SUBMITTAL DATA

RUSSELECTRIC GENERATOR CONTROL SWITCHGEAR

FOR

NIANTIC WOMENS PRISON
NIANTIC, CONNECTICUT

DUCCI ELECTRICAL CONTRACTORS, INC.

Signature _____

Date 1-22-93

The attached drawings have been checked for conformity to specifications and drawings.

RUSSELECTRIC SHOP ORDER NO. 19997

TABLE OF CONTENTS

SECTION I

A. System Description - Drawing #19997-WPA-112132 (Rev. 1), Sheets 1-12

B. 19997-WPA-112133 (Rev. 1), Sheets 1-6 - Bill of Material

C. 19997-D-112129 (Rev. 1), Sheets 1-6 - Generator Control Switchgear

SECTION II

RUSSELECTRIC DRAWINGS - 5KV SWITCHGEAR

A. 19997-WPA-112139 (Rev. 0), Sheets 1-4 - Bill of Material

B. 19997-D-112134 (Rev. 0), Sheets 1-4 - 5KV Generator Switchgear

SECTION III

RUSSELECTRIC DRAWINGS - 23KV SWITCHGEAR

A. 19997-WPA-112141 (Rev. 1), Sheets 1-5 - Bill of Material

B. 19997-D-112138 (Rev. 1), Sheets 1-9 - 23KV Distribution Switchgear

SECTION IV

COMPONENT BULLETINS

A. Aromat Bulletins:

1. PEC-87-9492.....HC-Relays
2. PEC-87-9492.....HP-Relays
3. PEC-87-9492.....SP-Relays

B. Alcad Bulletins:

1. Float Battery Chargers
2. Nickel Cadmium Batteries
3. Cabinet Shelf Mounting Detail
4. Indoor/Outdoor Battery/Charger Cabinet

C. Asea Brown Boveri Bulletins:

1. 6.2.3.5....Type MC-5
2. 7.2.1-1F...Type ITE-51 Time-Overcurrent Relays
3. 7.2.2-1C...Type ITE-50D High Dropout Overcurrent Relays
4. 7.3.2-1C...Type ITE-25S Synchronism Check Relays
5. 7.4.2-1B...Type ITE-59G Ground Voltage Relay
6. 7.4.3-1D...Type ITE-47H Undervoltage & Phase Sequence Relays
7. 7.4.6-1D...Type ITE-81 One and Two Step Frequency Relays
8. 7.4.9-1B...Type ITE-27N,ITE-59N Undervoltage & Overvoltage Relays
9. 7.6.1-1B...Type ITE-87M 3 Phase Percentage Differential Relay
10. 7.6.2-1D...Type ITE-87T Transformer Differential Relay
11. 7.6.4-1B...Type ITE-46D Current Balance Relays
12. 7.7.2-1C...Type ITE-49T Temperature Relay
13. 7.8.1-1D...Type ITE-32 High Speed Directional Relay
14. 7.8.4-1C...Type ITE-32R Reverse Power Relay

D. Basler Electric Bulletin:

1. BE1-51/27R.....Time Overcurrent Relays

E. Burndy Bulletin:

1. Connectors for Electrical Construction

F. C.A. Briggs Bulletin:

1. CD-1009.....Banshee

G. Clarostat Bulletin:

1. Potentiometers, Decades and Dials

H. Crompton Instruments Bulletins:

1. Paladin.....Transducers and Transmitters
2. Switchboard Instruments
3. Synchro-Check Relay

I. Electro Switch Bulletins:

1. 24-B.....Rotary Switches for Instrument and Control Applications
2. 34-A.....Series 24 LOR Lock-Out Relay

J. General Electric Bulletins:

1. 7173.....Type EB-27
2. 7750.....Type DS-60 Switchboard Watthour Meters
3. 7910.....Type JVM-3 Instrument Transformer
4. Series 90-70.....Programmable Controllers

K. Idec Bulletin:

1. SLC30/40 Series.....Combination Display Lights

L. Instrument Transformers, Inc. Bulletins:

1. 143.....Model 143 Current Transformers
2. 190.....Model 190 Current Transformers
3. 460.....Model 460 Potential Transformers
4. 780.....Model 780 Current Transformers
5. 785.....Model 785 Current Transformers

M. Russelectric Bulletins:

1. EDS-13.....Master Control Battery Selector
2. EDS-231.....Register Access/Engine Sequence Panel

N. Superior Bulletin:

1. Superior Test Switches.....2 Pole

O. T & B Bulletin:

1. WVP Rigid Vinyl Safety Signs

P. Vicor Corp. Bulletin:

1. Mega Module Series

Q. Westinghouse Bulletins:

1. 32-255.....Medium Voltage Metal-Clad Switchgear
2. Medium Voltage Switchgear With VCP-W/Vacuum Circuit Breakers

R. Woodward Bulletin:

1. 82383.....SPM-A Synchronizer

Russelectric

SYSTEM DESCRIPTION

MEDIUM-VOLTAGE
GENERATOR CONTROL SWITCHGEAR
FOR

NIANTIC WOMENS PRISON
NIANTIC, CONNECTICUT

A. INTRODUCTION

The generator control and distribution switchgear is designed to automatically control and supply normal and emergency generator power to the building loads. The system will be controlled by a programmable controller. In the event of the primary controller failure, full automatic operation will be carried out by a redundant secondary programmable controller. The emergency power is derived from 2:

1135Kw, 4160 Volt, (.8) power factor, 3-phase, 4-wire, 60Hz, diesel-driven generators sets, with provisions for a future unit of the same size.

The following equipment is being furnished:

Generator Control Switchgear, Drawing #19997-D-112129.
5KV Distribution Switchboard, Drawing #19997-D-112134.
23KV Distribution Switchboard, Drawing #19997-D-112138.

In the event of a normal power failure, the engine-generators will automatically start, parallel, and supply emergency generator power to the distribution loads. The generator control switchgear is equipped with an alarm system that will automatically shutdown an engine and initiate load shedding if an engine failure occurs. When the normal power returns, the building loads will be retransferred back to normal, and the engine-generators will be shutdown and placed back on standby until the next power failure occurs. The system is also designed to provide curtailment operation as described in Section C.

Dunnelectric Inc.
HINGHAM, MA 02043

B. AUTOMATIC STANDBY OPERATION

Utility voltage at the 23KV switchgear will be monitored by (3) undervoltage relays (Device 27). These relays will be used to detect a total loss of voltage or a "Brownout" condition. Additionally, single phasing will be detected by a negative sequence current balance relay. Operation of any of these relays will initiate the standby transfer sequence (after an adjustable 0-30 second time delay). Note that these relays will open the main breaker (52-U1) but will not trip the breaker lockout relay (86-U). This will allow an automatic unattended retransfer to normal without requiring manual reset of the lockout relay.

Once the power failure sequence is initiated, the main breaker will open, and all the non-essential loads will be dropped by the load shed contacts. All engine generators will be started and the first to reach 90% of voltage & frequency will connect to the emergency bus, establishing the synchronizing reference for the remaining generators. The additional generators will automatically synchronize and parallel to the emergency bus. After the required capacity is on the emergency bus the controls will signal closure of the generator main breaker (52-GM) re-energizing the site load. Load control contacts will signal restoration of the non-essential loads (refer to Section H for details of the load control system).

The generators will operate as long as necessary to power the load. However, after an adjustable 0-60 minute time delay a load demand system will be placed in operation. The load demand system will add or subtract generators as required to meet the bus load. A selector switch is provided to defeat the load demand system if desired. Refer to Section G for additional details of this system.

When the normal supply voltage returns, and after an adjustable 0-30 minute stabilization period, the controls will retransfer the building loads to the normal supply. The actual retransfer may be open or closed transition as selected by a key switch on the transfer control door.

In an open transition mode, transfers between the generators and the utility will always result in an interruption of power to the building load. The amount of open transition or "Off" time will be adjustable, to allow for motor regenerative power decay.

In a closed transition mode the normal and generator sources will be paralleled to allow a transfer without interruption of power to the loads. After a utility failure, a closed transition return to normal will automatically parallel the generators to the normal supply, followed by closure of the utility main breaker (52-U1). The generators will then gradually unload. When the generators have unloaded sufficiently, the generator main (52-GM), and individual generator breakers will open, and the engine-generators will continue to operate unloaded for a 0-10 minute adjustable cooldown period. All controls will then be automatically reset and remain in readiness for the next operation.

Dunwoodie Inc.
HINGHAM, MA 02043

As described above, the 23KV bus tie breaker (52-BT) will remain closed. If desired, the system may be configured with the bus tie normally open (during normal operation the 3750 KVA transformer would remain de-energized). Normally open or normally closed bus tie operating may be operator selected by a register value in the register access panel (1=closed, 0=open).

The retransfer to normal sequence may be selected to begin automatically or manually, as determined by the retransfer mode key switch on the transfer cubicle door. In the automatic mode, the retransfer sequence will begin after the 0-30 minute normal power stabilization time delay. In the manual mode the retransfer sequence will not begin until manually initiated using the key switch on the transfer cubicle door. This feature allows return to normal to occur at the operator's discretion.

During any automatic operation, the failure of the emergency bus will result in immediate retransfer to normal power, once available. Stabilization time delays will be bypassed to prevent being locked out from a "good" source.

C. CURTAILMENT OPERATION

Curtailment operation will allow paralleling the generators to the utility supply to reduce the site load.

A curtailment mode initiation switch is furnished with Auto-Off-Manual positions. In the "Auto" position curtailment will be automatically initiated once the utility KWHR import reaches a preset starting value. This value may be operator selected by entering the desired KWHR demand point in the data display register. Once this value is reached for a given demand period curtailment will begin. A register value will be used to set the demand period required by the utility. In the automatic mode curtailment will terminate when the sum of the generated and imported KWHR's fall below the stop setpoint value. The stop setpoint is also operator selected by a display register. All utility power monitoring will be derived from PT and CT signals within the primary switchgear. No additional energy monitoring contacts or signals will be required for curtailment operation.

With the curtailment mode switch in the "Off" position no curtailment will be allowed and any operation in progress will be terminated.

In the "Manual" position curtailment will begin immediately and continue until another position is selected.

The following sequence will take place for curtailment operation: If N.O. bus tie operation is selected, 52-BT will close to energize the 3750 KVA transformer. The generator main breaker (52-GM) will close, energizing the 5KV generator bus. The first engine generator will start, synchronize, and connect to the 5KV bus. Two modes of engine loading will be furnished, selected through the data display panel on the master door:

BASE LOAD - In this mode the generators will gradually ramp up to a fixed load value. This KW value will be operator selected as a register setting in the data display. Load demand operation will maintain the required amount of generators on the bus to produce this setpoint value. In this mode fluctuations in building load will be reflected by the utility power import level, as the generators will operate at a fixed (base load) power level.

FIXED IMPORT - In this mode the generators will gradually ramp to the load level required to hold the utility power import at a fixed amount. This import amount may be operator selected as an additional register setting in the data display. In this mode, fluctuations in building load will be reflected in the generator loading, as the utility power import will be held to the setpoint value.

Should the incoming 23KV normal power fail, the protective relays will trip the primary breaker (52-U1). Full emergency operation will then take place, as described previously.

Curtailment termination will result in the engines gradually unloading, followed by opening of the generator main, 23KV bus tie, and individual generator breakers. The engines will operate unloaded for the cooldown period.

D. MANUAL OPERATION

Complete manual operation will be allowed if the master selector switch is in the manual position. Open or closed transition transfer between sources will be allowed. During parallel with utility operation engine loading will be controlled using the manual load adjust switch on the transfer cubicle door.

A swing panel on the master door provides the following instrumentation required for manual operation: generator bus voltmeter, synchroscope, sync lights, and a frequency meter. A voltmeter phase selector switch (4 position) is included on the master door. Each transfer breaker and each generator breaker is provided with a frequency meter switch. This switch allows selection of both source frequencies.

Each synchronizing breaker includes a synchroscope switch which will energize the synchroscope, sync lights and the manual sync check relay. This relay will prevent breaker closure unless the two sources are within electrical limits. An interlock insures that these breakers have their sync switches on before closure is allowed.

Synchroscope and frequency meter switches have separately keyed handles that are removable in the off position only, assuring that only one respective switch is on at any time. One set of keyed handles are provided with the switchboard.

In the "Manual" position, the automatic synchronizer is locked out of the system. Receipt of an engine start signal will start all of the standby engine-generators, but synchronizing and paralleling procedures must be performed manually. Should all engines be locked out and a start signal occur, a "Start Signal Present" light will flash and the alarm horn will sound.

E. ENGINE-GENERATOR CUBICLE FEATURES

An automatic engine starting control and failure system is provided to control the starting, stopping, and monitoring of each engine-generator. The engine cranking system permits as many as four cranking attempts of 10-second duration with rest periods of 10 seconds. Overcrank lockout will occur after four unsuccessful cranking attempts. Means are provided to allow for a continuous cranking cycle if required.

Each engine generator cubicle is provided with individual red colored lights to indicate the following malfunctions:

Protective Relay Trip	24V D.C. Control Voltage Failure
Engine Overspeed	Spare
Fail to Synchronize	Low Oil Pressure
High Water Temperature	
Overcrank	

Protective relay trip will be a summation of the following protective relay actions:

Differential Overcurrent (87)
Reverse Vars (Loss of Field) (40)
Reverse Power (32)
Voltage Controlled Overcurrent (50/51V)
Ground Overcurrent (51N)
Generator High Winding Temp (49)

Should a malfunction occur, control circuitry will: open the generator circuit breaker, shed lower priority load if required, shutdown the engine, (illuminating a flashing red light) sound the alarm horn, and illuminate an individual red light to indicate the nature of the failure.

After the trouble has been corrected, the system must be reset manually by rotating the engine selector switch to the "Lockout/Reset" position. The alarm light will go out and the switch can then be placed in the desired mode of operation.

Each engine-generator cubicle is provided with individual amber colored lights to indicate the following malfunctions:

Battery Charger Failure	Approach High Water Temperature
Low Water Temperature	Day Tank High Fuel Level
Approach Low Oil Pressure	Day Tank Low Fuel Level
Day Tank Rupture	Spare
Low Water Level	Low Oil Level

Should any of these conditions occur, a lamp will light and the alarm horn will be sounded; but the engine-generator set will not shutdown.

When the condition has been corrected, the lamp will go out and the alarm horn will silence automatically. No further resetting of the system is required.

A four-position engine selector switch is provided for each engine-generator set to provide the following modes of operation:

In the "Lockout/Reset" position the generating plant is locked out. Whenever the selector switch is placed in the "Lockout/Reset" position while the engine-generator is operating, it will immediately shutdown and its circuit breaker will trip. The "Lockout/Reset" position resets the engine starting and failure controls should an engine be locked out due to a malfunction.

An "Off" position is provided to allow a normal shutdown with a time delay to allow the engine to cool after operating under load. Whenever the engine selector switch is placed in the "Off" position while the engine-generator is operating; the generator circuit breaker will trip but the engine will continue to operate for the duration of the cooldown timer. The engine running light will flash during cooldown operation.

In the "Auto" position the engine-generator set is on standby and will start whenever a signal is given from the automatic transfer system or when a system test is performed. When the commercial power returns and the transfer system signals the engine-generator to shutdown or the system test switch is returned to the "Normal" position; the circuit breaker will trip and the engine will continue to operate for the cooldown period before shutting down in readiness for the next operation.

When the engine selector switch is placed in the "Run" position, the engine will start and come up to speed and voltage. It will continue to operate until the selector switch is rotated to another position. This position is to be used for testing or for manual operation. Should a power failure occur while the engine is operating in the "Run" position and the master control switch is in the "Auto" position; the engine-generator will automatically synchronize and close its generator circuit breaker to the bus, and will otherwise perform as described under Automatic Operation (Section B).

A flashing red light will indicate that the engine selector switch is in either the "Lockout/Reset" or the "Off" position, or the engine-generator has been shutdown due to a malfunction as described previously.

Should a generator fail to synchronize while operating in the automatic mode, it will be automatically shutdown and locked out of the system after a time delay period, adjustable from 0-300 seconds. At that time, the master control switch can be placed in the "Manual" position, the failed engine-generator reset and manually synchronized to the bus.

F. MASTER CUBICLE FEATURES

An automatic DC control voltage sensor system (Master Control Battery Selector) provides DC control voltage to the control switchboard from the best engine starting battery available. Should the battery supplying the DC control voltage decrease below that of another battery input, the sensor will automatically switch to the better battery without interruption to the system. The DC control voltage sensor system will insure a stable DC control voltage supply as long as one of the input batteries is good. DC overvoltage protection is also included as part of this system. In addition to engine batteries, the 125V station batteries will be connected to the battery selector through a 125VDC to 24VDC power supply, to insure an additional source of supply.

A station alarm horn and silencing circuit with indicating lamp is provided to sound an audible signal should a malfunction occur. Should the alarm be silenced after a malfunction, receipt of another signal shall cause the horn to sound again (Annunciator Ring Back). Reset of the alarm horn is automatically accomplished when the failed circuit has been reset.

Load demand engine starting and stopping sequences will be shown by a solid state digital display and register access panel on the master door. The engine sequence may be changed at any time, using the pushbutton on the display panel. The data display unit also allows an operator access to the PC without having to implement software changes. The panel can be used to change all timer settings, load demand and load control setpoints, curtailment setpoints, and load demand engine sequence positions. Access panel functions can be user modified to allow for varying field conditions. All setpoints are protected to insure that a chosen value is within an acceptable range.

Voltage and frequency monitoring will be provided for the emergency bus. Alarms will be given for over or under voltage, and overfrequency. Underfrequency will result in an alarm and load shedding (refer to section H for additional load control details). All alarms will be latching, manually reset by use of the voltage/frequency failure reset pushbutton.

A three-position key-operated system switch is provided on the master control cubicle to permit supervised testing of the system. The "no-load" test will automatically start all standby engine-generator sets, synchronize them, and close their breakers to the bus; but the generator main breaker will remain open. The "Load" test position will simulate a normal power failure, with the resultant automatic operation as described previously.

Remote load test provisions are included, allowing for open or closed transition transfers between sources. Open transition warning contacts have been included to warn the "EMS" that a test will cause a momentary power outage during transfers. Refer to Section J for additional signals to/from the EMS.

The following alarms and indicators are provided on the master cubicle:

Controls Not in Auto	Backup PC Failure
Main Tank Low Fuel Level	Load Demand Operation
Start Signal Present	Decreasing Load
Critical Control Voltage Failure	Increasing Load
Load Shed On	Overload
Load Shed Bypassed	Gen Bus Synchronizing
Primary PC Failure	Remote Load Test
Spare	

G. LOAD DEMAND SYSTEM

The programmable controller monitors the load on the emergency bus and will initiate signals to add or subtract generators as required. In a normal power failure operation load demand sensing will, after a 0-60 minute time delay, be placed into operation. An indicating lamp on the master control cubicle will be flashing during the 0-60 minute time delay and will be on steady, when the system is operating in load demand mode.

The engine starting and stopping sequence can be changed through the Digital Display Unit. Registers 8-10 are reserved for engine no. 1-3 sequences. The engine which sequence register contains the value of 1 is the base engine, the one with a value of 2 is sequence position no. 2, etc.

If the sequence is changed during an automatic operation, any engine on line will remain on line. If the engine selected as the base engine is not on line, it will be immediately started up and placed on line. The engine-generator that is selected as sequence position no. 2 will be the first to be added to the bus and the last to be subtracted. Should an engine be locked out of the system, it will be skipped over and the next engine in sequence will be started or stopped as required.

Indicating lamps are provided on the master control cubicle to light when the loading of the generating system reaches preset "Decreasing Load", "Increasing Load", and "Overload" setpoints. These lights are flashing when timing and on steady when timed out.

The setpoints are field adjustable through the Register Access Panel. The "Overload" setpoint is adjustable from 90 to 125% of each engines' rated loading. The "Increase" is adjustable from 60 to 100% (or "Overload" - 10% whichever smallest) of the on line capability of the system. The "Decrease" is adjustable from 40 to 80% (or "Increase" - 10% whichever smallest) of the on line capability of the system after the decrease.

The overload and increase time delays have "inverse time characteristics" - the higher the loading - the shorter the time delay. The settings are programmable through the Register Access Panel. The ranges are 0 to 10.0 seconds for the overload setpoint, and 0-99.9 seconds for the increase time delay. The decrease time delay is adjustable from 0-999 seconds.

If the load on the emergency bus decreases below the "Decreasing" setpoint, the programmable controller will, after the time delay, signal the last engine-generator in sequence to be removed from the line. When a single engine generator is on line, the decrease sensing will be inoperative.

If the load on the emergency bus increases to above the "Increasing" setpoint, the programmable controller will, after the time delay, signal the next engine-generator in sequence to automatically start up and go on line. An "Increase Load Capacity" pushbutton is provided on the master control cubicle to allow an operator to immediately place the next engine-generator in sequence on line.

Should the load of any engine increase to above the "Overload" setpoint, the next engine-generator in sequence will, after the time delay, be started and placed on line. In addition to starting the next generator, non-essential loads will be shed to relieve the load on the emergency bus. Refer to section H for load control operation.

H. LOAD CONTROLS

During isolated bus generator operation an underfrequency or overload condition will result in load shed. Once the bus is restored to normal limits the shed load will be readded. Prioritized load control contacts are included for customer connection to the controlled loads. The control contacts are arranged for 10 priorities of control; priority #1 most important, priority #10 least important. Two normally open contacts are included for each priority. These contacts close for a shed signal and re-open for a re-add signal.

Should the engines become overloaded (adjustable 90-125% of any engine's rating) and after a 10 second time delay, the lowest priority (priority #10) will be shed and the next engine in sequence (if applicable) will be started. If the overload remains, the next lowest priority (#9) will be shed. The shedding will continue as long as the overload remains. (Note that priority #1 loads will not be shed and should be within the capacity of a single engine generator). Once the bus is restored and excess generation is available the shed loads will be readded in reverse order from which they were shed. A time delay (10 seconds - adjustable) between steps will allow the engines to recover.

Upon detecting an underfrequency condition all available engines will be started. Underfrequency load shedding will operate the load control contacts similar to overload except that the severity of underfrequency will determine the shedding rate. The inverse time feature will insure the greatest continuity of service to the priority #1 loads. Automatic restoration of load will occur after the bus has returned to normal frequency.

As backup to the load control system, the generator main breaker will trip and lockout should the generator bus frequency drop during isolated operation. This trip point will be factory set at 55HZ with a 4 second time delay. (Both values may be changed in the register panel). Reset of the generator main breaker will be manually initiated using the voltage/frequency failure reset pushbutton on the master door.

A key-operated load shed bypass switch on the master door will prevent overload load shed when in the bypass position. This will allow supervised loading of the engines up to their maximum rating, using the load add pushbutton. Each time this pushbutton is pushed, the next priority will be added. Should an underfrequency condition occur the bypass will be defeated, and load shedding will occur as described previously.

A load shed pushbutton on the master door will allow immediate load shed of the next lowest priority. Each time the pushbutton is depressed the next priority will be shed. This pushbutton will remain functional in both manual and automatic operation, however, in the automatic mode any shed load will be readded once the button is released, provided the bus is capable of increased load.

Master indicating lights are provided for load shed activated and load shed bypassed conditions.

I. TRANSFER CONTROL FEATURES

The transfer control cubicle will have indicators for the following:

Normal Power Available - This light will show power on; a set of form C contacts is available for customer use.

Fail to Synchronize/Transfer - Light will be steady should the generator bus fail to synchronize with the utility supply. Light will flash should the transfer not be completed (engines fail to load/unload, breakers fail to open, etc.) On a fail to transfer alarm the load will automatically be connected to the available source. Both fail to transfer and fail to synchronize conditions will require manual reset, using the reset pushbutton on the transfer cubicle door. Once reset, the synchronizing or retransfer sequence will begin again.

Summation "Protective Relay Trip" lights for breakers 52-U1, 52-BT and 52-GM. The protective relays are shown on drawing #19979-D-112138, sheets 8 & 9.

125VDC control voltage failure lights for the 23KV, 5KV and control switchboard.

Alarm lights for station battery high voltage, low voltage and charger AC failure.

Status lights for open transition alert and curtailment operation.

In addition to metering provided at the 5KV and 23KV switchboards, the following additional metering is included on the transfer control door:

23KV utility service voltmeter and ammeter with phase selector switches.

Utility service wattmeter.

5KV transformer secondary voltmeter with phase selector switch.

Gen main (52GM) ammeter and phase selector switch.

Gen main wattmeter.

Frequency meter switch for selection of 23KV incoming utility frequency or transformer primary or secondary frequency.

Synchroscope and circuit breaker control switches (with position indicating lights) for breakers 52-U1, 52-BT and 52-GM.

J. REMOTE CONTACTS AND SIGNALS

The following auxiliary contacts will be included for customer use, located in the control switchgear transfer control cubicle (Qty of Form C unless noted otherwise):

(4 each)	Generator running for each generator
(1)	Step up transformer alarm (from 86-T)
(1)	Normal power failure
(1)	23KV bus voltage loss
(1)	Generator bus voltage/frequency failure
(1 each)	Prealarm and failure summary contact for each generator
(1)	Engine locked out for each generator
(1)	Master controls not in auto
(1)	Station battery alarm

(1) Load shed activated

(2 form A each) Priority control for each of 10 priorities

(1) Open transition mode

(1) Manual retransfer mode

(1) Switchgear summary alarm

The following signals will also be provided:

(1 set) 5A CT output from 23KV main CT's (150/5)

(1 set) 5A CT output from 5KV gen main CT's (800/5)

(1 set) PT signals from 23KV PT's
PT's are wye-wye connected on line side of 52-U1
PT ratio is 200/1, 69V phase to neutral secondary

(1 set) PT signals from 5KV generator bus
PT's are open delta connected on load side of 52-GM.
PT ratio is 35/1

All PT signals will be separately fused at 1 amp.

The system is arranged to trip and lockout the utility main (52-U1) and all generators from a remote contact closure. A "Remote Lockout" light will annunciate this condition.

Remote load testing (see Section F) will be initiated by contact closure and terminate by contact opening.

APPROVED REV DATE
1 01/21/93

DWG. NO.
19997-WPA-112132
SYSTEM DESCRIPTION SHEET 12 OF 12

Dynalectric Inc

HINGHAM, MA 02043

BILL OF MATERIAL

GENERATOR CONTROL SWITCHGEAR

RUSSELECTRIC JOB NO: 19997 CUSTOMER: DUCCI ELECTRICAL CONTRACTORS

JOB NAME: NIANTIC WOMENS PRISON TORRINGTON, CONNECTICUT

NIANTIC, CONNECTICUT CUSTOMER P.O. NO.: B-811

RUSSELECTRIC REF. DWG. NO: 19997-D-112129

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
1	3	AMMETER, 5A MOVEMENT, TYPE: 077, SCALE: 0-250A	CROMPTON	077-05FA LSRS	N/A
2	3	D.C. MILLIAMMETER, TYPE: 077, .857 MA MOVEMENT, 0-1500 SCALE TITLED KW	CROMPTON	PER DESC.	N/A
3	5	VOLTMETER, TYPE: 077, 143V MOVEMENT, 5000V SCALE	CROMPTON	077-05GA PTUJ	N/A
4	1	FREQUENCY METER, 55-65HZ, 120V, 077 SERIES	CROMPTON	077-41LA PNAN	2900-0300
5	1	SYNCHROSCOPE, 120V, TYPE 077	CROMPTON	077-146A PRAE	N/A
6	6	SWITCH, VOLTMETER TRANSFER, NAMEPLATE MARKED: OFF, 1-2, 2-3, 3-1	ELECTRO SWITCH	2404C	N/A
7	5	SWITCH, AMMETER TRANSFER, NAMEPLATE MARKED: OFF, 1, 2, 3	ELECTRO SWITCH	2410C	5100-0030
8	3	SWITCH, ENGINE SELECTOR, NAMEPLATE MARKED: LOCKOUT/RESET, OFF, AUTO, RUN	ELECTRO SWITCH	24903LG	5100-0070
9	3	SWITCH, FREQUENCY METER, KEYED-HANDLE REMOVABLE IN "OFF" POSITION. NAME-PLATE MARKED: BUS, OFF, GEN	ELECTRO SWITCH	24202PN	5100-0080
10	6	SWITCH, SYNCHRONIZING, KEYED-HANDLE REMOVABLE IN "OFF" POSITION. NAMEPLATE MARKED: OFF, ON	ELECTRO SWITCH	24204E	N/A
11	6	CIRCUIT BREAKER CONTROL SWITCH SPRING RETURN TO CENTER	ELECTRO SWITCH	74202B	N/A
12	1	MASTER CONTROL SWITCH, NAMEPLATE MARKED: MANUAL-AUTO	ELECTRO SWITCH	24202MU	5100-0130

APPROVED DATE REV DWG. NO.

01/20/93 1 19997-WPA-112133

BILL OF MATERIAL SHEET 1 OF 6

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
13	1	FREQUENCY METER SWITCH, KEYED HANDLE REMOVABLE IN "OFF" POSITION. TITLED: FREQUENCY METER, POSITIONS TITLED: (315°) - UTIL (0°) - OFF (45°) - XFMR PRI (90°) - XFMR SEC.	ELECTRO SWITCH	SIMILAR TO 24202PN EXCEPT 4 DECKS AND SPECIAL ENGRAVING	N/A
14	1	VOLTMETER, TYPE 077, 150V MOVEMENT, 30KV SCALE, RMS COMPENSATED	CROMPTON	PER DESC.	N/A
15	1	DC MILLIAMMETER, TYPE 077, .666MA MOVEMENT, 0-4000 KW SCALE, TITLED KW	CROMPTON	PER DESC.	N/A
16	1	AMMETER, TYPE 077, 5A MOVEMENT, 150A SCALE	CROMPTON	077-05FA LSPZ	N/A
17	1	DC MILLIAMMETER, TYPE 077, .714 MA MOVEMENT, 0-4000 SCALE, TITLED KW	CROMPTON	PER DESC.	N/A
18	1	AC AMMETER, TYPE 077, 5A MOVEMENT, 0-800A SCALE	CROMPTON	077-05FA LSSN	N/A
19	3	POWER FACTOR METER, TYPE 077, 3 PHASE, 3 WIRE, 120V	CROMPTON	077-427A QQAD	N/A
20	5	WATT TRANSDUCER, 2 ELEMENT, 1000 CAL WATTS	CROMPTON	256-TWMU QQFA	5501-0031
21	1	FREQUENCY TRANSDUCER, 55-65HZ, 150V, 0-1MA, PALADIN SERIES, FILTERED	CROMPTON	SIMILAR TO 253-THZU-PQFA, EXCEPT 150V, FILTERED	N/A
22	1	VOLTAGE TRANSDUCER, 150 VOLT, 0-1MA PALADIN SERIES	CROMPTON	SIMILAR TO 253-TVAU-PQFA, EXCEPT 150V	N/A
23	2	LINEAR INTEGRATOR, 1MA INPUT, 2000 PULSES PER HOUR	CROMPTON	253-TIKU FABX	N/A
24	2	SYNCHRONIZING CHECK RELAY	CROMPTON	256-PLLU	N/A
25	4	AUTOMATIC SYNCHRONIZER, TYPE SPM-A	WOODWARD	9905-001	N/A

APPROVED DATE REV
01/20/93 1

DWG. NO.
19997-WPA-112133

Russelectric Inc.
HINGHAM, MA 02043

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
26	1	POWER SUPPLY, 600 WATT, 125VDC INPUT, 24VDC OUTPUT, INCLUDE STYLE B HEAT SINK AND "GRAFOIL"	VICOR	VI-N-13-CP	N/A
27	0	N/A			
28	0	N/A			
29	1	KEY OPERATED SELECTOR SWITCH, 3 POSITION, SPRING RETURN FROM LEFT POSITION, MAINTAINED IN RIGHT POSITION. KEY REMOVABLE IN CENTER AND RIGHT POSITION	CUTLER HAMMER	10250T 15335	N/A
30	9	PUSHBUTTON OPERATOR - BLUE	CUTLER HAMMER	10250T-108	N/A
31	1	PUSHBUTTON OPERATOR - GREEN	CUTLER HAMMER	10250T-103	N/A
32	1	PUSHBUTTON OPERATOR - YELLOW	CUTLER HAMMER	10250T-104	N/A
33	1	PUSHBUTTON OPERATOR - RED	CUTLER HAMMER	10250T-102	N/A
34	5	KEY OPERATED SELECTOR SWITCH, 2 POSITION MAINTAINED - KEY REMOVABLE IN BOTH POSITIONS	CUTLER HAMMER	10250T-15113	N/A
35	2	KEY OPERATED SELECTOR SWITCH 3 POSITION MAINTAINED - KEY REMOVABLE IN ALL POSITIONS	CUTLER HAMMER	10250T-15237	N/A
36	4	LEGEND PLATE MARKED: "TEST"	CUTLER HAMMER	10250T-M36	2200-0280
37	1	LEGEND PLATE MARKED: "SILENCE"	CUTLER HAMMER	10250TM36	2200-0280
38	1	LEGEND PLATE MARKED: "OPEN-CLOSED"	CUTLER HAMMER	10250TM36	2200-0280
39	3	LEGEND PLATE MARKED: "RESET"	CUTLER HAMMER	10250TM36	2200-0280
40	1	LEGEND PLATE MARKED: "INCREASE"	CUTLER HAMMER	10250TM36	2200-0280

APPROVED DATE REV
01/20/93 1

DWG. NO.
19997-WPA-112133

BILL OF MATERIAL SHEET 3 OF 6

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
41	1	LEGEND PLATE MARKED: "READD"	CUTLER HAMMER	10250TM36	2200-0280
42	1	LEGEND PLATE MARKED: "SHED"	CUTLER HAMMER	10250TM36	2200-0280
43	1	LEGEND PLATE MARKED: "LOWER RAISE"	CUTLER HAMMER	10250TM36	2200-0280
44	1	LEGEND PLATE MARKED: "NORMAL-BYPASS"	CUTLER HAMMER	10250TM36	2200-0280
45	1	LEGEND PLATE MARKED: "OFF-ON"	CUTLER HAMMER	10250TM36	2200-0280
46	1	LEGEND PLATE MARKED: "NO LOAD-LOAD"	CUTLER HAMMER	10250TM36	2200-0280
47	1	REGISTER ACCESS PANEL AND ENGINE SEQUENCE DISPLAY PANEL	RUSS-ELECTRIC	EDS-231	N/A
48	25	CONTACT BLOCK - 1 N/O, 1 N/C	CUTLER HAMMER	10250T1	2200-0040
49	3	POTENTIOMETER, STYLE 534 100 OHM, 2 WATT, 10 TURN	SPECTROL	PER DESC.	
50	3	POTENTIOMETER, STYLE 534 10K OHM, 2 WATT, 10 TURN	SPECTROL	PER DESC.	
51	1	SELECTOR SWITCH, 3 POSITION LEVER OPERATED, SPRING RETURN TO CENTER	CUTLER HAMMER	10250T-3043	N/A
52	6	VERNIER DIAL FOR 10 TURN POTENTIOMETER BLACK WITH LOCK	CLAROSTAT	412	N/A
53	3	COMBINATION DISPLAY LIGHTS, SLC-40 SERIES, TYPE F, 21 WINDOWS (3 ROWS X 7 COLUMNS), INCANDESCENT ILLUMINATED, 30VDC LAMPS, BLACK FRAME, CLEAR LENS, COLOR SCREENS: 13 RED, 7 AMBER, 1 GREEN. INCLUDE 20 #SLC-JP42 JUMPERS IDEC CAT. NO. SLC40N-0307-DE3FB-R(13)-G(1)-A(7), WITH CHECK TERMINALS	IDEC	PER DESC.	2450-0871

APPROVED
DATE 01/20/93
REV 1

DWG. NO. 19997-WPA-112133

BILL OF MATERIAL SHEET 4 OF 6

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
54	2	COMBINATION DISPLAY LIGHTS, SLC-40 SERIES, TYPE F, 21 WINDOWS (3 ROWS X 7 COLUMNS), INCANDESCENT ILLUMINATED, 30VDC LAMPS, BLACK FRAME, CLEAR LENS, COLOR SCREENS: 10 RED, 7 AMBER, 4 WHITE, INCLUDE 20 #SLC-JP40 JUMPERS IDEC CAT. NO. SLC40N-0307-DE3FB-R(10)-A(7)-W(4) WITH CHECK TERMINALS	IDEC	PER DESC.	2450-0881
55	6	COMBINATION DISPLAY LIGHTS, SLC-40 SERIES, TYPE F, 3 WINDOWS (1 ROW X 3 COLUMNS), INCANDESCENT ILLUMINATED, 30VDC LAMPS, BLACK FRAME, CLEAR LENS, COLOR SCREENS: 1 RED, 1 AMBER, 1 GREEN. INCLUDE 2 #SLC-JP42 JUMPERS IDEC CAT. NO. SLC40N-0103-DE3FB-R(1)-G(1)-A(1). WITH CHECK TERMINAL	IDEC	PER DESC.	2450-0891
56	0	N/A			
57	1	LEGEND PLATE MARKED: "XFER-MAN-AUTO"	CUTLER HAMMER	10250TM36	2200-0280
58	1	LEGEND PLATE MARKED: "LOWER-RAISE"	CUTLER HAMMER	10250TM36	2200-0280
59	2	LIGHT MODULE, COMPLETE WITH 6S6 C.S. BASE LAMP	CUTLER HAMMER	10250T202	2450-0380
60	2	LENS, CLEAR	CUTLER HAMMER	10250TC5	2450-0430
61	1	CYBERSONIC BANSHEE ALARM HORN 24VDC	C.A. BRIGGS	PER DESC.	2200-0416
62	1	ENGINE CONTROL RELAY PANEL	RUSS-ELECTRIC	N/A	3103-0170
63	1	MASTER CONTROL BATTERY SELECTOR	RUSS-ELECTRIC	EDS-13	4505-1572
64	9	AUXILIARY CURRENT TRANSFORMER, MODEL 190, 5/5 RATIO, (UTIL & EMS MTRG)	ITI	190X-5000	N/A
65	2	SERIES 90-70, 9 SLOT, REAR MOUNT RACK	GENERAL ELECTRIC	IC697-CHS790	N/A

APPROVED DATE REV

01/20/93 1

DWG. NO. 19997-WPA-112133

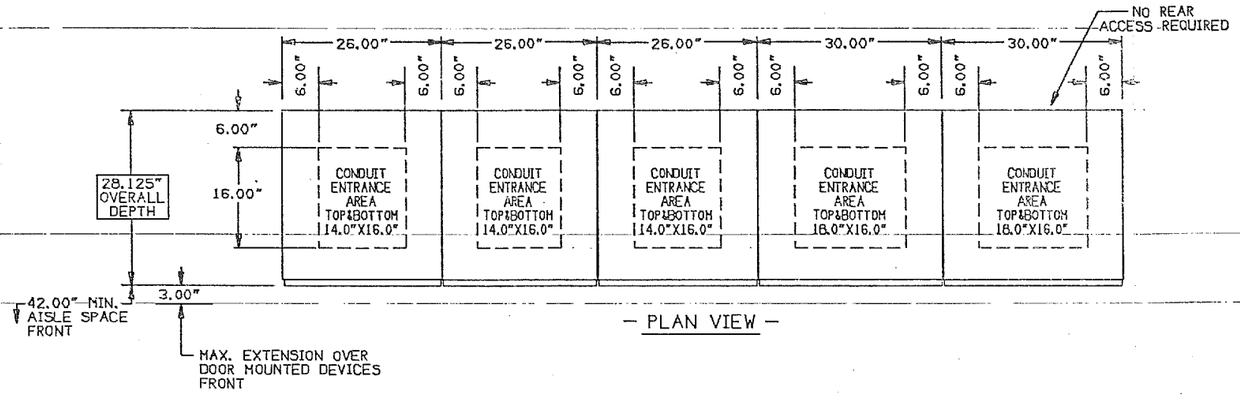
BILL OF MATERIAL SHEET 5 OF 6

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
66	2	SERIES 90-70 PLC PROCESSOR, 5/2K	GENERAL ELECTRIC	IC697 CPU731	N/A
67	2	POWER SUPPLY, 24VDC, 90 WATT, WITH ADAPTOR	GENERAL ELECTRIC	IC697 PWR721	N/A
68	1	COMMUNICATION COPROCESSOR	GENERAL ELECTRIC	IC697 CMM711	N/A
69	0	N/A			
70	0	N/A			
71	2	ANALOG INPUT CARD - 8 CHANNEL	GENERAL ELECTRIC	IC697 ALG230	N/A
72	2	ANALOG OUTPUT CARD, 4 CHANNEL	GENERAL ELECTRIC	IC697 ALG320	N/A
73	8	32 POINT DISCRETE OUTPUT MODULE, 24/48V, POS LOGIC	GENERAL ELECTRIC	IC697 MDL750	N/A
74	8	32 POINT DISCRETE INPUT MODULE, 24VDC, POSITIVE LOGIC	GENERAL ELECTRIC	IC697 MDL653	N/A
75	12	LED ASSEMBLY, 28VDC, GREEN, SHORT STOVEPIPE LENS	DIALCO	249-7972 3332-504	N/A
76	12	LED ASSEMBLY, 28VDC, RED, SHORT STOVEPIPE LENS	DIALCO	249-7872 3331-504	N/A
77	2	17 SERIES SOLDER TYPE D-SUB CONNECTOR 15 PIN PLUG #17-20150	WPI (NEWARK)	39F-1371	N/A
78	2	17 SERIES SOLDER TYPE D-SUB CONNECTOR 25 PIN PLUG #17-20250	WPI (NEWARK)	39F-1372	N/A
79	2	17 SERIES D-SUB HOOD - 25 CONTACT, TYPE 17-1726-2	WPI (NEWARK)	90F-8723	N/A
80	2	17 SERIES D-SUB HOOD - 15 CONTACT, TYPE 17-1725-2	WPI (NEWARK)	90F-8722	N/A
81	1	MIMIC PANEL PER DRAWING #19997-D-112129, SHEET 6, "METALPHOTO", BLACK CHARACTERS ON ALUMINUM FINISH	PRECISION GRAPHICS	PER DESC.	N/A

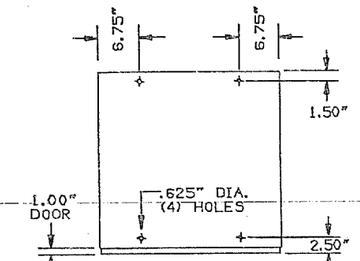
APPROVED DATE REV
01/20/93 1

DWG. NO.
19997-WPA-112133

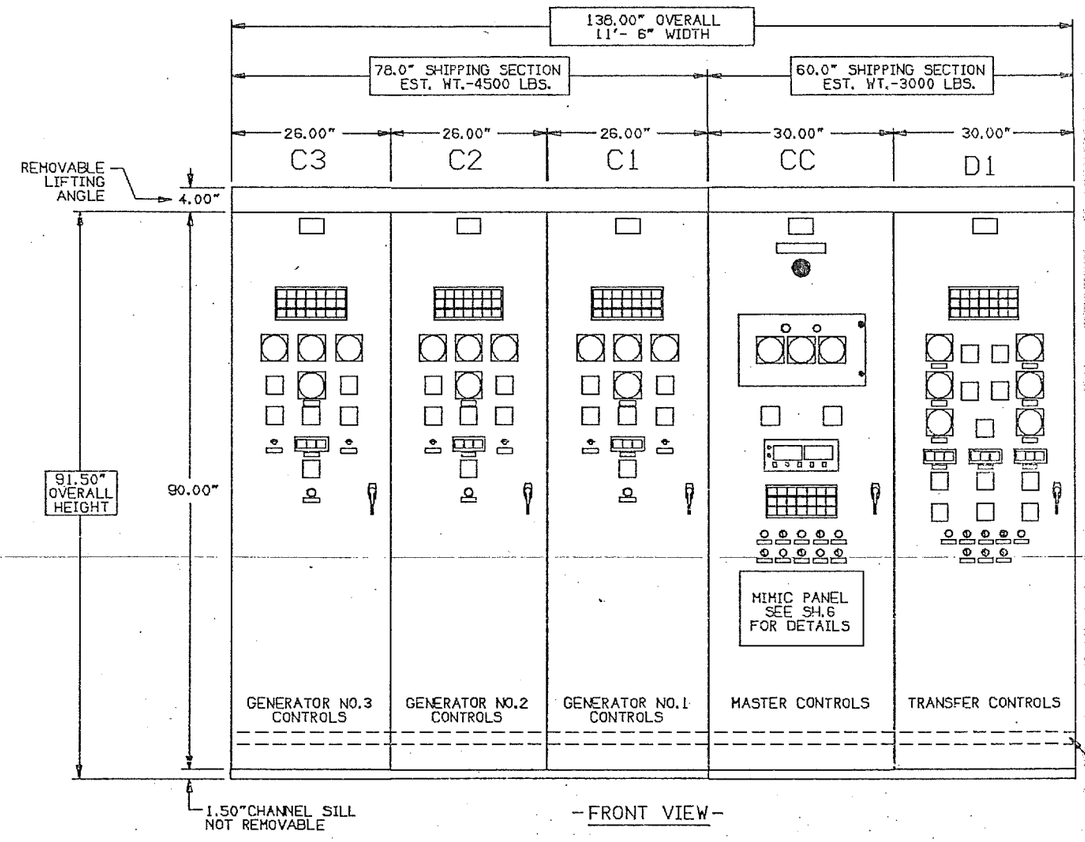
BILL OF MATERIAL SHEET 6 OF 6



– PLAN VIEW –



FLOOR BOLT DOWN PATTERN
TYPICAL PER CUBICLE



–FRONT VIEW–

ALL	UL891	N/A	N/A	N/A	N/A	N/A	N/A
CUBICLE NUMBER	TYPE LABEL	MAIN SECT AMPERES		VOLTAGE	SYSTEM	HZ	SHORT CIRCUIT RATING SYMMETRICAL AMPERES

SWITCHGEAR SHALL BEAR THE APPROPRIATE U/L LABEL AS LISTED IN THE TABLE ABOVE.

THE SHORT CIRCUIT RATING OF EACH SECTION IS EQUAL TO THE LOWEST SHORT CIRCUIT CURRENT RATING OF ANY CIRCUIT BREAKER OR FUSED SWITCH INSTALLED BUT NOT MORE THAN THE VALUE LISTED IN THE TABLE AT VOLTAGE SPECIFIED.

CUSTOMER: DUCCI ELECTRICAL CONTRACTERS
P.O. NO.: B 811

MIRROR IMAGE 01-20-93 TJC

REVISIONS

REFERENCE DRAWINGS

NO.	TITLE
19997-D-112130	SCHEMATIC DIAGRAMS
19997-D-112131	WIRING DIAGRAMS
19997-WPA-112132	SYSTEM DESCRIPTION
19997-WPA-112133	BILL OF MATERIAL

INSTALLATION

NIANTIC WOMEN'S PRISON
NIANTIC CONNECTICUT

TITLE

PHYSICAL DETAILS
GENERATOR CONTROL
SWITCHGEAR

RUSSELECTRIC INC.
SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	GVP	1-13-93	DWG. NO. 19997-D-112129	1
CHKD.				
APPD.		1-21-93	SHEET NO 01 CONT'D.ON SHEET NO. 02	REV.

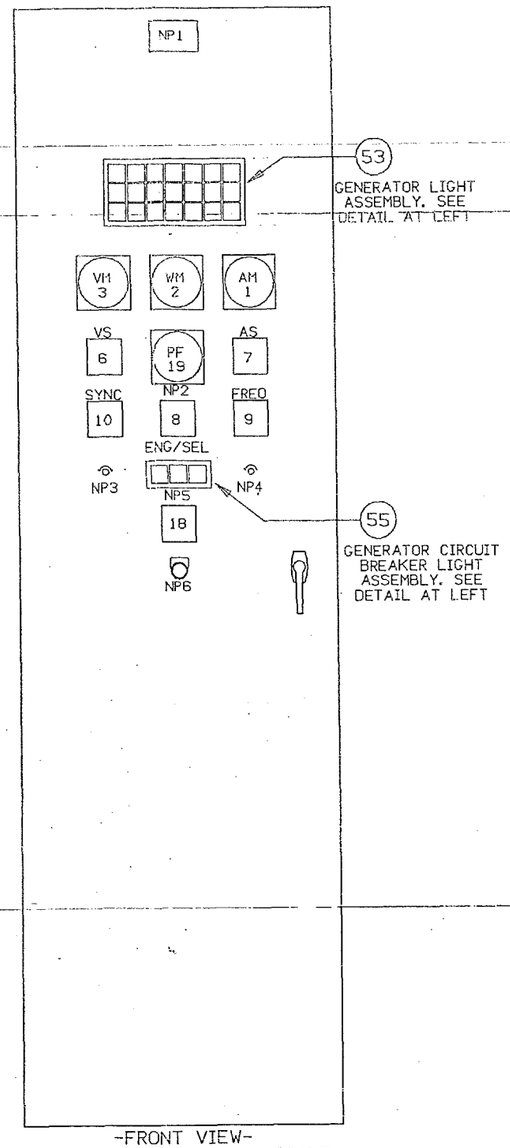
FILE NAME: S:\PARTS\NIA\H129\01

APPR. LOW OIL PRESSURE (A)	APPR. HIGH WATER TEMP. (A)	LOW WATER TEMP. (A)	DAY TANK LOW FUEL LEVEL (A)	DAY TANK HIGH FUEL LEVEL (A)	DAY TANK RUPTURE (A)	24V BATTERY CHARGER FAILURE (A)
LOW OIL PRESSURE (R)	HIGH WATER TEMP. (R)	LOW WATER LEVEL (A)	ENGINE LOCKED OUT (R)	OVER CRANK (R)	(R)	DC CONT. VOLTAGE FAILURE (R)
LOW OIL LEVEL (A)	(R)	FAIL TO SYNC. (R)	ENGINE RUNNING (G)	OVER SPEED (R)	PROTECTIVE RELAY TRIP (R)	(R)

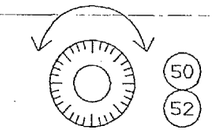
TYPICAL WINDOW COLOR
(SEE NOTE NO. 1)
DO NOT ENGRAVE.

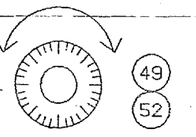
CIRCUIT BREAKER OPEN (G)	BREAKER DRAWN OUT (A)	CIRCUIT BREAKER CLOSED (R)

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.



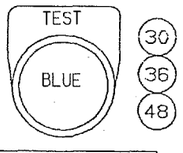
-FRONT VIEW-
GENERATOR CONTROL CUBICLE
(C1-C3)





NP3 VOLTAGE ADJUST

NP4 SPEED ADJUST



NP6 LAMP TEST

NP2 ENGINE GENERATOR NO. 1 ← THIS NAMEPLATE TO REFLECT THE GENERATOR NO.

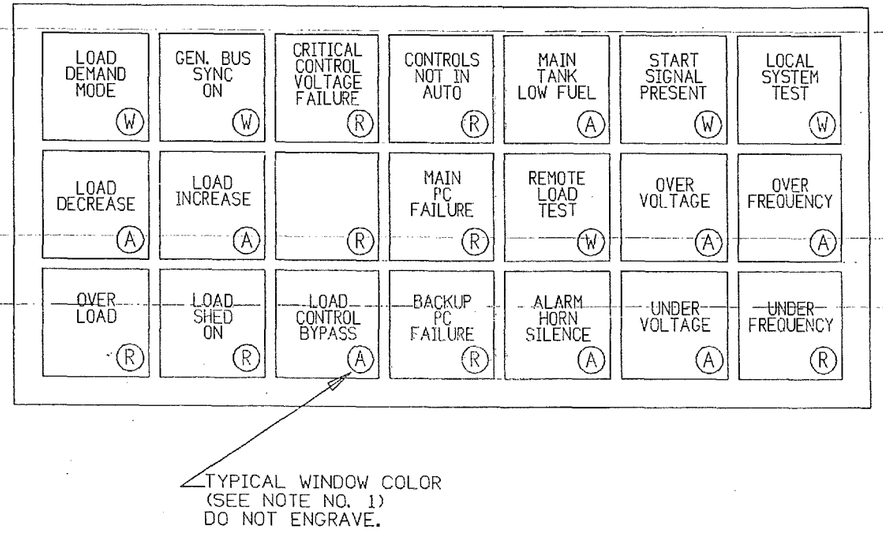
NP5 GENERATOR CIRCUIT BREAKER ← TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP1 GENERATOR NO. 1 CONTROL CUBICLE C1 ← 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUT	PHYSICAL DETAILS GENERATOR CONTROL CUBICLE DOOR DETAIL	DFTP. TJC 01-14-93 — DWG. NO. 19997-D-112129 — REV. 1 CHKD. — APPD. 1-15-93 — SHEET NO 02 CONT'D.ON SHEET NO. 03

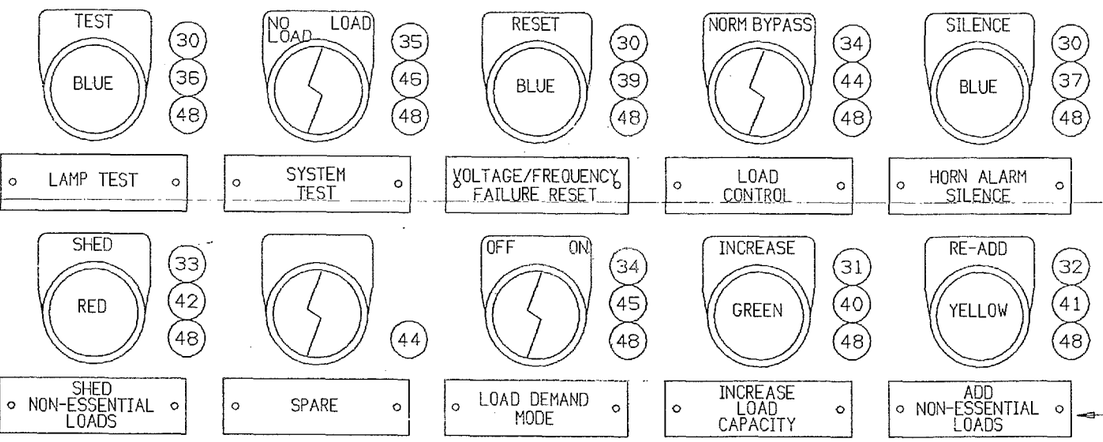
1. 1/20/93

FILE NAME: SUB\M125\02



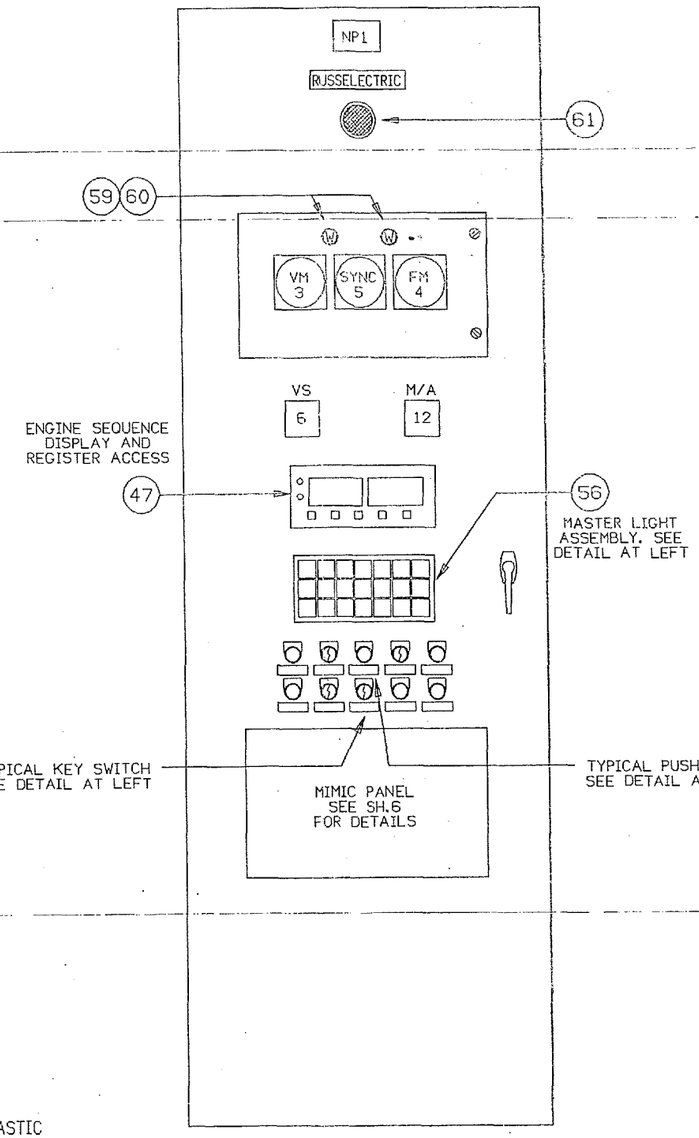
TYPICAL WINDOW COLOR
(SEE NOTE NO. 1)
DO NOT ENGRAVE.

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.



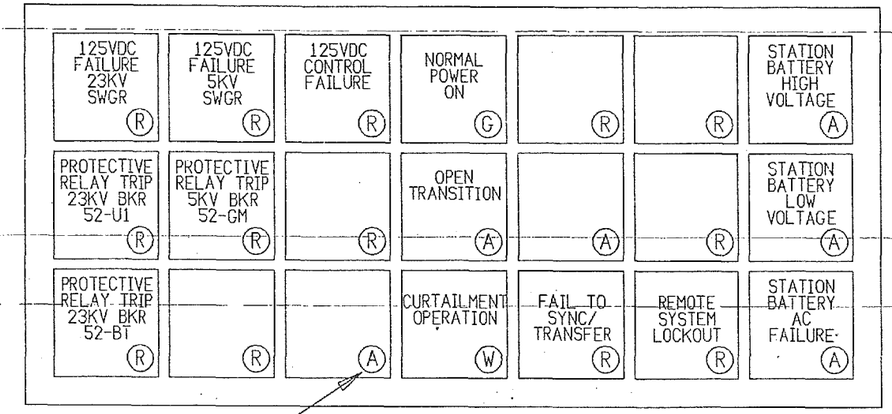
TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP1 — MASTER CONTROL CUBICLE CC — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS



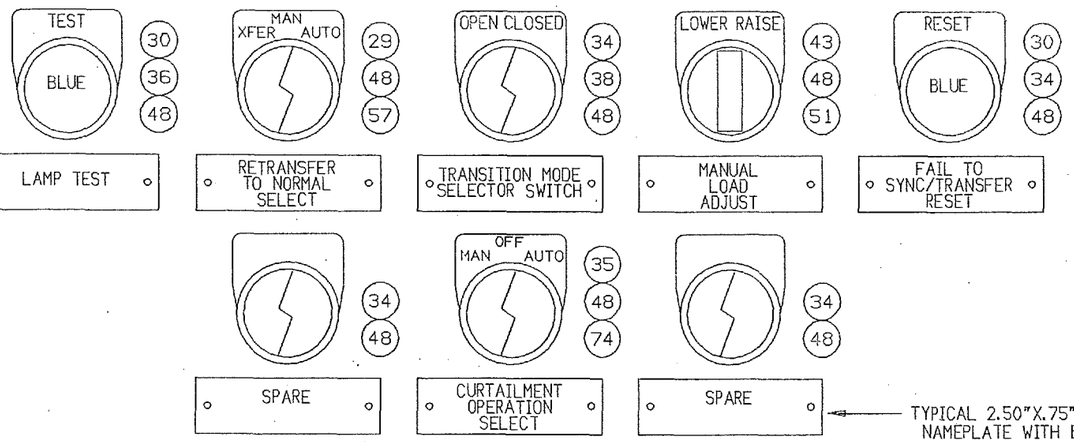
-FRONT VIEW-
MASTER CONTROL CUBICLE
(CC)

INSTALLATION: NIANTIC WOMEN'S PRISON, NIANTIC, CONNECTICUT	TITLE: PHYSICAL DETAILS MASTER CONTROL CUBICLE DOOR DETAIL	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043
		DFTP. TJC 01-14-93 — DWG. NO. 19997-D-112129 — /
		CHKD. —
		APPD. 1-20-93 — SHEET NO 03 CONT'D.ON SHEET NO. 04 — REV.



TYPICAL WINDOW COLOR
(SEE NOTE NO. 1)
DO NOT ENGRAVE.

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.

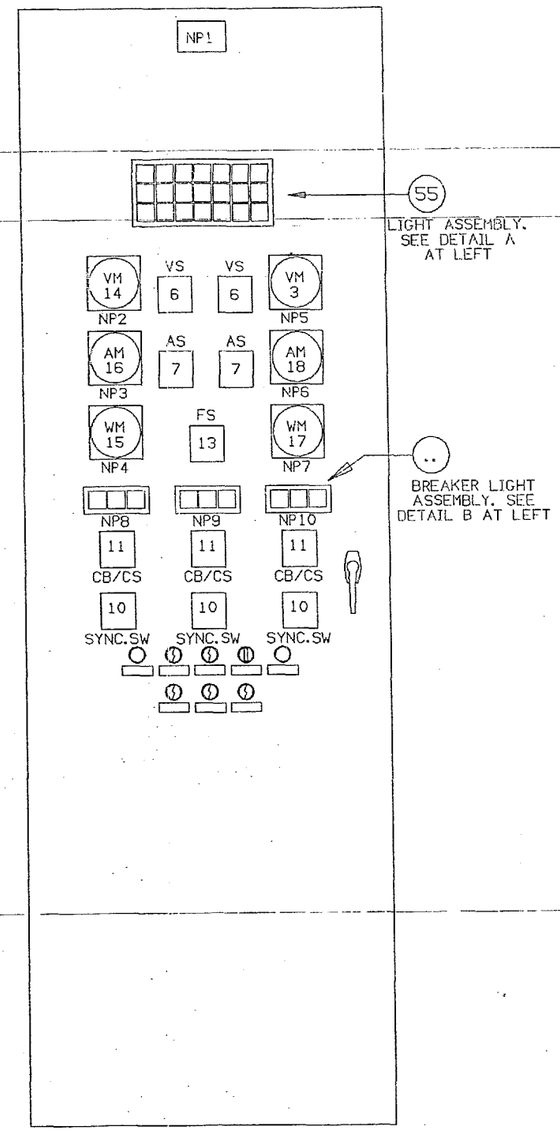


TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP1 — UTILITY TRANSFER AND CONTROL CUBICLE D1 — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP2	NP3	NP4	NP5	NP6
23KV SWGR INCOMING UTILITY VOLTAGE	23KV SWGR INCOMING UTILITY CURRENT	23KV SWGR INCOMING UTILITY KW	3750KVA TRANSFORMER SECONDARY VOLTAGE	5KV SWGR GEN.MAIN BREAKER 52-GM CURRENT

NP7	NP8	NP9	NP10
5KV SWGR GEN.MAIN BREAKER 52-GM KW	23KV UTILITY MAIN BREAKER 52-U1	23KV BUS TIE BREAKER 52-BT	5KV GENERATOR MAIN BREAKER 52-GM



-FRONT VIEW-
UTILITY TRANSFER CONTROL CUBICLE
(D1)

INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043			
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUT	PHYSICAL DETAILS UTILITY TRANSFER CONTROL DOOR DETAIL	DFTP. TJC 01-14-93	DWG. NO. 19997-D-112129		/
		CHKD.			
		APPD. 1-21-93	SHEET NO 04 CONT'D.ON SHEET NO. 05		REV.

WIRE RUN LIST

FROM	TO	QUANTITY AND SIZE
CONTROL SWGR ENGINE CONTROL CUBICLE (C1-C3)	RESPECTIVE ENGINE- GENERATOR SET	(8) #10,(30) #12 (3) 2C SHIELDED
	ENGINE BATTERY CHARGER	(4) #12
	DAY TANK AND RUPTURE BASIN	(5) #12
	5KV SWITCHGEAR RESPECTIVE BREAKER CUBICLE (D2-D4)	(6) #10, (24) #12
CONTROL SWGR MAST. CUB. (CC)	125V STATION BATTERY CONSOLE	(8) #12
CONTROL SWGR TRANSFER CONTROL CUBICLE (D1)	MOTOR CONTROL CTR "MCC-10" (ENGINE FAN STARTERS)	(24) #14
	REMOTE EMS CONTROLS	(20) #12 (65) #14
	5KV SWGR GEN MAIN BREAKER CUBICLE (D1)	(4) #10, (26) #12
	23KV SWGR 52-SDF1 BREAKER CUBICLE (D2)	(12) #10, (60) #12

FROM	TO	QUANTITY AND SIZE
5KV SWGR GEN MAIN BREAKER CUBICLE (D1)	125V STATION BATT CONSOLE	(2) #8
	23KV SWGR BUS TIE BREAKER CUBICLE (D5)	(4) #10
	TRANSFORMER SUDDEN PRESSURE & HI TEMP CONTACTS	(5) #12
23KV SWGR 52-SDF1 BREAKER CUBICLE (D2)	125V STATION BATT CONSOLE	(2) #8
125V STATION BATTERY CONSOLE	120VAC SINGLE PHASE 20A SUPPLY	(2) #12

NOTES

1. ALL WIRING MUST BE STRANDED; SPARES ARE INCLUDED IN ALL TOTALS.
2. ALL 2C SHIELDED TO BE BELDEN #8780 (2C #16) OR EQUAL.

INSTALLATION	TITLE	RUSSELECTRIC INC.
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUT	WIRE RUN SCHEDULE	SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	GVP	01-19-93	DWG. NO. 19997-D-112129	1
CHKD.				
APPD.		1/19/93	SHEET NO 05 CONT'D.ON SHEET NO. XX	REV.

FILE NAME: SLEN-H1-29-05

20.000

12.000

Russelectric Inc. SOUTH SHORE PARK HINGHAM, MA 02043

INCOMING 23KV SUPPLY

OPEN (G)
52-U1
CLOSED (R)

OPEN (G) CLOSED (R)
52-BT

3750KVA 23KV PRI 4.16KV SEC.

OPEN (G) CLOSED (R)
52-GM

52-SDF1 OPEN (G) CLOSED (R)

52-SDF2 OPEN (G) CLOSED (R)

52-SDF3 OPEN (G) CLOSED (R)

52-G1 OPEN (G) CLOSED (R)

52-G2 OPEN (G) CLOSED (R)

52-G3 OPEN (G) CLOSED (R)

L.E.D. TYPE PILOT LIGHT 75 TYP.

L.E.D. TYPE PILOT LIGHT 76 TYP.

1135KW 4.16KV G1

1135KW 4.16KV G2

1135KW 4.16KV G3

23KV DISTRIBUTION SWITCHGEAR

5KV GENERATOR SWITCHGEAR

PANEL TO BE CLEAR ANODIZED ALUMINUM WITH BLACK SILK SCREEN IMAGE OF SYSTEM ONE LINE DIAGRAM

INSTALLATION: NIANTIC WOMEN'S PRISON, NIANTIC, CONNECTICUT	TITLE: PHYSICAL DETAILS MIMIC PANEL	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	TJC	01-20-93	DWG. NO. 19997-D-112129	/
CHKD.				
APPD.		1-21-93	SHEET NO 06 CONT'D.ON SHEET NO. --	REV.

FILE NAME: SUBM1129-06

SECTION 13

BILL OF MATERIAL
5KV SWITCHGEAR

RUSSELECTRIC JOB NO: 19997
CUSTOMER: DUCCI ELECTRICAL CONTRACTORS
JOB NAME: NIANTIC WOMEN'S PRISON
TORRINGTON, CONNECTICUT
NIANTIC, CONNECTICUT
CUSTOMER P.O. NO: B-811
RUSSELECTRIC REF. DWG. NO: 19997-D-112134

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
1	3	1200A, 250MVA, 4.16 KV VACUUM CIRCUIT BREAKER ELEMENT, ELECTRICALLY OPERATED, 125VDC CHARGE, CLOSE AND TRIP. TYPE 50VCPW250	W'HOUSE	PER DESC.	N/A
2	4	CIRCUIT BREAKER COMPARTMENT KIT FOR ITEM #1 (PLUS ONE FUTURE), GLASS POLYESTER, LINE LOAD STABS, INCLUDE 5A-5B MOC AND TOC SWITCHES	W'HOUSE	7816C 75G02 PER DESC.	N/A
3	3	5KV SWITCHGEAR FRAME WITH ITEMS 1 & 2 IN UPPER COMPARTMENT AND STANDARD G.E. PT/CPT ROLLOUT IN LOWER COMPARTMENT (MODIFIED ARRANGEMENT 24)	RUSS-ELECTRIC	PER DESC.	1201-0524 MOD
4	1	5KV SWITCHGEAR FRAME WITH ITEMS 1 & 2 IN UPPER COMPARTMENT AND 1 PT AND 1 PT/CPT ROLLOUT IN LOWER COMPARTMENT (MODIFIED ARRANGEMENT 27)	RUSS-ELECTRIC	PER DESC.	1201-0524 MOD
5	4	POLYESTER BUS SUPPORT TYPE 1	GENERAL ELECTRIC	0144-D-2154-P001	N/A
6	12	SURGE ARRESTORS FOR USE ON 4.16 KV VACUUM BREAKER	GENERAL ELECTRIC	0144-D-2156-G003	N/A
7	24	TYPE 2 PRIMARY BOOT	GENERAL ELECTRIC	0177-C-C3204-P001	N/A
8	4	TYPE 3 PRIMARY BOOT	GENERAL ELECTRIC	0177-C-3205-P001	N/A
9	8	TYPE 8 PRIMARY BOOT	GENERAL ELECTRIC	0177-C-3218-P001	N/A
10	12	BOOT PLUG	GENERAL ELECTRIC	0209-B-4542-P001	N/A

APPROVED
DATE 01/13/93
REV 0

DWG. NO.
19997-WPA-112139
BILL OF MATERIAL SHEET 1 OF 4

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
11	12	TEE BOOT, 6" BUS, 6" RISER ¼" THICK	CONDEZ	001-1-0250-6-1 0250-6	N/A
12	10	POTENTIAL TRANSFORMER, TYPE JVM-3, 35/1 RATIO, WITH (2) 9F60BBD905 PRIMARY FUSES	GENERAL ELECTRIC	643X92	N/A
13	6	DIFFERENTIAL CT FURNISHED BY RUSSELECTRIC FOR INSTALLATION BY OTHERS, TYPE MC-5, 200/5 RATIO	ASEA BROWN BOVERI	401437-T4	N/A
14	9	CURRENT TRANSFORMER, MODEL 780, 200/5 RATIO (GEN DIFFERENTIAL)	ITI	780-201	N/A
15	18	CURRENT TRANSFORMER, MODEL 780, 250/5 RATIO (GEN RELAYING & METERING)	ITI	780-251	N/A
16	6	CURRENT TRANSFORMER, MODEL 780, 800/3 RATIO (GEN MAIN METERING)	ITI	780-801	N/A
17	3	CURRENT TRANSFORMER, MODEL 780, 1000/5 RATIO (GEN MAIN RELAYING)	ITI	780-102	N/A
18	3	REVERSE VAR RELAY, SINGLE PHASE, 120V, 13-150 WATT, 24VDC CONTROL, TEST CASE, 0° JUMPER	ASEA BROWN BOVERI	437W4790	2900-0151
19	3	REVERSE POWER RELAY, SINGLE PHASE, 120V, 13-150 WATT, 24VDC CONTROL, TEST CASE, 30° JUMPER	ASEA BROWN BOVERI	437W4790	2900-0151
20	3	TEMPERATURE RELAY, TYPE ITE-49T, 100 OHM, PLATINUM, 120 VAC CONTROL, TEST CASE, 120-180°C	ASEA BROWN BOVERI	436D6065	N/A
21	3	VOLTAGE RESTRAINED TIME OVERCURRENT RELAY, TYPE BE1-51/27R, 3 PHASE, INVERSE TIME, 125VDC POWER SUPPLY, CURRENT OPERATED TARGETS, ONE INSTANTANEOUS ELEMENT	BASLER	BE1-51/27R-B1E-B5P-B1NOF	N/A
22	4	GROUND OVERCURRENT RELAY, SINGLE PHASE, TYPE ITE-51S, SHORT TIME WITH INSTANTANEOUS ATTACHMENT (.5-24 TIME, 2-20X INST) TEST CASE, 125VDC	ASEA BROWN BOVERI	443S-4141	N/A

APPROVED	DATE	REV	DWG. NO.
	01/13/93	0	19997-WPA-112139

BILL OF MATERIAL SHEET 2 OF 4

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
23	3	DIFFERENTIAL RELAY, TYPE ITE-87M, 3 PHASE, WITH REACTOR ASSEMBLY, 125VDC CONTROL	ASEA BROWN BOVERI	219M2573	N/A
24	5	LOCKOUT RELAY, 6A-6B CONTACTS, 125VDC COIL	ELECTRO SWITCH	7803-E	N/A
25	12	TYPE EB-27 SHORTING TYPE TERMINAL STRIP, 4 CIRCUIT	GENERAL ELECTRIC	EB27-A04S	N/A
26	4	CIRCUIT ISOLATING SWITCH, 2 POLE GANGED	SUPERIOR	821F	N/A
27	4	COMBINATION DISPLAY LIGHTS, SLC-40 SERIES, TYPE F, 3 WINDOWS (1 ROW X 3 COLUMNS), INCANDESCENT ILLUMINATED, 30VDC LAMPS, BLACK FRAME, CLEAR LENS, COLOR SCREENS: 1 RED, 1 AMBER, 1 GREEN. INCLUDE 2 #SLC-JP42 JUMPERS IDEC CAT. NO. SLC40N-0103-DE3FB-R(1)-G(1)-A(1), WITH CHECK TERMINAL	IDEC	PER DESC.	2450-0891
28	1	PUSHBUTTON OPERATOR - BLUE	CUTLER HAMMER	10250T108	N/A
29	1	LEGEND PLATE MARKED: "TEST"	CUTLER HAMMER	10250TM36	2200-0280
30	1	CONTACT BLOCK - 1 N/O, 1 N/C	CUTLER HAMMER	10250T1	2200-0040
31	9	COMPRESSION LUG, 2 HOLE, LONG BARREL #1 AWG, 3/0	BURNDY	YA27 2N	N/A
32	6	COMPRESSION LUG, 2 HOLE, LONG BARREL #4 AWG, 500 MCM	BURNDY	YA34 2N	N/A
33	8	HIGH VOLTAGE WARNING SIGNS, 8" X 11"	T & B	BP-1051	N/A
34	3	TRANSFORMER DIFFERENTIAL RELAY, TYPE ITE-87T, 2 WINDING, 125VDC TEST CASE	ASEA BROWN BOVERI	41972441	N/A
35	1	OVERCURRENT RELAY, 3 PHASE WITH INSTANTANEOUS, TYPE ITE-51I, INVERSE TIME (1.5-6A TIME, 2-20X INST) TEST CASE, 125VDC CONTROL INDIVIDUAL PHASE TARGETS, TEST CASE, 125VDC CONTROL	ASEA BROWN BOVERI	443T1241	N/A

APPROVED	DATE	REV	DWG. NO.
	01/13/93	0	19997-WPA-112139

BILL OF MATERIAL SHEET 3 OF 4

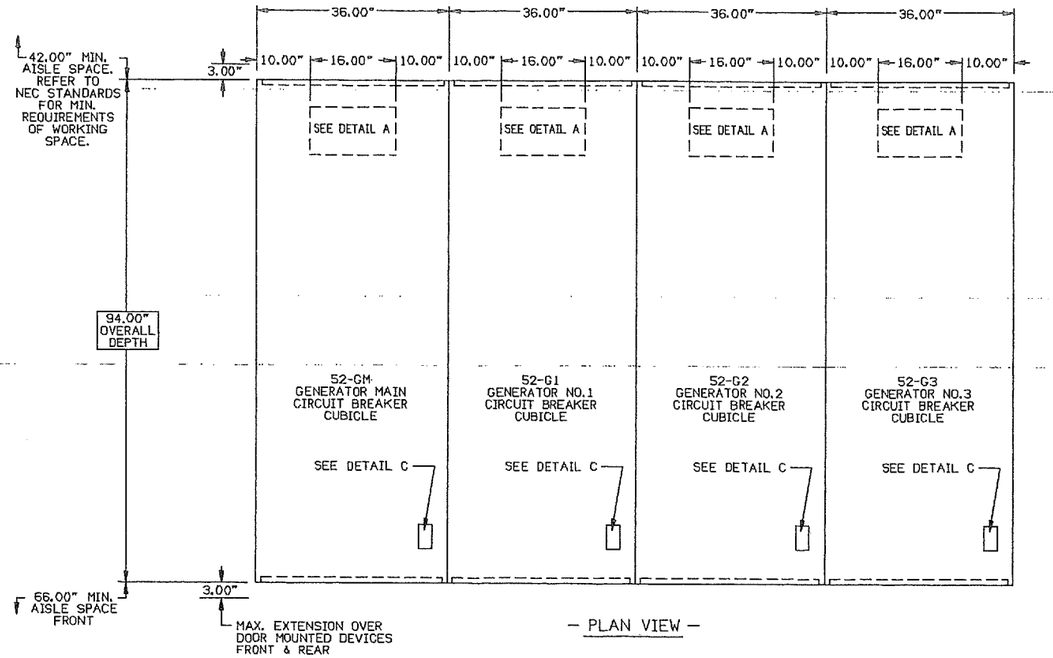
ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
36	1	COMBINATION DISPLAY LIGHTS, SLC-40 SERIES, TYPE F, 3 WINDOWS (1 ROW X 3 COLUMNS), INCANDESCENT ILLUMINATED, 30VDC LAMPS, BLACK FRAME, CLEAR LENS, COLOR SCREENS: 3 RED. INCLUDE 2 #SLC-JP42 JUMPERS IDEC CAT. NO. SLC40N-0103-DE3FB-R(1), WITH CHECK TERMINAL	IDEC	PER DESC.	N/A

APPROVED	DATE	REV	DWG. NO.
yp	01/13/93	0	19997-WPA-112139

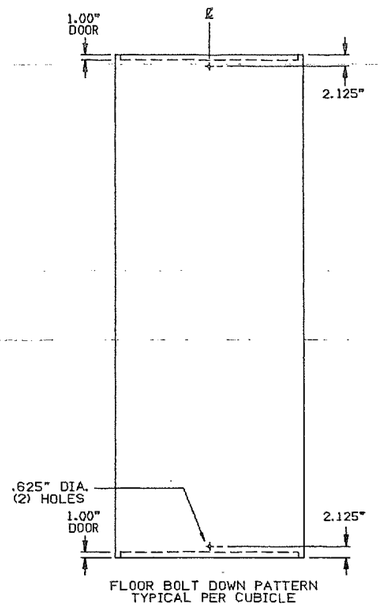
BILL OF MATERIAL SHEET 4 OF 4

Dynalectric Inc.

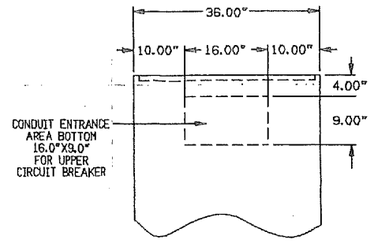
HINGHAM, MA 02043



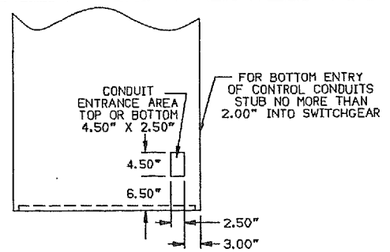
— PLAN VIEW —



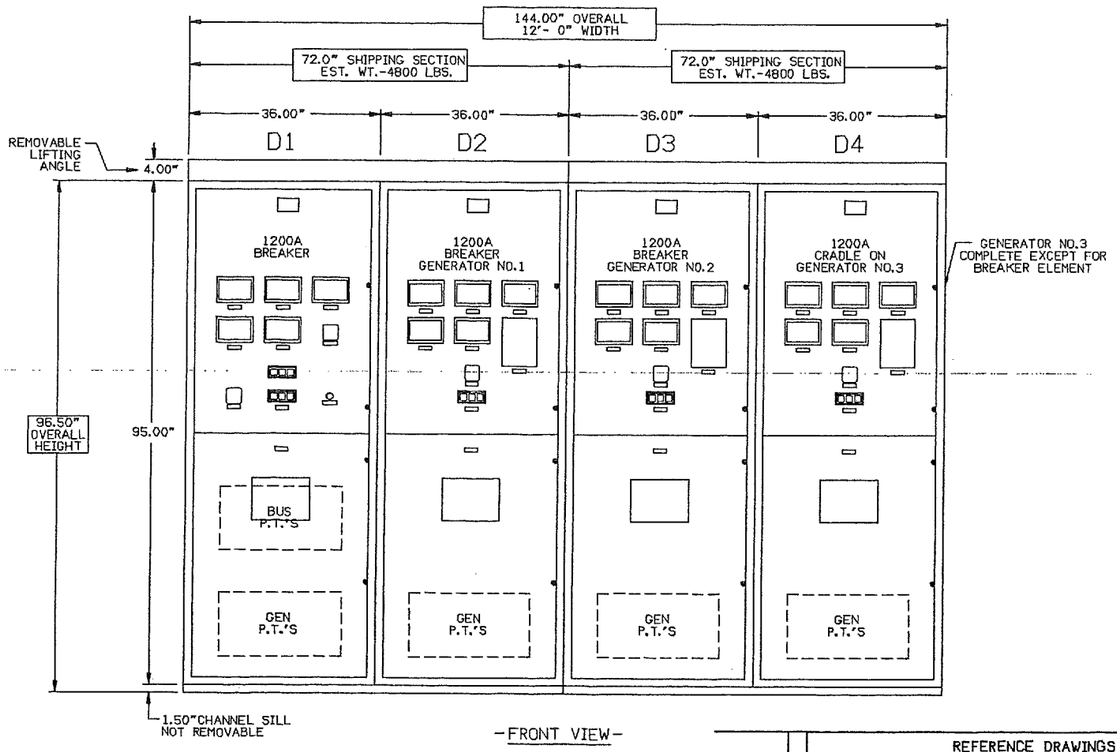
FLOOR BOLT DOWN PATTERN TYPICAL PER CUBICLE



-DETAIL A-
(POWER CONDUITS ONLY)



-DETAIL C-
(CONTROL CONDUITS ONLY)



-FRONT VIEW-

NOTES

1. ENCLOSURES TO BE FABRICATED FROM FORMED CHANNEL FRAMEWORK AND CODE GAUGE SHEET STEEL. ALL STEEL PARTS SHALL BE PREPARED FOR PAINTING BY A FIVE STEP CLEANING, PHOSPHATIZING AND SEALING PROCESS. THE PARTS SHALL THEN BE PAINTED ASA NO.61 GRAY, UTILIZING POLYESTER POWDER COATING APPLIED BY THE ELECTROSTATIC METHOD AND CURED IN A BAKING OVEN. THIS FINISH IS SUITABLE FOR OUTDOOR, AS WELL AS INDOOR APPLICATIONS.

CUBICLE NUMBER	TYPE LABEL	MAIN AMPERES	SECT AMPERES	VOLTAGE KV	SYSTEM	HZ	SHORT CIRCUIT RATING SYMMETRICAL AMPERES
D1-D4	UL1670	1200	1200	4.16	3Ø, 3W	06	250

SWITCHGEAR SHALL BEAR THE APPROPRIATE U/L LABEL AS LISTED IN THE TABLE ABOVE.

THE SHORT CIRCUIT RATING OF EACH SECTION IS EQUAL TO THE LOWEST SHORT CIRCUIT CURRENT RATING OF ANY CIRCUIT BREAKER OR FUSED SWITCH INSTALLED BUT NOT MORE THAN THE VALUE LISTED IN THE TABLE AT VOLTAGE SPECIFIED.

CUSTOMER: DUCCI ELECTRICAL CONTRACTORS
P.O. NO.: B-811

REVISIONS

REFERENCE DRAWINGS NO.	TITLE
19997-D-112135	SCHEMATIC DIAGRAMS
19997-D-112136	WIRING DIAGRAMS
19997-WPA-112137	BILL OF MATERIAL

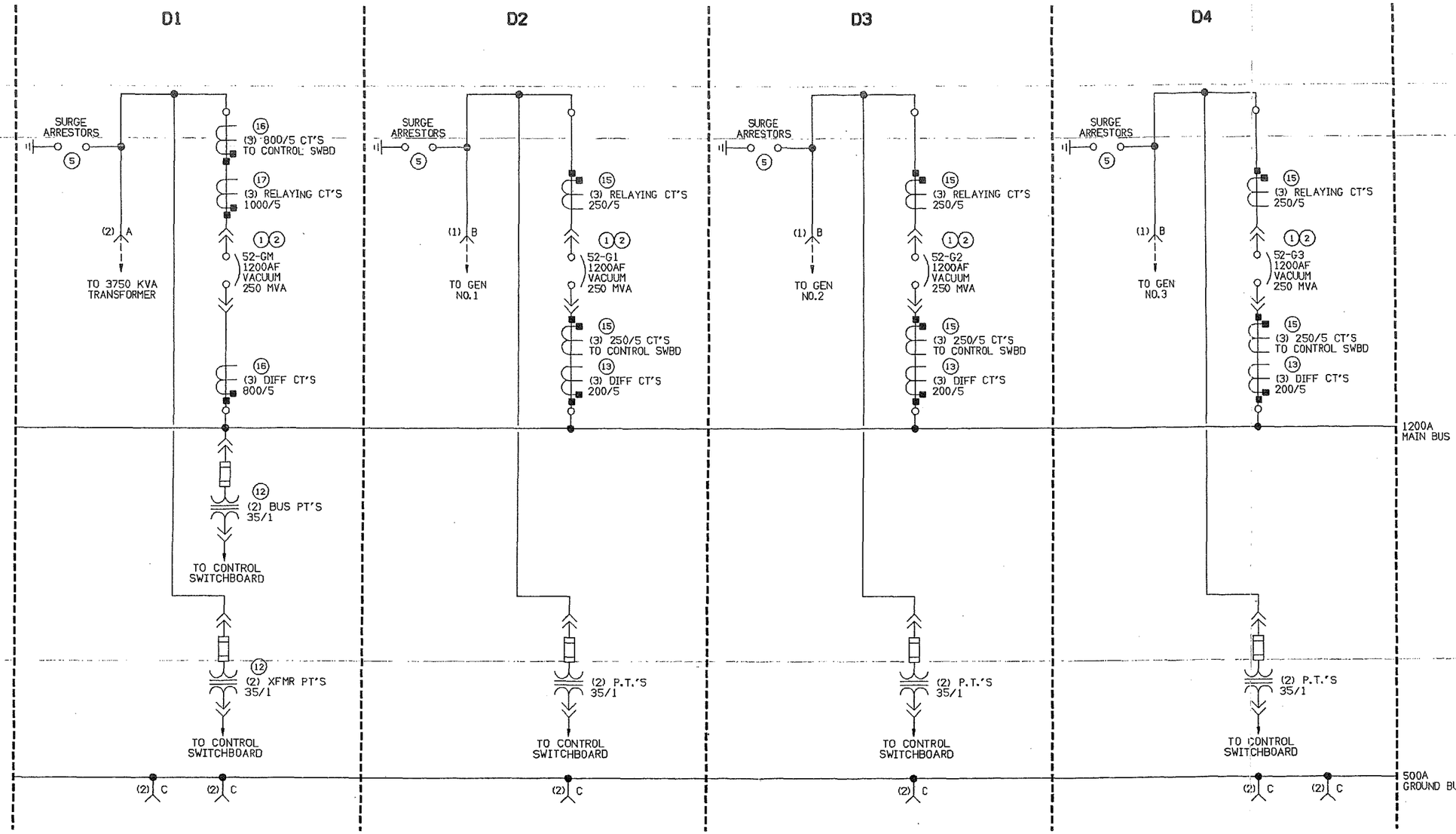
INSTALLATION
NIANTIC WOMEN'S PRISON
NIANTIC, CONNECTICUT

TITLE
PHYSICAL DETAILS
5KV GENERATOR
SWITCHGEAR

RUSSELECTRIC INC.
SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	TJC	1-13-93	DWG. NO. 19997-D-112134	0
CHKD.				
APPD.		1/15/93	SHEET NO 01 CONT'D.ON SHEET NO. 02	REV.

FILE NAME: SUBVM134\01



NOTES

1. CIRCLED NUMBERS REPRESENT BILL OF MATERIAL ITEM NUMBERS.
2. ALL BUS TO BE SILVER PLATED COPPER, PHASE BUS INSULATED FOR 5KV SERVICE.
3. ALL LUGS ARE BURNDY COMPRESSION TYPE YA, SIZE AND QUANTITY AS INDICATED.
5. SWITCHGEAR BIL RATING 60KV.
6. SYSTEM VOLTAGE 4.16KV, 3Ø,3W, 60HZ.

LUG SCHEDULE	
TYPE	SIZE
A	500MCM
B	3/0
C	NEMA 2 HOLE PATTERN

INSTALLATION

NIANTIC WOMEN'S PRISON
NIANTIC, CONNECTICUT

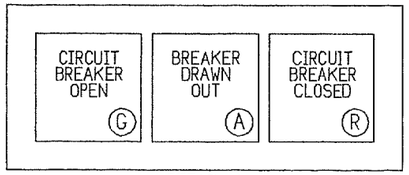
TITLE

5KV SWITCHGEAR
BUSSING ONE LINE DIAGRAM

RUSSELECTRIC INC.
SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	TJC	01-13-93	DWG. NO. 19997-D-112134	0
CHKD.				
APPD.		1/14/93	SHEET NO 02 CONT'D.ON SHEET NO. 03	REV.

FILE NAME: SUBM134X02



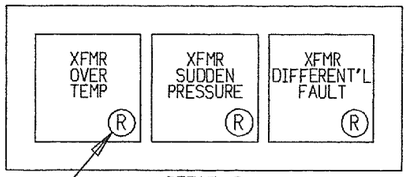
DETAIL A

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:

   A=AMBER R=RED

   G=GREEN W=WHITE

2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.

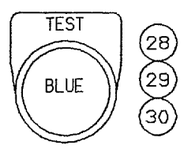


DETAIL B

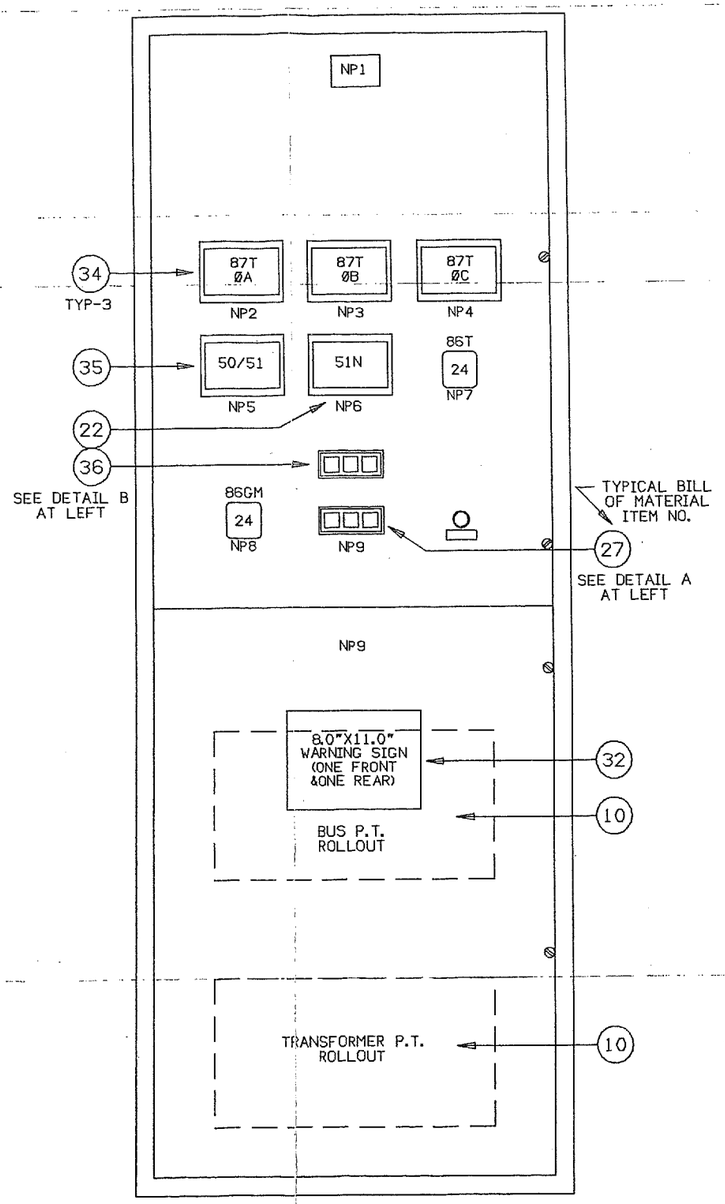
TYPICAL WINDOW COLOR (SEE NOTE NO. 1) DO NOT ENGRAVE.

NP1 — 3750KVA TRANSFORMER SECONDARY FEEDER CUBICLE D1 — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP2	TRANSFORMER DIFFERENTIAL RLY DEVICE 87T-ØA	NP6	52-GM GROUND OVERCURRENT RLY DEVICE 51N
NP3	TRANSFORMER DIFFERENTIAL RLY DEVICE 87T-ØB	NP7	TRANSFORMER LOCKOUT RELAY DEVICE 86T
NP4	TRANSFORMER DIFFERENTIAL RLY DEVICE 87T-ØC	NP8	52-GM LOCKOUT RELAY DEVICE 86-GM
NP5	52-GM OVERCURRENT RLY DEVICE 50/51	NP9 (2 REQ'D)	TRANSFORMER FEEDER BREAKER 52-GM — TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS



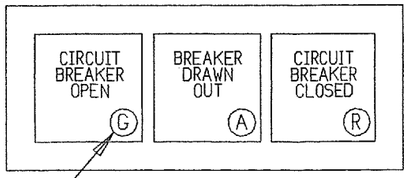
LAMP TEST SWITCH



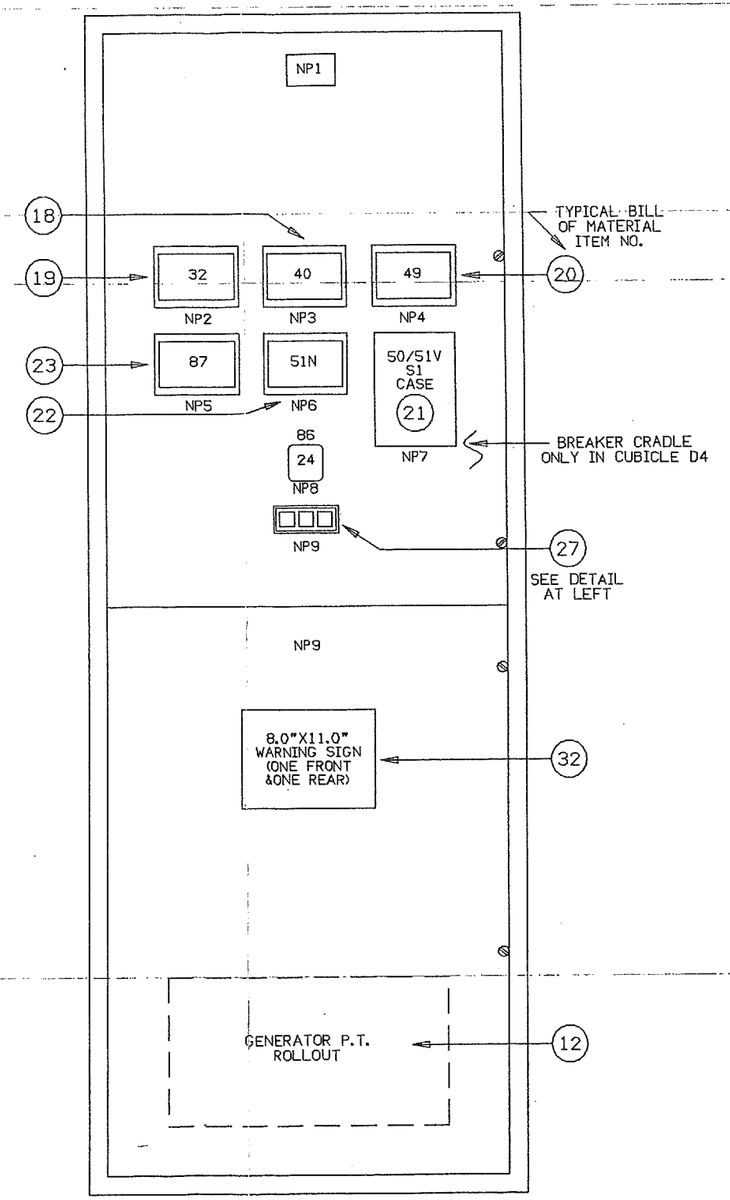
-FRONT VIEW-
GENERATOR MAIN FEEDER CUBICLE (D1)

INSTALLATION: NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUIT	TITLE: PHYSICAL DETAILS GENERATOR MAIN FEEDER DOOR DETAIL CUBICLE D1	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043	
		DFTP. TJC 01-13-93	DWG. NO. 19997-D-112134
		CHKD.	0
		APPD. 1-15-93	SHEET NO 03 CONT'D.ON SHEET NO. 04 REV.

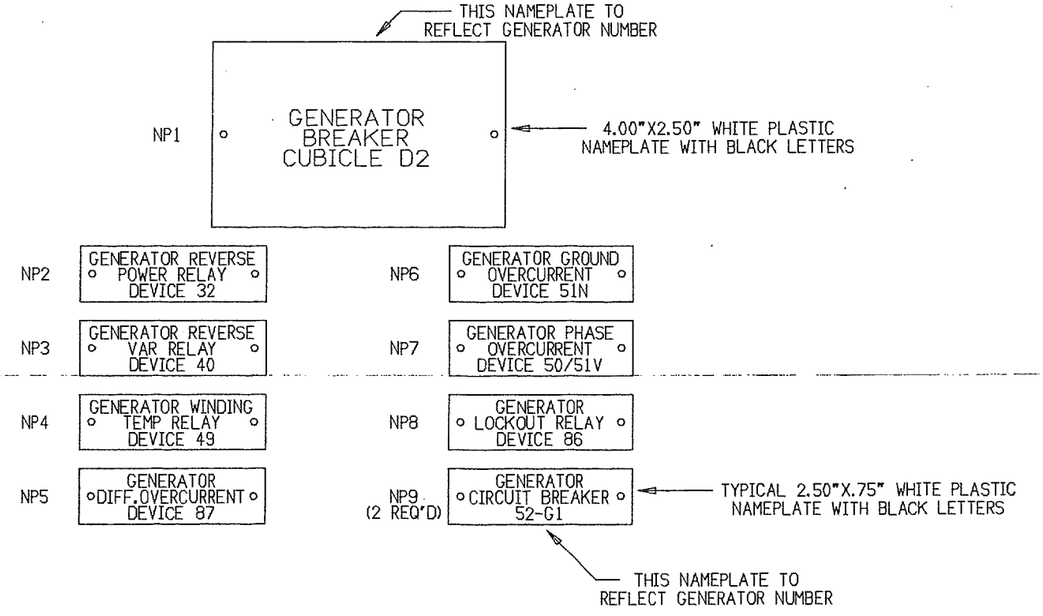
FILE NAME: SUBM134\03



NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.



-FRONT VIEW-
GENERATOR BREAKER CUBICLES
(D2-D4)



INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043			
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUT	PHYSICAL DETAILS GENERATOR BREAKER DOOR DETAIL CUBICLES D2-D4	DFTP. TJC 01-13-93	DWG. NO. 19997-D-112134	REV. 0
		CHKD.		
		APPD. 1/14/93	SHEET NO 04 CONT'D.ON SHEET NO. --	

FILE NAME: SUBM134V04

SECTION III

BILL OF MATERIAL
23KV SWITCHGEAR

RUSSELECTRIC JOB NO: 19997 — CUSTOMER: DUCCI ELECTRICAL CONTRACTORS

JOB NAME: NIANTIC WOMENS PRISON — TORRINGTON, CT

NIANTIC, CT — CUSTOMER P.O. NO: B-811

RUSSELECTRIC REF. DWG. NO: 19997-D-112138

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
1	5	27KV VACUUM CIRCUIT BREAKER, DRAWOUT ELEMENT, 1200A 25KAIC (RMS SYM), 1170MVA, 125KV BIL, BREAKER TO BE 125VDC OPERATED (CHARGE, CLOSE & TRIP) BREAKER TYPE - 27VCPW1250	W'HOUSE	8237A-11G02	N/A
2	5	27KV CIRCUIT BREAKER MINI-MODULE FOR USE WITH ITEM #1, INCLUDE 5A-5B MOC AND 5A-5B TOC SWITCH	W'HOUSE	7816C5-9G11	N/A
3	3	VOLTAGE TRANSFORMER, ROLL OUTS, EACH WITH (3) 200/1 PT'S CONNECTED LINE TO GROUND, EACH PT FURNISHED WITH .5E PRIMARY FUSE, INCLUDE SECONDARY DISCONNECTS	W'HOUSE	PER DESC.	N/A
4	3	VOLTAGE TRANSFORMER, "MINI MODULE" FOR USE WITH ITEM #3	W'HOUSE	7819C 53G01	N/A
5	3	AUXILIARY COMPARTMENT KIT FOR USE WITH ITEMS 3 & 4	W'HOUSE	1A343-42G04	N/A
6	4	27KV BUS SUPPORTS AND SNUBBERS	W'HOUSE	PER DESC.	N/A
7	1	SET OF BREAKER ACCESSORIES	W'HOUSE	1A301-36G01	N/A
8	3	INSULATING BOOT - RIGHT END	EGGER	7819C-05G01	N/A
9	3	INSULATING BOOT - LEFT END	EGGER	7819C-05G02	N/A
10	12	INSULATING BOOT - THROUGH BUS	EGGER	7819C-05G03	N/A
11	15	INSULATING BOOT - PRIMARY RISER	EGGER	6529C-97H01	N/A
12	15	INSULATING BOOT - PRIMARY RISER	EGGER	6529C-98H02	N/A

APPROVED — DATE 01/20/93 — REV 1

DWG. NO. 19997-WPA-112141

Russelectric Inc.
HINGHAM, MA 02043

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
13	30	INSULATOR CAP	EGGER	3A374-52H01	N/A
14	30	CYCLOALIPHATIC EPOXY INSULATOR, 15KV, 6" X 4.06"	ELECTRI-CAL EQUIPMENT INC. (E.E.I)	54-02718A	N/A
15	2	CIRCUIT BREAKER LIFTING YOKE	W'HOUSE	691C607-G01	N/A
16	75'	15KV UNSHIELDED, #4 JUMPER CABLE, EPR INSULATION 90°C, SINGLE CONDUCTOR "TIGER BRAND"	INDUS-TRIAL ELECTRIC (SHINE)	PER DESC.	N/A
17	6	CURRENT TRANSFORMER, MODEL: 785, 150/5	ITI	785-151	N/A
18	12	CURRENT TRANSFORMER, MODEL: 780, 150/5	ITI	785-151	N/A
19	9	CURRENT TRANSFORMER, MODEL: 780, 100/5	ITI	780-101	N/A
20	3	CURRENT TRANSFORMER MODEL: 143, 50/5	ITI	143-500	N/A
21	5	LOCKOUT RELAY, 6A-6B CONTACTS, 125VDC COIL	ELECTRO SWITCH	7803.E	N/A
22	5	CIRCUIT BREAKER CONTROL SWITCH	ELECTRO SWITCH	2440-D	51000-001
23	5	SWITCH, AMMETER TRANSFER, NAMEPLATE MARKED: OFF, 1, 2, 3	ELECTRO SWITCH	2410C	5100-0030
24	3	VOLTMETER SELECTOR SWITCH 4 POSITION	ELECTRO SWITCH	2404-C	N/A
25	12	TYPE EB-27 SHORTING TYPE TERMINAL STRIP, 4 CIRCUIT	GENERAL ELECTRIC	EB27-A04S	N/A
26	3	VOLTMETER, 4 1/2" 077 SERIES, 150V MOVEMENT, 30 KV SCALE RMS COMPENSATED	CROMPTON	077-05GA SCALED	N/A
27	2	AMMETER, 4 1/2" 077 SERIES, 5A MOVEMENT, 150A SCALE, RMS COMPENSATED	CROMPTON	077-05FA-LSPZ	N/A

APPROVED TP DATE 01/20/93 REV 1

DWG. NO. 19997-WPA-112141

BILL OF MATERIAL SHEET 2 OF 5

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
28	3	AMMETER, 4 1/2" 000 SERIES, 5A MOVEMENT, 100A SCALE, RMS COMPENSATED	CROMPTON	077-05FA LSPK	N/A
29	1	POWER FACTOR METER, 4-1/2", 077 SERIES, 120 VOLT	CROMPTON	077-427A QQAD	N/A
30	1	TYPE DSM-63 SWITCHBOARD WATTHOUR METER, 2 STATOR 15 MINUTE DEMAND REGISTER, FURNISHED WITH NAMEPLATE MARKED: MULTIPLY ALL READINGS BY 6000.	GENERAL ELECTRIC	700X64 G1	N/A
31	21	COMPRESSION LUG, 2 HOLE LONG BARREL #1 AWG	BURNDY	YA1C 2N	N/A
32	7	COMPRESSION LUG, 2 HOLE LONG BARREL #4 AWG	BURNDY	YA4C 2N	N/A
33	3	OVERCURRENT RELAY, 3 PHASE WITH INSTANTANEOUS, TYPE ITE-51I, INVERSE TIME (1.5-6A TIME, 2-20X INST) TEST CASE, 125VDC CONTROL INDIVIDUAL PHASE TARGETS, TEST CASE, 125VDC CONTROL	ASEA BROWN BOVERI	443T-1241	N/A
34	2	GROUND OVERCURRENT RELAY, SINGLE PHASE, TYPE ITE 51S, SHORT TIME WITH INSTANTANEOUS ATTACHMENT (.5-2A TIME, 2-20X INST) TEST CASE, 125VDC CONTROL	ASEA BROWN BOVERI	443S-4141	N/A
35	3	INSTANTANEOUS OVERCURRENT RELAY, SINGLE PHASE .8-8A 125VDC TEST CASE	ASEA BROWN BOVERI	418S-0541	N/A
36	2	FREQUENCY RELAY, ITE-81, SINGLE SET POINT, 63-54HZ, 1-99 CYCLES, 125VDC CONTROL, TEST CASE	ASEA BROWN BOVERI	42281275	N/A
37	3	OVERVOLTAGE RELAY, TYPE ITE-59N, ITE-59N, DEFINITE TIME .1-1 SECOND, TEST CASE, 125VDC	ASEA BROWN BOVERI	411U6175	N/A
38	3	UNDERVOLTAGE RELAY, TYPE ITE-27N, DEFINITE TIME 1-10 SEC, 60-110V RANGE, TEST CASE 125VDC	ASEA BROWN BOVERI	411T4175	N/A
39	1	REVERSE POWER RELAY, TYPE ITE-32R, SINGLE PHASE, 1.7-20 WATT, 1-30 SECONDS, 120 VAC SENSING, 125VDC CONTROL TEST CASE	ASEA BROWN BOVERI	437W4670	N/A

APPROVED DATE REV
01/20/93 1

DWG. NO.
19997-WPA-112141

BILL OF MATERIAL SHEET 3 OF 5

ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
40	1	GROUND OVERVOLTAGE RELAY, TYPE ITE-59G, SINGLE PHASE 208V, 3-18V TAP, INVERSE TIME, TEST CASE, 125VDC	ASEA BROWN BOVERI	410E1175	N/A
41	1	CURRENT BALANCE RELAY, TYPE ITE-46D, .1-.4A SECONDS, DEFINITE TIME, TEST CASE, 125VDC	ASEA BROWN BOVERI	427Q4140	N/A
42	2	SYNC CHECK RELAY, TYPE ITE-25S, .1-1.5 SECONDS, TEST CASE	ASEA BROWN BOVERI	424J2105	N/A
43	1	HIGH DROPOUT OVERCURRENT RELAY, TYPE ITE-50D, THREE PHASE .8-8A, .1-3 SEC, DEFINITE TIME, TEST CASE 125VDC (67V CURRENT)	ASEA BROWN BOVERI	468T2575	N/A
44	1	HIGH SPEED UNDERVOLTAGE & PHASE SEQUENCE RELAY TYPE ITE 47H 90-120VAC PU, 70-98% DO, 125VDC (67V VOLTAGE CONTROL)	ASEA BROWN BOVERI	412N0175	N/A
45	1	THREE PHASE DIRECTIONAL RELAY, TYPE ITE-32 .02A SENSITIVITY TEST CASE, 125VDC (67V DIRECTIONAL UNIT)	ASEA BROWN BOVERI	425P0070	N/A
46	6	CIRCUIT ISOLATING SWITCH 2 POLE GANGED	SUPERIOR	821F	N/A
47	5	COMBINATION DISPLAY LIGHTS, SLC-40 SERIES, TYPE F, 3 WINDOWS (1 ROW X 3 COLUMNS), INCANDESCENT ILLUMINATED, 30VDC LAMPS, BLACK FRAME, CLEAR LENS, COLOR SCREENS: 1 RED, 1 AMBER, 1 GREEN, INCLUDE 2 #SLC-JP42 JUMPERS IDEC CAT. NO. SLC4ON-0103-DE3FB-R(1)-G(1)-A(1) WITH CHECK TERMINAL	IDEC	PER DESC.	2450-0891
48	1	PUSHBUTTON OPERATOR - BLUE	CUTLER HAMMER	10250T108	N/A
49	1	LEGEND PLATE MARKED: "TEST"	CUTLER HAMMER	10250TM36	2200-0280
50	1	CONTACT BLOCK - 1 N/O, 1 N/C	CUTLER HAMMER	10250T1	2200-0040
51	92	NICKEL CADMIUM BATTERY CELLS, 83AH AT 8HR RATE	ALCAD	M80P (MP80)	N/A

APPROVED DATE REV

01/20/93 1

DWG. NO. 19997-WPA-112141

Russelectric Inc.

HINGHAM, MA 02043

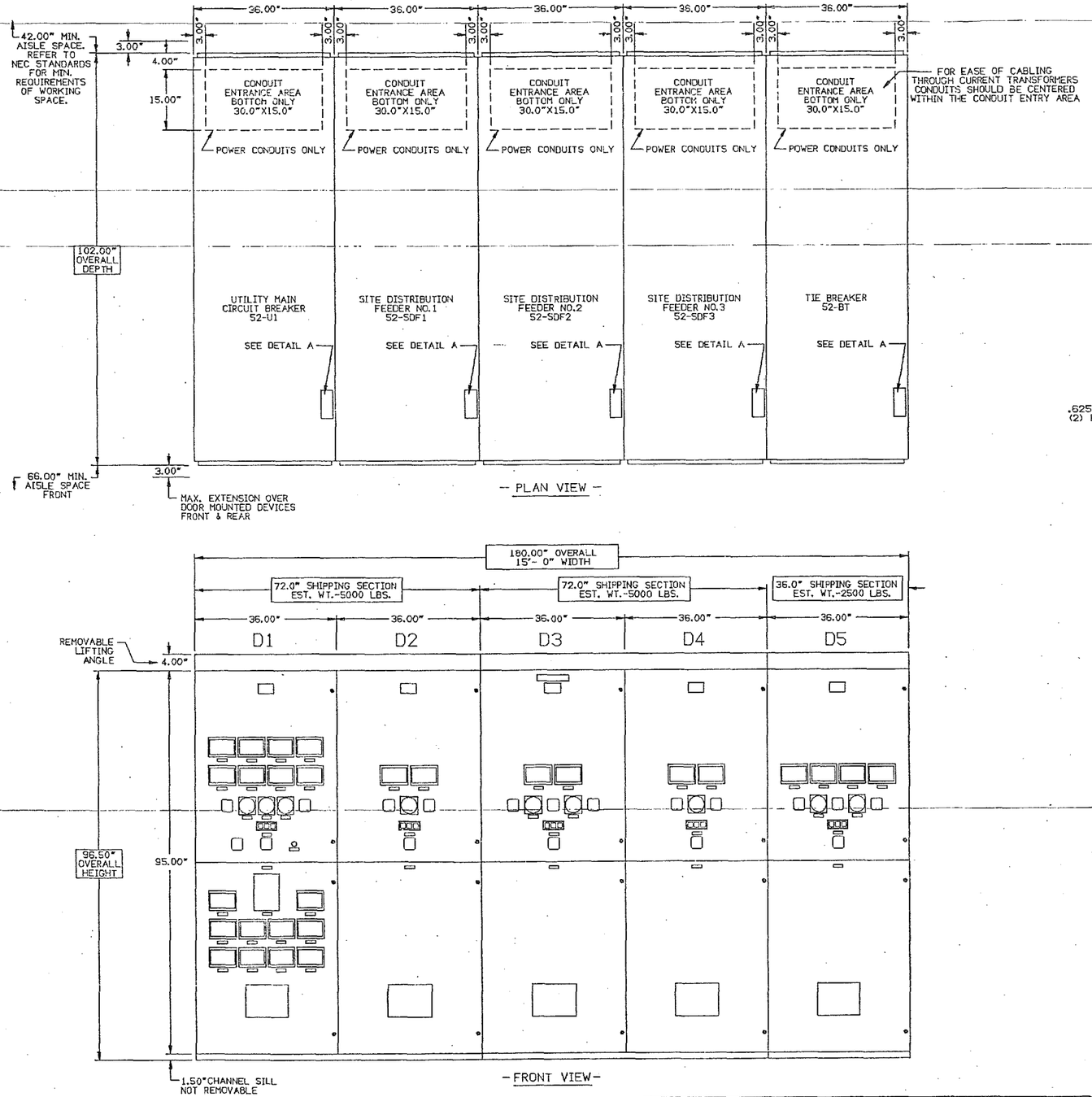
ITEM#	QTY	DESCRIPTION	MFG.	CAT. NO.	RUSS. NO.
52	1	BATTERY CHARGER FOR ITEM #51, 130VDC, 12A OUTPUT, 120VAC, SINGLE PHASE INPUT INCLUDE THE FOLLOWING: FILTERED OUTPUT, 0-72HR EQUALIZE TIMER WITH LINE FAILURE CIRCUIT, AC FAILURE RELAY, DC HIGH & LOW FAILURE RELAY WITH LIGHTS	ALCAD	1S5LR(F)-130-012 PER DESC.	N/A
53	1	NEMA 1 CONSOLE (NON SEISMIC) FOR ITEMS 51 & 52	ALCAD	C-785-624-6	
54	1	PORTABLE CIRCUIT BREAKER LIFTING DEVICE	W"HOUSE	6366C-91H01	N/A
55	3	POTENTIAL TRANSFORMER, MODEL 460, 120/120	ITI	460-120	N/A
56	10	HIGH VOLTAGE WARNING SIGNS, 8" X 11"	T & B	BP-1051	N/A
57	3	OVERCURRENT RELAY, SINGLE PHASE WITH INSTANTANEOUS TYPE ITE-51I, INVERSE TIME (1.5-6A TIME, 2-20X INST) TEST CASE, 125VDC CONTROL	ASEA BROWN BOVERI	443S 1241	N/A

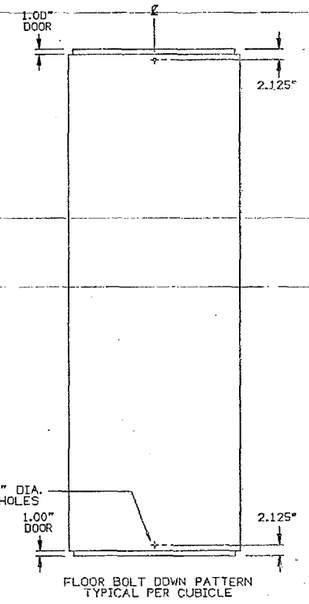
APPROVED DATE REV
TP 01/20/93 1

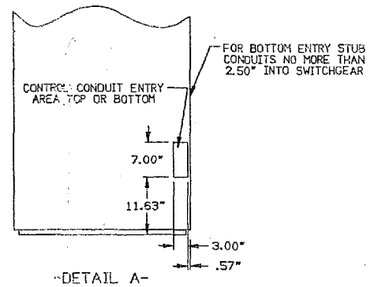
DWG. NO.
19997-WPA-112141
BILL OF MATERIAL SHEET 5 OF 5

Russelectric Inc.

HINGHAM, MA 02043







REVISIONS	REFERENCE DRAWINGS	
	NO.	TITLE
1 REVISED DEPTH TO 102,REV D1 & D2 DOORS 01-19-93 GVP	19997-D-112139 19997-D-112140 19997-WPA-112141	SCHEMATIC DIAGRAMS WIRING DIAGRAMS BILL OF MATERIAL

INSTALLATION

NIANTIC WOMEN'S PRISON
NIANTIC, CONNECTICUT

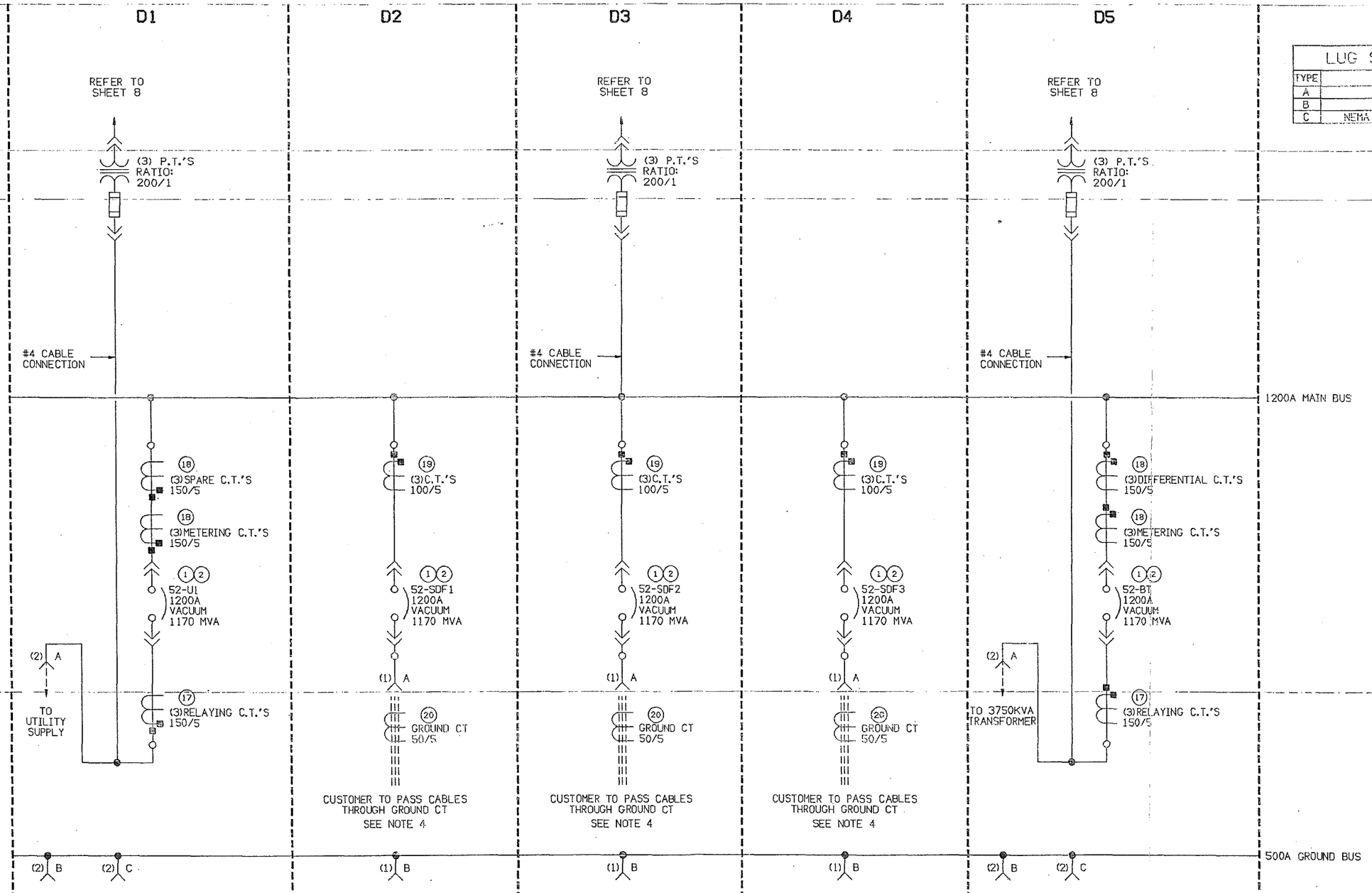
TITLE

PHYSICAL DETAILS
23KV DISTRIBUTION
SWITCHGEAR

CUSTOMER: DUCCI ELECTRICAL CONTRACTORS
P.O. NO.: B-811

RUSSELECTRIC INC.
SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	TJC	1-12-93	DWG. NO. 19997-D-112138	1
CHKD.				
APPD.		1-15-93	SHEET NO 01 CONT'D.ON SHEET NO. 02	REV.



LUG SCHEDULE	
TYPE	SIZE
A	#1
B	#4
C	NEMA 2 HOLE PATTERN

NOTES

1. CIRCLED NUMBERS REPRESENT BILL OF MATERIAL ITEM NUMBERS.
2. ALL BUS TO BE SILVER PLATED COPPER, PHASE BUS INSULATED FOR 23KV SERVICE.
3. ALL LUGS ARE BURNDY COMPRESSION TYPE YA, SIZE AND QUANTITY AS INDICATED.
4. MAINTAIN 23KV CLEARANCE (15") BETWEEN STRESS CONE AREA AND GROUND CT SURFACE. CABLE SHIELDS MUST PASS BACK THROUGH CT WINDOW BEFORE CONNECTING TO GROUND BUS.
5. SWITCHGEAR BIL RATING 125KV.
6. SYSTEM VOLTAGE 23KV, 3Ø,3W, 60HZ.

INSTALLATION

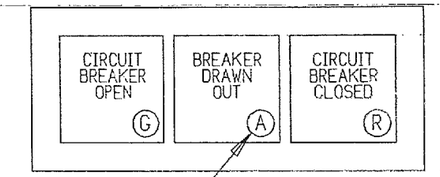
NIANTIC WOMEN'S PRISON
NIANTIC, CONNECTICUT

TITLE

23KV BUSSING
ONE LINE DIAGRAM

RUSSELECTRIC INC.
SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	GVP	01-12-93	DWG. NO. 19997-D-112138	
CHKD.				
APPD.		1-15-93	SHEET NO. 02 CONT'D.ON SHEET NO. 03	REV.



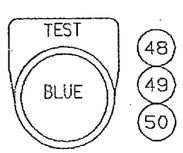
TYPICAL WINDOW COLOR (SEE NOTE NO. 1) DO NOT ENGRAVE.

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.

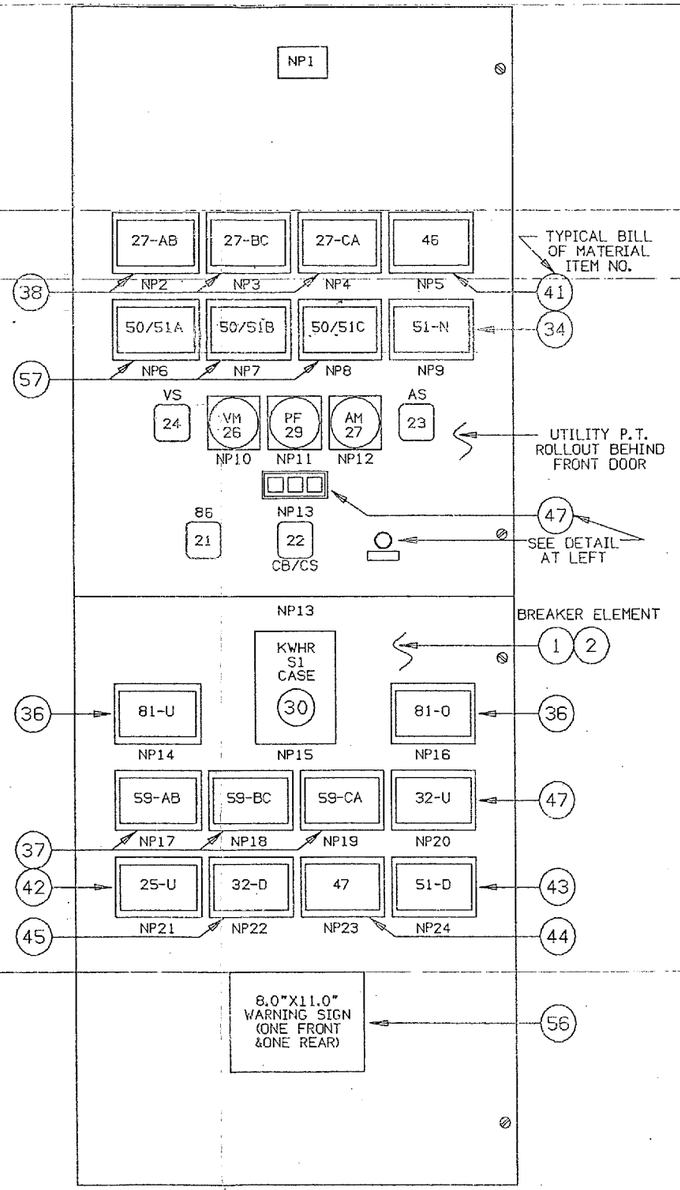
NP1 (2 REQ'D) — UTILITY MAIN BREAKER CUBICLE D1 — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP2	UNDERVOLTAGE RELAY PHASE A-B DEVICE 27	NP10	INCOMING UTILITY VOLTAGE	NP18	OVERVOLTAGE RELAY PHASE B-C DEVICE 59
NP3	UNDERVOLTAGE RELAY PHASE B-C DEVICE 27	NP11	LOAD BUS POWER FACTOR	NP19	OVERVOLTAGE RELAY PHASE C-A DEVICE 59
NP4	UNDERVOLTAGE RELAY PHASE C-A DEVICE 27	NP12	INCOMING UTILITY CURRENT	NP20	UTILITY REVERSE POWER RELAY DEVICE 32-U
NP5	CURRENT BALANCE RELAY DEVICE 46	NP13 (2 REQ'D)	23KV MAIN UTILITY SERVICE BREAKER 52-U1	NP21	BREAKER 52-U1 SYNC CHECK RLY DEVICE 25-U
NP6	ØA OVERCURRENT RELAY DEVICE 50/51	NP14	UNDERFREQUENCY RELAY DEVICE 81-0	NP22	DIRECTIONAL UNIT DEVICE 67V
NP7	ØB OVERCURRENT RELAY DEVICE 50/51	NP15	TOTAL UTILITY KILOWATTHOURS	NP23	VOLTAGE CONTROL UNIT DEVICE 67V
NP8	ØC OVERCURRENT RELAY DEVICE 50/51	NP16	OVERFREQUENCY RELAY DEVICE 81-0	NP24	OVERCURRENT UNIT DEVICE 67V
NP9	GROUND OVERCURRENT RELAY DEVICE 51N	NP17	OVERVOLTAGE RELAY PHASE A-B DEVICE 59		

NP24 — TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS



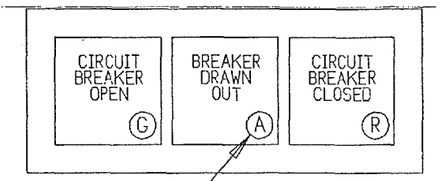
LAMP TEST SWITCH



-FRONT VIEW-
UTILITY MAIN BREAKER CUBICLE (D1)

INSTALLATION: NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUIT	TITLE: PHYSICAL DETAILS UTILITY MAIN CUBICLE DOOR DETAIL	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	TJC	01-12-93	DWG. NO. 19997-D-112138	/
CHKD.				
APPD.		1-21-93	SHEET NO 03 CONT'D.ON SHEET NO. 04	REV.



TYPICAL WINDOW COLOR (SEE NOTE NO. 1) DO NOT ENGRAVE.

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.

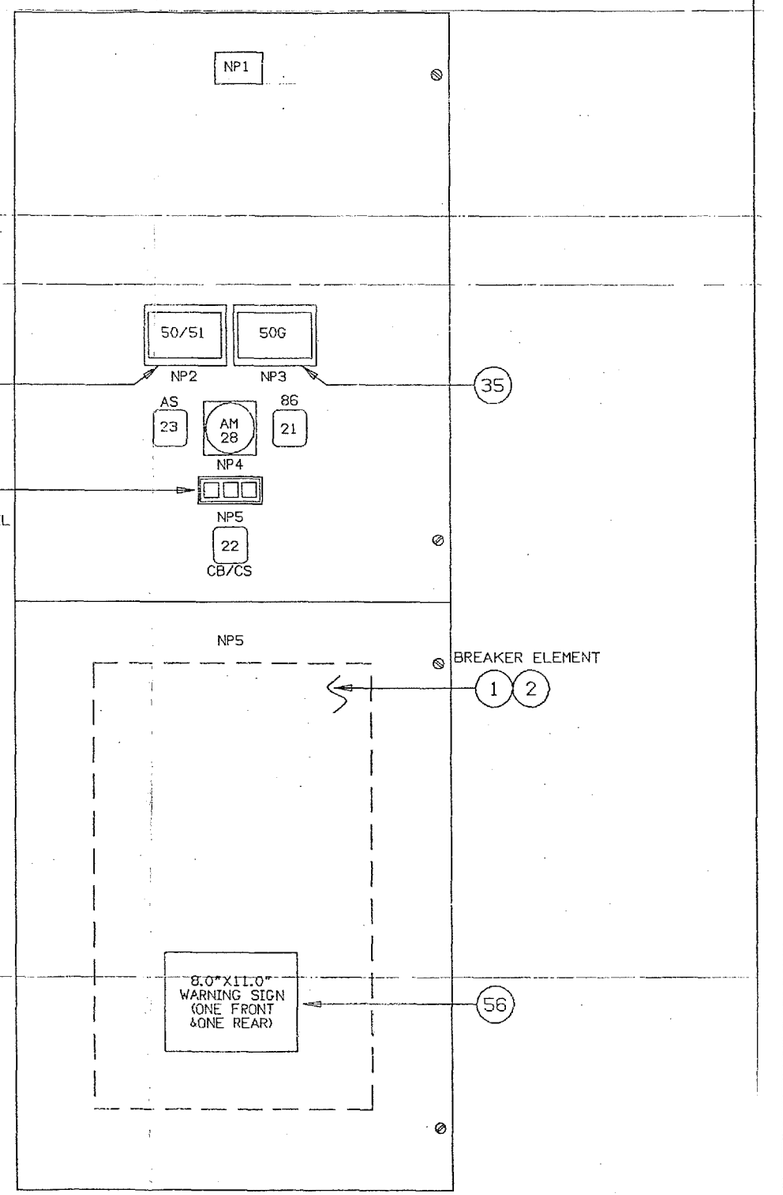
NP1 (2 REQ'D)
SITE FEEDER NO.1 CUBICLE D2
4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP2 BKR 52-SDF1 PHASE OVERCURR. DEVICE 50/51

NP3 BKR 52-SDF1 GND OVERCURRENT DEVICE 50G

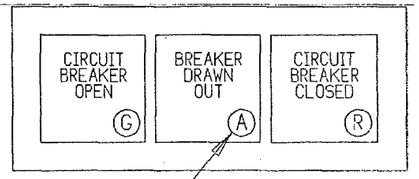
NP4 LOAD CURRENT

NP5 (2 REQ'D) 23KV FEEDER 52-SDF1 SITE DISTRIBUTION
TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS



-FRONT VIEW-
SITE DISTRIBUTION FEEDER NO.1 CUBICLE (D2)

INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043			
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUIT	PHYSICAL DETAILS FEEDER NO.1 52-SDF1 DOOR DETAIL	DFTP.	TJC	01-12-93	DWG. NO. 19997-D-112138
		CHKD.			
		APPD.		1-21-93	SHEET NO 04 CONT'D.ON SHEET NO. 05 REV.



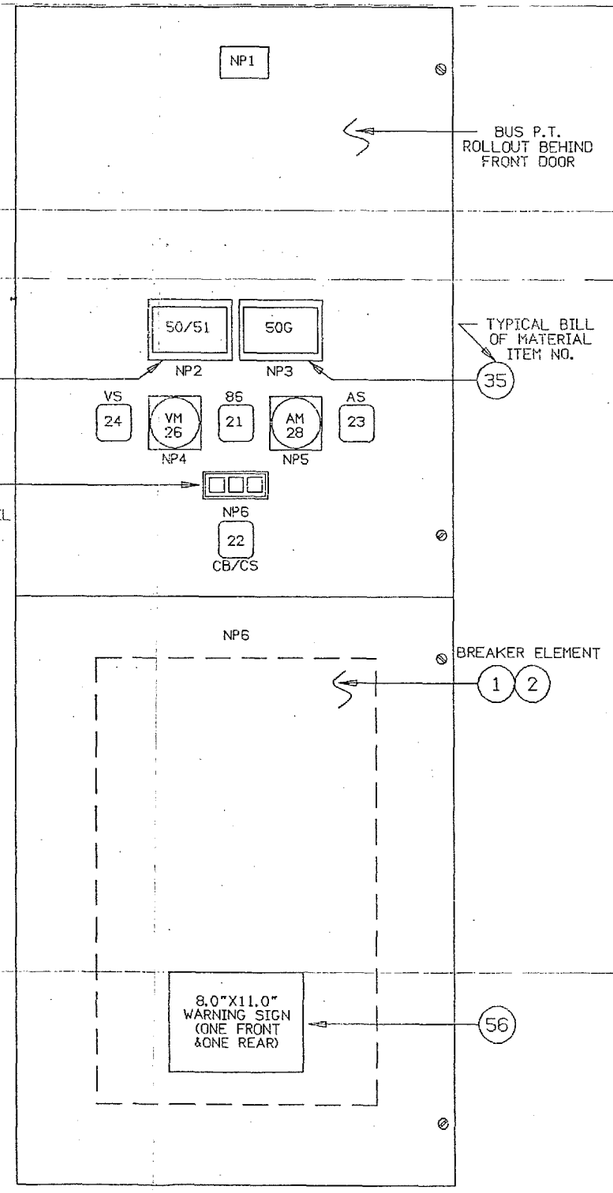
TYPICAL WINDOW COLOR (SEE NOTE NO. 1) DO NOT ENGRAVE.

NOTES: 1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:

A=AMBER R=RED

G=GREEN W=WHITE

2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.



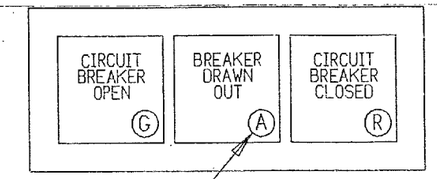
-FRONT VIEW-
SITE DISTRIBUTION FEEDER NO.2 CUBICLE (D3)

NP1 (2 REQ'D) — SITE FEEDER NO.2 CUBICLE D3 — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP2	BKR 52-SDF2 PHASE OVERCURR. DEVICE 50/51	NP5	LOAD CURRENT	
NP3	BKR 52-SDF2 GND OVERCURRENT DEVICE 50G	NP6 (2 REQ'D)	23KV FEEDER BKR 52-SDF2 SITE DISTRIBUTION	TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS
NP4	LOAD BUS VOLTAGE			

INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043	
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUIT	PHYSICAL DETAILS FEEDER NO.2 52-SDF2 DOOR DETAIL	DFTP. TJC 01-12-93	DWG. NO. 19997-D-112138 /
		CHKD.	
		APPD. 1-21-93	SHEET NO 05 CONT'D.ON SHEET NO. 06 REV.

NOTES:
1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:
   A=AMBER R=RED
   G=GREEN W=WHITE
2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.



TYPICAL WINDOW COLOR (SEE NOTE NO. 1) DO NOT ENGRAVE.

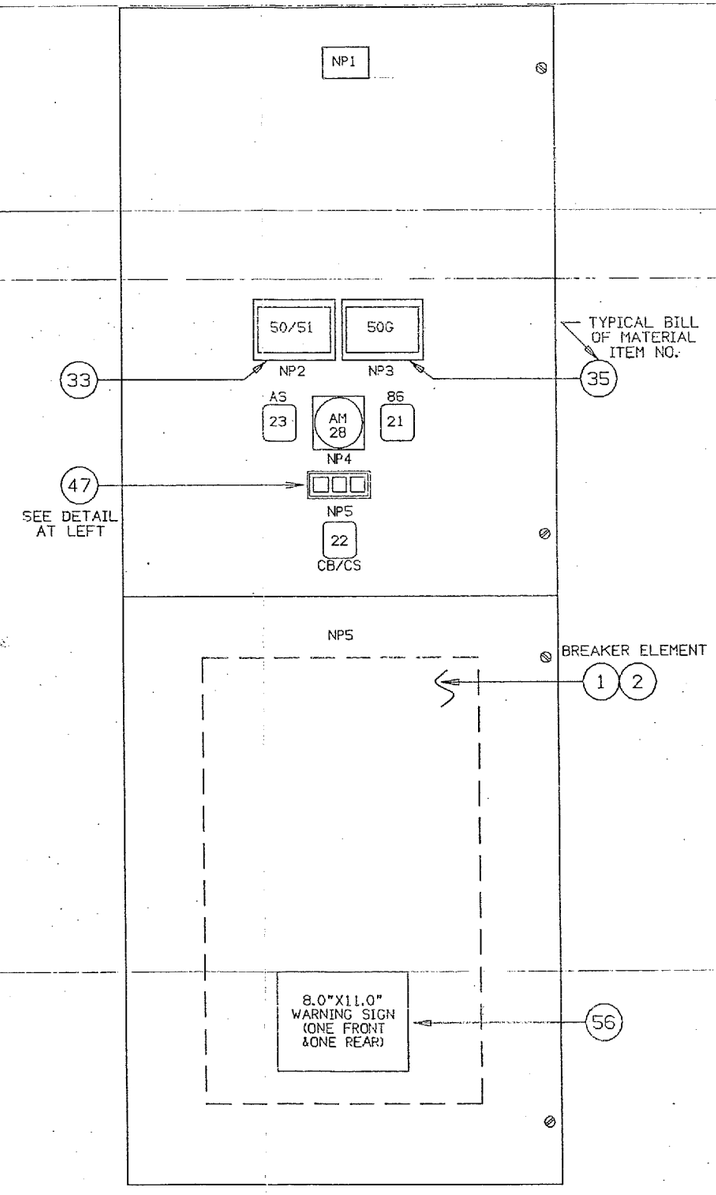
NP1 (2 REQ'D) — SITE FEEDER NO.3 CUBICLE D4 — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

NP2 — BKR 52-SDF3 ○PHASE OVERCURR.○ DEVICE 50/51

NP3 — BKR 52-SDF3 ○GND OVERCURRENT○ DEVICE 50G

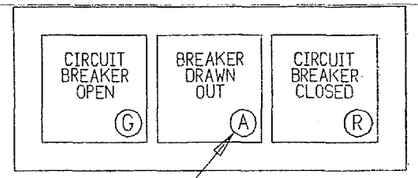
NP4 — ○ LOAD CURRENT ○

NP5 (2 REQ'D) — 23KV FEEDER ○ BKR 52-SDF3 ○ SITE DISTRIBUTION — TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS



-FRONT VIEW-
SITE DISTRIBUTION FEEDER NO.3 CUBICLE (D4)

INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043			
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUIT	PHYSICAL DETAILS FEEDER NO.3 52-SDF3 DOOR DETAIL	DFTP. TJC 01-12-93	DWG. NO. 19997-D-112138		/
		CHKD.			
		APPD. 1-21-93	SHEET NO 06	CONT'D.ON SHEET NO. 07	REV.



TYPICAL WINDOW COLOR
(SEE NOTE NO. 1)
DO NOT ENGRAVE.

NOTES: 1. DETAILS SHOWN ARE FOR BACKLIT ANNUNCIATOR BOX. WINDOWS ENGRAVED AS SHOWN. LETTERS INDICATE WINDOW COLOR:

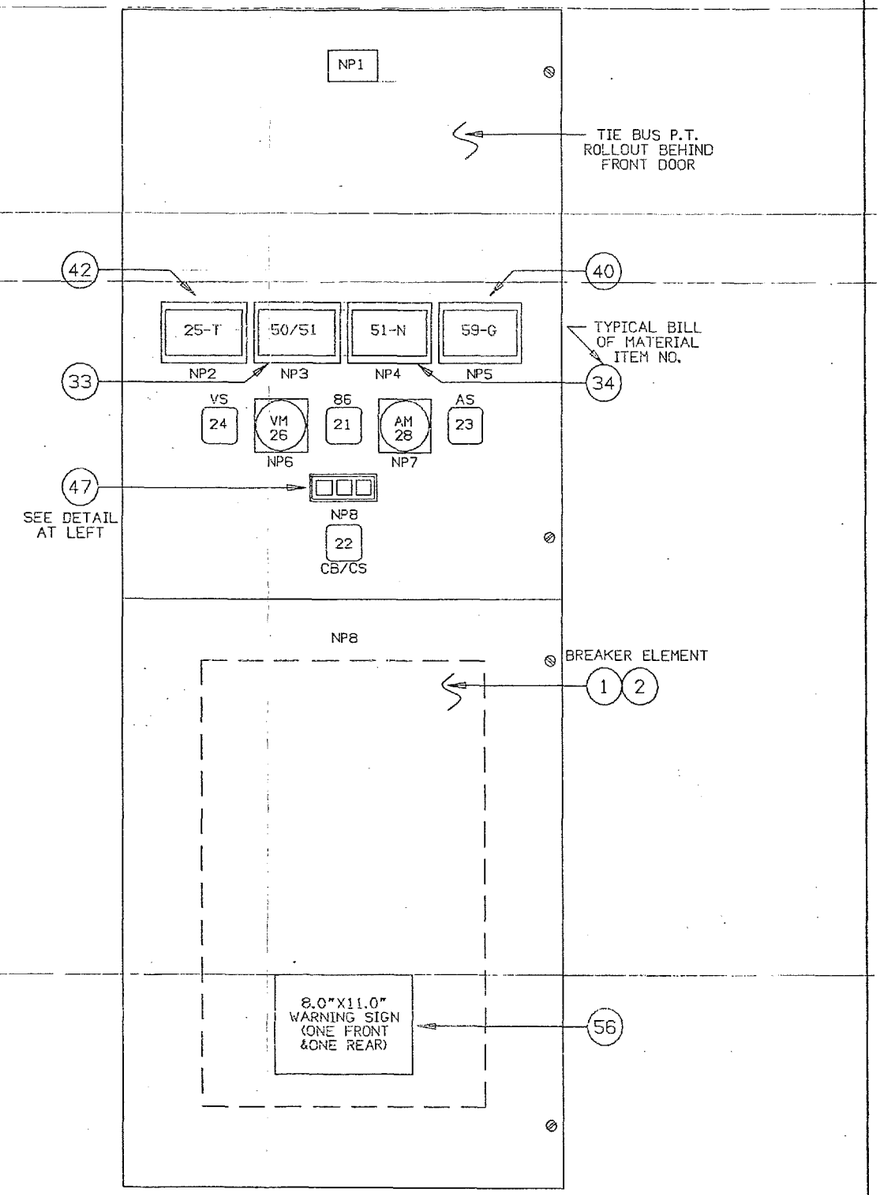
A=AMBER R=RED

G=GREEN W=WHITE

2. ALL LETTERING TO BE APROX. 3/16", BLACK LETTERS ENGRAVED ON WHITE BACKGROUND.

NP1 (2 REQ'D) — TIE BREAKER CUBICLE D5 — 4.00"X2.50" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS

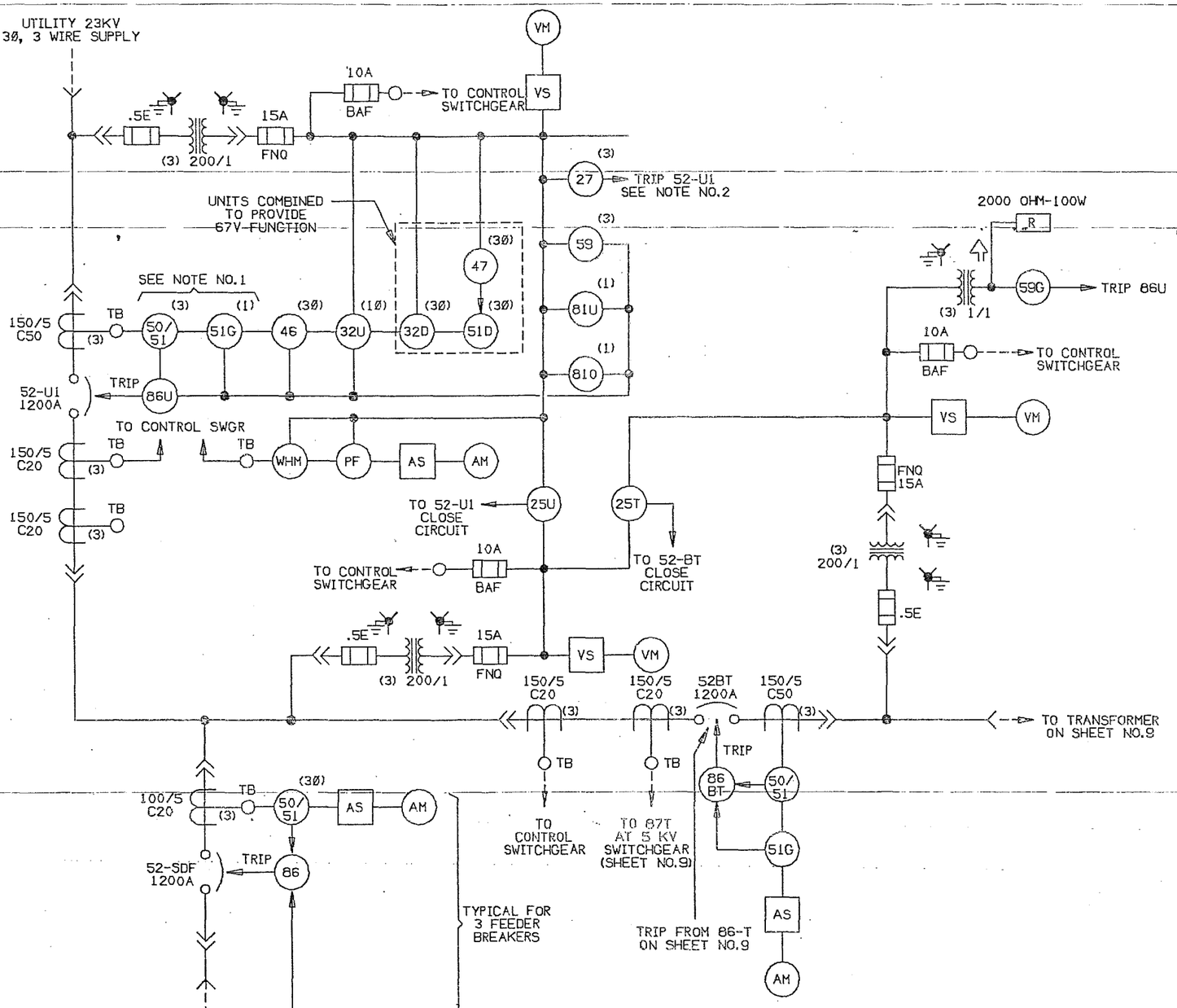
NP2	BREAKER 52-BT SYNC CHECK RLY DEVICE 25-T		NP6	TRANSFORMER PRIMARY VOLTAGE	
NP3	TIE BREAKER 52-BT PHASE OVERCURR. DEVICE 50/51		NP7	TIE BREAKER 52-BT CURRENT	
NP4	TIE BREAKER 52-BT GND OVERCURRENT DEVICE 51N		NP8 (2 REQ'D)	23KV TIE BREAKER 52-BT	TYPICAL 2.50"X.75" WHITE PLASTIC NAMEPLATE WITH BLACK LETTERS
NP5	23KV GROUND OVERVOLTAGE RLY DEVICE 59G				



-FRONT VIEW-
TIE BREAKER CUBICLE
(D5)

INSTALLATION: NIANTIC WOMEN'S PRISON, NIANTIC, CONNECTICUIT	TITLE: PHYSICAL DETAILS TIE BREAKER CUBICLE DOOR DETAIL	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043

DFTP.	TJC	01-12-93	DWG. NO. 19997-D-112138	/
CHKD.				
APPD.		1-21-93	SHEET NO 07 CONT'D.ON SHEET NO. 08	REV.

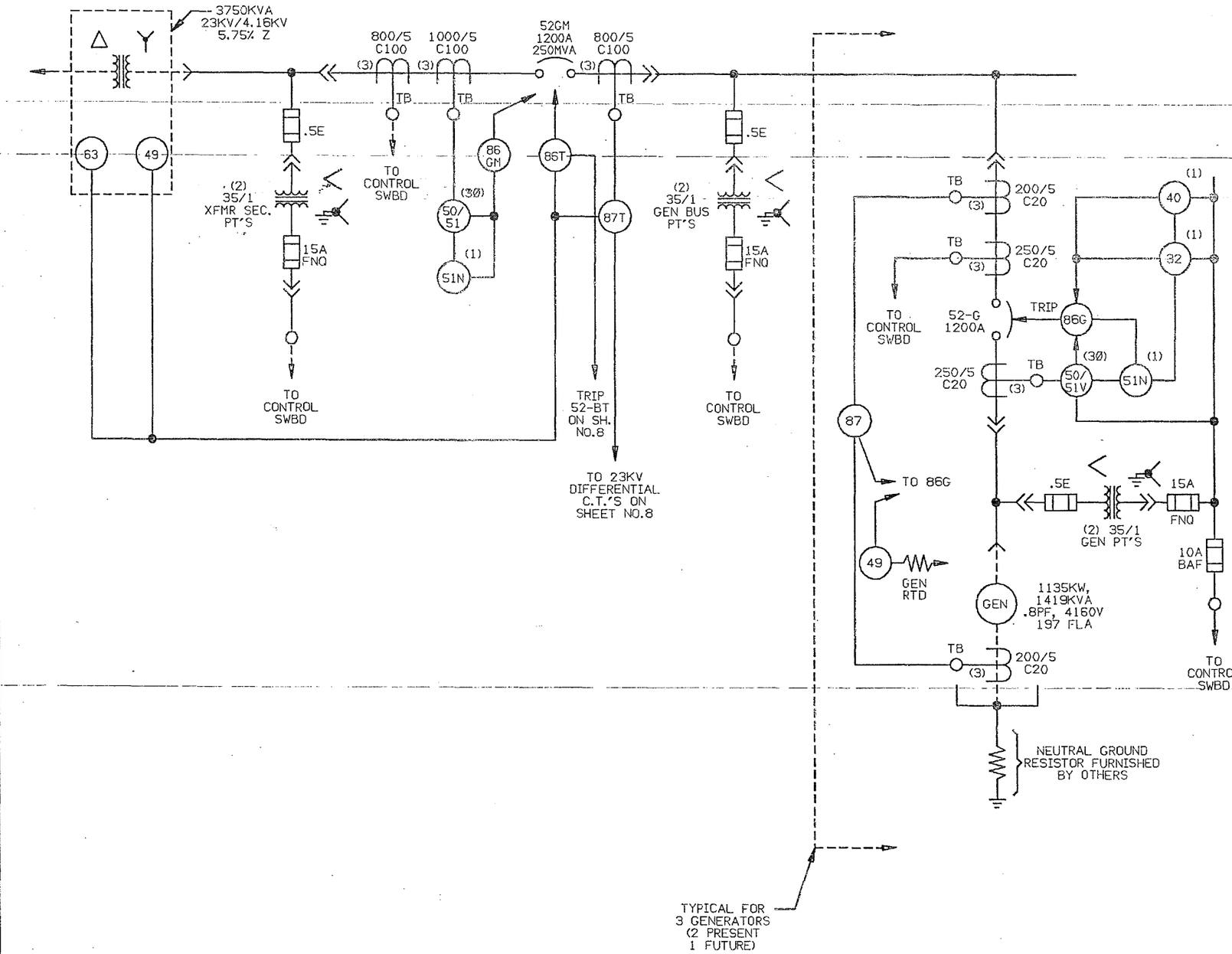


DEVICE NO.	B.O.M. ITEM NO.	DESCRIPTION
25T 25U	42	SYNC CHECK RELAYS USED TO BACKUP TO ALL AUTOMATIC SYNCHRONIZER CLOSE SIGNALS AND MANUAL CLOSE SIGNALS ORIGINATING FROM THE CONTROL SWITCHBOARD, DURING PARALLELING SEQUENCE.
27	38	UNDERVOLTAGE RELAYS USED TO DISCONNECT FROM UTILITY DUE TO ABNORMAL BUS VOLTAGE CONDITIONS.
32U	39	REVERSE POWER RELAY TO PREVENT EXPORT OF GENERATOR POWER TO THE UTILITY GRID.
46	41	NEGATIVE SEQUENCE CURRENT BALANCE RELAY TO DETECT UNBALANCE AND SINGLE PHASE CONDITIONS USED IN CONJUNCTION WITH 27 TO INITIATE THE TRANSFER SEQUENCE.
50/51	57(52-U1) 33(OTHERS)	TIME INSTANTANEOUS OVERCURRENT RELAYS ARRANGED TO TRIP AND LOCKOUT THE RESPECTIVE BREAKERS. SEE NOTE 1 BELOW.
51G	34	SHORT TIME GROUND OVERCURRENT RELAYS FOR MAIN AND BUS TIE BREAKERS.
50G	35	INSTANTANEOUS GROUND OVERCURRENT RELAYS FOR ALL FEEDER BREAKERS.
59G	40	LOW PICKUP GROUND OVERVOLTAGE USED TO DETECT GROUND FAULTS ON UTILITY SYSTEM.
67V	44,45,43	VOLTAGE CONTROLLED (47), DIRECTIONAL (32) OVERCURRENT RELAY (50/51) TO PREVENT THE GENERATORS FROM FEEDING A FAULT ON THE UTILITY SIDE OF 52-U1.
81U	36	HIGH SPEED UNDERFREQUENCY RELAY USED TO DISCONNECT GENERATORS FROM A FAILING UTILITY SUPPLY.
810	36	OVERFREQUENCY RELAY.
86 ALL	21	HIGH SPEED MANUAL RESET LOCKOUT RELAY ARRANGED TO TRIP AND LOCKOUT CIRCUIT BREAKER.

NOTES:

1. PHASE AND GROUND OVERCURRENT RELAYS ON 52-U1 TO BLOCK ENGINE START AND TRANSFER FUNCTIONS, TO PREVENT GENERATORS FROM TRANSFERRING ONTO A FAULTED BUS.
2. UNDERVOLTAGE RELAYS (27) AND CURRENT BALANCE RELAY (46) WILL TRIP 52-U1 AND INITIATE TRANSFER SEQUENCE, BUT WILL NOT TRIP 86-U, TO ALLOW FOR AUTOMATIC RETRANSFER TO NORMAL

INSTALLATION	TITLE	RUSSELECTRIC INC. SOUTH SHORE PARK, HINGHAM, MA 02043			
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUT	23KV PROTECTIVE RELAY SINGLE LINE DIAGRAM	DFTM. TJC 01-06-93	DWG. NO. 19997-D-112138	1
		CHKD.		
		APPD. 1-21-93	SHEET NO 08 CONT'D.ON SHEET NO. 09	REV.
			FILE NAME: SLB\M138\08	



DEVICE NO.	B.O.M. ITEM NO.	DESCRIPTION
32	19	REVERSE POWER RELAY, SINGLE PHASE, TO PROTECT AGAINST MOTORING OF GENERATOR IN THE EVENT OF FUEL SYSTEM FAILURE.
40	18	LOSS OF FIELD PROTECTION TO BE DETECTED AS REVERSE VARS TO PROTECT THE GENERATOR FROM VOLTAGE REGULATOR MALFUNCTION WHILE OPERATING IN PARALLEL WITH THE UTILITY.
49 GEN	20	GENERATOR WINDING RTD TEMPERATURE RELAY FOR UNIT SHUTDOWN. RTD FURNISHED BY OTHERS.
50/51V GEN	21	VOLTAGE RESTRAINED PHASE OVERCURRENT RELAY FOR GENERATOR PROTECTION.
51N	22	SHORT TIME GROUND OVERCURRENT RELAY.
50/51	35	GENERATOR MAIN BREAKER OVERCURRENT RELAY.
86	24	HIGH SPEED MANUAL RESET LOCKOUT RELAY, TRIPS BREAKER AND SHUTS DOWN ENGINE.
87	23	GENERATOR DIFFERENTIAL FAULT RELAY.
65 NOT SHOWN	BY OTHERS	ISOCHRONOUS LOAD SHARING GOVERNOR PROVIDING ENGINE FUEL SYSTEM CONTROL.
90 NOT SHOWN	BY OTHERS	VOLTAGE REGULATOR WITH POWER FACTOR CONTROLLER.

TRANSFORMER PROTECTION

DEVICE NO.	B.O.M. ITEM NO.	DESCRIPTION
49	BY OTHERS	TRANSFORMER HI-TEMP CONTACT
63	BY OTHERS	TRANSFORMER INTERNAL FAULT DETECTION USING SUDDEN PRESSURE CONTACT.
86T	24	LOCKOUT RELAY FOR TRANSFORMER PROTECTION-TRIPS PRIMARY AND SECONDARY BREAKERS.
87T	34	DIFFERENTIAL ZONE PROTECTION.

INSTALLATION	TITLE	RUSSELECTRIC INC.
NIANTIC WOMEN'S PRISON NIANTIC, CONNECTICUT	4.16KV PROTECTIVE RELAY SINGLE LINE DIAGRAM	SOUTH SHORE PARK, HINGHAM, MA 02043
	DFTM. TJC 01-08-93	DWG. NO. 19997-D-112138
	CHKD.	
	APPD. 1-15-93	SHEET NO 09 CONT'D.ON SHEET NO. — REV.
		FILE NAME: SUB\M138\09