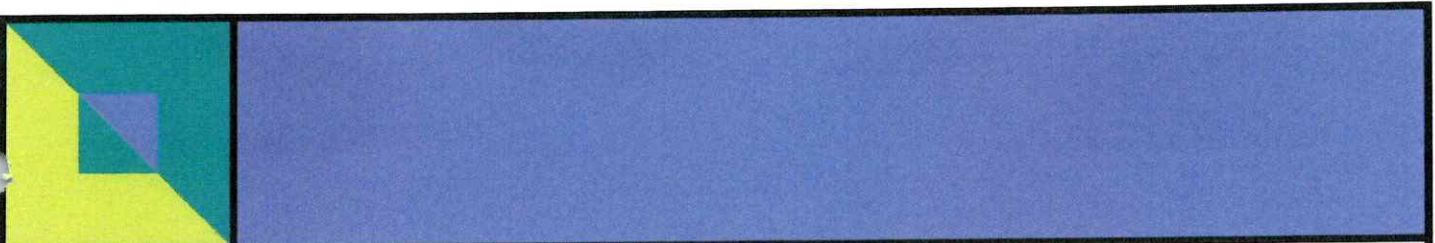


Ashland Review

3/4/26

Agenda

1. Switchgear short circuit requirements
2. Review original design
3. Review two switch gear design
4. Review two switch gear layout
5. No cost change order



Switchgear short circuit requirements



Project 9399-7

January 23, 2026

Mr. Chad Streeter
Vice President Operations
I.C. Reed & Sons
6 Evans Drive
Raymond, NH 03077

VIA Email

Dear Chad:

SUBJECT: Ashland, NH Switchgear Short Circuit Requirements

Per our call earlier this week, we understand that the substation facilities in Ashland, NH include an older indoor 15 kV class switchgear with 40 kA short circuit rating. The switchgear is supplied from two substation power transformers. This short circuit rating is higher than is typically found on 15 kV class distribution systems. I.C. Reed & Sons has asked PLM to calculate the maximum available short circuit current at this location so that an appropriate short circuit rating can be selected for the replacement equipment.

Based on photographs of transformer nameplates (enclosed), we have the following data to support our analysis and short circuit calculations:

- Transformer No. 1
 - 7.5 MVA self-cooled rating and 55C rise
 - 9.375 MVA forced air rating and 55C rise
 - 10.5 MVA forced air rating and 65C rise
 - 6.64% Impedance
- Transformer No. 2
 - 7.5 MVA self-cooled rating and 55C rise
 - 9.375 MVA forced air rating and 55C rise
 - 10.5 MVA forced air rating and 65C rise
 - 6.63% Impedance

As a worst-case, it is prudent to assume the 34.5 kV source connecting to the primary side of the substation transformers has zero impedance (so-called infinite bus). Maximum available short circuit current on the secondary side of a transformer with infinite bus primary can be calculated as follows:

$$I_{sc} = \frac{kVA_{self-cooled}}{\%Z \times V_{L-L} \times \sqrt{3}}$$

... So for T1 we have:

$$T1 I_{sc} = \frac{7500}{0.0664 \times 12.47 \times \sqrt{3}} = 5,230A$$

... And for T2 we have:

$$T2\ I_{sc} = \frac{7500}{0.0663 \times 12.47 \times \sqrt{3}} = 5,237A$$

Per the above, if the transformers are not in parallel (e.g., if the new switchgear has a main tie main design with bus tie open during normal operation) then the maximum available fault current will be less than 5,250A. Even if the two transformers were to operate in parallel (which we understand is not going to be the case), the maximum available short circuit current at 12.47 kV will be less than 10,500A. Standard distribution class equipment like circuit reclosers, padmounted switchgear, etc., with rated short circuit current ratings from 12,500A to 25,000A is sufficient for the replacement of Ashland's existing 40 kA rated indoor switchgear.

We trust this letter and our supporting calculations will meet your expectations. We thank you for utilizing PLM for this assignment and we look forward to working with I.C. Reed & Sons on the Ashland Substation upgrades and other future projects. If you have any questions or comments, please feel free to contact me.

Sincerely,

Matthew Dunnells

Matthew C. Dunnells, P.E.

Enclosures (Ashland Transformer Nameplate Photos)

GENERAL



NO. V 160813 A

CLASS OA/FA

CAUTION! INSTRUCTION BOOK INSIDE BOX
BEFORE INSTALLING OR OPERATING READ INSTRUCT

VOLTS RATING 34400-12470Y/7200

KVA RATING 7500 CONTINUOUS 55 C RISE SELF COOLED
KVA RATING 9375 CONTINUOUS 55 C RISE FORCED AIR
KVA RATING 10500 CONTINUOUS 65 C RISE FORCED AIR

IMPEDANCE VOLTS 3.64 %

34400-12470Y VOLTS AT 7500 KVA

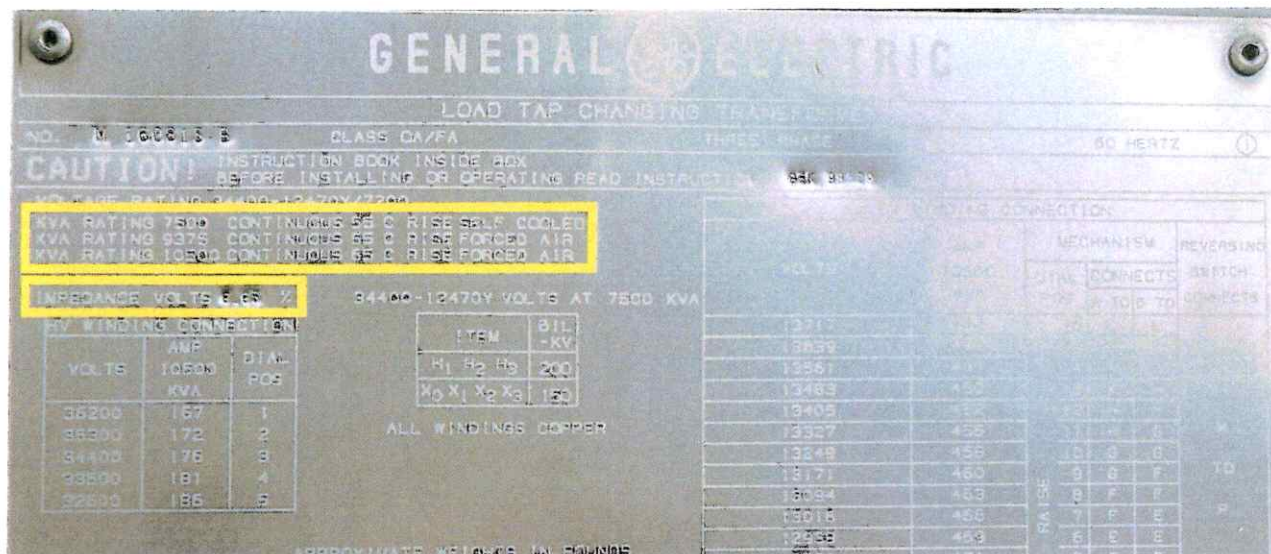
HV WINDING CONNECTION

VOLTS	AMP 10500 KVA	DIAL POS
35200	157	1
35300	172	2
34400	175	3
33500	181	4
32600	186	5

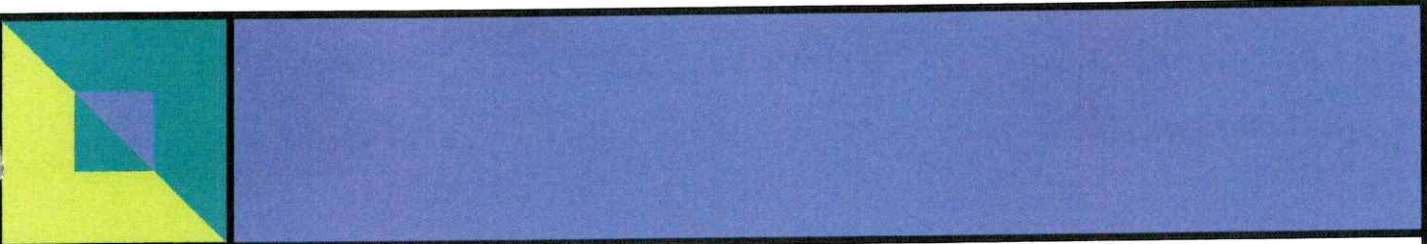
ITEM				BIL -KV
H ₁	H ₂	H ₃		200
X ₀	X ₁	X ₂	X ₃	150

ALL WINDINGS COPPER

Transformer No. 1 Nameplate Picture



Transformer No. 2 Nameplate Picture



Review original design

Phase 1

Engineering & Planning

- Note loading off existing circuits
- Confirm required amperage ratings in switch gear
- Provide stamped one line of new proposed work
- Provide drawings of equipment used during project
- Provide new switching configurations
- Work with the town to ensure all work is within the town's land
- Work with the Electric Department and Electrical inspector

Phase 2

Purchase new switch gear Lead Time = 40 weeks

- MV Metal Clad Switchgear Constructed to IEEE C37.20.2
- 12.47KV nominal – 15KV max, 3PH, 3W, 60Hz, 95KV BIL
- 40KA Short Circuit Current
- 1200A Max Continuous Current
- Silver Plated Copper Bus – Fluidized-Bed Epoxy Insulation
- 120VAC Control power from external source
- Outdoor, Non-Walkin
- 3" High Angle Base
- ANSI 61 Grey
- Rear Access Required

BREAKERS

- 9 1200A, 40 kA @ 15KV, Vacuum Breaker, 3-Cycle Interrupting Time
- 9 1200A, 41 kA, Compt. Kit, Glass Polyester Insulating Tubes
- 9 TOC Switch, 5A/4B Contacts (Ring-Tongue Terminals)
- 9 MOC Switch, 5A/4B Contacts (test & connect) (Ring-Tongue Terminals)
- 3 Key Interlock Provision

PROTECTIVE RELAYS

- 9 SEL-751 Feeder Protection Relay

TRANSFORMERS

- 6 Transformer drawer, 15kV with 2 pole secondary breaker (open delta)
- 8 Potential transformers, 14400/120 (120:1), 110 kV BIL, dual bushing, fused
- 27 Current transformers, 1200:5MR, C200
- 2 Control power transformer, 1Ø, 15 KV, 15 KVA, 120:1

METERS, SWITCHES & PILOT DEVICES

- 9 Breaker control switch, 1 deck, Open/ Close
- 9 Pilot light, LED, 30mm, 12-130VAC/VDC, red
- 9 Pilot light, LED, 30mm, 12-130VAC/VDC, green
- 9 Lockout relay (86) 2 deck
- 6 Test switch, 10 pole, FT-1
- 3 Test switch, 14-pole, FT-14

SPECIAL ITEMS

- 3 Kirk Key interlock single cylinder type "F"
- 1 120/208/240VAC Single Phase Charger
- 1 VRLA Rack
- 1 125VDC STRING CONSISTING OF (20) JARS AND ACCESSORIES
- 1 AC Panelboard
- 1 DC Panelboard

Phase 3

Install five gang operated load break switches, so that risers to existing switch gears can be isolated without disrupting utility power to Ashland customers. ICR will try to utilize circuit five as much as possible to help carry the loads of other circuits as circuit five currently has little to no load on it.

1. Replace pole and provide & install S&C Omni-Rupter between circuit 4 & 5
2. Replace pole and provide & install S&C Omni-Rupter between circuit 5 & 3
3. Replace pole and provide & install S&C Omni-Rupter between circuit 5 & 1
4. Replace pole, remove box cutouts and provide & install S&C Omni-Rupter between circuit 3 & 2 (Cut & Kick)
5. Replace pole and provide & install S&C Omni-Rupter between circuit 1 & 2

Phase 4

Construction

Excavate proposed switch location

Provide and install two six-inch conduits per feeder and two five-inch conduits per circuit swept into each compartment

Provide and install two three-inch conduits swept in and stubbed off for future communications cables

Construct and install concrete pad for switch gear

Install pad mounted switch gear on concrete pad

Provide and install ground ring

Bond to existing ground grid if it can be located during excavation

Develop settings for relays

Install settings in relays

Transformer 1

Isolate transformer 1

Remove cables from transformer 1 to existing gear

Provide and install up to eighty feet of two six-inch conduits from transformer 1 to switch gear

Provide and install up to one hundred feet of 3W, 500AL, 15KV, CN, Cable from transformer 1 to switch gear

Provide and install three terminations in transformer 1

Provide and install three terminations in switch gear feeder 1 bay

Circuits 1 & 2

Replace existing corner pole at the corner of Electric department parking lot

Install two poles across driveway for circuit 1 and 2 risers

Extend overhead primaries to new utility poles across driveway (solid line in diagram below)

Provide and install two five-inch conduits from circuit 1 riser to switch gear

Provide and install two five-inch conduits from circuit 2 riser to switch gear

Provide and install three six hundred amp disconnects on each riser

Provide and install three outdoor 15KV terminations on each riser pole

Provide and install three terminations per circuit in switchgear

Install three lightning arresters on each riser pole

Provide and install up to two hundred and fifty feet of 3W, 4/0AL, 15KV, CN, cable from switchgear to each riser

Cut over

Tie circuit 1 and 2 with new tie switch

Open circuit 1 on existing switch gear

De-energize primaries going towards old substation riser

Energize cables to circuit 1 riser
Phase in primaries across open circuit 1 600amp riser disconnects
Close circuit 1 600amp disconnects
Open circuit 2 on existing switch gear
De-energize primaries going towards old substation riser
Energize cables to circuit 2 riser
Phase in primaries across open circuit 2 600amp riser disconnects
Close circuit 2 600amp disconnects
Open circuit 1 and 2 tie switch

Circuits 3, 4, & 5

Replace existing two pole corner structures with three pole single dead-end structures
Provide and install two five-inch conduits from switch gear to each riser pole
Provide and install three 600amp disconnect switches for each riser pole
Provide and install three terminations on each riser pole
Install three lightning arresters on each riser pole
Provide and install up to one hundred feet of 3W, 4/0AL, 15KV, CN, cable from switchgear to each riser
Provide and install three terminations for each circuit in switch gear
Cut over
Tie circuit 3 and 5 with new tie switch
Open circuit 3 on existing switch gear
De-energize primaries going towards old substation riser at first junction pole out of the substation
Energize cables to circuit 3 riser
Phase in primaries across open circuit 3 600amp riser disconnects
Close circuit 3 600amp disconnects
Open circuit 5 on existing switch gear
De-energize primaries going towards old substation riser at first junction pole out of the substation
Energize cables to circuit 5 riser
Phase in primaries across open circuit 5, 600amp riser disconnects
Close circuit 5, 600amp disconnects
Open Circuit 5, and 3 tie switch
Close Circuit 5, and 4 tie switch
Open circuit 4, on existing switch gear
De-energize primaries going towards old substation riser at first junction pole out of the substation
Energize cables to circuit 4 riser
Phase in primaries across open circuit 4, 600amp riser disconnects
Close circuit 4, 600amp disconnects
Open tie between circuit 5 and 4

Transformer 2

Isolate transformer 2
Remove cables from transformer 2 to existing gear
Provide and install up to eighty feet of two six-inch conduits from transformer 2 to switch gear
Provide and install up to one hundred feet of 3W, 500AL, 15KV, CN, Cable from
Provide and install three terminations in transformer 2
Provide and install three terminations in switch gear feeder 2 bay
Open tie switch in new gear, separating load between the two transformers

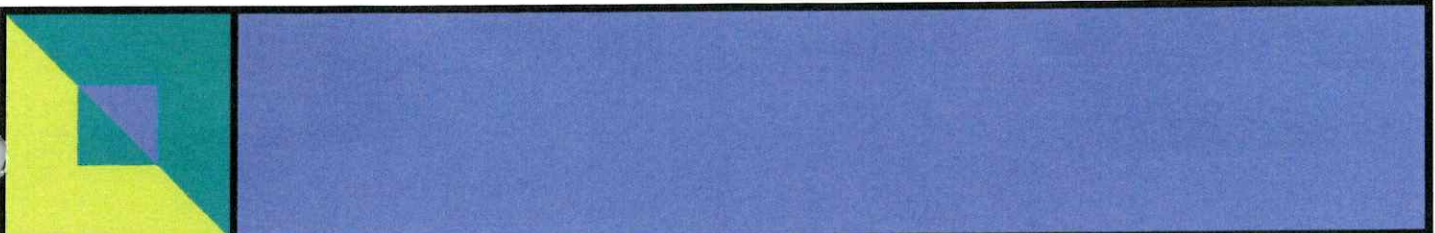
Phase 5

Removals

ICR will remove 12470 overhead conductors going into the substation

Wreck out existing pole structure

Remove cables going into existing substation building



Review two switch gear design



Subject: Ashland Substation – 5-Way Solid Dielectric Padmount Switchgear with SEL 751 Relays

Per your customer request, and information provided over email on 1/29/26, Eaton-ISG is proposing a 5-Way single-sided solid dielectric padmount switchgear with (3) protected Ways and (3) SEL 751 relays. Our proposal includes voltage sensing on (2) Ways, and a 2-button motor operator pendant. We take full exception to any specification as none were provided. We are pleased to quote as follows:

Item #1 – ISG Catalog # PS523066666-10XA-A0X-P0

Package includes:

- (1) of Item #1A – 5-Way Single-Sided Padmount Switchgear
- (1) of Item #1B – SEL 751 5-Way Padmount Automation Control
- (5) of Item #1C – Motor Operator - Right hand
- (6) of Item #1D – 15 kV Elbow Voltage Sensor
- (1) of Item #1E – 2-Way Motor Operator Pendant Control

Item #1A – ISG Catalog # PS523066666-10XA – 5-Way Single-Sided Padmount Switchgear

- Ratings
 - 15.5 kV ratings
 - 12.5 kA symmetrical - Momentary, Make and Latch, Fault Close, and Fault Interrupting
 - 20 kA asymmetrical - Momentary, Make and Latch, Fault Close, and Fault Interrupting
 - 32.5 kA Peak current
 - 125 kV BIL - Note: Reduced to 95 kV BIL when internal 15 kV voltage sensors are installed
- Configuration – 5-Ways
 - (2) Vacuum Fault Interrupter Switch Way(s) with Visible Open Isolation Point device
 - Way(s) 1 & 5
 - (2) Handle(s) that can be padlocked open/closed and hot stick operated
 - (2) Open (Green) and Closed (Red) Semaphore
 - (6) 600-amp bushings
 - (2) 6-pin connectors, one for each VFI Switch Way for Way Status
 - (3) Vacuum Fault Interrupter Protected Way(s) with Visible Open Isolation Point device
 - Way(s) 2-4
 - (3) Handle(s) that can be padlocked open/closed and hot stick operated
 - (3) Open (Green) and Closed (Red) Semaphore
 - (9) 600-amp bushings
 - (9) Internally mounted 600:1 current transformers installed on each bushing
 - (3) 6-pin Trip and Status Connector
 - (3) 4-pin CT Connectors - one per VFI-protected Way
 - (3) CT Shorting Plugs

- Switchgear Construction
 - Switch tank - 304 stainless steel Sealed, Dead-front
 - Single-Side Padmount 304 stainless steel enclosure with Munsell Green Smooth Powder Coat Finish
 - Dimensions – 103" W x 60" D x 76" H
 - (5) Motor Operator bracket provision(s) installed on each Way
 - (10) Visible Open Windows
 - (15) Load-break parking stands
 - Provisions for mounting CT powered relays on the Padmount enclosure doors
 - Provisions for future mounting of external potential transformers on bottom of the switch tank
 - ½" Diameter Grounding Rod
- Proposed switchgear similar to Eaton ISG-SD drawing # PS523066222-101A-A01-P2 with the following modifications:
 - Update:
 - Switched Ways to Ways 1 & 5, protected Ways to Ways 2-4
 - Terminations on all Ways to 600A
 - All internal CTs to 600:1
 - Paint to standard Munsell Green (P0)
 - Remove: Both PTs
 - Add: Motor operators on all Ways

Item #1B – CA-20XXX - SEL 751 5-Way Padmount Automation Control

- Configuration
 - (3) SEL 751 Automation Relay
 - Push Button Config: 8 pushbuttons
 - COM Connectors: Ethernet
 - COM Protocol: DNP3
 - Voltage Inputs: LEA
 - Current Inputs: 1A
 - Conformal Coat: Yes
 - Advanced Features: N/A
 - Test switches for Trip Circuits / CT shorting / Voltage potentials
 - (3) ABB FT-1 test switch, one per VFI protected Way
 - (1) ABB FT-1 test switch for voltage for Ways 1 & 5
 - 120 VAC to 24 VDC Power supply / charging system
 - Including 24VDC backup battery
 - Phoenix Contact 10 Port ethernet switch
 - (8) RJ45 copper ethernet ports
 - (2) SFP fiber ports
 - (3) RJ45 cables from relays to ethernet switch
- Construction
 - Mounted on the left side of the padmount enclosure
 - 304 stainless steel with utility green powder coat finish
 - Padmount style door
 - Heater and Thermostat
 - Rain gutter and vandal guard built into design of low voltage cabinet
 - Connectors will be located on the bottom of the control cabinet
 - Cable enclosure will protect and enclose connectors to the high voltage enclosure

- Connections on control cabinet
 - (2) 6 pin Connectors – Status from Ways 1 & 5
 - (3) 6 pin Connectors – Status and Trip from Ways 2-4
 - (3) 4 pin Connectors – CT Inputs from Ways 2-4
 - (5) 7 pin Connectors - Motor Operators – power and status
 - (2) 3 pin Connector - AC voltage inputs from PTs for control power (future-proofing)
 - (6) Cord grips for external 3 phase elbow voltage sensors
 - (1) Cord grip for communications
 - (1) Cord grip for customer supplied power
 - (5) 2 pin Connectors on front of cabinet for motor operator pendant
- Cables
 - (2) M/F cables for Status
 - (3) M/F cables for Trip and Status
 - (3) M/F cables for CT inputs
 - (5) M/F cables for Motor Operators
- Proposed control cabinet similar to Eaton ISG-SD drawing # CA-20125-SCH with the following modifications:
 - Add:
 - (2) Motor connectors
 - (2) Status connectors
 - (1) PT connector
 - (5) 2-pin connectors for motor operator pendant
 - (1) Cord grip for customer-supplied power
 - Update:
 - Relays per above requirements
 - Ethernet switch to 10-port Phoenix

Item #1C – FA-10034 - Motor Operator - Right hand

- 304 Stainless Steel
- 24vDC Padmount motor operators
- Includes: mounting hardware and linkage

Item #1D - 15 kV Elbow Voltage Sensor

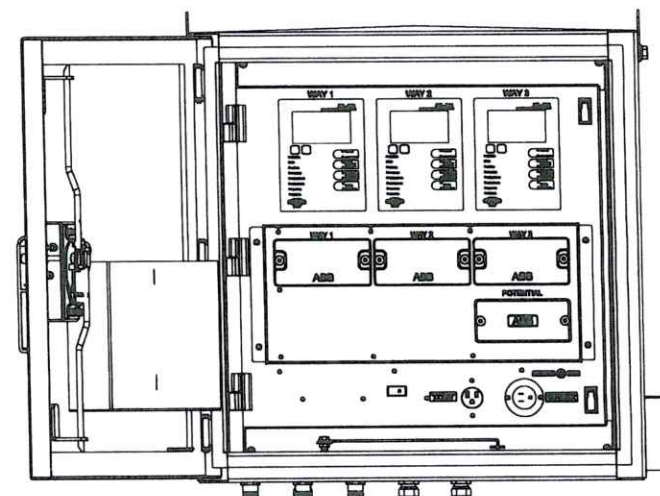
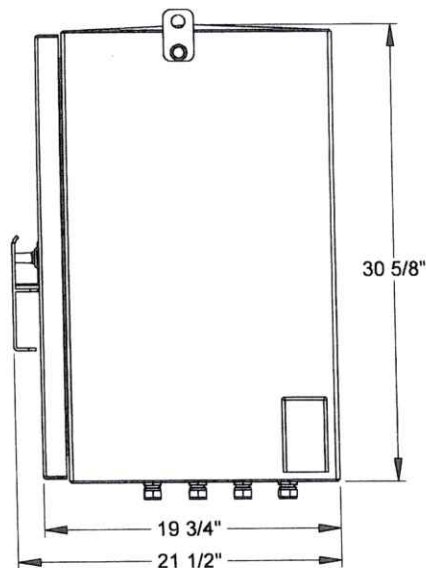
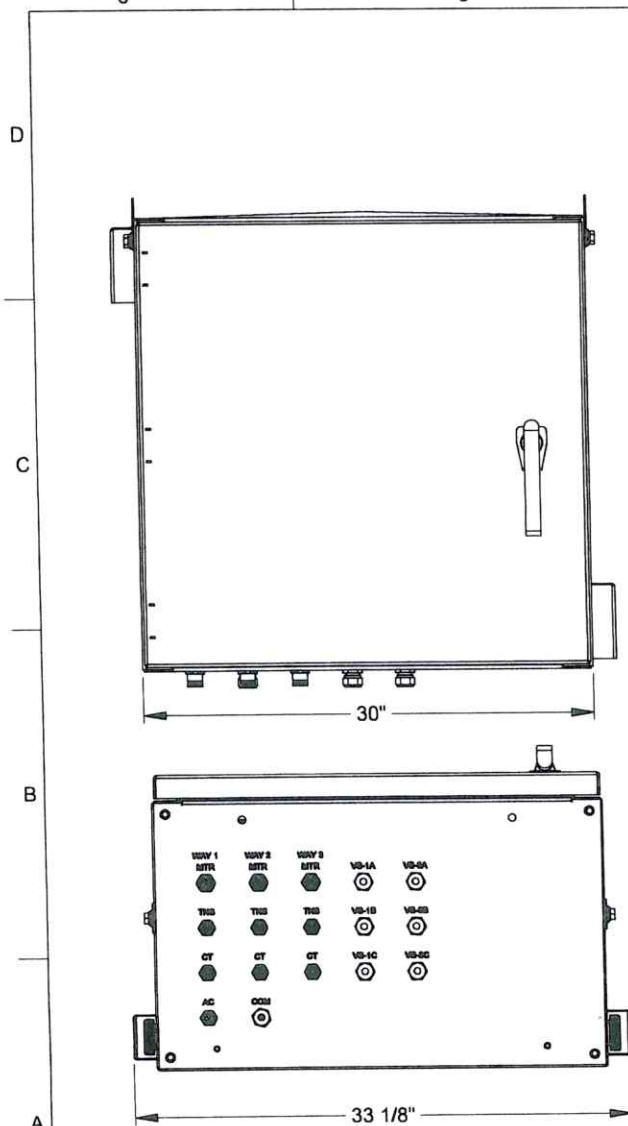
- 9532 – 15 kV Lindsey Elbow Sensor
- 1400:1 Ratio – approximate 5V output
- **Required but not supplied with switchgear:**
 - For Line to Ground PTs, ETPs with 200-amp terminations installed on back of 600-amp T-bodies on A and C phases of both Source Ways supplied by End User. Feed-through required on B phase to permit PT and Elbow voltage sensor installation
 - For Line to Line PTs, ETPs with 200-amp terminations installed on back of 600-amp T-body on B phase of both Source Ways supplied by End User. Feed-through required on A and C phase to permit PT and Elbow voltage sensor installation

Item #1E – FA-10062 - 2-Way Motor Operator Pendant Control

- (1) 25' 3 pin cable to control cabinet

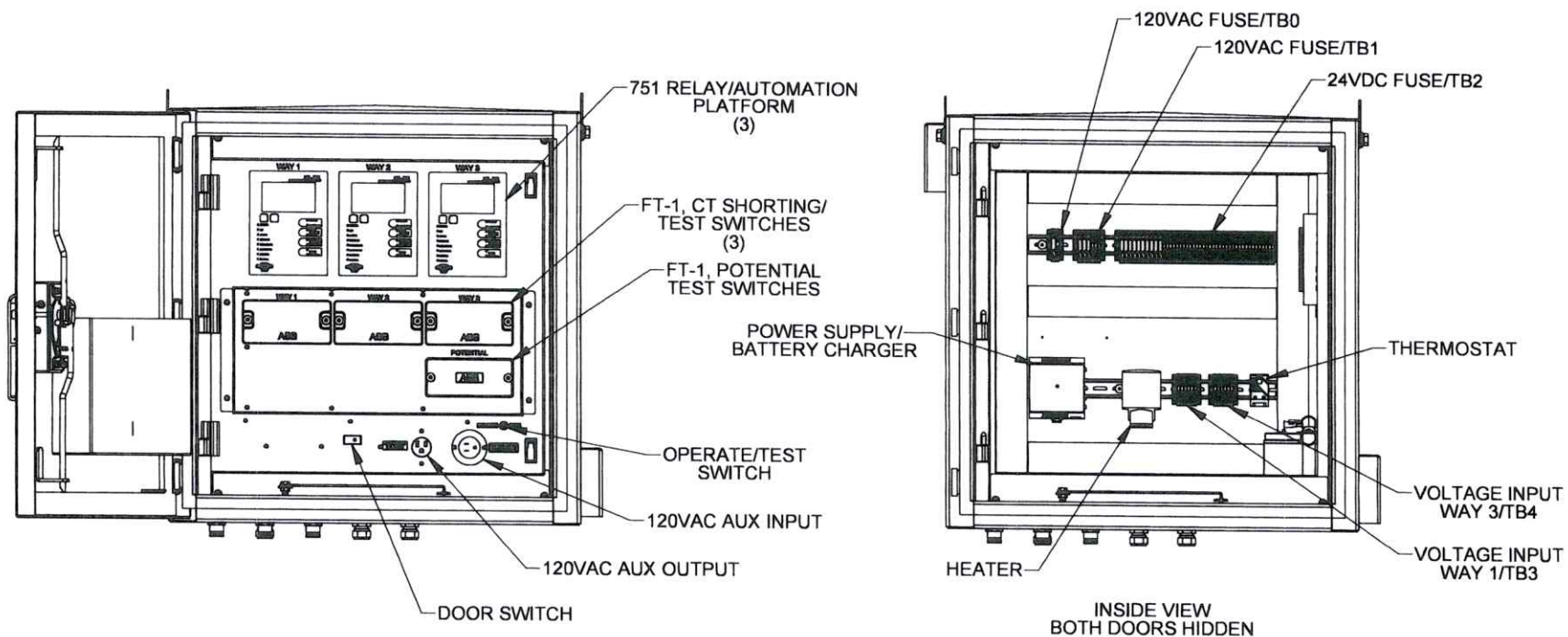
Approval Drawings: If required, submittal drawings for approval will be issued within 6-8 weeks after receipt of acceptable purchase order. Engineering department will assign appropriate catalog number for this switchgear assembly at that time. Note: Drawing approvals are only required on the initial order

REVISIONS			
REV.	DESCRIPTION	INITIALS	DATE
1-02	ADDED 'CUSTOMER SUPPLIED ELBOW VOLTAGE SENSOR' NOTE	KY	11 MAY 2022
1-03	CORRECTED NUMBER OF FUSE HOLDERS & TERMINAL BLOCKS; SHEET 3 BOM UPDATE	KY	03 FEB 2023
1-04	SHEET 7 ETHERNET SWITCH ADDED REPLACING SPARE FUSE	KY	18 APR 2023



FOR REFERENCE ONLY

EATON CONFIDENTIAL	ENG	DATE	CONTROL CABINET, MAIN ASSEMBLY, 4 WAY, (3) 751 LEA RELAY, (4) FT-1	Powering business Worldwide		Sacramento, CA 95834
	K YANG	16 FEB 2022		1 OF 12	PART NUMBER	REV
	DRAWN	DATE				
	K YANG	16 FEB 2022				
	ENG APPR	DATE				



FOR REFERENCE ONLY

EATON
CONFIDENTIAL

EATON
Powering Business Worldwide

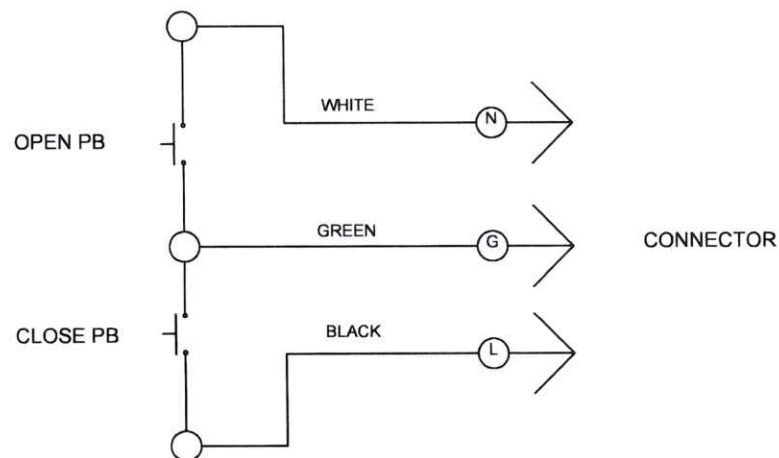
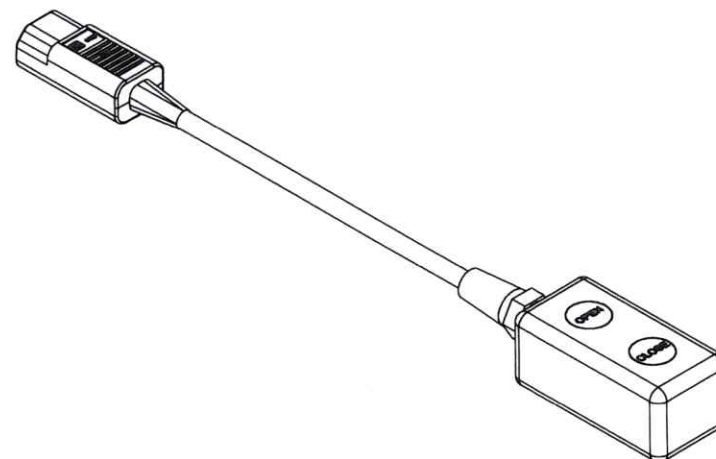
5069 Silver Peaks Ave. Suite #6
Dacono, CO 80514

2 OF 12

PART NUMBER
CA-20125-SCH

REV
1-04

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	PP-10870	PUSHBUTTON STATION, 2 BUTTON, SCHNEIDER ELECTRIC #9001BW91YU	1
2	PP-10871	OPEN LEGEND, PUSHBUTTON, SCHNEIDER ELECTRIC #9001B264	1
3	PP-10872	CLOSE LEGEND, PUSHBUTTON, SCHNEIDER ELECTRIC #9001B263	1
4	PP-10873-25	SJOOW, WIRE SIZE 16AWG, 3 CONDUCTORS	25FT
5	PP-10431	CONNECTOR, 3 PIN MALE , SCHURTER #4735.0000	1



FOR REFERENCE ONLY

PROPRIETARY AND CONFIDENTIAL INFORMATION
 THE INFORMATION CONTAINED WITHIN THIS DRAWING IS PROPRIETARY MEANING IT IS THE SOLE PROPERTY OF INNOVATIVE SWITCHGEAR SOLUTIONS, INC AND IS THE SUBJECT OF TRADE SECRET PROTECTION. DISCLOSURE OF THIS INFORMATION TO ANYONE MUST BE PURSUANT TO TERMS OF A NON-DISCLOSURE AGREEMENT, AND ANY REPRODUCTION OR TRANSMISSION IN PART OR IN WHOLE WITHOUT THE EXPRESS WRITTEN CONSENT OF INNOVATIVE SWITCHGEAR IS STRICTLY PROHIBITED.

ENG	DATE
DRAWN RLS	DATE 10-19-2016
ENG APPR RLS	DATE 10-19-2016

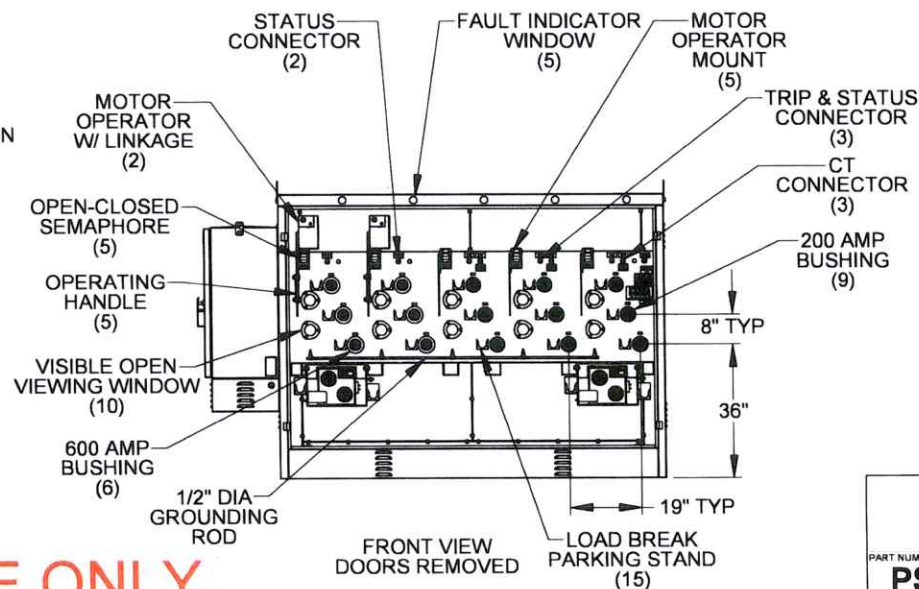
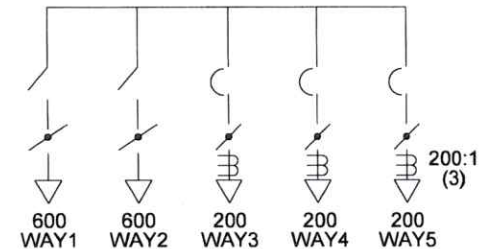
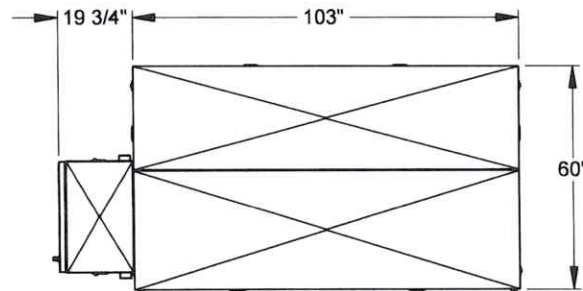
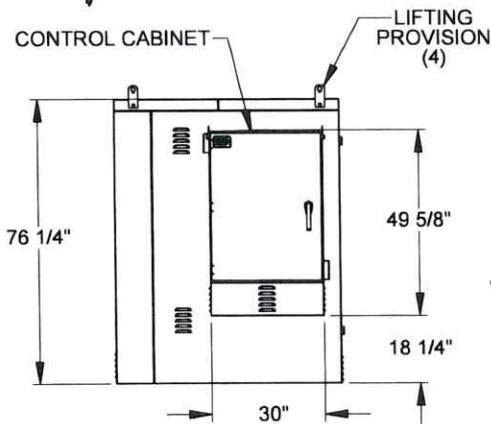
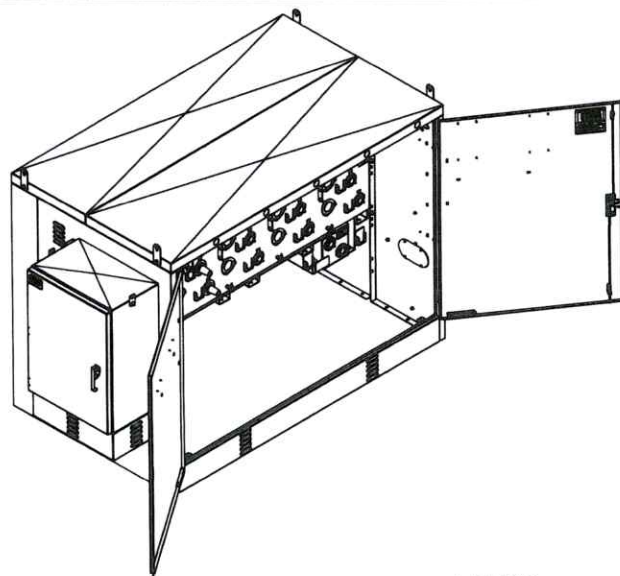


5073 Silver Peaks Ave.
 #101, Dacono CO.
 80514

1 OF 1

PART NUMBER **FA-10062-SCH**

REV 1-01



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MATERIAL
304 STAINLESS STEEL
FINISH
MUNSELL 7GY3.29/1.5 (HAMMERTONE)
WEIGHT
SEE NOTES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE SPECIFIED
TOLERANCES ARE: $\pm 1/16$

ENG B BENDEL
DRAWN B BENDEL
ENG APPR
DATE 05 NOV 2020
DATE 05 NOV 2020
DATE

ALL DIMENSIONS PER
ASME Y14.5 1994

B

**INNOVATIVE
SWITCHGEAR**

5069 Silver Peaks Ave. Suite #6
Dacono, CO 80514

PART NUMBER

PS523066222-101A-A01-P2

DESCRIPTION

PADMOUNT, 15.5KV, 12.5KA, 5WAY, 2WAY
SWITCH, 3WAY VFI PROTECTED WITH VISIBLE
OPEN ISOLATION POINT

DRAWING NUMBER

PS523066222-101A-A01-P2-OL

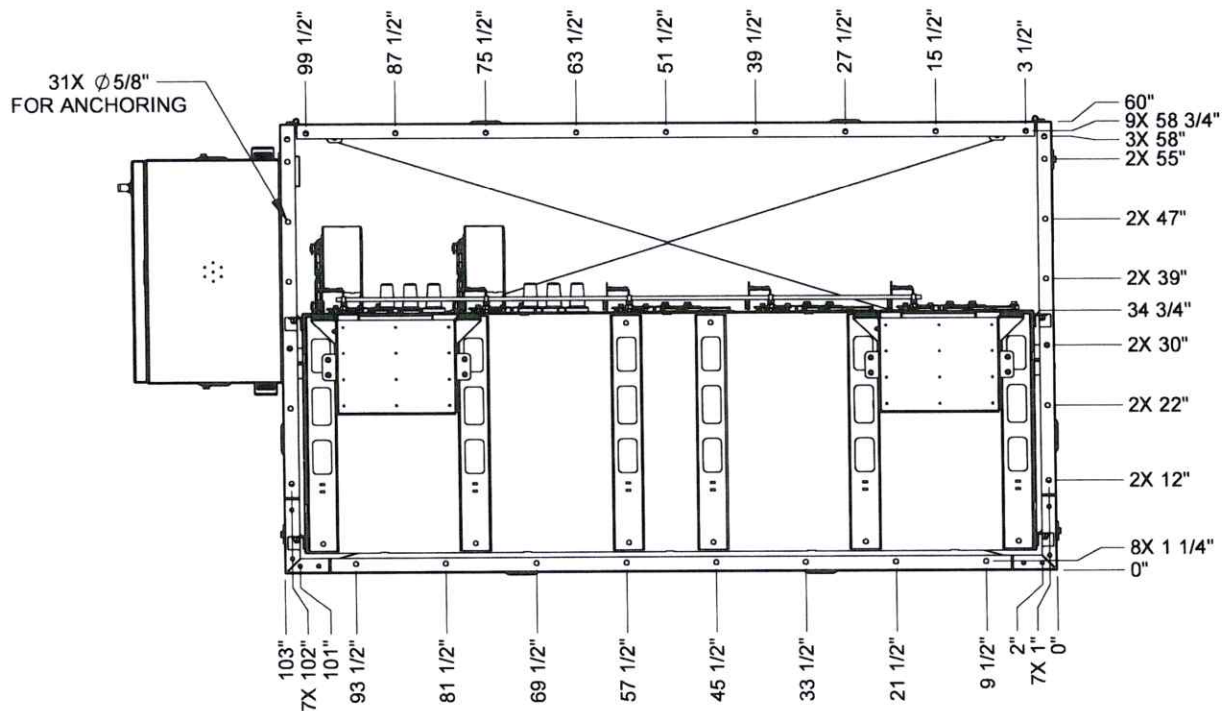
REV

1-01

DO NOT SCALE DRAWING

CAD FILE
PS523066222-101A-A01-P2-OL

1 OF 4



BOTTOM VIEW
CABLE CLEARANCE / MOUNTING PATTERN

FOR REFERENCE ONLY

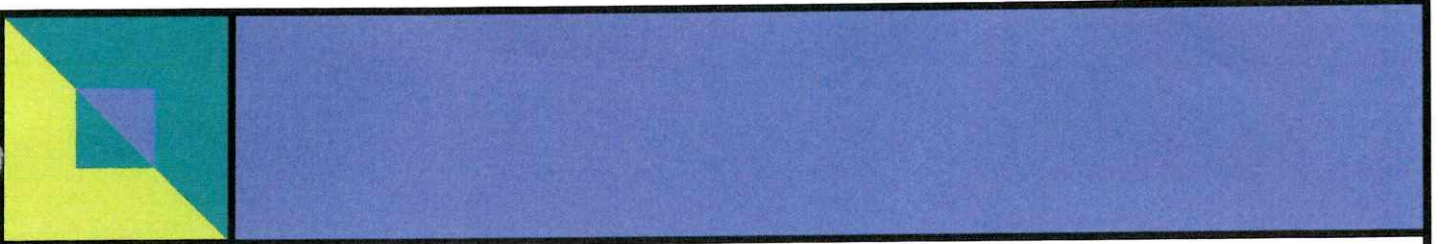
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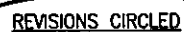


5069 Silver Peaks Ave. Suite #6
Dacono, CO 80514

	DRAWING NUMBER	REV
4 OF 4	PS523066222-101A-A01-P2-OL	1-01

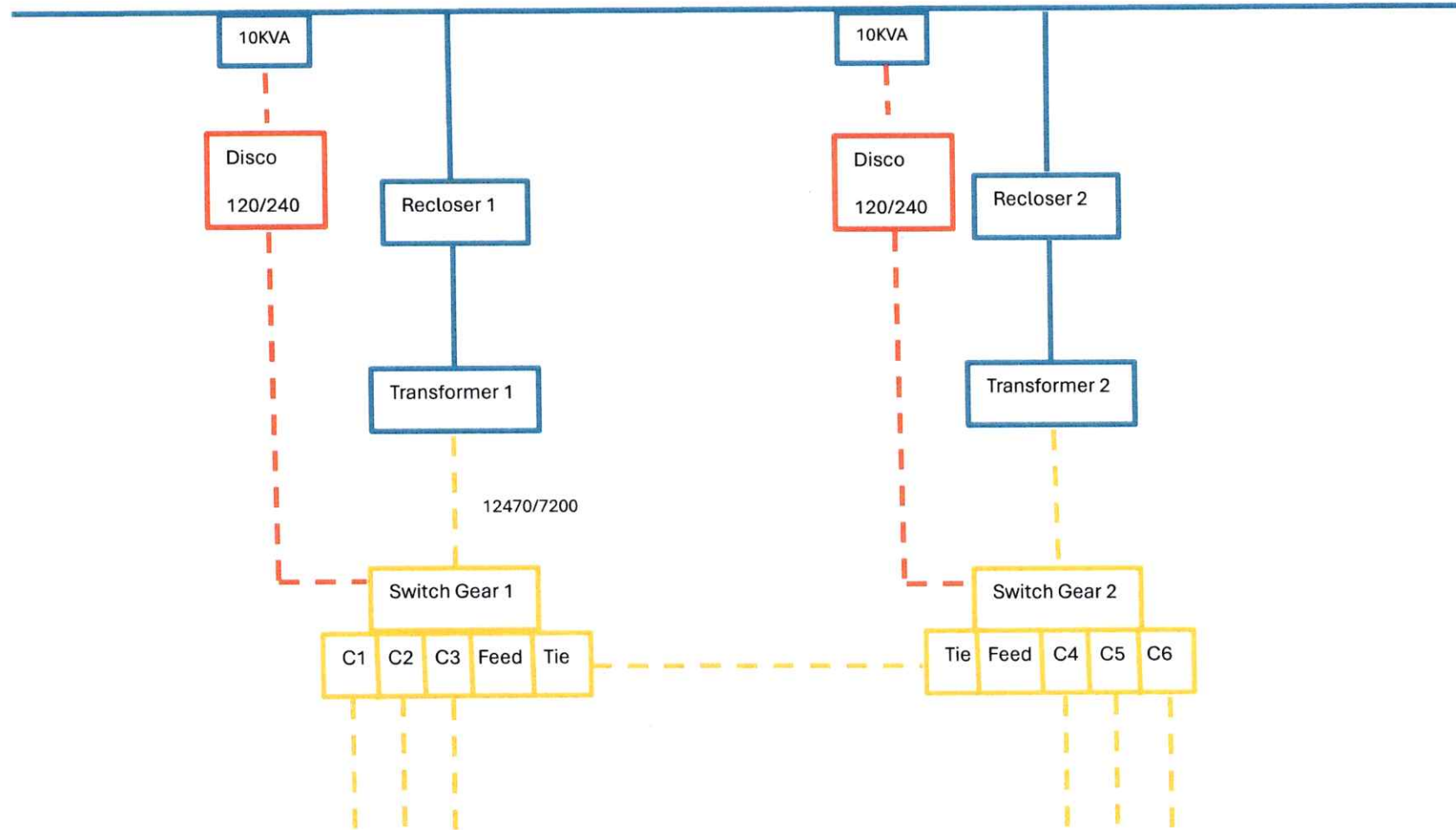


Review two switch gear layout



DATE	BY	CHK.	REVISIONS		TOWN OF ASHLAND - ELECTRIC DEPARTMENT ASHLAND SUBSTATION PROPOSED ONE LINE DIAGRAM
				SHEET PLM CHK. MOD DESG. 3/3/28 DATE NAME	942101-POL1-0

35kv feed from Eversource





**No cost
change order**

Proposal

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PROPOSAL SUBMITTED TO	PHONE	DATE
Ashland Electric Department	(603) 968-3083	03/04/2026
STREET	JOB NAME	
6 Collins St	Substation Switchgear Replacement Change Order	
CITY, STATE AND ZIP CODE	JOB LOCATION	
Ashland, NH 03217	6 Collins St Ashland, NH 03217	
ATTENTION	Email	
Ronald Beard	Townadmin@ashland.nh.gov	

We hereby submit a no cost change order to:

Provide two ISG switch gears in lieu of original switch gear design

ISG Switch Gears

Ashland Substation – 5-Way Solid Dielectric Padmount Switchgear with SEL 751 Relays
Eaton-ISG is proposing a 5-Way single-sided solid dielectric padmount switchgear with (3) protected Ways and (3) SEL 751 relays. Our proposal includes voltage sensing on (2) Ways, and a 2-button motor operator pendant. We take full exception to any specification as none were provided. We are pleased to quote as follows:

Item #1 – ISG Catalog # PS523066666-10XA-A0X-P0

Package includes:

- (1) of Item #1A – 5-Way Single-Sided Padmount Switchgear
- (1) of Item #1B – SEL 751 5-Way Padmount Automation Control
- (5) of Item #1C – Motor Operator - Right hand
- (6) of Item #1D – 15 kV Elbow Voltage Sensor
- (1) of Item #1E – 2-Way Motor Operator Pendant Control

Item #1A – ISG Catalog # PS523066666-10XA – 5-Way Single-Sided Padmount Switchgear

• Ratings

- ~ 15.5 kV ratings
 - 12.5 kA symmetrical - Momentary, Make and Latch, Fault Close, and Fault Interrupting
 - 20 kA asymmetrical - Momentary, Make and Latch, Fault Close, and Fault Interrupting
 - 32.5 kA Peak current
 - 125 kV BIL - Note: Reduced to 95 kV BIL when internal 15 kV voltage sensors are installed

• Configuration – 5-Ways

- ~ (2) Vacuum Fault Interrupter Switch Way(s) with Visible Open Isolation Point device
 - Way(s) 1 & 5
 - (2) Handle(s) that can be padlocked open/closed and hot stick operated
 - (2) Open (Green) and Closed (Red) Semaphore
 - (6) 600-amp bushings
 - (2) 6-pin connectors, one for each VFI Switch Way for Way Status
- ~ (3) Vacuum Fault Interrupter Protected Way(s) with Visible Open Isolation Point device
 - Way(s) 2-4
 - (3) Handle(s) that can be padlocked open/closed and hot stick operated
 - (3) Open (Green) and Closed (Red) Semaphore
 - (9) 600-amp bushings
 - (9) Internally mounted 600:1 current transformers installed on each bushing
 - (3) 6-pin Trip and Status Connector
 - (3) 4-pin CT Connectors - one per VFI-protected Way
 - (3) CT Shorting Plugs

• Switchgear Construction

- ~ Switch tank - 304 stainless steel Sealed, Dead-front
- ~ Single-Side Padmount 304 stainless steel enclosure with Munsell Green Smooth Powder Coat Finish
 - Dimensions – 103" W x 60" D x 76" H

- ~ (5) Motor Operator bracket provision(s) installed on each Way
- ~ (10) Visible Open Windows
- ~ (15) Load-break parking stands
- ~ Provisions for mounting CT powered relays on the Padmount enclosure doors
- ~ Provisions for future mounting of external potential transformers on bottom of the switch tank
- ~ ½" Diameter Grounding Rod
- Proposed switchgear similar to Eaton ISG-SD drawing # PS523066222-101A-A01-P2 with the following modifications:
 - ~ Update:
 - Switched Ways to Ways 1 & 5, protected Ways to Ways 2-4
 - Terminations on all Ways to 600A
 - All internal CTs to 600:1
 - Paint to standard Munsell Green (P0)
 - ~ Remove: Both PTs
 - ~ Add: Motor operators on all Ways

Item #1B – CA-20XXX - SEL 751 5-Way Padmount Automation Control

- Configuration
 - ~ (3) SEL 751 Automation Relay
 - Push Button Config: 8 pushbuttons
 - COM Connectors: Ethernet
 - COM Protocol: DNP3
 - Voltage Inputs: LEA
 - Current Inputs: 1A
 - Conformal Coat: Yes
 - Advanced Features: N/A
 - ~ Test switches for Trip Circuits / CT shorting / Voltage potentials
 - (3) ABB FT-1 test switch, one per VFI protected Way
 - (1) ABB FT-1 test switch for voltage for Ways 1 & 5
 - ~ 120 VAC to 24 VDC Power supply / charging system
 - Including 24VDC backup battery
 - ~ Phoenix Contact 10 Port ethernet switch
 - (8) RJ45 copper ethernet ports
 - (2) SFP fiber ports
 - ~ (3) RJ45 cables from relays to ethernet switch
- Construction
 - ~ Mounted on the left side of the padmount enclosure
 - ~ 304 stainless steel with utility green powder coat finish
 - ~ Padmount style door
 - ~ Heater and Thermostat
 - ~ Rain gutter and vandal guard built into design of low voltage cabinet
 - ~ Connectors will be located on the bottom of the control cabinet
 - ~ Cable enclosure will protect and enclose connectors to the high voltage enclosure
- Connections on control cabinet
 - ~ (2) 6 pin Connectors – Status from Ways 1 & 5
 - ~ (3) 6 pin Connectors – Status and Trip from Ways 2-4
 - ~ (3) 4 pin Connectors – CT Inputs from Ways 2-4
 - ~ (5) 7 pin Connectors - Motor Operators – power and status
 - ~ (2) 3 pin Connector - AC voltage inputs from PTs for control power (future-proofing)
 - ~ (6) Cord grips for external 3 phase elbow voltage sensors
 - ~ (1) Cord grip for communications
 - ~ (1) Cord grip for customer supplied power
 - ~ (5) 2 pin Connectors on front of cabinet for motor operator pendant
- Cables
 - ~ (2) M/F cables for Status
 - ~ (3) M/F cables for Trip and Status
 - ~ (3) M/F cables for CT inputs
 - ~ (5) M/F cables for Motor Operators
- Proposed control cabinet similar to Eaton ISG-SD drawing # CA-20125-SCH with the following modifications:
 - ~ Add:
 - (2) Motor connectors
 - (2) Status connectors
 - (1) PT connector
 - (5) 2-pin connectors for motor operator pendant
 - (1) Cord grip for customer-supplied power
 - ~ Update:
 - Relays per above requirements
 - Ethernet switch to 10-port Phoenix

Item #1C – FA-10034 - Motor Operator - Right hand

- 304 Stainless Steel
- 24vDC Padmount motor operators
- Includes: mounting hardware and linkage

Item #1D - 15 kV Elbow Voltage Sensor

- 9532 – 15 kV Lindsey Elbow Sensor
- 1400:1 Ratio – approximate 5V output
- Required but not supplied with switchgear:
 - ~ For Line to Ground PTs, ETPs with 200-amp terminations installed on back of 600-amp T-bodies on A and C phases of both Source Ways supplied by End User. Feed-through required on B phase to permit PT and Elbow voltage sensor installation
 - ~ For Line to Line PTs, ETPs with 200-amp terminations installed on back of 600-amp T-body on B phase of both Source Ways supplied by End User. Feed-through required on A and C phase to permit PT and Elbow voltage sensor installation

Item #1E – FA-10062 - 2-Way Motor Operator Pendant Control

- (1) 25' 3 pin cable to control cabinet

Original

To Circuit 5		Line PT			Line PT		To Circuit 2	125VDC Battery System
Fdr 1200AF	Bus PT	15kVACPT		Bus Trans	15kVACPT	Bus PT	Fdr 1200AF	
To Circuit 4	To Circuit 3	From T2			From T1	Spare	To Circuit 1	
Fdr 1200AF	Fdr 1200AF	Main 1200AF	Tie 1200AF		Main 1200AF	Fdr 1200AF	Fdr 1200AF	

- MV Metal Clad Switchgear Constructed to IEEE C37.20.2
 - 12.47KV nominal – 15KV max, 3PH, 3W, 60Hz, 95KV BIL
 - 40KA Short Circuit Current
 - 1200A Max Continuous Current
 - Silver Plated Copper Bus – Fluidized-Bed Epoxy Insulation
 - 120VAC Control power from external source
 - Outdoor, Non-Walkin
 - 3" High Angle Base
 - ANSI 61 Grey
 - Rear Access Required
- BREAKERS**
- 9 1200A, 40 kA @ 15KV, Vacuum Breaker, 3-Cycle Interrupting Time
 - 9 1200A, 41 kA, Compt. Kit, Glass Polyester Insulating Tubes
 - 9 TOC Switch, 5A/4B Contacts (Ring-Tongue Terminals)
 - 9 MOC Switch, 5A/4B Contacts (test & connect) (Ring-Tongue Terminals)
 - 3 Key Interlock Provision

PROTECTIVE RELAYS

- 9 SEL-751 Feeder Protection Relay

TRANSFORMERS

- 6 Transformer drawer, 15kV with 2 pole secondary breaker (open delta)
- 8 Potential transformers, 14400/120 (120:1), 110 kV BIL, dual bushing, fused
- 27 Current transformers, 1200:5MR, C200
- 2 Control power transformer, 1Ø, 15 KV, 15 KVA, 120:1

METERS, SWITCHES & PILOT DEVICES

- 9 Breaker control switch, 1 deck, Open/ Close
- 9 Pilot light, LED, 30mm, 12-130VAC/VDC, red
- 9 Pilot light, LED, 30mm, 12-130VAC/VDC, green
- 9 Lockout relay (86) 2 deck
- 6 Test switch, 10 pole, FT-1
- 3 Test switch, 14-pole, FT-14

SPECIAL ITEMS

- 3 Kirk Key interlock single cylinder type "F"
- 1 120/208/240VAC Single Phase Charger
- 1 VRLA Rack
- 1 125VDC STRING CONSISTING OF (20) JARS AND ACCESSORIES
- 1 AC Panelboard
- 1 DC Panelboard