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<ul> <li>FAULT INDICATORS (FMO)</li> <li>CABLE MAKEUP IN PMH (LIVE FRONT) (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM-4S) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM-4S) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM 4Z AND SML 4Z) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SML-20) FUSE FOR LIVE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SML-20) FUSE FOR LIVE FRONT</li> <li>PAD-MOUNTED SWITCHGEAR (PMH) (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SML-20) FUSE FOR LIVE FRONT</li> </ul>	28.05- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08-
<ul> <li>FAULT INDICATORS (FMO)</li> <li>CABLE MAKEUP IN PMH (LIVE FRONT) (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM-4S) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM-4S) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM 4Z AND SML 4Z) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SM 4Z AND SML 4Z) FUSE HOLDERS (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SML-20) FUSE FOR LIVE FRONT</li> <li>PAD-MOUNTED SWITCHGEAR (PMH) (FMO)</li> <li>FUSING INSTRUCTIONS FOR S &amp; C (SML-20) FUSE FOR LIVE FRONT</li> <li>PAD-MOUNTED SWITCHGEAR (PMH) (FMO)</li> <li>ESCO - ATS SWITCHGEAR (FMO)</li> </ul>	28.05- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.08- 28.09-

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2	12/7/12	KATIGBAK	GUINN	ADCOCK
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0	10/29/10	CECCONI	GUINN	ELKINS
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SECTION 28 - SWITCHGEAR TABLE OF CONTENTS



#### UNDERGROUND DISTRIBUTION PAD-MOUNTED SWITCHGEAR STANDARDS

#### LIVE-FRONT PAD-MOUNTED (NO LONGER STANDARD)

PROGRESS ENERGY FLORIDA HAS LIVE-FRONT PAD-MOUNTED SWITCHGEAR INSTALLED ON THE SYSTEM. THE MAJORITY OF THIS SWITCHGEAR IS THE S&C PMH DESIGN. A SMALL NUMBER OF THIS TYPE SWITCHGEAR MAY HAVE BEEN PURCHASED FROM EEI (NOW FEDERAL PACIFIC), MALTON (NOW ABB) AND OTHERS. THIS TYPE SWITCHGEAR IS LIVE FRONT, AIR INSULATED WITH 400 AMP LOADBREAK 25KV UNITS, 600 AMP LOADBREAK 15KV UNITS, 600 AMPS CONTINUOUS WITH 200 AMP, THREE-PHASE TAPS ON THE OTHER SIDE. ORIGINAL UNITS UTILIZED A NON-LOADBREAK, SM-4 UTILIZED A NON-LOADBREAK, SM-4 TYPE FUSE AND HOLDER. THE FUSE DESIGN WAS LATER UPGRADED TO A LOADBREAK FUSE HOLDER DESIGN, THE SM-4Z. THE LATEST MODELS UTILIZED A SML-20 FUSE HOLDER DESIGN THAT REQUIRED A SMU-20 FUSE.

SOME OF THESE UNITS MAY BE EQUIPPED WITH AUTO TRANSFER OPERATORS AND/OR DISTRIBUTION AUTOMATION OPERATORS.

#### REPLACEMENTS AND MAINTENANCE

PMH UNITS THAT FAIL OR NEED REPLACEMENT ARE BEING REPLACED WITH THE PME DESIGN OR WITH TRAYER SWITCHGEAR. REPLACEMENT SELECTION IS BASED ON OUTAGE TIME ALLOWED AND FIRST COST. THE TRAYER UNIT HAS A HIGHER INITIAL COST BUT CAN BE INSTALLED IN LESS TIME THAN A PME.

#### DEAD-FRONT SWITCHGEAR

#### PME DESIGN

IN THE LATE 1990'S, PAD-MOUNTED SWITCHGEAR DESIGNS WERE SWITCHED TO THE DEAD-FRONT PME DESIGNS. THIS DESIGN IS BASICALLY THE SAME AS THE PMH EXCEPT THE 600 AMP SIDE AND THE 200 AMP TAP SIDE IS TOTALLY ENCLOSED WITH NO EXPOSED LIVE PARTS. VIEWING WINDOWS ARE PROVIDED ON THE 600 AMP SIDE TO OBSERVE THE POSITION OF THE SWITCH. ALTHOUGH THE SWITCHGEAR IS TOTALLY ENCLOSED, IT IS VENTED TO THE ATMOSPHERE. THE RATING IS 600 AMP LOADBREAK (15 AND 25KV), 600 AMP CONTINUOUS ON THE FEEDER SIDE AND 200 AMPS ON THE TAP SIDE. THE SAME SMU FUSE USED IN THE LATE MODEL PMH IS USED IN THE PME. HOWEVER, DUE TO THE DEAD-FRONT DESIGN, A DIFFERENT FUSE HOLDER IS REQUIRED. VIEWING WINDOWS ARE PROVIDED ON THE 200 AMP TAP SIDE TO CHECK FUSES FOR A "FUSE BLOWN" INDICATOR.

THE PME DESIGN USES 600 AMP DEAD-BREAK ELBOWS ON THE FEEDER SIDE AND 200 AMP LOADBREAK ELBOWS ON THE TAP SIDE. FOR THIS REASON, THE PME IS NOT A DIRECT REPLACEMENT FOR THE PMH. THE PME PAD SIZE IS DIFFERENT, AND ALL THE CABLES HAVE TO BE SPLICED TO REACH THE HIGHER MOUNTED BUSHINGS.

LIKE THE PMH, SOME UNITS MAY BE EQUIPPED WITH MOTOR OPERATED AUTOMATIC TRANSFER PACKAGES.

THE PME STANDARD SPECIFIED FOR USE IS AN ALL "STAINLESS STEEL" DESIGN. THIS INCLUDES THE CABINET AND ALL INTERNAL PARTS WITH THE EXCEPTION OF THE FRAME, IT IS MILD STEEL. SOME PME UNITS PURCHASED PRIOR TO THE SWITCH TO THE STAINLESS STEEL WILL BE THE STANDARD MILD STEEL DESIGN.

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DISTRIBUTION PAD-MOUNTED SWITCHES



#### DEAD-FRONT SWITCHGEAR (CONT'D)

#### VISTA DESIGN

THE VISTA DESIGN IS A TOTAL DEAD-FRONT, SEALED STAINLESS STEEL TANK DESIGN THAT IS SUBMERSIBLE. THE INSULATION MEDIUM IS SF6 GAS. THESE UNITS MAY BE INSTALLED IN A VAULT BELOW GRADE, OR PLACED ON A PAD WITHIN A CABINET MADE OF STAINLESS STEEL.

THE STANDARD 15 KV VISTA UNITS HAVE MANUALLY OPERATED 600 AMP SWITCHES THAT ARE LOADBREAK (IN SF6 GAS). THE SWITCH OPERATORS HAVE A CLOSED, OPEN AND GROUND POSITION. A VIEWING WINDOW IS PROVIDED TO OBSERVE THE SWITCHES IN EACH POSITION. THE 200 AMP TAP SIDE IS EQUIPPED WITH INTERRUPTERS THAT ARE ELECTRONICALLY CONTROLLED. THE 200 AMP INTERRUPTERS ARE PRE-SET TO THE DESIRED EQUIVALENT FUSE CURVE USING A LAPTOP COMPUTER WITH SOFTWARE PROVIDED BY THE MANUFACTURER.

THE EXCEPTION TO THE STANDARD VISTA UNITS IS THE UNITS INSTALLED ON INTERNATIONAL DRIVE. THESE UNITS USE VACUUM BOTTLES ON THE 600 AMP SWITCH SIDE. THESE SWITCHGEAR ARE INSTALLED IN A HIGH SPEED, CLOSED LOOP CONFIGURATION. SPECIAL RELAYS ARE USED TO SENSE FAULTS BETWEEN THE SWITCHGEAR AND ISOLATE THE FAULT WITHOUT INTERRUPTING SERVICE TO ANY OF THE CUSTOMERS.

AN OPTION THAT MIGHT BE FOUND ON SOME OF THE VISTA UNITS IS THE SOLAR VOLTAIC POWERED VOLTAGE INDICATORS. THESE DISPLAYS HAVE FLASHING LIGHTNING BOLTS WHEN THE CIRCUIT IS ENERGIZED. THE DISPLAY ALSO CONTAINS PORTS THAT CAN BE USED TO CHECK PHASING.

#### TRAYER DESIGN

THE TRAYER SWITCHGEAR IS A TOTAL ENCLOSED, OIL FILLED, STAINLESS STEEL TANK, SUBMERSIBLE DESIGN THAT WAS FIRST INTRODUCED AS A REPLACEMENT FOR THE PMH DESIGN. THE 600 AMP SIDE CONTAINS VACUUM BOTTLES FOR LOADBREAK OPERATION. A VISIBLE OPEN (MECHANICAL BLADES OPEN) IS PROVIDED THROUGH A VIEWING WINDOW. THE 200 AMP SIDE HAS CANISTER TYPE FUSES TO PROTECT THE TAPS. THE FUSES INSTALLED IN THE CANISTERS ARE FULL RANGE CURRENT LIMITING FUSES. THE CANISTERS CAN BE WITHDRAWN UNDER LOAD AS A LOADBREAK MECHANISM.

IN 2006, THE TRAYER DESIGN WAS DESIGNATED AS THE STANDARD FOR FLOOD PRONE AREAS. IT ALSO REMAINS A CANDIDATE FOR THE REPLACEMENT OF A 15KV PMH WHERE OUTAGE TIME IS CRITICAL (THE UNIT COST IS MORE THAN A PME, BUT DUE TO THE DESIGN OF THE TRAYER, IT CAN BE INSTALLED IN LESS TIME WITH LESS CABLE SPLICING).

#### VFI SWITCHGEAR

THE VFI SWITCHGEAR IS A TOTALLY ENCLOSED, OIL FILLED, MILD STEEL OR STAINLESS STEEL TANK SWITCHGEAR THAT CAN BE CONFIGURED AS A PAD-MOUNTED RECLOSER (NORMALLY SET FOR ONE SHOT) OR IN A CONFIGURATION SIMILAR TO A PME. IT CAN BE FITTED WITH A PACKAGE TO PROVIDE SOURCE TRANSFER CAPABILITY. SWITCHING ON THE 600 AMP SIDE IS DONE WITH VACUUM BOTTLES INSULATED WITH OIL. A VISIBLE OPENING POINT IS PROVIDED BY A MECHANICAL BLADE THAT IS LINKED TO OPEN ONLY AFTER THE LOAD IS INTERRUPTED BY THE VACUUM BOTTLE. THE VISIBLE OPEN IS VIEWED THROUGH A VIEWING WINDOW. TRIP SETTINGS TO MATCH FUSE CURVES ARE SET DIRECTLY ON THE ELECTRONIC CONTROL PANEL. THIS PAD-MOUNTED RECLOSER TYPE IS USED IN 600 AMP AND 200 AMP APPLICATIONS. THEY MAY BE CONFIGURED WITH 600 AMP APPARATUS BUSHING ON THE SOURCE SIDE AND 600 AMP APPARATUS BUSHINGS OR 200 AMP BUSHING WELLS ON THE FEED SIDE.

IF THE VFI IS CONFIGURED AS A PME, VACUUM BOTTLES ARE USED TO PROVIDE LOADBREAK COMPATIBILITY ON THE 600 AMP SIDE. THE SAME DESIGN 600 AMP VACUUM BOTTLES ARE USED ON THE 200 AMP TAPS TO PROVIDE FAULT INTERRUPTING. TRIP SETTING TO MATCH FUSE CURVES ARE SET DIRECTLY ON THE ELECTRONIC CONTROL PANEL FOR EACH 200 AMP TAP.

#### SUBMERSIBLE SWITCHGEAR

SUBMERSIBLE SWITCHGEAR IS COVERED IN THE NETWORK, VAULTS AND TRANSCLOSURES SECTION OF THIS MANUAL.

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## DISTRIBUTION PAD-MOUNTED SWITCHES



THE PURPOSE OF THIS DRAWING IS TO PROVIDE STANDARD OPERATING CAPABILITIES OF MANUAL DISTRIBUTION LINE SWITCHES. THE SAFETY MANUAL SHOULD BE FOLLOWED FOR ALL SWITCHING SAFETY PROCEDURES. THE SUBSTATION EQUIPMENT OPERATIONS MANUAL SHOULD BE FOLLOWED WHEN MAKING OR BREAKING A FEEDER TIE. LOAD CHECKS MAY BE REQUIRED TO AVOID EXCEEDING THE RATINGS OF THESE SWITCHES. FOR OVERHEAD SWITCHES, SEE SECTION 08.

PME AND PMH SWITCHGEAR, SWITCHED COMPARTMENT: THESE SWITCHES HAVE LOAD BREAK INTERRUPTERS AND CAN PICK UP LOAD, MAKE A FEEDER TIE, DROP LOAD, AND OPEN A FEEDER TIE.

NOTE: THE 15KV UNITS ARE RATED 600 AMPS LOADBREAK AND THE 25KV UNITS ARE RATED 400 AMPS LOADBREAK.

SINGLE-PHASE SWITCHING: PICKING UP OR DROPPING A LARGE AMOUNT OF LOAD WITH SINGLE-PHASE SWITCHES CAN OPERATE THE FEEDER GROUND RELAYS. EVALUATE TURNING GROUND RELAYS OFF BASED ON AMOUNT OF LOAD TO BE TRANSFERRED AND THE GROUND RELAY SETTINGS. WHEN PICKING UP OR DROPPING THREE-PHASE LOAD, ALL PHASES SHOULD BE OPENED OR CLOSED WITHOUT DELAY BETWEEN PHASES. THREE-PHASE SERVICE SHOULD NOT BE PROVIDED FROM PHASES OF DIFFERENT FEEDERS EXCEPT FOR A SHORT PERIOD DURING SWITCHING. CONSULT THE DISTRIBUTION CONSTRUCTION SPECIFICATIONS OR DISTRIBUTION ENGINEERING MANUAL FOR FERRORESONANCE INFORMATION.

600 AMP ELBOWS: THESE ELBOWS ARE TO BE OPERATED DE-ENERGIZED ONLY.

PAD-MOUNTED LIVE FRONT SWITCHGEAR (PMH), 200 AMP FUSED COMPARTMENT WITH LOAD BREAK FITTINGS: THESE SWITCHES CAN PICK UP LOAD, MAKE A LINE TIE, DROP LOAD, AND OPEN A LINE TIE.

PAD-MOUNTED LIVE FRONT SWITCHGEAR (PMH), 200 AMP FUSED COMPARTMENT WITHOUT LOAD BREAK FITTINGS: THESE SWITCHES CAN PICK UP LOAD AND MAKE A LINE TIE. WHEN USED WITH A LOAD BUSTER TOOL, THESE SWITCHES CAN BE USED TO DROP LOAD, AND OPEN A LINE TIE.

PAD-MOUNTED DEAD FRONT SWITCHGEAR (PME), 200 AMP FUSED COMPARTMENT: THE FUSE COMPARTMENT HAS NO LOAD BREAK OR LOAD MAKE CAPABILITY. USE 200 AMP LOAD BREAK ELBOWS.

200 AMP LOAD BREAK ELBOWS: THESE ELBOWS CAN BE USED TO PICK UP LOAD, MAKE A LINE TIE, DROP LOAD, AND OPEN A LINE TIE. THESE ELBOWS SHOULD BE OPERATED ENERGIZED ONLY WHEN PROTECTED BY A DEVICE WITH A TRIP RATING OF 200 AMPS OR LESS.

SWITCHGEAR BUSHINGS:

INSULATING CAPS MUST BE INSTALLED ON ALL OPEN SWITCHGEAR BUSHINGS. THE ELECTROSTATIC GROUNDING WIRE ON THE INSULATING CAP MUST BE INSTALLED TO THE GROUND WIRE PRIOR TO INSTALLATION OF THE INSULATING CAP.

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DISTRIBUTION PAD-MOUNTED SWITCHES



#### SWITCHGEAR TAGGING AND LABELING

PME/PMH TYPE SWITCHGEAR









- 1. DEAD FRONT CONSTRUCTION 600A BOLTED ELBOW (T-BODY).
- 2. WILL NOT FIT PMH MOUNTING BOX: NEEDS 73" X 71"
- 3. LOOK THROUGH WINDOW, BELOW T-BODIES, FOR VISIBLE OPEN.
- 4. USE LARGE 3Ø FAULT INDICATOR CN 323457 (SHOWN).
- 5. T-BODY IS NON LOADBREAK (NO VOLTAGE AND NO CURRENT).
- 6. CAN INSTALL ELBOW ARRESTER ON STANDARD BUSHING.
- 7. GROUNDS ATTACH TO GROUNDING BAR WITH BOLTED CONNECTORS.
- 8. CABLE CAN BE ENERGIZED WHEN SWITCH IS OPEN.
- 9. WHEN INSTALLED PROPERLY, THE LC SHIELD GROUND BRAID HAS TWO LEADS. USE ONE TO CONNECT TO THE CROSS BONDS AND THE OTHER TO CONNECT TO THE NEUTRAL.
- 10. IT IS ACCEPTABLE TO CONNECT BOTH GROUND BRAID LEADS TO THE GROUNDING BAR USING SEPARATE CONNECTORS AS A METHOD OF CROSS BONDING.
- 11. ARRESTER INSTALLATION: WHEN A SWITCHGEAR HAS A NORMALLY OPEN SWITCH, ARRESTERS ARE TO BE INSTALLED ON THE CABLE CONNECTED TO THE OPEN SWITCH AND ON ONE ADDITIONAL 600 AMP WAY (TOTAL 6 ARRESTERS). WHEN A SWITCHGEAR HAS ONLY NORMALLY CLOSED SWITCHES, NO ARRESTERS ARE REQUIRED. ARRESTERS ARE ONLY REQUIRED WHERE AN OPEN SWITCH EXISTS.
- 12. INSTALL INSULATING CAPS ON BUSHINGS IN UNUSED BAYS (CU TUA15DUSTCOVF, CN 326246).

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USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL OR SAFETY MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

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<b>ENERGY</b>	

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PAD-MOUNTED SWITCHGEAR -

PME 600A SWITCH BAYS



- 1. WILL ACCEPT LOADBREAK BUSHING INSERT ( CN 326245).
- 2. USE 200A LOADBREAK ELBOWS.
- 3. WHEN INSTALLING, BRING WIRE THROUGH GALVANIZED RING AT BOTTOM OF SWITCHGEAR. BE SURE ELBOW WILL REACH BOTH ENERGIZED AND PARKING BUSHING.
- 4. CAN BE STICK OPERATED.
- 5. USES SME-20 FUSE DOOR.
- 6. ELBOW AND CABLE CAN BE ENERGIZED WHILE PARKED.
- 7. PARKING STAND BUSHING SHOWN IN PHOTO ABOVE. INSTALL PARKING STAND BUSHING AS REQUIRED. DO NOT LEAVE UNUSED BUSHINGS IN SWITCHGEAR.
- 8. INSTALL INSULATING CAPS ON BUSHINGS IN UNUSED BAYS (CU TUA15DUSTCOVF, CN 326246).



USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL OR SAFETY MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.



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RE	VISED	BY	CK'D	APPR.	

PAD-MOUNTED SWITCHGEAR -

PME FUSE BAYS



LEFT SOU VOLTAGE AUTOMAT "READY" I OVERCUR INDICATH RESET KE WITH OPT LOCKOUT MENU KE TEST KEY SIMULATI AND LOSS ON LEFT S	RCE INDICATING LAMP IC-TRANSFER INDICATING LAMP RENT-LOCKOUT NG LAMP AND Y (FURNISHED) TONAL OVERCURRENT FEATURE S FOR NG OVERCURRENT S OF VOLTAGE SOURCE.	<ul> <li>RIGHT SOURCE VOLTAGE INDICATING LAMP</li> <li>MANUAL/AUTOMATIC OPERATION SELECTOR SWITCH. WHEN IN "MANUAL." PREVENTS AN AUTOMATIC SOURCE TRANSFER WHILE PERMITTING MANUAL OPERATION USING OPEN/CLOSE PUSHBUTTONS</li> <li>TWO-LINE 48-CHARACTER LIQUID-CRYSTAL DISPLAY WITH BACKLIGHTING</li> <li>TEST KEYS FOR SIMULATING OVERCURRENT AND LOSS OF VOLTAGE ON RIGHT SOURCE</li> <li>KEYPAD</li> </ul>
3	MICRO-AT CONTROL	<b>PGN</b> 28 03-03

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ITEM ITEM DESCRIPTION
1 600 AMP MOTOR OPERATED 3-PHASE FAULT INTERRUPTER SWITCH, 3 POSITION
2 200 AMP SINGLE-PHASE FAULT INTERRUPTER SWITCH
3 600 AMP BUSHINGS FOR FAULT INTERRUPTER SWITCH
4 200 AMP BUSHING WELLS FOR FAULT INTERRUPTER SWITCH
5 2 SCHEITZER SEL-351 OVERCURRENT RELAY AND REMOTE CONTROL
NOTES: 1. SEE DWG. 28.03-05B FOR NOTES AND THREE LINE DIAGRAM.
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VISTA MODEL 422 CU SGVISTA9ID15F CN 266103 VISTA MODEL 431 CU SGVISTA11ID15F CN 266105



#### THREE LINE DIAGRAM

#### NOTES:

- 1. ON 600 SWITCHED WAY, USE 600A BOLTED ELBOW (T-BODY).
- 2. T-BODY IS NON-LOADBREAK: NO VOLTAGE AND NO CURRENT.
- 3. FITS MOUNTING BOX (CN 9220139615).
- 4. THE SOLID BLADE SWITCH HAS THREE-POSITIONS: OPEN, CLOSED AND GROUND.
- 5. LOOK THROUGH WINDOW FOR VISUAL POSITIONS OF SWITCH LOCATED ON OPERATION SIDE OF SWITCHGEAR.
- 6. ON 200 AMP INTERRUPTER WAY, USE 200A BOLTED T-BODY.
- 7. TANK CONTAINS SF-6 GAS, CHECK GAUGE BEFORE OPERATION.
- 8. CROSS BOND EACH SET OF THREE-PHASE CABLES AND CONNECT TO A #2 BARE COPPER GROUND LOOP THAT IS CONNECTED TO A DEEP DRIVEN GROUND ROD. CONNECT SWITCH GROUNDING PAD TO THE GROUND LOOP USING A #2 BARE COPPER JUMPER.
- 9. SEE DWG. 28.01-05 FOR GROUNDING DETAILS.
- 10. SEE DWG. 22.06-09 FOR CABLE CONDUIT PLACEMENT.
- 11. SEE DWG. 24.05-09 FOR MOUNTING BOX.
- 12. SEE DWG. 28.03-05A FOR TOP VIEWS.
- 13. ARRESTER INSTALLATION: WHEN A SWITCHGEAR HAS A NORMALLY OPEN SWITCH, ARRESTERS ARE TO BE INSTALLED ON THE CABLE CONNECTED TO THE OPEN SWITCH AND ON ONE ADDITIONAL 600 AMP WAY (TOTAL 6 ARRESTERS). WHEN A SWITCHGEAR HAS ONLY NORMALLY CLOSED SWITCHES NO ARRESTERS ARE REQUIRED. ARRESTERS ARE ONLY REQUIRED WHERE AN OPEN SWITCH EXISTS.

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S&C VISTA PAD-MOUNTED SWITCHGEAR	
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WITH MOTOR OP AND SCHEITZER RELAY CONTROL











COMPATIBLE UNIT SGCOMBOXATS PFG10F - - PEDFM9X14PF - - - - - - - - - - - - - - - - - - -	CU QTY SF 1 - - - - - - - - - - - - - - - - - - -	ITEM           NUMBER           9220269939           9220269951           9220267813           320173           9220272933           9220272935           9220270934           9220210934           9220211958           9220110469           21016308           372154           372704           372411           9220274893           9220274893           9220274893           9220276496           NON-STOCK           DLOCATION DEI	ITEM           QTY/           CU           1           1           1           1           1           1           1           *      *           * <th>DESCRIPTION CONTROL, SWITCH, ATS, COM DSCADA, WITH SEL 2440, SEL-3622, UI POST 10'X4"X4", FOR ATS COM CONTROL, WITH HOLES FOR CONDUIT CONTROLLER, AUTOMATION, DISCRETE, PROGRAMMABLE RELAY, SEL- GATEWAY, SECURITY, RELAY, SEL-3622 W/ FIRMWARE VER. R142 OR 1 PEDESTAL, STREET LIGHT, 9" X 14" X 12" D BOX-JUNCTION, FLUSH MM MODEM, CELLULAR, SIERRA GX440, W/DC POWER CABLE, RUGGEDIZE ANTENNA, MODEM, MOBILEMARK, LTM300, W/15' CABLE AND SMA COI BRACKET, MOUNTING, 12 GA., GLV STEEL, SWITCHGEAR PROXIMITY S SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURC CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, 90 DEG, SCH 40, 1-1/2X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TH CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL</th>	DESCRIPTION CONTROL, SWITCH, ATS, COM DSCADA, WITH SEL 2440, SEL-3622, UI POST 10'X4"X4", FOR ATS COM CONTROL, WITH HOLES FOR CONDUIT CONTROLLER, AUTOMATION, DISCRETE, PROGRAMMABLE RELAY, SEL- GATEWAY, SECURITY, RELAY, SEL-3622 W/ FIRMWARE VER. R142 OR 1 PEDESTAL, STREET LIGHT, 9" X 14" X 12" D BOX-JUNCTION, FLUSH MM MODEM, CELLULAR, SIERRA GX440, W/DC POWER CABLE, RUGGEDIZE ANTENNA, MODEM, MOBILEMARK, LTM300, W/15' CABLE AND SMA COI BRACKET, MOUNTING, 12 GA., GLV STEEL, SWITCHGEAR PROXIMITY S SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURC CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, 90 DEG, SCH 40, 1-1/2X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TH CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
UNIT SGCOMBOXATS PFG10F PEDFM9X14PF	QTY F 1 	NUMBER           9220269839           9220269951           9220267798           9220267913           320173           9220272935           9220270934           9220270934           9220271928           372104           9220271958           9220271958           9220110469           21016308           372154           372704           3722074893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274893           9220274895           102107           9220276496           NON-STOCK           D LOCATION DEI           MATERIALS -	QIY/ CU 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DESCRIPTION CONTROL, SWITCH, ATS, COM DSCADA, WITH SEL 2440, SEL-3622, UI POST 10'X4"X4", FOR ATS COM CONTROL, WITH HOLES FOR CONDUIT CONTROLLER, AUTOMATION, DISCRETE, PROGRAMMABLE RELAY, SEL- GATEWAY, SECURITY, RELAY, SEL-3622 W/ FIRMWARE VER. R142 OR 1 PEDESTAL, STREET LIGHT, 9" X 14" X 12" D BOX-JUNCTION, FLUSH MC MODEM, CELLULAR, SIERRA GX440, W/DC POWER CABLE, RUGGEDIZE ANTENNA, MODEM, MOBILEMARK, LTM300, W/15' CABLE AND SMA COI BRACKET, MOUNTING, 12 GA., GLV STEEL, SWITCHGEAR PROXIMITY S SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURC CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL.
SGCOMBOXATS PFG10F - - PEDFM9X14PF - - - - - - - - - - - - -	F         1           -         -	9220269839 9220269951 922026798 922026798 922027933 9220272933 9220272935 9220270934 9220274928 372104 9220274928 372104 9220274928 372104 372211 9220274893 922027489 922027489 922027489 922027489 922027489 922027489 922027489 922027489 922027489 922027489 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 92207487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 922027487 92207487 92207487 92207487 92207487 92207487 92207487 92207487 92207487 92207487 92207 92207487 92207487 92207487 92207487 9	PENDIN	CONTROL, SWITCH, ATS, COM DSCADA, WITH SEL 2440, SEL-3622, UI POST 10'X4"X4", FOR ATS COM CONTROL, WITH HOLES FOR CONDUIT CONTROLLER, AUTOMATION, DISCRETE, PROGRAMMABLE RELAY, SEL- GATEWAY, SECURITY, RELAY, SEL-3622 W/ FIRMWARE VER. R142 OR 1 PEDESTAL, STREET LIGHT, 9" X 14" X 12" D BOX-JUNCTION, FLUSH MC MODEM, CELLULAR, SIERRA GX440, W/DC POWER CABLE, RUGGEDIZE ANTENNA, MODEM, MOBILEMARK, LTM300, W/15' CABLE AND SMA COI BRACKET, MOUNTING, 12 GA., GLV STEEL, SWITCHGEAR PROXIMITY S SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURC CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT
PFG10F PEDFM9X14PF	1           -	9220269951 9220267798 9220267798 922027093 9220272935 9220272935 9220270934 9220274928 372104 9220274928 372104 9220274928 372104 37211 9220274893 922027496 NON-STOCK	1 1 1 1 1 1 1 1 * * * * * * * * * * * * *	POST 10'X4''X4", FOR ATS COM CONTROL, WITH HOLES FOR CONDUIT CONTROLLER, AUTOMATION, DISCRETE, PROGRAMMABLE RELAY, SEL- GATEWAY, SECURITY, RELAY, SEL-3622 W/ FIRMWARE VER. R142 OR 1 PEDESTAL, STREET LIGHT, 9" X 14" X 12" D BOX-JUNCTION, FLUSH MC MODEM, CELLULAR, SIERRA GX440, W/DC POWER CABLE, RUGGEDIZE ANTENNA, MODEM, MOBILEMARK, LTM300, W/15' CABLE AND SMA COJ BRACKET, MOUNTING, 12 GA., GLV STEEL, SWITCHGEAR PROXIMITY S SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURC CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 7 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT
- PEDFM9X14PF - - - - - - - - - - - - - - - - - - -		9220267798 9220267813 320173 9220272933 9220272935 9220270934 9220274928 372104 9220274928 372104 9220274928 372104 37211 9220274893 9220274893 9220274893 9220274877 9220125586 327852 192107 9220276496 NON-STOCK D LOCATION DEI	1 1 1 1 * * * * * * * * * * * * * * * *	CONTROLLER, AUTOMATION, DISCRETE, PROGRAMMABLE RELAY, SEL- GATEWAY, SECURITY, RELAY, SEL-3622 W/ FIRMWARE VER. R142 OR 1 PEDESTAL, STREET LIGHT, 9" X 14" X 12" D BOX-JUNCTION, FLUSH MC MODEM, CELLULAR, SIERRA GX440, W/DC POWER CABLE, RUGGEDIZE ANTENNA, MODEM, MOBILEMARK, LTM300, W/15' CABLE AND SMA COI BRACKET, MOUNTING, 12 GA., GLV STEEL, SWITCHGEAR PROXIMITY S SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURC CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 7 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT
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- - - - - - - - - - - - - - - - - - -		9220274928 372104 9220211958 9220110469 21016308 372154 372704 372411 9220274893 9220274893 9220274877 9220125586 327852 192107 9220276496 NON-STOCK D LOCATION DEI	* * * * * * * * * * * * * * * * * * *	SWITCH, PROXIMING, 12 GA., GLV STELE, SWITCHORAR TROADMITTS SWITCH, PROXIMITY, SENSOR, 12MM DIA, NON FLUSH MOUNT, SOURG CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20' FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT
- - - - - - - - - - - - - - - - - - -		372104           372104           9220211958           9220110469           21016308           372154           372704           372411           9220274893           9220274893           9220274877           9220125586           327852           192107           9220276496           NON-STOCK           D LOCATION DEI	* * * * * * * * * * * * * * * * * * *	CONDUIT, PVC, SCH 40, 1-1/2", W/CPLG, 20 FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- - - - - - - - - - - - - - - - - - -		9220211958 9220110469 21016308 372154 372704 372411 9220274893 9220274893 9220274877 9220125586 327852 192107 9220276496 NON-STOCK D LOCATION DEI	* * * * * * * * * * * * * * * * * * *	FLEXIBLE NONMETALLIC CONDUIT, 1-1/2 IN FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- - - - - - - - - - - - - - - - - - -		9220110469 21016308 372154 372704 372411 9220274893 9220274877 9220125586 327852 192107 9220276496 NON-STOCK D LOCATION DEI	* * * * * * * * * * * * * * * * * * *	FLEXIBLE NONMETALLIC CONDUIT, 2 IN FLEXIBLE NONMETALLIC CONDUIT CONNECTOR, 1-1/2 IN FEMALE CONDUIT ADAPTER, PVC, SXT, 1-1/2" COUPLING, PVC, SCH 40, 1-1/2N/ST BEND, PVC, 90 DEG, SCH 40, 1-1/2 X 12", RADIUS WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
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- - - - - - VILL VARY FROM I		9220274833 9220274877 9220125586 327852 192107 9220276496 NON-STOCK D LOCATION DEI	* * * * * PENDIN	WIRE, CABLE, ELECTRICAL, CONTROL, 12 CONDUCTOR, TINNED CU, 600 CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- - - - - VILL VARY FROM I		9220125586 327852 192107 9220276496 NON-STOCK D LOCATION DEI	* * * * PENDIN	CABLE, #6 AWG, 600V, GROUNDING COPPER, GREEN - INSULATED TIN CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- - - VILL VARY FROM I	- - - - - - - - - - - - - - - - - - -	327852 192107 9220276496 NON-STOCK D LOCATION DEI	* * * PENDIN	CONNECTOR, INSULATED SUBMERSIBLE, CONNECTOR, #12 - 1/0 STR. WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- - - VILL VARY FROM I	- - - - - - - - - - - - - - - - - - -	192107 9220276496 NON-STOCK D LOCATION DEI MATERIALS -	* * PENDIN	WIRE, COPPER, #10, STREETLIGHT, ST LIGHT #10 CU PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- - VILL VARY FROM I	- 	9220276496 NON-STOCK D LOCATION DE	* PENDIN	PT CABINET AND SECONDARY FUSE 277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
- VILL VARY FROM I	OCATION TO BILL OF	NON-STOCK D LOCATION DE	* PENDIN	277 TO 120V TRANSFORMER (AVAILABLE AT METER SHOP) G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT S ASSOCIATED WITH CONTROL
VILL VARY FROM I	BILL OF	O LOCATION DE	PENDIN	G ON NUMBER OF SWITCHGEAR AND THEIR ARRANGEMENT
			CU	UNINTERRUPTIBLE POWER SUPPLY, TRIO-UPS/1AC/24DC/5. WITH
-	1	9220284648	*	INTERGRATED POWER SUPPLY UNIT, 24 VDC/5 AMP OUTPUT.
-	1	9220284650	*	CONVERTOR, MINI-PS-12-24DC/5-15DC/2, DC/DC. INPUT; 12-24 V DC OUTPUT: 5-15 V DC/2 A
-	-	9220284653	*	BATTERY, QUINT-BAT/24DC/3.4AH, POWER STORAGE DEVICE, 24 VDC
-	-	9220150062	*	RING,, TERMINAL LUG RING, 12 - 10 1/2 STUD
-	1	9220284649	*	PTV1-9 - VINYL PIN TERMINALS - 22-16AWG, RED
-	-	9220284651	*	PTV2-9 - VINYL PIN TERMINALS - 16-14AWG
		DEDESTAL AN	D FOU	NDATION DETAILS
90 00 154 E	JR POLE, I	CEDESTAL AN	D FOU	NDATION DETAILS.
5. 28.03-15A F	,	ETAILS.		
G. 28.03-15A FG G. 28.03-15B F	OR ATS DE			
6. 28.03-15A F 6. 28.03-15B F	OR ATS DI			
G. 28.03-15A F G. 28.03-15B F	OR ATS DI			DEC DEM DEF
G. 28.03-15A FG G. 28.03-15B F	OR ATS DI	0.		
, , , , , , , , , , , , , , , , , , ,	. 28.03-15B F(			



THIS BOX IS TO BE USED TO SUPPLY 120V POWER TO THE ATS.

COMMUNICATIONS BOX FROM THE CT METERING CIRCUIT. USE WHEN THERE IS NO OTHER 120V SUPPLY AVAILABLE.

JUNCTION BOX TO HOUSE FUSE AND TRANSFORMER IF NECESSARY. MOUNT ON CT METER POST OR SECURE NEAR CT METER JUNCTION BOX.

CN 9220276496

			FUS 5 Al	SED DIS MP	SCONNECT - 277/120 VOLT T FOR USE WITH A NOT NEEDED FO NON-STOCK, AV METER SHOP. - TO ATS COMMUN CABINET	RANSFORMER 480V CIRCUITS. 9R 120V CIRCUITS. AILABLE AT THE NICATION
						ENERGY.
3						DEC DEM DEP DEF
2					ALTERNATE POWER SUPPLY FOR ATS COMMUNICATION	v
1					CADINET EDOM OT METEDING CADINET	X
0 REV	3/9/15	BURLISON	EANES CK'D	ADCOCK	CADINEI FROM CI METERING CADINEI	28.03-15D

#### OVERVIEW

PROGRESS ENERGY FLORIDA ALMOST EXCLUSIVELY USED S & C PMH STYLE PAD-MOUNTED SWITCHGEAR FOR 20 YEARS. SEVERAL PROBLEMS HAVE OCCURRED WITH THIS SWITCHGEAR. IN THE EARLY YEARS OF PAD-MOUNTED SWITCHGEAR WE FOUND THAT MILD STEEL ENCLOSURES RUSTED. CORTEN (WEATHERING) STEEL WAS USED FOR ABOUT A YEAR. AFTER A BRIEF RETURN TO MILD STEEL IN THE MID 80'S ALL UNITS HAVE BEEN MADE OUT OF STAINLESS STEEL. STAINLESS IS DIFFICULT TO DRILL BUT IT HOLDS UP EXTREMELY WELL IN OUR ENVIRONMENT. THE SECOND PROBLEM WITH PMH STYLE SWITCHGEAR IS THAT IT IS AIR INSULATED AND LIVE FRONT. THIS FEATURE MAKES THE GEAR HIGHLY SUSCEPTIBLE TO INTERNAL FAULTS CAUSED BY FROGS, SNAKES ETC. CLIMBING INSIDE THE SWITCHGEAR. THE RESULTING PHASE-TO-GROUND OR PHASE- TO-PHASE FAULT CAUSES ENOUGH DAMAGE TO TYPICALLY REQUIRE THE REPLACEMENT OF THE SWITCHGEAR. A THIRD PROBLEM IS THAT THE CLOSE CLEARANCE HAVE MADE THE INSTALLATION OF LIGHTNING ARRESTERS DIFFICULT.

#### INSULATION MEDIUM

PAD-MOUNTED SWITCHGEAR IS TYPICALLY INSULATED WITH AIR, OIL OR SF6. BECAUSE OF THE TANK REQUIRED TO CONTAIN THE OIL OR SF6 THESE INSULATION SYSTEMS ARE NOT VULNERABLE TO CRITTERS CAUSING FAULTS IF DEAD FRONT TERMINATION'S ARE USED. WE CAN EXPECT TO SEE SOLID DIELECTRIC PAD-MOUNTED SWITCHGEAR IN THE FUTURE. THIS MATERIAL SOLVES THE CRITTER PROBLEM AND ELIMINATES ENVIRONMENTAL SPILL CONCERNS.

#### NUMBER OF BAYS

THREE-PHASE PAD-MOUNTED SWITCHGEAR HAS TRADITIONALLY CONTAINED FOUR BAYS. THE MOST POPULAR CONFIGURATION (PME-9) HAS CONSISTED OF TWO 600 AMP SOLID BLADE BAYS AND TWO 200 AMP FUSE TAP BAYS. THE OIL AND SF6 FILLED SWITCHGEAR CAN TYPICALLY BE OBTAINED WITH UP TO SIX BAYS.

#### TERMINATIONS

THE SOURCE SIDE (600 AMP) TERMINATION'S CAN BE EITHER LIVE FRONT OR DEAD FRONT. AIR INSULATED GEAR SUCH AS THE PMH STYLE HAVE LIVE FRONT TERMINATION'S. THESE TERMINATION'S CAN BE OUTDOOR TERMINATORS (SKIRTED) OR INDOOR TERMINATORS (SKIRTLESS). IT IS IMPORTANT THAT THESE TERMINATION'S NOT TOUCH THE BARRIER WHICH CAN ACCLIERATE TRACKING. OIL AND SF6 INSULATED SWITCHGEAR IS TYPICALLY ALWAYS DEAD FRONT. THE DEAD FRONT (600 AMP) TERMINATION'S ARE DEAD BREAK. THIS MEANS THAT THE CABLE MUST HAVE NO CURRENT AND NO VOLTAGE BEFORE THE DEAD BREAK ELBOW IS REMOVED. THE 600 AMP DEAD BREAK (T-BODY) ELBOWS ARE AVAILABLE IN A STANDARD LENGTH AND AN EXTENDED LENGTH TO MINIMIZE THE NEED TO SPLICE OUT A SHORT CABLE WHEN CONVERTING FROM LIVE FRONT TO DEAD FRONT SWITCHGEAR.

THE LOAD SIDE (200 AMP) TERMINATION'S CAN BE EITHER LIVE FRONT OR DEAD FRONT. AIR INSULATED GEAR SUCH AS THE PMH STYLE HAVE LIVE FRONT TERMINATION'S. THESE TERMINATION'S CAN BE OUTDOOR TERMINATORS (SKIRTED) OR INDOOR TERMINATORS (SKIRTLESS). IT IS IMPORTANT THAT THESE TERMINATION'S NOT TOUCH THE BARRIER BOARDS WHICH CAN ACCELERATE TRACKING. OIL AND SF6 INSULATED SWITCHGEAR IS TYPICALLY ALWAYS DEAD FRONT. THE DEAD FRONT (200 AMP) ELBOWS ARE LOADBREAK SWITCHES. THE 200 AMP LOADBREAK ELBOWS ARE AVAILABLE IN A STANDARD LENGTH AND AN EXTENDED LENGTH TO MINIMIZE THE NEED TO SPLICE OUT A SHORT CABLE.

#### ARRESTERS

ARRESTERS IN PAD-MOUNTED SWITCHGEAR CAN MINIMIZE LIGHTNING INDUCED FLASHOVERS AND MINIMIZE THE VOLTAGE SURGES THAT SHORTEN THE LENGTH OF LIFE OF THE 15KV CABLE. WITH LIVE FRONT SWITCHGEAR THE SPACE AVAILABLE FOR MOUNTING THE OVERHEAD STYLE ARRESTER IS VERY LIMITED AND THE RESULTING CLEARANCES INCREASE THE RISK OF CRITTER INDUCED FAULTS. DEAD FRONT SWITCHGEAR LENDS ITSELF TO THE INSTALLATION OF ELBOW ARRESTERS PLUGGED INTO THE BACK SIDE OF THE 600 AMP T-BODY ELBOWS. SINCE ALL TERMINATION'S AND ARRESTERS ARE DEAD FRONT THERE IS NO RISK OF CRITTER INDUCED FAULTS. ARRESTER INSTALLATION: WHEN A SWITCHGEAR HAS A NORMALLY OPEN SWITCH, ARRESTERS ARE TO BE INSTALLED ON THE CABLE CONNECTED TO THE OPEN SWITCH AND ON ONE ADDITIONAL 600 AMP WAY (TOTAL 6 ARRESTERS). WHEN A SWITCHGEAR HAS ONLY NORMALLY CLOSED SWITCHES, NO ARRESTERS ARE REQUIRED. ARRESTERS ARE ONLY REQUIRED WHERE AN OPEN SWITCH EXISTS.

#### SOURCE SWITCHING

THREE-PHASE PAD-MOUNTED SWITCHGEAR USES GANG OPERATED 600 AMP 3-PHASE SWITCHES. THESE SWITCHES CAN ALWAYS BE OPERATED MANUALLY. SOME SWITCHES ARE SPECIFIED WITH MOTOR OPERATORS. MOTOR OPERATORS ARE OF TWO BASIC DESIGNS. NORMALLY WHEN A SIGNAL IS SENT TO A MOTOR OPERATED SWITCH THE MOTOR IS ENERGIZED AND AFTER SEVERAL SECONDS THE MECHANISM GOES OVER TOGGLE AND THE MECHANISM RAPIDLY CHANGES THE SWITCH POSITION. THIS STYLE OF SWITCHGEAR HAS TRADITIONALLY BEEN DISPATCHER CONTROLLED.

AUTOMATIC TRANSFER SWITCHES TYPICALLY HAVE SPRINGS THAT ARE PRECHARGED BY A MOTOR. THESE SWITCHES RESPOND INSTANTLY TO A SIGNAL TO OPERATE. AFTER THE SWITCH MOVES THE MOTOR WILL RECHARGE THE MECHANISM IN PREPARATION FOR THE NEXT OPERATION. AUTOMATIC TRANSFER SWITCHES WILL SENSE A LOSS OF VOLTAGE AND AFTER A TIME DELAY IT WILL OPEN THE CLOSED SWITCH WHICH IS WITHOUT VOLTAGE AND THEN CLOSE THE ALTERNATE SWITCH FROM AN ENERGIZED ALTERNATE SOURCE THIS TRANSFER IS SAID TO BE OPEN TRANSITION BECAUSE BOTH SWITCHES ARE NOT CLOSED AT THE SAME TIME.

AUTOMATIC CIRCUIT RECONFIGURATION REFERS TO A GROUP OF CONTROLS THAT GATHER CURRENT AND VOLTAGE INFORMATION DURING AND IMMEDIATELY AFTER A FAULT. THEY THEN COMMUNICATE WITH EACH OTHER, ANALYZE THE DATA AND OPEN AND CLOSE THE NECESSARY SWITCHES TO ISOLATE THE FAULTED PORTION OF THE CIRCUIT AND RE-ENERGIZE THE REST OF THE CIRCUIT. THE RECONFIGURATION IS DONE IN LESS THAN ONE MINUTE WITHOUT DISPATCHER INTERVENTION. A COMMUNICATION LINK IS NORMALLY PROVIDED TO THE DISPATCHER TO INFORM HIM OF THE RECONFIGURED CIRCUIT STATUS.

#### 600 AMP INTERRUPTER

SIX HUNDRED AMP VACUUM INTERRUPTERS ARE AVAILABLE FOR OIL AND SF6 FILLED SWITCHGEARS. ONE OF THESE MECHANISMS COULD BE SPECIFIED FOR USE IN THE MIDDLE OF A 600 AMP FEEDER. IF A FAULT OCCURS BEYOND THE INTERRUPTER WILL CLEAR THE THE FAULT INSTEAD OF THE SUBSTATION BREAKER. THIS REDUCES THE NUMBER OF CUSTOMERS THAT ARE OUT OF SERVICE DUE TO THE FAULT.

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## 600 AMP RATED SWITCHGEAR



#### 600 AMP VISUAL OPEN & GROUND

PMH LIVE FRONT SWITCHGEAR HAS VISIBLE GANG OPERATED AIR BREAK SWITCHES THAT INFORM THE OBSERVER AS TO WHETHER THE SWITCH IS OPEN OR CLOSED. OIL AND SF6 FILLED SWITCHES CONTAIN VACUUM BOTTLES AND DO NOT LEND THEMSELVES TO VISUAL OBSERVATION. VISIBLE OPENS CAN BE OBTAINED ON THE SWITCHGEAR BY USING 600 AMP FEED THROUGH TYPE DEVICES AT EACH 600 AMP BUSHING (U-OP). THESE DEVICES ARE DEAD BREAK. (DO NOT OPERATE DEAD BREAK DEVICES WITH CURRENT OR VOLTAGE PRESENT.) USING THESE DEVICES A VISIBLE OPEN CAN BE ACHIEVED. A 200 AMP BUSHING IS ALSO AVAILABLE WITH THESE DEVICES THAT PERMITS THE INSTALLATION OF GROUNDS AND ARRESTERS. THE 200 AMP BUSHING CAN ALSO BE USED FOR VOLTAGE TESTING. SOME MANUFACTURERS OF OIL AND SF6 FILLED SWITCHGEAR ARE INSTALLING A TWO OR THREE-PHASE SWITCH IN SERIES WITH THE VACUUM BOTTLE. THE POSITION OF THIS SWITCH CAN BE OBSERVED THROUGH A VIEWING WINDOW. THE THREE POSITION SWITCH ALLOWS THE OPERATOR TO OPEN AND GROUND THE CABLE.

#### TAP SWITCHING

THE OLDEST FUSE DOORS ON THE SYSTEM MUST BE OPERATED WITH A LOAD BUSTER TOOL. THESE FUSE HOLDERS HAVE ARCING HORNS THAT THE LOAD BUSTER TOOL HOOKS OVER WHEN OPENING A FUSE. MOST OF OUR PAD-MOUNTED FUSE HOLDERS HAVE NO ARCING HORNS. THEY DO HAVE BUILT-IN ARC SNUFFERS AND ARE DESIGNED TO BE OPERATED WITH A SWITCH STICK.

DEAD FRONT TAP SWITCHING CAN TAKE ONE OF TWO FORMS. PME SWITCHGEAR MUST BE SWITCHED BY OPERATING THE LOADBREAK ELBOWS. AFTER THE CABLE IS PARKED THE FUSE PANEL CAN BE FLIPPED OPEN AND THE FUSE REPLACED. DEAD FRONT SWITCHGEAR WITH VACUUM INTERRUPTERS SHOULD BE SWITCHED BY MOVING THE INTERRUPTER HANDLE TO THE OPEN POSITION. IF A VISUAL OPEN IS REQUIRED THE LOADBREAK ELBOW SHOULD THEN BE PARKED. WHEN RE-ENERGIZING A TRIPPED BREAKER THE BREAKER MUST FIRST BE MOVED TO THE OPEN POSITION TO COCK THE TRIP MECHANISM AND THEN CLOSED.

#### FAULT CLEARING

THE AIR INSULATED SWITCHGEAR USED ON THE FLORIDA POWER SYSTEM UTILIZE EXPULSION FUSES WITH SNUFFERS. THE FUSE HOLDERS PURCHASED PRIOR TO AUGUST 1996 USE THE SML-4Z FUSE. WHEN THE FUSE BLOWS A FLUORESCENT RED TARGET IS VISIBLE THROUGH THE TRANSLUCENT FUSE HOLDER TUBE. SINCE AUGUST 1996 WE HAVE PURCHASED THE SML-20 FUSE. A RED TARGET PROJECTS FROM THE TOP OF THE UPPER END FITTING WHEN THE FUSE BLOWS.

THE VACUUM INTERRUPTERS HAVE OPERATING HANDLES THAT MOVE TO THE TRIPPED POSITION WHEN THE INTERRUPTER CLEAR A FAULT. SOME HANDLES OPERATE ONLY ONE PHASE AND OTHERS WILL OPERATE ALL THREE PHASES. THOSE SWITCH BAYS WITH SEPARATE HANDLES ON EACH PHASE CAN BE SET (1) TO TRIP ONLY ON THE FAULTED PHASE OR (2) TO TRIP ALL THREE PHASES EVEN IF THE FAULT IS ONLY ON ONE PHASE.

#### BOX PADS

SEVERAL OF BOX PADS ARE REQUIRED TO FIT THE VARIOUS PAD-MOUNTED SWITCHGEARS USED ON THE SYSTEM. IT IS IMPORTANT TO MATCH THE CORRECT SIZE BOX PAD TO THE SWITCHGEAR BEING INSTALLED. CONCRETE IS THE PREFERRED MATERIAL FOR BOX PADS. FIBERGLASS IS ORDERED IN THOSE CASES WHERE THERE IS INSUFFICIENT VOLUME TO JUSTIFY MAKING A NEW MOLD SIZE FOR A CONCRETE UNIT.

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600 AMP RATED SWITCHGEAR



## PAD-MOUNTED SWITCHGEARS

SWITCH TYPE	INSULATION MEDIUM	600A SW TYPE	VISUAL OPEN CONFIRMATION	FAULT CLEARING DEVICE	FAULT CLEARING CONFIRMATION	ARRESTER TYPE	CRITTER PROOF	RISING H20 PROOF
S & C PMH	AIR	AIR	VIEW SW	POWER FUSE	RED INDICATOR	BASE MOUNT	NO	NO
S & C PME	AIR	AIR	VIEW SW	POWER FUSE	RED INDICATOR	ELBOW	YES	NO
S & C VISTA	SF6	VACUUM	VIEW SW	VAC INTERRUPTER	"TRIP" FLAG	ELBOW	YES	YES
COOPER VFI NOV 2003 AND BEFORE	OIL	VACUUM	U-OP	VAC INTERRUPTER	BKR HANDLE	ELBOW	YES	YES
COOPER VFI DEC 2003 AND AFTER	OIL	VACUUM	VIEW SW	VAC INTERRUPTER	BKR HANDLE	ELBOW	YES	YES
TRAYER	OIL	VACUUM	VIEW SW	CL FUSE	TAG-200/OHM METER	ELBOW	YES	YES

## SWITCHGEAR ASSEMBLY, THREE-PHASE, PME TYPE

MACRO UNIT	DESCRIPTION
SGNWTRAYAT615FM	SWGR MACRO TRAY NETWORK 2-600, 1-200 VFI, AUTOTRANSFER
SGPME10SS15FM	SWGR MACRO PME 10, 4-600A SW SS 15KV
SGPME11SS15FM	SWGR MACRO PME 11, 3-600A SW, 1-3PH FUSED COMP SS 15KV
SGPME4200AS15FM	SWGR MACRO PME 4 WITH 6 BUSHING WELLS ON INPUT SIDE SS 15KV
SGPME4600A15FM	SWGR MACRO PME 4 WITH 600 AMP APPURATUS BUSHING 15KV
SGPME9ASTSS15FM	SWGR MACRO PME 9, 2-600A AST SW, 2-3PH FUSE COMP SS 15KV
SGPME9SS15FM	SWGR MACRO PME 9, 2-600A SW, 2-3PH FUSED COMP SS 15KV
SGTRAY10SS15FM	SWGR MACRO TRAY PM, 4-600A MAN VAC SW SS 15KV
SGTRAY11SS15FM	SWGR MACRO TRAY PM, 3-600A MAN VAC SW1-3PH 200A CLF SS 15KV
SGTRAY915FM	SWGR MACRO TRAY PM, 2-600A MAN VAC SW, 2-3PH 200ACL FUSE15KV
SGVISTA11ID15FM	SWGR MACRO VISTA11, 3-600 SW, 1-3PH 200A ET FUSE I-DRIVE 15KV
SGVISTA422S15FM	SWGR MACRO VISTA 9, 2-600 MAN SW, 2-200A ET FUSE SS 15KV
SGVISTA431S15FM	SWGR MACRO VISTA 11, 3-600 MAN SW, 1-200A ET FUSE SS 15KV
SGVISTA9ID15FM	SWGR MACRO VISTA 9, 2-600 SW, 2-3PH 200A ET FUSE I-DRIVE 15KV

## SWITCHGEAR ASSEMBLY, THREE-PHASE, 600 AMP, PMH TYPE (FOR MAINTENANCE ONLY)

COMP. UNIT	DESCRIPTION
SGPMH10MO15F	MOTOR OPERATED, 4 600 AMP SWITCHES, NO FUSES (PMH-10 MOTOR)
SGPMH11MO15F	MOTOR OPERATED, 3 600 AMP SWITCHES, 1 SET OF 200 AMP FUSES (PMH-11 MOTOR)
SGPMH9MO15F	MOTOR OPERATED, 2 600 AMP SWITCHES, 2 SETS OF 200 AMP FUSES (PMH-9 MOTOR)
SGPMH9ASTSS15F	AUTOMATIC TRANSFER, 2 600 AMP SWITCHES WITH TRANSFER, 2 SETS OF 200 AMP FUSES (PMH-9 SOURCE TRANSFER)

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## PAD-MOUNTED SWITCHGEARS





COMPARTMENT OF	RIENTATIONS		
	• TRAYER ATS	1     2     3     4       SWITCH     VFI     VFI     SWITCH	
	◆VISTA 9 I-DRIVE	VFI VFI VFI VFI SWITCH	
	•VISTA 9 NEXT GEN	4     3     2     1       VFI     VFI     SWITCH     SWITCH	
3			<b>₩.</b>
	PAD CONFIGURAT	IONS -	DEF X
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## APPROXIMATE WEIGHTS (LBS) FOR EACH TYPE OF GEAR

MANUAL PMH GEAR	2,200
MOTORIZED PMH GEAR	2,500
AUTOTRANSFER GEAR	2,500
TRAYER	2,160
MANUAL PME	1,900
COOPER VFI 5	1,500
COOPER VFI 9 & 12	2,725
COOPER PST	4,975

## SETTING SWITCHGEAR

BEFORE LIFTING THE SWITCHGEAR, BE SURE THAT ALL BARRIERS ARE SECURE. SWITCHES CAN BE OPEN OR CLOSED. FUSE HOLDERS SHOULD BE REMOVED TO ASSURE THEY CANNOT FALL OUT.

BOLT THE GEAR TO THE MOUNTING BOX.

REMOVE THE LIFTING EYES AND STORE IN THE FUSE STORAGE COMPARTMENT.

GROUNDING PMH (LIVE FRONT) SWITCHGEAR

INSTALL A DEEP DRIVEN GROUND (3 RODS) IN ONE CORNER OF THE MOUNTING BOX. INSTALL #2 COPPER RING BUS. CONNECT RING BUS TO GROUND ROD.

CONNECT RING BUS TO GROUND PLATE IN EACH CORNER OF GEAR WITH A SHORT PIECE OF 4/0 COPPER, A TWO BOLT CONNECTOR AND LUG. CONNECT CABLE CONCENTRIC NEUTRALS TO RING BUS WITH TWO BOLT CONNECTOR. DO NOT CONNECT THE CABLE NEUTRAL TO THE GROUNDING BAR.



#### GENERAL

ALL INSTALLATION GUIDELINES FOR MANUAL GEAR APPLY TO THIS EQUIPMENT. THE MOTOR OPERATORS FOR THIS GEAR SHOULD HAVE BEEN PREVIOUSLY INSTALLED AND TESTED. FOR MOTOR OPERATOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS, SEE DWG. 28.05-13.

THE POWER SUPPLY TO OPERATE THE MOTOR ON THIS IS IN THE SUPERVISORY CONTROL RTU CABINET. COMPLETE INSTALLATION AND TESTING OF THIS EQUIPMENT WILL REQUIRE COORDINATION WITH THE TELECOMMUNICATIONS DEPARTMENT.



#### SUPERVISORY CONTROL CABLE CONNECTIONS

REMOVE THE COVER FROM THE CABLE TROUGH BELOW THE MOTOR OPERATOR ON COMPARTMENT 2. (THIS COMPARTMENT CONTAINS THE INTERCONNECT CIRCUIT BOARD.) INSTALL THE CONTROL CABLE FROM THE SCADA RADIO CONTROL BOX (RTU) INTO THE MOTOR OPERATOR CABINET. CONNECT THE CABLE INTO THE BOTTOM OF THE INTERCONNECT CIRCUIT BOARD.



CABLE TO RTU

#### TESTING AND OPERATING

NOTE: THE FOLLOWING OPERATIONS MAY REQUIRE A SWITCHING ORDER FROM THE DISPATCHER. SUPERVISORY OPERATION CAN BE DONE BY A TELECOMMUNICATION TECHNICIAN USING AN EMULATOR TEST SET ON THE LOCAL RTU OR THE DISPATCHER.

#### CHECK COUPLING LINKAGE

PLACE THE LOCAL/REMOTE SWITCH IN LOCAL POSITION. OPEN AND CLOSE EACH 600A SWITCH USING THE MANUAL HANDLE. VERIFY CORRECT SWITCH BLADE OPERATION.

#### CHECK LOCAL MOTOR OPERATION (DECOUPLED)

LEAVE THE LOCAL/REMOTE SWITCH IN LOCAL POSITION. DECOUPLE THE OPERATOR. PRESS THE OPEN AND CLOSE BUTTONS AND VERIFY CORRECT OPERATION OF THE MOTOR OPERATOR. ATTEMPT OPERATION THROUGH SUPERVISORY. THE MOTOR SHOULD NOT RESPOND TO SUPERVISORY.

CHECK LOCAL MOTOR OPERATION (COUPLED) LEAVE THE LOCAL/REMOTE SWITCH IN LOCAL POSITION.



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0	10/29/10	ROBESON	GUINN	ELKINS
RE	VISED	BY	CK'D	APPR.

## INSTALLATION GUIDELINES - PMH TYPE GEAR

WITH ATTACHED PM MOTOR OPERATIONS



RECOUPLE THE OPERATOR. PRESS THE OPEN AND CLOSE BUTTONS AND VERIFY CORRECT OPERATION OF THE 600 AMP SWITCH.

<u>NOTE:</u> IF THE OPERATOR STALLS BEFORE THE 600 AMP SWITCH OPERATES, IT MAY BE NECESSARY TO ADJUST THE LIMIT SWITCH ACTUATING ARM. REFER TO THIS SECTION (28) ON PROCEDURES FOR ADJUSTING SWITCHES.

#### CHECK POSITION INDICATOR SWITCH OPERATION

VERIFY THAT SUPERVISORY SHOWS THE PROPER POSITION FOR THE 600A SWITCH (OPEN OR CLOSED). OPERATE THE 600A SWITCH AND OBSERVE THE POSITION INDICATOR SWITCHES. AS THE OPERATOR BEGINS TO TRAVEL, THE FIRST POSITION SWITCH SHOULD CHANGE. THE OPERATOR SHOULD CONTINUE TO TRAVEL AND OPERATE THE 600A SWITCH, THEN THE OTHER POSITION SWITCH SHOULD OPERATE, AND SUPERVISORY SHOULD SHOW THE NEW POSITION.

#### CHECK REMOTE MOTOR OPERATION

PLACE THE LOCAL/REMOTE SWITCH IN THE REMOTE POSITION. ATTEMPT TO OPERATE THE SWITCH WITH THE OPEN AND CLOSE PUSH BUTTONS. THE SWITCH SHOULD NOT OPERATE. OPERATE THE SWITCH THROUGH SUPERVISORY AND VERIFY CORRECT FUNCTIONS.

#### CHECK SUPERVISORY PICKUP OF FAULTED CIRCUIT INDICATORS

MOMENTARILY JUMPER ACROSS THE TWO CONDUCTORS ON THE TERMINAL STRIP IN EACH SWITCH COMPARTMENT. AS LONG AS THE JUMPER IS IN PLACE, SUPERVISORY SHOULD SHOW A FAULT IN THAT SWITCH COMPARTMENT.



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RE	VISED	BY	CK'D	APPR.

INSTALLATION GUIDELINES - PMH TYPE GEAR WITH ATTACHED PM MOTOR OPERATIONS



#### INSTALLATION GUIDELINES - PM MOTOR OPERATOR

THIS SECTION DEALS WITH THE INSTALLATION OF PM TYPE MOTOR OPERATORS ON S&C PMH SWITCHGEAR. THESE OPERATORS CAN ONLY BE INSTALLED ON S&C GEAR.

THE SWITCHGEAR MUST BE EQUIPPED WITH INTERNAL WIRE TROUGHS AND BLIND MOUNTING HOLES FOR FIELD INSTALLATION OF MOTOR OPERATORS. INSTALLATION OF MOTOR OPERATES ONTO SWITCHGEAR THAT IS NOT EQUIPPED THIS WAY WILL REQUIRE SPECIAL PROCEDURES AND SUPPORT FROM DISTRIBUTION ENGINEERING.

#### GENERAL PROCEDURES

REMOVE ALL COVERPLATES AND/OR PLUGS FROM THE SIDE OF THE SWITCHGEAR.

INSTALL THE MOTOR OPERATORS USING THE FACTORY INSTRUCTIONS PACKAGED WITH THE OPERATOR.

INSTALL THE CABLE RISER TROUGH BELOW THE MOTOR OPERATORS USING THE FACTORY INSTRUCTIONS.

PULL THE GROUND WIRE OUT OF THE INTERNAL WIRE TROUGH BELOW EACH OPERATOR. BOUND THE GROUND TO THE METAL PLATE IN THE MOTOR OPERATOR USING A 6-32 SCREW.

PULL THE FAULTED CIRCUIT INDICATOR CABLES OUT OF THE INTERNAL WIRE TROUGH BELOW THE COMPARTMENT 2 SWITCH OPERATOR, AND ROUTE INTO THE OPERATOR CABINET.

INSTALL THE INTERCONNECT CIRCUIT BOARD IN THE COMPARTMENT 2 SWITCH OPERATOR. PRESS THE STANDOFFS INTO THE SQUARE HOLES ON THE METAL PLATE, THEN SECURE THE BOARD TO THE STANDOFFS WITH SHEET METAL SCREWS.









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0	10/29/10	ROBESON	GUINN	ELKINS
RE	VISED	BY	CK'D	APPR.

INSTALLATION GUIDELINES -PM MOTOR OPERATOR



INSTALL THE CONTROL CABLES FROM EACH MOTOR OPERATOR TO THE INTERCONNECT CIRCUIT BOARD. CONFIRM THAT THE CABLES ARE IN PROPER POSITIONS ON THE SWITCH CONTROLLERS AND THE INTERCONNECT BOARD. USE WHITE PLASTIC CABLE TAGS TO IDENTIFY CABLES AS NECESSARY.

CONFIRM WHICH FAULT INDICATOR CABLE IS FROM WHICH COMPARTMENT, AND PLUG THE CABLES INTO THE APPROPRIATE RECEPTACLES ON THE INTERCONNECT CIRCUIT BOARD.

#### ADJUSTMENT OF LIMIT AND POSITION SWITCHES

THE LIMIT SWITCH SHUTS OFF POWER TO THE MOTOR AFTER THE 600A SWITCH HAS OPERATED. AN IMPROPERLY OPERATING LIMIT SWITCH CAN CAUSE THE MOTOR TO DRIVE BEYOND THE NORMAL STOP POINT, DAMAGING THE MECHANISM, OR STOP BEFORE THE 600A SWITCH HAS OPERATED, LEAVING THE OPERATOR "HUNG UP" BETWEEN POSITIONS.

THE POSITION INDICATOR SWITCHES TELL THE SUPERVISORY SYSTEM THE POSITION OF THE 600 AMP SWITCH. IMPROPERLY OPERATING SWITCHES CAN PROVIDE FAULTY POSITION DATA TO THE DISPATCHER.

FINAL ADJUSTMENTS FOR THESE SWITCHES CAN ONLY BE DONE BY OPERATING THE 600A SWITCHES. SET THE INITIAL POSITION BY CAREFULLY FOLLOWING THE INSTRUCTIONS IN THE S&C INSTALLATION MANUAL.

CHECK FINAL ADJUSTMENTS BY OBSERVING THE OPERATION OF THE SWITCHES WHILE OPERATING THE 600A SWITCH WITH THE MANUAL HANDLE. TURN THE HANDLE VERY SLOWLY AND CONFIRM THAT THE FIRST POSITION INDICATOR SWITCH OPERATES SHORTLY AFTER THE HANDLE IS MOVED, AND THAT THE 600A SWITCH CHANGES POSITION BEFORE THE LIMIT SWITCH OPERATES. THE OTHER POSITION INDICATOR SWITCH OPERATES. THE OTHER POSITION INDICATOR SWITCH OPERATE AS THE OPERATOR APPROACHES ITS FINAL POSITION IF THE LIMIT SWITCH CHANGES BEFORE THE 600 AMP SWITCH OPERATES, INCREASE THE SPECIFIED CLEARANCE BETWEEN THE ACTUATING ARM AND THE SWITCH LEVER SLIGHTLY. DO NOT INCREASE THIS CLEARANCE BY MORE THAN 1/8".

#### TESTING AND OPERATING

CONDUCT ALL INITIAL TEST PROCEDURES AS DESCRIBED ON DWGS. 28.05-11A AND THIS DRAWING.



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0	10/29/10	ROBESON	GUINN	ELKINS
RE	VISED	BY	CK'D	APPR.

INSTALLATION GUIDELINES -PM MOTOR OPERATOR **FLA** 28.05-11B

#### GENERAL

THIS GEAR USES VOLTAGE SENSORS ON THE INCOMING FEEDERS TO PROVIDE OPERATING POWER. NO EXTERNAL POWER SOURCE IS REQUIRED FOR THE MOTORS IN THE GEAR ITSELF. EXTERNAL POWER WILL BE REQUIRED FOR SUPERVISORY CONTROL EQUIPMENT IF IT IS USED WITH THIS GEAR.

NOTE: STANDARD FAULT INDICATORS ARE NOT USUALLY INSTALLED IN THIS GEAR SINCE IT HAS INTERNAL FAULT SENSING.

TIP: REMEMBER THAT THE SWITCH AND THE FUSE COMPARTMENTS ARE NOT IN THE SAME LOCATIONS FOR AUTOTRANSFER PMH-9 AS FOR MANUAL OR MOTOR OPERATED GEAR.

## CONTROLLER SETTINGS

ALL CONTROLLER SETTINGS BE SPECIFIED BY THE LOCAL ENGINEER. SET THE CONTROLLER USING THE PROCEDURES IN THE S&C MANUAL LOCATED IN THE DOOR POCKET.

NOTE: CONTROLLER SETTING PROCEDURES MAY VARY DEPENDING ON THE VINTAGE OF THE GEAR AND THE TYPE OF CONTROLLER USED. BE SURE THE CORRECT MANUAL IS BEING USED AND THAT ALL STEPS ARE FOLLOWED. EXTRA COPIES OF MANUALS CAN BE OBTAINED BY CONTACTING DISTRIBUTION STANDARDS.

#### TESTING AND OPERATION

CONDUCT ALL INITIAL TEST PROCEDURES AS DESCRIBED ON DWGS. 28.05-11A AND 28.05-11B. CONDUCT ADDITIONAL TEST AS DESCRIBED IN THE S&C MANUAL LOCATED IN THE DOOR POCKET.

NOTE: TEST PROCEDURES MAY VARY SOMEWHAT DEPENDING ON THE VINTAGE OF THE GEAR AND THE TYPE OF CONTROLLER USED. BE SURE THE CORRECT MANUAL IS BEING USED AND ALL TEST STEPS ARE FOLLOWED.

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RE	VISED	BY	CK'D	APPR.

INSTALLATION GUIDELINES -AUTOMATIC TRANSFER GEAR





- 1. DEAD FRONT CONSTRUCTION 600A BOLTED ELBOW (T-BODY).
- 2. CAN BE ADAPTED TO MOTOR CONTROLLER.
- 3. FITS MOUNTING BOX (CN 152199).
- 4. VACUUM BOTTLE SWITCH IS IN SERIES WITH SOLID BLADE SWITCH.
- 5. THE SOLID BLADE SWITCH HAS TWO POSITIONS, OPEN AND CLOSED.
- 6. LOOK THROUGH WINDOW, ABOVE BØ FOR VISUAL POSITION OF SOLID BLADE SWITCH.
- 7. USE LARGE 3Ø FAULT INDICATOR (CN 323457).
- 8. DOOR WILL LIFT OFF FOR ADDED ROOM.
- 9. T-BODY IS NON LOADBREAK (NO VOLTAGE AND NO CURRENT).
- 10. CABLE CAN BE ENERGIZED WHEN SWITCH IS OPEN.
- 11. ARRESTER INSTALLATION: WHEN A SWITCHGEAR HAS A NORMALLY OPEN SWITCH, ARRESTERS ARE TO BE INSTALLED ON THE CABLE CONNECTED TO THE OPEN SWITCH AND ON ONE ADDITIONAL 600 AMP WAY (TOTAL 6 ARRESTERS). WHEN A SWITCHGEAR HAS ONLY NORMALLY CLOSED SWITCHES, NO ARRESTERS ARE REQUIRED. ARRESTERS ARE ONLY REQUIRED WHERE AN OPEN SWITCH EXISTS.



USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

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0	10/29/10	ROBESON	GUINN	ELKINS
REVISED		BY	CK'D	APPR.

TRAYER PAD-MOUNTED SWITCHGEAR -600A SWITCH SIDE





1. WILL ACCEPT LOADBREAK BUSHING INSERT ( CN 326245).

2. USE 200A LOADBREAK ELBOW.

3. TAKES FULL RANGE CURRENT LIMITING FUSE:

FUSE SIZE	CATALOG NUMBER
90 AMP	CN 300552
150 AMP	CN 300554

4. 200 AMP FUSE MAY BE USED TO PROVIDE FAULT PROTECTION OF #4/0 CU PRIMARY. 200 AMP FUSE WILL NOT PROVIDE OVERLOAD PROTECTION OF LOADBREAK ELBOWS AND INSERTS. LOAD CURRENT SHOULD BE HELD TO 200 AMPS OR LESS.

5. KEEP WATER OUT OF FUSE HOLDER WHILE REPLACING FUSE.

6. COVER CAP IS AVAILABLE TO KEEP WATER OUT.

7. CAN BE STICK OPERATED.

8. ELBOW AND CABLE CAN BE ENERGIZED WHILE PARKED.



USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL AND SAFETY MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

REVISED		BY	CK'D	APPR.
0	10/29/10	ROBESON	GUINN	ELKINS
1	4/29/13	DANNA	DANNA	ADCOCK
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TRAYER PAD-MOUNTED SWITCHGEAR



CURRENT LIMITING FUSE SIDE



- 1. DEAD FRONT CONSTRUCTION 600A BOLTED NON LOADBREAK (NO VOLTAGE AND NO CURRENT), ELBOW (T-BODY).
- 2. TAKES LARGE MOUNTING BOX (71" X 77").
- 3. USES VACUUM BOTTLES FOR SWITCHES AND INTERRUPTERS.
- 4. USES LARGE 3Ø FAULT INDICATOR ( CN 323457).
- 5. USES U-OP CONSTRUCTION FOR VISIBLE OPEN ON 600A SIDE ( CN 326227).
- 6. USES STANDARD LOADBREAK ELBOWS AND BUSHING INSERTS ON 200 AMP SIDE.
- 7. OPERATIONS OR ENGINEERING WILL MAKE BREAKER SETTINGS.
- 8. BREAKER'S YELLOW HANDLE READS OPEN, CLOSED AND TRIPPED.
- 9. TRIPPED BREAKER MUST BE OPENED TO COCK MECHANISM BEFORE CLOSING.
- 10. CABLE AND ELBOWS CAN BE ENERGIZED WHILE BREAKER IS OPEN.
- 11. SEE DWGS. 28.06-07A AND 28.06-07B FOR COOPER VFI-5.
- 12. ARRESTER INSTALLATION: WHEN A SWITCHGEAR HAS A NORMALLY OPEN SWITCH, ARRESTERS ARE TO BE INSTALLED ON THE CABLE CONNECTED TO THE OPEN SWITCH AND ON ONE ADDITIONAL 600 AMP WAY (TOTAL 6 ARRESTERS). WHEN A SWITCHGEAR HAS ONLY NORMALLY CLOSED SWITCHES, NO ARRESTERS ARE REQUIRED. ARRESTERS ARE ONLY REQUIRED WHERE AN OPEN SWITCH EXISTS.



USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

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RE	VISED	BY	CK'D	APPR.

COOPER PAD-MOUNTED SWITCHGEAR

VFI 9, 12 & PST





#### INSTALLATION NOTES:

- 1. APPROXIMATE WEIGHT OF STAINLESS STEEL COOPER 15 KV VFI-5 IS 1500 LBS.
- 2. USE 75" X 42" MOUNTING BOX (CN 9220109880).
- 3. LOAD BEARING SURFACES OF SWITCHGEAR MUST SIT ON STEEL BEAMS AND CONCRETE OF MOUNTING BOX. SEE DWG 24 05-07
- 4. LIDS OF SOURCE AND TAP COMPARTMENTS MAY BE RAISED TO FACILITATE CABLE INSTALLATION.
- 5. USE THREE SINGLE-PHASE FAULT INDICATORS (CN 72).
- 6. INSTALL 200 AMP REDUCING TAP PLUG (CN 326426) ON EACH T-BODY FOR TESTING AND GROUNDING. INSTALL 200 AMP LOAD BREAK INSULATED CAP (CN 326246) OR ELBOW ARRESTER, (CN 220526) AS INDICATED ON WORK REQUEST.
- 7. THE VFI CONTROL IS POWERED BY INTERNAL CT'S. NO EXTERNAL POWER SOURCE IS REQUIRED.
- 8. WORK ORDER PREPARER TO SET BREAKER BASED ON COORDINATION STUDY.

#### CONTROL SETTINGS:

1. STANDARD VFI-5 CONTROL COMES WITH EF TCC CARDS FOR PHASE AND GROUND.

#### OPERATION NOTES:

- 1. DEAD FRONT CONSTRUCTION 600A BOLTED DEADBREAK (NO VOLTAGE AND NO CURRENT), ELBOW (T-BODY).
- 2. DE-ENERGIZE TAP BUSHINGS BEFORE PLACING THE VISIBLE BREAK ACCESSORY SWITCH INTO THE GROUND POSITION.
- 3. USES VACUUM BOTTLES FOR INTERRUPTERS.
- 4. BREAKER'S YELLOW (VFI1) HANDLE READS OPEN, TRIPPED AND CLOSED.
- 5. TRIPPED BREAKER MUST BE OPENED TO COCK MECHANISM BEFORE CLOSING.
- 6. IF A FAULT IS PRESENT WHEN THE BREAKER IS CLOSED, THE TRIP FREE MECHANISM WILL PREVENT THE MECHANISM FROM BEING HELD IN THE CLOSED POSITION.
- 7. WINDOW TO VIEW VISIBLE OPEN, VISIBLE GROUND IS IN TAP COMPARTMENT. USE A FLASHLIGHT.
- 8. VISIBLE BREAK (VB1) SWITCH HANDLE IS ON RIGHT SIDE WHEN FACING TAP COMPARTMENT.
- 9. BREAKER IS INTERLOCKED WITH VISIBLE BREAK SWITCH.
- 10. BREAKER MUST BE OPENED BEFORE VISIBLE BREAK CAN BE OPENED.
- 11. VISIBLE BREAK MUST BE CLOSED BEFORE BREAKER CAN BE CLOSED.
- 12. CABLE AND ELBOWS CAN BE ENERGIZED WHILE VISIBLE BREAK IS OPEN.

USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

NOTES

1. SEE DWG. 28.06-07A FOR DESIGN SPECIFICATIONS.

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RE	VISED	BY	CK'D	APPR.



#### ALTERNATIVES TO LIVE FRONT SWITCHGEAR REPLACEMENT

1. REVIEW OUTAGE AND INFRARED DATA TO IDENTIFY CRITICAL COMPONENTS.

- 2. REVIEW S&C PMH SERVICE PUBLICATION.
- 3. LIGHTNING ARRESTERS
  - A. REMOVE OR REPLACE LIGHTNING ARRESTERS THAT HAVE ISOLATORS.
  - B. REMOVE LIGHTNING ARRESTERS FROM SWITCHGEAR THAT IS NOT A NORMAL OPENING POINT.
  - C. FOR SWITCHGEAR THAT CANNOT BE DE-ENERGIZED WITHOUT A CUSTOMER OUTAGE, CUT AND REMOVE ARRESTER LEAD FROM SWITCHGEAR THAT IS NOT A NORMAL OPENING POINT.
  - D. REPLACE LIGHTNING ARRESTERS IN SWITCHGEAR THAT IS A NORMAL OPENING POINT.
  - E. FOR SWITCHGEAR THAT CANNOT BE DE-ENERGIZED WITHOUT A CUSTOMER OUTAGE, CUT AND REMOVE ARRESTER LEAD FROM SWITCHGEAR THAT IS A NORMAL OPENING POINT. INSTALL SCOUT ARRESTERS IN LIEU OF ARRESTERS IN THIS SWITCHGEAR.
    - I. SCOUT ARRESTER LOCATIONS.
      - 1. INSTALL AN ELBOW ARRESTER IN THE FIRST PAD-MOUNTED TRANSFORMER FROM EACH EACH FUSE OF SWITCHGEAR.
        - 2. INSTALL LINE ARRESTERS AND ASSOCIATED GROUND RODS ON FIRST PRIMARY POLE ON EACH SIDE OF EACH FEEDER RISER POLE.

#### 4. TERMINATORS

- A. REPLACE TERMINATORS TOUCHING BARRIER BOARDS. CABLE SPLICE MAY BE REQUIRED TO PROPERLY POSITION TERMINATOR.
- B. REPLACE TERMINATORS WITH VISIBLE TRACKING.
- C. REPLACE TERMINATORS WITH AUDIBLE TRACKING.
- D. REPLACE TERMINATORS WITH SPLIT SHEDS, SURFACE CRACKING, OR OTHER VISIBLE DAMAGE.
- E. REPLACE TERMINATORS WITH ORGANIC GROWTH.
- F. REMOVE, BRUSH AND REINSTALL HEATING SPADES.

5. FUSES

- A. IF FUSES ARE SEALED IN PLASTIC AND DRY, OK TO USE.
- B. IF FUSES ARE NOT SEALED IN PLASTIC OR WET, SCRAP.

#### 6. FUSE HOLDERS

- ▶ A. REPLACE FUSE HOLDERS THAT ARE NO LONGER TRANSPARENT.
  - B. REPLACE FUSE HOLDERS THAT NO LONGER HAVE A SMOOTH FINISH ON FIBERGLASS TUBE. C. REPLACE FUSE HOLDERS WITH RUSTED END FITTINGS.

#### 7. BARRIER BOARDS

- A. REPLACE MISSING BARRIER BOARDS.
- B. POSITION BARRIER BOARDS PROPERLY
- C. VERIFY FRONT BARRIER BOARDS ARE LEFT IN 'VERTICAL' (NOT 'SLIDE') POSITION .
- D. REPLACE DISCOLORED AND DAMAGED BARRIER BOARDS.

#### 8. SWITCHGEAR

- A. REMOVE VEGETATION FROM INSIDE SWITCHGEAR.
- B. REMOVE OR PRUNE VEGETATION TOUCHING OUTSIDE OF SWITCHGEAR.
- C. REMOVE OR PRUNE VEGETATION INTERFERING WITH SAFE OPERATION OF SWITCHGEAR.
- D. REMOVE DEBRIS FROM TOP OF SWITCHGEAR.
- E. ADD FIRE ANT KILLER INSIDE SWITCHGEAR.
- F. INSTALL ADDITIONAL VENTILATION IN SWEATING SWITCHGEAR.
- G. REPLACE SWITCHGEAR WITH SOOT FROM PREVIOUS FAULT.
- H. REPLACE SWITCHGEAR WITH ORGANIC GROWTH ON INSULATORS.
- I. REPLACE SWITCHGEAR WITH VISIBLE DAMAGE TO INSULATORS.
- J. REPLACE SWITCHGEAR WITH DETERIORATED OR DAMAGED ARC CHUTES ON SWITCH SIDE.
- K. REPLACE SWITCHGEAR WITH CABINET RUST THROUGH.

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1	8/27/12	ROBESON	BURLISON	ELKINS
0	6/17/10	ROBESON	GUINN	ELKINS
RE	VISED	BY	CK'D	APPR.

# ALTERNATIVES TO LIVE

FRONT SWITCHGEAR REPLACEMENT





- 1. LIVE FRONT CONSTRUCTION.
- 2. TORQUE BOLTS WITH BELLEVILLE WASHERS AT 40 FOOT-POUNDS.
- 3. USE LARGE FAULT INDICATORS CN 323457.
- 4. TRAIN CABLE SO TERMINATOR DOES NOT TOUCH (RED) BARRIER BOARD.
- 5. PHASING ABC-CBA LEFT TO RIGHT.
- 6. TERMINATION CAN BE ENERGIZED WHEN SWITCH IS IN OPEN POSITION.
- 7. FITS MOUNTING BOX CN 152199.

8. BARRIER BOARDS <u>SHALL</u> BE LEFT IN <u>VERTICAL</u> POSITION BEFORE CLOSING/ LOCKING DOORS.

9. SEE DWG. 28.04-05 FOR COMPATIBLE UNITS.



USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL OR SAFETY MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

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0	10/29/10	ROBESON	GUINN	ELKINS
RE	VISED	BY	CK'D	APPR.

PAD-MOUNTED SWITCHGEAR - PMH 600A AIR BREAK SWITCH





- 1. LIVE FRONT CONSTRUCTION.
- 2. TORQUE BOLTS WITH BELLEVILLE WASHERS AT 40 FOOT-POUNDS.
- 3. TRAIN CABLES SO TERMINATOR DOES NOT TOUCH (RED) BARRIER BOARD.
- 4. PHASING ABC-CBA LEFT TO RIGHT.
- 5. CAN USE S&C FUSE SML-20 OR SML-4Z DEPENDING ON FUSE HOLDER. UNITS PURCHASED SINCE AUGUST 1996 REQUIRE SML-20 FUSE.
- 6. TERMINATOR CAN BE ENERGIZED WHEN SWITCH IS IN OPEN POSITION.

7. BARRIER BOARDS <u>SHALL</u> BE LEFT IN <u>VERTICAL</u> POSITION BEFORE CLOSING/ LOCKING DOORS.



USE PROPER SAFETY PROCEDURES AS OUTLINED IN ACCIDENT PREVENTION MANUAL OR SAFETY MANUAL. BEFORE WORKING ON SWITCHGEAR OR CABLE, GROUND IT.

 8. INTERNAL INSULATORS MAY BE REPLACED IN FIELD AS REQUIRED: TOP INSULATOR SWITCH COMPARTMENT - CN 9220260112 BOTTOM INSULATOR FUSE AND SWITCH COMPARTMENT - CN 9220260113 TOP INSULATOR FUSE COMPARTMENT - CN 922026114

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1	10/7/13	DANNA	DANNA	ADCOCK	
0	10/29/10	ROBESON	GUINN	ELKINS	
REVISED		BY	CK'D	APPR.	

PAD-MOUNTED SWITCHGEAR - PMH

FUSE BAYS









#### CN 9220237002

## NOTES:

- 1. REPLACEMENT SWITCHGEAR FOR EXISTING ESCO 3 WAY SWITCH.
- 2. SWITCHGEAR IS FOR NETWORK APPLICATIONS ONLY AND IS TO BE INSTALLED ON NETWORK FEEDERS.
- 3. FEEDER CABLE IS TERMINATED TO FRONT OF SWITCHGEAR USING 600 AMP BOLTED ELBOW (T-BODY).
- 4. INSTALL FAULT INDICATORS (CN 323257) ON ALL PRIMARY CABLES.
- 5. SWITCHGEAR IS A TWO POSITION DISCONNECT (OPEN/CLOSE) WITH NO GROUND POSITION.
- 6. 200 AMP BUSHINGS LOCATED ON TOP OF GEAR ARE INTERNALLY CONNECTED TO 600 AMP BUSHINGS LOCATED ON THE FRONT OF THE GEAR. 200 AMP BUSHINGS WILL SERVE AS POINTS TO VOLTAGE TEST AND APPLY GROUNDS TO THE SWITCHGEAR ONCE (1) THE SWITCH HAS BEEN OPENED VIA THE SWITCH OPERATING MECHANISM AND (2) THE VISIBLE DISCONNECT INDICATES OPEN.
- 7. SWITCHGEAR CAN BE OPERATED VIA A REMOTE CONTROL PENDENT OR STICK OPERATED FROM TOP SIDE OF GEAR.
- 8. SWITCHGEAR IS SCADA OPERATED AND MONITORED.
- 9. CROSS BOND LC SHIELD GROUND BRAID AND CONNECT TO 4/0 CU GROUND GRID IN VAULT.
- 10. INSTALL ELBOW ARRESTERS ON ALL CABLES USING 200 AMP BUSHING INTERFACE ON T-BODY.
- 11. SEE DWG. 28.09-05A FOR FRONT, RIGHT AND REAR VIEWS AND ONE-LINE DIAGRAM.

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1	12/7/12	DANNA	DANNA	ADCOCK	TRAYER 3-WAY VACUUM LOADBREAK SWITCH		iieryy®
0	10/29/10	ROBESON	GUINN	ELKINS			DWG.
R	EVISED	BY	CK'D	APPR.		FLA	28.09-05B









#### LIVE FRONT SWITCHGEAR INSPECTION

I. BARRIER BOARDS
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- A. INTACT B. HARDWARE NOT LOOSE
- C. BOARDS ARE NOT WICKING (GETTING MOISTURE INSIDE BOARDS) OR COMING APART
- D. CHECK INDIVIDUAL PHASE DIVIDER BARRIERS
- E. LOOK FOR TRACKING OF ELECTRICITY ALONG BARRIERS/BOARDS
- 2. CHECK FOR CONTAMINATION A. SEE HEAVY WHITE POWER RESIDUE ON PIECES OF EQUIPMENT
- 3. CHECK FOR PROPER CABLE TRAINING
- 4. NEUTRALS AND GROUNDS ATTACHED/CORRODED
- 5. ANY APPARENT HARDWARE PROBLEMS
- 6. CHECK INSULATORS ON SWITCH CAM A. NOT CONTAMINATED
  - B. NOT CHIPPED, CRACKED, OR DAMAGED
- 7. CHECK ARRESTERS
  - A. NO ARRESTERS WITH ISOLATORS
  - B. WIRE CONNECTED
  - C. PORCELAIN
    - I. CRACKED
    - II. BROKEN
  - D. POLYMER
    - I. NOT CONTAMINATED
    - II. NOT DAMAGED
- 8. CHECK FOR LATCH OPERATING PROPERLY
- 9. CHECK FOR PADLOCKS ON ALL DOORS AND SWITCH HANDLES
- 10. CHECK THAT SWITCH BLADES ARE NOT BURNED OR DISCOLORED (OPEN POSITION ONLY)
- 11. CHECK THAT ARC CHUTES ARE NOT BURNED, CONTAMINATED OR PRESENCE OF OZONE (CHALKY WHITE) DETERIORATION
- 12. LOOK FOR TRACKING OF TERMINATIONS
- 13. CHECK FOR PROPER SPACING BETWEEN TERMINATORS AND BARRIER BOARDS
  - A. 15 KV
    - I. 1 INCH FROM ENERGIZED PARTS TO BARRIERS
    - II. 1/2 INCH FROM TERMINATOR SKIRTS TO BARRIERS
    - III. 6 INCHES FROM ENERGIZED PARTS TO ELECTRICAL GROUND OR FROM PHASE TO PHASE COMPONENTS
  - B. 25 KV
    - I. 2-1/4 INCHES FROM ENERGIZED PARTS TO BARRIERS
    - II. 1-1/4 INCHES FROM TERMINATOR SKIRTS TO BARRIERS
    - III. 7-1/2 INCHES FROM ENERGIZED PARTS TO ELECTRICAL GROUND OR FROM PHASE TO PHASE COMPONENTS
- 14. CHECK PAD AND SWITCH FOR ENCLOSURE INTEGRITY
- 15. CHECK FOR LEVEL PAD
- 16. CHECK FOR PLANT AND ANIMAL INTRUSION
- 17. CHECK FOR PROPER WORKING CLEARANCES FOR SWITCHES AND FUSES A. SIDES - 3 FEET
  - B. FRONT AND BACK 10 FEET
- 18. CHECK FOR WARNING LABELS INSIDE AND OUTSIDE. APPLY NEW LABELS AS NEEDED ON EXTERIOR OR INTERIOR DOOR.
- 19. CHECK FOR SEVERE RUSTING ON EXTERIOR OF CABINET (HINGES, PENTA LATCH, SWITCH HANDLE ACCESS DOORS)
- 20. RECORD MANUFACTURER, MANUFACTURE DATE AND SERIAL NUMBER.
- 21. RECORD FUSES WHICH REQUIRE LOAD BUSTER TOOL

22. LEAVE ALL BARRIERS IN VERTICAL (NOT 'SLIDE') POSITION BEFORE CLOSING/ LOCKING DOORS.



LIVE FRONT SWITCHGEAR VISUAL INSPECTION



#### SWITCHES

SWITCHES ARE RATED A FULL 600 AMPS CONTINUOUS LOAD, WITH OVERLOAD RATINGS. THEY CAN BE OPENED OR CLOSED UNDER FULL LOAD. OPERATING THE SWITCH WITH MORE THAN 600 AMPS CAN SIGNIFICANTLY SHORTEN SWITCH LIFE, AND SHOULD BE AVOIDED.

#### FUSE HOLDERS

<u>SML-4Z NON-LOADBREAK:</u> THESE ARE THE OLDEST STYLE FUSE HOLDERS USED IN OUT PAD-MOUNTED SWITCHGEAR. THESE HOLDERS DO NOT HAVE BUILT-IN ARC INTERRUPTERS AND DO HAVE LOADBREAK HORNS FOR USE WITH S&C LOADBREAK TOOL. THIS FUSE HOLDER IS RATED 200A CONTINUOUS

SML-20/SME-20/SML-4Z LOADBREAK: THESE FUSE HOLDERS HAVE BUILT-IN INTERRUPTERS AND NO LOADBREAK HORNS. THESE FUSE HOLDERS ARE RATED AT 200A CONTINUOUS. (THE SML-20 FUSE END FITTING USED IN THE PMH SWITCHGEAR ARE NOT INTERCHANGEABLE WITH THE SME-20 END FITTINGS USED IN THE PME SWITCHGEAR. THE SAME FUSE IS USED IN BOTH FUSE HOLDERS.)

NOTE: IT IS VERY IMPORTANT TO TIGHTEN THE 5/16" RETAINING BOLT ON THE TOP SIDE OF FUSE END FITTING ON THE PMH AND PME SWITCHGEAR.

#### FUSE STORAGE

COMPARTMENTS ARE PROVIDED TO STORE BOTH THE COMPLETE FUSE NOTRER AND REPLACEMENT FUSES.

REPLACEMENT FUSE CARTRIDGES CAN BE STORED IN THE POCKET ON THE FUSE SIDE DOORS, OR CARRIED BY OPERATING PERSONNEL.

ON S&C GEAR, COMPLETE FUSE HOLDERS CAN BE STORED IN THE COMPARTMENT ON THE SWITCH SIDE BETWEEN THE OUTSIDE SWITCH BARRIER AND THE SIDE OF THE CEAR. NOTE: SOME OLDER GEAR MIGHT NOT HAVE COMPARTMENTS FOR THE HOLDERS.

ON MALTON GEAR, COMPLETE FUSE HOLDERS CAN BE STORED ON THE HOOKS ON THE FRONT BARRIERS OF THE FUSE COMPARTMENTS.





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BY

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FUSE STORAGE (FMO)









#### FUSE OPERATION FOR ALL PMH LIVE FRONT SWITCH GEAR (SM-4S, SM-4Z, SML-4Z AND SML-20 FUSE HOLDERS)

- 1. FOLLOW ALL SAFETY (APM MANUAL) AND SWITCHING & TAGGING PROCEDURES.
- 2. A GRAPPLER TOOL (CN 266120) WITH AN APPROVED INSULATED STICK SHALL BE USED TO OPEN AND CLOSE FUSE DOOR. 3. WHEN REMOVING FUSE DOOR FROM SWITCH GEAR:
  - UPPER AND LOWER SWITCH ASSEMBLY MUST BE CONSIDERED ENERGIZED

• GRAPPLER TOOL WITH INSULATED STICK SHALL BE USED TO REMOVE AND INSTALL FUSE DOOR ASSEMBLY.

FUSING (REF. DWG. 28.08-21B)

- STEP 1 LOOSEN THE TWO SCREWS WHICH SECURE LOWER END FITTING TO FERRULE OF FUSE HOLDER. (SEE FIG. 1)/
- STEP 2 LOOSEN CLAMP BOLT AND PRY CLAMP APART SLIGHTLY. (SEE FIG. 2)
- STEP 3 UNSCREW AND REMOVE SNUFFLER. A BAR OR WRENCH HANDLE CAN BE USED TO LOOSEN SNUFFLER. (SEE FIG.
- STEP 4 UNSCREW AND WITHDRAW HOLDER CAP, SPRING, AND CABLE ASSEMBLY. (SEE FIG. 4)
- STEP 5 SCREW REFILL UNIT OF CORRECT AMPERE RATING HAND TIGHT ONTO END OF SPRING AND CABLE ASSEMBLY. DO NOT USE A WRENCH. CHECK TO SEE THAT KNURLED COLLAR AT OTHER END OF REFILL UNIT IS TIGHT AGAINST SHOULDER OF REFILL UNIT FERRULE. (SEE FIG. 5)
- STEP 6 INSERT THIS COMBINATION INTO FUSE HOLDER AND SCREW HOLDER CAP DOWN TIGHT. THE FINAL 1/4 TURN SHOULD BE MADE WITH A WRENCH. (SEE FIG. 6)
- STEP 7 CAREFULLY DRAW REFILL PULL CORD (WHICH COMES WITH FUSE) OUT THROUGH FUSE HOLDER AGAINST SPRING TENSION, UNTIL CONTACT FINGERS OF FUSE HOLDERS LATCH BEHIND KNURLED COLLAR OF REFILL UNIT. REFEASE PULL CORD SLOWLY, PERMITTING COLLAR TO REST ON SPRING CONTACT FINGERS. REMOVE AND DISCARD PULL CORD. (SEE FIG. 7)

STEP 8 REPLACE SNUFFLER, SCREWING IN FIRMLY. FINAL 1/4 TURN SHOULD BE MADE WITH A BAR OR WRENCH HANDLE. (SEE FIG. 3)

STEP 9 TIGHTEN CLAMP BOLT. (SEE FIG. 2)

STEP 10 TIGHTEN TWO SCREWS WHICH SECURE LOWER END AND FITTING TO LOWER REPRULE OF FUSE HOLDER. (SEE FIG. 1)

REFUSING BLOWN FUSES (REF. DWG. 28.08-21B)

- STEP 1 LOOSEN THE TWO SCREWS WHICH SECURE LOWER END FITTING TO TERRUPE OF FUSE HOLDER. (SEE FIG. 1)
- STEP 2 LOOSEN CLAMP BOLT AND PRY CLAMP APART SLIGHTLY. (SEE PLC: 2)-
- STEP 3 UNSCREW AND REMOVE SNUFFLER. A BAR OR WRENCH HAADLE CAD BE USED TO LOOSEN SNUFFLER. (SEE FIG. 3)
- STEP 4 REMOVE AND DISCARD BLOWN REFILL UNIT.
- STEP 5 UNSCREW AND WITHDRAW HOLDER CAP TO WHICH IS ANTACHED THE SPRING AND CABLE ASSEMBLY. (SEE FIG. 4)
- STEP 6 UNSCREW AND DISCARD THE ARCING TERMINAD OF THE BLOWN REFILL UNIT ATTACHED TO THE SPRING AND CABLE ASSEMBLY. WIPE CLEAN ALL CONTACT SURFACES WITH CLEAN SLOTH. (IF THE SPRING ASSEMBLY IS DAMAGED, INSTALL A NEW SM4S FUSE HOLDER AND RETURN DAMAGED FUSE HOLDER TO THE MATERIAL SALVAGE SHOP).
- STEP 7 AFTER A FAULT, THE INTERIOR OF/THE GLASS EBOXY TUBE OF THE FUSE HOLDER SHOULD BE WIPED TO REMOVE ANY DUST AND METALLIC PARTICLES THAT MAY BE PRESENT. THE SILENCER SHOULD BE INVERTED TO DISCARD DEBRIS AND CAREFULLY INSPECTED BEFORE REUSING. OF INTERNAL PARTS OF SILENCER ARE BADLY BURNED AS A RESULT OF AN EXTREMELY HIGH FAULT, INSTALL A NEW FUSE HOLDER AND SCRAP DAMAGED FUSE HOLDER.
- STEP 8 REASSEMBLE FUSE HOLDER AS DESCRIBED IN STEPS 5 THROUGH 10 UNDER FUSING.

REFUSING UNBLOWN FUSES (REF. DVG. 28.08-21B)

- STEP 1 LOOSEN THE TWO SCREWS WHICH SECURE LOWER END FITTING TO FERRULE OF FUSE HOLDER. (SEE FIG. 1)
- STEP 2 LOOSEN CLAMP BOLT AND PRY CLAMP APART SLIGHTLY. (SEE FIG. 2)
- STEP 3 UNSCREW AND REMOVE SNUFFLER. A BAR OR WRENCH HANDLE CAN BE USED TO LOOSEN SNUFFLER. (SEE FIG. 3)
- STEP 4 INSERT A CORD OR WIRE THROUGH SMALL HOLE IN THE PROJECTING THREAD PORTION OF REFILL UNIT FERRULE. PULL REFILL UNIT OUTWARD ABOUT 1/8".
- STEP 5 UNSCREW AND REMOVE KNURLED COLLAR FROM REFILL UNIT AND ALLOW REFILL UNIT TO SLIDE SLOWLY BACK INTO FUSE HOLDER.
- STEP 6 UNSCREW AND WITHDRAW HOLDER CAP, SPRING, AND CABLE ASSEMBLY AND REFILL UNIT. UNSCREW REFILL UNIT FROM SPRING AND CABLE ASSEMBLY. REPLACE WITH REFILL UNIT OF CORRECT AMPERE RATING, AND REASSEMBLE AS DESCRIBED IN STEPS 5 THROUGH 10 UNDER FUSING.

Addbuster tool must be used to open all SM-4S fuse holders.

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NOTES

# FUSING INSTRUCTIONS FOR



S & C (SM-4S) FUSE HOLDERS (FMO)



FUSE O	DPERATION FOR ALL PMH LIVE FRONT SWITCH GEAR (SM-4S, SM-4Z, SML-4Z AND SML-20 FUSE HOLDERS)
1. FOLL 2. A GR FUSE 3. WHE	LOW ALL SAFETY (APM MANUAL) AND SWITCHING & TAGGING PROCEDURES. RAPPLER TOOL (CN 266120) WITH AN APPROVED INSULATED STICK SHALL BE USED TO OPEN AND CLOSE E DOOR. EN REMOVING FUSE DOOR FROM SWITCH GEAR:
	• UPPER AND LOWER SWITCH ASSEMBLY MUST BE CONSIDERED ENERGIZED.
	• GRAPPLER TOOL WITH INSULATED STICK SHALL BE USED TO REMOVE AND INSTALL FUSEDOOR ASSEMBLY.
FUSING	<u>G</u> (SEE DWG. 28.08-19B)
STEP 1 STEP 2 STEP 3	UNSCREW AND REMOVE SILENCER. A BAR OR WRENCH HANDLE CAN BE USED TO LOSEN SILENCER. (SEE FIG. 1) UNSCREW AND WITHDRAW HOLDER CAP, SPRING, AND CABLE ASSEMBLY. (SEE FIG. 2) SCREW PEELL UNIT OF CORRECT AMPERE PATING HAND TIGHT ONTO EXPLOY SPRING AND CARLE
STEP 4	ASSEMBLY. <u>DO NOT USE A WRENCH.</u> CHECK TO SEE THAT KNURLED COLLAR AT OTHER END OF REFILL UNIT IS TIGHT AGAINST SHOULDER OF REFILL UNIT FERRULE. (SEE FIG. 3)
STEP 5	TURN SHOULD BE MADE WITH A WRENCH. (SEE FIG. 4) CAREFULLY DRAW REFILL PULL CORD (WHICH COMES WITH FUSE) OUT THROUGH FUSE HOLDER, AGAINST SPRING TENSION, UNTIL CONTACT FINGERS OF FUSE HOLDERS LATCH BEHIND KNURLED COLLAR OF REFILL UNIT. RELEASE PULL CORD SLOWLY, PERMITTING COLLAR TO REST ON SPRING CONTACT FINGER. REMOVE AND DISCARD PULL CORD. (SEE FIG. 5)
STEP 6	REPLACE SILENCER, SCREWING IN FIRMLY. FINAL 1/4 TURN SHOULD BE MADE WITH A BAR OR WRENCH HANDLE. (SEE FIG. 1)
REFUSI	ING BLOWN FUSES (REF. DWG. 28.08-19B)
STEP 1	UNSCREW AND REMOVE SILENCER. A BAR OR WRENCH HANDLE CAN BE USED TO LOOSEN SILENCER. (SEE FIG. 1)
STEP 2 STEP 3	REMOVE AND DISCARD BLOWN REFILL UNIT UNSCREW AND WITHDRAW HOLDER CAP TO WHICH IS ATTACHED THE SPRING AND CABLE ASSEMBLY. (SEE FIG. 2)
STEP 4	UNSCREW AND DISCARD THE ARCING TERMINAL OF THE BLOWN REFILL UNIT ATTACHED TO THE SPRING AND CABLE ASSEMBLY. WIPE CLEAN ALL CONTACT SURFACES WITH CLEAN CLOTH. (IF THE SPRING ASSEMBLY IS DAMAGED, INSTALL A NEW RUSE HOLDER AND RETURN DAMAGED FUSE HOLDER TO THE MATERIAL SALVACE SHOP.)
STEP 5	AFTER A FAULT, THE INTERIOR OF THE CLASS-EPOXY TUBE OF THE FUSE HOLDER SHOULD BE WIPED TO REMOVE ANY DUST AND METALLIC PARTICLES THAT MAY BE PRESENT. THE SILENCER SHOULD BE INVERTED TO DISCARD DEBRIS AND CAREFULLY INSPECTED BEFORE REUSING. IF INTERNAL PARTS OF SILENCER ARE BADLY BURNED AS A RESULT OF AN EXTREMELY HIGH FAULT, INSTALL A NEW FUSE HOLDER AND SCRAP DAMAGER FUSE HOLDER. BEASSEMBLE FUSE HOLDER AS DESCRIBED IN STEPS 3 THROUGH 6 UNDER FUSING
REFUSI	ING UNBLOWN FUSES (SEE DWG, 28.08-19B)
STEP 1	UNSCREW AND REMOVE SUFFICER A BAR OF WRENCH HANDLE CAN BE USED TO LOOSEN SUFFICER
STEP 2	(SEE FIG. 1) INSERT A CORP OF WIRE THROUGH SMALL HOLE IN THE PROJECTING THREAD PORTION OF REFILL UNIT
STEP 3	FERRULE. PULL REFUL UNIT OUTWARD ABOUT 1/8". 5 UNSCREW AND REMOVE KNURLED COLLAR FROM REFILL UNIT AND ALLOW REFILL UNIT TO SLIDE SLOWLY
STEP 4	BACK INTO FUSE HOLDER. UNSCREW AND WITHDRAW HOLDER CAP, SPRING, AND CABLE ASSEMBLY AND REFILL UNIT.
	UNSCREW REFILL UNIT FROM SPRING AND CABLE ASSEMBLY. REPLACE WITH REFILL UNIT OF CORRECT AMPERE RATING, AND REASSEMBLE AS DESCRIBED IN STEPS 3 THROUGH 6 UNDER FUSING.
NOTE:	SML-42-FDSE DOORS ASSEMBLIES ARE NOT INTERCHANGEABLE WITH SML-2 OR SME-20 FUSE DOOR ASSEMBLIES.
REPLAC	CEMENT CATALOG NUMBERS FOR SML-4Z: CN 230853
$\checkmark$	
	FUSING INSTRUCTIONS FOR S & C (SM 4Z AND SML 4Z) FUSE HOLDERSPuke Energ



FUSE OPERATION FOR ALL PMH LIVE FRONT SWITCH GEAR (SM-4S, SM-4Z, SML-4Z AND SML-20 FUSE HOLDERS)

- 1. FOLLOW ALL SAFETY (APM MANUAL) AND SWITCHING & TAGGING PROCEDURES.
- 2. A GRAPPLER TOOL (CN 266120) WITH AN APPROVED INSULATED STICK SHALL BE USED TO OPEN AND CLOSE FUSE DOOR.
- 3. WHEN REMOVING FUSE DOOR FROM SWITCH GEAR:
  - UPPER AND LOWER SWITCH ASSEMBLY MUST BE CONSIDERED ENERGIZED.
  - GRAPPLER TOOL WITH INSULATED STICK SHALL BE USED TO REMOVE AND INSTALL FUSE DOOR ASSEMBLY.

#### FUSING

- STEP 1 THE LOWER END FITTING MUST BE ATTACHED FIRST. UNSCREW AND DISCARD THE RED CAP LOCATED ON THE LOWER END OF THE FUSE. NEXT, SLIP THE LOWER END FITTING OVER THE UPPER END OF THE FUSE AND SLIDE IT DOWN UNTIL THE LOCATING SLOT IS ALIGNED WITH THE LOCATING PIN ON THE LOWER FERRULE. SEAT THE LOWER END FITTING AGAINST THE SHOULDER OF THE LOWER FERRULE. THEN THREAD THE SILENCER ONTO THE LOWER END FITTING AND SCREW IT ON FIRMLY. THE FINAL FRACTIONAL TURN SHOULD BE MADE WITH A BAR OR WRENSH MANDLE.
- STEP 2 SLIP THE UPPER END FITTING OVER THE FUSE. ALIGN THE LOCATING PIN (INSIDE THE UPPER END FITTING) WITH THE LOCATING SLOT IN THE FUSE AND SEAT THE UPPER END FITTING FIRMLY AGAINST THE UPPER END OF THE FUSE. TIGHTEN THE CLAMP SCREW FIRMLY.

#### REFUSING

WHEN THE FUSE OPERATES, THE FUSE UNIT DOES NOT SWING OPEN BUT THE BLOWN-FUSE INDICATOR MOVES TO THE EXTENDED POSITION, PROVIDING VISUAL EVIDENCE THAT THE FUSE IS BLOWN. MOVE THE FUSE UNIT TO THE OPEN POSITION AND THEN REMOVE IT FROM THE MOUNTING.

LOOSEN THE UPPER-END FITTING CLAMP SCREW, AND PRY THE CLAMP APART SLIGHTLY USING A SCREWDRIVER SLIDE THE UPPER END FITTING OFF THE UPPER END OF THE FUSE. THEN UNSCREW AND REMOVE THE SILENCER. SLIDE THE LOWER END FITTING OFF THE UPPER END OF THE FUSE.

NEXT, ATTACH THE END FITTINGS AND SIDENCER TO A NEW FUSE, FOLLOWING THE ILLUSTRATIONS ON DWG. 28.08-21B. A BLOWN FUSE CANNOL BE SALVAGED. DISCARD IT.

NOTES:

- 1. SEE DWG. 28.08-21B FOR HUSTRATIONS.
- 2. S & C SMU-20 FUSES HAVE SILVER OR NICKEL-CHROME FUSIBLE ELEMENTS THAT ARE NONDAMAGEABLE; CONSEQUENTLY, THERE IS NO NEED TO REPLACE UNBLOWN COMPANION FUSES ON SUSPICION OF DAMAGE FOLLOWING A FUSE OPERATION.
- 3. REUSE SILENCER, UPPER AND LOWER END FITTINGS IF NOT SEVERELY PITTED OR DAMAGED.
- 4. FUSE FITTING (CN 230851) INCLUDES UPPER END FITTING, LOWER END FITTING AND SILENCER.

REPLACEMENT) CATALOG NUMBERS FOR SML-20 FUSE DOOR ASSEMBLY: CN 230851

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## FUSING INSTRUCTIONS FOR S & C (SML-20) FUSE FOR LIVE FRONT PAD-MOUNTED SWITCHGEAR (PMH) (FMO)







FEED THRU BUSHINGS				
COMPATIBLE UNIT	CATALOG NUMBER	DESCRIPTION		
FDTHR153WWMTF	326223	FEED THRU TAP, 3-WAY, FOR 200 AMP ELBOW TERMINATORS WITH MOUNTING BRACKET		
FDTHR154WWMTF	326224	FEED THRU TAP, 4-WAY, FOR 200 AMP ELBOW TERMINATORS WITH MOUNTING BRACKET		

1. USE 600 AMP SWITCH ANGLE BRACKET ( CN 070282) FOR MOUNTING OF FEED THRU BUSHING BRACKET.

2. GROUND BRACKET TO #2 CU GROUND GRID.

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# LOADBREAK JUNCTION -BRACKET MOUNTED



FAULT INDICATOR 37-5/8" AULT INDICATOR
INDICATOR 46" 42"
Image: Constraint of the second se
FRONT VIEW
HOLES HOLES
RELAY BOX TO REMOTE CONTROL BOX OPEN OPEN OPEN
CONNECTION TO RTU BOX
NOTES:
1. EXISTING THREE-WAY 600 AMP LOADBREAK SWITCH FOR DEDICATED NETWORK FEEDERS, USE CU SGNWESCOM615F THREE WAX POWELL-ESCO FOR REPLACEMENT OF THIS SWITCHGEAR.
2. RELAY BOX CONTAINS MOTOR OPERATED CONTROL RELAYS.
3. CONTROL BOX CONTAINE TWO OUTLETS: ONE FOR REMOTE CONTROL BOX CONNECTION AND ONE FOR 120 VOLT BACKREED TO OPERATE.
4. FAULT INDICATORS ARE ON ALL PRIMARY CABLES. USE CN 323457.
5. FAULT INDIGATORS ARE SCADA MONITORED.
6. SWITCHGEAR IS SCADA OPERATED AND MONITORED. 7. USE 600 AMP BOLTED ELBOW (T-BODY), NON-LOADBREAK.
8. CROSSBOND LC SHIELD GROUND BRAID AND CONNECT TO 4/0 CU GROUND GRID IN VAULT.
9. INTERNAL SWITCHGEAR GROUND POSITION CAN ONLY BE OBTAINED BY LOCAL CONTROL OPERATION.
10. ARRESTER INSTALLATION: WHEN A SWITCHGEAR HAS A NORMALLY OPEN SWITCH, ARRESTERS ARE TO BE INSTALLED ON THE CABLE CONNECTED TO THE OPEN SWITCH AND ON ONE ADDITIONAL 600 AMP WAY
REQUIRED. ARRESTERS ARE ONLY REQUIRED WHERE AN OPEN SWITCH EXISTS.
1       ESCO LOADBREAK THREE-WAY SWITCH (FMO)         0       10/29/10       ROBESON       GUINN       ELKINS