

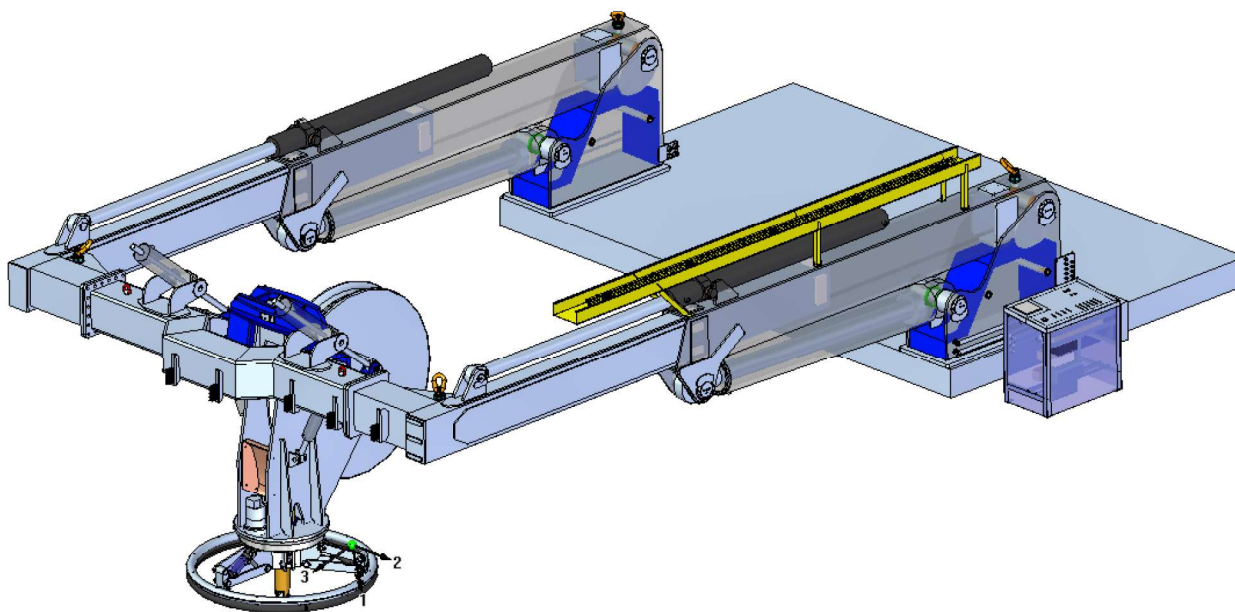
Data Sheet

Sepro A-Frame
Type DPL-15



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FOR INFORMATION ONLY



Picture of A-frame with simplified bottom frame. For info only

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A-Frame – Basic specification

Performance and design

Drawing :

SWL air : $15T_e @ 3\angle 0^\circ$
(@dynamic factor) $15T_e @ 2\angle 30^\circ$

SWL submerged : $22,5T_e @ 2\angle 0^\circ$
(@dynamic factor) $22,5T_e @ 1,33\angle 30^\circ$

Calculations

	Construction	Factor	Equation	Result
SWL air	A-frame $\angle 0^\circ$ (vertical)	3	$15T_e \times 3$	$45T_e$
	Latch $\angle 0^\circ$ (vertical)	2	$15T_e \times 2$	$30T_e$
	Luffing $\angle 0^\circ$ (vertical)	1,25	$15T_e \times 1,25$	$18,75T_e$
	A-frame $\angle 30^\circ$ (angled)	2	$15T_e \times 2$	$30T_e$
	Vertical load result			$\approx 26T_e$
	Horizontal load result			$15T_e$
SWL submerged	A-frame $\angle 0^\circ$ (vertical)	2	$22,5T_e \times 2$	$45T_e$
	A-frame $\angle 30^\circ$ (angled)	1,33	$22,5T_e \times 1,33$	$30T_e$
	Vertical load result			$\approx 26T_e$
	Horizontal load result			$15T_e$

Dimensions

Overall dimensions (preliminary values) : Max outreach to center line of cable Ref. drawing
From edge of foundation bracket

Max height of stack Ref. drawing

Distance between legs Ref. drawing

Bottom Frame:
Length Ref. drawing
Width Ref. drawing



SH Group A/S | Kuopiovej 20 | DK-5700 Svendborg
Tel. +45 6221 7810 | VAT No.: DK 12762704 | www.shgroup.dk
Global Handling & Deck Equipment Supplier

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Construction

Design Temperature	: TD -20° to +45°C.
Weight	: Approx. 30 Ton
General	: Self-contained all steel welded construction.
Sea fastening clamps Sacrificial	: 1 set off sea fastening clamps for welding to deck. Bolts for fastening brackets to A-Frame foundation included.
Working area	: Grated floor panels complete with bottom plate in steel in working/docking area. All painted surfaces subjected to foot traffic have non-slip finish.
Main hydraulic cylinders	: Hydraulic cylinder for A-frame tilt with stainless steel piston rods and rotational flow divider.
Hydraulic cylinders	: Hydraulic cylinders for docking head extension etc. with stainless piston rods and bearings.
Controls (HCP)	: Control panel in stainless steel for mounting beside A-Frame foundation with necessary relief valves, check valves and control valves, Danfoss PVG, for local of all A-Frame functions: - A-frame boom tilt (in/out) - A-frame boom extension - Tilt latch (roll) - Tilt latch (pitch) - Latch lock/release - Emergency stop
Hydraulic system	: Connection plate with pressure, return, drain and LS for connection to HPU Hydraulic pressure required 250 bar
Hydraulic fitting and pipes	: Hydraulic pipe material: Up to Ø42 in stainless steel AISI316 with Walform connection. Fittings system: Ermeto. Fitting material: Chromatic steel body, stainless steel nut. - Stainless steel body optional. Hose coupling material: Chromatic steel wrapped with densyl tape. - Stainless steel optional.
Hoses	: Connection hoses 10m long between HPU and HCP are included if HPU is chosen. Connection hoses 2m long between HCP and A-Frame are included.
Lights	: 2 pc 500W floodlights mounted on A-Frame legs.

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- Docking head** : The docking head unit is directly connected to the A-frame top bar and provides no vertical movement.
The docking head is built with:
- Fail safe latch interface ROV/TMS with Ø1900 mm rubber fender
 - Hydraulic open with visual indicator to confirm operation
 - ø 1700 mm PA6G cable sheave to suit exact cable diameter.
 - Able to take up Ø260 mm Linksys bend restrictor
 - Sheave can rotate sideways to adapt to fleet angle (max +/-8 °)
 - Rotation 0 - 270° with hydraulic brake
 - +/-10° max pitch of latch, variable hydraulic dampened
 - +/-15° max roll of latch, variable hydraulic dampened
 - Damping moment: 70 kNm when A-frame is in vertical pos.
 - Snubber damping moment: 45 kNm
 - Latch function, self-latching/ locking, spring applied with visual indication.
- Transport and installation** : All items are equipped with non-certified lifting points for handling and assembly.
The assembled A-frame is equipped with ILO 152 certified lifting points for lifting onto the vessel at the quay.
- Surface treatment** :
- | | | |
|--|-----|----------------|
| Degreasing | | |
| Sandblasting to ISO8501-1 | SA | 2,5 |
| 1 x Zinc primer | 70 | my |
| 1 x Priming epoxy coat | 130 | my |
| 2 x Top coat polyurethane à | 40 | my total 80 my |
| Total layer thickness | 280 | my |
| Colour RAL - TBA | | |
| Layer thickness regarded as minimum values | | |

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Documentation

- FAT** : SH Group A/S standard FAT according to DNVGL's Standard, May 2016. Standard for offshore and platform lifting appliances DNVGL-ST-0378.
- Manuals** : One Operational and technical manual
One Fabrication record book
One Electrical documentation
Two Electronic versions on USB stick
Delivered in English

Electrical installation directive

- Motor cable, control cable, earthing, marking etc.** : According to DNVGL's Electrical Installations, July 2015. Offshore Standard DNVGL-OS-D201.

Design directives

- System design** : The system is designed according to DNVGL's Standard, May 2016. Standard for offshore and platform lifting appliances DNVGL-ST-0378.
- Lifting design** : Lifting devices are designed, tested and certified according to ILO 1.5.2 compliance certificate issued by DNV
(Safety and health in dock work)
- Lifting devices are frame, pad eyes and lifting sling.
- Hydraulic hoses** : Hydraulic Hoses MED certified
- Quality Assurance** : SH Group A/S operates a DS/EN ISO 9001-2008 certified quality assurance system.

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Frame – Options

The guide will lead you through the available Frame options. Options are additional and not included in the Frame basic price. Options are listed according to levels. Level 1 will be invoiced together with the Frame basic price. Level 3,4... will be invoiced separately upon completion of each job.

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Level 1 - Certification options

Level 1 options installed on Frame prior to FAT

1.1 DNV lifting appliances: DNVGL-ST-0378



1.2 DNV 2.7-3 for max gross mass > 25 T



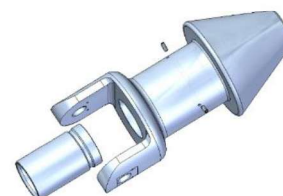
1.3 I.L.O. 1.5.2 lifting appliances



1.4 Custom specified certification

Level 1 - Additional design features and equipment – Mechanical

1.5 Bullet for TMS in material 1.4418 QT
Delivery of bullet incl. mold insert, connection bolt and washer. All in material 1.4418 QT.
Excl. custom redesign, load test or third part inspection.



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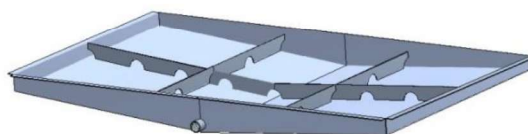
1.6 Link from bullet to TMS interface in material 1.4418 QT.

Excl. custom redesign, load test or third part inspection.



1.7 Drip tray

V-shaped AISI 304 stainless steel tray with 2" outlet. Tray placed under working area.



1.8 Central lubrication

"Hard to reach" grease points being lead to central places located on side of the frame. Servicing is made easy and no hard to reach spots are "forgotten". High-pressure grease hoses are used. Mild steel fittings are wrapped with Densyl tape. Hose fittings in stainless steel.



1.10 HPU

For each frame, a Hydraulic power unit is available. Only high quality components are used. Engineering and construction carried out in our own facilities, giving the end user an opportunity of influence the product.

Pipe system: Ermeto.

Fitting material: Chromatic steel body, stainless steel nut.

-Stainless steel body optional.

Hose coupling material: Chromatic steel wrapped with densyl tape.

-Stainless steel optional.

Standard HPU including:

- Certified protection and lifting frame according to I.L.O. 1.5.2.
- Certified Lifting sling I.L.O. 1.5.2.
- 500 L oil tank, ISO32 oil.
- Starter box in stainless steel IP56.
- Ls compensated piston pump
- Pressure and return line filters
- Cooler oil/air.
- Alarm low level, low-low level cut off.
- Heating in tank.



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1.11 Water separation filter

Mounted on HPU. Filter keeps oil clean and avoids water in the oil coming from condensation.



1.12 PLC basic installation with HMI

Integration of PLC and HMI opens up a range of possible controlling and safety features for the frame. This option includes basic intelligence installation making more options applicable. Depending on chosen options, the operator has the possibility of controlling or viewing via HMI:

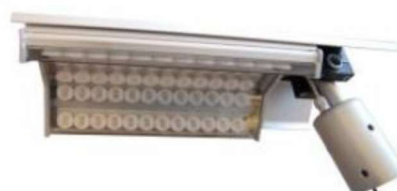
- Floodlights on/off
- Frame load
- Latched indication
- HPU alarms
- HPU status



1.13 Floodlights upgrade to LED

With this upgrade, a minimum of maintenance on the light sources are secured. The LEDs are characterized by a lifetime, which typically is 20 times longer compared to halogen. Moreover, they are durable and are therefore ideal for the harsh offshore environment.

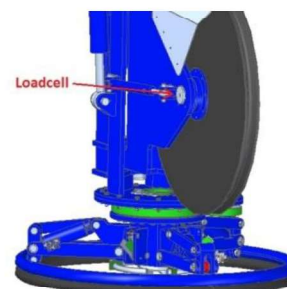
Applicable without PLC	✓
Applicable with PLC	✓



1.14 Load cell in docking head

Load sensing able by integrated load cell in cable sheave. Requires interface to an electrical control system. Combination with A-frame PLC or a Sepro winch electrical controlled is recommended.

Applicable without PLC	✗
Applicable with PLC	✓



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1.15 Radio remote control

For wireless control. Can be able to handle both Winch and Frame at same time.
Requires interface to a PLC.
Option appendix available upon request for more info.

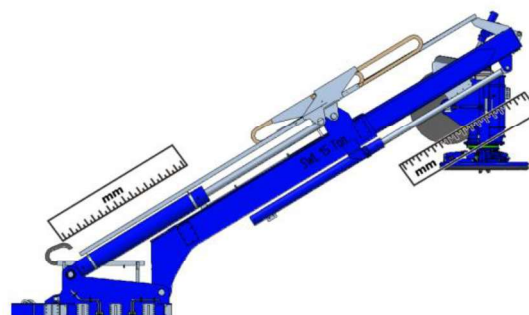
Applicable without PLC	✗
Applicable with PLC	✓



1.16 Frame collision control

Collision control - advanced version.
Linear transducer on main cylinder and extension cylinder. Input to PLC - software handles boundaries. Boundaries easy to change by input on HMI.
(Option designed for complete winch and frame delivery).

Applicable without PLC	✗
Applicable with PLC	✓



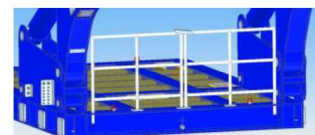
1.17 Latched indication

The latched TMS activates proximity switches placed in docking head.
Feedback from switches represented at HCP by activated lamps.
This option applies to stand-alone frames without HMI or connection to a Sepro winch, as latched indication is included here.

Applicable without PLC	✓
Applicable with PLC	✗

1.18 Safety Railing:

Between the A-frame legs is mounted a removable railing in seaworthy aluminum.



1.19 Cable Rinsing System

For cleaning the Cable during recovery.

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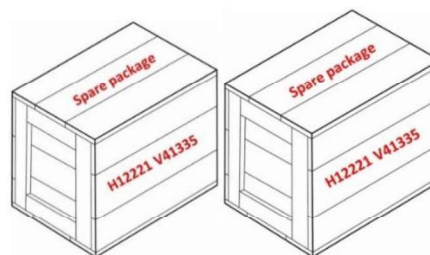
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Level 3 - Spare part options

Options delivered after FAT

3.1 Full spare package

The full spare package contains spares for replacement offshore as well as onshore. An offshore spare applies to the maintenance, able to be carried out at sea. Onshore parts are those who require heavy lifting gear and will normally be used in service of the equipment.



3.2 Reduced spare package

The reduced spare package is basically containing spares for the maintenance to be carried out at sea.



Level 4 - Preservation and storage option

Option delivered after FAT

4.1 Preservation and storage

Preservation and storage of Frame up to 6 months from FAT. Insurance not included.

- Emitters are placed in all electrical cabins and small junction boxes.
- All outer surfaces are protected with surface protection.
- Moisture absorbing units is placed evenly distributed inside the unit.
- The entire unit is carefully wrapped with UV resistant shrinking film.
- The outer protection film is inspected every third month for damage or cracks, if any then repaired.



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Level 5 - Shipping options

Options delivered after FAT

- 5.1 Loading**
Loading of equipment.
FCA - according to incoterms 2010.
According o frame agreement



- 5.2 Delivery**
Loading and delivery of equipment.
Location to be agreed, delivery according to
DAP – Incoterms 2010.



Level 6 - Installation Support, HAT & SAT

Option delivered after FAT

- 6.1** Sepro's participation in installation, commissioning, Harbor Acceptance Test and/or Sea Acceptance Test can be ordered based on Sepro Service Rates according to Frame Agreement.

Sepro shall be notified by e-mail and with a purchase order minimum 4 weeks before a mobilization shall take place, enabling Sepro/SH Group to have the required people and resources available and travelling organized. Sepro/SH Group's participation is required to maintain our warranty.



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Level 7 - Training options

Options delivered after FAT

- 7.1 Training course – 1 day**
Training course with Operator for 6 persons for 1 day.
Training course will be held at our facilities located in Svendborg.



- 7.2 Training course – 3 days**
Training course with Supervisor for 6 persons for 3 days.
Training course will be held at our facilities located in Svendborg.



List of deviations and exceptions

As a minimum we have the following deviations.

Item	Description
1	Source code is not part of delivery.

Date	Alteration of conditions or requirements	Initials
05-07-2017	Spec updated and bottom frame added	MB



SH Group A/S | Kuopiovej 20 | DK-5700 Svendborg
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