

Spec item : L-4	SPECIFICATION	
L-4 SWITCHBOARD BREAKERS INSTALLATION		

Part 1: SCOPE:

The intent of this specification shall be to remove the existing specified Siemens MW Air Circuit Breakers, custom buss and rewire where necessary, the Main and Emergency Switchboards to retrofit the new Schneider Masterpact NW 08H1 series breakers. There are six (6) breakers in total. See list of breakers in the Table at the end of this Specification item.

- 1.1 The original Siemens MW Air Circuit Breakers and cradles are to be removed and transported ashore to CCG Tech Stores by the contractor.
- 1.2 The existing necessary Busswork is to be removed; modifications made to custom rebuss for connection of the Masterpact NW 08H1 series cradle in cradle breakers.
- 1.3 All 6 of the Masterpact NW 08H1 series breakers and cradles, are owner supplied.
- 1.4 All six trip units on the new replacement breakers must be tested, proven and approved by Lloyd's as existing trip unit devices were fitted to Siemens MW breakers.
- 1.5 Contractor shall supply and install each new breaker door with new lamacoid labels (2 ½" x 4", white on black) indicating breaker name, number and description, plus breaker trip characteristics.
- 1.6 Contractor shall supply a Schneider FSR and put an allowance of \$45,000.00 for FSR in their bid price. The actual cost will be adjusted by Public Works and Government Services (PWGSC) 1379 action as per Schneider FSR invoice.
- 1.7 All work to satisfaction of owner's representative and Lloyd's Surveyor.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

See list of drawings below:

Switchboard Drawings:

590-ED-1

G62013-S1015-S122

G62013-S1015-S130

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G62013-S1015-S132
G62013-S1015-S134
G62013-S1015-S135
G62013-S1015-S143
G62013-S1015-S145
G62013-S1015-S148
G62013-S1015-S150
G62013-S1015-S154
G62013-S1015-S160
G62013-S1015-S164
460 Volt Electrical Dist

Emergency Switchboard Drawings

G62013-S1015-S210
G62013-S1015-S213
Emergency Tie

2.2 Standards

Schneider Electric is to perform all of the following work, unless otherwise stated and provide fully certified personnel acceptable to Lloyd's in accordance to Ship Safety Electrical Standards TP127E and IEEE Standard 45 – Recommended Practice for Electrical Installation on Shipboard.

All work shall be completed in accordance with Canadian Coast Guard's Ship's ISM Fleet Safety Manual concerning Hot Work, Confined Space Entry, Fall Protection, and Lock-Out and Tag Out Procedures.

2.3 Regulations

All work performed and any modifications made, must be compliant with the latest Canada Shipping Act Regulations and in particular to the Marine Machinery Regulations. All work shall meet the requirements of Lloyd's Register Rules and Regulations and in particular Chapters 6, 12, 13, 14 and 17.

2.4 Owner Furnished Equipment

Schneider Electric shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3: TECHNICAL DESCRIPTION:

3.1 General

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3.1.1. Breakers to be replaced consist of the following with locations:

Item	Circuit	Description	Location
1	2CB1	Shore Power Supply Breaker	Main Switchboard in Motor Control Room
2	3CB1	Ship Service Gen Breaker #1	Main Switchboard in Motor Control Room
3	5CB1	Ship Service Gen Breaker #2	Main Switchboard in Motor Control Room
4	6CB1	Ship Service Gen Breaker #3	Main Switchboard in Motor Control Room
5	11CB1	Emergency Generator Breaker	Emerg. Swbd in Emerg. Gen. Room
6	13CB1	Emergency Tie Breaker	Emerg. Swbd in Emerg. Gen. Room

3.1.2. Breakers will be installed by Schneider Electric over a 5 day period (Mon - Fri). Allowing for (5) 12 hour work days (Mon -Fri) and (1) 4 hour day (Sat) for testing if not tested on Fri.

3.1.3. Vessel is responsible for transporting Breakers and Cradles on board prior to start of work Monday morning.

3.1.4. Work areas in switchboard to be isolated from power prior to Monday morning by Contractor, as per isolation procedure noted below. Contractor to supply materials (Cable and buss connections) for this portion of work.

3.1.5. The majority of this work is confined to the Ship Service Switchboard and as a result will compromise most of the vessel's hotel load. Therefore, the Contractor is requested to arrange to isolate the Ship Service Switchboard work areas. Bus links in switchboard are to be removed to isolate the 4 breaker section being worked on, in a two stage process below. Contractor supplied jumper arrangement of 3 cables, minimum 20 twenty feet in length, capable of 400 amps hotel load is to be connected to power up distribution loads on switchboard. Contractor shall have distribution power re-routed to isolate Schneider's work area and removed and return power distribution to normal state after Schneider's work is completed in Ship Service Switchboard.

3.1.6. Ship Service Switchboard Isolation Procedure will be carried out by Contactor as follows:

Stage 1

1. Remove bus link between Generator 1 and Generator 2 and install GPO3(or isolation board) at bus entrance.
2. Remove bus link between Generator 3 and Distribution Board and install

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GPO3(or isolation board) at bus entrance.

3. Install temporary power cables from Generator 1 BUS link to Distribution board BUS link. (access from the rear switchboard)
4. Perform breaker swap in Generator 2 and Generator 3. Shore power will be feeding the bussing to the generator 1 link connection which will power distribution board with temp cables.

Stage 2

1. Remove temporary power cables.
2. Reinstall bus link between Generator 3 and Distribution board. (link between Generator 1 and Generator 2 still removed)
3. Disconnect Generator 2 incoming cables from breaker.
3. Disconnect shore power incoming feeder cable from breaker (easy access from the back) and connect them directly to the temporary power cables. Connect the other end of the cable to the incoming of Generator 2 (Which is the new Schneider breaker newly installed)
4. Power distribution board directly from shore power cables via the Generator 2 breaker.
5. Perform work on Shore Power and Generator 1 breaker.

- 3.1.7. Schneider shall remove existing Siemens breakers and cradles.
- 3.1.8. Schneider Electric shall relocate control wiring to terminal blocks within each section of the switchboard. All materials required for this purpose to be supplied by Schneider Electric.
- 3.1.9. Schneider Electric will install 6 Masterpact breakers and cradles supplied by the Coast Guard.
- 3.1.10. Schneider Electric will supply and install custom bussing between cradles and existing bus bars.
- 3.1.11. Schneider Electric will supply and install control wiring as required for the new breakers.
- 3.1.12. Existing switchboard doors will remain.
- 3.1.13. Schneider Electric will set and test the breaker trip units to settings similar to existing breakers via FFTK test kit. Spare breaker shall be set with the same parameters as Generator breaker settings by Schneider Electric.

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- 3.1.14.** Schneider Electric will perform contact resistance, megger as well as conduct mechanical and electrical tests. Schneider Electric shall submit a detailed test result to the Chief Engineer / Electrical Officer upon completion.
- 3.1.15.** Schneider Electric shall provide updated electrical drawings showing changes which have been made.
- 3.1.16.** Contractor to assure that installation of temporary cables to power the distribution section of ship's main switchboard is both safe and practical for period that work is being carried out on isolated sections of switchboard by Schneider, thus allowing for both switchboards to be de-energized simultaneously.
- 3.1.17.** The Emergency Generator will be run up and placed on line to power up Emergency Bus only, during the preparation, transfer and completion stages at the beginning and end of project for disconnecting and reconnection of bus sections. Ensure Emergency Tie is locked out and racked out in Emergency Gen Room during these planned blackout conditions.
- 3.1.18.** All control and signal wiring for auxiliary connections for these 4 Ship Service Switchboard Breakers, plus Emergency Swbd Breakers is to be isolated/ de-energized before disconnecting in local breaker cubicles by Schneider Electric.
- 3.1.19.** Emergency switchboard breaker retrofits can be carried out with Emergency bus isolated and powered down.
- 3.1.20.** The two (2) breakers to be retrofitted in Emergency Switchboard are isolated from the hotel bus once the Emergency Tie Feeder in MCR is opened, locked out. The full Emergency switchboard is dead once this breaker is locked out. All control and signal wiring for auxiliary connections are to be proven isolated by Schneider Electric before disconnecting in local Emergency breaker cubicles.
- 3.1.21.** Once breakers are installed and busswork is retrofitted in Emergency Switchboard and connections in Emergency Switchboard are verified and completed by Schneider Electric, power can be restored to this section by closing Emergency Tie Feeder in MCR.
- 3.1.22.** A full test of all retrofitted breaker units shall be carried out by Schneider Electric before energizing each bus. This is in the primary interest of providing safety to all personnel while maintaining power for the vessel's hotel load. 48 hour notice is to be given for any planned power outages. Any work on energized electrical equipment to be carried out with proper arc flash protection PPE and procedures as per ISM and Industry safety standards listed below.

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3.1.23. Contractor shall insure that all test be witness by Lloyd's Surveyor and the Chief Engineer. Contractor is responsible for contacting Lloyd's Surveyor and Chief Engineer prior to any testing.

3.2 Location

See Table

3.3 Interferences

Contractor is responsible for the identification of interference items, their temporary removal, storage and refitting to vessel.

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

All work shall be completed to the satisfaction of the Lloyd's Surveyor and Chief Engineer.

4.2 Testing

4.2.1. Contractor shall insure that all test be witness by Lloyd's Surveyor and the Chief Engineer.

4.2.2. After installation, all breakers shall be tested and all associated functions proven operational along with remote controls and indication circuits.

4.3 Certification

All breakers shall be re - certified and copies of each certification shall be given to the vessel's Chief Engineer.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

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The associated drawings shall be updated where necessary to reflect any and all changes.

5.2 Spares

5.3 Training
N/A

5.4 Manuals

There shall be 3 copies of manuals left with the vessel upon completion of project.