



TECHNICAL SPECIFICATION OFFSHORE AHC CRANE STIFF BOOM JL750TAHC

CLIENT

PROJECT NAME

M/S ELEKTRON

REFERENCE NO

01571500VDR00

DATE

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MELCAL MARINE maintains the right to make any changes, modifications and/or improvements at its own discretion ensuring no impact on the overall performance. All images/pictures are for illustration purposes only.

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

EN 13852-1:2013 – “Cranes – Offshore Cranes, Part 1 General purpose offshore cranes”

IEC 61892 - Mobile and fixed offshore units - Electrical installations

Quality System Standard EN ISO 9001:2008 certified and accredited by DNV Quality Assurance. Certificate number 143797-2013-AQ-ITA-ACCREDIA.

*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

Ambient temperature	Min	-20°C
	Max	+40°C
Humidity		85%

2.4 Area Classification

Zone	Boom Safe Zone	Crane column Safe Zone	Pedestal Safe Zone	HPU Safe Zone
Gas group	--	--	--	--
Temp. class	--	--	--	--

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
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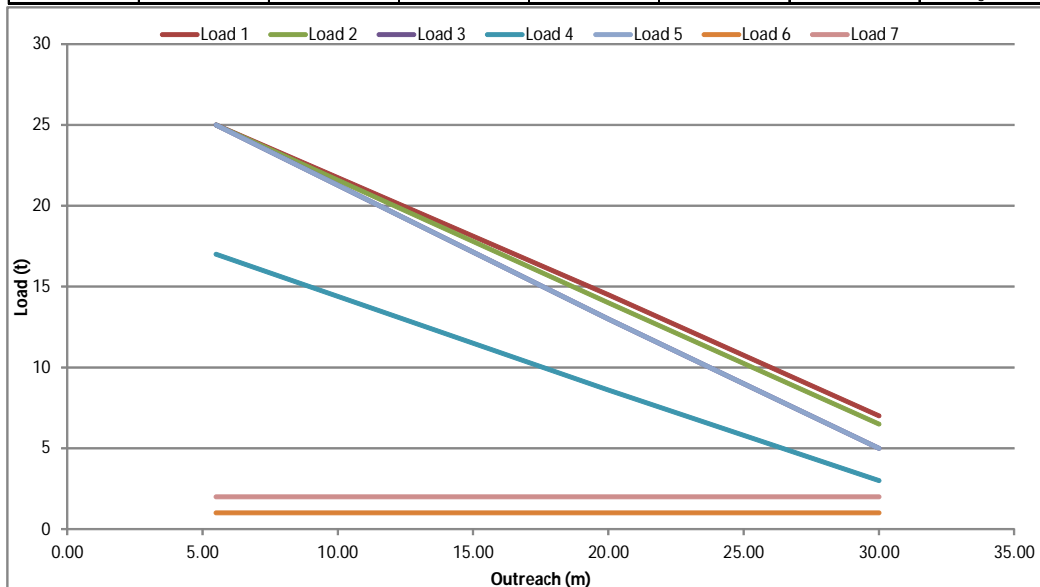
3.4 Slewing

Slewing range (°)	360° Continuous
Slewing speed +/- 5% (rpm)	0.7

3.5 Load chart

Radius (m)	Main Hoist -1 Line pull-					Auxiliary Hoist -1 Line pull-	
	Load 1 (t)	Load 2 (t)	Load 3 (t)	Load 4 (t)	Load 5 (t)	Load 6 (t)	Load 7 (t)
5.50	25	25	25	17	25	1	2
20.00	14.5	14	13	8.6	13	1	2
30.00	7	6.5	5	3	5	1	2

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



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/sec²)

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
	24V DC
Emergency power system (V)	690V/60Hz/3ph
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	ball slewing bearing with grease nipples
Manufacturer	Rothe Erde or equivalent
Bolts material	10.9 HDG
Gear	Internal

5.2 Slewing gearbox

Type	Internal pinion drive
Quantity	3
Mounting bolts material	10.9 HDG

5.3 Hydraulic cylinder(s)

Type	Double acting
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5.4 Main hoist

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

5.5 Main hoist wire rope

Type of wire rope	Anti turn galvanized steel
Wire Rope Diameter (mm)	36
Wire Rope Tensile Strength (N/mm ²)	2160
Min Breaking Load (kN)	1208
Min. req. safety factor	4.7
Meters of wire rope (m)	1500
No dead turns on drum	5
Preservation	Brilube 70 grease

5.6 Main hoist rope sheaves

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

5.7 Main hoist hook

According to applicable rules/regulations

Supplied with safety latch

5.8 Auxiliary hoist

Max SWL (t)	2 Cargo 1 Lifting of personnel
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Grooving type Smooth drum
Mounting bolts material 10.9 HDG

5.9 Auxiliary hoist wire rope

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

5.10 Auxiliary hoist rope sheaves

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

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

Oil tank location Integrated in crane/pedestal
Oil tank capacity (l) 2000
Oil tank level Sight glass
Maintenance Inspection and cleaning hatch
Drain valve

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 sleeve
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

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

9.2 Cabin controls

Type	Self centered joysticks	
Functions	Right joystick	Left joystick
	Luffing boom	Luffing jib
	Hoisting	Slewing

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
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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

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

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
Push buttons/lamps
LMS display

Indicators

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

Coating Procedure

NORSOK M-501 System 1

Paint supplier

International Marine Coatings

Shot Blasting

SA 2.5 (ISO8501-1)/(DIN55928)

Primer coat

DFT 75 µm;

Intermediate coat

DFT 160 µm;

Finish coat

DFT 60 µm;

Total DFT

295 µm.

Finish Color (RAL)

White (9010)

Certification

NACE

12. SAFETY DEVICES

1.1 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 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 Slewing 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

Crane load diagram material
Instrumentation labels material
* Different instrumentation languages upon request.

AISI 316 stainless steel
Trafolite

13.2 Tagging

Hydraulic line tagging system*
Hydraulic line tagging material
Electric cables tagging system*
Electric cables tagging material
* Client tagging system upon request.

MELCAL MARINE standard
AISI 316 stainless steel
MELCAL MARINE standard
AISI 316 stainless steel

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

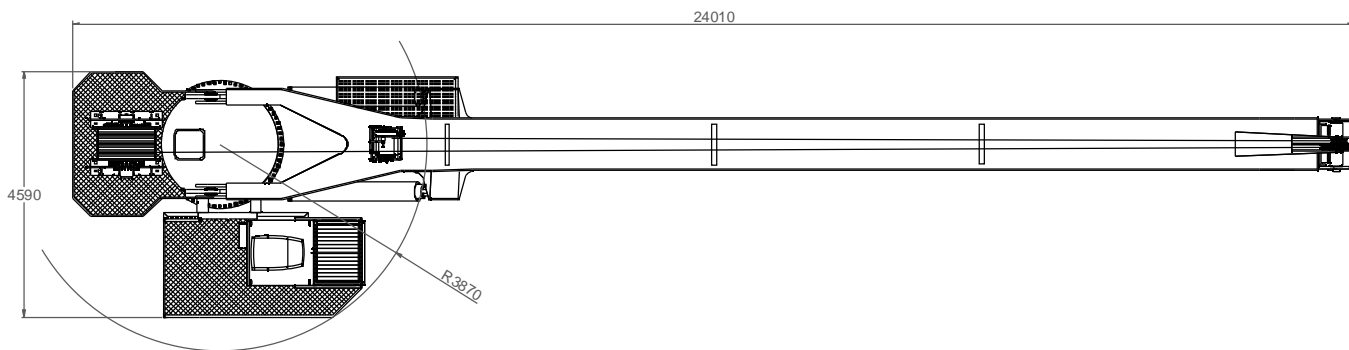
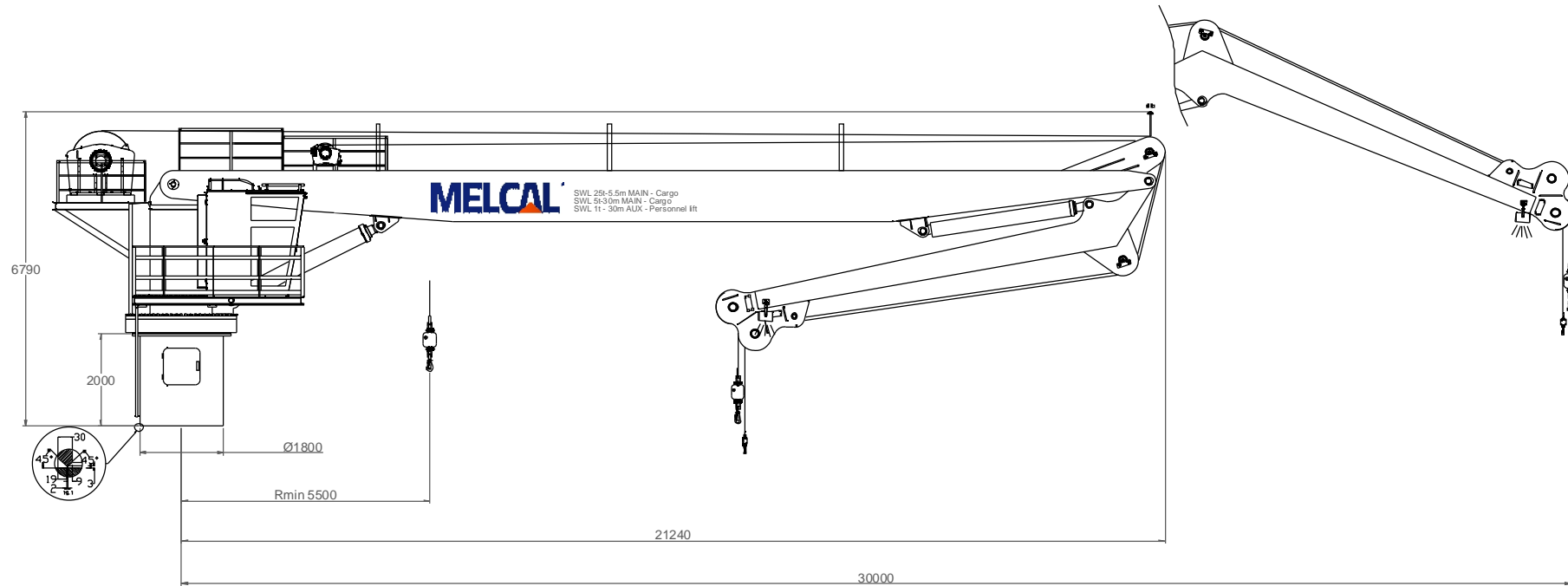
General arrangement drawing no. 01571500DFR00
Supplier master document list (SMDL)

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).



TECHNICAL DATA

CRANE MODEL	JL700AHC
WEIGHT	38000 kg APPROX
MAX DYNAMIC FORCES ON DECK (AT MAX OUTREACH)	LIFTING MOMENT : TBS AXIAL LOAD : TBS SLEWING TORQUE : TBS
DYNAMIC FACTOR	1.7

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Description		Version	Modification index		Order
GENERAL ARRANGEMENT		00	1	2	3
Particular		Revision	4	5	6
PRELIMINARY		00	Scale		015715
			1/100	Size	A3
			Signature		Date
			L. Pipitone		06/02/2015
			A. Lombardo		06/02/2015
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			Page 1/1		
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Supplier Master Document List (SMDL) PRELIMINARY



1.	2.	3.	4.	5.	6.	7.
Supplier Document No.	Rev.	Document title	Planned submittal date	Actual submittal date	Format	Comments
		Dimension drawings				
		Load diagram				
		Pedestal interface				
		Quality Inspection & Testing Plan				
		Paint Report				
		Handling Procedure				
		Installation Procedure				
		Packing List				
		Preservation procedure				
		Use & Maintenance Manual				
		Spare Parts Manual				
		Circuit Diagrams				
		Electric General arrangement				
		Terminal Strip Connection				
		Electric Installation				
		Cable Log				
		Main Block Diagram				
		Sub block diagram				
		Instrument index				
		Lubrication map				
		Hydraulic Diagram				
		Hydraulic components index				
		Hose Log				
		Pressure Test Certificate				
		Loose Gear Component Certificates				
		Declaration of Conformity				
		Factory Acceptance Test Procedure (FAT)				
		Commissioning Procedure				
		SPIR				
		Noise Measurement Report (optional)				
		Class Society Certificate (optional)				
		Green Passport Declaration (optional)				
		Mechanical Completion Dossier (optional)				
		Manufacturer's Record Book - MRB (optional)				
		Lifting Certificate (optional)				
		Flushing Certificate (optional)				
		Weight Measurement Report (optional)				
		Atex Log (optional)				

