1. SPECIFICATIONS

1.1 GENERAL

The two new cranes are designed, manufactured and erected for container handling at Salalah Port Service in Oman. The cranes comprise a rail mounted, electrically powered, single trolley, traveling tower, gantry type structure capable of container handling through the legs of the structure.

These two cranes are Post-Panamax quayside container cranes with cantilever boom capable of being raised to clear the upper structure of the ships. The crane is capable of continuous duty cycle operation at speeds up to full speed with loads up to 50LT with 63.5m maximum outreach and 25m maximum backreach, the crane can not be run continuously with load exceeding 50LT. The cranes are capable of operating with full load when the boom in the raised position. However, with boom up, trolley should not move out of the gantry frame when wind speed exceeds 20m/s. The rated load of these cranes is 65LT, however, **65LT IS MERELY AN INTERMITTENT LOAD**.

Power for the cranes is 11KV, 3 phase, 50HZ, which is supplied by quay system. With the transformer, Power of different voltage level is supplied to various distribution panels in the electrical room. AC power is converted into DC power by SCR (silicon controlled rectifier) and fed to the main drives.

The main hoist has reversible and full-speed adjustable thyristor control. Speed of hoisting and lowering is controlled automatically according to the lifted load. There is height indicator, overload protection, over speed protection, etc. in the main hoist drive system to ensure safe and efficient operation. A spring set thruster released BUBENZER disk brake on the motor input shaft together with a spring set hydraulically released caliper disk brake on the drum ensure safety of main hoist operation even in emergency case.

DC voltage variation control is employed for boom hoist drive system. The boom can be raised 80°. Movement is regulated from the control system in the boom hoist control cabin on seaside upper beam. A spring set thruster released BUBENZER disk brake on the motor input shaft together with two spring set hydraulically released caliper disk brakes on the drum ensure safety of boom hoist operation. Over speed protection is provided. The boom can be raised to 80° and latched at the top of the A-frame for maintenance.

A rope- towed main trolley is controlled by DC drive with voltage variation. Two spring set thruster released BUBENZER disk brakes on the motor input shaft ensure safety of trolley travel. In the main trolley rope reeving system, there are two sets of towing ropes. For both

ropes, one end is fixed to the trolley, and the other end is secured on the rope drum. From the operator s cab under trolley frame, the operator can control all the crane motion except boom hoist. Two hydraulic rope tension devices are installed at the back end of the girder to prevent ropes from being over loose.

Two rope- towed slave trolleys(catenary trolley) are controlled by DC drive with voltage variation. A spring set thruster released BUBENZER disk brakes on the motor input shaft ensure safety of catenary trolley travel. There are three sets of towing ropes for catenary trolley rope reeving system. For two of them, one end is fixed to the trolley, and the other end is secured on the rope drum, the third set rope is used to connect two catenary trolleys together to keep the distance unchanged between two trolleys. During operation catenary trolleys support the sagging main hoist ropes, main trolley towing ropes and catenary trolley ropes. There re also two hydraulic rope tension devices provided at the rear end of the girder to prevent ropes from being over loose.

There are four sets of gantry drive mechanisms at each corner of the gantry fame. They are all controlled by DC drive. There are eight wheels in each drive mechanism, and half of them are positively driven. Two sets of stowage devices and four sets of tie down devices are provided to prevent the crane from shifting in strong wind. All the passive wheels are equipped with HILLMAR wheel brakes to prevent the crane from moving in sudden wind gusts during normal operation. OLEO pneumatic-hydraulic buffers are provided at four corners to absorb impact energy in case of collision.

There sets of mechanisms are installed at the tip of boom, with these mechanisms the operator can adjust trim, list and skew of the spreader from the operator s cab.

The machinery house is equipped with a maintenance service crane with 11 tons capacity. With 50 meters total lift height, the service crane is capable of centering over, hoisting , traveling, and lowering to the dock surface, any piece of assemble equipment in the machinery house. The crane is driven by AC power and operated from a pendant control box.

There is an outdoor service lift provided at the end of girder for maintenance of trolley assembly, rope tension devices and anti- snag devices.

An ALIMARK elevator is provided with landing at operator s cab access level, at machinery house level and at access to gantry power cable reel.

Stairs, ladders, platforms, and walkways are provided on the crane to make readily accessible all parts and areas to which access is required for the crane s operation, lubrication, service, maintenance or inspection, including structural inspections.

Lighting at stairs, ladders, walkways, platforms and in the machinery house allows for safe nighttime operation. Aviation lights are provided both on the tope of seaside A-frame top and at the boom tip for crane safety in the night.

The boom and girder are of dual box section construction. Seaside and landside girder support beams(upper sill beams), sill beams, gantry legs and gantry linking beams are of box section construction. Backstays and diagonals are of tubular section construction. Seaside A-frame combines tubular and box-section construction. Both forestays are of H type construction. All the connection on the gantry frame are rigid. The boom is hinged at the heel end with the gantry frame.

1.2 MAIN TECHNICAL PARAMETERS

Q18-12

1.2.1 LIFTING CAPACITY:

Rated load under the spreader: 65 LT

Weight of lifting system: 18.3 LT

1.2.2 SPEED:

Main hoist:

lifted load under spreader(LT)	speed(m/min)	speed(fpm)
65	53	173.9
50	59	193.6
0	170	557.7

Trolley: 240 m/min (787.4 fpm)

Catenary trolley: 153m/min (502.0 fpm)

Gantry: 60m/min (196.9fpm)

Boom hoist(single cycle): 0°~80° 6 min

80°~0° 6 min

1.2.3 PRINCIPAL DIMENSIONS:

1) Operating outreach from waterside rail with bumpers uncompressed: 63.5m (208.3 ft.)
2) Operating backreach from landside rail with bumpers uncompressed: 25m (82.0 ft.)
3) Rail gage(center to center distance): 30.48m (100 ft.)

4) Lift height above rail to underside of spreader: 40m (131.2 ft.)

5) Lift height below rail to underside of spreader: 15.2m (49.9 ft.)

6) Total lifting height: 55.2m (181.1 ft.)

7) Vehicular clearance under portal: 15.2m (49.9 ft.)

8) Longitudinal clearance between crane legs: 18.3m (60.0 ft.)

9) Longitudinal hoist rope centers: 5.436 m (17.83 ft.)

10) Overall width between buffers (uncompressed): 27m (88.5 ft.)

11) Overall boom width, including all parts and trolley 9.0m (29.5 ft.)

1.2.4 SPECIFICATION FOR GANTRY TRAVEL:

1) Number of wheels:

seaside: 8/corner 4 driven/corner

landside: 8/corner 4 driven/corner

2) Stowage device (manual): 2 sets

Wheel brake (electro-hydraulic): 4 sets/corner

Buffer (pneumatic-hydraulic): 1 set/corner

Height above rail: 1000 mm (3.28 ft.)

1.2.5 SPREADER

Type: BROMMA AST- 6

capacity: 65LT

1.2.6 TILTING

Trim: ±3.5°

List: ±5°

Skew: ±3°

1.2.7 POWER SUPPLY METHOD:

1) Gantry travel: SPECIMAS Cable reel system

travel distance(one way): 530m (1739 ft.)

2) Trolley traverse: STEMMANN Festoon cable carrier system

traverse distance: 118.98m (390.4 ft.)

1.3 SPECIFICATION OF MOTORS AND BRAKES

1.3.1 MAIN MOTORS

No.	Location	Parameters of motor		Supplier
1	Main hoist	Capacity Type Speed Voltage Duty Quantity	335 KW CD6173 650/2085 RPM 275 VDC continuous 2	GE
2	Main trolley	Capacity Type Speed Voltage Duty Quantity	224KW CD508AT 1650 RPM 550 VDC continuous 1	GE
3	Catenary trolley	Capacity Type Speed Voltage Duty Quantity	23 KW CD328AT 1750 RPM 550 VDC continuous 1	GE
4	Gantry travel	Capacity Type Speed Voltage Duty Quantity	19 KW CD328AT 1750 RPM 275 VDC 60 MIN 16	GE
5	Boom hoist	Capacity Type Speed Voltage Duty Quantity	224 KW CD6173 1750 RPM 575 VDC continuous 1	GE