NGCC AMUNDSEN

ITEM – 13

TECHNICAL SPECIFICATION

Revision: 01

FOR

THE INSTALLATION

OF A

POWER SUPPLY

TRANSFER SWITCH

FOR

THE

SCIENCE WINCH'S

HYDRAULIC PUMPS

REVISIONS

Rev.	Prepared by (init.)	Approved by (init.)	Date of revision (DD-MM-YYYY)	Description
00	MT ing	JFP ing	2018-02-16	First emission
01	**MT ing**	**JFP ing**	**2018-02-20**	**Add section 9.0 and revised section 10.0 to 12.0 noted by a vertical line at left of page**

INDEX

1.0 INTRODUCTION

This document describes the modifications and the additions required to make it possible to transfer the #1 hydraulic pump's 440V/3/60 power supply to the #2 hydraulic pump while conserving the existing transfer switch used for the #2 hydraulic pump and the bow thruster.

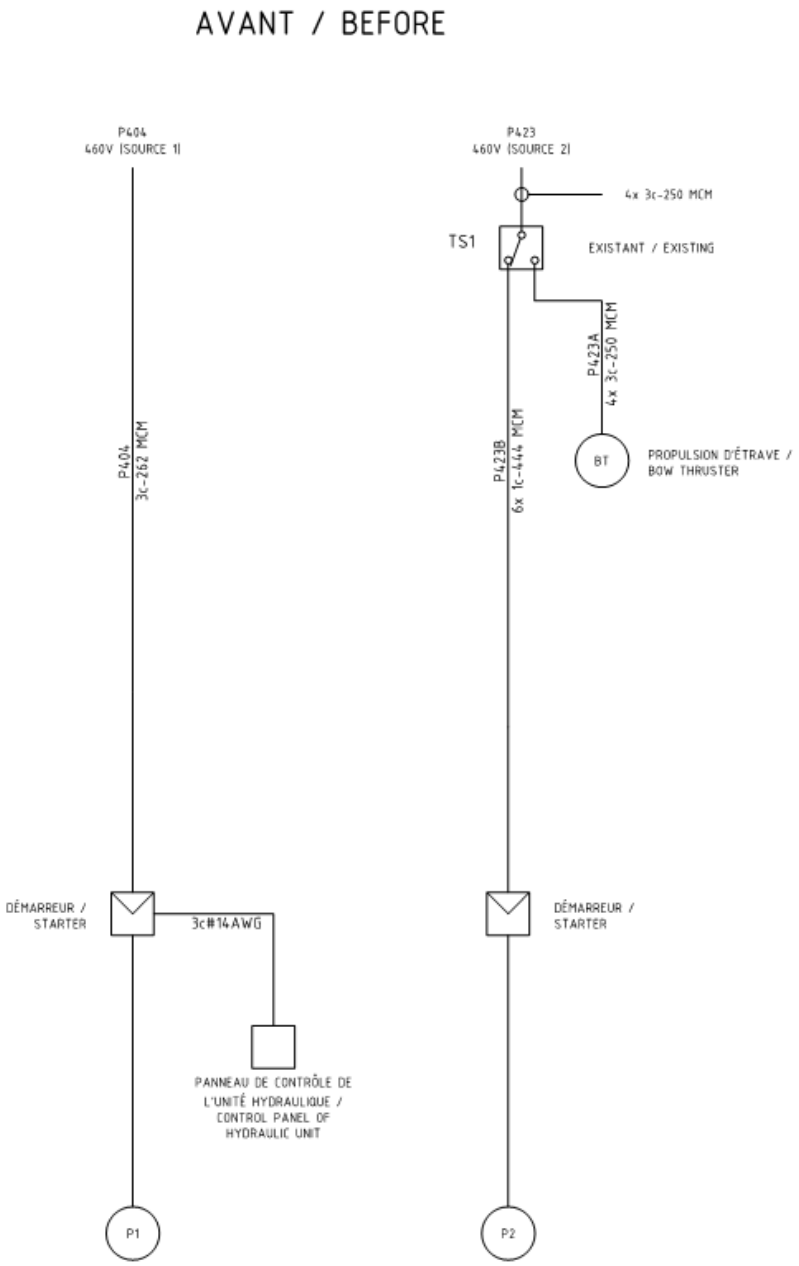
2.0 DOCUMENTATION

All fabrication and installation documents must be supplied in their original editable WORD and CAD versions.

3.0 CURRENT INSTALLATION

The current installation allows the hydraulic pumps to be powered as follows:

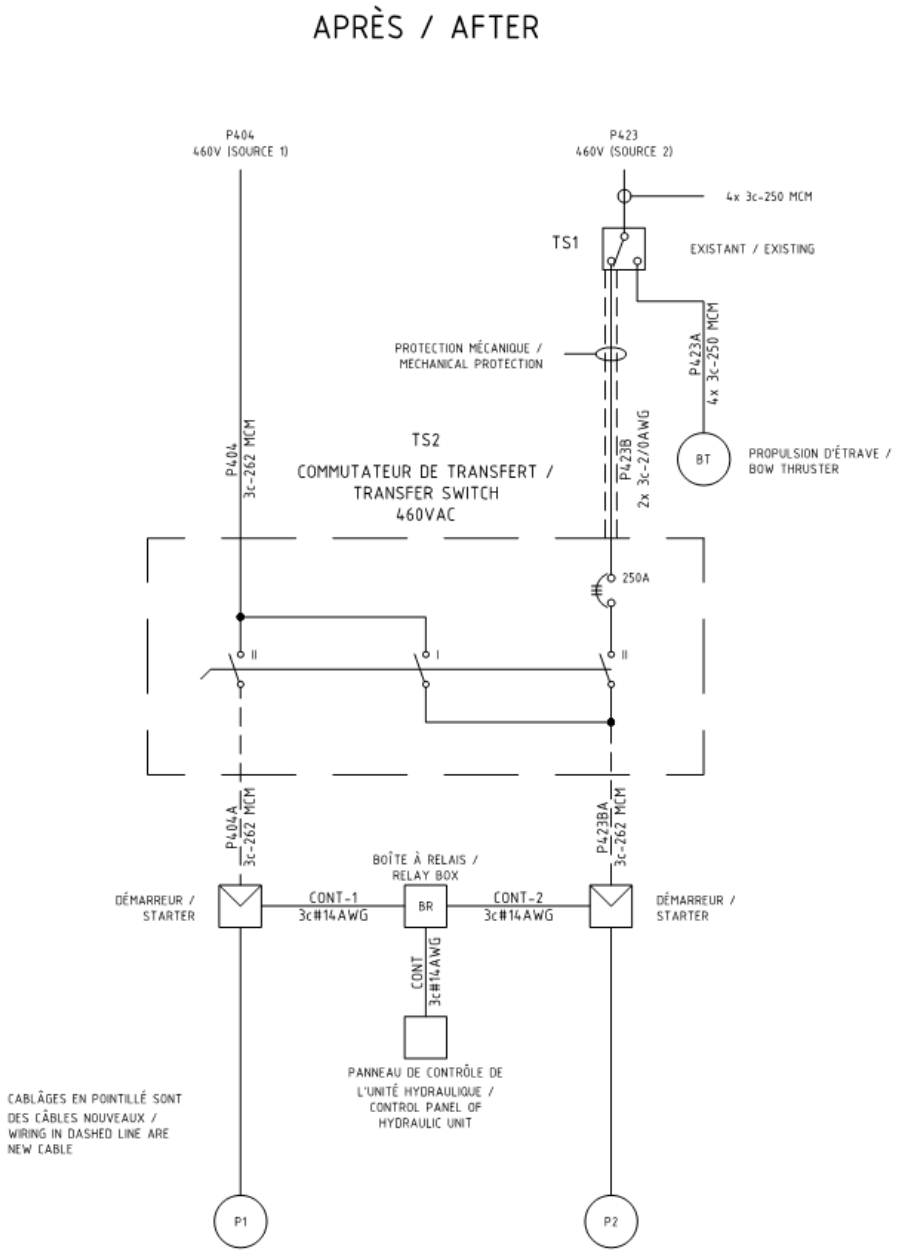
- Circuit P-404 : powers the #1 hydraulic pump and the hydraulic unit's control panel;
- Circuit P-423 : powers either the bow thruster or the #2 hydraulic pump via the TS1 manual transfer switch.



4.0 DESIRED INSTALLATION

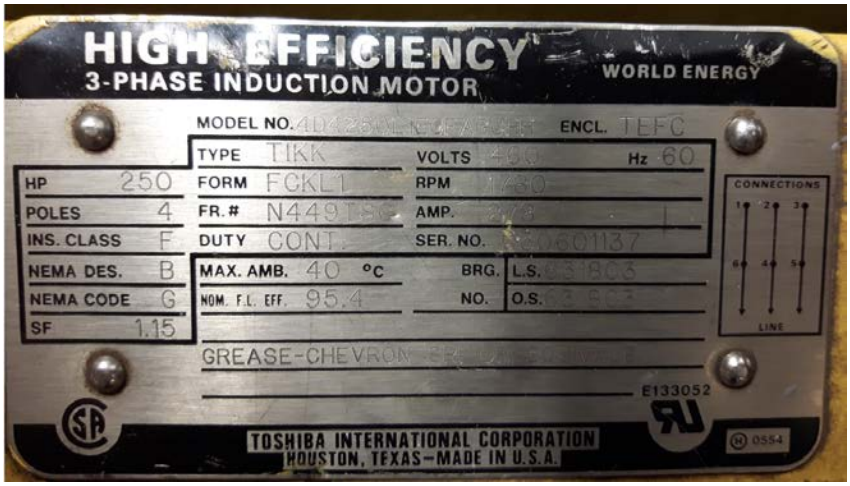
The desired installation must allow the hydraulic pumps to be powered as follows:

- Circuit P-404 : powers either the #1 hydraulic pump or the #2 hydraulic pump via the TS2 manual transfer switch;
- Circuit P-423 : powers either the bow thruster or the #2 hydraulic pump via the TS1 manual transfer switch;
- The hydraulic unit's control must be powered by the hydraulic pump starter currently in operation (#1 hydraulic pump or #2 hydraulic pump);



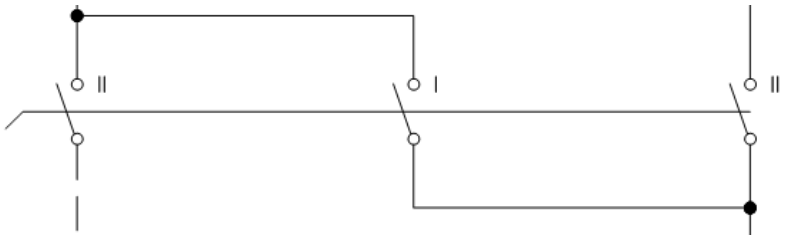
5.0 MOTOR DATA FOR THE P1 & P2 PUMPS

Operating voltage: 440V/3/60



6.0 NEW PANEL CHARACTERISTICS

A- The fabrication of the new panel for the TS2 manual transfer switch must include :
- 1 x 30-in. wide, 36-in. high, 16-in. deep, IP22 (Nema 12) enclosure;
- 1 x Manual transfer switch :
  - Voltage = 600 V;
  - Phase = 3;
  - Capacity = 400 AMP continuous;
  - Short circuit breaking capacity = minimum 18 kA;
  - Short circuit making capacity = minimum 33 kA;
  - With 3 levels of switching :
    - Position II, with two switches closed;
    - Position O, with three switches opened;
    - Position I, with one switch closed.



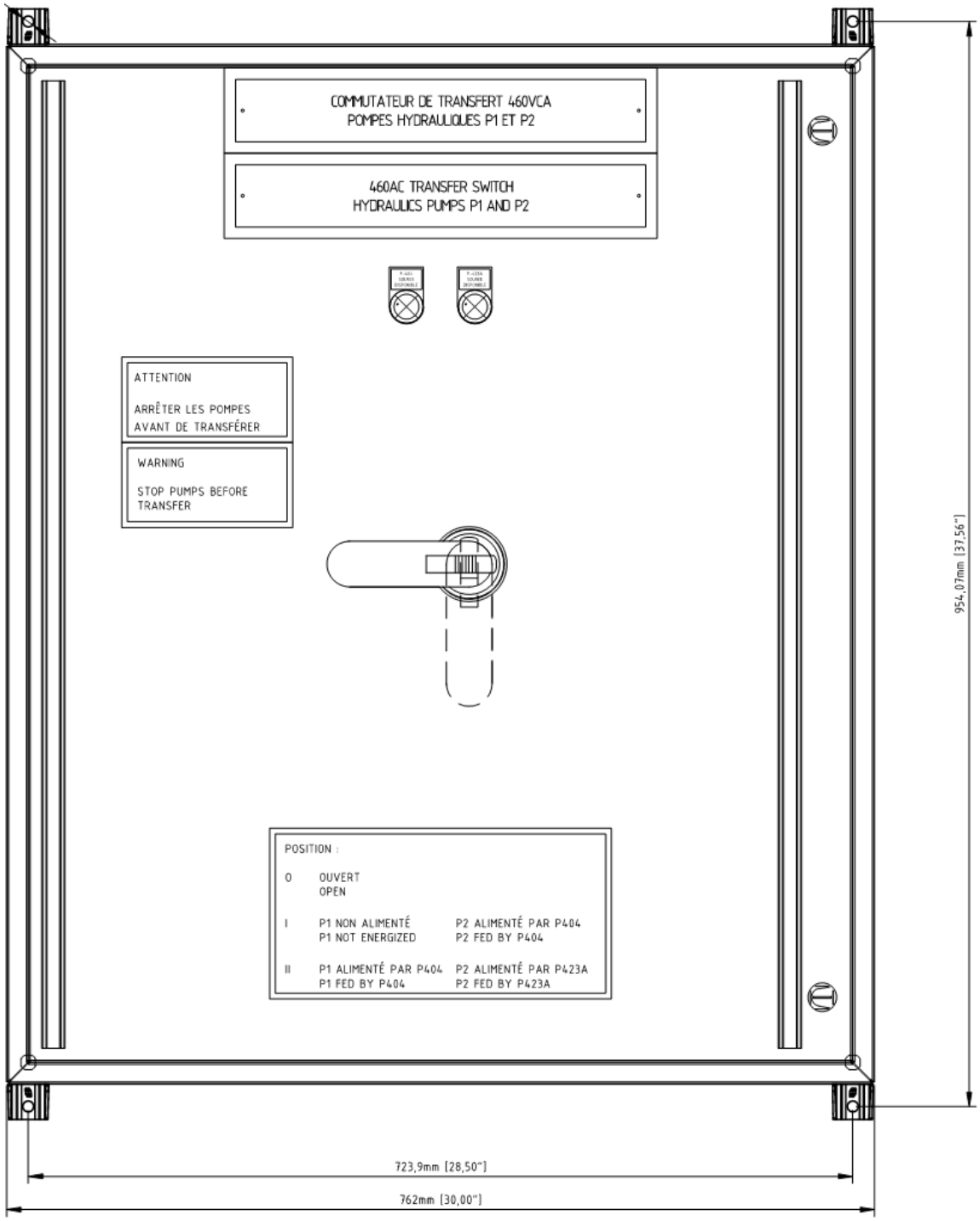
- 1 x Breaker :
  - Voltage = 600 V;
  - Phase = 3;
  - Capacity = 250 AMP;
  - Short circuit breaking capacity = minimum 18 kA;
  - Short circuit making capacity = minimum 33 kA;
- 4 x 600 V fuse holders with 2 AMP fuses;
- 2 x Green indicator lights with 460 VAC – 6 VAC transformers;

B- The fabrication of the RB relay box used to power the hydraulic unit's control panel at 120 VAC must include :
- 1 x 10-in. wide, 12-in. high, 6-in. deep, IP22 (Nema 12) enclosure;
- 1 x Contactor :
  - Coil = 120 VAC
  - Contacts = 2 NO 2 NC
  - Contacts = minimum 15 AMP

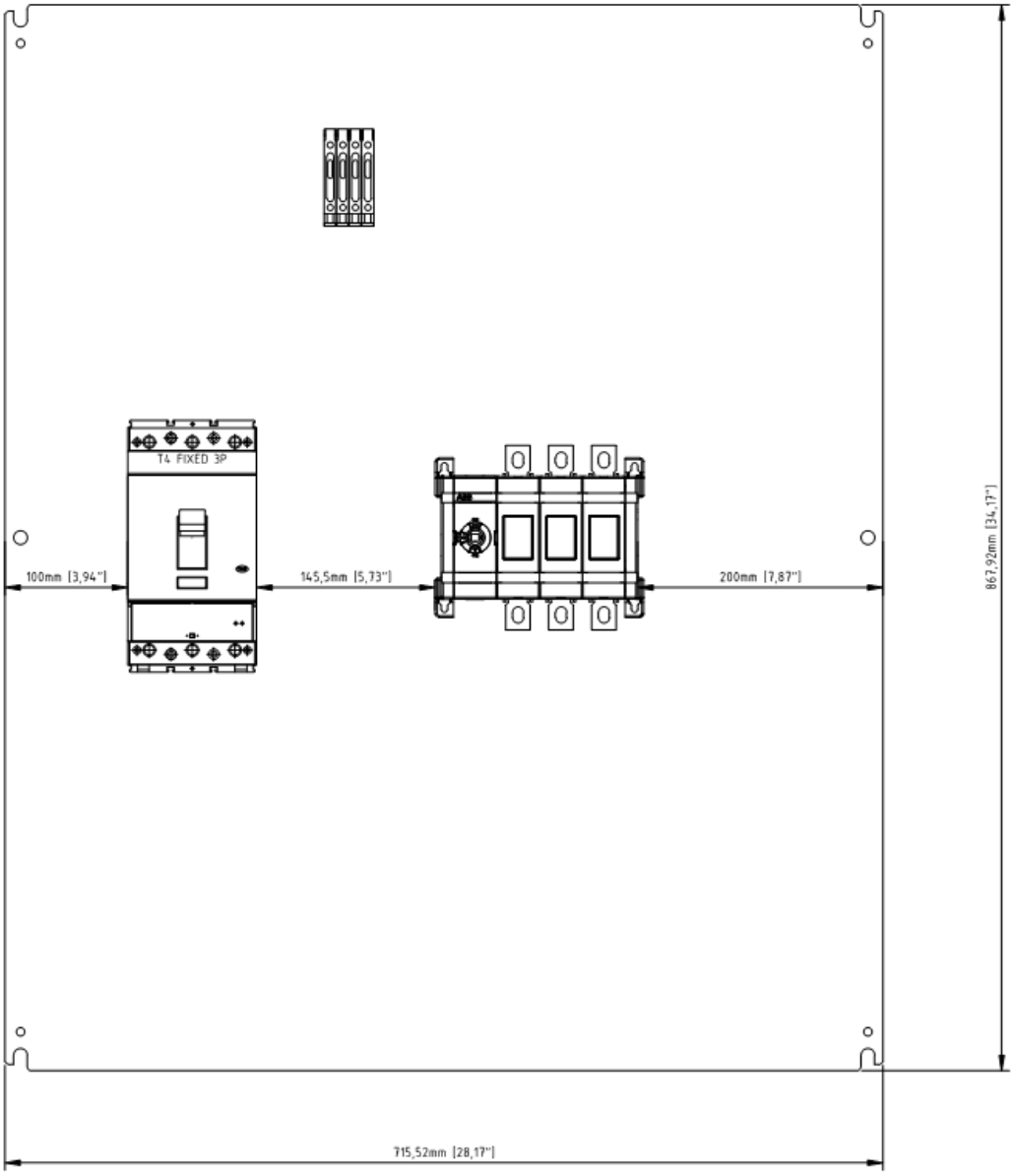
Note : All electrical components must be CSA, UL or class society certified.

7.0 TRANSFER SWITCH PANEL TS2

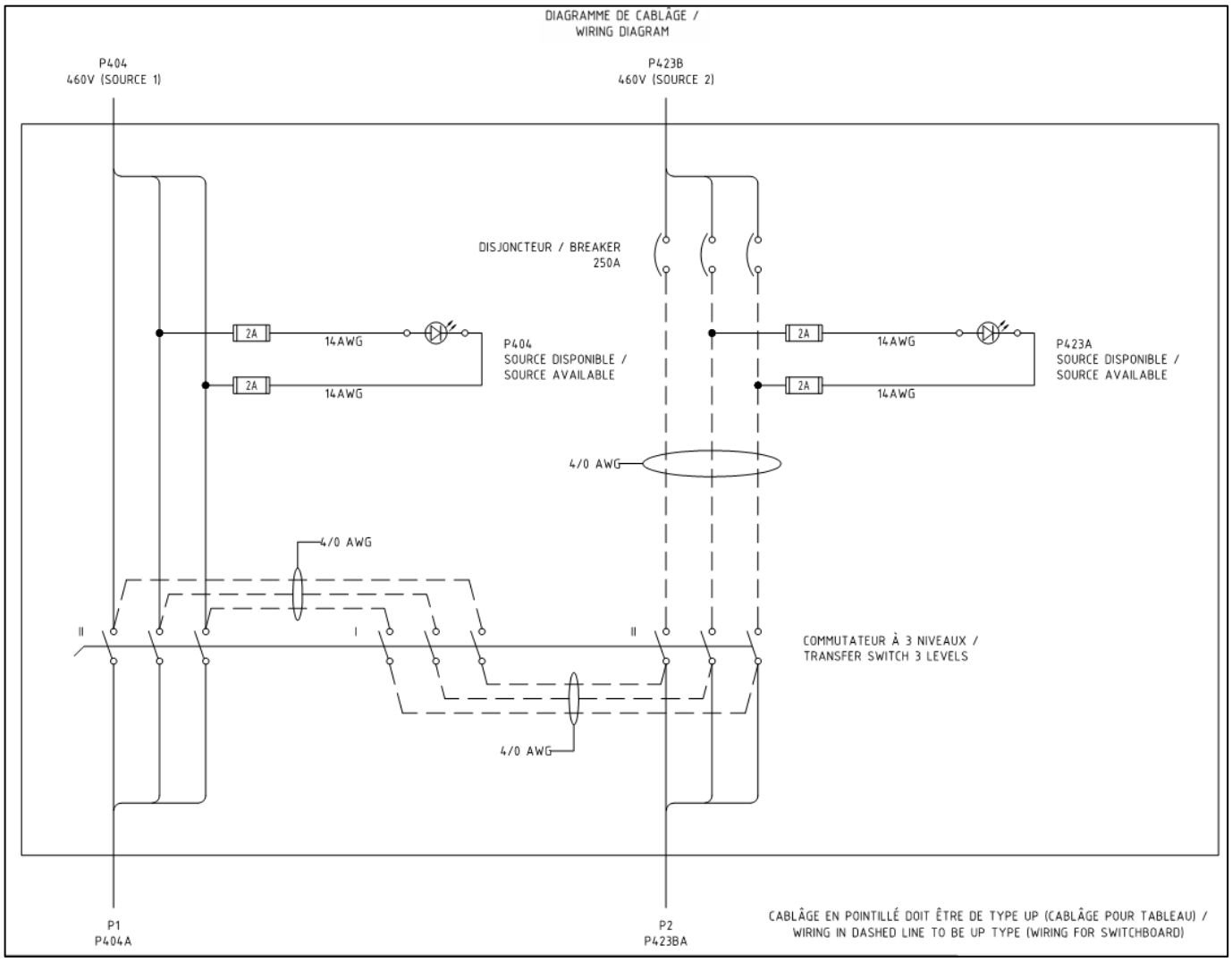
The fabrication details of the TS2 transfer switch panel can be found below.



Front view


T4 FIXED 3P
100mm [3,94"]
145,5mm [5,73"]
200mm [7,87"]
867,92mm [34,17"]
715,52mm [28,17"]

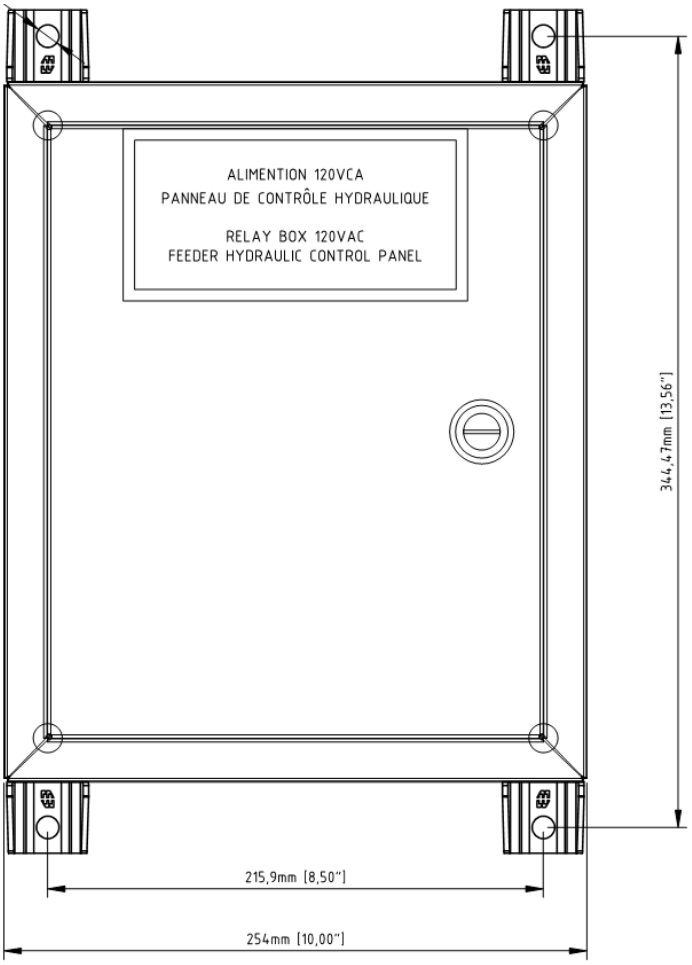
Baseplate



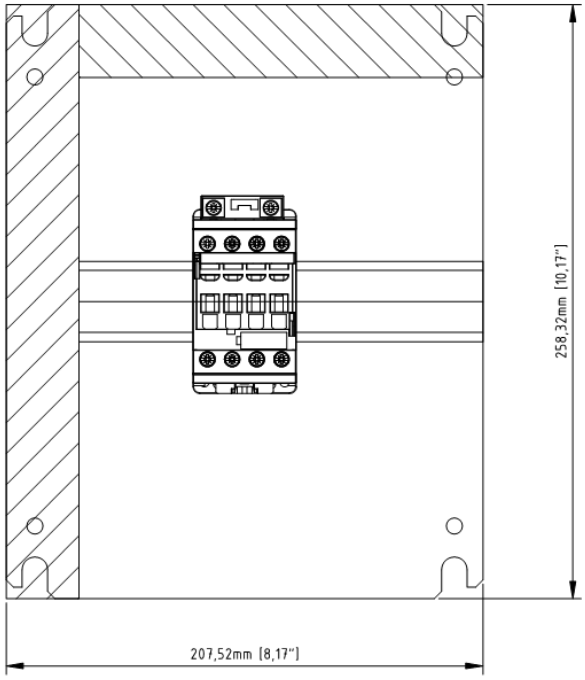
Cabling diagram

8.0 RELAY PANEL RB

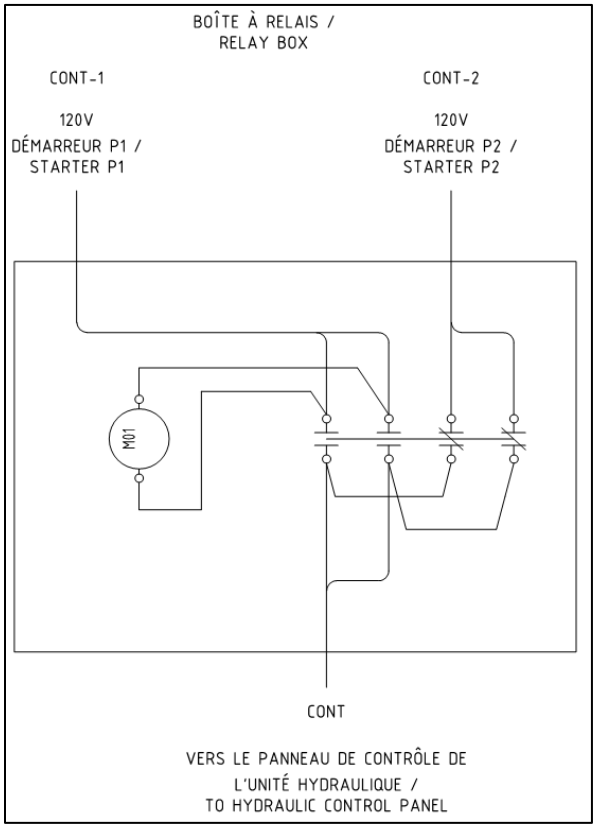
The fabrication details of the RB relay panel can be found below.



Front view



Baseplate



Cabling diagram

9.0 PHOTO OF ACTUAL INSTALLATION

The P1 & P2 pumps starters:

The TS1 transfer switch:

10.0 INSTALLATION OF THE TRANSFER SWITCH PANEL

The final location of the TS2 transfer switch panel on board the NGCC Amundsen shall be determined with the chief electrician. The proposed location (see below) is above the existing bow thruster control panel just beside transfer switch TS1.

Support for the transfer switch TS » and access (grating and hand rail) to transfer switch TS2 must be provided.

Close-up view

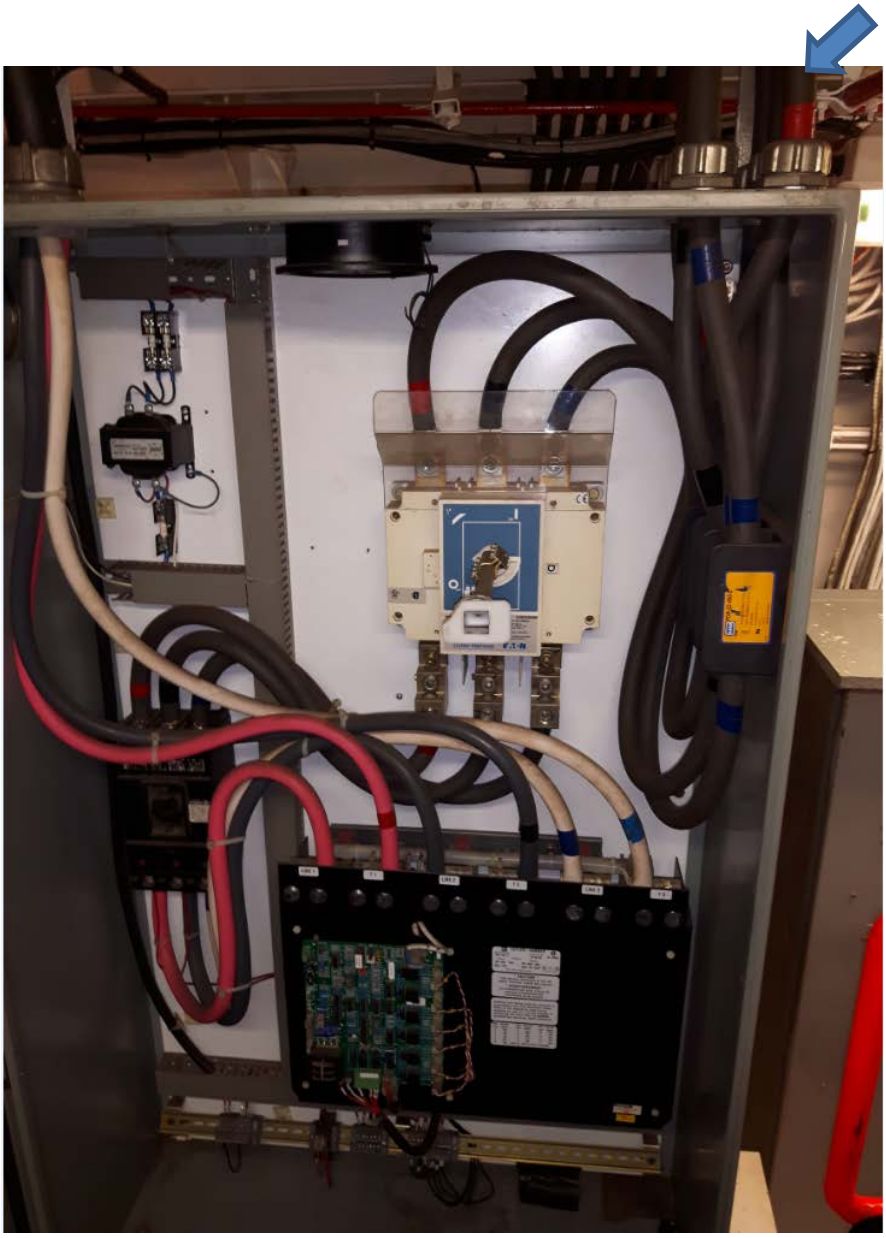
Modifications to the ship's existing cabling are as follows:

1- Disconnect and recover the 3C-262MCM (P404) cable that powers the P1 pump's starter;

2- If cable P404 is too short, lengthen this cable either by a splice (see note 1 below) or by a compliant junction box (IP22 – Nema 12). The new cable length shall be 3C-262MCM cable (classification society certified marine cable), shall be routed to the TS2 transfer switch (enter from the top with a waterproof cable gland) and connect it as described in section 7.0;
Note 1: The splice material and the splice procedure shall be approved by the class society prior to do the installation.

3- Install a new 3C-262MCM cable (classification society certified marine cable) named P404A between the TS2 transfer switch (enter from the top with a waterproof cable gland) and the P1 pump's starter (use the existing cable gland) and connect it as described in section 7.0;

4- Disconnect and remove the six 1C-444MCM (P423B) cables powering the P2 pump's starter;



5- Install within a mechanical protection two new 3C-2/0AWG cables (classification society certified marine cable) named P423B between TS1 and TS2 transfer switches (enter from the top with a waterproof cable glands) and connect them as described in section 7.0;
6- Install a new 3C-262MCM cable (classification society certified marine cable) named P423BA between the TS2 transfer switch (enter from the top with a waterproof cable gland) and the P2 pump's starter (enter from the top with a waterproof cable gland and plug the 6 unused holes) and connect it as described in section 7.0;

7- Disconnect and recover the actual cable from the P1 starter which feed the hydraulic control panel. Install the relay box RB close to P1 & P2 starters and route following 3C-14AWG cables (classification society certified marine cable) :

- Cable CONT-1 between P1 starter and relay box RB,
- Cable CONT-2 between P2 starter and relay box RB,
- Cable CONT between relay box RB and the hydraulic control panel,

The power (120V or 230V depending of the control transformer) inside P1 & P2 starters shall be taken at the control fuse. Connect the relay box RB as described in section 7.0.

Estimated new cable length including 15% spare (classification society certified marine cable):

-	P404	3C-262MCM	lengthen of 30 ft (9.2m)
-	P404A	3C-262MCM	30 ft (9.2m)
-	P423B	2 x 3C-2/0AWG	36 ft (11.0m) total
-	P423BA	3C-262MCM	25 ft (7.6m)
-	CONT-1	3C-14AWG	12 ft (3.7m)
-	CONT-2	3C-14AWG	10 ft (3.0m)
-	CONT	3C-14AWG	30 ft (9.2m)

11.0 HOT WORK

Required Hot work (ex: supports for panels & cables and access & hand rail to transfer switch TS2) is part of installation mandate.

12.0 VERIFICATION AND START UP

Before starting up the system, perform the following checks:

- Verify the connections of the following panels :
  - TS2 transfer switch panel;
  - P1 pump motor starter;
  - P2 pump motor starter;
  - RB relay box;
  - Junction box or splice for cable P404;
  - Hydraulic unit control panel.

- Test the insulation of the following cable numbers (Megger test) :
  - P404
  - P404A
  - P423B
  - P423BA
  - Cont-1
  - Cont-2
  - Cont

- Perform the following source transfer tests :
  - Power the P1 pump using the P404 cable (TS2 in the II position);
  - Power the P2 pump using the P423B cable (TS1 in the “Winch Pump #2” position and TS2 in the II position);
  - Power the P2 pump using the P404 cable (TS2 in the I position).

Configuration the TS2 transfer switch handle is: