



EQUIPMENT & MAINTENANCE MODULES

6 APRIL 2018

MODULES

1. Basic Electrical & Electronic Engineering
2. Know your QC
3. Main Hoist System
4. Trolley system, self driven, rope towed
5. Gantry System
6. Boom system
7. Spreader inspection, twistlock
8. Headblock
9. Catenary trolley system
10. Trim list skew
11. Main cable reel system
12. Festoon, cable chain
13. Spreader cable reel
14. Service Hoist, Trolley, Boom brakes
15. Gantry brakes
16. Substation, Switch-gear and Trafo
17. Trolley rail system
18. Trolley and gantry wheels
19. Gearbox-Drum-Barrel coupling
20. Auxillary Hoist and Boom brakes
21. Wirerope replacement & rope length adjust
22. Anti-collision system, crane-to-crane, ship to crane
23. Couplings and sheaves
24. QC Sensors and limit switches
25. Preventive maintenance task
26. Preventive maintenance inspection
27. Structural inspection.
28. Lubrication
29. Alignment verification method (2)
30. Paint repair
31. Bolted joints and bolts inpection
32. Pin connection inspections
33. Wirerope inspection & lubrication
34. Motor, cables, panel preventive maintenance
35. Alignment, basic and inspection (1)
36. Replacement 1-(Electrical Protection System)
37. Replacement 2 - (Motor, Gearbox ,TT wheel & GT Wheels)
38. Replacement 3- (Sheaves, Bearing & Couplings)
39. Replacement 4- (Hydraulic component replacement)
40. QC Emergency operation

NICE TRAINING PROJECT
MANAGEMENT DATA

Phase One

Phase Two

Phase Three

NICE TRAINING MODULES

Phase Four

Phase Five

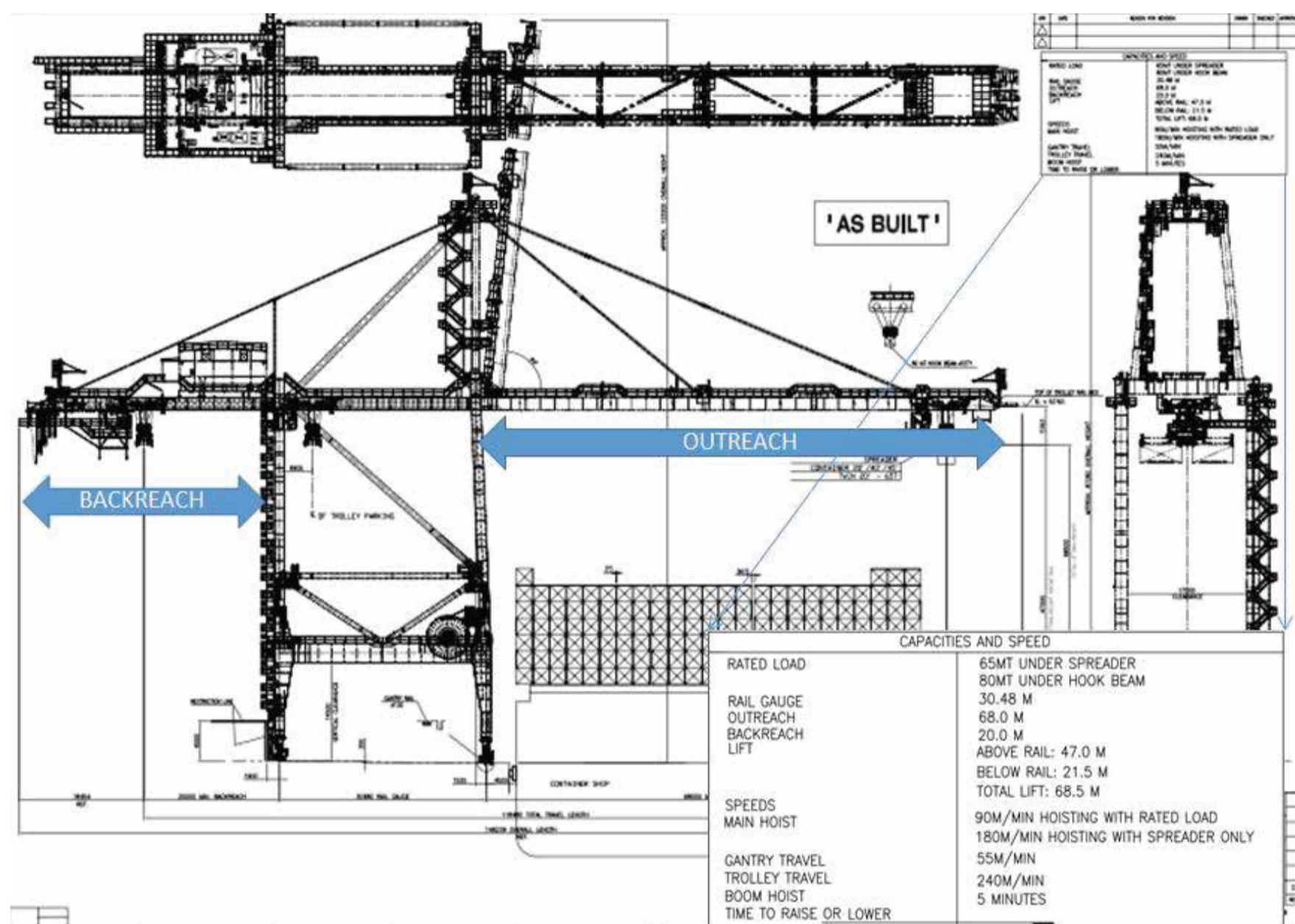
GANTRY SYSTEM OBJECTIVES

- This program will ensure that maintenance staffs have the required knowledge and skills to recognize equipment and its component when carrying out the required maintenance of the Quay Crane (QC) Gantry Motion System.
- To understand the theoretical and design aspects of QC Gantry Motion System and their associated components.
- To gain knowledge on how to troubleshoot problems and improve the reliability of QC Gantry Motion System.
- To have a basic understanding of the specifications and standards related to QC Gantry Motion System.
- To understand the ancillaries of QC Gantry Motion System e.g. motors, brakes, wheel brake, rail clamp and drive/PLC system.

GANTRY SYSTEM LEARNING OUTCOME

- How to identify QC Gantry Motion System and their components correctly;
- Determine ways to maintain the QC Gantry Motion System efficiently;
- Practical methods of carrying out trouble-shooting of Gantry Motion System faults accurately;
- To identify Gantry Motion System specifications correctly;
- Correct ways to use tools, plant and equipment safely;
- Emergency procedures to be adopted in the event of an accident or mishap accurately.

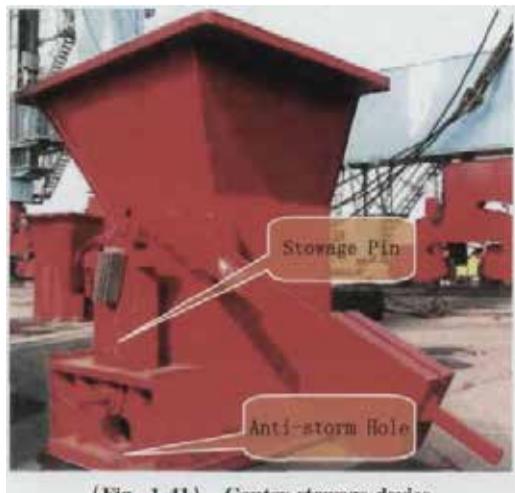
GENERAL ARRANGEMENT



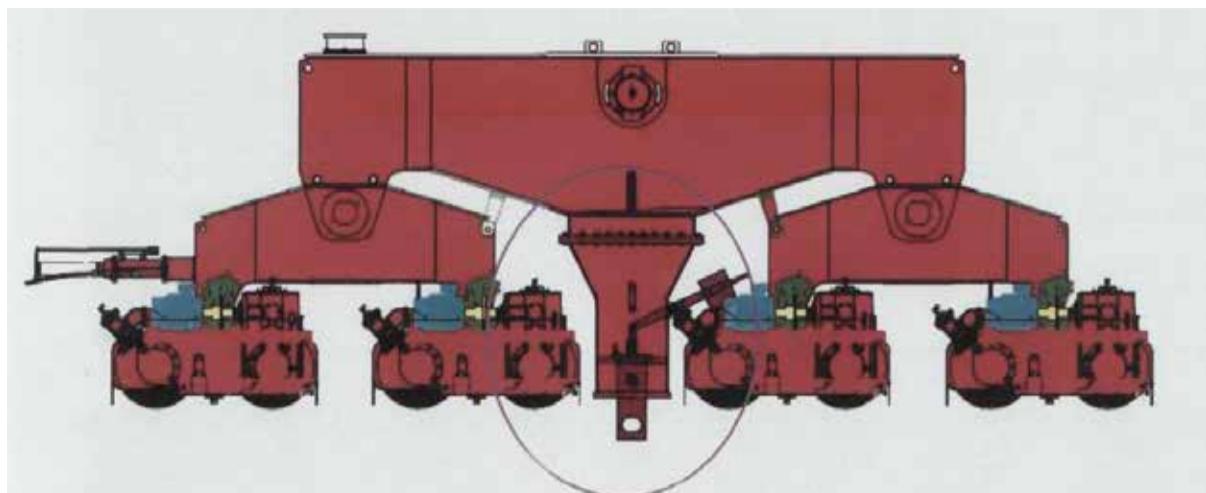
GANTRY SYSTEM GANTRY BOGIE



GANTRY SYSTEM GANTRY STOWAGE DEVICE



(Fig. 1-41) Gantry stowage device



No crane operation is allowed when a wind exceeds 25m/sec! The crane must be stowed at its stowage position. The crane must be secured with tie-downs when wind exceeds 35m/sec.

GANTRY SYSTEM MAJOR COMPONENTS

(Table 1-5) Major Components for Gantry Travel Drive

Motor	type	1LP4 188-4	Wheel brake	type	YLZ63-200CP
	power	25kW		clamping force	180kN
	rotation speed	1 750rpm		type	MLPK6 355×20
Reducer	braking torque	250Nm	Motor coupling	rated torque	600Nm
	type	FKR555.96. D1A		type	75MFK-140-519
	ratio	95.712		maximum permissible impact force	700kN
Motor brake	type	YP11-300-355×20	Buffer	stroke	500mm
	braking torque	410Nm		Wheel	diameter
					Φ 25mm

GANTRY SYSTEM TECHNICAL SPECIFICATION

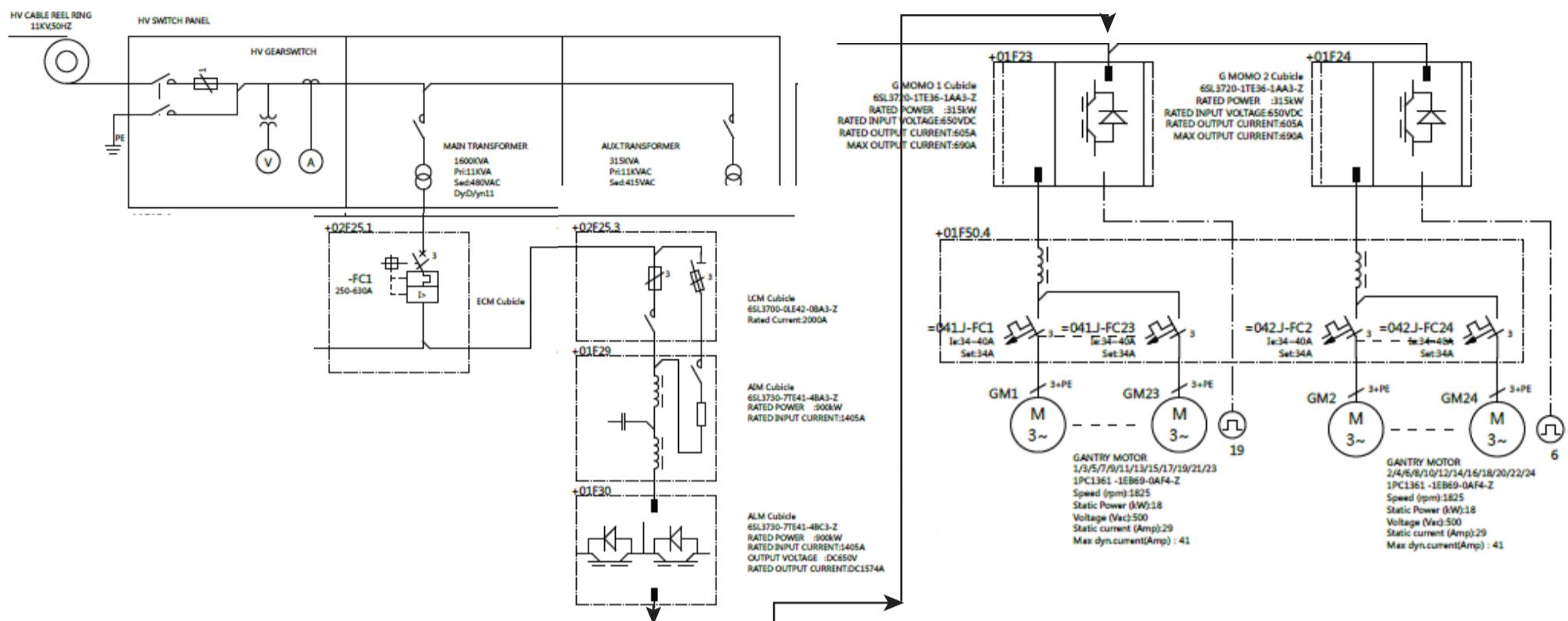
Gantry

Motor	AC squirrel cage motor
Type number	1LP4183-4CA90-Z
Manufacturer	Siemens
Quantity	10
Z:MOTOR	+A12+B02+K45+Y54+K85+C25+Y80+L1Y
Catalog data at 40° C 50Hz	22kW, S1 at 1455 rpm
Rated output (required)	200 Kw, S2 30 min at 1455 rpm
Maxi. torque	242 Nm
Rated voltage	500VAC
Rated current	34 Amps

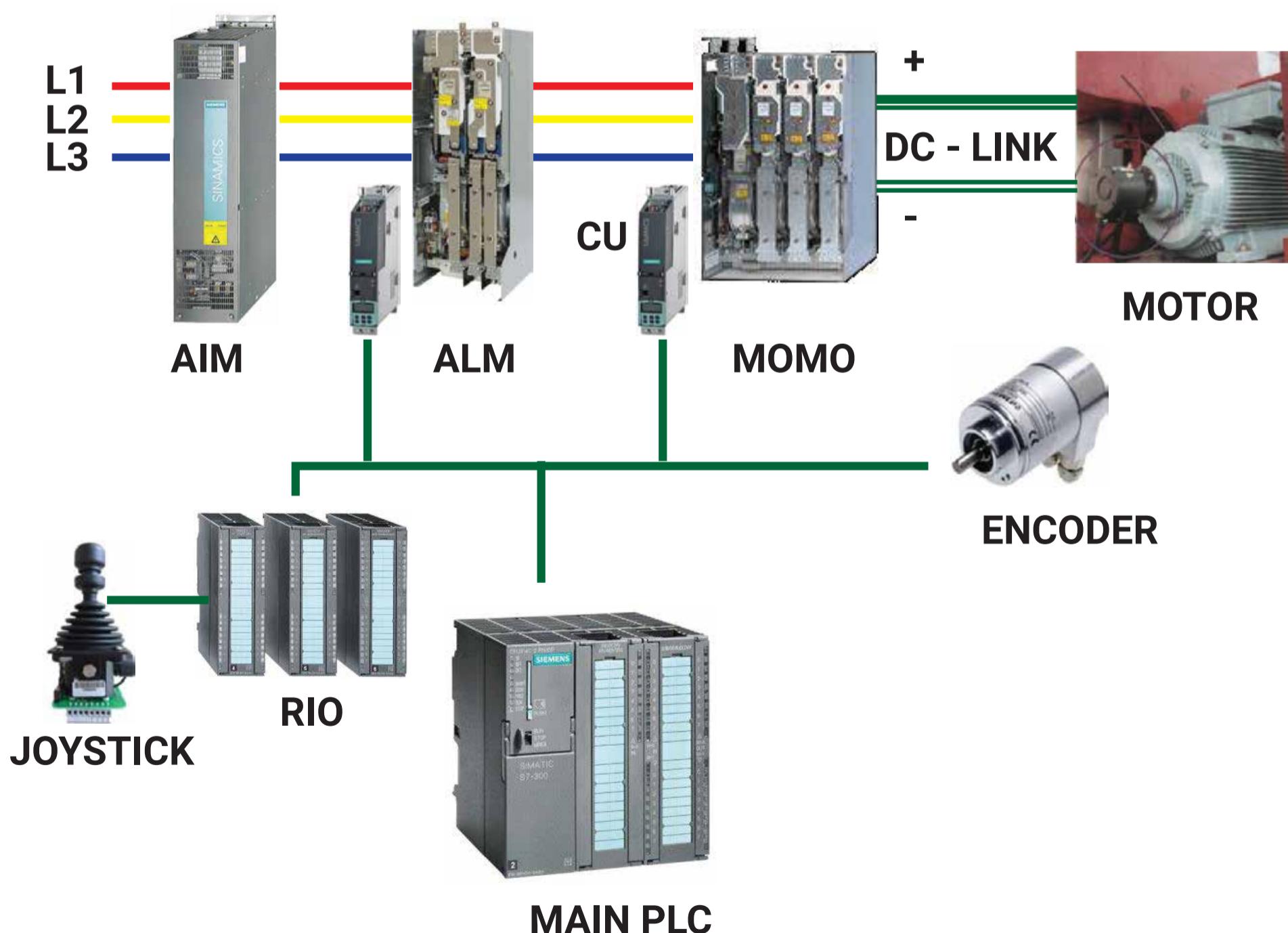
Mechanical data

Type of construction	IM1001
Frame size	180M
Terminal box	Cast iron left side
Pre-drilled glandplate	
Class of protection	IP 56
Method of cooling	IC410
Moment of inertia	J=0,099 kgm ²
Material housing	Cast iron
Insulation class	F, vacuum pressure impregnation
Temperature rise according	F
Operation mode	Converter operation
Weight	135 kg
Dimensions	As per catalog

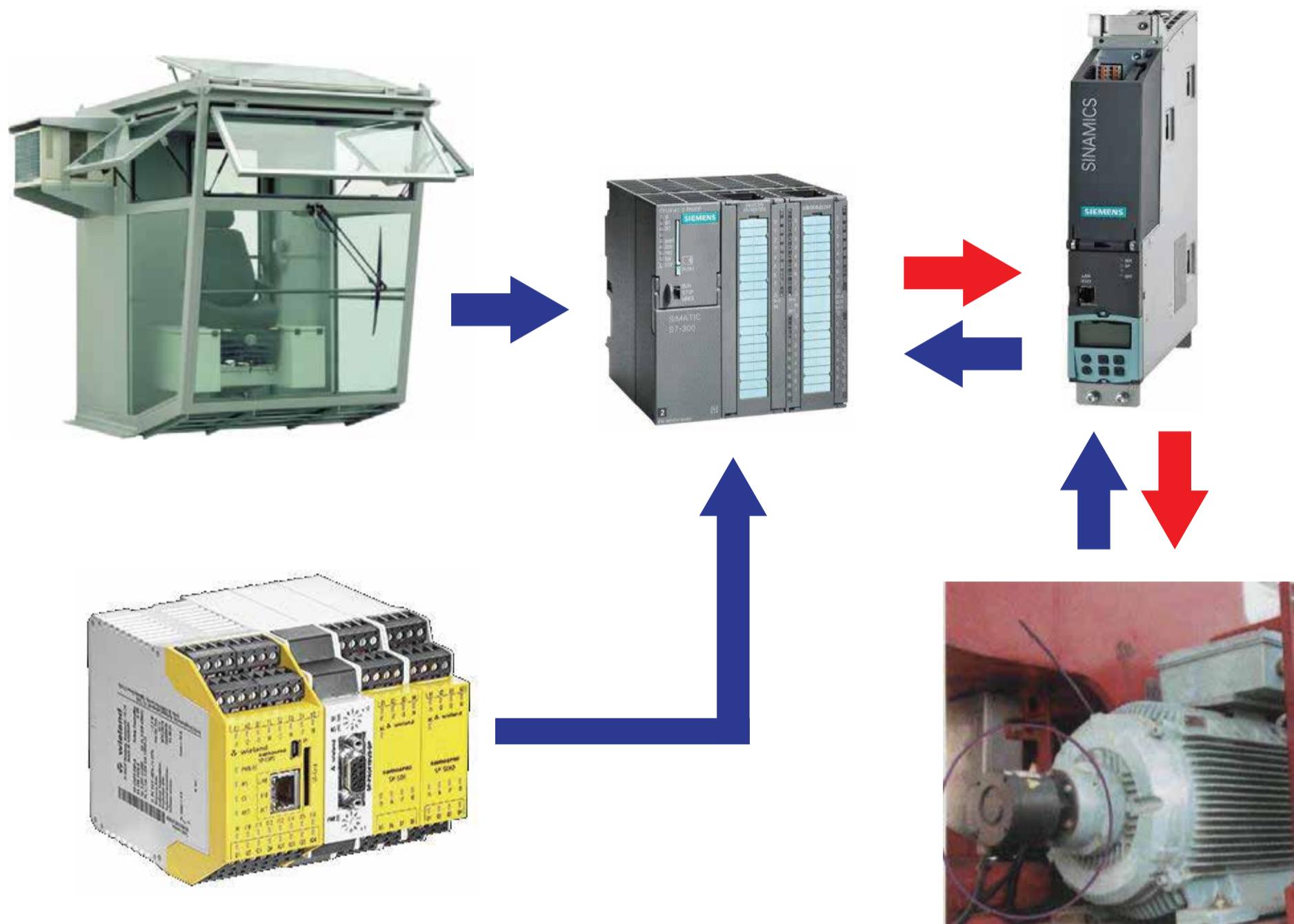
GANTRY SYSTEM SINGLE LINE DIAGRAM



GANTRY SYSTEM FLOW DIAGRAM



GANTRY SYSTEM CONTROL SCHEMATIC



SAFETY INTERLOCK SYSTEM

GANTRY SYSTEM BASIC INTERLOCKS

1. Gantry operation can only be available when boom is leveled or latched
2. During gantry operation, the motion is tripped by boom anti-collision, gantry anti-collision and cable reel sensors but reverse operation can be possible.
3. Gantry wheel brakes are to be released during gantry operation.
4. All the gantry brakes are to be released during the gantry motion.
5. Check any fault in cable reel system eg. Drive trip, HT cable under-tension, HT cable over-tension etc.
6. Gantry end stop limit switch activated.
7. Emergency switch activated

GANTRY SYSTEM GENERAL SAFETY

1. Ensure that all anchor pins are at “Disengaged” position.
2. Ensure that there are no obstacles (Objects like pallets, oil pit cover, vehicles, etc.) on or near the rails before travelling. Watch for ship’s obstacles such as gangways, gear, ship cranes davits, superstructures, etc.
3. At the end of operation, raise the boom to stowed position before gantry travelling.
4. When stop the gantry operation, always allow for safe braking distance. The crane has momentum and can not stop immediately when travelling fast.
5. In an emergency case, make use of the emergency stop push button to stop the crane.
6. Ensure that the alarm gong and lamps at each leg are ringing and lighting when the crane travels. If not, call maintenance personnel.
7. If any abnormal noise is heard during travelling, immediately stop operation and call maintenance staff.
8. Ensure that the operator’s cabin is at the center of the crane or at parking position so that any obstructions on the ground are visible before travelling.
9. On completion of operation, move the crane to safely location to avoid collision with departing vessel.