

**THIRD AMENDMENT TO AGREEMENT BETWEEN BROWARD COUNTY AND SHANGHAI ZHENHU
HEAVY INDUSTRIES CO., LTD. INC., a/k/a ZPMC FOR CONSTRUCTION, TRANSPORTATION,
ERECTION, TESTING, AND COMMISSIONING OF
LOW-PROFILE SUPER POST PANAMAX CONTAINER HANDLING GANTRY CRANES
(RFP # X2111385P1)**

This Third Amendment is made and entered into by and between Broward County, a political subdivision of the State of Florida ("County"), and Shanghai Zhenhu Heavy Industries Co., Ltd. Inc., a/k/a ZPMC, a Peoples Republic of China corporation, authorized to transact business in the State of Florida ("Contractor") (collectively referred to herein as the "Parties").

RECITALS

A. The Parties entered into that certain Agreement between Broward County and Shanghai Zhenhu Heavy Industries Co., Ltd. Inc., a/k/a ZPMC, dated June 6, 2017, which was amended by a First Amendment, dated February 6, 2019, and a Second Amendment, dated June 8, 2020 (collectively referred to herein as the "Agreement").

B. The Parties desire to further amend the Agreement, including: (i) increasing the time for Substantial Completion of option cranes, (ii) increasing the price and time for County to order option cranes, and (iii) modifying other terms related to County's purchase of option cranes.

Now, therefore, in consideration of the mutual terms, conditions, and covenants hereinafter set forth and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. The above recitals are true and correct and are incorporated herein as if set forth in full hereunder.
2. Capitalized terms not otherwise defined herein shall have the meanings set forth in the Agreement.
3. Revisions made to the Agreement by this Third Amendment are indicated by the use of strikethroughs to indicate deletions and underlining to indicate additions, unless otherwise stated.
4. Section 1.19 of the Agreement is hereby amended as follows:
 - 1.19 Notice to Proceed – Shall mean a written document issued by the County's Contract Administrator instructing Contractor to begin Work. Initial ("first") and second Notice to Proceed shall be issued for all three (3) base cranes and ~~each~~ all three (3) option cranes ordered by County.

5. Section 4.2 of the Agreement is hereby amended as follows:

4.2 County's Contractor Administrator shall instruct Contractor to commence with the Work by written instructions, in the form of an initial Notice to Proceed for all base cranes and ~~each~~ all three (3) option cranes ordered.

6. Article 4 of the Agreement is hereby amended as follows:

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4.3 Contractor shall furnish an Overall Project Schedule ("OPS") (for each crane order), all required bonds, insurance certificates, and documents as set forth herein to County's Contract Administrator within twenty-one (21) calendar days of Contractor's receipt of the first Notice to Proceed issued for each crane order. The OPS shall be written in the English language. The OPS shall include all activities at the Site, as well as details involving design, submittals, materials and parts, fabrication, assembly, transportation, testing, and commissioning of each crane. The OPS shall provide in detail, the orderly sequence of all activities, their descriptions, durations, start and finish dates, labor requirements, dependencies, including dependencies on Work of other contractors on or off the Site, and on or off the Assembly Facility and Fabrication Facility as necessary to the condition of the Work. The critical path for the entire Work shall be indicated in the OPS, which shall be updated by Contractor monthly and submitted with its payment requests. A second Notice to Proceed (for each crane order) directing Contractor to commence with fabrication and all other requested services of Contractor hereunder will not be issued until County's Contract Administrator and Consultant have completed review and acceptance of Contractor's submission of the OPS, Specifications and final crane design, and all required bonds, insurance certificates, and all other required documents as set forth herein. The Parties hereto acknowledge that the first Notice to Proceed for the first three cranes ordered ("Base Crane Order") was issued on December 29, 2017, and that the second Notice to Proceed for the Base Crane Order was issued on June 29, 2018. With regard to ~~each~~ the option cranes ordered, and subject to the express requirements stated above in this section, the second Notices to Proceed shall be sent by County no later than ~~thirty (30)~~ sixty (60) calendar days after the issuance date of the first Notice to Proceed for ~~each such~~ the option cranes.

4.4 Time is of the essence throughout this Agreement. Each of the first three (3) cranes ordered by County comprising the Base Crane Order shall achieve Substantial Completion by ~~December 29, 2020,~~ February 27, 2021 (as extended sixty (60) days by Change Order No. 1). Each option crane ordered by County shall achieve its Substantial Completion Date within ~~twenty five (25)~~ twenty-seven (27) months after the issuance date of the first Notice to Proceed for ~~each such~~ the option cranes. Each crane ordered by County shall reach Final Completion and be ready for final payment within ninety (90) calendar days from the date certified

by the County's Contract Administrator and Consultant as the Substantial Completion Date for each crane.

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7. Section 5.1 of the Agreement is hereby amended as follows:

5.1 This is a lump sum contract. County agrees to pay Contractor for the performance of all Work including all reimbursable expenses (authorized under County's Procurement Code, as may be amended), the total lump sum price of Thirteen Million Eight Hundred Thousand Dollars (\$13,800,000.00) per crane for the first three (3) cranes ordered by County (Base Crane Order), which order shall be placed by County (by the issuance of a first Notice to Proceed). The total lump sum price for each option crane ordered by County no later than ~~six (6) months from the date of Substantial Completion of the Base Crane Order~~ September 30, 2021, shall be ~~Thirteen Million Eight Hundred Thousand Dollars~~ Fifteen Million One Hundred Thousand Dollars (\$13,800,000.00 \$15,100,000) per option crane. ~~The total lump sum price for each option crane ordered by County more than six (6) months but no later than eighteen (18) months from the date of Substantial Completion of the Base Crane Order shall be Fifteen Million One Hundred Eighty Thousand Dollars (\$15,180,000.00) per option crane. The total lump sum price for each option crane ordered by County more than eighteen (18) months but no later than thirty (30) months from the date of Substantial Completion of the Base Crane Order shall be Sixteen Million Six Hundred Ninety eight Thousand Dollars (\$16,698,000.00) per option crane. The total lump sum price for each option crane ordered by County more than thirty (30) months but no later than forty two (42) months from the date of Substantial Completion of the Base Crane Order shall be Eighteen Million Three Hundred Sixty seven Thousand Eight Hundred Dollars (\$18,367,800.00) per option crane.~~ The total number of option cranes ordered by County shall not exceed three (3). The total lump sum compensation paid by County to Contractor for each crane, is for all costs, including overhead and profit, associated with completion of all Work in full conformity with the requirements of this Agreement. County hereby waives all Port Tariff charges and fees against Contractor's ships calling Port Everglades to effectuate the terms and conditions of this Agreement. The Parties hereto acknowledge and agree, that at the time of contracting, there were no United States (U.S.) Tariff(s) or import duties to be imposed on each crane ordered by County. In the event of a subsequent change in the status of U.S. imposed Tariff(s) or import duties on each crane ordered by County, County will reimburse Contractor (on a direct cost basis) for any such U.S. Tariff charges or import duties imposed on each crane. Contractor shall provide County (with its reimbursement request) specific backup documentation evidencing Contractor's payment of such U.S. Tariffs or import duties on each crane.

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8. Section 10.1 of the Agreement is hereby amended as follows:

10.1 Before beginning Work on the ~~Base~~ ~~Crane~~ ~~Order~~ of three (3) cranes and upon issuance of the second Notice to Proceed and prior to commencement of fabrication of the first crane, Contractor shall schedule, administer, and attend a kick-off preconstruction conference at a location designated by the Contractor, and bring Contractor's Design Engineer for the Project. A kick-off preconstruction conference shall also be held by the Contractor following the issuance of the second Notice to Proceed for ~~each~~ the option crane order.

9. Section 21.4 of the Agreement is hereby amended as follows:

21.4 Upon the date of approval of a Change Order or amendment increasing the Contract price, Contractor shall ensure that both the Performance Bond and Payment Bond values are increased to reflect the increase in the total Contract price.

10. Section 36.44 of the Agreement is deleted in its entirety and replaced by the following (strikethroughs and underlining omitted):

36.44 Verification of Employment Eligibility. Contractor represents that Contractor and each Subcontractor have registered with and use the E-Verify system maintained by the United States Department of Homeland Security to verify the work authorization status of all newly hired employees in compliance with the requirements of Section 448.095, Florida Statutes, and that entry into this Contract will not violate that statute. If Contractor knowingly violates this section, County may immediately terminate this Contract for cause and Contractor shall be liable for all costs incurred by County due to the termination.

11. Sections 36.68 and 36.69 are hereby added to the Agreement to read as follows (underlining omitted):

36.68 Prohibited Telecommunications Equipment. Contractor represents and certifies that it and its Subcontractors do not use any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system, as such terms are used in 48 CFR §§ 52.204-24 through 52.204-26. Contractor represents and certifies that Contractor and its Subcontractors shall not provide or use such covered telecommunications equipment, system, or services at any time during the term of this Contract.

36.69 Criminal History Screening Practices. If this Contract is subject to the requirements of Section 26-125(d) of the Broward County Code of Ordinances,

Contractor represents and certifies that its policies, practices, and procedures regarding inquiry into the criminal history of an applicant for employment, including a criminal history background check, preclude inquiry into an applicant's criminal history until the applicant is selected as a finalist and interviewed for the position.

12. Section 1.1.3 of the technical specifications is replaced with the attached Exhibit A of this Third Amendment ("Scope of Supply for Option Cranes"). All references to the "scope of supply" for option cranes or Section 1.1.3 of the technical specifications are deemed to reference the attached Exhibit A, which is incorporated and made a part of the Agreement.
13. Section 2.13.3 of the technical specifications is replaced with the attached Exhibit B of this Third Amendment ("Acceptable Suppliers List"). All references to "acceptable suppliers" or Section 2.13.3 of the technical specifications are deemed to reference the attached Exhibit B, which is incorporated into and made a part of the Agreement.
14. Section 8.5.5 of the technical specifications is replaced with the attached Exhibit C of this Amendment ("Spare Parts List"). All references to "spare parts list" or Section 8.5.5 of the technical specifications are deemed to reference the attached Exhibit C, which is incorporated into and made a part of the Agreement.
15. Contractor agrees to supply the spare parts listed in Exhibit D ("At-cost Spare Parts List") at Contractor's actual cost to County for the duration of the warranty period as set forth in Article 17 of the Agreement.
16. Contractor agrees to incorporate all suggestions and design modifications set forth in Exhibit E of this Amendment ("Suggestions and Design Modifications") into the Work for the option crane order.
17. Preparation of this Third Amendment has been a joint effort of County and Contractor, and the resulting document shall not, solely as a matter of judicial construction, be construed more severely against one of the Parties than the other.
18. Except as expressly modified herein, all other terms and conditions of the Agreement remain in full force and effect.
19. This Third Amendment may be executed in multiple originals, and may be executed in counterparts, each of which shall be deemed to be an original, but all of which, taken together, will constitute one and the same document.
20. This Third Amendment is effective upon complete execution by the Parties.

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IN WITNESS WHEREOF, the Parties have made and executed this Third Amendment on the respective dates under each signature: Broward County, through its Board of County Commissioners, signing by and through its Mayor or Vice-Mayor, authorized to execute same, and Shanghai Zhenhua Heavy Industries Co., Ltd. Inc., a/k/a ZPMC, signing by and through its _____, duly authorized to execute same.

County:

ATTEST:

BROWARD COUNTY, by and through
its Board of County Commissioners

Broward County Administrator, as
ex officio Clerk of the Broward County
Board of County Commissioners

By _____
Mayor

____ day of _____, 20__

Approved as to form by
Andrew J. Meyers
Broward County Attorney
Port Everglades Department
1850 Eller Drive, Suite 502
Fort Lauderdale, Florida 33316
Telephone: (954) 523-3404
Telecopier: (954) 468-3690

By _____
Antonio Lozada (Date)
Assistant County Attorney

By _____
Carlos A. Rodriguez-Cabarrocas (Date)
Senior Assistant County Attorney

**THIRD AMENDMENT TO AGREEMENT BETWEEN BROWARD COUNTY AND SHANGHAI
ZHENHUA HEAVY INDUSTRIES CO., LTD. INC. a/k/a ZPMC**

Contractor:

SHANGHAI ZHENHUA HEAVY INDUSTRIES
CO., LTD. INC. a/k/a ZPMC, a Peoples
Republic of China corporation authorized to
transact business in the state of Florida

WITNESSES:

By: _____

(Print Name and Title)

ATTEST:

Corporate Secretary

Print Name of Secretary

___ day of _____, 20__

(Corporate Seal)

EXHIBIT A

Scope of Supply for Option Cranes

1.1.3 Option Cranes — The scope of supply shall include:

- .1 Three (3) Cranes—Nos. SP-11, SP-12, and SP-13
- .2 Five (5) telescoping 20', 40', 45', separating twin-20' spreaders, (one spreader for each Crane, and two spare spreaders)—Nos. BS-29, BS-30, BS-31, BS-32, and BS-33.
- .3 Three (3) spreader over-height adapters, Nos. OH-7, OH-8, and OH-9.
- .4 Spare parts; See Section 8.5.5
- .5 Local and remote crane management system (CMS and RCMS); see Sections 6.8 and 6.9. The RCMS shall provide the same functionality, and be fully integrated with, the existing RCMS system. Two RCMS stations shall be provided in the maintenance building and be connected to the cranes by fiber optic cable. Fiber optic cabling will be coiled up in the second floor of the new switchgear building and the Contractor shall connect to and extend fiber optic cabling as needed to the RCMS. Raceways and boxes between the new and the existing switchgear building will be provided by the infrastructure contractor. Contractor shall provide all cabling, equipment, and make terminations for a fully complete and operational RCMS.
- .6 Cable reel with cable and termination in the wharf; see Sections 2.4 and 5.7.3.
- .7 Hardware and software for full integration with existing TMEIC/Gotting crane anti-collision system, including positioning equipment and wharf transponders landside and waterside.
- .8 Closed circuit television cameras (CCTV); see Section 7.3.
- .9 See Exhibit B for list of other acceptable suppliers.
- .10 Crane maintenance during Warranty Period.
- .11 Installing bumpers and support brackets on one existing crane for ZPMC to SAMSUNG crane interfacing.

EXHIBIT B
Acceptable Suppliers List

2.13.3 The acceptable suppliers shall be:

	COMPONENT	SUPPLIER/BRAND
1	Control system and electrical	TMEIC
2	Electric motors	TMEIC
3	Gear boxes and gearing	Falk
4	Air compressor	Ingersoll Rand
5	Air conditioners	York
6	Anemometer	Gill WindObserver IS
7	Bearings and seals	SKF/FAG for high-speed bearings, NSK for motors, others are Chinese brand products
8	Secondary bearings and seals, where approved	SKF, FAG, Timken, Koyo, Sealmaster, Rexnord
9	Brakes, high-speed, including discs (B)	Pintsch-Bubbenzer
10	Brakes, gantry motor (B)	Pintsch-Bubbenzer, KFB
11	Brakes, non-driven gantry wheel (B)	Pintsch-Bubbenzer
12	Bumpers	Oleo, with marine plating
13	Cable reel, gantry (A)	Cavotec pull and store
14	Cable reel, spreader (A)	Cavotec
15	CCTV Cameras	Orlaco
16	Couplings, with brake disc	by brake supplier
17	Couplings, drum	Malmedie
18	Diesel auxiliary generator set	Cummins / ONAN, EPA Tier 4F
19	Electrical cable, gantry with 12 Single Mode fibers	Prysmian
20	Electrical cable, spreader	Prysmian
21	Elevator	Alimak
22	Encoders	Huebner Gissen
23	Energy chain: trolley and boom systems	IGUS
24	Hydraulic components	Rexroth, Parker, available in the U.S.
25	Hydraulic cylinders	Rexroth, Parker, Hydropa available in the U.S.
26	Hydraulic oil	Mobil
27	Hydraulic power units, for brakes	by brake supplier
28	Intercom	Control International
29	Fuses	Ferraz Shawmut, Bussmann, GE
30	Laser (anti-collision system)	SICK
31	Lighting, floodlights	Phoenix
32	Lighting, aviation lights	Phoenix
33	Limit switches, magnetic	Schmersal
34	Limit switches, proximity	Schmersal
35	Limit switches, mechanical	GE, Omron
36	Limit switches, rotary cam	GE

37	Load cells	Brosa
38	Lubricants	Mobil
39	Master Switches	Brieda Dynamic
40	Operator's cabin and consoles	Brieda Dynamic
41	Paint	Hempel, Tnemec for interior
42	Service cranes, powered	ZPMC
43	Spreader cable plugs and sockets	Pyle-National
44	Spreader	BROMMA STS45 with SCS and Height Indication System
45	Spreader over-height adaptor	BROMMA
46	Spreader cable shock-absorbing device	Cavotec S06-S1227-500 bollard type damper with 2 springs
47	Trolley rail pads and clips	Gantrex North America, WeldLok series
48	Welding machine	Miller XMT 450 CC/CV 230/460V W/O AUX POWER Stock # 907481
49	Wire rope	Kiswire, HYFIL K8, galvanized and pre-lubricated

Notes:

- (A) Drive shall be by the control system supplier.
- (B) Bubenzer brakes, couplings, and discs shall be made in Germany.
- (C) All supplier/brands for the Option Crane Order shall be the same as the Base Crane Order except for item 42.

EXHIBIT C
Spare Parts List

8.5.5 Spare parts to be furnished with cranes

NO.	Spare Parts Description	Drawing No. or Model	BOM	Usage	Supplier	Total Qty.
I. Mechanical (机械部分)						
A. Hydraulic components						
1	snag cylinder挂舱油缸 (including encoder)	140/70-3000	HC-FC140-70-3000	multi-functional hydraulic system倾转液压系统	Parker	1
2	trolley cylinder小车张紧油缸	125/70-800	HC-FC125-70-800	trolley tension hydraulic syst	Parker	2
3	valve control circuit card放大版	EHH-AMP-702-K-20/24VDC	belong to B30	multi-functional hydraulic system倾转液压系统	VICKERS	2
4	Guide ring 导向带	FC 2525 Q5038T /2.5*25	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	4
5	piston Sealing 活塞密封圈	OE 1400 052 00211E/140*119*8.1	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	4
6	O ring O型圈	2-224/40.04*3.53	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	4
7	Guide ring 导向带	FC 2520 Q5038T /2.5*20	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	4
8	O ring O型圈	2-355/132.72*5.33	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	4
9	rod Sealing 活塞杆密封圈	OD 0700 052 00171D/70*85.1*6.3	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	8
10	rod Sealing 活塞杆密封圈	B3 7085 P5008/70*85.1*11.4	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	8
11	Wiper 防尘圈	A5 7020 N3587/70*80*7	Belong to HC-FC140-70-3000	sang cylinder 挂舱油缸	PARKER	8

12	piston Sealing 活塞 密封圈	OE 1250 052 00211D/125*109.5*6 .3	Belong to HC- FC125-70-800	trolley cylinder 小 车张紧油缸	PARKER	4
13	O ring O型圈	2-225/47.22*3.53	Belong to HC- FC125-70-800	trolley cylinder 小 车张紧油缸	PARKER	4
14	O ring O型圈	2-349/113.67*5.33	Belong to HC- FC125-70-800	trolley cylinder 小 车张紧油缸	PARKER	4
15	pump 油泵	A10VS071DRS/32R- VPB22U99-S2184	B3	multi-functional hydraulic system倾 转液压系统	REXROTH	1
16	pump 油泵	A10VS018DFR1/31R - VPB22U99-S2184	B3	trolley tension hydraulic system小 车张紧液压系统	REXROTH	1
17	no used	no used		Boom brakes 大梁应 急制动器	Bubbenzer	no used
18	no used	no used		Gantry wheel brakes 大车夹轮器	Bubbenzer	no used
19	filter element 滤芯	0240 D0100N	belong to B5	multi-functional hydraulic system倾 转液压系统	HYDAC	2
20	filter element 滤芯	0330 R0100N	belong to B36	multi-functional hydraulic system倾 转液压系统	HYDAC	2
21	filter element 滤芯	0110 R0100N	belong to B19	trolley tension hydraulic system小 车张紧液压系统	HYDAC	2
22	valve solenoid 线圈	507833	belong to B8	multi-functional hydraulic system倾 转液压系统	VICKERS	1
23	valve solenoid 线圈	617499	belong to B13	multi-functional hydraulic system倾 转液压系统	VICKERS	4
24	valve solenoid 线圈	300AA00125A	belong to B10	trolley tension hydraulic system小 车张紧液压系统	VICKERS	1

25	throttle valve 节流阀	DVP-06-01.X	B23	multi-functional hydraulic system 倾转液压系统	HYDAC	1
26	throttle valve 节流阀	DVP-10-01.X	B26	multi-functional hydraulic system 倾转液压系统	HYDAC	1
27	check valve 单向阀	CV2-20-P-0-30	B7	multi-functional hydraulic system 倾转液压系统	VICKERS	1
28	throttle valve 节流阀	NV1-10-R-0	B9	trolley tension hydraulic system 小车张紧液压系统	VICKERS	1
29	directional valve 电磁阀	DG4V-3-2A-M-U-B6-60	B8	multi-functional hydraulic system 倾转液压系统	VICKERS	1
30	pressure relief valve 溢流阀	DB10-2-5X/315	B12	multi-functional hydraulic system 倾转液压系统	REXROTH	1
31	logic valve 插装阀	LC16DB20E7X/S0004	B22	multi-functional hydraulic system 倾转液压系统	REXROTH	1
32	logic valve 插装阀	L-LC40DB20E7X/304	B18	multi-functional hydraulic system 倾转液压系统	HENGLI	1
33	logic valve 插装阀	LC40B05E7X	B27	multi-functional hydraulic system 倾转液压系统	REXROTH	1
34	pressure relief valve 溢流阀	DBDS6K1X/315	B19	multi-functional hydraulic system 倾转液压系统	REXROTH	1
35	proportional directional valve 比例阀	EPV16-B-4-24D-M-U-13	B30	multi-functional hydraulic system 倾转液压系统	VICKERS	1

36	directional valve 电磁阀	DG4V-5-6C-M-U- EK6-60	B13	multi-functional hydraulic system倾 转液压系统	VICKERS	1
37	check valve 单向阀	PCGV-8-A-1-1X	B14	multi-functional hydraulic system倾 转液压系统	VICKERS	1
38	pressure sensing vavle 定压差阀	DPS2-16-F-F-0-160	B15	multi-functional hydraulic system倾 转液压系统	VICKERS	1
39	check valve 单向阀	CV3-10-P-0-20	B42	multi-functional hydraulic system倾 转液压系统	VICKERS	1
40	check valve 单向阀	CV1-10-P-0-30	B5	trolley tension hydraulic system小 车张紧液压系统	VICKERS	1
41	directional valve 电磁阀	SBV11-10-C-0- 120AGH	B6	trolley tension hydraulic system小 车张紧液压系统	VICKERS	1
42	pressure relief valve 溢流阀	RV3-10-S-0-36	B7	trolley tension hydraulic system小 车张紧液压系统	VICKERS	1
43	throttle valve 节流 阀	FCV7-10-C-0-FF/40	B10	trolley tension hydraulic system小 车张紧液压系统	VICKERS	1
44	ball valve 单向阀	G1/2	B44	multi-functional hydraulic system倾 转液压系统	AMIC	1
45	butterfly valve 蝶 阀	SBU110-DN65-NBR- PN16-LS	B34	multi-functional hydraulic system倾 转液压系统	ZPMC	1
46	butterfly valve 蝶 阀	SBU110-DN40-NBR- PN16-LS	B17	trolley tension hydraulic system小 车张紧液压系统	ZPMC	1

47	ball valve 单向阀	G1/2	B25	trolley tension hydraulic system 小车张紧液压系统	ZPMC	1

B. Headblock 吊具上架

1	Twistlock 转销	OZHEE999111		Headblock 吊具上架	ZPMC	4
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C. Trolley assembly 小车总称

1	trolley wheel 小车车轮	D21-075A-020201		Trolley assembly 小车总称	ZPMC	4
2	trolley wheel shaft 小车车轮轴	D21-075A-020208		Trolley assembly 小车总称	ZPMC	4
3	trolley wheel bearing 小车车轮轴承	23032E1AM 160×240×60		Trolley assembly 小车总称	FAG/SKF	8
4	trolley wheel seal 小车车轮油封	180X210X15 HMS5 RG		Trolley assembly 小车总称	SKF	8

D. Sheaves assembly 滑轮装配

1	M.H. sheave assembly 起升滑轮	ZMHL900-Ab		M.H. system 起升系统	ZPMC	2
2	M.H. equalizer sheave assembly 起升均衡滑轮	ZMHL560-Aa		M.H. system 起升系统	ZPMC	2
3	Trolley reeving sheave assembly 小车牵引滑轮	ZTHL750-Ab		Trolley system 小车系统	ZPMC	2

E. Oil seals 密封圈

1	Oil seals 密封圈	160X190X15 HMSA10 RG	D21-075A- 01140200-B8/ D21- 075A- 01140400-B8	Boom hanger system 大梁悬挂系统	SKF	10
2	Oil seals 密封圈	230X260X15 HMS5 RG	D21-075A- 01140500-B4/ D21- 075A- 01141700-B4	Boom hanger system 大梁悬挂系统	SKF	10
3	Oil seals 密封圈	280X310X16 HMS4 R	D21-075A- 01140600-B4	Boom hanger system 大梁悬挂系统	SKF	10

4	Oil seals 密封圈	60X85X8 HMS5 RG	D21-075A-01141500-B10	Boom hanger system 大梁悬挂系统	SKF	10
5	Oil seals 密封圈	180X210X15 HMS5 RG	D21-075A-0202-B3	Trolley 小车总成	SKF	10
6	Oil seals 密封圈	100X125X12 HMSA10 RG	D21-075A-0204-B8	Trolley 小车总成	SKF	10
7	Oil seals 密封圈	320X360X20 HMS5 RG	D21-075A-0304- B5/ D21-075A-0309-B5	M.H. mechanism 起升机构	SKF	10
8	Oil seals 密封圈	150X180X15 HMS5 RG	ZT2-006514-00-B5	Trolley drive mechanism 小车驱动机构	SKF	10
9	Oil seals 密封圈	40X62X10 HMS5 RG	ZT2-006514	Trolley drive mechanism 小车驱动机构	SKF	10
10	Oil seals 密封圈	150X180X15 HMS5 RG	D21-075A-0504-B5	Boom drive mechanism 大梁驱动机构	SKF	10
11	Oil seals 密封圈	40X62X10 HMS5 RG	ZT2-006752	Boom drive mechanism 大梁驱动机构	SKF	10
12	Oil seals 密封圈	210X240X15 HMSA10 RG	D21-075A-0604-B10/ D21-075A-0605-B10	Gantry drive mechanism 大车驱动机构	SKF	240
13	Oil seals 密封圈	O-ring 160×3.55	D21-075A-0600- B14	Gantry drive mechanism 大车驱动机构	SKF	10
14	Oil seals 密封圈	60X80X8 HMS5 RG	D21-075A-211101-B4	Catenary trolley 托架小车	SKF	10
15	Oil seals 密封圈	180X210X15 HMS5 RG	ZMHL900-Ab-B2	M.H. sheave assembly 起升滑轮	SKF	10
16	Oil seals 密封圈	180X210X15 HMS5 RG	ZMHL560-Aa-B2	M.H. equalizer sheave assembly 起升均衡滑轮	SKF	10

17	Oil seals 密封圈	150X180X15 HMS5 RG	ZTHL750-Ab-B2	Trolley reeving sheave assembl	SKF	10
18	Oil seals 密封圈	CR 95*125*12 HMSA10 V		Boom Reducer 大梁减速箱	SKF	4
19	Oil seals 密封圈	CR 240*270*15 HMSA10 RG		Boom Reducer 大梁减速箱	SKF	2
20	Oil seals 密封圈	CR 240*270*15 HMSA10 RG		Trolley Reducer 小车减速箱	SKF	2
21	Oil seals 密封圈	CR 52*72*8 HMSA10 V		Gantry Reducer 大车减速箱	SKF	2
22	Oil seals 密封圈	CR 200*230*15 HMSA10 RG		Gantry Reducer 大车减速箱	SKF	4
F. Brakes 制动器						
1	M.H.brakes pads 起升制动器摩擦片	pads for SB28.3-900*30- BL450-8		M.H. mechanism 起升机构	Bubenger	2 sets
2	Trolley brake pads 小车制动器摩擦片	pads for SB23.3-630x30-BL80- 6		Trolley drive mechanism 小车驱动机构	Bubenger	1 set
3	Boom brakes pads 大梁高速制动器摩擦片	pads for SB23.3-500*30-35/5		Boom drive mechanism 大梁驱动机构	Bubenger	1 set
4	Boom emergency brakes pads大梁应急制动器摩擦片	pads for SF15		Boom drive mechanism 大梁驱动机构	Bubenger	2 sets
5	Gantry wheel brakes pads大车夹轮器摩擦片	pads for BRB120		Gantry drive mechanism 大车驱动机构	Bubenger	16 sets
6	M.H.brakes disc 起升高速制动器制动盘	disc for SB28.3-900*30-BL450- 8		M.H. mechanism 起升机构	Bubenger	1
7	Trolley brakes disc 小车高速制动器制动盘	disc for SB23.3-630x30-BL80- 6		Trolley drive mechanism 小车驱动机构	Bubenger	1

8	Boom Drum brake disk 大梁卷筒制动盘	D21-075A-0513		Boom drive mechanism 大梁驱动机构	ZPMC	1
9	M.H.brake thruster 起升制动器推进器	thruster for SB28.3-900*30- BL450-8		M.H. mechanism 起升机构	Bubenger	1
10	Trolley brake thruster 小车制动器推进器	thruster for SB23.3-630x30- BL80-6		Trolley drive mechanism 小车驱动机构	Bubenger	1
11	Boom brake thruster 大梁制动器推进器	thruster for SB23.3-BL35/5- 560x30		Boom drive mechanism 大梁驱动机构	Bubenger	1
12	Elevator brake assembly 电梯制动器	Supplied by Alimak		Elevator 电梯	Alimak	1 set
13	Elevator safety device 电梯安全装置	Supplied by Alimak		Elevator 电梯	Alimak	1 set

G. Air filter 空气过滤器

1	Air filter	ZT2-030402-02		MH/B machinery house 主机房	ZPMC	16
2	Air filter	Pressurizing Unit type PRZ200 110V-60Hz		Operator cab 司机室	Brieda	2

H. Anti-friction block 抗磨块

1	Anti-friction block 抗磨块	D21-075A-020902		Trolley 小车总成	ZPMC	20
2	Anti-friction block 抗磨块	D21-075A-1001		Anti-slag and T/L/S device 挂舱保护/倾转机构	ZPMC	4
3	Anti-friction block 抗磨块	ZT2-009112		Trolley reeving system 小车缠绕系统	ZPMC	2
4	Anti-friction block 抗磨块	ZT2-009114		Boom reeving system 大梁缠绕系统	ZPMC	590

I. Roller 托辊

1	Middle roller 150 中 滚筒150	ZT2-009302a		Trolley 小车总成 /Trolley reeving system 小车缠绕系统	ZPMC	14
2	Side roller 150 边滚 筒150	ZT2-009332a		Trolley 小车总成 /Trolley reeving system 小车缠绕系统	ZPMC	20
3	Roller 滚筒	D21-075A-200206		M.H. reeving system 起升缠绕系统	ZPMC	76
4	Roller 滚筒	D21-075A-200602		M.H. reeving system 起升缠绕系统	ZPMC	32

J. Rollers assembly 托辊装配

1	托辊装配%%C150/4- 35 Idler assembly%%C150/4- 35	ZT2-009612-00		Trolley 小车总成	ZPMC	1
2	托辊装配%%C150/3- 35 Idler assembly%%C150/3- 35	ZT2-009611-00		Trolley 小车总成 /Trolley reeving system 小车缠绕系统	ZPMC	1
3	托辊装配 1 Idler assembly 1	D21-075A-2002		M.H. reeving system 起升缠绕系统	ZPMC	1
4	托辊装配 2 Idler assembly 2	D21-075A-2006		M.H. reeving system 起升缠绕系统	ZPMC	1

K. Gantry drive mechanism 大车驱动机构

1	Driving wheel assembly 主动车轮 装配	D21-075A-060400		Gantry drive mechanism 大车驱动 机构	ZPMC	1

L. M.H.Reducer 起升减速箱

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1	PINION, HIGH SPEED, HELICAL, RIGHT HAND	C35390		M. H. Reducer 起升減速箱	Falk	1
2	L. S. GEAR AND SHAFT, ASSEMBLY	C35395-A01		M. H. Reducer 起升減速箱	Falk	1
3	L. S. PINION AND INTERMEDIATE GEAR, ASSEMBLY	C35396-A01		M. H. Reducer 起升減速箱	Falk	1
4	INTERMEDIATE PINION AND H. S. GEAR, ASSEMBLY	C35397-A01		M. H. Reducer 起升減速箱	Falk	1
5	BEARING, SPHERICAL ROLLER, 23156 CC/W33 C3	919096		M. H. Reducer 起升減速箱	Falk/SKF/TIMKEN	2
6	BEARING, HH437549-HH437510, TAPER SINGLE ROLLER	921901		M. H. Reducer 起升減速箱	Falk/SKF/TIMKEN	2
7	BEARING, HH228349-HH228310, TAPER ROLLER	921470		M. H. Reducer 起升減速箱	Falk/SKF/TIMKEN	2
8	BEARING, HH221449-HH221410, TAPER SINGLE ROLLER	921443		M. H. Reducer 起升減速箱	Falk/SKF/TIMKEN	2
9	SEAL SINGLE LIP, 4.00" I. D. x 5.00" O. D. x 0.438", CRWH1, 39932, VITON	10065063		M. H. Reducer 起升減速箱	Falk/SKF/SIMRIT	2
10	SEAL SINGLE LIP, 4.00" I. D. x 5.25" O. D. x 0.438", CRWH1, 39996, VITON	912998		M. H. Reducer 起升減速箱	Falk/SKF/SIMRIT	2

11	SEAL SINGLE LIP, 10.75" I.D. x 12.25" O.D. x 0.625", HDS1, 1075230, NITRILE	10065031		M. H. Reducer 起升减 速箱	Falk/SKF/ SIMRIT	2
12	SEAL SINGLE LIP, 10.75" I.D. x 12.75" O.D. x 0.625", CRWH1, 107551, NITRILE	10064932		M. H. Reducer 起升减 速箱	Falk/SKF/ SIMRIT	2

M. Trolley Reducer 小车减速箱

1	Input Pinion 输入齿 轮轴	03.03.M440THC4AS-03		Trolley Reducer 小 车减速箱	Falk	1
2	1st stage gear wheel 一级齿轮	03.03.M440THC4AS-04		Trolley Reducer 小 车减速箱	Falk	1
3	2nd stage gear wheel 二级齿轮	03.03.M440THC4AS-06		Trolley Reducer 小 车减速箱	Falk	1
4	2nd stage gear wheel 2 二级齿轮2	03.03.M440THC4AS-07		Trolley Reducer 小 车减速箱	Falk	1
5	3rd stage pinion 三 级齿轮轴	03.03.M440THC4AS-08		Trolley Reducer 小 车减速箱	Falk	1
6	3rd stage gear wheel 三级齿轮	03.03.M440THC4AS-09		Trolley Reducer 小 车减速箱	Falk	1
7	4th stage gear wheel 第四级齿轮	03.03.M440DHC3AS-08		Trolley Reducer 小 车减速箱	Falk	1
8	4th stage pinion 四 级齿轮轴	03.03.M440THC4AS-10		Trolley Reducer 小 车减速箱	Falk	1
9	2rd stage shaft 二 级轴	02.01.15.M440THC4AS -05		Trolley Reducer 小 车减速箱	Falk	1
10	output shaft 输出轴	02.01.15.M440THC4AS -12		Trolley Reducer 小 车减速箱	Falk	1
11	bearing 圆锥滚子 轴承(T) 33220	02.01.03.003716		Trolley Reducer 小 车减速箱	Falk/SKF/ TIMKEN	2

12	bearing 调心滚子 轴承(T) 22220CC/W33	02.01.03.003717		Trolley Reducer 小 车减速箱	Falk/SKF/ TIMKEN	2
13	bearing 调心滚子 轴承(T) 22224CC/W33	02.01.03.003718		Trolley Reducer 小 车减速箱	Falk/SKF/ TIMKEN	2
14	bearing 调心滚子 轴承(T) 23230CC/W33	02.01.03.000460		Trolley Reducer 小 车减速箱	Falk/SKF/ TIMKEN	2
15	bearing 调心滚子 轴承(T) 23048CC/W33	02.01.03.000450		Trolley Reducer 小 车减速箱	Falk/SKF/ TIMKEN	2
16	Dual lips seal 100*130*12内包骨架/ 双唇	02.01.02.000010		Trolley Reducer 小 车减速箱	Falk/SKF/ SIMRIT	4
17	Dual lips seal 240*270*15内包骨架/ 双唇	02.01.02.000150		Trolley Reducer 小 车减速箱	Falk/SKF/ SIMRIT	2

N. Boom Reducer 大梁减速箱

1	Input Pinion 输入齿 轮轴	03.03.M440DHC3AS-03		Boom Reducer 大梁减 速箱	Falk	1
2	1st stage gear wheel 一级齿轮	03.03.M440DHC3AS-04		Boom Reducer 大梁减 速箱	Falk	1
3	2nd stage pinion 二 级齿轮轴	03.03.M440DHC3AS-05		Boom Reducer 大梁减 速箱	Falk	1
4	2nd stage gear wheel 二级齿轮	03.03.M440DHC3AS-06		Boom Reducer 大梁减 速箱	Falk	1
5	3rd stage pinion 三 级齿轮轴	03.03.M440DHC3AS-07		Boom Reducer 大梁减 速箱	Falk	1
6	3rd stage gear wheel 三级齿轮	03.03.M440DHC3AS-08		Boom Reducer 大梁减 速箱	Falk	1
7	output shaft 输出轴	02.01.15.M440DHC3AS -09		Boom Reducer 大梁减 速箱	Falk	1

O. Gantry Reducer 大车减速箱

1	Bevel gear wheel 锥 齿轮	02.01.05.CD002097G- T1		Gantry Reducer 大车 减速箱	Falk	8
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2	Bevel pinion 锥 齿轮轴	02.01.05.CD002099G- T1		Gantry Reducer 大车 减速箱	Falk	8
3	2nd stage pinion 中 间齿轴	03.03.D002096-T2		Gantry Reducer 大车 减速箱	Falk	8
4	2nd stage gear wheel 齿轮	03.03.D006468-T2		Gantry Reducer 大车 减速箱	Falk	8
5	3rd stage gear wheel 齿轮	03.03.D002844-T2		Gantry Reducer 大车 减速箱	Falk	8
6	3rd stage pinion 齿轮轴	03.03.D006452-T2		Gantry Reducer 大车 减速箱	Falk	8
7	Output hollow shaft 空心轴	02.01.15.CD007317- T2		Gantry Reducer 大车 减速箱	Falk	8

P. Sheaves 滑轮装配

1	Bearing 轴承	NJ232E 160x290x48		ZMHL900-Ab 起升滑 轮装配	FAG	8
2	Bearing 轴承	NJ232E 160x290x48		ZMHL560-Aa 起升转 向滑轮装配	FAG	8
3	Bearing 轴承	NJ226E 130x230x40		ZTHL750-Ab 小车滑 轮装配	FAG	8
4	Oil seals 密封圈	180X210X15 HMS5 RG		ZMHL900-Ab 起升滑 轮装配	SKF	8
5	Oil seals 密封圈	180X210X15 HMS5 RG		ZMHL560-Aa 起升转 向滑轮装配	SKF	8
6	Oil seals 密封圈	150X180X15 HMS5 RG		ZTHL750-Ab 小车滑 轮装配	SKF	8

Q. Spreader 吊具

1	TWISTLOCK PIN KIT	BR1701427		Spreader 吊具	Bromma	8
2	FLIPPER ARM TYPE1/2	BR1135461/1135494		Spreader 吊具	Bromma	4
3	LAND PIN SOFT ASSY	BR1028393		Spreader 吊具	Bromma	8
4	Not used	NO USED		Spreader 吊具	Bromma	not used

5	ACTUATOR	BR1002277		Spreader 吊具	Bromma	2
6	TWISTLOCK CYLINDER	BR74147		Spreader 吊具	Bromma	2
7	HOOK CYLINDER	BR48370		Spreader 吊具	Bromma	2
8	TWINLIFT CYLINDER	BR23528		Spreader 吊具	Bromma	2
9	TIE CYLINDER	BR63083		Spreader 吊具	Bromma	1
10	Not used	NO USED		Spreader 吊具	Bromma	not used
11	SEAL KIT FOR TWL CYLINDER	BR74146		Spreader 吊具	Bromma	4
12	SEAL KIT FOR DOG CYLINDER	BR700224		Spreader 吊具	Bromma	4
13	SEAL KIT FOR TWIN LIFTING CYLINDER	BR700222		Spreader 吊具	Bromma	4
14	SEAL KIT FOR HOOK CYLINDER	BR700220		Spreader 吊具	Bromma	4
15	DG4V-3-2C-MU-H7- 60	BR73096		Spreader 吊具	Bromma	7
16	KDG4V-5-2C-50N-H- MU-H7-30	BR701233		Spreader 吊具	Bromma	1
17	DG4V-3-561C-MU- H7-60	BR79661		Spreader 吊具	Bromma	1
18	DG4V-3-6C-MU-H7- 60	BR73097		Spreader 吊具	Bromma	2
19	DG4V-5-6CJ-MU-H6- 20	BR76054		Spreader 吊具	Bromma	3
20	SOLENOID HA NG10 PROP	BR700628		Spreader 吊具	Bromma	10
21	SOLENOID DG4V-3- 60 24V DC	BR70422		Spreader 吊具	Bromma	10
22	SOLENOID COIL DG4V-5 24V DC	BR77799		Spreader 吊具	Bromma	10
23	FILTER ELEMENT RETURN	BR700674		Spreader 吊具	Bromma	4
24	FILTER ELEMENT PRESSURE	BR700673		Spreader 吊具	Bromma	4
25	SCS4	BR1108621		Spreader 吊具	Bromma	1

26	Gateway	BR39895		Spreader 吊具	Bromma	1
27	Hydr Pump	BR700757		Spreader 吊具	Bromma	1
R. Access gate 安全门						
1	Walkway safety door FB-2(70R1) 走道安全门(70R1)	D21-075A-310400		Walkway, platform and stairs system 梯 子平台	ZPMC	18
2	Walkway safety door FB-2(80L1) 走 道安全门(80L1)	D21-075A-310400		Walkway, platform and stairs system 梯 子平台	ZPMC	18
S. Special bearing 特殊轴承						
1	球铰支承环 Spherical bush	ZT2-041202-15a		Trolley 小车总成	ZPMC	1

序号 NO.	备件品名 Spare Parts Description	供货商 Vender	型号/Model	数量 Qty.	
				Total Qty.	pc
	Electrical Part				
	Cable				
1	MV Cable Reel Reeling Cable	Prysmian	Prysmian/PROTOLON (SM-R)-LWL (N)TSKCGEWOEU 3x2AWG+1x4AWG+1x8AWG+1x(12E9 F.O.) BLACK 15KV	755	m
2	Spreader Cable Reel Reeling Cable	Prysmian	Prysmian/Cordaflex (SM)-RS 44X12 AWG	90	m
3	Shuttle Boom Energy Chain Cable	IGUS			
3.1	E-Chain Power Cable	IGUS/Chainflex	CF300.UL.350.01.D 1X35	284	m
3.2	E-Chain Power Cable	IGUS/Chainflex	CF300.UL.1200.01.D 1X120	71	m
3.3	E-Chain Power Cable	IGUS/Chainflex	CF300.UL.250.01.D 1X25	71	m
3.4	E-Chain Control Cable	IGUS/Chainflex	CF9.25.25 (25X2.5,300/500V)	142	m
3.5	E-Chain Fiber Optical Cable	IGUS/Chainflex	CFLG.12G.62.5/125.T(12G62.5/125um)	146	m
3.6	E-Chain Communication Cable	IGUS/Chainflex	CF11.05.06.02 6X2X0.5	71	m
3.7	E-Chain VFC Motor Cable	IGUS/Chainflex	CF310.UL.1200.01 1X120C	639	m
3.8	E-Chain VFC Motor Cable	IGUS/Chainflex	CF310.UL.250.01 1X25C	213	m
4	Trolley Energy Chain Cable	IGUS			
4.1	E-Chain Power Cable	IGUS/Chainflex	CF300.UL.250.01.D 1X25	545	m
4.2	E-Chain Control Cable	IGUS/Chainflex	CF9.25.25 (25X2.5,300/500V)	109	m
4.3	E-Chain Fiber Optical Cable	IGUS/Chainflex	CFLG.12G.62.5/125.T(12G62.5/125um)	238	m
4.4	E-Chain Communication Cable	IGUS/Chainflex	CF11.05.06.02 6X2X0.5	109	m
4.5	E-Chain VFC Motor Cable	IGUS/Chainflex	CF310.UL.250.01 1X25C	327	m
	Sensor/Limit Switch				
5	Counterweight Operated Limit Switch	GE	IC9445D204	2	pc
6	Big Lever Operated Limit Switch	Schmersal	TA064-12y-8028-1	4	pc
7	Big Lever Operated Limit Switch	Schmersal	TD422-01y-2512/8028	4	pc
8	Small Lever Operated Limit Switch	Schmersal	Z4V7H335-11z-RVA-2272/2654/8028	4	pc

9	Proximity Switch	Turck	NI4-M12-AZ31X	4	pc
10	Proximity Switch	Turck	Ni15-M30-AZ3X/S90	4	pc
11	Magnet Operated Limit Switch	Schmersal	BN20-11RZ-M16-8028	4	pc
12	Load Measuring Sensor	Brosa	Force measuring pin, type 0201 30t (Ø75)	4	pc
	LED Floodlight				
13	LED Floodlight	Phoenix	Phoenix/EcoMod 2 Series EM2-420-VS-277-480-ZC	5	pc
14	LED Floodlight	Phoenix	Phoenix/EcoMod 2 Series EM2-420-MF-277-480-ZC	5	pc
15	LED Maintenance Floodlight	Phoenix	Phoenix/EcoMod 2 Series EM2-280-WF-277-480-ZC	5	pc
	LED Walkway Light				
16	Outdoor LED Walkway Light	Phoenix	Phoenix/Cube-Light CL-13LED-120-240-CD-VSR-ZC	20	pc
17	Indoor LED Light	Phoenix	Phoenix/HDL Series HDL-2-UNIV-DP-SM- ZC	5	pc
18	Indoor LED Light (With Battery)	Phoenix	Phoenix/HDL Series HDL-2-UNIV-DP-SM-EMB-6FT-ZC	5	pc
	Others				
19	Aircraft Warning Light	Point Lighting	Point Lighting/POL POL-21005-1F- R-10B- D	3	pc
20	Anemometer	GILL	GILL/WindObserver IS	1	pc
21	Camera				
21.1	AFZ HD-E ALU	Orlaco	Orlaco 0103810	1	pc
21.2	PTZ HD-E Sst	Orlaco	Orlaco 0506820	1	pc
22	Camera Controller		Camera Control Module	1	pc
23	Master Switch				
23.1	Trolley/Boom Main Joystick	S&B	SPOHN+BURKHARDT NEW TYPE NS3 WITH DYCS HANDLE, 360°	1	pc
23.2	Hoist/Gantry Main Joystick	S&B	SPOHN+BURKHARDT NEW TYPE NS3 WITH DYCS HANDLE	1	pc
24	Plug for SCR Cable on the Trolley	Harting	S6H-KMS48-L63 Kit plug mobile 48P Harting		
24.1	S6H-CM048-L50 (Housing)	Harting	Mobile housing Harting HAN B,48P,M50 side (P/N 19 30 048 0549)	1	pc
24.2	S6H-C2416-M24 (Insert 1-24)	Harting	Insert male Harting HAN E,24Px16A,num.1- 24 (P/N 09 33 024 2601)	1	pc

24.3	S6H-C2416-M48 (Insert 25-48)	Harting	Insert male Harting HAN E,24Px16A,num.25-48 (P/N 09 33 024 2611)	1	pc
25	Plug for SCR Cable on the Headblock				
25.1	Plug Housing	Weidmuller	Weidmuller/HE 1001520000	1	pc
25.2	Insert 1-24	Weidmuller	Weidmuller/HE Insert female 1211600000	1	pc
25.3	Insert 25-48	Weidmuller	Weidmuller/HE Insert female 1226600000	1	pc
25.4	Pins 1-48	Weidmuller	Weidmuller/HE Pins female 1201500000	48	pc
	Related Mechanical Parts				
26	Shuttle Boom E-chain Spares	IGUS	5050RHD.17/17.250.S10.0.E	15	m
27	Trolley E-chain Spares	IGUS	P4.56R.20.250.S40.0.AG	20	m
28	Rope Re-reeving Motor	Marathon	TCA 132MA-7.5	1	pc
29	Maintenance Crane Hoist Motor	KoneCranes	MT11ML200N200FA5053XRIP66	1	pc
30	Emergency Motors				
30.1	Main Hoist Emergency Motor	Marathon	TCA 225S04-37	1	pc
30.2	Trolley Emergency Motor	Marathon	TCA 160LA-15	1	pc
30.3	Shuttle Boom Emergency Motor	Marathon	TCA 132MB06-5.5	1	pc
31	Gantry Cable Reel				
31.1	HV Ringpack	Cavotec	F560/4517/1 pred FORJ	1	pc
31.2	Fiber Optic Rotary Joint	Cavotec	S22-40412-9S0 FOR A 40 turn 12 channel ST 9/125um	1	pc
31.3	Pull Reel Motor	Bronzoni	Motor Bronzoni taglia112 2.2KW	1	pc
31.4	Store Reel Motor	Bronzoni	Motor Bronzoni taglia112 1.5KW	1	pc
32	Spreader Cable Reel				
32.1	Spreader Reel Ringpack	Cavotec	FV46/4S	1	pc
32.2	Spreader Reel Motor	Bronzoni	Motor Bronzoni taglia132 9.2KW	1	pc
	Air conditioner Spare parts				
	Air conditioner (PLC room)	YORK	PC180/NC180	3	sets
	Air conditioner (E-room)	YORK	DHY18CSB21S/DHY18NWB21S	3	sets



Item	Task	Name	Catalog Number	Description	Total Qty.
<u>ELECTRICAL PROJECT SPARE PARTS</u>					
1	1001A	MISC-ITEMS	V1K55A00	FILTERLTL,MOTOR PROTECTION	1
2	1085	PART	140G-G2C3-C25	480V, 25Ka IC, Thermal-Mag Fixed, 25 Amps	2
3	1085	PART	1489-M1C100	10A, 480v, 1P, 10KA, C-Curve	2
4	1085	PART	1489-M1C040	4A, 480v, 1P, 10KA, C-Curve	2
5	1085	PART	SDP 3-15-100T	In:86-264vAC 47-63Hz, Out:15vDC 3.4A	1
6	1085	PART	100S-C23D14BC	23A (ac3),1-N/O,1-N/C, 110-120 vAC 50-60Hz coil	2
7	1085	PART	100-C09-D10	9A (AC3), 1-O/C Aux, 110/120vac 50/60Hz coil	2
8	1085	PART	100-C16-D10	16A (AC3), 1-O/C Aux, 110/120vac 50/60Hz coil	2
9	1085	PART	100-C30-D10	30A (AC3), 1-O/C Aux, 110/120vac 50/60Hz coil	2
10	1085	PART	140M-C2E-B40	600V, 10Ka IC, ADJ (2.5-4.0) Amps	2
11	1085	PART	140M-C2E-C10	600V, 10Ka IC, ADJ (6.3-10) Amps	2
12	1085	PART	140M-C2E-B10	600V, 10Ka IC, ADJ (0.63-1.0) Amps	2
13	1085	PART	700-CF400D	600vAC, 110-120V, 50/60Hz coil, 4-N/O contacts	2
14	1085	PART	700-HC24A1-4	4PDT 5A, 110/120 vac 50/60Hz coil, LED	3
15	1085	PART	700-HC24Z24-4	4PDT 5A, 24vDC coil, LED	2
16	1085	PART	TRS 12VDC 1CO	1-C/O contact, 12vDC coil	1
17	1085	PART	IC200PWR102	120Vac Power Supply, Expanded 3.3Vdc	1
18	1085	PART	IC200MDL240	16 ckt 120Vac input	2
19	1085	PART	IC200MDL330	16 Ckt Isolated 120vac, 0.5A Output	2
20	1085	PART	IC200MDL930	8 ckt Relay Output	2
21	1085	PART	800TC-TFXT6D2	12-130v AC/DC LED 1-N/C contact	6
22	1085	PART	800TC-D9B	Momentary, 2-N/O, 2-N/C contact	6
23	1085	PART	IC200EBI001	PLC,VERSAMAX ETHERNET NIU	1
24	1085	PART	IC200CHS022	MODULE,Compact Box Style I/OCarrier	1
25	1085	PART	IC200ERM002	PLC,VERSAMAX EXPANSION MODULE	1
26	1085	PART	IC200CBL600	PLC,VERSAMAX CABLE	1
27	1085	PART	IC200ACC201	Versamaz Expansion Terminator	1
28	1085	PART	LWLS-D-1-M	LWL decoder	1
29	1110	MOTOR	3V16792AM1110	MOTOR,AC,640 kW,900/1800 RPM,460V, IP55, MAIN HOIST MOTOR, WITH ENCODER	1
30	1241	MISC-ITEMS	UOM41L-1212-62.5/125-B5	TACH,1024 PPR,	1
31	2110	MOTOR	3V16792AM2110	MOTOR,AC,305 kW, 1750 RPM,460V, TROLLEY MOTOR WITH ENCODER	1

32	3110	MOTOR	3V16792AM3110	MOTOR,AC,25/53 KW,1750/1260 RPM,460VAC,AC GANTRY MOTOR WITH TACH, IM V1 MOUNTING, WITH MOTOR MOUNTED BRAKES	1
33	3120	MOTOR	3V16792AM3120	MOTOR,AC,25/53 KW,1750/1260 RPM,460VAC,AC GANTRY MOTOR WITHOUT TACH, IM V1 MOUNTING, WITH MOTOR MOUNTED BRAKES	1
34	3241	MISC-ITEMS	OCD-DPC1B-1213-C10S-H3P	SENSOR,position encoder	1
35	4110	MOTOR	3V16792AM4110	MOTOR, AC, 65kW, 1750 RPM, 460V, BOOM MOTOR, WITH ENCODER	1
36	5000	PART	140G-G2C3-C35	480V, 25Ka IC, Thermal-Mag Fixed, 35 Amps	2
37	5000	PART	LP-CC-30	30A, 600vac, 200Ka Interrupting	4
38	5000	PART	1489-M2C500	50A, 240v, 2-pole,10KA, "C" Curve	2
39	5000	PART	1489-M1C010	1A, 240v, 1-pole,10KA, "C" Curve	2
40	5000	PART	1489-M2C150	15A, 240v, 2-pole, 10KA, "C" Curve	2
41	5000	PART	1489-M1C080	8A, 240v, 1-pole, 10KA, "C" Curve	2
42	5000	PART	1489-M1C060	6A,48vDC, 1-pole, 10KA, "C" Curve	2
43	5000	PART	1489-M1C200	20A, 240v, 1-pole, 10KA, "C" Curve	2
44	5000	PART	1489-M1C160	16A, 240v, 1-pole, 10KA, "C" Curve	2
45	5000	PART	1489-M1C020	2A,48vDC, 1-pole, 10KA, "C" Curve	2
46	5000	PART	PRO MAX 240W 24V 10A	24vDC, 10Amps, 110-240vAC 47-63Hz Input	1
47	5000	PART	RE22R2AMR	110-240Vac, 50-60 Hz, 0.3-30 Sec TDAE	1
48	5000	PART	700S-CF440DC	4NO/4NC, 110-120 vAC , 50/60Hz coil	1
49	5000	PART	700-HC22Z24-4	2PDT 10A, 24vDC coil, LED	2
50	5000	PART	IC695PSA140	RX3I Power Supply	1
51	5000	PART	IC694MDL240	16 point, 120 vac	2
52	5000	PART	IC694MDL930	8 point, Isolated, 2A Pilot duty, 10mA Min.	2
53	5000	PART	IC694MDL940	16 N/O 2A, 4 group of 4	2
54	5000	PART	IC694PWR330	POWER SUPPLY	1
55	5000	PART	IC694MDL660	32 point, 24 vDC, 4 isolated groups	2
56	5000	PART	IC694MDL260	32 point, 120 vac	2
57	5000	PART	IC694MDL742	16 point, 24 vDC, 1A ESCP	2
58	5000	PART	800TC-QBH2G	Green, 12-130v Ac/Dc LED, 1-N/O, 1-N/C contact	6
59	5000	PART	800TC-QBH2R	Red, 12-130v Ac/Dc LED, 1-N/O, 1-N/C contact	6
60	5000	PART	800TC-QBH2A	Amber, 12-130v Ac/Dc LED, 1-N/O, 1-N/C contact	6
61	5000	PART	800TC-A6A	Red, Momentary, 1-N/O, 1-N/C contact	6
62	5000	PART	800TC-H48A	Spring-Return to Left, Key Out Left, 1-N/O,N/C	6
63	5000	PART	800TC-A2A	Black, Momentary, 1-N/O, 1-N/C contact	6

64	5000	PART	800TC-J2KC1B	3-Pos.Maintained, 2-N/O + 2-N/C contacts	6
65	5000	PART	3.220.401.084	Non-Reset, panel mount, 110vAC, 60 Hz	1
66	5000	PART	XEB0471	250vAC, 0.1uF, 47Ω 1/2 watt	3
67	5000	PART	800TC-J42B	3-Pos, Maint, Key Out Center, 2-N/O, 2-N/C	6
68	5000	PART	102MC-ST	MISC ELEC,1-UTP PORT	1
69	5000	PART	102MCE-ST-15	COMPUTERHDWR,N-Tron Fiber Optic Eth Sw	1
70	5000	PART	116TX	COMPUTERHDWR,Ethernet Switch,16, 10/100BaseTX RJ45 Ports	1
71	5000	PART	IC695CHS016	MISC,CPU RACK	1
72	5000	PART	IC695CPE305	PLC,RX3i Processor	1
73	5000	PART	IC694ACC310	PLC,RX3i BLANK FILLER PANEL	1
74	5000	PART	IC695ETM001	MODULE,PLC ETHERNET MODULE	1
75	5000	PART	IC695PBM300	PRINTEDCIRCUITBD,RX3i Profibus Master Mod	1
76	5000	PART	IC695ALG112	ISOLATED ANALOG Module	1
77	5000	PART	IC695LRE001	PLC,SER BUS TRANSMIT MOD	1
78	5000	PART	IC693CBL300	MISC,BASE EXPANSION CABLE	1
79	5000	PART	IC693ACC307	MISC MECH, IO TERM	1
80	5000	PART	IC694CHS392	MISC MECH, IO RACK	1
81	5000	PART	IC694ALG392	PLC,RX3i ANALOG OUTPUT MOD	1
82	5000	PART	IC694TBB032	TERMINALBD,EXTENDED BOX STYLE,TERMINAL BLOCK,36 PIN, ONE	1
83	5000-NA	MISC-ITEMS	UO-EM-D41	MISC,LWL-F/O DECODER	2
84	5000-NB	MISC-ITEMS	UO-EM-AMP	MISC ELEC,ABSOLUTE ENCODER	2
85	5000-NC	MISC-ITEMS	UO-EM-FIL	MISC,EMI Filter	2
86	5000-ND	MISC-ITEMS	UO-EM-EGS41-0.63-300	MODULE,Overspeed Module	2
87	5010	MISC-ITEMS	9L20AXX012XHS	MISC,TVSS Equip for Slip Ring	1
88	5505A	MISC-ITEMS	SI20-P-230VAC	SENSOR,Sway Sensor	2
89	5505B	MISC-ITEMS	BMU-02A	SENSOR,Infrared beacon angle +/-25 De	2
90	5505C	MISC-ITEMS	DRC3-5.0	CABLE,5m Long Synchronisation cable,	2
91	5563A	MISC-ITEMS	HG G-98760XC	SENSOR,Transponder Reader	2
92	5563B	MISC-ITEMS	HG G-70653ZA	SENSOR,Puck Transponder	2
93	5563C	MISC-ITEMS	HG G-81830TA	SENSOR, PROGRAMMING UNIT	2
94	5564A	MISC-ITEMS	1060832	SENSOR,LD-LRS3601 LASER SENSOR	2
95	5564B	MISC-ITEMS	2018303	MISC,SICK MOUNTING SET	2
96	5570B	MISC-ITEMS	1046135	SENSOR,LMS511-10100 Laser Sensor	2
97	5570C	MISC-ITEMS	2015623	MISC,Mounting Set for Laser Scanner	2
98	5570D	MISC-ITEMS	2015624	MISC,MTG BRKT, MTG SET 2	2
99	5570E	MISC-ITEMS	6034415	CABLE,ETH CBL, 4-POLE, M12 PLG 4-PIN,(D- TYPE ENCD)/RJ-45 PLG 5m	2

100	5570F	MISC-ITEMS	6036159	CABLE,PWR SPLY CBL, (AWG22), M12 SKT,5-PIN, (A-TYPE ENCd)4X0.50 mm2	2
101	5570G	MISC-ITEMS	2056850	MISC,PROTECTION HOOD	2
102	5582R	MISC-ITEMS	6032770	MISC,CABLE ASSEMBLY	1
103	6000	PART	140G-G2C3-C60	480V, 25Ka IC, Thermal-Mag Fixed, 60 Amps	2
104	6000	PART	140G-G2C3-C40	480V, 25Ka IC, Thermal-Mag Fixed, 40 Amps	2
105	6000	PART	140G-G2C3-C30	480V, 25Ka IC, Thermal-Mag Fixed, 30 Amps	2
106	6000	PART	140G-G2C3-C20	480V, 25Ka IC, Thermal-Mag Fixed, 20 Amps	2
107	6000	PART	1489-M3C300	30A, 240v, 3-pole, 10KA, "C" Curve	2
108	6000	PART	1489-M3C100	10A, 240v, 3-pole, 10KA, "C" Curve	2
109	6000	PART	1489-M2C200	20A, 240v, 2-pole, 10KA, "C" Curve	2
110	6000	PART	1489-M1C150	15A, 240v, 1-pole, 10KA, "C" Curve	2
111	6000	PART	1489-M1D160	16A, 240v, 1-pole, 10KA, "D" Curve	2
112	6000	PART	1489-M1C030	3A, 240v, 1-pole, 10KA, "C" Curve	2
113	6000	PART	140M-C2E-C16	600V, 10Ka IC, ADJ (10-16) Amps	2
114	6000	PART	1492-RCDA4A25-US	480vAC, 25A Carry, 30mA trip, 3P + N	2
115	6000	PART	PRO MAX 120W 12V 10A	12vDC, 10 Amps, 85-132vAC 47-63Hz Input	1
116	6000	PART	HDR-30-5	5V, 3A, 15W, 80mVp-p	1
117	6000	PART	100-C12-D10	12A (AC3), 1-O/C Aux, 110/120vac 50/60Hz coil	2
118	6000	PART	700-HC14Z24-4	250vAC, 7A, 4PDT, 24vdc coil, LED	1
119	6000	PART	20.22.8.120.0000	13A, 2-N/O Poles, 120vAC coil	2
120	6000	PART	IC694MDL754	32 point, 12/24 vDC 0.75A ESCP	2
121	6000	PART	IC694MDL350	16 Isolated Points, 120 vAC 2.0A	2
122	6000	PART	IC200MDL650	32 ckt 24vDC input	2
123	6000	PART	IC200MDL741	16 ckt 24vDC, 0.5A, ECSP	2
124	6000	PART	IC200MDL640	16 ckt 24vDC input	2
125	6000	PART	IC695ALG508	RX3I INPUT Module	1
126	6000	PART	IC694ALG221	PLC,4-CHANNEL ANALOG CURRENT INPUT	1
127	6000	PART	108TX	COMPUTERHDWR,ETHERNET SW	1
128	6000	PART	LWLS-T-1-62.5/125	LWL transmitter	1
129	6000	PART	PSI-MOS-PROFIB/FO 850E	alarm contact for PROFIBUS up to 12 Mbps	1
130	6000	PART	IC200ETM001	Expansion Transmitter Module	1
131	6000	PART	IC200CBL615	Versamax RACK EXPANSION CABLE	1
132	6025	PART	800FP-LE3	22.5mm Push Button Operator, Illuminated / Plastic, Extended Head / Green	6
133	6025	PART	800F-ALP+800F-NUG+800F- X01+800F-X10	Plastic Power Module and Latch Mount, 24V AC/DC, Integrated Green LED, screw termination, with 1 N.O. - 1 N.C. standard contact blocks	6
134	6025	PART	800FP-LE0	22.5mm Push Button Operator, Illuminated / Plastic, Extended Head / Amber	6

135	6025	PART	800F-ALP+800F-NUW+800F- X01+800F-X10	Plastic Power Module and Latch Mount, 24V AC/DC, Integrated Amber LED, screw termination, with 1 N.O. - 1 N.C. standard contact blocks	6
136	6025	PART	800FP-E2	22.5mm Push Button Operator, Plastic, Extended Head, Black	6
137	6025	PART	800FP-SM22	22.5 mm Plastic Selector Sw, 2 Pos, Maintain Contact	6
138	6025	PART	800FP-P3+800F-ALP+800F-NUG	Plastic Power Module and Latch Mount, 24V AC/DC, Integrated Green LED, screw termination	6
139	6025	PART	800FP-P4+800F-ALP+800F-NUR	Plastic Power Module and Latch Mount, 24V AC/DC, Integrated Red LED, screw termination	6
140	6025	PART	855P-B30SH22	855P Panel Mount Signaling Alarm, NEMA4, 12-24 V AC/DC; High Output 80 dB, 30mm Size with 22mm mounting hole	1
141	6025	PART	104TX	COMPUTERHWDWR,N-TON ETHERNET SWITCH,FOUR PORT	1
142	6025	PART	MB3180	Modbus gateways; 1 Port RS-232/422/485	1
143	6025	PART	SUBCON 9/F-SH	Contact, D-SUB plug, 9-pos. female connector	1
144	6030	PART	1489-M1C050	5A, 1p, "C" Curve (DC Breaker for Lasers)	2
145	6030	PART	PRO MAX 480W 24V 20A	24vDC, 20Amps, 110-240vAC 47-63Hz Input	1
146	6031	PART	800FP-MT44	800F Non-Illuminated Mushroom Operators, Twist to Release, 40mm, Round Plastic (Type 4/4X/13, IP66), Red, , Standard Pack (Qty. 1)	6
147	6031	PART	800FP-LE4	22.5mm Push Button Operator, Illuminated / Plastic, Extended Head / Red	6
148	6031	PART	800F-ALP+800F-NUR+800F- X01+800F-X10	Plastic Power Module and Latch Mount, 24V AC/DC, Integrated Red LED, screw termination, with 1 N.O. - 1 N.C. standard contact blocks	6
149	6031	PART	800FP-SB32	22.5 mm Plastic Selector Sw, 3 Pos, Spr. Return from Both	6
150	6031	PART	800FP-KR21	22.5 mm Plastic Key Sel. Sw, 2 Pos, Spr. Return from Right to Left, Key Out Left	6
151	6032	PART	800FP-KM21	22.5 mm Plastic Key Sel. Sw, 2 Pos, Maintain Contact, Key Out Left	6
152	6060	PART	194E-A16-1753-4G	Disconnect Switch, Non-Fused, 3 Phase, 2-Position, 16A, 690VAC, Dinrail Mounting	2
153	6060	PART	194E-A40-1753-6G	Disconnect Switch, Non-Fused, 3 Phase, 2-Position, 40A, 690VAC, Dinrail Mounting	2
154	6060	PART	1489-M2D050	480V, 10Ka IC, Thermal-Mag Fixed, 5 Amps, 'D' Curve	2
155	6060	PART	1489-M1C070	277V, 10Ka IC, Thermal-Mag Fixed, 7 Amps, 'C' Curve	2
156	6060	PART	PRO MAX 72W 12V 6A	12VDC, 6A, INPUT:110-240VAC, 47-63HZ	1

157	6060	PART	140M-C2E-B63	480V, 65Ka IC, ADJ (4.0-6.3) Amps	2
158	6060	PART	IC200MDL331	8 ckt 120vAC output	2
159	6060	PART	IC200MDL742	32 ckt 24vDC output, ESCP, 0.5A	2
160	6060	PART	800FP-LE3+800F-ALP+800F-NUG+800F-X10+800F-X01	22.5mm Push Button Operator, Illuminated / Metal, Extended Head / Green	6
161	6060	PART	800FP-LE4+800F-ALP+800F-NUR+800F-X10+800F-X01	22.5mm Push Button Operator, Illuminated / Metal, Extended Head / Red	6
162	6060	PART	800FP-LE0+800F-ALP+800F-NUW+800F-X10+800F-X01	22.5mm Push Button Operator, Illuminated / Metal, Extended Head / Amber	6
163	6060	PART	800FP-LE5++800F-ALP+800F-NUW+800F-X10+800F-X01	22.5mm Push Button Operator, Illuminated / Metal, Extended Head / Yellow	6
164	6060	PART	800FP-P0+800F-ALP+800F-NUW	22.5mm Metal Pilot Light, Amber	6
165	6060	PART	800FP-P5+800F-ALP+800F-NUW	22.5mm Metal Pilot Light, Yellow	6
166	6060	PART	800FP-KM34	22.5 mm Metal Key Sel. Sw, 3 Pos, Maintain Contact, Key Out Center	6
167	6060	PART	800FP-SM32	22.5 mm Metal Selector Sw, 3 Pos, Maintain Contact	6
168	6060	PART	800FP-SM42	22.5mm Selector Switch, 4 Pos, Metal, Maintain Contact	6
169	6065	PART	1489-M1D030	277V, 10Ka IC, Thermal-Mag Fixed, 3 Amps, 'D' Curve	2
170	6065	PART	IC200ALG620	I/O DEVICE,INPUT,ANALOG,0-10VDC,4,VERSAMAX BLOCK	1
171	6065	PART	IC200ALG260	MISC,VERSAMAX I/O BLOCK	1
172	6067	PART	800T-NX115	PUSHBUTTON	6
173	6125	PART	140G-G2C3-C45	480V, 25Ka IC, Thermal-Mag Fixed, 45 Amps	2
174	6125	PART	1489-M3D250	25A, 480v, 3P, 10KA, D-Curve	2
175	6125	PART	1489-M2D040	4A, 480v, 2P, 10KA, D-Curve	2
176	6125	PART	100-C23-D10	23A (AC3), 1-NO contact, 110-120v, 50/60 Hz coil	2
177	6125	PART	100-C09D10	9A (AC3), 1-NO contact, 110-120v, 50/60 Hz coil	2
178	6125	PART	700-HC14A1-4	4PDT 7A, 110/120 vac 50/60Hz coil w/LED option	1
179	6125	PART	800T-QH2G	Green, 12-130v AC/DC LED, terminal guards	6
180	6125	PART	800FP-MM45	Momentary, Yellow Mushroom Head	6
181	6125	PART	800FP-F2	Pushbutton, Momentary, Black Cap	6
182	7000	PART	LP-CC-2	2.0A, 600vac, 200Ka Interuupting	2
183	7000	PART	LP-CC-5	5.0A, 600vac, 200Ka Interuupting	2
184	7000	PART	1489-M2D005	0.5A, 480v, 2-pole, 10KA, "D" Curve	2
185	7000	PART	LP-CC-10	10A, 600vac, 200Ka Interuupting	2
186	7000	PART	140G-G2C3-C50	480V, 25Ka IC, Thermal-Mag Fixed, 50 Amps	2
187	7000	PART	140G-G2C3-C15	480V, 25Ka IC, Thermal-Mag Fixed, 15 Amps	2
188	7000	PART	140M-C2E-C20	480V, 30Ka IC, ADJ (14.5-20) Amps	2
189	7000	PART	140MG-H8E-C60	480V, 30Ka IC, ADJ (40-63) Amps	2

190	7000	PART	700-CF220B	4-pole, 600V, 2O/2C, 440-480vac 50/60Hz coil	1
191	7000	PART	700-CF220D	4-pole, 600V, 2O/2C, 110-120vac 50/60Hz coil	1
192	7000	PART	104-C16-D22	16A (AC3), 2-O/C Aux, 110/120vac 50/60Hz coil	2
193	7000	PART	700-HC22A1-4	2PDT 10A, 300v-UL, 110/120 vac 50/60Hz coil w/LED	2
194	7000	PART	800T-QH2W	White, 12-130v AC/DC LED, terminal guards	1
195	7000	PART	800TC-J2B	30.5 mm Metal, 2 N.O. + 2 N.C. contact blocks	2
196	7000	PART	800TC-H31A	30.5 mm Metal, 1 N.O. + 1 N.C. contact blocks	1
197	7005	PART	100-C09-D200	32A (ac1), 2O/2C Power pole, 110/120, 50/60 Hz coil	2
198	7006	PART	140M-C2E-B25	480V, 65Ka IC, ADJ (1.6-2.5) Amps	2
199	7006	PART	140M-C2E-C25	480V, 30Ka IC, ADJ (18-25) Amps	2
200	7006	PART	104-C37-D22	37A (AC3), 2-O/C Aux, 110/120vac 50/60Hz coil	2
201	7006	PART	100-C12-D200	32A (AC1), 2-NO/2-NC MP, 110/120vac 50/60Hz coil	2
202	7006	PART	100-FPTA30	TDAE (on delay) 0.3 to 30 Seconds 1-N/O, 1-N/C	1
203	7010	XT-MISC	3V16792AM7010	TRANSFORMER,75 KVA, 480/208Y-120V,3 phase delta,50/60,dry,E-Room lighting and heating XM	1
204	7015	XT-MISC	3V16792AM7015	TRANSFORMER,15 KAV, 480/208Y-120V.3 Phase,50/60,dry,Cab lighting and heat XFMR	1
205	7025	XT-MISC	3V16792AM7025	TRANSFORMER,5 KVA,480/230,3 phase,50/60,dry,Drive Fan transformer	1
206	7100	XT-CNTRL	63-28-310-8	TRANSFORMER,10 kVA,208,240,480/120,208,240V,3 PH,60 HZ,DRY	1
207	8400	PART	MMPO100I3560	100 kVAR, 60 Hertz, 600 VAC,3 phase, wye connected	1
208	8400	PART	ES-27-3-F-B-1-N-0-A-0	Under voltage relay,480VAC 50/60Hz. trip,w/two N.O.&two N.C	1
209	8400	PART	A60C150-121	150 Ampere, Type JSK fuse, 600 VAC,	24
210	8400	PART	800T-QH2R	Indicator light, red lens, 120 Vac	6
211	8400	PART	800TC-H31B	For Normal / Bypass selection	6
212	8400-NA	MISC-ITEMS	3V16792AM8400-NA	INDUCTOR,FILTER TUNING REACTOR 2.05 MICRO H, 345A, 10 kV BIL, COPPER	1
213	8407	DRV-IND	UP0041-00	INDUCTOR,0.16 mH, 825 AMPS,LINE REACTOR, NEMA 3R ENCLOSURE	1
214	8409	MISC-ITEMS	UP0042-00	INDUCTOR,0.13 mH, 1000 AMPS,LINE REACTOR, NEMA 3R ENCLOSURE	1
215	9220	PART	15CLPT-1.5	FUSE, TYPE CLPT CURRENT LIMITING, 2 AMP, 15.5KV MAX.	4

216	9220	PART	15CLPT-PNM-A	FUSE MOUNTING, TYPE CLPT, NON- DISCONNECT TYPE, PORCELAIN INSULATORS,	2
217	9220	PART	10250T101-2	PUSHBUTTON, FLUSH OPERATOR, BLACK, 2 N.O. CONTACTS	6
218	9220	PART	10250T102-2	PUSHBUTTON, FLUSH OPERATOR, RED, 2 N.O. CONTACTS	6
219	9220	PART	10250T221LAP06	INDICATING LIGHT, P-T-T LED TRANSFORMER 120VAC, AMBER	2
220	9220	PART	10250T221LGP06	INDICATING LIGHT, P-T-T LED TRANSFORMER 120VAC, GREEN	2
221	9220	PART	10250T221LRP06	INDICATING LIGHT, P-T-T LED TRANSFORMER 120VAC, RED	2
222	9220	PART	7803D	LOCKOUT RELAY, COIL 120VAC, MANUAL RESET, 3 DECKS	1
223	9220	PART	CTD-2	CAPACITOR TRIP DEVICE, INPUT: 120VAC / 125VDC, OUTPUT: 170 / 125VDC, 21.5 JOULES	1
224	9220	PART	CPT5-95-5-SD07492	CPT, INDOOR RATED, SINGLE PHASE, 13200:120/240VAC, RATIO 110:1,	1
225	9220	PART	PTG5-2-110-SD03093FF	INDOOR VOLTAGE TRANSFORMER, TWO BUSHING, 13200:120V, RATIO: 110:1, 50/60HZ.,	1
226	9220	PART	PQMII-T20-C-A	POWER QUALITY METER, BASIC UNIT WITH DISPLAY	1
227	9220	PART	KUSC-04	TERMINAL BLOCK, 4 POLE, BASE MOUNTED, DOUBLE ROW, STANDARD BLOCK WITH SHORTING STRAP & 4 SHORTING SCREWS, 60A, 600V	1
228	9220	PART	MPDB63162	POWER DISTRIBUTION BLOCK, MINIATURE, ALUMINUM, 2-POLE, BOX TO BOX, OPENINGS PER POLE - PRIMARY: (1) #4-14, SECONDARY: (4) #4-14, AMP RATING: 85, 600 VOLT	1
229	9220	PART	MPDBC6263	SAFETY COVER, MINIATURE MPDB62 & MPDB63 SERIES, 1-POLE	1
230	9220	PART	AJT50	FUSE, 50A, 600VAC, 200kAI.R., TIME DELAY, CLASS J, UL LISTED	2
231	9220	PART	A4J6	FUSE, 6A, 600VAC, 200kAI.R., FAST ACTING, CLASS J, UL LISTED	4
232	9220	PART	AJT5N	FUSE, 5A, 600VAC, 200kAI.R., TIME DELAY, CLASS J, UL LISTED	1
233	9220	PART	ATDR15	FUSE, 15A, 600VAC, 200kAI.R., TIME DELAY, CLASS CC, UL LISTED	4
234	9220	PART	ATDR5	FUSE, 5A, 600VAC, 200kAI.R., TIME DELAY, CLASS CC, UL LISTED	4
235	9220	PART	780R500	CT, CURRENT RATING: 50:5A, SINGLE RATIO	1

236	9220	PART	780R201	CT, CURRENT RATING: 200:5A, SINGLE RATIO	1
237	9220	PART	EHT00008	EHT TUBULAR ENCLOSURE HEATER	1
238	5410A, 5410A-TA and 5410A-TC	PART	TMEIC	LCMS Computer Fully Configured with CIMPPLICITY System part v10.0 Server Runtime English Standard License and Machine Edition v9.5 Professional Development Suite 700 Points	1
239	6404	PART	TMEIC	Operator Cab Display Monitor	1
240	6405	PART	TMEIC	Operator Cab Viewer Computer	1



Item	Catalog/Part No	Type/Form No.	Description	Total Qty.
TM10e2 Drives: 3-1500 Fr.,3-900 Fr. 460V Sources; 6-1200 Fr.,6-600 Fr.,3-60 Fr.,3-15 Fr. 460V Inverters				
1	2J3A8122P801	ARND-8122A	VOLT PH DET,ARND-8122A - PRINTEDCIRCUITBD	1
2	2KCF4039P801	ARND-4039A	DIGITAL - PRINTEDCIRCUITBD	1
3	2KCF4059P801	ARND-4059A(CNB)	CONNECTOR - PRINTEDCIRCUITBD -	1
4	3AZF0310P002	CTR-GDM_395	395MM - CABLE	2
5	3AZF0311P001	CTR-XIO_100	100MM - CABLE	2
6	3AZF0351P001	CTR CN11-CNB CN1	CTR.CN11-CNB.CN1 - CABLE	1
7	3AZF0351P002	CTR CN12-CNB CN2	CTR.CN12-CNB.CN2 - CABLE	1
8	3AZF0351P003	CNB CN11-GDM CN2	CNB.CN11-GDM.CN2 - CABLE	1
9	3AZF0351P004	CNB CN12-GDMS SN2	CNB.CN12-GDMS.CN2 - CABLE	1
10	3AZF0351P006		CNB.CN12-GDMS.CN2 - CABLE	1
11	3AZF0368P001	CTR.CN85-DISP.CN1	1250MM - CABLE	6
12	3AZF0369P001	CTR.CN22-DISP.CN4	1000MM - CABLE	6
13	3AZF0370P001	CTR.CN15-XIO.CN1	100 PIN,415MM, XIO TO CTR - CABLE	6
14	3AZF0371P001	CTR.CN11-GDM.CN2	950MM - CABLE	5
15	3AZF0371P002	CTR.CN12-GDMS.CN2	1500MM - CABLE	2
16	3RSH200J683J*S	RS40H 20W-68K-OHM	68K,20W - RESISTOR	1
17	TEIGU4150CV04	TEIGU4150CV04	TM10E2,AC,15 FR,460V - INVERTER	1
18	TEIGU4600CV04	TEIGU4600CV04	TM10E2,AC,60 FR,460V - INVERTER	1
19	4EAF0423G002	2AYF0211G1-R	1200VDC,600/750A,6 PARALLEL - IGBTSTACK	1
20	4EAF0423G003	2AYF0212G1-R	1200VDC,900A,8 PARALLEL - IGBTSTACK	1
21	4EAF0756G006	ARND-4041A+SPRING	EXT I/F XIO PG M-STAGE SPRING - PRINTEDCIRCUITBD	1
22	4EAF0756G012	ARND-4045B+SPRING	EXT I/F XIO PG&RES CUBE SPRING - PRINTEDCIRCUITBD	1

23	4F3A2851P007	HB-20 T5_135	AIRFILTER -	2
24	4F3A2851P008	HB-20 T5_305	AIRFILTER -	6
25	4FBF0119P001	CS-7L ON-100/OFF-80	- THERMOSTAT	5
26	4FBF0121P001	AFB1224HHE-G817	<5HP,24VDC, 6.48W - FAN	1
27	4FBF0130P002	M7-HPT1000-0.65CN	- SENSOR	3
28	4FBF0141P001	PM50CL1A120	FR VARIOUS,1200V, 50A - IGBT	2
29	4FBF0141P003	PM150CL1A120	FR VARIOUS,1200V, 150A - IGBT	2
30	4FBF0156P115	1489-M3D050	3,5,460 V,15 - CIRCUITBRKR	2
31	4FBF0156P141	1489-M3D070	3,7,460 V,15 - CIRCUITBRKR	2
32	4FBF0182P001	LNKV6202MTECTG	2000 UF,430VDC,DIGITAL - CAPACITOR	0
33	4FBF0182P002	LNKV6402MTECTG	4000 UF,430VDC,DIGITAL - CAPACITOR	0
34	4FBF0182P012	YBASTOUB	4000 UF,430VDC,DIGITAL - CAPACITOR	0
35	4FBF0182P013	YBASTOUE	4000 UF,430VDC,DIGITAL - CAPACITOR	0
36	4FBF0186P001	170M3418	350A,690V - FUSE	2
37	4FBF0186P002	170M3419	400A,690V - FUSE	2
38	4FBF0186P013	170M6419	1600A,690V - FUSE	16
39	4FBF8192P001	LDA30F-24-XTIC	24VDC,1.3A - POWERSUPPLY	1
40	4FBF8192P002	LDA50F-24-XTIC	24VDC,2.1A - POWERSUPPLY	1
41	4FBF8192P021	LDC60F-2-CY	5.0VDC, +/-15VDC - POWERSUPPLY	1
42	4FBFQ599P047	S-T100 AC200V	AC,3,150,690,60 - CONTACTOR	1
43	4KAF4040G034	ARND-4040M	CTR(MULTI-STAGE) PG ONLY - PRINTEDCIRCUITBD	1
44	4KAF4044G034	ARND-4044M	CTR(CUBICLE)PG ONLY - PRINTEDCIRCUITBD	1
45	5D3A1118P021	ARND-8216A	PS20Wi GND DET GDI ARND-8216A - PRINTEDCIRCUITBD	1
46	5D3A1118P106	ARND-4047A (KPAD)	KEYPAD FOR e2 PRODUCTS,(KPAD) ARND- 4047A,10e2, MVe2, ETC. - PRINTEDCIRCUITBD	1
47	5D3A1121P028	ARND-4061B	GDM CUBICLE - PRINTEDCIRCUITBD	1
48	5D3A1121P029	ARND-4062A	DIGITAL - PRINTEDCIRCUITBD	1
49	5D3A1121P031	ARND-4063A	DIGITAL - PRINTEDCIRCUITBD	1
50	5D3A1121P033	ARND-4065A	DIGITAL, ARND-4065A - PRINTEDCIRCUITBD	4
51	5P2Z0845P019	SC-0 220Vac 1A	AC,SC-0,1A,220V - CONTACTOR	1

52	5P2Z0845P515	SZ-Z5 100-250V CR	.1 UF,750 OHM - RCNETWORK	1
53	5P2Z0933P003	GV2-ME03*0.25-0.4A	2 POLES,,25-.40A,460V - CIRCUITBRKR	2
54	5P2Z0933P006	GV2-ME06*1-1.6A	,1-1.6A,460V - CIRCUITBRKR	2
55	5P3A0517P090	G2R-2-SND-AP3-DC24V	G2R-2-SND-AP3-DC24V - RELAY	2
56	5P3A0517P095	P2RF-08	RELAY SOCKETS - MISC MECH	0
57	5P3A0555P025	LC1-F630 + LX1-FL220	AC,3 POLE,1000AMPS @ 1000 VOLTS,220 VAC,50/60 HZ - CONTACTOR	1
58	5P3A0555P033	LA9-D09980	SURGE SUPPRESSOR - RCNETWORK	1
59	5P3A0555P035	LA9-D09981	SUPPRESSOR - FILTERLTL	1
60	5P3A2005P340	SETOF2W300514RL MATCH	2200A,950VAC,9.5URD2*73TTF2200 - FUSE	2
61	5P3A4547P001	W4D400-DP12-40	, - FAN	2
62	5P3A7624P011	FF400R12KE3	400A IGBT - 1200VDC	2
63	5P3H1498P005	ESD-R-38B	Core Type ESD-R-38B - FERRITE	6
64	5P3H1698P038	HAX 1500-S/SP18 1500A/4V	1500A/4V - CURRENTXFMR	1
65	5P3H1698P045	HAS 50-S/SP16	Hall-Effect Current Transducer,CDG, 50A/4V - CURRENTXFMR	1
66	5P3H1698P046	HAS 100-S/SP16	100A/4V - CURRENTXFMR	1
67	5P3H1698P057	HAT 1000-S/SP1 1000A/4V	1000A/4V - CURRENTXFMR	3
68	5P3H4240P009	SCT25P122D505K-01	5UF,1200V - CAPACITOR	0
69	5P3K1006P306	CDR20L203JC	20K OHMS,20W - RESISTOR	5
70	5P3K1006P315	CWC30A3R0JIX500NZZ	3 OHM,300 W - RESISTOR	2
71	5P3K3507P012	ZCAT3035-1330	FERRITE CORE - DRIVECOMPONENT	0
72	5P3R4385P013	WMTB-P-1200-334K	- CAPACITOR	0
73	E000260P01	LA4FRCP	„SURGE SUPPRESSOR FOR COIL - RCNETWORK	2
74	E000261P01	LAD-N11	AUX CONTACT FOR CONTACTOR - CONTACTOR	3
75	E000624P05	SZ-A11	AC,8A - CONTACTOR	1
76	P24072007118	ATM1	1A,600V - FUSE	12

EXHIBIT D
At-Cost Spare Parts List

Option Cranes — Contractor agrees to supply the spare parts listed below at cost to County for duration of the warranty period.

No	Description	Type	Brand
1	HOIST T/L/S CYLINDER	140/70-3000 HC-FC140	ZPMC
2	TROLLEY TENSIONING CYLINDER	125/70-800 HC-FC 125-70-800	ZPMC
3	Twist Lock(with Nut)	0ZHEE998541 BX0501a	ZPMC
4	Trolley Wheel	D21-075A-020201	ZPMC
5	Trolley Wheel Shaft	D21-075A-020208	ZPMC
6	Trolley Wheel Bearing	23032-E1A-XL-M	FAG
7	Trolley Wheel Seal	180X210X15 HMS5 RG	SKF
8	MH Sheave Assembly	ZMHL900-Ab	ZPMC
9	MH Sheave Assembly	ZMHL500-Aa	ZPMC
10	MH Equalizer Sheave Assembly	ZMHL560-Aa	ZPMC
11	Trolley Reeving sheave Assembly	ZTHL750-Ab	ZPMC
12	HOIST BRAKE THRUSTOR	SB28.3-900*30-BL450-8	BUBENZER
13	TROLLEY BRAKE THRUSTOR	SB23.3-630x30-BL80-6	BUBENZER
14	BOOM BRAKE THRUSTOR	SB23.3-BL35/5-560x30	BUBENZER
15	MV CABLE	PROTOLON(SM-R) 15KV BLACK 3x2AWG+1x4AWG+1x8 AWG+12E9/125 with 15KN tragoran 755M	PRYSMIAN
16	SPREADER CABLE	CORDAFLEX(SM)-RS 44x12AWG 90M	PRYSMIAN
17	E-CHAIN POWER CABLE	CF300.UL.350.01.D 1X35	IGUS HAINFLE
18	E-Chain Power Cable	CF300.UL.1200.01.D 1X120	IGUS HAINFLE
19	E-Chain Power Cable	CF300.UL.250.01.D 1X25	IGUS /Chainflex
20	E-Chain Control Cable	CF9.25.25 (25X2.5,300/500V)	IGUS /Chainflex
21	E-Chain Fiber Optical Cable	CFLG.12G.62.5/125.T (12G62.5/125um)	IGUS/Chainflex
22	E-Chain Communication Cable	CF11.05.06.02 6X2X0.5	IGUS /Chainflex

23	E-Chain VFC Motor Cable	CF310.UL.1200.01 1X120C	IGUS /Chainflex
24	E-Chain VFC Motor Cable	CF310.UL.250.01 1X25C	IGUS /Chainflex
25	E-Chain Power Cable	CF300.UL.250.01.D 1X25	IGUS /Chainflex
26	E-Chain Control Cable	CF9.25.25 (25X2.5,300/500V)	IGUS/Chainflex
27	E-Chain Fiber Optical Cable	CFLG.12G.62.5/125.T (12G62.5/125um)	IGUS/Chainflex
28	E-Chain Communication Cable	CF11.05.06.02 6X2X0.5	IGUS /Chainflex
29	E-Chain VFC Motor Cable	CF310.UL.250.01 1X25C	IGUS/Chainflex
30	Trolley/Boom Main Joystick	SPOHN+BURKHARDT NEW TYPE NS3 WITH DYCS HANDLE, 360°	S&B
31	Hoist/Gantry Main Joystick	SPOHN+BURKHARDT NEW TYPE NS3 WITH DYCS HANDLE	S&B
32	MV Ringpack	F560/4517/1 pred FORJ	Cavotec
33	MV Ringpack	taglia112 2.2KW	Bronzoni
34	MV Ringpack	taglia112 1.5KW	Bronzoni
35	Spreader Reel Ringpack	FV46/4S	Cavotec
36	Spreader Reel Ringpack	taglia132 9.2KW	Bronzoni
37	Hoist Motor - Right	3V16792AM1110 MOTOR,AC,640 kW,900/1800 RPM,460V, IP55, MAIN HOIST MOTOR, WITH ENCODER	TMEIC
38	Hoist Motor - Left	3V16792AM1110MOTO R,AC,640 kW,900/1800 RPM,460V, IP55, MAIN HOIST MOTOR, WITH ENCODER	TMEIC
39	Gantry Motor - With Encoder	3V16792AM3110 MOTOR,AC,25/53 KW, 1750/1260 RPM,460VAC, AC GANTRY MOTOR WITH TACH, IM V1 MOUNTING, WITH MOTOR MOUNTED BRAKES	TMEIC
40	Gantry Motor - Without Encoder	3V16792AM3120 MOTOR,AC,25/53 KW, 1750/1260 RPM,460VAC, AC GANTRY MOTOR WITHOUT TACH, IM V1 MOUNTING, WITH MOTOR MOUNTED BRAKES	TMEIC
41	Trolley Motor	3V16792AM2110 MOTOR,AC,305 kW, 1750 RPM,460V, TROLLEY MOTOR WITH ENCODER	TMEIC
42	Boom Motor	3V16792AM4110 MOTOR, AC, 65kW, 1750 RPM, 460V, BOOM MOTOR, WITH ENCODER	TMEIC
43	TM10e2 Drives - 4FBF0141P001	FR VARIOUS,1200V, 50A - IGBT	TMEIC
44	TM10e2 Drives - 4FBF0141P003	FR VARIOUS,1200V, 150A - IGBT	TMEIC
45	TM10e2 Drives - 5P3A7624P011	400A IGBT - 1200VDC	TMEIC
46	TM10e2 Drives - TEIGU4150 CV04	TM10E2,AC,15 FR,460V - INVERTER	TMEIC

47	TM10e2 Drives - TEIGU4600 CV04	TM10E2,AC,60 FR,460V - INVERTER	TMEIC
48	TM10e2 Drives - 4EAF0423G002	1200VDC,600/750A,6 PARALLEL - IGBTSTACK	TMEIC
49	TM10e2 Drives - 4EAF0423G003	1200VDC,900A,8 PARALLEL - IGBTSTACK	TMEIC
50	TM10e2 Drives - 5D3A1118P106	KEYPAD FOR e2 PRODUCTS,(KPAD) ARND-4047A,10e2, MVe2, ETC. - PRINTED CIRCUIT BOARD	TMEIC
51	TM10e2 Drives - 4FBF8192P021	5.0VDC, +/-15VDC - POWERSUPPLY	TMEIC
52	TM10e2 Drives - 2J3A8122P801	VOLT PH DET,ARND- 8122A - PRINTED CIRCUIT BOARD	TMEIC
53	TM10e2 Drives - 2KCF4039P801	DIGITAL - PRINTED CIRCUIT BOARD	TMEIC
54	TM10e2 Drives - 2KCF4059P801	CONNECTOR - PRINTED CIRCUIT BOARD	TMEIC
55	TM10e2 Drives - 4EAF0756G006	EXT I/F XIO PG M- STAGE SPRING - PRINTEDCIRCUITBD	TMEIC
56	TM10e2 Drives - 4EAF0756G012	EXT I/F XIO PG&RES CUBE SPRING - PRINTED CIRCUIT BOARD	TMEIC
57	TM10e2 Drives - 4FBFQ599P047	AC,3,150,690,60 - CONTACTOR	TMEIC
58	TM10e2 Drives - 4KAF4040G034	CTR(MULTI-STAGE) PG ONLY - PRINTED CIRCUIT BOARD	TMEIC
59	TM10e2 Drives - 4KAF4044G034	CTR(CUBICLE)PG ONLY - PRINTED CIRCUIT BOARD	TMEIC
60	TM10e2 Drives - 5D3A1118P021	PS20Wi GND DET GDI ARND-8216A - PRINTED CIRCUIT BOARD	TMEIC
61	TM10e2 Drives - 5D3A1121P028	GDM CUBICLE - PRINTED CIRCUIT BOARD	TMEIC
62	TM10e2 Drives - 5D3A1121P029	DIGITAL - PRINTED CIRCUIT BOARD	TMEIC
63	TM10e2 Drives - 5D3A1121P031	DIGITAL - PRINTED CIRCUIT BOARD	TMEIC
64	TM10e2 Drives - 5D3A1121P033	DIGITAL,ARND-4065A - PRINTED CIRCUIT BOARD	TMEIC
65	TM10e2 Drives - 5P2Z0845P019	AC,SC-0,1A,220V - CONTACTOR	TMEIC
66	taglia112 2.2KW	Pull Reel Motor	Bronzoni
67	taglia112 1.5KW	Store Reel Motor	Bronzoni
68	TMEIC Control	LCMS - Local Crane Management System	TMEIC

EXHIBIT E

Suggestions and Design Modifications

Option Cranes — Contractor agrees to incorporate all suggestions and design modifications listed below into the Work for the option crane order.:

Item Category	Issue	Comments	Suggested Changes for Option Cranes
1 Structural	Seafastening boom bracket (2-piece)	It was difficult to install the boom seafastening bracket. And misalignment was found in the other low profile project.	ZPMC to modify the current design to make it easier to install
2 Structural	Boom Hanger access	There are two platforms that are very close to each other between the hanger and the support beam. Suggest connecting them and allowing for differential movement.	ZPMC to design
3 Structural	Boom hanger shear block	The adjustment bolt makes a popping sound when it rubs against the shear block. ZPMC will add a brass slide block on the bolts to allow for sliding against the shear block.	ZPMC to incorporate change into the design drawings.
4 Structural	Boom stow beam bolting	During manufacturing, ZPMC welded the boom stow beam bracket to the boom since some of the bolt holes were not drilled in the correct location. ZPMC may consider incorporating a welded connection into the next design, instead of a bolted connection.	ZPMC to incorporate change into the design drawings.
5 Structural	Boom stowage bracket movement	Properly adjust shims and connection to minimize boom movement during operation.	ZPMC can address during manufacturing
6 Structural	Boom Stowage Device access	Add a movable ladder or platform to access the boom stowage pin device	ZPMC to incorporate change into the design drawings.
7 Structural	Drainage at LS end inclined member	see final structural walkthrough notes	ZPMC to incorporate change into the design drawings.
8 Structural	Fabreeka	This ended up being generic Fabreeka. ZPMC should show the actual material on the drawings.	ZPMC to incorporate change into the design drawings.
9 Structural	Lower chord lower flange	Suggest making the flange wider to avoid class G detail at transverse weld and on other side of boom rail.	ZPMC consider for design.
10 Structural	LS hold down roller	The LS hold down roller was difficult to install. Suggest adding the fabreeka joint above the roller to make easier to install.	ZPMC consider for design.
11 Structural	Paint Condition	Liftech to consider if paint spec needs to be modified. Liftech to double check the painting colors for the signage.	Liftech review.
12 Structural	Permanent seafastening connection of the trolley and catenary trolley	It is difficult to remove these attachments after the cranes arrive, so suggest modify the bracket so they can be left in place (good detailing).	ZPMC can use design from the other low profile project.
13 Structural	Portal beam to leg lug - proper transitions	Joint detail could be improved. Suggest Isolating the plate taper and the radius transitions to prevent compounding stress concentrations of these two details	ZPMC to incorporate change into the design drawings.
14 Structural	Rail clip	Allow 8 mm more clearance between weld toes.	ZPMC to incorporate change into the design drawings.
15 Structural	Tie-down and crane interface	There was interference between the wharf bracket and the tie-down. Modify design on option cranes to match as-built condition.	ZPMC to incorporate change into the design drawings.
16 Structural	Upper chord flange	Suggest using transitions in lieu of 4:1, use radius, like PED Samsung	ZPMC to incorporate change into the design drawings.
17 Structural	Rail clips vs. shear blocks	At boom diagonals, weld clip on 3-sides, do not use shear blocks.	ZPMC can use design from the other low profile project.
18 Structural	WS hold down roller connection	MT requirement should be added to the horizontal backup plate inside TGSB.	ZPMC to incorporate change into the design drawings.
19 Structural	ZPMC-Samsung Crane Interface	Crane-crane interface bracket between Samsung and new crane - the length was too short and had to be modified to avoid crane-crane interference.	ZPMC to incorporate change into the design drawings.
20 Safety	Spreader Reel	Safety cage around spreader cable reel was added after the design was complete.	ZPMC to incorporate change into the design drawings.
21 Safety	Sheave Guards	Some sheave guards were excluded on the boom backreach (hoist sheaves) that PED requested to be added, even though they passed OSHA.	ZPMC to incorporate change into the design drawings.
22 PED	Headblock Ancillary	Modifications to headblock were documented in punch list (handrails and other topical features).	ZPMC to incorporate change into the design drawings.
23 Multiple	Punchlist	Review the Punchlist. Many Quality Control issues on the punch list can be addressed proactively with design changes.	ZPMC to review punch list and consider where the design can be improved to reduce QC issues.
24 Multiple	Boom Stowage Pin adjustment	The adjustment was difficult in practice. This should be dealt with in the hydraulics or by making the beam stronger.	ZPMC to incorporate change into the design drawings.
25 Multiple	Boom stowage pin pump	Pressure in the pump needs to be released or minimized after stow pin engagement	ZPMC to incorporate change into the design drawings.

26 Multiple	Gantry Braking	Gantry braking changes are not considered by PED as of 04/20. Unless the outcome of the gantry braking report shows that changes should be made, Ped will keep the braking system the same.	No action required
27 Multiple	Personnel Transport	A lot of small design changes, such as the washing platform, headblock, signs, and electrical switches and logic were made to accommodate the personnel transport after the design was completed.	ZPMC to incorporate changes into the design drawings.
28 Multiple	Cable lengths	McKay verify Gantry Distance on B30: - Cable lengths should be the same - Thermal motor sizing against Wind should be the same	(04/20) PED said these requirements likely will not change for the Option Cranes. Cable lengths to be confirmed.
29 Mechanical	Gantry seals	ZPMC used the wrong ones, not sure if design changes are necessary. Closed; agree	No action required
30 Mechanical	HVAC bolt types	Bolts corroded and needed to be replaced with a bolt of a different material	ZPMC to incorporate change into the design drawings.
31 Mechanical	Machinery House noise levels	Cooling fans and AC are too loud by design. This has not been resolved for new cranes yet	PED accepted as-is. No action required
32 Mechanical	Rereiving procedure	There should be adjustment turnbuckles on the main hoist ropes in M/house, just like the Samsung cranes have - PED said they do not need this because there are digital and hydraulic alternatives. - CLOSED	No action required
33 Mechanical	Rope ends for trolley and boom shuttling	ZPMC should add 2-hole lugs at the rope dead-end points for tying off during re-reeving, and other hole for adding a snatch block.	ZPMC to incorporate change into the design drawings.
34 Mechanical	Spreader anti-collision sensor	Is this the headblock anti-sway sensor (beacon) replaceable? ZPMC had many faulty ones with crane delivery	ZPMC consider for design.
35 Mechanical	Z-motion trolley limit switch	Make sure Z-motion rules are incorporated into next design, including limit switches	ZPMC to incorporate change into the design.
36 Mechanical	Glass	Verify use of safety glass in existing Base cranes. Other recent projects had non-tempered glass and shattered sharply.	ZPMC pay attention to procure correct material
37 Mechanical	Wire Rope	ZPMC may propose a different wire rope for option cranes. PED has a strong preference for Kisswire brand.	ZPMC consider for design.
38 Electrical	Humidistat in E-Room	Suggest a humidistat be used to meet the humidity requirement in Spec 7.1.3 Suggest Humidistats be installed within the Source drive enclosures themselves.	ZPMC to incorporate change into the design.
39 Electrical	VFD Cable Work	ZPMC had to do rework because they did not follow McKay comments.	ZPMC to incorporate change into the design.
40 Electrical	Console Layouts	Console Layouts - Ask PED if all functions are ergonomic, any missing. - PED will report back. Manual gantrying per rail? Quick panel display on ground station control (not in the Checker's cab). Also retrofit to Base Cranes. Arnie will have a meeting with the End Users. Incorporate the field changes of the Base cranes to the design of the Option cranes.	PED to Update
41 Electrical	Kirk Key	Kirk Key considerations - The change from 1-key to 2-key is in progress and should be complete before the option cranes are ordered. They will need to add another for the option cranes.	PED/ZPMC to incorporate change
42 Electrical	Auxiliary Generator	Diesel Genset Cable Routing, Penetrations in structure, pull box design	ZPMC to incorporate change into the design drawings.
43 Electrical	MV Cable Bracket	Misalignment of MV cable bracket with cable trench (height)	ZPMC to incorporate change into the design drawings.
44 Electrical	Ground Stations	Operator cab and ground station screens needed to be modified to be full-function CMS.	ZPMC to incorporate change into the design.
45 Commercial	Small Business Participation	Status: Small business participation is required in the contract.	ZPMC to consider this requirement early for the option cranes.
46 Wharf	New Cranes on Berth 30	The next order of cranes will be operating on Berth 30. The specifications need to be reviewed for changes related to that, e.g. cable lengths, travel distance to tie-downs, interface with existing cranes, clearance and geometry.	Verify Specs are consistent.B30