

# 1 GENERAL DESCRIPTION

## 1.1 Introduction

The Pedestal Mounted Offshore Crane (PMOC) is to be installed on A Pipe-Lay Vessel (PLV). The crane is meant to be used for the handling and transshipment of pipes.

The maximum working radius of the PMOC is 38.5 metres. Its maximum lifting capacity is 26 mt whilst the jib is operating within a radius of 7.8 to 33.1m. The hook travel amounts to approximately 70m.

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**NOTE**      *The tons meant in this manual are metric tonnes (mt). One metric tonne is equivalent to 1.1 short tonnes (tn) or 2204 lbs. See the 'Conversion table SI - Imperial' on page XII for further conversion factors.*

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The crane was designed to meet the following codes and standards:

- Norwegian Maritime Directorate (NMD), Regulations 13 January 1986 No. 31 Concerning deck cranes.
- Lloyd's Register of Shipping, Code of Lifting Appliances in a Marine Environment 2003.

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**NOTE:**      *The PMOC may only be operated by fully qualified personnel with full knowledge and understanding of the manual.*

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## 1.2 Main characteristics

Refer to figure 1-1. The PMOC is characterized by the following features:

- The basis of the PMOC is the pedestal which is fixed to the vessel structure.
- The crane house is connected to the pedestal by means of a slew bearing. The slew bearing is actuated by means of 2 slew drives and enables a rotation of the crane around its vertical axis.
- The winches for hoisting and luffing are built into the crane house, above the slew bearing. This makes the PMOC fully revolving, because the winches and hoist wires rotate along with the crane house and present no limitation to the slewing movement. The electrical power is transferred by means of a slipring.
- The PMOC is fully electrical driven.
- The PMOC is provided with an Automatic Overload Protection System (AOPS) to absorb shocks and to protect the crane structure from sudden overloads. The AOPS works by means of a hydraulic cylinder with an accumulator and is connected to the main hoist tackle by means of a sheave in the base section of the jib.
- The luffing tackle suspends the jib from the head section of the PMOC and serves to vary the angle of the jib.

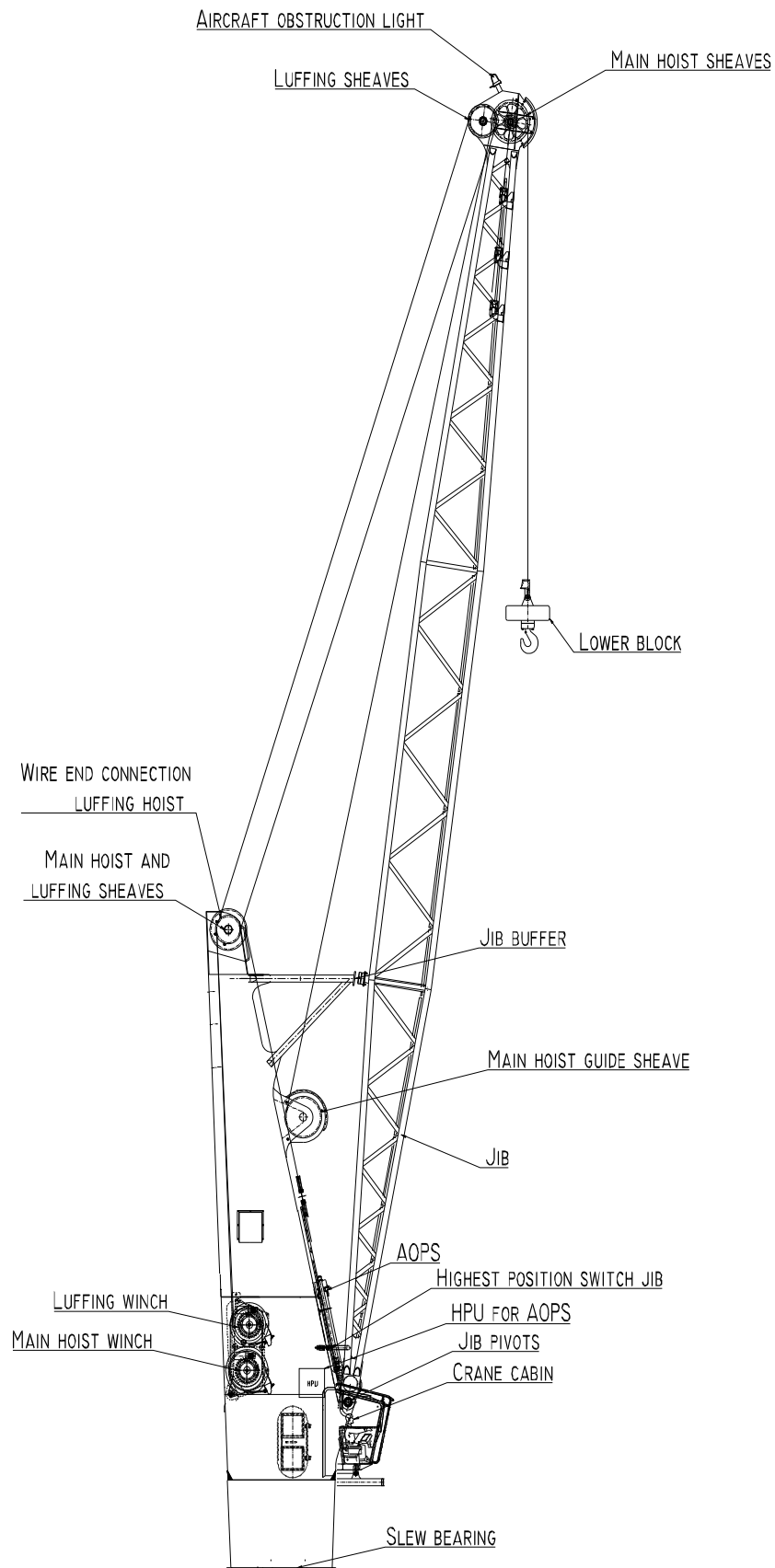


Figure 1-1: General overview

## 1.3 Scope of supply

The Huisman scope of supply for the PMOC consists of the following main parts:

- 1 Crane house incl. transition section
- 1 Slew bearing
- 1 Jib, lattice beam type
- Winches for main and luffing hoist
- Slew drive system
- Electric AC drive system
- Cooling and heating system for inverter room
- Power and control cabinets
- Slip ring with additional free connections
- Rigging including one 26mt lower block for the main hoist
- Electrical cabling down to demarcation level
- Operator's cabin
- Automatic greasing slew bearing
- Automatic Overload Protection System
- Man riding on main hoist
- Safety and monitoring devices and controls
- Paint system
- Manuals in threefold and electronic

The following is to be supplied by the client:

- Pedestal up to demarcation
- Slip ring foundation up to demarcation
- Boom support
- Mechanical installation and electrical hook up of the crane, refer to section 1.4.6.

## 1.4 Technical specifications

### 1.4.1 Introduction and definitions

The technical specification definitions define under which conditions the PMOC may be operated within the safety margins. If any operation takes place outside these conditions, the PMOC may be seriously damaged or there will be great danger to the operator or bystanders. Disregard of the technical specifications could also result in loss of the load.

#### Safe Working Load (SWL)

The safe working load (SWL) is the lifting capacity of a crane. The SWL depends on a number of conditions, such as:

- Radius, or distance between the centreline of the mast (pedestal and crane house) and the centreline of the hook, measured at deck level
- Dynamic factor
- Sea state, defined as Hsig
- Offlead and sidelead

## Dynamic factor

The dynamic factor is the ratio between the maximum dynamic hook load and the actual hook load, depending on the operating conditions (wave height, i.e.  $H_{sig}$  [m]).

## Sea state

This is the name for a number of environmental conditions (such as wind speed, wave height, wave period) which together result in motion of the crane vessel and the boat or structure from which a load has to be lifted. The sea states are classed in four categories. See table 1-1. The PMOC is designed to operate in a maximum sea state of 5-6. See section 1.4.2 on page 5 for details.

Table 1-1: Sea states

Sea state [-]	Significant wave height $H_{sig}$ [m]
1-2	1.0
3-4	2.5
5-6	4.0
7	7.0

## Offlead and sidelead

Offlead is the angle between the hoist tackle and the centreline of the mast in the plane of the jib and mast (load moving sideways).

Side lead is the angle between the hoist tackle and the centreline of the mast out of the plane of the jib and the mast (load moving sideways).

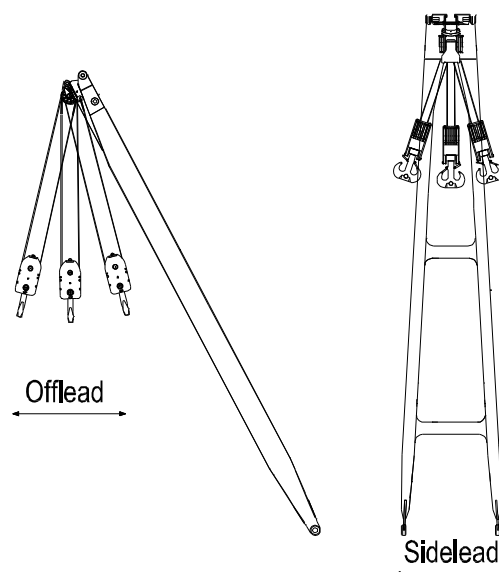


Figure 1-2: Offlead and sidelead

## 1.4.2 Main hoist

### Capacities

A summary is given below. See table 1-2 and figure 1-3 on page 8 for details.

26t @ 31m - (see the loadcharts in table 1-2)

Number of falls	1 [-]
Maximum offlead / sidelead	4/8 and 8/4 [°]
Duty factor	1,2 [-]
Max. dynamic factor (=F <sub>duty</sub> * F <sub>hoist</sub> )	1,6 [-]

**Table 1-2: Load chart**

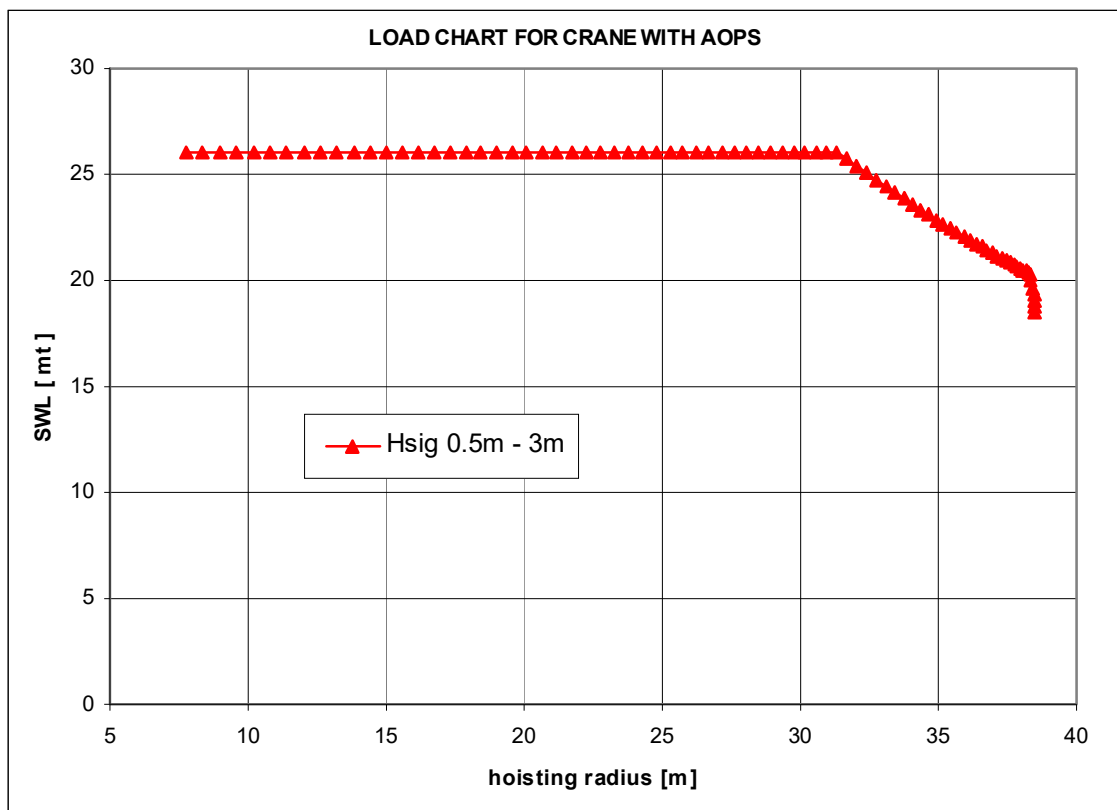
boom angle [deg]	hoisting radius [m]	with AOPS Hsig 0.5m - 3m	F <sub>duty</sub> =1.2	AOPS disabled Hsig 0.5m - 4m	F <sub>duty</sub> =1.2	Man riding, AOPS disabled, Hsig=1.6m	F <sub>duty</sub> =1.2
		SWL [ mt ]	Fhoist [ - ]	SWL [ mt ]	Fhoist [ - ]	SWL [ mt ]	Fhoist [ - ]
82	7,72	26,0	1,10	16,0	2,14	2,0	3,38
81	8,34	26,0	1,10	16,0	2,14	2,0	3,37
80	8,96	26,0	1,10	16,0	2,14	2,0	3,36
79	9,57	26,0	1,10	16,0	2,14	2,0	3,35
78	10,18	26,0	1,10	16,0	2,13	2,0	3,34
77	10,79	26,0	1,10	16,0	2,13	2,0	3,34
76	11,40	26,0	1,10	16,0	2,13	2,0	3,33
75	12,01	26,0	1,10	16,0	2,13	2,0	3,32
74	12,61	26,0	1,10	16,0	2,12	2,0	3,31
73	13,21	26,0	1,10	16,0	2,12	2,0	3,3
72	13,81	26,0	1,10	16,0	2,12	2,0	3,3
71	14,40	26,0	1,10	16,0	2,12	2,0	3,29
70	14,99	26,0	1,10	16,0	2,11	2,0	3,28
69	15,57	26,0	1,10	16,0	2,11	2,0	3,27
68	16,16	26,0	1,10	16,0	2,11	2,0	3,26
67	16,73	26,0	1,10	16,0	2,11	2,0	3,25
66	17,31	26,0	1,10	16,0	2,10	2,0	3,24
65	17,88	26,0	1,10	16,0	2,10	2,0	3,24
64	18,44	26,0	1,10	16,0	2,10	2,0	3,23
63	19,00	26,0	1,10	16,0	2,10	2,0	3,22
62	19,55	26,0	1,10	16,0	2,09	2,0	3,21
61	20,10	26,0	1,10	16,0	2,09	2,0	3,2
60	20,65	26,0	1,10	16,0	2,09	2,0	3,19
59	21,18	26,0	1,10	16,0	2,08	2,0	3,18
58	21,72	26,0	1,10	16,0	2,08	2,0	3,17
57	22,24	26,0	1,10	16,0	2,08	2,0	3,16
56	22,77	26,0	1,10	16,0	2,07	2,0	3,15

**Table 1-2: Load chart**

55	23,28	26,0	1,10	16,0	2,07	2,0	3,14
54	23,79	26,0	1,10	16,0	2,07	2,0	3,13
53	24,29	26,0	1,10	16,0	2,06	2,0	3,12
52	24,79	26,0	1,10	16,0	2,06	2,0	3,11
51	25,28	26,0	1,10	16,0	2,06	2,0	3,1
50	25,76	26,0	1,10	16,0	2,05	2,0	3,09
49	26,23	26,0	1,10	16,0	2,05	2,0	3,08
48	26,70	26,0	1,10	16,0	2,04	2,0	3,07
47	27,16	26,0	1,10	16,0	2,04	2,0	3,06
46	27,61	26,0	1,10	16,0	2,04	2,0	3,05
45	28,06	26,0	1,10	16,0	2,05	2,0	3,04
44	28,49	26,0	1,10	16,0	2,07	2,0	3,02
43	28,92	26,0	1,10	16,0	2,08	2,0	3,01
42	29,35	26,0	1,10	16,0	2,09	2,0	3
41	29,76	26,0	1,10	16,0	2,10	2,0	2,99
40	30,16	26,0	1,10	15,9	2,11	2,0	2,98
39	30,56	26,0	1,10	15,6	2,11	2,0	2,97
38	30,95	26,0	1,09	15,3	2,12	2,0	2,96
37	31,33	26,0	1,09	15,1	2,13	2,0	2,95
36	31,70	25,8	1,10	14,8	2,14	2,0	2,94
35	32,06	25,4	1,11	14,6	2,14	2,0	2,93
34	32,42	25,1	1,12	14,3	2,15	2,0	2,91
33	32,76	24,7	1,13	14,1	2,16	2,0	2,9
32	33,09	24,4	1,13	13,9	2,16	2,0	2,89
31	33,42	24,1	1,14	13,7	2,17	2,0	2,88
30	33,74	23,9	1,15	13,5	2,17	2,0	2,87
29	34,04	23,6	1,16	13,4	2,17	2,0	2,86
28	34,34	23,3	1,17	13,2	2,18	2,0	2,85
27	34,63	23,1	1,18	13,1	2,18	2,0	2,84
26	34,90	22,9	1,19	12,9	2,18	2,0	2,82
25	35,17	22,7	1,20	12,8	2,18	2,0	2,81
24	35,43	22,5	1,20	12,7	2,19	2,0	2,8
23	35,68	22,3	1,21	12,6	2,19	2,0	2,79
22	35,92	22,1	1,22	12,5	2,19	2,0	2,78
21	36,14	21,9	1,23	12,4	2,19	2,0	2,77
20	36,36	21,7	1,24	12,3	2,19	2,0	2,76
19	36,57	21,6	1,24	12,2	2,18	2,0	2,75
18	36,77	21,4	1,25	12,1	2,18	2,0	2,74
17	36,95	21,3	1,26	12,1	2,18	2,0	2,73
16	37,13	21,2	1,26	12,0	2,18	2,0	2,71
15	37,29	21,0	1,27	12,0	2,18	2,0	2,7
14	37,45	20,9	1,27	11,9	2,17	2,0	2,69
13	37,59	20,8	1,28	11,9	2,17	2,0	2,68
12	37,73	20,7	1,28	11,9	2,16	2,0	2,67
11	37,85	20,6	1,29	11,8	2,16	2,0	2,66

**Table 1-2: Load chart**

10	37,96	20,6	1,29	11,8	2,16	2,0	2,65
9	38,06	20,5	1,29	11,8	2,15	2,0	2,64
8	38,15	20,4	1,30	11,8	2,15	2,0	2,63
7	38,23	20,4	1,30	11,8	2,14	2,0	2,62
6	38,30	20,3	1,31	11,8	2,13	2,0	2,61
5	38,36	20,0	1,32	11,8	2,13	2,0	2,62
4	38,41	19,7	1,34	11,8	2,12	1,8	2,66
3	38,45	19,4	1,36	11,8	2,11	1,7	2,71
2	38,47	19,1	1,38	11,8	2,11	1,6	2,76
1	38,49	18,8	1,39	11,8	2,10	1,5	2,82
0	38,49	18,5	1,41	11,8	2,09	1,4	2,88



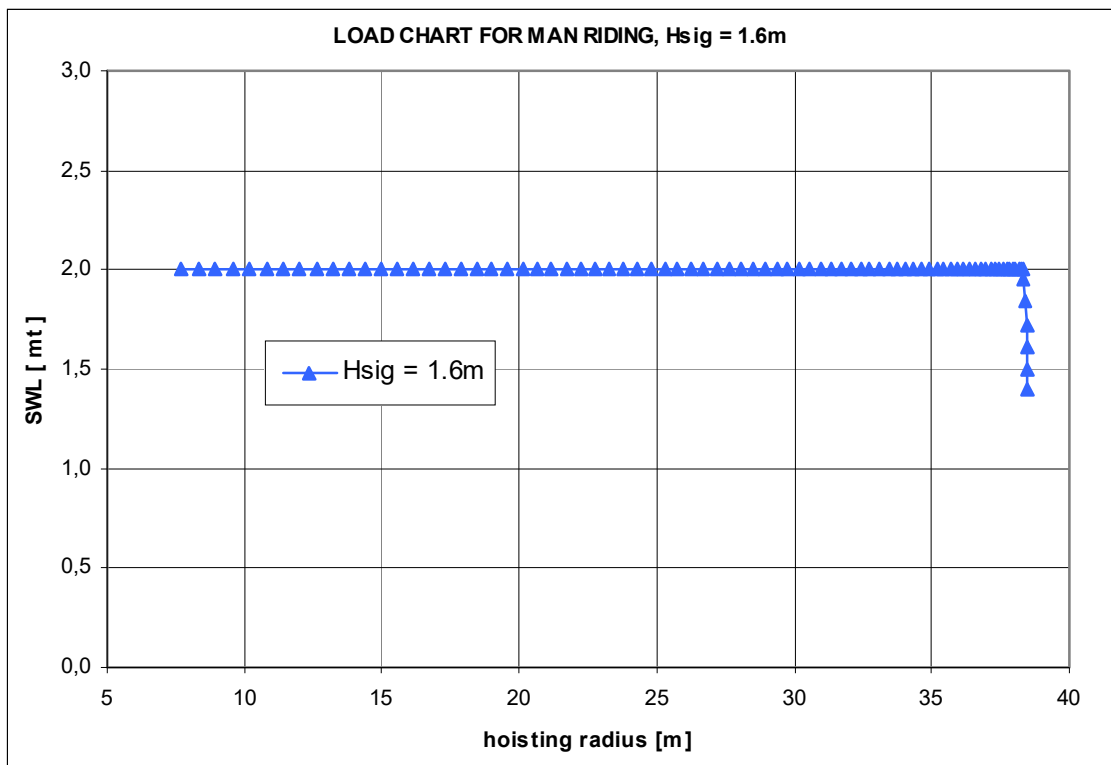
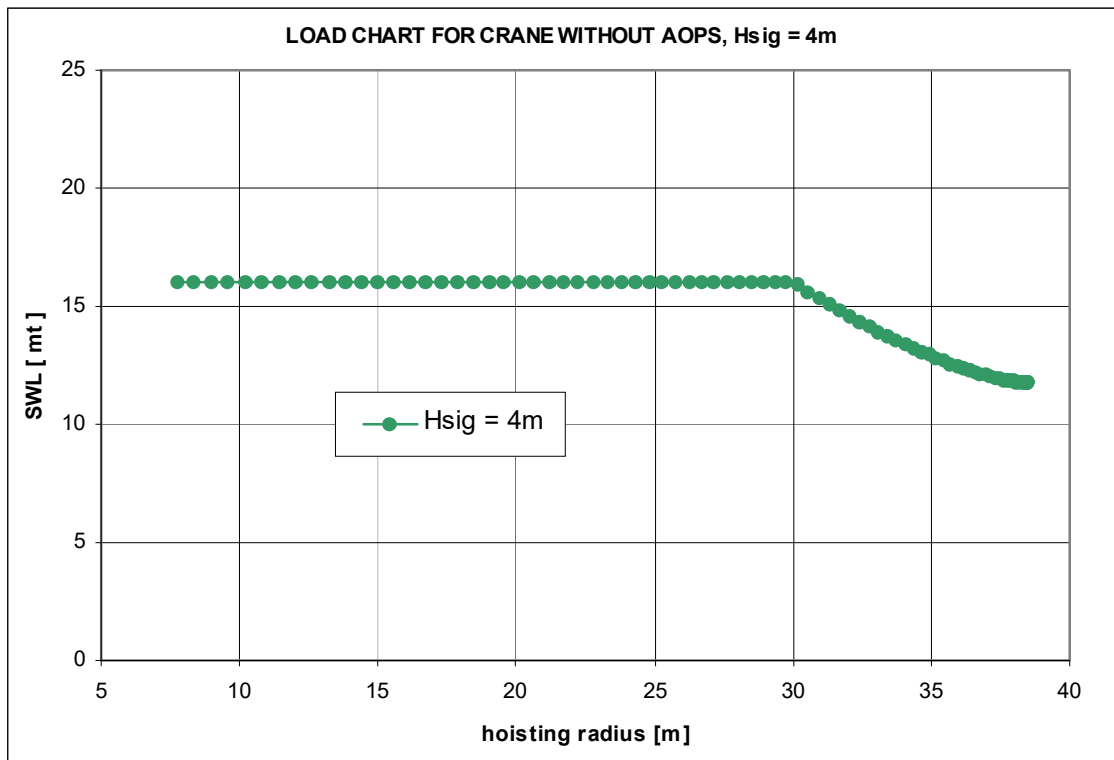


Figure 1-3: Graphic representation of hoist capacities



## Hoisting speeds

Loads	Max hoisting speed	
SWL 26 mt	40	[m/min]
Reduced loads 16t<SWL<26t	60	[m/min]
Small loads SWL<5	100	[m/min]

## Working radii

Minimum radius	7.7	[m]
Maximum radius	38.5	[m]
Hooktravel at max. jib angle	70	[m]

### 1.4.3 Luffing hoist

#### Angles

Min. jib angle, operating	0	[deg]
Max. jib angle, operating	82	[deg]

#### Luffing time

Luffing time from 15-75 degrees jib angle		
Full load	100	[s]
High speed	40	[s]

### 1.4.4 Slewing

Slewing range	fully revolving	360	[deg]
Number of slew drives		2	[-]
Maximum slewmoment		1370	[kNm]
Maximum slewmoment	static, holding force	1920	[kNm]

### 1.4.5 Environmental operating conditions

Ambient min. temperature	-10	[°C]
Ambient max. temperature	45	[°C]
Operational wind speed	20	[m/s]
Wind speed while out of service	63	[m/s]

## 1.4.6 Vessel interface

*Reference drawings:*

- A05-64000-00-18: Interface drawing
- A05-64000-90-12: Power and signal interface between crane and ship

For the mechanical interface requirements refer to drw. A05-64000-00-18. The electrical interfaces are shown on drw. A05-64000-90-12. The reference drawings are in Appendix L.

## 1.5 Safety

This section provides some general safety prescriptions. Detailed safety information is given wherever appropriate in the next chapters.









### 1.5.1 General safety prescriptions

- Prior to operating, maintaining or repairing the system, all instructions and safety regulations in this manual as well as in the supplier documentation must have been read and fully understood by all personnel who will be working with, or in the vicinity of, the 26 mt PMOC.
- The load specifications as well as the environmental conditions as described in this manual may NOT be exceeded. It is strongly advised to STOP the 26 mt PMOC before it reaches its limits! In case of any doubt on the definition of the operating conditions, do not hesitate to consult Huisman. Huisman does not accept liability due to neglect or disregard of the prescriptions and specifications stated in this manual.
- No persons are allowed near or on the system during operation, without prior knowledge and consent of the operator.
- The system may only be operated by an authorised operator, who is well trained and experienced in operating similar equipment, and who has full knowledge and understanding of the contents of this manual.
- Regular maintenance, service and inspection are required in order to guarantee safe use of the system for the duration of its lifetime. Maintenance may only be carried out by well-trained and experienced personnel.
- Before starting maintenance or repair activities, make sure that all electrical power is disconnected and that all components are in a safe position. Always secure moveable parts that could present a risk of injury or damage.
- Welding operations to the main structure or any other heat treatment can influence the system's integrity or fatigue life. It is therefore not allowed to carry out any welding, grinding or cutting operations without a written confirmation from Huisman in advance.
- The keys of key switches used for operation must be kept in a safe place by an authorised person (supervisor) when not in use. The key switches may only be used when the person concerned has full knowledge and understanding of any possible consequences of doing so.
- The operator must have clear view of the system and its direct vicinity during operation.
- External noise level from activities in the surrounding area can be considerable. In this case it is the captain's responsibility to supply hearing protection (ear muffs, ear plugs etc.)

- During sea travel, or when the maximum operating conditions are exceeded, the system must be seafastened.

### 1.5.2 General safety signs

The following safety signs are to be applied at the appropriate locations in the system.

SYMBOL	MEANING
	Keep away from moving loads. Extreme caution is required.
	General warning sign. Caution is required (e.g. moving machine parts).
	Potentially lethal voltages are present in the cabinets.
	Wear safety gloves to protect skin from aggressive cleaning or maintenance products.
	Wear safety glasses.
	Wear safety boots.
	Wear ear protection.
	Wear a safety helmet.