TECHNICAL SPECIFICATION
OFFSHORE AHC CRANE
STIFF BOOM
JL750TAHC

CLIENT
PROJECT NAME M/S ELEKTRON
REFERENCE NO 01571500VDR00
DATE March 5, 2015
<table>
<thead>
<tr>
<th>Rev.</th>
<th>Issue description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Issued for information</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

1. INTRODUCTION .................................................................................................................. 4
2. DESIGN CONSIDERATIONS............................................................................................... 5
3. PERFORMANCE DATA ........................................................................................................ 5
4. STEEL STRUCTURE(S)/COMPONENTS ............................................................................. 8
5. MAIN COMPONENTS ......................................................................................................... 9
6. HYDRAULIC SYSTEM ....................................................................................................... 10
7. ELECTRIC SYSTEM ......................................................................................................... 11
8. LUBRICATION .................................................................................................................. 12
9. CONTROL SYSTEM ......................................................................................................... 13
10. CONTROL SYSTEM ...................................................................................................... 15
11. SURFACE-COATING SYSTEM ......................................................................................... 15
12. SAFETY DEVICES ......................................................................................................... 15
13. NAMEPLATE, LABELS & TAGGING ............................................................................. 16
14. INSPECTION & TESTING ............................................................................................... 17
15. CERTIFICATION ............................................................................................................ 17
16. DOCUMENTATION ....................................................................................................... 17
17. SPECIAL TOOLS ........................................................................................................... 18
18. ATTACHMENTS ............................................................................................................ 18
19. OPTIONS ....................................................................................................................... 19

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1. INTRODUCTION

1.1 Company
MELCAL MARINE is a dynamic engineering, research, and manufacturing company, building on the world renowned Italian tradition of hydraulic lifting devices and dedicated to the marine and offshore industry. MELCAL MARINE cranes are always tailor made to your specific requirements at standard product quality and price.

Sales, engineering, production development and after sales support take place in our main offices in Italy and are internationally supported through worldwide factory trained and supported sales and service partners.

At the preliminary stages of any project MELCAL MARINE works closely with you in finding the most efficient solution, always bearing in mind innovative design, safety, international rules and regulations. As an independent company, all departments within our company pull tighter to guarantee feasibility and quick response. You will always have a significant participation during the preliminary steps of each project, choosing desired accessories, safety features, special requirements, painting procedures, etc.

All production processes followed by MELCAL MARINE quality control department are certified to ISO 9001:2008, verified and accredited by DNV.

1.2 Product
The JL Series, STIFF BOOM AHC pedestal cranes, are a reliable and low maintenance crane. Designed for general cargo handling, service, and offshore applications, onboard various vessel types and offshore units. Tailor made to your requested specifications, in different boom lengths and lifting capacities and for different on-board and off-board sea state working conditions. All JL series cranes can be equipped with different accessories and class certified by all leading classification societies.

1.3 Benefits
Tailor engineered to clients specific requirements
Manufactured to the most demanding safety rules and regulations
Designed to operate in the harshest environments
Experienced engineering and technical support
Versatile applications
Box boom structure with low center of gravity
User and maintenance friendly
Maintenance free hydraulic luffing cylinders
Operation of 2 or more functions simultaneously
Continuously variable speed control from zero to max speed
360° Continuous slewing
Norsok M 501 Coating System 1
Documentation package to NORSOK Z-018
Worldwide 24 hour aftersales support
100% Made in Italy
2. DESIGN CONSIDERATIONS

2.1 Design Codes & Standards
Federation Europeenne de la Manutention, F.E.M. 1.001, 3rd Edition, Revised 1998.10.01, "Rules for the Design of Hoisting Appliances": U3, Q2, A3 & T5, L2, M5

DNV – Standard for Certification No. 2.22 “Lifting Appliances” June 2013

IEC 61892 - Mobile and fixed offshore units - Electrical installations

*General note: Irrespective of date of validity of rules and regulations states in this specification, rules and regulations valid at date of contract are applicable for equipment supplied under the relevant contract

2.2 Applications
Lifting of personnel
Lifts over vessel side in open waters (Offshore External Lift)
Subsea

2.3 Environmental Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-20°C</td>
<td>+40°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>85%</td>
<td></td>
</tr>
</tbody>
</table>

2.4 Area Classification

<table>
<thead>
<tr>
<th>Zone</th>
<th>Boom Safe Zone</th>
<th>Crane column Safe Zone</th>
<th>Pedestal Safe Zone</th>
<th>HPU Safe Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas group</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Temp. class</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

3. PERFORMANCE DATA*

3.1 General
Drive system: Electro hydraulic
Performance matrix:
- Two functions can be operated simultaneous with max load and reduced speed
- All motions are of infinite variable control from zero to full speed

3.2 Boom Angles
Max. boom angle (°): 78
Min. boom angle (°): 0

3.3 Luffing
Luffing time full range +/- 5% (s): 100

3.4 Slewing
Slewing range (°): 360° Continuous
Slewing speed +/- 5% (rpm): 0.7
3.5 Load chart

<table>
<thead>
<tr>
<th>Radius (m)</th>
<th>Load 1 (t)</th>
<th>Load 2 (t)</th>
<th>Load 3 (t)</th>
<th>Load 4 (t)</th>
<th>Load 5 (t)</th>
<th>Load 6 (t)</th>
<th>Load 7 (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.50</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>17</td>
<td>25</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20.00</td>
<td>14.5</td>
<td>14</td>
<td>13</td>
<td>8.6</td>
<td>13</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>30.00</td>
<td>7</td>
<td>6.5</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Load</th>
<th>Condition</th>
<th>SWH (m)</th>
<th>Sea State</th>
<th>Heel-Trim (deg)</th>
<th>Wind speed Op/Stowed</th>
<th>Crane Dynamic factor</th>
<th>Pedestal Dynamic Factor</th>
<th>Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load 1</td>
<td></td>
<td>--</td>
<td>--</td>
<td>6+3</td>
<td>24/63</td>
<td>1.2</td>
<td>1.8</td>
<td>Shipboard</td>
</tr>
<tr>
<td>Load 2</td>
<td></td>
<td>0.6</td>
<td>--</td>
<td>6+3</td>
<td>24/63</td>
<td>1.3</td>
<td>1.95</td>
<td>Offshore</td>
</tr>
<tr>
<td>Load 3</td>
<td></td>
<td>1</td>
<td>--</td>
<td>6+3</td>
<td>24/63</td>
<td>1.7</td>
<td>2.55</td>
<td>Offshore</td>
</tr>
<tr>
<td>Load 4</td>
<td></td>
<td>2</td>
<td></td>
<td>6+3</td>
<td>24/64</td>
<td>2.5</td>
<td>3.75</td>
<td>Offshore</td>
</tr>
<tr>
<td>Load 5</td>
<td></td>
<td>1</td>
<td></td>
<td>6+3</td>
<td>24/65</td>
<td>1.7</td>
<td>2.55</td>
<td>AHC</td>
</tr>
<tr>
<td>Load 6</td>
<td></td>
<td>0.6</td>
<td></td>
<td>6+3</td>
<td>24/65</td>
<td>1.3</td>
<td>1.95</td>
<td>Personnel lift</td>
</tr>
<tr>
<td>Load 7</td>
<td></td>
<td>0.6</td>
<td></td>
<td>6+43</td>
<td>24/66</td>
<td>1.3</td>
<td>1.95</td>
<td>Cargo lift</td>
</tr>
</tbody>
</table>

3.6 Main Hoist
Speed last layer (m/min) | 20 - 1 Fall (Full load) 120 - 1 Fall (empty hook)

3.7 Aux. Hoist
Speed last layer (m/min) | 25

3.8 Active Heave Compensation (AHC)

3.8.1 Design parameters
AHC SWL (t) | 25
Heave/Amplitude (+/- m) | 3
Wave period (sec) | 10-20
Acceleration required (m/sec) | 1.46
Max. Lifting speed AHC operation (m/min) | 1 approx.
Level of AHC (typically) | 95% approx.
3.8.2 AHC System
Secondary controlled hydraulic motors, variable displacement swash plate piston motors with constant pressure for continuous load balancing
Accumulator cylinders
Low speed hoist or lowering at maximum power in AHC mode

3.8.3 AHC Winch modes
General cargo handling
Active heave compensation (AHC)
Constant tension (CT)

3.8.4 AHC General information
Compensated boost type system, compensating the crane jib tip movement resulting from heave motion, by paying in /out wire rope, as a pure position controlled system.
Motion reference unit (MRU) measuring vessel heave, pitch and roll motion. Based on the information from the MRU the crane computer calculates the resulting crane boom tip heave motion/speed, a set of servo valves will compensate the heave by paying out and in wire rope.

3.9 Load Forces/Reactions on Deck**
Max dynamic lifting moment (kNm)
Max dynamic axial load on crane base (kN) To be submitted
Max dynamic slewing torque (kNm)

3.10 Hydraulic Data
Max oil flow (l/min) 300
Max working pressure (bar) 280

3.11 Electric Data
Power consumption (kW) 2 x 110
Main power supply (V) 690V/60Hz/3ph
Auxiliary power supply (V) 230V
Emergency power system (V) 24V DC
Starting unit type Soft starter

3.12 Weights & Dimensions
Crane weight (t) Refer to drawing no. 01571500DFR00
Weight certificate Weight certificate with COG
According to EN ISO 19901-5
Items > 1 t with weight certificate

*All stated data are approx and to be confirmed upon completion of final crane. The above speeds are based on average volumetric efficiencies; a speed tolerance within acceptable range should be taken into consideration. Request for verification for weights that are crucial to vessel design.

** The above given loads are maximum design loads calculated in accordance with the design codes specified in Section 2.1 and not include required / additional safety factors for the pedestal.
4. **STEEL STRUCTURE(S)/COMPONENTS**

4.1 **Steel type**
S355 & S690
Steel quality according to applicable rules and regulations
All primary steel is fully traceable
Primary steel is certified by 3.1 certificate according to EN10204
Welding carried out by LRS certified welders according to UNI-EN-ISO 15614 welding procedures.

4.2 **NDT’s**
According to applicable rules and regulations
Third party inspection

4.3 **Crane column**
Totally enclosed watertight structure
Cylinder luffing bracket(s)

4.4 **Crane column / main boom pin**
AISI 630 stainless steel

4.5 **Luffing cylinders**
St 52.3 Housing material
Double chromium plated/thickness of 100µm piston rods

4.6 **Main boom**
Welded steel box structure
Internal stiffeners
Replaceable bushings in boom hinge
Cylinder luffing brackets
Winch service platform
Guiding windows for wire rope

4.7 **Main boom / cylinder pin**
AISI 630 stainless steel

4.8 **Knuckle jib**
Welded steel box structure
Internal stiffeners
Replaceable bushings in boom hinge
Cylinder luffing brackets
Guiding windows for wire rope

4.9 **Pedestal**
Design according to applicable rules and regulations
Cylindrical design
Steel pipe and flange, rolled and welded longitudinally
Weather tight manhole/access hole with reinforcement plates
Welding preparation at lower end
4.10 Miscellaneous
Ladders, handrails, guards and platforms according to applicable rules/regulations

4.11 Lifting lugs
According to DNV.2.7-1 Offshore Containers
Lifting lugs data sheets supplied

5. MAIN COMPONENTS

5.1 Slewing bearing
Type
Manufacturer
Bolts material
Gear
ball slewing bearing with grease nipples
Rothe Erde or equivalent
10.9 HDG
Internal

5.2 Slewing gearbox
Type
Quantity
Mounting bolts material
Internal pinion drive
3
10.9 HDG

5.3 Hydraulic cylinder(s)
Type
Double acting

5.4 Main hoist
Max SWL (t)
Grooving type
Mounting bolts material
25
Smooth drum
10.9 HDG

5.5 Main hoist wire rope
Type of wire rope
Wire Rope Diameter (mm)
Wire Rope Tensile Strength (N/mm²)
Min Breaking Load (kN)
Min. req. safety factor
Meters of wire rope (m)
No dead turns on drum
Preservation
Anti turn galvanized steel
36
2160
1208
4.7
1500
5
Brilube 70 grease

5.6 Main hoist rope sheaves
Rope sheave diameter (mm)
Bearing
Material
Twenty times wire rope diameter
AISI 316 stainless steel
Nylatron

5.7 Main hoist hook
According to applicable rules/regulations
Supplied with safety latch

5.8 Auxiliary hoist
Max SWL (t)
Cargo
Lifting of personnel
2
1
**Grooving type**
Smooth drum

**Mounting bolts material**
10.9 HDG

### 5.9 Auxiliary hoist wire rope

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of wire rope</td>
<td>Anti turn galvanized steel</td>
</tr>
<tr>
<td>Wire Rope Diameter (mm)</td>
<td>12</td>
</tr>
<tr>
<td>Wire Rope Tensile Strength (N/mm²)</td>
<td>2160</td>
</tr>
<tr>
<td>Min Breaking Load (kN)</td>
<td>135</td>
</tr>
<tr>
<td>Min. req. safety factor</td>
<td>5.0</td>
</tr>
<tr>
<td>Lifting height (m)</td>
<td>40</td>
</tr>
<tr>
<td>No dead turns on drum</td>
<td>5</td>
</tr>
<tr>
<td>Preservation</td>
<td>Brilube 70 grease</td>
</tr>
</tbody>
</table>

### 5.10 Auxiliary hoist rope sheaves

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rope sheave diameter (mm)</td>
<td>Twenty times wire rope diameter</td>
</tr>
<tr>
<td>Bearing</td>
<td>AISI 316 stainless steel</td>
</tr>
<tr>
<td>Material</td>
<td>Nylatron</td>
</tr>
</tbody>
</table>

### 5.11 Auxiliary hoist hook

According to applicable rules/regulations
Supplied with safety latch

### 6. HYDRAULIC SYSTEM

#### 6.1 Hydraulic system

System type
Open/Closed loop system

#### 6.2 Hydraulic pump

Pump type
Piston pump

#### 6.3 Hydraulic oil tank

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil tank location</td>
<td>Integrated in crane/pedestal</td>
</tr>
<tr>
<td>Oil tank capacity (l)</td>
<td>2000</td>
</tr>
<tr>
<td>Oil tank level</td>
<td>Sight glass</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Inspection and cleaning hatch</td>
</tr>
<tr>
<td></td>
<td>Drain valve</td>
</tr>
</tbody>
</table>

#### 6.4 Main control valve

Control valve block type
Proportional

#### 6.5 Slewing system

Gearbox specification
Hydraulic piston motor

#### 6.6 Hoisting system

Gearbox specification
Hydraulic piston motor

#### 6.7 Hydraulic oil cooling

Oil cooler type
Air oil cooler
6.8 Hydraulic slip ring
For transfer hydraulic connections to crane rotating sections

6.9 Hydraulic pipes
Hydraulic pipes of stainless steel/AISI 316
Pipes identification tags according to hydraulic schemes

6.10 Pipe fittings
Mild steel covered with denso tape

6.11 Hydraulic hoses
According to ISO 6945
High quality for resistance to salinity and sunlight
Wired braided for applicable specified hydraulic pressure ratings
Hoses identification tags according to hydraulic diagrams

6.12 Hose fittings
Mild steel covered with denso tape

6.13 Hydraulic line clamps
According to DIN 3015
Made of fire retardant material
Bolts in SS 316L

6.14 Hydraulic oil filtering
Pressure filter
Return filter
Drain Filter

6.15 Hydraulic system cleanliness
Flush test According to ISO 4406 17/15/12
Pressure test According to ASME B31.3

7. ELECTRIC SYSTEM

7.1 General
Protection against moisture and internal humidity using calculated quantities of silica gel or similar.
Cables identification tags according to electric diagrams.

7.2 Prime Mover (Electric Motor)
Protection class rating (IP) IP 56
Motor rating S1
Insulation class F
Temperature rise class B
Housing type Squirrel cage
Cooling system Self-cooling fan
Regulation IEC 60034-30
Monitoring SPM Nipples
7.3 Starter Cabinet
Location
Supplied as loose unit for installation in safe zone
Protection class rating
IP 56
Main isolation switch
Safety door
Control panel
Emergency stop push/pull button - red color
Power ON indicator
Motor running indicator
Hour meter
Ampere meter
Volt meter

7.4 Electric cables
Halogen free
Flame retardant
According to NEK606

7.5 Cable glands
External cable glands of marine brass covered with protection sleave
Internal cable glands of marine brass or nylon

7.6 Cable trays
External cable trays and pipes of stainless steel/AISI316

7.7 Electric slip ring
For transfer of electric power connections to crane rotating sections
Spare rings available upon request.

7.8 Junction box(s)
External junction boxes of stainless steel/AISI316, IP66
Internal junction boxes of galvanized steel, IP 56

7.9 Heating
Electric motor space heater
Starter cabinet space heater
Junction boxes space heater
Operator cabin heating
Machinery room heating

7.10 Lighting
2 x Pendulum suspended LED floodlight
1 x Helicopter warning light
Operator cabin internal light

8. LUBRICATION
AISI 316L Stainless steel grease nipple
AISI 316L Stainless steel grease lines
Centralized manual greasing system
9. CONTROL SYSTEM

9.1 Operator cabin

<table>
<thead>
<tr>
<th>Model</th>
<th>MELCAL MARINE MC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Position</td>
<td>Right hand side</td>
</tr>
<tr>
<td>Mounting</td>
<td>Mounted on vibration dampers</td>
</tr>
<tr>
<td>Access</td>
<td>External entrance door</td>
</tr>
<tr>
<td>Internal average noise level (dB)</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>Insulation</td>
<td>Internal acoustic and thermal isolation</td>
</tr>
<tr>
<td></td>
<td>Flooring of rubber mat</td>
</tr>
<tr>
<td>Operator chair</td>
<td>Ergonomic operator chair</td>
</tr>
<tr>
<td></td>
<td>Adjustable</td>
</tr>
<tr>
<td></td>
<td>Turnable</td>
</tr>
<tr>
<td></td>
<td>Armrests with integrated control joysticks</td>
</tr>
<tr>
<td></td>
<td>Foot rest</td>
</tr>
<tr>
<td>Cabin lighting</td>
<td>Internal ceiling light</td>
</tr>
<tr>
<td>Cabin windows</td>
<td>Front windows w/ wiper</td>
</tr>
<tr>
<td></td>
<td>Side windows</td>
</tr>
<tr>
<td></td>
<td>Roof window w/ wiper</td>
</tr>
<tr>
<td></td>
<td>Floor window</td>
</tr>
<tr>
<td></td>
<td>Tempered safety glass</td>
</tr>
<tr>
<td></td>
<td>Adjustable sunshade curtains</td>
</tr>
<tr>
<td>Heating</td>
<td>Heater unit with air blow ducts</td>
</tr>
<tr>
<td></td>
<td>Window defroster</td>
</tr>
<tr>
<td>Cooling</td>
<td>Air conditioning unit</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Earthed electric socket (230V/60Hz)</td>
</tr>
<tr>
<td></td>
<td>Coat hook</td>
</tr>
<tr>
<td></td>
<td>Paper/document box</td>
</tr>
<tr>
<td></td>
<td>Fire extinguisher, 2kg CO2 type</td>
</tr>
<tr>
<td>Emergency escape</td>
<td>Life vest and safety harness (Client scope of supply)</td>
</tr>
</tbody>
</table>

9.2 Cabin controls

<table>
<thead>
<tr>
<th>Type</th>
<th>Self centered joysticks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functions</td>
<td>Right joystick</td>
</tr>
<tr>
<td></td>
<td>Luffing boom</td>
</tr>
<tr>
<td></td>
<td>Hoisting</td>
</tr>
</tbody>
</table>

9.2.1 Operator Control Panel

| Control console       | Load rating charts           |
|                       | Control functions marking and labeling |
|                       | Warning horn                 |
|                       | Air conditioning controls    |
|                       | Heating controls             |
|                       | Emergency stop button        |
|                       | Window wiper controls        |
|                       | Push buttons / lamps         |
CCTV Monitor
HMI Touch screen

9.3 HMI Touch Screen Control Panel (Siemens PLC)
- Colour touch screen
- LMS display
- Audible/visual overload indicator
- Operation mode selector
- Hoist selection
- Personnel lift selection
- Actual load on hook
- Percentage of SWL/actual load on hook
- Outreach/boom angle

9.3.1 Load monitoring system

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Visual Display</th>
<th>Audible Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main hoist load display 90%</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Main hoist load display 110%</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Aux hoist load display 90%</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Aux hoist load display 110%</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Actual load on hook</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Boom/angle radius indicator</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Wire length/speed payout indicator</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Wind speed indicator</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Data logger</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Hoist limit switch up</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Hoist limit switch down</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Slack wire detection indicator</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>MOPS</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>AOPS</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Constant tension</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>AHC</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

9.4 Communication system
- Warning horn
- External deck overload alarm
- Loud speaker (Client scope of supply)
- VHF / UHF (Client scope of supply)
- Telephone (Client scope of supply)
- PA-speaker (Client scope of supply)
10. CONTROL SYSTEM

10.1 Radio remote control
Control functions
- Joysticks controls
- Crane start/stop selector
- Emergency stop button
Indicators
- Push buttons/lamps
- LMS display

Radio installation will be delivered with a back-up cable of 15 meters and a spare battery.

11. SURFACE-COATING SYSTEM

11.1 Surface protection system

<table>
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<tr>
<th>Coating Procedure</th>
<th>NORSOK M-501 System 1</th>
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12. SAFETY DEVICES

12.1 Controls system
Load limiting system (Overload protection)
Main overpressure valve for safety of the whole hydraulic system
Dead man type control levers/spring centered controls
Failsafe control functions
Load diagram(s)/curve(s)
Emergency stop button(s)
Radio Remote Control (RRC)
Audible overload alarm
Visual overload alarm
Load monitoring system (LMS)
Personnel lift ON indicator
Cargo / Personnel lift key selector
External deck overload alarm
External deck motion flashing light
Fire extinguisher
Remote diagnostic system
CCTV Hoist camera

12.1.1 Hydraulic system
Pressure gauge(s)
Blocking valves incase of leakage
High oil temperature indicator and over-heating stop
Hydraulic filter indicator
Low hydraulic oil level stop

12.2 Electric system
Halogen free
Flame retardant
Electric motor thermistor overload protection

12.3 Luffing system
Load holding valves
Boom angle indicator
Boom angle sensors

12.4 Slewling system
Fail safe brakes
Slew load holding valve

12.5 Main hoisting system
Load holding valve
Fail safe multi-disc brake
Hook stop in upper and lower most positions
Empty drum protection with 5 wraps of wire rope remaining on winch drum
Constant tension (CT)
Manual overload protection system (MOPS)
Automatic overload protection system (AOPS)

12.6 Auxiliary hoist system
Load holding valve
Fail safe multi-disc brake
Hook stop in upper and lower most positions
Empty drum protection with 5 wraps of wire rope remaining on winch drum
Constant tension (CT)
Manual overload protection system (MOPS)
Automatic overload protection system (AOPS)
Independent secondary brake for lifting of personnel

12.7 Emergency operation system
Emergency Power System (EPS)

12.8 Other
SWL marking on boom/jib
Dropped object management

13. NAMEPLATE, LABELS & TAGGING

13.1 Nameplate and instrumentation labels
Language* English
Crane nameplate material AISI 316 stainless steel
13.2 Tagging
Hydraulic line tagging system* MELCAL MARINE standard
Hydraulic line tagging material AISI 316 stainless steel
Electric cables tagging system* MELCAL MARINE standard
Electric cables tagging material AISI 316 stainless steel
* Client tagging system upon request.

14. INSPECTION & TESTING
ISO 9001:2008 accredited by DNV
Class society requirements (If applicable)
Quality inspection test plan (QITP) issued at PO
Factory acceptance test (FAT) issued 30 days before FAT date
Coating procedure specification (CPS)
Manufacture record book (MRB)
Other client specific inspections / testing upon request

15. CERTIFICATION
15.1 Manufacture certification
Declaration of conformity
FAT Test report
Loose gear certificates (ILO Format)

15.2 Class Society certification
DNV – Standard for Certification No. 2.22 “Lifting Appliances” June 2013

16. DOCUMENTATION
16.1 Language
All documents are supplied in English language. Upon request documentation can be supplied in other languages.

16.2 Copies
1 (one) PC Electronic copy
Upon request desired number of copies of each type document can be issued.

16.3 Standard
NORSOK Z-018

16.4 Document list
Refer to attachment Supplier Master Document List (SMDL).
Upon request MELCAL MARINE can issue desired number of copies of each type document.
Other documentation upon request.

17. SPECIAL TOOLS

NA

18. ATTACHMENTS
General arrangement drawing no. 01571500DFR00
Supplier master document list (SMDL)
19. OPTIONS

19.1 Spare parts

  19.1.1 Commissioning spare parts (Refer to attachment).

  19.1.2 Two Year recommended spare parts list (Refer to attachment).
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