

Mount Nansen Electrical Assessment Final Report



Prepared for:
Kirsten Hulstein, Project Manager
Assessment and Abandoned
Mines
Government of Yukon

Prepared by:
Jordan Youngs

June 3, 2014

Sign-off Sheet

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Prepared by _____
(signature)

Jordan Youngs

Reviewed by _____
(signature)

Corry Martin

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Executive Summary

The enclosed final report has been prepared for the Mount Nansen Electrical Assessment. The purpose of this report is to provide a consolidated manual of project documentation for the purposes of operation, maintenance and future work. This report covers the work performed from August 2012 through to March 2014. In September 2012, Stantec performed an Electrical Assessment of the Mount Nansen Mine Site. As a result of the recommendations in the assessment report, seven work tasks were performed to improve the site installations. In addition, another project was performed in parallel with these work tasks to install a portable generator for the seepage pond shack.

This manual contains the assessment reports, field reviews, design drawings, work task descriptions, shop drawings, as built records, and warranty information for all work performed under the Electrical Assessment and Portable Generator work tasks.

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Letter of Assurance
March 10, 2014

1.0 Letter of Assurance



Stantec Architecture Ltd.
107 Main Street Suite 202
Whitehorse YT Y1A 2A7
Tel: (867) 633-2400
Fax: (867) 633-2481

Stantec

7 March 2014

File: 144901696, 144901768

Yukon

Community Services

Consumer & Protective Services

Building Safety Branch

Box 2703 (C-8)

Whitehorse, Yukon Y1A 2C6

Phone: (867) 667-5741

Fax: (867) 393-6249

Email: doug.badry@gov.yk.ca

Attention: Doug Badry, Manager – Building Safety

Dear Doug:

Reference: Letter of Assurance, Electrical – Mt. Nansen Site Assessment, Work Tasks 01 through 07, and Portable Generator Provisions

Based on our periodic field reviews, which were carried out in accordance with the performance standards of the Association of Professional Engineers of Yukon, Stantec has determined that the construction is in general conformity with the electrical design documents that formed the basis for the issuance of the building permit and any changes thereto authorized by the Chief Building Inspections Official.

As used herein, "field reviews" shall mean such periodic reviews at the project site and at fabrication locations as the Engineer, in his professional discretion, considers to be necessary in order to ascertain that the work substantially conforms in all material respects to the plans and supporting documents prepared by the Engineer and 'accepted' by the Territory of Yukon for the project. This will include keeping records of all visits and any corrective action taken as a result thereof.

This letter / report applies only to the electrical systems of the building designed by Stantec and installed under contract, (formerly FSC Architects & Engineers) and does not apply to the designs prepared by other professional architects or engineers.

GL

Reference: Letter of Assurance, Electrical Mt. Nansen Site Assessment, Work Tasks 01 through 07, and Portable Generator Provisions

In accordance with ULC requirements, and recent changes to the process for Fire Alarm Verifications in the Yukon, the Fire Alarm System in the bunkhouse building was verified with a three party process. Arcrite Northern was the installing contractor, Vipond Systems Group was the independent verification agent, and Stantec witnessed the Verification.

At the time this letter was prepared, the following deficiencies remain outstanding:

- 1 At the Victoria Creek Pumphouse, one phase conductor is spliced with splitbolt and tape, on the secondary side of the pole mounted, three phase transformer bank. The splitbolt connector is to be removed and replaced with a suitable barrel lug-type connector.
- 2 Behind the generator sea containers, adjacent the camp shop, teck feeder cable is lain above ground, in an area not normally accessible to vehicle traffic. This deficiency is seasonal, and is to be corrected by burial, or by providing mechanical protection (cable tray or PWF constructed cover) once snow is melted and cables are accessible.

The owners representative has been made aware of the outstanding work, and will arrange to have these tasks completed during scheduled maintenance on site, and as seasonal conditions permit.

The following circled items have been reviewed either by me or under my direction and to my satisfaction. These items are limited to those affected by the work of this project only.

ELECTRICAL

~~EQ (6.1) Electrical Systems & Devices, including High Building Systems where Applicable~~

~~EQ (6.2) Continuity of Fire Separations and Electrical Penetrations~~

~~EQ (6.3) Functional Testing of Electrical Related Fire Emergency Systems & Devices~~

~~-6.4 Electrical Systems & Devices Maintenance Manuals- N/A~~

~~-6.5 Structural Capacity of Electrical Components, including Anchorage & Seismic Restraint~~

~~-6.6 Clearances from Building of all Electrical Utility Equipment- N/A~~

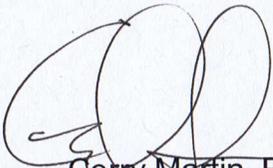
Reference: Letter of Assurance, Electrical Mt. Nansen Site Assessment, Work Tasks 01 through 07, and Portable Generator Provisions

~~6.7 Fire Protection of Wiring for Emergency Systems~~ N/A.

② 6.8 Review of all Applicable Shop Drawings

Respectfully,

STANTEC ARCHITECTURE LTD.



Corry Martin, P.Eng.
Electrical Engineer
corry.martin@stantec.com



MT. NANSEN WT01-07
AND PORTABLE GENERATOR
PROVISIONS.

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Contractor Warranty
March 10, 2014

2.0 Contractor Warranty

WARRANTY

Arcrite Northern Ltd. warrants all equipment supplied and/or installed by them to be free from defects in material and workmanship arising from normal usage for a period of one (1) year from the date of customer acceptance.

Our obligation, under the Warranty, is limited to the provision of labour to repair any installation defect arising from workmanship during the installation period, and to The repair or replacement of any defective material or parts supplied and installed by Arcrite Northern Ltd. within one (1) year after date of signing Certificate of Completion.

This warranty does not extend to any product or installation work carried out by Arcrite Northern Ltd. that has been subject to or caused by misuse, neglect, accident, improper repair, or alteration

This Warranty Period for the *Government of the Yukon Abandoned Mines, Mt. Nansen Contract no. C00017381* will commence the date of the final electrical inspection.

Electrical Warranty Commencement Date: October 2014
Electrical Warranty Completion Date: October 2015

Chad Harwood
Management (Print)

Feb 14 2014
Date


Management (Sign)

WARRANTY

Arcrite Northern Ltd. warrants all equipment supplied and/or installed by them to be free from defects in material and workmanship arising from normal usage for a period of one (1) year from the date of customer acceptance.

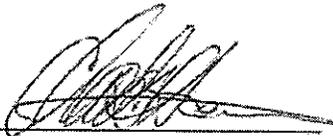
Our obligation, under the Warranty, is limited to the provision of labour to repair any installation defect arising from workmanship during the installation period, and to The repair or replacement of any defective material or parts supplied and installed by Arcrite Northern Ltd. within one (1) year after date of signing Certificate of Completion.

This warranty does not extend to any product or installation work carried out by Arcrite Northern Ltd. that has been subject to or caused by misuse, neglect, accident, improper repair, or alteration

This Warranty Period for the *Government of the Yukon Abandoned Mines, Mt. Nansen Contract no. C00017379* will commence the date of the final electrical inspection.

Electrical Warranty Commencement Date: October 2014
Electrical Warranty Completion Date: October 2015

Chad Harwood
Management (Print)


Management (Sign)

Feb 14 2014
Date

WARRANTY

Arcrite Northern Ltd. warrants all equipment supplied and/or installed by them to be free from defects in material and workmanship arising from normal usage for a period of one (1) year from the date of customer acceptance.

Our obligation, under the Warranty, is limited to the provision of labour to repair any installation defect arising from workmanship during the installation period, and to The repair or replacement of any defective material or parts supplied and installed by Arcrite Northern Ltd. within one (1) year after date of signing Certificate of Completion.

This warranty does not extend to any product or installation work carried out by Arcrite Northern Ltd. that has been subject to or caused by misuse, neglect, accident, improper repair, or alteration

This Warranty Period for the *Government of the Yukon Abandoned Mines, Mt. Nansen Seepage Pond Generator Project* will commence the date of the final electrical inspection.

Electrical Warranty Commencement Date: January 2014
Electrical Warranty Completion Date: January 2015

Chad Haawood
Management (Print)

Feb. 14 2014
Date


Management (Sign)

WARRANTY

Arcrite Northern Ltd. warrants all equipment supplied and/or installed by them to be free from defects in material and workmanship arising from normal usage for a period of one (1) year from the date of customer acceptance.

Our obligation, under the Warranty, is limited to the provision of labour to repair any installation defect arising from workmanship during the installation period, and to The repair or replacement of any defective material or parts supplied and installed by Arcrite Northern Ltd. within one (1) year after date of signing Certificate of Completion.

This warranty does not extend to any product or installation work carried out by Arcrite Northern Ltd. that has been subject to or caused by misuse, neglect, accident, improper repair, or alteration

This Warranty Period for the *Government of the Yukon Abandoned Mines, Mt. Nansen Contract no. C00019418* will commence the date of the final electrical inspection.

Electrical Warranty Commencement Date: January 2014
Electrical Warranty Completion Date: January 2015


Management (Print)


Management (Sign)


Date

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Electrical Assessment Report
March 10, 2014

3.0 Electrical Assessment Report

The following report is the initial assessment report containing the recommendations which resulted in the follow-on work tasks that were completed on site. This report has been provided for background information purposes. The results of the individual work tasks and deficiency status are described within the Field Reviews included later in this document.



Stantec

Field Assessment

GENERAL INFORMATION			
Project:	Electrical Assessment of the Mount Nansen Site	Report No.:	E04
Date of Visit:	14 September 2012	FSC File:	144901696 – 0400.40
Date of Issue:	26 October 2012 E04 Issued 29 November 2012	Contractor File:	C00015246
Present:	Josée Perron, YG AAM Emily Ham, YG AAM Doug Langila, DES DES Staff (x2) Michael Henney, YWCHSB Corry Martin, Stantec	Weather:	10°C

DOCUMENT REVISIONS		
Revision	Description	Y/M/D
E01	Interim report, with priority recommendations.	120917
E02	Assessment report.	121025
E03	Meeting Minutes: Meeting at AAM office 121105 at 10 AM. Erik Pit, Josee Perron, Rod Savoie, Corry Martin, Doug Langila (<i>DES-by phone</i>) <i>Minutes prepared by Corry Martin. Notify within 10 working days of any errors or omissions.</i>	121106
E04	Document Revision: Based on comments from AAM (Erik Pit), and correspondence between Rod Savoie and Erik Pit. Some schedule items were removed; schedule items are at the back of the report.	121129

SITE CONDITIONS AND GENERAL OBSERVATIONS		
Items		Action Priority
A	Isolation of the decommissioned Mill Building: <i>Stantec was requested to review the existing electrical distribution, and confirm that the abandoned Mill building was completely isolated.</i> On September 14th 2012, Corry Martin reviewed all existing feeders leading to and from the existing Mill Building. It was determined that the Mill Building has been isolated from exterior power sources.	Complete
B	AAM requested Stantec to review the seepage pond pumping system and advise on course of action in the event of pumping failure, and make recommendations to improve reliability. E04: Work not included in scope of services, but may be re-initiated at a later date.	-
C	AAM requested that Stantec review and present options for backup power generation at the Bunkhouse and Kitchen building (water storage).	-

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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SITE CONDITIONS AND GENERAL OBSERVATIONS	
Items	Action Priority

AAM provided a list of equipment required as generator backup load, on Oct 10, 2012.

E04: Work not included in scope of services, but may be re-initiated at a later date.

SPECIFIC OBSERVATIONS	
Item	Action Priority

Section 1: Power Generation and Distribution

1.01	Site generators (typical of 3) are not seismically restrained to sea-containers, and sea-containers are not restrained to ground.	Low-Medium
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This is a code compliance issue, and further discussion is required to identify the risks, and priority of these upgrades.

E03: Need to confirm if this is a requirement in the context of a site in closure. This presents a low safety risk; however, operational risks should be taken into consideration. AAM to follow up with WCB and discuss if this is a requirement, and if a procedure would suffice (such as staff instruction to leave the sea-cans in the event of an earthquake.

E04: AAM discussed this item with WCB and it was determined that, in light of the impending closure of the Mount Nansen Site, a risk assessment with appropriate mitigations would be sufficient. This item will be considered closed, unless AAM requires further services from Stantec.

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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1.02	<p>Generator feeders undersized: Generator feeders are 3c-#4/0 aluminum teck cable. These conductors are suitable for carrying 180A.</p> <p>The main breaker, located downstream of the generator transfer switches, is fused at 400A, and also supplies a 100A fused disconnect on the line side of the switch. This represents a total available load of 500A.</p> <p>Although a 500A load is unlikely given the present camp demands; the cable is not adequately protected from overcurrent, and has not been sized to code. The cable must be replaced with equivalent 400A rated cables (minimum), which would match the upstream overcurrent devices located on the generators.</p> <p>E03: Option to change generator breakers instead of re-feeding distribution. Doug: 'Highest phase on typical load is 129A at 480VAC'. More load is anticipated- thermostats are up, more heat in water storage building. Doug suggested 200A breaker. Largest inrush load is 15hp 3Ø pump at seepage pond- currently fed with 50A breaker, and not showing any nuisance tripping. Voltage Drop is 8 to 10% during startup.</p> <p>Feeders from generator to transfer switch are currently 4/0 AL. – Good for 205A (provided the breaker frame is rated for 90 degrees C), otherwise the rating would be 180A.</p> <p>Stantec to review breaker sizes and issue instruction.</p>	Medium-High
E04: Stantec recommends changing the cable sizes, rather than downsizing breakers, as this will maintain spare power capacity in the power system.		(STANTEC)
1.03	<p>Site generators were not adequately grounded. The ground cable must be increased in order to safely accommodate a phase-to-ground fault condition.</p> <p>Schedule: Stantec proposes to provide engineered documents for addressing the grounding revisions by 2 November 2012.</p> <p>E03: Drawings were reviewed, stamped and issued by 6 November 2012. (Complete) Grounding electrodes require 1/0 cu (minimum), with 1/0 copper connections to Xo point/grounding point on generator skids. Existing (new) CAT 6.6 generator uses #2 grounding wire and plates to form a ground electrode- this is still too small for re-use. All plates should be trenched and re-installed at the same time. AAM to talk to Jon Bronson regarding materials order, Doug to prepare materials takeoff for grounding upgrades.</p>	Medium-High
E04: Note that the use of split bolts is not acceptable for grounding electrode connections.		(STANTEC)
		(AAM/DES)

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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1.07 Overhead power distribution poles: **Low**

Overhead distribution poles generally appeared to be in good condition. Some poles however, showed signs of weathering, and the creosote layer protecting the poles has leached away. Without adequate protection, the poles are susceptible to rot.

Stantec recommends that an overhead powerline contractor conduct an assessment of the pole conditions on site. Poles should be assessed for general condition (rot, condition of creosote protection, etc), condition of anchoring, condition of leaning poles, and compliance with ground clearance and spans.



Figure 1: Typical discolouration of power distribution poles.

Schedule: This has not been included in Stantec's scope of services.

E04: In the spring, water is standing and poles do not have adequate protection. AAM to look at the condition of the poles during decommissioning of the abandoned line. Depending on these findings, the poles may require review by a powerline contractor.

(AAM)

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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1.08 Overhead power distribution pole anchors: **Medium**
 Several poles have sunk or have shifted due to frost heaving and soil conditions. In many cases, pole anchor cables are slack, and are not adequately supporting the poles. Pole anchors should be tightened.



Figure 2: Typical slack pole anchor.

Schedule: This has not been included in Stantec's scope of services. AAM/DES may take action immediately, by having a powerline contractor make adjustments.

E03: Pole anchors to be reviewed by powerline contractor.

(AAM)

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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Section 2: Victoria Creek Pumphouse

2.01	<p>Victoria Creek Pumphouse service mast does not meet code. Service mast is a teck cable, without adequate strapping or weatherhead. Service mast should be corrected and new overhead cable should be installed between the pole mounted transformer bank and the building.</p>	Complete (not reviewed)
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Update 25 Oct 2012: DES email dated 16 Oct 12 indicates that the teck cable has been re-fed and reconnected to the transformer secondary. Photos of the installation have been reviewed by Stantec. Installation appears acceptable, pending on site review at a later date.

Schedule: Stantec will not provide any design documentation for this item, but will review when on site.

E04: Note that a powerline contractor is required for re-feeding the overhead lines. When the overhead bank is re-configured, a proper neutral conductor will be required to reference the downstream voltage.

2.02	<p>Victoria Creek Pumphouse electrical distribution system is not grounded. System should be grounded in accordance with the Canadian Electrical Code 22.1. At minimum, 2 x 10' ground rods, spaced 10' apart (or equivalent grounding plate) should be installed. Tie grounding rods to building system neutral and ground with #6 AWG bare copper ground.</p>	Complete (not reviewed)
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Update 25 Oct 2012: DES email dated 16 Oct 12 indicates that a new ground plate has been installed at the Victoria Creek pumphouse. Stantec will review on site.

2.03	<p>DES to confirm if the neutral support cable is connected to the centerpoint of a WYE configured transformer bank. If the power service is un-referenced (no grounded neutral), a ground fault monitoring system must be installed, or the transformer bank must be re-configured as a delta-wye bank.</p>	High
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E03: Doug indicated that the service may be a high leg service, and noted that there are multiple split bolts used. Work is incomplete at this time. Need powerline contractor to complete this work. Delta-Wye transformer configuration will require the creation of a neutral conductor, and replacement of existing teck service mast with a 4 conductor teck cable. Work to be completed at same time as powerline contractor work.

(AAM)

(DES)

2.04	<p>The service entrance disconnect should be service entrance rated, and the neutral should be solidly grounded to the new grounding plate installed by DES.</p>	High
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E03: Clarification: Service entrance rated disconnect switch includes a solid neutral block, with removable screw to bond the neutral block to the equipment case (bonded). Service entrance switch replacement should be scheduled with powerline contractor work (2.03).

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2.05	<p>30kVA transformer: the primary side bonding conductor has been used as the neutral grounding point secondary side of the transformer. The bonding conductor is undersized for this arrangement and could cause overheating of the bond wire- and damage to the transformer.</p> <p>The Xo point on the secondary side of the transformer should be bonded with a green insulated conductor, of equal size as the secondary side conductors. (#3 AWG).</p> <p><i>Note that the #3 copper cable is sized according to the primary side overcurrent protection of 30A, not the KVA rating of the transformer.</i></p>	High
	E03: Repairs can be completed by Doug (DES) on site.	(DES)
	E04: Note that this repair can be completed immediately. Stantec will show this sizing on the work description for Victoria Creek pumphouse and will review on site once the work is completed.	(STANTEC)
2.06	<p>Pole-mounted, 4160 to 480V step-down transformers located outside the Victoria Creek pumphouse have grounding rods installed in the ground to bond the casing of the transformers. These ground rods have been pushed out of the ground due to frost action. (See Figure #1).</p> <p>New ground rods should be installed adjacent to the transformer pole, and ground connections from the transformers should be securely fastened to the new grounding rods.</p>	Low
	GENERAL NOTE: 2.01 through 2.04, and 2.06 should be completed during a scheduled shutdown, when the powerline contractor is on site. 2.05 Can be completed now. Stantec has enough information to prepare a work description for these tasks.	NOTE (STANTEC)

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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Section 3: Seepage/Tailings Pond Pumphouse(s)

3.01 Seepage pond pumphouse is supplied by a 45kVA transformer. The secondary side of the electrical transformer is currently grounded using the primary side grounding conductor (#10 AWG). This is undersized for the transformer and could be easily overloaded. **Complete (not reviewed)**

The seepage pond transformer secondary neutral should be grounded with #4 copper conductor, to two 19mm x 3m, copper-clad grounding rods (or suitable ground plates) spaced 3m apart, installed to the side of the parking area. This grounding conductor should also serve as the system ground for this site.

Note that the #4 copper cable is sized according to the primary side overcurrent protection of 30A, not the KVA rating of the transformer.

Schedule: AAM/DES may take action immediately based on this report item.

E03: Doug (DES) has installed a grounding plate, with upgraded neutral wire (#2 AWG) to centerpoint (Xo). #2 AWG Conductor is acceptable. Stantec to review on site. Transformer replacement outstanding. (STANTEC)

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3.02 Seepage pond transformer (45 kVA) is an autotransformer, and the WYE point on the transformer has been grounded to act as the neutral of the secondary side. This setup cannot protect against a ground fault on the secondary side of the transformer and poses a safety risk to personnel. A suitable Delta-Wye transformer should be installed to operate the pumphouse loads, with a solid ground electrode provided. **High**



Figure 3: Field modified autotransformer with neutral cable attached to the transformer center-point (Xo).

Schedule: Stantec proposes to provide engineered documents for addressing the pumphouse distribution upgrades by 14 December 2012.

E03: Doug measured 240 VAC on secondary side of autotransformer (should be 208 VAC). Doug indicated that transformer clearance did not appear adequate. Non-combustible shield or surface may be required.

(STANTEC)

Stantec to provide feedback on transformer, clearances, and provide work description. DES/AAM to provide report of grounding modifications, for Stantec to review.

(DES/AAM)

E04: DES/AAM is to provide a report of the grounding completed for review. Stantec will provide a work description considering an appropriate dry type transformer and any required shielding for protecting combustible surfaces.

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3.03 Cables behind the transformer located at in the seepage pond pump house were dirty and have been subject to a fire (likely due to a previous transformer fire). Cables were not accessible during our assessment review. Cables should be inspected for damage, meggar tested, and replaced as necessary. **Low-Medium**



Figure 4: Teck cables which have subject to a previous fire.

Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.

E03: Doug (DES) will assess the cables for damage and replace/repair as necessary. DES will also remove excess cable from the building. (DES)

E04: This work is to be completed in conjunction with 3.04. Stantec to review. (STANTEC)

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3.05 Tailings-pond building cable drops: **Complete (not reviewed)**
The tailings pond building contains two services: one at 600V, and the other at 480V.

The 600V service is no longer required, and should be removed- along with the overhead service conductors and mast. The 600V mast is not sufficiently braced to the building and must be re-attached if it is to remain.



Figure 5: 600V Service Mast at the Tailings pond pumphouse. Mast is secured with tie-wire.

Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.

E03: **Doug: 600V service has been removed. Stantec to review on site.** **(STANTEC)**

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3.06 Low

Tailings-pond building cable drops:
 The 480V service contains a lengthy drip loop, which poses a safety hazard. The length of the drip loop could cause friction and deterioration of the cable on the roof of the building, leading to fire. The drip loop should be shortened.



Figure 6: Drip loops at the tailings pond pumphouse.

Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.

E03: Doug (DES) can shorten the existing drip loops, but does not have enough compression connectors and must use split bolts. Stantec approved split bolts as a temporary measure – to be replaced with proper compression connectors when they can be sourced. The rationale for this approval is that this is a temporary solution, and it is more suitable than the existing installation.

(DES)

E04: Linesman is not required to do this work, provided this distribution is isolated and locked-out during the work. Stantec to review.

(STANTEC)

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Section 4: Shop (adjacent to old mill)

4.01 The 30 kVA transformer in the shop is fed from a 60A fused disconnect (fused at 60A) 3Ø, 480V. This is oversized for the transformer. **Medium**

According to the CEC 2012:

The maximum primary-side fuse size should be no greater than 45A.

The minimum primary-side conductors should be no smaller than 45A.

The minimum secondary-side conductors should be no smaller than 105A.

The minimum secondary-side neutral conductor should be no smaller than 105A.

The transformer primary-side fuses should be replaced as shown above. The primary and secondary conductors should be reviewed to ensure that they meet the minimum ampacities as shown above.

Schedule: AAM/DES may take action immediately based on this report item. Stantec to review on site.

(STANTEC)

4.02 The main service switch, and 480V distribution to the shop is 3Ø, 3 wire (without neutral). This setup cannot protect against a ground fault in the 480V distribution- and poses a safety risk to personnel. **Medium**

E03: Additional heater may be required for the shop. AAM to provide heater sizing. Stantec to prepare drawings: reviewed, stamped and issued by 121106. (Complete)

E04: Stantec to review this work on site.

(STANTEC)

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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Section 5: Bunkhouse and Kitchen

5.01 The Bunkhouse fire alarm system is not operational and does not meet the requirements of the National Building Code of Canada (NBCC). Residential style smoke alarms are currently installed; however, these alarms are not tied together to alarm all tenants in the event of a fire. **High**

The Bunkhouse requires a fire alarm as per sections 3.2.4.1 and 9.10.18.2 of the NBCC 2010, for a “residential occupancy with sleeping accommodation for more than 10 persons”.

Stantec issued direction on 19 Oct 2012 as follows:

Replace the existing fire alarm panel and make upgrades in order to meet the current requirements of the National Building Code of Canada (NBCC) and the other applicable fire alarm standards, particularly CAN/ULC S524 (installation) and ULC S537 (verification). The intent would be to have the fire alarm system operational and verified by January 22, 2013.

It is necessary to prepare engineered drawings and specifications in order to describe this work.

Schedule: Stantec proposes to provide the drawings/specification package by 23 November 2012.

E03: Change Order for design services to be approved before design-work can commence. AAM to discuss with WCB and advise if they’ll accept a household-type interconnected smoke alarm system. Stantec would like clarification on who is the AHJ (Authority Having Jurisdiction) for this site in the context of a non-operating mine. Does this fall under WCB and the mining inspector- or does this building fall under YG Building safety jurisdiction? **(STANTEC/AAM)**

E04: Design work underway for new fire alarm system, review drawings delivered to AAM 28 Nov 2012.

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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5.02 The Bunkhouse emergency lighting was not installed as per NBCC requirements, and was not operational at time of review. **High**

Stantec issued direction on 19 Oct 2012 as follows:

New, illuminated exit signs are to be installed at locations required by the NBCC and for unambiguously directing occupants to exits.

Emergency lighting is required to meet NBC requirements for illuminance levels on egress routes, duration of operation for this building type (30 minutes) and be triggered by the failure of power to all normal-powered lighting that illuminates egress routes.

It is recommended that emergency lighting be upgraded by December 5th, 2012.

It is necessary to prepare engineered drawings and specifications in order to describe this work.

Schedule: Stantec proposes to provide the drawings/specification package by 23 November 2012.

**E03: CCN for design services to be approved before work can commence. (STANTEC/AAM)
Emergency lighting and fire alarm design to be prepared as a single package.**

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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5.03 Propane tank blanket receptacles located at the bunkhouse are located immediately adjacent to three propane tanks (1000 USWG capacities). The receptacle must be relocated away from vents on the propane tanks. For aggregate propane storage over 2000 USWG, up to and including 5000 USWG, all sources of ignition (including electrical receptacles) must remain 15' (5m) from propane tank. **High (in progress)**

The anchoring of the propane tanks, and the installation of propane lines should be reviewed to ensure compliance with the propane code. Propane lines and tanks are currently installed without bracing to the ground, or one another.

Propane tanks at the kitchen building (adjacent to the bunkhouse) are installed in a similar manner. These tanks are not in use. Power to the tank plug should be turned off, and the plug should be removed to prevent use.

Stantec issued direction on 19 Oct 2012 as follows:

It is recommended that the receptacles or propane blanket connection points be relocated outside of the hazardous areas and that the unused tank blankets be disconnected, as identified in the Stantec Field Assessment, item 004.

It is proposed that this work be completed by November 7, 2012

Update 25 Oct 2012: DES email dated 16 Oct 12 indicates that a replacement post has been installed at the recommended minimum distance away from the tanks. Completion of the wiring is awaiting DES Electricians' next shift and may be delayed further pending his decision on material requirements.

Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.

E03: Propane cable/connectors not on site yet. Post has been placed according to recommendations above. Trenching may not be possible depending on soil conditions. Doug (DES) will install cable overground if necessary. (DES)

E04: Stantec will review in the context of electrical requirements. Compliance with the non-electrical aspects of the propane code (anchoring, bracing of propane lines, etc.) is outside the scope of services for this work.

5.04 Bunkhouse boiler room: boiler emergency shutdown switches are required to be located adjacent to the entry door in the boiler room. Switches should be installed, complete with red 'emergency shutoff' cover plates, to indicate boiler shutdown. **Complete (not reviewed)**

Update 25 Oct 2012: DES email dated 16 Oct 12 indicates that this item has been corrected.

Schedule: Stantec will take no further action on this item, except to review the work done on site at the time of the final field review.

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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5.05	<p>Bunkhouse Lower Bathroom: Class A GFCI protection is required for any receptacles installed within 1.5m of sinks, bathtubs, or showers. Other locations should be reviewed to ensure compliance.</p> <p>Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.</p> <p>E03: DES will order GFI plug and install. Stantec to review on site.</p>	<p>Low</p> <p>(DES/STANTEC)</p>
5.06	<p>Bunkhouse sub-panel: Subfeed panel off of main bunkhouse panel is fed from 2P100A breaker, and 1P20A breaker. Breaker to be replaced with suitable 3 pole breaker, sized 3P90A or less.</p> <p>Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.</p> <p>E03: DES will fix. Stantec to review on site.</p>	<p>Medium</p> <p>(DES/STANTEC)</p>
5.07	<p>Subfeed panel feeder: aluminum conductors have not been treated with anti-oxidant coating as required by code. Conductors should be removed, wire brushed, coated, and reinstalled.</p> <p>Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.</p> <p>E03: DES will fix, by removing, wire brushing, coating with antioxidant, and re-installing. Stantec to review on site.</p>	<p>Low</p> <p>(DES/STANTEC)</p>
5.08	<p>Receptacle on rear of building is within 5' of a propane vent. Receptacle should be relocated away from the propane vent, or removed.</p> <p>Schedule: AAM/DES may take action immediately based on this report item. No further action will be taken by Stantec unless requested by AAM.</p> <p>E03: DES removed the receptacle.</p>	<p>Complete (not reviewed)</p> <p>(DES – COMPLETE)</p>

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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Task Completion List				
Task	Description	Stantec Submission	Complete	Confirmed
A	Isolation of Old Mill Building	NA	NA	120917
B	Seepage Pond Supervision	NA	NA	NA
C	Bunkhouse Backup Power	NA	NA	NA
D	Single Line Diagram (Draft)	(121214)	-	-
	Single Line Diagram (Final Copy)	(130114)	-	-
1.01	Generators – Seismic Restraint	NA	NA	NA
1.02	Generators – Feeders/Breaker sizing	(121130)	-	-
1.03	Generators – Grounding	(121130)	-	-
1.04	Generators – Heating	NA	NA	NA
1.05	Main Distribution – Step up transformer inspection and testing	(121130)	-	-
1.06	Generators – House loads transformer change	(121214)	-	-
1.07	Distribution – Service Pole Condition	NA	NA	NA
1.08	Distribution – Service Pole Anchors	NA	NA	NA
2.01	Vic Crk PH – Service Mast	120917	-	-
2.02	Vic Crk PH – Grounding Electrodes	120917	121025	-
2.03	Vic Crk PH – Reconfiguration of Pole Mount Transformer Bank	(121214)	-	-
2.04	Vic Crk PH – Service Disconnect Replacement	(121214)	-	-
2.05	Vic Crk PH – 30kVA XFR Neutral Point Bonding Conductor Change	(121214)	-	-
2.06	Vic Crk PH – Pole Mount Transformer Grounding Rods	(121214)	-	-
3.01	Seepage Pond PH – Transformer Xo Point Bonding	121025	121105	-
3.02	Seepage Pond PH – Transformer Replacement	(121214)	-	-
3.03	Seepage Pond PH – Cables Damaged by Fire	121025	-	-
3.04	Seepage Pond PH – Pump Feeders and Combination Starter	121025	-	-
3.05	Tailings Pond PH – 600V Service Mast	121025	121105	-
3.06	Tailings Pond PH – Shorten 480V Service Drip Loop	121025	-	-
4.01	Shop – Oversized transformer feeders	121025	-	-
4.02	Shop – Distribution Revisions	121106	-	-
5.01	Bunkhouse – Fire Alarm System Design	(121214)	-	-
5.02	Bunkhouse – Emergency Lighting Design	(121214)	-	-
5.03	Bunkhouse – Propane Tank Plugs	120919	-	-
5.04	Bunkhouse – Boiler Room Emergency Shutoff Switches	120917	121016	-
5.05	Bunkhouse – Bathroom GFI	121025	-	-
5.06	Bunkhouse – Subpanel Breakers	121025	-	-
5.07	Bunkhouse – Subpanel Feeder Antioxidant	121025	-	-
5.08	Bunkhouse – Receptacle Adjacent Propane Vent	121025	121105	-

Project:	Electrical Assessment of the Mount Nansen Site	Project No.:	144901696	Report No.:	E04
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SAFETY AND SECURITY	
Were there any health or safety incidents reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any security issues or breaches reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If YES to either, describe:	

DISTRIBUTION		
Name	Company	Via
Erik Pit	Regulatory Affairs Officer Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines	Erik.Pit@gov.yk.ca
Josée Perron	Senior Project Manager Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines	Josee.Perron@gov.yk.ca
Distributed By:	Person	Signature
Stantec Electrical	Corry Martin, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Field Review FRE-01
March 10, 2014

4.0 Field Review FRE-01

This field review has been provided as background information. The most recent information is provided in FRE-03.



Stantec

Field Review

GENERAL INFORMATION			
Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Report No.:	FRE-01
Date of Visit:	2013 April 16/17	Stantec File:	144901696.0801
Date of Issue:	10 January 2014	Contractor File:	
Present:	Erik Pit, AAM Doug Langila, Site Electrician - Denison Environmental (DES) Colin, Arcrite Northern (AN) Jason, Vipond Fire Protection (AN) Corry Martin, Stantec	Weather:	Overcast -8°C/Snow -10°C

SITE CONDITIONS / GENERAL INFORMATION	
Items	
A	Review was called to witness verification of the fire alarm system.
B	Work tasks in progress. Site visit was used to identify outstanding work, and deficiencies for work tasks.
C	Portable standby generator was reviewed on site, in advance of generator operations manual and design of transfer switch installation work tasks.
D	CAT 3306 Generator is out of service. Remaining Perkins generator and CAT 6.6 are operational.

GENERAL OBSERVATIONS OR INSTRUCTIONS/DIRECTION TO CONTRACTOR		
New Items		Action By
FR-E01.1	As-built drawings were not available on site. Contractor to provide as-built drawings of completed work tasks, particularly for fire alarm and emergency wiring.	Contractor
FR-E01.2	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Grounding plates installed. Provide photos showing connectors, cable and burial depth.	Info
FR-E01.3	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) HRC fuses have been replaced with time delay type. Substitution not acceptable. Contractor to provide specified fuses.	AN
FR-E01.4	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Contractor has abandoned old cables and conductors in place. DES electrician to remove cables where practical, and cut and mark cables to be left in place.	DES
FR-E01.5	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Grounding plates installed behind generator sean containers (x4), and connected with #1/0 AWG copper cable. Provide photos of installation, connectors, cable and burial depth.	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Project No.:	144901696.0801	Report No.:	FRE-01
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FR-E01.6

WT-02: Generator Feeders and Automatic Transfer Switches

Contractor

Main camp feeders are run overground from generator 3 sea container to site step-up 500kVA transformer. DES/AN have provided mechanical protection and high visibility marking of cables and protection.



Figure FRE-01.1: Temporary Cabling to Main Step-up Transformer

Cables to be sleeved with rigid metal pipe or drill steel, where subject to vehicle traffic. AAM/DES to conduct routine inspection of above ground cables, and maintain mechanical protection where necessary. Notify camp staff about locations of temporary cabling and safety procedures.

Contractor to bury cables when ground conditions permit. Provide photos of trenching and cable installation.

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Project No.:	144901696.0801	Report No.:	FRE-01
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FR-E01.7	WT-02: Generator Feeders and Automatic Transfer Switches Contractor to confirm that primary cables on 500kVA transformer were dressed with Aluminum oxide protectant.	Contractor
FR-E01.8	WT-02: Generator Feeders and Automatic Transfer Switches Contractor has changed cables from 500kcmil AL to 350 MCM copper. Change is acceptable.	Info
FR-E01.9	WT-02: Generator Feeders and Automatic Transfer Switches New transfer switches were provided. New transfer switch contacts have been misaligned during cable installation. 3306/6.6 transfer switch fingers do not fully align with contacts, and may prevent the switch from closing. DES electrician adjusted contact positions on site. This item has been noted for warranty purposes.	Info/Warranty
FR-E01.10	WT-02: Generator Feeders and Automatic Transfer Switches Neutral lugs installed in main fused switch (400A) are not installed on insulated standoffs as specified. Contractor to correct.	Contractor
FR-E01.11	WT-02: Generator Feeders and Automatic Transfer Switches Neutral lugs installed in 400A transfer switches are not installed on insulated standoffs as specified. Contractor to correct.	Contractor
FR-E01.12	WT-02: Generator Feeders and Automatic Transfer Switches Contractor has installed cable tray between generator sea containers. Installation acceptable. Contractor to confirm sealing and flashing of sea can penetrations. Provide bond cable to cable tray as required by CEC.	Contractor
FR-E01.13	WT-02: Generator Feeders and Automatic Transfer Switches Truck shop fused switch (150A 3Ø 3W) was damaged. Switch contacts would not open and door safety bypass was jammed. DES site electrician repaired the switch. This item has been noted for warranty purposes. Truck shop fused switch had neutral block grounding screw installed (switch is installed past the point of service). DES site electrician removed the grounding screw.	Contractor
FR-E01.14	WT-03: Emergency lighting and exit signage. <ul style="list-style-type: none"> Battery pack test was conducted at 6:15 PM. Emergency lighting and exit signage tested operational for 30 minutes. "EXIT" signage was removed. Sign was existing, and did not conform to remaining signage (iso-standard pictogram signage) Weatherproof remote head was not installed on rear stairwell exiting 'office' on main floor. Remote head installed on site and tested. Diode orientation was confirmed for exit signage. Relays for monitoring lighting circuits were confirmed operational. Inoperable DC remote head replaced on site. Emergency lighting and exit signage operational. 	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Project No.:	144901696.0801	Report No.:	FRE-01
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FR-E01.15	<p>WT-03: Fire alarm verification notes:</p> <ul style="list-style-type: none"> • Heat detector in main floor common area failed, and was replaced on site. • Contractor has made minor relocations to device layouts, to suit site conditions. • Heat detector was added to entrance vestibule on site. Heat detector added to main floor initiating zone. • Contractor has installed smoke detectors to underside of gluelam beams in bedroom 10. Beam depth was less than 300mm. Relocation acceptable. • KO fillers added to various junction boxes on site. • Contractor has substituted Ionization type smoke detectors (1451A) with photoelectric type (2151A). Change is acceptable. • Fire alarm NAC and initiation circuits modified on site. Changes acceptable. • 24 Hour battery run-down test, followed by 30 minute bell test was not conducted on site. Vipond/Arcrite instructed site electrician on test. DES electrician to provide test results to Vipond/Arcrite for inclusion in fire alarm verification report. • Contractor to provide completed fire alarm verification report to AAM/Stantec. 	Contractor
FR-E01.16	<p>WT-04: Testing of Main Site Distribution Transformer</p> <p>Test results from transformer outstanding. Contractor to provide transformer oil test results.</p>	Contractor
FR-E01.17	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>Existing pole transformer bank could not be modified to delta-wye configuration. Contractor left transformer bank as-is, and made connections according to Site instruction SI-01.</p> <p>Split bolt connector remains on o/h transformer bank wiring. Contractor to remove split bolt and replace with continuous conductor or approved compression connector.</p>	Contractor
FR-E01.18	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>Service switch lamicaid label not installed. Contractor to install.</p> <p>Ground fault monitoring panel not installed. Contractor to install.</p> <p>Contractor to disconnect bare aluminum bond from service entrance switch bond lug.</p> <p>Cut bare aluminum bond at entrance to switch.</p> <p>Attach service grounding conductor to service entrance switch neutral lug and install grounding screw, to bond neutral block to switch case.</p> <p>Change time delay fuses to HRC fuses as specified, or conventional fuses. TD fuses are not acceptable.</p> <p>Strapping of teck cables was incomplete at time of review. Contractor to correct.</p> <p>Provide photos of completed installation.</p>	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Project No.:	144901696.0801	Report No.:	FRE-01
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FR-E01.19	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>DES has installed 1 grounding plate, instead of 2 shown on drawings. Change is acceptable. Note that grounding system was modified to include tie to overhead transformer case ground.</p> <p>Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p>	Info
FR-E01.20	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>AN provided 2 new ground plates for grounding of o/h transformers. Grounding plates were tied to existing ground rods. Installation acceptable.</p> <p>Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p>	Contractor
FR-E01.21	<p>WT-05: Generator Shack Revisions (1/E01-02)</p> <p>New 3Ø combination load center in G3:Perkins sea container was not load balanced as per drawings and specifications. Measured loads on site were A(42A), B(68A), and C(59). Contractor to balance loads on A, C phases as per notes. Confirm loads are balanced within 20%.</p>	Contractor
FR-E01.22	<p>WT-05: Generator Shack Revisions (1/E01-02)</p> <p>Provide nylon bushing for cables entering transformer (larger than #8 AWG as required by CEC).</p> <p>Provide grounding hub where grounding conductor passes through transformer casing (see note C, WT-05, drawing E01-02).</p>	Contractor
FR-E01.23	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <ul style="list-style-type: none"> • Nylon bushings required for transformer primary and secondary conductors. • Ground cable to xO point on transformer requires insulated ground hub through transformer case. • Grounding cable to be brought to service entrance switch as per drawing 2/E01-02 of WT-05. • Re-install ground screw to ground neutral in service entrance switch. • Neutral cable to be removed between transformer and main switch. • TD fuses provided. TD fuses are not acceptable. Provide HRC fuses or standard fuses. • Teck cable from seepage pond shack to pole not buried. Seasonal deficiency. Provide adequate marking and mechanical protection. Notify DES staff and equipment operators. DES to routinely inspect temporary cables for damage and placement of mechanical protection. • Split bolts have been used to make connections to o/h lines at the seepage pond. Split bolts are not acceptable. Contractor to replace connectors with approved compression connector. • Teck weatherhead was not provided for pole riser teck cable. Contractor to correct. 	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Project No.:	144901696.0801	Report No.:	FRE-01
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FR-E01.24	WT-05: Seepage Pond Revisions (2/E01-02) Roofing tin was used for transformer non-combustible shield, with ½” plywood screwed to the back. Roofing tin appears to be 29 ga., not 18ga as specified. Contractor to replace. Provide tin on rear and side of transformer. Specifications call for contractor to notify AAM if transformer clearance is less than 6” to wall surface. Provide measurements and transformer shop drawings to engineer for review.	Contractor
FR-E01.25	WT-05: Seepage Pond Revisions (2/E01-02) Contractor has substituted seepage pond motor starter with alternate motor starter. Provide stop/start station on motor starter. Start contact to be press and hold type, requiring reset after each power failure or generator shutdown.	Contractor
FR-E01.26	WT-05: Seepage Pond Revisions (2/E01-02) Provide photographs of grounding conductor, grounding plate installations. Provide photos of ground plate installation: connectors, cables, burial depth and marking.	Contractor
FR-E01.27	WT-06: Generator Fluid Heaters WT06-01: External oil pan heaters: wolverine. Current status: CAT3306 = need new glue CAT6.6 = Installed Perkins = Installed WT06-02: Inline coolant heaters. Current status: CAT3306 = Currently out of service, coolant heater not installed. CAT6.6 = Installed (factory installed) Perkins = Cannot accept coolant heater. Coolant piping is hard piped, with metric fittings.	DES
FR-E01.28	Generator feeders and distribution were not properly phased during cable replacement. Pump operates in reverse while perkins generator is operational. Contractor to phase generators to seepage pump. Confirm correct phase rotation with visual inspection. Phasing of generators to DES Electrician Doug Langila approval.	Contractor
FR-E01.29	<i>Contractor has not provided shop drawings for distribution equipment installed on site.</i>	Info
FR-E01.30	<i>Contractor to provide letters of warranty when project is substantially complete.</i>	Contractor
Old Items		Action By
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Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-05	Project No.:	144901696.0801	Report No.:	FRE-01
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SAFETY AND SECURITY	
Were there any health or safety incidents reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any security issues or breaches reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If YES to either, describe:	

CONSTRUCTION OUTLOOK	
Are there any submittals, issues or direction required over the next week, which may affect schedule?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Explain:	

Site Visit Report Prepared By:	
Name:	Martin, Corry
Date:	10 January 2014

DISTRIBUTION		
Name	Company	Via
Erik Pit	Regulatory Affairs Officer Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	erik.pit@gov.yk.ca

Issued By:	Person / Title	Signature
Stantec Electrical	Corry Martin, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Field Review FRE-02
March 10, 2014

5.0 Field Review FRE-02

This field review has been provided as background information. The most recent information is provided in FRE-03.



Stantec
Field Review

GENERAL INFORMATION			
Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Report No.:	FRE-02 Rev.A (24Sept13)
Date of Visit:	30 August 2013	Stantec File:	144901696.0801
Date of Issue:	10 January 2014	Contractor File:	
Present:	Kirsten Hulstein, AAM Doug Langila, Site Electrician - Denison Environmental (DES) Cam, Arcrite Northern (AN) Corry Martin, Stantec	Weather:	Sunny +7C, warming to +18C

SITE CONDITIONS / GENERAL INFORMATION	
Items	
A	Contractor has requested review to assess for substantial completion.
B	Work was underway to install portable generator connections on site (STANTEC 144901768). Field review was combined for both projects.

GENERAL OBSERVATIONS OR INSTRUCTIONS/DIRECTION TO CONTRACTOR		
New Items		Action By
FR-E02.1	Contractor to strap #3/0 Teck cable from generator sea containers to shop. Strap off ground on existing cantruss brackets. Provide mechanical protection where cable is installed from sea cans to edge of concrete fuel containment.	Contractor
		
<p>Photo: #3/0 Teck cable laid on ground between generator sea cans and shop.</p>		

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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FR-E02.2	WT-07: Contractor has substituted class D fuses for class H fuses as specified. Substitution not acceptable. Contractor to supply class H fuses, plus 3 spares as indicated on WT-07.	Contractor
FR-E02.3	Spare parts have not been turned over to site electrician as required by work tasks. Contractor to assemble spare parts and parts list, and turn over to site electrician. Provide signed receipt in O&M manual.	Contractor
Old Items		Action By
FR-E01.1	As-built drawings were not available on site. Contractor to provide as-built drawings of completed work tasks. UPDATE 130830: Asbuilts received for emergency lighting and fire alarm. Asbuilts outstanding for remaining work on site.	Contractor
FR-E01.2	(Removed: Duplicate)	Info
FR-E01.3	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) HRC fuses have been replaced with time delay type. Substitution not acceptable. Contractor to provide specified fuses.	AN
FR-E01.4	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Contractor has abandoned old cables and conductors in place. DES electrician to remove cables where practical, and cut and mark cables to be left in place. Update 130830: Complete	Info
FR-E01.5	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Grounding plates installed behind generator sea containers (x4), and connected with #1/0 AWG copper cable. Provide photos of installation, connectors, cable and burial depth.	Contractor
FR-E01.6	WT-02: Generator Feeders and Automatic Transfer Switches Main camp feeders are run overground from generator 3 sea container to site step-up 500kVA transformer. DES/AN have provided mechanical protection and high visibility marking of cables and protection. (photo removed) <i>Figure FRE-01.1: Temporary Cabling to Main Step-up Transformer</i> Cables to be sleeved with rigid metal pipe or drill steel, where subject to vehicle traffic. AAM/DES to conduct routine inspection of above ground cables, and maintain mechanical protection where necessary. Notify camp staff about locations of temporary cabling and safety procedures. Contractor to bury cables when ground conditions permit. Provide photos of trenching and cable installation. Update 130830: Cables buried. Provide photographs of burial. Update 130924: Burial information received indicating depths of burial and distance measurements at several intervals. Installation acceptable.	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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FR-E01.7	WT-02: Generator Feeders and Automatic Transfer Switches Contractor to confirm that primary cables on 500kVA transformer were dressed with Aluminum oxide protectant. 130830: Contractor confirmed on site.	Info
FR-E01.8	WT-02: Generator Feeders and Automatic Transfer Switches Contractor has changed cables from 500kcmil AL to 350 MCM copper. Change is acceptable.	Info
FR-E01.9	WT-02: Generator Feeders and Automatic Transfer Switches New transfer switches were provided. New transfer switch contacts have been misaligned during cable installation. 3306/6.6 transfer switch fingers do not fully align with contacts, and may prevent the switch from closing. DES electrician adjusted contact positions on site. This item has been noted for warranty purposes.	Info/Warranty
FR-E01.10	WT-02: Generator Feeders and Automatic Transfer Switches Neutral lugs installed in main fused switch (400A) are not installed on insulated standoffs as specified. Contractor to correct. Update 130830: Complete	Info
FR-E01.11	WT-02: Generator Feeders and Automatic Transfer Switches Neutral lugs installed in 400A transfer switches are not installed on insulated standoffs as specified. Contractor to correct. Update 130830: Complete	Info
FR-E01.12	WT-02: Generator Feeders and Automatic Transfer Switches Contractor has installed cable tray between generator sea containers. Installation acceptable. Contractor to confirm sealing and flashing of sea can penetrations. Provide bond cable to cable tray as required by CEC. Update 130830: Installation acceptable.	Info
FR-E01.13	WT-02: Generator Feeders and Automatic Transfer Switches Truck shop fused switch (150A 3Ø 3W) was damaged. Switch contacts would not open and door safety bypass was jammed. DES site electrician repaired the switch. This item has been noted for warranty purposes. Truck shop fused switch had neutral block grounding screw installed (switch is installed past the point of service). DES site electrician removed the grounding screw.	Info/Warranty

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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FR-E01.14	<p>WT-03: Emergency lighting and exit signage.</p> <ul style="list-style-type: none"> Battery pack test was conducted at 6:15 PM. Emergency lighting and exit signage tested operational for 30 minutes. “EXIT” signage was removed. Sign was existing, and did not conform to remaining signage (iso-standard pictogram signage) Weatherproof remote head was not installed on rear stairwell exiting ‘office’ on main floor. Remote head installed on site and tested. Diode orientation was confirmed for exit signage. Relays for monitoring lighting circuits were confirmed operational. Inoperable DC remote head replaced on site. Emergency lighting and exit signage operational. 	Info
FR-E01.15	<p>WT-03: Fire alarm verification notes:</p> <ul style="list-style-type: none"> Heat detector in main floor common area failed, and was replaced on site. Contractor has made minor relocations to device layouts, to suit site conditions. Heat detector was added to entrance vestibule on site. Heat detector added to main floor initiating zone. Contractor has installed smoke detectors to underside of gluelam beams in bedroom 10. Beam depth was less than 300mm. Relocation acceptable. KO fillers added to various junction boxes on site. Contractor has substituted Ionization type smoke detectors (1451A) with photoelectric type (2151A). Change is acceptable. Fire alarm NAC and initiation circuits modified on site. Changes acceptable. 24 Hour battery run-down test, followed by 30 minute bell test was not conducted on site. Vipond/Arcrite instructed site electrician on test. DES electrician to provide test results to Vipond/Arcrite for inclusion in fire alarm verification report. Contractor to provide completed fire alarm verification report to AAM/Stantec. <p>Update 130830: Report received. Report acceptable.</p>	Info
FR-E01.16	<p>WT-04: Testing of Main Site Distribution Transformer</p> <p>Test results from transformer outstanding. Contractor to provide transformer oil test results.</p> <p>Update 130830: Transformer oil testing conducted on site. Not witnessed by the consultant. Contractor to provide test results as listed in WT-04.</p>	Contractor
FR-E01.17	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>Existing pole transformer bank could not be modified to delta-wye configuration. Contractor left transformer bank as-is, and made connections according to Site instruction SI-01.</p> <p>Split bolt connector remains on o/h transformer bank wiring. Contractor to remove split bolt and replace with continuous conductor or approved compression connector.</p>	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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FR-E01.18	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01) Service switch lamicoid label not installed. Contractor to install. 130830 Complete</p> <p>Ground fault monitoring panel not installed. Contractor to install. 130830 No Change- contractor to correct.</p> <p>Contractor to disconnect bare aluminum bond from service entrance switch bond lug. Cut bare aluminum bond at entrance to switch. Attach service grounding conductor to service entrance switch neutral lug and install grounding screw, to bond neutral block to switch case. 130830 Complete</p> <p>Change time delay fuses to HRC fuses as specified, or conventional fuses. TD fuses are not acceptable. 130830: Fuses changed to Class K5. Fuses acceptable. Provide spares.</p> <p>Strapping of teck cables was incomplete at time of review. Contractor to correct. 130830 No change- contractor to correct.</p> <p>Provide photos of completed installation.</p>	Contractor
FR-E01.19	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01) DES has installed 1 grounding plate, instead of 2 shown on drawings. Change is acceptable. Note that grounding system was modified to include tie to overhead transformer case ground.</p> <p>Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p>	Info
FR-E01.20	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01) AN provided 2 new ground plates for grounding of o/h transformers. Grounding plates were tied to existing ground rods. Installation acceptable.</p> <p>Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p>	Contractor
FR-E01.21	<p>WT-05: Generator Shack Revisions (1/E01-02) New 3Ø combination load center in G3:Perkins sea container was not load balanced as per drawings and specifications. Measured loads on site were A(42A), B(68A), and C(59). Contractor to balance loads on A, C phases as per notes. Confirm loads are balanced within 20%. 130830: Not complete. Update panel directory to suit.</p>	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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FR-E01.22	<p>WT-05: Generator Shack Revisions (1/E01-02)</p> <p>Provide nylon bushing for cables entering transformer (larger than #8 AWG as required by CEC).</p> <p>Provide grounding hub where grounding conductor passes through transformer casing (see note C, WT-05, drawing E01-02).</p> <p>Update 130830: Ground bushing omitted for insulated conductor. Installation acceptable.</p>	Info
FR-E01.23	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <ul style="list-style-type: none"> Nylon bushings required for transformer primary and secondary conductors. Ground cable to xO point on transformer requires insulated ground hub through transformer case. Grounding cable to be brought to service entrance switch as per drawing 2/E01-02 of WT-05. Re-install ground screw to ground neutral in service entrance switch. Neutral cable to be removed between transformer and main switch. Teck cable from seepage pond shack to pole not buried. Seasonal deficiency. Provide adequate marking and mechanical protection. Notify DES staff and equipment operators. DES to routinely inspect temporary cables for damage and placement of mechanical protection. Split bolts have been used to make connections to o/h lines at the seepage pond. Split bolts are not acceptable. Contractor to replace connectors with approved compression connector. Teck weatherhead was not provided for pole riser teck cable. Contractor to correct. <p>Update 130830: Complete</p> <ul style="list-style-type: none"> TD fuses provided. TD fuses are not acceptable. Provide HRC fuses or standard fuses. <p>Update 130830: No change.</p>	Contractor
FR-E01.24	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <p>Roofing tin was used for transformer non-combustible shield, with ½” plywood screwed to the back. Roofing tin appears to be 29 ga., not 18ga as specified. Contractor to replace. Provide tin on rear and side of transformer.</p> <p>Specifications call for contractor to notify AAM if transformer clearance is less than 6” to wall surface. Provide measurements and transformer shop drawings to engineer for review.</p> <p>Update 130830: Sheet metal protection replaced. Installation acceptable. Contractor to provide transformer shop drawings.</p>	Contractor
FR-E01.25	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <p>Contractor has substituted seepage pond motor starter with alternate motor starter. Provide stop/start station on motor starter. Start contact to be press and hold type, requiring reset after each power failure or generator shutdown.</p> <p>Update 130830: Complete.</p>	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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FR-E01.26	WT-05: Seepage Pond Revisions (2/E01-02) Provide photographs of grounding conductor, grounding plate installations. Provide photos of ground plate installation: connectors, cables, burial depth and marking.	Contractor
FR-E01.27	WT-06: Generator Fluid Heaters WT06-01: External oil pan heaters: wolverine. Current status: CAT3306 = need new glue CAT6.6 = Installed Perkins = Installed WT06-02: Inline coolant heaters. Current status: CAT3306 = Currently out of service, coolant heater not installed. CAT6.6 = Installed (factory installed) Perkins = Cannot accept coolant heater. Coolant piping is hard piped, with metric fittings.	DES
FR-E01.28	Generator feeders and distribution were not properly phased during cable replacement. Pump operates in reverse while perkins generator is operational. Contractor to phase generators to seepage pump. Confirm correct phase rotation with visual inspection. Phasing of generators to DES Electrician Doug Langila approval.	Contractor
FR-E01.29	<i>Contractor has not provided shop drawings for distribution equipment installed on site.</i>	Info
FR-E01.30	<i>Contractor to provide letters of warranty when project is substantially complete.</i>	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-02
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SAFETY AND SECURITY	
Were there any health or safety incidents reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any security issues or breaches reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If YES to either, describe:	

CONSTRUCTION OUTLOOK	
Are there any submittals, issues or direction required over the next week, which may affect schedule?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Explain:	

Site Visit Report Prepared By:	
Name:	Martin, Corry
Date:	10 January 2014

DISTRIBUTION		
Name	Company	Via
Erik Pit	Regulatory Affairs Officer Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	erik.pit@gov.yk.ca
Kirsten Hulstein	Project Manager Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	kirsten.hulstein@gov.yk.ca

Issued By:	Person / Title	Signature
Stantec Electrical	Corry Martin, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Field Review FRE-03
March 10, 2014

6.0 Field Review FRE-03

The following field review provides the most current information available with respect to outstanding deficiency status.



Stantec
Field Review

GENERAL INFORMATION			
Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Report No.:	FRE-03 (07March14)
Date of Visit:	07 March 2014	Stantec File:	144901696.0801
Date of Issue:	10 March 2014	Contractor File:	
Present:	Corry Martin, Stantec	Weather:	

SITE CONDITIONS / GENERAL INFORMATION	
Items	
A	Outstanding items reviewed for completion based info and site photos from contractor.

GENERAL OBSERVATIONS OR INSTRUCTIONS/DIRECTION TO CONTRACTOR		
Old Items		Action By
FR-E02.1	Contractor to strap #3/0 Teck cable from generator sea containers to shop. Strap off ground on existing cantruss brackets. Provide mechanical protection where cable is installed from sea cans to edge of concrete fuel containment.	Contractor
		
<p>Photo: #3/0 Teck cable laid on ground between generator sea cans and shop.</p> <p>UPDATE 140307: Deficiency item still outstanding. Refer to Letter of Assurance.</p>		

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E02.2	WT-07: Contractor has substituted class D fuses for class H fuses as specified. Substitution not acceptable. Contractor to supply class H fuses, plus 3 spares as indicated on WT-07. UPDATE 140307: Class H fuses provided. Installation acceptable	Info
FR-E02.3	Spare parts have not been turned over to site electrician as required by work tasks. Contractor to assemble spare parts and parts list, and turn over to site electrician. Provide signed receipt in O&M manual. UPDATE 140307: Spare parts acceptable.	Info
FR-E01.1	As-built drawings were not available on site. Contractor to provide as-built drawings of completed work tasks. UPDATE 130830: Asbuilts received for emergency lighting and fire alarm. Asbuilts outstanding for remaining work on site. UPDATE 140307: Asbuilts received.	Info
FR-E01.2	(Removed: Duplicate)	Info
FR-E01.3	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) HRC fuses have been replaced with time delay type. Substitution not acceptable. Contractor to provide specified fuses. UPDATE 140307: Fuses acceptable	Info
FR-E01.4	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Contractor has abandoned old cables and conductors in place. DES electrician to remove cables where practical, and cut and mark cables to be left in place. Update 130830: Complete	Info
FR-E01.5	WT-01: Generator Grounding and Shop SLD: (Detail 2, E01) Grounding plates installed behind generator sea containers (x4), and connected with #1/0 AWG copper cable. Provide photos of installation, connectors, cable and burial depth. UPDATE 140307: Photos reviewed, installation acceptable.	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E01.6	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Main camp feeders are run overground from generator 3 sea container to site step-up 500kVA transformer. DES/AN have provided mechanical protection and high visibility marking of cables and protection.</p> <p style="text-align: center;">(photo removed)</p> <p style="text-align: center;"><i>Figure FRE-01.1: Temporary Cabling to Main Step-up Transformer</i></p> <p>Cables to be sleeved with rigid metal pipe or drill steel, where subject to vehicle traffic. AAM/DES to conduct routine inspection of above ground cables, and maintain mechanical protection where necessary. Notify camp staff about locations of temporary cabling and safety procedures.</p> <p>Contractor to bury cables when ground conditions permit. Provide photos of trenching and cable installation.</p> <p>Update 130830: Cables buried. Provide photographs of burial. Update 130924: Burial information received indicating depths of burial and distance measurements at several intervals. Installation acceptable.</p>	Info
FR-E01.7	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Contractor to confirm that primary cables on 500kVA transformer were dressed with Aluminum oxide protectant.</p> <p>130830: Contractor confirmed on site.</p>	Info
FR-E01.8	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Contractor has changed cables from 500kcmil AL to 350 MCM copper. Change is acceptable.</p>	Info
FR-E01.9	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>New transfer switches were provided. New transfer switch contacts have been misaligned during cable installation. 3306/6.6 transfer switch fingers do not fully align with contacts, and may prevent the switch from closing. DES electrician adjusted contact positions on site.</p> <p>This item has been noted for warranty purposes.</p>	Info/Warranty
FR-E01.10	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Neutral lugs installed in main fused switch (400A) are not installed on insulated standoffs as specified. Contractor to correct.</p> <p>Update 130830: Complete</p>	Info
FR-E01.11	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Neutral lugs installed in 400A transfer switches are not installed on insulated standoffs as specified. Contractor to correct.</p> <p>Update 130830: Complete</p>	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E01.12	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Contractor has installed cable tray between generator sea containers. Installation acceptable. Contractor to confirm sealing and flashing of sea can penetrations. Provide bond cable to cable tray as required by CEC.</p> <p>Update 130830: Installation acceptable.</p>	Info
FR-E01.13	<p>WT-02: Generator Feeders and Automatic Transfer Switches</p> <p>Truck shop fused switch (150A 3Ø 3W) was damaged. Switch contacts would not open and door safety bypass was jammed. DES site electrician repaired the switch.</p> <p>This item has been noted for warranty purposes.</p> <p>Truck shop fused switch had neutral block grounding screw installed (switch is installed past the point of service). DES site electrician removed the grounding screw.</p>	Info/Warranty
FR-E01.14	<p>WT-03: Emergency lighting and exit signage.</p> <ul style="list-style-type: none"> Battery pack test was conducted at 6:15 PM. Emergency lighting and exit signage tested operational for 30 minutes. "EXIT" signage was removed. Sign was existing, and did not conform to remaining signage (iso-standard pictogram signage) Weatherproof remote head was not installed on rear stairwell exiting 'office' on main floor. Remote head installed on site and tested. Diode orientation was confirmed for exit signage. Relays for monitoring lighting circuits were confirmed operational. Inoperable DC remote head replaced on site. Emergency lighting and exit signage operational. 	Info
FR-E01.15	<p>WT-03: Fire alarm verification notes:</p> <ul style="list-style-type: none"> Heat detector in main floor common area failed, and was replaced on site. Contractor has made minor relocations to device layouts, to suit site conditions. Heat detector was added to entrance vestibule on site. Heat detector added to main floor initiating zone. Contractor has installed smoke detectors to underside of gluelam beams in bedroom 10. Beam depth was less than 300mm. Relocation acceptable. KO fillers added to various junction boxes on site. Contractor has substituted Ionization type smoke detectors (1451A) with photoelectric type (2151A). Change is acceptable. Fire alarm NAC and initiation circuits modified on site. Changes acceptable. 24 Hour battery run-down test, followed by 30 minute bell test was not conducted on site. Vipond/Arcrite instructed site electrician on test. DES electrician to provide test results to Vipond/Arcrite for inclusion in fire alarm verification report. Contractor to provide completed fire alarm verification report to AAM/Stantec. <p>Update 130830: Report received. Report acceptable.</p>	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E01.16	<p>WT-04: Testing of Main Site Distribution Transformer</p> <p>Test results from transformer outstanding. Contractor to provide transformer oil test results.</p> <p>Update 130830: Transformer oil testing conducted on site. Not witnessed by the consultant. Contractor to provide test results as listed in WT-04.</p> <p>UPDATE 140307: Test results received. Included in Final Report.</p>	Info
FR-E01.17	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>Existing pole transformer bank could not be modified to delta-wye configuration. Contractor left transformer bank as-is, and made connections according to Site instruction SI-01.</p> <p>Split bolt connector remains on o/h transformer bank wiring. Contractor to remove split bolt and replace with continuous conductor or approved compression connector.</p> <p>UPDATE 140307: Split bolt is not acceptable. Refer to Letter of Assurance.</p>	Contractor
FR-E01.18	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>Service switch lamicoid label not installed. Contractor to install.</p> <p>130830 Complete</p> <p>Ground fault monitoring panel not installed. Contractor to install.</p> <p>130830 No Change- contractor to correct.</p> <p>UPDATE 140307: Complete</p> <p>Contractor to disconnect bare aluminum bond from service entrance switch bond lug. Cut bare aluminum bond at entrance to switch. Attach service grounding conductor to service entrance switch neutral lug and install grounding screw, to bond neutral block to switch case.</p> <p>130830 Complete</p> <p>Change time delay fuses to HRC fuses as specified, or conventional fuses. TD fuses are not acceptable.</p> <p>130830: Fuses changed to Class K5. Fuses acceptable. Provide spares.</p> <p>UPDATE 140307: Complete</p> <p>Strapping of teck cables was incomplete at time of review. Contractor to correct.</p> <p>130830 No change- contractor to correct.</p> <p>UPDATE 140307: Complete</p> <p>Provide photos of completed installation.</p> <p>UPDATE 140307: Photos reviewed by Corry Martin</p>	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E01.19	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>DES has installed 1 grounding plate, instead of 2 shown on drawings. Change is acceptable. Note that grounding system was modified to include tie to overhead transformer case ground.</p> <p>Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p> <p>UPDATE 140307: Photos reviewed by Corry Martin</p>	Info
FR-E01.20	<p>WT-05: Victoria Creek Pumphouse Revisions (E01-01)</p> <p>AN provided 2 new ground plates for grounding of o/h transformers. Grounding plates were tied to existing ground rods. Installation acceptable.</p> <p>Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p> <p>UPDATE 140307: Photos not available. Contractor certifies installation is correct. Installation acceptable.</p>	Info
FR-E01.21	<p>WT-05: Generator Shack Revisions (1/E01-02)</p> <p>New 3Ø combination load center in G3:Perkins sea container was not load balanced as per drawings and specifications. Measured loads on site were A(42A), B(68A), and C(59). Contractor to balance loads on A, C phases as per notes. Confirm loads are balanced within 20%.</p> <p>130830: Not complete. Update panel directory to suit.</p> <p>UPDATE 140307: Complete</p>	Info
FR-E01.22	<p>WT-05: Generator Shack Revisions (1/E01-02)</p> <p>Provide nylon bushing for cables entering transformer (larger than #8 AWG as required by CEC).</p> <p>Provide grounding hub where grounding conductor passes through transformer casing (see note C, WT-05, drawing E01-02).</p> <p>Update 130830: Ground bushing omitted for insulated conductor. Installation acceptable.</p>	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E01.23	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <ul style="list-style-type: none"> Nylon bushings required for transformer primary and secondary conductors. Ground cable to xO point on transformer requires insulated ground hub through transformer case. Grounding cable to be brought to service entrance switch as per drawing 2/E01-02 of WT-05. Re-install ground screw to ground neutral in service entrance switch. Neutral cable to be removed between transformer and main switch. Teck cable from seepage pond shack to pole not buried. Seasonal deficiency. Provide adequate marking and mechanical protection. Notify DES staff and equipment operators. DES to routinely inspect temporary cables for damage and placement of mechanical protection. Split bolts have been used to make connections to o/h lines at the seepage pond. Split bolts are not acceptable. Contractor to replace connectors with approved compression connector. Teck weatherhead was not provided for pole riser teck cable. Contractor to correct. <p>Update 130830: Complete</p> <ul style="list-style-type: none"> TD fuses provided. TD fuses are not acceptable. Provide HRC fuses or standard fuses. <p>Update 130830: No change.</p> <p>UPDATE 140307: Fuses replaced with Class H. Fuses acceptable</p>	Info
FR-E01.24	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <p>Roofing tin was used for transformer non-combustible shield, with ½" plywood screwed to the back. Roofing tin appears to be 29 ga., not 18ga as specified. Contractor to replace. Provide tin on rear and side of transformer.</p> <p>Specifications call for contractor to notify AAM if transformer clearance is less than 6" to wall surface. Provide measurements and transformer shop drawings to engineer for review.</p> <p>Update 130830: Sheet metal protection replaced. Installation acceptable. Contractor to provide transformer shop drawings.</p> <p>UPDATE 140307: Shop drawings not provided</p>	Contractor
FR-E01.25	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <p>Contractor has substituted seepage pond motor starter with alternate motor starter. Provide stop/start station on motor starter. Start contact to be press and hold type, requiring reset after each power failure or generator shutdown.</p> <p>Update 130830: Complete.</p>	Info
FR-E01.26	<p>WT-05: Seepage Pond Revisions (2/E01-02)</p> <p>Provide photographs of grounding conductor, grounding plate installations. Provide photos of ground plate installation: connectors, cables, burial depth and marking.</p>	Contractor

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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FR-E01.27	WT-06: Generator Fluid Heaters	DES
	<p>WT06-01: External oil pan heaters: wolverine. Current status: CAT3306 = need new glue CAT6.6 = Installed Perkins = Installed</p> <p>WT06-02: Inline coolant heaters. Current status: CAT3306 = Currently out of service, coolant heater not installed. CAT6.6 = Installed (factory installed) Perkins = Cannot accept coolant heater. Coolant piping is hard piped, with metric fittings.</p>	
FR-E01.28	Generator feeders and distribution were not properly phased during cable replacement. Pump operates in reverse while perkins generator is operational. Contractor to phase generators to seepage pump. Confirm correct phase rotation with visual inspection. Phasing of generators to DES Electrician Doug Langila approval. UPDATE 140307: Approved	Info
FR-E01.29	<i>Contractor has not provided shop drawings for distribution equipment installed on site.</i>	Info
FR-E01.30	<i>Contractor to provide letters of warranty when project is substantially complete.</i> UPDATE 140307: Warranty letters received.	Info

Project:	Mt. Nansen Electrical Work Tasks WT-01 through WT-07	Project No.:	144901696.0801	Report No.:	FRE-03
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SAFETY AND SECURITY	
Were there any health or safety incidents reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any security issues or breaches reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If YES to either, describe:	

CONSTRUCTION OUTLOOK	
Are there any submittals, issues or direction required over the next week, which may affect schedule?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Explain:	

Site Visit Report Prepared By:	
Name:	Martin, Corry
Date:	10 March 2014

DISTRIBUTION		
Name	Company	Via
Erik Pit	Regulatory Affairs Officer Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	erik.pit@gov.yk.ca
Kirsten Hulstein	Project Manager Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	kirsten.hulstein@gov.yk.ca

Issued By:	Person / Title	Signature
Stantec Electrical	Corry Martin, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 01
March 10, 2014

7.0 Work Task 01

SECTION 2.0 PRODUCTS AND EXECUTION

1.3.0 CUTTING, PATCHING, EXCAVATION & BACKFILLING

- 1.3.1 ARRANGE AND PAY FOR ALL CUTTING, PATCHING, EXCAVATION AND BACKFILLING COSTS RELATED TO THE WORK OF THIS CONTRACT.
- 1.3.2 RESTORE ALL EXCAVATIONS TO ORIGINAL CONDITION SUBSEQUENT TO COMPLETION OF ELECTRICAL INSTALLATIONS DESCRIBED IN THESE DRAWINGS AND SPECIFICATIONS.
- 1.3.3 SURROUND ALL CABLES OR CONDUITS INSTALLED IN TRENCHES WITH SAND OR 6MM SCREENED EARTH AS INDICATED ON DETAILS AND AS REQUIRED BY THE C.E.C.

1.4.0 SUBMITTALS

- 1.4.1 SUBMIT SHOP DRAWINGS CLEARLY INDICATING DETAILS OF MATERIAL FABRICATION, LAYOUT, DIMENSIONS, CAPACITIES, PERFORMANCE CHARACTERISTICS, CERTIFICATION STANDARDS, WEIGHT, WIRING DIAGRAMS AND OTHER PERTINENT INFORMATION.
- 1.4.2 PROVIDE SHOP DRAWINGS FOR ALL EQUIPMENT INCLUDING SWITCHES AND FUSES. SHOP DRAWINGS SUBMITTED TO THE ENGINEER ARE TO HAVE THE PRIOR APPROVAL STAMPS OF THE CONTRACTOR.
- 1.4.3 THE ENGINEER WILL PROVIDE ONE SET OF DRAWINGS TO BE USED AS RECORD DRAWINGS ON SITE. MAINTAIN A DAILY RECORD OF REVISIONS AND ADDITIONS TO THE ORIGINAL WORK. ALL MARKINGS ARE TO BE DONE NEATLY IN A COLOR OTHER THAN BLUE OR GRAY PENCIL.

1.5.0 TESTING

- 1.5.1 PROVIDE TO THE ENGINEER THE RESULTS OF ALL TESTS IN WRITTEN FORM.
- 1.5.2 PERFORM TESTS ON ALL EQUIPMENT AS RECOMMENDED BY THE MANUFACTURER.
- 1.5.3 MEGGER TEST ALL FEEDERS PRIOR TO ENERGIZING AND ENSURE THAT THE REQUIREMENTS OF THE C.E.C. ARE MET.
- 1.5.4 TAKE VOLTAGE READINGS AND ADJUST TRANSFORMER TAP SETTINGS IF NECESSARY.

1.6.0 WARRANTY

- 1.6.1 PROVIDE A WRITTEN WARRANTY GUARANTEEING THAT THE WORK PERFORMED WILL BE FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE AND THAT ANY DEFECTIVE WORK WILL BE REPAIRED OR REPLACED WITHOUT COST TO THE OWNER DURING THIS PERIOD PROVIDED THAT SUCH FAILURES ARE NOT DUE TO IMPROPER USAGE OR NEGLIGENCE.
- 1.6.2 THE WARRANTY SHALL STATE THAT THE PERIOD OF GUARANTEE WILL IN NO WAY SUPPLANT ANY OTHER GUARANTEE OF A LONGER PERIOD.

2.1.0 WIRING AND CONDUIT

- 2.1.1 BUILDING WIRING TO BE COPPER RW90 XLPE INSTALLED IN EMT CONDUIT OR TECK CABLE, EXCEPT WHERE OTHERWISE INDICATED ON THESE DRAWINGS.
- 2.1.2 TECK CABLE TO BE RW90, 1000 VOLT, COPPER WITH GROUNDING CONDUCTOR AND ALUMINUM INTERLOCKING ARMOUR. CABLE IS TO BE ROUTED INSIDE SUITABLY SIZED RIGID STEEL CONDUIT WHERE TECK CABLE IS EXPOSED TO MECHANICAL INJURY.
- 2.1.3 ENSURE THAT CONDUIT IS DRY PRIOR TO WIRING INSTALLATION. SEAL CONDUIT THAT MAY BECOME EXPOSED TO MOISTURE.
- 2.1.4 RUN CONDUIT PARALLEL TO BUILDING LINES EXCEPT WHERE SPECIFICALLY INDICATED.
- 2.1.5 DO NOT CUT STRUCTURAL MEMBERS EXCEPT WHERE SPECIFICALLY INDICATED.
- 2.1.6 PROVIDE PULL CORD IN ALL EMPTY CONDUIT RUNS THAT EXCEED 3 METERS IN LENGTH OR THE TOTAL SUM OF BENDS EXCEED 90 DEGREES.

2.2.0 GROUNDING

- 2.2.1 PROVIDE GROUNDING INSTALLATIONS NECESSARY TO MEET THE REQUIREMENTS OF THE CURRENT CANADIAN ELECTRICAL CODE AND ADDITIONAL REQUIREMENTS INDICATED ON THESE DRAWINGS OR SPECIFICATIONS.

2.4.0 SERVICE ENTRANCE ENCLOSED FUSED SWITCH

- 2.4.1 600V RATED FOR CONTINUOUS CURRENT AT 150A AND 10,000 AMP FAULT INTERRUPTING CAPACITY. SERVICE ENTRANCE RATED ENCLOSED IN STAND ALONE TYPE 1 ENCLOSURE COMPLETE WITH H.R.C. FUSES OF SIZE NOTED ON DRAWINGS.

2.5.0 ENCLOSED FUSED SWITCH

- 2.5.1 600V RATED FOR CONTINUOUS CURRENT AS SHOWN ON THE DRAWINGS AND 10,000 AMP FAULT INTERRUPTING CAPACITY. TYPE 1 ENCLOSURE COMPLETE WITH H.R.C. FUSES OF SIZE NOTED ON DRAWINGS.

2.6.0 RECORDS

- 2.6.1 PHOTOS: PROVIDE DIGITAL PHOTOGRAPHS OF ALL INSTALLATIONS INCLUDING TRENCHING, CABLE INSTALLATIONS, CABLE AND WIRE CONNECTIONS, GROUND PLATES, TERMINATIONS IN GENERATORS AND ALL ELECTRICAL EQUIPMENT. PROVIDE PHOTOS TO A.A.M.
- 2.6.2 ON A COPY OF THE DRAWINGS RECORD ANY REVISIONS MADE ON SITE AND PROVIDE TO A.A.M.



Stantec Architecture Ltd.
107 Main Street, Suite 202
Whitehorse YT Canada
Y1A 2A7
Tel. 867.633.2400
Fax. 867.633.2481
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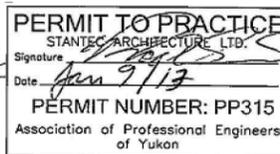
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Notes

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0	ISSUED FOR CONSTRUCTION	PIO	RDS	12/11/06
Revision		By	Appd.	YY.MM.DD

2	RE-ISSUED FOR CONSTRUCTION	PIO	RDS	13/01/10
1	ISSUED FOR 100%	PIO	RDS	12/12/18
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Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title
Specifications Continued
Work Task 01

Project No. 144901696	Scale NTS
Drawing No. E03	Sheet 3 of 3
	Revision 2

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 02
March 10, 2014

8.0 Work Task 02



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 107 Main Street, Suite 202
 Whitehorse YT Canada
 Y1A 2A7
 Tel. 867.633.2400
 Fax. 867.633.2481
 www.stantec.com

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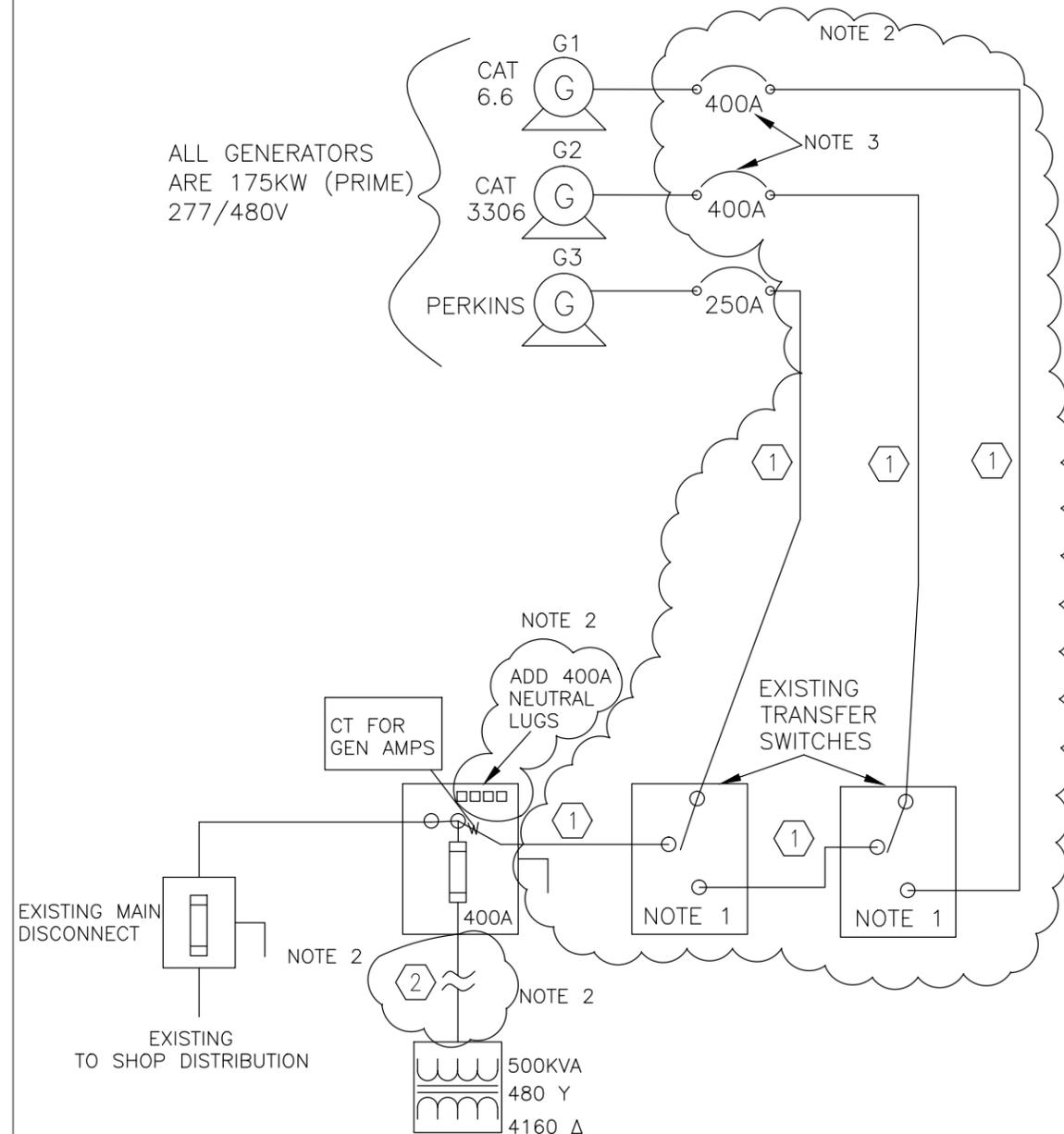


Client/Project
 Mt. Nansen Electrical
 Whitehorse, YT
 Title
 GENERATOR FEEDERS AND AUTOMATIC TRANSFER SWITCHES
 Work Task 02

Project No.	Scale	
144901696	NTS	
Drawing No.	Sheet	Revision
E01	1 of 3	1

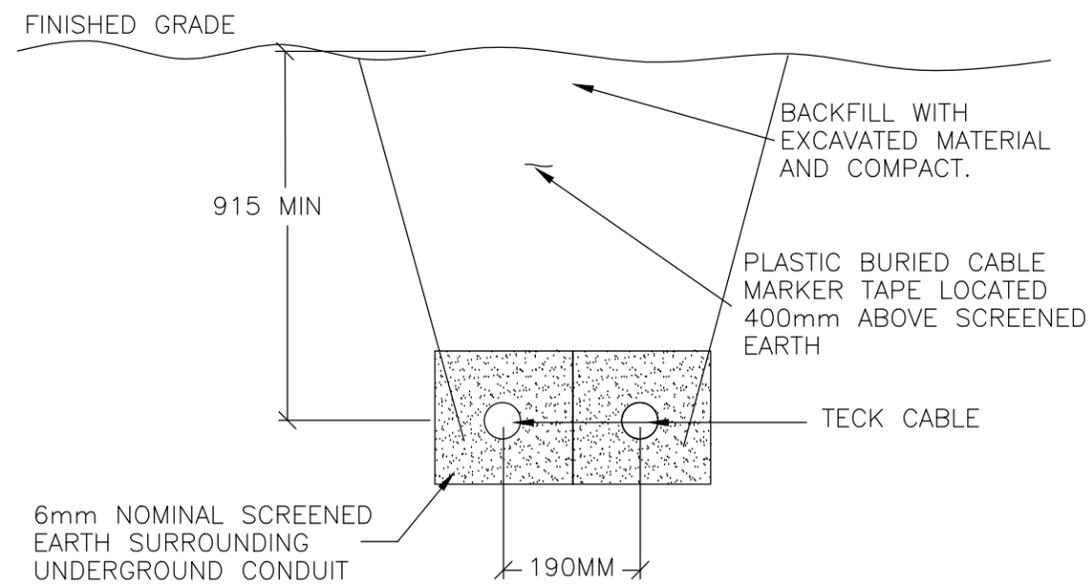
CONDUCTOR SCHEDULE		
CONDUCTOR	EXISTING	REPLACE WITH
①	3C 4/0 AL TECK	4C 500MCM AL TECK WITH #2 AL BOND RUN BURIED OR IN CABLE TRAY
②	3C 4/0 CU TECK	2RUNS [4C 250MCM AL TECK WITH #2 AL BOND] CABLE TO BE BURIED ACCORDING TO DETAIL 2/E01. IF SEASONAL CONDITIONS PREVENT BURIAL, THEN CABLING MAY BE TEMPORARILY RUN ON SURFACE WITH SUITABLE MECHANICAL PROTECTION.

MATERIALS LIST		
MATERIAL	DESCRIPTION	QUANTITY
MANUAL TRANSFER SWITCH	REFER TO SPECIFICATIONS	2
TECK CABLES	4C 500MCM AL TECK WITH #2 AL BOND	LENGTHS TO BE DETERMINED ON SITE BY D.E.S.
NEUTRAL LUGS	AS SPECIFIED	1
TECK FITTINGS/CONNECTORS	AS REQUIRED	TO BE DETERMINED ON SITE BY D.E.S.
CABLE TRAY (IF REQUIRED)	REFER TO SPECIFICATIONS	LENGTH TO BE DETERMINED ON SITE
3P300A GENERATOR BREAKERS	REFER TO SPECIFICATIONS	2



1 FEEDER AND TRANSFER SWITCH REVISIONS
 E01 SCALE: NTS

- NOTES:
1. REPLACE EXISTING TRANSFER SWITCHES WITH NEW 400A RATED TRANSFER SWITCHES. REFER TO SPECIFICATIONS FOR DETAILED TRANSFER SWITCH INFORMATION.
 2. NEW WORK IS WITHIN CLOUDED AREAS.
 3. REPLACE EXISTING 3P400A BREAKERS WITH NEW 3P300A BREAKERS.



2 CABLE BURIAL DETAIL
 E01 SCALE: NTS

V:\144901696\144901696\144901696.dwg - Generator Feeders Understated\Working\144901696.dwg
 20/12/18 10:08 AM By: J.C. Contact: Paul

SECTION 2.0 PRODUCTS AND EXECUTION

2.1.0 WIRING AND CONDUIT

- 2.1.1 TECK CABLE TO BE RW90, 1000 VOLT, ALUMINUM WITH GROUNDING CONDUCTOR AND ALUMINUM INTERLOCKING ARMOUR. CABLE IS TO BE ROUTED INSIDE SUITABLY SIZED RIGID STEEL CONDUIT WHERE TECK CABLE IS EXPOSED TO MECHANICAL INJURY.
- 2.1.2 DO NOT CUT STRUCTURAL MEMBERS EXCEPT WHERE SPECIFICALLY INDICATED.

2.2.0 BONDING

- 2.2.1 PROVIDE BONDING INSTALLATIONS NECESSARY TO MEET THE REQUIREMENTS OF THE CURRENT CANADIAN ELECTRICAL CODE AND ADDITIONAL REQUIREMENTS INDICATED ON THESE DRAWINGS OR SPECIFICATIONS.

2.3.0 MANUAL TRANSFER SWITCH

- 2.3.1 MECHANICALLY OPERATED, LOCKABLE IN ANY POSITION, NON-FUSABLE, HP RATED, NEUTRAL LUGS, 3-POLE 600V RATED FOR CONTINUOUS CURRENT AT 400A AND MINIMUM OF 5,000 AMP FAULT WITHSTAND CAPACITY. TYPE 1 ENCLOSURE, 2 POSITION, QUICK BREAK, QUICK MAKE TYPE WITH HANDLE OPERABLE FROM OUTSIDE OF ENCLOSURE WITH DOOR CLOSED. PROVIDE ADHESIVE LABELING INDICATING WHICH GENSET IS CONNECTED AT EACH SWITCH POSITION. SQUARE D 82345 OR APPROVED EQUIVALENT.

2.4.0 RECORDS

- 2.4.1 PHOTOS: PROVIDE DIGITAL PHOTOGRAPHS OF ALL INSTALLATIONS INCLUDING TRENCHING, CABLE INSTALLATIONS, CABLE AND WIRE CONNECTIONS, TERMINATIONS IN GENERATORS AND ALL ELECTRICAL EQUIPMENT. PROVIDE PHOTOS TO A.A.M.
- 2.4.2 ON A COPY OF THE DRAWINGS RECORD ANY REVISIONS MADE ON SITE AND PROVIDE TO A.A.M.
- 2.4.3 PROVIDE RECORD OF MEGGER TESTS INCLUDING RESULTS OBTAINED ON EACH CONDUCTOR, DATE AND TIME OF TEST AND WHO CONDUCTED THE TEST. SUBMIT A COPY OF THE TEST RESULTS FOR REVIEW AT LEAST TWO WEEKS PRIOR TO REQUEST FOR SUBSTANTIAL COMPLETION.

2.5.0 NEUTRAL LUGS

- 2.5.1 SUITABLE FOR CONNECTION OF 4X 250MCM ALUMINUM CABLING, INSULATED FROM ENCLOSURE TO WHICH THEY ARE FASTENED.

2.6.0 CABLE TRAY

- 2.6.1 GALVANIZED STEEL, LADDER TRAY: 6" WIDE, 6" SIDEWALL, 9" RUNG SPACING. SUITABLE FOR FREE SPAN BETWEEN BUILDINGS FOR CABLE RUN. THOMAS & BETTS OR EQUAL.

2.7.0 GENERATOR BREAKERS

- 2.7.1 3-POLE, THERMAL/MAGNETIC TYPE WITH CURRENT RATING AS INDICATED ON DRAWINGS. MINIMUM INTERRUPTING CAPACITY OF 10KA. PRIOR TO ORDERING ENSURE THAT BREAKERS WILL FIT INTO EXISTING GENERATOR ENCLOSURES.



Stantec Architecture Ltd.
107 Main Street, Suite 202
Whitehorse YT Canada
Y1A 2A7
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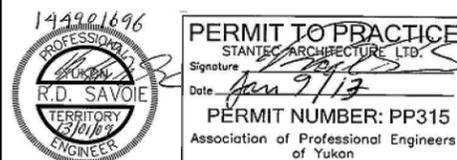
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Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title
Specifications 2

Work Task 02

Project No.	Scale	
144901696	NTS	
Drawing No.	Sheet	Revision
E03	3 of 3	1

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 03
March 10, 2014

9.0 Work Task 03

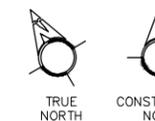


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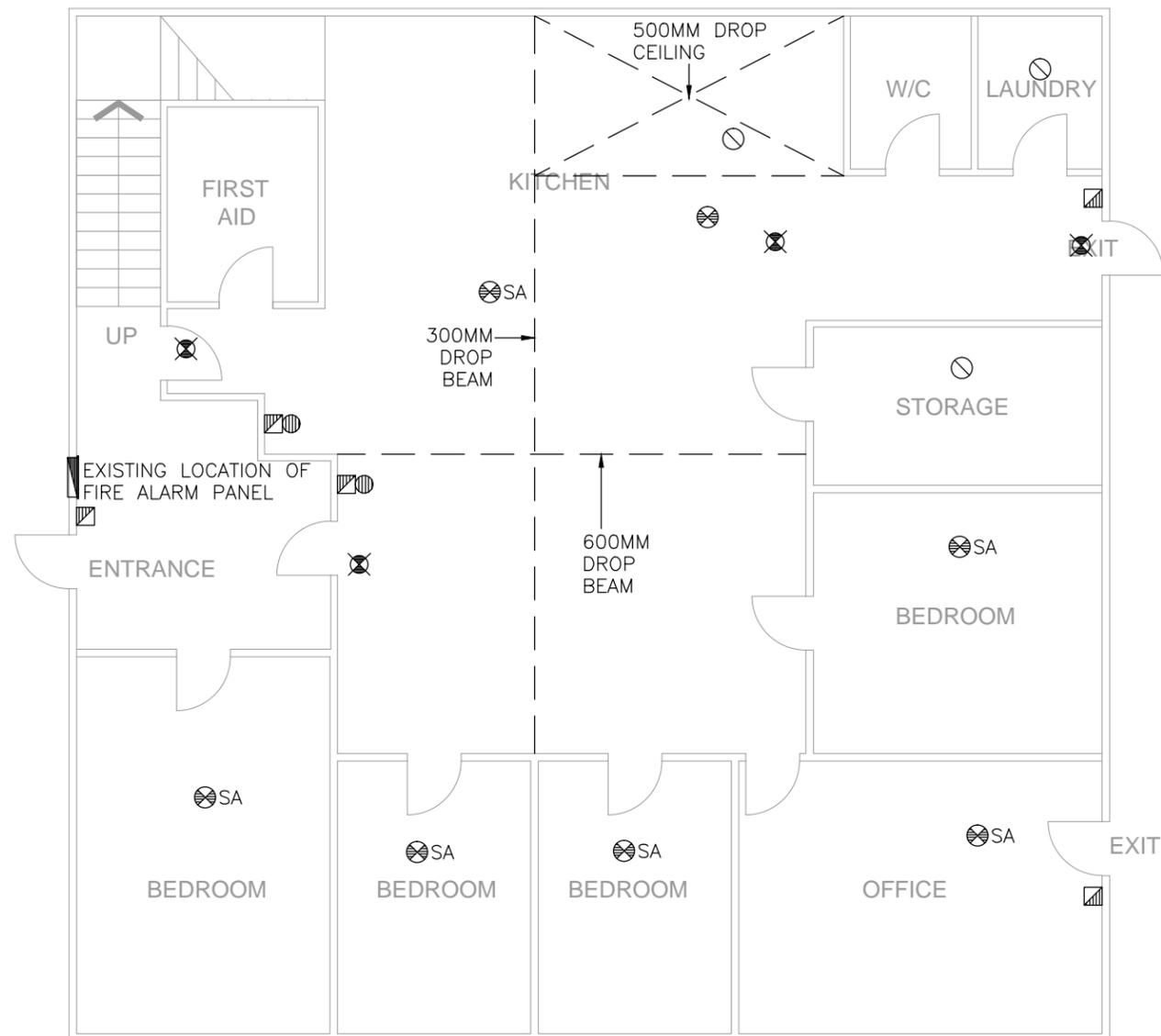
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SYMBOL	DESCRIPTION
FIRE ALARM DEVICES	
	SMOKE DETECTOR
	SMOKE ALARM
	CONVENTIONAL STANDARD HEAT DETECTOR
	CONVENTIONAL HIGH TEMPERATURE HEAT DETECTOR - DEGREES
	FIRE ALARM PULL STATION
	FIRE ALARM AUDIO/VISUAL DEVICE
	END-OF-LINE-RESISTOR
	FIRE ALARM GONG
EMERGENCY LIGHTING	
	CEILING MOUNT EXIT
	WALL MOUNT EXIT
	EMERGENCY LIGHTING BATTERY PACK
	EMERGENCY LIGHTING BATTERY PACK C/W HEADS
	DOUBLE REMOTE HEAD
PANELS	
	FLUSH MOUNT FIRE ALARM PANEL

Notes

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Revision	By	App
2 ISSUED FOR ASBUILT	PIO	CFI
1 ISSUED FOR CONSTRUCTION	PIO	RD:
0 ISSUED FOR 100%	PIO	RD:
Issued	By	App

File Name: _____
 Dwn. Chkd. Desg

Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title

1ST FLOOR FIRE ALARM, EMERG
 LIGHTING DEMOLITION
 Work Task 03

Project No.	Scale	
144901696	AS NOTED	
Drawing No.	Sheet	Re

E01-01

1 of 8

01 1ST FLOOR FIRE ALARM & EMERGENCY LIGHTING DEMOLITION
 E01-01 SCALE: 1:100

NOTES:

- REMOVE ALL DEVICES AND WIRING BACK TO THE SOURCE WHERE PRACTICAL AND NOT REQUIRING THE REMOVAL OF FINISHES. REMOVE CONDUIT WHERE CONDUIT IS NOT BEING USED IN THE NEW FIRE ALARM SYSTEM. TURN OVER ALL DEMOLISHED DEVICES TO OWNER'S REPRESENTATIVE.
- EXISTING FIRE ALARM SYSTEM IS NOT FUNCTIONAL.



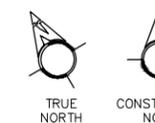
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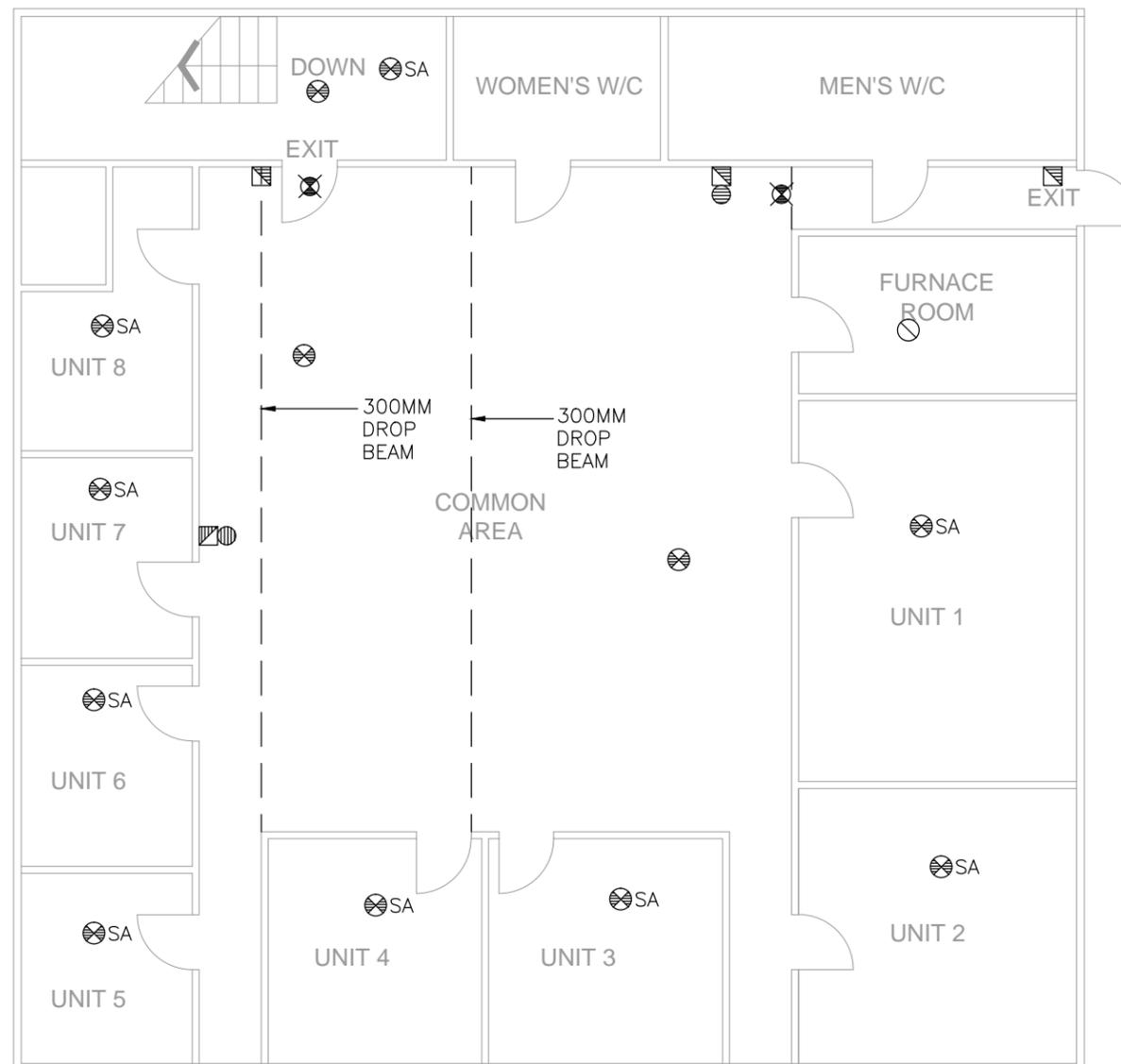
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2	ISSUED FOR ASBUILT	PIO	CFI
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0	ISSUED FOR 100%	PIO	RD:
Revision		By	App
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1	ISSUED FOR CONSTRUCTION	PIO	RD:
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Issued		By	App
File Name:		Dwn.	Chkd.
			Desg

01 2ND FLOOR FIRE ALARM & EMERGENCY LIGHTING DEMOLITION
 E01-02 SCALE: 1:100

NOTES:

1. REMOVE ALL DEVICES AND WIRING BACK TO THE SOURCE WHERE PRACTICAL AND NOT REQUIRING THE REMOVAL OF FINISHES. REMOVE CONDUIT WHERE CONDUIT IS NOT BEING USED IN THE NEW FIRE ALARM SYSTEM. TURN OVER ALL DEMOLISHED DEVICES TO OWNER'S REPRESENTATIVE.

Client/Project

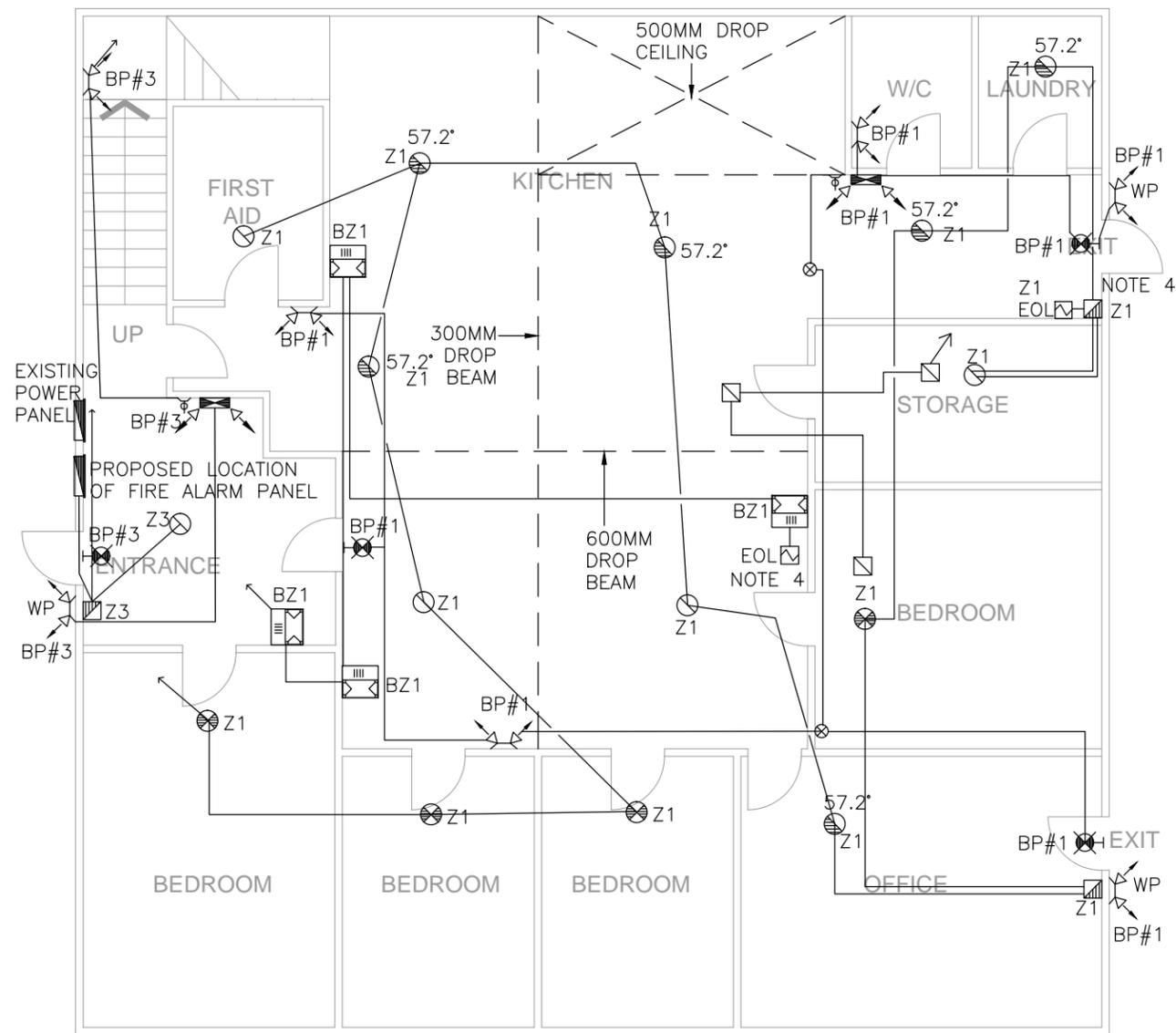
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Title

2ND FLOOR FIRE ALARM, EMERGENCY LIGHTING DEMOLITION
 Work Task 03

Project No.	Scale
144901696	AS NOTED
Drawing No.	Sheet
	Re



01 1ST FLOOR FIRE ALARM & EMERGENCY LIGHTING

E02-01 SCALE: 1:100

NOTES: (APPLIES TO 01/E02-01 ONLY)

- ENSURE THAT THE FIRE ALARM SYSTEM BREAKER IS RED IN COLOR AND CONTAINS A RED TIE LOCK DEVICE.
- BATTERY PACKS ARE TO BE CIRCUITED IN SUCH A WAY THAT UPON FAILURE OF THE NORMAL ROOM LIGHTING, IN ANY AREA THAT HAS EMERGENCY LIGHTING, THE EMERGENCY LIGHTING IS TO ACTIVATE SO THAT THE AREA IS NOT LEFT IN TOTAL DARKNESS.
- END OF LINE DEVICES TO BE IN A SEPARATE BOX USED FOR NO OTHER PURPOSE MOUNTED AT A MAXIMUM HEIGHT OF 1800MM AFF ON CENTER AND LOCATED BEYOND THE LAST DEVICE IN THE CIRCUIT.
- CONTRACTOR IS PERMITTED TO RELOCATED END-OF-LINE DEVICES AS IS NECESSARY. END-OF-LINE DEVICE ARE TO BE LOCATED IN THE COMMON AREA AND NOT IN A BEDROOM, STORAGE, OR OFFICE SPACE.
- EMT CONDUIT IS TO BE PROVIDED FOR FIRE ALARM SYSTEM WIRING. SURFACE CONDUIT IS PERMITTED TO BE USED.
- ASSIGN DEDICATED A.C. CIRCUIT FOR EXIT LIGHTS. INCLUDE TIE LOCK ON EXIT LIGHT BREAKER.
- ALL CO DEVICES ARE TO BE INTERCONNECTED WITHIN THE BUILDING. CIRCUIT THE CO DETECTORS WITH AN EXISTING LIGHTING CIRCUIT.

BATTERY PACK SCHEDULE

#	DESCRIPTION	VOLTAGE/WATTAGE
1X BP#1	FIRST FLOOR	12/200
1X BP#2	SECOND FLOOR	12/250
1X BP#3	STAIRWELL	12/144

MATERIALS LIST

NAME	DESCRIPTION	QUANTITY
SMOKE DETECTOR	AS PER THE SPECIFICATIONS	21
RATE OF RISE HEAT DETECTOR 57°C	AS PER THE SPECIFICATIONS	4
FIXED TEMP HEAT DETECTOR 57°C	AS PER THE SPECIFICATIONS	6
FIXED TEMP HEAT DETECTOR 90°C	AS PER THE SPECIFICATIONS	1
MANUAL PULL STATION	AS PER THE SPECIFICATIONS	5
END OF LINE RESISTOR	-	5
HORN/STROBE DEVICES	AS PER THE SPECIFICATIONS	7
EMERGENCY LIGHTING BATTERY PACKS REMOTE HEAD COMBO	SEE BATTERY PACK SCHEDULE ABOVE	3
DOUBLE REMOTE HEADS	AS PER THE SPECIFICATIONS	12
BOX AND DUPLEX RECEPTACLES FOR EMERGENCY LIGHTING	AS PER THE SPECIFICATIONS	3
DOUBLE WEATHERPROOF REMOTE HEADS	AS PER THE SPECIFICATIONS	4
FIRE ALARM CONTROL PANEL	AS PER THE SPECIFICATIONS	1
EXIT SIGNAGE	AS PER THE SPECIFICATIONS	7
CONDUIT (15MM)	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
CONDUIT (21MM)	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
FIRE ALARM WIRING	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
#12 AWG BUILDING WIRE	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
#10 AWG BUILDING WIRE	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
CONDUIT CONNECTORS	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
WIRING CONNECTORS	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
CONDUIT FITTINGS	AS PER THE SPECIFICATIONS	TBD BY D.E.S.
CARBON MONOXIDE DETECTORS	AS PER THE SPECIFICATIONS	6
EMERGENCY LIGHTING MONITORING MODULE	AS PER THE SPECIFICATIONS	1



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107 Main Street, Suite 2
Whitehorse YT Canada
Y1A 2A7
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Legend

BP#1: 6,8
BP#2: 32,34,27,28,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,342,343,344,345,346,347,348,349,350,351,352,353,354,355,356,357,358,359,360,361,362,363,364,365,366,367,368,369,370,371,372,373,374,375,376,377,378,379,380,381,382,383,384,385,386,387,388,389,390,391,392,393,394,395,396,397,398,399,400,401,402,403,404,405,406,407,408,409,410,411,412,413,414,415,416,417,418,419,420,421,422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000

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Dwn. Chkd. Desg

Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title
1ST FLOOR FIRE ALARM, EMERGENCY LIGHTING AND DETAILS
Work Task 03

Project No. 144901696 Scale AS NOTED

Drawing No. _____ Sheet _____ Re _____

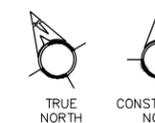


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 107 Main Street, Suite 2
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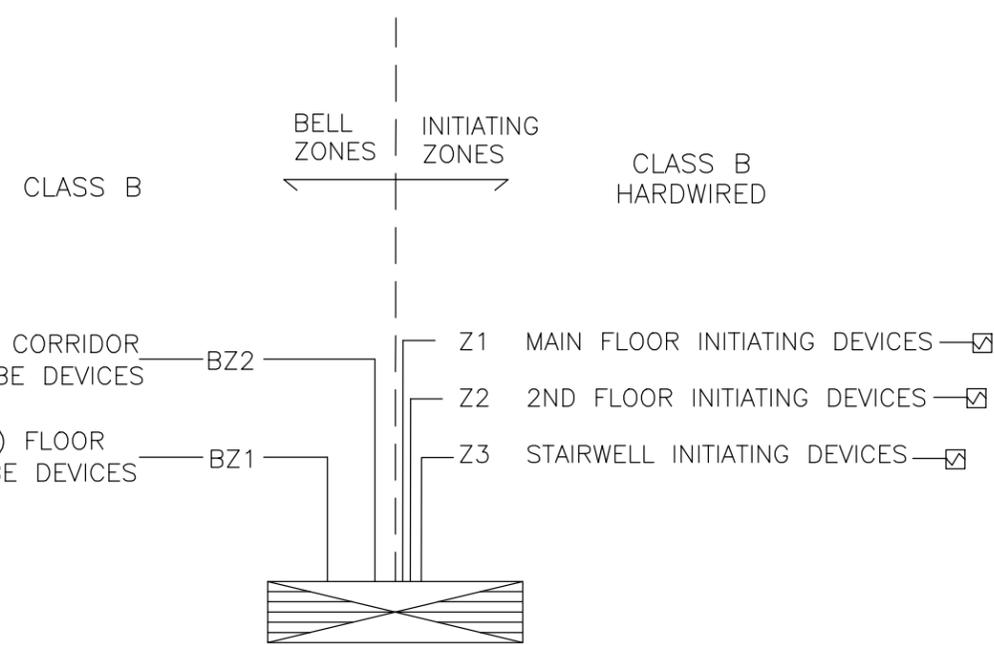
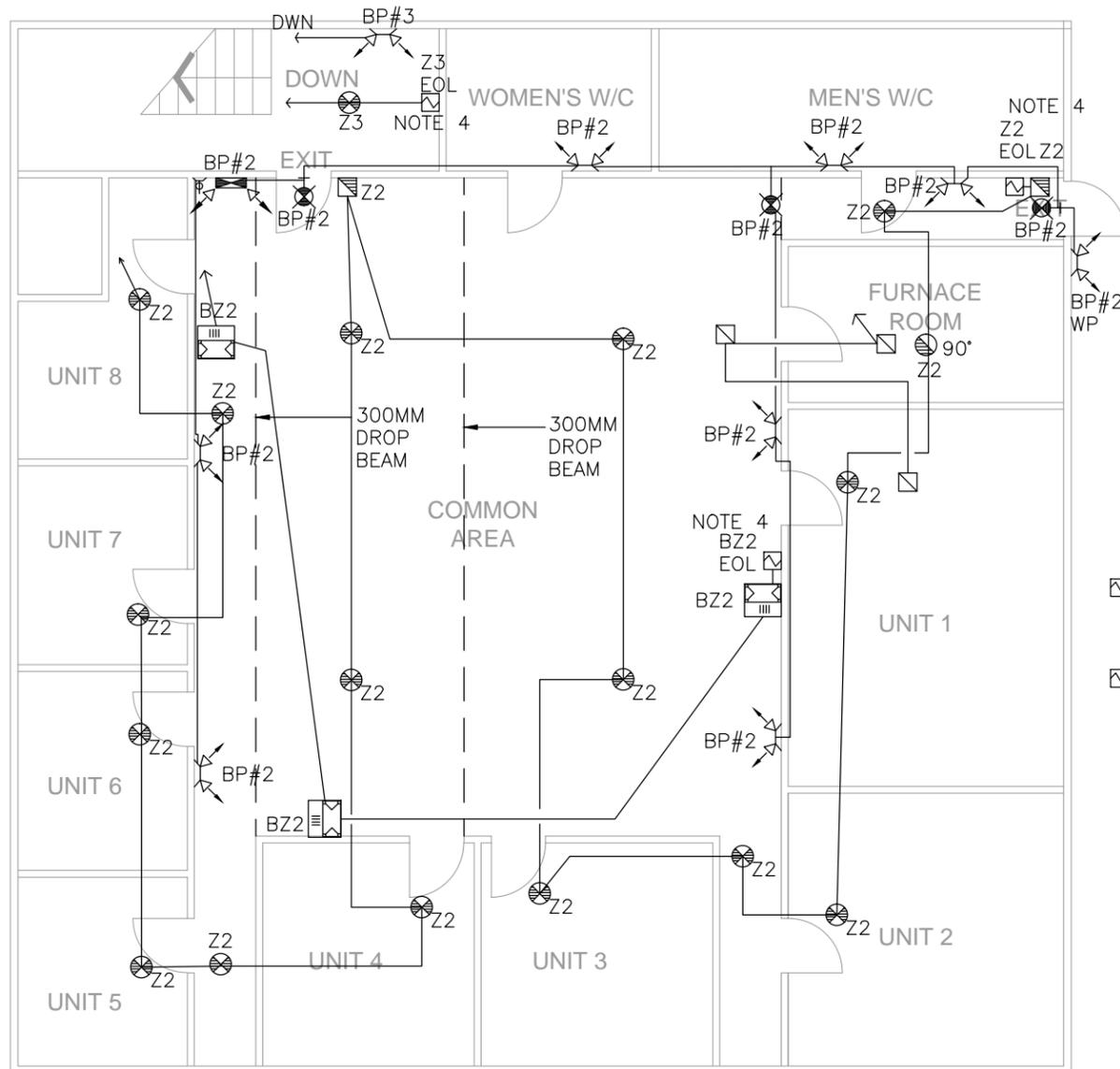
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02 FIRE ALARM RISER DIAGRAM
 E02-02 SCALE: N.T.S.

NOTES:

1. CONFIRM ACCEPTABLE DEVICE VOLTAGE DROP WITH MANUFACTURER AND SIZE CONDUCTORS ACCORDINGLY.
2. ENSURE 40% MAXIMUM CONDUIT FILLS.
3. FIRE ALARM SYSTEM TO BE SETUP AS SINGLE STAGE SYSTEM.

Notes

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File Name:		Dwn.	Chkd.
			Des

01 2ND FLOOR FIRE ALARM & EMERGENCY LIGHTING
 E02-02 SCALE: 1:100

NOTES: (APPLIES TO 01/E02-02 ONLY)

1. ENSURE THAT ALL FIRE ALARM INITIATING DEVICES ARE INSTALLED A MINIMUM OF 450MM FROM SUPPLY/RETURN AIR GRILLS.
2. ALL PULL STATIONS TO BE MOUNTED AT 1200MM ON CENTER AFF.
3. END OF LINE DEVICES TO BE IN A SEPARATE BOX USED FOR NO OTHER PURPOSE MOUNTED AT A MAXIMUM HEIGHT OF 1800MM ABOVE FINISHED FLOOR ON CENTER AND LOCATED BEYOND THE LAST DEVICE IN THE CIRCUIT.
4. CONTRACTOR IS PERMITTED TO RELOCATE END-OF-LINE DEVICES AS IS NECESSARY. END-OF-LINE DEVICES ARE TO BE LOCATED IN THE COMMON AREA AND NOT IN A BEDROOM, STORAGE, OR OFFICE SPACE.
5. ALL CO DEVICES ARE TO BE INTERCONNECTED WITHIN THE BUILDING. CIRCUIT THE CO DETECTORS WITH AN EXISTING LIGHTING CIRCUIT.

Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title
2ND FLOOR FIRE ALARM, EMER LIGHTING AND DETAILS
 Work Task 03

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	Re

SECTION 1.0 DIVISION 26 & 28 GENERAL REQUIREMENTS

1.1.0 GENERAL MATERIALS AND LABOR

- 1.1.1 PERFORM ELECTRICAL INSTALLATIONS SO AS TO FORM COMPLETE AND OPERATING SYSTEMS. PROVIDE EVERYTHING NECESSARY TO FORM A COMPLETE AND OPERATING SYSTEM EVEN IF NOT SPECIFICALLY CALLED FOR IN THESE DRAWINGS AND SPECIFICATIONS.
- 1.1.2 ALL INSTALLATIONS ARE TO COMPLY WITH THE CANADIAN ELECTRICAL CODE, THE NATIONAL BUILDING CODE AND THE REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION.
- 1.1.3 OBTAIN ALL PERMITS REQUIRED BY LOCAL AUTHORITIES PRIOR TO BEGINNING WORK. PROVIDE A FINAL ACCEPTANCE CERTIFICATE FROM THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION UPON COMPLETION OF THE WORK.
- 1.1.4 SUBMIT TO THE LOCAL INSPECTION DEPARTMENT THE REQUIRED NUMBER OF DRAWING SETS AND INCLUDE IN THIS TENDER ALL COSTS FOR DRAWING PRINTS, PLAN REVIEWS, PERMIT COSTS AND SURVEYS.
- 1.1.5 NOTIFY THE ENGINEER OF ANY CHANGES REQUESTED BY THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION PRIOR TO MAKING SAID CHANGES.
- 1.1.6 THE WORD 'PROVIDE' MEANS THE SUPPLY, DELIVERY AND INSTALLATION OF DEVICE OR EQUIPMENT REFERENCED TO THE LEVEL REQUIRED TO BE COMPLETE AND OPERATIONAL. 'SUPPLY' MEANS TO OBTAIN AND DELIVER TO THE PROJECT SITE, READY FOR UNPACKING ASSEMBLY AND INSTALLATION. 'INSTALL' MEANS THE UNLOADING, UNPACKING, ASSEMBLING, ERECTING, APPLYING, FINISHING, PROTECTING, CLEANING AND SIMILAR OPERATIONS AT THE PROJECT SITE TO COMPLETE ITEMS OF WORK SUPPLIED BY OTHERS.
- 1.1.7 EXAMINE THE SITE PRIOR TO SUBMITTING TENDER. NO EXTRAS WILL BE PROVIDED FOR WORK THAT WOULD HAVE BEEN EVIDENT UPON A THOROUGH INVESTIGATION OF THE SITE.
- 1.1.8 PROVIDE COPIES OF THE ENGINEERED DRAWINGS TO LOCAL UTILITY SUPPLY AUTHORITIES. PRIOR TO ORDERING MATERIALS OR PERFORMING WORK, NOTIFY ENGINEER OF ANY REVISIONS TO THE WORK REQUIRED BY UTILITY SUPPLY AUTHORITIES.

1.2.0 MATERIALS AND WORKMANSHIP

- 1.2.1 EQUIPMENT AND MATERIAL TO BE NEW AND CERTIFIED BY AN ACCREDITED CERTIFICATION BODY OF THE STANDARDS COUNCIL OF CANADA (SCC). WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT SCC APPROVED, OBTAIN SPECIAL APPROVAL FROM THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION AND PAY ALL ASSOCIATED FEES. NOTIFY ENGINEER PRIOR TO SUPPLYING MATERIAL THAT IS NOT SCC APPROVED.
- 1.2.2 KEEP A COMPETENT FOREMAN AND TRADESMEN QUALIFIED FOR WORK IN THE PROVINCE OR TERRITORY OF THE PROJECT LOCATION AT ALL TIMES DURING WORK IN PROGRESS. ALL WORKERS ON THE SITE ARE TO BE SATISFACTORY TO THE ENGINEER.
- 1.2.3 OBTAIN CLARIFICATION FROM THE ENGINEER WHERE THE INTENT OF THE DRAWINGS OR SPECIFICATIONS ARE NOT CLEAR. MAKE CORRECTIONS TO WORK PERFORMED CONTRARY TO THE INTENT OF THE DRAWINGS OR SPECIFICATIONS AND BEAR ALL COSTS FOR MAKING SAID CORRECTIONS.
- 1.2.4 COORDINATE ALL WORK DESCRIBED BY THESE DRAWINGS AND SPECIFICATIONS WITH THAT OF OTHER TRADES WORKING ON THE SITE SO AS TO NOT HOLD UP THE PROGRESS OF OTHER TRADES.
- 1.2.5 NO SUBSTITUTION OF MATERIALS IS PERMITTED WITHOUT THE WRITTEN ACCEPTANCE OF THE ENGINEER 10 DAYS PRIOR TO TENDER CLOSING.

1.3.0 CUTTING, PATCHING, EXCAVATION & BACKFILLING

- 1.3.1 ARRANGE AND PAY FOR ALL CUTTING AND PATCHING COSTS RELATED TO THE WORK OF THIS CONTRACT.

1.4.0 SUBMITTALS

- 1.4.1 SUBMIT SHOP DRAWINGS CLEARLY INDICATING DETAILS OF MATERIAL FABRICATION, LAYOUT, DIMENSIONS, CAPACITIES, PERFORMANCE CHARACTERISTICS, CERTIFICATION STANDARDS, WEIGHT, WIRING DIAGRAMS AND OTHER PERTINENT INFORMATION.
- 1.4.2 PROVIDE SHOP DRAWINGS FOR ALL EQUIPMENT DEVICES INCLUDING FIRE ALARM CONTROL PANEL, INITIATING DEVICES, SIGNAL DEVICES, CO DETECTORS, EMERGENCY LIGHTING BATTERY PACKS, REMOTE HEADS AND EXIST SIGNS. SHOP DRAWINGS SUBMITTED TO THE ENGINEER ARE TO HAVE THE PRIOR APPROVAL STAMPS OF THE CONTRACTOR.



Stantec Architecture I
107 Main Street, Suite 2
Whitehorse YT Canada
Y1A 2A7
Tel. 867.633.2400
Fax. 867.633.2481
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Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title

SPECIFICATIONS 1

Work Task 03

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SECTION 2.0 PRODUCTS AND EXECUTION

2.1.0 WIRING AND CONDUIT

- 2.1.1 BUILDING WIRING TO BE COPPER RW90 XLPE INSTALLED IN EMT CONDUIT EXCEPT WHERE OTHERWISE INDICATED ON THESE DRAWINGS. PROVIDE OFFSET SWEEPS IN/OUT OF JUNCTION BOXES.
- 2.1.2 ENSURE THAT CONDUIT IS DRY PRIOR TO WIRING INSTALLATION. SEAL CONDUIT THAT MAY BECOME EXPOSED TO MOISTURE.
- 2.1.3 RUN CONDUIT PARALLEL TO BUILDING LINES EXCEPT WHERE SPECIFICALLY INDICATED.
- 2.1.4 USE WIRING APPROVED FOR FIRE ALARM INSTALLATIONS FOR FIRE ALARM SYSTEMS. TO BE NEXANS SECUREX II OR EQUAL FOR BOTH SIGNALING & INITIATION CIRCUITS.
- 2.1.5 DO NOT CUT STRUCTURAL MEMBERS EXCEPT WHERE SPECIFICALLY INDICATED.
- 2.1.6 PROVIDE PULL CORD IN ALL EMPTY CONDUIT RUNS THAT EXCEED 3 METERS IN LENGTH OR THE TOTAL SUM OF BENDS EXCEED 90 DEGREES.

2.2.0 WIRING DEVICES AND FIXTURES

- 2.2.1 DUPLEX RECEPTACLES: WHITE, CSA 5-15R PATTERN, 125V, 15A, U-GROUND, HUBBELL 5251 SERIES OR LEVITON 5242 SERIES.

2.4.0 BONDING

- 2.4.1 PROVIDE BONDING INSTALLATIONS NECESSARY TO MEET THE REQUIREMENTS OF THE CURRENT CANADIAN ELECTRICAL CODE AND ADDITIONAL REQUIREMENTS INDICATED ON THESE DRAWINGS OR SPECIFICATIONS.
- 2.4.2 PROVIDE BOND WIRE FOR FIRE ALARM THROUGHOUT.

2.8.0 FIRE ALARM SYSTEM

- 2.8.1 FIRE ALARM SYSTEM TO MEET THE REQUIREMENTS OF THE LATEST APPLICABLE VERSIONS OF THE FOLLOWING CODES/STANDARDS:
- .1 CAN/ULC-S524 INSTALLATION OF FIRE ALARM SYSTEMS
 - .2 CAN/ULC-S525 AUDIBLE SIGNAL APPLIANCES FOR FIRE ALARM
 - .3 CAN/ULC-S527 CONTROL UNITS FOR FIRE ALARM SYSTEMS
 - .4 CAN/ULC-S528 MANUAL PULL STATIONS
 - .5 CAN/ULC-S529 SMOKE DETECTORS FOR FIRE ALARM SYSTEMS
 - .6 CAN/ULC-S530 FIRE DETECTORS, HEAT ACTUATED, FOR FIRE ALARM SYSTEMS
 - .7 CAN/ULC-S536 INSPECTION AND TESTING OF FIRE ALARM SYSTEMS
 - .8 CAN/ULC-S537 VERIFICATION OF FIRE ALARM SYSTEMS
 - .9 NBCC - NATIONAL BUILDING CODE OF CANADA
- 2.8.2 FIRE ALARM SYSTEM: CONVENTIONAL, SUPERVISED, ANNUNCIATED, 24 VOLT AC/DC SYSTEM.
- 2.8.3 SYSTEM TO INCLUDE CONTROL PANEL, TROUBLE SIGNAL DEVICES, POWER SUPPLY FACILITIES, MANUAL ALARM STATIONS, AUTOMATIC ALARM INITIATING DEVICES, AUDIBLE/VISUAL SIGNAL DEVICES, (INTERIOR) END-OF-LINE DEVICES, AND ANCILLARY DEVICES.
- 2.8.4 INCLUDE INSTRUCTIONS FOR COMPLETE FIRE ALARM SYSTEM TO PERMIT EFFECTIVE OPERATION AND MAINTENANCE, TECHNICAL DATA - ILLUSTRATED PARTS LISTS WITH PARTS CATALOGUE NUMBER, COPY OF APPROVED SHOP DRAWINGS WITH CORRECTIONS COMPLETED AND MARKS REMOVED EXCEPT REVIEW STAMPS AND A LIST OF RECOMMENDED SPARE PARTS FOR SYSTEM.



Stantec Architecture I
107 Main Street, Suite 2
Whitehorse YT Canada
Y1A 2A7
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Client/Project

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Whitehorse, YT

Title

SPECIFICATIONS 2

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2.8.5 EQUIPMENT AND DEVICES:

- .1 FIRE ALARM CONTROL PANEL: FACP SHALL BE CLASS B SYSTEM WITH 80-CHARACTER BACKLIT ALPHANUMERIC LCD TO BE ABLE TO COMMUNICATE WITH AND CONTROL THE FOLLOWING EQUIPMENT: SMOKE AND HEAT DETECTORS, SINGLE-STAGE MANUAL PULL STATIONS, ANNUNCIATORS AND OTHER SYSTEM CONTROLLED DEVICES. THE OPERATOR CONTROL SHALL HAVE ACKNOWLEDGE SWITCH, ALARM SILENCE SWITCH, ALARM ACTIVATE SWITCH, SYSTEM RESET SWITCH, LAMP TEST SWITCH AS A MINIMUM. THE CONTROL PANEL SHALL PROVIDE OR SHALL BE CAPABLE OF EXPANDING FOR COMMUNICATING WITH ADDITIONAL DEVICES AND SHALL INCLUDE FORM-C ALARM, TROUBLE, SUPERVISORY AND SECURITY RELAYS. IT SHALL ALSO INCLUDE A MINIMUM OF 10 CLASS-B INITIATING CIRCUITS AND 4 CLASS-B NOTIFICATION APPLIANCE CIRCUITS. ULC LISTED. PRODUCT STANDARD OF ACCEPTANCE: NOTIFIER SFP-10UDC.
- .2 CONVENTIONAL SMOKE DETECTORS: FIELD ADJUSTABLE SENSITIVITY OF ALL SMOKE DETECTORS ON SITE. CEILING MOUNT WITH SEPARATE TWIST LOCK BASE AND TAMPER PROOF FEATURE. POSITIVE VISUAL INDICATION OF ALARM. BUILT IN TEST SWITCH. SENSOR - STABLE OPERATION UP TO 1200 FEET PER METER. ULC LISTED. PRODUCT STANDARD OF ACCEPTANCE: NOTIFIER 1451A
- .3 CONVENTIONAL STANDARD HEAT DETECTORS: STANDARD THERMAL DETECTORS SHALL BE RATED AT 57.2°C AND HAVE A RATE OF RISE ELEMENT RATED AT 8.3°C PER MINUTE. REMOVABLE COVER FOR FIELD CLEANING. POSITIVE VISUAL INDICATION OF ALARM. BUILT IN TEST SWITCH. FIELD METERING OF DETECTOR SENSITIVITY. TAMPER PROOF. ULC LISTED. PRODUCT STANDARD OF ACCEPTANCE: NOTIFIER 5601A SERIES.
- .4 CONVENTIONAL HIGH TEMPERATURE HEAT DETECTOR: HIGH TEMPERATURE THERMAL DETECTORS SHALL BE RATED AT 90°C FIXED OR 57.2°C FIXED (AS SHOWN ON DRAWINGS). REMOVABLE COVER FOR FIELD CLEANING. POSITIVE VISUAL INDICATION OF ALARM. BUILT IN TEST SWITCH. FIELD METERING OF DETECTOR SENSITIVITY. TAMPER PROOF. ULC LISTED. PRODUCT STANDARD OF ACCEPTANCE: NOTIFIER 5603A/5604A SERIES.
- .5 CONVENTIONAL PULL STATIONS: NORMALLY OPEN CONTACT, NON-CODED, NON-BREAK-GLASS TYPE, WITH POSITIVE VISUAL INDICATION OF OPERATION. TO BE CONSTRUCTED OF DURABLE EXTRUDED ALUMINUM. RESET USING A RESET KEY. RED SURFACE BACK BOXES TO BE SUPPLIED AS REQUIRED. ULC LISTED. PRODUCT STANDARD OF ACCEPTANCE: NOTIFIER N-MPS SERIES.
- .6 ALL SELECTED DEVICES ARE TO BE APPROVED FOR USE WITH SELECTED FIRE ALARM SYSTEM PANEL.
- .7 ABOVE EACH MANUAL PULL STATION POST A PERMANENT SIGN READING "IN CASE OF FIRE CALL XXX-XXXX." CONTRACTOR TO COORDINATE NUMBER WITH OWNER.

2.8.7 SYSTEM VERIFICATION:

- .1 PROVIDE AN INSPECTOR THAT IS QUALIFIED TO PERFORM FIRE ALARM VERIFICATIONS IN THE YUKON AND ON BEHALF OF THE MANUFACTURER IS TO MAKE A THOROUGH INSPECTION OF ANY AND ALL INITIATING AND SIGNAL ZONES. THE INSPECTION IS TO BE PERFORMED TO THE STANDARDS OF CAN/ULC-S537 TO ENSURE THE FOLLOWING:
 - .1 SYSTEM IS COMPLETE AND FUNCTIONAL IN ACCORDANCE WITH ENGINEER'S SPECIFICATIONS.
 - .2 SYSTEM IS INSTALLED ACCORDING TO UNDERWRITERS LAB OF CANADA S524 REQUIREMENTS.
 - .3 SYSTEM IS INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 - .4 REGULATIONS COVERING SUPERVISION OF COMPONENTS ARE ADHERED TO.
 - .5 SUBSEQUENT CHANGES NECESSARY TO CONFORM TO ITEMS 1, 2, AND/OR 3 TO BE DONE WITH TECHNICAL ASSISTANCE SUPPLIED BY THE MANUFACTURER.
- .2 SUPPLY THE FIRE ALARM INSPECTOR ONE JOURNEYMAN ELECTRICIAN DURING THE PERIOD OF THIS INSPECTION.
- .3 THE ENGINEER OF RECORD MUST BE PRESENT DURING THE ENTIRE FIRE ALARM VERIFICATION.
- .4 VERIFICATION MAY BE PERFORMED ONLY AFTER:
 - .1 BUILDING IS AT A STATE OF COMPLETION THAT WILL ENSURE A DUST FREE ENVIRONMENT AND THE ABSENCE OF CONTAMINATING FUMES FROM VERIFICATION DATE TO FINAL COMPLETION.
- .5 ENSURE THAT FIRE ALARM SYSTEM AND ALL ANCILLARY COMPONENTS AND FUNCTIONS ARE FULLY FUNCTIONAL, FREE OF FAULTS AND READY FOR TESTING PRIOR TO REQUESTING FIRE ALARM VERIFICATION.
- .6 NOTIFY ENGINEER AND OWNER OF REQUESTED VERIFICATION DATE AND TIME AT LEAST 10 BUSINESS DAYS IN ADVANCE. INDICATE IN WRITING THAT ITEMS IN 2.8.7.1 ARE COMPLETE.
- .7 PROMPTLY CORRECT ANY DEFICIENCIES IDENTIFIED BY THE FIRE ALARM SYSTEM INSPECTOR DURING THE VERIFICATION INSPECTION.
- .8 PROVIDE TWO FULL CHARGED HAND HELD TWO-WAY VOICE COMMUNICATION RADIOS DURING VERIFICATION, AND BRING TO SITE SPARE PARTS (EG. SMOKE DETECTORS, HEAT DETECTORS, PULL STATIONS, SIGNAL DEVICES, AND OTHER KEY PARTS) THAT MAY BE NECESSARY IN ORDER TO PREVENT FAILURE OF THE VERIFICATION SHOULD A DEVICES FAIL. ANY UNUSED PARTS MAY BE RETURNED TO MANUFACTURER.
- .9 ALL SMOKE DETECTORS ARE TO BE TESTED TO ENSURE THAT THE SENSITIVITY IS WITH THE MANUFACTURERS RANGE REQUIREMENTS AND MEETS THE REQUIREMENTS OF THE ULC REQUIREMENTS.



Stantec Architecture I
 107 Main Street, Suite 2
 Whitehorse YT Canada
 Y1A 2A7
 Tel. 867.633.2400
 Fax. 867.633.2481
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		Desg	

Client/Project

Mt. Nansen Electrical
 Whitehorse, YT

Title

SPECIFICATIONS 3

Work Task 03

Project No.	Scale
144901696	NTS
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E05

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 Whitehorse YT Canada
 Y1A 2A7
 Tel. 867.633.2400
 Fax. 867.633.2481
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Mt. Nansen Electrical

Whitehorse, YT

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SPECIFICATIONS 4

Work Task 03

Project No.	Scale
144901696	NTS
Drawing No.	Sheet
	Re

E06

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2.8.8 FIELD QUALITY CONTROL:

- .1 PERFORM TESTS IN ACCORDANCE WITH THE LATEST APPLICABLE VERSION OF CAN/ULC-S537.
- .2 TEST EACH DEVICE AND ALARM CIRCUIT TO ENSURE MANUAL STATIONS, THERMAL AND SMOKE DETECTORS TRANSMIT ALARM TO CONTROL PANEL AND ACTUATE FIRST STAGE ALARM GENERAL ALARM ANCILLARY DEVICES.
- .3 ENSURE ZONES ARE SHOWN CORRECTLY ON ANNUNCIATOR PANELS.
- .4 ENSURE PROPER OPERATION OF TROUBLE SIGNALS BY SIMULATING GROUNDS AND BREAKS ON ALARM AND SIGNALING CIRCUITS.
- .5 SIMULATE AND TEST ALL AUXILIARY FUNCTIONS.
- .6 MAKE ADJUSTMENT TO AUDIBLE SIGNAL DEVICES (INCLUDING REMOVAL IF NECESSARY) TO ENSURE THAT SOUND PRESSURE LEVELS MEET NBCC (NATIONAL BUILDING CODE OF CANADA) REQUIREMENTS IN ALL AREAS OF THE BUILDING. REFER TO NBC 3.2.4.19.

2.9.0 FIRE STOPPING

- .1 ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES TO BE ADEQUATELY FIRE-STOPPED IN ACCORDANCE WITH THE NBCC (NATIONAL BUILDING CODE OF CANADA), AND TO THE APPROVAL OF THE ENGINEER.
- .2 PROVIDE SHOP DRAWINGS FOR ALL FIRE STOP MATERIAL FOR REVIEW PER SECTION 1.4.0 - SUBMITTALS.

2.10.0 EMERGENCY LIGHTING AND EXIT SIGNS

- 2.10.1 STANDARD ENCLOSURE: EMERGENCY LIGHTING BATTERY PACKS TO INCLUDE 10 YEAR LIFE, SEALED LEAD ACID BATTERIES, AUTOMATIC CHARGER AND TRANSFER SWITCH, 120 VAC INPUT, 12 VDC OUTPUT WITH OUTPUT POWER AND DURATION AS INDICATED BELOW FOR 30 MINUTES, INTEGRAL DOUBLE 12 WATT LIGHTING HEADS WHERE INDICATED ON DRAWINGS. LUMACELL RGS SERIES OR AIMLITE EBST SERIES.
- 2.10.2 REMOTE HEADS TO BE DOUBLE 12WATT QUARTZ HEADS, 12V COMPATIBLE. REMOTE HEAD MANUFACTURER TO MATCH BATTERY PACK MANUFACTURER. TO BE LUMACELL RS SERIES OR AIMLITE RSM SERIES. WHERE REMOTE HEADS ARE REQUIRED TO BE WEATHERPROOF, AIMLITE RMWP SERIES OR LUMACELL RSWP ARE TO BE USED.
- 2.10.3 EMERGENCY LIGHTING DC WIRING TO BE MINIMUM OF #10 AWG. USE LARGER WIRE SIZING AS NECESSARY TO ENSURE VOLTAGE DROP DOES NOT EXCEED 3%.
- 2.10.4 STANDARD EXIT LIGHTING: THERMOPLASTIC, OR ENAMEL FINISH, LIGHT EMITTING DIODE SOURCE, DC VOLTAGE OPTION, SELF-POWERED BATTERY, 5 YEAR WARRANTY, SINGLE OR DOUBLE FACE, ARROW AS SHOWN ON DRAWINGS. NRCAN/CSA C860 COMPLIANT. GREEN RUNNING MAN COMPLIANT. LUMACELL LA SERIES OR AIMLITE RPST SERIES. EXIT LIGHTING IS TO BE FED FROM A DEDICATED BREAKER WITH A TIE LOCK DEVICE INSTALLED.
- 2.10.5 UPON FAILURE OF THE NORMAL ROOM LIGHTING IN AN AREA WITH EMERGENCY LIGHTING, THE EMERGENCY LIGHTING IS TO ACTIVATE SO THAT THE AREA IS NOT LEFT IN TOTAL DARKNESS.
- 2.10.6 MONITORING MODULE. DEVICE THAT GUARANTEES EMERGENCY LIGHTING REMAINS ON OR IS TURNED ON WHEN THE POWER TO A LIGHTING CIRCUIT IS LOST FOR EACH CIRCUIT THAT IS MONITORED. SHALL BE CAPABLE OF CONTROLLING A MINIMUM OF 3 BATTERY PACKS. MODULE TO INCLUDE TEST SWITCH. TO BE LUMACELL VSR OR EQUAL.

2.11.0 CARBON MONOXIDE DETECTOR

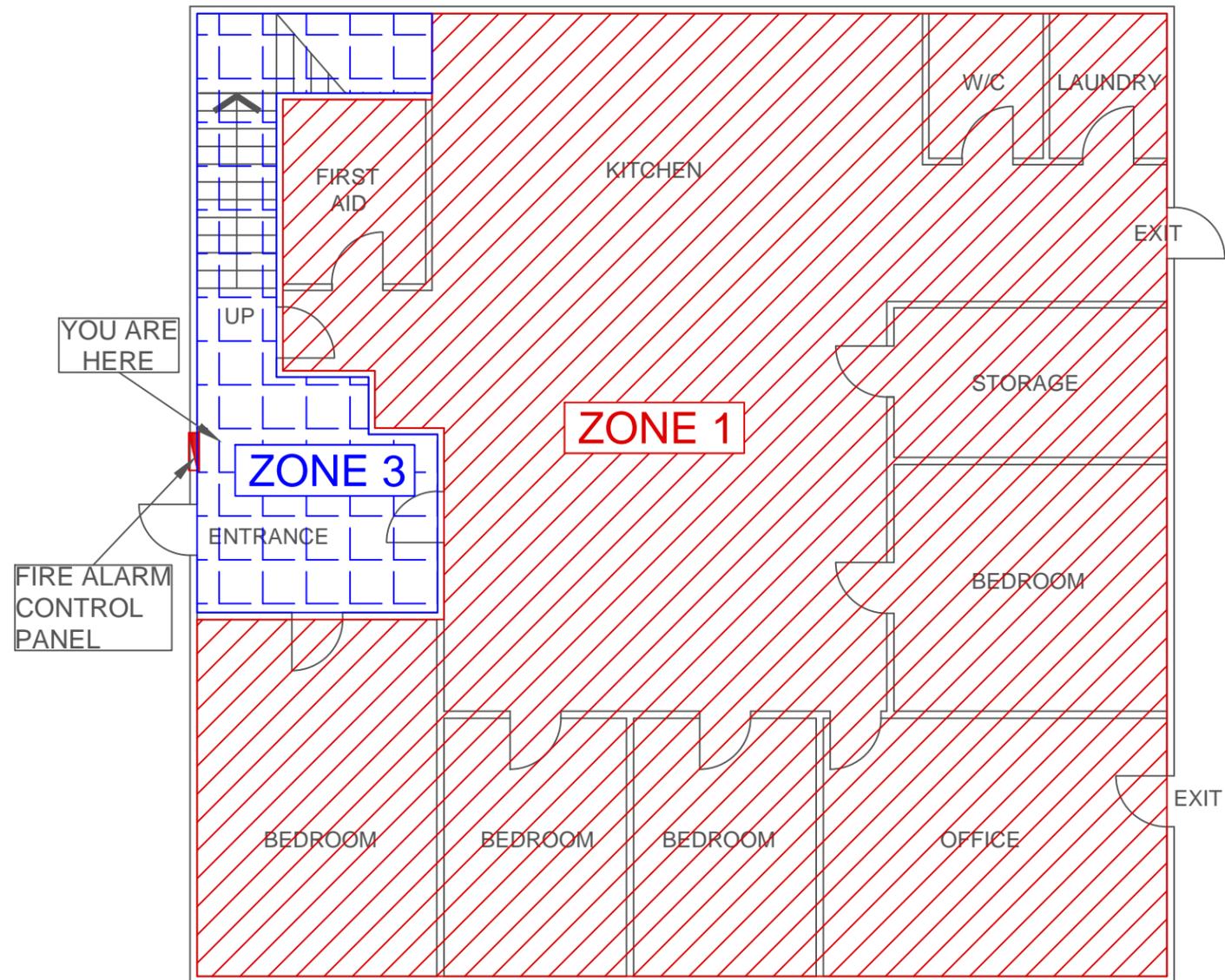
- 2.11.1 DETECTOR TO BE CAPABLE OF HARD WIRED 120V INSTALLATION, INTEGRAL 9VDC BATTERY BACKUP, AND CAPABLE OF HARDWIRED INTERCONNECTION BETWEEN ALL CO DEVICES. ULC APPROVED. CO512BNA OR EQUIVALENT.

SECTION 3.0 EXECUTION

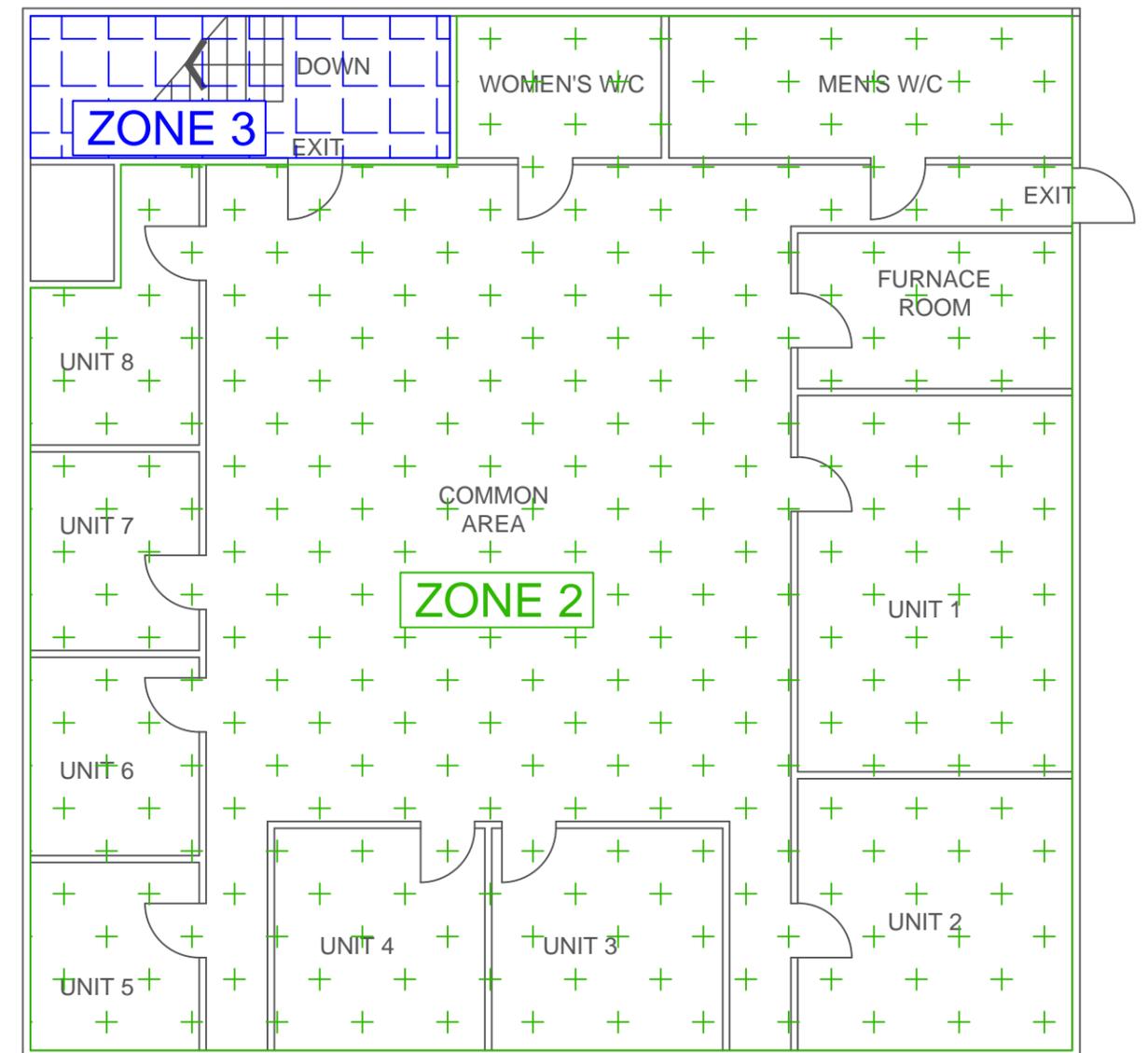
3.1.1 SURFACE FINISHES:

1. THE INTERIOR FINISHES OF THE EXISTING BUILDING ARE COMPRISED OF GYPSUM CEILING AND WALLS. EMT SURFACE CONDUIT IS ACCEPTABLE.

MT. NANSEN BUNKHOUSE FIRE ALARM ZONE PLAN



1ST FLOOR ZONE PLAN



2ND FLOOR ZONE PLAN

ZONE LEGEND	
ZONE 1	[Red diagonal hatching pattern]
ZONE 2	[Green cross pattern]
ZONE 3	[Blue grid pattern]



MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 04
March 10, 2014

10.0 Work Task 04



Work Task Instruction

Project Name:	Mt. Nansen Electrical	Instruction #:	WT- 04
Location:	Mt. Nansen, Yukon		
Stantec Project #:	144901696-02-01	Date of Issue:	18 December, 2012
Client Project #:		Contract #:	
Contractor:		Owner:	Assessment and Abandoned Mines Branch Energy, Mines & Resources Government of Yukon
Attention:		Attention:	Erik Pit, Regulatory Affairs Officer
REFERENCE:	Testing of Main Site Distribution Transformer – Work Task 04		

Supplemental Instructions are issued to clarify or interpret contract documents or to provide direction resulting from field conditions. Supplemental Instructions are subject to the provisions of the Contract. Proceeding with work in accordance with these Instructions indicates the Contractor's acknowledgement there will be no change in the Contract Price or the Contract Time. If the Contractor believes that this instruction affects the Contract Price or the Contract Time, the Contractor shall promptly notify the Consultant.

DESCRIPTION

#	INSTRUCTION
	All tasks below are in reference to the main site distribution transformer (500kVA, 480/4160V). The intent is that this work task be provided to contract personnel experienced in the procedures for transformer testing and oil sampling and with the suitable equipment for conducting the work in a safe manner. The work is to be conducted in accordance with the requirements of the testing laboratory and the applicable ASTM standards. It is expected that site power will be disconnected and locked out, and that all grounding and safety procedures will be in place prior to conducting inspections and sampling. Arrange and schedule any power shut-downs with Abandoned Mines Branch and obtain approval of schedule in advance of proceeding.
WT04-01	Prior to conducting any oil sampling determine if the transformer may contain PCB's. If in doubt inform Assessment and Abandoned Mines before proceeding.
WT04-02	Perform visual observation of the transformer exterior and check electrical connections and cabling. Report any signs of leakage, connection issues, inadequate torques, damaged cables or other observations that may be detrimental to the continued operation of the transformer.



Project:	Mt. Nansen Electrical	Project No.:	144901696	WT No.:	WT- 04
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WT04-03

Obtain oil sampling package from testing laboratory. Remove oil samples in accordance with the requirements of the testing laboratory and ASTM guidelines. Ensure that inappropriate exposure to atmosphere and other contaminants is prevented. Package and ship samples to testing laboratory following all laboratory requirements. As a minimum, the following tests are to be conducted:

- .1 Dissolved gas analysis;
- .2 Interfacial Tension;
- .3 Specific Gravity;
- .4 Moisture Content (Karl Fischer);
- .5 PCB verification.

Obtain from the testing laboratory the results of all tests conducted along with any recommendations for immediate action and recommended subsequent tests and testing schedule. Provide recommendations to Abandoned Mines Branch.

DISTRIBUTION

Name	Company	Via
Erik Pit	Assessment and Abandoned Mines Branch	Erik.pit@gov.yk.ca
Issued By:	Person / Title	Signature
Stantec Electrical	Rod Savoie, P.Eng.	



Safe Reliable Operation and Maintenance (SROM) Report

Transformer OLTC OCB

Over all reliability of Equipment 2 = Good

1=Excellent 2=Good 3=Fair (action require) 4=Poor (action require)

Comments: Overall condition of the unit appears to be good. Co, Co2, and Furan level indicates that paper mechanical strength approaching mid life of the unit. Continue to monitor and trend gas levels. Fluid quality appears to be in good condition. Complete name plate information helps to assess the unit condition better.

With current conditions fire and safety hazards present No
Moisture dynamics calculation of oil and paper are within limit Yes
Oil re-conditioning or re-clamation may require in next 5 years No
Oil replacement require may require in next 5 years No
Next sample date and tests recommended SROM 10/21/14

Fluid Analysis Report 2006749

Equipment 2006749 Tank BOT MAIN
Serial No. 2006749
Apparatus type TRN
Group name GENERAL
Owner ARCRITE NORTHERN
Norms TRN_PWR_IEC_72.5KV
Fluid type OIL

Gas Analysis Limit ASTM

Table with 4 columns: Parameter, Value, Limit, ASTM. Rows include Sample date (10/21/13), Fluid temp (25), Hydrogen (65), Methane (11), Ethane (2), Ethylene (7), Acetylene (0), Carbon Monoxide (526), Carbon Dioxide (8247), Oxygen (12016), Nitrogen (56520), Total heat gas (20), TDCG (611), Equivalent TCG (0.773), Est. safe handling limit (8.4), CO2/CO (15.679), O2/N2 (0.213).

Fluid Quality

Table with 4 columns: Parameter, Value, Limit, ASTM. Rows include DB D1816 (61), PF at 25 C (0.078), PF at 100 C (0.951), Acid number (0.039), Interfacial tension (28), Oxidation inhibitor (0.42), Specific Gravity (0.886), Color (1.5), Oil quality index (1.4), PF100/PF25 (12.192), Visual (CLR/BRT), Aluminum (1), Barium (0).



Safe Reliable Operation and Maintenance (SROM) Report

Boron ppm	0
Calcium ppm	2
chromium ppm	0
Copper ppm	0
Iron ppm	0
Lead ppm	1
molybdenum ppm	0
magnesium ppm	0
Nickel ppm	0
Phosphorus ppm	1
Silicon ppm	0
Silver ppm	0
Sodium ppm	2
Tin ppm	0
Zinc ppm	0

Moisture Analysis

Fluid temp °C	25
Moisture ppm	9
Relative saturation %	13
Dew point °C	-16

Furans

Total furan ppb	214	Indiv.
Estimated DP	623	

Particle Analysis

4 µm and larger No	1241	Indiv.
6 µm and larger No	383	
14 µm and larger No	63	
21 µm and larger No	27	
38 µm and larger No	8	
Total particle count No	1241	
First quartile of sizes	4.7	
Median particle size	5.4	
Third quartile of sizes	7.8	
Interquartile range	3.1	
Mean particle size	7.3	
Standard deviation	5.52	
Skewness	1.032	

Fluid Analysis Report 2006749

Limits are applicable only when no history present. SROM provides in depth analysis of results.

The analysis, opinion or interpretation in this report are based on the information provided, sample received and best judgement of HV Oil Incorporated. HV Oil Incorporated does not accept liability for any omissions or errors in this report which may arise as a result contaminated sample, change of chemical property. HV Oil assumes no responsibility and makes no warranty or representation, expressed or implied as to the condition, productivity, proper operation of equipment or other property for which this report may be used or relied upon for any reason whatsoever.

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 05
March 10, 2014

11.0 Work Task 05



Stantec Architecture Ltd.
 107 Main Street, Suite 202
 Whitehorse YT Canada
 Y1A 2A7
 Tel. 867.633.2400
 Fax. 867.633.2481
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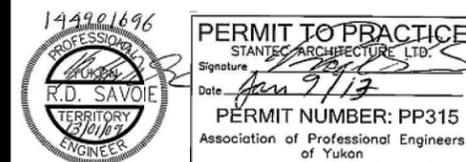
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Notes

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Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title
 VICTORIA CREEK PUMPHOUSE REVISIONS

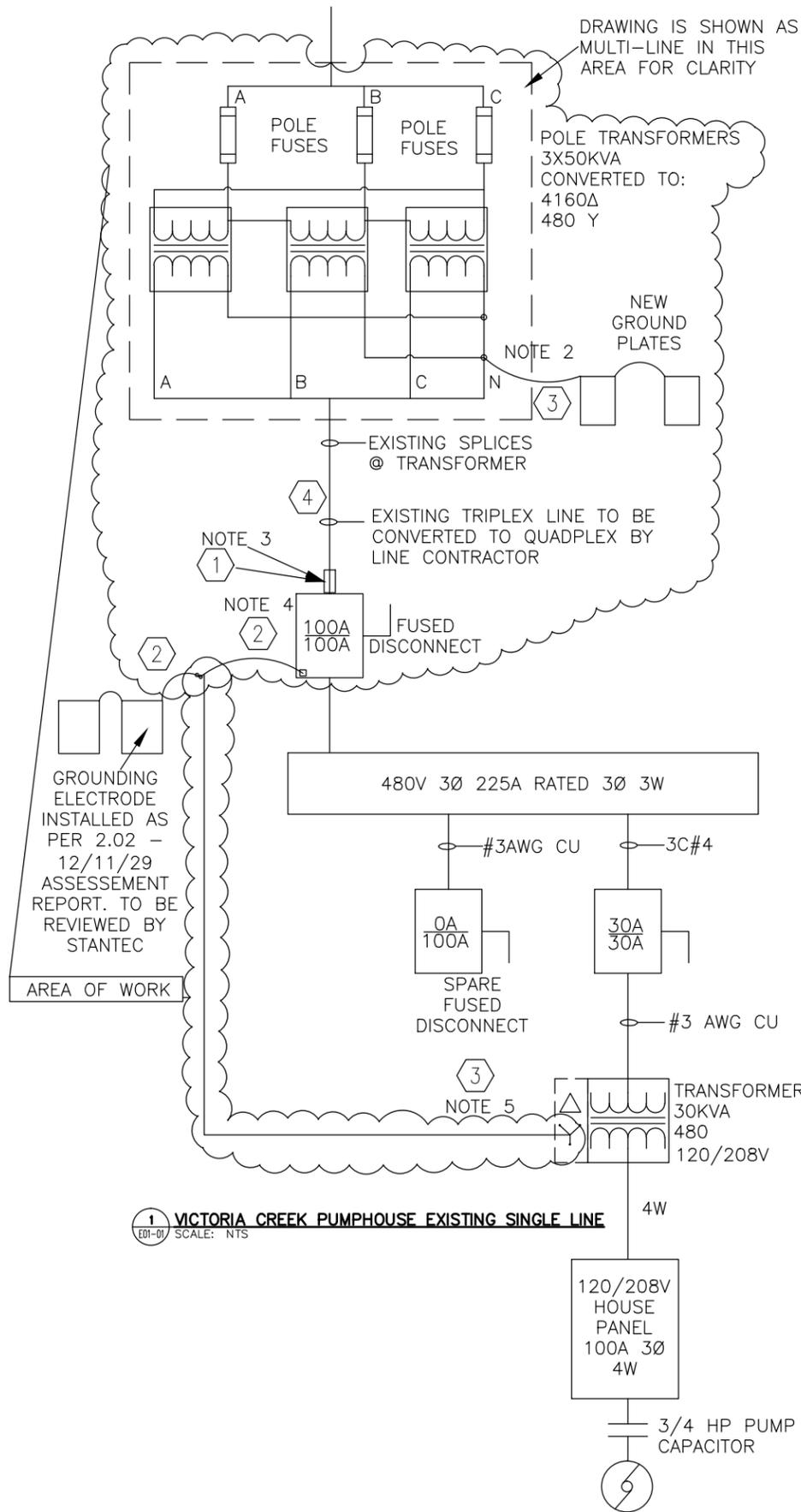
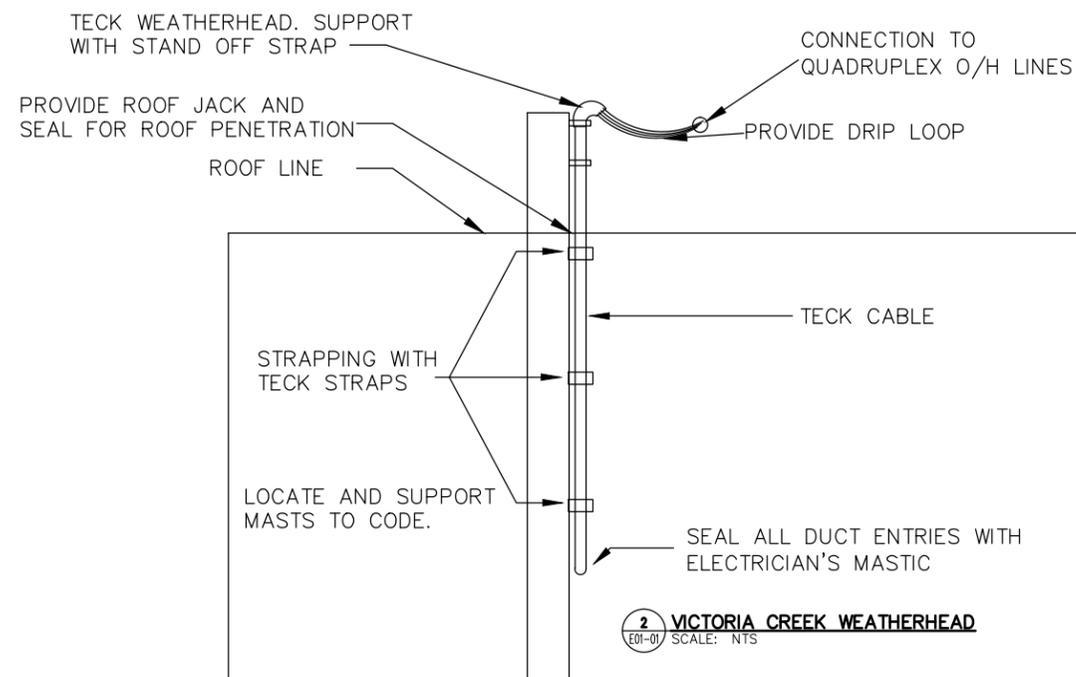
Work Task 05

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144901696	AS NOTED	
Drawing No.	Sheet	Revision
E01-01	1 of 5	1

NOTES:

- PRIOR TO MODIFYING TRANSFORMER CONNECTIONS OR ORDERING ASSOCIATED MATERIAL, CONFIRM WHETHER OR NOT THE EXISTING TRANSFORMER TAPS ARE SUITABLE FOR BEING CONNECTED IN A 277/480V WYE CONFIGURATION. ADVISE A.A/M. OF STATUS.
- IF SERVICE IS HIGH LEG SERVICE, RECONFIGURE TRANSFORMER BANK TO DELTA / WYE CONFIGURATION USING #2 AL CONDUCTORS. PROVIDE TWO NEW 3000M GROUND RODS WITH A MINIMUM OF 3000MM SEPARATION. INSTALL GROUND RODS ADJACENT TO THE TRANSFORMER POLE. CONNECT CONDUCTOR FROM XO POINT OF TRANSFORMER SECONDARY TO GROUND RODS. INCLUDE GROUND HUB WHERE CONDUCTOR PASSES THROUGH TRANSFORMER CASING. REFER TO CONDUCTOR SCHEDULE FOR CONDUCTOR SIZE AND TYPE. GROUNDING CONDUCTOR IS TO BE A SOLID CONDUCTOR FREE OF ANY SPLICES.
- REPLACE EXISTING TECK CABLE FROM THE POINT OF O/H QUADRUPLIX CONNECTION TO THE BUILDING MAIN DISCONNECT WITH TECK CABLE AS SHOWN. REFER TO THE CONDUCTOR SCHEDULE FOR CONDUCTOR SIZE AND TYPE. REFER TO DETAIL 2/E01-01 FOR DETAILS ON THE WEATHERHEAD INSTALLATION.
- REPLACE EXISTING 100A 3P FUSED DISCONNECT SWITCH WITH NEW 100A 3P, 600V SERVICE ENTRANCE-APPROVED SWITCH AND PROVIDE AND INSTALL THREE (3) NEW 100A FUSES. ENSURE THAT NEUTRAL BUS ON SERVICE ENTRANCE SWITCH IS GROUNDED. CONNECT BARE CU GROUNDING CONDUCTOR (AS NOTED IN THE CONDUCTOR SCHEDULE) FROM THE NEUTRAL BUS ON THE SERVICE SWITCH TO THE GROUND PLATE CONDUCTOR. USE COMPRESSION FITTINGS OR CADWELD FOR CONNECTIONS TO GROUNDING PLATE CONDUCTOR.
- CONNECT THE XO POINT ON THE SECONDARY SIDE OF THE TRANSFORMER TO THE GROUND ELECTRODE CONDUCTOR USING A COMPRESSION CONNECTION OR CADWELD. INCLUDE GROUND HUB WHERE CONDUCTOR PASSES THROUGH TRANSFORMER CASING. REFER TO CONDUCTOR SCHEDULE FOR CONDUCTOR SIZE AND TYPE.

CONDUCTOR SCHEDULE (APPLIES TO ALL DRAWINGS)		
CONDUTOR	EXISTING	REPLACE WITH
①	3C #2 TECK	4C #1 AL TECK
②	NOT EXISTING	#6 BARE CU CONDUCTOR
③	NOT EXISTING	#3 RW90 XLPE GREEN INSULATED OR BARE CU CONDUCTOR WITH GROUND HUB
④	TRIPLEX	4C #2 AL QUADRUPLIX TO BE INSTALLED BY POWER LINE CONTRACTOR
⑤	3C #10AWG	3C #6 CU TECK
⑥	4C #10AWG	4C #8 CU TECK



MATERIALS LIST FOR E01-01

MATERIAL	DESCRIPTION	QUANTITY	NOTE REFERENCE
GROUND PLATES	AS PER SPECS	2	NOTE 1
#6 CU GROUND CONDUCTOR	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE 3
QUADRUPLIX 4C #2AL	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE 2
4C #1 AL TECK CABLE	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE 2
TECK WEATHERHEAD	FOR 4C #1 TECK	1	NOTE 2
TECK FITTINGS	AS REQUIRED	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE 2
TECK STRAPS	AS REQUIRED	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE 2
EMT CONDUIT FITTINGS	AS REQUIRED	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE 2
WEATHERHEAD STRAPPING	AS REQUIRED	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE 2
ROOF JACK	FOR SEALING PENETRATION OF ROOF @ THE SERVICE MAST ENTRANCE	1	NOTE 2
SERVICE ENTRANCE FUSED SWITCH (50A)	AS PER SPECS	1	NOTE 3
100A FUSES	AS PER SPECS	3	NOTE 3
GROUND #3 CU CONDUCTOR	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE1, NOTE 4
GROUND HUB	SUITABLE FOR #2 TO #6 WIRE	2	NOTE1, NOTE 4

MATERIALS LIST E01-02

MATERIAL	DESCRIPTION	QUANTITY	NOTE REFERENCE
45A FUSES	AS PER SPECS	6	NOTE A
LOADCENTER	30CCT, AS PER SPECS	1	NOTE B
GROUND #3 CU CONDUCTOR	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE C
GROUND #6 CU CONDUCTOR	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE F
SERVICE ENTRANCE FUSED SWITCH (50A)	AS PER SPECS	1	NOTE F
TRANSFORMER	AS PER SPECS	1	NOTE D
STARTER	NEMA SIZE 3 STARTER. SEE SPECS	1	NOTE E
OVERLOAD DEVICES	AS PER MOTOR NAMEPLATE	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE E
3C #6 AWG CU TECK	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE E
GROUND HUB	SUITABLE FOR #2 TO #6 WIRE	3	NOTE C, NOTE D, NOTE F
SHEET METAL	SHEET METAL AROUND TRANSFORMER SEE SPECS	QUANTITY TO BE DETERMINED BY D.E.S.	NOTE D
TECK WEATHERHEAD	FOR 4C #8 TECK	1	NOTE G
TECK FITTINGS	AS REQUIRED	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE G
TECK STRAPS	AS REQUIRED	QUANTITIES TO BE DETERMINED BY D.E.S.	NOTE G
4C #8 AWG CU TECK	AS PER CONDUCTOR SCHEDULE	LENGTHS TO BE DETERMINED BY D.E.S.	NOTE G



Stantec Architecture Ltd.
107 Main Street, Suite 202
Whitehorse YT Canada
Y1A 2A7
Tel. 867.633.2400
Fax. 867.633.2481
www.stantec.com

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Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title

MATERIALS LIST

Work Task 05

Project No.	Scale	
144901696	AS NOTED	
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ELECTRICAL SPECIFICATIONS

1.1.0 GENERAL REQUIREMENTS

- 1.1.1 PERFORM ELECTRICAL INSTALLATIONS SO AS TO FORM COMPLETE AND OPERATING SYSTEMS. PROVIDE EVERYTHING NECESSARY TO FORM A COMPLETE AND OPERATING SYSTEM EVEN IF NOT SPECIFICALLY CALLED FOR IN THESE DRAWINGS AND SPECIFICATIONS.
- 1.1.2 ALL INSTALLATIONS ARE TO COMPLY WITH THE CANADIAN ELECTRICAL CODE, THE NATIONAL BUILDING CODE AND THE REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION.
- 1.1.3 OBTAIN ALL PERMITS REQUIRED BY LOCAL AUTHORITIES PRIOR TO BEGINNING WORK. PROVIDE A FINAL ACCEPTANCE CERTIFICATE FROM THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION UPON COMPLETION OF THE WORK.
- 1.1.4 SUBMIT TO THE LOCAL AUTHORITY HAVING JURISDICTION DEPARTMENT THE REQUIRED NUMBER OF DRAWING SETS AND INCLUDE IN THIS TENDER ALL COSTS FOR DRAWING PRINTS, PLAN REVIEWS, PERMIT COSTS AND SURVEYS.
- 1.1.5 NOTIFY THE ENGINEER OF ANY CHANGES REQUESTED BY THE LOCAL AUTHORITY HAVING JURISDICTION PRIOR TO MAKING SAID CHANGES.
- 1.1.6 THE WORD 'PROVIDE' MEANS THE SUPPLY, DELIVERY AND INSTALLATION OF DEVICE OR EQUIPMENT REFERENCED TO THE LEVEL REQUIRED TO BE COMPLETE AND OPERATIONAL. 'SUPPLY' MEANS TO OBTAIN AND DELIVER TO THE PROJECT SITE, READY FOR UNPACKING ASSEMBLY AND INSTALLATION. 'INSTALL' MEANS THE UNLOADING, UNPACKING, ASSEMBLING, ERECTING, APPLYING, FINISHING, PROTECTING, CLEANING AND SIMILAR OPERATIONS AT THE PROJECT SITE TO COMPLETE ITEMS OF WORK SUPPLIED BY OTHERS.

1.2.0 MATERIALS AND WORKMANSHIP

- 1.2.1 EQUIPMENT AND MATERIAL TO BE NEW AND CERTIFIED BY AN ACCREDITED CERTIFICATION BODY OF THE STANDARDS COUNCIL OF CANADA (SCC). WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT SCC APPROVED, OBTAIN SPECIAL APPROVAL FROM THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION AND PAY ALL ASSOCIATED FEES. NOTIFY ENGINEER PRIOR TO SUPPLYING MATERIAL THAT IS NOT SCC APPROVED.
- 1.2.2 KEEP A COMPETENT FOREMAN AND TRADESMEN QUALIFIED FOR WORK IN THE PROVINCE OR TERRITORY OF THE PROJECT LOCATION AT ALL TIMES DURING WORK IN PROGRESS. ALL WORKERS ON THE SITE ARE TO BE SATISFACTORY TO THE ENGINEER.
- 1.2.3 OBTAIN CLARIFICATION FROM THE ENGINEER WHERE THE INTENT OF THE DRAWINGS OR SPECIFICATIONS IS NOT CLEAR. MAKE CORRECTIONS TO WORK PERFORMED CONTRARY TO THE INTENT OF THE DRAWINGS OR SPECIFICATIONS AND BEAR ALL COSTS FOR MAKING SAID CORRECTIONS.
- 1.2.4 COORDINATE ALL WORK DESCRIBED BY THESE DRAWINGS AND SPECIFICATIONS WITH THAT OF OTHER TRADES WORKING ON THE SITE SO AS TO NOT HOLD UP THE PROGRESS OF OTHER TRADES.

1.3.0 CUTTING, PATCHING, EXCAVATION & BACKFILLING

- 1.3.1 ARRANGE AND PAY FOR ALL CUTTING, PATCHING, EXCAVATION AND BACKFILLING COSTS RELATED TO THE WORK OF THIS CONTRACT.
 - 1.3.2 RESTORE ALL EXCAVATIONS TO ORIGINAL CONDITION SUBSEQUENT TO COMPLETION OF ELECTRICAL INSTALLATIONS DESCRIBED IN THESE DRAWINGS AND SPECIFICATIONS.
 - 1.3.3 SURROUND ALL CABLES OR CONDUITS INSTALLED IN TRENCHES WITH SAND OR 6MM SCREENED EARTH AS INDICATED ON DETAILS AND AS REQUIRED BY THE C.E.C.
- ## 1.4.0 SUBMITTALS
- 1.4.1 SUBMIT SHOP DRAWINGS CLEARLY INDICATING DETAILS OF MATERIAL FABRICATION, LAYOUT, DIMENSIONS, CAPACITIES, PERFORMANCE CHARACTERISTICS, CERTIFICATION STANDARDS, WEIGHT, WIRING DIAGRAMS AND OTHER PERTINENT INFORMATION.
 - 1.4.2 PROVIDE SHOP DRAWINGS FOR ALL EQUIPMENT INCLUDING LOAD CENTERS, SWITCHES, TRANSFORMERS, AND STARTERS. SHOP DRAWINGS SUBMITTED TO THE ENGINEER ARE TO HAVE THE PRIOR APPROVAL STAMPS OF THE CONTRACTOR.
 - 1.4.3 THE OWNER WILL PROVIDE ONE SET OF DRAWINGS TO BE USED AS RECORD DRAWINGS ON SITE. MAINTAIN A DAILY RECORD OF REVISIONS AND ADDITIONS TO THE ORIGINAL WORK. ALL MARKINGS ARE TO BE DONE NEATLY IN A COLOR OTHER THAN BLUE OR GRAY PENCIL.

1.5.0 TESTING

- 1.5.1 PROVIDE TO THE ENGINEER THE RESULTS OF ALL TESTS IN WRITTEN FORM.
- 1.5.2 PERFORM TESTS ON ALL EQUIPMENT AS RECOMMENDED BY THE MANUFACTURER.
- 1.5.3 MEGGER TEST ALL FEEDERS PRIOR TO ENERGIZING AND ENSURE THAT THE REQUIREMENTS OF THE C.E.C. ARE MET.
- 1.5.4 TAKE VOLTAGE READINGS AND ADJUST TRANSFORMER TAP SETTINGS IF NECESSARY.

1.6.0 WARRANTY

- 1.6.1 PROVIDE A WRITTEN WARRANTY GUARANTEEING THAT THE WORK PERFORMED WILL BE FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE AND THAT ANY DEFECTIVE WORK WILL BE REPAIRED OR REPLACED WITHOUT COST TO THE OWNER DURING THIS PERIOD PROVIDED THAT SUCH FAILURES ARE NOT DUE TO IMPROPER USAGE OR NEGLECT.
- 1.6.2 THE WARRANTY SHALL STATE THAT THE PERIOD OF GUARANTEE WILL IN NO WAY SUPPLANT ANY OTHER GUARANTEE OF A LONGER PERIOD.



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Y1A 2A7
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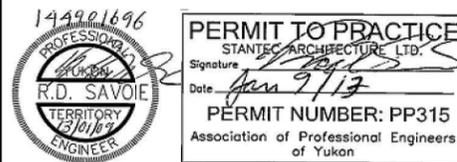
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Legend

Notes

Revision	Issued For	By	Appd.	YY.MM.DD
1	ISSUED FOR CONSTRUCTION	PIO	RDS	13/01/10
0	ISSUED FOR 100%	PIO	RDS	12/12/18

File Name:	Dwn.	Chkd.	Dsgn.	YY.MM.DD



Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title

SPECIFICATIONS 1

Work Task 05

Project No.	Scale	
144901696	AS NOTED	
Drawing No.	Sheet	Revision
E02-01	4 of 5	1

SECTION 2.0 PRODUCTS AND EXECUTION

2.1.0 WIRING AND CONDUIT

- 2.1.1 BUILDING WIRING TO BE COPPER RW90 XLPE INSTALLED IN EMT CONDUIT OR TECK CABLE, EXCEPT WHERE OTHERWISE INDICATED ON THESE DRAWINGS.
- 2.1.2 TECK CABLE TO BE RW90, 1000 VOLT, COPPER OR ALUMINUM (AS INDICATED) WITH GROUNDING CONDUCTOR AND ALUMINUM INTERLOCKING ARMOUR. CABLE IS TO BE ROUTED INSIDE SUITABLY SIZED RIGID STEEL CONDUIT WHERE TECK CABLE IS EXPOSED TO MECHANICAL INJURY.
- 2.1.3 ENSURE THAT CONDUIT IS DRY PRIOR TO WIRING INSTALLATION. SEAL CONDUIT THAT MAY BECOME EXPOSED TO MOISTURE.
- 2.1.4 RUN CONDUIT PARALLEL TO BUILDING LINES EXCEPT WHERE SPECIFICALLY INDICATED.
- 2.1.5 DO NOT CUT STRUCTURAL MEMBERS EXCEPT WHERE SPECIFICALLY INDICATED.
- 2.1.6 PROVIDE PULL CORD IN ALL EMPTY CONDUIT RUNS THAT EXCEED 3 METERS IN LENGTH OR THE TOTAL SUM OF BENDS EXCEED 90 DEGREES.

2.2.0 BONDING

- 2.2.1 PROVIDE BONDING INSTALLATIONS NECESSARY TO MEET THE REQUIREMENTS OF THE CURRENT CANADIAN ELECTRICAL CODE AND ADDITIONAL REQUIREMENTS INDICATED ON THESE DRAWINGS OR SPECIFICATIONS.

2.3.0 SERVICE ENTRANCE ENCLOSED FUSED SWITCH

- 2.3.1 600V RATED FOR CURRENT AT 50A OR 100A (AS SHOWN) AND 10,000 AMP FAULT INTERRUPTING CAPACITY. SERVICE ENTRANCE RATED ENCLOSED IN STAND ALONE TYPE 1 ENCLOSURE COMPLETE WITH H.R.C. FUSES OF SIZE NOTED ON DRAWINGS.

2.4.0 GROUND PLATES

- 2.4.1 COPPER-CLAD GROUND PLATES MINIMUM DIMENSIONS: 100MM X 500MM X 5MM

2.5.0 TECK WEATHERHEAD

- 2.5.1 PVC CONSTRUCTION, SEALING GLANDS FOR TECK CABLE (SIZES IDENTIFIED) WITH OPENINGS FOR INDIVIDUAL WIRES (4).

2.6.0 GROUND HUB

- 2.6.1 SIZED ACCORDING TO WIRE SIZE USED. DESIGNED AND APPROVED FOR SOLID ELECTRICAL CONNECTION OF GROUND WIRE TO EQUIPMENT ENCLOSURE.

2.7.0 LOADCENTER

- 2.7.1 3Ø, 120/208V, 30CCT. 100A BUSSING. ULC LISTED. NEMA 1 ENCLOSURE. MAIN BREAKER. TIN PLATED COPPER BUSSING. TO BE SCHNEIDER QO LOADCENTER.

2.8.0 SHEET METAL

- 2.8.1 18 GAUGE. ZINC-COATED SHEET METAL.

2.9.0 DISTRIBUTION TRANSFORMER

- 2.9.1 GENERAL USE TYPE, 3 PHASE WITH KVA AND VOLTAGES AS INDICATED ON DRAWINGS. DELTA PRIMARY WYE SECONDARY, 60 HZ, ALUMINUM WINDINGS, VOLTAGE TAPS OF 4-2.5%, CLASS H, 80 °C TEMPERATURE RISE, 50 DB AVERAGE SOUND LEVEL, EEMAC 1 ENCLOSURE WITH REMOVABLE FRONT PANEL AND DRIP SHIELD, FLOOR MOUNTING, DELTA TRANSFORMERS OR EQUAL.
- 2.9.2 ENSURE ADEQUATE CLEARANCE SPACE FROM WALLS AND OTHER OBSTRUCTIONS. MOUNT TO FLOOR ELEVATED ON 100 MM STEEL CHANNELS.
- 2.9.3 PRIOR TO ORDERING TRANSFORMER CONFIRM DIMENSIONS OF AVAILABLE SPACE AND TRANSFORMER. ADVISE A.A.M. IF CLEARANCE TO WALLS OF AT LEAST 6" CANNOT BE ACHIEVED.

2.10.0 FUSES

- 2.10.1 H.R.C. FUSES OF SIZE NOTED ON DRAWINGS. ENSURE SELECTED FUSES ARE COMPATIBLE WITH RESPECTIVE FUSED SWITCHES.

2.11.0 MOTOR STARTERS

- 2.11.1 FULL VOLTAGE MAGNETIC STARTERS: MAGNETIC STARTERS OF SIZE, TYPE, RATING AND ENCLOSURE TYPE AS INDICATED ON DRAWINGS. SOLENOID OPERATED CONTACTOR, POWER AND CONTROL TERMINALS, H-O-A SWITCH IN COVER, ADJUSTABLE ELECTRONIC OVERLOAD DEVICES WITH NON-THERMAL TYPE CURRENT SENSING, 3:1 CURRENT RANGE ADJUSTMENT, PHASE UNBALANCE AND PHASE LOSS PROTECTION, VISIBLE TRIP INDICATION. RED LED PILOT LIGHT ON OUTSIDE OF ENCLOSURE AND TWO SETS OF NO AND NC AUXILIARY CONTACTS.

2.12.0 RECORDS

- 2.12.1 PHOTOS: PROVIDE DIGITAL PHOTOGRAPHS OF ALL INSTALLATIONS INCLUDING TRENCHING, CABLE INSTALLATIONS, CABLE AND WIRE CONNECTIONS, GROUND PLATES, TERMINATIONS IN GENERATORS AND ALL ELECTRICAL EQUIPMENT. PROVIDE PHOTOS TO A.A.M.
- 2.12.2 ON A COPY OF THE DRAWINGS RECORD ANY REVISIONS MADE ON SITE AND PROVIDE TO A.A.M.



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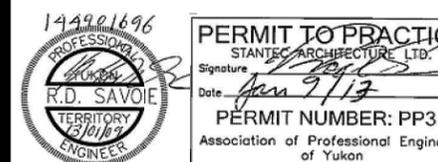
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0	ISSUED FOR 100%	PIO	RDS	12/12/18
Revision		By	Appd.	YY.MM.DD
1	ISSUED FOR CONSTRUCTION	PIO	RDS	13/01/10
0	ISSUED FOR 100%	PIO	RDS	12/12/18
Issued		By	Appd.	YY.MM.DD
File Name:		Desn.	Chkd.	Desn.
				YY.MM.DD



Client/Project

Mt. Nansen Electrical

Whitehorse, YT

Title
SPECIFICATIONS 2

Work Task 05

Project No.	Scale	
144901696	AS NOTED	
Drawing No.	Sheet	Revision
E02-01	5 of 5	1

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 06
March 10, 2014

12.0 Work Task 06



Work Task Instruction

Project Name:	Mt. Nansen Electrical	Instruction #:	WT- 06
Location:	Mt. Nansen, Yukon		
Stantec Project #:	144901696-02-01	Date of Issue:	11 January, 2013
Client Project #:		Contract #:	
Contractor:		Owner:	Assessment and Abandoned Mines Branch Energy, Mines & Resources Government of Yukon
Attention:		Attention:	Josée Perron, Regulatory Affairs Officer
REFERENCE:	Generator Fluid Heaters – Work Task 06		

Supplemental Instructions are issued to clarify or interpret contract documents or to provide direction resulting from field conditions. Supplemental Instructions are subject to the provisions of the Contract. Proceeding with work in accordance with these Instructions indicates the Contractor's acknowledgement there will be no change in the Contract Price or the Contract Time. If the Contractor believes that this instruction affects the Contract Price or the Contract Time, the Contractor shall promptly notify the Consultant.

DESCRIPTION

INSTRUCTION

All tasks below are in reference to the provision of crankcase oil pan and engine coolant heaters for the three primary generators on the site.

Note that some information for these generators has not been available due to lack of labelling on the units. For the oil pan heaters the following assumptions have been made. If possible, it would be beneficial for A.A.M. or D.E.S. to confirm the oil volume assumptions prior to ordering components.

The preferred heating range is 15 to 30 W/litre of oil.

The assumptions for the oil pan heaters are that the crankcase oil volumes are as follows:

Cat 3306 – 27 litres (estimate from available product literature)

Cat 6.6 – 16 litres (estimate from available product literature)

Perkins – between 20 and 27 litres (no information available)



Project:	Mt. Nansen Electrical	Project No.:	144901696	WT No.:	WT- 06
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WT06-01 Provide external oil pan heaters, one for each of the generators. The work is to include providing 15A, 120V electrical receptacle connections in suitable locations (if not currently available) for connection of the heaters and attachment of the heaters to the exterior of the generator oil pans. Heaters are to be Wolverine Silicone Pad, CSA approved models available from Ajax Steel and Industrial Supply in Whitehorse, with wattages identified below. Follow all manufacturer's instructions for installation.

- Cat 3306 – 500W Wolverine TCSA-HEATER-40
- Cat 6.6 – 250W Wolverine TCSA-HEATER-16
- Perkins – 500W Wolverine TCSA-HEATER-40

WT06-02 Provide external coolant circulation heaters for each of the generators (one per generator). Heaters are to be Tempro Industrial, 1000W, 120V complete with all mounting hardware and plumbing lines and fittings. Provide one dedicated 15A, 120V circuit and receptacle for each heater. Follow all manufacturer's instructions for installation.

DISTRIBUTION

Name	Company	Via
Josée Perron	Assessment and Abandoned Mines Branch	Josee.Perron@gov.yk.ca
Erik Pit	Assessment and Abandoned Mines Branch	Erik.Pit@gov.yk.ca
Issued By:	Person / Title	Signature
Stantec Electrical	Rod Savoie, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Work Task 07
March 10, 2014

13.0 Work Task 07


Stantec
Work Task Instruction

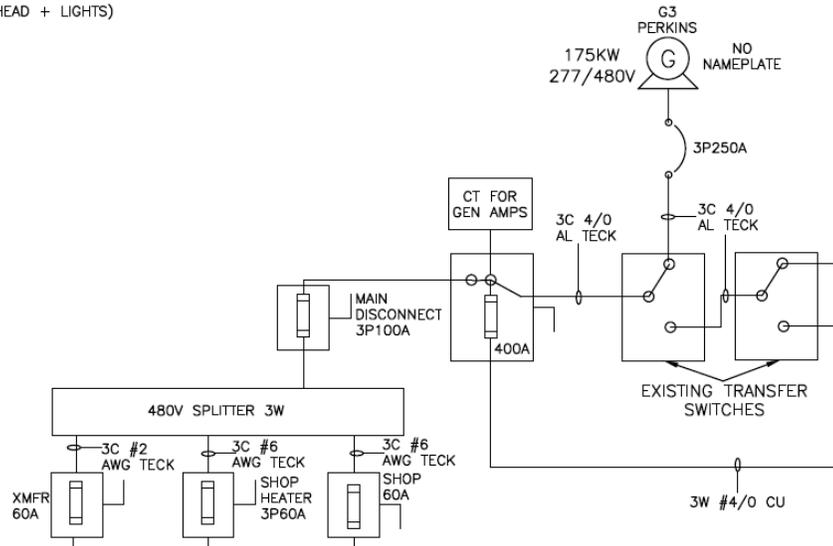
Project Name:	Mt. Nansen Electrical	Instruction #:	WT- 07
Location:	Mt. Nansen, Yukon		
Stantec Project #:	144901696-02-01	Date of Issue:	2013 April 19
Client Project #:		Contract #:	
Contractor:		Owner:	Assessment and Abandoned Mines Branch Energy, Mines & Resources Government of Yukon
Attention:		Attention:	Josée Perron, Regulatory Affairs Officer
REFERENCE:	Generator Sea Container 3, Distribution Switch Replacement – Work Task 06		

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DESCRIPTION

#	INSTRUCTION
WT07-01	Replace existing generator sea-container and shop fused switch. Existing switch supplies power from 400A main switch to 480V 200A 3W splitter shown in the single line diagram below. ("MAIN DISCONNECT 3P100A").

HEAD + LIGHTS)



Provide new conductors on the load, and supply sides of the new disconnect switch.

Project:	Mt. Nansen Electrical	Project No.:	144901696	WT No.:	WT- 07
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Confirm ratings of 480V splitter prior to starting work. Notify engineer if splitter rating is less than 200A.

Conductors as follows:

3 x #3/0 Cu, with #6 Cu bond, or equivalent aluminum conductors. Install in EMT conduit or teck cable. Conductors to be RW90 XLPE.

Fused disconnect as follows:

600V, fusible, 3 wire (3 blades and fuseholders), 200A rated, NEMA 1 enclosure. Provide 6 class H fuses rated at 200A. Install 3 fuses, turn 3 over to site electrician. Standard of acceptance: H364 by Schneider Electric.

Confirm phase rotation of any motors on the load side of the switch, following installation.

Do all installation in accordance with the CEC and AHJ. Provide permits for all work.

DISTRIBUTION

Name	Company	Via
Josée Perron	Assessment and Abandoned Mines Branch	Josee.Perron@gov.yk.ca
Erik Pit	Assessment and Abandoned Mines Branch	Erik.Pit@gov.yk.ca
Issued By:	Person / Title	Signature
Stantec Electrical	Corry Martin, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Single Line Diagrams
March 10, 2014

14.0 Single Line Diagrams

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Single Line Diagrams
March 10, 2014

14.1 EXISTING SINGLE LINE PRIOR TO UPGRADES

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Single Line Diagrams
March 10, 2014

14.2 AS BUILT SINGLE LINE – ENTIRE SITE



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Notes

Record Document

This set of record documents shows the reported location of the work and significant changes made during the construction process. Because these documents are based on unverified information provided by other parties which will be assumed reliable, Stantec cannot and does not warrant their accuracy.

Revision	Description	By	Appd.	YY.MM.DD
E	REVISED RECORD DRAWING	KFK	CFM	14.05.29
D	RECORD DRAWING	JCY	CFM	14.03.06
C	ISSUED FOR REVIEW	JCY	CFM	14.01.10
B	ISSUED FOR 100%	PIO	RDS	13.01.10
A	ISSUED FOR REVIEW	PIO	RDS	12.12.06

Revision	Description	By	Appd.	YY.MM.DD
D	RECORD DRAWING	JCY	CFM	14.03.06
C	ISSUED FOR REVIEW	JCY	CFM	14.01.10
B	ISSUED FOR 100%	PIO	RDS	13.01.10
A	ISSUED FOR REVIEW	PIO	RDS	12.12.06

File Name:	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Client/Project

Mt. Nansen Electrical

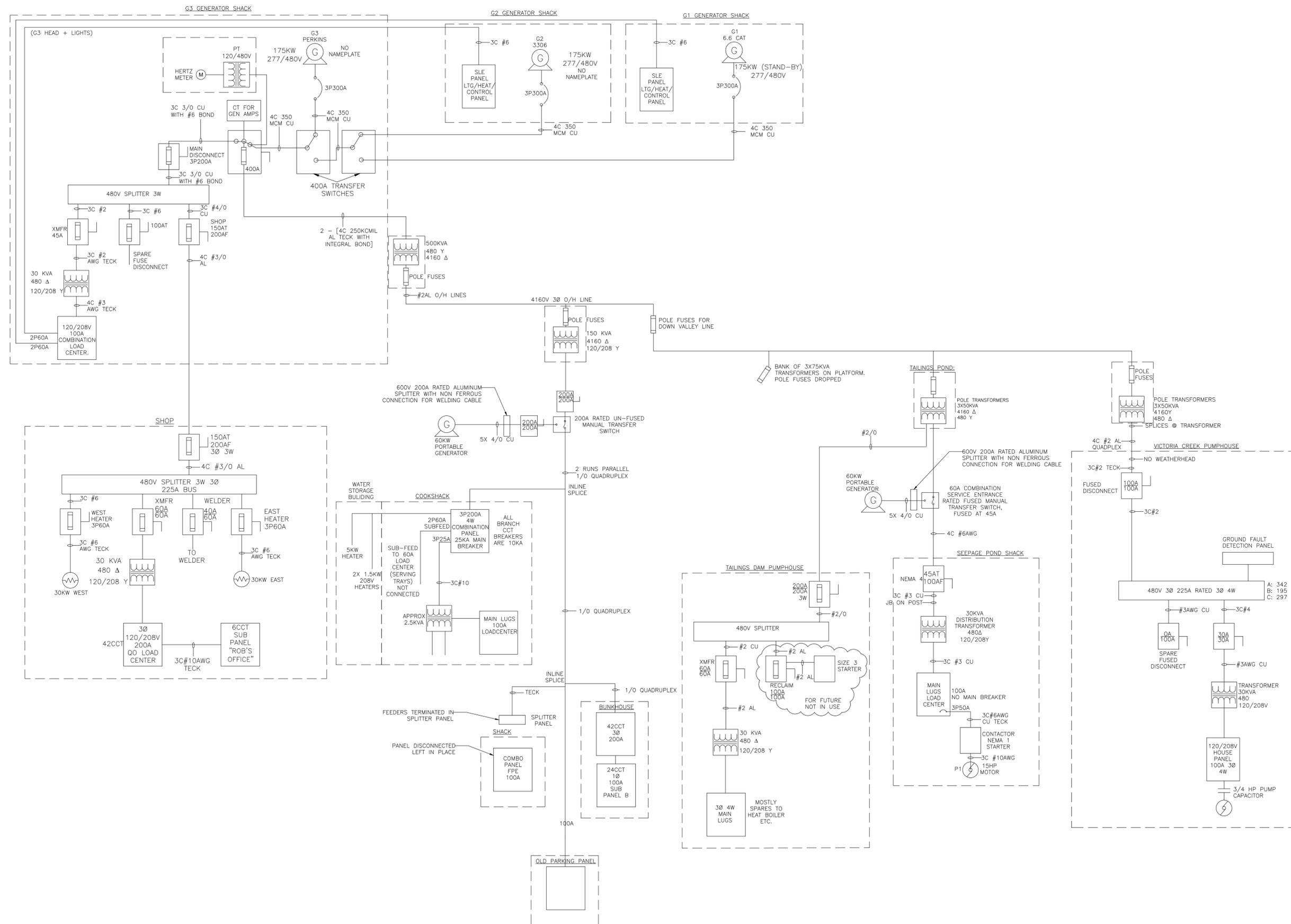
Whitehorse, YT

Title

EXISTING SINGLE LINE DIAGRAM

Project No.	Scale
144901696	NTS

Drawing No.	Sheet	Revision
E01	1 of 1	1



MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

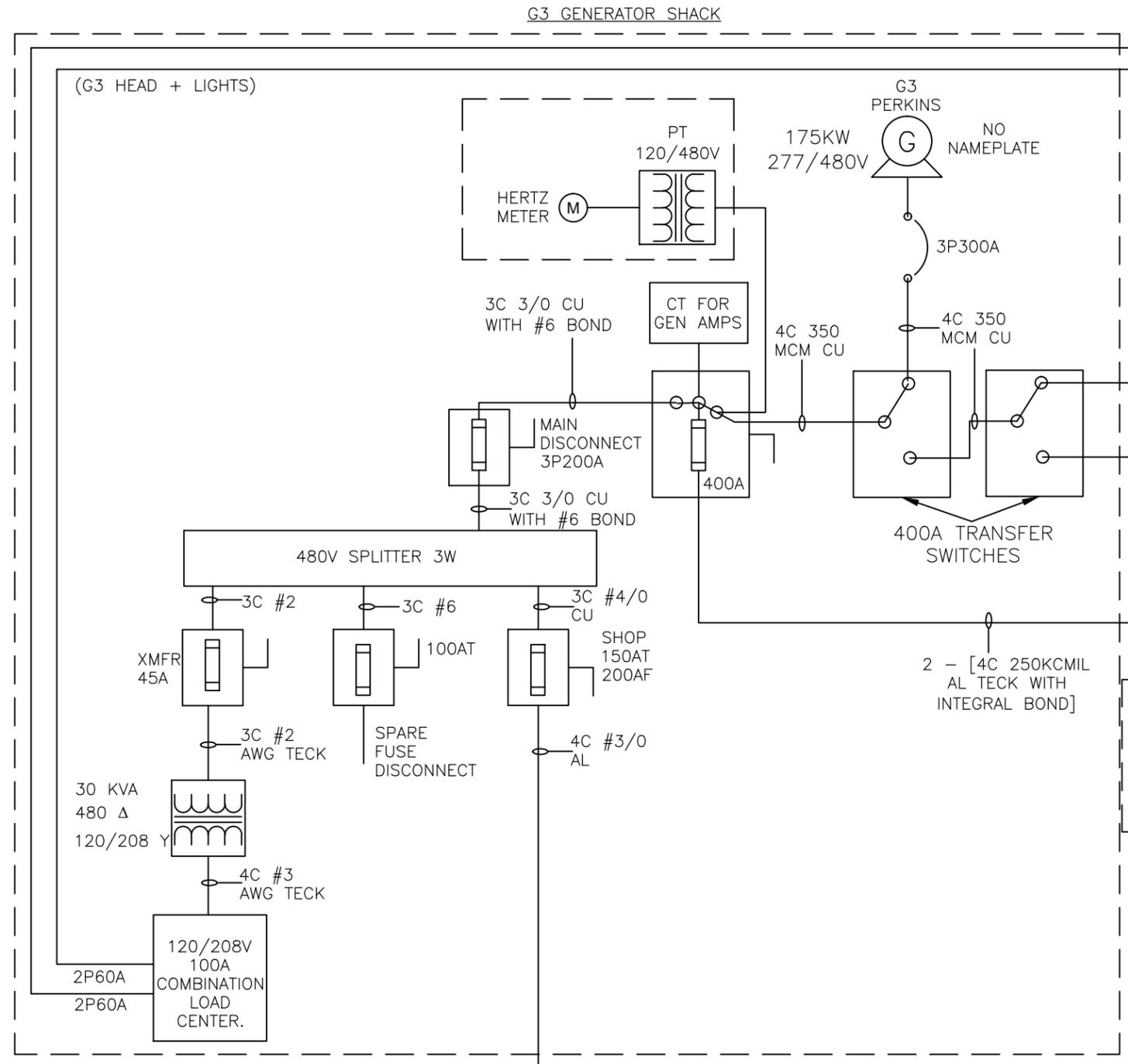
Single Line Diagrams
March 10, 2014

14.3 AS BUILT SINGLE LINE – SITE COMPONENTS

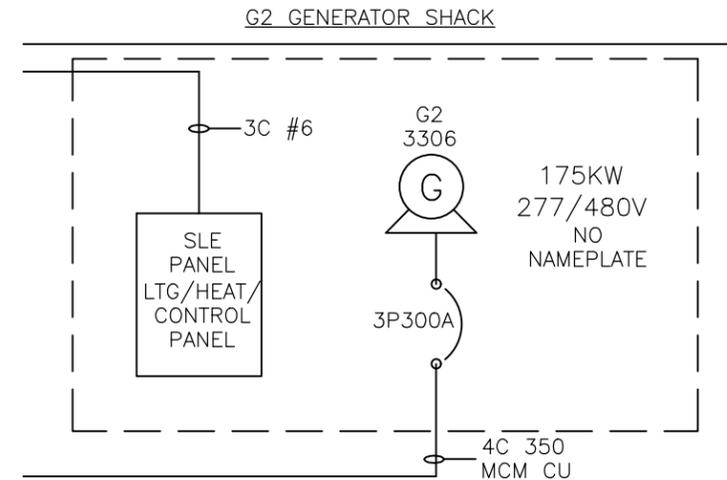
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 2014/06/03 2:08 PM By: Youngs, Jordan

ORIGINAL SHEET - ANSI B

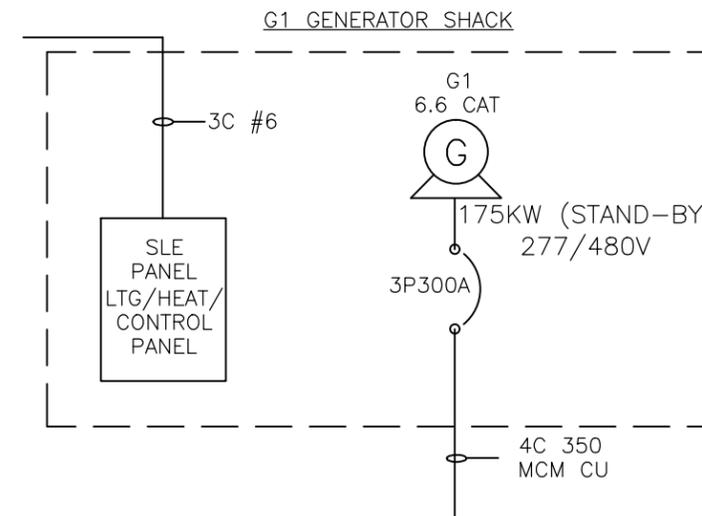
March, 2014
 144901696



01 G3 GENERATOR SHACK
 E-02 SCALE: NTS



02 G2 GENERATOR SHACK
 E-02 SCALE: NTS



03 G1 GENERATOR SHACK
 E-02 SCALE: NTS



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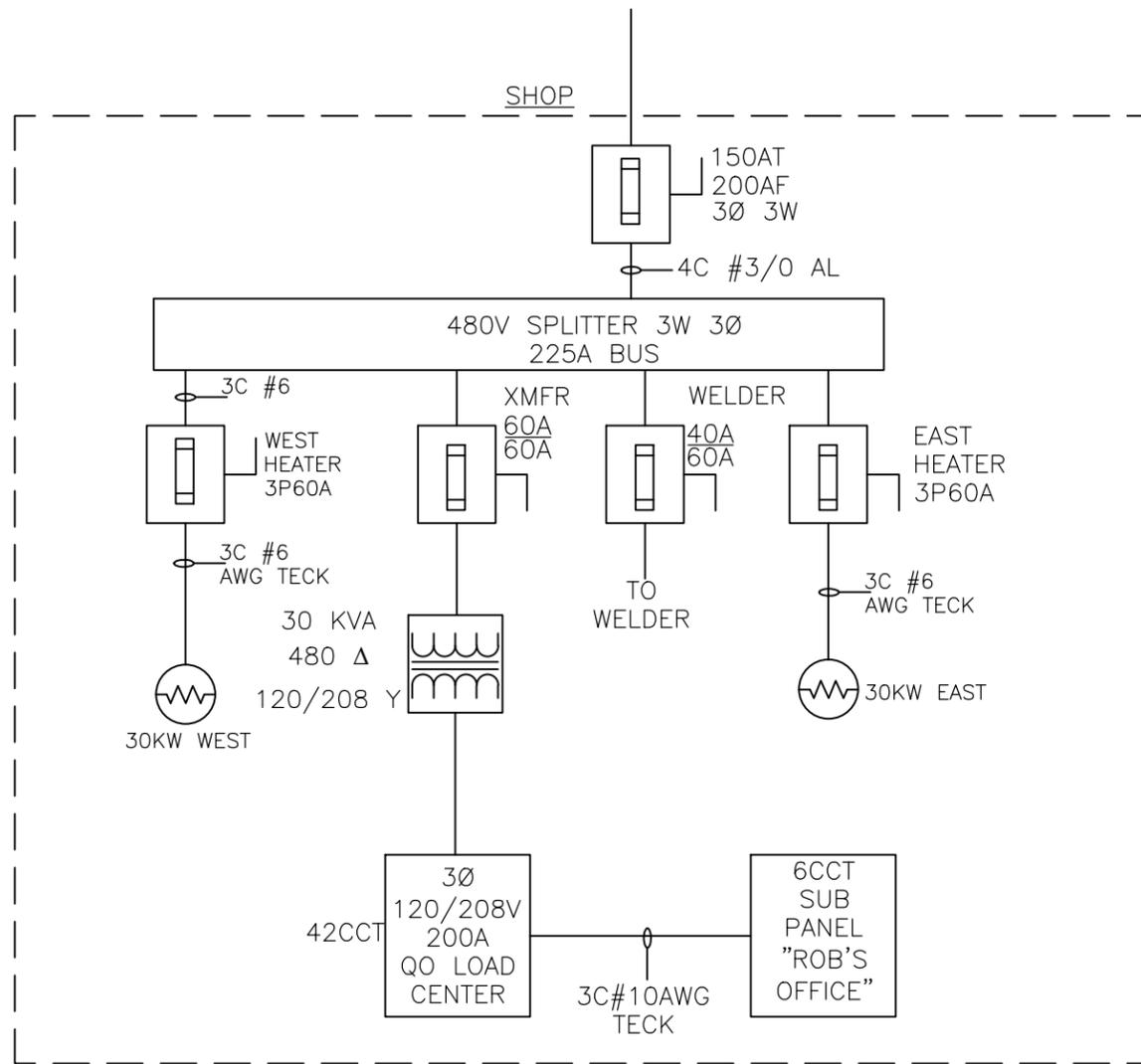
Record Drawing

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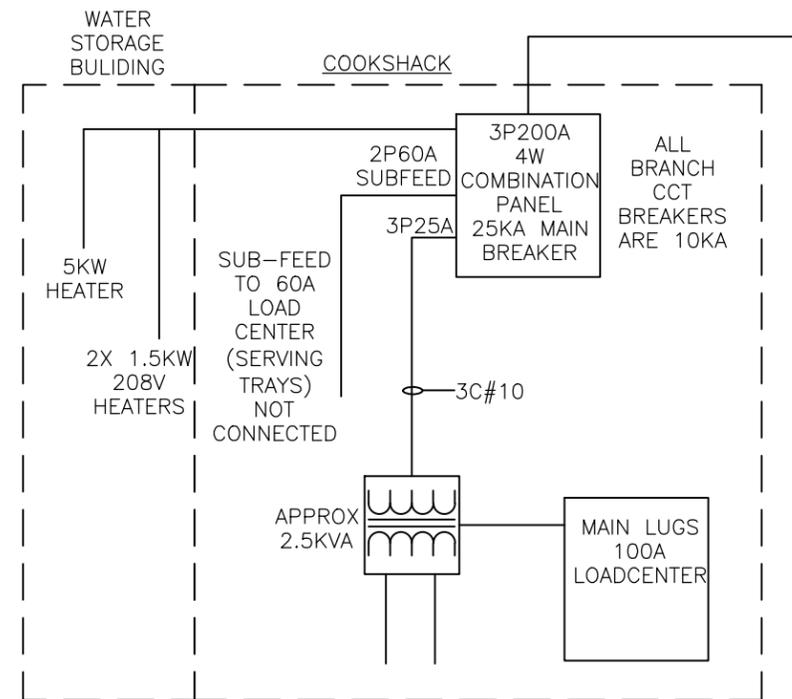
Client/Project

Mt. Nansen Electrical
 Whitehorse, YT
 Figure No.
E02
 Title
GENERATOR SHACK

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2014/06/03 2:08 PM By: Youngs, Jordan



01 SHOP
E-03 SCALE: NTS



02 COOKSHACK
E-03 SCALE: NTS

ORIGINAL SHEET - ANSI B

March, 2014
144901696



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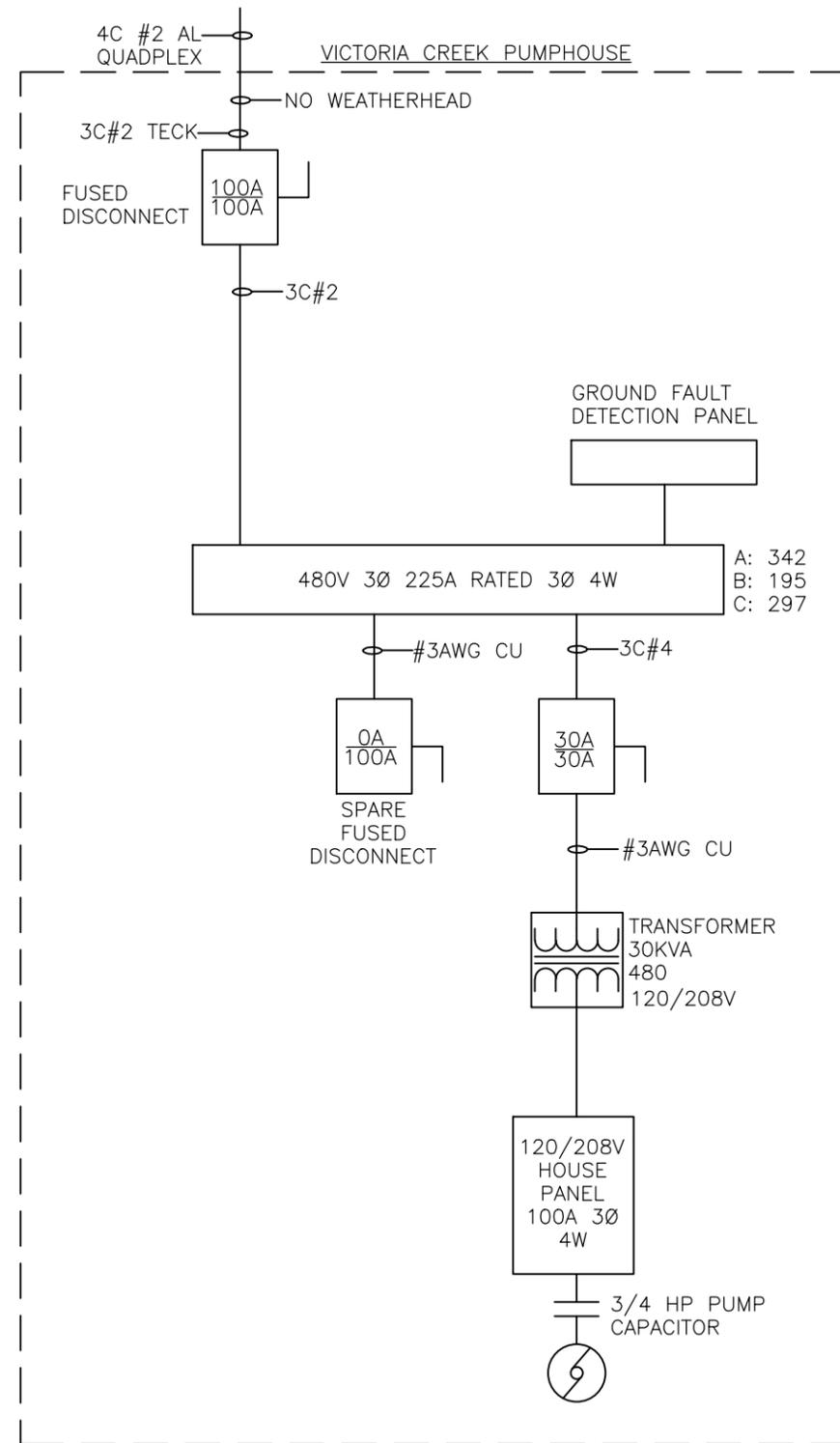
Figure No.

E03

Title

SHOP AND COOKSHACK

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01 VICTORIA CREEK PUMPHOUSE
E-04 SCALE: NTS

ORIGINAL SHEET - ANSI B

March, 2014
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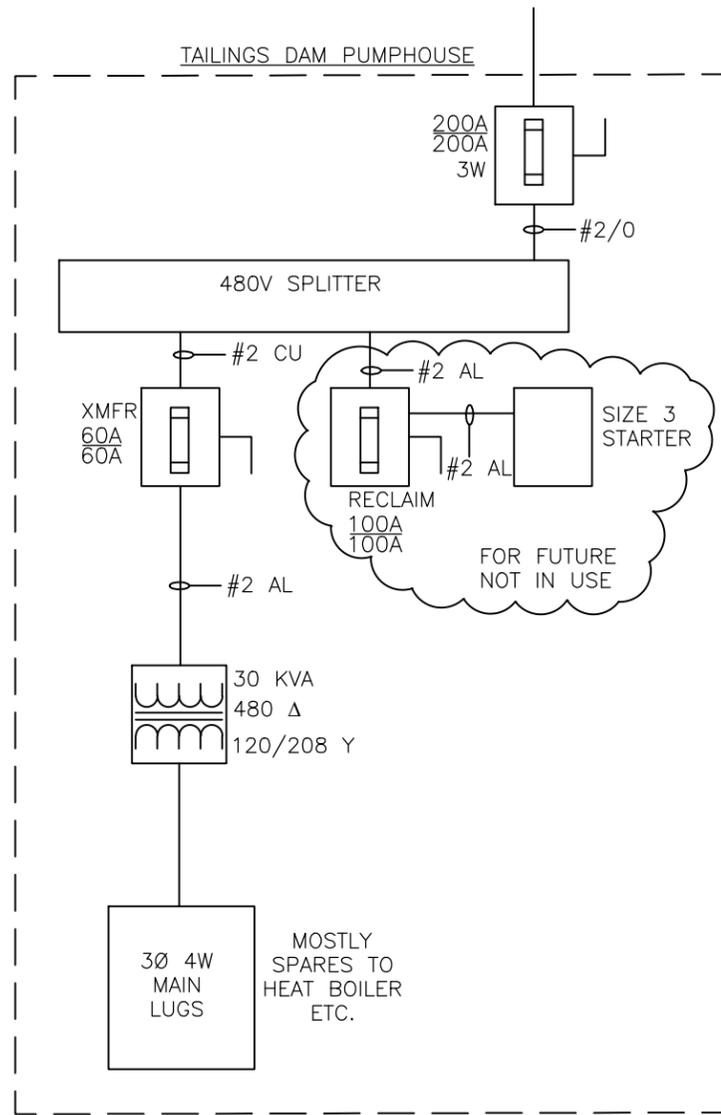
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E04

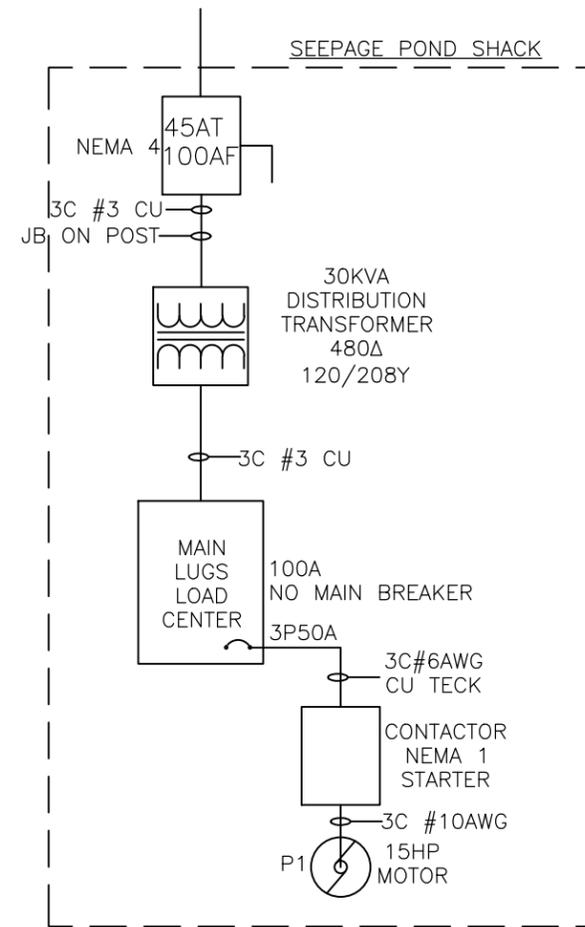
Title

VICTORIA CREEK PUMPHOUSE

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 2014/06/03 2:08 PM By: Youngs, Jordan



01 TAILINGS DAM PUMPHOUSE
 E-05 SCALE: NTS



02 SEEPAGE POND SHACK
 E-05 SCALE: NTS

ORIGINAL SHEET - ANSI B

March, 2014
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Client/Project

Mt. Nansen Electrical
 Whitehorse, YT

Figure No.

E05

Title

**TAILINGS DAM PUMPHOUSE
 AND SEEPAGE POND SHACK**

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Mobile Generator Task
March 10, 2014

15.0 Mobile Generator Task

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Mobile Generator Task
March 10, 2014

15.1 DRAWINGS



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Notes

1	RE-ISSUED FOR TENDER	PIO	CFM	13.06.04
0	ISSUED FOR TENDER	PIO	CFM	13.05.02
Revision		By	Appd.	YY.MM.DD

1	RE-ISSUED FOR TENDER	PIO	CFM	13.06.04
0	ISSUED TENDER	PIO	CFM	13.05.02
Issued		By	Appd.	YY.MM.DD

File Name: _____ Dwn. Chkd. Dsgn. YY.MM.DD



PERMIT TO PRACTICE
Signature: _____
Date: June 9, 2015
PERMIT NUMBER: PP315
Association of Professional Engineers of Yukon

MT. NANSEN PORTABLE GENERATOR

Client/Project
YG ASSESSMENT + ABANDONED MINES

MANUAL TRANSFER INSTALLATIONS
MT. NANSEN ELECTRICAL
WHITEHORSE, YT

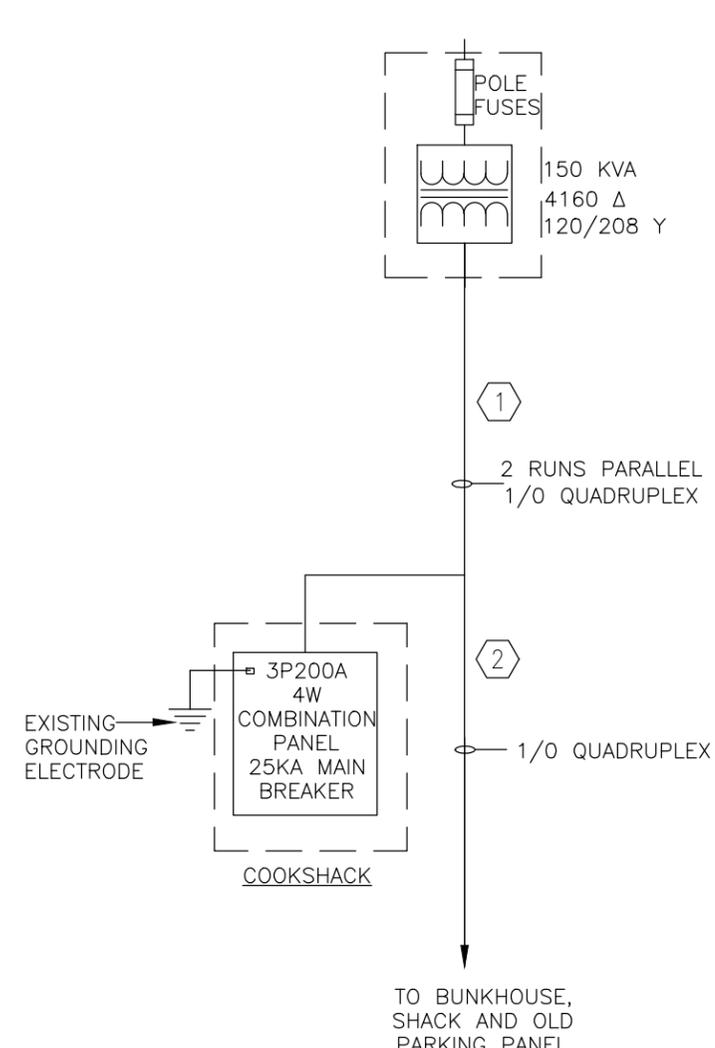
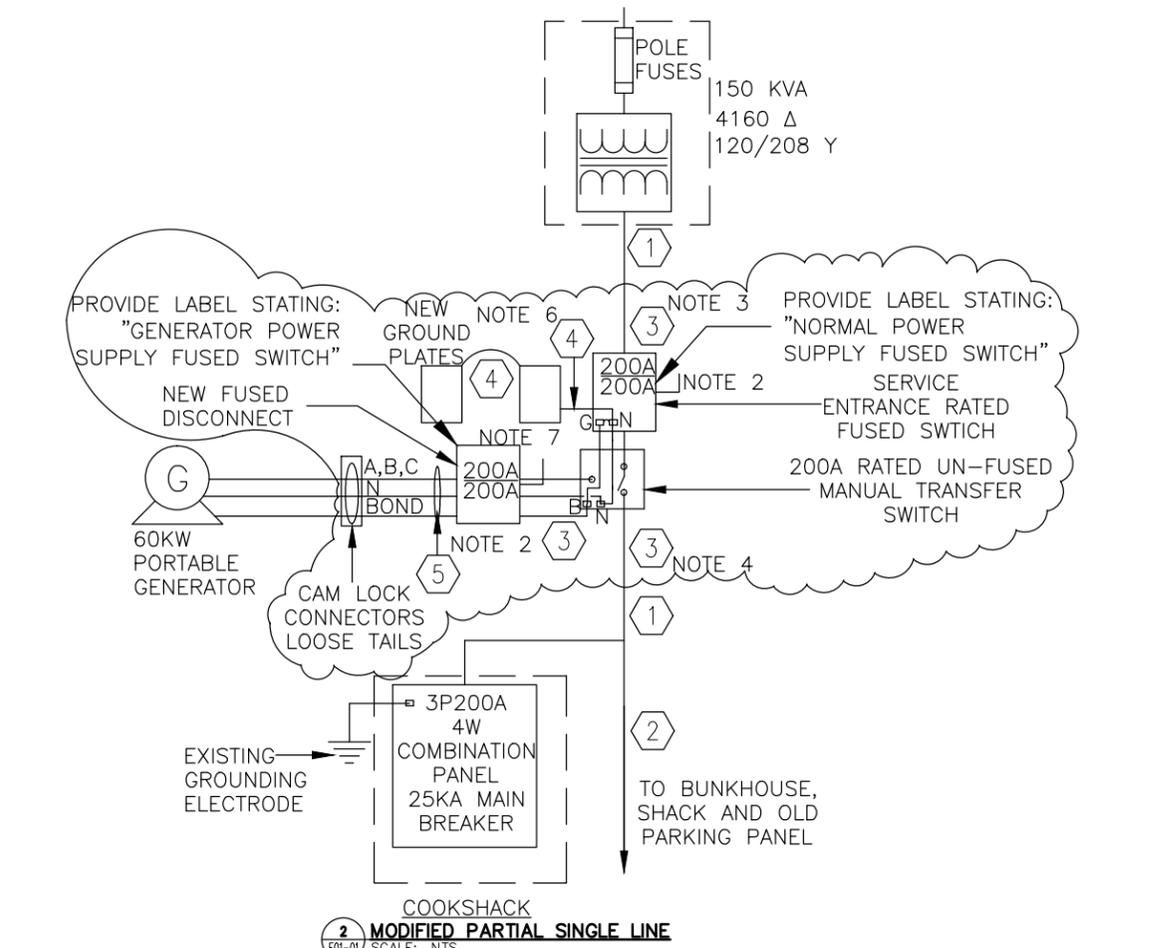
Title
COOKHOUSE AND BUNKHOUSE
TRANSFER SWITCH ADDITIONS

Project No. 144901768 Scale AS NOTED

Drawing No. Sheet Revision

E01-01 1 of 7 1

- NOTES:
- AREAS OF WORK WITHIN CLOUDS.
 - FUSED TRANSFER SWITCH AND CAM LOCK CONNECTORS TO BE MOUNTED ON EXISTING POLE LOCATION SHOWN ON 1/E02-01. ENSURE THAT ALL ELECTRICAL EQUIPMENT IS ACCESSIBLE FROM GROUND LEVEL. CAM LOCK CABLE PIGTAILS TO BE FED THROUGH BOTTOM OF SWITCH. REFER TO E02-01 FOR DETAILS.
 - PROVIDE TECK WEATHERHEAD AND CONNECT TECK CABLE TO OVERHEAD CONDUCTORS TO BRING TECK CABLE DOWN THE POLE.
 - BRING TECK CABLE UP THE POLE AND PROVIDE TECK WEATHERHEAD TO CONNECT TO OVERHEAD CONDUCTORS.
 - PROVIDE PERMANENT WEATHER-PROOF LABEL ON POLE BESIDE CAM LOCK CONNECTORS STATING THE FOLLOWING: "PORTABLE GENERATOR CONNECTION POINT. SITE VOLTAGE 3Ø 120/208V."
 - PROVIDE TWO NEW 100MM X 500MM X 5MM GROUND PLATES WITH A MINIMUM OF 3000MM SEPARATION. INSTALL GROUND PLATES ADJACENT TO THE POLE. MINIMUM DEPTH OF 600MM BELOW GRADE.
 - PROVIDE TREATED 8"X8"X10' LONG PWF POST. BURY 4' BENEATH GRADE, BACKFILL WITH GRANULAR SOIL, COMPACT IN LAYERS. MOUNT GENERATOR FUSED DISCONNECT AND 200A TRANSFER SWITCH TO POST.



1 EXISTING PARTIAL SINGLE LINE
E01-01 SCALE: NTS

2 MODIFIED PARTIAL SINGLE LINE
E01-01 SCALE: NTS

MATERIALS LIST		
MATERIAL	DESCRIPTION	QUANTITY
200A FUSES	AS PER SPECS	6
200A SERVICE ENTRANCE RATED FUSED SWITCH	AS PER SPECS	2
CAM LOCK CONNECTORS	ALREADY EXISTING ON SITE - TO BE INSTALLED BY CONTRACTOR	5 EXISTING ON SITE
MALE CAM LOCK CAPS	AS PER SPECS	5
4C 4/0 KCMIL TECK WEATHER HEAD	AS PER SPECS	2
TECK STRAPS	AS PER SPECS	TO BE DETERMINED ON SITE
CAN TRUSS AND BRACKETS	AS PER SPECS	LENGTH TO BE DETERMINED ON SITE
SPLICE KIT	-	TO BE DETERMINED ON SITE
200A MANUAL TRANSFER SWITCH	AS PER SPECS	1
#3 RW90 CU BOND	AS PER SPECS	LENGTH TO BE DETERMINED ON SITE
4C 4/0 AWG CU TECK	AS PER SPECS	LENGTH TO BE DETERMINED ON SITE
4/0 AWG STRANDED CU WELDING CABLE	AS PER SPECS	LENGTH TO BE DETERMINED ON SITE
GROUNDING ELECTRODE	AS PER SPECS	1
RACK MOUNTED INSULATED SPOOL WITH DEAD END GRIP	AS PER SPECS	2 (BACK TO BACK)
ILSCO CONNECTORS	AS PER SPECS - 4/0 TO 1/0 PIGTAIL ADAPTOR	5
AL PLATE, AL LOCKNUTS, AL BUSHINGS	AS PER 4/E02-01	TO BE DETERMINED ON SITE

CONDUCTOR SCHEDULE (CONDUCTOR SCHEDULE IS SPECIFIC TO THIS DRAWING)	
CONDUCTOR	CONDUCTOR SIZE
1	2 RUNS 1/0 PARALLEL QUADPLEX
2	1/0 QUADPLEX
3	4C 3/0 CU TECK WITH #4 CU BOND
4	#3 RW90 XLPE GREEN INSULATED OR BARE CU
5	5X 4/0 AWG STRANDED CU WELDING CABLE WITH #4 CU BOND

I:\144901768\144901768\144901768\Drawings\Generator TS Installation\Working\144901768 - TS ChungseB_recover.dwg 2017/05/24 11:10 AM By: C.ChungseB

ELECTRICAL SPECIFICATIONS

1.1.0 GENERAL REQUIREMENTS

- 1.1.1 PERFORM ELECTRICAL INSTALLATIONS SO AS TO FORM COMPLETE AND OPERATING SYSTEMS. PROVIDE EVERYTHING NECESSARY TO FORM A COMPLETE AND OPERATING SYSTEM EVEN IF NOT SPECIFICALLY CALLED FOR IN THESE DRAWINGS AND SPECIFICATIONS.
- 1.1.2 ALL INSTALLATIONS ARE TO COMPLY WITH THE CANADIAN ELECTRICAL CODE, THE NATIONAL BUILDING CODE AND THE REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION.
- 1.1.3 OBTAIN ALL PERMITS REQUIRED BY LOCAL AUTHORITIES PRIOR TO BEGINNING WORK. PROVIDE A FINAL ACCEPTANCE CERTIFICATE FROM THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION UPON COMPLETION OF THE WORK.
- 1.1.4 SUBMIT TO THE LOCAL AUTHORITY HAVING JURISDICTION DEPARTMENT THE REQUIRED NUMBER OF DRAWING SETS AND INCLUDE IN THIS TENDER ALL COSTS FOR DRAWING PRINTS, PLAN REVIEWS, PERMIT COSTS AND SURVEYS.
- 1.1.5 NOTIFY THE ENGINEER OF ANY CHANGES REQUESTED BY THE LOCAL AUTHORITY HAVING JURISDICTION PRIOR TO MAKING SAID CHANGES.
- 1.1.6 THE WORD 'PROVIDE' MEANS THE SUPPLY, DELIVERY AND INSTALLATION OF DEVICE OR EQUIPMENT REFERENCED TO THE LEVEL REQUIRED TO BE COMPLETE AND OPERATIONAL. 'SUPPLY' MEANS TO OBTAIN AND DELIVER TO THE PROJECT SITE, READY FOR UNPACKING ASSEMBLY AND INSTALLATION. 'INSTALL' MEANS THE UNLOADING, UNPACKING, ASSEMBLING, ERECTING, APPLYING, FINISHING, PROTECTING, CLEANING AND SIMILAR OPERATIONS AT THE PROJECT SITE TO COMPLETE ITEMS OF WORK SUPPLIED BY OTHERS.

1.2.0 MATERIALS AND WORKMANSHIP

- 1.2.1 EQUIPMENT AND MATERIAL TO BE NEW AND CERTIFIED BY AN ACCREDITED CERTIFICATION BODY OF THE STANDARDS COUNCIL OF CANADA (SCC). WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT SCC APPROVED, OBTAIN SPECIAL APPROVAL FROM THE LOCAL INSPECTION AUTHORITY HAVING JURISDICTION AND PAY ALL ASSOCIATED FEES. NOTIFY ENGINEER PRIOR TO SUPPLYING MATERIAL THAT IS NOT SCC APPROVED.
- 1.2.2 KEEP A COMPETENT FOREMAN AND TRADESMEN QUALIFIED FOR WORK IN THE PROVINCE OR TERRITORY OF THE PROJECT LOCATION AT ALL TIMES DURING WORK IN PROGRESS. ALL WORKERS ON THE SITE ARE TO BE SATISFACTORY TO THE ENGINEER.
- 1.2.3 OBTAIN CLARIFICATION FROM THE ENGINEER WHERE THE INTENT OF THE DRAWINGS OR SPECIFICATIONS IS NOT CLEAR. MAKE CORRECTIONS TO WORK PERFORMED CONTRARY TO THE INTENT OF THE DRAWINGS OR SPECIFICATIONS AND BEAR ALL COSTS FOR MAKING SAID CORRECTIONS.
- 1.2.4 COORDINATE ALL WORK DESCRIBED BY THESE DRAWINGS AND SPECIFICATIONS WITH THAT OF OTHER TRADES WORKING ON THE SITE SO AS TO NOT HOLD UP THE PROGRESS OF OTHER TRADES.

1.3.0 CUTTING, PATCHING, EXCAVATION & BACKFILLING

- 1.3.1 ARRANGE AND PAY FOR ALL CUTTING, PATCHING, EXCAVATION AND BACKFILLING COSTS RELATED TO THE WORK OF THIS CONTRACT.
- 1.3.2 RESTORE ALL EXCAVATIONS TO ORIGINAL CONDITION SUBSEQUENT TO COMPLETION OF ELECTRICAL INSTALLATIONS DESCRIBED IN THESE DRAWINGS AND SPECIFICATIONS.
- 1.3.3 SURROUND ALL CABLES OR CONDUITS INSTALLED IN TRENCHES WITH SAND OR 6MM SCREENED EARTH AS INDICATED ON DETAILS AND AS REQUIRED BY THE C.E.C.

1.4.0 SUBMITTALS

- 1.4.1 SUBMIT SHOP DRAWINGS CLEARLY INDICATING DETAILS OF MATERIAL FABRICATION, LAYOUT, DIMENSIONS, CAPACITIES, PERFORMANCE CHARACTERISTICS, CERTIFICATION STANDARDS, WEIGHT, WIRING DIAGRAMS AND OTHER PERTINENT INFORMATION.
- 1.4.2 PROVIDE SHOP DRAWINGS FOR ALL EQUIPMENT INCLUDING LOAD CENTERS, SWITCHES, TRANSFORMERS, AND STARTERS. SHOP DRAWINGS SUBMITTED TO THE ENGINEER ARE TO HAVE THE PRIOR APPROVAL STAMPS OF THE CONTRACTOR.
- 1.4.3 THE OWNER WILL PROVIDE ONE SET OF DRAWINGS TO BE USED AS RECORD DRAWINGS ON SITE. MAINTAIN A DAILY RECORD OF REVISIONS AND ADDITIONS TO THE ORIGINAL WORK. ALL MARKINGS ARE TO BE DONE NEATLY IN A COLOR OTHER THAN BLUE OR GRAY PENCIL.

1.5.0 TESTING

- 1.5.1 PROVIDE TO THE ENGINEER THE RESULTS OF ALL TESTS IN WRITTEN FORM.
- 1.5.2 PERFORM TESTS ON ALL EQUIPMENT AS RECOMMENDED BY THE MANUFACTURER.
- 1.5.3 MEGGER TEST ALL FEEDERS PRIOR TO ENERGIZING AND ENSURE THAT THE REQUIREMENTS OF THE C.E.C. ARE MET.

1.6.0 WARRANTY

- 1.6.1 PROVIDE A WRITTEN WARRANTY GUARANTEEING THAT THE WORK PERFORMED WILL BE FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE AND THAT ANY DEFECTIVE WORK WILL BE REPAIRED OR REPLACED WITHOUT COST TO THE OWNER DURING THIS PERIOD PROVIDED THAT SUCH FAILURES ARE NOT DUE TO IMPROPER USAGE OR NEGLIGENCE.
- 1.6.2 THE WARRANTY SHALL STATE THAT THE PERIOD OF GUARANTEE WILL IN NO WAY SUPPLANT ANY OTHER GUARANTEE OF A LONGER PERIOD.



Stantec Architecture Ltd.
107 Main Street, Suite 202
Whitehorse YT Canada
Y1A 2A7
Tel. 867.633.2400
Fax. 867.633.2481
www.stantec.com

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Consultants

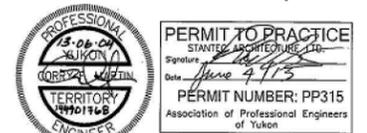
Stamp

Notes

Revision	By	Appd.	YY.MM.DD
1	RE-ISSUED FOR TENDER	PIO	CFM 13.06.04
0	ISSUED FOR TENDER	PIO	CFM 13.05.02

Issued	By	Appd.	YY.MM.DD
1	RE-ISSUED FOR TENDER	PIO	CFM 13.06.04
0	ISSUED TENDER	PIO	CFM 13.05.02

File Name: _____ Dwn. Chkd. Dsgn. YY.MM.DD



MT. NANSEN ELECTRICAL GENERATOR

Client/Project

YG ASSESSMENT + ABANDONED MINES

MANUAL TRANSFER SWITCH ADDITION
MT. NANSEN ELECTRICAL
WHITEHORSE, YT

Title

SPECIFICATION 1

Project No.	Scale	
144901768	AS NOTED	
Drawing No.	Sheet	Revision

E03-01 6 of 7 1

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Mobile Generator Task
March 10, 2014

15.2 FIELD REVIEWS



Stantec

Field Review

GENERAL INFORMATION			
Project:	Mt. Nansen Portable Generator	Report No.:	FRE-01
Date of Visit:	30 August 2013	Stantec File:	144901768.0801
Date of Issue:	5 September 2013	Contractor File:	
Present:	Kirsten Hulstein, AAM Doug Langila, Site Electrician - Denison Environmental (DES) Cam, Arcrite Northern (AN) Corry Martin, Stantec	Weather:	Sunny +7C, warming to +18C

SITE CONDITIONS / GENERAL INFORMATION	
Items	
A	Contractor has requested substantial completion of the generator connection locations, at cookshack and at seepage pond. Note that Victoria creek pumphouse generator connections has been removed from contract.
B	Work was underway during review.

GENERAL OBSERVATIONS OR INSTRUCTIONS/DIRECTION TO CONTRACTOR		
New Items		Action By
FR-E01.1	Bunkhouse Generator Site: Knockout fillers required	Contractor
FR-E01.2	Bunkhouse Generator Site: Ground plates installed at 750mm, spaced at 3000mm. Contractor to provide photos of existing grounding plate installation. Show cadweld/ampact connectors, and depth with tape measure.	Contractor
FR-E01.3	Bunkhouse Generator Site: Lamicaid missing for normal power fused switch.	Contractor
FR-E01.4	Bunkhouse Generator Site: Provide blocking behind panels for mounting equipment – or use cantruss brackets with through bolting.	Contractor
FR-E01.5	Seepage Pond Generator Site: Contractor provided alternate transfer switch than shown on drawings. IlSCO reducing connectors do not fit in lugs of smaller 60A transfer switch. Contractor to provide smaller connectors to suit.	Contractor
FR-E01.6	Seepage Pond Generator Site: Cables used for pole risers: PTT cables Inc (-40C) 600V CSA RW90 XLPE. Cables do not indicate UV rating. Contractor to provide shop drawings of cable indicating UV rated.	Contractor
FR-E01.7	Seepage Pond Generator Site: Dead end slipped off ceramic insulator while on site. Contractor to provide photos of completed installation with dead-end supported on ceramic insulator.	Contractor
FR-E01.8	Typical of both sites: Site Voltage Signage required as per drawings/specifications.	Contractor
FR-E01.9	Typical of both sites: Written colors required on each camlock cord end as per specifications. Contractor to test fit generator cables during startup and testing. Confirm Leviton connectors are suitable for use with Crouse Hinds.	Contractor
FR-E01.10	Typical of both sites: 12' - 8x8 PWF post in place, buried 4'. Installation acceptable.	Info

Project:	Mt. Nansen Portable Generator	Project No.:	144901768.0801	Report No.:	FRE-01
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FR-E01.11	Typical of both sites: Class RK1 fuses installed. Fuses acceptable.	Info														
FR-E01.12	Typical of both sites: No 'J' hooks were provided for camlock pigtails. Remove requirement for J hooks.	Info														
FR-E01.13	Typical of both sites: Shop drawings for overhead line connectors (ILSCO) required.	Contractor														
FR-E01.14	Typical of both sites: Aluminum or fibreglass plates required where individual phase conductors penetrate ferrous enclosure. Refer to drawing detail 4/E02-01. Provide non-ferrous connectors and bushings.	Contractor														
FR-E01.15	<p>Generator was started and tested on site. Generator voltage regulator not operating correctly. Observed voltages as follows:</p> <table border="0" style="margin-left: 40px;"> <tr> <td><u>120/208V 4W</u></td> <td><u>480V 3W</u></td> </tr> <tr> <td>AB 182V</td> <td>AB 366V</td> </tr> <tr> <td>AC 253V</td> <td>AC 504V</td> </tr> <tr> <td>BC 177V</td> <td>BC 353V</td> </tr> <tr> <td>AN 196V</td> <td></td> </tr> <tr> <td>BN 120V</td> <td></td> </tr> <tr> <td>CN 248V</td> <td></td> </tr> </table> <p>AAM to contact Finning for service of generator unit. Service required prior to commissioning of site.</p>	<u>120/208V 4W</u>	<u>480V 3W</u>	AB 182V	AB 366V	AC 253V	AC 504V	BC 177V	BC 353V	AN 196V		BN 120V		CN 248V		AAM/DES
<u>120/208V 4W</u>	<u>480V 3W</u>															
AB 182V	AB 366V															
AC 253V	AC 504V															
BC 177V	BC 353V															
AN 196V																
BN 120V																
CN 248V																
FR-E01.16	Contractor to provide testing and startup of generator, confirm phase rotation at each site.	Contractor														
FR-E01.17	AAM to review access requirements for generator to seepage pond site.	AAM														
FR-E01.18	<i>Asbuilt drawings were not available for review.</i>	Contractor														
FR-E01.19	<i>Contractor to provide letters of warranty when project is substantially complete.</i>	Contractor														
Old Items		Action By														
-	-	-														

Project:	Mt. Nansen Portable Generator	Project No.:	144901768.0801	Report No.:	FRE-01
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SAFETY AND SECURITY	
Were there any health or safety incidents reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any security issues or breaches reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If YES to either, describe:	

CONSTRUCTION OUTLOOK	
Are there any submittals, issues or direction required over the next week, which may affect schedule?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Explain:	

Site Visit Report Prepared By:	
Name:	Martin, Corry
Date:	5 September 2013

DISTRIBUTION		
Name	Company	Via
Kirsten Hulstein	Project Manager Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	kirsten.hulstein@gov.yk.ca
Erik Pit	Regulatory Affairs Officer Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	erik.pit@gov.yk.ca

Issued By:	Person / Title	Signature
Stantec Electrical	Corry Martin, P.Eng.	



Stantec
Field Review

GENERAL INFORMATION			
Project:	Mt. Nansen Portable Generator	Report No.:	FRE-02
Date of Visit:	07 March 2014	Stantec File:	144901768.0801
Date of Issue:	10 March 2014	Contractor File:	
Present:	Corry Martin, Stantec	Weather:	

SITE CONDITIONS / GENERAL INFORMATION	
Items	
A	Outstanding items reviewed for completion

GENERAL OBSERVATIONS OR INSTRUCTIONS/DIRECTION TO CONTRACTOR		
New Items		Action By
FR-E01.1	Bunkhouse Generator Site: Knockout fillers required UPDATE 140307: Complete	Info
FR-E01.2	Bunkhouse Generator Site: Ground plates installed at 750mm, spaced at 3000mm. Contractor to provide photos of existing grounding plate installation. Show cadweld/ampact connectors, and depth with tape measure. UPDATE 140307: Complete	Info
FR-E01.3	Bunkhouse Generator Site: Lamicaid missing for normal power fused switch. UPDATE 140307: Complete	Info
FR-E01.4	Bunkhouse Generator Site: Provide blocking behind panels for mounting equipment – or use cantruss brackets with through bolting. UPDATE 140307: Complete	Info
FR-E01.5	Seepage Pond Generator Site: Contractor provided alternate transfer switch than shown on drawings. IlSCO reducing connectors do not fit in lugs of smaller 60A transfer switch. Contractor to provide smaller connectors to suit. UPDATE 140307: Complete	Info
FR-E01.6	Seepage Pond Generator Site: Cables used for pole risers: PTT cables Inc (-40C) 600V CSA RW90 XLPE. Cables do not indicate UV rating. Contractor to provide shop drawings of cable indicating UV rated. UPDATE 140307: Contractor to provide shop drawings of cable.	Contractor
FR-E01.7	Seepage Pond Generator Site: Dead end slipped off ceramic insulator while on site. Contractor to provide photos of completed installation with dead-end supported on ceramic insulator. UPDATE 140307: Complete	Info
FR-E01.8	Typical of both sites: Site Voltage Signage required as per drawings/specifications. UPDATE 140307: Complete	Info

Project:	Mt. Nansen Portable Generator	Project No.:	144901768.0801	Report No.:	FRE-02
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FR-E01.9	Typical of both sites: Written colors required on each camlock cord end as per specifications. Contractor to test fit generator cables during startup and testing. Confirm Leviton connectors are suitable for use with Crouse Hinds. UPDATE 140307: Complete	Info														
FR-E01.10	Typical of both sites: 12' - 8x8 PWF post in place, buried 4'. Installation acceptable.	Info														
FR-E01.11	Typical of both sites: Class RK1 fuses installed. Fuses acceptable.	Info														
FR-E01.12	Typical of both sites: No 'J' hooks were provided for camlock pigtails. Remove requirement for J hooks.	Info														
FR-E01.13	Typical of both sites: Shop drawings for overhead line connectors (ILSCO) required. UPDATE 140307: Shop drawings not provided.	Contractor														
FR-E01.14	Typical of both sites: Aluminum or fibreglass plates required where individual phase conductors penetrate ferrous enclosure. Refer to drawing detail 4/E02-01. Provide non-ferrous connectors and bushings. UPDATE 140307: Requirement removed for ungrounded conductors not exceeding 200A. See CEC 4-010(3).	Info														
FR-E01.15	Generator was started and tested on site. Generator voltage regulator not operating correctly. Observed voltages as follows: <table border="0" style="margin-left: 40px;"> <tr> <td><u>120/208V 4W</u></td> <td><u>480V 3W</u></td> </tr> <tr> <td>AB 182V</td> <td>AB 366V</td> </tr> <tr> <td>AC 253V</td> <td>AC 504V</td> </tr> <tr> <td>BC 177V</td> <td>BC 353V</td> </tr> <tr> <td>AN 196V</td> <td></td> </tr> <tr> <td>BN 120V</td> <td></td> </tr> <tr> <td>CN 248V</td> <td></td> </tr> </table> AAM to contact Finning for service of generator unit. Service required prior to commissioning of site. UPDATE 140307: Shunt wiring removed. DES confirmed correct generator operation on site.	<u>120/208V 4W</u>	<u>480V 3W</u>	AB 182V	AB 366V	AC 253V	AC 504V	BC 177V	BC 353V	AN 196V		BN 120V		CN 248V		Info
<u>120/208V 4W</u>	<u>480V 3W</u>															
AB 182V	AB 366V															
AC 253V	AC 504V															
BC 177V	BC 353V															
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BN 120V																
CN 248V																
FR-E01.16	Contractor to provide testing and startup of generator, confirm phase rotation at each site. UPDATE 140307: Complete	Info														
FR-E01.17	AAM to review access requirements for generator to seepage pond site. UPDATE 140307: Complete	Info														
FR-E01.18	Asbuilt drawings were not available for review. UPDATE 140307: Complete	Info														
FR-E01.19	Contractor to provide letters of warranty when project is substantially complete. UPDATE 140307: Complete	Info														
Old Items		Action By														
-	-	-														

Project:	Mt. Nansen Portable Generator	Project No.:	144901768.0801	Report No.:	FRE-02
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SAFETY AND SECURITY	
Were there any health or safety incidents reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any security issues or breaches reported during the period?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If YES to either, describe:	

CONSTRUCTION OUTLOOK	
Are there any submittals, issues or direction required over the next week, which may affect schedule?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Explain:	

Site Visit Report Prepared By:	
Name:	Martin, Corry
Date:	10 March 2014

DISTRIBUTION		
Name	Company	Via
Kirsten Hulstein	Project Manager Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	kirsten.hulstein@gov.yk.ca
Erik Pit	Regulatory Affairs Officer Yukon Government Energy, Mines and Resources Assessment and Abandoned Mines (AAM)	erik.pit@gov.yk.ca

Issued By:	Person / Title	Signature
Stantec Electrical	Corry Martin, P.Eng.	

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Mobile Generator Task
March 10, 2014

15.3 O&M MANUAL

Mt. Nansen Mine Site

Portable Generator Operations Manual

Prepared April 2013

by Stantec Consulting Ltd.

Safety

This operations manual is intended to be a guide only. Staff should be familiar with the operation of the generator and have experience making connections, inspecting the generator prior to use, and conducting ongoing checks while the generator is operating. At all times, staff should not expose live (energized) electrical contacts or terminals, unless trained and equipped to do so.

General Operation and Maintenance

This manual is not intended to supplant the general operation and maintenance manual for the generator set. The intent of this manual is to address basic operational procedures specific to the sites where the generator set will be used. For general operations and maintenance of the generator set, refer to the manufacturer's operation and maintenance manual(s).

Diesel Power Generation – Overview

A portable 75kVA/60KW generator is available at the Mt. Nansen mine site to meet the facilities standby power requirements. The unit is trailered, and can be relocated to various sites to provide temporary power. The generator provides power at the following operating voltages:

- 120/208V 3 phase,
- 277/480V 3 phase.
- The unit is also capable of 120/240 single phase power, and is equipped with onboard service receptacles.

The generator's control panel monitors the generator's running characteristics and is equipped with visual and audible warning devices for trouble conditions. The generator sub-base fuel tank is sized to operate the generator under full load for 24 hours.

It is recommended that a logbook be stored with the generator. Information should be recorded in the logbook at all maintenance activities, and each time the unit is used. Information should be recorded in the logbook is at a minimum:

- Date, time, hour-meter value, location, and operator name
- List of maintenance conducted, or list the conditions of equipment as revealed during a pre-use inspection. A manufacturer supplied checklist should be followed during each startup.
- Values of meters and gauges at startup, and during operation. (Recorded values will help diagnose failures at a later date.)
- Average load during operation (as expressed in amperes per phase), voltages (as expressed per phase to neutral), and fuel consumption.

The portable generator is to be stored in the shop when not in use. After each use, the generator should be inspected and the tank should be filled.

Upon power failure the emergency power generator is able to be relocated using the F550 flatbed truck, to one of the following three locations:

Cookhouse and Bunkhouse:

Site Voltage: 120/208V 3Ø

Generator connection and transfer switch location: North side of cookhouse, at power pole.



Figure 1(a): Generator Connection Pole Location

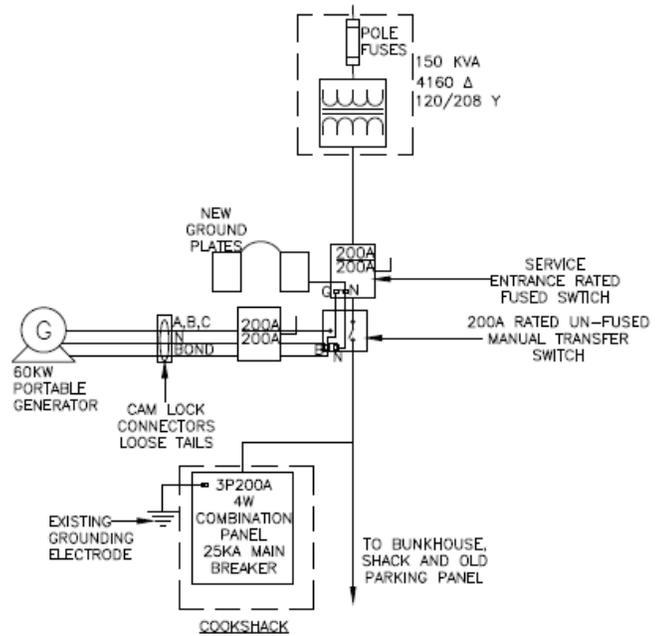


Figure 1(b): Electrical Single Line Detail

Seepage Pond:

Site Voltage: 277/480V 3Ø

Generator connection and transfer switch location: northwest of the seepage pond sloped parking surface; first power pole on level ground.

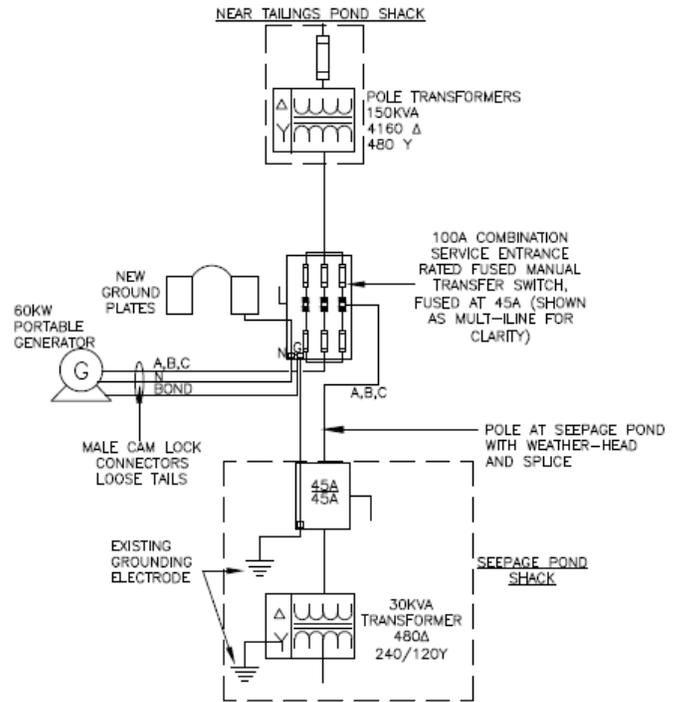
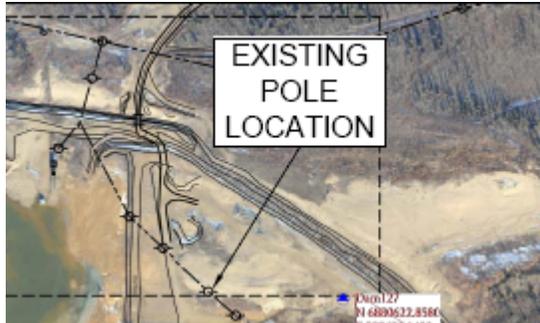


Figure 2(a): Generator Connection Pole Location

Figure 2(b): Electrical Single Line Detail

Connecting the Portable Generator:

The following steps outline the required procedure when connecting the portable generator to one of the three sites mentioned above:

1. Relocate generator to desired site. Locate generator in close proximity to the pole mounted camlock plug connections. Ensure that the generator is able to connect to the plugs with slack cable.
2. Securely mount the generator in place. Ensure that all wheels are blocked and the generator is immobile during usage.
3. Conduct a 'walk around' check on the generator trailer, and generator unit. Inspect the unit for damage, and check all belts and fluid levels. Refer to the manufactures generator maintenance manual for more information.
4. Record the value of the hourmeter into the generator logbook. Record the time and date, and note any future maintenance items into the logbook.



5. Change the generator voltage to the appropriate voltage. Refer to above portable generator locations and signage installed at each site transfer switch for each site voltage. Do not change voltage when generator is operating.
6. Remove and uncoil the 45' long generator connection cables. Open the back door of the portable generator. Connect the male generator cam lock connectors to the female cam lock connectors attached to the generator. Connect plugs as follows:
 - a. Bond plug (Green)
 - b. Neutral plug (White)
 - c. Line 1 plug (Red)

- d. Line 2 plug (Black)
 - e. Line 3 plug (Blue)
7. Connect the female generator cam lock connectors to the male cam lock connectors on site. Remove and store dust covers on site. The cables are color coded, and the written color designation is shown on the plug and at the connector. Connect plugs as follows:
- a. Bond plug (Green)
 - b. Neutral plug (White)
 - c. Line 1 plug (Red)
 - d. Line 2 plug (Black)
 - e. Line 3 plug (Blue)
8. Tighten all plug connectors with a flat-head screwdriver. Check all connections. Connections should be snug. Bundle cables out of walking areas where possible.



9. Open the generator breaker MCCB by turning it to the OFF (O) position.

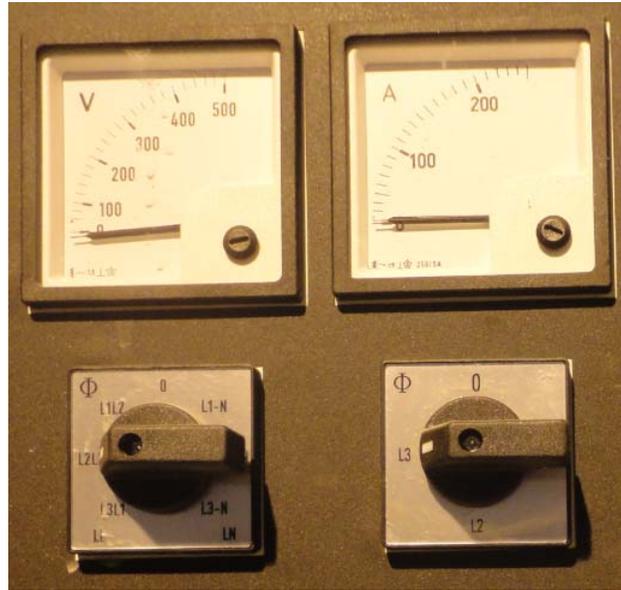




10. Turn the battery key switch to (I). Ensure that the mushroom stop button on the portable generator is not depressed. Depress the glow plug button. Turn the generator start switch to RUN. **The generator will start.**



11. Wait for generator to reach a stabilized speed. Oil pressure should stabilize within 10 seconds. Wait until the jacket water temperature reaches 140 degrees F: this is typically 3 to 5 minutes, but may be longer in cold weather. Check all gauges for normal values. Ensure that the frequency reads 59-61Hz. Adjust the frequency as required.
12. Switch the manual transfer to the 'off' position, and wait for 15 seconds. Switch the transfer switch to the portable generator position.
13. Stand aside from the front of the breaker, facing away then close the generator breaker and close the generator breaker MCCB by turning to the ON position (I).



14. Using the generator phase selector switches on the control panel, confirm that voltages and amperages are balanced on all phases. If one phase is showing no amperage, shut down the generator using the 'Disconnecting the Portable Generator' sequence, check all connections, and restart the generator.
15. Confirm the operation of the load. If the generator is at the seepage pond, check that the pump has started, and that it is rotating in the correct direction. *Note that the pump may still have a reduced flow if it is rotating in reverse.*

During Generator Operation:

During generator operation, the generator unit should be periodically checked for the following:

- Movement of the trailer, wheel chocks
- Fuel level
- Alarms, as displayed on the control panel
- Frequency, amperage, and voltage readings. Ideal values are:
 - Frequency: 60 Hz (58 to 60 Hz is acceptable)
 - Amperage: measured per phase, using the selector switch on the control panel. Phases should be within 10% of one another.

(Note that the Victoria Creek pumphouse may exceed these typical values for amperages.)
 - Voltage: should be the rated site voltage, with a tolerance of +/- 2%.

If the generator is shut down for re-fuelling or relocation to another site, a full startup check (walk-around) should be completed.

Disconnecting the Portable Generator:

The following steps outline the procedure to dis-connect the portable generator:

1. Ensure that the main site power is present. One of the three primary power generators must be operating, and the distribution to the local transfer switch must be operational, ready for load transfer.
2. At the bunkhouse cookshack only: Turn off the 200A fused breaker on the normal power supply (“NORMAL POWER SUPPLY FUSED SWITCH”), adjacent to the transfer switch. Turn off the “GENERATOR POWER SUPPLY FUSED SWITCH”. Switch the manual transfer to the ‘off’ position, and wait for 15 seconds. Stand aside facing away from the transfer switch the move the handle to the 'normal' power position. Turn on the 200A fused breaker on the normal power supply (“NORMAL POWER SUPPLY FUSED SWITCH”), adjacent to the transfer switch. Confirm that there is power to the cookshack/bunkhouse.
3. At the Seepage pond and Victoria Creek Pumphouse only: Switch the manual transfer to the ‘off’ position, and wait for 15 seconds. Stand aside facing away from the transfer switch the move the handle to the 'normal' power position.
4. Wait for the generator to cool down. This is approximately 3 to 5 minutes after running at full load. Cool down timing must be in accordance with Caterpillar recommendations. Monitor water jacket temperature, and oil pressure.
5. Power off the portable generator, and turn the key into the ‘off’ position. Camlock cables are now safe to disconnect.
6. Using a flat-head screwdriver, loosen the cam lock on both the site connectors and the generator connectors and decouple them in the following sequence.
 - a. Line 1 conductor plug (Red)
 - b. Line 2 conductor plug (Black)
 - c. Line 3 conductor plug (Blue)
 - d. Neutral conductor plug (White)
 - e. Bond Plug (Green)
7. Replace the dust covers on site cables, and on generator attached cables.
8. Neatly coil the generator connection cables and store them for travel. Open the rear access door on the generator enclosure, coil the generator leads vertically inside the door, and close the door for travel. Do not remove the generator attached cables.
9. Solidly connect the generator trailer to the truck hitch then remove portable generator bracing to ensure generator is mobile.
10. Relocate portable generator to desired location. If the generator is finished use, review the maintenance logbook for any items which need to be addressed.

Store the generator with the unit plugged in, so that battery chargers, coolant and oil pan heaters are operating.

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Shop Drawings
March 10, 2014

16.0 Shop Drawings

MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Shop Drawings
March 10, 2014

16.1 MAIN SITE ASSESSMENT

Transmittal



Stantec

Stantec Architecture Ltd.
107 Main Street, Suite 202
Whitehorse, YT Y1A 2A7
Tel: (867) 633-2400
Fax: (867) 633-2481

To:

Company: Stantec Ltd
Address: 107 Main Street, Suite 202,
Whitehorse, YT
Y1A 2A7
Phone: 1-867-633.2400
Date: March 20, 2013
File:
Delivery: Via EMAIL

From:

- For Your Information
- For Your Approval
- For Your Review
- As Requested

Reference: TRN E01

Attachment:

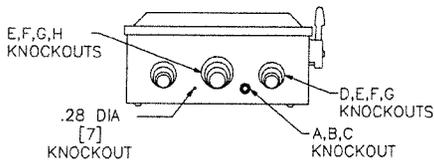
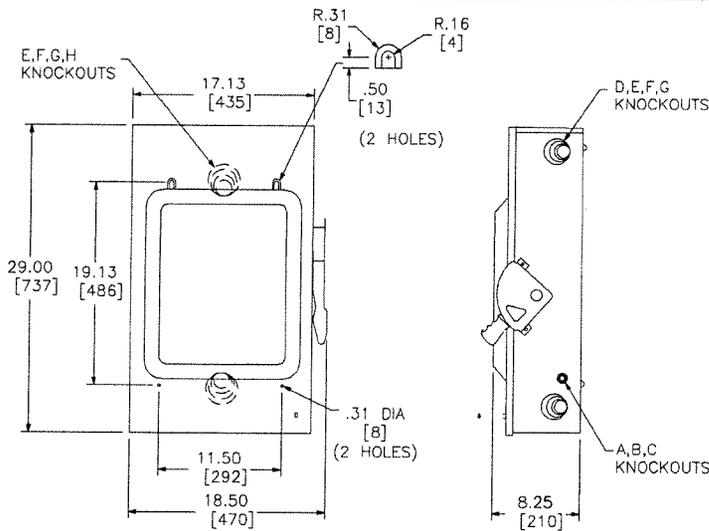
Copies	Doc Date	Pages	Description
1	March 20, 2013	29	

Note:

STANTEC ARCHITECTURE LTD

cc.

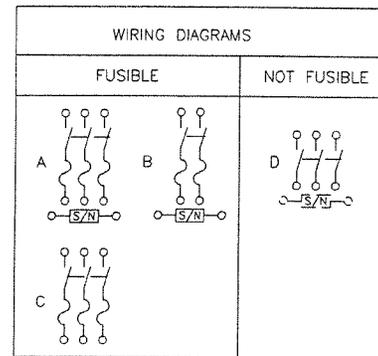
One Team. Infinite Solutions.



TYPICAL TOP AND BOTTOM ENDWALLS

NEMA TYPE 1

DUAL DIMENSIONS: INCHES MILLIMETERS



TERMINAL LUGS ‡			
AMPERES	MAX WIRE	MIN WIRE	TYPE
200	250 KCMIL	#6 AWG	AL OR CU

SYMBOL	KNOCKOUTS			
	CONDUIT SIZE		DIAMETER	
	IN	MM	IN	MM
A	.50	13	.88	22
B	.75	19	1.13	29
C	1.00	25	1.38	35
D	1.25	32	1.75	45
E	1.50	38	2.00	51
F	2.00	51	2.50	64
G	2.50	64	3.00	76
H	3.00	76	3.50	89

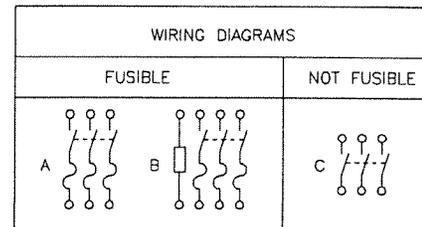
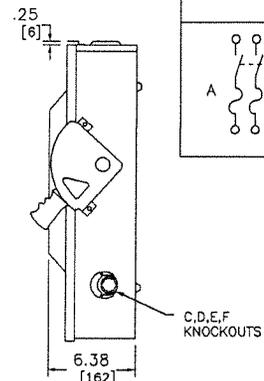
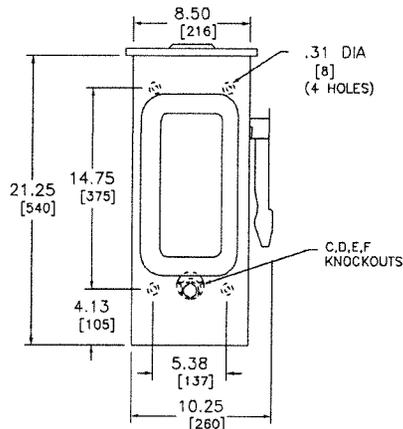
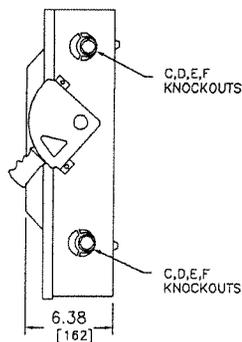
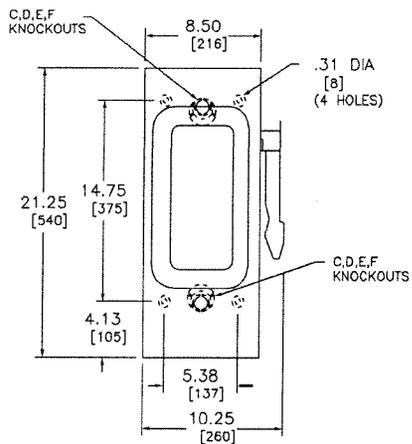
NOTES:
 FINISH - GRAY BAKED ENAMEL
 cUL CERTIFIED - FILE E-2875
 ALL NEUTRALS - INSULATED GROUNDEABLE
 FUSIBLE SWITCHES ARE SUITABLE FOR USE AS SERVICE EQUIPMENT.
 SHORT CIRCUIT CURRENT RATINGS:
 10,000 AMPERES WITH CLASS H OR K FUSES.
 200,000 AMPERES WITH CLASS R FUSES HAVING CLASS R REJECTION
 KITS INSTALLED OR CLASS J FUSES.
 ON 600V SWITCHES, 100,000 AMPERE MAX ON CORNER GROUNDED DELTA
 WHEN PROTECTED BY CLASS R OR J FUSES.
 WHEN MOUNTING THESE SWITCHES, ALLOW 4.00/[102] MIN CLEARANCE BETWEEN
 ENCLOSURES FOR OPENING OF SIDE HINGED DOOR.
 ‡ LUGS SUITABLE FOR 75°C CONDUCTORS.
 # IF CORNER GROUNDED DELTA, USE OUTER SWITCHING POLES FOR UNGROUNDED CONDUCTORS.
 & IF CORNER GROUNDED DELTA, INSTALL NEUTRAL AND USE OUTER SWITCHING POLES FOR UNGROUNDED CONDUCTORS.
 ~ USE ANY TWO SWITCHING POLES.
 < MAX RATING

CATALOG NUMBER	VOLTAGE RATINGS	WIRING DIAG	HORSEPOWER RATINGS														
			240VAC				480VAC				600VAC				250 VDC	600 VDC	
			STD		MAX		STD		MAX		STD		MAX		STD	STD	
NEMA TYPE 1			1 Ø	3 Ø	1 Ø	3 Ø	1 Ø	3 Ø	1 Ø	3 Ø	1 Ø	3 Ø	1 Ø	3 Ø			
CH224N	240VAC,250VDC	B	15	25#	-	60#	-	-	-	-	-	-	-	-	-	40	-
CH324N	240VAC,250VDC	A	15~	25#	-	60#	-	-	-	-	-	-	-	-	-	40	-
CH364	600VAC,600VDC	C	15~	25#	-	60&	25~	50~	50~	125&	30~	60	50~	150	40~	50~	
CH364N	600VAC,600VDC	A	15~	25&	-	60#	25~	50#	50~	125#	30~	60	50~	150	40~	50~	
CHU364	600VAC,600VDC	D	-	-	15~	60&	-	-	50~	125&	-	-	50~	150	40~	< 50~	<

HEAVY DUTY SAFETY SWITCHES
 VISIBLE BLADE TYPE
 200 AMPERE - SERIES F5
 ENCLOSURE - NEMA TYPE 1 GENERAL PURPOSE

SQUARE D COMPANY

DWG# 3229C
 NO.

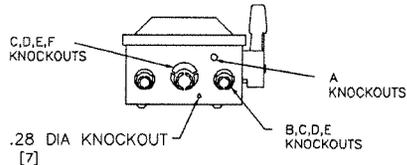


TERMINAL LUGS ‡

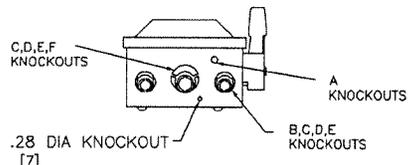
AMPERES	MAX. WIRE	MIN. WIRE	TYPE
100	#1/0 AWG	#12 AWG	AL
	#1/0 AWG	#14 AWG	CU

KNOCKOUTS

SYMBOL	CONDUIT SIZE		DIAMETER	
	IN	MM	IN	MM
A	.50	13	.88	22
B	.75	19	1.13	29
C	1.00	25	1.38	35
D	1.25	32	1.75	45
E	1.50	38	2.00	51
F	2.00	51	2.50	64



TYPE 1



TYPE 3R ▲

DUAL DIMENSIONS: INCHES
MILLIMETERS

NOTES:
FINISH - GRAY BAKED ENAMEL
CSA CERTIFIED - FILE #LL-89067
ALL NEUTRALS - INSULATED GROUNDABLE
SHORT CIRCUIT CURRENT RATINGS:
10,000 AMPERES WITH CLASS H OR K FUSES.
200,000 AMPERES WITH CLASS R FUSES HAVING CLASS R REJECTION KITS INSTALLED OR CLASS J FUSES.

WHEN MOUNTING THESE SWITCHES, ALLOW 4.00/[102] MIN. CLEARANCE BETWEEN ENCLOSURES FOR OPENING OF SIDE HINGED DOOR.

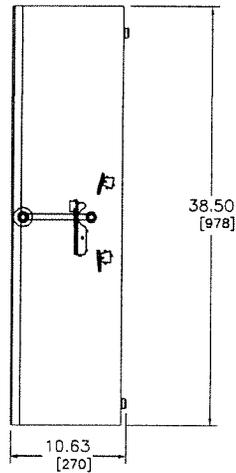
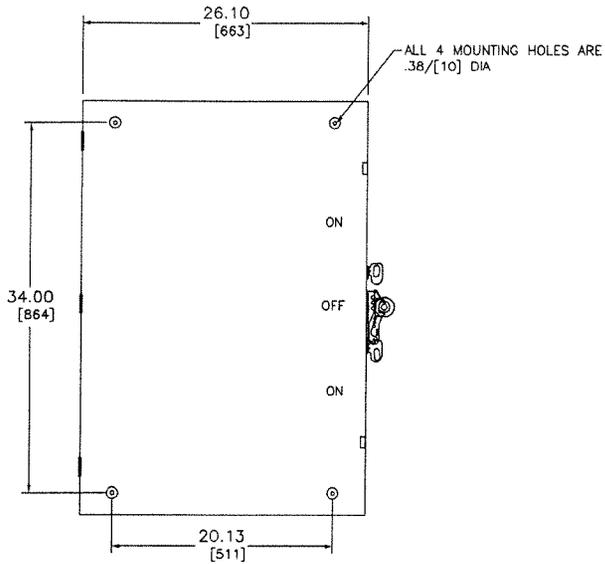
▲ TYPE 3R SWITCHES HAVE PROVISIONS FOR MAXIMUM 2.50 IN / 64 MM BOLT-ON B-HUB.
‡ LUGS SUITABLE FOR 60°C OR 75°C COPPER OR ALUMINUM CONDUCTORS.
SUFFIX E1 - ELECTRICAL INTERLOCK INSTALLED: 1 N.O., 1 N.C. CONTACTS
SUFFIX E2 - ELECTRICAL INTERLOCK INSTALLED: 2 N.O., 2 N.C. CONTACTS

CATALOG NUMBER	VOLTAGE RATINGS	WIRING DIAG.	HORSEPOWER RATINGS									250 VDC.	600 VDC.
			240VAC			480VAC			600VAC				
			STD.	MAX.		STD.	MAX.		STD.	MAX.			
			3Ø	1Ø	3Ø	3Ø	1Ø	3Ø	3Ø	1Ø	3Ø			MAX.	MAX.
CH323N	240VAC,250VDC	B	15	-	30	-	-	-	-	-	-	20	-
CH323NRB	240VAC,250VDC	B	15	-	30	-	-	-	-	-	-	20	-
CH363	600VAC;600VDC	A	-	-	-	25	-	60	30	-	75	20	50
CH363RB	600VAC;600VDC	A	-	-	-	25	-	60	30	-	75	20	50
CH363N	600VAC;600VDC	B	-	-	-	25	-	60	30	-	75	-	50
CH363NRB	600VAC;600VDC	B	-	-	-	25	-	60	30	-	75	-	50
CHU363	600VAC;600VDC	C	-	20	40	-	40	75	-	40	100	20	50
CHU363RB	600VAC;600VDC	C	-	20	40	-	40	75	-	40	100	20	50

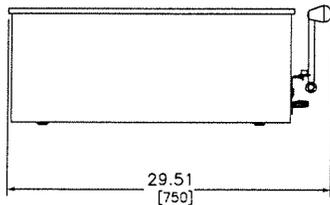
HEAVY DUTY SAFETY SWITCHES
VISIBLE BLADE TYPE
100 AMPERE
ENCLOSURE - TYPE 1 GENERAL PURPOSE
TYPE 3R RAINPROOF



DWG# 1905C
NO.



NEMA TYPE 1
ILLUSTRATED



NOTES:
FINISH - GRAY BAKED ENAMEL
SHORT CIRCUIT CURRENT RATING:
10,000 AMPERES WHEN PROTECTED BY CLASS H OR K FUSES.
82,000 LINE DEVICES ARE LOAD-MAKE, LOAD-BREAK.
UL LISTED - FILE E-2875 AND CUL CERTIFIED FOR USE IN CANADA
SUITABLE FOR USE AS SERVICE EQUIPMENT IN US ONLY.
▲ USE LEFT AND RIGHT SWITCHING POLES 250VDC APPLICATION.

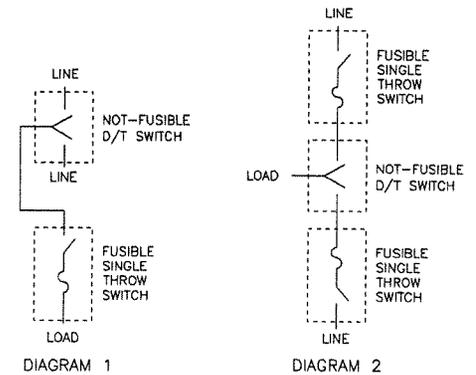
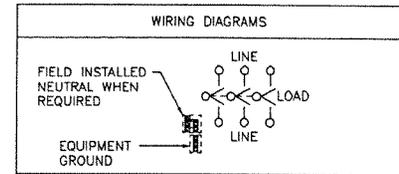


DIAGRAM 1 AND 2 ILLUSTRATE METHODS OF APPLYING FUSES TO DOUBLE THROW SWITCHES WHEN REQUIRED.

DUAL DIMENSIONS: INCHES
MILLIMETERS

FIELD INSTALLABLE ACCESSORIES	
NEUTRAL KIT	DT400N
ELECTRICAL INTERLOCK	EK400DTU2
EQUIPMENT GROUND	(2) PK0GTA2

CATALOG NUMBER	VOLTAGE RATINGS	TERMINAL LUGS		
		AMPERES	WIRE RANGE	TYPE
82345	600VAC/250VDC ▲	400	(1) 1/0-600 KCML OR (2) 1/0-300	AL/CU

DOUBLE THROW SAFETY SWITCHES
400 AMPERE
ENCLOSURE - NEMA TYPE 1 GENERAL PURPOSE

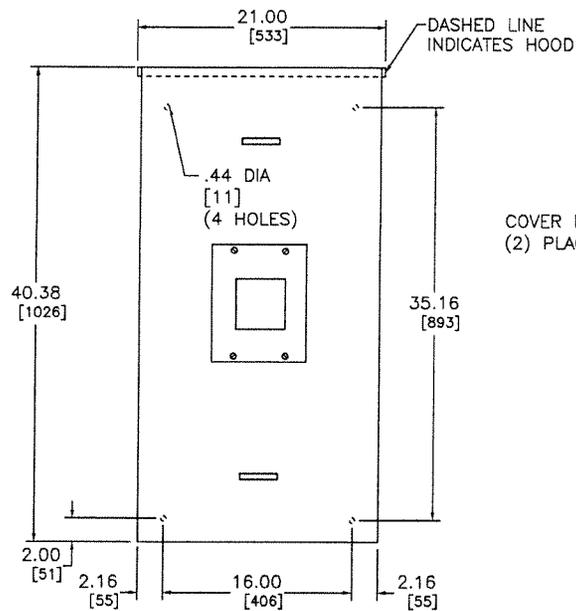
SQUARE D
Schneider Electric

DWG# 3379
NO.

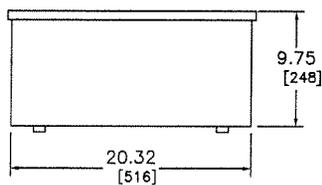
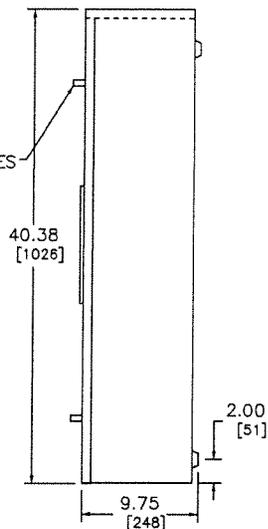
Main

Ampere Rating	300A
Approvals	UL Listed - CSA Certified - IEC Rated
Catalog Reference Number	0612CT0101
Circuit Breaker Type	Standard
Depth	8.10 Inches
Electronic Trip Unit	Basic
For Use With	Switchboards
Frame Type	M-Frame
General Application	Provides overload and short circuit protection
Height	12.80 Inches
Marketing Trade Name	Powerpact
Mounting Type	Unit Mount
Number of Poles	3-Pole
Short Circuit Current Rating	65kA@240VAC - 35kA@480VAC - 18kA@600VAC
Terminal Type	Lugs (ON and OFF ends)
Type	MG
Voltage Rating	600VAC
Weight	24 Pounds
Width	8.30 Inches
Wire Size	#3/0-500 AWG/kcmil(Al/Cu)

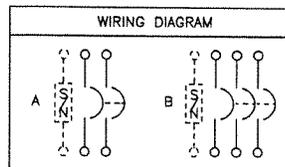
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COVER HANDLES
(2) PLACES



M800S
NEMA/EEMAC TYPE 1
NO KNOCKOUTS



CIRCUIT BREAKER TERMINAL LUG DATA					
CIRCUIT BREAKER CATALOG NO. PREFIX	AMPERE RATING	CONDUCTORS PER PHASE	WIRE SIZE (AWG/KCMIL)		TYPE
			MAX	MIN	
MGL,MJL PGL,PJL,PKL,PLL	300-800A 250-800A	3	500	3/0	AL OR CU

FIELD INSTALLABLE NEUTRAL ASSEMBLIES AND GROUND KIT						
CATALOG NUMBER	MAXIMUM AMPERE RATING	NUMBER OF TERMINALS	CONDUCTORS PER TERMINAL	WIRE SIZE (AWG/KCMIL)		TYPE
				MAX	MIN	
AL800SN	800A	6 (3 IN-3 OUT)	1 2 ●	500 250	3/0 6	AL OR CU
* SN800SN AND (2) SN1200	800A	16 (8 IN-8 OUT)	1 2 ●	750 350	3/0 6	
** S33576 AND S33576MK	800A	8 (4 IN-4 OUT)	1 2 ●	750 300	3/0 4	
PK0GTA4 ▲	-	4	1	300	6	

DUAL DIMENSIONS: INCHES
MILLIMETERS

FIELD INSTALLABLE CIRCUIT BREAKER DATA										
CIRCUIT BREAKER CATALOG NO. PREFIX	WIRING DIA	AMPERE RATING	UL LISTED INTERRUPTING RATING RMS SYMMETRICAL AMPERES							FEDERAL SPECS W-C-375B/ GEN
			AC VOLTAGE				DC VOLTAGE			
			240	480Y/277	480	600	125	250	600	
MGL	A B	300-800	65K	35K	35K	18K	-	-	-	X
MJL	A B	300-800	100K	65K	65K	25K	-	-	-	X
PGL ■	A B	250-800	65K	35K	35K	18K	-	-	-	X
PJL ■	A B	250-800	100K	65K	65K	25K	-	-	-	X
PKL ■	A B	250-800	65K	50K	50K	50K	-	-	-	X
PLL ■	A B	250-800	125K	100K	100K	25K	-	-	-	X

- NOTES:
 FINISH - GRAY BAKED ENAMEL ELECTRODEPOSITED OVER CLEANED PHOSPHATIZED STEEL.
 cULus - FILE E136861 CE MARKED.
 NEUTRAL - INSULATED GROUNDABLE.
 THE SHORT CIRCUIT CURRENT RATING OF THIS ENCLOSED CIRCUIT BREAKER, INDICATED ON CHART ABOVE, MAY BE LESS THAN THE AIR RATING INDICATED ON THE INSTALLED CIRCUIT BREAKER.
 * FOR 200% NEUTRAL APPLICATION.
 ** NEUTRAL AND NEUTRAL CT FOR USE ON INTEGRAL GROUND FAULT PROTECTION APPLICATION. APPLICABLE ONLY TO P-FRAME, 400-800A.
 ● NUMBER OF TERMINALS FOR SERVICE GROUND CONDUCTORS.
 ▲ GROUND KIT.
 ■ STANDARD OR 100% RATED, 800A MAX.

CIRCUIT BREAKER ENCLOSURES
250-800 AMPERE
NEMA/EEMAC TYPE 1 GENERAL PURPOSE ENCLOSURE

SQUARE D
Schneider Electric

DWG# 3432
NO.

NQ Panelboards – Ready to Install (RTI)

20" Wide Enclosures — 240 Vac, 48 Vdc

NQ

RTI Optional Main Lug Kits for NQ Main Lug Panelboards

Amps	Aluminum				Copper			
	Aluminum Mechanical		Aluminum Compression		Copper Mechanical		Copper Compression	
	Cat. #	Lug Wire Range for wire bending space	Cat. #	Lug Wire Range for wire bending space	Cat. #	Lug Wire Range for wire bending space	Cat. #	Lug Wire Range for wire bending space
100	NQALM1	(1) #6 - 350 MCM	NQALV1	(1) #4-300 kcmil	NQCUM1	(1) #6 - 350 kcmil	NQCUV1	(1) #6 - 350 kcmil
225	NQALM2	(1) #6 - 350 MCM	NQALV2	(1) 250-350 kcmil	NQCUM2	(1) #6 - 350 kcmil	NQCUV2	(1) #6 - 350 kcmil
400	NQALM4	(1) 1/0-750 MCM or (2) 1/0-350 MCM	NQALV4	(2) 2/0-500 kcmil	NQCUM4	(1) 1/0-750 kcmil or (2) 1/0-350 kcmil	NQCUV4	(1) 400-750 kcmil
600	NQALM6	(2) 1/0-750 MCM	NQALV6	(2) 2/0-500kcmil	NQCUM6	(2) 1/0-750 kcmil	NQCUV6	(2) 250-500 kcmil
600 *	NQALM6A	(3) 1/0-250 MCM		---	---	---	---	---

a. Optional lug for 600A. Can also be used for 400A.

NQ RTI Accessories Main Breaker Kits and 200% Neutrals

Main Breaker Kits

Mains Ampacity	Main Breaker Kit (less circuit breaker)		
	Catalogue No.	Fits Breaker Frames	Add Box Ht
100	NQMB2HJ	H 100 A max	12"
225	NQMB2HJ	H 150 A max and J 225A max	
	NQMB2Q	Q 225 A max	
	NQMB2KI	KI 225 A max	
400	NQMB4LA	LAL/LHL (LC F/A only.)	
600		Factory Assembled Only	

200% Neutrals

Mains Ampacity	200% Neutral Kit		Copper 100% Neutral Kit	
	Catalogue No.	Add Box Ht	Catalogue No.	Add Box Ht
100	NQNL1	no adder	100A NQN1CU	no adder
225	NQNL2 or NQNL2ACCY **		225A NQN2CU	
			400A NQN6CU	
400	NQNL4 *		600A NQN6CU *	

* Not to be used with SFL, FTL or SFB. These combinations - Factory Assembled Only.
 ** For 225A panel with SFL, FTL or SFB, use NQNL2ACCY.

Sub Feed Lugs, Feed-Through Lugs and Sub Feed Breakers

Mains Ampacity	Sub Feed Lugs (N/A in MCB Interiors)	Feed-thru Lugs	Sub Feed Circuit breaker kits (breaker not included)	
			Single SFB	Two SFBs
	Catalogue No.	Catalogue No.	Catalogue No.	Catalogue No.
100	NQSFL1	100A Not Available, Use 225A Interior	---	---
225	NQSFL2	NQFTL2L (a)	NQSFB2Q or NQSFB2HJ	---
		NQFTL2H (b)		---
400	NQSFL4	NQFTL4L (a)	NQSFB4Q or NQSFB4HJ	---
600		NQFTL4H (b)		---
Factory Assembled Only				

(a) final character L indicates the kit is used for low circuit count interiors 30-42 cct
 (b) final character H indicates the kit is used for high circuit count interiors 54, 72 and 84 cct

Refer to Section DE3 for Main Breakers Ready to Install

NQ RTI Service Entrance Main Breaker and Main Lug Panelboards

Mains Rating	1 phase or 3 phase	max # of single pole QO/QOB circuit breakers	Factory Installed Main Breaker	Catalogue Number	Type 1 Enclosure Width	Surface or Flush-Mount Trim
100A	3 phase	42	QBL32100	NQSE342100S	14"	S
				NQSE342100F	14"	F
200A	3 phase	42	QBL32200	NQSE342200S	14"	S
				NQSE342200F	14"	F
225A	3 phase	42	n/a	NQML342225S*	14"	S
400A	1 phase	42	LAL26400	NQSE142400F	20"	F
	3 phase	42	LAL36400	NQSE342400S	20"	S
	1 phase	84	LAL26400	NQSE184400F	20"	F
	3 phase	72	LAL36400	NQSE372400S	20"	S

Note: no field-installable kits available for above listed RTI SE MB or ML Panelboards

* 225A Main lug device

STRAIGHT LENGTHS – ALUMINUM & STEEL

CSA Class D6, E6 – 150mm (6") siderail; 6m (20 ft)

Note D6 in steel available in 3m & 6m

	MATERIAL	STYLE	CLASS	SIDERAIL	RUNG SPACING		
					cm	in	
A	Aluminum	L	Ladder	C	102mm (4")		
S	Pre-Galv Steel	V	Ventilated	D,E	115mm (4 1/2")	15	6
HD	Hot Dipped Steel	S	Solid	C6, D6, E6	150mm (6")	22.5	9
SS	Stainless Steel					30	12
						45	18

Example: A L D6 30 - 30

STYLE	PREFIX	RUNG SPACING		WIDTH	
		cm	in	cm	in
LADDER	ALD6	15	6	15	6
	→ SLD6 →	22.5	9	→ 30	12
	HLD6	30	12	45	18
	SSLD6	45	18	60	24
	ALE6			75	30
	SLE6			90	36
	HDLE6				
	SSLE6				
VENTILATED	AVD6	Maximum 50mm (2") spacing between Rungs		15	6
	SVD6			30	12
	HDVD6			45	18
	SSVD6			60	24
	AVE6			75	30
	SVE6			90	36
	HDVE6				
	SSVE6				
SOLID	ASD6	N/A		15	6
	SSD6			30	12
	HDSD6			45	18
	SSSD6			60	24
	ASE6				
	SSE6				
	HDSE6				
	SSSE6				

Note: All Cable tray comes complete with 2 Spyderlok Connector plates & hardware.

COPE

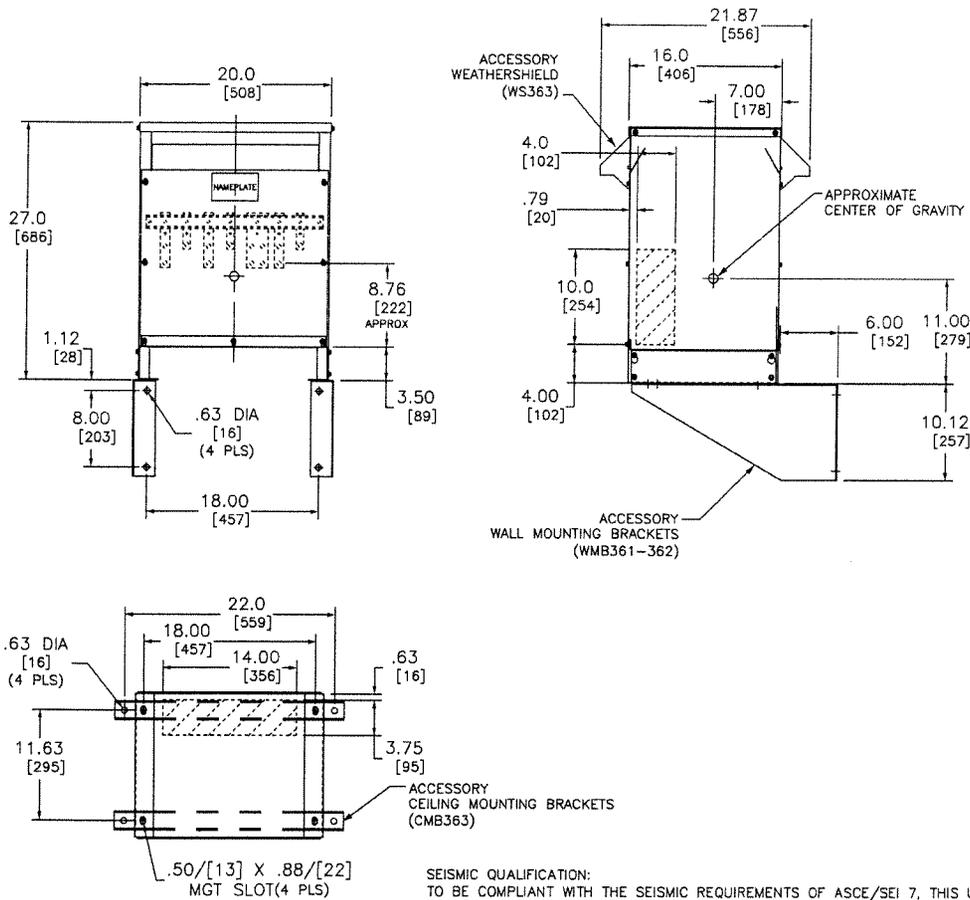


CLASS D6, E6 TRAY

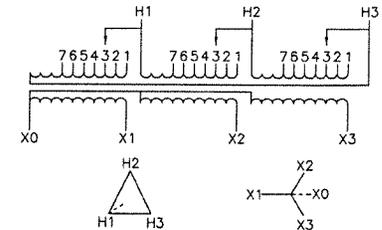


SPYDERLOK

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IN EACH PHASE CONNECT TO TAPS	
PRIMARY VOLTS	2-2.5% FCAN 4-2.5% FCBN
504	1
492	2
480	3
468	4
456	5
444	6
432	7



TRANSFORMER SPECIFICATIONS:

30 KVA 3Ø 60 HZ
 PRIMARY VOLTAGE 480 DELTA
 SECONDARY VOLTAGE 208Y/120
 150 °C RISE ABOVE 40°C AMBIENT
 220 °C INSULATION SYSTEM
 ALUMINUM WINDINGS
 APPROXIMATE WEIGHT: 260 LBS
 GUARANTEED SOUND LEVEL: 45 dB
 EFFICIENCY @35%: 97.5% AVG. CONFORMS
 TO NEMA TP 1 - 2002 AND CSA C802.2

SEISMIC QUALIFICATION:
 TO BE COMPLIANT WITH THE SEISMIC REQUIREMENTS OF ASCE/SEI 7, THIS UNIT HAS BEEN QUALIFIED BY SHAKE TABLE TESTING THROUGH SELF CERTIFICATION TO ICC ES AC156. CONTACT YOUR LOCAL SCHNEIDER ELECTRIC/SQUARE D REPRESENTATIVE FOR RELATED QUESTIONS.

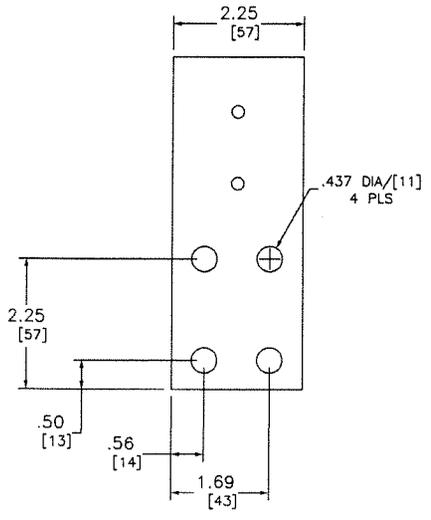
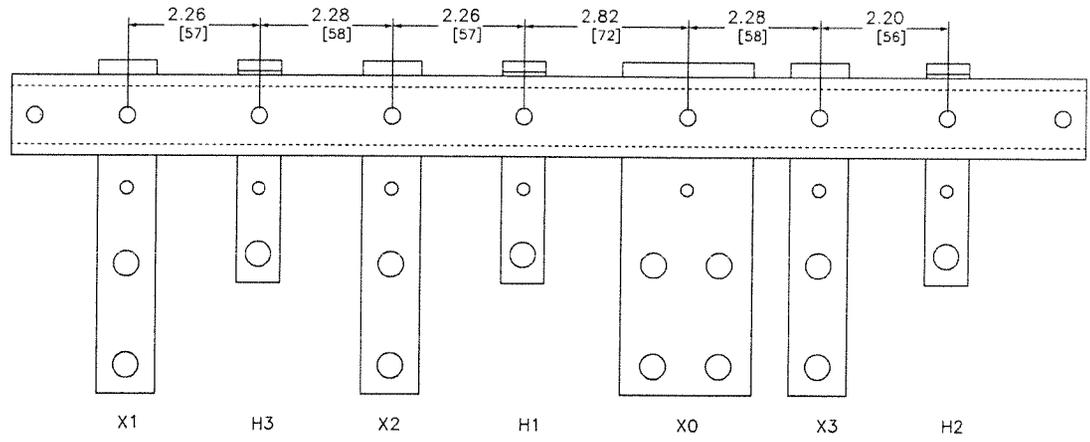
- NOTES:**
- 1) cULus LISTED (MEETING UL 1561 AND CSA C22.2)
 - 2) NEMA 2 VENTILATED ENCLOSURE ENCLOSURE RATED FOR NEMA 3R WHEN OPTIONAL WEATHERSHIELD ACCESSORY IS INSTALLED.
 - 3) MINIMUM CLEARANCE OF 3.00[76] BETWEEN VENT OPENINGS, WALL OR OTHER OBSTRUCTION
 - 4) SHADED AREAS DENOTE CUSTOMER CONDUIT ENTRANCE LOCATIONS, AVAILABLE BOTH SIDES AND BOTTOM

DUAL DIMENSIONS: INCHES
 MILLIMETERS

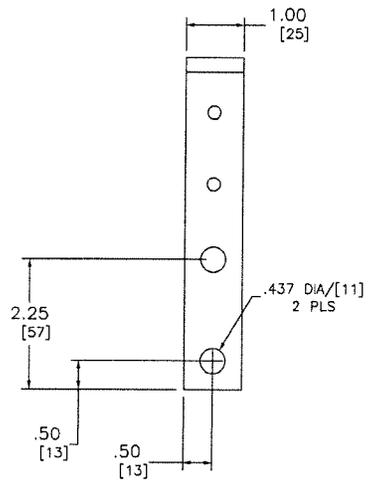
LOW VOLTAGE ENERGY EFFICIENT, TP1
 DRY-TYPE TRANSFORMER
 CATALOG NO EE30T3H
 3 PHASE, 30kVA, ALUMINUM
 PRIMARY 480 DELTA ,SECONDARY 208/120



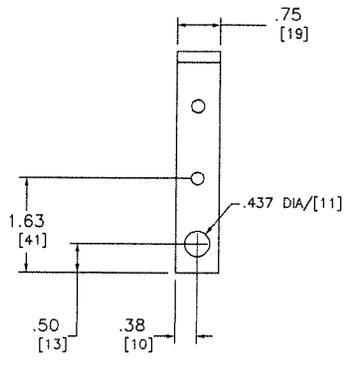
DWG# 6312-0002
 NO.



X0 TERMINAL DETAIL



X TERMINAL DETAIL



H TERMINAL DETAIL

DUAL DIMENSIONS: INCHES
MILLIMETERS

LOW VOLTAGE ENERGY EFFICIENT, TP1
 DRY-TYPE TRANSFORMER
 CATALOG NO EE30T3H
 3 PHASE, 30KVA, ALUMINUM
 PRIMARY 480 DELTA ,SECONDARY 208/120



DWG# 6312-0002
 NO.

SFP-5UDC/SFP-10UDC

Five Zone Fire Alarm Control Panel Ten Zone Fire Alarm Control Panel



Conventional Fire Alarm Control Panels

General

The **SFP-5UDC** is a five-zone FACP (Fire Alarm Control Panel) and the **SFP-10UDC** is a ten-zone FACP. These control panels provide reliable fire signaling protection for small to medium-sized commercial, industrial, and institutional buildings. Both panels include built-in communicators for Central Station Service and remote upload/download.

Each of these FACPs is compatible with System Sensor's microprocessor-based i³ series detectors. These conventional smoke detectors can transmit a maintenance trouble signal to the FACP indicating the need for cleaning and a supervisory "freeze" signal when the ambient temperature falls below the detector rating. Additionally, both the SFP-5UDC and SFP-10UDC are compatible with conventional input devices such as two- and four-wire smoke detectors, pull stations, waterflow devices, tamper switches, and other normally-open contact devices. Refer to the *Notifier Device Compatibility Document* for a complete listing of compatible devices.

Outputs include four NACs (Notification Appliance Circuits), three programmable Form-C relays (factory programmed for Alarm, Trouble, and Supervisory) and 24 VDC special application resettable and nonresettable power outputs. The FACPs supervise all wiring, AC voltage, battery level and telephone line integrity.

Activation of a compatible smoke detector or any normally-open fire alarm initiating device will activate audible and visual signaling devices, illuminate an indicating LED, sound the piezo sounder at the FACP, activate the communicator and FACP alarm relay, and operate an optional module used to notify a remote station or initiate an auxiliary control function.

Features

- Listed to ULC S527-99, S559-01.
Listed to UL Standard 864, 9th edition.
- Built-in DACT (Digital Alarm Communicator/Transmitter).
- Style B (Class B) IDC (Initiating Device Circuit)
 - SFP-5UDC - five IDCs.
 - SFP-10UDC - ten IDCs.
- Style Y (Class B) NAC (Notification Appliance Circuit) - special application power
 - SFP-5UDC - four NACs.
 - SFP-10UDC - four NACs.
- Notification Appliances may be programmed as
 - Silence Inhibit.
 - Auto-Silence.
 - Strobe Synchronization for System Sensor, Wheelock, Gentex, Faraday, or Amseco devices.
 - Selective Silence (horn-strobe mute).
 - Temporal or Steady Signal.
 - Silenceable or Nonsenseable.
- Optional N-CAC-5X Style Z (Class A) Converter Module for NACs and IDCs (2 required for SFP-10UDC).
- Form-C Relays for Alarm, Trouble and Supervisory - Contact Ratings 2.0 A @ 30 VDC or 0.5 A @ 30 VAC (resistive).
- 7.0 A total system current for SFP-5UDC.



SFP-5UDC

- 7.0 A total system current for SFP-10UDC.
- Optional Trim Ring TR-CE-B for semi-flush mounting.
- 24 volt operation.
- Low AC voltage sense.
- Alarm Verification.
- PAS (Positive Alarm Sequence).
- Automatic battery trickle charger.
- Built-in LED Annunciator Module N-ANN-LED
- Optional 4XTM module (conventional reverse polarity/city box transmitter).

PROGRAMMING AND SOFTWARE:

- Can be programmed at the panel with no special software or additional equipment.
- Programmable Make/Break Ratio.
- Upload/Download (local or remote) of program and data via integral DACT.

USER INTERFACE:

- Built-in DACT (Digital Alarm Communicator/Transmitter).
- Integral 80-character LCD display with backlighting and keypad.
- Real-time clock/calendar with automatic daylight savings adjustments.
- ANN-BUS for connection to annunciators.
- Audible or silent walk test capabilities.
- Piezo sounder for alarm, trouble, and supervisory.

Controls and Indicators

LED INDICATORS

- FIRE ALARM (red)
- SUPERVISORY (yellow)
- TROUBLE (yellow)
- AC POWER (green)
- ALARM SILENCED (yellow)

CONTROL BUTTONS

- ACKNOWLEDGE
- ALARM SILENCE
- SYSTEM RESET (lamp test)
- DRILL

Terminal Blocks

AC Power – TB1:

- SFP-5UDC (FLPS-7 Power Supply): 120 VAC, 50/60 HZ, 3.90 A.
- ➔ SFP-10UD (FLPS-7 Power Supply): 120 VAC, 50/60 HZ, 3.90 A.

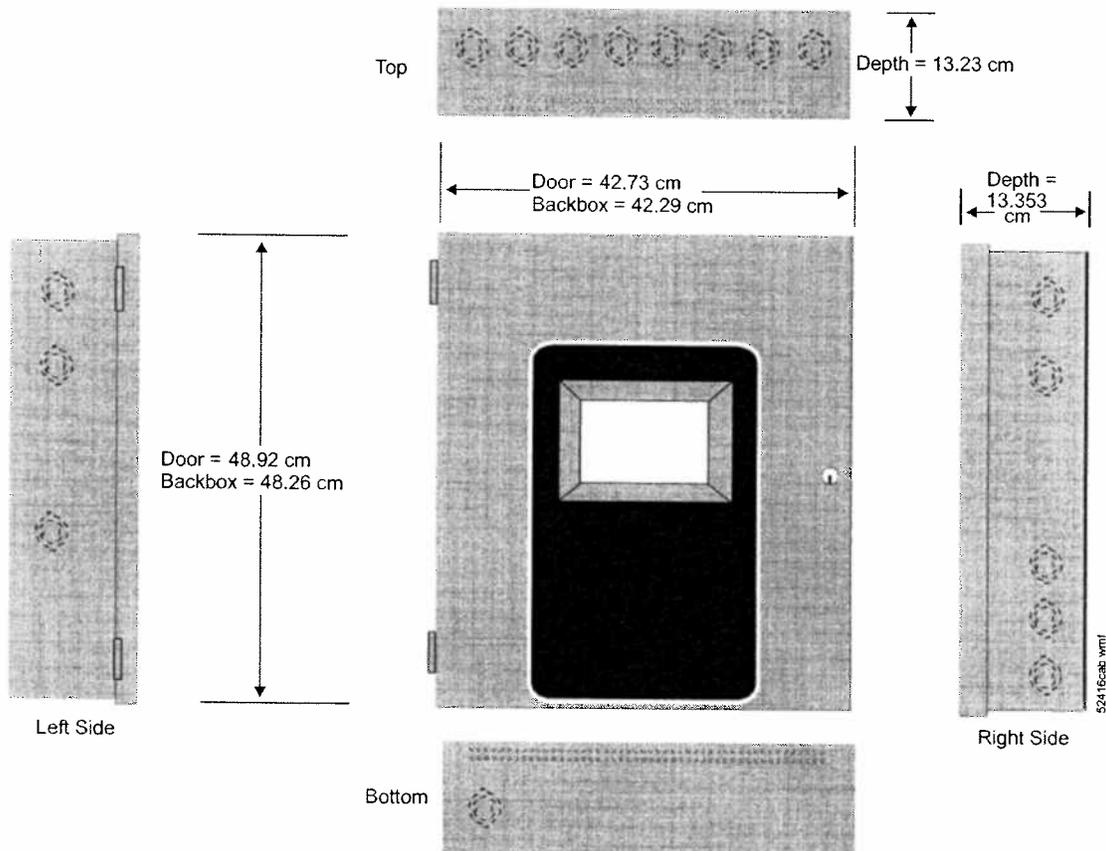
- **Wire size:** minimum 14 AWG (2.00 mm²) with 600 V insulation. Supervised, nonpower-limited.

Battery (sealed lead acid only) – J12:

- Maximum Charging Circuit - Normal Flat Charge: 27.6 VDC @ 1.4 A. Supervised, nonpower-limited.
- Maximum Charger Capacity: 18 AH battery for SFP-5UDC, and 26 AH battery for SFP-10UDC. [Two 18 Ah batteries can be housed in the FACP cabinet. Larger batteries require separate battery box such as the BB-26 or NFS-LBB.]
- Minimum Battery Size: 12 AH.

Initiating Device Circuits – TB4 (and TB 6 on SFP-10UDC only):

- Alarm Zones 1 - 5 on TB 4 (SFP-5UDC and SFP-10UDC).
- Alarm Zones 6 - 10 on TB6 (SFP-10UDC only).
- Supervised and power-limited circuitry.
- Operation: All zones Style B (Class B).
- Normal Operating Voltage: Nominal 20 VDC.
- Alarm Current: 15 mA minimum.
- Short Circuit Current: 40 mA max.
- Maximum Loop Resistance: 100 ohms.



Cabinet Measurements

- End-of-Line Resistor: 4.7K ohm, 1/2 watt (P/N 71252 UL-listed).
- Standby Current: 2 mA.

Refer to the *Notifier Device Compatibility Document* for listed compatible devices.

Notification Appliance Circuits – TB5 (and TB 7 on SFP-10UDC only):

- Four NACs
- Operation: Style Y (Class B)
- Special Application power
- Supervised and power-limited circuitry
- Normal Operating Voltage: Nominal 24 VDC
- Maximum Signaling Current: 7.0 A for SFP-5UDC, 2.5 A maximum per NAC; 7.0 A for SFP-10UDC, 3.0 A maximum per NAC.
- End-of-Line Resistor: 4.7K ohm, 1/2 watt (Part #71252)
- Max. Wiring Voltage Drop: 2 VDC

Refer to the *Notifier Device Compatibility Document* for compatible listed devices.

Form C Relays – TB8:

- *Relay 1* (factory default programmed as Alarm Relay)
- *Relay 2* (factory default programmed as fail-safe Trouble Relay)
- *Relay 3* (factory default programmed as Supervisory Relay)

Special Application Resettable Power – TB9:

- Jumper selectable by JP31 for resettable or nonresettable power.
- Operating voltage: 24 VDC nominal.
- Maximum available current: 500 mA - appropriate for powering four-wire smoke detectors.
- Power-limited circuit.

Refer to the *Notifier Device Compatibility Document* for listed compatible devices.

Remote Sync Output - TB2: Remote power supply synchronization output, only required for the SFP-5UDC. 24 VDC nominal special application power. Maximum current is 40 mA. End-of-Line Resistor: 4.7K ohm. Supervised and power-limited circuit.

Product Line Information

SFP-5UDC: Five-zone, 24-volt Fire Alarm Control Panel (includes black backbox, FLPS-7 power supply, technical manual, and a frame & post operating instruction sheet).

SFP-10UDC: Ten-zone, 24-volt Fire Alarm Control Panel (includes black backbox, FLPS-7 power supply, technical manual, and a frame & post operating instruction sheet).

OPTIONAL MODULES

N-CAC-5X: Optional (Class A) Converter Module. Converts Style B (Class B) Initiating Device Circuits to Style D (Class A); and Style Y (Class B) Notification Appliance Circuits to Style Z (Class A). Connects to J2 on the SFP-5UDC and SFP-10UDC main circuit board.

NOTE: Two Class A Converter Modules are required for the ten-zone panel.

4XTM: Transmitter module. Provides a supervised output for local energy municipal box transmitter and alarm and trouble reverse polarity. Includes a disable switch and disable trouble LED. A module jumper option allows the reverse polarity circuit to open with a system trouble condition if no alarm conditions exist. Mounts to the main circuit board connectors J4 and J5.

COMPATIBLE ANNUNCIATORS

N-ANN-LED: Comes mounted in the dress panel and provides three LEDs for each zone: Alarm, Trouble, and Supervisory. In non-ULC applications, additional N-ANN-LED modules can be used for remote LED annunciation.

N-ANN-RLY: Relay module. Mounts inside the cabinet. Provides ten Form C relays.

N-ANN-80: Remote LCD Annunciator for non-ULC applications. Mimics the information displayed on the FACP's LCD. Black. (For white, order: **N-ANN-80-W**.)

N-ANN-S/PG: Serial/parallel printer gateway for non-ULC applications. Provides a connection for a serial or parallel printer.

N-ANN-I/O: Driver module for non-ULC applications. Provides connections to a user-supplied graphic annunciator.

ACCESSORIES

BB-26: Battery backbox, holds up to two 25 AH batteries.

NFS-LBB: Battery backbox, holds up to two 55 AH batteries. Black.

➔ **TR-CE-B:** Optional black trim-ring for semi-flush mounted cabinets.

PRN-6: UL listed printer for use in non-ULC applications.

SYSTEM SPECIFICATIONS

System Capacity

- Annunciators 2

Electrical Specifications

- **SFP-5UDC (FLPS-7 Power Supply):** 120 VAC, 50/60 HZ, 3.90 A
- **SFP-10UDC (FLPS-7 Power Supply):** 120 VAC, 50/60 HZ, 3.90 A
- **Wire size:** minimum 14 AWG (2.0 mm²) with 600 V insulation, supervised, nonpower-limited
- **Battery size:** minimum 12 AH; maximum 18 AH.

Cabinet Specifications

Door: 48.92 cm. (19.26") high x 42.73 cm. (16.82") wide x 1.82 cm. (0.72") deep. **Backbox:** 48.26 cm. (19.00") high x 42.29 cm. (16.65") wide x 13.34 cm. (5.25") deep. **Trim Ring (TR-CE-B):** 55.88 cm. (22.00") high x 49.91 cm. (19.65") wide.

Shipping Specifications

Dimensions:

- 50.80 cm (20.00") high
- 57.15 cm (22.5") wide
- 21.59 cm (8.5") deep.

Weight: 12.20 kg (27 lb)

Temperature and Humidity Ranges

This system meets NFPA requirements for operation at 0 – 49°C and at a relative humidity 93% ± 2% RH (noncondensing) at 32°C ± 2°C. However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15 – 27°C.

Agency Listings and Approvals

The listings and approvals below apply to the basic SFP-5UDC and SFP-10UDC control panels. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL/ULC Listed:** File S635
- **FM Approved**
- **CSFM:** 7165-0028:246

NOTE: For additional UL-listed models, see DN-60185.

NFPA Standards

The SFP-5UDC/SFP-10UDC complies with the following NFPA 72 Fire Alarm Systems requirements:

- **LOCAL** (Automatic, Manual, Waterflow and Sprinkler Supervisory).
- **AUXILIARY** (Automatic, Manual and Waterflow) (requires 4XTM).
- **REMOTE STATION** (Automatic, Manual and Waterflow) (Where a DACT is not accepted, the alarm, trouble and supervisory relays may be connected to UL 864 listed transmitters. For reverse polarity signaling of alarm and trouble, 4XTM is required.)
- **PROPRIETARY** (Automatic, Manual and Waterflow).
- **CENTRAL STATION** (Automatic, Manual and Waterflow, and Sprinkler Supervised).

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For more information, contact Notifier.
In Canada: (888) 289-1114
10 Whitmore Road
Woodbridge, Ontario L4L 7Z4
Outside Canada: Phone: (203) 484-7161
On the web: www.notifier.com



N-MPS and NFW-MPS Conventional Series

Manual Stations



Conventional Initiating Devices

General

The Notifier MPS Conventional Series manual stations provide reporting for the NFS-320C, NFS2-640, and NFS2-3030 fire alarm control panels; NFW-MPS series manual stations provide reporting for FireWarden series panels. These high quality, die cast metal manual stations include screw terminal connections, and integrated break-glass rod. The alarm contact for the manual station is rated for 1A, 24VDC. The contacts are gold plated to avoid the risk of corrosion.

The MPS Series manual stations are available as single or two-stage for conventional systems. Models N-MPS-SC/SCC are single-stage manual stations. Models N-MPS-2C/2CC (two-stage models) are similar to the N-MPS-SC (single-stage models) except they contain an additional 2nd Stage normally open key-switch. A 2nd stage key is supplied with each unit to activate the 2nd Stage key-switch.

All models are available with screw terminal connectors and a hex key for reset. Two-stage models also include a key-switch and 2 keys. All conventional models mount on a single gang box or on a single gang box with a plaster ring.

For surface mounting, use Notifier surface back-box MPS-BB with all conventional manual stations.

Operation

The Notifier MPS Series manual stations are operated by pulling the handle on the front of the station. To reset the manual station, open the manual station with the hex key (provided) and place the handle in the normal upright position. Replace the break-glass rod, and close the manual station front cover.

The N-MPS two-stage models include a key switch which is located above the handle. Operation of the key-switch, when connected to a separate alarm initiating circuit, will activate the second stage of a two-stage alarm signaling system.

To reset the second stage activation, return the key-switch to the original position before resetting the fire alarm control panel.

Models provided with an ancillary contact for mag-lock release, will simultaneously release the locally connected mag-lock upon pulling the handle on the front of the manual station.

Features

- Constructed of high quality die-cast metal
- Highly visible red enamel finish
- English and French lettering
- Single action pull lever design
- Optional dual action lever kit
- Integrated break-glass
- Hex key resettable
- Screw terminal connectors
- Optional ancillary contact for local mag-lock release
- Single-stage and two-stage models
- Key-switch activation for second stage
- Surface or semi-flush mounting
- All conventional models mount on a standard single-gang electrical box or a surface metal back-box



Architectural/Engineering Specifications

The manual station is the Notifier N-MPS series. Operating instructions appear in English and French lettering. The unit is constructed of high quality die cast metal and finished in red enamel paint to be easily identified. When the handle is pulled, the manual station initiates an immediate operation of the alarm detection circuit. In addition, those manual stations installed in a two-stage system are equipped with a key-switch designed to operate the second stage alarm initiating circuit. Manual stations shall have the option of an ancillary contact for local mag-lock release. Manual stations are listed with Underwriters Laboratories Canada (ULC). Manual stations are required to be installed to the current Canadian Electrical Code and the current CAN/ULC – S524 (Standard for the installation of Fire Alarm Systems) and comply with CAN/ULC-S528, (Manual Stations for Fire Alarm Systems, Including Accessories). Manual stations must be installed within the limits defined by the national/local requirements. Final acceptance is subject to the local authority having jurisdiction.

Manual stations are provided with a hex key-operated reset lock to reset the device after the manual station has been operated and to allow access for testing. The stations are designed so that after an actual emergency operation the stations cannot be restored to normal operation without the use of the supplied hex key. The manual stations are provided with an integrated break-glass feature.

The addition of the dual action adapter cover (MPS-LP) requires the operator to first lift the cover and then pull the handle of the manual station.

All conventional models mount on a single-gang box or on a single-gang box with a plaster ring.

For surface mounting, use Notifier surface back-box MPS-BB for conventional manual stations.

Agency Listings and Approvals

- ULC listed: S7568

Specifications

ALL CONVENTIONAL MODELS

Maximum Applied Voltage: 32 VDC

Supply Voltage Nominal: 24 VDC

Average Current Consumption: 400uA, Single stage versions, 550 uA Two stage versions

Maximum Current Consumption: 550 uA Single stage versions, 1100 uA Two stage versions

Operating Temperature Range: 0°C to 49°C

Humidity: 10 to 93% noncondensing

Dimensions: 121mm (H) x 82mm (W) x 55mm (D)

Weight: 499 Grams Single stage version, 567 Grams Two stage version

ALL MODELS WITH ANCILLARY CONTACTS

Ancillary Contact Ratings:

- 30 VAC 6 amps Resistive, 6 amps Inductive
- 30 VDC 6 amps Resistive, 3 amps Inductive

NOTE: All models are for use indoors in a dry location.

Product Line Information

CONVENTIONAL MANUAL STATIONS

➔ **N-MPS-SC:** Conventional single-stage manual station, English/French lettering.

N-MPS-SCCF: Conventional single-stage manual station. Form-C alarm and ancillary contacts included. English/French lettering.

N-MPS-SCB: Conventional single-stage manual station. Blue in color. English/French lettering.

N-MPS-2C: Conventional two-stage manual station. English/French lettering.

N-MPS-2CC: Conventional two-stage manual station. Form-C alarm and ancillary contacts included. English/French lettering.

For addressable manual stations, see DN-60629.

ACCESSORIES

MPS-LP: Lift/pull dual action adapter cover for use with the MPS Series manual stations. English/French lettering.

RMS-TP3: Mounting plate for semi-flush mounting addressable manual stations to a 4" square electrical box, red.

RMS-TP1: Mounting plate for semi-flush mounting addressable manual stations to a two-gang electrical box, red.

MPS-BB: Surface back-box, for use with conventional models 123.83mm(H) x 82.5mm(W) x 44.5mm(D) 4.88"(H) x 3.25"(W) x 1.75"(D).

MPS-ER: Extension ring for addressable models using existing single-gang electrical boxes.

RMS-GR/10: Replacement break-glass rods. Package of 10.

PS-AWRC-029: Replacement Hex Key

MPS-KEY: Replacement 2nd Stage Key



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For more information, contact Notifier.
(888) 289-1114
10 Whitmore Road
Woodbridge, Ontario L4L 7Z4
www.notifier.com



100 Series

100 Series Low-Profile Plug-In Smoke Detectors



Conventional Initiating Devices

General

100 Series Plug-in Smoke Detectors offer superb performance and reliability in a profile which is just 2" (5.1 cm) deep. Model 2151 (photoelectric sensor) and model 2151T (photoelectric sensor with thermal) can be used with a variety of different adapter bases in several wiring configurations and voltages. Other features include: low current draw, stable performance in high air velocities, built-in tamper resistant base design, remote LED option, removable cover, and built-in test switch.

The 100 Series is designed to meet the performance criteria designated by UL. Its sensing chambers are sealed against back pressure air flow, dirt, and insects. This chamber is protected by a fine mesh screen which can be cleaned or replaced. Additional key features include a variety of mounting bases and a full line of accessories.

All 100 Series photoelectric smoke detectors contain a unique optical sensing chamber designed to sense smoke particles produced by a wide range of combustion sources. A custom integrated circuit incorporates signal processing to reduce false alarms.

Model 2151(A) photoelectric detector's unique optical sensing chamber is engineered to sense smoke by a wide range of combustion sources. Dual electronic thermistors add 135°F fixed temperature thermal sensing on model 2151T.

Specifications

Operating Voltage/Alarm Current: See Adapter Base Selection Guide (see page 2).

Standby Current: 120µA Standby.

Sensitivity: 1 - 3.18%/ft.

Height: 2.0" in B401.

Diameter: 4.1" Installed In B401; 6.2" installed in B110LP.

Shipping Weight: 5.2 oz.

Construction: Flame retardant thermoplastic.

Temperature:

– Photo: 32°F to 120°F (0°C to 49°C).

– Photo/Thermal: 32°F to 100°F (0° to 38°C).

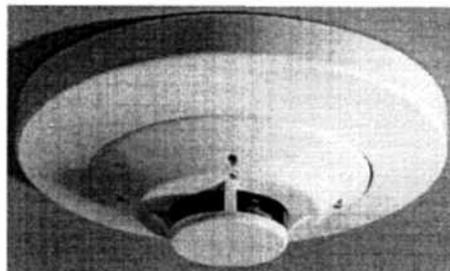
UL Listed Velocity Range: Photo: 0–3000 fpm (0–15.2 m/s).

Humidity Range: 10%–93% RH non-condensing.

Smoke Detector Spacing: On smooth ceilings (as defined in NFPA 72), spacing of 30 feet (900 sq. ft.) may be used as a guide. Other spacing may be used depending on ceiling height, high air movements, and other conditions or response requirements.

Agency Listings and Approvals

These listings and approvals apply to the modules specified in this document. In some cases, certain modules or applications



7049:pho.jpg

may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL Listed:** S911.
- **ULC Listed:** CS308.
- **CSFM:** 7272-1653:0122.
- **FM Approved.**
- **MEA Approved:** 205-94-E.
- **Maryland State Fire Marshal:** #2180.

Product Line Information

NOTE: "A" suffix indicates ULC listed model.

➔ **2151(A):** Low-profile photoelectric detector. Must be mounted to one of the B100 Series or B400 Series bases listed in the Adapter Base Selection Guide.

2151T: Low-profile photoelectric detector with thermal. Must be mounted to one of the B100 Series or B400 Series bases listed in the Adapter Base Selection Guide.

F110: Retrofit replacement flange for B400 Series flanged bases.

RA100Z: Remote annunciator for 2 or 4 wire systems, 3-32V. Fits standard single gang electrical box.

SENS-RDR: Hand-held sensitivity reader.

SMK400E: Surface mounting kit provides for entry of surface wiring conduit. For use with B401 or B401R mounting bases only.

EOLR-1: End of line relay for power supervision, 12/24 VDC systems.

M02-04-00: Test magnet.

M02-09-00: Test magnet with 32° telescoping handle.

XR2B: Detector removal tool. Allows installation and/or removal of 100 Series detector heads from base in high ceiling installations when used with XP-4.

XP-4: Extension pole for XR2B. Comes in three 5 ft. sections.

C58-227-01: Replacement dust cover for 100 Series smoke detectors.

RMK400: Recessed mounting kit (B401 sold separately).

Adapter Base Selection Guide

Base Model Number	Loop Type	Current Limit Resistor	Contact Type	Nominal Voltage	Current Draw on Alarm (mA)
B110LP	2-wire*	No	—	12/24 VDC	10-130**
B110RLP/B401BR†	2-wire*	Yes	—	24 VDC	10-62
B112LP/B402†	4-wire	Yes	Form A & C	24 VDC	17-36
B114LP/B404†	4-wire	Yes	Form A & C + A Supervisory	120 VAC	75 mA AC maximum
B116LP/B406†	2-wire*	No	Form C	24 VDC	20-100**
B401†	2-wire*	No	—	12/24 VDC	10-130**

* Functionality contingent on panel compatibility.

** Must be limited by control panel.

† Flangeless base.

Relay Contact Ratings: Resistive or inductive (60% power factor) load.

Form A: 2.0 A at 30 VAC/DC

Form C: 0.6 A at 110VDC, 2.0 A at 30 VDC

1.0 A at 125VAC, 2.0 A at 30 VAC

Junction Box Selection Guide*

Base Model Number	Single Gang	3-1/2" Octagon	4" Octagon	4" Square	50 mm	60 mm	75 mm
B401	No	No	No	No	Yes	Yes	No
B110LP/RLP	Yes	Yes	Yes	Yes	No	No	No
B112LP/B116LP	Yes	Yes	Yes	Yes	Yes	Yes	Yes
B114LP	No	No	Yes	Yes	No	No	No

* Box depth contingent on base and wire size. Refer to National Electrical Code or local applicable codes for appropriate recommendations.

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www.notifier.com

5600 Series

Mechanical Heat Detectors



Conventional Initiating Devices

GENERAL

System Sensor's 5600 Series mechanical heat detectors offer property protection against fire and for non-life-safety installations, where smoke detectors are inappropriate.

Multiple configurations. The 5600 Series offers a full line of configurations to accommodate a broad range of applications. Both single- and dual-circuit models are offered, each available for low- and high-temperature ratings with either fixed-temperature or combination fixed-temperature/rate-of-rise (ROR) activation. The ROR element of the fixed/ROR models is restorable, to accommodate field-testing the unit.

Installation flexibility. To satisfy a variety of installations, the 5600 Series easily mounts to single-gang and octagonal backboxes. These models also accommodate 4" (101.6 mm) square backboxes when used with a plaster ring. The mounting bracket is reversible to allow for flush- and surface-mount backbox installations.

Visual identification. The 5600 Series provides clear markings on the exterior of the unit to ensure that the proper detector is being used. Alphanumeric characters identify the activation method, as well as the temperature rating, in degrees Fahrenheit and Celsius. Fixed temperature models are identified "FX", while combination fixed/rate-of-rise units are marked "FX/ROR". The 5600 Series also provides a collector as a post-activation indicator. Once the detector has been activated, the collector drops from the unit to allow easy identification of the specific unit in alarm.

FEATURES

- Multiple configurations available:
 - Fixed-temperature (non-resettable) or combination fixed (non-resettable)/rate-of-rise (self-restoring).
 - Low-temperature and high-temperature ratings.
 - Single-circuit and dual-circuit.
- Easy-to-read alphanumeric identification of detector type and temperature rating.
- External collector provides visual indication of activation.
- Reversible mounting bracket for flush- and surface-mount installations.
- Flexible mounting capabilities: single-gang, 3.5" or 4" octagonal, 4" (101.6 mm) square with plaster ring.
- Easy-to-use terminal screws provide a more positive wiring connection.
- Low-profile design to coordinate with room aesthetics.

AGENCY LISTINGS AND APPROVALS

These listings and approvals apply to the modules specified in this document. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL Listed:** S2101
- **ULC Listed:** S2101 (all with "A" suffix)
- **MEA:** 199-03-E
- **CSFM:** 7270-1209:227, 7270-1653:167
- **FM Approved**



SPECIFICATIONS

PHYSICAL SPECIFICATIONS

Maximum installation temperature:

For models 5601P, 5603, 5621, 5623: 100°F (38°C).

For models 5602, 5604, 5622, 5624: 150°F (65.6°C).

Alarm temperature:

For models 5601P, 5603, 5621, 5623: 135°F (57°C).

For models 5602, 5604, 5622, 5624: 194°F (90°C).

Rate-of-Rise Threshold: 15°F (8.3°C) per minute (models 5601, 5602, 5621, 5622 only).

Operating Humidity Range: 5% to 95% RH noncondensing.

Input Terminals: non-polarized, accept 14 to 22 AWG (2.0 to 0.33 mm²).

Dimensions: diameter with mounting bracket: 4.57" (116 mm); height with mounting bracket: 1.69" (43 mm).

Weight: 6 oz. (170 grams).

Mounting Options: 3.5" (88.9 mm) octagonal backbox; 4" (101.6 mm) octagonal backbox; single-gang backbox; 4" (101.6 mm) square backbox with a square-to-round plaster ring.

ELECTRICAL SPECIFICATIONS

Operating Voltage	Contact Ratings (resistive)
6 - 125 VAC	3.0 A
6 - 28 VDC	1.0 A
125 VDC	0.3 A
250 VDC	0.1 A

Mechanical heat detector shall be a System Sensor 5600 Series model number _____, Listed to Underwriters Laboratories UL 521 for Heat Detectors for Fire Protective Signalling Systems. The detector shall be either a single-circuit or a dual-circuit type, normally open. The detector shall be rated for activation at either 135°F (57°C) or 194°F (90°C), and shall activate by means of a fixed-temperature thermal sensor, or a combination fixed-temperature/rate-of-rise thermal sensor. The rate-of-rise element shall be activated by a rapid rise in temperature, approximately 15°F (8.3°C) per minute. The detector shall include a reversible mounting bracket for mount-

ing to 3.5-inch (88.9 mm) octagonal, 4-inch (101.6 mm) octagonal, single gang, and 4-inch (101.6 mm) square backboxes with a square-to-round plaster ring. Wiring connections shall be made by means of SEMS screws that shall accommodate 14 – 22 AWG wire. The detector shall contain alphanumeric markings on the exterior of the housing to identify its tempera-

ture rating and activation method. The rate-of-rise element of combination fixed-temperature/rate-of-rise models shall be restorable, to allow for field-testing. The detectors shall include an external collector that shall drop upon activation to identify the unit in alarm.

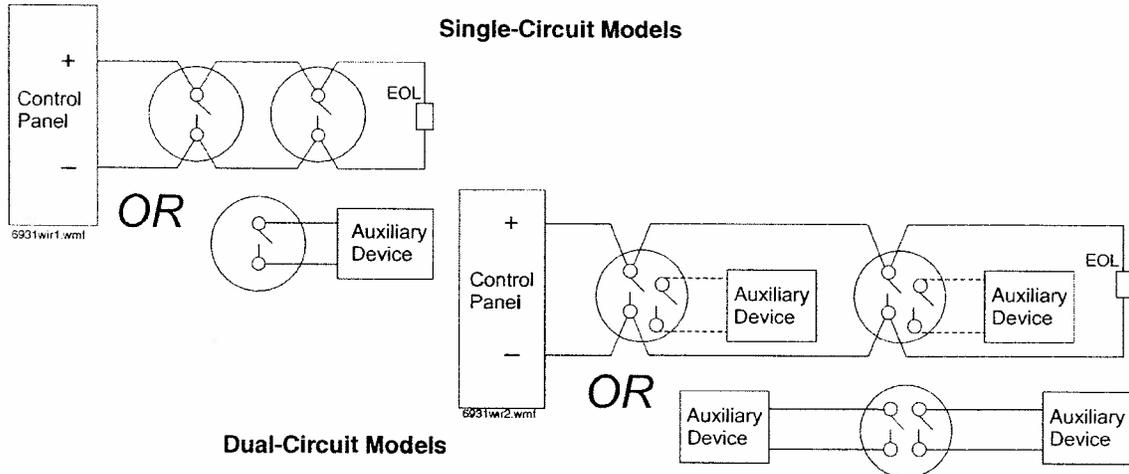
ORDERING INFORMATION

Model*	Identification Method on Exterior	Circuit	Temperature Rating	Activation	UL Protected Spacing, 10' (3.048 m) Ceiling*
5601P	None	Single	135°F (57°C)	Fixed-Temperature/Rate-of-Rise	50 ft. x 50 ft. (15.24 m x 15.24 m)
5602	Lettering	Single	194°F (90°C)	Fixed-Temperature/Rate-of-Rise	50 ft. x 50 ft. (15.24 m x 15.24 m)
5603	Lettering	Single	135°F (57°C)	Fixed-Temperature	25 ft. x 25 ft. (7.62 m x 7.62 m)
5604	Lettering	Single	194°F (90°C)	Fixed-Temperature	25 ft. x 25 ft. (7.62 m x 7.62 m)
5621	Lettering	Dual	135°F (57°C)	Fixed-Temperature/Rate-of-Rise	50 ft. x 50 ft. (15.24 m x 15.24 m)
5622	Lettering	Dual	194°F (90°C)	Fixed-Temperature/Rate-of-Rise	50 ft. x 50 ft. (15.24 m x 15.24 m)
5623	Lettering	Dual	135°F (57°C)	Fixed-Temperature	25 ft. x 25 ft. (7.62 m x 7.62 m)
5624	Lettering	Dual	194°F (90°C)	Fixed-Temperature	25 ft. x 25 ft. (7.62 m x 7.62 m)

NOTE: Refer to NFPA 72 guidelines for spacing reductions when ceiling heights exceed 10 feet (3.048 m).

* Add an "A" to part number for ULC model.

WIRING DIAGRAMS



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SpectrAlert® Advance

Selectable Output Notification Appliances



Audio/Visual Devices

General

SpectrAlert® Advance selectable-output horns, strobes and horn/strobes are rich with features guaranteed to cut installation times and maximize profits. The SpectrAlert Advance series of notification appliances is designed to simplify your installations, with features such as: plug-in designs, instant feedback messages to ensure correct installation of individual devices, and eleven field-selectable candela settings for wall and ceiling strobes and horn/strobes.

More specifically, when installing Advance products, first attach a universal mounting plate to a four-inch square, four-inch octagon, or double-gang junction box. The two-wire mounting plate attaches to a single-gang junction box.

Then, connect the notification appliance circuit wiring to the SEMS terminals on the mounting plate.

Finally, attach the horn, strobe, or horn/strobe to the mounting plate by inserting the product's tabs into the mounting plate's grooves. The device will rotate into position, locking the product's pins into the mounting plate's terminals. The device will temporarily hold in place with a catch until it is secured with a captured mounting screw.

SpectrAlert Advance products allow you to choose:

- 12 or 24 volts.
- 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, or 185 candela by way of a rear-mounted slide switch and front viewing window.
- Horn tones and volume by way of a rotary switch.

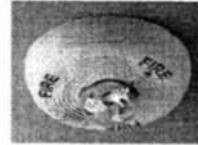
The SpectrAlert Advance series includes outdoor notification appliances. Outdoor strobes and horn/strobes (two-wire and four-wire) are available for wall or ceiling. Outdoor horns are available for wall only. All System Sensor outdoor products are rated between -40°C and 66°C in wet or dry applications.

Models available:

- Indoor wall-mount: horn, strobe, 2-wire horn/strobe, 4-wire horn/strobe.
- Indoor ceiling-mount: strobe, 2-wire horn/strobe, 4-wire horn/strobe.
- Outdoor wall-mount: horn, strobe, 2-wire horn/strobe, 4-wire horn/strobe.
- Outdoor ceiling-mount: strobe, 2-wire horn/strobe, 4-wire horn/strobe.

Features

- Plug-in design.
- Same mounting plate for wall- and ceiling-mount units.
- Shorting spring on mounting plate for continuity check before installation.
- Captive mounting screw.
- Tamper-resistance capability.
- Field-selectable candela settings on wall and ceiling units: 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, 185.
- Automatic selection of 12 or 24 volt operation at 15 and 15/75 candela.
- Outdoor wall and ceiling products.
- Outdoor products rated from -40°C and 66°C .



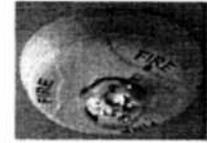
Indoor Ceiling
Horn/Strobe



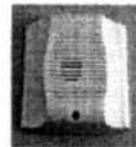
Outdoor Ceiling
Strobe



Indoor Wall
Horn/Strobe



Indoor Ceiling
Strobe



Indoor Wall
Horn



Outdoor Wall
Strobe

- Outdoor products rainproof per UL50 (NEMA 3R) and weatherproof per NEMA 4X, IP56
- Minimal intrusion into the backbox.
- Horn rated at 88+ dbA at 16 volts.
- Rotary switch for tone selection.
- Three horn volume settings.
- Electrically compatible with existing SpectrAlert products.

Engineering Specifications

SpectrAlert Advance horns, strobes, and horn/strobes mount to a standard 10.16 x 10.16 x 3.81 cm backbox, 10.16 cm octagonal backbox, or a double-gang backbox. Two-wire products mount to a single-gang 5.08 x 10.16 x 4.763 cm backbox. A universal mounting plate shall be used for mounting ceiling and wall products. The notification appliance circuit wiring shall terminate at the universal mounting plate. Also, SpectrAlert Advance products, when used with the SyncCircuit™ Module accessory, shall be powered from a non-coded notification appliance circuit output and shall operate on a nominal 12 or 24 volts. When used with the SyncCircuit Module, 12-volt rated notification appliance circuit outputs shall operate between 9 and 17.5 volts; 24-volt rated notification appliance circuit outputs shall operate between 17 and 33 volts. Indoor SpectrAlert Advance products shall operate between 0°C and 49°C from a regulated DC, or full-wave-rectified, unfiltered power supply. Strobes and horn/strobes shall have field-selectable candela settings including 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, 185.

STROBE

The strobe shall be a System Sensor SpectrAlert Advance Model _____ listed to CAN/ULC S5512 and shall be approved for fire protective service. The strobe shall be wired

as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1 Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system.

HORN/STROBE COMBINATION

The horn/strobe shall be a System Sensor SpectrAlert Advance Model _____ listed to CAN/ULC S5512 and shall be approved for fire protective service. The horn/strobe shall be wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1 Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. The horn shall have three audibility options and an option to switch between a Temporal 3 pattern and a Non-Temporal (continuous) pattern. These options are set by a multiple position switch. On four-wire products, the strobe shall be powered independently of the sounder. The horn on horn/strobe models shall operate on a coded or non-coded power supply.

OUTDOOR PRODUCTS

SpectrAlert Advance outdoor horns, strobes and horn/strobes shall be listed for outdoor use by ULC and shall operate between -40°C and 66°C. The products shall be listed for use with a System Sensor outdoor/weatherproof backbox with half-inch and three-fourths-inch conduit entries.

SYNCHRONIZATION MODULE

The module shall be a System Sensor Sync•Circuit MDL3RA or MDL3WA listed to ULC and shall be approved for fire protective service. The module shall synchronize SpectrAlert strobes at 1 Hz and horns at Temporal 3. Also, while operating the strobes, the module shall silence the horns on horn/strobe models over a single pair of wires. The module shall mount to a 11.906 x 11.906 x 5.398 cm backbox. The module shall also control two Style Y (class B) circuits or one Style Z (Class A) circuit. The module shall synchronize multiple zones. Daisy-chaining two or more synchronization modules together will synchronize all the zones they control. The module shall not operate on a coded power supply.

Operating Specifications

- **Standard operating temperature:** 0°C to 49°C.
- **K Series operating temperature:** -40°C to 66°C.
- **Humidity range:** 10% to 93% non-condensing (indoor products).
- **Strobe flash rate:** 1 flash per second.
- **Nominal voltage:** regulated 12 VDC/FWR or regulated 24 VDC/FWR. **NOTE:** Full Wave Rectified (FWR) voltage is a non-regulated, time-varying power source that is used on some power supply and panel outputs.
- **Operating voltage range:** 8 V to 17.5 V (12 V nominal); or 16 V to 33 V (24 V nominal). **NOTE:** P, S, PC, and SC products will operate at 12 V nominal only for 15 cd and 15/75 cd.
- **Input terminal wire gauge:** 12 to 18 AWG (3.31 to 0.821 mm²).
- **Ceiling-mount dimensions (including lens):** 17.3 cm diameter x 6.4 cm deep.
- **Wall-mount dimensions (including lens):** 14.2 cm H x 11.9 cm W x 6.4 cm D.
- **Horn dimensions:** 14.2 cm H x 11.9 cm W x 3.3 cm D.

Agency Listings and Approvals

The listings and approvals below apply to SpectrAlert Advance Selectable Output Notification Devices. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL Listed:** S4011
- **ULC Listed:** S5512
- **FM Approved**
- **MEA:** 452-05-E
- **CSFM:** 7125-1653:0186 (indoor strobes); 7125-1653:0188 (horn strobes, chime strobes); 7135-1653:0189 (horns, chimes)

Strobe Current Draw, ULC Maximum (mA RMS)

Candela	8 – 17.5 V		16 – 33 V		
	DC	FWR	DC	FWR	
Standard Candela Range	15	123	128	66	71
	15/75	142	148	77	81
	30	NA	N/A	94	96
	75	NA	NA	158	153
	95	NA	NA	181	176
	110	NA	NA	202	195
	115	NA	NA	210	205
High Candela Range	135	NA	NA	228	207
	150	NA	NA	246	220
	177	NA	NA	281	251
	185	NA	NA	286	258

Horn Current Draw, ULC Maximum (mA RMS)

Sound Pattern	dB	8 – 17.5 V		16 – 33 V	
		DC	FWR	DC	FWR
Temporal	High	57	55	69	75
Temporal	Medium	44	49	58	69
Temporal	Low	38	44	44	48
Non-temporal	High	57	56	69	75
Non-temporal	Medium	42	50	60	69
Non-temporal	Low	41	44	50	50
Coded	High	57	55	69	75
Coded	Medium	44	51	56	69
Coded	Low	40	46	52	50

Horn and Horn/Strobe Rotary Switch Setting

Setting	Repetition Rate	dB Level
1	Temporal horn	High
2	Temporal horn	Medium
3	Temporal horn	Low
4	Normal horn	High
5	Normal horn	Medium
6	Normal horn	Low
7*	Externally coded	High
8*	Externally coded	Medium
9*	Externally coded	Low

**NOTE: Settings 7, 8, and 9 are not available on 2-wire horn/strobe.*

Horn and Horn/Strobe Output (dBA)

Switch Position	Sound Pattern	dB	8 – 17.5 V		16 – 33 V	
			DC	FWR	DC	FWR
1	Temporal	High	96	93	101	99
2	Temporal	Medium	89	89	95	95
3	Temporal	Low	86	87	91	92
4	Non-temporal	High	90	86	96	93
5	Non-temporal	Medium	82	82	90	89
6	Non-temporal	Low	79	80	86	86
7*	Coded	High	90	87	96	93
8*	Coded	Medium	82	82	90	89
9*	Coded	Low	78	80	86	86

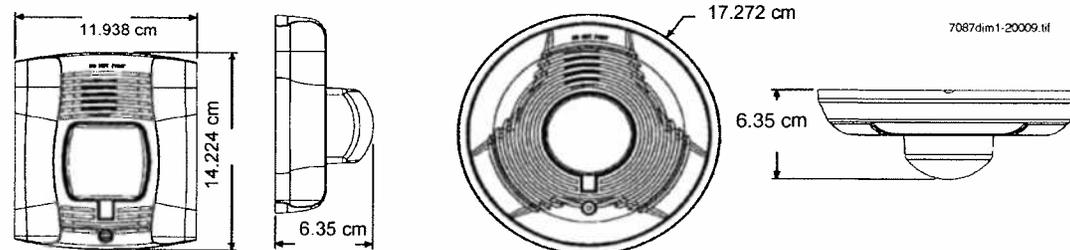
**NOTE: Settings 7, 8, and 9 are not available on 2-wire horn/strobe.*

Two-Wire Horn/Strobe, **STANDARD** Candela Range (15 – 115 cd), ULC Maximum Current Draw (mA RMS)

Input, Sound Pattern, dB Level	8 – 17.5 V		16 – 33 V						
	15	15/75	15	15/75	30	75	95	110	115
Input, Temporal, High	137	147	79	90	107	176	194	212	218
Input, Temporal, Medium	132	144	69	80	97	157	182	201	210
Input, Temporal, Low	132	143	66	77	93	154	179	198	207
Input, Non-temporal, High	141	152	91	100	116	176	201	221	229
Input, Non-temporal, Medium	133	145	75	85	102	163	187	207	216
Input, Non-temporal, Low	131	144	68	79	96	156	182	201	210
Input, Temporal, High	136	155	88	97	112	168	190	210	218
Input, Temporal, Medium	129	152	78	88	103	160	184	202	206
Input, Temporal, Low	129	151	76	86	101	160	184	194	201
Input, Non-temporal, High	142	161	103	112	126	181	203	221	229
Input, Non-temporal, Medium	134	155	85	95	110	166	189	208	216
Input, Non-temporal, Low	132	154	80	90	105	161	184	202	211

Two-Wire Horn/Strobe, **HIGH** Candela Range (135 – 185 cd), ULC Maximum Current Draw (mA RMS)

Input	16 – 33 V				Input	16 – 33 V			
	135	150	177	185		135	150	177	185
Temporal, High	245	259	290	297	Temporal, High	215	231	258	265
Temporal, Medium	235	253	288	297	Temporal, Medium	209	224	250	258
Temporal, Low	232	251	282	292	Temporal, Low	207	221	248	256
Non-temporal, High	255	270	303	309	Non-temporal, High	233	248	275	281
Non-temporal, Medium	242	259	293	299	Non-temporal, Medium	219	232	262	267
Non-temporal, Low	238	254	291	295	Non-temporal, Low	214	229	256	262



Ordering Information

Model	Description	Model	Description
WALL HORN/STROBES		CEILING HORN/STROBES	
P2RA	2-wire horn/strobe, standard cd, red.	PC2RKA	2-wire horn/strobe, standard cd, red, outdoor.
P2RHA	2-wire horn/strobe, high cd, red.	PC2RHKA	2-wire horn/strobe, high cd, red, outdoor.
P2RKA	2-wire horn/strobe, standard cd, red, outdoor	PC2WA	2-wire horn/strobe, standard cd, white.
P2RHKA	2-wire horn/strobe, high cd, red, outdoor.	PC2WHA	2-wire horn/strobe, high cd, white.
P2WA	2-wire horn/strobe, standard cd, white.	PC4RKA	4-wire horn/strobe, standard cd, red, outdoor.
P2WHA	2-wire horn/strobe, high cd, white.	PC4RHKA	4-wire horn/strobe, high cd, red, outdoor.
P4RA	4-wire horn/strobe, standard cd, red.	PC4WA	4-wire horn/strobe, standard cd, white.
P4RHA	4-wire horn/strobe, high cd, red.	PC4WHA	4-wire horn/strobe, high cd, white.
P4RKA	4-wire horn/strobe, standard cd, red, outdoor.	HORNS	
P4RHKA	4-wire horn/strobe, high cd, red, outdoor.	HRA	Horn, red.
P4WA	4-wire horn/strobe, standard cd, white.	HRKA	Horn, red, outdoor.
P4WHA	4-wire horn/strobe, high cd, white.	HWA	Horn, white.
ACCESSORIES		WALL STROBES	
BBS-2A	Backbox skirt, wall, red.	SRA	Strobe, standard cd, red.
BBSW-2A	Backbox skirt, wall, white.	SRHA	Strobe, high cd, red.
BBSC-2A	Backbox skirt, ceiling, red.	SRKA	Strobe, standard cd, red, outdoor.
BBSCW-2A	Backbox skirt, ceiling, white.	SRHKA	Strobe, high cd, red, outdoor.
WTPA	Flush mount, weatherproof plate, red	SWA	Strobe, standard cd, white.
WTPWA	Flush mount, weatherproof plate, white	SWHA	Strobe, high cd, white.
TR-HSA	Trim Ring, Red, package of 5	CEILING STROBES	
TRW-HSA	Trim Ring, White, package of 5	SCRKA	Strobe, standard cd, red, outdoor.
TRC-HSA	Trim Ring Ceiling, Red, package of 5	SCRHKA	Strobe, high cd, red, outdoor.
TRCW-HSA	Trim Ring Ceiling, White, package of 5	SCWA	Strobe, standard cd, white.
		SCWHA	Strobe, high cd, white.
<p>NOTE: For strobes and horn/strobes, add suffix "-F" for French or "-B" for Bilingual.</p> <p>NOTE: **"High cd" refers to strobes that include 135, 150, 177, and 185 candela settings. "Standard cd" refers to strobes that include 15, 15/75, 30, 75, 95, 110, and 115 candela settings.</p> <p>NOTE: All outdoor models ("K(A)" suffix) include a plastic weatherproof backbox.</p> <p>NOTE: Add "-R" to models for weatherproof replacement device (no back box included). Only for use with weatherproof outdoor flush mounting plate, WTPA and WTPWA.</p> <p>NOTE: Add "P" to model for plain housing (No "FIRE" marking on the cover.)</p>			

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For more information, contact Notifier.
(888) 289-1114
10 Whitmore Road
Woodbridge, Ontario L4L 7Z4
www.notifier.com



EOL-CR, EOL-CW

Universal End-of-Line Device Mounting Plates

 **NOTIFIER**[®]
by Honeywell

Miscellaneous

General

The EOL-CR and EOL-CW Universal End-of-Line Device Mounting Plates are used, when required, to place the end-of-line device at an accessible height. The EOL-CR/-CW consists of a terminal strip mounted on a heavy gauge metallic single-gang faceplate, finished in red or white baked enamel; it fits on a standard single-gang electrical box. The end-of-line device is included with the corresponding module in the central equipment.

Architectural/Engineering Specifications

The End-of-Line Device Mounting Plate shall be model EOL-CR/-CW. It shall consist of a terminal strip, mounted on a single-gang faceplate, made of heavy-gauge metal, finished in red (EOL-CR) or white (EOL-CW), and shall fit on a standard single-gang electrical box.

Agency Listings and Approvals

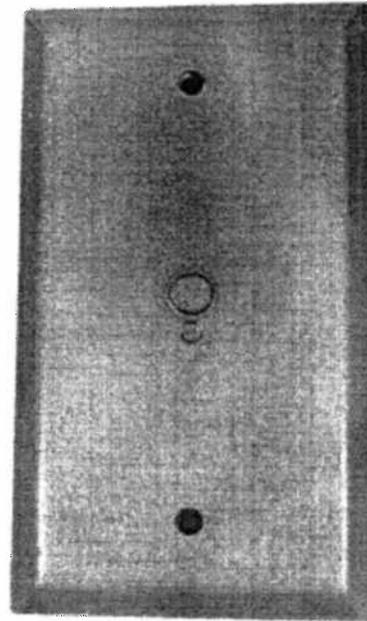
The listings and approvals below apply to the EOL-CR and EOL-CW Mounting Plates for End-of-Line Devices. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in progress. Consult factory for latest listing status.

- ULC Listed: File S7547

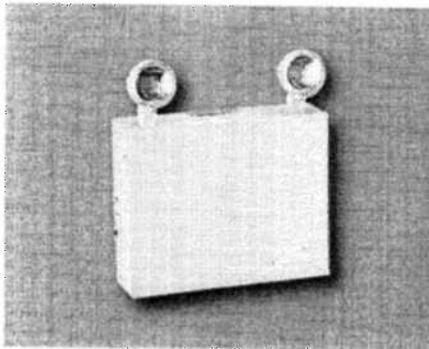
Ordering Information

➔ EOL-CR: End-of-line device mounting plate (red). Shipping weight 0.17 kg (6 oz.).

EOL-CW: End-of-line device mounting plate (white). Shipping weight 0.17 kg (6 oz.).



EOL-CR



LDX Series

6, 12 and 24 Volts

Steel Battery Units

Project/Location: _____

Contractor: _____

Date: _____

Prepared by: _____

Features

- ⊗ Rugged steel cabinet with corrosion-resistant undercoating
- ⊗ Removable front panel on cabinet provides easy access and allows unit to be mounted at ceiling height
- ⊗ Unit comes standard with electronic lockout and brownout circuits
- ⊗ Sealed dust-proof transfer relay, test switch and LED indicator lights
- ⊗ Solid-state pulse-type charger – current-limited, temperature-compensated, short-circuit proof and reverse-polarity protected.
- ⊗ Long-life, maintenance-free lead acid battery
- ⊗ NEXUS[®] compatible



Typical Specification

Supply and install a complete emergency lighting system as described herein and shown on the drawings.

The Ready-Lite Smart Diagnostic micro-controller board shall supply the rated load for a minimum of a 1/2 hour to 87.5% of the rated battery voltage. The unit shall be rated 120V or 347V, 60 Hz and be CSA listed.

The charger shall be fully computer tested and its charge voltage factory set to $\pm 1\%$ tolerance. Chargers with field-adjusted potentiometers are not acceptable. A pulse-type charger shall be employed to promote long battery life and reduce the potential for grid corrosion. The charger shall provide a continuous high charge to recharge the battery, when the battery is at full capacity, the charger will shut-off. Periodically the charger shall provide a pulse of energy to keep the battery topped off. The pulse charger shall be current limited and precisely regulated by a micro-controller circuit, which samples the battery in relation to its temperature, state of charge and input voltage fluctuations. The charger shall be current limited, temperature compensated, short-circuit proof and reverse polarity protected. The unit shall be furnished with an electronic lockout circuit, which will connect the battery when the AC circuit is activated, and an electronic brownout circuit, which will activate the emergency lights when utility power dips below 75% of nominal voltage. A low voltage battery protection circuit shall be provided and will disconnect the load and circuitry form the fused output circuit when the battery reaches the end of discharge. The unit shall self-test for 1 minute every 30 days, 10 minutes on the 6th month and 30 minutes every 12 months. The unit shall be capable of full recharge in compliance with CSA specifications. The unit shall be furnished with sealed dust tight relay, a test switch and diagnostic LED indicator lights to continuously monitor the status of the unit: Battery Failure, Battery Disconnected, Charger Failure, Lamp Failure, Service Alarm, AC "ON", Charger High Rate. The unit shall come complete with tool-less emergency lighting heads requiring no tools to adjust or aim.

The unit shall be Ready-Lite model: _____

Wire Guards

460.0078-RL	Wall Mount - "A" Cabinet
460.0081-RL	Wall Mount - "B" Cabinet
460.0034-RL	Wall Mount - "C" Cabinet

Power Consumption and Unit Rating

Model Number	AC Specs	Emergency power available for lamps				
		30min	1h00	1h30	2h00	4h00
LDX636	0.10 / 0.04 Amp	36	21	15	12	6
LDX672	0.22 / 0.08 Amp	72	42	30	24	12
LDX6108	0.22 / 0.08 Amp	108	63	45	36	18
LDX6180	0.22 / 0.08 Amp	180	105	75	60	30
LDX1236	0.09 / 0.03 Amp	36	21	5	2	6
LDX1272	0.15 / 0.06 Amp	72	42	30	24	12
LDX12100	0.34 / 0.12 Amp	100	58	42	33	17
LDX12144	0.40 / 0.14 Amp	144	84	60	48	24
LDX12216	0.41 / 0.14 Amp	216	117	83	67	33
LDX12250	120 / 347V _{ac} 0.41 / 0.14 Amp	250	144	100	83	42
LDX12360	0.43 / 0.15 Amp	360	210	150	120	60
LDX24144	0.55 / 0.20 Amp	144	84	60	48	24
LDX24200	0.67 / 0.23 Amp	200	117	83	67	33
LDX24288	0.67 / 0.23 Amp	288	168	120	96	48
LDX24350	0.67 / 0.23 Amp	350	200	144	120	60
LDX24432	0.67 / 0.23 Amp	432	250	180	144	72
LDX24550	0.88 / 0.33 Amp	550	320	230	180	90
LDX24720	0.88 / 0.33 Amp	720	420	300	240	120



Project/Location: _____

Contractor: _____

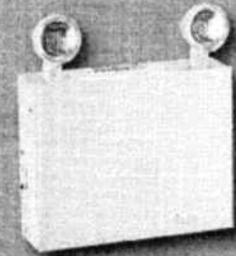
Date: _____

Prepared by: _____

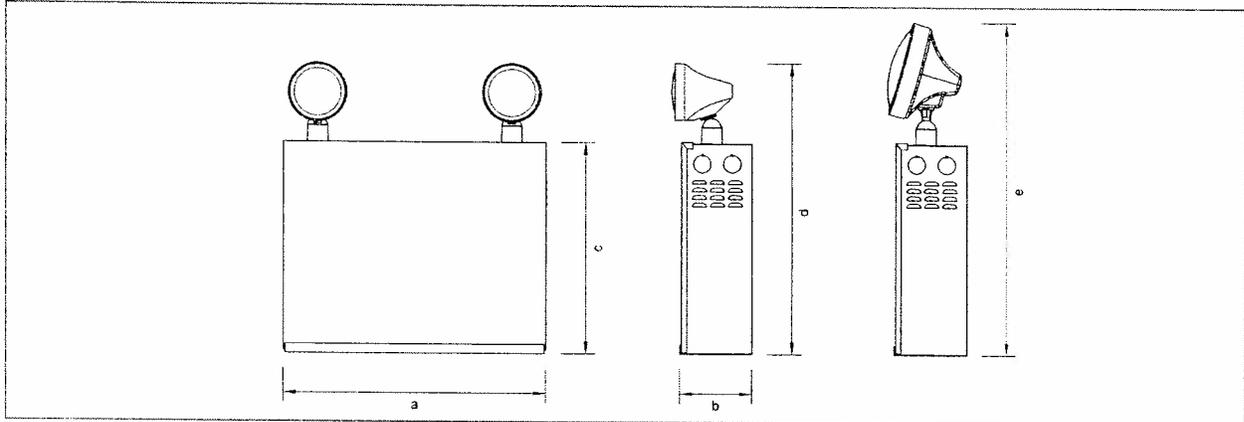
LDX Series

6, 12 and 24 Volts

Steel Battery Units



Dimensions



Dimensions

Cabinet	Dimensions				
	a	b	c	d	e
A	13 1/4 in. [33.4 cm]	3 1/4 in. [9.2 cm]	10 1/2 in. [26.8 cm]	14 1/4 in. [36.8 cm]	16 1/2 in. [42.2 cm]
B	16 1/4 in. [41.0 cm]	5 1/2 in. [13.8 cm]	10 1/4 in. [26.1 cm]	14 1/4 in. [36.1 cm]	16 1/4 in. [41.4 cm]
C	23 1/4 in. [58.8 cm]	5 1/2 in. [13.8 cm]	10 1/4 in. [26.1 cm]	14 1/4 in. [36.1 cm]	16 1/4 in. [41.4 cm]

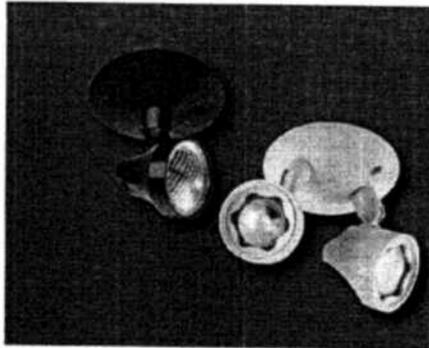
Replacement Lamps

Ordering Code	Lamp Type	Voltage-Wattage
570.0016-RL	Mini tungsten (MT9W)	6V - 9W
570.0025-RL		12V - 9W
570.0045-RL		24V - 9W

For the complete list please refer to the Lamp Chart on page 113

Ordering Information

Series	Capacity and Cabinet Size	Special Options	Number of Heads	Head Style / Lamp Wattage	Colour	AC Voltage	Options
LDX6= 6 volts EXAMPLE: LDX6-108AD2RT9	-36= 72 watts [A]* -72= 72 watts [A]* -108= 108 watts [A]* -180= 180 watts [B]*	Blank= standard AD= self-diagnostic ADN= self-diagnostic non-audible NEX= NEXUS* system interface* (6 and 12 volts only)	Blank= no head 1= one head 2= two heads 3= three heads	RT9= mini tungsten, 6V, 12V, 24V - 9 watts, wedge base RT18= mini tungsten, 12V - 18 watts, wedge base RQ8= mini halogen, 6V, 12V - 8 watts, quartz bi-pin RQ12= mini halogen, 6V, 12V, 24V - 12 watts, quartz bi-pin RM6= mini halogen, 6V - 6 watts, MR16 RM10= mini halogen, 6V - 10 watts, MR16 RM12= mini halogen, 12V, 24V - 12 watts, MR16 RM20= mini halogen, 12V, 24V - 20 watts, MR16	Blank= factory white BK= black	Blank= 120/347Vac input U277= 277Vac input U240= 240Vac input U220= 220/50Hz Vac input	A= ammeter CT= cabtire D3= time delay 15 min. D6= 6cct. fuse panel IT= AC terminal block LB= light activated test switch LD= lamp disconnect OT= output terminal block R1= remote test receiver* R2= remote test transmitter TL= twist lock plug V= voltmeter
	LDX12= 12 volts EXAMPLE: LDX12-100AD2RT9	-36= 36 watts [A]* -72= 72 watts [A]* -100= 100 watts [A]* -144= 144 watts [A]* -200= 200 watts [B]* -250= 250 watts [B]* -360= 360 watts [B]*			LT9= large tungsten, 6V, 12V, 24V - 9 watts, wedge base LT18= large tungsten, 12V, 24V - 18 watts, wedge base LT25= large tungsten, 6V, 12V, 24V - 25 watts, DCB LQ8= large halogen, 6V, 12V - 8 watts, quartz bi-pin LQ12= large halogen, 6V, 12V, 24V - 12 watts, quartz bi-pin LQ20= large halogen, 6V, 12V, 24V - 20 watts, quartz bi-pin LQ55= large halogen, 12V - 55 watts, H3 LQ70= large halogen, 24V - 70 watts, H3 LS9= large tungsten, 6V - 9 watts, sealed beam LS18= large tungsten, 6V, 12V - 18 watts, sealed beam LS25= large tungsten, 6V, 12V - 25 watts, sealed beam LH8= large halogen, 6V, 12V - 8 watts, quartz sealed beam LH12= large halogen, 6V, 12V - 12 watts, quartz sealed beam LH20= large halogen, 6V - 20 watts, quartz sealed beam LD7= 12V - 4 watts LED			SP102 - INTERNAL MONITORING
LDX24= 24 volts EXAMPLE: LDX24-144AD2RT9	-144= 144 watts [A]* -200= 200 watts [B]* -288= 288 watts [B]* -350= 350 watts [C]* -432= 432 watts [C]* -550= 550 watts [C]* -720= 720 watts [C]*	*Not all options are available with NEXUS* System. Please consult your sales representative for output power range.					*Remote test transmitter required.



RT/RQ/RM Series

Micro Tungsten Lamps

Micro Quartz Lamps, MR16 Lamps

Project/Location: _____

Contractor: _____

Date: _____

Prepared by: _____

Features

- Fire-retardant thermoplastic
- Variable light patterns using adjustable lens
- 300° rotation



Typical Specification

Lamp head and stem shall be injection molded, impact resistant, flame retardant thermoplastic. The lens shall be inverse concave design and fully adjustable for aisle or area distribution during installation without the need to energize the lamp. Visual identification of distribution shall be provided through position of adjustment pins.

The remote fixture shall be certified to CSA C22.2 No.250.

Fixture shall be supplied with a canopy for installation on any four inch octagon box. Housing shall be so designed to allow for lamp replacement if required. Lamp shall be _____ volts, _____ watts Model: RT-, RQ- or RM- by Ready-Lite.

The unit shall be Ready-Lite model: _____.

Wire Guards

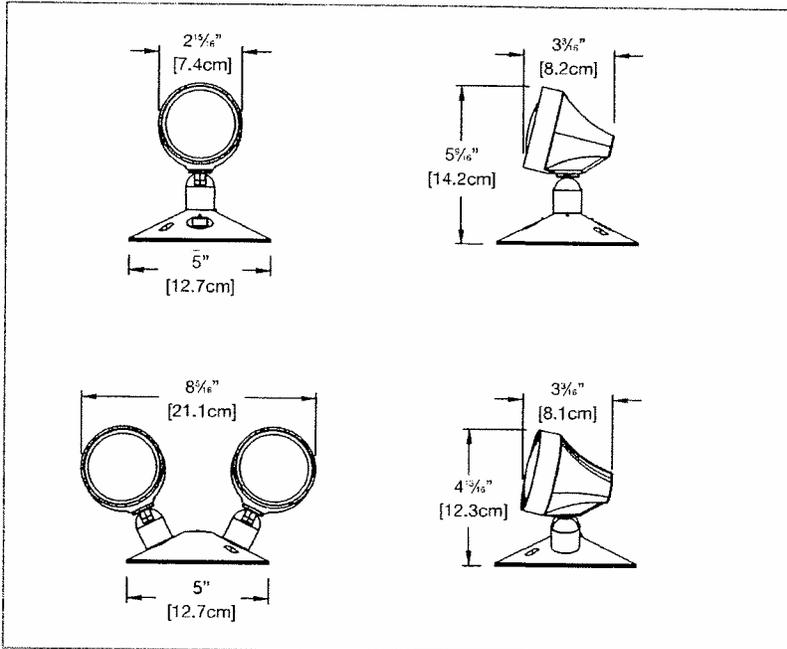
460.0029-RL:	Wall Mount
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Replacement Lamps

Model	Lamp Type	Voltage
570.0016-RL	Tungsten	6V - 9W
570.0045-RL	Tungsten	24V - 9W
580.0015-RL	Halogen (quartz)	12V - 12W
580.0093-RL	LED	12V - 4W

See the complete list page 113

Dimensions



Ordering Information

Series	Lamp Type	Number of Heads	Voltage/Wattage	Colour
R = mini, par 18	T = tungsten, wedge base Q = halogen, quartz bi-pin M = halogen, MR16	1 = single head 2 = double head 3 = triple head	- 6/9 = 6V - 9 watts, wedge base - 12/9 = 12V - 9 watts, wedge base - 12/18 = 12V - 18 watts, wedge base - 24/9 = 24V - 9 watts, wedge base - 24/18 = 24V - 18 watts, wedge base - 6/8 = 6V - 8 watts, quartz bi-pin - 6/12 = 6V - 12 watts, quartz bi-pin - 12/8 = 12V - 8 watts, quartz bi-pin - 12/12 = 12V - 12 watts, quartz bi-pin - 24/12 = 24V - 12 watts, xenon quartz - 12/10 = 12V - 10 watts, MR16 - 6/6 = 6V - 6 watts, MR16 - 6/10 = 6V - 10 watts, MR16 - 12/12 = 12V - 12 watts, MR16 - 12/20 = 12V - 20 watts, MR16 - 24/12 = 24V - 12 watts, MR16 - LD7 = 12V-4 watts LED	Blank = factory white BK = black

EXAMPLE: RT-2-6/9





Project/Location: _____

Contractor: _____

Date: _____

Prepared by: _____

Features

- Fully gasketed cast aluminum back plate with clear polycarbonate cover – NEMA-4X Certified
- Choice of single or double lamp models
- Available in 6, 12 and 24 volts models with various wattages
- UV and impact resistant cover
- Easy installation on four-inch octagonal box
- Comes standard with tamper-proof screws and bit
- NSF Certified for food processing plants

Typical Specification

Supply and install Ready-Lite **TUF-NM Series** remote emergency lighting fixtures. These remote fixtures will consist of either single or double lamp configurations according to the design. These fixtures shall be fully gasketed with a die cast aluminum back plate and a clear heavy-duty UV resistant polycarbonate light cover. Units shall be NEMA-4X and NSF certified and specifically designed for high abuse areas, wet and cold weather locations. The standard unit will come with stainless steel tamper-proof screws and bit.

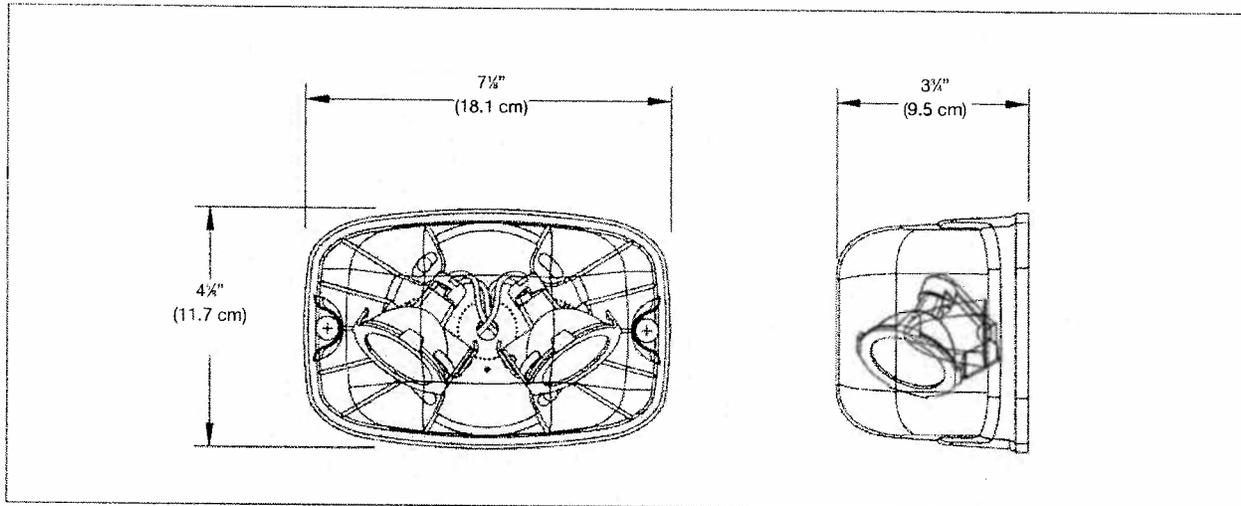
The remote fixture shall be certified to CSA C22.2 No. 250 and NSF Certified for use in food processing plants.

The head(s) shall be fully adjustable without tools and should be equipped with high efficiency MR16 halogen lamp(s).

The unit shall be Ready-Lite model: _____.



Dimensions



Replacement Lamps

Model	Lamp Type	Voltage-Wattage
580.0079-RL	MR16-Flood	6V - 10W
580.0080-RL		12V - 12W
580.0077-RL		24V - 12W

See the complete list page 113

Ordering Information

Series	Number of Lamps	Voltage/Wattage/Lamp Type	Colour
NMM= NEMA-4X	1= one lamp 2= two lamps	-6/6= 6V-6 watts, MR16 -6/10= 6V-10 watts, MR16 -12/12= 12V-12 watts, MR16 -12/20H= 12V-20 watts, MR16 High output -24/12= 24V-12 watts, MR16 -24/20= 24V-20 watts, MR16 -LD7= 12V-4 watts LED	Blank= factory white BK= black GY= grey

EXAMPLE: NMM2-6/6



Project/Location: _____

Contractor: _____

Date: _____

Prepared by: _____

RS Series

All-Metal Pictogram Exit Sign

Labour-saving, Steel pictogram exit sign



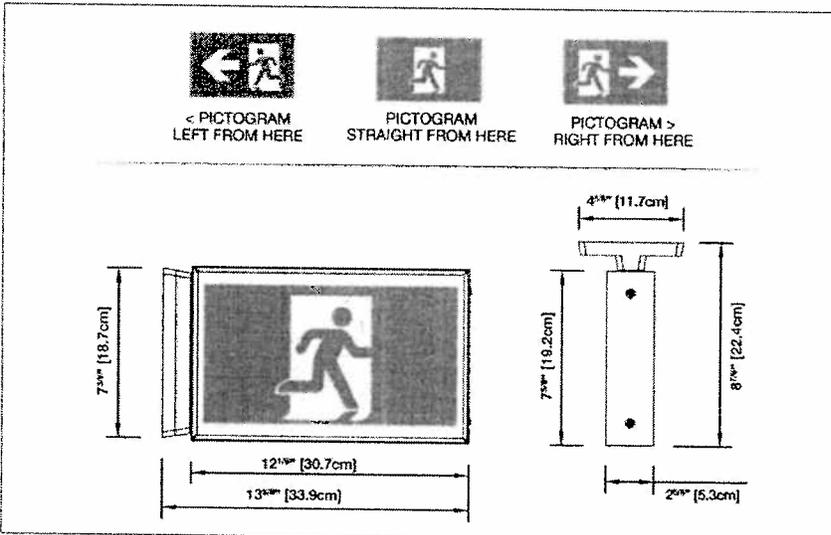
Typical Specification

Supply and install the Ready-lite RS Series pictogram exit signs. The equipment shall operate with universal 2-wire AC input voltage of 120 to 347Vac at less than 2.5 Watts and universal 2-wire DC input voltage from 6 to 24Vdc at 1 Watt consumption for single and double face signs. The sign shall be suitable for wall, end, or ceiling mount. The frame and back plate shall each be of a one-piece steel construction. The faceplate(s) shall be constructed of robust clear poly-carbonate panels with an opaque border coloured factory-white. Each face plate shall come standard with two legend films for pictogram and directional indicators. The light source shall be white light-emitting diodes (LED) and shall provide even illumination in normal and emergency operation. The pictogram exit sign in a self-powered configuration shall use a sealed Nickel-Cadmium battery of 2.4V nominal voltage and shall stay illuminated during emergency operation for at least two hours upon AC failure.

The exit sign shall meet or exceed the requirements of CSA 22.2 No.141-10 standard.

The equipment shall be Ready-lite Model: _____

Dimensions



Features

- Metal construction using Canadian cold-rolled steel
- Based on a modular design, this product comes pre-assembled for quick, easy installation
- Long-life white LED light source
- Supplied standard with two pictogram films per face, for direction selection
- Meets or exceeds CSA 22.2 No.141-10 standard for pictogram exit signs
- Two-wire universal AC input: 120 to 347Vac; two-wire standard DC input: 6 to 24Vdc
- Energy efficient – consumes less than 2.5 Watts in AC mode and only 1W in DC-remote
- Self-powered model delivers standard two hours of back-up lighting
- Universal mounting – end, wall or ceiling
- Easy access to wiring entry for all mounting options
- Canopy mounting system designed specifically for ease of installation



Wire Guards

460.0079-RL	Wall mount
460.0027-RL	End mount
460.0028-RL	Ceiling mount

Power Consumption

Model	AC Specs		DC Specs	
	Voltage	Power	Voltage	Power
AC-only	120 to 347Vac	Less than 2.5 W	-	-
AC/DC standard	120 to 347Vac	Less than 2.5 W	6 to 24Vdc	Less than 1.5 W
AC/Special DC	120 to 347Vac	Less than 2.5 W	36, 48, 120Vdc	Less than 2.5 W
Two-wire 120V AC/DC	120Vac	Less than 2.5 W	120Vdc	Less than 2.5 W
Self-powered	120 to 347Vac	Less than 3 W	Ni-Cd battery	Min. two hours

Ordering Information

Series	Faces/Mounting	Voltage	Colour	Options
RS= pictogram steel exit sign	1= single face universal mounting 2= double face universal mounting	U= 120 to 347 Vac; 6 to 24 Vdc SP= 120 to 347 Vac, self-powered / 2 hours U00= 120 to 347 Vac only U36= 120 to 347 Vac; 36 Vdc U48= 120 to 347 Vac; 48 Vdc U120= 120 to 347 Vac; 120 Vdc 2120= 2-wire 120 Vac/Vdc	W= factory white B= black G= grey Other colours available	TP= tamper proof screws VR= vandal-resistant shield and tamper proof screws 990.0119-RL= tamper proof bit *One bit per order. Sold separately.

EXAMPLE: RS1UWVR

Unlike EXIT signs, the pictogram sign is not available in double arrow configuration.



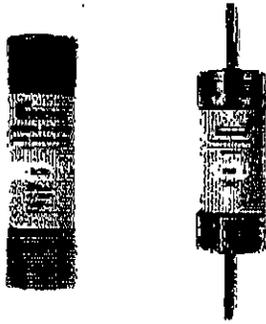
AAM

FR. 02.7 steps

NON/NOS 600/250Vac Class K5 & H



NON (250V) 1/8-600A, General Purpose Fuses



Description: Basic protection 250V NON Class K5 and H general purpose, non-current-limiting, one-time fuses.

Catalog Symbol: NON-(amp)

Ratings:

- Volts — 250Vac
- 125Vdc (1/4-100A)
- Amps — 1/8-600A
- IR — 50kA Vac RMS Sym. (1/8-60A)
- 10kA Vac RMS Sym. (65-600A)
- 50kA Vdc (1/8-60A)
- 10kA Vdc (65-100A)

Agency Information:

CE, UL Listed, Class K5 (1/8-60A), Std. 248-9, Class H (65-600A), Std. 248-6 (125Vdc 1/8-100A), UL Guide JDDZ, File E4274

CSA Certified, Class 1421-01, File 53787 (1/8-12A, 65-600A)†

† For CSA Certified 15-80A, see PON Data Sheet # 4126.

Catalog Numbers (amps)

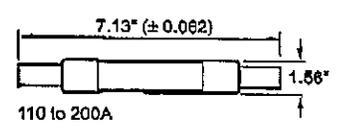
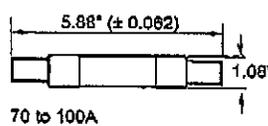
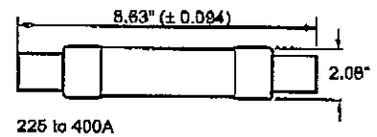
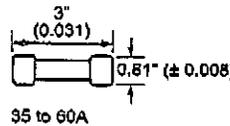
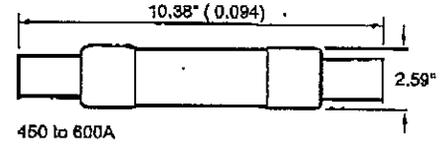
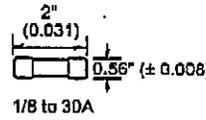
NON-1/8	NON-3	NON-12	NON-65	NON-200
NON-1/4	NON-3 1/2	NON-15	NON-70	NON-225
NON-3/8	NON-4	NON-20	NON-75	NON-250
NON-1/2	NON-5	NON-25	NON-80	NON-300
NON-1	NON-6	NON-30	NON-90	NON-350
NON-1 1/2	NON-6 1/2	NON-35	NON-100	NON-400
NON-1 3/4	NON-7	NON-40	NON-110	NON-450
NON-2	NON-8	NON-45	NON-125	NON-500
NON-2 1/2	NON-9	NON-50	NON-150	NON-600
NON-3	NON-10	NON-60	NON-175	

Carton Quantity and Weight

Amp Rating	Carton Qty.
1/8-30	10
35-60	10
65-100	5
110-200	1
225-400	1
450-600	1

Dimensions - In

All Diameters ± 0.008



Features:

- Protect lighting, heating and other circuits not subject to temporary surges and where available short-circuit currents are relatively low
- NON one-time fuses do not have any appreciable degree of time-delay and thus should not be specified in circuits where large transients or motor overloads occur. Use Bussmann advanced protection FUSETRON™ FRN-R or ultimate protection Low-Peak™ LPN-RK dual-element, time-delay fuses.
- For general purpose circuits, size at amp rating of circuit
- For motor circuits, size at 300% to 400% according to the NEC® motor ampacity tables 430.247 to 430.250, per 430.8(A)(1)

Recommended Fuse Blocks:

Fuse Amps	1-Pole	2-Pole	3-Pole
0-30	H25030-1	H25030-2	H25030-3
35-60	H25060-1	H25060-2	H25060-3
70-100	HM25100-1CR	HM25100-2CR	HM25100-3CR
110-200	HM25200-1CR	HM25200-2CR	HM25200-3CR
225-400	HM25400-1CR	HM25400-2CR	HM25400-3CR
450-600	HM25600-1CR	HM25600-2CR	HM25600-3CR

For additional information on 250 volt fuse blocks, see Data Sheet # 1112 (H250) and product brochure # 3192 (HM Series).

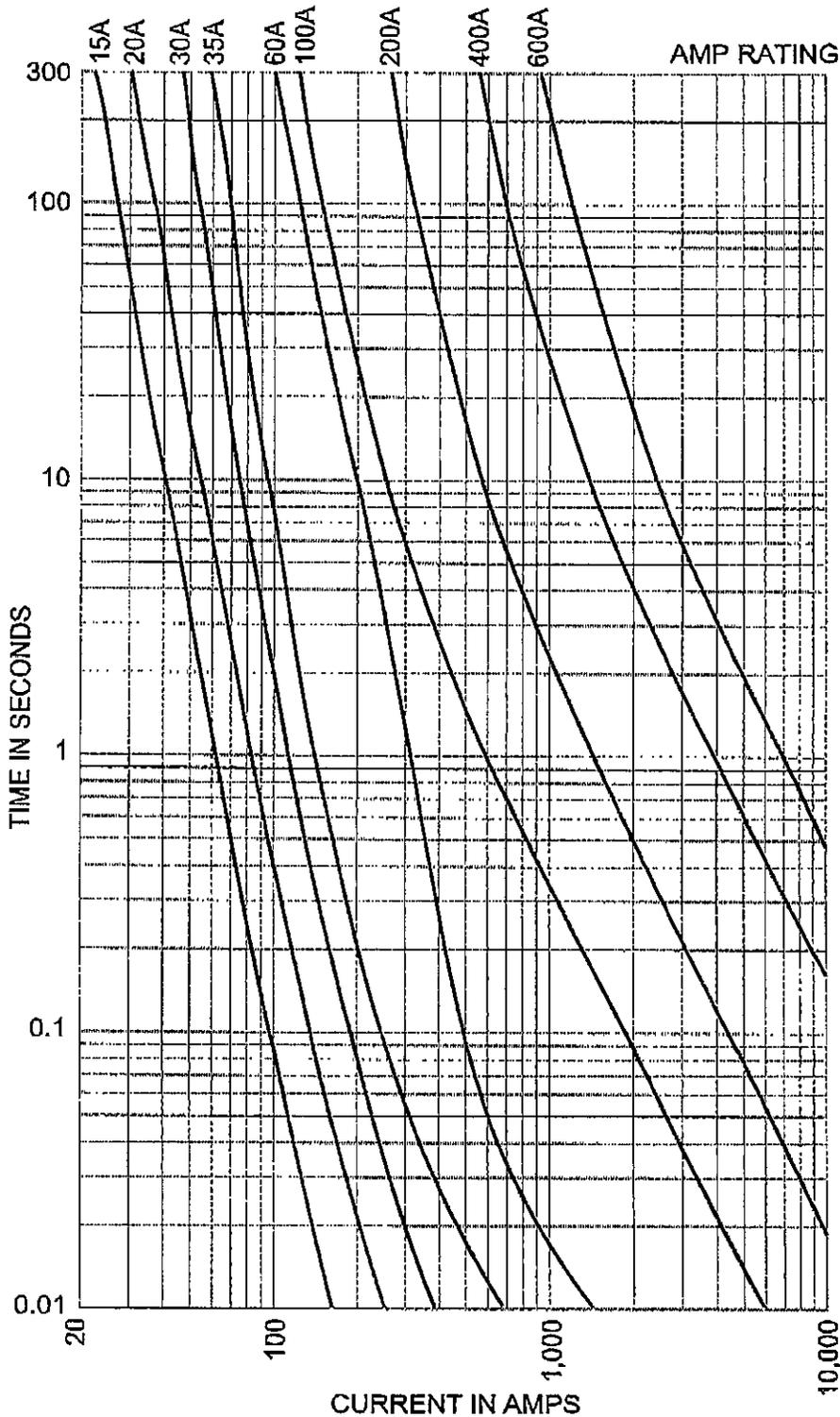
Fuse Reducers For Class R Fuses

Equipment Fuse Clips	Desired Fuse (Case) Size	Catalog Numbers (Pairs) 250V
60A	30A	NO.263
100A	30A	NO.213
	60A	NO.216
200A	60A	NO.228
200A	100A	NO.2621
400A	100A	NO.2641
	200A	NO.2642

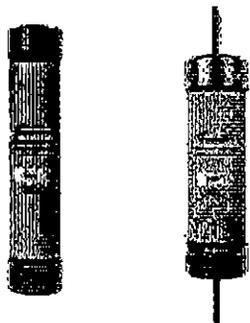
For additional information on Class K5 & H fuse reducers, see Data Sheet # 1118.

NON (250V) 1/8-600A, General Purpose Fuses

Time-Current Curves - Average Melt

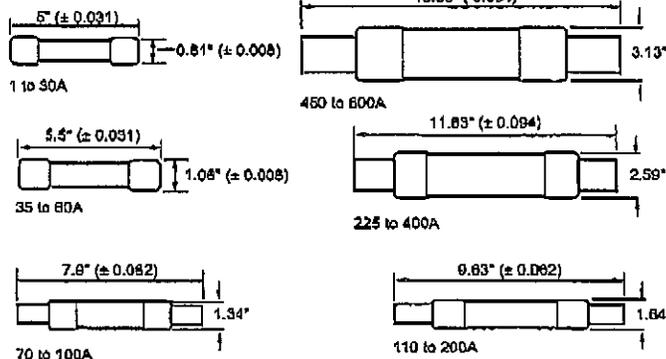


NOS (600V), 1-600A, General Purpose Fuses



Dimensions – in

All Diameters ± 0.008



Description: Basic protection 600V NOS Class K5 and H general purpose, non-current-limiting, one-time fuses.

Catalog Symbol: NOS-(amp)

Ratings:

- Volts – 600Vac
- Amps – 1-600A
- IR – 50kA Vac RMS Sym. (1-60A)
- 10kA Vac RMS Sym. (70-600A)

Agency Information:

CE, UL Listed, Class K5 (1-60A), Std. 248-9, Class H (70-600A), Std. 248-6, UL Guide JDDZ, File E4273
 CSA Certified, Class 1421-01, File 53787

Catalog Numbers (amps)

NOS-1	NOS-9	NOS-40	NOS-100	NON-300
NOS-2	NOS-10	NOS-45	NOS-110	NOS-350
NOS-3	NOS-12	NOS-50	NOS-125	NOS-400
NOS-4	NOS-15	NOS-60	NOS-150	NOS-450
NOS-5	NOS-20	NOS-70	NOS-175	NOS-500
NOS-6	NOS-25	NOS-75	NOS-200	NOS-600
NOS-7	NOS-30	NOS-80	NOS-225	
NOS-8	NOS-35	NOS-90	NOS-250	

NOS 600V Carton Quantity and Weight

Amp Rating	Carton Qty.
1-30	10
35-60	10
70-100	5
110-200	1
225-400	1
450-600	1

Features:

- Protect lighting, heating and other circuits not subject to temporary surges and where available short-circuit currents are relatively low
- NOS one-time fuses do not have any appreciable degree of time-delay and thus should not be specified in circuits where large transients or motor overloads occur. Use Bussmann advanced protection FUSETRON™ LPS-R or ultimate protection Low-Peak™ LPS-RK dual-element, time-delay fuses.
- For general purpose circuits, size at amp rating of circuit
- For motor circuits, size at 300% to 400% according to the NEC® motor ampacity tables 430.247 to 430.250, per 430.8(A)(1)

Recommended Fuse Blocks

Fuse Amps	1-Pole	2-Pole	3-Pole
0-30	H60030-1	H60030-2	H60030-3
35-60	H60060-1	H60060-2	H60060-3
70-100	HM60100-1CR	HM60100-2CR	HM60100-3CR
110-200	HM60200-1CR	HM60200-2CR	HM60200-3CR
225-400	HM60400-1CR	HM60400-2CR	HM60400-3CR
450-600	HM60600-1CR	HM60600-2CR	HM60600-3CR

For additional information on 600 volt fuse blocks, see Data Sheet # 1112 (H) and product brochure # 3192 (HM Series).

Fuse Reducers For Class R Fuses

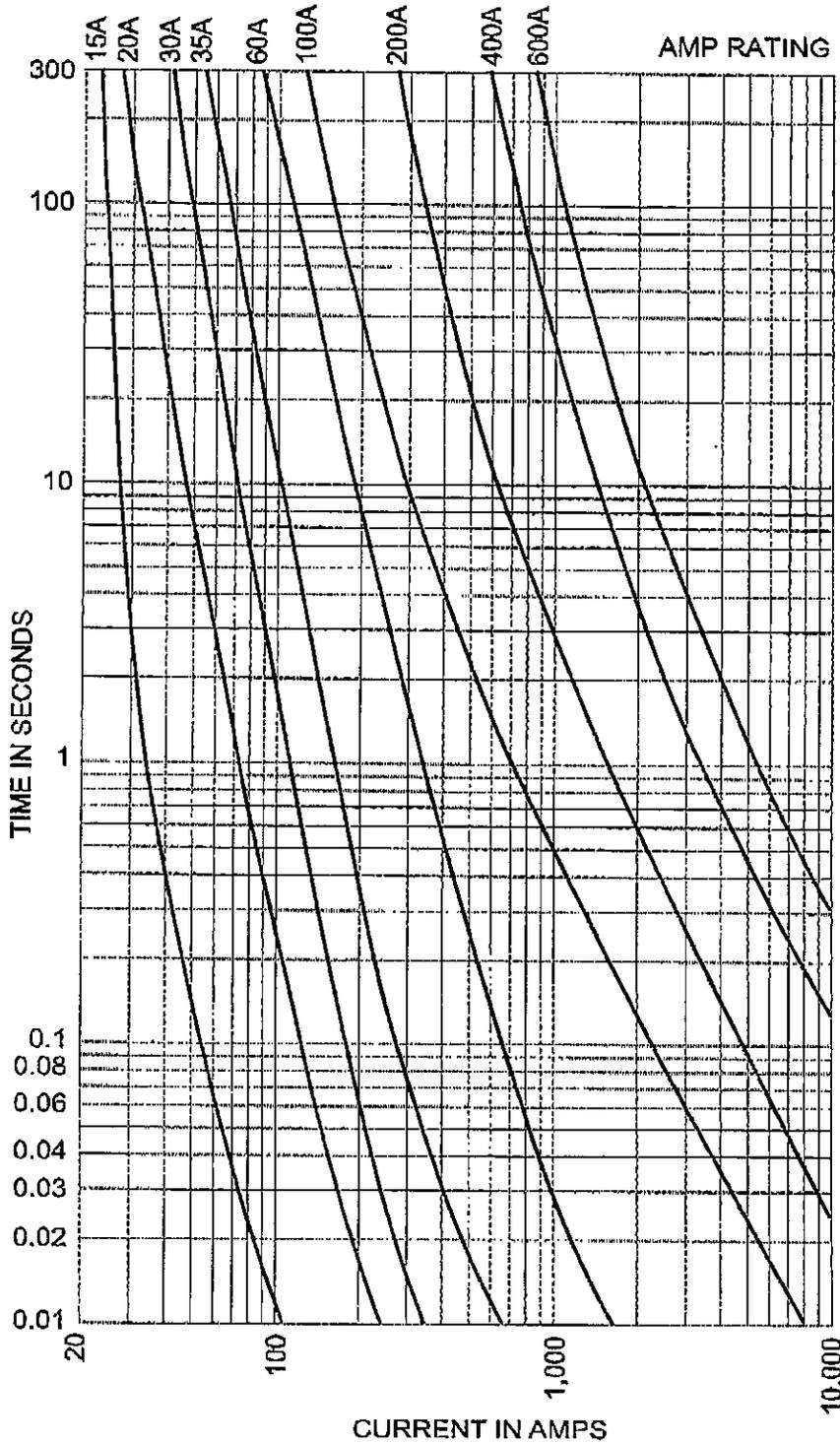
Equipment	Desired Fuse (Case) Size	Catalog Numbers (Pairs) 250V
Fuse Clips		
60A	30A	NO.663
100A	30A	NO.215
	60A	NO.618
200A	60A	NO.628
200A	100A	NO.2621
400A	100A	NO.2641
	200A	NO.2642

For additional information on Class R fuse reducers, see Data Sheet # 1118.

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NOS (600V), 1-600A, General Purpose Fuses

Time-Current Curves - Average Melt



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MOUNT NANSEN ELECTRICAL ASSESSMENT FINAL REPORT

Shop Drawings
March 10, 2014

16.2 MOBILE GENERATOR TASK

Mt. Nansen

- Reviewed
- Reviewed as Modified
- Revise and Resubmit
- Not Reviewed



By: Paul O'Connor

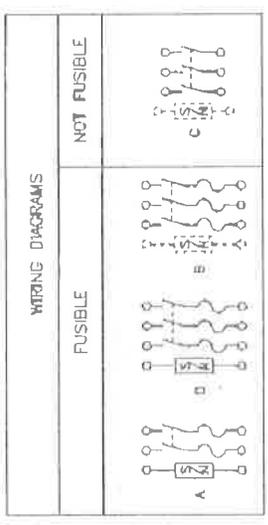
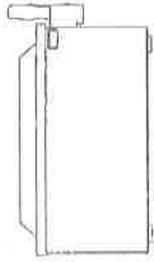
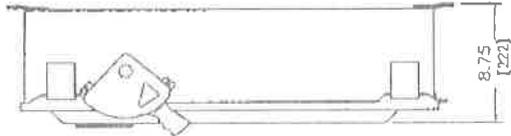
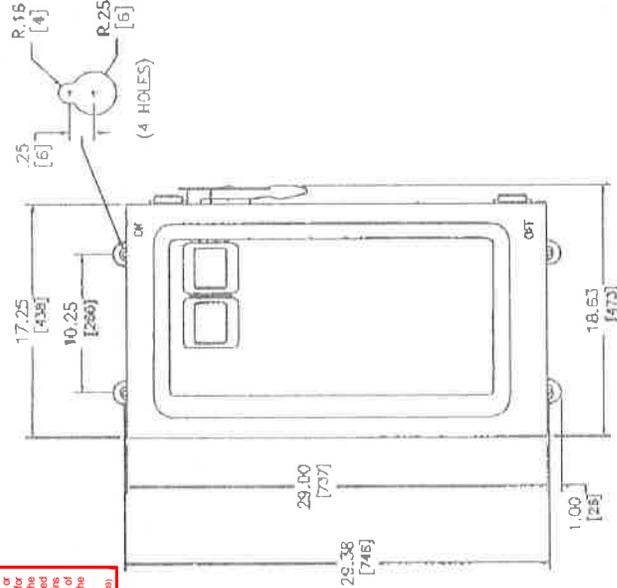
This review by Stantec Architecture Ltd. is for the sole purpose of ascertaining conformance with the general requirements of the contract documents. It does not constitute an approval of the design or construction of the work. Stantec Architecture Ltd. approves the design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the design or construction of the work. The Contractor is responsible for dimensions to be confirmed and checked at the job site, for information that pertains to construction and installation and for coordination of the work of all submittals.

(PC-148)

To be service entrance rated

Contractor to ensure enclosure type is NEMA 3R rated

General Note: IlSCO connectors to be provided for welding cable connections to disconnect/transfer switches



TERMINAL LUGS &			
AMPERES	MAX WIRE	MIN WIRE	TYPE
200	25G KCMIL	#6 AWG	CU/AL

MOUNT NANSEN
COOK SHACK
C/W CSN20 SOLID NEUTRAL

DUAL DIMENSIONS: INCHES MILLIMETERS

CATALOG NUMBER	VOLTAGE RATINGS	WIRING DIAG	HORSEPOWER RATINGS														
			240VAC				480VAC				600VAC						
			STD	MAX	3Ø	1Ø	STD	MAX	3Ø	1Ø	STD	MAX	3Ø	1Ø			
DP224NARK	240VAC-250VDC	A	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A
DP224NARK	240VAC-250VDC	C	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A
CH364ARK	600VAC-600VDC	B	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A
DP364NARK	600VAC-600VDC	D	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A
DP364ARK	600VAC-600VDC	C	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A	15	25A	60A

NOTES:
FINISH - GRAY BAKED ENAMEL
CSA CERTIFIED - FILE #11 88567
ALL NEUTRAL - INSULATED GROUNDABLE
SHORT CIRCUIT CURRENT RATINGS:
10,000 AMPERES WHEN USED WITH OR PROTECTED BY CLASS H OR K FUSES
200,000 AMPERES WHEN USED WITH OR PROTECTED BY CLASS R OR J FUSES
ON 600V SWITCHES, 100,000 AMPERE, MAX ON CORNER GROUNDED DELTA
WHEN PROTECTED BY CLASS R OR J FUSES.
WHEN MOUNTING THESE SWITCHES, ALLOW 4-000/(102) MIN CLEARANCE BETWEEN ENCLOSURES FOR OPENING OF SIDE HINGED DOOR.
A LUGS SUITABLE FOR 75°C CONDUCTORS.
B IF CORNER GROUNDED DELTA, USE OUTER SWITCHING POLES FOR UNGROUNDED CONDUCTORS.
C & E CORNER GROUNDED DELTA, INSTALL NEUTRAL AND USE OUTER SWITCHING POLE FOR UNGROUNDED CONDUCTORS.
D USE ANY TWO SWITCHING POLES.



Schneider Electric

HEAVY DUTY SAFETY SWITCHES
VISIBLE BLADE TYPE
200 AMPERE - SERIES FS
ENCLOSURE - TYPE 12 INDUSTRIAL

DP224NARK

3033C

JULY 2006



LOW-PEAK™
 Dual-Element, Time-Delay Fuses
 Class RK1 — 600 Vac/300 Vdc

MOUNT NANSEN
 COOK SHACK

LPS-RK
 70-600A





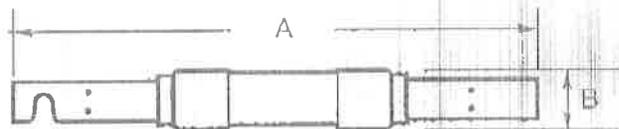
- Reviewed
- Reviewed as Modified
- Revise and Resubmit
- Not Reviewed

By: Paul O'Connor

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STANTEC ARCHITECTURE LTD. (PC-1449)

Dimensional Data



Dimensions (Inches)

Ampere Ratings	"A"	"B"
70-100	7.88 (± 0.062)	1.11 (± 0.020)
110-200	9.63 (± 0.062)	1.81 (± 0.020)
225-400	11.63 (± 0.094)	2.36 (± 0.020)
450-600	13.38 (± 0.094)	2.89 (± 0.020)

Features:

- Current-limitation for maximum short-circuit protection and reduced arc flash hazard.
- Type 2 protection for IEC and NEMA starters when properly sized.
- High inrush current motor protection.
- Time-delay permits 130% FLA sizing for back-up motor overload protection, and angle-phasing protection.
- Low watt loss power consumption.
- Electrically isolated end caps.
- 300Vdc, UL Listed.

Applications:

- Branch distribution
- Motors
- Transformers
- Solenoids
- General purpose circuits

Quantity not reviewed

Catalog Symbol: LPS-RK_SP (600V)

Ampere Rating: 70 to 600A

Ratings:

- Volts — 600Vac (or less)
- 300Vdc (or less)
- Amps — 70-600A
- IR — 300kA RMS Sym.
- 100kA DC

Agency Information:

CE, UL Listed—Special Purpose**, Guide JFHR, File E56412
 CSA Certified, (200k AIR) Class 1422-02, File 53787,
 Class RK1 per CSA C22.2 No. 248.12

Catalog Numbers

LPS-RK-70SP	LPS-RK-150SP	LPS-RK-350SP
LPS-RK-80SP	LPS-RK-175SP	LPS-RK-400SP
LPS-RK-90SP	LPS-RK-200SP	LPS-RK-450SP
LPS-RK-100SP	LPS-RK-225SP	LPS-RK-500SP
LPS-RK-110SP	LPS-RK-250SP	LPS-RK-600SP
LPS-RK-125SP	LPS-RK-300SP	

Available with in plate option. Add suffix "-IP", (Ex: LPS-RK-100SP-IP)

Carton Quantity and Weight—LPS-RK (600Vac)

Amp Ratings	Carton Qty.	Weight*	
		Lbs.	Kg.
70-100	1	2.20	1.0
110-200	1	1.10	0.5
225-400	1	2.36	1.1
450-600	1	3.44	1.6

*Weight per carton.

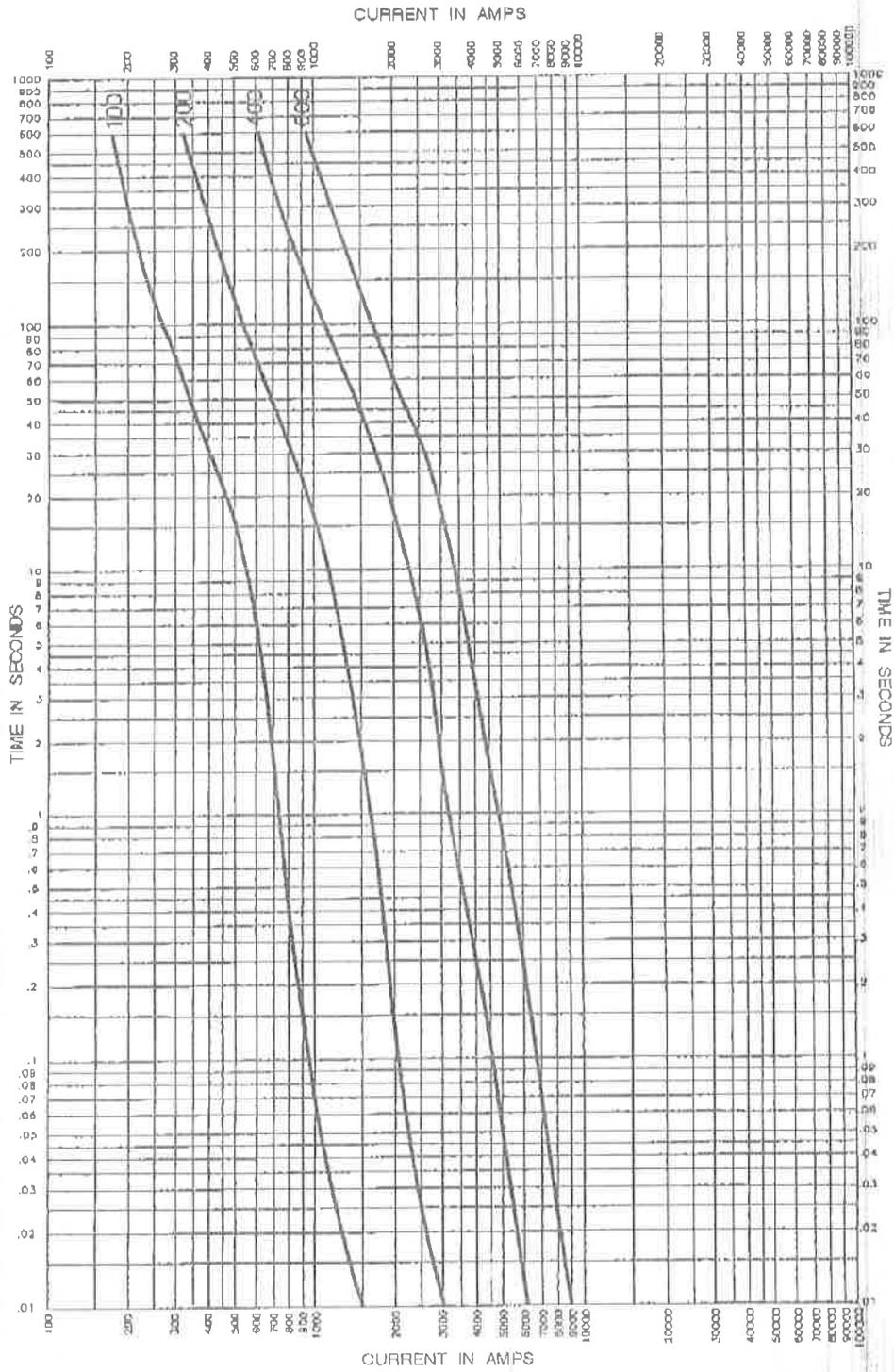
** Meets all performance requirements of UL Standard 248-12 for Class RK1 fuses.

Fuse Blocks

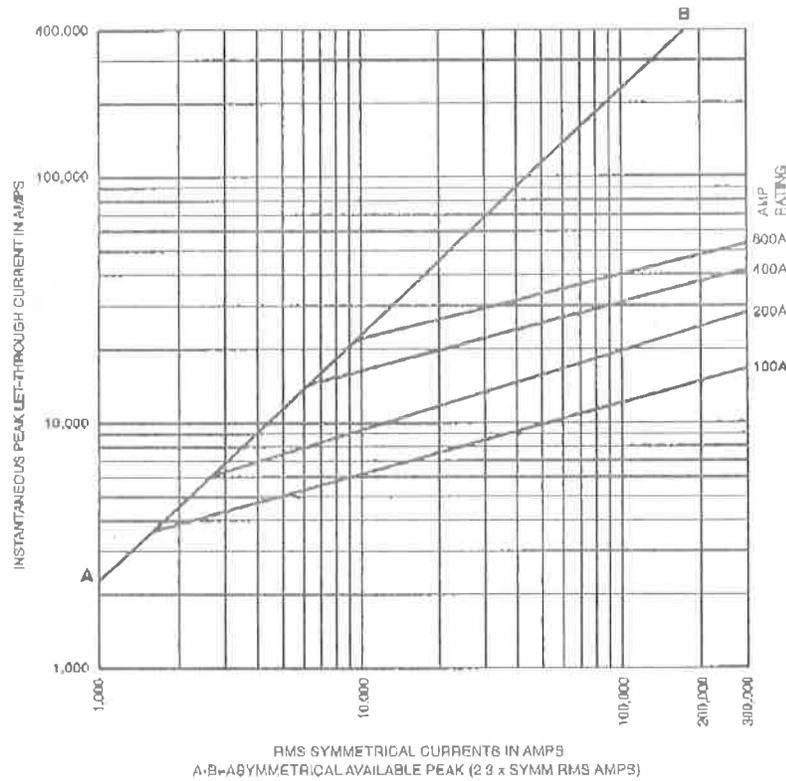
	1-Pole	2-Pole	3-Pole
100 Amp Case			
Box Lug	RM60100-1CR	RM60100-2CR	RM60100-3CR
200 Amp Case			
Box Lug	RM60200-1CR	RM60200-2CR	RM60200-3CR
400 Amp Case			
Box Lug	RM60400-1CR	RM60400-2CR	RM60400-3CR
600 Amp Case			
Box Lug	RM60600-1CR	RM60600-2CR	RM60600-3CR

For additional information on the RM600 series fuse blocks, refer to data sheet 1111.

Time-Current Characteristic Average Melt



Current-Limitation Curves



Current-Limiting Effects

Prop. S.C.C.	Let-Through Current (Apparent RMS Symmetrical) Versus Fuse Rating			
	100A	200A	400A	600A
5,000	2,200	3,250	5,000	5,000
10,000	2,700	4,100	7,150	9,600
15,000	3,050	4,650	7,950	10,650
20,000	3,300	5,100	8,650	11,500
25,000	3,500	5,500	9,200	12,200
30,000	3,700	5,800	9,660	12,750
35,000	3,900	6,100	10,100	13,300
40,000	4,050	6,400	10,450	13,750
50,000	4,300	6,850	11,100	14,600
60,000	4,550	7,250	11,700	15,300
80,000	4,950	7,960	12,850	16,450
100,000	5,250	8,560	13,450	17,450
160,000	5,900	9,750	15,050	19,400
200,000	6,450	10,700	16,300	20,800
250,000	6,850	11,500	17,350	22,100
300,000	7,250	12,200	18,250	23,200

*Values derived from curve data.

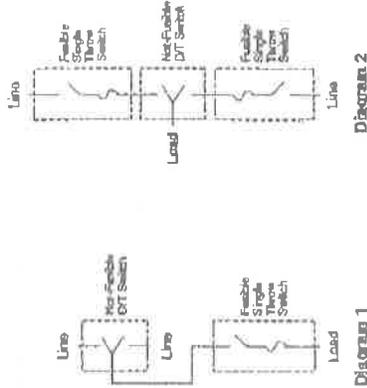
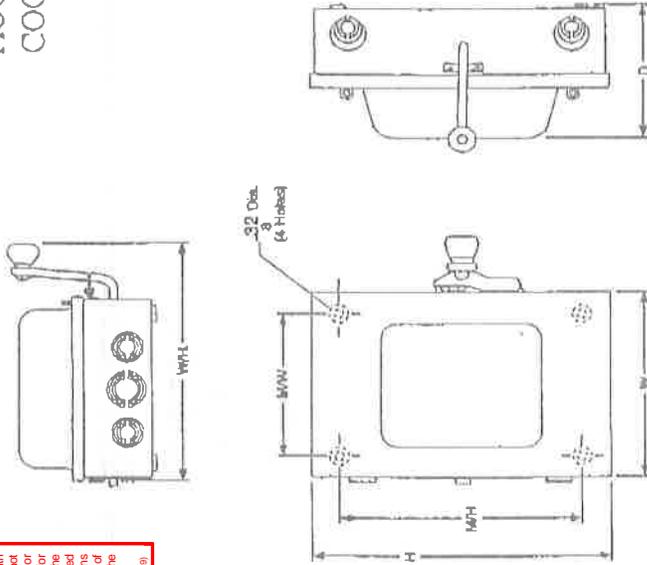
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CDT-200-E

WIRING DIAGRAMS

MOUNT NANSEN
COOK SHACK



Diagrams 1 and 2 illustrate methods of applying fuses to double throw switches when required.

TERMINAL LUGS			
Ampacity	Max. Wire	Min. Wire	Type
200	3/0 Incaul	#5 AWG	AlCu

Dead Dimensions: INCHES
MILLIMETERS

Catalogue Number	Voltage Ratings	Wire Dia.	Overall Dimensions										Knoctatus						
			Horsepower Ratings		D		W		H		M/W		M/W		Left Side	Right Side	Back		
	240 Vac	480 Vac	600 Vac	250 Volt	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	
C2234-08	600 Vac, 250 Volt	B	...	...	30.08	764	20.00	508	11.75	298	23.88	607	27.50	699	17.50	445	1-1/4, 1 1/2, 2, 2 1/4	2-1/4, 1 1/2, 2, 2 1/4	...
C2234-16B	600 Vac, 250 Volt	B	...	...	32.50	826	20.63	524	10.63	270	24.00	610	28.44	722	17.50	445	1-1/4, 1 1/2, 2, 2 1/4	2-1/4, 1 1/2, 2, 2 1/4	...
C2244A	600 Vac	C	...	...	31.13	791	24.76	629	11.75	288	28.25	718	28.59	724	22.00	559	1-1/4, 2 1/4, 2-1/4, 2	2-2 1/4	...
C2244-16B	600 Vac	C	...	...	30.50	773	24.00	609	10.00	254	25.50	647	26.25	676	22.00	559	...	...	...

- NOTES:
- Finish - Gray beveled enamel electrode postited over cleaned phosphated steel.
 - CSA Certified - File #11-88087.
 - 82,000 line devices are Circuit-Make, Circuit-Break and are Load-Make/Load-Break rated.
 - 92,000 line devices are Slow-Make, Slow-Break and are not Load-Make/Load-Break rated.
 - Type 3R devices have provisions for maximum 2 1/2" bolt-on h.t.d.
 - Not suitable for use as service equipment.
 - For Isolation use only. Not load-make, load break rated.

DOUBLE THROW SAFETY SWITCHES
200 Ampere
Enclosure - Type 1 General Purpose
Type 3R Weather-proof



DWG. NO. CDT-200-E

Contractor to ensure enclosure type is NEMA 3R rated

To be solid neutral type transfer switch

By: Paul O'Connor

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STANTEC ARCHITECTURE LTD. (PC-148)

Reviewed
 Reviewed as Modified
 Revise and Resubmit
 Not Reviewed

Shrink-Kon™

Heat-Shrinkable Tubing

MOUNT NANSEN
COOK SHACK



- Reviewed
- Reviewed as Modified
- Revise and Resubmit
- Not Reviewed

Heavy-Wall Heat-Shrinkable Tubing

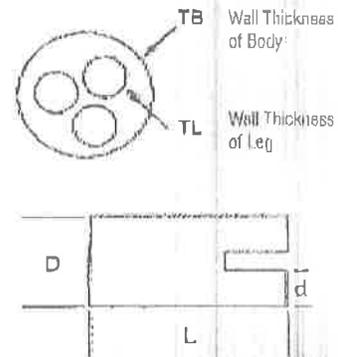
HSB Series – Heat-Shrinkable Breakout Boots

- Boots for 2-, 3- and 4-way cable breakouts
- Thermoplastic adhesive liner provides complete environmental protection and insulation
- Meets ESI 09-11
- Strain relief and mechanical protection
- Continuous operating temperature: -55°C to 100°C
- Shrink temperature of 135°C

By: Paul O'Connor

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STANTEC ARCHITECTURE LTD. (PC-1449)



Approved as alternate to weatherhead.

Heat-Shrinkable Breakout Boots

Cat. No.	No. Legs	D		d		L	TB	TL	Application Legs 600V Conductor AWG/kcmil	Std. Pkg. Qty.	
		Expanded Dia. (mm.) (in.)	Recovered Dia. (mm.) (in.)	Expanded Dia. (mm.) (in.)	Recovered Dia. (mm.) (in.)						
HSB200-75-2	2	1.07	0.90	0.83	0.30	4.09	0.13	0.13	#3-300	10	
HSB120-50-3	3	1.50	0.50	0.85	0.16	4.47	0.11	0.11	#8-3/0		
HSB170-02-3		2.20	0.89	1.20	0.35	7.09	0.12	0.12	#1-600		
HSB240-112-3		2.83	1.38	1.48	0.89	7.01	0.16	0.12	300-1000		
HSB125-50-4	4	1.83	0.47	0.69	0.12	3.74	0.10	0.08	#12-2/0		
HSB175-02-4		2.30	0.90	1.18	0.25	7.05	0.18	0.18	#4-600		
HSB205-120-4		3.10	1.40	1.50	0.49	8.45	0.13	0.13	3/0-1000		
HSB350-136-3		3.54	1.84	1.88	0.55	7.87	0.12	0.08	4/0-1000		
HSB430-167-3	3	4.33	1.36	1.57	0.69	7.01	0.18	0.12	300-1000		6
HSB400-200-3		4.92	2.32	2.00	1.00	11.14	0.15	0.15	450-1000		
HSB520-135-4	4	5.25	3.00	1.35	0.65	10.02	0.18	0.16	4/0-1000		

Order multiple in std. pkg.

HSB Series Specifications

Property	Test Method	Typical Performances
TENSILE STRENGTH		2100 psi (14.5 MPa)
ULTIMATE ELONGATION		600%
ELONGATION AFTER HEAT AGING (108 HRS. AT 170°C)	ASTM D412, ISO 640	520%
HEAT SHOCK (4 HRS. AT 220°C)		No dripping, cracking, flowing
COLD TEMPERATURE FLEXIBILITY (-80°C)	ASTM2571	No cracking
FLAMMABILITY	ASTM D630	Self ext. within 1.07 sec.
DIELECTRIC STRENGTH	ASTM D2071	280 V/mil (11kV/mm)
WATER ABSORPTION	ASTM D670	0.03%

Contractor has submitted an alternate. It is the contractors responsibility to confirm compatibility of the Leviton connectors with Crouse Hinds connectors.



Single Pole Devices

MOUNT NANSEN
COOK SHACK

Industrial Grade

Quantity not reviewed

PROTECTIVE CAPS AND COVERS

16 Series

Description	Color	Cat. No.	Cat. No.
		Male	Female
Protective Caps	White	16P21-W	16P22-W
	Black	16P21-E	16P22-E
	Brown	16P21-H	16P22-H
	Red	16P21-R	16P22-R
	Blue	16P21-B	16P22-B
	Orange	16P21-O	16P22-O
	Green	16P21-G	16P22-G
	Yellow	16P21-Y	16P22-Y
Snap Back Covers - for Male and Female Panel Receptacles	White	16S21-W	—
	Black	16S21-E	—
	Brown	16S21-H	—
	Red	16S21-R	—
	Blue	16S21-B	—
	Orange	16S21-O	—
	Green	16S21-G	—
NEMA 3R Enclosure - for Male and Female Panel Receptacles	White	16S31-W	—
	Black	16S31-E	—
	Brown	16S31-H	—
	Red	16S31-R	—
	Blue	16S31-B	—
	Orange	16S31-O	—
	Green	16S31-G	—
Yellow	16S31-Y	—	



16P22-E



16S21-O



16S31 Mounted on 16R24-14R

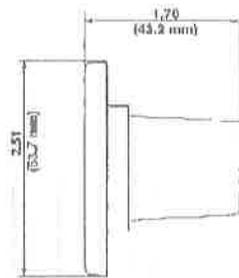


16S31-R

TESTING AND CODE COMPLIANCE

- NEMA 3R-Rated for use outdoors (Protective Caps Only)

DIMENSIONS



Male Protective Cap



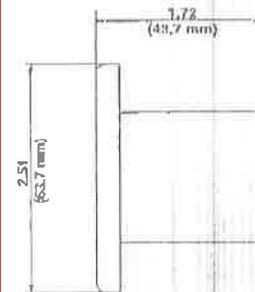
- Reviewed
- Reviewed as Modified
- Revise and Resubmit
- Not Reviewed

By: Paul O'Connor

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STANTEC ARCHITECTURE LTD.

(PC-1449)



Female Protective Cap

Bussmann

LOW-PEAK®
Dual-Element, Time-Delay Fuses
Class RK1 - 600 Volt

MOUNT NANSEN
 SEEPAGE PONDS

LPS-RK
0-60 Amps



 Reviewed
 Reviewed as Modified
 Revise and Resubmit
 Not Reviewed

By: Paul O'Connor

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STANTEC ARCHITECTURE LTD. (PC-1449)

Dimensional Data



Features:

- Current-limitation for maximum short-circuit protection.
- Type 2 protection for IEC and NEMA starters when properly sized.
- High Inrush current motor protection.
- Time-delay permits 130% FLA sizing for back-up motor protection.
- Protection against single-phase motor damage.
- Low watt loss power consumption.
- Electrically isolated end caps.
- 300Vdc, UL Listed.

Applications:

- Branch distribution
- Motors
- Transformers
- Solenoids
- General purpose circuits

Quantity not reviewed

Catalog Symbol: LPS-RK_SP

Dual-Element, Time-Delay - 10 seconds (minimum) at 500% rated current

Current-Limiting

Ampere Rating: 1/10 to 60A

Voltage Rating: 600Vac (or less)
 300Vdc (or less)

Interrupting Rating:

ac: 300,000A RMS Sym.

dc: 100,000A

Agency Information:

UL Listed, Special Purpose**, Guide JFHR, File E56412
 CSA Certified, (200,000AIR), Class RK1 per CSA C22.2,
 No. 248.12, Class 1422-02, File 53787

**Meets all performance requirements of UL Standard 248-12 for Class RK1 fuses.

Catalog Symbol and Amperes

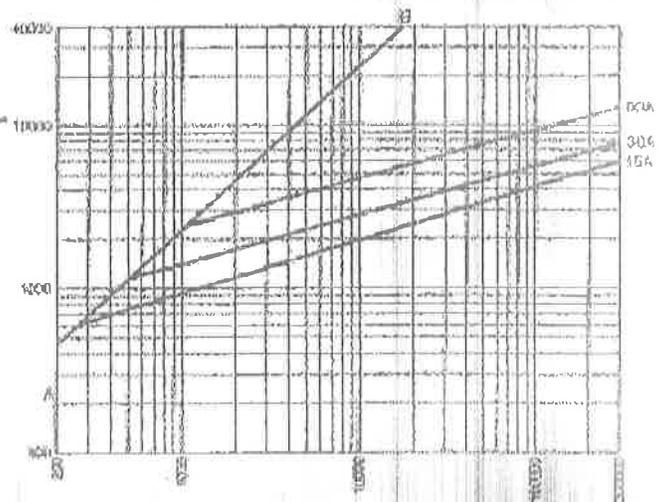
LPS-RK-1/10SP	LPS-RK-1/10SP	LPS-RK-5SP	LPS-RK-20SP
LPS-RK-2/10SP	LPS-RK-1 1/10SP	LPS-RK-5 1/10SP	LPS-RK-25SP
LPS-RK-3/10SP	LPS-RK-1 1/10SP	LPS-RK-6SP	LPS-RK-30SP
LPS-RK-4/10SP	LPS-RK-2 1/10SP	LPS-RK-8 1/4SP	LPS-RK-35SP
LPS-RK-5/10SP	LPS-RK-2 1/10SP	LPS-RK-7SP	LPS-RK-40SP
LPS-RK-6/10SP	LPS-RK-2 1/2SP	LPS-RK-8SP	LPS-RK-45SP
LPS-RK-8/10SP	LPS-RK-3SP	LPS-RK-9SP	LPS-RK-50SP
LPS-RK-1SP	LPS-RK-3 1/10SP	LPS-RK-10SP	LPS-RK-60SP
LPS-RK-1 1/10SP	LPS-RK-3 1/4SP	LPS-RK-12SP	
LPS-RK-1 1/4SP	LPS-RK-4SP	LPS-RK-15SP	
LPS-RK-1 1/2SP	LPS-RK-4 1/4SP	LPS-RK-17 1/2SP	

Carton Quantity and Weight

Ampere Ratings	Carton Qty.	Weight*	
		Lbs.	Kg.
0-30	10	1.6	0.725
35-60	10	2.6	1.178

*Weight per carton.

Current-Limitation Curve



HMS SYMMETRICAL CURRENTS IN AN
 A-B=ASYMMETRICAL AVAILABLE F
 (2.3 x SYMM RMS AMPS)

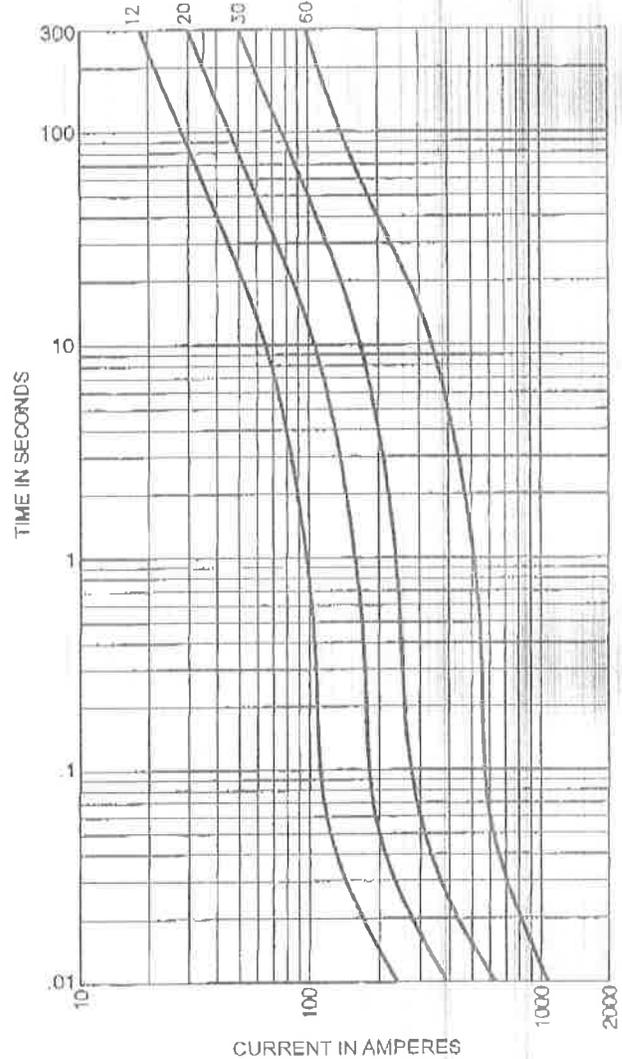
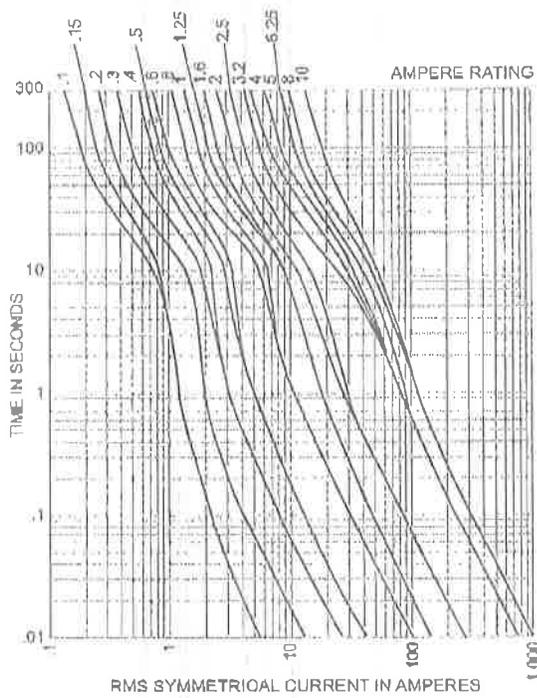
CE logo denotes compliance with European Union Low Voltage Directive (50-1000Vac, 75-1500Vdc). Refer to Data Sheet: B002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

Bussmann

LOW-PEAK[®]
Dual-Element, Time-Delay Fuses
Class RK1 - 600 Volt

LPS-RK
0-60 Amps

Time-Current Characteristic Curves—Average Melt





Recommended fuseblocks for Class R 600V fuses
 See Data Sheet: 1111

The only controlled copy of this Data Sheet is the electronic read-only version located on the Bussmann Network Drive. All other copies of this document are by definition uncontrolled. This bulletin is intended to clearly present comprehensive product data and provide technical information that will help the end user with design applications. Bussmann reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Bussmann also reserves the right to change or update, without notice, any technical information contained in this bulletin. Once a product has been selected, it should be tested by the user in all possible applications.

Single Pole Devices

Contractor has submitted an alternate. It is the contractor's responsibility to confirm compatibility of the Leviton connectors with Crouse Hinds connectors.



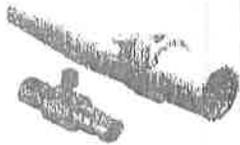
Industrial Grade

MOUNT NANSEN
SEEPAGE POND

CAM-TYPE CONNECTORS (UP TO 400A, 600V)

16 Series, Taper Nose

Quantity not reviewed



16D28-W



16D37-H

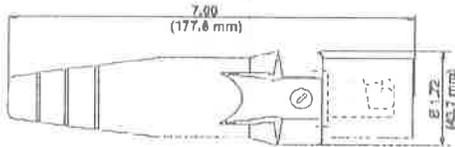
Description	Color	Cat. No. Complete	Cat. No. Contact	Cat. No. Insulator
Male Detachable Plug - Crimped (Cable Size: 3/0-4/0)	White	16D28-W	16D28-C	16SDM-14W
	Black	16D28-E	16D28-C	16SDM-14E
	Brown	16D28-H	16D28-C	16SDM-14H*
	Red	16D28-R	16D28-C	16SDM-14R
	Blue	16D28-B	16D28-C	16SDM-14B
	Orange	16D28-O	16D28-C	16SDM-14O
	Green	16D28-G	16D28-C	16SDM-14G
Female Detachable Plug - Crimped (Cable Size: 3/0-4/0)	White	16D37-W	16D37-C	16SDF-14W
	Black	16D37-E	16D37-C	16SDF-14E
	Brown	16D37-H	16D37-C	16SDF-14H*
	Red	16D37-R	16D37-C	16SDF-14R
	Blue	16D37-B	16D37-C	16SDF-14B
	Orange	16D37-O	16D37-C	16SDF-14O*
	Green	16D37-G	16D37-C	16SDF-14G*
	Yellow	16D37-Y	16D37-C	16SDF-14Y*

* Contact factory for availability.

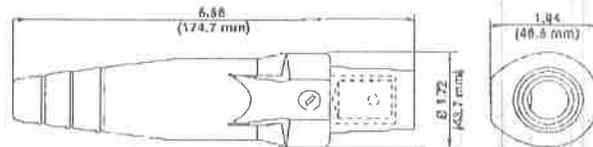
TESTING AND CODE COMPLIANCE

- Meets UL Standards (File #E13399)
- NEMA 3R-Rated for use outdoors
- CSA Certified (File #152105)

DIMENSIONS



Male Detachable Plug - Crimped



Female Detachable Plug - Crimped



- Reviewed
- Reviewed as Modified
- Revise and Resubmit
- Not Reviewed

By: Paul O'Connor

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STANTEC ARCHITECTURE LTD.

(PC-1449)

Contractor has submitted an alternate. It is the contractor's responsibility to confirm compatibility of the Leviton connectors with Crouse Hinds connectors.

LEVITON

Single Pole Devices

MOUNT NANSEN
SEEPAGE PONDS

Industrial Grade

Quantity not reviewed

PROTECTIVE CAPS AND COVERS

16 Series

Description	Color	Cat. No.	
		Male	Female
Protective Caps	White	16P21-W	16P22-W
	Black	16P21-E	16P22-E
	Brown	16P21-H	16P22-H
	Red	16P21-R	16P22-R
	Blue	16P21-B	16P22-B
	Orange	16P21-O	16P22-O
	Green	16P21-G	16P22-G
Snap Back Covers - for Male and Female Panel Receptacles	White	16S21-W	—
	Black	16S21-E	—
	Brown	16S21-H	—
	Red	16S21-R	—
	Blue	16S21-B	—
	Orange	16S21-O	—
	Green	16S21-G	—
NEMA 3R Enclosure - for Male and Female Panel Receptacles	White	16S31-W	—
	Black	16S31-E	—
	Brown	16S31-H	—
	Red	16S31-R	—
	Blue	16S31-B	—
	Orange	16S31-O	—
	Green	16S31-G	—
	Yellow	16S31-Y	—



16P22-E



16S21-O



16S21 Mounted on 16R24-14R

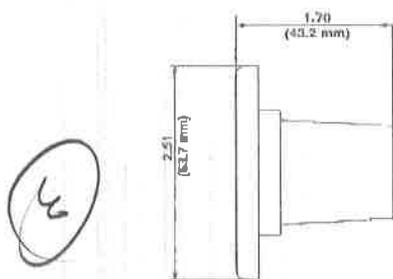


16S31-R

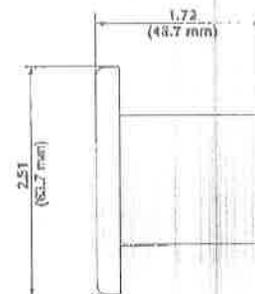
TESTING AND CODE COMPLIANCE

- NEMA 3R-Rated for use outdoors (Protective Caps Only)

DIMENSIONS



Male Protective Cap



Female Protective Cap

To be service entrance rated

- Reviewed
- Reviewed as Modified
- Revise and Resubmit
- Not Reviewed

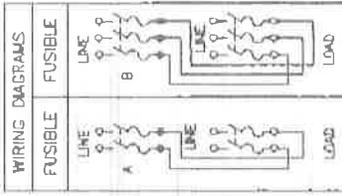


By: Paul O'Connor

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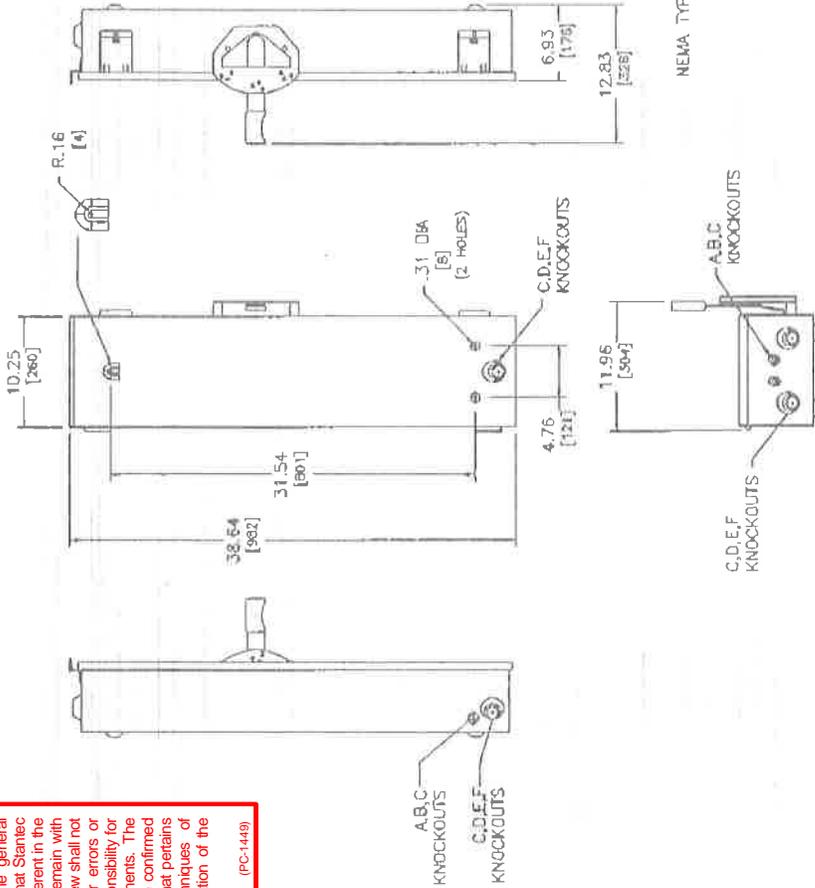
STANTEC ARCHITECTURE LTD. (PC-1449)

MOUNT NANSEN
VICTORIA CREEK PUMPHOUSE



TERMINAL LUGS			
AMPERES	MAX. WIRE	MIN. WIRE	TYPE
100	1/0 AWG	#14	AL

KNOCKOUTS			
SYMBOL	CONDUIT SIZE		DIAMETER
	IN	MM	IN
A	.50	13	.88
B	.75	19	1.13
C	1.00	25	1.38
D	1.25	32	1.75
E	1.50	38	2.00
F	2.00	51	2.50



NEMA TYPE 3R

DIAL DIMENSIONS: INCHES
MILLIMETERS

CATALOG NUMBER	VOLTAGE RATING	AMPERE RATING	WIRING DIAG	240 VAC			480 VAC			600 VAC			125 VDC			250 VDC			600 VDC											
				1PH	3PH	MAX	STD	MAX	STD	MAX	STD	MAX	1PH	3PH	MAX	STD	MAX	1PH	3PH	MAX	STD	MAX								
D1723ARB	240	100	A	7.5	15	NA	15	30	NA	NA	NA	15	30	NA	NA	NA	NA	NA	NA	20	NA	NA								
D1732ARB	240	100	B	7.5	15	NA	15	30	NA	NA	NA	15	30	NA	NA	NA	NA	NA	20	NA	NA	NA								
D1763ARB	600	100	B	7.5	15	15	15	30	15	30	15	30	25	50	80	25	50	80	15	40	30	75	NA	NA	NA	20	NA	NA	40	50



NOTES:
1. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.
2. ALL NEUTRALS - INSTALLED SHORT CIRCUIT CURRENT RATING: 10,000 AMPERES WHEN USED IN CONNECTION WITH CLASS J OR K FUSES.
3. FOR SINGLE PHASE HP PATROLS, USE 2 SWITCHING POLES.
4. FOR 3 PHASE, HP PATROLS, USE 3 SWITCHING POLES.
5. FOR CORNER GROUNDING DELTA SYSTEM, USE 3 SWITCHING POLES AND INSTALL NEUTRAL FOR GROUNDING CONDUCTOR.



HEAVY DUTY SAFETY SWITCHES
VISIBLE BLADES
100 AMPERE
ENCLOSURE - TYPE 3R
FUSIBLE

TYPE 3201



LOW-PEAK™
 Dual-Element, Time-Delay Fuses
 Class RK1 --- 600 Vac/300 Vdc

MOUNT NANSEN
 VICTORIA CREEK PUMPHOUSE

LPS-RK
 70-600A



 **Stantec**

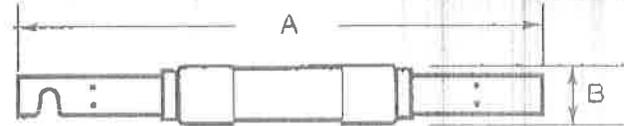
Reviewed
 Reviewed as Modified
 Revise and Resubmit
 Not Reviewed

By: Paul O'Connor

This review by Stantec Architecture Ltd. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Architecture Ltd. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all subtrades.

STANTEC ARCHITECTURE LTD. (PC-1449)

Dimensional Data



Dimensions (Inches)

Ampere Ratings	"A"	"B"
70-100	7.88 (+ 0.062)	1.11 (+ 0.020)
110-200	9.63 (+ 0.062)	1.11 (+ 0.020)
225-400	11.63 (+ 0.094)	2.36 (+ 0.020)
450-600	13.38 (+ 0.064)	2.68 (+ 0.020)

Features:

- Current-limitation for maximum short-circuit protection and reduced arc flash hazard.
- Type 2 protection for IEC and NEMA starters when properly sized.
- High inrush current motor protection.
- Time-delay permits 130% FLA sizing for back-up motor overload protection, and single-phasing protection.
- Low watt loss power consumption.
- Electrically isolated end caps.
- 300Vdc, UL Listed.

Applications:

- Branch distribution
- Motors
- Transformers
- Solenoids
- General purpose circuits

Quantity not reviewed

Catalog Symbol: LPS-RK_SP (600V)

Ampere Ratings: 70 to 600A

Ratings:

- Volts --- 600Vac (or less)
- 300Vdc (or less)
- Ampe --- 70-600A
- IR --- 300KA RMS Sym.
- 100KA DC

Agency Information:

CE, UL Listed—Special Purpose**, Guide JFRR, File E56412
 CSA Certified, (200k AIR) Class 1422-02, File 53787,
 Class RK1 per CSA C22.2 No. 248.12

Catalog Numbers

LPS-RK-70SP	LPS-RK-150SP	LPS-RK-350SP
LPS-RK-80SP	LPS-RK-175SP	LPS-RK-400SP
LPS-RK-90SP	LPS-RK-200SP	LPS-RK-450SP
LPS-RK-100SP	LPS-RK-225SP	LPS-RK-500SP
LPS-RK-110SP	LPS-RK-250SP	LPS-RK-600SP
LPS-RK-125SP	LPS-RK-300SP	

available with tin plate option. Add suffix "-1P", (ex: LPS-RK-100SP-1P)

Carton Quantity and Weight—LPS-RK (600Vac)

Amp Ratings	Carton Qty.	Weight*	
		Lbs.	Kg.
70-100	1	2.20	1.0
110-200	1	1.10	0.5
225-400	1	2.36	1.1
450-600	1	3.44	1.5

*Weight per carton.

** Meets all performance requirements of UL Standard 248-12 for Class RK1 fuses.

Fuse Blocks

	1-Pole	2-Pole	3-Pole
100 Amp Case			
Box Lug	RM60100-1CR	RM60100-2CR	RM60100-3CR
200 Amp Case			
Box Lug	RM60200-1CR	RM60200-2CR	RM60200-3CR
400 Amp Case			
Box Lug	RM60400-1CR	RM60400-2CR	RM60400-3CR
600 Amp Case			
Box Lug	RM60600-1CR	RM60600-2CR	RM60600-3CR

For additional information on the RM600 series fuse blocks, refer to data sheet 1111.

Single Pole Devices

Contractor has submitted an alternate. It is the contractor's responsibility to confirm compatibility of the Leviton connectors with Crouse Hinds connectors.



Industrial Grade

MOUNT NANSEN
VICTORIA CREEK PUMPHOUSE

Quantity not reviewed

CAM-TYPE CONNECTORS (UP TO 400A, 600V)

16 Series, Taper Nose



16D28-W



16D37-H

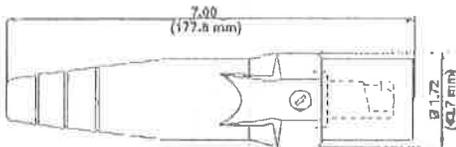
Description	Color	Cat. No. Complete	Cat. No. Contact	Cat. No. Insulator
Male Detachable Plug - Crimped (Cable Size: 3/0-4/0)	White	16D28-W	16D28-C	16SDM-14W
	Black	16D28-E	16D28-C	16SDM-14E
	Brown	16D28-H	16D28-C	16SDM-14H*
	Red	16D28-R	16D28-C	16SDM-14R
	Blue	16D28-B	16D28-C	16SDM-14B
	Orange	16D28-O	16D28-C	16SDM-14O
	Green	16D28-G	16D28-C	16SDM-14G
Female Detachable Plug - Crimped (Cable Size: 3/0-4/0)	White	16D37-W	16D37-C	16SDF-14W
	Black	16D37-E	16D37-C	16SDF-14E
	Brown	16D37-H	16D37-C	16SDF-14H*
	Red	16D37-R	16D37-C	16SDF-14R
	Blue	16D37-B	16D37-C	16SDF-14B
	Orange	16D37-O	16D37-C	16SDF-14O*
	Green	16D37-G	16D37-C	16SDF-14G*
	Yellow	16D37-Y	16D37-C	16SDF-14Y*

* Contact factory for availability.

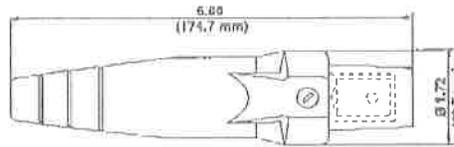
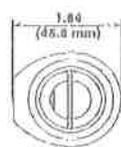
TESTING AND CODE COMPLIANCE

- Meets UL Standards (File #E13399)
- NEMA 3R-Rated for use outdoors
- CSA Certified (File #152105)

DIMENSIONS



Male Detachable Plug - Crimped



Female Detachable Plug - Crimped



Single Pole Devices

MOUNT NANSEN
VICTORIA CREEK PUMPHOUSE

Industrial Grade

PROTECTIVE CAPS AND COVERS

16 Series

Description	Color	Cat. No.	
		Male	Female
Protective Caps	White	16P21-W	16P22-W
	Black	16P21-E	16P22-E
	Brown	16P21-H	16P22-H
	Red	16P21-R	16P22-R
	Blue	16P21-B	16P22-B
	Orange	16P21-O	16P22-O
	Green	16P21-G	16P22-G
Snap Back Covers - for Male and Female Panel Receptacles	White	16S21-W	—
	Black	16S21-E	—
	Brown	16S21-H	—
	Red	16S21-R	—
	Blue	16S21-B	—
	Orange	16S21-O	—
	Green	16S21-G	—
NEMA 3R Enclosure - for Male and Female Panel Receptacles	White	16S31-W	—
	Black	16S31-E	—
	Brown	16S31-H	—
	Red	16S31-R	—
	Blue	16S31-B	—
	Orange	16S31-O	—
	Green	16S31-G	—
	Yellow	16S31-Y	—



16P22-E



16S21-O



16S21 Mounted on 16R24-14R

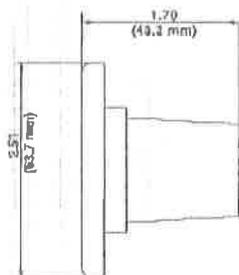


16S31-R

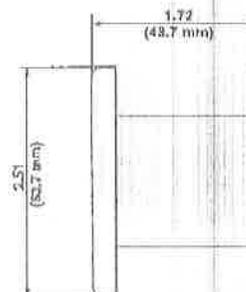
TESTING AND CODE COMPLIANCE

- NEMA 3R-Rated for use outdoors (Protective Caps Only)

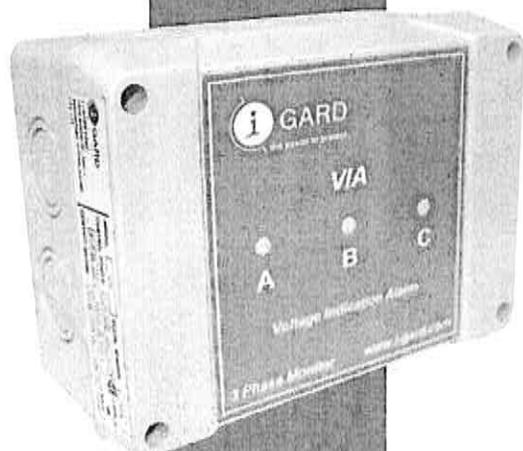
DIMENSIONS



Male Protective Cap

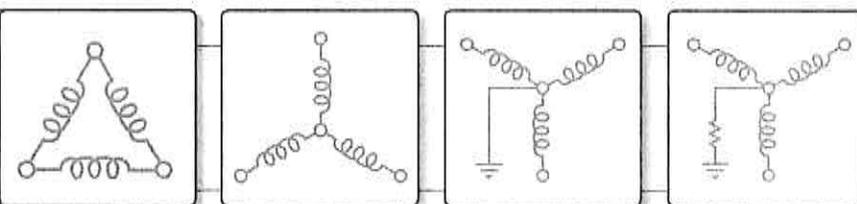


Female Protective Cap



VIA

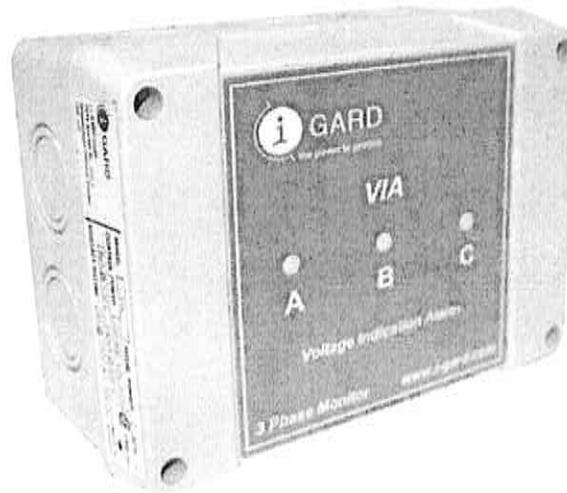
VOLTAGE ALARM INDICATOR



the power to protect

VIA

IMPORTANT



Each VIA Indicator and its auxiliary parts is carefully inspected before it is packed in a specially designed carton. The unit should be examined immediately upon receipt. If damage or indication of rough handling is apparent, a claim should be filed without delay with the transport company. I-Gard should be notified promptly if replacements for damaged goods are necessary. If units received are not to be installed immediately they should be stored in their original containers in an area free of dust and moisture.

CONTENTS

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3. Operation	5
4. Indication	6
5. Installation Instructions	7
6. Service	11
7. Technical Specifications	12
8. Dimensional Drawings	13
9. I-GARD Products	15

1. FEATURES

- POWERED DIRECTLY FROM 3 PHASES
- BRIGHT LED LAMP TECHNOLOGY USED FOR INDICATION
- ALL PHASES FUSED INTERNALLY
- CONTAINS 2 AUXILIARY RELAYS FOR EXTERNAL INDICATION
- PLASTIC ENCLOSURE WITH KNOCKOUTS FOR CONVENIENT MOUNTING
- ISOLATED FLUSHMOUNT EXTERNAL DISPLAYS ARE OPTIONAL

2. INTRODUCTION

The I-Gard VIA is a 3-phase ground fault indicator unit and is designed specifically for Ground Fault Indication on Wye or Delta-connected, three-phase, three-wire, resistance grounded or ungrounded power systems. It may be used on systems between 120V and 600V (up to 690 without CSA approval) or up to any voltage with the use of 120V or 240V potential transformers (PT's).

One or more optional flush mounted external displays can be mounted on panel doors or other locations. Up to four displays can be connected using an RJ-45 (networking) cable in a daisy-chain configuration. Isolation inside the VIA protects the external display from high voltages. Up to several kilometers of cable can be used between the VIA and VIA-R display. Refer to table 2.0 for catalogue numbers.

The VIA is designed to provide an alarm when a single ground fault occurs, and to indicate on which phase the fault occurred. Additionally the VIA can indicate both phase loss as well as DC ground faults. Each phase is fused inside the VIA enclosure; therefore it does not require any external hardware.

When a second fault, on another phase, occurs in the distribution system, the only limitation on the amount of ground fault current is the impedances of the faults, the impedance of the source (transformer windings feeding the faults) and the ground circuit between them. Under

this condition, extensive damage can occur, making it necessary to clear the first fault as soon as possible. The prime advantage, then, of using the VIA Ground Alarm Indicator unit, is that the user is given early warning of ground faults allowing time to locate and clear the fault to ensure maximum service continuity.

Catalogue Number	Description
VIA	VIA (Voltage Indication Alarm)
VIA-R	Remote VIA

Table 2.0 Catalogue numbers

3. OPERATION

The VIA measures the fault level as shown in Figure 3.0 below. The fault is expressed as a percentage of the total neutral voltage displacement at the time of a ground fault. A bolted fault (short) to ground is considered to be a 100% fault. A RED LED indicates a fault on which the neutral voltage displacement from ground is greater than or equal to 50%, YELLOW indicates a neutral to ground voltage greater than or equal to 20% and less than 50%, and GREEN means a neutral to ground voltage displacement of less than 20%.

Two auxiliary, normally open relays can also be used for external indication. The 20% relay closes when the system has a 20% or greater fault level (when any of the LED's change to YELLOW). The 50% relay closes when the system has a fault level that is greater than or equal to 50% (when any of the LED's change to RED). In addition, the 20% relay will close in the event of a phase loss.

The VIA indicator also has the capability to indicate when a DC fault has occurred. If a bolted fault (100%) occurs from the positive DC side of a rectifier, the VIA LED's will all turn RED and flash. If the fault is resistive (less than 100%) the LED's will turn YELLOW and flash. Likewise if the fault is from the negative side of the DC rectifier, the LED's will change color (depending on the fault intensity) and double flash (indicating a negative DC fault).

The fault indication is not a latched function; once the fault is cleared, the VIA will reset to the normal state.

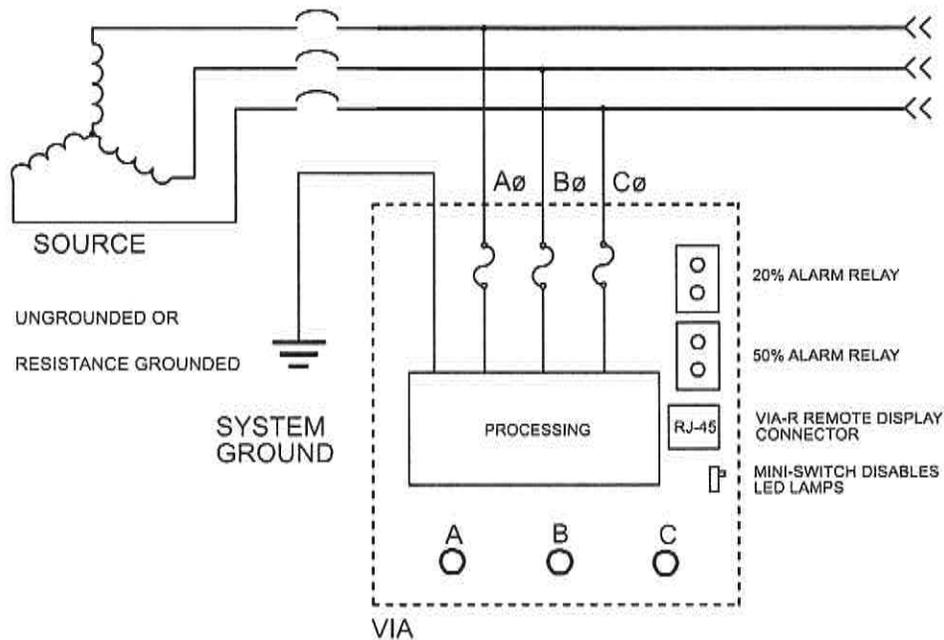


Figure 3.0 VIA internal operation diagram

4. INDICATION

The status of each phase is represented by a LED lamp on the front of the unit. The LED's are labelled A, B, C, corresponding to the connections within the VIA.

Table 4.0 shows all possible conditions that can be displayed using the LED lamps.

Condition	Reason
Any phase LED is GREEN	No fault or ground fault level is less than 20%
One phase LED is YELLOW	Fault level is greater than or equal to 20%, but less than 50%
One phase LED is RED	Fault level is greater than or equal to 50%
One phase LED is GREEN and BLINKING	Phase is lost or fuse is blown
One phase LED is OFF	Unit may be defective (LED may have burned out)
All phase LED's are OFF	More than 1 phase is lost, more than one fuse is blown or unit is defective
All phase LED's are RED and BLINKING (single flash)	DC fault from positive (+) to ground
All phase LED's are RED and BLINKING (double flash)	DC fault from negative (-) to ground

Table 4.0 VIA indication summary

The VIA Indicator has a tolerance of +/- 15% of the neutral voltage displacement during a ground fault.

When indicating DC faults the VIA does not apply the 20% and 50% level thresholds. However, it does distinguish between bolted DC faults (RED) and resistive faults (YELLOW).

In addition to visual indication, the VIA is equipped with two optional auxiliary relays. Table 4.1 below describes the operation of these relays.

Condition	State of 20% Relay	State of 50% Relay
No fault or fault is less than 20%	Open	Open
Fault level is greater than or equal to 20%, but less than 50%	Close	Open
Fault level is greater than or equal to 50%	Close	Close
Phase is lost or fuse blown	Close	Open
Negative or Positive DC Fault (low level)	Close	Open
Negative or Positive DC Fault (high level)	Close	Close

Table 4.1 Auxiliary relay operation summary

If using an external display the VIA's internal LED lamps can be disabled. This is done by toggling the mini switch on the VIA's top printed circuit board shown in Figure 5.0. The VIA's internal LED lamps can be either on or off depending on customer preference.

5. INSTALLATION INSTRUCTIONS

DANGER

Hazard of Electrical Shock, Burn or Explosion

All installation, servicing and testing referred to in this manual must be performed by qualified personnel. All power should be disconnected prior to removing covers or enclosures and where live conductors may otherwise be exposed.

Failure to observe these precautions may result in death or severe personal injury and damage to equipment.

Before placing an intentional ground fault on the power system, check that a fault does not already exist. Any test ground fault equipment must be rated for full system voltage and interrupting capacity, and be fused for protection.

Prior to mounting, select one of the 10 knockout locations for wiring. (Refer to Figure 8.0 for dimensions and knockout locations.) Gently tap with a hammer to snap out the plastic. A cable grommet (25mm or 32mm) can be used to seal the knockout and provide entry for the cables.

Each enclosure can be mounted directly to a panel or wall. In order to properly mount the VIA, remove the cover by unscrewing the 4 corner screws. The unit has four screw mounting locations as shown in Figure 5.0. Prior to mounting on the wall, four holes need to be drilled out to accommodate the mounting screws. Use the appropriate drill bit depending on the selected screws. Once the drill holes are ready, proceed to mount the back and then to re-attach and tighten the top cover.

Each VIA comes with mounting hardware listed in Table 5.0.

Description	Quantity
8-18 Roundhead, Slotted, Stainless Steel Screw	4
#8 Flat Washer	4
25mm Cable Grommet	2

Table 5.0 Mounting hardware included with VIA

All required connections are made inside the VIA enclosure. Please ensure that all power is disconnected before and during setup and installation. All three phases must be connected to their corresponding terminal. Should the phase connections be inverted, the VIA ground fault indication will also be inverted. A good ground connection is essential for proper bonding and voltage indication; to complete the ground connection, connect a wire from the VIA ground terminal to a reliable system ground.

If using an optional external flush mount display, connect the RJ-45 cable to the RJ-45 jack inside the VIA as shown in Figure 5.0. Route the cable clear of any exposed high voltage components such as fuses or phase connection terminal blocks. The connections to the alarm relays must also be made during the installation process.

When using remote VIA indicators, it may be desired to toggle the mini-switch to disable the internal LED lamps. This is not required; in fact, the internal LED lamps can remain active even if using more than one external display. However, the internal LED's may not be visible as a result of the mounting location, and therefore will not be useful. The mini-switch then can be used to disable the indicating lights on the main VIA.

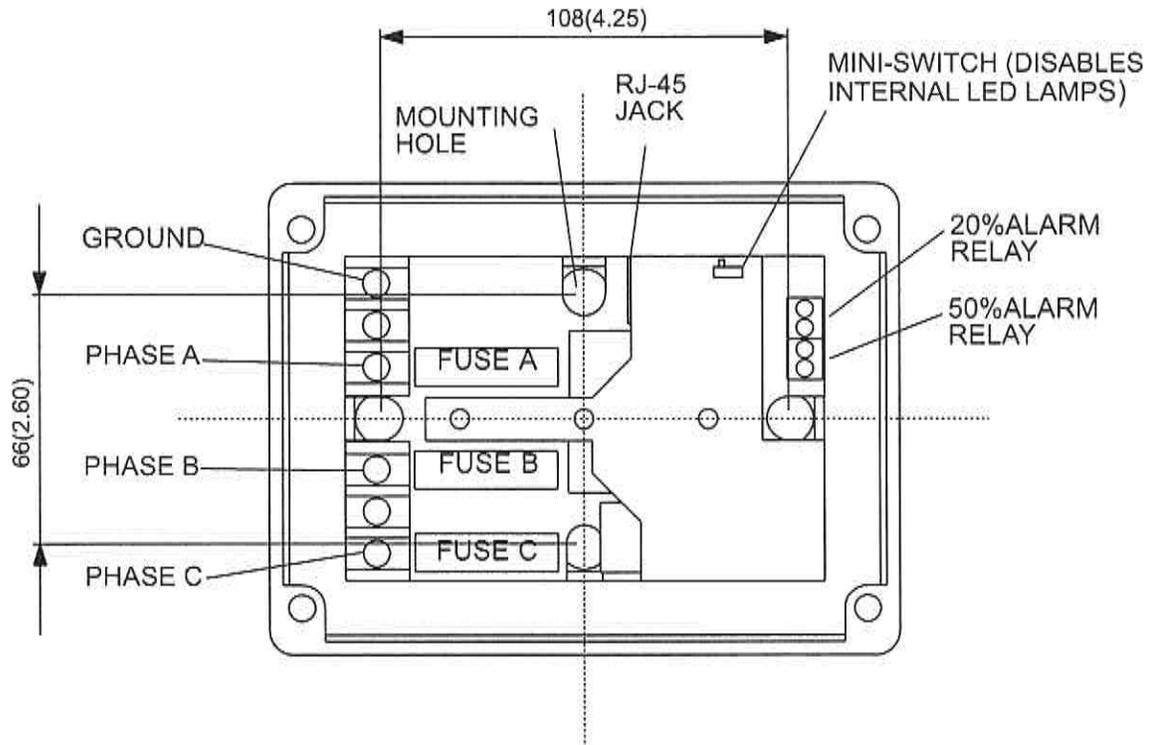


Figure 5.0: Connections and Mounting - mm (inches)

The external VIA-R (remote indicator) may be mounted with the base or flush mounted directly on a panel door or wall. For flush mounting, remove and discard the base. Remove the screws and replace with the machine screws provided (see Table 5.1 for a list of hardware provided with the VIA-R remote display). Figure 5.1 shows the recommended cut-out pattern for flush mounting the display on a door. Once attached, connect the RJ-45 cable into either of the two modular jacks. If using more than one VIA-R (remote indicator), daisy chain the units by connecting a cable from the remaining jack to the next VIA-R in the chain. In this manner, up to four VIA-R units may be connected to a single VIA main unit.

Description	Quantity
6-32, 3/4 " Roundhead, Slotted, Stainless Steel Screw	4
#6 Flat Washer	4
6-32 Hex Nut	4
25mm Cable Grommet	1
5 meter, Straight Through, RJ-45 cable	1

Table 5.1 Mounting hardware included with VIA-R

There are no limits on the distance between the VIA base and the VIA-R remote display. The unit comes with a 5-meter cable, but this can be replaced with any length. The cable cannot be cross wired (must be a straight through cable) with 8 conductors and a modular RJ-45 plug at both ends.

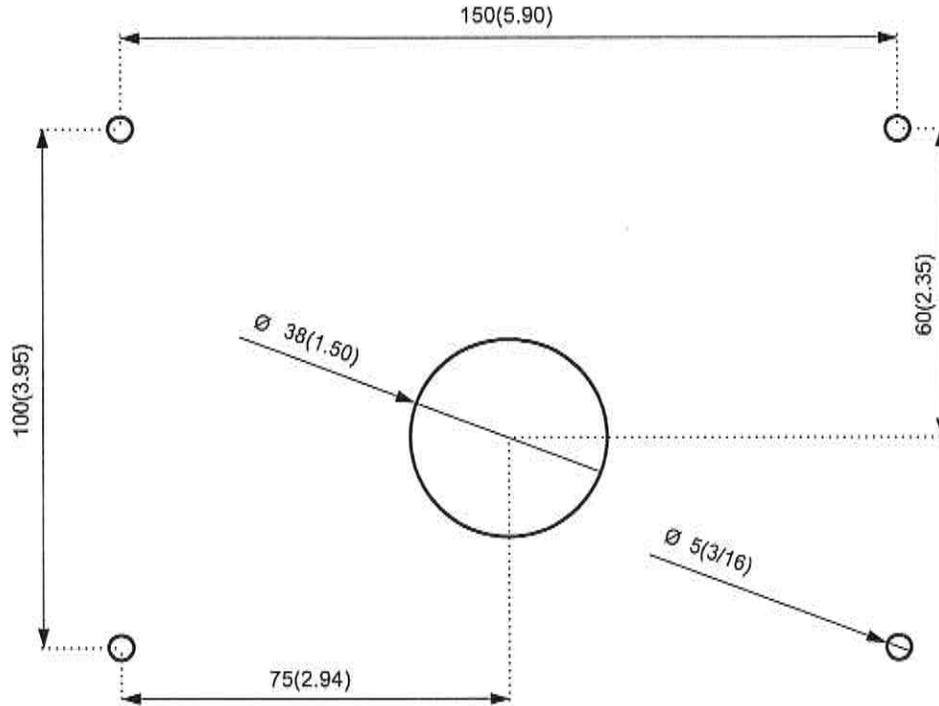


Figure 5.1: VIA-R cut-out dimensions for flush mounting - mm (inches)

The VIA can be used on higher system voltages with the use of potential transformers. Appropriately sized (see section 6 for power requirements) PT's with output voltages that fall within the VIA operating range must be used. Connections are shown in Figure 5.2. The VIA voltage range is between 120 and 600 Volts AC +/- 10%.

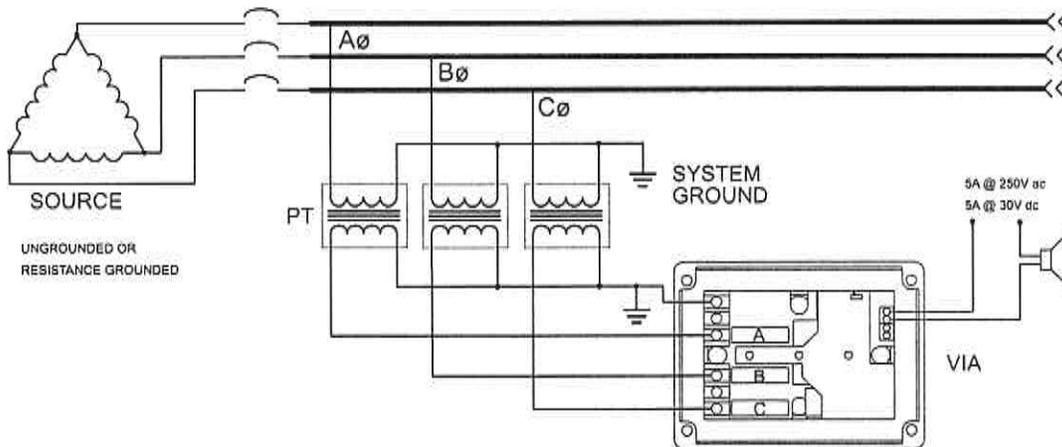


Figure 5.2: VIA connected to system through potential transformers (PT's)

6. SERVICE

For assistance in installation, set-up or testing please contact I-GARD (www.i-gard.com).

 DANGER
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Before placing an intentional ground fault on the power system, check that a fault does not already exist. Any test ground fault equipment must be rated for full system voltage and interrupting capacity, and be fused for protection.

The VIA contains three fuses that protect each phase input. The fuses are 3 Amp fast-acting type (part number BBS-3 by Bussmann). Approved equivalent fuses can also be used. There are no other recommended, user-serviceable parts in the VIA.

To replace a fuse, isolate the VIA and remove the top cover by unscrewing the 4 corner screws. Remove the burned fuse out of the fuse holder and replace it with a new one. Reattach the cover and tighten the screws.

All service other than direct replacement of entire modules to I-GARD should be referred to qualified factory representatives. Please visit the I-GARD website for information regarding field service representatives in your area.

Note: Please ensure that proper authorisation is obtained from I-GARD before returning any material.

7. TECHNICAL SPECIFICATIONS

Control Power and Burden:

120-690 VAC, +/- 10%, 50/60 Hz (CSA approved up to 600V AC)

4 VA @ 120V ac

12 VA @ 208V ac

15 VA @ 240V ac

45 VA @ 415V ac

60 VA @ 480V ac

100 VA @ 600V ac

125 VA @ 690V ac

Temperature Range (Celsius):

Operating Temperature: -40 to +65

Storage Temperature: -40 to +85

Isolation Voltage for External Display:

AC Voltage (60 seconds): 3000V

Peak Voltage (1 second): 6000V

Ground Fault:

Pickup Settings (as a percentage of displacement from ground):

GREEN 0% - 19%

YELLOW 20% - 49%

RED 50% - 100%

Pickup Tolerance:

+/- 15%

(YELLOW: 17% - 23%)

(RED: 42.5% - 57.5%)

Output Contacts:

Type: Form A (Normally Open)

Rating: 5A @ 250V ac (resistive)

5A @ 30V dc (resistive)

Replacement Fuse: Bussmann BBS-2

Physical:

Weight: 0.40 kg (0.88 lbs)

Dimensions: 6.57" (L) x 4.92" (W) x 3.22" (H) (See Fig. 8.0)

Standards: CSA

I-GARD RESERVES THE RIGHT TO CHANGE SPECIFICATIONS OF ITS PRODUCTS WITHOUT NOTICE

8. DIMENSIONAL DRAWINGS

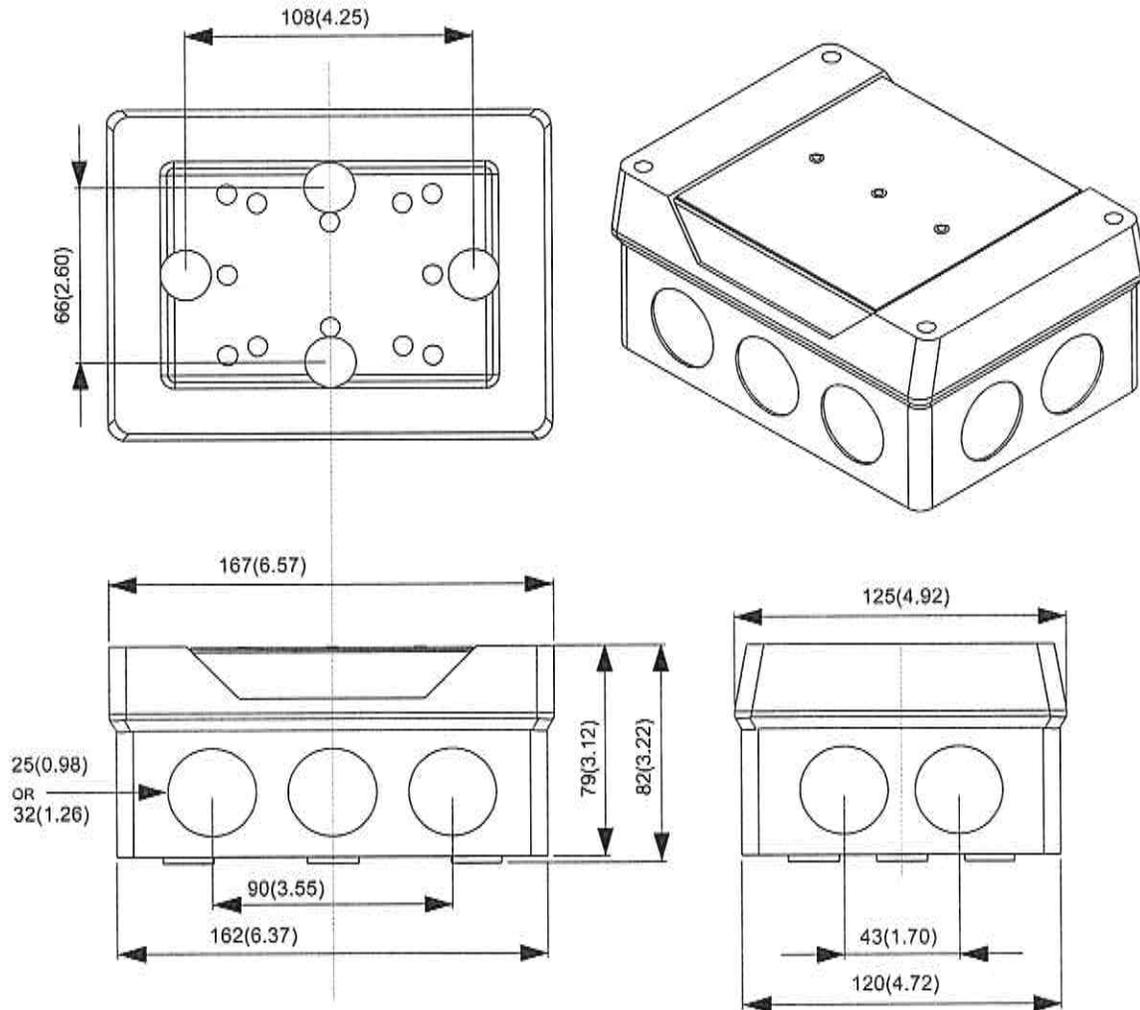


Figure 8.0: VIA / VIA-R Dimensions – mm (Inches)

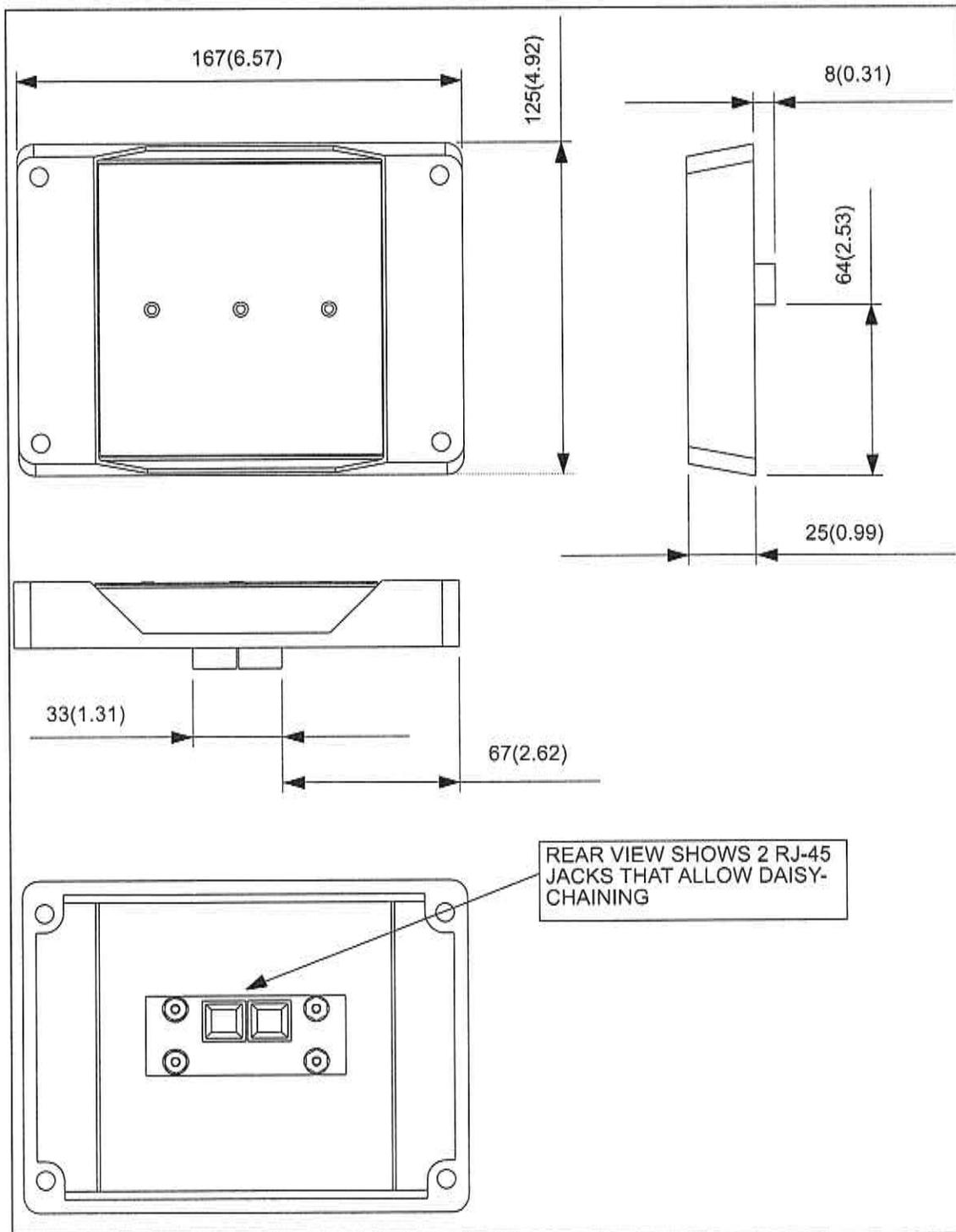


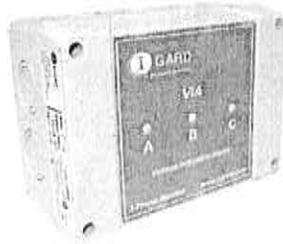
Figure 8.1: VIA-R Display Dimensions - mm (Inches)

9. I-GARD PRODUCTS

These are some of the I-Gard Products. For more information or for a complete list of them, please contact I-Gard



FALCON
Optical Arc
Protection System



VIA
Voltage Alarm Indicator



mGARD
Ground Fault
Relay



STOPLIGHT
High Resistance
Grounding System



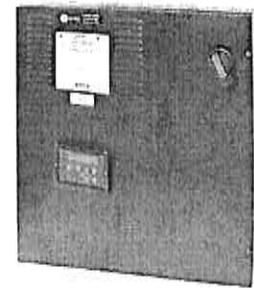
GEMINI
High Resistance
Grounding System



SLEUTH
High Resistance
Grounding System



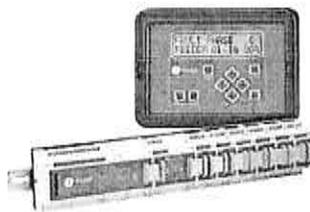
FUSION
High Resistance
Grounding System



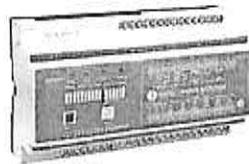
SENTINEL
High Resistance
Grounding System



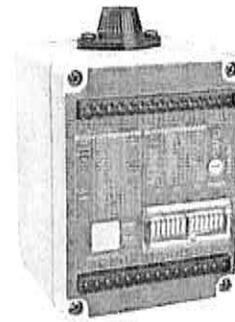
MGFR
Ground Fault
Relay



DSP OHMNI
High Resistance
Grounding System



SIGMA
Ground Fault Relay
Resistor Monitor



GCHK-100
Mining Relay



7615 Kimbel St., Unit 1
Mississauga, Ontario
Canada L5S 1A8

Phone	905-673-1553
Toll Free	1-888-737-4787
Fax	905-673-8472
e-mail:	sales@i-gard.com
	www.i-gard.com