GE Medical Systems

Technical Publications

Direction 2299672
Revision 1

Signa® Ovation™

(Main Disconnect Panel)

Service Manual

Operating Documentation

GE Industrial Systems 55-21958

243B10438

TABLE OF CONTENTS

CAUTION

Troubleshooting and servicing should be performed by qualified electrician.

WARNING!

AC and DC control power is present when the breakers are in the open position. AC power may originate from two separate sources. De-energize both prior to servicing this panel. UPS power is present when breakers are open.

This panel has been wired for use at 480V/60HZ, the panel can be converted for use at 380-400-415V/50HZ by changing the two transformer primary wiring connections from 480V to 400V. Refer to Page 11.

1- THEORY OF OPERATION

This panel incorporates a number of features desirable by MR installations to minimize down time, protect PDU (Power Distribution Unit) electronics, reduce operating costs, and reduce operational delays after a power outage. The panel comes wired for a common feed for the PDU and TCU (Temperature Control Unit). The panel can easily be field re-configured for dual feeds. Dual feeds consist of normal power feed for the PDU and a separate essential power source feed for the TCU.

The PDU branch circuit is controlled by an electrically held contactor, which opens on any loss of power. The TCU power circuits utilize a time-delayed automatic restarting control circuit, which restores power after a power outage. The time delay protects the TCU's sensitive electronic equipment from sags and surges which immediately follow power loss from black outs, storms, utility reclosure operations and out of phase Automatic Transfer Switch operations. The panel has a TCU contactor which is controlled by an autostart DC control circuit. DC battery control circuit protection time is based upon the condition of the battery but is expected to hold for at least 48 hours. The DC Battery has a life of 5 years at which time the battery and charger must be replaced to assure auto-restart capability.

PDU and TCU power Emergency Off disconnection is also provided by this panel. Two remote emergency off pushbuttons included with this panel and the cover-mounted emergency off pushbutton provide immediate shutdown for the entire system. Additional remote emergency off pushbuttons may be ordered from GE Supply 1-800-200-9760, if required for a particular installation. Remote emergency off pushbuttons are listed on page 27 of this manual. Restoration of power after an emergency off operation is accomplished by first pressing the Main Power ON pushbutton on the cover of the panel and subsequently pressing the PDU ON pushbutton.

Circuit breaker CB3 provides power for the TCU as indicated on the attached wiring diagram.

1-1 SPECIFICATIONS

1-1-1 ELECTRICAL SPECIFICATIONS

3 Phase, 3 Wire + Ground

UL 489 & CSA C 22.2

Interrupting Rating 25,000 AIC Symmetrical 50/60 Hertz

IEC 947-2 Interruption Capacity

380-415V, Ue, Icu 15,000 RMS Symmetrical AMPS 50/60 Hertz

380-415V, Ue, Ics 10,000 RMS Symmetrical AMPS 50/60 Hertz

1-1-2 ENVIRONMENTAL SPECIFICATIONS

FOR INDOOR USE ONLY

Temperature 59-86F (15-30C)

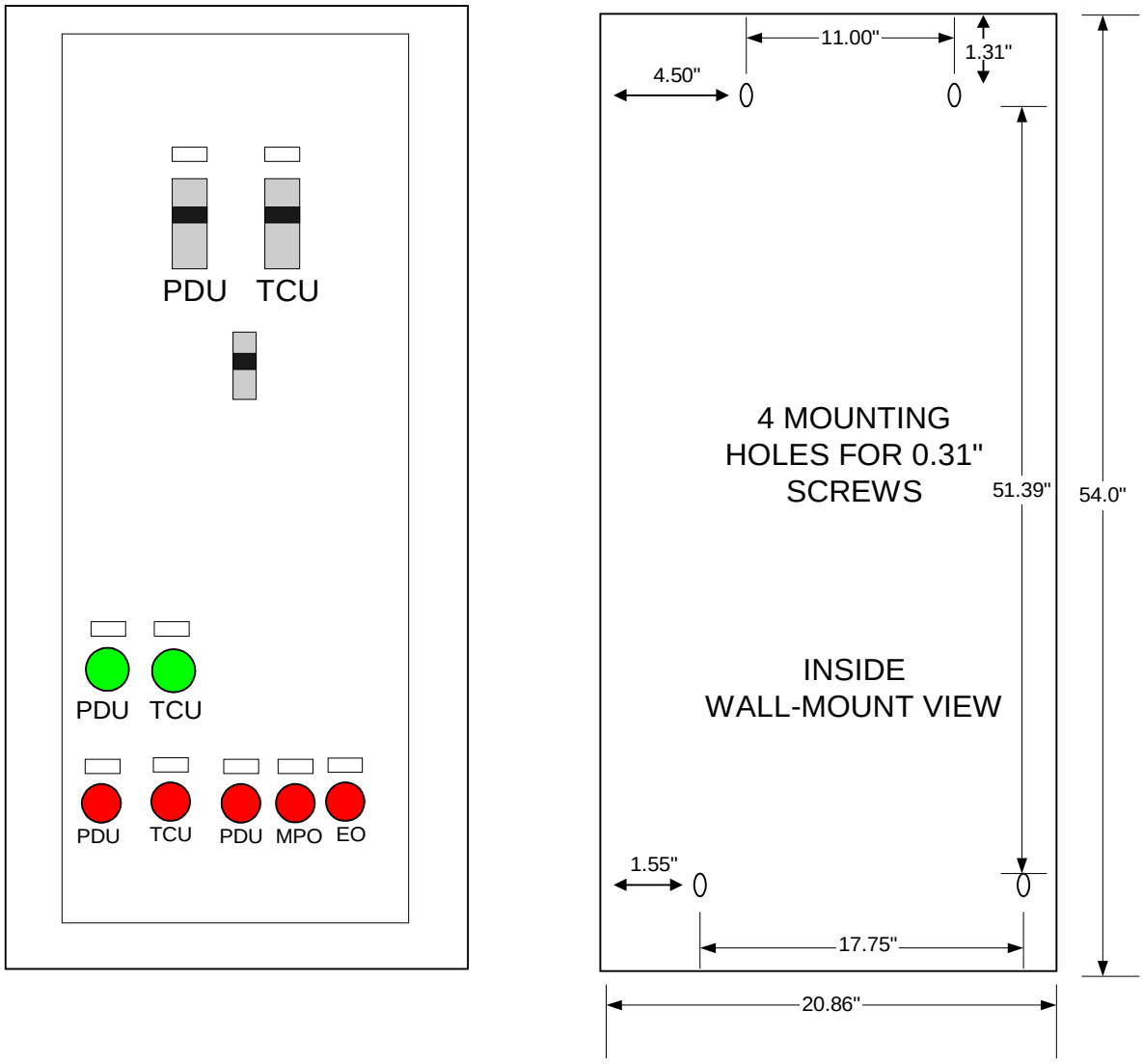
Humidity 30-75% NON CONDENSING

1-2 Panel Dimensions

Refer to Table 1-1 and Illustration 1-1 for the physical dimensions of the panel. The panel may be recessed approximately 6.95 inches (176.5 mm) into the wall for semi-flush installations. See Illustration 1-1 for the front view and mounting pattern of the Main Disconnect Panel.

TABLE 1-1
PANEL EXTERNAL PHYSICAL DIMENSIONS

PARAMETER	DIMENSIONS
Height	54.0 in. 1371.6 mm
Width	20.86 in. 508.0 mm
Depth	8.32 in. 211.33 mm
Weight	230 lbs 104.33 kg
Door Swing Radius	19.75 in. 501.65 mm

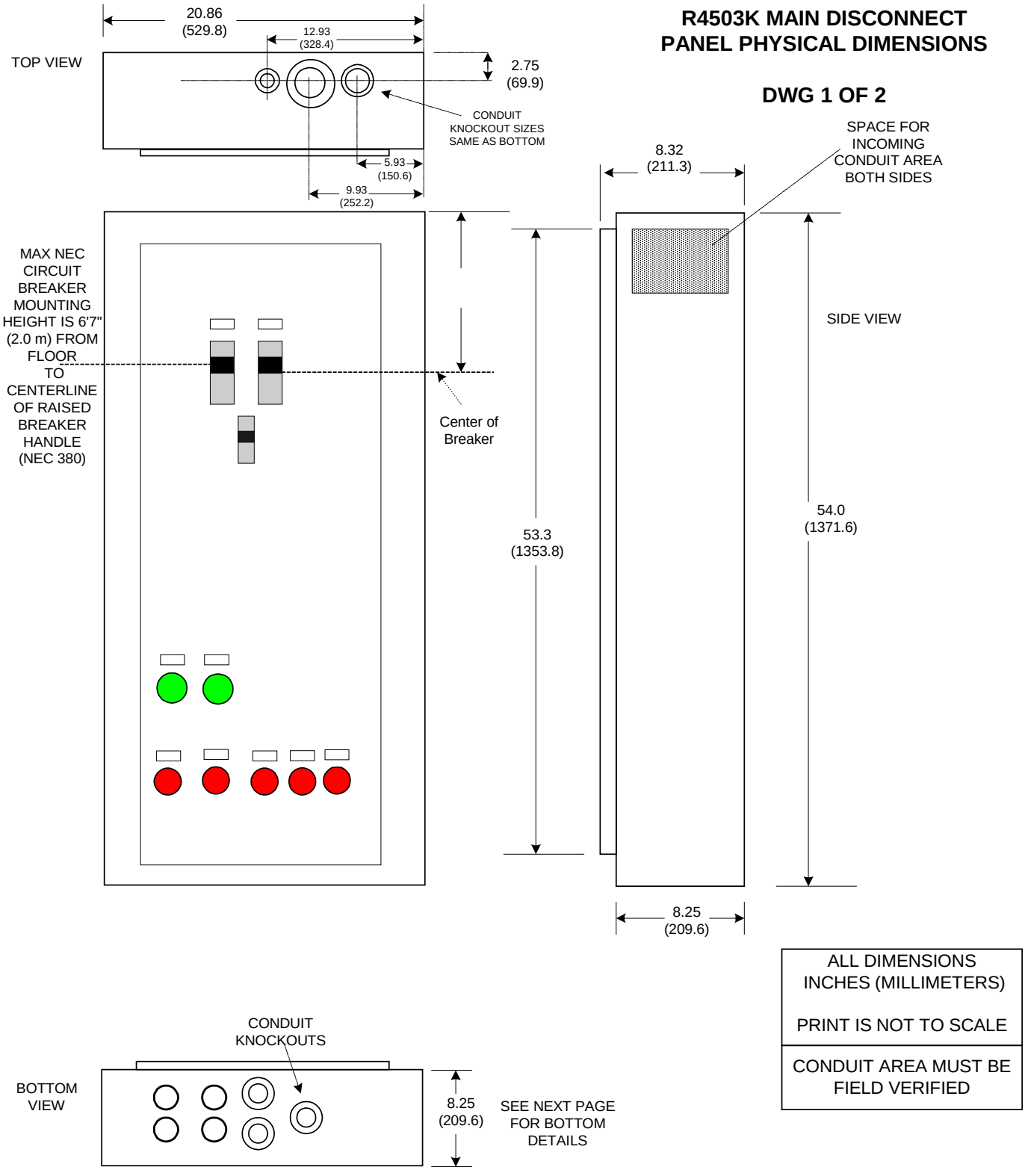


FRONT VIEW **MOUNTING PATTERN**

FRONT AND INTERIOR VIEW OF MAIN DISCONNECT PANEL
ILLUSTRATION 1-1

1-3 PANEL LAYOUT AND FULL PHYSICAL DRAWINGS

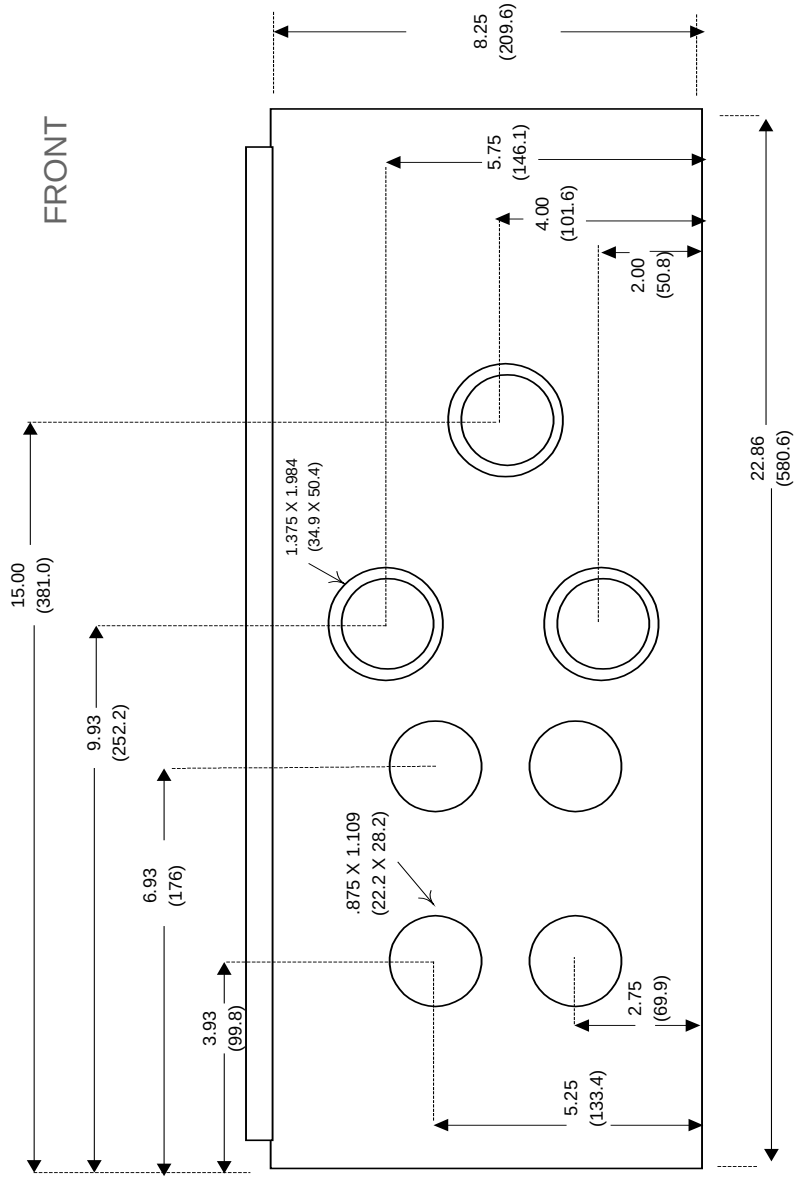
See Illustrations 1-2 and 1-3 for panel layout and full physical drawings including cable access holes and conduit knockout positions.



FULL PHYSICAL DRAWINGS
ILLUSTRATION 1-2

ALL DIMENSIONS ARE INCHES (MILLIMETERS)

DRAWING NOT TO SCALE



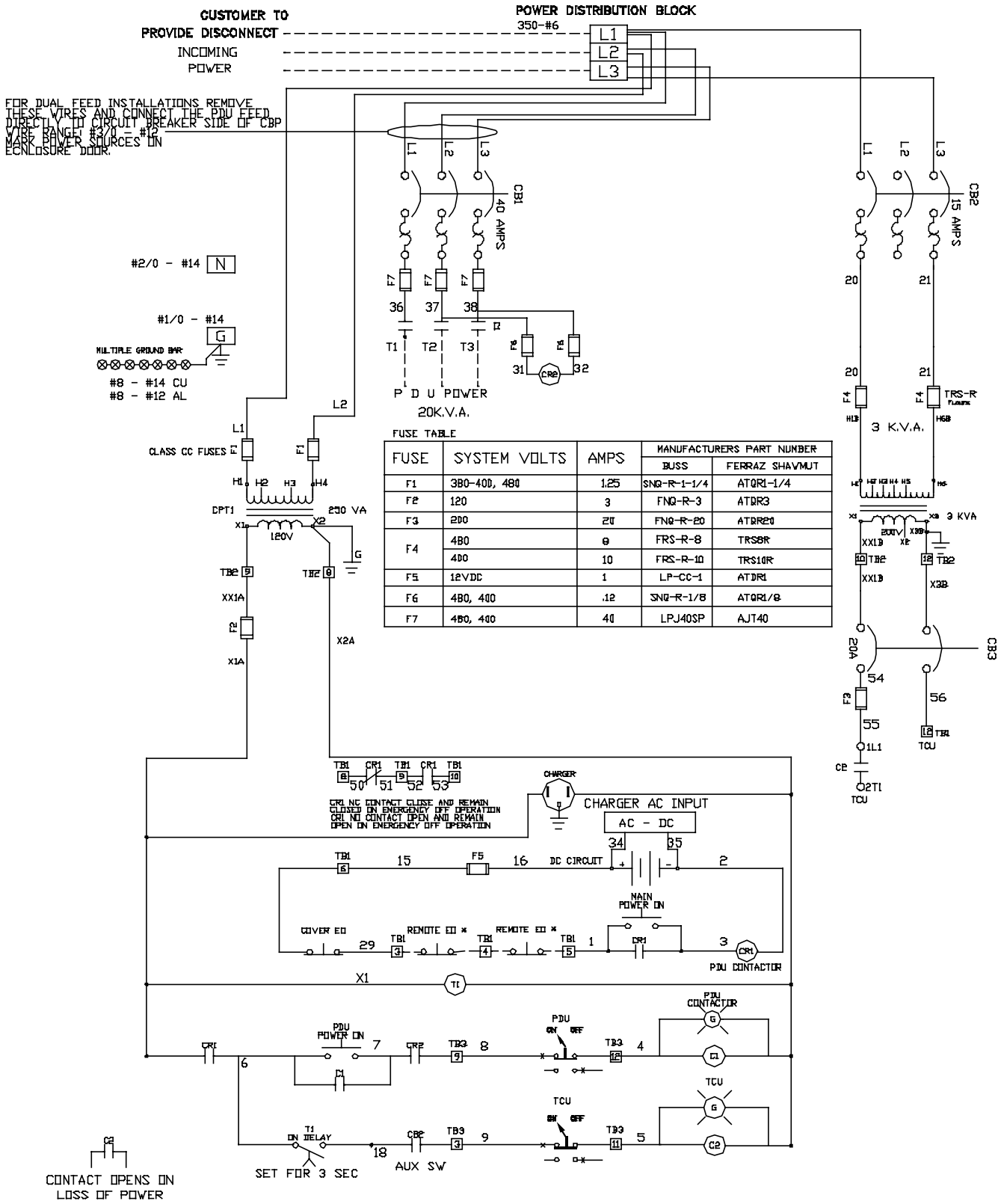
DWG 2 OF 2
BOTTOM VIEW

R4503K MAIN DISCONNECT PANEL
DIMENSIONAL DRAWING

DETAILED BOTTOM VIEW
ILLUSTRATION 1-3

1-4 WIRING DIAGRAM

See illustration 1-4 (page 8) for the Main Disconnect Panel wiring diagram.



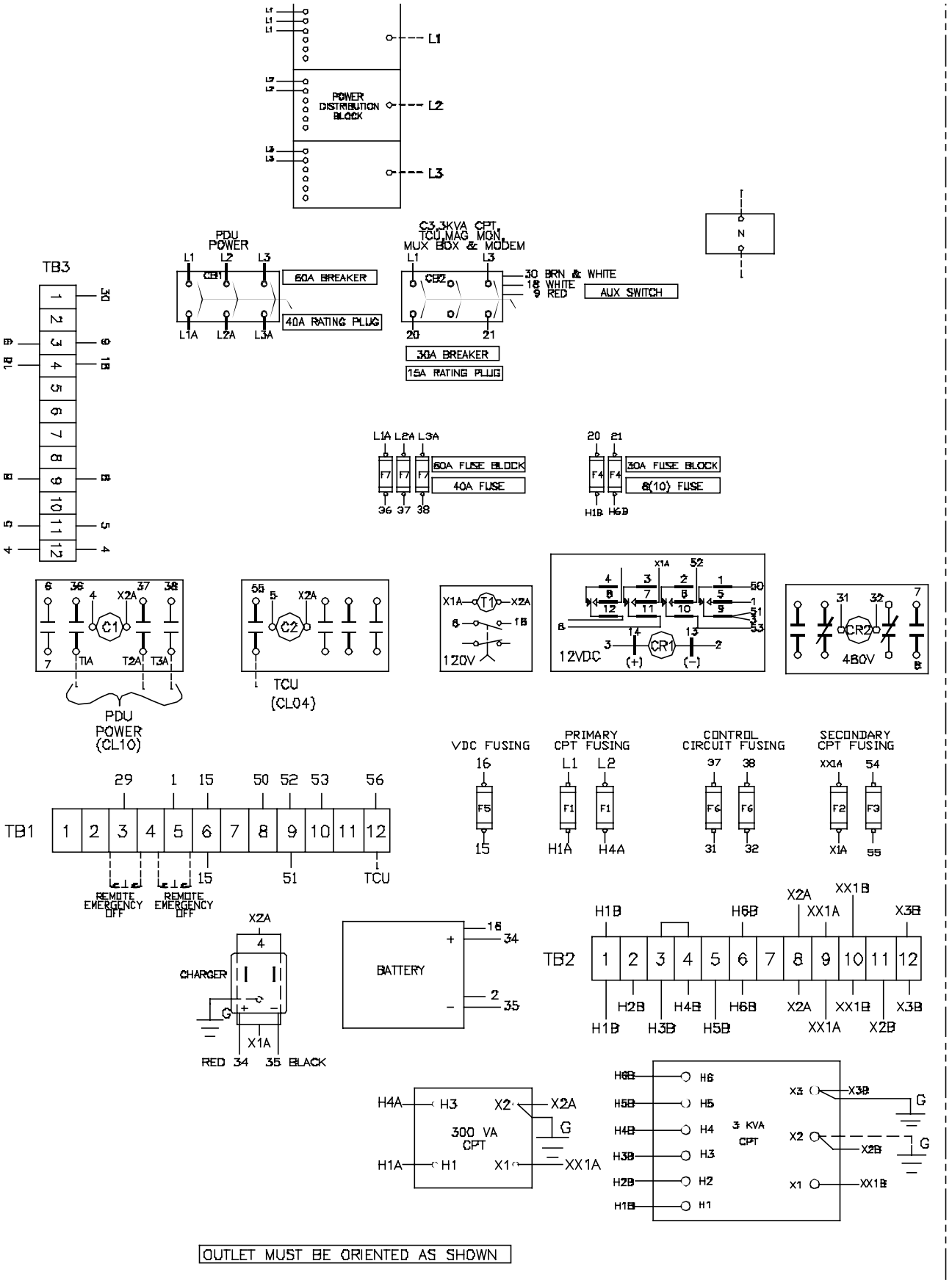
FUSE TABLE

FUSE	SYSTEM VOLTS	AMPS	MANUFACTURERS PART NUMBER	
			BUSS	FERRAZ SHAWMUT
F1	380-400, 480	1.25	SNQ-R-1-1/4	ATQR1-1/4
F2	120	3	FNQ-R-3	ATQR3
F3	200	20	FNQ-R-20	ATQR20
F4	480	8	FRS-R-8	TRS8R
	400	10	FRS-R-10	TRS10R
F5	12VDC	1	LP-CC-1	ATDR1
F6	480, 400	.12	SNQ-R-1/8	ATQR1/8
F7	480, 400	40	LPJ40SP	AJT40

WARNING:

CONTROL CIRCUIT IS ENERGIZED WHEN PDU AND TCU BREAKERS ARE DE-ENERGIZED. 3KVA TRANSFORMER(C2) CONTACTOR ENERGIZES AUTOMATICALLY AFTER A POWER OUTAGE.

* "2" REMOTE EMERGENCY OFF'S MUST BE INSTALLED FOR CIRCUIT TO BE OPERATIONAL.



R4503K MAIN DISCONNECT PANEL WIRING DIAGRAM
ILLUSTRATION 1-5

1-5 Warning Labels

Warning labels shown in this section are provided with the MDP and are to be affixed to the Signa Ovation system equipment as indicated.

1-5-1 TCU

Two TCU labels are provided with the MDP. Illustration 1-6 shows the TCU warning label which is to be affixed to or near the TCU located on the system Penetration Panel. A TCU label should be affixed in both the Equipment Room and Magnet Room.

WARNING: THIS TEMPERATURE CONTROL UNIT IS FED BY AN AUTOMATIC RESTART CIRCUIT, WHICH ENERGIZES THE SYSTEM TEMPERATURE CONTROL UNIT AUTOMATICALLY AFTER A POWER INTERRUPTION.

TCU WARNING LABEL
ILLUSTRATION 1-6

2 INSTALLATION

2-1 Installation Single Feed

- Incoming power is connected to the main lugs located at the top of the Main Disconnect Panel. The main lug may be rotated 180 degrees to aid connection.
- The PDU is connected directly to the load side of contactor C1- terminals T1A, T2A, T3A.
- TCU connections are made at contactor C2 and circuit breaker CB3.
- Black, plastic, strain relief devices are shipped with the panel and must be installed on the TCU cable.
- Mounting height of the centerline of the top breakers must not exceed 6ft-7in. (2m) above the floor per National Electric Code (NEC # 380-8).
- Complete the label on the cover of the panel indicating the location and circuit of the power source providing power to this panel.
- Two labels are supplied indicating “Warning of automatic restart OF THE TCU” must be installed on the TEMPERATURE CONTROL UNIT. See section 1-5 “Warning Labels”.

The control circuit wiring must be completed by installing the two remote emergency off pushbuttons as shown on the wiring diagrams on the inside of the door. The PDU contactor and TCU contactor will not close unless the remote emergency off pushbuttons are installed or temporarily jumpered.

♦ ***For warranty parts or technical assistance contact GE SUPPLY – Milwaukee, WI (414) 527-6600, CST.***

2-2 Installation Dual Feed

- Re-configuring the panel for a normal feed for the PDU and an essential feed for the TCU 3 KVA transformer is accomplished by removing the cables between main lug terminal block and the PDU breaker, CB1. These wires are identified on the wiring diagram located on page 8 and inside the panel cover.
- The incoming normal power feed is connected directly to the top of CB1, PDU circuit breaker line side lugs.
- The TCU transformer input power and control power transformer, incoming power is terminated on the power distribution terminal block, which also supplies power to the control circuit.
- The primary of the control transformer control circuit must be fed from the same source as the TCU transformer to provide power for emergency shut down and automatic restarting.
- The PDU is connected directly to the load side of the contactor C1- terminals T1A, T2A, T3A.
- TCU connections are made at contactor C2 and circuit breaker CB3.
- Black, plastic, strain relief devices are shipped with the panel and must be installed on the TCU cable.
- Mounting height of the centerline of the top breakers must not exceed 6ft-7in. (2 m) above the floor per National Electric Code (NEC).
- Complete the label on the cover of the panel indicating the location and circuit of each power source providing power to this panel.
- Two labels are supplied indicating “Warning of automatic restart OF THE TCU” must be installed on the TEMPERATURE CONTROL UNIT. See section 1-5 “Warning Labels”.

The control circuit wiring must be completed by installing the two remote emergency off pushbuttons as shown on the wiring diagram on the inside of the door. The PDU and TCU contactors will not close unless the remote emergency off pushbuttons are installed or temporarily jumpered.

2-3 480V TO 400V CONVERSION

THIS PANEL HAS BEEN WIRED FOR USE AT 480V/60HZ, THE PANEL CAN BE CONVERTED FOR USE AT 380-400-415V/50HZ BY CHANGING THE TWO TRANSFORMER PRIMARY WIRING CONNECTIONS FROM 480V TO 400V. MAKE SURE POWER FEED(S) TO THE MDP ARE DISCONNECTED AND LOCKED OFF.

.250KVA Control Transformer CPT1

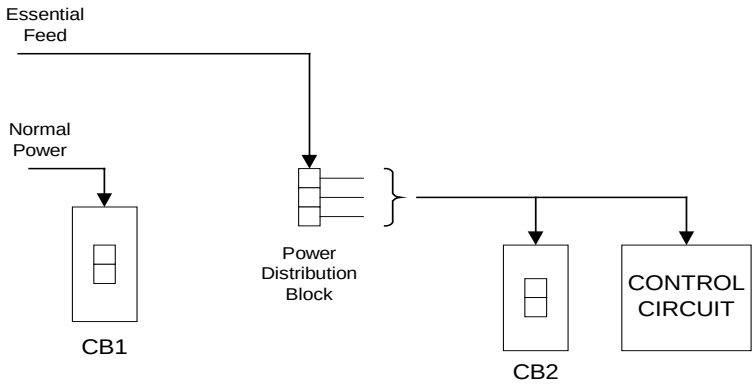
1. Open two pole fuse holder F1.
2. Remove wire originally connected to transformer terminal H4.
3. Connect wire from Step 2 to transformer terminal H3.
4. Close fuse holder F1.

3KVA Transformer

1. Verify that 15 Ampere CB3 is open.
2. Remove two dead front covers for fuse block F4.
3. Remove two TRS8R fuses.
4. At terminal block TB2 remove the wire or metal jumper connecting terminal 3 to terminal 4.
5. Connect a wire jumper between terminals H2 and H4 only.
6. Move wire from the top of terminal block 2, terminal 6, and reconnect to adjacent terminal 5.
7. Replace fuses in terminal block 4 with spare 10A, TRS10R fuses shipped with the panel.
8. Replace the dead front fuse holders.

2-4 DUAL FEED SYSTEM CONFIGURATION

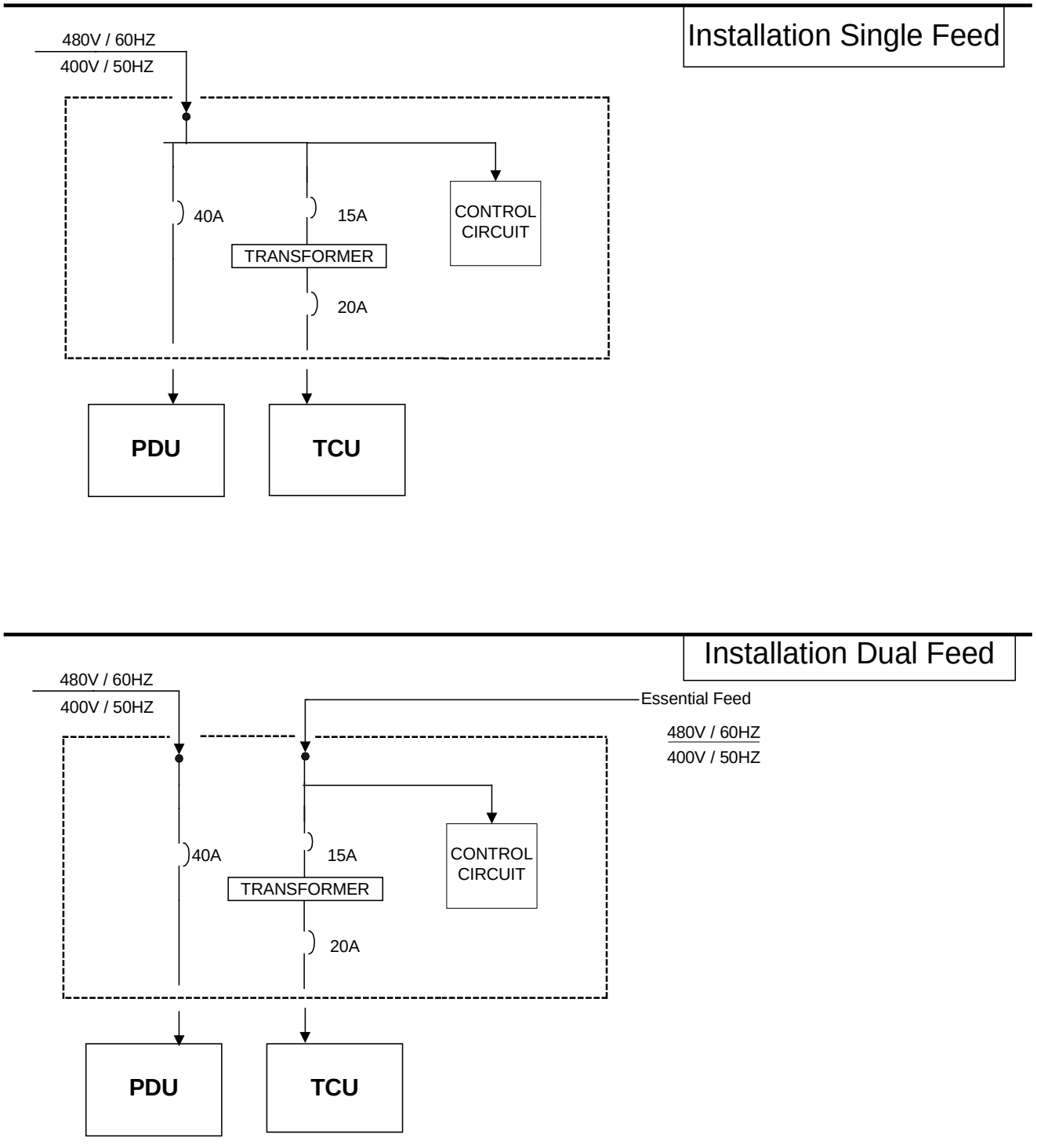
See illustration 2-1 for the Dual Feed System Configuration.



DUAL FEED SYSTEM CONFIGURATION
ILLUSTRATION 2-1

2-5 INCOMING POWER CONFIGURATION

See illustration 2-2 for the incoming power configuration.



INCOMING POWER CONFIGURATION
ILLUSTRATION 2-2

2-6 TESTING SINGLE FEED PANELS

WARNING!

AC AND DC CONTROL POWER IS PRESENT WHEN THE BREAKERS ARE IN THE OPEN POSITION. MAKE SURE NO ONE IS WORKING ON THE EQUIPMENT WHICH THIS PANEL FEEDS PRIOR TO TESTING THE PANEL.

TESTING ACTION	VERIFY
1. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON.	1. Two green pilot lights should be on indicating proper contactor operation.
2. Press any emergency off pushbutton.	2. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF. Verify that the TCU power is disconnected and the PDU power is disconnected.
3. Press the main power ON pushbutton and PDU ON pushbutton. Verify the PDU selector switches are all set to ON and repeat for all other emergency off pushbuttons.	3. All contactors must de-energize and stay de-energized after an emergency OFF operation. All pilot lights must be OFF when emergency OFF is pressed.
4. Press the main power ON pushbutton and PDU ON pushbutton. Verify the PDU selector switches are all set to ON.	4. All two green pilot lights should be ON indicating proper contactor operation.
5. Press any emergency off pushbutton.	5. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF.
6. Starting with the de-energized state of #5, turn OFF incoming power from the breaker feeding power to this panel.	6. The two lights must be OFF indicating loss of power.
7. With incoming power OFF from step 6, now restore incoming power to panel (switch to ON).	7. Upon restoration of power all contactors must remain OFF. All pilot lights must be OFF. This demonstrates emergency off function remains disabled during a loss of power. No auto restart after any emergency OFF operation.

TESTING ACTION	VERIFY
8. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON.	8. The two green pilot lights should be ON.
9. Individually rotate each on-off selector switch for the PDU, TCU to OFF then ON.	9. Each green indicating light should turn OFF and the respective contactor should open in OFF. Each green pilot light should turn on and its respective contactor close when turned ON as the selector switch is switched to ON.
10. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON. Turn OFF incoming power from the breaker feeding power to this panel and restore power to the panel.	10. Both green pilot lights must be ON. PDU and TCU green indicating lights should turn OFF with loss of power. The TCU contactor and TCU green indicating light must turn ON with the restoration of power indicating the proper operation of the automatic restart feature. PDU pilot light turns off on any loss of power and remains off with restoration of power. PDU contactor opens and does not close upon power restoration. PDU does not automatically restart after a power loss. This demonstrates the DC supervisory circuit is operating properly and the TCU auto restart feature is operational.

2-7 TESTING DUAL FEED PANELS

WARNING!

AC AND DC CONTROL POWER IS PRESENT WHEN THE BREAKERS ARE IN THE OPEN POSITION. POWER ORIGINATES FROM TWO SEPARATE SOURCES. DE-ENERGIZE BOTH PRIOR TO SERVICING THIS PANEL. MAKE SURE NO ONE IS WORKING ON THE EQUIPMENT WHICH THIS PANEL FEEDS PRIOR TO TESTING THE PANEL.

TESTING ACTION	VERIFY
1. Press the main power ON pushbutton and PDU ON pushbutton. Rotate the TCU and PDU selector switches to ON.	1. Two green pilot lights should be ON indicating proper contactor operation.
2. Press any emergency off pushbutton.	2. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF.
3. Press the main power ON and PDU ON pushbuttons. Verify TCU and PDU selector switches are all set to ON and repeat for all other emergency off pushbuttons.	3. All contactors must de-energize and stay de-energized. All three pilot lights must be OFF when emergency off is pressed.
4. Press the main power ON pushbutton and PDU ON pushbutton. Verify TCU and PDU selector switches are all set to ON. Individually rotate each on-off selector switch for the PDU and TCU to off then on.	4. Two green pilot lights should be ON indicating proper contactor operation. Each green indicating light should turn OFF and the respective contactor should open in OFF and close when switch is ON.
5. Press any emergency off button.	5. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF.
6. Start with the de-energized state of #5, turn OFF both incoming power feeds from the normal power breaker and the essential power breaker feeding power to this panel.	6. All pilot lights must be OFF indicating system is de-energized.
7. Restore both the normal and essential power feeds to the panel.	7. Upon restoration of power all pilot lights and contactors must remain OFF. This demonstrates auto restart does not work after emergency off operations.

TESTING ACTION	VERIFY
8. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON.	8. Both pilot lights should be ON.
9. De-energize power to the PDU breaker only from its source breaker.	9. PDU light and contactors C1 will turn OFF as it indicates system's actual state. TCU light will remain ON.
10. Restore power to PDU breaker from source breaker.	10. PDU breaker green pilot remains OFF and contactor C1 remains open. TCU green pilot light should remain ON.
11. Press main power ON push button. Press PDU power on pushbutton.	11. PDU breaker pilot light turns ON. TCU green pilot light should be ON.
12. De-energize TCU essential source breaker feeding this panel.	12. All pilot lights should be OFF and all contactors open as the AC control power is obtained from the essential power feed.
13. Restore TCU essential source breaker feeding power to this panel.	13. PDU pilot light remains off. TCU pilot light turns on with power restoration. Contactor C2 should close.
14. Press the main power ON pushbutton and PDU on pushbutton. Verify the TCU and PDU selector switches are all set to ON.	14. Two green pilot lights should be ON.
15. De-energize both normal PDU source power and essential source power to the panel and restore power to the panel.	15. Both green pilot lights must be ON. The PDU and TCU green pilot lights should turn OFF during the power outage. Upon restoration of power PDU pilot light and PDU contactor remains open. TCU pilot light turns on. Restoration of power must initiate "ON" operation of TCU pilot light and contactor C2 for the TCU. This demonstrates the DC supervisory circuit is operating properly and the TCU auto restart feature is operational.

3-TROUBLESHOOTING

Auto Restart function, PDU, and TCU contactors will not close unless the control circuit emergency off pushbuttons are wired as indicated on the wiring diagram.

Make sure the emergency off pushbuttons are wired through normally closed contacts.

Operation of any emergency off pushbutton should de-energize relay CR1, shutting the entire system down.

Check LED pilot light lamps for burnt out or broken in shipment.

Check to see that battery charger is firmly installed in its receptacle and 12VDC wired to the battery.

NOTES:

FOR WARRANTY PARTS OR TECHNICAL ASSISTANCE CONTACT:
GE SUPPLY – MILWAUKEE, WI. (414)-527-6600 CST

4-MAINTENANCE

4-1 General Maintenance

Note

The auto restart circuit requires the 7 Ah DC battery to be functional. Semi-annually verify that the 12V DC charging circuit is operational.

Battery and Charger Test

1. Unplug battery charger from receptacle.
2. Remove the (+) wire from the charger.
3. Plug in charger and measure DC voltage of charger.
   DC voltage must be between 12 and 13.65 volts. If less than 11 volts, replace charger.
4. With charging circuit de-energized, measure the DC battery voltage. If battery voltage is less than 11 volts replace battery. Whenever a battery is replaced the charger must also be replaced.

Normal operation of DC circuit is from DC charger with battery fully charged in float stage. If battery is suspect or questionable, replace immediately as this is an insignificant maintenance cost. The manufacturer of the battery is B & B Battery and the manufacturer for the charger is EDS, Inc. Contact GE Supply or BatteryStuff.com for battery replacement.

Battery# BP7-12
Charger# 11027

Specific battery maintenance and recharge/discharge information can be found in attached B & B documents and on the B & B web site (below).

Battery life is 5 years at which time it must be replaced. Initial date code on top of battery is read as (mm/dd/y/c). Where c = Q.C. inspector code.

B & B Battery can be located at: www.batterystuff.com

GE Supply
12221 W. Feerick St.
Milwaukee, WI 53222
Phone 414-527-6600
Fax 414-527-6652

GE Supply
National Service Center
9100 Purdue Road Suite 300
Indianapolis, IN 46268
Phone 1-800-243-7313

See illustration 4-1 and 4-2 for battery manufacturer's main data sheet.

Maintenance-Free Rechargeable Sealed Lead-Acid Battery

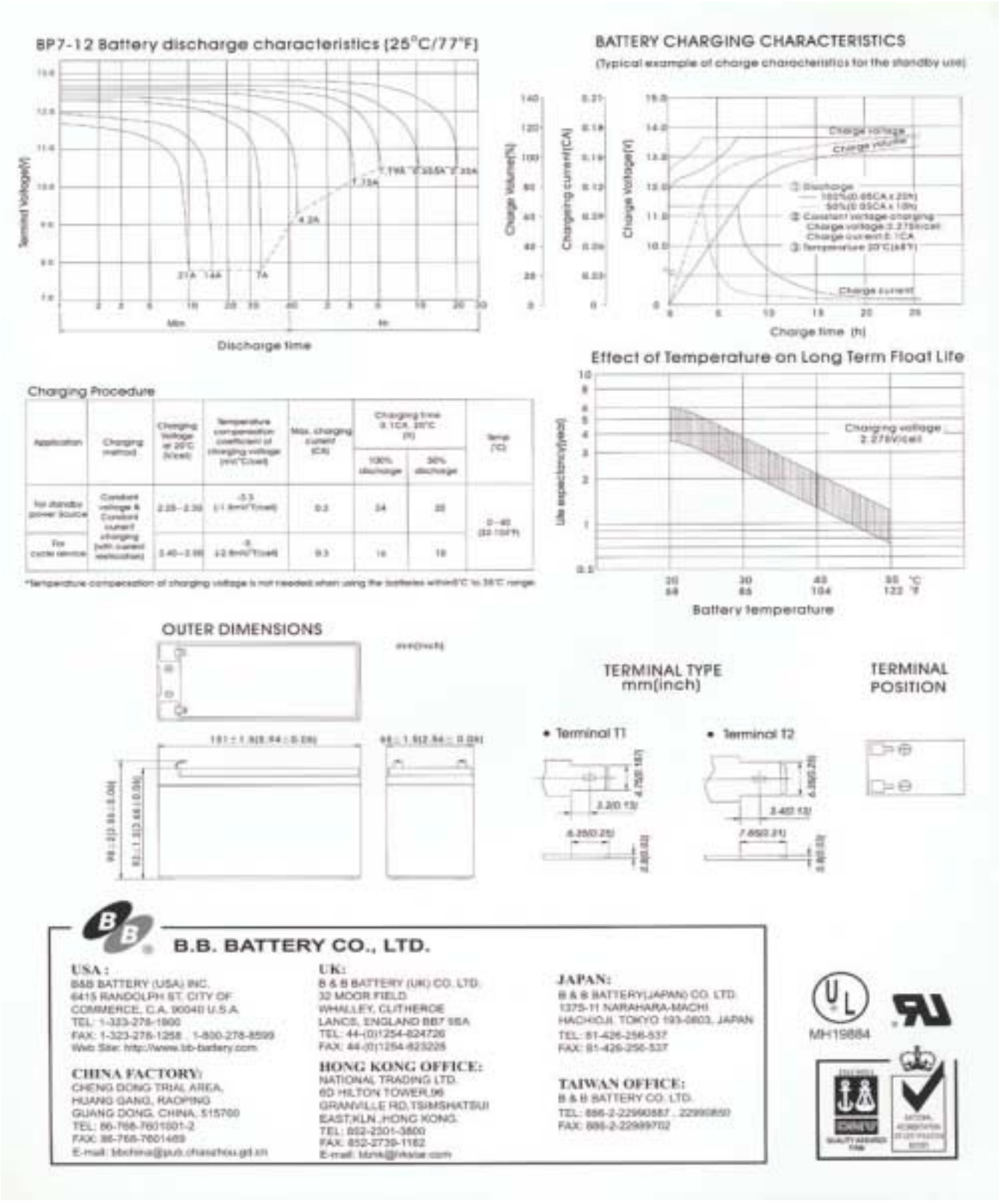
BP7-12

The battery is constructed by plates, separators, safety valves and container. Since the electrolyte is held by a glass-mat separator and plates, the battery can use in any direction and position without leakage.

PERFORMANCE SPECIFICATIONS

Nominal Voltage(V)	12 volts(6cells in series)
Nominal Capacity(AH)	
20 hour rate F.V.(1.75V/cell) (350mA to 10.50volts)	7.0A.H.
10 hour rate F.V.(1.75V/cell) (665mA to 10.50volts)	6.65A.H.
5 hour rate F.V.(1.75V/cell) (1190mA to 10.50volts)	5.95A.H.
1 hour rate F.V.(1.55V/cell) (4200mA to 9.30volts)	4.2A.H.
Approximate Weight	2600g.(5.73lbs.)
Terminal	
Standard	Type T2
Optional	Type T1
Internal Resistance (Fully Charged Battery)	<25mΩ
Maximum Discharge Current For 5 sec.(A)	105A
Maximum Charge Current(A)	2.1A
Ambient Temperature	
Charge	0°C(32°F)~40°C(10°4F)
Discharge	-20°C(-4°F)~50°C(12°2F)
Storage	-20°C(-4°F)~40°C(10°4F)
Vibration test:	
Frequency: 16.7HZ	
Amplitude: 4mm	
Vibrate the battery horizontally or vertically for 60 minutes.The battery have no abnormality.	
Case	ABS
Dimension(mm/inch)	
Length ±1.5mm	151/5.95
Width ±1.5mm	65/2.56
Container Height ±1.5mm	93/3.66
Total Height ±2mm	98/3.86
Application	UPS.Laboratory Equipment,Toy-Cars,Power Packs,Fishing Lights.

BATTERY MANUFACTURER DATA SHEET
ILLUSTRATION 4-1



BATTERY MANUFACTURER DATA SHEET
ILLUSTRATION 4-2

4-2 Battery Manufacturer's Application Notes

BB BP batteries are highly efficient maintenance free electrochemical systems designed to provide years of trouble free electrical energy. The performance and service life of these batteries can be maximized by observing the following guidelines:

1. Heat kills batteries. Avoid placing batteries in close proximity to heat sources of any kind. The longest service life will be attained where the battery temperature does not exceed 20°C. (also see notes 3 & 8 hereunder) . When calculating the correct float voltage setting, whether or not temperature compensation is required, full consideration must be given to the temperature of the battery and room ambient. For the purpose of the calculation, consider the temperature of a battery on float to be 1°C. above local ambient. Also, if the battery is used in an enclosure, the temperature gradient of the enclosure itself must be included in the calculation. i.e. The operating temperature of the battery is given by: -Room temperature + enclosure temperature +1°C.

2. Since a battery may generate ignitable gases, do not install close to any equipment that can produce electrical discharges in the form of sparks.

3. When the battery is operated in a confined space, adequate ventilation should be provided.

4. The battery case is manufactured from high impact ABS plastic resin. It should not be placed in an atmosphere of, or in contact with organic solvents or adhesive materials.

5. Correct terminals should be used on battery connecting wires. Soldering is not recommended but if unavoidable please refer to us for further guidance.

6. Avoid operating at temperatures outside the range -15 to +50°C. for float/standby applications and +5 to +35°C. for cyclic use.
7. When there is a possibility of the battery being subjected to heavy vibration or mechanical shock, it should be fastened securely and the use of shock absorbent material is advisable.

8. When connecting the batteries, free air space must be provided between each battery. The recommended minimum space between batteries is 0.02 inches (5mm) to 0.04 inches (10mm) . In all installations due consideration must be given to adequate ventilation for the purposes of cooling.

9. When the batteries are to be assembled in series to provide more than 100V, proper handling and safety procedures must be observed to prevent accidental electric shock. (See note #15 below) .

10. If 2 or more battery groups are to be used, connected in parallel, they must be connected to the load through lengths of wires, cables or busbars that have the same loop line resistance as each other. This makes sure that each parallel bank of batteries presents the same impedance to the load as any other of the parallel banks thereby ensuring correct equalization of the source to allow for maximum energy transfer to the load.
11. To obtain maximum life, the ripple current flowing in the battery, from any source, should not exceed 0.1C Amps R.M.S.

12. When cleaning the battery case, ALWAYS use a water soaked wet or dampened cloth but NEVER use oils, organic solvents such as petrol, paint thinners etc. DO NOT even use a cloth that is impregnated or has been in contact with any of these or similar substances.

13. Do not attempt to dismantle the battery. If accidental skin/eye contact is made with the electrolyte, wash or bathe the affected area/part straight away with liberal amounts of clean fresh water and seek IMMEDIATE medical attention.

14. DO NOT INCINERATE batteries as they are liable to rupture if placed into a fire. Batteries, that have reached the end of their service life, can be returned to us for safe disposal.

15. Touching electrically conductive parts might result in an electric shock. Be sure to wear rubber gloves before inspection or maintenance work.

16. The use of mixed batteries with different capacities, that may have been subjected to different uses, be of different ages and are of different manufacturers is liable to cause damage to the battery itself and/or the associated equipment. If this is unavoidable please consult us beforehand.

17. To obtain maximum life, batteries should never be stored in a discharged state.

18. In order to obtain maximum working life, when the batteries are used in an UPS system, the following is advised:-
    (a) Where the D.C. input exceeds 60 volts, each battery should be insulated from the battery stand by using suitable polypropylene or polyethylene material.
    (b) In high voltage systems the resistance between battery and stand should always be greater than 1 Megohm. An appropriate alarm circuit could be incorporated to monitor any current flow.

4-3 Battery Manufacturer's Material Safety Data Sheet

B & B Battery (U.S.A.), Inc.

6414 Randolph Street, City of Commerce, CA 90040 (323) 278-1900 Fax (323) 278-1268

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: Sealed Maintenance free Lead Acid Batteries
DATE: 7/1/00
ISSUED BY: ENGINEERING
TELEPHONE NO: (323) 278-1900

HAZARDOUS COMPONENTS

COMPONENTS	%WEIGHT	TLV	LD50 ORAL	LC50 INHALATION	LC50 CONTACT
Lead (Pb, PbO2, PbSo)	About 70%	N/A	(500) mg/Kg	N/A	N/A
Sulfuric Acid	About 20%	1 mg/m3	(2.140) mg/Kg	N/A	N/A
Fiberglass Separator	About 5%	N/A	N/A	N/A	N/A
Styron R 478 (Polystyrene)	About 5%	N/A	N/A	N/A	N/A

PHYSICAL DATA

COMPONENTS	DENSITY	MELTING POINT	SOLLUBILITY (H^2O)	ODOR	APPEARANCE
Lead	11.34	327.4°C (Boiling)	None	None	Silver-Gray Metal
Lead Sulfate	6.2	1070°C (Boiling)	40 mg/l (15°C)	None	White Powder
Lead Dioxide	9.4	290°C (Boiling)	None	None	Brown Powder
Sulfuric Acid	About 1.3	About 114°C (Boiling)	100%	Acidic	Clear Colorless Liquid
Fiberglass Sep.	N/A	N/A	SLIGHT	TOXIC	WHITE FIBROUS GLASS
478 Polyslyrene	N/A	N/A	NONE	NO ODOR	SOLID

FLAMMABILITY DATA

COMPONENTS	FLASHPOINT	EXPLOSIVE LIMITS	COMMENTS
Lead	None	None	
Sulfuric Acid	None	None	
Hydrogen		4% - 74.2%	Sealed batteries can emit hydrogen only if over charged (float voltage> 2.4 VPC)
Fiberglass Sep.	N/A	N/A	Toxic vapors may be released. In case of fire: wear self-contained breathing apparatus.
478 Polyslyrene	None	N/A	Temperatures over 300 °C (572°F) may release combustible gases. In case of fire: wear positive pressure self-contained breathing apparatus.

FIRST AID

SULFURIC ACID PRECAUTIONS

SKIN CONTACT: Flush with water, see physician if contact area is large or if blisters form.
EYE CONTACT: Call physician immediately and flush with water until physician arrives.
Ingestion: Call physician. If patient is conscious, flush mouth with water, have the patient drink milk or sodium bicarbonate solution.

DO NOT GIVE ANYTHING TO AN UNCONSCIOUS PERSON.

B & B MATERIAL SAFTEY DATA SHEET FOR BP7-12 BATTERY
ILLUSTRATION 4-3

REACTIVITY DATA

COMPONENT	Sulfuric Acid
STABILITY	Stable at all temperatures
POLYMERIZATION	Will not polymarize
INCOMPATIBILITY	Reactive metals, strong bases, most organic compounds
DECOMPOSITION PRODUCTS	Sulfuric dioxide, trioxide, hydrogen sulfide, hydrogen
CONDITIONS TO AVOID	Prohibit smoking, sparks, etc. from battery charging area. Avoid mixing acid with other chemicals.

SPILL OR LEAK PROCEDURES

STEPS TO TAKE IN CASE OF LEAKS OR SPILLS

If sulfuric acid is spilled from a battery, neutralize the acid with sodium bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime).
Flush the area with water discard to the sewage systems. Do not allow unneutralized acid into the sewage system.
WASTE DISPOSAL METHOD:
Neutralized acid may be flushed down the sewer. Spent batteries must be treated as hazardous waste and disposed of according to local state, and federal regulations. A copy of this material safety data must be supplied to any scrap dealer or secondary smelter with battery.

PROTECTION

EXPOSURE	PROTECTION	COMMENTS
SKIN	Rubber gloves, Apron	Protective equipment must be worn if battery is cracked or otherwise damaged.
RESPIRATORY	Respirator (for lead)	A respirator should be worn during reclaim operations if the TLV exceeded.
EYES	Safety goggles, Face Shield	

ELECTRICAL SAFETY

Due to the battery's low internal resistance and high power density. High levels of short circuit can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only.
Follow all installation instruction and diagrams when installing or maintaining battery systems.

HEALTH HAZARD DATA

LEAD: The toxic effects of lead are accumulative and slow to appear. It affects the kidneys, reproductive, and central nervous system.
The symptoms of lead overexposure are anemia, vomiting, headache, stomach pain (lead colic), dizziness, loss of appetite, and muscle and joint pain. Exposure to lead from a battery most often occurs during lead reclaim operations through the breathing or ingestion of lead dusts and fumes.
THIS DATA MUST BE PASSED TO ANY SCRAP OR SMELTER WHEN A BATTERY IS RESOLD.

SULFURIC ACID: Sulfuric acid is a strong corrosive. Contact with acid can cause severe burns on the skin and in the eyes. Ingestion of sulfuric acid will cause GI tract burns. Acid can be release if the battery case is damaged or if the vents are tampered with.

FIBERGLASS SEPARATOR: Fibrous glass is an irritant of the upper respiratory tract, skin and eyes. For exposure up to 10F/CC use MSA Comfoll with type H filter. Above 10F/CC up to 50F/CC use Ultra-Twin with type H filter.
This product is not considered carcinogenie by NTP or OSHA.

B & B MATERIAL SAFETY DATA SHEET FOR BP7-12 BATTERY
ILLUSTRATION 4-4

4-4 BATTERY FEATURES

The following is a list of features of the B & B batteries.

SEALED CONSTRUCTION

BB unique construction and sealing technique ensures that no electrolyte leakage should occur from the terminals or case of any BP battery. This feature provides for safe and efficient operation of BP batteries in any orientation. BB BP batteries are classified as “Non-Spillable” and meet all requirements of the International Air Transport Association. (I.A.T.A. Dangerous Goods Regulations).

ELECTROLYTE SUSPENSION SYSTEM

All BB BP batteries utilize an electrolyte suspension system consisting of a glass fiber separator material. This suspension system helps to achieve maximum service life, by fully retaining the electrolyte and preventing its escape from the separator material. No silica gels or other contaminants are used.

GAS GENERATION

BP batteries incorporate a unique BB design that effectively recombines over 99% of the gas generated during normal usage.

MAINTENANCE FREE OPERATION

During the life of BP batteries, there is no need to check their specific gravity or add water etc. In fact, there are no provisions for such maintenance functions to be carried out.

OPERATION IN ANY ORIENTATION

The combination of sealed construction and BB’s electrolyte suspension system permits operation of BP batteries in any orientation without loss of capacity, electrolyte, or service life.

LOW PRESSURE VENTING SYSTEM

BB BO batteries are equipped with a safe, low pressure venting system, which is designed to release excess gas and reseal automatically in the event of the internal gas pressure rising to an unacceptable level. This low pressure venting system, coupled with the significantly high recombination efficiency, make BB BP batteries one of the safest valve regulated lead acid batteries available.

HEAVY DUTY GRIDS

The heavy duty lead calcium alloy grids in BP batteries provide an extra margin of performance and service life in both float and cyclic applications, even in conditions of deep discharge.

CYCLIC SERVICE LIFE

Depending upon the average depth of discharge, over 1,000 discharge/recharge cycles can be expected from BP batteries.

FLOAT SERVICE LIFE

The expected service life of BP batteries used in standby applications is typically 5 years; however, experience has shown that their service life often exceeds 6 years, if the BP batteries are operated strictly within specification.

4-5 General Battery and Charger Specifications

Refer to Tables 4-1 and 4-2 for manufacturer's general specifications for the B & B BP7-12 battery and the EDS 11027 charger.

TABLE 4-1
GENERAL BATTERY SPECIFICATIONS

B&B Model #	Nominal Voltage (V)	Nominal Capacity 20 hr rate (mA)	Discharge Current 20 hr rate (mA)	Dimensions								Approx. Weight		Standard Terminal Type
				Length		Width		Height		H.O.T.				
				in.	mm.	in.	mm.	in.	mm.	in.	mm.	lbs.	kg.	
BP7-12	12	7.0	350	5.95	151	2.56	65	3.7	94	3.86	98	5.7	2.6	T2

GENERAL CHARGER SPECIFICATIONS

TABLE 4-2

EDS Model#	Nom. Voltage (V)	Voltage Range (V)	Nominal Current (A)	Type of Charger
11027	12	13.6- 14.70	0.70	Dual Voltage Auto

Charger Dimensions							
Length		Width		Height		Approx. Weight	
Inches	mm	inches	mm	inches	mm	lbs	kg
3.4	86.4	2.8	71.1	2.3	58.42	1.3	0.59

5 PARTS LIST

5-1 Renewable Parts

See Table 5-1 for renewable parts for the Ovation main disconnect panel.

Table 5-1
LIST FOR RENEWABLE PARTS

Part	Volts	Amps	Manufacturer Part Number	
			Buss	Gould-Shawmut
Fuse F1	380,480	1.25	SNQ-R-1-1/4	ATQR1-1/4
Fuse F2	120	3	FNQ-R-3	ATQR3
Fuse F3	200	20	FNQ-R-20	ATQR20
Fuse F4	480	8	FRS-R-8	TRS8R
	400	10	FRS-R-10	TRS10R
Fuse F5	12VDC	1	LP-CC-1	ATDR1
Fuse F6	480, 400	0.12	SNQ-R-1/8	ATQR1/8
Fuse F7	480,400	40	LPJ40SP	AJT40
Red PB Operator*			CR104PBG00R1	
Contact Block*			CR104PXC01F	
Name Plate*			CR104PXN2RP009 “Emergency Off”	
SS Wall Plate*			CR2940BD201D	
Selector Switch			P9SSMD0V	
Pilot Lamp (Green)			080BA9S6LV	
Battery	12 DC	-	BP7-12	
Battery Charger	12 DC	0.80	11027	
* = Component parts of additional remote emergency OFF pushbutton				

All of the above parts are in stock at GE Supply Milwaukee (414)-527-6600.

5-2 Replacement Parts

See Table 5-2 for replacement parts for the Openspeed System main disconnect panel.

Table 5-2
LIST FOR REPLACEMENT PARTS

Part	Manufacturer Part Number		
Power Distribution Block	4000N51P062		
Neutral Block	4000N51P059		
CB1	SEHA36AT0060		
40 AMP Plug	SRPE60A40		
CB2	SEHA36AT0030		
15 AMP Plug	SRPE30A15		
CB3	V07220		
F1 and F6 Fuse Blocks	3007N36P002		
F2 and F3 Fuse Blocks	3007N36P001		
F5 Fuse Block	3007N38P001		
F4 Fuse Block	3007N39P009		
F4 Dead Front Cover	3007N39P010		
F7 Fuse Block	3007N39P006		
F7 Dead Front Cover	3007N39P007		
C1	CL10A311MJS		
C2	CL04A310MJ		
CPT1	9T58E0506		
3KVA Transformer	5000N53P001		
CR1	4001N42P001		
CR2	RL4RA022TU		
T1	RL4RA040TJ	BTLF30C	
Charger-Recepticle, Box, and Cover	3009N13P003	3009N14P001	3009N14P004
Main Power and PDU Power “ON” PB’s	P9SPNVG		
PDU “ON-OFF” Selector Switches	P9SSMD0V		
PDU Light Operators and Power Supply MOD’s	P9SLVD	P9PTNVJLV	

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	Mar 9, 2001	Lou Hernandez	Final Release