) Slowly operate all functions and assure the control handles operate according to the operation signs. Inspect for leaks and loose connections.
- 7.) The G80 is ready for further testing and certification procedures.

## 4.5.2 Requirements

It's important to be aware of the following requirements listed below before the davit is commissioned into normal operation. These requirements are to be followed in order to maintain a safe working environment for the davit, crew and operators and to prevent accidents or damages to personnel and equipment. These requirements will ensure a long operation-life for the davit and daughtercraft.

Requirements for installation and operation:

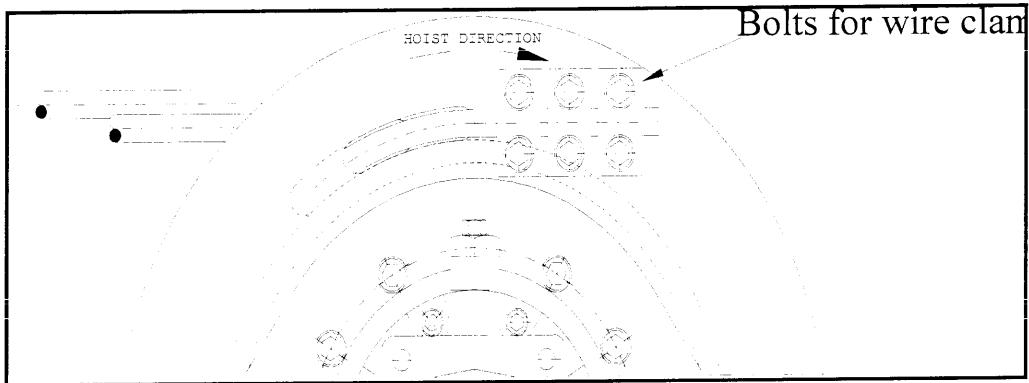
- Only skilled and trained operators, preferably trained by Hydramarine service engineers, are allowed to operate the davit.
- Control panel and davit to be located in a safe, controlled working environment so the operator and crew can perform launch and recovery operations without distractions.
- Control panel to be positioned so eye contact between the operator and crew can be maintained during the entire launch and recovery procedure.
- Adequate space for the operator must be considered during the installation of the operators' panel.
- The operator and crew must be equipped with radio communication or similar.
- Adequate lighting is necessary for operator and crew during night-time operation.
- Hydraulic hoses between the control panel and davit must be installed and protected to prevent damage or rupture.
- Prevent all possibilities of contamination to the hydraulic system during oil and oil filter change.
- At least NAS class 6 hydraulic oil is required.
- It is recommended that customer implement and maintain the maintenance program provided by HYDRAMARINE.
- **To provide maximum safety for operator and crew, it is required that all spare parts and major maintenance requirements are provided and performed by Hydramarine service personnel.**

The wire end is connected into three clamps. These wire clamps are bolted to the winch drum with M16 bolts.

Tight up the clamps with required torque:

**Bolts: M16 Class 8.8**

**Tightening torque: 195 Nm (oiled)**



## 4.6 Filling of Hydraulic Oil

After installing the davit onboard, fill the hydraulic system oil on davits tank.  
Quantity and type of oil to be used is stated in ch. **Feil! Fant ikke referansekinden.** in this user manual.

A suitable male quick release coupling is delivered with the davit.  
A female-quick release coupling is mounted on the pipe to the filter at the left hand side of the davit. If this connection is used, the hydraulic oil will be filled trough the return-filter. Use pump and fill oil until oil is visible at middle of upper level glass beside filter. This will prevent introducing further contamination into the hydraulic system.

If the quick release coupling is not used, fill oil directly into the return filters. The filter is located in the tank side.  
Fill oil till visible at middle of level glass.

It is outermost important to use new, clean oil. Under no circumstance water, dirt or other impurities must be allowed to enter the tank.  
Impurities and moisture will reduce the efficiency and shorten the lifetime of the hydraulic system.

If the delivered multihose is used connecting the davit to the operating console, no further flushing of the hydraulic system is required. However, if other pipes or hoses are used, partly or entirely, these pipes/hoses need to be cleaned and flushed before use. The davits hydraulic system is flushed to clas NAS 6.

## 4.7 Checklist Prior to First Time Start-up

Check following elements:

No:	Description:	Checked:
1	Deck/substructure designed to withstand loads from davit.	
2	Hydraulic oil filled in tank	
3	All electric coupling safe and carried out by certified electrician	
4	Rotation of electric motors comply to the arrow on motors.	
5	All hose/pipe couplings properly secured	
6	Free space for air cooling doors at diesel motor box to open.	
7	Check that all wrapping, securing of wire, etc. is removed and that wire have free access all the way from winch trough wiresheaves down to the boat.	
8	Check that all protective denso tape is removed.	

## 4.8 First Time Start-up

**IMPORTANT:** Before starting the integrated hydraulic power unit, ensure that the ball valves (MH 16) located on the hydraulic oil tank for the suction side of the hydraulic pump is **OPEN**.

As a final check before first time start up, check the rotation of the electric motor. The motor ***must rotate in clockwise direction*** seen from the motors fan end. This is done by SHORT start of motor while observing the rotation of the motor. If the motor is rotating in wrong direction, interchange 2 phases and check again for ***clockwise rotation***.

The pump must not be allowed to run in the wrong direction for an extended period of time, as this will adversely affect the life span of the hydraulic pump.

When motor is rotating in correct direction, allow the motor to run in approx. 5 minutes without trying to operate the davit. Then follow instruction in ch. 4.9 in this user manual.

## 4.9 Function Test / First Time Adjustment

There might be air in the hydraulic system when the davit is started for the first time. The following procedure is to be carried out with **no load in hook/ring**. Start by very carefully turning the davit approx. 10 degrees and then return it to the resting position. Repeat 3 times before the davit is operated at full outreach. Operate winch carefully. Make sure that wire have free access all the way from the winch trough the wire sheaves. Observe winch drum and make sure that wire is properly laid. Operate winch carefully. Operate winch (lower and hoist) for a few minutes.

After completing the above procedure, the davit may be operated using a load of approx. 50% of SWL. We recommend that test-load is used, not boat. After operating the davit with suspended testload in all positions, operate the davit to its resting position and stop the electric motor.

## 4.10 Security Precautions During Testing

*Please consider the following security precautions during testing:*

*During testing it's always a risk that errors may occur. Therefore, perform first time overload test using test-loads and not boat.*

*Do not operate loads above persons on lower decks, or above equipment that may be damaged by falling loads. We strongly advise only to test above water in a cleared and protected area.*

*Use calibrated loads.*

*Test to be performed by competent personnel.  
Always follow test procedures.*

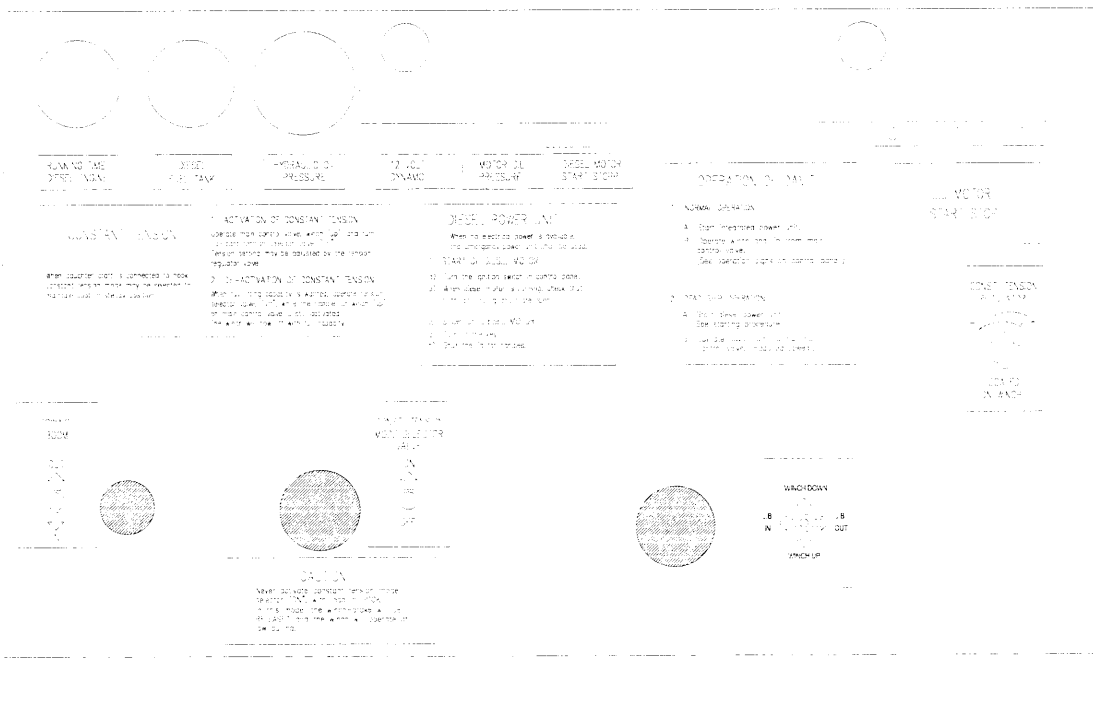
*In doubt, contact Hydramarine AS.*

## **5 OPERATION OF DAVIT**

## 5.1 Operators Panel

The operator panel contains the following controls:

1. Indicator for oil pressure in hydraulic system.
2. Indicator for running time diesel engine
3. Indicator for diesel fuel tank level
4. Electric motor start / stop button.
5. Indicator lamp for low oil pressure in diesel motor.
6. Indicator lamp for generator on diesel motor.
7. Ignition switch for diesel motor.
8. Stick for winch up / down, and jib in / out.
9. Stick for towing boom in /out.
10. Stick for constant tension on/off



## 5.2 Launching of Daughtercraft

When launching the daughtercraft it is important to operate the davit and the towing boom correctly.

The Constant Tension system is not to be used when launching.

- A) Ensure that towing line from towing boom is connected to D.C.
- B) Start hydraulic power unit by pressing green button. The electric motor start with internal time delay.
- C) Operate towing boom to outer position.
- D) Operate davit jib to outer position, after start of Daughtercrafts engines.
- E) Lower the boat by the same lever. Stabilise the boat during launching by adjusting towing line. It is possible to lower the boat anywhere on the way out, so be careful not to make any collisions.
- F) When Daughtercraft is seaborne, release lifting hook and operate davit jib in .
- G) Give power on Daughtercraft forward until towline is slack, release towing line, and manoeuvre Daughtercraft away.
- H) Be careful when the empty lifting ring reach the docking head. No automatic end stop.
- I) Retract davit jib to inner position.
- J) Retract towing boom to inner position.
- K) Stop hydraulic power unit by pressing red button. (Or switch of the ignition key if diesel powered.)

## 5.3 Dead Ship Launching.

Use the same procedure as described above. Instead of starting el. motors with green knob, use key in the ignition switch to start the diesel hydraulic power pack.

### Starting the Diesel engine:

- Warning! Make sure that no person are in area of air cooling doors.
- Turn the key in the operators panel clockwise until the engine starts. Do not run the starter motor for more than 15 seconds at a time. After each attempt to start the engine, wait a few moments or the battery will not deliver full power.
- All manoeuvres are operative, but with reduced speed.

Use of the engine at low temperatures: For ambient temperatures lower than  $-10^{\circ}\text{C}$  use specific winter diesel fuel to avoid the risk of clogging the fuel filter with paraffin deposits

### Stopping the engine:

Turn the key in the operators panel anticlockwise until the engine stops.  
Close the air cooling doors.

## 5.4 Recovery of Daughtercraft

This davit is equipped with CONSTANT wire TENSION SYSTEM.

Use the CONSTANT TENSION to keep the wire tense while the Daughtercraft waving in the sea.

- A) Turn out the davit.
- B) Manoeuvre Daughtercraft along shipside and pick up towline. Connect towline to Daughtercraft, and reduce power so that Daughter craft is towed by towing boom.
- C) Move the main hook down by pushing "winch down" stick.
- D) Connect the hook to the daughtercraft.
- E) Enter the CONSTANT TENSION mode
- F) Operate the WINCH UP stick while still holding the CONSTANT TENSION stick in ON position.
- G) When the wire is tight, and a short time before Daughtercraft reach a wave top, operate CONSTANT TENSION stick to OFF, and the Daughtercraft will rise with full power. Adjust towline to stabilise the boat during hoisting. Before the boat enters the docking head, reduce the hoisting speed, adjust towing line to keep the boat stable and straight beneath the docking head.  
**Note!** To prevent damage on the hook and docking head it is important not to hoist the boat into the docking head with full speed. Let the boat stabilise and adjust to correct position by adjusting towing line before hoisting into the docking head.
- H) Stop hoisting when boat reach the davits docking head and the small cylinders pushes nearly half way up. The Daughtercraft will stabilise when entering the four V-shaped spaces.
- I) Turn the davit in, and let the Daughtercraft down in stowed position.
- J) Stop the hydraulic power unit.

## 5.5 Dead Ship Recovery

Use the same procedure as described above. Instead of starting el. motors with green knob, use key in the ignition switch to start the diesel hydraulic power unit.

### Starting the engine:

- Warning! Make sure that no person are in area of air cooling doors.
- Turn the key in the operators panel clockwise until the engine starts. Do not run the starter motor for more than 15 seconds at a time. After each attempt to start the engine, wait a few moments or the battery will not deliver full power.
- All manoeuvres are operative, but with reduced speed.

### Stopping the engine:

Turn the key in the operators panel anticlockwise until the engine stops.  
Close the air cooling doors.

## 5.6 Precautions During Operation

*Even though the davit has been designed, built and tested to ensure max security, the operators skill is of outermost importance for safe operation. Personnel intended for operation need training to withhold this safety level. The davit and operating panel are equipped with signs and instructions showing how to operate the davit.*

*Upon request, Hydramarine may offer training for personnel.*

## 6 DRAWINGS

## 6.1 General arrangement drawing

## 6.2 Assembly-drawing

## 6.3 Hydraulic Flow Diagram

## 6.4 Electric Diagram